



MEMORANDUM

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DEC 12 1996

To: All Regional Managers

From: The Honourable David Zirnelt
Minister of Forests

Re: Interior Appraisal Manual

I hereby approve Amendment No. 1 to the *Interior Appraisal Manual*. This amendment will come into force on January 1, 1997. The amendment clarifies sections of the *Interior Appraisal Manual* and changes others to reflect changes in policy.

The following sections are amended:

Section	Nature of Amendments
4.3	Clarifies wording so that development costs may only be allocated to
4.3.1	the first tributary cutting authority.
4.3.1.4	Clarifies, the definition of "Existing Roads and Structures".
4.3.2.2 (2)	Changes the definition of winter roads to snow roads to match
4.3.2.3	requirements of the <i>Forest Practices Code of British Columbia Act</i> .
4.3.2.2 (6)	Adds the definition for Fort Nelson/Peace under "Regions".
4.5.4 (2)	Removes the cost estimates for Babine Lake (South), Babine Lake (North), and Ootsa Lake (Tahtsu Road). Replaces Babine Lake (South) cost estimate.
Table 6-1	Changes the miscellaneous stumpage rates, forest district specific rates for seismic lines, gas or oil well sites and right-of-way to well sites by including pipelines with a qualifier.

David Zirnelt
Minister of Forests

Attachment: (1)

All Regional Managers
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cc: Bill Howard
Director
Revenue Branch

All Subscribers, *Interior Appraisal Manual*



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MANUAL TITLE

Interior Appraisal Manual

REVISION No.

1

ISSUE DATE

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MANUAL CO-ORDINATOR

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AUTHORIZATION (Name, Title)

W. Howard
Director, Revenue Branch

Please make the following changes to your copy of the above Ministry manual. Please insert the following specified pages and **file this notice** immediately after the Amendments Tab.

ACTION (Remove/Insert)	(VOL.) CHAPTER-SECTION-SUBJECT	PAGE(S)	COMMENTS
	TABLE OF CONTENTS		
REMOVE	Table of Contents	i - ii	
INSERT	Table of Contents	i - ii	
REMOVE	Chapter 4	5 - 14	
INSERT	Chapter 4	5 - 14	
REMOVE	Chapter 4	17 - 20	
INSERT	Chapter 4	17 - 20	
REMOVE	Chapter 4	29 - 30	
INSERT	Chapter 4	29 - 30	
REMOVE	Chapter 4	39 - 42	
INSERT	Chapter 4	39 - 42	
REMOVE	Chapter 6	11 - 12	
INSERT	Chapter 6	11 - 12	
REMOVE	Index	I-1 to I-4	
INSERT	Index	I-1 to I-4	
INSERT	Minister's Letter and Manual Transmittal		After Amendments Tab

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4.3 Development

Development costs are estimated for the following development works; subgrade construction, placement of additional stabilizing material, and construction and installation of drainage and other pertinent structures.

The costs for development works may only be allocated to the first tributary cutting authority, subject to Section 4.3.1, (5.). A cutting authority is considered to be tributary:

1. If timber from the cutting authority being appraised can be transported over the development works in question, or
2. If the development works occur on a Main Service Road. A Main Service Road is defined as a main access road to the operation, necessary to maintain and supply the day-to-day harvesting activities of the cutting authority being appraised. To qualify, bulk fuels, supplies, equipment and the harvesting crew should be transported on this road on a daily basis.

Two methods of estimating development costs are used in the appraisal system:

1. Tabular cost estimates are made for construction of roads and drainage structures using the applicable formulas in Section 4.3.2 of this manual. Tabular estimates must be used for an appraisal when physical dimensions and conditions fall within the tabular limitations.
2. Detailed engineering cost estimates are made when the physical dimensions and conditions of a road section or a drainage structure exceed the tabular limitations of the manual. A detailed engineering estimate is made according to Section 4.3.3. Projects eligible for this costing method are listed in Section 4.3.3.

Total estimated costs are divided by the applicable net cruise volumes and summed to determine the unit cost estimate (\$/m³) for development. Where utilization of deciduous volume is mandatory, the deciduous volume must be included in the applicable net cruise volume.

Where applicable, these cruised volumes and development cost estimates must be segregated on the basis of legal boundaries.

Throughout this section the term "roads" is meant to include roads, drainage and other pertinent structures.

4.3.1 Development Cost Allocation

Where proration is required for Section 4.3.1:

$$\text{Crown share} = \text{Total Estimated Cost (\$)} * \frac{\text{Appraised Timber Volume}}{\text{Total Timber Volume}}$$

Where:

Crown share (\$)	=	dollar amount to be allocated to stumpage-bearing timber in the cutting authority being appraised.
Total Estimated Cost (\$)	=	dollar amount of the total development cost estimate.
Appraised Timber Volume (m ³)	=	volume of appraised timber tributary to the project and under the control of the licensee or a company legally associated with the licensee, including volume in all areas contributing to the allowable annual cut determination.
Total Timber Volume (m ³)	=	total volume tributary to the project and under the control of the licensee or a company associated with the licensee.

In all cases, volumes are estimated from the latest approved operational or inventory cruise data and maps of the area within the drainage to the height of land.

The Crown share is included in the appraisal of the first tributary cutting authority, subject to Section 4.3.1, (5.).

Development cost estimates are allocated according to the outline below (See also *Appendix III*).

The estimated development costs are allocated as follows:

1. Appraised timber areas on Crown lands.
 - a. For development providing access to appraised timber only, total estimated costs are included in the appraisal,
 - b. For development providing access to non-appraised timber only, total estimated costs are not included in the appraisal, and
 - c. For development in appraised timber areas providing access to both appraised and non-appraised timber all estimated costs are prorated between appraised and non-appraised timber. The appraised timber portion is then included in the appraisal.

2. For full appraisals on Timber Licence (TL) cutting authorities.
 - a. New development will be allocated as in Section 4.3.1, (1.),
 - b. unamortized development on the TL that is required for access to the cutting authority will be included in the appraisal of that cutting authority. Unamortized development is defined as:
 - i. the development started after January 1, 1988,
 - ii. development cost estimates that were not included in any prior appraisal calculation for Crown timber (or were considered as zero), and
 - iii. having had no non-appraised timber transported over the development (excluding Right of Way timber).

Costs for this type of existing development are exempt from Section 4.3.1, (4.).

Cost estimates for these existing roads will be derived from the nearest appraised cutting authority by:

- i. establishing the average road cost per kilometre from that appraisal estimate, excluding bridges and pertinent structures, and
- ii. multiplying the average \$/km by the kilometres of tributary road in the TL cutting authority.

Cost estimates for bridges or pertinent structures will be derived from the tables in Section 4.3.2.4 or from the detailed engineering estimates as defined in Section 4.3.3. At reappraisal, these initial cost estimates for existing development will be trended as provided for in Section 4.12, but will not otherwise be revisited.

3. Private Land.

When a new or reconstructed road or structure on private land is required for Crown timber extraction, the estimated cost of the road or structure will be included in the appraisal of the next tributary cutting authority according to the procedures of Section 4.3.1 and the following guidelines:

- a. For development providing access to appraised timber only, the total estimated costs are included in the appraisal,
- b. For development providing access to non-appraised timber only, estimate costs are not included in any appraisal,

- c. For development on private land providing access to both non-appraised and appraised timber total estimated costs are prorated between non-appraised and appraised timber (Section 4.3.1). The Crown allocation is included in the appraisal.

4. Existing Roads and Structures

The following are defined as 'existing roads' for the cutting authority being appraised and are not eligible for inclusion in development cost estimates.

- 1. Costs of constructed roads that have previously been included in appraisals of Crown timber, or;
- 2. roads previously constructed to develop non-appraised timber, or;
- 3. roads previously constructed all or in part for purposes unrelated to logging the cutting authority area being appraised, or;
- 4. all roads, drainage and other pertinent structures constructed, repaired or reconstructed on private land before August 1, 1996.

If the 'existing road' requires reconstruction or replacement subsequent to August 1, 1996, the cost estimate is made as described in Section 4.3.3. If the 'existing road' is on private land, road and land use charges may be recognised as described in Section 4.7.

A road on private land that has previously been included in an appraisal because it was 'required for only short term timber extraction' (as per previous policy) shall continue to be included upon reappraisal.

5. Extended Road Amortization

Where the new development cost estimates exceeds \$4.00/m³, a written agreement may be made at the time of the initial appraisal which apportions the main access road cost estimate to two or more tributary cutting authorities. The main access road ends at the far boundary of the first cutting authority.

The agreement is subject to the following conditions:

- a. Only the main access roads serving the tributary cutting authorities (as defined in Section 4.3) may be considered. The roads must be on Crown land,
- b. Each cutting authority must be in the licensee's approved forest development plan,
- c. The agreement must be signed by the licensee and the licensor,
- d. The amount apportioned will be a fixed lump sum, which will be trended as provided for in Section 4.12 but will not otherwise be revisited,

- e. The term of the agreement must not exceed the terms of the cutting authorities, and
- f. The agreement will only be valid under Comparative Value Timber Pricing (CVP) and confers no obligation on the Crown to compensate licensees for any unamortized costs.

6. Reconstruction and Replacement

Reconstruction and Replacement are defined as:

- replacement or structural repair of a major drainage structure (e.g., replacing stringers, cross ties, or cribbing), or
- major resurfacing, which means resurfacing sections of more than 0.3 km in length that were initially surfaced, but have deteriorated due to long term wear and tear, or
- major reconstruction, which means restoring at least 0.1 km of road (per occurrence) that requires complete rebuilding of the subgrade.

The costs approved under this section must not qualify under routine maintenance as described in Section 4.6.

Reconstruction and replacement cost estimates are determined as detailed engineering cost estimates (Section 4.3.3) and must be approved in advance by the district manager. The cost estimates may be applied to remaining tributary timber (i.e., applicable volume). Cost estimates for reconstruction are not to exceed the tabular costs for new construction under similar conditions.

Where bridge materials are re-used, the cost estimate will include dismantling, transportation and installation at the new site, but will exclude initial materials purchased and initial delivery costs.

Costs may not be recognized if the licensee has been negligent or has not followed approved plans or standards as defined under the Forest Practices code and regulations.

7. Access Management

Access management is defined as the temporary removal of a major drainage structure or construction of a barrier, including a gate, excavation, or placement of boulders with the purpose of temporarily eliminating all vehicle access.

An access management cost estimate will be determined by a detailed engineered estimate.

The access management required in the cutting authority must be based on a formal Access Management Plan or forest development plan.

Costs may be determined for more than one removal/replacement of the structure/barrier if the cutting authority term warrants it.

Costs approved under this section must not qualify under routine maintenance as described in Section 4.6.

4.3.2 Tabular Cost Estimates

These roads are generally a single lane width with turnouts. These roads may or may not be stabilized (ballasted or surfaced) with additional materials.

4.3.2.1 Subgrade Construction

The subgrade construction cost estimate includes clearing and grubbing, stripping, stump removal, ditch construction, turnout construction, material costs and installation of culverts with diameters up to 950 mm or the equivalent cross-section area or single log abutment culverts up to 3.4 m span. Right-of-way felling and logging is excluded.

4.3.2.2 Subgrade Construction Variables

For appraisal purposes the following subgrade construction variables are recognized:

1. Section length: (L)

Road sections are recorded in multiples of 0.1 km. Each section should be representative of a single moisture class. Each section should be 1 km or longer, although some individual section lengths less than 1 km but greater than 0.1 km are acceptable for extreme variations of slope or percent rock. The section length includes that portion traversing through landings. For ground skidding short roads (up to 100 m long) that access single landings are included in the Tree-to-Truck cost estimates (Section 4.4) and are not eligible for development cost estimates.

2. Road Type:

- Operational Roads: (OP) - are generally built under the authority of a Road Permit but portions may be constructed under the authority of a Cutting Permit. They do not include any roads built on a Forest Service right-of-way (i.e., addendum roads). An operational road exists within a cut block when the road accesses timber beyond the cutblock, or is intended to access timber beyond the block as shown on a development plan.
- Block Roads: (BLOCK) - are generally built under the authority of a cutting permit and include roads which are located completely within the cutblock.
- Snow Roads: (WINTER) - snow roads are a form of overland construction that uses clean snow and ice as fill. Suitability of materials is not an issue as all are frozen. Stripping is limited to large stumps that cannot be easily covered with snow or ice. Cuts into mineral or organic soil must not exceed 0.3 m in depth for sustained distances or 0.5 m in depth for distances up to 5 m. Fort Nelson roads are estimated separately. This road type includes operational and block road categories. Stabilizing costs are not applicable.
- Fort Nelson Roads: - (FN) - applies to all roads constructed in the Fort Nelson Forest District. Stabilizing costs are not applicable to Forest Nelson Roads.

3. Uphill Side Slope: (SLOPE %)

Uphill side slope percent represents all slopes in the section and may show a range of variation (± 15 percent about the average) within any section length. To derive a meaningful average for uphill side slope percent, several representative cross-section measurements are taken along the section length and the sum of one-half of the distance on each side of the measurement is applied as a weight against the measurement at that cross-section. The uphill side slope percent is measured at right angles to the road centreline and is recorded to the nearest integer. Where the road is located on a bench, the uphill side slope of the bench is used.

4. Percent Rock: (ROCK %)

Rock includes bed rock and large boulders, and may be rippable or may require drilling and blasting. The Rock percent rock is determined as follows:

$$\text{ROCK \%} = \frac{h^2}{H^2} * 100$$

Where:

h = the vertical cut height of all rock measured from the bottom of the ditch

H = the total vertical cut height of all materials above the bottom of the ditch

To determine the percent rock for roads not yet constructed, constructed roads on similar land/rock forms are used as a guide.

5. Soil Moisture (WET):

In the equation, wet is restricted to soil moisture regimes 'sub-hygic, hygric, sub-hydric or hydric', and to CWH, MH, ICH, SBS, and ESSF Biogeoclimatic Zones. For the purpose of appraisals any other biogeoclimatic zones and any other soil moisture regimes do not have 'WET roads'.

6. Region:

Cariboo Forest Region (CA)

Kamloops Forest Region (KA)

Nelson Forest Region (NE)

Prince George Forest Region (PG) (excluding Fort Nelson, Fort St. John, and Dawson Creek Forest Districts)

Prince Rupert Forest Region (PR) (excluding North Coast Forest District)

Peace (PE) (includes Fort St. John, and Dawson Creek Forest Districts)

Fort Nelson/Peace (FNP) (includes Fort Nelson, Fort St. John and Dawson Creek Forest Districts).

4.3.2.3 Subgrade Cost Estimate

For each operational and block road the subgrade cost estimate is determined from the formula:

$$\$/\text{km} = \text{CONSTANT} + (223 * \text{ROCK}\%) + (a * \text{SLOPE}\%) + (b * \text{WET}) + (-2062 * \text{CA}) + (3112 * \text{NE}) + (-1405 * \text{PR}) + (c * \text{OP})$$

Where:

CA = 1 if Cariboo Forest Region, otherwise CA = 0.

NE = 1 if Nelson Forest Region, otherwise NE = 0.

PR = 1 if Prince Rupert Forest Region, otherwise PR = 0.

	Biogeoclimatic Zone							
	CWH	MH	ICH	IDF	SBPS	SBS	ESSF	Other
CONSTANT	19663	19663	8233	4297	4297	7416	8289	4297
a	556	556	290	290	290	70	198	290
b	2863	2863	2863	0	0	2863	2863	0

	Region					
	CA	PE	KA	NE	PG	PR
c	5284	17056	0	0	6607	8103

Where:

OP = 1 if an Operational Road, otherwise = 0

WET = 1 if Soil Moisture regime 'sub-hygic, hygric, sub-hydric or hydric' and in CWH, MH, ICH, SBS or ESSF biogeoclimatic zones; otherwise WET = 0.

For the above equations, the following limits apply:

- if SLOPE% exceeds 50%, 50% is used in the equation, and
- if ROCK% exceeds 50%, 50% is used in the equation.

Also see Detailed Engineered Costs Section 4.3.3, (3.).

Snow roads

The subgrade cost estimate is determined from the following table for Snow Roads.

Side Slope %	All Snow Roads (\$/km)
0-5	3800
6-10	4600
11-15	5200

Slopes over 15 percent are considered block roads (see Section 4.3.2.2, (2)).

Fort Nelson District Roads

The total cost estimate for Fort Nelson Forest District roads is 8,100 \$/km.

No cost estimate for additional stabilizing material is allowed either in the Fort Nelson Forest District or for Snow Roads.

4.3.2.4 Drainage Structures

An appraisal may include a cost estimate for large drainage structures only where their requirement is substantiated by field data. Such structures shall be placed so as to maintain the natural drainage pattern of the area crossed by the proposed road. All pipe culverts under 950 mm in diameter and all single log abutment culverts under 3.5 m span length are included in the subgrade cost estimates (see Section 4.3.2.1).

1. Culverts

The cost estimates for the supply and installation of culverts from 0.95 m to 1.8 m in diameter are determined from the following table. Detailed engineering cost estimates are required for metal culverts larger than 1.8 m in diameter, or outside this table, no interpolation of values is permitted.

4.3.2.5 Additional Stabilizing Material

Road stabilization is the placement of gravel or broken rock on the road subgrade to provide stable support and a running surface for logging equipment using the road. Where stabilizing material developed during the subgrade or ditch construction is insufficient, a cost estimate for additional stabilizing material to be trucked in from selected borrow pits may be included in the appraisal.

Unit Cost Estimate

The unit cost estimate (\$/km) for the additional stabilizing material includes:

- borrow pit preparation,
- rock drilling, explosives, loading of explosives and blasting,
- loosening and/or pushing materials in borrow pits when required (e.g., compacted or cemented gravel, oversize material, etc.),
- loading gravel trucks,
- truck hauling, and
- spreading and compacting the material.

The cost estimates assume borrow pits are located adjacent to the road side and are not part of the subgrade excavation. If a new road needs to be constructed to access the borrow pit, then an access road cost estimate is required in addition to the in-place unit cost estimates.

For each road, the additional stabilizing material cost estimate is determined from the formula as follows:

$$\$/\text{km} = \text{CONSTANT} + (73 * \text{SLOPE}\%) + (a * \text{OP}) + (3448 * \text{QROCK}) + (-2056 * \text{NE}) + (2696 * \text{PR})$$

Where:

	Biogeoclimatic Zone			
	CWH	MH	SBS	Other
CONSTANT	16457	16457	5311	8005

	Region					
	CA	PE	KA	NE	PG	PR
a	0	0	2638	0	3795	3680

For the above equations:

- QROCK = 1 if road is stabilized with quarried rock that requires drilling and blasting. Otherwise QROCK = 0.
- OP = 1 if an Operational Road. Otherwise OP = 0.
- NE = 1 if Nelson Forest Region. Otherwise NE = 0.
- PR = 1 if Prince Rupert Forest Region. Otherwise PR = 0.

For the above equations the following limit applies:

If SLOPE % exceeds 50 percent, 50 percent is used in the calculation.

Also see Detailed Engineered Costs Section 4.3.3, (3.).

No cost estimate for additional stabilizing material is allowed either in the Fort Nelson Forest District, or for any Snow Roads.

4.3.2.6 Cattle Guards, Remedial Fences and Pipeline Crossings

Where the cutting authority specifies the installation of cattle guards, wing fences or remedial fences, the installed cost using new or recycled material is estimated as follows:

- | | |
|--------------------|--|
| 1. Cattle Guards | \$3,100 each |
| 2. Wing Fences | \$ 465 per 100 m |
| 3. Remedial Fences | \$ 465 per 100 m - as defined in <i>Appendix IV-Glossary</i> |

All costs include materials, transportation and installation.

When a pipeline crossing is necessary a cost estimate is made by using the detailed engineering cost method as described in Section 4.3.3.

4.3.2.7 Snow Road Reconstruction

Snow road reconstruction is defined as the reconstruction of previously used snow roads and seismic lines; as defined under Snow Roads, Section 4.3.2.2. These costs are included in the road maintenance cost estimate, Section 4.6.

4.3.3 Detailed Engineering Cost Estimates

Where the tabular cost estimating procedures of this manual cannot be used due to their physical limitations, the cost of a project shall be estimated by preparing a detailed engineering cost estimate.

Where specific development projects involve detailed engineering cost estimates, based on approved road layout and design plans, the District Manager shall be advised of project details no later than 60 days before the start of work on the project, or according to the lead time requirements outlined in Section 2.2.

For appraisal purposes, the estimated development project costs are made on the basis of the site-specific data and the equipment and labour rates specified in Appendix 1. Due consideration is given to arm's length competitive bids for any specific project. The appraisal estimate is not constrained in any way by a licensee's actual costs. The following specific situations, are considered for detailed engineering cost estimates:

Where actual or estimated costs are for the time of appraisal, these costs must be back-trended to July 1, 1994 to match the cost base of this manual.

1. New construction and upgrading of Forest Service roads that meet the criteria and conditions provided in the Main Access Roads policy.
2. Road construction on uphill side slopes greater than 50 percent, or when rock percent exceeds 50 percent, or terrain class 4 and 5.
3. Road construction on uphill terrain with two or more gullies over 10 m deep at centreline in a 0.3 km section.
4. End haul construction (of roads and landings) requiring removal of excavated material to a spoil area, or roadfill located more than 300 m away.
5. Overland construction to provide a roadbed by trucking in material for extensive filling.

6. Non-log bridges, log bridges with greater than 5.4 m average crib height, and/or greater than 15.4 m span length, or ice bridges including ice bridge reconstruction for additional logging seasons following the procedures outlined in Section 4.3.2.7. Crib back-fills and all site preparation and protection features such as rip rap are to be included, as well as material and equipment supply and delivery
7. Structural maintenance of bridges.
8. Reconstruction of roads and pertinent structures. Cost estimates for reconstruction are not to exceed the tabular cost for new construction under similar conditions.
9. Upgrade of roads and pertinent structures. Road upgrade resulting in a change in the standard of the road and structure where the licensee is not obligated to carry out road maintenance.
10. Replacement of road running surfaces with uninterrupted lengths over 0.3 km and loose depth of stabilizing material over 5 cm.
11. Metal culverts greater than 1.8 m in diameter when specified in the cutting authority.
12. Placement of additional stabilizing material where geo-tech fabric, corduroy, crushed and/or screened rock/gravel are used.
13. Retaining walls, railway crossings and other special structures.
14. Access management (as defined in Section 4.3.1, (7.)).
15. Deactivation of roads

For the purpose of this manual, deactivation includes the following activities:

- bridge removal,
- major culvert (i.e., over 950 mm) removal,
- pull back unstable sidecast or road fills,
- cut/fill slope stabilization,
- recontouring, and
- deep fill removal.

16. Pipeline crossings.

When the volume per tree is less than 0.20 m³, a cost additive will apply to the Ground Skidding Tree-to-Truck cost estimates in all Forest Regions. The cost additive is determined as follows:

$$$/m = 2.61 - 13.063 * VOLTREE$$

The tree-to-truck cost estimate is determined from the formula as follows:

$$$/m^3 = \text{CONSTANT} + 3.34 * \text{SS\%/100} + 4.24 * \text{SLOPE\%/100} - 5.41 * \text{VOLHA/1000} + 0.70 * \text{VOLHA/VOLTREE/1000} + 0.43 * \text{GVOL} + 3.61 * \text{BD\%/100} + 2.85 * \text{DPCUT2} - 2.76 * \text{PCUT2/100} + 0.67 * \text{SUPP2/100} + 1.26 * \text{SUPP3/100}$$

Where CONSTANT =

Region/District	Biogeoclimatic Zone				
	CWH/MH	BWBS	SBPS	SBS	All Other
Nelson	0	15.91	0	0	17.18
All Other	17.10	14.83	14.64	14.66	16.10

For the above equation the following definitions apply:

- if DS is less than or equal to 50 km, then SUPP2 = 0,
- if DS is greater than 50 km and less than or equal to 150 km, then SUPP2 = DS-50,
- if DS is greater than 150 km, then SUPP2 = 100,
- if DS is less than or equal to 150 km, then SUPP3 = 0,
- if DS is greater than 150 km, then SUPP3 = DS -150,
- if BD % is less than or equal to 15, then BD % = 0,
- GVOL = gross volume per tree (m³) computed as VOLTREE / (1-DEFECT % / 100),
- DPCUT2 = 1 if partial cut percent is greater than 0 and less than 100 otherwise DPCUT2=0,
- PCUT2 = percent volume removed in a partial cut (EXCEPT: if partial cut %>=90% and <100%, PCUT2=90; if partial cut%=100%, PCUT2=0).

4. Overhead Cable Logging

Overhead cable logging cost estimates will be recognized when required in the cutting authority document. The method includes both stationary (spar) and mobile (grapple) yarders, but variations in machine size, spar/boom height, winch line capacity and yarding technique are not recognized.

Variations recognized within the method are:

a. Clear Cut

Clear Cut is defined as removal of 100 percent of the net cruise volume

b. Partial Cut

Partial cut is defined as the removal of less than 100 percent of the total net cruise volume.

When the volume per tree is less than 0.20 m³, a cost additive will apply to the Overhead Cable Logging Tree-to-Truck cost estimates in all forest regions. The cost additive is determined as follows:

$$$/m^3 = 2.61 - 13.063 * VOLTREE$$

The tree-to-truck cost estimate is determined from the formula as follows:

$$$/m^3 = \text{CONSTANT} + 4.58 * \text{SLOPE\%/100} - 2.01 * \text{VOLHA/VOLTREE/1000} \\ - 2.12 * \text{GVOL} + 0.20 * \text{GVOLSQR} + 2.08 * \text{BD\%/100} + 2.28 * \\ \text{CDPCUT} + 0.70 * \text{SUPP2/100}$$

Where:

CONSTANT =

Region/District	Biogeoclimatic Zone	
	SBS	All Other
Fort Nelson/Peace (FNP)	29.33	32.68
Kamloops	24.32	27.67
All Others	25.69	29.04

4.5.4 Special Transportation Systems

A special transportation system is recognized in the appraisal where geographic conditions dictate its use.

The cost estimates include all costs associated with servicing the appropriate cutting authorities, excluding all on-site costs of owning and operating a camp facility.

The recognized special transportation systems are as follows:

1. Railway

a. Truck to Rail Transfer

When logs are appraised by railway for part of the way between the cutting authority and the point of appraisal, the cost estimate for the truck-to-rail transfer part of the phase is:

B.C. Rail - Dease Lake Extension: \$5.46/m³

All Other Railways: \$2.51/m³

b. Railway Transportation

The railway transportation cost estimate is based on the following table for the points of origin shown. Otherwise, the best information on hand is used.

B.C. Rail Log Transportation

Origin	Cost Estimate (\$/m ³)	Point of Appraisal
Leo Creek	15.51	Fort St. James
Lovell	15.91	Fort St. James
Bear Lake	16.37	Fort St. James
Minaret Creek	16.51	Fort St. James
Niteal	15.23	Fort St. John

2. Barge/Ferry Used for Truck Haul (Private)

When a truck haul road is interrupted by a body of water and the operation of a barge system is feasible to provide the road link for logging trucks, the cost estimate for this phase, regardless of ownership is:

- | | |
|--------------------------|-----------------------|
| a. Babine Lake (South): | \$1.82/m ³ |
| b. Kinbasket Lake: | \$4.14/m ³ |
| c. Revelstoke 1880 Lake: | \$3.08/m ³ |
| d. Williston Lake: | \$3.47/m ³ |

For any other location, the cost estimate is determined by the Director, Revenue Branch.

3. Barge/Ferry Not Used for Truck Haul (Private)

The cost estimate includes all costs associated with the operation of the systems and includes bubble systems where applicable.

When a cutting authority can be served only by water, and daily (operating days only) ferry/barge services are feasible for crew transportation, the cost estimate for this phase, regardless of ownership is:

- | | |
|-----------------|-----------------------|
| Ootsa Lake: | \$0.45/m ³ |
| Kinbasket Lake: | \$3.82/m ³ |

For any other location, the cost estimate is determined by the Director, Revenue Branch.

4. Other Systems

The cost estimate for other systems are:

- | | |
|----------------------------|-----------------------|
| a. Arrow Dam Log Transfer: | \$1.54/m ³ |
|----------------------------|-----------------------|

This includes raft dismantle and rebuild, and all related on-site costs.

- | | |
|--------------------------------|-----------------------|
| b. Hansard Low Water Bridge *: | \$0.37/m ³ |
| c. Williston Lake Dry Dump *: | \$3.24/m ³ |

* Applicable to winter logged volume estimate only.

4.6 Road Maintenance

Where the licensee is obliged to carry out road maintenance, routine road maintenance includes but is not limited to, the following:

- grading
- snowplowing and freezing in
- sanding
- spot gravelling (< 0.3 Km distance)
- culvert repairs and thawing
- culvert removal (< 950 mm)
- culvert replacement (< 950 mm)
- non-structural maintenance of bridges
- bridge re-decking/wearing surface replacement
- ditching
- snow road reconstruction
- road use charges paid to other licensees
- seasonal erosion control
- roadside treatments
- sign maintenance
- dust control
- brushing
- minor flood and storm damage repair
- slough removal
- water bar construction
- road ripping
- final erosion control
- cross ditch construction
- grass seeding

The cost estimate for all routine maintenance carried out on logging operations depends on the geographic location of the cutting authority area. Cost estimates do not apply where there is less than one kilometre of road to be maintained.

For a management unit, other than Timber Supply Areas or Tree Farm Licence (for example Woodlot Licences), the routine road maintenance cost estimate is \$1.51/m³.

The geographic location is recognized by Forest Region, Timber Supply Area and Supply Block, and Tree Farm Licence as follows.

Routine Road Maintenance Cost Estimates

Region	TFL	TSA	Supply Block	\$/m3
Prince Rupert		Bulkley 3	All	1.78
		Cassiar 4	All	1.74
		Cranberry 42	All	1.74
		Kalum 10	All	1.74
		Kispiox 12	All	1.23
		Lakes 14	All	1.03
		Morice 20	All	1.54
		Nass 43	All	1.74
	1			1.74
	41			1.74

Region	TFL	TSA	Supply Block	\$/m3
Kamloops		Kamloops 11	1	2.14
		Kamloops 11	2, 3, 4	0.99
		Lillooet 15	All	2.21
		Merritt 18	All	1.21
		Okanagan 22	1, 2, 3	1.39
		Okanagan 22	4, 5	1.38
		Okanagan 22	6, 7, 8, 9	2.28
	15			1.39
	18			2.14
	33			2.28
	35			0.99
	49			1.38

Table 6-1 Miscellaneous Stumpage Rates*All Forest Regions*

Species	Product	Reserve Stumpage Rate
Cedar	Shakes	\$6.00/m ³
Cedar	Blanks	\$7.20/m ³
Cedar	Fence Posts	\$3.00/m ³
Cedar	Mining Timbers & Fence Rails	\$3.00/m ³
All Species	Firewood	\$0.50/m ³
All Species	Bolts/Blocks	\$5.30/m ³
Yew	All	\$0.25/m ³
All Species	Grades: 3, 4, 5 and 6	\$0.25/m ³
All Deciduous	All (except grades 3, 4, 5 and 6)	\$0.50/m ³
All Species (except Cedar)	Fence Rails, Mining Timbers, Fence Posts	\$1.20/m ³
All Species	Pickets & Palings, Mine Cribbing, Car Stakes, Round Stakes & Sticks, Rails (Split), Lagging (Split), Orchard Props	\$1.20/m ³
All Species	Christmas Tree: under 3m 3-5 m over 5 m	\$0.20/each \$1.00/each \$1.50/each
All Species	Logs salvaged below the high water levels of the Mica, Arrow, Revelstoke, W.A.C. Bennett Dam Flood Basins and the Slocan, Kootenay, Mineral, Babine and Ootsa Lakes.	\$0.25/m ³
All Species	Trees classified as "Dead Potential" on Cruise-based cutting authorities	\$0.25/m ³

Forest District Specific

Description	District	Reserve Stumpage Rate
Gross area cleared for seismic lines, gas or oil well sites, right-of-way to well sites and pipe lines*	Cranbrook	\$1147/ha
	Dawson Creek	\$1640/ha
	Ft. Nelson	\$1640/ha
	Ft. St. John	\$1640/ha

*For pipe line rights-of-way a stumpage rate may be determined by using the above rates for cutting authorities containing less than 1 000 m³, of merchantable volume. For cutting authorities of 1 000 m³ and over see Section 6.2.

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