

1.5 RIPARIAN ASSESSMENT						
Block	Riparian I.D. and Class	RMA	SU	Width (m)	SPH Retained	Comments (Indicate if in a Community Watershed)
4	S5-4-1	RMZ	NA	30	-	
4	S6-4-1 to S6-4-4	RMZ	1	20	See Table 1	All are located within the harvest area except for S6-4-4. Streams within the ground based portion of the block and it have a 5m MFZ and a 20m RMZ ribboned around the stream in the field. Only a 20m RMZ has been ribboned around the streams within the cable portion of the block. Merchantable and non-merchantable reserve will be retained within the RMZ of the stream within the ground-based portion of the block. Non-merchantable reserve will be retained but no merchantable reserve will be retained, where the RMZs are within the cable harvest area due to safety concerns. See Table 2 below for information on non-merchantable reserve. / Not within a Community Watershed.
4	NCD-4-1 to NCD-4-3	N/A	1	N/A	-	All NCDs are located within the block. A 5m MFZ has been ribboned around the NCDs in the field in the ground-based portion of the block. See Table 2 Below for non-merchantable reserve information. Not within a Community Watershed.
Management Strategies: See Non-Merchantable Section and the Harvest /Operational Constraints Section Below						

Safety Highlights:

In addition to the standard safety hazards and risks associated with all aspects of forest management, the following safety hazard(s) apply to this block and must be enforced and practiced:

- Public Traffic on mainlines from hunters, campers, other recreationalists and local residents.
- Steep slopes >35% are present in a few areas.
- Downhill cable harvest areas occur within the block.

Remedial Action

- Personnel will be informed of this hazard and signage will be posted near the proposed development when harvesting and road-building activities are being conducted.
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Leave Tree Specifications:

Table 1. - Layer 1 Reserved Timber ¹											
Block	HU	Selection Priority	Species	Size	Stems per Hectare			Distribution ²			
					Target	Minimum	Maximum	S	G	I	R
4	1	<ul style="list-style-type: none">Most WindfirmBl	Bl, Se	Bl, Se >/= 55cm dbh	5	2	10	√	√	√	
4	1 (RMZ)	<ul style="list-style-type: none">Variable Size ClassesBl	Bl, Se	All	10	7	15	√	√	√	
Additional Requirements/Notes:											
¹ Refer to Appendix I for Table of Reserve Timber Abbreviations and Definitions ² Distribution Types: S: Single Trees, G: Groups of Trees, I: Irregularly Distributed, R: Regularly Distributed											
Note: Safety is a priority when conducting operations near reserved timber. Refer to TSL Schedule “A”, Section 2.00 regarding Dangerous Trees.											
Table2. – Other Reserved Timber ¹											
Non-Merchantable											
Block	HU	Location(s)	Species	Size	Stems per Hectare						
					Target	Minimum					
4	1&2	MFZ of NCDs and S6s and within the area that is 5m on either side of all NCDs/S6s without MFZ	All + Brush Species	<12.5cm dbh	All, where present and where operationally feasible.	All, where present and where operationally feasible.					
4	1&2	RMZs	All	<12.5cm dbh	All, where present and where operationally feasible.	All, where present and where operationally feasible.					
Dead Trees to be Stubbed (where Mechanical Falling is utilized)											
Block	HU	Species	Size	Stubbing Height	Stems per Hectare			Distribution ²			
					Target	Minimum	Maximum	S	G	I	R
4	1	All	>/=35cmdbh	3-5m	7	5	10	√	√	√	
Additional Requirements: 1. Stub trees must not pose a hazard to worker safety. 2. In selecting dead trees for stubbing, give selection priority to trees with signs of wildlife use (e.g. cavity nests, holes, and dens).											
Coarse Woody Debris											
Block	HU	Species	Size	M ³ per Hectare		Distribution ²					
				Target	Minimum	S	G	I	R		
4	1&2	All	Retain CWD and wildlife trees that are representative (spp, age and size) of pre-harvest levels/conditions.	15	10	√	√	√			
¹ Refer to Appendix I for Table of Reserve Timber Abbreviations and Definitions ² Distribution Types: S: Single Stems/Logs, G: Groups of Stems/Logs, I: Irregularly Distributed, R: Regularly Distributed											
Note: Manage CWD levels to pre-harvest levels, except in areas where concentrations are too high for effective planting and/or successful regeneration. Safety is a priority when conducting operations near reserved timber. Refer to TSL Schedule “A”, Section 2.00 regarding Dangerous Trees.											

Harvest / Operational Constraints:

- All temporary access structures must be fully rehabilitated upon the completion of harvesting.
- Bladed or Excavated trails may be required for safety in areas that may require adverse skidding and in areas with steep slopes.

TSA Recommendations

General Operational Recommendations:

- Harvesting and road building activities should be modified or suspended when there is abundant hill slope runoff occurring at the site, which is likely to occur during times such as spring break-up or from prolonged heavy precipitation. This is intended to reduce the likelihood of concentrated or redirected drainage as well as erosion and sediment delivery.
- In general, the following cut slope angles are recommended:
 - 0.25H:1V for competent bedrock
 - 0.5H:1V for highly fractured bedrock, and as a cut off for the upper 0.5 m of soil where side slopes exceed 50%
 - 1H:1V for compact to dense thick till and loose to compact colluvial and glaciofluvial materials on slopes in excess of 50% gradient
 - 1.25H:1V for compact to dense till and loose to compact colluvial and glaciofluvial materials on slopes less than 50% gradient
- In general, fill slope angles are recommended at 1.5H:1V, with allowance for steeper fills where specific materials and methods are used:
 - General Rock Fills: maximum 1.25H:1V
 - Wood-support Fills: maximum 1.25H:1V
 - Keyed Rock Fills: maximum 1.1H:1V
 - Placed Rock Fills: maximum 1H:1V
- Cross-drain and stream culverts have been identified in the proposed culvert summary tables on Figures 3, 4 and 5. Additional cross-drain culverts and changes to planned locations may be warranted based on conditions encountered during construction. Final cross-drain culvert requirements are to be confirmed by the BCTS Road Construction Supervisor at the time of construction based on conditions encountered.
- All proposed and existing road and trail drainage systems should be maintained and kept clear of debris during and subsequent to harvesting operations, including at and downslope of culvert discharge locations.
- Excavated or bladed trail construction should be minimized as practical, and avoided in areas of seepage or where shallow subsurface runoff is likely to be intercepted. Where imperfectly drained or poorly drained areas cannot be avoided, effective drainage control should be installed and puncheon can be used to reduce impact.
- All trails should be fully rehabilitated upon completion of use and concurrent with operations, prior to the next spring freshet. If any trails are to remain in place for an extended period of time prior to rehabilitation, then additional precautions should be taken including pulling back all watercourse crossings and any potentially unstable fill slopes, and installing frequent cross-ditches in order to limit the potential for redirected runoff.
- Machine use should be limited to areas where excessive scour, rutting, or compaction is avoidable. This would generally restrict machine use from areas of moderately steep or steeper slopes as well as any localized areas of wet, soft, or very loose soils. Some modified machine use (e.g. hoe-chucking) may be possible in these areas if excessive disturbance is avoidable.
- All natural drainage patterns (including all NCDs and S6 streams as well as dry swales and gullies) should be maintained and left free of excess debris (slash or soil) that could result in a redirection of seasonal surface runoff. Temporary skid bridges are recommended for all watercourse crossings.
- Seasonal deactivation should be installed on all roads in the development area following operations or during shutdown periods in order to control erosion and sediment delivery to fish habitat, as well as to back-up road drainage systems at watercourse crossings and reduce the potential for redirected runoff.

Specific Recommendations:

Winter harvesting on an adequate snowpack is recommended as an option to facilitate yarder and backspar trail construction in rocky terrain and/or imperfectly drained to poorly drained areas. Winter harvesting would also reduce site disturbance including sedimentation within watercourses with connectivity to downstream fish habitat, as well as reduce the likelihood of redirected and/or concentrated runoff which could result in a landslide.

Block 4 (Refer to Figure 5)

- Install 450 mm culvert at Δ32 of East Barnes 9000 to maintain natural drainage at ephemeral swale (NVC).
- Change Δ41 culvert to a 450 mm which is adequate for Stream S6-4-2 flows.

See TSA for Field Review Recommendations.

Kootenay Business Area Field Marking Standards

	Ribbon	Paint
Harvest Boundary	BCTS Block Boundary	
Falling Corners		FC#
WTRA Boundary	Reserve	
Reserve Boundary	Reserve	
Riparian Reserve Zone	Reserve	
Riparian Management Zone	Riparian Mgmt. Zone	
Management Zone	Management Zone	
Treatment Unit Boundary	Treatment Unit Boundary	
Reserve Trees		
Machine Free Zone	//// Machine Free Zone ////	
Cruising	Cruise Line	Plot Trees
Traverse Stations		
SP Plot Location		

	Ribbon	Paint
NCD & Stream Centers	Water Course	
Road P-Line		
Road Center Line	Road Centerline	
Landings	Landing	
Road Right of Way	R/W Boundary	
Road RP		
Culverts	Culvert	
Designated Crossing	Crossing	
Culvert RP Outside Right of Way		
Tail Holds / Guyline / Intermediate Supports		
Skid Trail / Back Spar Trail / Forwarding Trail	///// Trail/////	
Recce Ribbon / D-Line / Skyline Roads	//////////	

I certify that the work described herein fulfills standards expected of a member of the Association of British Columbia Forest Professionals, and that I did personally supervise the work.

RPF'S SIGNATURE and SEAL

RPF PRINTED NAME

Stefano De Vuono

DATE SIGNED

April 15, 2019