THE FOLLOWING INFORMATION IS ATTACHED FOR INFORMATION ONLY AND DOES NOT FORM PART OF THE SITE PLAN

TSL TA0568 BLOCK 2 SUPPORT DOCUMENT

LICENCE #	LOCATION	OPERATING PLAN #	BLOCK #	BLOCK PRE #	ROAD
TA0568	Swehaw	19	1	BSH-174	Swehaw FSR
TA0568	Big Sheep	19	2	BSH-169	Santa Rosa Road
TA0568	Big Sheep	19	3	BSH-167	American FSR
TA0568	Big Sheep	19	4	BSH-176	Powerline FSR

1. ASSESSMENT INFORMATION

1(a). VISUAL IMPACT ASSESSMENT

This development is not located within a scenic area or established visual polygon. A VIA is not required.

1(b). PEST INCIDENCE SURVEY

Pest Specific Comments:

Block 1
The cruise compilation indicated there was no insect attack noted in block 1 and no insect attack was observed in block 1 during development activities. However, in blocks 2, 3, and 4 the only insect attack was Douglas-fir beetle. In block 2 the beetle attack is moderate impacting 36% of the Fdi volume with 33% being green attack and 3% grey attack. In blocks 3 and 4 the attack was relatively minor impacting 10% of the Fdi volume in the blocks. In block 3, 4% is green attack and 6% grey attack. Whereas in block 4, all of it was green attack.

All of the blocks in this development were assessed after the Santa Rosa fire during SP data collection by Cabin Forestry in May 2019. Expected relative pest occurrence values are from the Establishment to Free Growing Guidebook - Nelson Forest Region 2000.

Forest Health Comments:

Blowdown:
The cruise compilation measured blowdown in block 1 to be 3.3% of the total stand volume, effecting only Lw (6.9% of the Lw volume). The compilation measured blowdown in block 2 as 7.8% of the total stand volume spread across Fdi, Cw, Bl, and Pli. The compilation measured blowdown in block 3 to be 2.9% of the total stand volume, affecting Fdi, Bl, and Lw. The compilation measured blowdown in block 4 to be 1.7% of the total stand volume with blowdown occurring in Fdi and Cw.

Fire Impact
In block 1 fire affected 86% of the stand volume, of which 83% was light or medium burn, and 3% heavy. In block 2 fire affected 78% of the stand volume, of which 69% was light or medium burn, and 9% heavy. In block 3 the impact of fire affected 94% of the stand volume, of which 89% was light or medium burn and 5% heavy. The impact of fire in block 4 affected 81.5% of the stand volume, of which 77.1% was light or medium burn and 4.4% heavy.

Armillaria Root Disease: An Armillaria risk assessment was completed on block 1, 2, 3 and 4 by Sean Harper of Cabin Forestry Services on June 6, 2019. The assessment determined the relative risk of Armillaria occurring in the blocks to be moderate. However, due to the fire, no root disease was observed in block 1 during development. As such, the current risk to inventory is considered low to moderate. However in block 2, 3 and 4 the cruise indicated that block 2 consist of 29% Fdi, block 3 consists of 65% Fdi, and block 4 consists of 44% Fdi. Due to the fire it was not positively determined during development activities whether root disease was present in the blocks. As such, current risk to inventory is considered Moderate.

Schweinitzii Butt Rot: No incidence of Schweinitzii Butt Rot was found on site in any of the blocks. Current risk to inventory is considered very low for all four blocks but could become a concern in the post- harvest stands.

1(c). FIRST NATIONS STRENGTH OF CLAIM ASSESSMENT

The Strength of Claim Assessment is on file.

1(d). CULTURAL HERITAGE ASSESSMENT

At the time of the submission of this SP, BCTS has referred this development in Operating Plan 19 to all potentially affected First Nations, as was determined through a search of the Consultative Area Database (CAD). The proposed development was referred May 17, 2019. The only First Nations to respond to date are the Okanagan Indian Band (OKIB), the Penticton Indian Band (PIB), Splatsin First Nation (SPFN). None of the three requested Cultural Heritage Reviews (CHRs) for blocks 1 or 3, and SPFN was the only one of the three that requested a Cultural Heritage Review (CHR) for both block 2 and 4.

Block 2:
SPFN completed a Cultural Heritage Review (CHR) and Preliminary Field Reconnaissance (PFR) on June 25, 2019. The follow-up CHR report had no findings. The PFR report noted two areas of potential (AOPs) existed in the block and further archaeological review was required. Tipi completed an archaeological field assessment and determined no archaeological materials, or sites were observed, recorded, or are otherwise suspected within the proposed block (refer to the archaeological assessment section below).

Block 4:
SPFN completed a Cultural Heritage Review (CHR) and Preliminary Field Reconnaissance (PFR) on June 25, 2019. The follow-up PFR report had no findings. The CHR report recommended that all non-merchantable timber along the banks of watercourses be left, as it will provide riparian habitat over time and provide cover for the watercourse extending its availability. This recommendation has been incorporated into watercourses (NCDs) in MFZs within the block harvest area. The Site Plan Support Document and the Harvest Plan outline retention prescriptions (refer to the Riparian Assessment sections of both documents)

Comments have not been received from WFN or any other First Nation group other than OKIB, PIB, or SPFN on any of the four blocks to-date. If a CHR is requested by WFN or another First Nation, and accommodations are required after completion of the CHR, this plan will be amended by the Timber Sales Manager prior to the sale of the TSL.

If a previously unidentified affected cultural heritage resource is encountered during harvesting, road construction, or mechanical site preparation that is authorized or carried out by the TSM, the TSM will require that the operations cease to the extent necessary to protect the affected cultural heritage resource until a cultural heritage resource evaluation can be carried out.

1(e). ARCHAEOLOGICAL OVERVIEW / IMPACT ASSESSMENT

For blocks 3 and 4 no areas of archaeological concern are currently known to exist within, or adjacent to the blocks. No archaeological potential polygons were identified in the block drilldowns to overlap within the referral area of interest. An Archaeological Overview Assessment (AOA) is not planned for the blocks.

For blocks 1 and 2, an Archaeological Overview Assessment (AOA) was assigned to Tipi in May 2019. Tipi determined that an Archaeological Impact Assessment is required. Thirty-day notification for an AIA was sent out to affected First Nations May 23, 2019.

Block 1:
An archaeological field inspection was conducted on the proposed development area (block 1) by Tipi on July 3rd and 4th, 2019 under BC Heritage Inspection Permit 2019-0109. The findings of their field inspection were provided by Justin Hanna in a letter of notice dated July 12, 2019. The letter stated that no archaeological materials, or sites were observed, recorded, or are otherwise suspected within the proposed block. The letter recommended that no further archaeological inspections, investigations, or archaeological resource management prescriptions are required for the proposed development provided the proposed development does not extend beyond the area assessed.

Block 2:
An archaeological field inspection was conducted on the proposed development area (block 2) by Tipi on July 3rd and 4th, 2019 under BC Heritage Inspection Permit 2019-0109. The field inspection focused on two areas of archaeological potential (AOPs 1 &2) within block 2, as identified by Splatsin First Nation (Yucwmenluècwc). The findings of Tipi's field inspection were provided by Justin Hanna in a letter of notice dated July 12, 2019. The letter stated that no archaeological materials, or sites were observed, recorded, or are otherwise suspected within the proposed block.

If a previously unidentified archaeological feature is encountered during harvesting, road construction, or mechanical site preparation that is authorized or carried out by the TSM, the TSM will require that the operations cease to the extent necessary to protect the affected archaeological feature until an Archaeological Impact Assessment (AIA) can be carried out.

1(f). TERRAIN STABILITY / AVALANCHE ASSESSMENT

Block 1:
No potentially unstable, or unstable terrain polygons were shown on LRM mapping as overlapping the proposed block harvest area. However, slope instability indicators were noted during development activities resulting from the fresh burn causing saturated soils within the block harvest area. Lidar mapping showed slopes >60% exist along the northern harvest boundary of the block and in WTRA-1 extending down to the S5 Swehaw Creek, S5-1) to the north of the block. The BCTS TSA Decision Tool determined a Site Review is required.

Jenn Sabean P.Geo (Geoscientist) of Sitkum Consulting Ltd. completing a TSA office review on the block and determined a field assessment was not required and there are no recommended changes to the block layout. The recommendations are contained in the final TSFA report entitled 19-1521 TA0568 Santa Rosa Blks 1-2 TSFA Office & Site Review Final Report dated and signed August 20, 2019

Block 2:
No indicators of slope instability were noted within the block harvest area during development activities and no potentially unstable, or unstable terrain polygons were shown on LRM mapping as overlapping the proposed block harvest area. There is no known fish habitat in American Fork (S6-10) directly downslope of the development. However, LIDAR and cruise mapping showed slopes >60% exist within the block. Lidar mapping also shows >60% slopes above (west of) and below (east of) the block. The BCTS TSA Decision Tool determined a Site Review is required for this development.

Jenn Sabean P.Geo (Geoscientist) of Sitkum Consulting Ltd. completed a TSFA "Terrain Stability Field Assessment on TSL TA0568 Block 2 on July 24, 2019. The scope of the assessment was to review the steeper in-block and downslope terrain as well as assess the drainage control along the existing road (American FSR).

The field summary report dated July 31, 2019 noted that the block is situated on irregular terrain with moderately steep (50-65%) gradient slopes in between gentle gradient benches. Some bedrock is present in the upper portion of the block. The stream (S6-1) that bisects the block and is within the designated WTRA becomes a well- defined gully with steeper gullied terrain existing in the lower portion of the block, downslope of the American FSR. The report determined that based on the condition of the trees and forest floor it appeared the burn intensity in the block was overall low but with some moderate burn areas. Some soils exhibit hydrophobic characteristics, with the top +/- 1 inch altered as a result of the fire. However, the report stated that the proposed harvest methods are unlikely to increase the incremental risk of landslides and the report had no recommended changes required to the proposed block 2 harvest boundaries. The report did recommend that in order to reduce the risk of post-harvest events that harvesting be conducted during during dry periods and that deactivation of trails be done as soon as practicable after completion of harvesting. These recommendations have been incorporated into the plans for the block.

The report noted the American FSR appears to be quite recently built and is in moderate condition. The road is rutted with loose surface material that is well drained through rocky sections and poorly drained in some low-lying sections, with very few existing culverts. There were no signs of road prism failures and no significant signs of concentrated and redirected runoff. However, the report recommended additional culverts need to be installed as there is an increased risk of instability on the road due to the lack of existing culverts, the presence of thick, loose, sandy material with some steeper gullied terrain along sections of the road, as well as the effects of the recent fire. The culvert recommendations have been incorporated into the plans for the block.

The final TSA report for proposed block 2 was dated August 20, 2019. The final TSA report is consistent with the field summary report. The final report noted that when good harvesting practices are employed, including careful drainage management, the likelihood of a hazardous in-block landslide attributable to the proposed harvesting of block 2 is estimated to be very low. The report also noted that considering with the implementation of the recommended additional culverts along the existing American FSR to improve drainage control and maintain natural drainage patterns, the WTRA and machine free zone along stream S6-1's gully, and assuming generally accepted good development practices, the overall likelihood of a hazardous downslope drainage related landslide attributable to the proposed development of block 2 is estimated to be low to very low.

Recommendations given in the final report are particularly emphasized due to the potentially hydrophobic (water repellant) nature of the soils as a result of the recent fire. The intent of the recommendations are to manage road surface runoff, control surface erosion, and prevent concentrated or redirected runoff onto potentially sensitive downslope terrain.

General recommendations given in the final report are as follows:
- Seasonal deactivation measures are recommended for all permanent roads associated with this development during periods of non-industrial use. Appropriate measures include backing up culverts with cross-ditches, and installing intermediate cross-ditches and water-bars as appropriate based on road drainage, grade, and material properties.
- Harvesting during dry periods and deactivation of trails as soon as practicable should be considered to reduce the risk of post-harvest erosion events.
- For existing roads within the proposed development to be used for skidding, decking, processing, etc. it is recommended that the drainage structures - ditches and culverts - be maintained on a frequent and basis to ensure they are clean and functioning

The final report also provided recommendations for additional culverts on the American FSR which is consistent with the field summary report. The culvert recommendations have been incorporated into the plans for the block.

Final recommendations in the report were on changed circumstances and supervision:
- if site conditions encountered during development vary significantly from those described in this report (e.g. unexpected significant seepage, unexpected material textures encountered in excavations, etc.), or if any stability or erosion concerns become apparent during operations, then an immediate field review by a qualified registered professional (QRP) is recommended. Timely mitigation of problem sites can significantly reduce potential adverse effects.
- Sufficient development supervision should be carried out by an experienced and qualified development supervisor to ensure generally accepted good development practices are implemented along with all recommendations presented in this report.

Blocks 3 and 4:
No indicators of slope instability were noted within the blocks during development, or cruise activities. Slopes in the blocks observed during development and cruise activities were noted to be fairly level to moderately steep with some shorter 50-55% slope sections. No slopes >60% were observed. Based on the BCTS drill down for the blocks and LRM mapping, there are no mapped unstable terrain polygons that overlap the blocks. Based on the previously mentioned information, and on the BCTS TSA Decision Tool a Terrain Stability Field Assessment (TSFA) is not required for either block.

1(g). RIPARIAN ASSESSMENT

Block 1:
There are no known fish streams associated with the block or affected by operations in the block. There is one S5 stream (Swehaw Creek = S5-1) located adjacent to WTRA-1 at the northern end of the block, and one S6 stream (S6-2) located adjacent to the eastern boundary of the block. One non-classified drainages (NCD3) is in the block harvest area at the southern end of the block. All riparian features were classified as per FPPR. The S6-2 stream and NCD have been flagged in the field with purple watercourse ribbon.

The 30m riparian management zone (RMZ) of Swehaw Creek is either retained in WTRA-1 or outside the block gross area.

The majority of the 20m riparian management zone (RMZ) for stream S6-2 is either retained in WTRA-1 or located outside the block gross area. Where the RMZ is in the block harvest area the RMA is marked in the field with blue-glo ribbon with black Riparian Management Zone letters.

NCD3 has a 5m machine free zone (MFZ) marked in the field with blue ribbon with black slashes and black Machine Free Zone lettering. A designated crossing has been marked on the site plan and harvest plan maps.

Riparian Management Strategies include:
1) Trees must be felled and skidded away from riparian features where practicable. Do not skid up and down adjacent to the RMZ of S6-2 or the MFZ of NCD-3. Any debris entering a riparian feature because of harvesting or addressing danger trees will be removed upon completion of harvesting activities unless it does not obstruct water flow, or its removal would cause further damage to the riparian feature.
2) At the designated crossing on NCD3, it is recommended to place a temporary skid culvert (logs placed in draw or old culvert) to prevent a potential diversion of flow.
3) All machine trails and crossings should be fully rehabilitated upon the completion of harvesting. Excess material that could cause redirection of natural drainage patterns should not be left at swale or gully crossing locations.
4) All surface drainage patterns should be maintained and any that are disrupted because of harvesting operations should be restored immediately.

Block 2:
One S6 stream (S6-1) is in the WTRA that splits the northern and southern portions of the block. Two S6 streams (S6-2 and S6-10) are located outside the southeastern boundary of the block. The entire RMZs of S6-2 ad S6-10 are located outside the proposed block harvest area. One NCD (NCD-1) is in the western section of WTRA-1 and terminates by flowing into S6-1. Three NCDs (NCD-6, NCD-7 and NCD-8) start in the southeast harvest area of the block and terminate flowing into S6-10 outside the block. Three NCDs (NCD-2, NCD-3 and NCD-5) are located outside the southeast boundary of the block. NCD-2 and NCD-3 flow into S6-2, whereas NCD-5 flows into S6-10. All riparian features were classified as per FPPR. Stream S6-1 has been flagged in the field with purple watercourse ribbon. Riparian management strategies are outlined below.

Within the block harvest area, the 20m riparian management zone (RMZ) of S6-1 is flagged in the field with blue-glo ribbon with black Riparian Management Zone letters. Where available non-merchantable timber is to be retained in the RMZ.

Where NCD-6, NCD-7 and NCD-8 are located within the block harvest area they have been marked in the field with blue ribbon with black slashes and black Machine Free Zone lettering. Where available non-merchantable timber is to be retained in the MFZ.

Riparian Management Strategies include:

5) An existing skid trail is located along the southeastern boundary harvest area. The trail is proposed to be used to harvest the area below >60% slopes which prevent harvesting up to the American FSR in the block. The trail is located above the commencement of NCS 6, 7 and 8 and terminates on the American FSR to the east. Designated skid trail crossings are marked in the field on American Creek (S6-2), NCD-2, and NCD 3 with pink ribbon with black slashes and black Trail lettering. It is recommended to place a temporary skid culvert (logs placed in the draw, or an old culvert) on the two riparian features to prevent a potential diversion of flow. The crossings will require removal after harvesting. The portion of the trail inside the block will require full rehabilitation upon the completion of harvesting. Surface drainage needs to be restored. Excess material that could cause redirection of natural drainage patterns should not be left at swale or gully crossing locations.
6) Trees must be felled and skidded away from riparian features where practicable. Do not skid up and down adjacent to the RMZ of MFZs. Any debris entering a riparian feature because of harvesting or addressing danger trees will be removed upon completion of harvesting activities unless it does not obstruct water flow, or its removal would cause further damage to the riparian feature.
7) All machine trails and crossings should be fully rehabilitated upon the completion of harvesting. Excess material that could cause redirection of natural drainage patterns should not be left at swale or gully crossing locations.
8) All surface drainage patterns should be maintained and any that are disrupted because of harvesting operations should be restored immediately.
9) Where present and operationally feasible, all non-merchantable stems (<12.5 cm DBH) with good form, health, and vigour will be reserved within the 20m RMZ of the S6-1 stream and the 5m MFZ of NCD-6, NCD-7, and NCD-8 within the block harvest area.

Block 3:
There are no known fish streams, or any other riparian features associated with the block or affected by operations in the block. No riparian management is required in this development. No riparian management is required in this development.

Block 4:
There are two S6 stream (S6-1 and S6-2) and six non-classified drainages (NCD-1, NCD-2, NCD-3, NCD-4-1, NCD-4-2, and NCD-5) located within the block. The streams start from four of the six NCDs that flow within the block. All riparian features were classified as per FPPR and have been flagged in the field with purple watercourse flagging ribbon. For the NCDs within the harvest area a 5m machine free zone (MFZ) has been established in the field with blue ribbon with black slashes and black Machine Free Zone lettering. Within the block harvest area, the 20m riparian management zone (RMZ) of both S6-1 and S6-2 are flagged in the field with blue-glo ribbon with black Riparian Management Zone letters. Where the harvest area is within 5m of the stream a 5m MFZ within the RMZ has been marked in the field to protect the stream banks.

Riparian Management Strategies include:
1) Trees must be felled and skidded away from riparian features where practicable. Do not skid up and down or adjacent to the RMZ of the S6 streams or MFZs on the S6 streams and NCDs.
2) Any debris entering a riparian feature because of harvesting will be removed upon completion of harvesting activities unless it does not obstruct water flow, or its removal would cause further damage to the riparian feature.
3) All machine trails and crossings should be fully rehabilitated upon the completion of harvesting. Excess material that could cause redirection of natural drainage patterns should not be left at swale or gully crossing locations.
4) All surface drainage patterns should be maintained and any that are disrupted because of harvesting operations should be restored immediately.
5) Where present and operationally feasible, all non-merchantable stems <12.5cm dbh with good form, health and vigour, and brush species will be reserved within the 20m RMZ of the two S6 streams and 5m MFZ of the NCDs.

1(h). SOIL ASSESSMENT

HAZARD RATINGS					SOIL CHARACTERISTICS			
Block #	SU	Soil Comp.	Soil Erosion	Soil Disp.	Depth to Unfavourable Subsoil Min. (cm.)	Depth to Unfavourable Subsoil Max. (cm.)	Type of Unfavourable Subsoil	Sediment Delivery Risk (Community Watersheds)
1	1	H	H	L	50	80	Parent Material (Rock)	N/A
2	1	L	M	L	50	80	None noted	N/A
2	2	L	M	M	30	40	Fragmental Materials (>70%CF)	N/A
3	1	M	M	L	70	70	Dense Parent Material	N/A
4	1	L	M	H	50	60	Coarse Fragmental Material (>70% CF)	N/A

Comments:
In blocks 1 and 2 the soils in the block tend to be loose due to the fire. Both blocks are recommended dry season harvest in the summer with low moisture and/or during the winter with frozen ground and/or adequate snowpack.

In block 3 the soils tend to be shallow with lots of exposed rock at higher elevations in the block and a dense parent material unfavourable substrate layer at approximately 70cm depth throughout the block. Dry season harvest is not recommended due to the potential risk of fire during the dry season.

In block 4 a root restricting layer was noted at 60cm in soil pit 1 in the northern end of the block. Soil pit 2 at the southern end of the block showed a Coarse Fragmental (>70% CF), root restricting layer which is difficult to dig at approximately 50cm depth. Winter harvest is recommended due to overland flow during the wet spring and fall seasons and the potential risk of fire during the summer dry season because of the exposed rock.

The soils in all blocks are considered non-sensitive, the licensee is responsible for ensuring the maximum soil disturbance limit of 10% of the NAR is not exceeded.

1(i). WINDTHROW ASSESSMENT

A wind-throw assessment of all four blocks was completed by Sean Harper of Cabin Forestry Services on June 26, 2019. The assessment determined that wind-throw risk post-harvest in all four blocks is estimated to be low throughout the development area.

1(j). WATERSHED / HYDROLOGICAL ASSESSMENT

Block 1:
This block is not located within a Community Watershed. However, the block is in the Big Sheep - Swehaw Domestic Watershed. Two water licenses for domestic use exist on Swehaw Creek within 900m of its junction with Big Sheep Creek. The nearest POD 28329 is located on Swehaw Creek approximately 10 Km downstream of the block.

Water Resources Engineer Alan Bates, PGeo. Of Steamworks Consulting Inc sent a letter to Dan Upward BCTS Practices Forester on July 12, 2016 regarding flood risks in the Big Sheep Creek watershed. In the letter Alan Bates noted that approximately 220 ha of new harvest was proposed in the watershed in 2016, amounting to 0.6% of the total watershed. Combining the existing and proposed harvesting the 2016 estimated total Equivalent Clearcut Area (ECA) for the watershed was 9.4%. This ECA level is considered a very low level of disturbance and creates a very low and not likely risk for flow regime change related to forest harvesting. Alan Bates also noted all the harvesting proposed by BCTS in the Big Sheep Creek watershed was in the lower watershed. Peak flows during freshet will be driven by snowmelt in the upper basin at higher elevations. For these reasons Alan Bates concluded that the level and location of harvest is considered unlikely to affect flow regime and/or flood flows in Big Sheep Creek.

BCTS updated the ECA for the Upper Swehaw Main Sub-basin Watershed in June 2019. Proposed block 1 is in the Upper Swehaw Main sub basin. The ECA area associated with the sub basin is 307.1 ha for an impact of 18.2%. The ECA% is below the 20% threshold for increased peak flows and is considered to have a low peak flow hazard as per the BCTS Practices Document for Domestic/Community Watersheds and Hydrologic Planning, May 2010. As a result, no further management decision is required. The ECA for the entire Big Sheep Watershed was calculated to be 3536.8ha for an impact of 10.2%. This ECA level is considered a very low level of disturbance and creates a very low risk for flow regime change related to forest harvesting.

Blocks 2, 3, and 4
These developments are not located within a Community Watershed or an identified Domestic Watershed. A Watershed ECA analysis is not required. The stream systems (S6-1, S6-2, and S6-10) associated with block 2 do not have a POD on them. There are no riparian features associated with block 3, as such no PODs are impacted by the block's harvest and road construction activities. The stream systems (S6-1, and S6-2) associated with block 4 do not have a POD on them.

1(k). WILDLIFE ASSESSMENT

-General Observations: - All four blocks in this development are overlapped by conditional harvest areas for Grizzly Bear GAR Order #8-373. All commitments in the GAR are met so there are no additional management requirements. The block is not located within an Ungulate Winter Range Area/Polygon or UWR Gar Order area; therefore, there are no UWR requirements. The amount of wildlife sign observed in this block was Moderate. Some signs of wildlife were bear and ungulate scat, and tracks.

-Migratory Birds: - Field data and a Migratory Bird Take Risk Assessment completed by Cabin Forestry Services Ltd. indicated all four blocks in this development should be considered Risk Rank 3. A risk ranking of 3 doesn't require a timing window for operations, or any further management requirements.

- Trap line license in the area is TR0409T001.
- There is no guide outfitter license overlapping the area.

1(l). FISHERIES ASSESSMENT

This development is not located within a Fisheries Sensitive Watershed. There are no known fish streams associated with any of the blocks or affected by operations within the blocks. None of the streams in any of the blocks are direct tributaries to a fish stream.

1(m). SPECIES AT RISK ASSESSMENT

The four blocks are not within a Wildlife Habitat area for Coeur d'Alene Salamander, Flammulated Owl, Interior Western Screech-Owl, and Williamson's Sapsucker. No species at risk were observed within, or near the proposed blocks during development activities.

Block 2 is the closest block of the four to identified species at risk. The nearest species at risk noted in LRM to block 2 is a masked sensitive risked ecosystem or species approximately 1.5 km west of the block. The nearest species at risk to block 2 identified in LRM is the American Badger located approximately 5.8 km west of the block.

1(n). OTHER ASSESSMENTS

Coarse Woody Debris:
CWD is a mix of older stems, and recent windthrown and fire damaged stems with full, or partial bark cover.
CWD levels are to be managed to pre-harvest levels, except in areas where concentrations are too high for effective planting and/or successful regeneration. The licensee must retain a minimum of 4 full length logs per hectare, having a minimum dbh of 7.5cm. However, levels are expected to be higher due to non-merchantable log grades (firm-wood rejects and some dry grade 4), as well as timber that is unsalvageable due to the fire, or blowdown left on site. Efforts will be made to ensure these logs are not broken at time of harvesting. Logs may consist of a variety of species and shall be evenly distributed across the block. Safety is a priority when conducting operations near reserved timber. **Refer to the Block Harvest Plans for more detailed information.**

Biological Diversity:

Block 1:
The proposed block within this development is consistent with the requirements for Old forest/OGMAs, Mature, Maximum cut-block size and Green-up/Adjacency. Adjacent block TSL A91033 Block 2 was harvested in 2015 by Glover Contracting Ltd. Block 2 is located to the west of the proposed block (TA0568 Block 1) and has not achieved required green-up. The combined opening of both blocks will create a NAR of be 43.2 ha. FPPR sections 65 (4) and 64 (2)(a)(i)(A) exempt the green up requirement for proposed block TA0568 Blk1 as timber harvesting is being carried out on the block to recover timber damaged by fire. **Refer to the Site Plan for more detailed information.**

Block 2:
The proposed block within this development is consistent with the requirements for Old forest/OGMAs, Mature, Maximum cut-block size and Green-up/Adjacency. The proposed block has a net area to reforest (NAR) of 14.53 ha and is consistent with Section 64 of the FPPR. The nearest adjacent block (TSL A62686 Block 1 NAR = 36.0 ha) at the pinch point is approximately 70 meters to the east. The combined area of the two blocks exceeds the maximum opening size of 40 ha as per the FPPR. However, as per FPPR section 64(2)(a)(i)(A), green-up/adjacency is not applicable as the proposed block is being harvested to recover timber damaged by fire. In addition, as per FPPR section 64 (4) green-up is not applicable as this proposed block is more than two tree lengths from TSL A62686 Block 1 (Ave total height in TSL TA0568 block 1 = 29.5m).
Refer to the Site Plan for more detailed information.

Block 3:
The proposed block is consistent with the requirements for Old forest/OGMAs, Mature, Maximum cut-block size and Green-up/Adjacency. The proposed block has a net area to reforest (NAR) of 13.86 ha and is consistent with Section 64 of the FPPR. Adjacent blocks TSL A62686 Block 1 and TSL A62686 Block 1 have achieved required green-up. This block complies with Sections 65 of the FPPR and the KBHLPO objective 4. **Refer to the Site Plan for more detailed information.**

Block 4:
The proposed block within this development is consistent with the requirements for Old forest/OGMAs, Mature, Maximum cut-block size and Green-up/Adjacency. The proposed block has a net area to reforest (NAR) of 18.9 ha and is consistent with Section 64 of the FPPR. Adjacent blocks TSL A62686 Block 1, TSL A62687 Block 1, and TSL A62687 Block 1 have all achieved required green-up. TSL TA0568 Block 4 complies with Sections 65 of the FPPR and the KBHLPO objective 4. **Refer to the Site Plan for more detailed information.**

Vegetation:

Block 1:
The vegetation layer in the block is absent due to the fire. **Refer to the Silviculture Plan for more detailed information.**

Block 2:
In SU 1 the understory vegetation layer is absent due to the fire. However, alder is present on roadsides and near stream S6-1
In SU 2 the herb layer is composed of shiny leaf spirea, Black Huckleberry, alder, and falsebox with minor amounts of Baldhip rose. Although there is no requirement to manage for Vaccinium Spp. since this area is not within a BEC Zone site series identified in GWM 6, attempts will be made to maintain Vaccinium Spp. productivity within this block by avoiding brushing treatments on Vaccinium Spp. and minimizing the amount of skid trails within the block, where practicable. The herb layer is comprised of mainly pine grass, with minor amounts of balsam root and princes pine. **Refer to the Silviculture Plan for more detailed information.**

Block 3:
In areas where fire occurred in the block, the fire destroyed most of the herb, shrub, and regen layers. Where the fire damage was minimal, at higher elevations the regen layer was sparse (200 sph) but at lower elevation it was fairly dense (1600 sph). In the minimal fire damage areas, the shrub layer is composed of falsebox (10%) and Saskatoon (5%), and the herb layer is comprised of mainly pine grass (85%), queens cup (40%), and pussy toes (35%). The heavy herb and grass layer may compete with reforestation process. **Refer to the Silviculture Plan for more detailed information.**

Block 4:
In areas where fire occurred in the block the fire destroyed most of the herb, shrub, and regen layers. Where the fire damage was minimal, the shrub layer comprised between 13% and 34% of the ground cover. The shrub layer consisted of shinyleaf spirea (0-10%), Black Huckleberry (2-7%), falsebox (3-10%), Baldhip Rose (5%), with minor amounts of Utah Honeysuckle (0-3%), and Oregon Grape (0-2%). The herb layer comprised 27% to 29% of the ground cover. The herb layer consists of pine grass (10-15%), twin flower (5-7%), Prince's-pine (0-5%), Hawkweed (2-5%), Rattlesnake plantain (0-5%), with minor amounts of Arrow-leaved balsamroot (0-2%). The herb layer with a fair component of pinegrass may compete with the reforestation process. Hawkweed is an invasive plant and appropriate management as per the FSP and BCTS' Environmental Procedure "Invasive Plants EFP #09" is required. Although there is no requirement to manage for Vaccinium Spp. since this area is not within a BEC Zone site series identified in GWM 6, attempts will be made to maintain Vaccinium Spp. productivity within this block by avoiding brushing treatments on Vaccinium Spp., where practicable. **Refer to the Silviculture Plan for more detailed information.**

2. RESERVE / RETENTION INFORMATION

2(a). WTRA / WTP (Inside or attributed to the block)

Block	I.D.#	Area	Inventory Label	Description
1	1	0.78	Se (BlFdi) 845	WTRA-1 is located at the north end of the block on relatively steep ground above & adjacent to Swehaw Creek (S5). The WTRA will serve to protect the stream and steep banks associated with it. The WTRA contains high value wildlife trees and joins onto an OGMA located in TFL 23. Wildlife evidence consists of bear and ungulate scat frequent in and around the WTRA. Stems per hectare = 800. Crown closure is relatively high.

2	1	0.85	SeFdi (LwBl) 634	WTRA-1 is located on the west side of the main access road and splits the northern and southern portions of the block. The WTRA will serve to protect the stream (S6-1) with good riparian values - high shrub/tree species mix, abundance in herbs, good growing site. The WTRA contains high value wildlife trees. Wildlife evidence consists of bear and ungulate scat frequent in and around the WTRA. Stems per hectare = 900. Crown closure is relatively high.
2	2	0.33	LWFdi 536	WTRA-2 is located on the east side of the main access road and splits the northern and southern portions of the block. The WTRA will serve to protect the stream (S6-1) with good riparian values - high shrub/tree species mix, abundance in herbs, good growing site. The WTRA contains high value wildlife trees. Wildlife evidence consists of bear and ungulate scat frequent in and around the WTRA. Stems per hectare = 900. Crown closure is relatively high.
3	1	1.0	FdiBl(Se) 624	WTRA-1 is in the northeast side of the block. It is located on steeper slopes above an existing block with Shallow soils and frequent exposed rock. Fdi and Lw snags with high wildlife value are common throughout the WTRA. Wildlife evidence consists of bear and ungulate scat frequent in and around the WTRA. Stems per hectare = 900. Crown closure is relatively high.
4	1	1.13	FdiSeBl 735-0/15	WTRA-1 is in the northeast side of the block. It is located on relatively flat to moderately steep slopes (5-35%) above a previously harvested greened up block. The WTRA has shallow soils and frequent exposed rock. Fdi, Bl, Se, and Lw snags with high wildlife value are common throughout the WTRA. Wildlife evidence consists of bear and ungulate scat frequent in and around the WTRA. Stems per hectare = 800. Crown closure is relatively high.
4	2	0.17	FdiSeBl 735-0/15	WTRA-2 is near the middle of the block on the eastern boundary. The WTRA includes 82% of the RMZ of stream S6-2, as well as 100% of NCD 3, and portions of NCDs 4-1, and 4-2 providing biodiversity and wildlife habitat values. Fdi, Bl, Se, and Lw snags with high wildlife value are common throughout the WTRA. Wildlife evidence consists of bear and ungulate scat frequent in and around the WTRA. Stems per hectare = 800. Crown closure is relatively high.
4	3	0.30	SeBlFdi(Lw) 736-0/13	WTRA-3 is in the RMA of stream S6-1 located in the southeast corner of the block. The WTRA includes 98% of the RMZ of stream S6-1, as well as 100% of NCDs 1 and 2 providing biodiversity and wildlife habitat values. Fdi, Bl, Se and Lw snags with high wildlife value are common throughout the WTRA. Wildlife evidence consists of bear and ungulate scat frequent in and around the WTRA. Stems per hectare = 1000. Crown closure is relatively high.

2(b). Group WTRA / WTP Calculations (To be retained on the first block of the licence only)

Block #	Total Block Area* (Ha.)	Total WTRA / WTP Area (Ha.)	WTRA % of Block Area
1	4.9	0.8	15.9%
2	15.2	1.2	7.8%
3	14.0	1.0	7.1%
4	19.5	1.6	8.2%
TOTAL (all Blocks):	**53.6**	**4.6**	**8.5%**
Green Cells Auto-Calculate			

Comments:

* Note:
1)Total Block Area = NAR+PAS

3. ACCESS SUMMARY

3(a). PERMANENT & TEMPORARY ACCESS STRUCTURES (double-click on Excel spreadsheet below to enter data)

Block	Road	PAS Area Calculation	% of Gross Block Area
1	AR10167.01Swehaw FSR	93m x 9.5m = 0.09 ha (1/2 PAS)	1.58
1	AR10167.01Swehaw FSR	40m X 11m = 0.04 ha (Full PAS)	0.70
	Total block 1 PAS	**0.13ha**	**2.28%**
2	AR7874.08 American FSR	364m x 5.5m = 0.20 ha (1/2 PAS)	1.22
2	AR7874.08 American FSR	430m X 11m = 0.47 ha (Full PAS)	2.87
	Total block 2 PAS	**0.67ha**	**4.09%**
3	ARR22569.sec1	141m X 9 = 0.13	**0.87%**
4	ARR12252 Sec3 (Existing Road	17.6m x 11.0m = 0.2 ha (Existing Road)	0.09
4	ARR12252 Sec3 (Proposed Road)	639.9m X 9.0m = 0.58 ha (Proposed Road)	2.75
	Total block 4 PAS	**0.60ha**	**2.84%**
Block	**Road**	**TAS Area Calculation**	**% of NAR**
2	Existing Skid Trail	172 m X 4.0m = 0.07 ha	**0.5%**
3	ARTSLTA0568 BLK3 SPUR1	403m x 7.0m = 0.28 ha	**2.02%**

Comments:

The portion of the trail inside block 2 will require full rehabilitation upon the completion of harvesting. Surface drainage needs to be restored. Excess material that could cause redirection of natural drainage patterns should not be left at swale or gully crossing locations.

TAS road in block 3 will be rehabilitated upon harvest completion, or as soon as soil conditions allow after snow melt, prior to the spring freshet. Where possible, and not restricted by rock, rehabilitation will consist of removing the original road bed compaction and returning displaced surface soils retrieve any side-cast and berm material to the extent practicable, and necessary to establish trees. Erosion control measures such as swales, dips, and water-bars are required to maintain natural drainage patterns for the entire road. Rehabilitation must be done in a manner to allow silviculture access by ATV. The ATV trail should be constructed onto the top of the rehabilitated road surface. The trail can be built with a mostly out-sloped surface that has many swales and dips, as well as water-bars to control surface runoff with no opportunity for significant runoff interception, or diversion. The trail is generally not that easy to navigate, and are not fast to navigate, but are functional for ATV access where foot access is too far.

All access structures constructed in the four block will be managed to ensure natural drainage patterns are maintained and erosion measures are installed prior to spring freshet. Areas within the block assigned to roadside work areas will not exceed 25%.

4. OTHER SUPPORTING INFORMATION

4(a). HLP / FSP CONSIDERATIONS

Range Comments:

There are no range licenses within this development. There are no range barriers that will be affected by harvesting of the proposed development areas.

Recreation Comments:

Block 1

This development is not located within an established recreation site or trail with legal objectives. The nearest recreation trail is the Mount St. Thomas Trail recreational trail located approximately 2.6 km west of the block. The nearest recreation site is the Big Sheep Creek recreation site (Site Id 2146) located on the Big Sheep Creek FSR located approximately 4.8km east of the block. Activities associated with this proposed development will not impact the Rec site or trail.

Block 2
This development is not located within an established recreation site or trail with legal objectives. The nearest recreation trail is the Dewdney Trail recreational trail located approximately 90 to 100 meters northwest of the block. The trail is designated a Heritage Trail under the Heritage Conservation Act. As per FSP section 5.7.6, primary forest activities within 100 metres of the centerline of the Dewdney Trail sections will be limited to an amount that, in the opinion of a QRP, is necessary to address damage caused by fire, insects, wind-throw or other forest health factors and will be consistent, to the extent practicable, with the requirements of the Dewdney Trail Plan and will proceed only with the authorization of the District Manager FLNRO. Harvest of this block is required to address timber damaged by fire and meets the requirements of section 5.7.6 of the FSP. A June 19, 2017 email from T. DeCourcy, District Manager FLNRO to L. Hodgkinson BCTS Planning Forester authorized harvest within the 100m trail buffer. The email noted that salvage is restricted to fire damaged timber or trees required to be felled for safety.

The nearest recreation site is the Santa Rosa Creek recreation site (Site Id 2144) located on the Rossland -Cascade Rd approximately 4.8 km northeast of the block.

Block 3 and 4
These developments are not located within an established recreation site or trail with legal objectives. The nearest recreation trail is the Dewdney Trail located approximately 400 meters northwest of block 3 and 600 meters northwest of block 4. The trail is designated as a Heritage Trail under the Heritage Conservation Act. As the blocks are not within the 100m buffer zone of the trail these blocks will not require any special management for the trail.

The nearest recreation site to the blocks is the Santa Rosa Creek recreation site (Site Id 2144) located on the Rossland -Cascade Rd near the Dewdney trail. The recreation site is approximately 4.0 km northeast of block 3 and approximately 3.5 km northeast of block 4.

Invasive Species Comments:

Block 1
No invasive species was observed within or near the proposed block during SP data collection. The nearest occurrence of an invasive plant is Spotted Knapweed noted in LRM mapping on the Rossland Cascade Hwy near the junction of the Swehaw FSR which accesses the block. This occurrence is located approximately 10km from the block but is on the access route to the block. Contractors need to be made aware of this invasive plant occurrence during pre-works and appropriate measures applied to prevent spreading of the invasive species to the block during operational activities.

Blocks 2 and 3
No invasive species was observed within or near proposed blocks 2 and 3 during SP data collection. The nearest occurrence of an invasive plant is Hawkweed located in TA0568 block 4 approximately 1.1 km east of block 2 and approximately 180 meters east of block 3. An occurrence of Hoary Alyssum (HA), Scentless Chamomile (SH), Spotted Knapweed (SK), and Yellow Devil Hawkweed (YD) was noted in LRM mapping approximately 1.8 km west of block 2, and approximately 2.6 km northwest of block 3.

The nearest occurrence of invasive plants on the access route to the block are Diffuse knapweed (DK), Hound's-tongue (HT), St. John's wort/Saint John's wort/Goatweed (SJ), Plumeless thistle (PT), and Spotted Knapweed (SK) at approximately 11km of the Santa Rosa Road. This occurrence is located approximately 15 km from block 2 and approximately 14.2 km from block 3. However, the occurrence is on the access route to the blocks. Contractors need to be made aware of this invasive plant occurrence during pre-works and appropriate measures applied to prevent spreading of the invasive species to the block during operational activities.

Block 4
Invasive Hawkweed species were observed within the proposed block during SP data collection. As per FSP section 6.1, where invasive plant infestations are found to be located within or adjacent to areas proposed for timber harvesting and road building activities the following site-specific measures are required to minimize the establishment and/or spread of invasive plants.

1. Contractors engaged in timber harvesting and road building activities are to be provided with an information package regarding the identification and reporting of invasive plants. Contract / agreement requirements related to invasive plants are to be reviewed at pre-work meetings and monitored by BCTS for conformance.
2. Vehicles, mechanized equipment, culverts, bridges and cattle-guards are to be inspected for the presence of soil or plant material, including documentation on inspection forms, prior to being transported to or from work sites and, if present, plant and soil materials are to be removed
3. To reduce the available seedbed for invasive plants:
    I. grass seed exposed mineral soils on cut and fill slopes of new roads and trails during the first available spring or fall and not more than 12 months following construction; and
    II. grass seed exposed soils on all new landings and rehabilitated areas during the first available spring or fall and not more than 12 months following the time of mineral soil exposure, except if the rehabilitated areas are to be revegetated through the planting of trees; and
4. where grass seeding is undertaken, utilize high quality seed (a mix recommended by a MFLNRO range specialist, if available; otherwise Canada Common #1 Forage mix or better grade) to ensure that the introduction of invasive plant seed is minimized.
5. Invasive plant infestations located in the cut-block will be recorded monitored and reported-on during post-harvest surveys. Personnel conducting post-harvest surveys will be required to identify and report new invasive plant infestations observed during surveys.

In addition, an occurrence of Hoary Alyssum (HA), Scentless Chamomile (SH), Spotted Knapweed (SK), and Yellow Devil Hawkweed (YD) was noted in LRM mapping approximately 3.3 km northwest of the block.

An occurrence of invasive plants exists on the access route to the block Spotted Knapweed (SK) which occurs in a large area surrounding the Rossland Cascade Road and is located where the Powerline FSR junctions with it. The Invasive plant occurrence is mapped as extending up to1 km on the Powerline FSR. This occurrence is located approximately 15.7 km from the block but is on the access route to the block. Contractors need to be made aware of this invasive plant occurrence during pre-works and appropriate measures applied to prevent spreading of the invasive species to the block during operational activities.

In all four blocks operations regarding Invasive Plants will follow the procedures set out in the BCTS Environmental Procedure “Invasive Plants EFP #09”.

4(b). ADDITIONAL COMMENTS

5. ADMINISTRATION

☒ ORIGINAL	☐ AMENDMENT#	

RPF PRINTED NAME	RPF'S SIGNATURE and SEAL
Peter Share	
DATE SIGNED	
September 27, 2019	
I certify that I have reviewed this document and, while I did not personally supervise the work described, I have determined that this work has been done to standards acceptable of a Registered Professional Forester.	