SITE PLAN CP 414 BLOCK 14
COOPER CREEK CEDAR LTD.

A. TENURE IDENTIFICATION

LICENCE NO.:	CP:	BLOCK:	TIMBER MARK:	UTM:	LICENSEE NAME:
FL A30171	**414**	**14**	**FE5414**	**495261 E, 5575523 N**	**Cooper Creek Cedar Ltd.**
AREA UNDER TENURE (ha):	MAPSHEET/OPENING #:		ELEVATION:	LOCATION:	
37.3	**82K035**		**910-1280m**	**Deception Creek**	

B. AREA SUMMARY

AREA OF NO PLANNED REFORESTATION (ha) (NPR)									
PERMANENT ACCESS	ROCK	WATER	SWAMP	OTHER NP	NC>4ha	WILDLIFE TREE RETENTION AREA (HA):	IMMATURE	OTHER	TOTAL NPR AREA
2.0	**-**	**-**	**-**	**-**	**-**	**3.2**	**-**	**-**	**5.2**

NET AREA TO BE REFORESTED (ha)		
SU	SU AREA DESCRIPTION	NET AREA TO BE REFORESTED:
A	**ICHwk1 01[9] 05[1]** The block is located in the Meadow Creek Watershed. The aspect of SU A is mainly east facing, slopes range from 15 to 50% with an average of 30%. The elevation of SU A is 920-1280m. Surface soil texture is Silty-Loam (SiL) and subsoil texture is Silty-Loam to Loam (SiL-L). Soils are moderately well to well drained. Coarse fragment content is low to moderate (5-55%). Moisture regime is mesic to submesic and nutrient regime is medium to rich. Humus form is a mor (4-6cm thickness) and rooting depth is 30-40cm. Soils in SU A exhibit **non-sensitive** characteristics. Average stand density (all species) is 622 stems/ha. Most stems fall within the 20-65cm DBH classes, with <2% of stems in the 70-120cm DBH classes. Approximate species densities are Hw 319 stems/ha, Cw 207 stems/ha, Fdi 64 stems/ha, Sx 17 stems/ha, Lw 14 stems/ha and At 2 stems/ha. Stand age ranges from 70-193 with an average of 132 years old. The understory contains densities of Hw and Cw regen, saplings and poles that are mainly in poor (suppressed) condition. SU A will be harvested with **Conventional Ground Based** methods and a clearcut silviculture system.	**25.7**
B	**ICHwk1 05** The aspect of SU B is mainly west-southwest facing with slopes ranging from 13 to 20% with an average of 15%. The elevation of SU B is from 910-1010m. Surface and subsoil texture is Silty-Loam (SiL). Soils are moderately well drained. Coarse fragment content is low to moderate (5-30%). Moisture regime is subhygric to mesic and nutrient regime is medium to rich. Humus form is a mor (4.0cm thickness) and rooting depth is 30cm. Soils in SU B exhibit **non-sensitive** characteristics. Average stand density (all species) is similar to SU A. SU B will be harvested with **Conventional Ground Based** methods and a clearcut silviculture system	**6.4**
	TOTAL NET AREA TO BE REFORESTED:	**32.1**
	TOTAL AREA UNDER THE PLAN:	**37.3**

SOIL DISTURBANCE

SU	Max. Allowable Soil Disturbance (%)	Max. Amount TAS May Exceed MASD Prior to Rehab (%)	Max. Allowable Soil Disturbance For Roadside Work Areas (%)	Maximum Permanent Access Structures (%)
A	10.0	5.0	25%	5.3
B	10.0	5.0		

SU	CRITICAL SITE CONDITIONS THAT AFFECT THE TIMING OF OPERATIONS AND HOW THEY AFFECT THEM
A	• Avoid machine travel during periods of soil saturation to reduce risk of soil compaction. Utilize designated harvesting trails, or a supporting snow pack in the winter. • Spot piling along roadsides, landings and within the NAR may be necessary to remedy high levels of coarse woody debris.

RESULTS AND STRATEGIES

Biodiversity Objectives	
Result or Strategy Description	**3.5.3 - Old and Mature Forest**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	'KBHLP Objective 2 – Old & Mature Forests' For the purposes of biodiversity analysis older BEC mapping (1994) is used and this block falls in ICHmw2, and within Connectivity Corridor. CP414 Deception falls within Landscape Unit K17 For the ICHmw2, there is a Mature + Old forest requirement in this landscape unit. Analysis completed by Timberland (April 2019) shows that post-harvest there will be a surplus of Mature + Old within the Landscape Unit ICHmw2, and also within connectivity corridor.
Result or Strategy Description	**3.5.3 - Green-up**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	'KBHLP Objective 4 – Green-up' – The proposed cutblock is consistent with FPPR Section 65(2).
Result or Strategy Description	**3.5.1 - Objectives set by Government for Wildlife and Biodiversity – Landscape Level**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	'KBHLP Objective 4 – Green-up'. The proposed cutblock complies with Sections 64 and 65 of the FPPR.
Cultural Heritage Resources	
Result or Strategy Description	**3.7 - Objectives set by Government for Cultural Heritage Resources**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	A referral letter dated August 15, 2018, was sent to the appropriate individual(s) and/or group(s). Cooper Creek Cedar Ltd did not receive any comments from First Nations identifying any concerns with the proposed development that had the potential of impacting cultural heritage values. No cultural heritage values were noted in this area.
Recreation Resources	
Result or Strategy Description	**4.3 - Recreation Sites**
Applies:	NO
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	The proposed cutblock is not located within a designated Recreational Area or Trail with legal objectives; therefore, managing for Recreation Resources is not applicable.
Riparian Management	
Result or Strategy Description	**3.4.1 Objectives set by Government for Fish, Water, Wildlife & Biodiversity in Riparian Areas**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	1) Mat Creek (**S2 class**) is located outside the southeast harvest boundary. 2) See Section E.1 for Riparian Management Strategies. 3) See Section F for management strategies related to Temporary Access Structures and Soil Disturbance that should be used during and post-harvest in order to prevent/reduce soil disturbance and sediment delivery.
Soil Objectives	
Result or Strategy Description	**3.1 - Objectives set by Government for Soils [FPPR Section 5 and 12.1(1)]**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	1) **SU A and B** contain non-sensitive soils and soil disturbance will not exceed **10%.** Specific measures for mitigating soil disturbance levels are addressed in Section F of this Site Plan. 2) Areas of the block where temporary access structures are required will be rehabilitated. Specific rehabilitation measures are addressed under Section F of this Site Plan. 3) PAS will not exceed the recommended limit of **7.0%** and is estimated at **5.3%**. 4) Areas within the block assigned to roadside work areas will not exceed **25%**.
Visual Objectives	
Result or Strategy Description	**3.6 – Visual Quality**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	A Visual Impact Assessment was completed for CP 409, 412 and 414by Timberland Consultants in April 2019. Portions of two cutblocks (CP412-15 and 409-4) fall within polygons with a VQO of Modification and the remaining cutblocks fall within area that is not visually sensitive. The proposed development of this CP meets the established VQO of M from the selected viewpoints.
Water Management Objectives	
Result or Strategy Description	**3.4.4 - Consumptive Use Streams**
Applies:	NO
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	'KBHLP Objective 6' – **Block 14** is located within the Meadow Creek watershed. Deception Creek is located to the north of the block and Mat Creek is located to the south of the block. Deception flows into Mat Creek which is a lower order stream that flows into Meadow Creek; therefore the KBHLP streamside management zone does not apply. Meadow Creek has six domestic use POD's, the closest of which is >6km from **Block 14.** Referral letters were sent **February 8, 2019** and comments were received. The distance between the block and POD's will help avoid of minimize disturbance to water quality.

Wildlife Objectives	
Result or Strategy Description	**3.3.1 - Objectives set by Government for Wildlife - Species at Risk – Section 7 of the FPPR**
Applies:	NO
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	The block is not within a Wildlife Habitat Area. There were no sightings of Species at Risk during field development of this cutblock.
Result or Strategy Description	**3.5.2 - Objectives set by Government for Wildlife and Biodiversity – Stand Level**
Applies:	YES
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	Four Wildlife Tree Retention Areas are planned for this block, totalling **3.2 ha**. Overall wildlife tree retention percentage for block 14 is approximately **8.6%.** Total WTRA for CP414 is **12.8 ha** which constitutes approximately 7.2**%** of the gross area of the permit. The WTRA area meets the minimum percent requirements stated in the FSP for each block (3.5%) and for the whole cutting permit (7%).
Result or Strategy Description	**3.3.2 - Ungulates**
Applies:	NO
How the Result or Strategy Applies to the Site (or Rationale if it does not apply)	Block 14 is outside designated Ungulate Winter Range

ADDITIONAL COMMENTS

Consistency Statement

This block is consistent with the approved **2018 to 2023 Forest Stewardship Plan for Cooper Creek Cedar Ltd – Forest Licence A30171**.

This Site Plan is prepared for **FL A30171 CP 414 Block 14**, in accordance with FRPA Section 10(1), (2) & (3).

Community Watersheds

FSP Section **3.4.3**

Not applicable - The proposed block is not located within a Community Watershed.

Enhanced Resource Development Zones

FSP Section **3.2.1**

'KBHLP Objective 7 – Enhanced Resource Development Zones – Timber'

Block 14 is not within an Enhanced Resource Development Zone.

Fire Maintained Ecosystems

FSP Section **3.5.3**

'KBHLP Objective 8 – Fire maintained Ecosystems'. There are no NDT 4 ecosystems in the FDUs under this FSP, therefore the requirement to create a Result/Strategy for this objective does not apply.

Fisheries Sensitive Watersheds

FSP Section **3.4.2**

At the time the FSP was developed there were no designated "Fisheries Sensitive Watersheds" in FDUs under this FSP, therefore the requirement to create a Result/Strategy for this objective does not apply.

Invasive Plants

FSP Section **4.1** – Invasive Plants

The IAPP website was checked on January, 7, 2019. The following invasive species were reported in nearby areas to **CP 414 Deception**: Canada thistle, Chicory, Common tansy, Orange hawkweed, Yellow hawkweed, Hawkweed species, Oxeye daisy, St. John's wort, and Spotted knapweed.

Measures to prevent the introduction or spread of invasive plants noted in the FSP include:

- Cleaning equipment before moving from a worksite with existing infestations to a new work site.
- Minimizing soil disturbance during primary forest activities (PFA).
- Reseed exposed mineral soil, resulting from a PFA in the first available fall or spring within 12 months following the soil disturbance. Plan planting of cutblocks as soon after harvesting as possible.
- During PFAs minimize soil disturbance by:
  - Harvest on a snowpack, when feasible
  - Random skid to designated skid trails to minimize skidder traffic on the ground
  - Utilize benches for skid trails to minimize side cuts
  - Utilize brush to construct skid trails to reduce contact with the ground
  - Use overhead cable harvesting systems on steep ground
- Where grass seeding is undertaken, CCC will use certified grass seed (Canada common #1 or better grade) from reputable suppliers to ensure premium quality free of invasive plant seed, or a seed mix recommended by a MFLNRO range specialist.
- See FSP for additional strategies and practices regarding invasive plants.

Natural Range Barriers

FSP Section – **4.2**

Not applicable. There are no range tenures located in the FDUs covered by this FSP.

Timber

FSP Section **3.2** - Timber

As per Sec 12(8) of the FPPR, results or strategies are not required for an objective set by government for timber.

Wildlife - Caribou

FSP Section – **3.3** and **3.5.3**

'KBHLP Objective 3 – Caribou' was cancelled and replaced by *GAR Order #U-4-012 – Mountain Caribou – Southwest Kootenay Planning Unit.* This block does not fall within a Caribou Management Zone.

This block falls within the Southern Mountain Caribou Matrix Range and Beneficial Management Practices (BMPs) for operating in woodland caribou habitat have been applied. BMPs include:

- 'Habitat connectivity - Design blocks to minimize fragmentation'. Blocks have been grouped into clusters leaving retention patches anchored to creeks and NCDs.
- Caribou Sign and Sightings - Staff and contractors are to report any sightings or sign to supervisor.
- 'Silviculture treatments will not result in the conversion of forest cover to pure spruce stands. The intent is to have silviculture practices result in a species composition that existed prior to forest harvest'. A mixed species composition, similar to the preharvest stand, will be planted.

Wildlife – Grizzly Bear Habitat - Connectivity

FSP Section **3.3** and **3.5.3**

'KBHLP Objective 5 – Grizzly Bear Habitat & Connectivity Corridors'. Not applicable to the FDU which includes this block.

Block 14 falls within Connectivity Corridor area. Applicable targets for Old and Mature forest will be met following harvest.

STOCKING REQUIREMENTS

SU	NAR (ha)	Standards ID #	Other Performance Standards
A	25.7	1057894	See Section H - Stocking Requirements
B	6.4	1057900	

C. MANAGEMENT OBJECTIVES & STRATEGIES

C.1 MANAGEMENT OBJECTIVES

- Objectives for **CP 414 Block 14** protecting nearby streams, maintaining water quality, and maintaining rich biodiversity and wildlife values: All of these objectives are carefully considered, and a balance between all management objectives is the goal.
- Harvest this mature stand of **HwCwFdi(LwSx)** for sawlogs, chips and value-added products and manage for a healthy, free growing stand of planted and natural **CwHwFdLwPw(Sx)** for similar end products.
- **Wildlife Tree Retention Area (WTRA):** Four group reserves are planned for retention, totalling **3.2 ha** in size (8.6% of the block). The reserves shelter mature stand values, wildlife values, riparian areas and portions of stand structure that are similar to the harvest area.
- **Kootenay Boundary Land Use Plan – Implementation Strategy (June 1997):** This block is located within the designated **Landscape Unit K17 (Goat Range)** – High BEO Assignment.

C.2 CONDITIONS THAT MUST EXIST AFTER HARVEST OR TREATMENT TO ACCOMMODATE KNOWN FOREST RESOURCES

C.2a WILDLIFE

Stand Level attributes/ concerns identified:

Ungulate Winter Range: Block 14 is outside designated ungulate winter range

Migratory Bird Habitat Assessment: Block 14 is within Migratory Bird Risk Rating 5 polygon (Age Class derived from cruise data 7,8 & Height class 4(3)) – ICH: CH - (CwHw(FdiLwSx)). The management matrix therefore requires:

1) The entire Site must be scheduled for harvest outside Restricted Period 1 (April 23 – August 1) , OR
2) Two or more BMP's with DoP rank 2 (moderate) or DoP rank 3 (high) must be selected from the list of BMPs and applied to the Site.

BMP's PL2 and LO2 have been implemented on site to reduce the likelihood of incidental take and to conform with CCC's adopted management strategy. PL2 refers to the implementation of a patch/edge retention system around biodiversity anchors encompassed in the four WTRA's. LO2 refers to higher levels of retention prescribed surrounding riparian features: This has been implemented around Mat Creek (S2 class stream) as well as Deception Creek (S5 class stream) and stream S6-14-1.
BMP PL3 and SO4 have been implemented as well. PL3 refers to the appropriate training of forest planners, layout personnel, and forest workers. SO4 refers to operation specific recommended practices when chance encounters of active nests occur.

Stand/ Site Attributes:

Slope values are low to moderate in most of the block with a few moderately steep areas. Middle to lower elevation ICH wk1 site conditions. Aspect is mainly east facing, with long, uniform, continuous slopes. Middle to lower slope location. Vegetation cover is low to moderate over most of the block. Existing coarse woody debris levels are low to moderate (5-20%) (15-55cm diameter) in most areas.

SU A: stand type is: $Hw_5Cw_3Fdi_2$(LwSx) with approximately 625 stems/ha.

SU B: stand type is: $Cw_5Hw_4Sx_1$(Fdi) with 600 stems/ha.

Average stand density (all species) is 622 stems/ha. Most stems fall within the 20-65cm DBH classes, with <2% of stems in the 70-120cm DBH classes. Approximate species densities are Hw 319 stems/ha, Cw 207 stems/ha, Fdi 64 stems/ha, Sx 17 stems/ha, Lw 14 stems/ha and At 2 stems/ha. Stand age ranges from 70-193 with an average of 132 years old. The understory contains densities of Hw and Cw regen, saplings and poles that are mainly in poor (suppressed) condition.

Forest cover adjacent to the block includes a mix of previous selection harvesting and mature stands outside of all boundaries..

Actions prescribed:

Total Area specified for the retention of wildlife trees: **3.2 ha** (8.6% of gross area)

Wildlife Tree Retention Patch (WTRA):

WTRA-1 (1.4ha) Cw5Hw4Sx1(Fdi): This WTRA is located on the south boundary of the block preserving the RMZ of Mat Creek. Density and stand structure and composition is similar to the harvest area; Height range is 20 - 40m; DBH range is 30 – 100cm; Age class is predominantly 6. Slope values are moderate and crown closure is 40. The area includes moderate vegetation cover, low coarse woody debris, and decaying snags. Small mammal tracks and scat were noted.

WTRA-2 (0.5ha) Cw4Hw3Fdi2Sx1: This WTRA is located in the northeast corner of the block and preserves the RMZ of Deception Creek. Stand structure is similar to the harvest area, 500-700 sph; height range is 20-35m; DBH range is 40 – 80cm; Age class is predominantly 6. Old stumps and snags were noted.

WTRA-3 (0.5ha) Fdi5Hw3Cw2(Lw): This WTRA is located in the centre of the block and contains steep, potentially hazardous terain. Stand density is approximately 400sph; heights are average 32m. A non-merchantable component exists of Hw7Cw3 at approximately 600sph. There is moderate cover of CWD, mainly on the ground, at 15-30cm in diameter

WTRA-4 (0.9ha) Cw4Hw3Fd3: This WTRA is located in the centre of the block preserving the RMA of S6-14-1. Slopes are moderate to steep. Mature density is approximately 400sph and average height is 25m. A non-merchantable component exists of Hw6Cw4 at approximately 550sph. The area contains moderate vegetation cover including thimbleberry, devil's club, yew and Hw regen and low to moderate Cw, Hw and Fdi CWD from 15-50cm in diameter.

WTRA's will provide stand structure values for wildlife, perching and cover values, and riparian values. Coarse woody debris values will also be created over time from dead and fallen stems. WTRAs have been established in part, as a best management practice for the reduction of migratory bird incidental take **(BMP PL2, LO2)** and to mitigate risk nearby streams.

Snags

Retain safe snags **<5m tall** in **SU A and B** where operationally feasible. Snags with evidence of wildlife use are preferred.

C.2c FISHERIES

There is one **S2 class** stream (Mat Creek) that flows outside the southern harvest boundary. This stream flows in a southeast direction and drains into Meadow Creek. The full 30m RRZ and **≥80%** of the basal area will be retained within the **20m RMZ** within WTRA-1 and outside the harvest area.

See Section E.1 for Riparian Management Strategies.

Drainage from the majority of the cutblock area flows downslope to the East, towards Mat Creek.

C.2d WATERSHEDS

See RESULTS AND STRATEGIES (3.4.4 – Consumptive Use Streams).

C.2e RECREATION

Not applicable. The proposed cutblock is not located within a designated Recreational Area or Trail with legal objectives.

C.2f BIOLOGICAL DIVERSITY

Landscape Unit - K17 (Goat Range): High BEO Assignment.

C.2g VISUAL RESOURCE MANAGEMENT

See RESULTS AND STRATEGIES (3.6 – Visual Quality)

C.2h CULTURAL HERITAGE

See RESULTS AND STRATEGIES – (3.7 - Objectives set by Government for Cultural Heritage Resources)

See Section E.5 for Archaeological information

C.2i RANGE

Not applicable. There are no range tenures located in the FDUs covered by this FSP.

C.2j OTHER RESOURCES

Trapping / Guiding:

Trappers or guiding license holders in the area will be identified and notified through the Forest Stewardship Planning process.

Windthrow:

Windthrow hazard is **Moderate** for adjacent mature stands and **Low** for adjacent immature stands. These stands have already been partially exposed to winds from past harvesting, roads and natural openings.

Soils are fine and moderately well drained with 30-40 cm rooting depths.

CONDITIONS NOT APPLICABLE TO THIS SITE PLAN

THE FOLLOWING CONDITIONS WERE CONSIDERED, AND FOUND NOT TO BE APPLICABLE TO THIS SITE PLAN:

None identified.

D. ECOLOGICAL INFORMATION AND SITE CHARACTERISTICS

D.1 STANDARDS UNITS AND CRITICAL SITE CONDITIONS

	BIOGEOCLIMATIC					
SU	**TREATMENT UNIT**	**ZONE**	**SUBZONE**	**VARIANT & PHASE**	**SITE SERIES**	**SITE TYPE**
A	1	ICH	wk	1	01^{9} 05^{1}	-
B	1	ICH	wk	1	05	-

E. MANAGEMENT STRATEGIES

E.1 RIPARIAN MANAGEMENT STRATEGIES

RIPARIAN RESERVE ZONE (RRZ)

RIPARIAN/ LAKE ID	RIPARIAN/ LAKE CLASS	HARVESTING Y/N	SU XREF	DESCRIPTION OF THE PURPOSE AND EXTENT OF REMOVAL OR MODIFICATION OF TREES AND ANY RELATED FOREST PRACTICES IN RIPARIAN RESERVE ZONE(S)
Mat Creek (S2)	S2	N	A,B, WTRA-1	**30m RRZ:** No harvesting will take place in the 30m RRZ of Mat Creek. The harvest boundary was located ≥30m from Mat Creek.

RIPARIAN MANAGEMENT ZONE (RMZ)

RIPARIAN/ LAKE ID	HARVESTING Y/N	SU XREF	MANAGEMENT STRATEGIES FOR RIPARIAN OR LAKESHORE MANAGEMENT AREAS INCLUDING PROTECTING STREAM BANKS (if there is no RRZ), MAINTAINING SHADE, AND DEBRIS MANAGEMENT. IF FELLING AND/OR YARDING ACROSS STREAMS. INCLUDE EITHER THE RESIDUAL BASAL AREA OR DENSITY FOR RMZ (S) AND LMZ (S).
Mat Creek (S2)	Y	A,B, WTRA-1	**20m RMZ: ≥70%** of the basal area will be retained within the 20m RMZ within WTRA-1 and outside the harvest boundary. Portions of the 20m RMZ that fall within the block will be harvested as per SU A and B. (See additional management strategies below)
Deception Creek (S5)	Y	A, WTRA-2	**30m RMZ: ≥10%** of the basal area will be retained within the 30m RMZ outside the harvest area and within WTRA-2. (See additional management strategies below)
S6-14-1	Y	A,B, WTRA-4	**20m RMZ:** ≥20% of the basal area will be retained within WTRA-4. Understorey stems (layer 3 & 4 stems & deciduous stems & shrubs) will be retained to a maximum of 100 stems/ha. Portions of the 20m RMZ that fall within the block will be harvested as per SU A and B. Portions of Spur 1 and 2 fall within the RMZ because the road is required as part of a stream crossing. Road maintenance activities must not be carried out beyond the clearing width of the road, except as necessary to maintain the stream crossing. Gravel or other fill must not be removed from the RMZ in the process of constructing, maintaining or deactivating the road, unless the gravel or fill is within the road prism, at the stream crossing, or there is no other practicable option. (FPPR 50) (See additional management strategies below)

NON-CLASSIFIED (NC) RIPARIAN AREAS

RIPARIAN/ LAKE ID	SU XREF	MANAGEMENT STRATEGIES
NCD-14-1, 2, 3	A	Three NCD channels are present within SU A and WTRA-2 at the northeast end of the block. (See additional management strategies below)

1) **Deception Creek (S5):** had an average channel width of 3.6m, and average gradient of 18%. The stream runs outside the northern harvest boundary.
2) **S6-14-1:** Stream had low flow, average channel width of 1.5m, and average gradient of 17%. The stream originates on upper slopes and enters the block within WTRA-4 before passing through portions of SU A and B
3) Observe a **5m Machine Free Zone (MFZ)** on the **S6** stream, except at designated road and skid crossings. Reserve non-merchantable understory stems **<17.5cm DBH** and **shrubs** within the **5m MFZ**, where practicable.
4) **Fall and skid timber away from riparian features** (streams, NCD's, wetland) where practicable. Any debris entering a riparian feature as a result 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. **Minimize crossings** on **watercourse channels** to the extent possible.
5) Where **watercourses** are crossed more than once, it is recommended to place a temporary skid bridge (e.g.: logs placed in draw) in order to prevent a potential diversion of flow.
6) All **machine trails** and **crossings** (NCD) should be fully rehabilitated upon the completion of harvesting or prior to the next freshet. Excess material that could cause redirection of natural drainage patterns should not be left at crossing locations.
7) **All surface drainage patterns** should be maintained and any that are disrupted as a result of harvesting operations should be restored immediately.
8) **A post-harvest inspection** should be completed to assess the amount of logging debris/excess soil within the wetted perimeter of all subtle drainage features. All natural drainage patterns should be maintained and left free of excess debris (slash or soil) that could result in a redirection of seasonal surface runoff/drainage diversion.
9) **Basal area retention** levels for the in-block RMZ's (within the NAR) are based on windthrow, windfirmness, wildlife habitat, water quality, and operational constraints.

E.2 FOREST HEALTH MANAGEMENT STRATEGIES

SU	Code	Nelson Region DRA Risk Factors	Points	Relative Risk	Comments
A,B	DRA	Site factors	**8**	H	• Armillaria is absent or present at low levels within the stand. • The Nomographic Zones in Section 3.0 of the "Armillaria Root Disease Management Guidelines for the Nelson Forest Region" (June 1998) indicate that Alternative or Intensive deferred treatments for root disease management are appropriate for this site. should Armillaria become a problem. • Alternative treatments will include planting a species mixture that includes species tolerant and /or moderately susceptible to Armillaria (e.g.: Lw, Cw, Pw). Fd (highly susceptible) may be included but should be limited to a maximum of 50% of the mix. Microsite selection should reflect buffer zones around infected stumps, if they can be identified. • Hand-pulling (preferred) or pop-up spacing (alternative) should be considered in the future should Armillaria become a limiting factor in meeting regeneration or free growing requirements (see section H). • Stumping or pushover harvesting treatments are not suitable due to low sign of Armillaria, steep slopes in areas, and high soil hazards.
		Host factors	**3-9**	L-M	
		Inoculum potential	**0**	L	
		Disease factors	**4-9**	L	
			15-26	**L-M**	

Other Forest Health Factors

SU	Code	%	Comments	Current risk to inventory
A, B	IWS	0	If Sx is planted in the post-harvest stand, monitor for white pine (spruce) weevil during silviculture surveys.	nil
A, B	DSB	0	Pw is absent or present in minor amounts in the current stand. A small amount of Pw may be planted in SU A and B. Plant only rust resistant stock. Expect high incidence of white pine blister rust on any naturally regenerated Pw.	nil
A, B	IBD	<2	Very Low incidence of Douglas-fir beetle. Fd forms approximately 10% of the current stand density and 18% of the current stand volume over the entire block (DBH range 20-65cm).	Low

Expected future risks and actions

A forest health/pest incidence assessment is not required. Forest health information was collected during SP field data collection in **October 2018**.

Stand health risks in the future include a heavy snowpack on a cool aspect causing snowpress.

Timber type of the pre-harvest stand by volume is $Hw_{47}Cw_{29}Fd_{18}Lw_{3}Sx_{3}$

E.3 VEGETATION MANAGEMENT STRATEGIES

LIVESTOCK TO BE USED FOR VEGETATION MANAGEMENT: YES: ☐ NO: ☒

Current Brush Hazard: SU A,B: Low levels of brush inside most of the block with patches of moderate levels of herbaceous brush in 05 type areas.

Future Brush Hazard: Moderate. Mesic to subhygric moisture regime, cool east aspect and established brush in disturbed areas. Potential competitor species exist outside the block and at block boundaries, and include alder, lady fern, thimbleberry and devil's club.

Brushing Methods: Should brushing become necessary, manual treatments are the preferred methods.

Risks and Considerations: Woody brushing or stand tending treatments must be carefully assessed due to pathogen ability to colonize wounds on stocked trees that may be damaged by brushing treatments.

Anticipated Timing: Treatment needs will be assessed through periodic walkthroughs and silviculture surveys. Treatment timing will be prescribed at the time of brush assessment.

E.4 COARSE WOODY DEBRIS (CWD) MANAGEMENT STRATEGIES

Existing coarse woody debris levels are low to moderate (5-20%) (15-55cm diameter) in most areas. Some areas contain older, well decayed debris from previous selective logging. The stand has a dead standing and down component (Pw, Hw, Cw, Fdi, Lw and Sx).

(FPPR Section 68): **Manage for the minimum of 4 logs per hectare,** each being at least **2 metres** in length and at least **7.5cm** in diameter at one end.

See the SITE PREP section (K.1) for additional CWD management strategies.

E.5 ARCHAEOLOGICAL IMPACT ASSESSMENT

Archaeological Overview Mapping of the **CP 414** area shows that **block 14** does not fall within a polygon that has a potential rating. An Archaeological Impact Assessment is not required.

F. SOIL CONSERVATION

F.1 SITE DISTURBANCE

	HAZARD RATINGS			SOIL CHARACTERISTICS		
SU	SOIL COMPACTION	SOIL DISPLACEMENT	SURFACE SOIL EROSION	DEPTH TO UNFAVOURABLE SUBSOIL (cm)		TYPE OF UNFAVOURABLE SUBSOIL
				MIN(cm)	MAX(cm)	
A	High	Moderate	High	60	65	None
B	High	Moderate	High	60	60	None

F.2 SOIL DISTURBANCE LIMITS

SU A: ARE THERE SENSITIVE SOILS? ☐ YES ☒ NO

SU B: ARE THERE SENSITIVE SOILS? ☐ YES ☒ NO

MAX. PROPORTION OF TOTAL AREA UNDER THE PRESCRIPTION ALLOWED FOR PERMANENT ACCESS STRUCTURES (PAS): **5.3%.**

Roadside harvesting or temporary landings will be used.

DEACTIVATION OF PERMANENT ACCESS STRUCTURES: Any landings will be deactivated – debris will be piled & burned, water control will be installed around all landings.

Terrain Stability Assessment, Deception Creek, CP 409 (414) Blocks 13, 14, 15 and Spurs 1, 3, 4, 5 and 6

Block 14, and the associated Spurs 1, 2, 3, and 6 roads, were reviewed by Christopher Perdue, P.Geo., Eng.L. of Perdue Geotechnical Services on October 4 and 5, 2018 (road report dated May 17, 2019 and blocks report dated May 29, 2019)**:**

Spur 1: No significant concerns identified along the majority of the road length, other than the proposed, northernmost switchback (apex at Hub 42) is situated on a groundwater emergence zone within a broad, historic slump feature; gentle surrounding slopes; switchback recommended to be relocated 20m south to avoid wet site conditions and excessive site disturbance.

Spurs 2, 3, and 6: No significant concerns identified along the entire lengths of each road; limited full bench construction sections recommended across hillside gradients incapable of supporting side cast fill slopes; limited sections of reduced cut slope angles across wet sections where fine-grained soils are anticipated.

The Spur-1 switchback at Hub 42 was relocated as recommended.

Based on the results of the assessment, the likelihood of landslide initiation as a result of the proposed timber harvesting of **Block 1** is rated as **Low**.

- Several large, historic and inactive landslides were identified throughout the proposed development area that are inferred to be several thousands of years old.
- No evidence of recent or imminent slope instability was identified within the proposed harvest area or the immediate adjacent terrain during the field review.

Road construction practices and drainage control measures along access routes within and downslope of the proposed harvest areas (including seasonal surface drainage control measures during periods of non-operational use) will have the greatest influence on surface / sub-surface watercourses and slope stability.

Provided all natural watercourses are appropriately managed and maintained, the proposed timber harvesting is not expected to have a significant adverse effect on hillslope hydrology or slope stability.

General Timber Harvesting Recommendations are included in the TSA report and are noted on the Harvest Plan map.

SU	MAXIMUM ALLOWABLE SOIL DISTURBANCE WITHIN THE NET AREA TO REFOREST (%)	MAXIMUM EXTENT SOIL DISTURBANCE LIMITS MAY BE TEMPORARILY EXCEEDED TO CONSTRUCT TEMPORARY ACCESS STRUCTURES OR EXCAVATED OR BLADED TRAILS (%)
A	**10%**	**5%**
B	**10%**	**5%**

MASD for Roadside Work Areas: 25%

Maximum soil disturbance levels may be exceeded for short periods of time; however any temporary access structures or excavated or bladed trails will be rehabilitated to the extent necessary to bring the SU net area back into compliance with the specified soil disturbance limits.

See **Section F.4** below for description of temporary access structures or excavated or bladed trails, if any.

Avoid harvesting during spring freshet/breakup conditions when soils are moist to reduce soil displacement and compaction.

Steep slopes >35% are present in parts of SU A and are noted on the **Harvest Plan Map.** In SU A and B conventional harvest methods will be utilized.

F.3 REHABILITATION TIME FOR TEMPORARY ACCESS STRUCTURES

MAXIMUM ALLOWABLE TIME TO COMPLETE REHAB (MEASURED FROM COMPLETION OF HARVEST): **1 YEAR**

F.4 MANAGEMENT STRATEGIES FOR TEMPORARY ACCESS STRUCTURES

SU	GENERAL LOCATION:	MAX ALLOWABLE HEIGHT OF CUTBANKS (m)	AVERAGE HEIGHT OF CUTBANKS (m)	EQUIPMENT TO BE USED (IF OTHER THAN EXCAVATOR)
A,B	Blading or excavating is expected to occur in parts of the unit with moderate to steep slopes.	0.8	0.3	Skidder, cat.

Total PAS = **2.0 ha**

Proposed Landings (temporary):
SU A: **5** landings @ 0.2 ha = **1.0 ha**
SU B: **1** landing @ 0.2 ha = **0.2 ha**

- **SU A, B: Roadside harvest with landings. Favourable skidding with minor amount of adverse skidding below spur 2 and 6.**
- **See Section E.1 for stream management strategies.**

The following will apply for any excavated/bladed trails that are required:

- Maximum trail width is 4m.
- Actual dimensions of bladed trails may vary depending on topography.
- The amount of bladed trail constructed will be kept to a minimum.

Short sections that become bladed trails where a non-bladed trail crosses a hump or ridge will be exempt from rehabilitation requirements provided that the soil disturbance limits in this SP are not exceeded.

Rehabilitation for bladed or excavated trails:
Any bladed or excavated trails will be rehabilitated as follows:

- De-compact the trail, including removing woody debris that is conducting subsurface moisture
- Place fill material that was sidecast on the excavated portion of the trail
- Re-contour the slope
- Re-establish natural surface drainage
- Place some woody debris over exposed mineral soil

G. SILVICULTURAL SYSTEMS

SILVICULTURAL SYSTEMS

SU	SYSTEM / VARIANT / PHASE
A, B	Clear-cut silviculture system.
SU	**STAND STRUCTURE AND SITE CONDITION - COMMENTS**
A,B	Post-harvest stand structure will be even-aged with one age class. Planted trees and natural regeneration will include **Fd Cw Lw Sx Hw (Bl Pw)**. No mature leave trees are prescribed for this block. **Wildlife Tree Group Reserve Area (WTRA):** totalling **3.2 ha**

H. STOCKING REQUIREMENTS (As per DSE South Columbia Default Stocking Standards Version 1.0, April 1, 2018)

LICENCE #	CP	BLOCK	OPENING NUMBER	LOCATION
A30171	414	14	82K035	Deception Creek

H1 ECOLOGICAL INFORMATION

SU	Net Area (ha)	Zone	Subzone	Variant/ Phase	Site Series (complex - %)	Elevation			Slope position	Soil Texture (0-30cm)
						Min	Max	Avg		
A	25.7	ICH	wk	1	01^{9} 05^{1}	920	1280	1100	Mid-Lower slope	SiL-L
B	6.4	ICH	wk	1	05	910	1010	960	Mid-Lower slope	SiL

RATIONALE FOR STOCKING STANDARD FSP ID SELECTION

STANDARDS UNIT FSP ID #	CHANGE FROM STANDARD PRACTICE	COMMENT: (For example: Forest health (DRA) or Rocky site)
1057894	N/A	
1057900	N/A	

H2 STOCKING REQUIREMENTS FOR SILVICULTURAL SYSTEMS OTHER THAN SINGLE TREE SELECTION

Standard unit	Standards ID	Regen Delay (yrs)		Free Growing Early (yrs)			Free Growing Late (yrs)	
A	1057894	4		9**			20	
Preferred Species		**Acceptable Species**		**Post Spacing Density (sph)**				**Max Coniferous (sph)**
Species	min ht(m)	Species	min ht (m)	**Min**	700	**Max**	1800	10,000
Cw Hw[201] Fd[9,14,58,203] Pw[31]	Fd- 1.4, Pw- 2.0, Cw Hw- 1.0	Lw[9,14,16,32] Sx[10,13,204]	Lw- 2.0, Sx- 1.0	**Well Spaced Trees (sph)**				
				Target	**Minimum** pref&acc		**Minimum** preferred	**Min Horizontal Inter-tree distance (m)**
				1200	700		600	2.0*
							Height Relative to Competition (%)	
							150	

B	1057900	4		9**			20	
Preferred Species		**Acceptable Species**		**Post Spacing Density (sph)**				**Max Coniferous (sph)**
Species	min ht (m)	Species	min ht (m)	**Min**	700	**Max**	1800	10,000
Cw[32] Hw[201] Sx[201]	Cw Hw Sx- 1.0	Pw[1,31] Bl[500]	Pw- 2.0, Bl- 1.0	**Well Spaced Trees (sph)**				
				Target	**Minimum** pref&acc		**Minimum** preferred	**Min Horizontal Inter-tree distance (m)**
				1200	700		600	2.0*
							Height Relative to Competition (%)	
							150	

** Early Free Growing has been left in for information purposes only. In RESULTS it is in the comments section only and does not preclude making FG declarations early.

Other Required Stocking Information/Footnotes :

1 – suitable on elevated microsites

9 – suitable on warm aspects

10 – suitable on cool aspects

13 – suitable at upper elevations

14 – suitable at lower elevations

16 – suitable in the southern portion of biogeoclimatic unit

31 – must use of blister rust resistant stock. See BC Journal of Ecosystems and Management 10(1): 97-100 for supplementary information. 32– limited by growing-season frosts

58 – South Area – Fd limited to a max 50% of preferred and acceptable well-spaced stems in the IDFmw and all subzones of the ICH due to root rot. See Root Rot Handbook (2017, in press).

201- Maximum 50% of preferred and acceptable well-spaced trees

203 – Recommended on sites for climate change adaptation.

204 – Not recommended due to climate change concerns.

* - a reduced MITD of 1.7m may be used to facilitate planting superior microsites, when sites have: mechanical site preparation (mounding and disk trenching), been previously fill planted, or conditions where obstacle planting for snow creep is necessary. Reduced MITD applies to PLANTED TREES ONLY

H3 SITE PREPARATION

SU	TECHNIQUE (S) / LIMITING FACTORS
	Options for SU A, B include: • Pile, or pile and burn, slash accumulations on roadsides and landings, or within the NAR. Up to 10% of piles may be left unburned in order to contribute to wildlife habitat and coarse woody debris values. • Piling treatment during dry weather conditions or when soils not saturated • Burn piles in the spring or fall. Up to 20% of piles may be left unburned to contribute to wildlife habitat and coarse woody debris values. • No site prep, plant as is. • Mechanical site preparation (e.g.: mounding, scarification) where necessary and feasible, combined with brush/slash piling, utilizing an excavator. • Broadcast burn or Spot burn if needed within the NAR to reduce excessive slash cover. Low to Moderate intensity burn, impact rank 2 to 3. (Broadcast burn or Spot burn is a good option to reduce slash levels prior to planting, and improve soil warming on this cool aspect.)

H4 PLANTING

SU	Area (ha)	Regen. Method	Species	Age	Stock Type	Season	Stems/Ha	Total Stems
A	25.7	Plant	CwFdPw (SxLw)	1+0	PSB 412A/410	Spring	1400-1600	35,980 - 41,120
B	6.4	Plant	CwSx(Pw)	1+0	PSB 412A/410	Spring	1400-1600	8,960-10,240

LIMITING FACTORS / COMMENTS:

.

- Plant on the high or low side of obstacles to minimize snow creep and snow press.
- Hw is a preferred species in SU A and B, and natural regen exist. Expect quantities of natural regeneration. Maximum 50% of preferred and acceptable crop trees may be Hw (Footnote 201)
- Manage for a high diversity of planted trees as a climate change adaptation strategy. Increasing species diversity may help buffer the negative impacts of climate change, and make forests more resilient when faced with extreme weather events. This strategy is meant to reduce the forest health risks to future timber supply by providing a diversity of species should one or more become susceptible to pests or other damaging agents.
- Replanting these stands with a high diversity of species, including species that are more adapted to hotter and drier growing conditions like Lw and Fdi, will promote a stand that is more likely to tolerate a warming climate.
- Microsite selection for Lw, and Fdi concentrated to dry sites and Cw and Sx populating draws and cold air exposures.
- Limiting factors include a cool aspect and heavy snowfall. Moisture surpluses are expected in the spring.
- Plant as soon as possible following harvesting or site prep operations. **Note:** a post-harvest assessment should be completed to assess the necessity of site preparation prior to planting. If site prep is needed, the person completing the assessment will generate a prescription surrounding the areas that are required and the methods to be employed.
- Anticipated Timing/Constraints: Treatment needs will be assessed through periodic walkthroughs and silviculture surveys.
- Monitor for signs of ungulate browse during silviculture surveys.

H5 BRUSHING / STAND TENDING

SU	TECHNIQUE (S) / LIMITING FACTORS
A,B	Brush hazard: Current hazard is moderate due to mesic to subhygric moisture regime with some wet alder complex in openings outside the block. Future brush hazard is moderate to high due to cool aspect and evidence of wet alder brush complex in openings. Competitor species post-harvest include thimbleberry, lady fern, fireweed and woody shrubs such as alder, maple and willow. Brushing Methods: Manual treatments are preferred. However, existing pathogens spread by colonizing wounds on stocked trees and care must be taken to limit damage to crop trees. Woody brushing may be necessary prior to Free Growing and likely is an option in pathogen management, as long as crop trees are not injured. Anticipated Timing/Constraints: Treatment needs will be assessed through periodic walkthroughs and silviculture surveys. Treatment timing will be prescribed at the time of brush assessment.

I. ADMINISTRATION

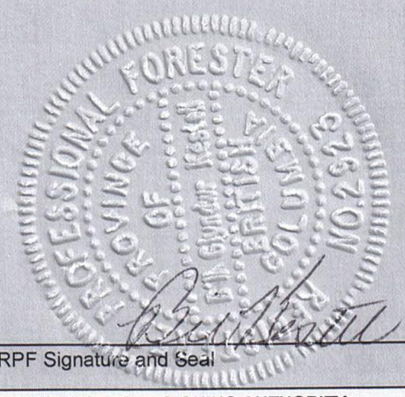
RPF SIGNATURE AND SEAL:

Bill Kestell

RPF Name (Printed)

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 the standards expected of a member of the Association of British Columbia Forest Professionals.

Date: 2020-02-15 RPF #: 2923



RPF Signature and Seal

SITE PLAN PREPARED BY:

Tom Haukaas, RFT

MAJOR LICENSEE SIGNING AUTHORITY:

SITE PLAN ATTACHMENTS:

- ☑ SP MAP(S)
- ☑ ARCHAEOLOGICAL IMPACT ASSESSMENT
- ☑ TERRAIN STABILITY FIELD ASSESSMENT
- ☑ VISUAL IMPACT ASSESSMENT
- ☐ RIPARIAN ASSESSMENT
- ☐ FOREST HEALTH / PEST INCIDENCE ASSESSMENT
- ☐ SOIL CONSERVATION TABLE
- ☑ OTHER: REFORESTATION PRESCRIPTION
- ☑ OTHER: ARMILLARIA RISK ASSESSMENT MATRIX

Licence Holder Signing Authority Signature

Licence Holder Signing Authority Name (Printed)

Date:

	Standards Units					
	A	**B**			**TOTAL HA**	**%**
Compaction	High	High				
Soil Displacement	Moderate (10-14)	Moderate (7)				
Surface Erosion	High (30-31)	High (28)				
Forest Floor Displacement	Mod-High (13-17)	Moderate (14)				
Mass Wasting	Moderate to High (36-39)	Moderate (36)				
Harvest System	Ground Based	Ground Based				
TOTAL AREA	29.1	8.2			37.3	
Wildlife Tree Patches / NP Nat						% WTP/IMM
WTRA	1.8	1.4			3.2	8.6
Permanent Access Structures						% Disturbance
Proposed roads	1.4	0.4			1.8	4.8
Existing roads	0.2	-	-		0.2	0.5
Landings	-	-	-		-	-
Total disturbance permanent access structures					**2.0**	**5.3**
NET AREA TO BE REFORESTED	**25.7**	**6.4**			**32.1**	
Sensitive Soils (Y/N)	No	No				
Temporary Access Structures: Road, landing, excavated or bladed trails that will be rehabilitated (% of NAR).	5% (excavated/bladed trails)	5% (excavated/bladed trails)				
Max. Allowable dispersed Soil Disturbance (% of NAR by Standards Unit) as a result of harvesting, mechanical site preparation, or hazard abatement activities.	10%	10%				

Comments: Landings within the NAR are temporary and will be fully rehabilitated.

Rehabilitation/Deactivation measures:

All landings and trails within the NAR are temporary and will be rehabilitated by decompacting, re-contouring, surface restoration, followed by planting.

Landings will be deactivated as per the following: Minimize runoff flowing onto the landing and minimize erosion of the landing fill material by incorporating appropriate drainage systems. If required, carry out measures to ensure that the landing is stable, such as decompaction, re-contouring, and grass seeding.

Proposed Roads (permanent):

SU A: Spur 1 = 1068m x 10m **= 1.07ha**

Spur 2 = 21m x 10m = **0.02ha**

Spur 3 = 327m x 10m = **0.33ha**

Spur 6 = 58m x 10m = **0.06ha**

SU B: Spur 1 = 93m x 10m = **0.09ha**

Spur 2 = 222m x 10m = **0.22ha**

Existing Roads (permanent):

SU A: SECTION D = 192m x 10m = **0.19ha**

Proposed Landings (temporary): 5 landings utilizing new access structures. One landing utilizing existing access structures. Five 0.2 ha landings in SU A, and one 0.2ha landing in SU B.

See **Section F.4** for discussion of rehabilitation of excavated/bladed trails.