



REGIONAL DISTRICT OF CENTRAL KOOTENAY
DEVELOPMENT PERMIT
DP1909D (Wing Creek Resort)

Date: July 4, 2019

Issued pursuant to Section 490 and 491 of the *Local Government Act*

1. This Development Permit is issued to Kevin Hoffart of Wing Creek Resort, Shutty Bench as the registered owner (hereinafter called the "Permittee") and shall only apply to those lands within the Regional District of Central Kootenay, in the Province of British Columbia legally described as Lot 1, District Lot 819, Plan NEP88169 (PID: 027-774-546) as shown on the attached Schedules 1 and 2, forming part of this Permit, referred to hereafter as the "said lands".
2. This Development Permit is issued subject to compliance with all of the bylaws of the Regional District of Central Kootenay applicable thereto, except as specifically varied or supplemented by this Permit.
3. This Development Permit shall not have the effect of varying the use or density of land as specified in the applicable Zoning Bylaw of the Regional District of Central Kootenay, nor a Floodplain Specification under Section 524 of the Local Government Act.
4. The said lands have been designated 'Tourist Commercial (TC)' and are located within a Development Permit Area pursuant to the Electoral Area 'D' Official Community Plan Bylaw No. 2435, 2016 as amended.
5. The Permittee has applied to the Regional District of Central Kootenay to construct a single family dwelling within the Watercourse Development Permit area and to use land and buildings situated on the said lands for this purpose. Pursuant to this Development Permit and subject to the terms and conditions herein contained, as well as all other applicable Regional District Bylaws, the Regional District of Central Kootenay hereby authorizes the use of the said lands for a single family dwelling.
6. The Permittee is required to obtain approval in writing from the Regional District of Central Kootenay prior to the construction any new buildings, external additions to existing buildings or for any deviation from the development authorized under Section 5 of this Development Permit. Furthermore, the Permittee is hereby advised of the following requirements:
 - 6.1 The Regional District of Central Kootenay Building Department requires that the Permittee obtain a demolition permit and/or building permit prior to the removal of any existing buildings and structures, the renovation, expansion or alteration of any existing building and the construction of any new building.
 - 6.2 A building permit shall be required prior to any construction involving land in this location at which time the Permittee shall be required to address sewage disposal issues to the satisfaction of the Interior Health Authority and Regional District of Central Kootenay Senior Building Official.
7. As a condition of the issuance of this Permit, the Regional District shall hold an irrevocable Letter of Credit submitted by the Permittee in the amount of **\$3887.50** to ensure the landscaping requirements are completed and in accordance with the following provisions:


- 7.1 Environmental Best Management Practices are to be undertaken as per Section 6.2 of the Masse Environmental report shown in Schedule 3.
 - 7.2 The Mitigation Plan to be undertaken as identified in Section 7 of the Masse Environmental report shown in Schedule 3.
 - 7.3 Environmental Monitoring of development activities shall follow the recommendation of Section 8 of the Masse Environmental report shown in Schedule 3.
 - 7.4 A condition of the posting of the Letter of Credit is that should the Permittee fail to carry out the works and services as herein above stated, according to terms and conditions of this permit within the time provided, the Regional District may use the Letter of Credit to complete these works or services by servants, agents or contractors, and any surplus shall be paid over to the Permittee. If the amount of funds is insufficient to cover the actual cost of completing the works, then the Permittee shall pay such deficiency to the Regional District immediately upon receipt of the Regional District's bill for same.
 - 7.5 The Permittee shall complete the landscaping works required by this Permit prior to July 4, 2020. Within this time period the required landscaping must be inspected and approved by the Regional District.
 - 7.6 If the landscaping is not approved within this time period, the Regional District has the option of continuing to renew the Letter of Credit until the required landscaping is completed or has the option of drawing from the Letter of Credit to complete the required landscaping. In this event, the Regional District or its agents have the irrevocable right to enter into the property to undertake the required landscaping for which the Letter of Credit was submitted.
 - 7.7 If the landscaping is approved within this time period without the Regional District having to draw on the Letter of Credit, 90% of the original amount of the Letter of Credit shall be returned to the Permittee.
 - 7.8 A hold back of 10% of the original amount of the Letter of Credit shall be retained until a final inspection is undertaken within 12 months of the date of the original inspection and approval was given to the landscaping. If the landscaping receives approval at final inspection, the 10% hold back will be returned to the Permittee. If after the final inspection, approval of the landscaping is not given, the Regional District has the option of continuing to renew the Letter of Credit until the required landscaping is approved or has the option of drawing on the Letter of Credit the funds to complete the required landscaping. In this event, the Regional District or its agents have the irrevocable right to enter onto the property to undertake the required landscaping for which the Letter of Credit was submitted.
8. The said lands shall be developed strictly in accordance with the terms and conditions of this Development Permit and the requirements of all applicable Regional District Bylaws as well as any plans and specifications which may, from time to time, be attached to this Permit shall form a part thereof.
 9. In accordance with the Local Government Act, if the development authorized by this Development Permit is not commenced within two years of the date of this Permit, this Permit shall lapse.
 10. In accordance with the Local Government Act, 'Notice' shall be filed in the Land Title Office that the said lands are subject to this Development Permit.

11. The terms of this Development Permit including subsequent amendments, are binding on all persons who acquire an interest in the said lands associated with this Permit.
12. It is understood and agreed that the Regional District has made no representations, covenants, warranties, guarantees, promises, or agreement (verbal or otherwise) with the Permittee other than those in this Development Permit. It is solely the responsibility of the Permittee to ensure that the requirements of all other applicable government agencies are satisfied.
13. This Development Permit does not constitute a building permit.
14. This Development Permit shall come into force and effect 14 days after the date of issuance unless a Waiver of Appeal is received from the Permittee at which time the Development Permit shall be deemed to be issued upon receipt of the Waiver of Appeal. OR If a Notice of Appeal is received the Development Permit shall be suspended until such time as the Board of the Regional District of Central Kootenay has decided the Appeal.

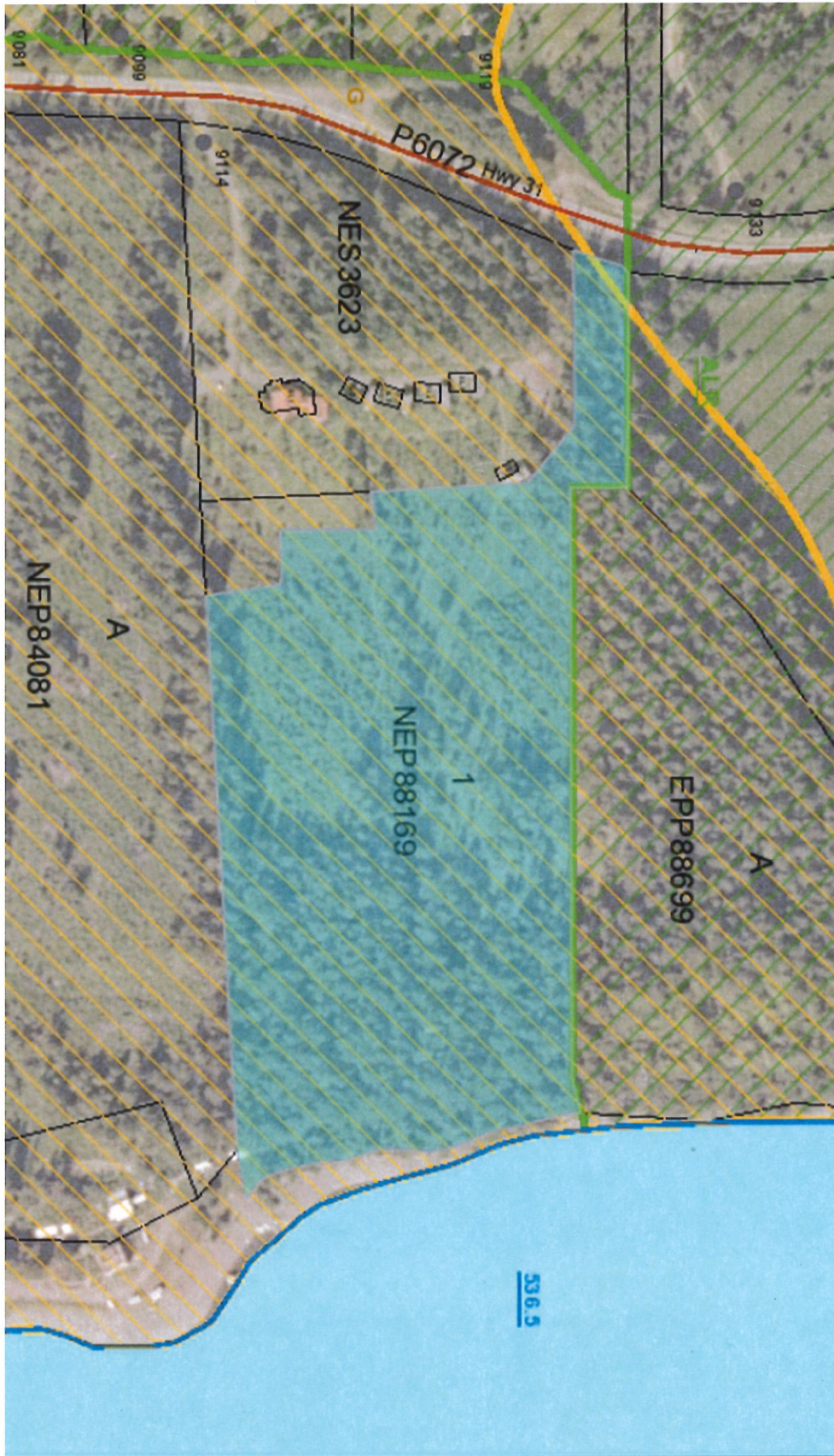


Sangita Sudan, General Manager of Development Services

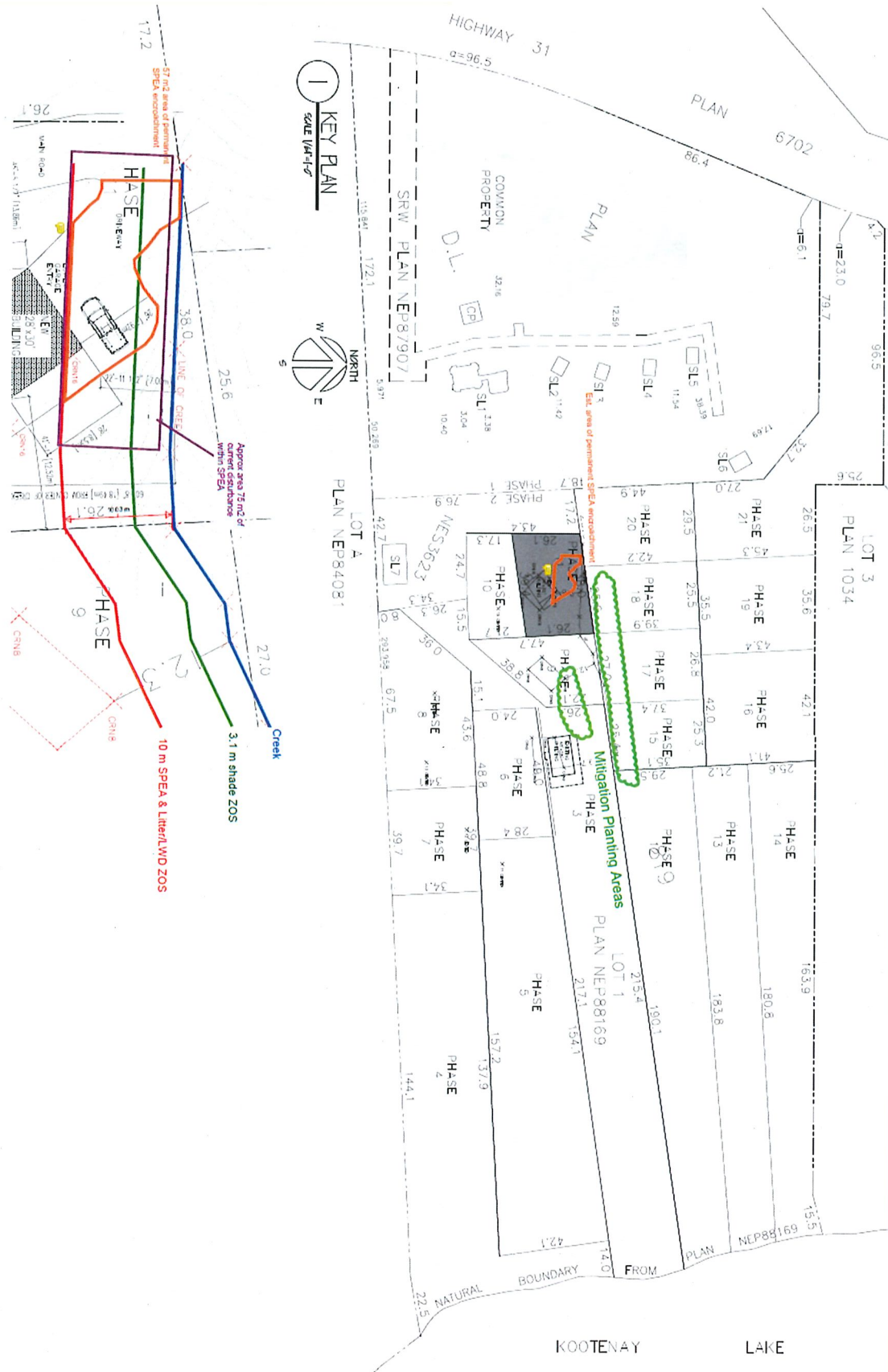
July 11, 2019
Date of Approval (date of review and approval)

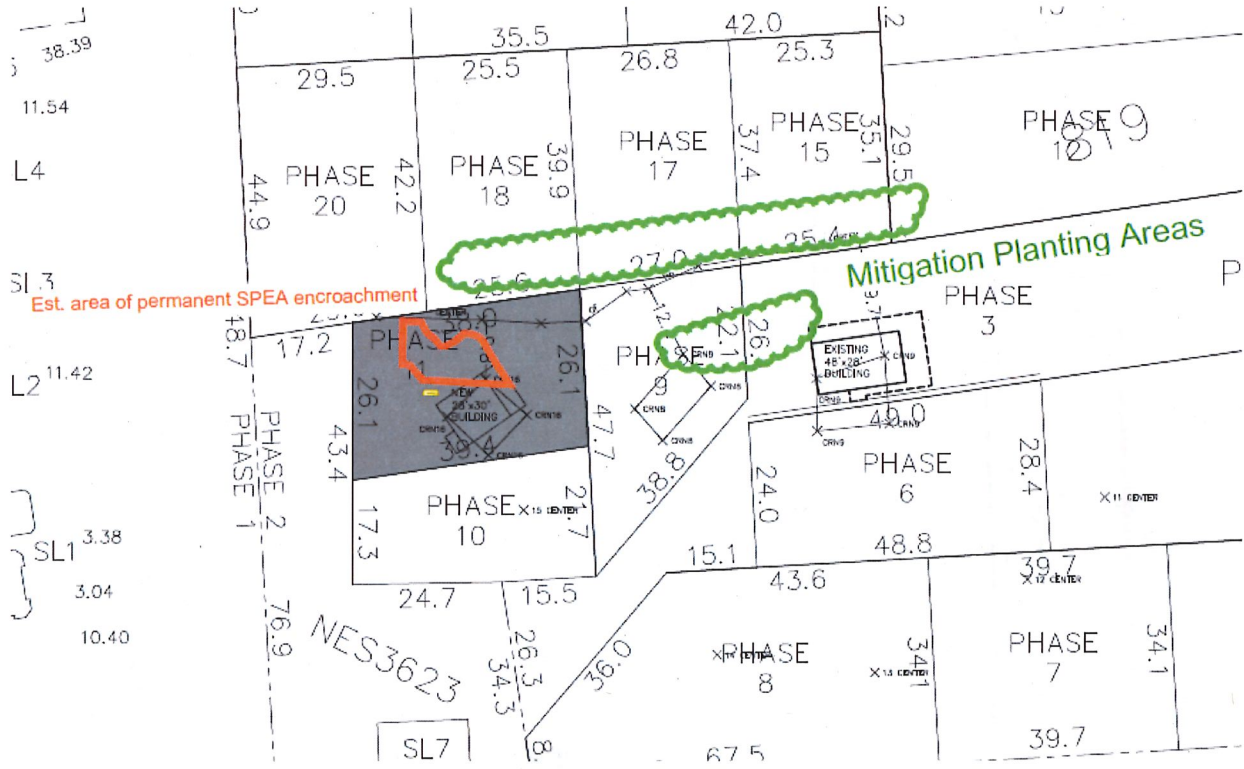
November 8, 2019 
Date of Issuance (pending receipt of securities)

Schedule 1: Subject Property



Schedule 2: Site Plan





Schedule 3: Environmental Assessment



WING CREEK RESORT Riparian Assessment



Prepared for:
Regional District of Central Kootenay
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May 16, 2019

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ABBREVIATIONS

AHI: Aquatic Habitat Index

DBH: Diameter at Breast-Height

FIM: Foreshore Inventory Mapping

GSC: Geodetic Survey of Canada

HWM: High Water Mark

LWD: Large Woody Debris

FLNRORD: Forests, Lands and Natural Resource Operations and Rural Development

QEP: Qualified Environmental Professional

RAR: Riparian Area Regulation

RDCK: Regional District of Central Kootenay

SPEA: Streamside Protection and Enhancement Area

WDP: Watercourse Development Permit

ZOS: Zones of Sensitivity

1 INTRODUCTION

Masse Environmental Consultants Ltd. was retained by Dwight Smith – President of Hamill Creek Timber Homes to conduct a riparian assessment for cabin 1 at the Wing Creek Resort (9114 Highway 31; Lot 1 District Lot 819 Kootenay District Plant NEP88169 Except Strata Plan NES3623 (Phase 1); PID – 027-774-546). A single cabin was constructed in 2018, and additional cabins are planned in the future.

Construction of cabin 1 and future proposed cabins will involve work within the 30 m Watercourse Development Permit (WDP) Area of a small unnamed creek, as defined in the Regional District of Central Kootenay Electoral Area 'D' Comprehensive Land Use Bylaw No. 2435, 2016.

A site visit was conducted on May 15, 2019 by Iraleigh Anderson A.Ag. to conduct a riparian assessment on the property.

This assessment evaluates the existing conditions of the property and riparian areas, identifies important habitat values, assesses the environmental impacts related to the proposed development, and recommends measures to protect environmentally sensitive areas during development. It is based on the following regulatory framework and best management practices documents:

- Electoral Area 'D' Comprehensive Land Use Bylaw No. 2435, 2016
- British Columbia Riparian Areas Regulation
- Kootenay Lake Shoreline Management Guidelines
- Provincial Water Sustainability Act
- General BMPs and Standard Project Considerations (Ministry of Environment)
- On the Living Edge: Your Handbook for Waterfront Living
- Develop with Care. Environmental Guidelines for Urban and Rural Land Development in British Columbia
- British Columbia Firesmart Homeowners Manual
- Riparian Factsheet No. 6 – Riparian Plant Acquisition and Planting

This report has been prepared by Iraleigh Anderson A.Ag., and reviewed by Sylvie Masse, MSc, RPBio.

I, Sylvie Masse, hereby certify that:

- a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the Fish Protection Act;
- b) I am qualified to carry out this part of the assessment of the development proposal made by the developer;
- c) I have carried out my assessment of the development proposal, and my assessment is set out in this Assessment Report; and
- d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

2 PROJECT OVERVIEW

2.1 Location

The subject property is located at the Wing Creek Resort Development ~6 km north of Kaslo, BC (Appendix 1). The property is situated within a rural subdivision, bordered by private properties to the north and south, Kootenay Lake to the east, and Highway 31 to the west (Appendix 2). The property covers an area of 7.5 ha, with 160 m of frontage on Kootenay Lake and 450 m frontage on an unnamed creek which flows east and drains into Kootenay Lake at the eastern natural boundary.

The project area is within the Interior Cedar Hemlock dry warm variant 1 (ICHdw1) biogeoclimatic subzone (MacKillop and Ehman 2016). This moist climatic region is characterized by very hot, moist summers; and very mild winters with light snowfall. Soils generally dry out in late summer for varying extents of time ranging from insignificant to extensive. Snowpacks are very shallow to shallow and of short duration and combined with the mild climate result in no significant soil freezing (MacKillop and Ehman 2016).

2.2 Existing Site Conditions

The subject property slopes along an eastern aspect toward Kootenay Lake (Photos 1-6). The property is bisected by a small west to east flowing creek which drains into Kootenay Lake. The creek is not recorded in BC Freshwater atlas data and is assumed to be a first order stream draining an area <100 ha.

The upper part of the subject property has been logged within the past 20 years and is currently regenerating young forest. Past logging extended to the banks of the creek and the riparian vegetation along the creek is also early seral. Slopes are gentle along this upper part of the property and all currently proposed building sites are located in this area. The lower part of the property is steeper with slopes of 30% and greater. The lower part of the property north of the creek has a slightly older Douglas fir (*Pseudotsuga menziesii*) and western redcedar (*Thuja plicata*) forest which has recently been thinned and has very little understory vegetation. An access road enters the property from the west and turns to the south along the contour above 5 current/proposed cabin building sites. An access path descends to Kootenay Lake on the north side of the creek.

A recently constructed cabin (cabin 3) sits on the steep southern bank above the creek. Cabin 3 is the first of five new cabins proposed in this part of the property and is covered under a site-specific exemption to the *Floodplain Management Bylaw 2080*, which allows the building footprint to extend no closer than 5.25 m from the creek. Excavation for the next proposed cabin (cabin 1) has begun above cabin 3, just east of the access road and south of the creek.

Multiple other existing cabins and outbuildings are sited between the area of new development and Highway 31 on a piece of common property of the Wing Creek Resort strata.



Photo 1. Young forest regeneration in foreground within upper part of the property. Conifer forest in the background covers the steeper lower part of the property.



Photo 2. Kootenay Lake access path through steep conifer forest in the lower part of the property.



Photo 3. Early seral riparian vegetation along the creek.



Photo 4. Kootenay Lake access path through young forest along upper part of the property.



Photo 5. Recently completed cabin 3.



Photo 6. Excavation for cabin 1 next to creek

2.3 Proposed Development

Current proposed development includes:

- Construction of cabin 1, a single-storey building with a deck (103.98 m²).
- Driveway and walking path for cabin 1.
- Connect cabin 1 to existing electric and septic systems which service existing buildings in the resort.

Cabin 1 has been granted a site-specific exemption to the *Floodplain Management Bylaw 2080*. Based on the conditions of the exemption, cabin 1 may be built no less than 7 m from the natural boundary of the creek.

Three more cabins are proposed within the immediate area around cabin 3 and the proposed footprint for cabin 1. The next 3 cabins have also been granted a site-specific exemption to *Floodplain Management Bylaw 2080* setbacks. In order to comply with the Regional District of Central Kootenay Electoral Area 'D' Comprehensive Land Use Bylaw No. 2435, 2016, the siting of the 3 future cabins will be adjusted based on the setbacks determined in this riparian assessment report.

2.4 Services and Site Drainage

Drinking water will be supplied to cabin 1 from an existing well to the east, near cabin 3. Electric and septic hookups will enter the cabin from the south and will be tied into the main services for the resort which are located on the common strata property to the west. The septic tank will be located south of cabin 1, ~18.5 m from the creek; which is outside of the 10 m setback for watertight septic tanks as outlined in Interior Health Authority Guidelines (IHA) as defined in the Standard Practice Manual (MOH 2014) under the *Sewerage System Regulation*.

3 REGULATORY REVIEW

3.1 Streamside Protection and Enhancement Area (SPEA)

No current or future development is proposed within the 30 m WDP of Kootenay Lake. The scope of this assessment includes proposed development within the 30 m WDP of the creek.

To determine whether the WDP setback of 30 m from the high water mark (HWM; see definition below) of the creek aligns with the criteria in the Riparian Area Regulation (RAR), a detailed assessment of the site was conducted to calculate the streamside enhancement and protection area (SPEA).

The entire reach of the creek between the road and Kootenay Lake was considered a single reach. Within this reach the average channel width was 1.04 m and the average slope was 23%, with a step pool channel morphology. As per the RAR, the Zone of Sensitivity (ZOS) setbacks were determined based on this stream width and channel type. The Large Woody Debris (LWD), and Litter ZOS were plotted at the minimum setback of 10 m from the HWM. The Shade ZOS was determined by plotting a traced facsimile of the HWM 3.1 m due south of the south bank HWM. The SPEA was determined based on the ZOS with

the greatest width. The SPEA throughout the site was determined to be 10 m from the HWM on both banks of the creek. Results for the ZOS and SPEA are presented in Table 1, and on the site plan and SPEA setback map (Appendix 2).

The HWM within the subject property was well defined along the creek, which was generally confined within steep banks. General indicators of the HWM along the creek included perennial vegetation and mineral soil. The HWM was always placed above areas of undercut banks which occurred frequently along the creek. Two marker flags were left as an example of the HWM below cabin 1 (Photo 7 and Photo 8).

The BC Riparian Regulation (BC 2015) defines the High Water Mark as follows:

“High Water Mark” means the visible high water mark of a stream where the presence and action of the water are so common and usual, and so long continued in all ordinary years, as to mark on the soil of the bed of the stream a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself, and includes the active floodplain”

“Stream” includes any of the following that provides fish habitat:

- (a) a watercourse, whether it usually contains water or not;
- (b) a pond, lake, river, creek or brook;
- (c) a ditch, spring or wetland that is connected by surface flow to something referred to in paragraph (a) or (b).

Table 1. Results of detailed RAR assessment.

Feature Type	SPVT ¹	Zones of Sensitivity			SPEA
		LWD	Litter fall	Shade	
Creek – North Bank	TR	10 m	10 m	NA	10 m
Creek – South Bank	TR	10 m	10 m	3.1 m	10 m

¹ SPVT: site potential vegetation type (TR-tree)

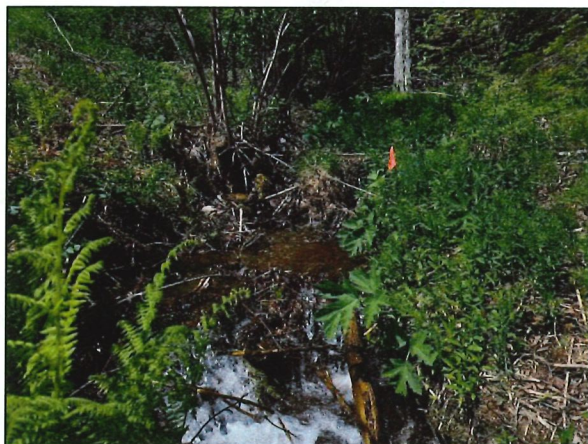


Photo 7. Orange flag indicates HWM.



Photo 8. Orange flag indicates HWM.

3.2 Kootenay Lake Shoreline Management Guidelines

No development is proposed along the foreshore of Kootenay Lake. Therefore a review of Kootenay Lake Foreshore Inventory Mapping (FIM) and the Kootenay Lake Shoreline Management Guidelines (EEC 2016, Ktunaxa Nation Council et al. 2017) is not relevant to the scope of this assessment.

4 RESOURCES

4.1 Fish and Fish Habitat

The portion of the creek that flows through the subject property is likely non-fish bearing (Photo 9 to Photo 12). The gradient of the lower part of the creek was generally 30%, with 2 culverts and several cascades which would limit upstream fish movement near the mouth of the creek. However, because the creek drains into a fish-bearing waterbody (Kootenay Lake), the SPEA on both banks of the creek is protected under the RAR. A domestic water intake is located at the lower part of the creek, above the cascades and culverts which limit upstream fish movement.



Photo 9. Mouth of Creek on Kootenay Lake.



Photo 10. Cascade below culvert near mouth of the creek on Kootenay Lake.

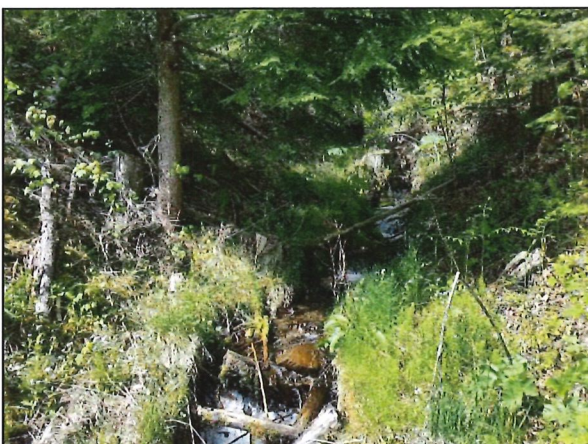


Photo 11. Creek below cabin 3.



Photo 12. Water intake near lower end of creek.

4.2 Riparian Vegetation

The riparian area around the creek is covered by a heterogeneous mix of regenerating conifers and shrubs. Common species included Douglas fir, Douglas maple (*Acer glabrum*) and paper birch (*Betula papyrifera*). The understory was generally covered with native mosses and ferns including lady fern (*Athyrium filix-femina*) and oak fern (*Gymnocarpum dryopteris*), though invasive orange hawkweed (*Hieracium aurantiacum*) was commonly encountered throughout the riparian area and other areas of the site which have been recently logged.

Table 2. Plant species list.

Common Name	Scientific Name	Common Name	Scientific Name
Trees		Herbaceous	
Douglas-fir	<i>Pseudotsuga menziesii</i>	oak fern	<i>Gymnocarpium dryopteris</i>
western redcedar	<i>Thuja plicata</i>	bracken fern	<i>Pteridium aquilinum</i>
western hemlock	<i>Tsuga heterophylla</i>	lady fern	<i>Athyrium filix-femina</i>
western white pine	<i>Pinus monticola</i>	common horsetail	<i>Equisetum arvense</i>
grand fir	<i>Abies grandis</i>	orange-red king devil	<i>Hieracium aurantiacum</i>
paper birch	<i>Betula papyrifera</i>	stream violet	<i>Viola glabella</i>
Cottonwood	<i>Populus trichocarpa</i>	queen's cup	<i>Clintonia uniflora</i>
Shrubs		northern bedstraw	<i>Galium boreale</i>
Scouler's willow	<i>Salix scouleriana</i>	oxeye daisy	<i>Leucanthemum vulgare</i>
European mountain-ash	<i>Sorbus aucuparia</i>	fireweed	<i>Chamerion angustifolium</i>
mountain alder	<i>Alnus incana</i>	stinging nettle	<i>Urtica dioica</i>
tall Oregon-grape	<i>Mahonia aquifolium</i>	baneberry	<i>Actaea rubra</i>
dog rose	<i>Rosa canina</i>	wall lettuce	<i>Mycelis muralis</i>
baldhip rose	<i>Rosa gymnocarpa</i>	small-flowered forget-me-not	<i>Myosotis laxa</i>
devil's club	<i>Oplopanax horridus</i>	bull thistle	<i>Cirsium vulgare</i>
blue elderberry	<i>Sambucus nigra</i>	common dandelion	<i>Taraxacum officinale</i>
thimbleberry	<i>Rubus parviflorus</i>	wild ginger	<i>Asarum caudatum</i>
red raspberry	<i>Rubus idaeus</i>	twinflower	<i>Linnaea borealis</i>
Douglas maple	<i>Acer glabrum</i>		
common snowberry	<i>Symphoricarpos albus</i>		

4.3 Wildlife

4.3.1 Reptiles and Amphibians

This east facing property was generally lacking any significant rocky features, or any other indication of reptile habitat. While the forested areas of the property provide limited foraging habitat for amphibians, there was no amphibian breeding habitat observed within the subject property.

4.3.2 Birds

Canada Geese (*Branta canadensis*) were the only bird observed during the site survey, however, the subject property is likely visited by dozens of other species of birds throughout the year and may be used by multiple songbird species during the spring breeding bird season from early-April to mid-August.

Most of the site is dominated by young regenerating forest. Though young forest is very common and of relatively limited habitat value, it may be used by songbirds each year during the breeding season.

No raptor nests were observed on the subject property, though the mature Douglas-firs along the steep slope at the lower part of the property provide potential perching and nesting sites. Mature cottonwoods (*Populus trichocarpa*) at the mouth of the creek provide nesting habitat for songbirds, owls and raptors.

These valuable habitat trees should be retained during any future development that may occur near the foreshore.

4.3.3 Mammals

The regenerating forest on the site provides forage for deer (*Odocoileus* sp.) and black bear (*Ursus americanus*). The dense vegetation along the creek may be used for cover by mammals moving between upland forest and the Kootenay Lake foreshore.

4.4 Species at Risk

A 10 km buffer around the subject property was used to query BC Conservation Data Center records using the [CDC iMap](#) tool. Three species at risk data sets were queried for data points occurring within a 10 km buffer of the subject property:

1. Species and Ecosystems at Risk – Publicly Available Occurrences: This data set contains the geographic locations of known species at risk occurrences which are available to the public.
2. Species and Ecosystems at Risk – Masked Secured: This data set contains obscured geographic locations occurrences of human sensitive species at risk.
3. Species and Ecosystems at Risk – Extirpated and Historical Occurrences: This data set contains the locations of occurrences of species at risk which have become extirpated, or have not been confirmed in recent times.

Based on this query, only two at risk species occurrence are known within the 10 km buffer around the project area.

The Species and Ecosystems at Risk – Publicly Available Occurrences data set contained an occurrence record for white sturgeon (*Acipenser transmontanus*) within Kootenay Lake. White sturgeon is a wide-ranging fish species which occurs throughout Kootenay Lake and belongs to the Kootenay River population which is listed as Endangered under the Canadian *Species at Risk Act*. An area of white sturgeon critical habitat is defined north of the project area at the Duncan delta (Environment Canada 2014a). Residential development is not considered a threat to the recovery of the Kootenay River population of white sturgeon (Environment Canada 2014a); however, stewardship of riparian areas, including the retention of native vegetation, contributes to the protection of white sturgeon.

The Species and Ecosystems at Risk – Extirpated and Historical Occurrences dataset contains an occurrence of Piper's anemone (*Anemone piperi*) ~4 km away on Mount Buchanan. Though considered threatened and included in the BC red list, Piper's anemone is listed as a historical occurrence by the BC CDC and is likely extirpated. The population of *Anemone piperi* on mount Buchanan was last observed in 1972.

The lack of documented species at risk identified in the data queries does not preclude the presence of a species at risk from an area. Given the time of year, and the scope of this assessment it is impossible to rule out the presence of at-risk species on this site.

4.5 Archaeological Resources

Kootenay Lake is part of the traditional territory of the Sinixt, Okanagan and Ktunaxa First Nations and is known to have documented archaeological sites along Kootenay Lake. A review of archaeological resources on this property is outside the scope of this report.

5 ENVIRONMENTAL CONSIDERATIONS

5.1 Development Activities and Impacts within the SPEA/WDP

Clearing within approximately 75 m² of the SPEA has already been completed for the development of cabin 1. The disturbed area will be replanted after construction, though the final cabin/deck structure will permanently encroach into the SPEA by 57 m². A mitigation plan to replace this loss of riparian habitat and function is proposed in Section 7.

Three additional cabins are planned in future phases of this project. Impacts to the environment from future development will be limited if:

- Construction footprints and associated disturbances are limited to areas outside of the 10 m SPEA.
- Measures to protect the Integrity of the SPEA and Environmental Best Management Practices outlined in this report are followed during each phase of construction on the property (Section 6).

5.2 Wildlife Impacts

Removal of streamside vegetation decreases available nesting habitat for songbirds and cover for mammals which move through this riparian area.

5.3 Aquatic Impacts

No in-water works are proposed as part of this project. However, earthworks associated with construction activities increases the amount of exposed soils which can be susceptible to erosion, and result in sedimentation to the creek.

Permanent removal of riparian vegetation within the SPEA can decrease upland riparian functions which are required to maintain the health and productivity of aquatic ecosystems. The SPEA is meant to protect 5 primary functions of riparian vegetation. These 5 functions have been grouped into 3 Zones of Sensitivity (as per the RAR) and are listed below along with an assessment of impacts to each function which may result from proposed development.

1. Large woody debris, bank and channel stability

The creek is non-fish bearing due to a downstream obstruction and steep gradients, therefore LWD is not a factor limiting fish habitat; however, LWD may be important for stream channel morphology and maintenance. The creek is of limited flow and is unlikely to contribute significant quantities of LWD into fish habitat downstream in Kootenay Lake.

Vegetation provides numerous functions for slope stability, such as rainfall interception, soil dewatering, and soil reinforcement and its removal within the SPEA could compromise local bank stability.

The stream channel is generally confined within a ravine throughout the proposed development area and has no defined floodplain. Stream channel migration in this system would likely only occur during a catastrophic flood.

2. Shade

The loss of some shade trees in this system may cause minor changes in water temperature of the creek. The creek is not fish bearing, and so changes in temperature could only affect fish habitat by contributing to changes in water temperature downstream in Kootenay Lake. The protection of shade is part of an important long-term landscape level effort with the objective of preventing negative cumulative effects on the water temperature of Kootenay Lake and its tributaries.

3. Litter fall and insect drop

Insects and plant matter falling into the creek are moved downstream into Kootenay Lake where they provide food for invertebrates and fish populations. This function is the most apparent connection between this non-fish bearing creek and Kootenay Lake. The permanent loss of riparian vegetation along this stream contributes to landscape level riparian modification and conversion which slowly decreases the productivity of Kootenay Lake, by removing inputs which support the aquatic food web.

6 MEASURES TO PROTECT THE INTEGRITY OF SPEA

An assessment was conducted to evaluate potential threats to the integrity of the SPEA, including windthrow, slope stability, hazard trees, and flooding. Environmental best practices recommended to protect the integrity of the SPEA include appropriate scheduling of environmentally sensitive activities, protection of vegetation within the SPEA, sediment and erosion control, stormwater management, construction waste management, spill prevention, and invasive plant management.

Proposed construction activities on the building site should not pose a threat to the ecological integrity of the SPEA provided environmental best management practices outlined in this section are followed during construction.

6.1 Environmental Hazard Assessment

6.1.1 Hazard Trees

No hazard trees were observed within the SPEA. The development area of the property has been recently logged and all trees are generally young and vigorous. It is anticipated that no trees will be removed for human safety during the development process.

6.1.2 Windthrow

There is little windthrow risk to the SPEA because no significant clearing of timber is proposed. It is unlikely that the proposed construction activities on site will increase the windthrow risk to trees in or near the SPEA. A full assessment of windthrow risk by a Registered Professional Forester (RPF) was not completed as part of this survey, and there is no apparent evidence that such an assessment is required.

6.1.3 Slope Stability

A full assessment of geotechnical hazard is beyond the scope of this report, and any such assessment should be led by a P.Geo, or P.Eng. However, no slope stability hazard indicators were observed during the site visit. The area of proposed development within the property was assessed by WSA Engineering in 2010 in preparation for the application for a site-specific exemption to the *Floodplain Management Bylaw 2080* setbacks.

6.1.4 Floodplain Concerns

Development of cabins 1-5 within the 10 m *Floodplain Management Bylaw 2080* setback was granted a site-specific exemption by the RDCK in 2011.

6.1.5 Encroachment

Encroachment within the SPEA by Wing Creek Resort guests could cause impacts on riparian vegetation including trampling and removal of riparian trees, shrubs, and wildflowers. Plans for landscaping around cabins 1-5 should include barriers to discourage human entry and modification in the SPEA. Barriers including handrails and prickly or dense native plants such as Hawthorn (*Crataegus douglasii*) or rose (native *Rosa spp. e.g. R. gymnocarpa*) should be used to block access to the SPEA wherever possible.

6.2 Environmental Best Management Practices

6.2.1 Scheduling of Environmentally Sensitive Activities

Under the provincial *Wildlife Act* it is unlawful to disturb nesting birds, their nests, and eggs. In order to avoid potential impacts to breeding songbirds, any clearing of vegetation within the subject property should occur within the least risk work period for nesting birds (August 15- March 31).

6.2.2 Protection of Trees and Vegetation in the SPEA

The following measures should be implemented to protect vegetation within the SPEA:

- Clearing of vegetation should be kept to the minimum possible area required for access, staging, construction works, and safety considerations.
- The SPEA boundary should be flagged prior to work, and no vegetation should be removed or modified within the SPEA.
- Regenerating riparian vegetation must be preserved to ensure the redevelopment of a functioning riparian ecosystem within the SPEA.

6.2.3 Fire Protection

Rural residential development of forested areas increases landowner exposure to the potentially catastrophic effects of wildfire. Proper protection of rural properties involves landscape design that minimizes fuel sources within the immediate vicinity of homes (for more information see the FireSmart Homeowner's Manual MFLNRO N.D.). Replanting of riparian and upland vegetation around newly developed cabins should adhere to principles of rural residential fire protection.

6.2.4 Protection of Fish

No instream works are proposed as part of this project. Future incidental development of the property should preserve fish habitat by:

- Limit widening and further development of the Kootenay Lake access trail north of the creek to areas outside of the 10 m SPEA.
- Limit the extent of beach cleaning and preserve foreshore vegetation and boulders which provide fish habitat during periods of inundation.

6.2.5 Erosion and Sediment Control

Excavation during construction of the cabins involves the risk of erosion and sediment releases into the creek. The following mitigation measures should be implemented to reduce the risk of sediment input:

- Amount of soil disturbance should be kept to a minimum.
- Stockpiles of soil should be located at least 30 m from any watercourse and covered with tarps to prevent erosion and establishment of invasive weeds if they are left for greater than two months.
- Disturbed soils should be revegetated as soon as possible after construction.
- Soil disturbance on steep slope above the building site should be minimized. Areas on this slope which are disturbed during construction of the road should be replanted as soon as possible.

6.2.6 Stormwater Management

During construction, stormwater runoff, if present, should be controlled and redirected away from exposed soils. In the event of heavy rainfall, additional mitigation measures may be required. New development should incorporate sustainable stormwater management systems. For example: rain barrels, rainwater gardens and permeable surfaces. Stormwater is not to be directly discharged into the creek.

6.2.7 Construction Waste Management

All construction waste generated on site must be taken off site and re-used, recycled or disposed of accordingly. Construction personnel should be instructed to ensure the site is kept clean and to prevent litter from escaping the site. Concrete will be used in the construction of the house foundation. Fresh concrete and concrete laden water is caustic and toxic to aquatic organisms. The following precautions should be taken when handling concrete to ensure the protection of fish habitat:

- Concrete waste should be collected and disposed of at an approved disposal site.
- Washing of equipment used during concrete work should occur at a designated location at least 30 m away from any waterbody where wash water will not drain directly into the water.

6.2.8 Management of Equipment and Fuel/Lubricant Materials

The most likely source of any contaminant is from equipment or vehicles used or stored on-site, either during fueling or from unanticipated leaks or the failure of a hydraulic hose. In order to minimize the likelihood and impact of a spill within the riparian area, ensure that:

- Each piece of heavy equipment will be equipped with its own spill response kit.
- All staff will be familiar with the use of spill kits and their contents. The contents of the kits will be replaced immediately after use.

6.2.9 Invasive Plant Management

Construction activities can potentially increase dispersal of invasive plant species which can out-compete native riparian vegetation, causing damage to habitat and ecosystem function. The following mitigation measures are recommended in order to reduce the establishment and proliferation of invasive plant species on site:

- All equipment should be thoroughly washed and inspected before entering the project site to prevent the import of new invasive plant seeds and root fragments.
- Amount of vegetation clearing, and soil disturbance should be minimized.
- All exposed soils should be re-vegetated as soon as possible following completion of the project.

7 MITIGATION PLAN

To mitigate for the disturbance of 75 m² of riparian habitat and permanent loss of 57 m² of riparian habitat caused by the cabin, replacement planting is recommended within the 10 m SPEA near the current and future proposed building sites.

As there is no standard riparian replacement ratio currently implemented within the RDCK, the number of recommended replacement plantings was determined based on available literature and on assumptions based on professional knowledge:

- In the absence of a defined compensation ratio it is assumed that all disturbed and/or permanently altered riparian areas will be replaced at a 1:1 ratio of areal extent.

- As per provincial guidelines (MOA 2012), plant density 0.3 plants/m² (~2 m plant spacing) is recommended for potted trees and shrubs. As such, potted trees and tall shrubs are interchangeable at a 1:1 ratio in the planting prescription.
- A conservative assumption of 50% mortality of replacement plantings was used to adjust plant volumes and spacing.

Based on a density of 0.3 plants/m² it is assumed that 22 trees/tall shrubs were lost within the disturbed 75 m² area. Based on assumed 50% mortality and a 1:1 replacement ratio, these plants should be replaced by 44 trees and/or tall shrubs. All plants should be replaced within the 10 m SPEA of the creek. Portions of the 75 m² disturbed area within the SPEA which are outside the footprint of cabin 1 should be replanted immediately after construction and re-seeded with a mix of native grasses, wildflowers, and fast-growing annual grasses to provide cover on exposed soils.

The 57 m² of SPEA vegetation permanently lost to the cabin 1 footprint should be replaced elsewhere onsite. Two potential planting areas were identified (See Appendix 2 Site Plan):

1. Within the recently disturbed footprint of cabin 3 (Photo 13).
2. Along areas of the Kootenay Lake access path which have been widened into the 10 m SPEA (Photo 14).



Photo 13. Recently disturbed area within 10 m SPEA at cabin 3.



Photo 14. Area of widened footpath encroachment into 10 m SPEA.

The following best practices will promote the survival, health and function of plantings (MOA 2012):

- All plantings must occur within the 10 m SPEA.
- Composition of planted stock must include only native trees and shrubs occurring elsewhere on the site including Douglas-fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*), paper birch (*Betula papyrifera*), willow (*Salix spp.*), mountain-ash (*Sorbus sitchensis*, or *S. scopulina*), mountain alder (*Alnus incana*), blue elderberry (*Sambucus nigra*), or Douglas maple (*Acer glabrum*).

- Potted stock should be a minimum of two years old (MOA 2012).
- By engaging a qualified landscaper for further development and execution of a planting plan.
- Planting should not occur during periods of hot dry weather unless they are irrigated daily.
- Irrigate new plantings during the plant establishment period, minimum 3 years.
- If planting within the footpath area, an application of wood chip mulch around each plant would help limit competition from existing grasses.
- Adhere to best practices outlined in the FireSmart Homeowner's manual so that compensatory plantings do not increase wildfire risk to nearby cabins.
- Plant survivorship should be assessed one year after planting. If greater than 20% mortality after at least one growing season and one dormant season is observed than replacement planting would be required (MOA 2012).

Indicators of success of replacement riparian plantings:

- Native species composition including only species listed above.
- Plants spaced at ~1 m (assuming long term survival of 50%) throughout areas within the 10 m SPEA which collectively cover 57 m².
- 80% survival after one complete growing season and one complete dormant season would indicate initial success.
- 50% survival after three growing seasons.

8 ENVIRONMENTAL MONITORING

Environmental monitoring of development activities by a Qualified Environmental Professional may be required at the discretion of the RDCK. This could include marking the boundary of the SPEA in the field and ensuring that mitigation measures to protect the SPEA and compensation for encroachment are implemented.

9 CONCLUSION

The proposed footprint of the proposed cabins at Wing Creek Resort is within the 30 m WDP area of an unnamed creek. A detailed assessment of the site was conducted, and a SPEA setback of 10 m was determined. The proposed footprint of cabin 1 encroaches within the SPEA, however the locations of other proposed cabins can be moved outside of the SPEA. Recommended mitigation measures for encroachment of cabin 1 within the SPEA include planting 34 native trees and/or shrubs within a 57 m² area within the 10 m SPEA. Any additional activities proposed within the WDP area should be assessed by a QEP prior to construction.

10 CLOSURE

I, Sylvie Masse, certify that I am qualified to carry out this assessment; and that the assessment methods under the Regulation have been followed; and that, in my professional opinion:

- (i) if the development is implemented as proposed, or
- (ii) if the streamside protection and enhancement areas identified in the report are protected from the development, and
- (iii) if the developer implements the measures identified in the report to protect the integrity of those areas from the effects of the development,


then there will be no harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes in the riparian assessment area.

Prepared by:



Iraleigh Anderson, A.Ag.

Reviewed by:

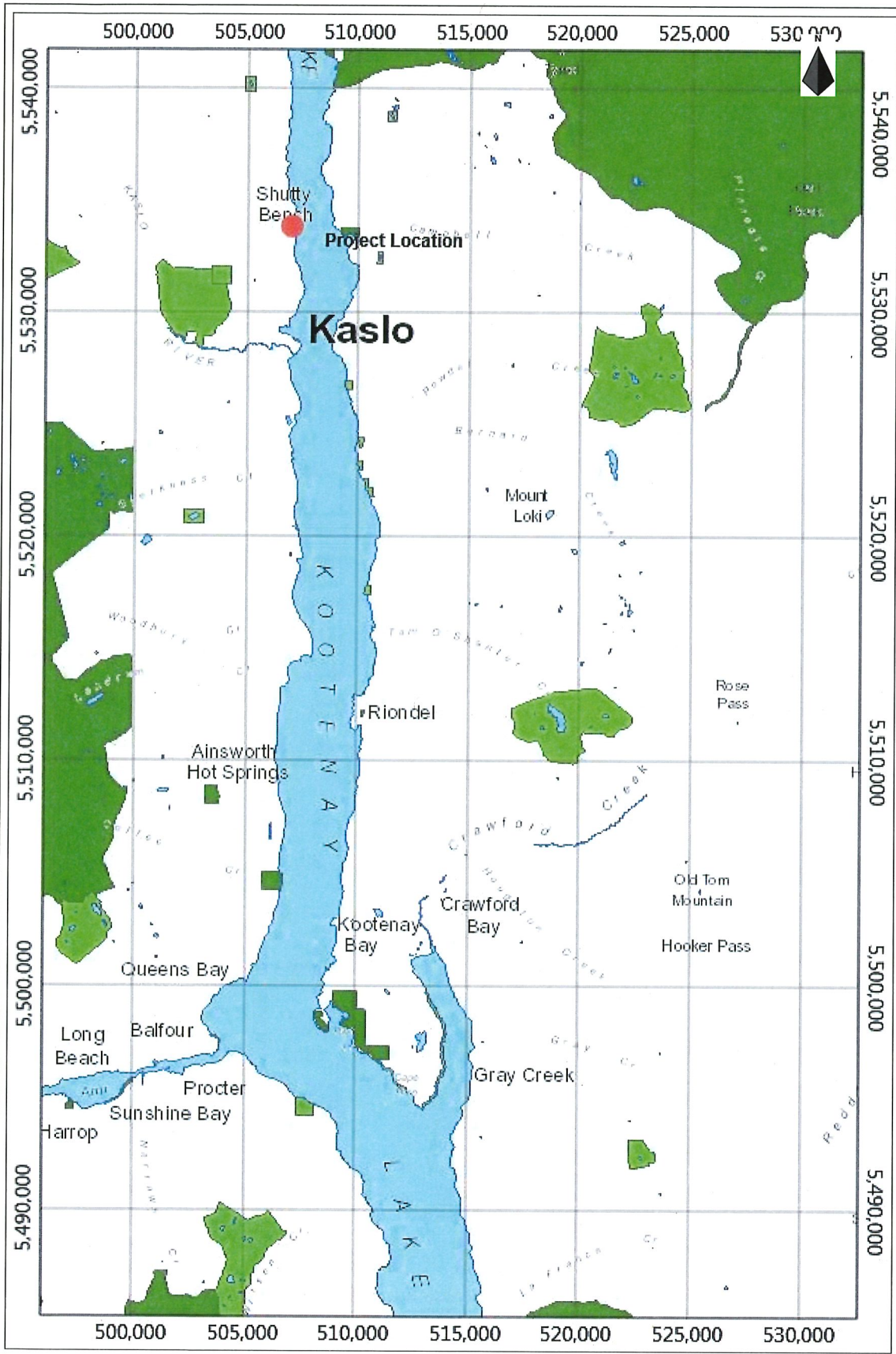


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APPENDIX 1
LOCATION MAP



Project Location

Legend

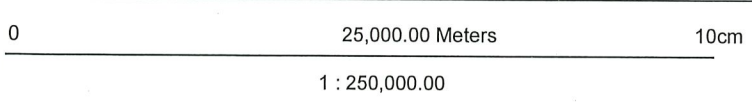
- Lakes (Mid Scale)
- ParksAndTenures**
- Park
- Recreation Site or Rese
- Wildlife Management A

Notes

Lot 1 District Lot 819 Kootenay
 District Plant NEP88169
 Except Strata Plan NES3623
 (Phase 1) PID - 027-774-546

Date Plotted: 5/14/2019

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APPENDIX 2
SITE PLAN AND STREAMSIDE ENHANCEMENT AND PROTECTION AREA SETBACK MAP

