



**REGIONAL DISTRICT OF CENTRAL KOOTENAY**  
**DEVELOPMENT PERMIT**  
**DP2101D (The Sentinel c/o Built Prefab Corp.)**

Date: June 24, 2021

Issued pursuant to Sections 490 and 491 of the Local Government Act

1. This Development Permit is issued to 52785308 AMUNDSEN ENTERPRISES of Vancouver, BC 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 A Plan NEP19585 District Lot 7386 Kootenay Land District (PID: 017-548-110) 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 Country Residential (RC) and are located within a ‘Watercourse Development Permit Area’ pursuant to the *Electoral Area ‘D’ Comprehensive Land Use Bylaw No. 2435, 2016* as amended.
5. The Permittee has applied to the Regional District of Central Kootenay to build five two-storey pre-fabricated duplexes, a new septic field, landscaping, fire pit zone, driveway access and parking area 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 this purpose.
6. The Permittee is required to obtain approval in writing from the Regional District of Central Kootenay prior to any further disturbance, construction any new buildings, external additions to existing buildings or for any deviation from the development authorized under Schedules 2 and 3 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 Development is authorized in accordance with the terms described in the report titled “5308 Amundsen Road, Mirror Lake, BC - Riparian Assessment” prepared by Masse Environmental Consultants Ltd., dated June 22, 2021, and attached to this permit as Schedule 3. Conditions of the report can be categorized as follows:

- 6.2.1 Measures to protect the integrity of the Streamside Protection and Enhancement Area (SPEA). This includes the protection of trees and other vegetation within the SPEA, sediment and erosion control, storm water management, protection of fish habitat, scheduling of environmentally sensitive activities, construction waste management, management of equipment and fuel/lubricant materials and management of invasive plants. All work shall be done in accordance with Section 6 of the attached report (Schedule 3). Notably, the following conditions shall be adhered to:
- 6.2.1.1 Staging and access should only occur in previously disturbed areas of the site;
  - 6.2.1.2 The SPEA should be clearly marked prior to construction to protect vegetation and root systems within the SPEA. Snow fencing shall be installed along the 15 metre setback from Kootenay Lake or top of embankment and shall remain in place through the duration of construction; and,
  - 6.2.1.3 No pollutants should be allowed to contaminate the soil within the development area next to the SPEA.
  - 6.2.1.4 To reduce the risk of sediment input to Kootenay Lake and Ditch 1 the amount of soil disturbance should be kept to a minimum. Any surface runoff should be controlled and directed away from exposed soils. In the event of heavy rainfall, additional mitigation measures such as ditching or covering soils may be required to ensure turbid wastewater does not leave the construction site. Soil should be safely stockpiled in a manner that eliminates the possibility of erosion and sediment transport. Disturbed soils should be revegetated as soon as possible after construction.
  - 6.2.1.5 The following mitigation measures will help decrease stormwater impacts: rainwater collected on roofs should not be allowed to form surface runoff. Downspouts should direct rainwater into suitable landscape features which can absorb and utilize runoff rather than discharging it directly to Kootenay Lake; and stormwater discharges must adhere to the Water Sustainability Act or any other applicable legislation.
  - 6.2.1.6 Works should be scheduled to avoid impacts to nesting birds. The best timing for vegetation clearing is within the least risk window for nesting birds (August 15-April 15). Any clearing outside of these windows shall require a nesting survey.
  - 6.2.1.7 Development of the property should protect fish habitat by adhering to sediment, stormwater, and waste management best practices outlined in the Riparian Assessment to ensure that there is no release of deleterious materials into Kootenay Lake or Ditch 1.
  - 6.2.1.8 To minimize the likelihood and impact of a spill of fuel/lubricant materials within the riparian area, ensure that: each piece of heavy equipment will have its own spill response kit; all staff will be familiar with the use of spill kits and their contents; and equipment shall be stored in a designated area as far from Kootenay Lake and Ditch 1 as possible and secondary containment will be utilized to capture any potential spills or leaks.

- 6.2.1.9 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 immediately following construction; and hand-pulling of spotted knapweed located within the SPEA of Kootenay Lake and Ditch 1.
- 6.3 The proposed development shown in Schedule 2 does not encroach within the SPEA; however, previous development of the roundhouse straddling the property line did encroach within the SPEA. To mitigate for the loss of riparian habitat and to restore habitat functions a 40 m<sup>2</sup> area, located north of the roundhouse will be revegetated and include: within the disturbed area of the SPEA, planting of at least 2 native trees and 30 native shrubs in accordance with Section 7 – Mitigation Plan and Revegetation attached as Schedule 3 shall be implemented. Landscaping shall be completed once the construction is complete. Plant species and seed mix blend shall be in accordance with Tables 4 and 5 of Schedule 3.
- 6.4 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 \$1, 265 to ensure the landscaping requirements as set forth in Section 7 are completed and in accordance with the following provisions:
- 7.1 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.
- 7.2 The Permittee shall complete the landscaping works required by this Permit prior to October 1, 2022. Within this time period the required landscaping must be inspected and approved by the Regional District.
- 7.3 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.
- 7.4 If the landscaping is approved within this time period without the Regional District having to draw the on the Letter of Credit, 90% of the original amount of the Letter of Credit shall be returned to the Permittee.
- 7.5 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.

*S Sudan*

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Sangita Sudan, General Manager of Development Services

June 25, 2021

Date of Approval

July 6, 2021

Date of Issuance

Schedule 1: Location Map



Source: Esri, Airbus DS,  
USGS, NOAA, NASA, CNR,  
H Robinson, NCBAS, NLS,  
CS, NMA,  
Geodataxy.com



REGIONAL DISTRICT OF CENTRAL KOOTENAY  
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Nelson, BC V1L 5R4  
Phone: 1-800-268-7325 www.rdck.bc.ca  
maps@rdck.bc.ca

Legend

-  Electoral Areas
-  RDCK Roads
-  Cadastre
-  Civic Address

Map Scale:

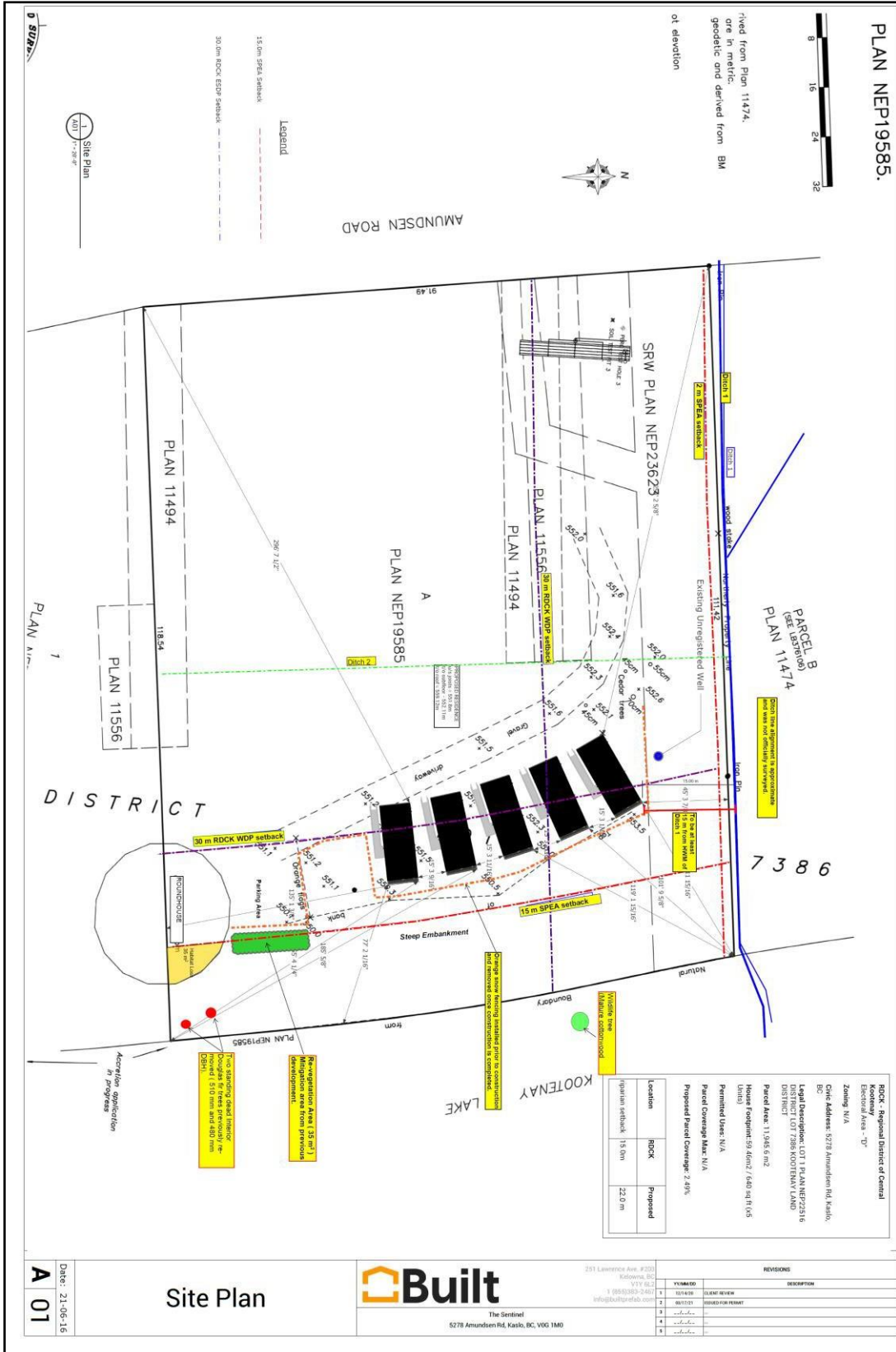
1:2,257



Date: February 16, 2021

The mapping information shown are approximate representations and should only be used for reference purposes. The Regional District of Central Kootenay is not responsible for any errors or omissions on this map.

Schedule 2: Site Plan



PLAN NEP19585.



Level from Plan 11474.  
 one in metric.  
 geodetic and derived from BM  
 at elevation



Legend  
 15m SPEA Setback  
 30m ROCK ETOP Setback

Site Plan  
 A01

ROCK - Regional District of Central Kootenay Regional Area - "R" Zoning: N/A Owner Address: 5278 Amundsen Rd, Kaslo, BC Legal Description: LOT 1 PLAN NEP2316 DISTRICT LOT 7386 KOOTENAY LAND (2017) 1963 Parcel Area: 11,345.6 m <sup>2</sup> House Footprint: 59.4km <sup>2</sup> / 640 sq ft (154 Units) Permitted Uses: N/A Parcel Coverage Max: N/A Proposed Parcel Coverage: 2.6%	
Location	ROCK
Separation setback	15.0m
Proposed	22.0m

**Built**

The Sentinel  
5278 Amundsen Rd, Kaslo, BC, V0G 1M0

REVISIONS	
NO.	DESCRIPTION
1	151946 CLIENT REVIEW
2	961701 ISSUED FOR PERMIT
3	
4	

Site Plan

A 01

Date: 21-06-16

**Schedule 3:** Riparian Assessment, dated June 22, 2021 by Masse Environmental Consultants Ltd. for 5308 Amundsen Road



**5308 AMUNDSEN RD  
MIRROR LAKE, BC**

**Riparian Assessment**



Prepared for:  
**Regional District of Central Kootenay**  
202 Lakeside Drive,  
Nelson BC, V1L 5R4

Prepared by:  
**Masse Environmental Consultants Ltd.**  
812 Vernon St.  
Nelson, BC, V1L 4G4

June 22, 2021

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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
- RAPR: Riparian Area Protection Regulation
- RDCK: Regional District of Central Kootenay
- ROW: Right of Way
- SPEA: Streamside Protection and Enhancement Area
- WDP: Watercourse Development Permit
- ZOS: Zones of Sensitivity



## 1 INTRODUCTION

Masse Environmental Consultants Ltd. was retained by Ian Garrety (Built Prefab) on behalf of Dunowen Properties (Owner), to conduct a riparian assessment to accompany an application for a Waterfront Development Permit at 5308 Amundsen Rd (PID 017-548-110). The proposed development includes the construction of five - two storey pre-fabricated duplexes within the 30 m watercourse development permit (WDP) area of Kootenay Lake and an unnamed watercourse. The development is part of the Sentinel Retreat and Wellness Center located on both 5308 and 5278 Amundsen Road. A site survey was conducted on January 18, 2021 by Fiona Lau B.Tech., A.Sc.T.

A previous riparian assessment report was prepared by Masse (2017) at 5278 Amundsen Road for the construction of two amenity buildings within the WDP area. Proposed development and mitigation were approved by the RDCK in 2017.

This riparian assessment evaluates the existing conditions of the property and riparian areas, identifies habitat values, assesses potential environmental impacts, and recommends mitigation measures to protect and compensate for the alterations within the riparian area. 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
- British Columbia *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
- BC Tree Replacement Criteria
- A Homeowner's Guide to Stormwater Management.

This report has been prepared by Fiona Lau B.Tech., A.Sc.T., and reviewed by Lisa Pavelich, BSc, PAg.

I, Fiona Lau, hereby certify that:

- a) I am a Qualified Environmental Professional (QEP), as defined in Section 21 of the *Riparian Areas Protection Regulation* made under the *Riparian Areas Protection Act*;
- b) I am qualified to carry out the assessment of the proposal made by the developer (Muirhead Land Development Solutions Ltd.), which is described in Section 2.3 of this Assessment Report (the "development proposal");
- c) I have carried out an 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 specifications of the *Riparian Areas Protection Regulation* and assessment methodology set out in the Minister's manual.

## **2 PROJECT OVERVIEW**

### **2.1 Location**

The subject property is located ~7 km south of the community of Kaslo, BC (Appendix 1). The property is bordered by private property to the north (5318 Amundsen), commonly owned property of "The Sentinel" to the south (5278 Amundsen Rd), Ministry of Transportation (MoT) right of way to the west (Amundsen Rd) and Kootenay Lake to the east.

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**

#### *2.2.1 Watercourses*

Two watercourses were identified within the subject property: Kootenay Lake (Photo 1) and an un-named watercourse (Ditch 1; Photo 2).

During the site visit, the visible high water mark (HWM) of Kootenay Lake was located at ~533.5 m – 534 m elevation, approximately the natural boundary line as shown on the attached site plan (Appendix 2). The natural boundary was based on the location of presence of terrestrial vegetation along the foreshore (see definition of Natural Boundary below). The riparian setbacks will be measured from the natural boundary line as depicted on the survey.

**"Natural Boundary"** means the visible high water mark of any lake, river, stream or other body of water is 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 body of water a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself (MOE 2016)."

Two connected drainage courses were observed on the subject property (See Appendix 2 for locations). The first drainage ditch (Ditch 1) is located along the north property line, which captures drainage from Amundsen Road above and 5318 Amundsen Rd. The water flows through a 600 mm culvert across Amundsen Road, discharging onto the property and flows in an easterly direction through a defined, open channel into Kootenay Lake (Photo 2). A steep ~ 3 m high cascade (>60% slope) creates a barrier to fish

(Photo 3) just upstream of the mouth. It is assumed that Ditch 1 flows for > 6 months per year based on site observations and personal communication with Dustin East (Facility Manager).

Consistent with the definition of a watercourse under the RDCK Bylaw, Ditch 1 is considered a watercourse because it flows for > 6 months per year and therefore the WDP area of 30 m will apply and the setbacks taken from the HWM.

A second drainage ditch (Ditch 2) bisects the property and flows in a northerly direction into Ditch 1 at the north property boundary. Ditch 2 flows intermittently, dries up before Ditch 1 and flows < 6 months per year (pers. comm. Dustin East; Photo 4). Both ditches have a watershed area < 2 km<sup>2</sup> and are assumed to be non-fish bearing based on site conditions; however, no fish presence survey was completed as part of this assessment. Ditch 2 is not considered a watercourse under the RDCK bylaw.



Photo 1. View of Kootenay Lake along east property boundary, looking north.



Photo 2. View of Ditch 1 along north property boundary, looking east.



Photo 3. Cascade on Ditch 1 near foreshore.



Photo 4. View of Ditch 2 bisecting property, looking north.

### 2.2.2 Existing Development

The subject property has undergone some recent development within the WDP area of Kootenay Lake and Ditch 1 including a portion of a new amenity building, referred to as the “Roundhouse” (Photo 5), new driveway, and parking area (Photo 6). The Roundhouse structure was constructed under the approved 2017 watercourse development permit for 5278 Amundsen Rd and straddles the two property lines. The upgraded driveway and new parking area construction is currently unauthorized and is proposed as part of the development within the WDP areas. A large area within the north-west quadrant of the property has been cleared between the driveway and Ditch 1 (Photo 7). In addition, two large Interior Douglas fir trees (510 mm and 480 mm DBH) were observed to have been cut in recent years in front of the Roundhouse (Photo 8). According to the Owner, these trees were standing dead and posed a risk to the Roundhouse and its occupants and were therefore removed.



Photo 5. View of Roundhouse located on 5278 and 5308 Amundsen Road.



Photo 6. View of cleared parking area next to Roundhouse.



Photo 7. Cleared area next to Ditch 1 in north-west quadrant of property.



Photo 8. Interior Douglas Fir tree cut in front of Roundhouse along foreshore.

### 2.2.3 Proposed Development Siting

The proposed development is sited in a partially disturbed young conifer forest (< 30 years old) along the top of the embankment above Kootenay Lake, which appears to have been historically managed by some clearing and thinning of trees and understorey vegetation (Photos 9 and 10). The new driveway and parking

area have already been constructed; however historical photos taken during the 2017 assessment of this area show similar habitat, as described above (Photo 11).



Photo 9. Proposed siting of duplex development along top of embankment, looking north.



Photo 10. Proposed siting of duplex development along top of bank, looking south.



Photo 11. Proposed siting of duplex development, looking north and upgraded driveway alignment, 2017.

## 2.3 Proposed Development

The proposed development within the 30 m WDP area will disturb a total of ~735 m<sup>2</sup>. Development includes:

- Site preparation including vegetation clearing and site levelling (495 m<sup>2</sup>);
- Construction of five, two-storey pre-fabricated duplexes (275 m<sup>2</sup>);
- Upgrading existing driveway (widening and re-graveling) (90 m<sup>2</sup>);
- New parking lot area (110 m<sup>2</sup>)
- Proposed septic field (40 m<sup>2</sup>).

### 2.3.1 Site Preparation

Site preparation will involve, vegetation clearing, site levelling and installation of water and sewer services.

### *2.3.2 Duplexes*

The proposed duplexes will be sited parallel to each other along the top of the embankment, ranging from ~ 22 m to ~27 m setback from the HWM of Kootenay Lake. Each duplex will have a footprint of 4.9 m (16') x 15 m (49' 4"), including the back decks.

### *2.3.3 Driveway and Parking Area*

The existing driveway from Amundsen Road to the Roundhouse Development has been widened and gravelled. The driveway is sited ~27 m from the HWM of Kootenay Lake and >15 m from Ditch 1. A small parking area has been constructed north of the Roundhouse and is sited ~18 m from the HWM of Kootenay Lake.

Refer to Site Plan for proposed development footprint and locations (Appendix 2).

## **2.4 Services**

The Roundhouse is connected to the existing water system which draws water from Kootenay Lake. The proposed duplexes will connect to the existing water system, also used by the main lodge located at 5278 Amundsen Rd.

The proposed development will require the installation of a new septic system, which will include septic tanks, pump station, and a septic field. Since the new septic field will be in the north-west quadrant of the property within the 30 m setback of Ditch 1, the septic system design shall be a Type 3 system which can be located up to a 15 m setback from a watercourse (Refer to Site Plan in Appendix 2 for location).

## **3 REGULATORY REVIEW**

### **3.1 Streamside Protection and Enhancement Area**

To determine whether the 30 m WDP setback from the HWM of Kootenay Lake and Ditch 1 aligns with Riparian Area Protection Regulation (RAPR) criteria, a detailed assessment of the subject property was conducted to calculate the Streamside Protection and Enhancement Area (SPEA) setbacks. Results for the Zones of Sensitivity (ZOS) and SPEA are presented in Table 1, Figure 2 and Appendix 2.

#### *Kootenay Lake*

As per the RAPR, the large woody debris (LWD), and litter ZOS were plotted 15 m inland from the HWM of Kootenay Lake. The Shade ZOS was plotted 0 -7 m south of the HWM. The SPEA setback is determined based on the ZOS with the greatest width. Therefore, within the subject property the SPEA is 15 m from the HWM.

#### *Ditch 1*

As per the RAPR, the vegetation to assist in controlling localized erosion, litterfall and shade ZOS was plotted 2 m setback from the HWM of Ditch 1. Therefore, within the subject property the SPEA is 2 m from the HWM.



The BC Riparian Areas Regulation (BC 2015) defines “High Water Mark” and “Stream” 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 RAPR assessment.

Feature Type	SPVT <sup>1</sup>	Zones of Sensitivity			SPEA
		LWD	Litter fall	Shade	
Kootenay Lake	TR	15 m	15 m	0 -7 m	<b>15 m</b>
Ditch 1 (No fish)	N/A	N/A	2 m	2 m	<b>2 m</b>

<sup>1</sup> SPVT: site potential vegetation type (TR-tree)

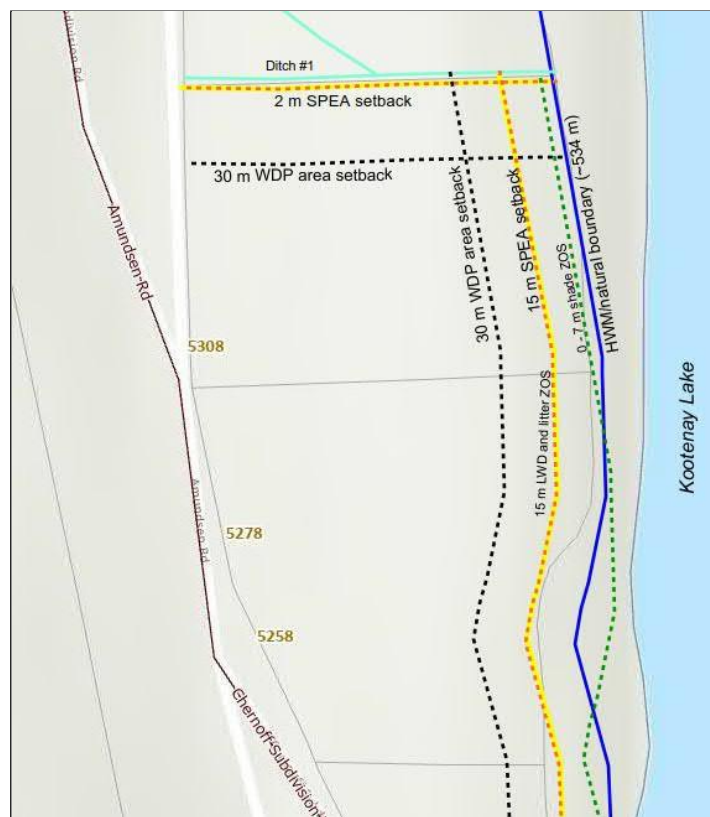


Figure 1. SPEA setback map.

### 3.2 Kootenay Lake Shoreline Management Guidelines

The Kootenay Lake Foreshore Inventory Mapping (FIM) and the Kootenay Lake Shoreline Management Guidelines documents (EEC 2016, KLP 2018) were used to help determine site specific risks for riparian habitat, Ktunaxa Nation cultural values, and archaeological resources along the shoreline. The property is within FIM segment 71. Table 2 provides the environmental and archaeological risk results identified in the FIM along the shoreline of the property.

Table 2. Environmental and archaeological risk results.

<b>Aquatic Habitat Index Rating (AHI)</b>	<b>Aquatic Sensitivity</b>	<b>Archaeological Risk</b>	<b>Enhanced Engagement Required</b>
Moderate	Yes	Yellow	No

## 4 RESOURCES

### 4.1 Fish and Fish Habitat

The Kootenay Lake foreshore consists of a rocky shoreline with angular boulders and cobble substrate (Photos 12 and 13) and is moderately sloped at ~30 % gradient. The instream habitat provides potential rearing and cover habitat for juvenile and adult fish. No aquatic vegetation was observed within this segment along the shoreline; however, it has been noted in the FIM mapping as having some submergent vegetation fronting the property (EEC 2016, KLP 2018).

Kootenay Lake supports a variety of fish species, including several species of regional interest, such as Rainbow Trout, Bull Trout, Kokanee, White Sturgeon, Westslope Cutthroat Trout, and Burbot. Mussels were not observed along the foreshore; however, a complete mussel survey was not conducted as part of the site visit, since no inwater works are proposed.

Ditch 1 is non-fish bearing; however, riparian vegetation along the banks provide leaf litter and insect drop to enter Kootenay Lake and support the food web for local fish.



Photo 12. View of angular rock along shoreline.



Photo 13. View of rearing and cover habitat.

## 4.2 Riparian Vegetation

The riparian area along Kootenay Lake has an eastern aspect, with a shoreline gradient of ~30%, graduating to a steep embankment >55%. Exposed fractured bedrock is evident throughout the riparian area, with a thin layer of top soil. Dominant shoreline vegetation consists of Black cottonwood (*Populus trichocarpa*), Paper birch (*Betula papyrifera*), Red osier dogwood (*Cornus stolonifera*) and Alder sp. (*Alnus sp.*) (Photos 14). Vegetation along the steep embankment consists mostly of Western red cedar (*Thuja plicata*), with minimal understorey and presence of moss and lichens (Photo 15). Many of the trees within the SPEA may have shallow root systems due to the lack of soils and available nutrients and may be susceptible to windthrow.

The riparian area along Ditch 1 consists of a variety of native tree and shrub species, agronomic grasses and exotic species. Native plants within the SPEA help provide bank stability, erosion protection and shade. Dominant tree species included Western red cedar, Interior Douglas fir and Paper birch with shrubs consisting mostly of red osier dogwood, alder sp, and rose sp. (*rosa sp.*) (Photos 16 and 17).

Table 3 provides a list of plant species encountered on the property within the riparian area of Kootenay Lake and Ditch 1.



Photo 14. View of shoreline vegetation looking north.



Photo 15. View of entire riparian area along foreshore looking south.



Photo 16. View of overhanging vegetation along banks of Ditch 1, looking north.



Photo 17. View of conifer trees along banks of Ditch 1, looking east.

Table 3. Plant species encountered on the property.

Species Name	Latin Name	Species Name	Latin Name
<b>Trees</b>		<b>Shrubs cont.</b>	
Interior Douglas fir	<i>Pseudotsuga menziesii</i>	Sitka Mountain ash	<i>Sorbus sitchensis</i>
Western red cedar	<i>Thuja plicata</i>	Soopolallie	<i>Shepherdia canadensis</i>
Lodgepole pine	<i>Pinus contorta</i>	Thimbleberry	<i>Rubus parviflorus</i>
Black cottonwood	<i>Populus trichocarpa</i>	Douglas maple	<i>Acer glabrum</i>
Paper birch	<i>Betula papyrifera</i>	<b>Herbaceous</b>	
<b>Shrubs</b>		Licorice fern	<i>Polypodium glycyrrhiza</i>
Rose sp.	<i>Rosa sp.</i>	Queen's cup	<i>Clintonia uniflora</i>
Red osier dogwood	<i>Cornus stolonifera</i>	Pasture sage	<i>Artemisia frigida</i>
Oregon grape	<i>Mahonia aquifolium</i>	Wild strawberry	<i>Fragaria virginiana</i>
Common snowberry	<i>Symphoricarpos albus</i>	Spotted knapweed	<i>Centaurea biebersteinnii</i>
Black hawthorn	<i>Crataegus douglasii</i>	Grasses sp.; mosses sp.; and lichens sp.	

#### 4.2.1 Reptiles and Amphibians

The rocky outcrops and abundant cover provided by rocks and large woody debris have the potential for reptiles; however, presence of these species on site was not confirmed due to time of year of the site visit.

#### 4.2.2 Birds

Both conifer and deciduous trees favour species such as cavity dwellers, songbirds and raptors. A quick assessment was conducted to identify raptor nests and none were found. A mature black cottonwood was identified as a wildlife tree (UTM 11U 507264. 5522433) directly next to Kootenay Lake (See Site Plan, Appendix 2). This tree provides important perch habitat for raptors and nesting and feeding habitat for cavity dwellers.

#### 4.2.3 Mammals

The riparian area has some suitable habitat for mammals with palatable vegetation including grasses and young saplings. Ungulates and bears most likely use the area to access the water and browse on vegetation. Deer droppings were observed within the property during the site visit.

#### 4.3 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. Based on this query, three species at risk occurrences are known within the 10 km of the project area:

- 1) The Upper Kootenay River white sturgeon (*Acipenser transmontanus*) population- Red listed. Critical Habitat for white sturgeon on Kootenay Lake is located at the Crawford Creek delta on the east shore of Kootenay Lake ~ 33 km away and at the Duncan delta at the north end of Kootenay Lake ~ 28 m away (Environment Canada 2014).
- 2) Painted turtle (*Chrysemys picta*)- Blue listed. The nearest observation of painted turtle was in Mirror Lake, approximately 2.5 km away. The subject property does not provide suitable turtle habitat.
- 3) Wild licorice (*Glycyrrhiza lepidota*)- Blue listed. The nearest observation of wild licorice was at Mirror Lake, approximately 2.5 km away.

#### 4.4 Archaeological Resources

Kootenay Lake is part of the traditional territory of the Sinixt, Okanagan and Ktunaxa First Nations and archaeological evidence is documented at multiple shoreline sites. A review of archaeological resources on this property is outside the scope of this report.

### 5 IMPACT ASSESSMENT

The proposed development is sited outside of the SPEA; therefore, direct impacts to the riparian area has been avoided. Indirect ecological impacts associated with the proposed development include:

- Soil disturbance adjacent to SPEA may provide sites where exotic plant species can become established.
- Potential for erosion and sediment release into the SPEA and watercourses.
- Disturbance to wildlife within SPEA during construction.
- Expansion of human infrastructure adjacent to SPEA could lead to future terrestrial habitat impacts within the SPEA (ie. noise and light pollution).

### 6 MEASURES TO PROTECT THE INTEGRITY OF SPEA

This section provides measures to protect the integrity of the SPEA as described in RAPP, as well as recommended best management practices.

### **6.1 Danger Trees**

A RPF was not retained to assess danger trees; however, a quick assessment for potential danger trees was conducted by the QEP within the property and no observable danger trees were identified.

### **6.2 Windthrow**

A Registered Professional Forester (RPF) was not retained to assess potential windthrow. Clearing activities within the development footprint may increase the risk of windthrow on the property.

### **6.3 Slope Stability**

Slope stability hazard indicators were assessed as part of the riparian assessment. The following hazard indicators on the steep embankment along the foreshore of Kootenay lake were observed: curved and sweeping trees, poorly developed soil layer, fractured rock, and seepage. Further assessment of geotechnical hazard is beyond the scope of this report, and any such assessment should be led by a P.Geol, or P.Eng. It is recommended that a geotechnical assessment be conducted prior to any development along the top of this embankment.

### **6.4 Protection of Trees and Vegetation in the SPEA**

Protection of trees and other vegetation in the SPEA can be achieved by implementing the following measures:

- Staging and access should only occur in previously disturbed areas of the site.
- The SPEA should be clearly marked prior to construction to protect vegetation and root systems within the SPEA. Snow fencing shall be installed along the top of embankment and shall remain in place through the duration of construction. Refer to Appendix 2 for Site Plan.
- No pollutants should be allowed to contaminate the soil within the development area next to the SPEA.

### **6.5 Encroachment**

The proposed development does not encroach within the SPEA; however previous development of the Roundhouse straddling the property line did encroach within SPEA. As part of the approved development permit for this work (RDCK 2017), re-vegetation north of the Roundhouse as indicated on the Masse 2017 Riparian Assessment Report was to be completed. Revegetation has not yet been completed and has been included as part of this development permit application since it is located within 5308 Amundsen Road (Section 7.1).

Future encroachment within the SPEA of Kootenay Lake and Ditch 1 is discouraged to preserve the function of the riparian vegetation and to help maintain bank stability. Any future development (ie. structures, landscaping, vegetation tree removal) proposed within the SPEA will require a QEP review and a RDCK Watercourse Development Permit.

## **6.6 Sediment and Erosion Control**

The following mitigation measures should be implemented to reduce the risk of sediment input to Kootenay Lake and Ditch 1:

- Amount of soil disturbance should be kept to a minimum.
- Any surface runoff should be controlled and directed away from exposed soils.
- In the event of heavy rainfall, additional mitigation measures such as ditching or covering soils may be required to ensure turbid wastewater does not leave the construction site.
- Top soil shall be segregated and stockpiled, to be later spread on disturbed areas.
- Soil should be safely stockpiled in a manner that eliminates the possibility of erosion and sediment transport.
- Disturbed soils should be revegetated as soon as possible after construction.

## **6.7 Stormwater Management**

The proposed development will result in a marginal increase in the total impervious area of the property and is limited to the six duplex development footprint. The following mitigation measures will help decrease stormwater impacts:

- Rainwater collected on roofs should not be allowed to form surface runoff. Downspouts should direct rainwater into suitable landscape features which can absorb and utilize runoff rather than discharging it directly to Kootenay Lake.
- Stormwater discharges must adhere to the *Water Sustainability Act* or any other application legislation.

## **6.8 Floodplain Concerns**

There were no floodplain concerns observed on the subject property.

## **6.9 Scheduling of Environmentally Sensitive Activities**

Works should be scheduled to avoid impacts to nesting birds. The best timing for vegetation clearing is within the least risk window for nesting birds (August 15-April 15). Any clearing conducted outside of these windows shall require a nesting survey.

## **6.10 Protection of Fish Habitat**

Development of the property should protect fish habitat by adhering to sediment, stormwater, and waste management best practices outlined in this report to ensure that there is no release of deleterious materials into Kootenay Lake or Ditch 1.

## **6.11 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. 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.
- Equipment will be stored in a designated area as far from Kootenay Lake and Ditch 1 as possible and secondary containment will be utilized to capture any potential spills or leaks.

### **6.12 Invasive Plant Management**

Construction activities can potentially increase prevalence of invasive plant species which can out-compete native riparian vegetation, causing damage to habitat and ecosystem function. The following mitigation measures are recommended 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 immediately following construction.
- Hand-pull spotted knapweed located within the SPEA of Kootenay Lake and Ditch 1.

## **7 MITIGATION PLAN**

The Shoreline Management Guidelines for Kootenay Lake outlines general principles for shoreline development in order to achieve a “No Net Loss” of habitats present. The principle is achieved by applying the following priority sequence of mitigation options: 1. *Avoidance* of environmental impacts; 2. *Minimization* of unavoidable impacts; 3. On-site *restoration*; and 4. *Offset* residual impacts that cannot be minimized through compensation (KLP 2018). The proponent has demonstrated the principle of “Avoidance” by locating proposed development outside of the 15 m SPEA of Kootenay Lake and 2 m SPEA of Ditch 1.

It was noted on the site visit that re-vegetation had not yet occurred north of the Roundhouse, as required on the RDCK Development Permit 2017 for 5278 Amundsen Road. Refer to 7.1 for revegetation plan.

### **7.1 Revegetation**

The proposed revegetation is designed with a focus on naturalizing disturbed areas within the 30 m WDP area. The vegetation prescription will include a combination of native potted stock and a specifically formulated seed blend to promote shrub and herbaceous habitat establishment. The recommended plant species list is provided in Table 4. The re-vegetated areas will require ongoing maintenance (ie. irrigation and weeding), until they become naturalized over the moderate to long term.

To mitigate for the permanent loss of vegetation within the SPEA, caused by the previous construction of the Roundhouse within 5308 Amundsen Road (~35 m<sup>2</sup> within the SPEA), the Owner will revegetate an area of ~40 m<sup>2</sup>, located north of the Roundhouse. In addition, all disturbed areas within the 30 m WDP area shall be re-seeded with a native seed blend.



Revegetation will include:

- Planting of at least 2 native trees and 30 native shrubs within the 35 m<sup>2</sup> revegetation area (Refer to Table 4 for recommended plant species list). Composition and plant locations within the revegetation areas are at the discretion of the owner. Plant species can be substituted with the approval of the QEP.
- Re-spreading of topsoil on disturbed areas around the duplex development to promote natural re-generation of native species.
- Re-seed disturbed soil areas with Native riparian seed blend, specially formulated for riparian area application is available at Interior Seed & Fertilizer <https://interiorseedandfertilizer.ca> (Table 5).
- Additional native planting and re-seeding shall be completed by Owner, if plant establishment has < 80% coverage after two years (Refer to Table 4 for recommended plant species list).

#### *General Planting and Maintenance Guidelines*

- Planting should not occur during periods of hot dry weather unless they are irrigated daily.
- Locally adapted native plants are preferable to those collected or grown outside the region. The species listed in Table 4 are available from Sagebrush Nursery in Oliver <https://sagebrushnursery.com>, or Tipi Mountain Native Plants <http://tmnp.tipimountain.com/> near Kimberley.
- Trees to be planted at minimum 3 m spacing and shrubs be planted at minimum of 1 m spacing.
- Planting holes shall be a minimum of 3 times the size of the pot.
- Specific locations of plants shall be directed by a QEP or professional landscaper.
- Use transplant fertilizer (ie. Mykes Mycorrhizae Tree and Shrub or similar) as per manufacturers specifications in each planting hole.
- Bark mulch placement around each of the planted stock will help the soil retain moisture and reduce weeds and watering requirements.
- Plantings which do not survive should be replaced to ensure complete establishment of native plants, and exclusion of exotic plants.
- Ensure the objective of the restoration is to naturalize the riparian area and not create a landscaped garden.
- Regularly irrigate new plantings during the plant establishment period for a minimum of 3 years and thereafter as required.
- Pull any invasive weeds on a yearly basis prior to going to seed.
- Replanting of riparian vegetation around buildings should adhere to principles of rural residential fire protection (for more information see the FireSmart Homeowner's Manual MFLNRO N.D.

Table 4. Recommended plant species.

Species	Scientific Name	Pot Size	Species	Scientific Name	Pot Size
<b>Trees</b>			<b>Shrubs cont.</b>		
Interior Douglas fir	<i>Pseudotsuga menziesii</i>	#5	oregon grape	<i>Mahonia aquifolium</i>	#1
Paper birch	<i>Betula papyrifera</i>	#5	red flowering currant	<i>Ribes sanguineum</i>	#1
ponderosa pine	<i>Pinus ponderosa</i>	#5	red osier dogwood	<i>Cornus stolonifera</i>	#1
Western larch	<i>Larix occidentalis</i>	#5	Saskatoon berry	<i>Amelanchier alnifolia</i>	#1
Western red cedar	<i>Thuja plicata</i>	#5	common snowberry	<i>Symphoricarpos albus</i>	#1
Western white pine	<i>Pinus monticola</i>	#5	scoulers willow or sitka willow	<i>Salix scouleriana and/or Salix sitchensis</i>	#1
<b>Shrubs</b>			Common juniper	<i>Juniperus communis</i>	#1
black twinberry	<i>Lonicera involucrata</i>	#1	Sword Fern	<i>Polystichum munitum</i>	#1
blue elderberry	<i>Sambucus caerulea</i>	#1	<b>Grasses and Flowers</b>		
Douglas maple	<i>Acer glabrum</i>	#1	Native Tufted Hairgrass	<i>Deschampsia cespitosa</i>	#1
kinnikinnick	<i>Arctostaphylos uva-ursi</i>	4"	bluebunch wheatgrass	<i>Pseudogenaria spicata</i>	#1
mallow ninebark	<i>Physiocarpus malvaceus</i>	#1	junegrass	<i>Koeleria macrantha</i>	#1
nootka rose or native rose sp.	<i>Rosa nutkana or rosa sp.</i>	#1	yarrow	<i>Achillea millefolium</i>	#1
ocean spray	<i>Holodiscus discolor</i>	#1	golden rod	<i>Solidago canadensis</i>	#1
Soopolallie	<i>Shepherdia canadensis</i>	#1	Silky lupine	<i>Lupinus sericeus</i>	#1

Table 5. Recommended seed mix blend

Native Riparian Blend 1	% weight	% by species
slender wheatgrass	25.0%	18%
streambank wheatgrass	25.0%	18%
fringed brome grass	24.7%	9%
northern wheatgrass	20.0%	14%
sheep fescue	3.0 %	10%
tufted hairgrass	1.0 %	11%
fowl bluegrass	1.0 %	9%
yarrow	0.3 %	3%

## 8 ENVIRONMENTAL MONITORING

The anticipated effort for environmental monitoring and professional guidance on this project includes the following:

- QEP may be required by the RDCK to conduct a post construction site visit once revegetation is complete to assess compliance and completion of the project.
- QEP may be required by the RDCK to prepare an environmental summary report.

## 9 CONCLUSION

Overall, the construction as proposed will pose minimal ecological risk to Kootenay Lake and Ditch 1 as long as the recommendations outlined in this report are implemented. It is recommended that a geotechnical assessment be conducted prior to any development along the top of the embankment. The proposed development is sited outside of the SPEA; therefore, minimizing risk to the ecological function of the riparian area. Any future development (ie. structures, landscaping, vegetation removal) proposed within the 30 m WDP area will require a QEP review and an amendment to the RDCK Watercourse Development Permit. If you have any comments or questions, please do not hesitate to contact the undersigned.

## 10 CLOSURE

This report has been prepared by a Qualified Environmental Professional (QEP) who has not acted for, or as an agent(s) of the RDCK and was at the expense of the property owner.

I, Fiona Lau, 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.

Sincerely,



Fiona Lau, ASCT, BTEch.  
[fiona@masseenvironmental.com](mailto:fiona@masseenvironmental.com)

Reviewed by:



Lisa Pavelich, P.Ag, BSc.  
Masse Environmental Consultants

## 11 REFERENCES

- [BC] Province of British Columbia. 2015. Riparian Areas Regulation. Victoria, British Columbia, Canada.
- [EEC] Ecoscape Environmental Consultants. 2016. Kootenay Lake Foreshore Inventory and Mapping and Aquatic Habitat Index. Prepared for: Kootenay Lake Partnership & Fisheries and Oceans Canada.
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- Kipp, S. and Callaway, C. 2002. On the Living Edge. Your Handbook for Waterfront Living.
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- [MELP] BC Ministry of Environment Lands and Parks. 1996. Tree Replacement Criteria
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- [MEC] Masse Environmental Consultants Ltd. 2017. 5278 Amundsen Road Riparian Assessment Report. Prepared for the RDCK.
- [MOA] BC Ministry of Agriculture. 2012. Riparian Factsheet No. 6 – Riparian Plant Acquisition and Planting.
- [MOE] BC Ministry of Environment. 2014. Develop with Care. Province of British Columbia. Victoria, British Columbia, Canada.
- [MOE] BC Ministry of Environment. 2015. General BMPs and Standard Project Considerations. Victoria, British Columbia, Canada.
- [MOE] BC Ministry of Environment. 2016. Provincial Water Sustainability Act. Victoria, British Columbia, Canada.
- [MOE] BC Ministry of Environment. Habitat Wizard. 2019.

5308 Amundsen Road, Mirror Lake – Riparian Assessment

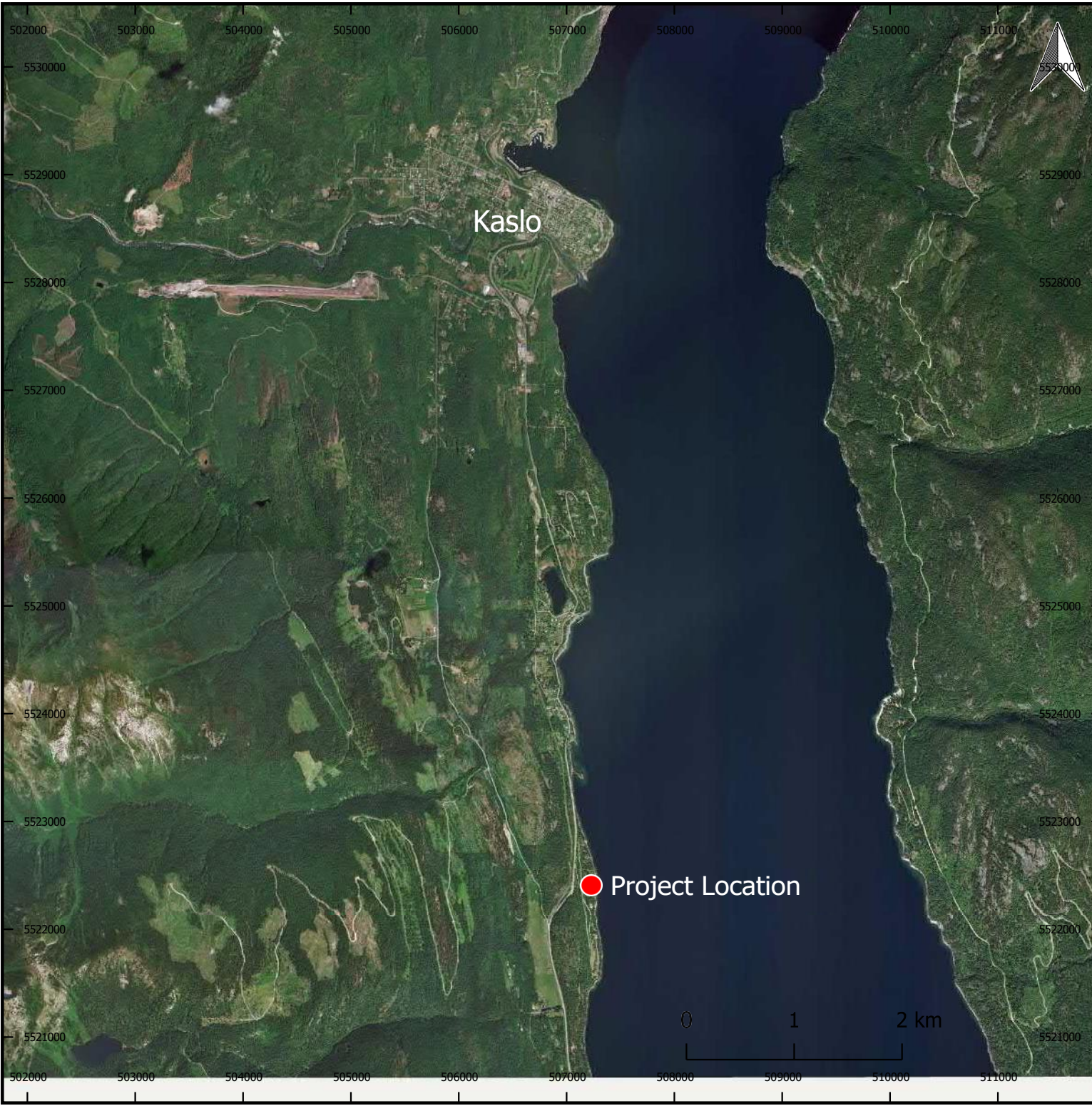
[MOH] Health Protection Branch of the BC Ministry of Health. 2014. Sewerage System Standard Practice Manual – Version 3.

[MFLNRO] BC Ministry of Forests Lands and Natural Resource Operations. N.D. Firesmart Homeowner's Manual.

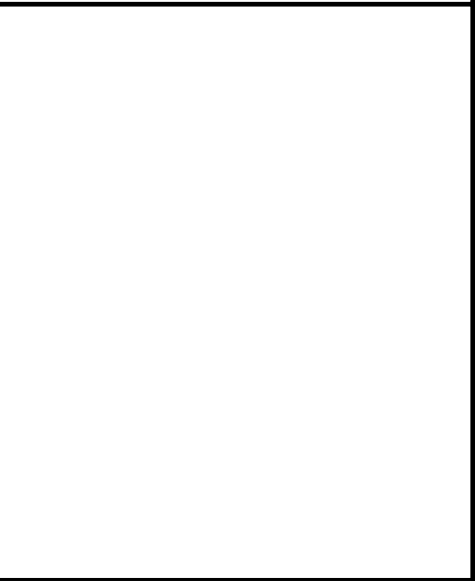
[RDCK] Regional District of Central Kootenays. 2016. Electoral Area 'D' Comprehensive Land Use Bylaw No. 2435, 2016.



**APPENDIX 1**  
**LOCATION MAP**

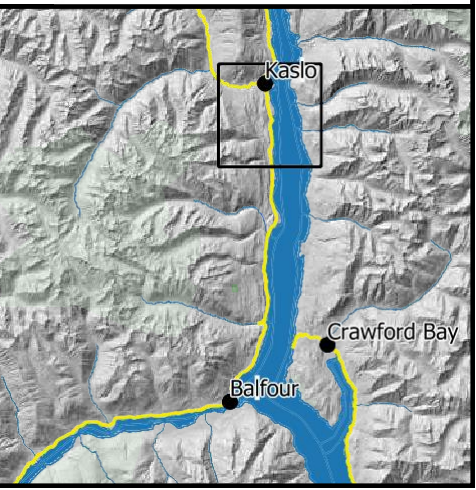


# 5308 Amundsen Rd. Project Location

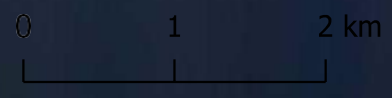


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1/21/2021



● Project Location





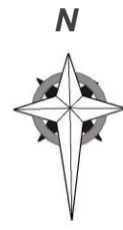
**APPENDIX 2**  
**SITE PLAN AND MITIGATION PLANS**

# PLAN NEP19585.

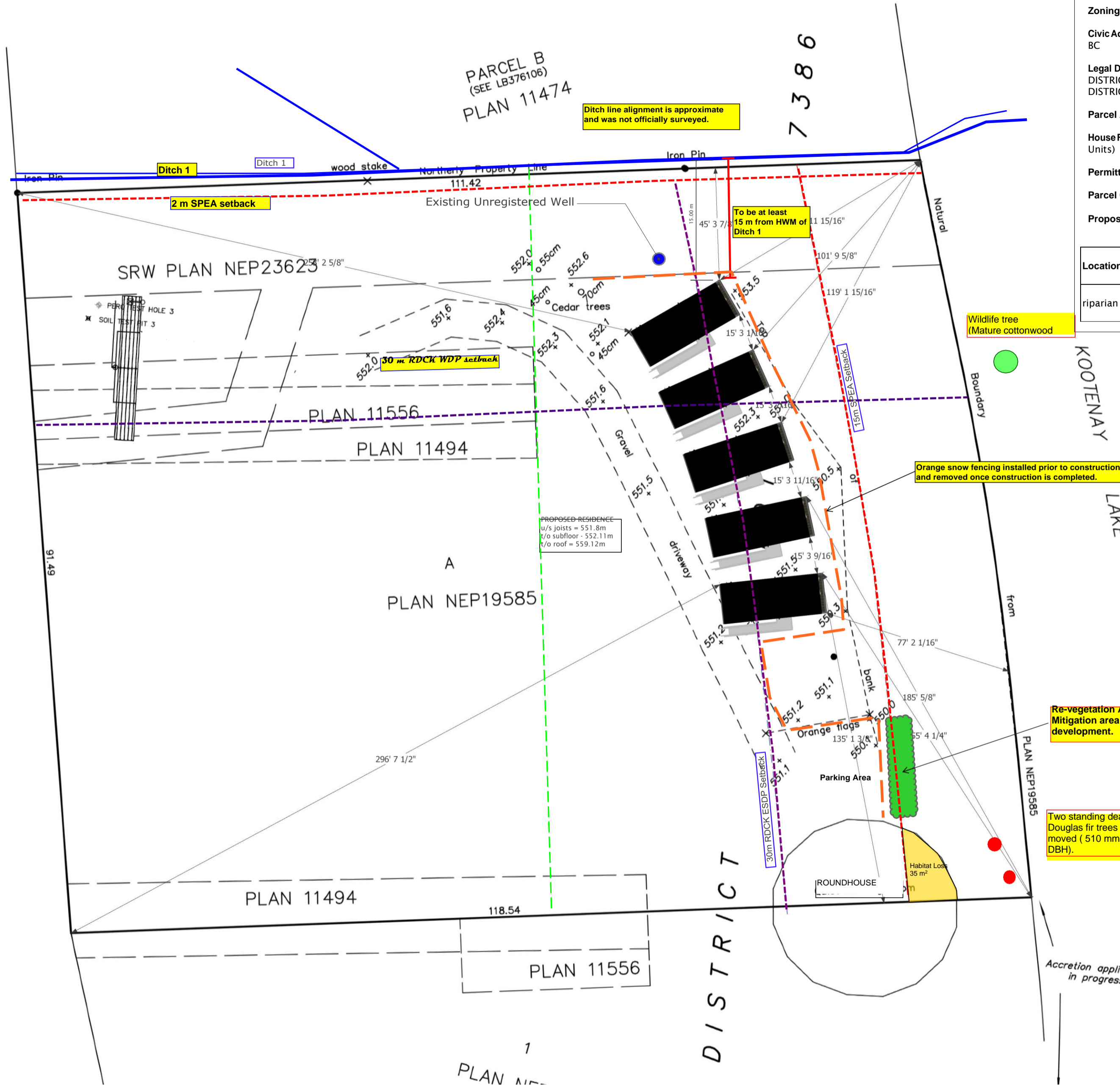


derived from Plan 11474.  
are in metric.  
geodetic and derived from BM

not elevation



AMUNDSEN ROAD



Ditch line alignment is approximate and was not officially surveyed.

To be at least 15 m from HWM of Ditch 1

30 m RDCK WDP setback

15m SPEA Setback

Wildlife tree (Mature cottonwood)

Orange snow fencing installed prior to construction and removed once construction is completed.

Re-vegetation Area (35 m<sup>2</sup>) Mitigation area from previous development.

Two standing dead Interior Douglas fir trees previously removed (510 mm and 480 mm DBH).

Accretion application in progress

PROPOSED RESIDENCE  
u/s joists = 551.8m  
t/o subfloor = 552.11m  
t/o roof = 559.12m

Habitat Loss  
35 m<sup>2</sup>

### Legend

15.0m SPEA Setback

30.0m RDCK ESDP Setback

Location	RDCK	Proposed
riparian setback	15.0m	22.0 m

RDCK - Regional District of Central Kootenay Electoral Area - "D"

Zoning: N/A

Civic Address: 5278 Amundsen Rd, Kaslo, BC

Legal Description: LOT 1 PLAN NEP22516 DISTRICT LOT 7386 KOOTENAY LAND DISTRICT

Parcel Area: 11,945.6 m<sup>2</sup>

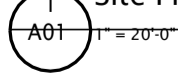
House Footprint: 59.46m<sup>2</sup> / 640sq.ft (x5 Units)

Permitted Uses: N/A

Parcel Coverage Max: N/A

Proposed Parcel Coverage: 2.49%

1 Site Plan



251 Lawrence Ave. #203 Kelowna, BC  
V1Y 6L2  
1 (855)383-2467  
info@builtprfab.com

REVISIONS	DESCRIPTION	DATE	BY	APP'D
1	CLIENT REVIEW	12/14/20		
2	ISSUED FOR PERMIT	03/17/21		



The Sentinel  
5278 Amundsen Rd, Kaslo, BC, V0G 1M0

Date: 21-06-16

A 01