



REGIONAL DISTRICT OF CENTRAL KOOTENAY
DEVELOPMENT PERMIT
D1605A (1055 Riondel Road – Boorman)

Date: August 19th, 2016

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

1. This Development Permit is issued to Peter and Rhonda Boorman, of Riondel, British Columbia 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 Sublot 65 District Lot 4595 Kootenay District Plan X31 Except Plans 5789 and EPP46855 (PID 007-920-610) 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' and are located within a Development Permit Area pursuant to the *Electoral Area A Comprehensive Land Use Bylaw No. 2315, 2013* as amended.
5. The Permittee has applied to the Ministry of Transportation and Infrastructure for the purposes of subdivision approval 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 the purposes of subdivision approval.
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 5.0 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 That the Streamside Protection and Enhancement Area (SPEA) as determined by the attached Environmental Assessment Report prepared by Masse Environmental Consultants Ltd. dated July 2016 (attached as Schedule 3) be

- maintained as a no-construction zone with the exception of foreshore access and/or required water works unless otherwise assessed by a Qualified Environmental Professional (QEP) prior to construction;
- 6.3 That all works in and about a watercourse obtain a *Water Sustainability Act Change Approval* or notification application;
 - 6.4 That exposed soils be re-vegetated with native vegetation as soon as possible following disturbance;
 - 6.5 That an erosion and sediment control plan is implemented during any proposed construction activity, including the installation of snow fencing along the SPEA boundary;
 - 6.6 That ten (10) native trees (> 1 gallon pots) be replanted in the disturbed area next to the unnamed stream on proposed lot 3 at a spacing of 3 metres to mitigate for the loss of riparian habitat caused by placement of rock;
 - 6.7 That stairs and decks within the SPEA be elevated from the ground to allow light penetration;
 - 6.8 That invasive weeds be removed to the extent possible;
 - 6.9 That live and dead trees, especially deciduous trees, over 30 cm DBH be retained unless considered a hazard;
 - 6.10 That a vegetative buffer be maintained around the cave as identified in the Environmental Assessment; and
 - 6.11 That clearing of trees and vegetation be conducted outside of the songbird breeding season (April 1st to July 30th) to the extent possible.
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 \$1000.00 to ensure the landscaping requirements as set forth in Section 6 are completed and in accordance with the following provisions:
- a. 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.
 - b. The Permittee shall complete the landscaping works required by this Permit prior to August 19th, 2018. Within this time period the required landscaping must be inspected and approved by the Regional District.
 - c. 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.

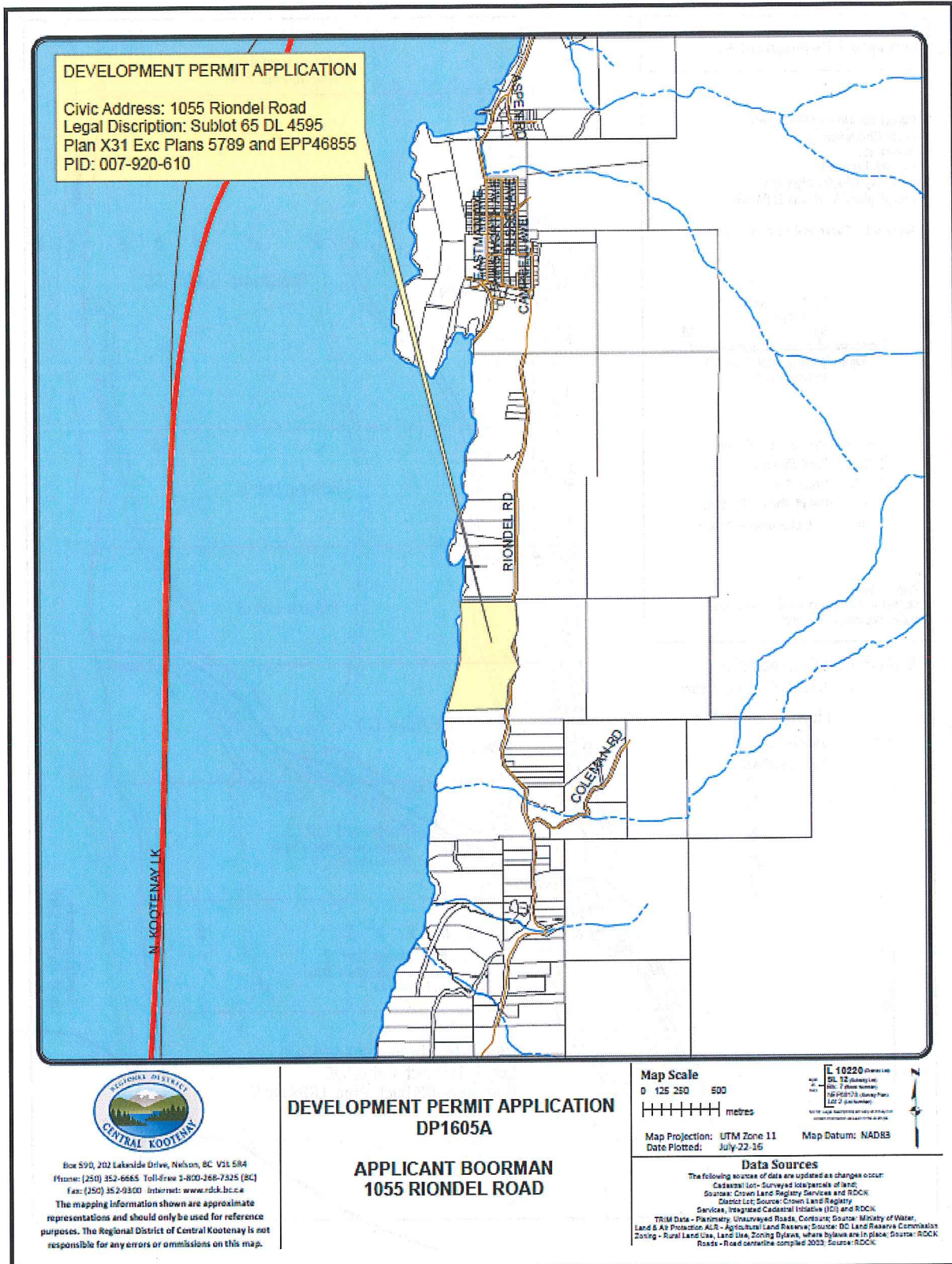
- d. If the landscaping is approved within this time period without the Regional District having to draw the on the Letter of Credit, 90% of the original amount of the Letter of Credit shall be returned to the Permittee.
 - e. A hold back of 10% of the original amount of the Letter of Credit shall be 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.
9. 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.
 10. 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.
 11. 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.
 12. 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.
 13. 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.
 14. This Development Permit does not constitute a building permit.
 15. 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.



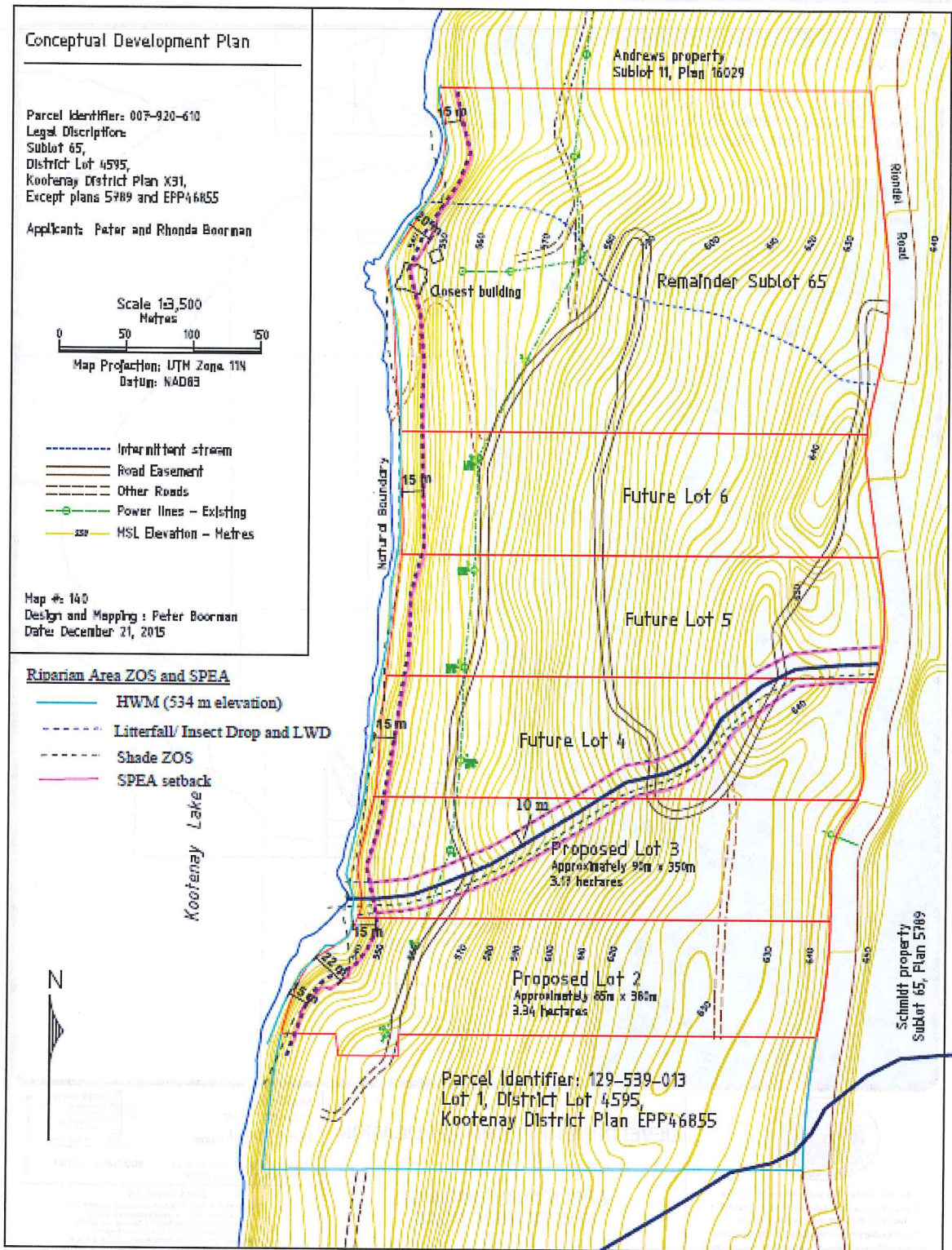
Sangita Sudan, General Manager of Development Services

Aug 19, 2016
Date of Issuance

Schedule 1: Subject Property



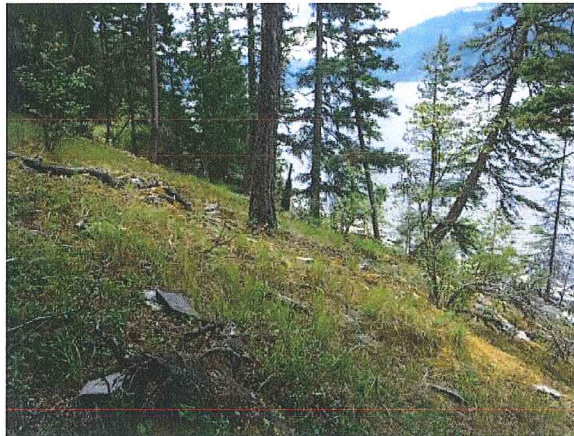
Schedule 2: Site Plan



Schedule 3: Environmental Assessment



**1055 RIONDEL ROAD SUBDIVISION
RIONDEL, KOOTENAY LAKE
Environmental 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

July 2016

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1 INTRODUCTION

Masse Environmental Consultants Ltd. (MEC) was retained by Koorumbin Properties Inc, owner of 1055 Riondel Road on Kootenay Lake (Appendix 1), to provide environmental consulting services in support of the second phase of the proposed subdivision. The area proposed for development consists of 25 hectares, which the proponent proposes to eventually subdivide into six parcels ranging in size from 3.17-8.8 hectares. The preliminary concept plan for the second phase of the subdivision consists of three single family residential lots with a common road accessing each of the properties. The proposed subdivision is located within the riparian areas of Kootenay Lake and an unnamed watercourse, triggering the requirement for an environmentally sensitive development permit area (ESDPA) application.

A site visit was conducted on June 13, 2016 by Fiona Lau, ASCT., and Sylvie Masse, M.Sc., R.P.Bio., to assess the habitat values and potential impact of the proposed subdivision on the riparian and foreshore areas.

This assessment will evaluate the existing conditions of the foreshore and riparian areas, identify important habitat values, assess the existing environmental impacts and recommend measures to protect environmentally sensitive areas for future development. It is based on the following regulatory framework and best management practices documents:

- Electoral Area 'A' Comprehensive Land Use Bylaw No. 2315.
- Riparian Areas Regulation
- Provincial Water 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

This report has been prepared by Fiona Lau and Sylvie Masse, M.Sc., R.P.Bio. We, Fiona Lau and Sylvie Masse, hereby certify that:

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

1.1 Location

The subject property, 1055 Riondel Road (Sublot 65, District Lot 4595 Plan X31 except Plans 5789 and EPP46855) is located along the east shore of Kootenay Lake, south of the community of Riondel

(Appendix 1). The subdivision is bordered by a Ministry of Transportation Right of Way (ROW) to the north and private property to the south.

The project area is within the Interior Cedar Hemlock dry warm variant 1 (ICHdw1) biogeoclimatic subzone (Ketchesen and Braumandl 1992). 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. Snow packs are very shallow to shallow and of short duration and combined with the mild climate result in no significant soil freezing.

During our site visit, we determined the visible high water mark to be at ~534 m elevation based on the location of presence of terrestrial vegetation along the foreshore (see definition of Natural Boundary below). Based on the definition of natural boundary, the 534 m elevation will be used as the HWM from which the riparian setbacks will be measured.

“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)

1.2 Streamside Protection and Enhancement Area (SPEA)

To determine whether the development permit area (DPA) aligns with the criteria in the Riparian Area Regulation (RAR), a detailed assessment of the site was conducted to calculate the streamside protection and enhancement area (SPEA) for Kootenay Lake on the proposed subdivision site. Results for the Zones of Sensitivity (ZOS) and SPEA are presented in Table 1 below and shown on the site plan in Appendix 2.

Table 1. Results of detailed assessment.

Feature Type	Lot #	SPVT	Zones of Sensitivity			SPEA
			LWD	Litter fall	Shade	
Lake	2	TR	15 m	15 m	0-30 m	15-22 m
	3	TR	15 m	15 m	0-5 m	15 m
	4	TR	15 m	15 m	0-6 m	15 m
	5	TR	15 m	15 m	0-5 m	15 m
	6	TR	15 m	15 m	0 m	15 m
	Sublot 65	TR	15 m	15 m	0-20 m	15-20m
Stream	3	TR	10 m	10 m	6 m	10 m
	4	TR	10 m	10 m	0 m	10 m

SPVT- site potential vegetation type (TR-tree)

LWD- large woody debris

SPEA- streamside protection and enhancement area

2 HISTORICAL AND CURRENT LAND USES

2.1 Existing Development

A single access road has been constructed through the property to each of the proposed lots including the previously subdivided lot (Lot 1) located at the south end of the property (Photo 1). Currently there is one single family residential home with a detached garage located at the north end of the property on subplot 65 (Photo 2). The home is located ~20 m from the HWM. Disturbance within the riparian area include:

- Construction of a small walking trail from the house to the beach;
- Clearing of some vegetation and soil disturbance on the natural point located directly in front of the house;
- Construction of an access road from the house to the boat access area; and
- Clearing of vegetation and re-grading of an area ~20 m long x ~10 m wide approximately 30 m south of the residence.

Ortho-photos indicate that both the construction of the home, installation of the access road and clearing of vegetation within the riparian area were implemented prior to 2013; therefore did not trigger the requirement of an Environmentally Sensitive Area Development Permit application.

Lot preparation has been completed in Lots 2 and 3 which consisted of clearing, re-grading and rock placement. Lot 2 activities were located >30 m from Kootenay Lake HWM (Photo 5) and Lot 3 activities were located >18 m from Kootenay Lake HWM (Photo 6). On Lot 3, an access road was constructed along the north side of a stream, encroaching 3 m into the 10 m riparian setback impacting approximately 10 m² of habitat. In addition, small standing dead trees were cut within an area of 25 m² (R. Boorman, personal communication, July 12, 2016).



Photo 1. Access road through proposed subdivision. Photo 2. Existing home located on subplot 65.



Photo 3. View of foreshore area directly in front of house.



Photo 4. View of access road and cleared area south of house.



Photo 5. Clearing and regrading completed on Lot 2.



Photo 6. Clearing and re-grading completed on Lot 3.

2.2 Water Resources

Kootenay Lake flows in from the North (Lower Duncan River) and South (Kootenay River) into the main body of Kootenay Lake, where it then flows through the west arm into the Kootenay River. The existing home located on subplot 65 of the proposed subdivision uses Kootenay Lake as their water source. Water pipes are laid from the home through the riparian area, drawing water from the lake (Photos 7 and 8).



Photo 7. Water intake line through riparian area



Photo 8. Water intake line at foreshore.

Two unnamed non-fish bearing watercourses were identified within the property boundaries, both flowing in an east to west direction. Stream #1 flows through proposed Lots 3 and 4 and is culverted with 500 mm diameter pipes under Riondel Road and three crossings under the subdivision access road. This stream has an average gradient of 26%, an average width of 2.0 m, step pool morphology and has a drainage area of <math><2.0 \text{ km}^2</math> (Photos 9 and 10). According to the applicant, the watercourse flows approximately 8-9 months of the year (P. Boorman, personal communication, June 13, 2016).

Stream #2 flows through subplot 65 and is culverted under Riondel Road. This stream has an average gradient of 25%, an average width of 1.2 m, step pool morphology and has a drainage area of <math>< 2.0 \text{ km}^2</math> (Photo 11). During the site inspection, water was observed to flow subsurface for a section of stream within the property boundaries (Photo 12). According to the applicant this stream flows for <math><6</math> months of the year (P. Boorman, personal communication, June 13, 2016).

According to the definition of a "watercourse" under the RDCK Floodplain Management Bylaw No. 2080 and/or the Electoral Area 'A', Comprehensive Land Use Bylaw No. 2315, only Stream #1 is considered a watercourse triggering the environmentally sensitive development permit area application and the assessment required under the riparian area regulation.

"Watercourse means any natural or man-made depression with well-defined banks and a bed 0.6 m (2.0 ft) or more below the surrounding land servicing to give direction to a current of water at least six months of the year/and or having a drainage area of two square kilometres (0.8 square miles) or more upstream of the point of consideration."

(RDCK 2013)

Under the Provincial Water Sustainability Act both these streams would be considered "watercourses" and would require a Change Approval notification/application for any works proposed below the high water mark.



Photo 9. Upstream view of Stream #1 channel



Photo 10. Downstream view of Stream #1 channel at mouth.



Photo 11. Upstream view of Stream #2 near mouth.



Photo 12. View of undefined banks of Stream #2 channel in upland section.

2.3 Moorage Facilities

A boat access area has been created on the foreshore of subplot 65, south of the residence (Photo 13). The boat access consists of a partially groomed section of beach to bring the applicants boat in and out of the water using a truck and trailer. Two small rock groins measuring 5-6 m long and 2-3 m wide are sited along each side of the boat access area (Photos 13 and 14).

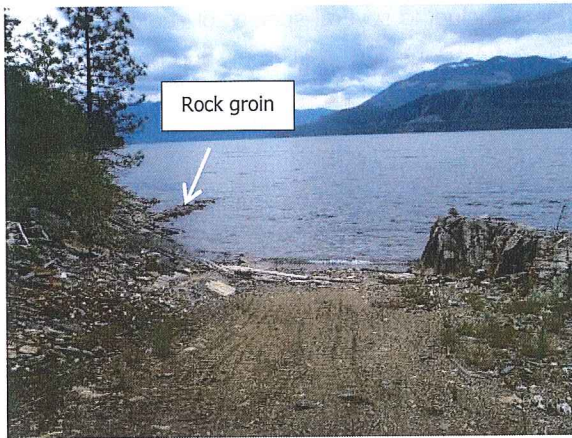


Photo 13. Boat access and rock groin on foreshore.



Photo 14. Rock groin location on the north side of boat access.

2.4 Services and Site Drainage

Sewage disposal for the existing residence on subplot 65 is serviced by a septic disposal field located on the property. Future residences on the proposed lots will require the installation of individual septic systems. Approved septic field locations are shown on the site plan for Lots 2 and 3.

There was no drainage issues observed within the riparian areas of the proposed subdivision. The access road has been recently upgraded with new gravel, proper ditching and culvert crossings. A natural seepage area was identified within the 15 m riparian setback on Lot 4 (See Appendix 3 for location).

3 RESOURCES

3.1 Fish and Fish Habitat

Typically, Kootenay Lake experiences two seasonal water level increases annually. The first increase is observed in April during low elevation snowmelt followed by a more substantial secondary rise in water levels due to high elevation snowmelt in June. Lake levels can vary by up to 4 m throughout the year affecting the extent of exposed shoreline.

The foreshore consists mostly of a rocky shoreline with small cobble/gravel beach areas located in front of subplot 65 and between Lots 2 and 3. The rocky shoreline consists predominantly of exposed bedrock with overlying boulders and cobbles and has an average gradient of 54% (Photos 15 and 16). The rocky shoreline provides potential rearing and cover habitat for juvenile and adult fish. No aquatic vegetation was observed within this segment. The beach areas consist predominantly of cobbles and gravel (Photos 17 and 18) and had an average gradient of 12%. There were no observations of emergent vegetation along the foreshore. The shallow water along the beach areas provides good rearing habitat for fry and juveniles.

Kootenay Lake supports a variety of fish species (Table 2), including several species of regional interest, such as rainbow trout, bull trout, kokanee, white sturgeon, Westslope cutthroat trout, and burbot.

Table 2. Fish species present in Kootenay Lake.

Species	Scientific Name	Comments
Burbot	<i>Lota lota</i>	Kootenay Lake population is red listed
Bull Trout	<i>Salvelinus confluentus</i>	Blue-listed species
Brook Trout	<i>Salvelinus fontinalis</i>	Introduced species
Kokanee	<i>Oncorhynchus nerka</i>	
Largemouth Bass	<i>Micropterus salmoides</i>	Introduced species
Largescale Sucker	<i>Catostomus macrocheilus</i>	
Longnose Dace	<i>Rhinichthys cataractae</i>	
Longnose Sucker	<i>Catostomus catostomus</i>	
Lake Whitefish	<i>Coregonus clupeaformis</i>	
Mountain Whitefish	<i>Prosopium williamsoni</i>	
Northern Pikeminnow	<i>Ptychocheilus oregonensis</i>	
Peamouth Chub	<i>Mylocheilus caurinus</i>	
Pumpkinseed	<i>Lepomis gibbosus</i>	Introduced species
Prickly Sculpin	<i>Cottus asper</i>	
Pygmy Whitefish	<i>Prosopium coulteri</i>	
Rainbow Trout	<i>Oncorhynchus mykiss</i>	
Redside Shiner	<i>Richardsonius balteatus</i>	
Slimy Sculpin	<i>Cottus cognatus</i>	
Torrent Sculpin	<i>Cottus rhotheus</i>	
Westslope Cutthroat Trout	<i>Oncorhynchus clarki lewisi</i>	Blue-listed species
White Sturgeon	<i>Acipenser transmontanus</i>	Kootenay Lake population is red-listed
Yellow Perch	<i>Perca flavescens</i>	Introduced species

(Habitat, 2016)



Photo 15. View of exposed bedrock along shoreline.



Photo 16. Typical view of rocky shoreline along the foreshore of the property.



Photo 17. View of beach area in front of subplot 65.



Photo 18. View of rocky beach area in front of Lots 2 and 3.

3.2 Riparian Vegetation

3.2.1 Kootenay Lake

The riparian area along Kootenay Lake is considered habitat located within the 15 m – 22 m riparian setback from the HWM depending on the lot aspect. The riparian area along the lake has a western aspect, is mostly rocky with a mosaic of mid-seral coniferous trees, mature Ponderosa Pine (*Pinus ponderosa*), infrequent low growing shrubs and deciduous trees and large open areas with dominant understorey vegetation consisting of mosses and lichens (Photos 19-22). The gradients are quite steep within the first 20-30 m ranging from 45% to 60% with minimal top soil layers and exposed bedrock abundant throughout. There is a grade break which typically occurs between 20-30 m from the HWM where the topography slightly levels to a gradient of ~33% (Photo 16). Many of the trees within the 30 m setback may have shallow rooting systems due to the lack of soils and available nutrients and may be susceptible to windthrow and erosion.

The forest stand within the riparian area is mostly consistent along the length of the property, with exception of a 100 m long section within Lots 3 and 4. This area consists of more densely growing vegetation, less exposed rock and increased soil moisture content. A natural seepage area (~25 m²) within this area supported Western Red Cedar (*Thuja plicata*), Red Osier Dogwood (*Cornus stolonifera*), Water Birch (*Betula occidentalis*) Claspig Twisted Stalk (*Streptopus amplexifolius*), Common Horsetail (*Equisetum arvense*) and Mountain Alder (*Alnus incana*).



Photo 19. View of riparian area looking south within subplot 65.



Photo 20. View of typical habitat within the riparian area.

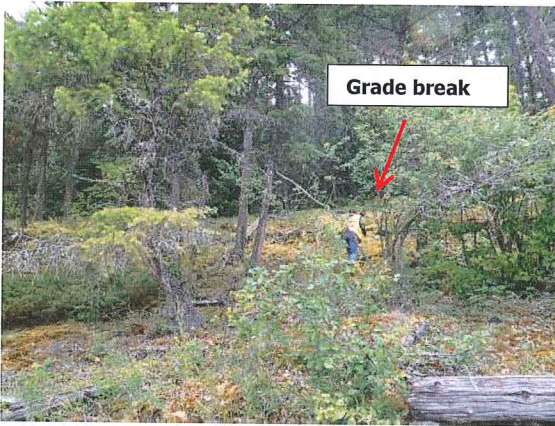


Photo 21. View of grade break within riparian area.



Photo 22. Lance-leaved Stonecrop (*Sedum lanceolatum*), lichen and moss.

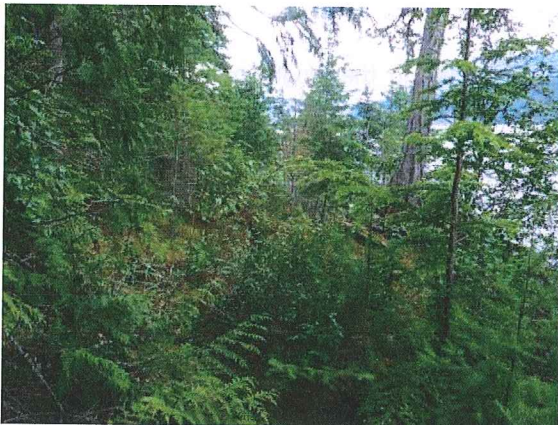


Photo 23. View of dense shrub vegetation within Lot 3.



Photo 24. View of seepage area within Lot 3

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

Table 3. Kootenay Lake riparian area native plant and weed species.

Species Name	Latin Name	Species Name	Latin Name
Trees		Herbaceous	
Black Cottonwood	<i>Populus balsamifera</i>	Wild Sarsaparilla	<i>Aralia nudicaulis</i>
Interior Douglas Fir	<i>Pseudotsuga menziesii</i>	American Vetch	<i>Vicia americana</i>
Lodgepole Pine	<i>Pinus contorta</i>	Bracken Fern	<i>Pteridium aquilinum</i>
Paper Birch	<i>Betula papyrifera</i>	Brown-eyed Susan	<i>Gaillardia aristata</i>
Ponderosa Pine	<i>Pinus ponderosa</i>	Clasping Twisted Stalk	<i>Streptopus amplexifolius</i>
Trembling Aspen	<i>Populus tremuloides</i>	Common Harebell	<i>Campanula rotundifolia</i>
Water Birch	<i>Betula occidentalis</i>	Common Horsetail	<i>Equisetum arvense</i>
Western Red Cedar	<i>Thuja plicata</i>	Common Red Paintbrush	<i>Castilleja miniata</i>
White Pine	<i>Pinus monticola</i>	False Solomons Seal	<i>Smilacina racemosa</i>
Shrubs		Fireweed	<i>Epilobium angustifolium</i>
Thimbleberry	<i>Rubus parviflorus</i>	Hair Bentgrass	<i>Agrostis scabra</i>
Black Hawthorn	<i>Crataegus douglasii</i>	Heart-leaved Twayblade	<i>Listera cordata</i>
Common Juniper	<i>Juniperus communis</i>	Lance-leaved Stonecrop	<i>Sedum lanceolatum</i>
Common Snowberry	<i>Symphoricarpos albus</i>	Nodding Onion	<i>Allium ceruum</i>
Douglas Maple	<i>Acer glabrum</i>	Parsley Fern	<i>Cryptopteris fragilis</i>
Falsebox	<i>Pachistima myrsinites</i>	Pasture Sage	<i>Artemisia frigida</i>
Kinnikinnick	<i>Arctostaphylos var. uva-ursi</i>	Pearly Everlasting	<i>Anaphalis margaritacea</i>
Mock Orange	<i>Philadelphus lewisii</i>	Peavine sp.	<i>Lathyrus sp.</i>
Mountain Alder	<i>Alnus incana</i>	Pinegrass	<i>Calamagrostis rubescens</i>
Nootka Rose	<i>Rosa nutkana</i>	Rattlesnake Plantain	<i>Goodyera oblongifolia</i>
Ocean Spray	<i>Holodiscus discolor</i>	Self-heal	<i>Prunella vulgaris</i>
Oregon Grape	<i>Mahonia aquifolium</i>	Showy Aster	<i>Aster conspicuus</i>
Princes Pine	<i>Chimaphila umbellata</i>	Showy Daisy	<i>Erigeron speciosus</i>
Red Osier Dogwood	<i>Cornus stolonifera</i>	Silky Lupine	<i>Lupines sericeus</i>
Saskatoon Berry	<i>Amelanchier alnifolia</i>	Slender Hawksbeard	<i>Crepis atrabarba</i>
Scoulers willow sp.	<i>Salix scouleriana</i>	Spreading dogbane	<i>Apocynum cannabinum</i>
Soopolallie	<i>Shepherdia canadensis</i>	Sweet Scented Bedstraw	<i>Galium triflorum</i>
Exotic/Weeds		Western Licorice Fern	<i>Polypodium hesperium</i>
Spotted Knapweed	<i>Centaurea maculosa</i>	Wild Strawberry	<i>Fragaria virginiana</i>
Wall Lettuce	<i>Mycelis muralis</i>	Yarrow	<i>Achillea millefolium</i>
Oxeye Daisy	<i>Leucanthemum vulgare</i>	Mosses and lichens	
Great Mullein	<i>Verbascum thapsus</i>	Step Moss	<i>Hylocomium splendens</i>
		Moss sp.	
		Lichen sp.	

3.2.2 Unnamed Tributary (Stream #1)

The riparian area along Stream #1 extends 10 m from the HWM of the watercourse and consists of a mid-seral coniferous forest stand with minimal understory vegetation with the exception of mosses and abundant coarse woody debris (Photos 25 and 26).



Photo 25. Downstream view of riparian area along Stream #1.



Photo 26. Upstream view of riparian area within Lot 3.

Table 4 provides a list of native plant and weed species encountered on the property within the riparian area of Stream #1.

Table 4. Kootenay Lake riparian area native plant and weed species.

Species Name	Latin Name
Trees	
Western Red Cedar	<i>Thuja plicata</i>
Interior Douglas Fir	<i>Pseudotsuga menziesii</i>
Western Hemlock	<i>Tsuga heterophylla</i>
Shrubs	
Falsebox	<i>Pachistima myrsinites</i>
Douglas Maple	<i>Acer glabrum</i>
Herbaceous	
Bunchberry	<i>Cornus canadensis</i>
Wild Ginger	<i>Asarum caudatum</i>
Pathfinder	<i>Adenocaulon bicolor</i>
Wall lettuce	<i>Mycelis muralis</i>
Moss sp.	

3.3 Wildlife

3.3.1 Reptiles and Amphibians

The west facing rocky outcrops have the potential for western skinks and reptiles; however presence of these species on site was not confirmed since no incidental observations were made. The western skink is a blue listed species in BC with one confirmed siting reported in Pilot Bay Provincial Park located ~9.5 km south of the subject property (CDC 2016). For the purpose of this report, further studies would not be required.

3.3.2 Birds

The mid-seral conifer forest favours species such as cavity dwellers, songbirds and raptors. A quick assessment was conducted to identify raptor nests and none were found. The riparian area is mostly undisturbed and provides some valuable wildlife habitat including habitat for cavity dwellers and mammals. Two wildlife trees were identified within the assessment area. Two Western Red Cedars (*Thuja plicata*) with multiple cavities excavated are located within the riparian area of Stream #2 close to mouth on Lot 3 (Photo 31). One cedar had a rotten base and is considered to be a potential hazard tree (Photo 32). A large Ponderosa Pine snag is located within subplot 65 close to Stream #2; however is not located with the riparian area (Photo 33). These trees provide good perch habitat for raptors, as well as habitat for cavity dwellers. See Appendix 3 for wildlife snag locations.

3.3.3 Mammals

Ungulate use was confirmed within the project area with visual observations of wildlife trails and droppings. Two small caves were identified very close to Stream #2 on subplot 65 within 20 m of the HWM of Kootenay Lake (UTM 11U. 510174.5509800) (See Appendix 3 for location). The larger cave was dry and had a full opening width of 2.7 m, depth of 2.7 m and height of 0.5 m (Photos 27 and 28). The smaller cave sited ~ 5 m away was wet, had an opening width of 1.3 m, depth of 1.3 m and height of 1.3 m (Photo 29). The larger cave is considered potential habitat for a variety of species including Bat sp. (*Chiropter sp.*), Black Bear (*Ursidae Americanis*), Coyote (*Canis latrans*) and Northern River Otter (*Lontra canadensis*). Unidentified scat was found at the opening of the cave (Photo 29). The size and shape of the scat indicated that it was a midsize mammal; however further investigation was not completed or required as part of this assessment.



Photo 27. View of larger cave opening.



Photo 28. View of larger cave interior.



Photo 29. View of small cave opening.



Photo 30. View of unidentified scat at cave opening.



Photo 31. Cavities excavated in cedar tree on Lot 3

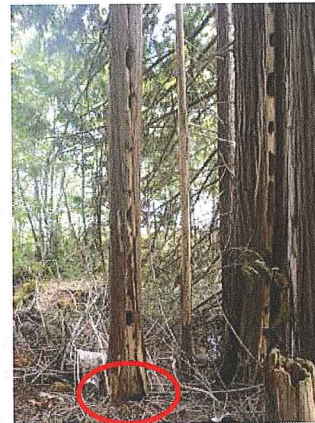


Photo 32. Hazard tree with rotten base on Lot 3.



Photo 33. Ponderosa Pine snag on subplot 65.

3.4 Species at Risk

3.4.1 Wildlife Species at Risk

Thirty three terrestrial vertebrate species at risk are known to occur within the ICH biogeoclimatic zone in the Kootenay Lake Forest District (CDC 2016). Of these, one species the Grizzly Bear (*Ursus arctos*) 'likely' occurs on site, and nine species Western Skink (*Plestiodon skiltonianus*), Great Blue Heron (*Ardea herodias herodias*), Short-eared Owl (*Asio flammeus*), Olive-sided Flycatcher (*Contopus cooperi*), Black Swift (*Cypseloides niger*), Bobolink (*Dolichonyx oryzivorus*), Barn Swallow (*Hirundo rustica*), Western Screech Owl (*Megascops kennicottii macfarlanei*), Lewis's Woodpecker (*Melanerpes lewis*), Western Grebe (*Aechmophorus occidentalis*), and American Badger (*Taxidea taxus*) are estimated to 'possibly' occur on site.

3.4.2 Vascular and Non-vascular Plant Species at Risk

Twenty three vascular plant species at risk are known to occur within the ICH biogeoclimatic zone in the Kootenay Lake Forest District (CDC 2016). Of these, three 'possibly' occur on site (Nuttalls Waterweed

(*Elodea nuattalii*), Orange Touch-me-not (*Impatiens aurella*) and Spurless Touch-me not (*Impatiens ecomuta*). No non-vascular species at risk are known to occur within the ICH biogeoclimatic zone in the Kootenay Lake Forest District (CDC 2016).

A species at risk inventory search was conducted using Habitat Wizard to identify any known occurrences within the project area. None were identified.

4 POTENTIAL ENVIRONMENTAL HAZARDS

The riparian area was assessed for potential environmental hazards including: slope stability indicators and hazard trees. Field indicators listed in Table 3.8 of the RAR were reviewed while on site to identify the presence of any potential indicators. Sweeping trees were observed throughout the property; however these observations do not confirm the presence of unstable terrain and it is recommended that a geotechnical assessment of this area be completed by a P.Ge. or P.Eng.

Six potential hazard trees were identified within the assessment area including a large sweeping Interior Douglas Fir tree on Lot 4 (Photo 34), four standing dead Western Red Cedar trees on Lot 3 (Photo 35) and one standing dead hemlock on Lot 3. (See Appendix 3 for locations). It is recommended that a Professional Arborist or Registered Professional Forester (RPF) is retained to assess potential hazard trees and potential windthrow for future clearing activities.



Photo 34. Large sweeping Interior Douglas Fir Tree on Lot 4.



Photo 35. Three standing dead Western Red Cedars in Lot 3.

5 IMPACTS AND RECOMMENDATIONS

The following section describes impacts to ecological values (fisheries, vegetation and wildlife) and recommends measures to protect the integrity of SPEA. SPEA was determined to be at setbacks from 15 m to 22 m from the HWM of Kootenay Lake and 10 m from the HWM of Stream #1. The recommended riparian setbacks for each property are shown in Table 5 below and are outlined on the Subdivision Plan in Appendix 2. Specifically for subplot 65 and Lot 2, the setback ranges in size dependent on the aspect of the shoreline at that location.

Table 5. Riparian Setbacks

Lot #	Riparian Setback (Kootenay Lake)	Riparian Setback (Stream #1)
2	15-22 m	-
3	15 m	10 m
4	15 m	10 m
5,6	15 m	-
sublot 65	15-20 m	-

5.1 Fisheries Impacts

The two small rock groin structures located on each side of the boat access on sublot 65 slightly impede fish movement by 5-6 m during high water levels; however are unlikely to affect current patterns and disrupt natural sediment transport along the lake foreshore. Pipes will be installed into the lake from each property to provide a source of water for new homes. These pipes are typically $\leq 3''$ in diameter and have fish screens at the intake to prevent fish from entering.

The riparian zone has numerous functions which benefit the aquatic ecosystem, which include bank stabilization, flood reduction, reduced sedimentation, enhancement of wildlife habitat, regulation of surface flows, and improved scenery and nutrient input into the lake)

Recommendations:

The following mitigation measures are recommended to reduce the impact of the proposed development on fisheries values:

- Riparian buffer along Kootenay Lake be maintained as a no-construction zone with the exception of foreshore access. Any activities proposed within the riparian setback should be assessed by a Qualified Environmental Professional (QEP) prior to construction.
- Riparian buffer be maintained along Stream #1 and any activities proposed within the riparian setback should be assessed by a QEP.
- Removal of riparian vegetation should be avoided. If vegetation removal is unavoidable (i.e. access stairs to foreshore) it should be minimized as much as possible.
- All works in and about a watercourse will require a Water Sustainability Act Change Approval or notification application.
- Revegetate exposed soils with native vegetation as soon as possible.
- Implement and maintain erosion and sediment control plans during construction.
- Concentrate shoreline alterations in one area and ensure shoreline accesses, structures and pathways are narrow.
- Minimize water pipe diameter and ensure that fish screens are placed at the intake.

5.2 Vegetation Impacts

Overall vegetation impacts on the property are considered minimal with most of the riparian areas intact. Selective clearing within the riparian setbacks has taken place on subplot 65 and more recently on Lot 3 (~35 m²). Activities conducted within the riparian setback on subplot 65 were completed prior to 2013; therefore did not trigger the requirement of an ESADP application.

Clearing and re-grading activities located on Lot 3 were completed recently and it is recommended that replanting be implemented within the disturbed area next to stream #1.

Recommendations

The following mitigation measures are recommended to reduce the impact of the proposed development on vegetation:

- 10 native trees (≥1 gallon pots) to be replanted in the disturbed riparian area next to Stream #1 on Lot 3 at a spacing of 3 m to mitigate for the loss of riparian habitat caused by the placement of rock.
- Retain natural vegetation within the riparian setback to maintain shoreline stability and habitat complexity.
- Revegetate exposed soils with native vegetation as soon as possible.
- Concentrate shoreline alterations in one area and ensure shoreline access, structures and pathways are narrow.
- Stairs and decks within the riparian area should be elevated from the ground to allow light penetration, promoting vegetation growth.
- Build stairs with landings instead of a path on steep slopes to access the waterfront to reduce erosion and habitat impact.
- Erect a snow fence along the riparian setback to protect the riparian area during construction.
- Install permeable upland surfaces that permit rainwater infiltration, which moderates water volume, timing and velocity.
- Maintain the natural drainage on the site as much as possible, with extra consideration taken when working near the moist area identified on Lots 3 and 4.
- Remove invasive weed species throughout the properties.
- Water pipes to be buried where possible.

5.3 Wildlife Impacts

Riparian zones allow wildlife to travel between habitat “islands” by providing migration corridors between upland areas and water, as well as along the foreshore. They also help circulate nutrients between terrestrial and aquatic ecosystems. The proposed subdivision will have an impact on habitat availability and quality, as well as potentially impede natural movement patterns of wildlife species.

Recommendations:

- Avoid construction activities around the caves and ensure that drainage does not flow directly into the dry cave.

- Maintain a vegetative buffer around the cave.
- Live and dead trees, especially deciduous trees, over 30 cm DBH should be retained, unless considered a hazard.
- To protect nesting bird species, clearing of trees and vegetation should be conducted outside of the songbird breeding season (April 1-July 30). If clearing is to occur during the songbird breeding season a Qualified Environmental Professional should assess presence of active nests within areas to be cleared.
- Design access to the foreshore to allow for wildlife movement across the riparian area.

6 CONCLUSION

The subject property proposed for development has been minimally disturbed by historic development activities with most of the riparian areas intact. The proposed development, if completed with the mitigation measures in mind will be of low magnitude. However, some sensitive habitats were identified on the property including riparian areas, caves and wildlife trees. It is recommended that the proposed riparian setbacks be maintained as a no- construction zone, with the exception of foreshore access. Any activities proposed within the riparian setbacks should be assessed by a QEP prior to construction.

7 CLOSURE

We, Fiona Lau and Sylvie Masse, certify that we are qualified to carry out this assessment; and that the assessment methods under the Regulation have been followed; and that, in our 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:



Fiona Lau, ASCT.

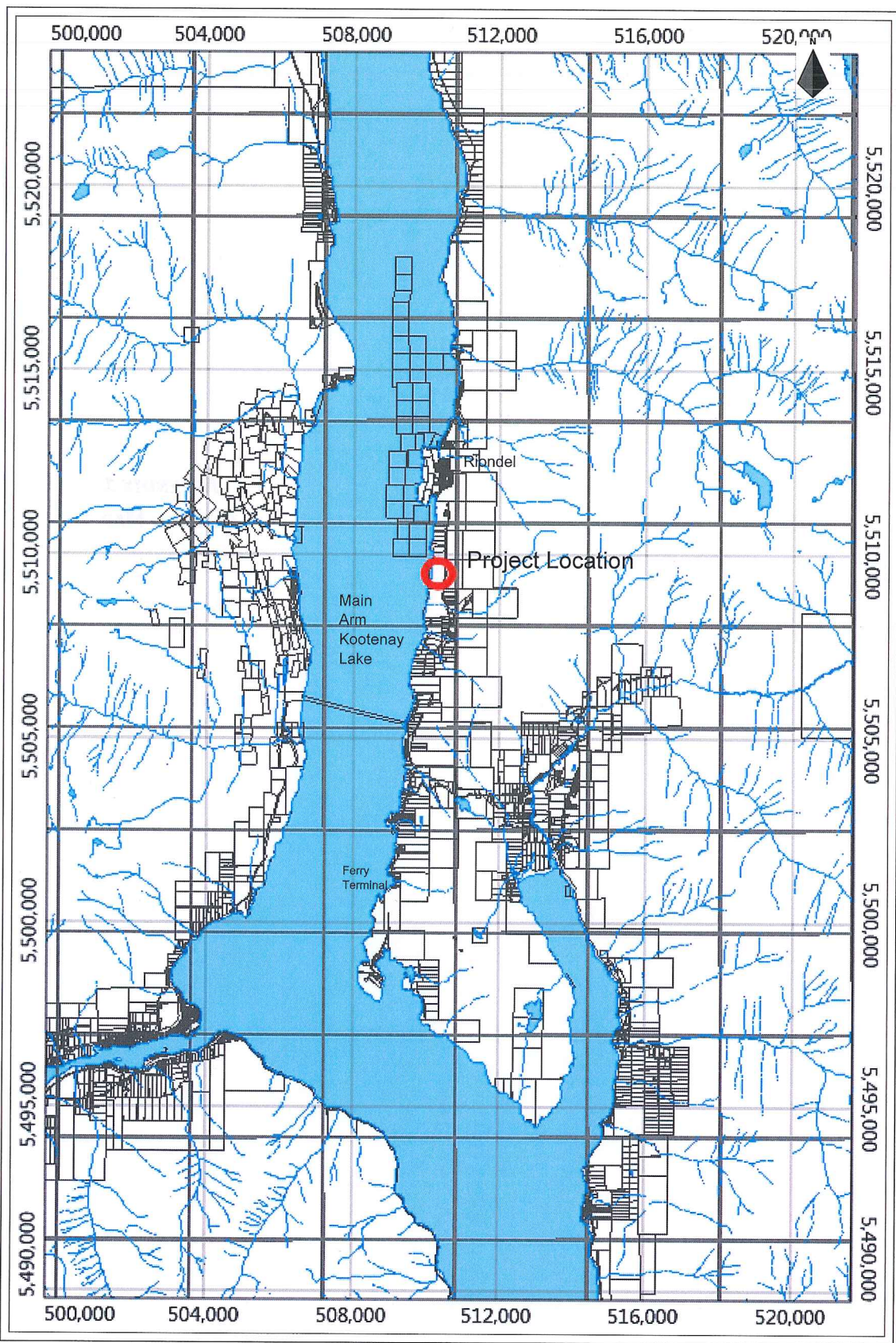


Sylvie Masse, M.Sc., R.P.Bio.
College of Applied Biology: R.P.Bio. #834

8 REFERENCES

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- Province of British Columbia. 2015. Riparian Areas Regulation. Victoria, British Columbia, Canada.

APPENDIX 1
LOCATION MAP



RDCK Map

Legend

- Streams
- Cadastre / Property Li
- Composite Maps
- Lakes (Mid Scale)

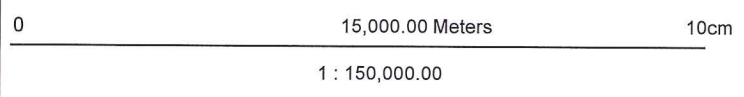
Notes

Map Details

Date Plotted: 6/2/2016



202 Lakeside Drive
 Nelson, BC
 1-800-268-7325
<http://www.rdck.ca>



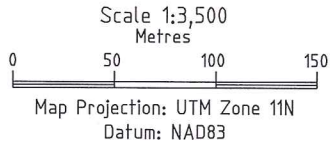
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APPENDIX 2
SUBDIVISION PLAN AND SPEA SETBACKS

Conceptual Development Plan

Parcel Identifier: 007-920-610
 Legal Description:
 Sublot 65,
 District Lot 4595,
 Kootenay District Plan X31,
 Except plans 5789 and EPP46855

Applicant: Peter and Rhonda Boorman



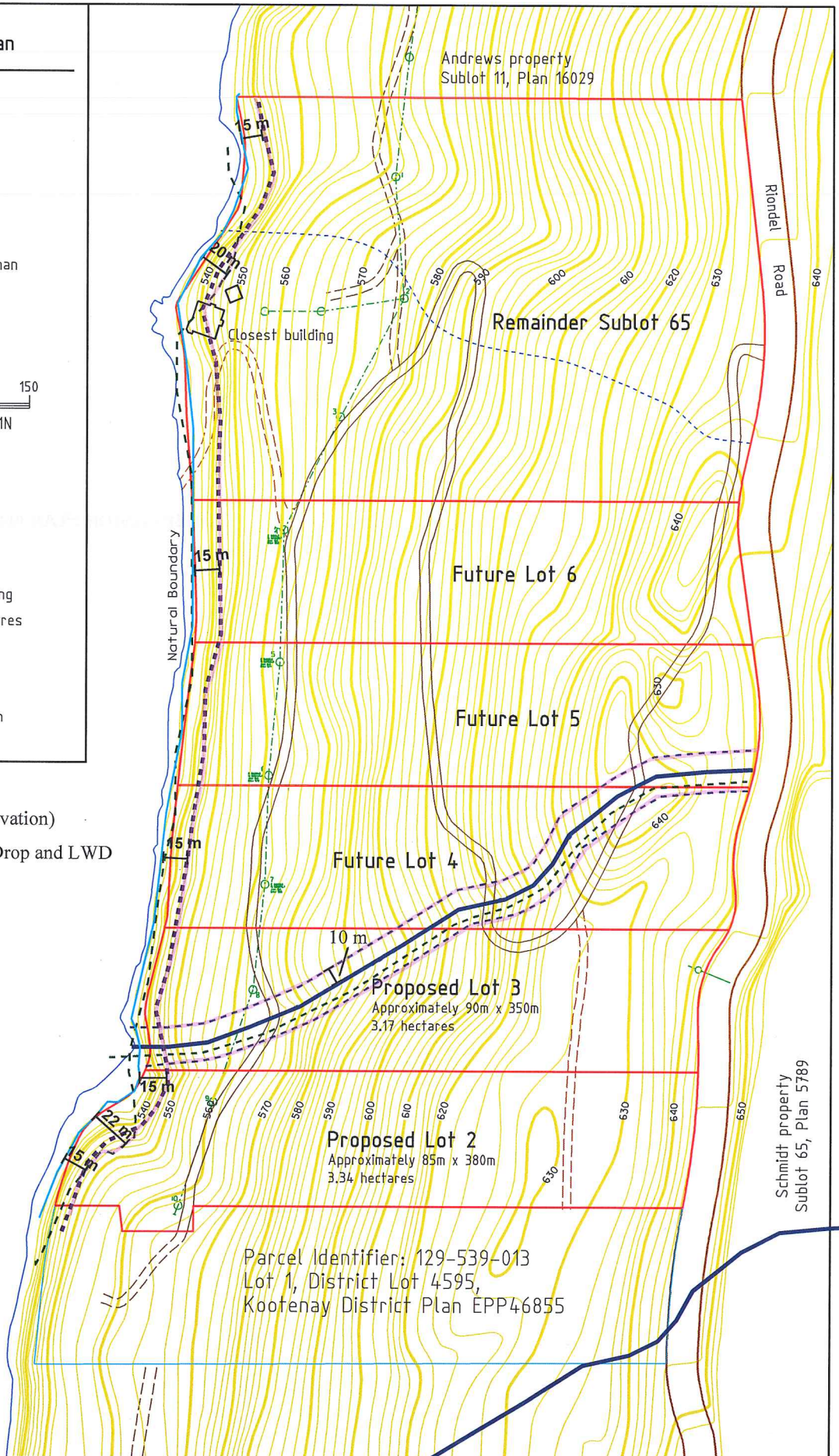
- - - - - Intermittent stream
- ==== Road Easement
- - - - - Other Roads
- - - - - Power lines - Existing
- 550 MSL Elevation - Metres

Map #: 140
 Design and Mapping : Peter Boorman
 Date: December 21, 2015

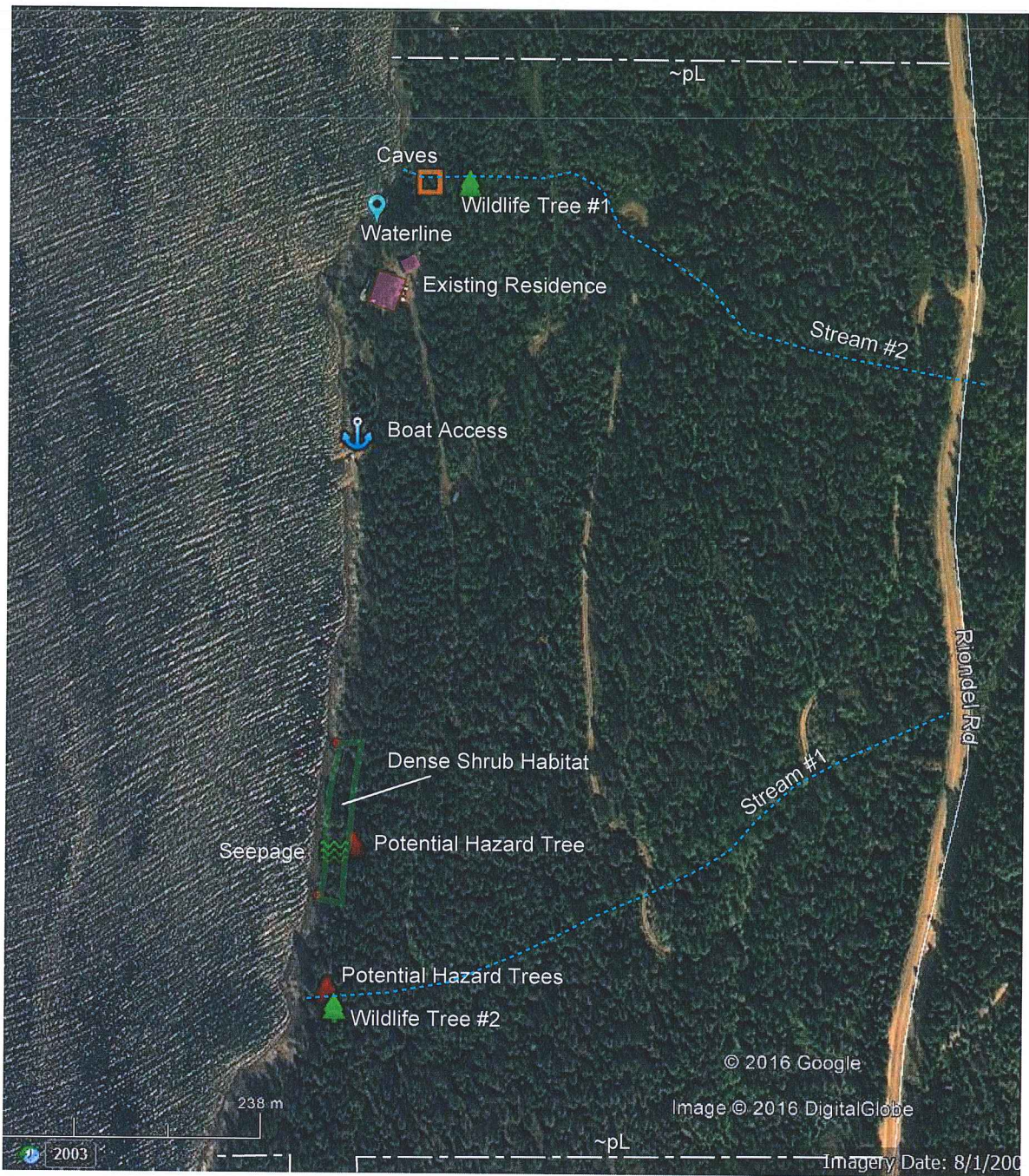
Riparian Area ZOS and SPEA

- HWM (534 m elevation)
- - - Litterfall/ Insect Drop and LWD
- - - Shade ZOS
- SPEA setback

Kootenay Lake



APPENDIX 3
SUBDIVISION FEATURES MAP



Features Map
 1055 Riondel Road Subdivision