



**REGIONAL DISTRICT OF CENTRAL KOOTENAY**  
**DEVELOPMENT PERMIT**  
**DP1601E (COPLEY)**

Date: May 6<sup>th</sup>, 2016

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

1. This Development Permit is issued to David Copley of 51 Edgehill Crescent, Calgary, Alberta 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 Strata Lot 1 District Lot 309 Kootenay District Strata Plan NES3286 Together with an Interest in the Common Property in Proportion to the Unit Entitlement of the Strata Lot as Shown on Form V (PID 027-190-277) 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 Floodplain Specifications for the subject property have been varied under an approved Floodplain Exemption under RDCK Board Resolution No. 137/16 on February 19<sup>th</sup>, 2016 to reduce the required setback from Kootenay Lake from 15.0 metres to 7.5 metres from the natural boundary.
5. The said lands have been designated 'Suburban Residential' and are located within a Development Permit Area pursuant to the Electoral Area 'E' Rural Official Community Plan Bylaw No. 2022, 2013 as amended.
6. The Permittee has applied to the Regional District of Central Kootenay to construct a single family dwelling 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 development of a single family dwelling and associated accessory buildings.
7. 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 Schedules 2 and 3 of this Development Permit. Furthermore, the Permittee is hereby advised of the following requirements:
  - 7.1 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.

- 7.2 The Permittee has submitted an Environmental Assessment prepared by Masse Environmental Consultants Ltd. dated March 2016 as part of the application for a Development Permit. The following mitigation measures are to be followed:
  - 7.2.1 The Permittee will be required to compensate for the removal of ten (10) trees within the identified Streamside Protection and Enhancement Area (SPEA) at a replacement ratio of 3:1 for a total of thirty (30) trees on and off site within the riparian area.
  - 7.2.2 The Permittee will be required to compensate for the loss of 63 square metres of riparian habitat with 175 square metres of enhancement area within the 15.0 metre zone as indicated in the mitigation plan. A fill area not exceeding 0.5 metres in elevation will be established to elevate the area to reduce inundation of plant species and planted with native plant species as outlined in the mitigation plan.
  - 7.2.3 The Permittee is authorized to remove the two hazard trees identified along the north-eastern property boundary.
  - 7.2.4 The Permittee should schedule vegetation clearing and construction to the least risk period for breeding birds between August 15<sup>th</sup> to January 30<sup>th</sup> for Raptors and August 1<sup>st</sup> to March 31<sup>st</sup> for other Birds; or conduct a nesting bird survey prior to such activities if scheduled outside of the least risk period.
  - 7.2.5 The Permittee will delay construction of rock stack wall, fill placement and footings installation if Kootenay Lake water levels rise above 534.0 GSC until water levels decrease below this level.
  - 7.2.6 The Permittee will keep the clearing of vegetation to the minimum possible required for access, staging, construction works and safety considerations, and provide snow fencing or other protective measures for the three cedar trees located at the north east corner of the proposed construction site and silt fencing along the northern property boundary to minimize risk of sediment entering the foreshore area.
  - 7.2.7 The Permittee will follow best management practices for concrete management and management of machinery, equipment, fuels, oils, lubricants and hydraulic fluids. Equipment will not be stored below the natural boundary of Kootenay Lake, will be regularly inspected and a designated staging area will be located greater than 15.0 metres from the natural boundary of Kootenay Lake for machinery and equipment storage, fueling and maintenance.
8. 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 **\$3,000.00** to ensure the landscaping requirements as set forth in Section 6 are completed and in accordance with the following provisions:

- 8.1 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.
- 8.2 The Permittee shall complete the landscaping works required by this Permit prior to **May 6<sup>th</sup>, 2018**. Within this time period the required landscaping must be inspected and approved by the Regional District.
- 8.3 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.
- 8.4 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.
- 8.5 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.
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.

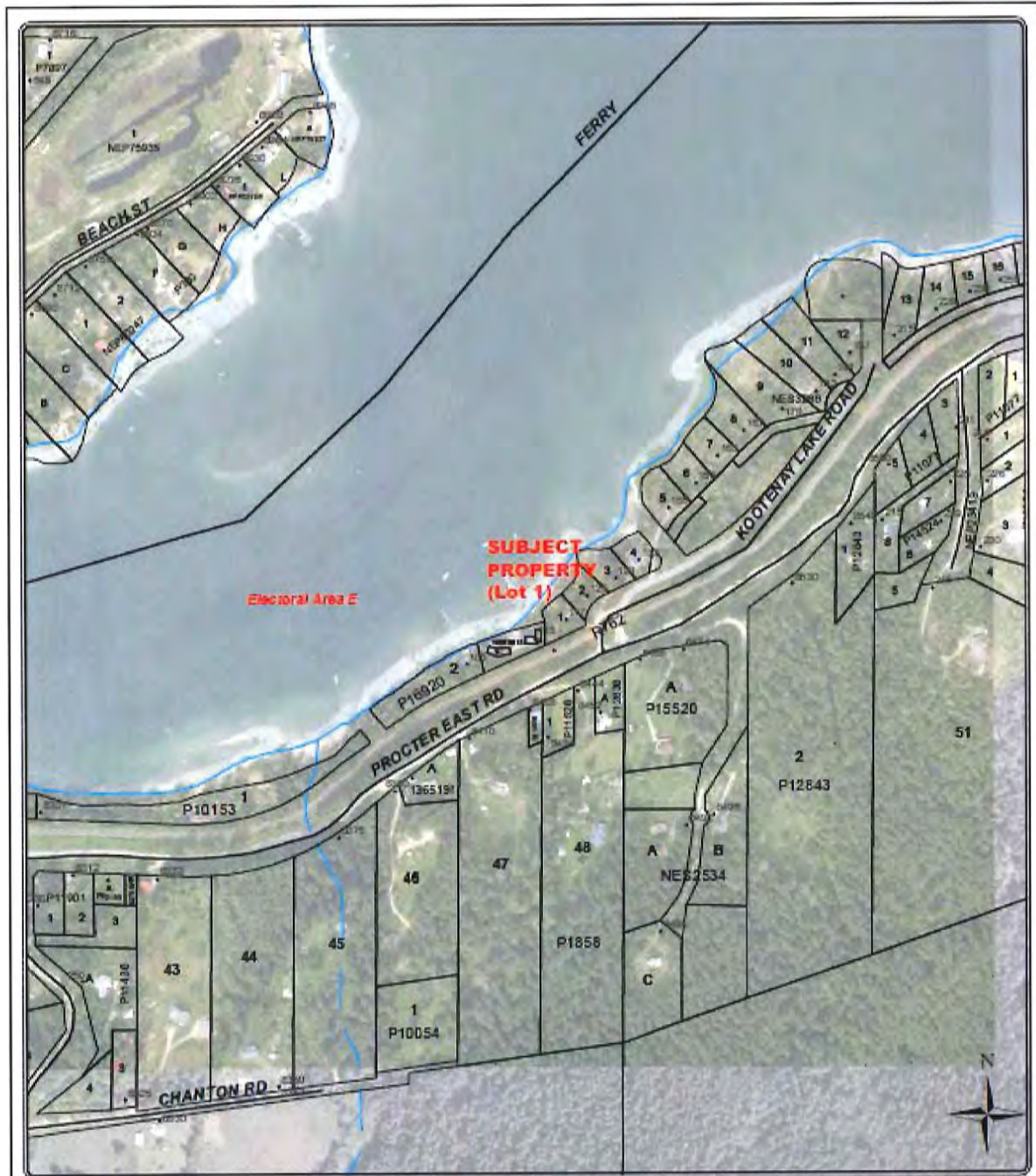

13. It is understood and agreed that the Regional District has made no representations, covenants, warranties, guarantees, promises, or agreement (verbal or otherwise) with the Permittee other than those in this Development Permit. It is solely the responsibility of the Permittee to ensure that the requirements 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

May 16, 2016  
Date of Issuance

Schedule 1: Subject Property





Box 990, 202 Lakeside Drive, Nelson, BC V1L 5H4  
 Phone: (250) 352-8995 Toll-free 1-800-256-7325 (B.C.)  
 Fax: (250) 352-5000 Internet: www.rdcck.bc.ca

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.

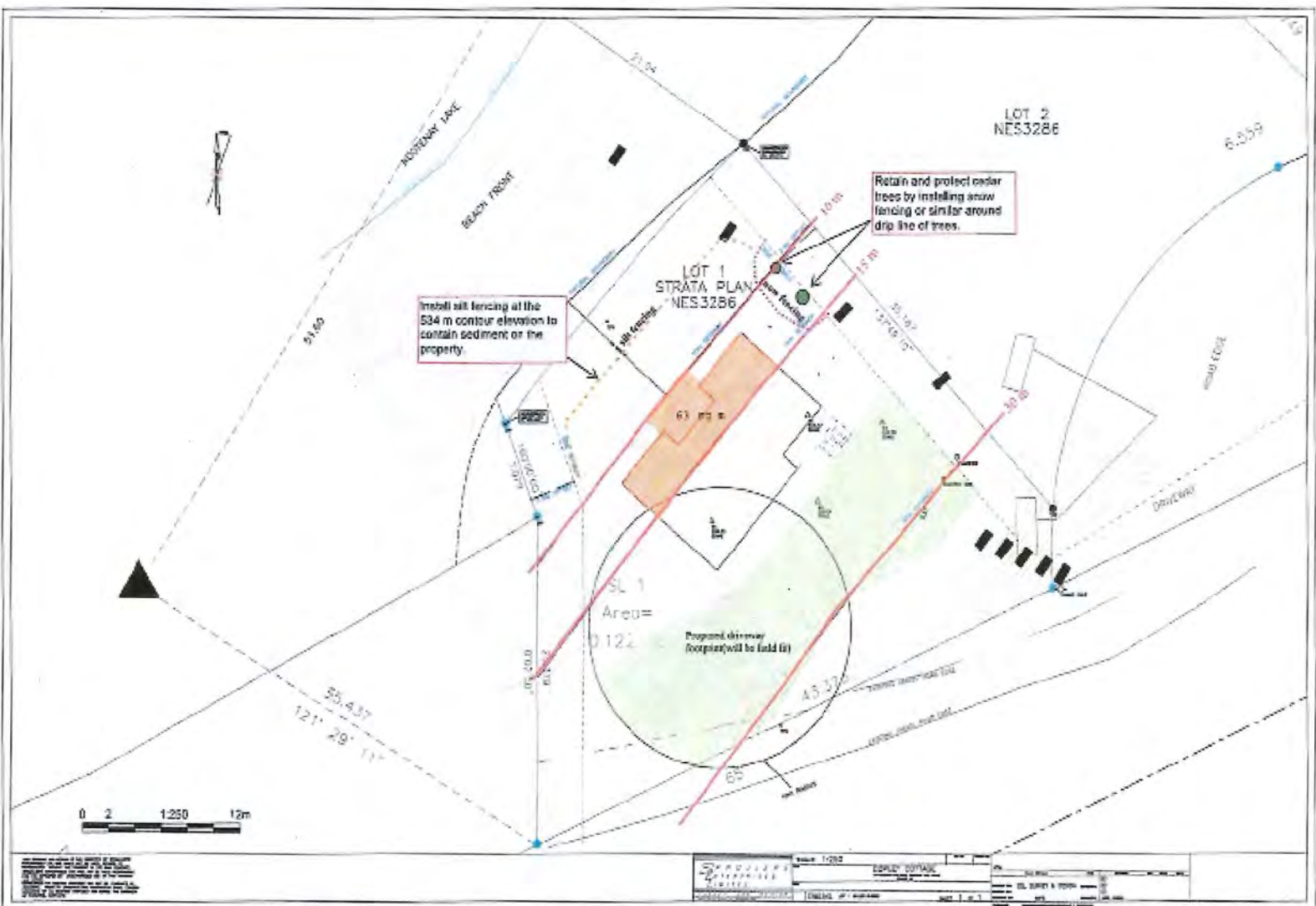
Watercourse Development Permit Area  
 Applicant: Oliver Berkeley for Dave Copley

Legal: Strata Lot 1 District Lot 309 Kootenay District Strata Plan NES3286 together with an interest in the common property in proportion to the unit entitlement of the strata lot as shown on Form V, PID 027-190-277  
 RDCK File: 4260-20-DP1601E-02256.101

Map Scale:  
  
 Map Projection: UTM Zone 11 Map Datum: NAD83  
 Date Plotted: November 30, 2015

Location Map

Schedule 2: Site Plan



**Schedule 3: Copley Environmental Assessment and Mitigation Plan**



**MASSE ENVIRONMENTAL  
CONSULTANTS LTD.**

**COPLEY RESIDENCE  
KOOTENAY LAKE  
Environmental Assessment**



Prepared for:  
**Regional District of Central Kootenay**

Prepared by:  
**Masse Environmental Consultants Ltd.**

812 Vernon St.  
Nelson, BC, V1L 4G4

March 2016



**TABLE OF CONTENTS**

Table of Contents.....	i
List of Tables.....	ii
List of Appendices.....	ii
1 Introduction .....	3
2 Background .....	3
3 Project Overview.....	5
3.1 House Design and Siting.....	5
4 Environmental Setting .....	6
4.1 Location.....	6
4.2 Aquatic Habitat.....	7
4.3 Riparian Habitat.....	9
5 Streamside Protection and Enhancement Area (SPEA).....	10
6 Environmental Considerations .....	11
6.1 Riparian, Fish and Wildlife Impacts.....	11
6.2 Aquatic Impacts.....	11
6.3 Windthrow .....	12
6.4 Slope Stability.....	12
6.5 Hazard Tree Removal.....	12
7 Measures to Protect the Integrity of SPEA .....	12
7.1 Scheduling of Environmentally Sensitive Activities.....	12
7.2 Protection of Existing Vegetation .....	13
7.3 Erosion and Sediment Control .....	13
7.4 Concrete Management .....	13
7.5 Site Access .....	14
7.6 Water Quality .....	14
7.7 Management of Equipment and Fuel/Lubricant Materials .....	15
7.8 Spill Response Procedure.....	15
7.9 Construction Waste Management .....	16
7.10 Sewage.....	16
7.11 Wildlife Management.....	16
7.12 Invasive Species Management .....	16
7.13 Environmental Monitoring .....	17
8 Mitigation Plan.....	17
8.1 Riparian Planting Prescription.....	18
8.1.1 Acquiring Native Plant Stock.....	19
9 Conclusion.....	19

10 Closure .....20

**LIST OF TABLES**

Table 1. Kootenay Lake maximum lake levels at Queens Bay ..... 5  
Table 2. Fish species present in Kootenay Lake. .... 8  
Table 3. Riparian plant species. .... 9  
Table 4. Results of detailed assessment. ....11  
Table 5. List of trees removed.....11  
Table 6. Least risk work windows for nesting birds.....13  
Table 7. BC Water Quality Guidelines for turbidity and total suspended solids.....14  
Table 8. Recommended riparian plant list.....18  
Table 9. Native plant nurseries. ....19

**LIST OF APPENDICES**

- Appendix 1. Location Map
- Appendix 2. Site Plan
- Appendix 3. Mitigation Plan

## **1 INTRODUCTION**

Masse Environmental Consultants Ltd. (MEC) was retained by David Copley, property owner of 117 Kootenay Lake Road (Lot 1) in Kootenay Lake Village just north of the Community of Proctor (Appendix 1), to provide environmental consulting services in support of the proposed single family home sited partially within the watercourse development permit area on Kootenay Lake. A site visit was conducted on February 25, 2016 by Fiona Lau, Environmental Technician and Sylvie Masse, MSc, RPBio to assess the impact of the proposed development on the riparian area.

This assessment is based on the following regulatory framework and best management practices documents:

- Electoral Area 'E', Official Community Plan (OCP) Natural Environment Policies
- Electoral Area 'E', Official Community Plan (OCP) Watercourse Development Permit Area
- Riparian Area Regulations
- 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 our assessment of the development proposal, and our 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.

## **2 BACKGROUND**

The subject property is located within the Watercourse Development Permit Area under the Electoral Area 'E' Official Community Plan Bylaw No. 2260, 2013 requiring an environmental assessment completed by a Qualified Environmental Professional (QEP) or RPBio for the proposed development within the 15 meter riparian setback.

In 2015, the Owner of 117 Kootenay Lake Road submitted an application to the RDCK to request a relaxation of the required Kootenay Lake floodplain setback from 15 meters to 7.5 meters for the purpose of a single family dwelling based on the premise that the lot could not accommodate the house while maintaining adequate access outside of the existing Canadian Pacific Railway (CPR) right of way (ROW), which is currently used illegally. This exemption was conditionally approved by the board with the following recommendations:

1. That the Engineering Report prepared by Chris Perdue, Perdue Geotechnical Services dated November 2, 2015, in support of a Site Specific Exemption for property located at 117 Kootenay Lake Road and legally described as Strata Lot 1 District Lot 309 Kootenay District Strata Plan NES3286 together with an interest in the common property in proportion to the unit entitlement of the strata lot as shown on Form V (PID 027-190-277) be ACCEPTED as satisfying the requirements of Section 11.0 of RDCK Floodplain Management Bylaw 2080,2009.
  
2. That a Site Specific Exemption from RDCK Floodplain Management Bylaw No. 2080, 2009, to reduce the required floodplain setback Kootenay Lake from 15 meters to 7.5 meters from the natural boundary as specified under Schedule "C" Floodplain Specifications Table BE APPROVED in accordance with the Engineering Report prepared by Chris Perdue, Perdue Geotechnical Services dated November 2, 2015., for property located at 117 Kootenay Lake Road and legally described as Strata Lot 1 District Lot 309 Kootenay District Strata Plan NES3286 together with an interest in the common property in proportion to the unit entitlement of the strata lot as shown on Form V (PID 027-190-277) SUBJECT TO the following conditions:
  - a) Preparation by David Steven Copley of a restrictive covenant under Section 219 of the Land Title Act in favour of the Regional District of Central Kootenay as prescribed under Section 11.0 of Floodplain Management Bylaw No. 2080, 2009 with the report prepared by Chris Perdue, Perdue Geotechnical Services report dated November 2, 2015 to be attached and forming part of the registered document.
  - b) That vegetation removal within the 15 meter setback from the natural boundary of Kootenay Lake be prohibited unless approved by the Province.
  - c) That the issue of a building permit be withheld until a Watercourse Development Permit under the Official Community Plan Bylaw no. 2260, 2013 has been approved by the Manager of Development Services.

(Crowe 2016)

### 3 PROJECT OVERVIEW

The proposed development on the property includes the construction of a single family home and landscaping located partially within the 15 meter watercourse development permit area, also known as the riparian setback. Initially the home was proposed at a setback of 7.5 meters from the natural boundary as per the conditional floodplain setback exemption. However, after careful consideration of the site and its topography, we recommended that the setback be increased as much as possible while still allowing construction of the house and the access road, in order to ensure there was sufficient space to mitigate for the riparian impacts and reduce the flooding potential. Onsite consultation with the Owner's Representative (Oliver Berkeley) and consultation with the Owner (David Copley) concluded that the house could be set back to a maximum of 10 meters from the natural boundary to accommodate the proposed house, retain the existing driveway with some minor modifications and retain the strip of trees at the back of the property. The 10 meter riparian setback would also accommodate a reasonable and legal access if CP Rail decides to close off their ROW. The proposed development will require an approval by the RDCK to encroach within the 15 meter riparian setback area.

#### 3.1 House Design and Siting

The proposed dwelling design is a single family home with a total footprint of ~141 m<sup>2</sup> (~1500 ft<sup>2</sup>), including the elevated decks, with a footprint of ~63 m<sup>2</sup> (~678 ft<sup>2</sup>) sited within the 15 meter development permit area (Photos 1 and 2). The home is two stories with the main floor elevation shown at 536.5 m on the building profile drawings prepared by Simple Concept Inc., meeting the flood construction level of 536.5 m stipulated in the Floodplain Management Bylaw No. 2080, 2009. The proposed home will sit on concrete footings and foundation walls which will be backfilled to below the main floor slab. The bottom of the retaining wall on the foreshore side ranges in elevation from 534.10 m to 534.25 m. During extremely high water years, where lake levels reach or exceed 534.10 m, water will likely reach the base of the footings. Table 1 below provides the maximum lake levels experienced over the last 20 years.

Table 1. Kootenay Lake maximum lake levels at Queens Bay

Year	MM-DD	Max. Lake Level (m)	Year	MM-DD	Max. Lake Level (m)
1996	06-11	534.147	2006	06-20	534.053
1997	06-12	534.435	2007	06-07	533.675
1998	06-02	533.313	2008	06-04	533.491
1999	06-26	533.619	2009	06-19	532.940
2000	06-30	533.056	2010	06-18	533.168
2001	05-30	532.052	2011	06-16	534.109
2002	06-30	533.965	2012	07-04	534.733
2003	06-19	533.273	2013	06-25	533.386
2004	06-15	532.407	2014	05-28	533.715
2005	06-23	532.779	2015	06-05	532.715

Alternate driveway design options were discussed with the Owner's Representative, Oliver Berkeley, to understand whether the property could be developed in a manner that could meet the riparian setback requirements. Mr. Berkeley explained that the owner preferred to have a driveway at the same elevation as the proposed house for convenience and to accommodate the owner's mobility issues, therefore eliminating the possibility of creating a driveway at the south-east corner where a platform and staircase could be constructed.



Photo 1. View of proposed building site.



Photo 2. View of riparian and foreshore area.

## 4 ENVIRONMENTAL SETTING

### 4.1 Location

The subject property is located in Kootenay Lake Village, just north of the community of Procter along the south shoreline of the West Arm of Kootenay Lake, approximately 500 m southwest (downstream) of the main body of Kootenay Lake and 1.2 km northeast of the community of Procter (Appendix 1). The subject property is irregularly shaped and bound by a Strata owned property to the east, CPR ROW to the south and a private lot to the west. The property is accessed off Kootenay Lake Road via a shared gravel driveway with neighbours to the west. The driveway encroaches into the CPR ROW and is currently unauthorized.

The project area is within the Interior Cedar Hemlock dry warm variant 1 (ICHdw1) biogeoclimatic subzone (Braumandl and Curran 1992) and spans an elevation band from approximately 529 m at the shoreline to 535 m. 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 but combined with the mild climate result in no significant soil freezing.

The high water mark (HWM), also known as the natural boundary of Kootenay Lake along the foreshore of this property was determined to be located along the natural boundary ranging in elevation between 533.5 m to 533.75 m as depicted on the survey plan and riparian setbacks were measured from this boundary.

#### **4.2 Aquatic Habitat**

The property is located just west of the outflow of Kootenay Lake on the West Arm. 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 exposed shoreline along the north side of the property indicates roughly where the high water mark occurs at ~533.5 m elevation.

The foreshore area is gently sloped at a 10% gradient and the substrate material consists predominantly of cobble and gravel with some sand (Photos 3 and 4). Fish habitat along the foreshore includes juvenile rearing habitat and potential for high value kokanee spawning habitat. Observations on Kootenay Lake indicate that Kokanee spawners select sites influenced by groundwater associated alluvial areas near tributary streams (Redfish Consulting Ltd. 2011). The subject property is sited approximately ~240 m east of the nearest tributary and is unlikely influenced by this stream; however groundwater seepage was observed along the foreshore just east of the site which may account for the potential of this area for kokanee spawning habitat (Photo 5). Kokanee spawning has not yet been confirmed in this area since it is currently not part of the shore spawning kokanee monitoring program in the West Arm, however due to its potential, the Province has created an Environmental Reserve under the Land Act Section 16 approximately 230 m long directly in front of the subject property. The Environmental Reserve prohibits any land tenures from being approved within the reserve area (K. Murphy, pers. comm., February 24, 2016).

No aquatic vegetation was observed instream along the foreshore of the property. 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



Photo 3. Foreshore area looking north-east.



Photo 4. Instream substrate material.





Photo 5. Groundwater seepage area east of subject property.



Photo 6. Foreshore area along property boundary.

### 4.3 Riparian Habitat

Riparian vegetation within the subject property has been disturbed through the removal of vegetation within the original building enveloped during subdivision development and further clearing activities completed by the Owner within the 7.5 m setback (Photos 7 and 8). An assessment of the adjacent undisturbed riparian area and stumps within the subject property was conducted to determine the species naturally occurring along the foreshore. Riparian vegetation observed within these areas consisted of a mixture of coniferous and deciduous species (Photos 9 and 10). A list of riparian plant species and weeds identified on the site and in adjacent riparian areas are listed in Table 3 below.

Table 3. Riparian plant species.

Species	Scientific Name	Species	Scientific Name
<b>Trees</b>		<b>Flowers</b>	
Western Red Cedar	<i>Thuja plicata</i>	Pasture Sage	<i>Artemisia frigida</i>
Lodgepole Pine	<i>Pinus contorta var. latifolia</i>	<b>Weeds sp.</b>	
White Pine	<i>Pinus monticola</i>	Mullein	<i>Verbascum thapsus</i>
Black Cottonwood	<i>Populus balsamifera</i>	Spotted Knapweed	<i>Centaurea stoebe</i>
Water Birch	<i>Betula occidentalis</i>	Curled Dock	<i>Rumex crispus</i>
<b>Shrubs</b>			
Red Osier Dogwood	<i>Cornus stolonifera</i>		
Snowberry	<i>Amelanchier alnifolia</i>		
Alder sp.	<i>Alnus sp.</i>		

The riparian area continues at a gradient of ~10% from the foreshore area; therefore during extremely high water years riparian vegetation within the first 10-12 m of the riparian area may be inundated with water. An access driveway was constructed at the back of the property where fill was placed to create a flat parking area. A significant grade break occurs at the back of the driveway where the gradient steepens up to the existing shared driveway. A strip of

large conifer trees exist between the shared driveway and subject property providing a privacy screen, noise buffer from the nearby railway and bank stabilization. Although these trees are outside of the riparian setback; they provide a small green space and habitat corridor between the development and shared driveway.



Photo 7. View of riparian area looking north east from the existing driveway.



Photo 1. View of cleared trees within and in front of the proposed building envelope.



Photo 9. View of riparian area to the east of the building envelope.



Photo 10. View of riparian area west of the building envelope.

## 5 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 the unnamed watercourse and Kootenay Lake on the proposed building site. Results for the Zones of Sensitivity and SPEA are presented in Table 4 below. The SPEA for this property was determined to be 30 m which at this time does not align with the DPA setback of 15 m.

Table 4. Results of detailed assessment.

Feature Type	SPVT	Zones of Sensitivity			SPEA
		LWD	Litter fall	Shade	
Lake	TR	15 m	15 m	30 m	30 m

SPVT- site potential vegetation type (TR-tree)

LWD- large woody debris

SPEA- streamside protection and enhancement area

## 6 ENVIRONMENTAL CONSIDERATIONS

### 6.1 Riparian, Fish and Wildlife Impacts

The footprint of the proposed house structure will affect a total area of 141 m<sup>2</sup> (~9.5 m wide by ~14 m long) within the 30 meter SPEA of Kootenay Lake with ~46 % (63 m<sup>2</sup>) of the structure sited within the 15 meter setback (see Appendix 2) causing a direct loss of riparian habitat.

Historical clearing activities within the original building footprint will not require replacement trees to be planted on site, however the additional clearing completed within the 7.5 meter setback requires the Owner to replace the trees at a 3:1 ratio according to the Kootenay Lake Subdivision Bylaw, which will also meet/exceed the BC Tree Replacement Criteria. The proposed driveway alignment will also require the removal of some shrubs within the 30 m SPEA to widen the turning radius at the switch back. The list of trees previously removed which require replacement are listed in Table 5 below.

Table 5. List of trees removed.

Species (Common Name)	Scientific Name	Quantity
Lodgepole Pine	<i>Pinus contorta var. latifolia</i>	1
Water Birch	<i>Betula occidentalis</i>	8
Western Red Cedar	<i>Thuja plicata</i>	1

To mitigate for the loss of riparian habitat caused by the construction of the new home within the 15 meter setback, an on-site mitigation plan has been proposed. To compensate for the loss of trees removed, 30 trees will be replaced on and off site within the riparian area. See Section 8 for the Mitigation Plan.

### 6.2 Aquatic Impacts

The house foundation has the potential to be wetted during extreme high water lake levels and hence create a vertical wall at the water land interface. Aquatic impacts from the proposed development are expected to be minimal as long as best management practices and mitigation

measures are followed. The footprint of the house is sited above the HWM; therefore minimal disruption to natural substrate, currents and sediment transport is expected.

### **6.3 Windthrow**

An RPF was not retained to assess potential windthrow since minimal clearing at this time is proposed within the SPEA.

### **6.4 Slope Stability**

A geotechnical report was prepared by Perdue Geotechnical Services on October 28, 2015 with no slope stability issues reported.

### **6.5 Hazard Tree Removal**

An RPF was not retained to assess hazard trees; however, a quick assessment for potential hazard trees was conducted by the QEP. Two large cottonwood trees were identified along the north-eastern property boundary within the 30 m SPEA. The tops of both the trees have snapped off potentially damaging the health of the tree. The Owner's representative has communicated that these two trees are planned for removal to minimize the potential risk to the house.

## **7 MEASURES TO PROTECT THE INTEGRITY OF SPEA**

Measures to protect the integrity of SPEA for the project include scheduling of environmentally sensitive activities, protection of existing vegetation, erosion and sediment control, concrete management, water quality, management of equipment and fuel/lubricant materials, spill response procedures, construction waste management, wildlife management, and site restoration.

### **7.1 Scheduling of Environmentally Sensitive Activities**

Environmentally sensitive activities include the clearing of vegetation and construction within the environmentally sensitive area.

The project has been scheduled to commence in spring 2016. Ideally, vegetation clearing should occur prior to March 31 before the breeding bird season. If clearing activities are scheduled outside of the least risk windows (Table 6), it is recommended that a nesting bird survey be conducted to ensure that there are no active nests within or immediately adjacent to the clearing area.

Table 6. Least risk work windows for nesting birds.

<b>Species</b>	<b>Least Risk Window</b>
Raptors (eagles, hawks, falcons, & owls) and herons	Aug 15 – Jan 30
Other Birds	August 1 – March 31

In the extreme case where water levels rise above the 534 m elevation; and construction activities are scheduled to occur; it is recommended that rock stack wall construction, fill placement and footings installation are delayed until water levels decrease to below 534 m to ensure water quality is not impacted.

### **7.2 Protection of Existing Vegetation**

The following mitigation measures will be implemented to protect the existing vegetation within the riparian area:

- Clearing of vegetation will be kept to the minimum possible area required for access, staging, construction works, and safety considerations.
- Snow fencing or similar protection measures will be installed around the three cedar trees located at the north east corner of the house.

### **7.3 Erosion and Sediment Control**

In order to prevent sediment from entering Kootenay Lake and minimize potential impacts to fish habitat, exposed soils will be minimized with respect to extent and duration. In addition a silt fence will be installed along the natural boundary to minimize the risk of sediment entering the foreshore area. The contractor will ensure that there are sufficient materials (silt fences, polyethylene plastic, filter cloth and tarps) available on-site for emergency protection measures when required during adverse weather conditions. This includes any stockpiles to be covered and silt fencing to be installed if there is a risk of erosion and sediment transport.

### **7.4 Concrete Management**

Concrete will be mixed off site and transported to site; however the following precautions will be taken when handling concrete on site to ensure the protection of adjacent waterbodies:

- Washing of concrete trucks will occur off site, or a catchment bucket will be used to collect concrete water at the base of the chute.
- Washing of equipment (shovels, troughs, etc) used during concrete work will occur at a designated location at least 15 m away from the HWM of Kootenay Lake where wash water will not drain directly into the Lake.
- All concrete pours will be conducted in the dry, as wet concrete can be toxic to aquatic life when exposed to water by increasing the pH.

**7.5 Site Access**

The site will be accessed by the existing driveway with some clearing and fill placement expected at the switchback to accommodate a safe turning radius.

**7.6 Water Quality**

Water quality must be maintained next to the work site and all efforts will be made to limit sediment entry into Kootenay Lake.

The BC Water Quality Guidelines (BCWQG) provide the acceptable threshold concentrations of suspended sediment in watercourses. Allowable induced turbidity or total suspended sediments (TSS) relate to ambient (background) levels occurring naturally in the watercourse. The allowable levels are described below in Table 7. The pH must be between 6.5 and 9.0 to meet BC water quality guidelines for aquatic life.

Table 7. BC Water Quality Guidelines for turbidity and total suspended solids.

<b>Water Use</b>	<b>Maximum Induced Turbidity - NTU or % of background</b>	<b>Total Suspended Solids - mg/L or % of background</b>
Raw Drinking Water without Treatment	Change from background of 1 NTU at any time when background is <5 NTU	No guideline
	Change from background of 5 NTU at any time	
Raw Drinking Water with Treatment to Remove Particulates	Change from background of 5 NTU at any time when background is <50 NTU	No guideline
	Change from background of 10% when background >50 NTU	
Freshwater Aquatic Life	Change from background of 8 NTU at any one time for a duration of 24 h in all waters during clear flows or in clear waters.	Change from a background of 25 mg/L at any one time for a duration of 24 hours in all waters during clear flows or in clear water.
	Change from background of 2 NTU at any one time for a duration of 30 d in all waters during clear flows or in clear waters.	Change from background of 5 mg/L at any one time for a duration of 30 d in all waters during clear flows or in clear waters.
	Change from background of 5 NTU at any time when background is 8 - 50 NTU during high flows or in turbid waters.	Change from background of 10 mg/L at any time when background is 25 - 100 mg/L during high flows or in turbid waters.
	Change from background of 10 % when background is >50 NTU at any time during high flows or in turbid waters.	Change from background of 10 % when background is >100 mg/L at any time during high flows or in turbid waters.

Table adapted from MoE 2006

### **7.7 Management of Equipment and Fuel/Lubricant Materials**

Construction activities require the use of machinery and equipment that use fuels, oils, lubricants, and hydraulic fluids. These materials are hazardous to the surrounding terrestrial and aquatic environments and must be managed properly. To reduce the risk of fluid leaks and spills the following measures will be implemented:

- Equipment will not be operated below the natural boundary.
- Machinery will arrive on site in a clean condition free of fluid leaks, excess oil or grease, mud, sediment, invasive species, and noxious weeds or seeds.
- All equipment will be regularly inspected for leaks at the start and end of each working day. Leaking equipment will be removed from the worksite and repaired in a designated area >15 m away from a watercourse or waterbody. Secondary containment will be placed under machinery parked overnight within 30 m of the watercourse to detect and contain minor leaks.
- A designated staging area for fueling and maintenance will be clearly marked on site at a location positioned >15 m away from Kootenay Lake. Re-fuelling of all construction or heavy equipment will be completed within the staging area.
- Equipment will be stored in the staging area overnight.
- An emergency spill response kit and spill reporting procedures (Section 6.9) will be on site. The spill response kit will be inspected regularly and replenished as necessary.
- Smoking will not be permitted within the staging area.
- If emergency repairs are required, spill pads will be used to capture any drips.
- No large quantities of fuel will be stored on site overnight.
- Small containers of fuel and oil will be stored in appropriate secondary containment within the staging area to minimize the effect of a spill.
- Any refuse contaminated with fuel, oil, grease, lubricants, or hydraulic fluid generated during repairs or servicing of equipment will be collected in polyethylene lined, covered, containers. This waste will be disposed of at a registered or licensed facility.
- Any small equipment including generators, pumps, and light towers located on site will be placed in secondary containment basins to contain any fuel leaks.

### **7.8 Spill Response Procedure**

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

- Each piece of heavy equipment will be equipped with a spill response kit or one large spill kit, clearly visible and easy to access will be kept on site.
- 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.
- If a spill occurs it will be contained immediately, reported to the project supervisor and/or the owner, and cleaned up. The contaminated material will be removed from the work site and disposed of, along with the contaminated soils, in an appropriate manner at a recognized facility.
- The Provincial Emergency Response Program (1-800-663-3456) will be contacted for spills of a reportable quantity to ground and all spills to water.

### **7.9 Construction Waste Management**

Construction waste will be managed and organized on site. Hazardous waste shall be contained in secure, labelled bins. All construction waste generated on site will be taken off site and disposed of accordingly. Construction personnel will be instructed to ensure the site is kept clean and to prevent litter from escaping the site.

### **7.10 Sewage**

Prior to construction commencing, a porta potty will be brought to site for workers and placed >15 m away from Kootenay Lake HWM. The new home will be connected to the community sewage system.

### **7.11 Wildlife Management**

Interactions between field crew and wildlife will be minimized by maintaining a litter free worksite and encouraging awareness.

### **7.12 Invasive Species Management**

Clearing and construction activities create a disturbed environment where invasive species and weeds are easily introduced. Once established, invasive plants have the capacity to invade adjacent, undisturbed natural plant communities, displace wildlife, and disrupt natural ecosystem functions. The following precautions will be employed to minimize potential introduction of invasive species to currently non-impacted areas of the project site:

- All equipment will be thoroughly washed before entering the project site to ensure that no seeds or plant parts are brought into the site by vehicles.
- Clearing of existing vegetation will be minimized.
- Disturbed soils will be revegetated as soon as possible with a herbaceous seed mix.



- Existing weeds on the site will be hand-pulled, bagged and brought to a municipal waste facility.

### **7.13 Environmental Monitoring**

Environmental monitoring is recommended during fill and boulder placement to ensure that the implementation corresponds to the approved plan and does not have adverse effects to the environment. The construction of the new home is not expected to cause any environmental impacts if best management practices and the mitigation plan are followed. However, if an environmental incident occurs, it is recommended that the Contractor call a qualified environmental practitioner to provide direction on environmental mitigation.

## **8 MITIGATION PLAN**

To mitigate for the loss of 63 m<sup>2</sup> of riparian habitat, 175 m<sup>2</sup> of riparian habitat enhancement is proposed within the 15 meter setback area (See Appendix 3 for Mitigation Plan). Currently the proposed 10 meter riparian setback fronting the house may be wetted during extremely high lake levels, minimizing the potential for many species to grow in this area. In order to create and restore biodiversity within the riparian zone and minimize the effects of a vertical wall structure on aquatic habitat at high water levels, the following is recommended:

- Create an area of fill fronting the home within the 5-15m setback with natural looking boulders, boulder clusters and growing medium. The boulder placement will be field fit and follow the natural contours. The height along the front of the fill area will not exceed 0.5 m and will be graded back towards the house at ~10 % gradient.
- Plant a mixture of native plant species within the fill area (See Section 8.1 for Planting Prescription). The proposed fill and top soil placement will provide a drier growing medium which will prevent root and stem rot if water levels rise above 534.0 m. Flood tolerant native plants will be planted along the front side of the wall to create a natural littoral zone.

A total of 30 replacement trees to compensate for the 10 trees removed within the riparian area are proposed to be planted on and off-site. A minimum of five replacement conifer trees are to be replanted onsite within the riparian area (See Section 8.1 for Planting Prescription). The offsite location for the remaining replacement trees is yet to be determined; however these trees are to be planted within a riparian area along Kootenay Lake.

### 8.1 Riparian Planting Prescription

Three areas of enhancement within the 15 meter setback have been selected to be planted with a mixture of native trees, shrubs, grasses and flowers. The riparian area has been divided into three distinct zones for planting (Area 1, Area 2 and Area 3) to mimic natural species occurring at those elevations and exposures. Table 8 below provides a detailed list of the recommended riparian plant species for each area.

Table 8. Recommended riparian plant list.

Common Name	Latin Name	Quantity	Recommended Pot Size
<b>Area 1: Riparian Area within 5 m setback (~75 m<sup>2</sup>)</b>			
<b><u>Shrubs</u></b>			
Red Osier Dogwood	<i>Cornus stolonifera</i>	3	#2
Pacific Willow	<i>Salix lucida</i>	1	#2
Sitka Willow and/or Sandbar Willow	<i>Salix lucida and/ or Salix exigua</i>	3	#1 or #2
Sitka Alder	<i>Alnus sinuata</i>	3	#1 or #2
<b><u>Grasses</u></b>			
Blue Joint Grass	<i>Calamagrostis canadensis</i>	20-plugs or 10-#1 or #2s	
<b>Area 2: Riparian Area between 5 m and 10 m setback (~70 m<sup>2</sup>)</b>			
<b><u>Trees</u></b>			
Western White Pine or alternate native conifer	<i>Pinus monticola</i>	1	#5
<b><u>Shrubs</u></b>			
Saskatoon Berry	<i>Amelanchier alnifolia</i>	4	#1 or #2
Common Snowberry	<i>Symphoricarpos albus</i>	4	#1 or #2
Douglas Maple	<i>Acer glabrum</i>	1	#2 or #5
Mallow Ninebark or Blue Elderberry	<i>Physocarpus malvaceus or Sambucus caerulea</i>	1	#2 or #5
Nootka Rose or Prickly Rose	<i>Rosa nutkana or Rosa acicularis</i>	4	#1 or #2
Ocean Spray	<i>Holodiscus discolor</i>	1	#2 or #5
Tall Oregon Grape	<i>Mahonia Aquifolium</i>	10	4" or #1
Kinnikinnick	<i>Arctostaphylos uva-ursi</i>	10	4"
<b><u>Grasses and Flowers</u></b>			
Native Grasses (Optional)	<i>Calamagrostis canadensis and/or Deschampsia cespitosa or alternate native species.</i>	TBD	Plugs or larger
Nodding Onion or alternate native plant	<i>Allium cernuum</i>	6	#1
Woolly Sunflower or alternate native flower	<i>Eriophyllum lanatum</i>	6	#1
<b>Area 3: Riparian Area between 5m - 15 m setback along north-eastern property line (~30 m<sup>2</sup>)</b>			
<b><u>Trees</u></b>			
Western Red Cedar	<i>Thuja plicata</i>	2	#2 or #5
Western White Pine	<i>Pinus monticola</i>	2	#2 or #5

Planting should be completed in the spring or fall. Planting placement and arrangement within each planting area will be at the discretion of the Owner/Landscaper. Additional plants may be added to the 15 meter setback to fill in spaces if desired; however species must be native. It is recommended that trees be planted at minimum 3 m spacing, shrubs to be planted at minimum 1 m spacing and grasses and flowers to be planted at minimum 50 cm spacing.

*8.1.1 Acquiring Native Plant Stock*

Nurseries located as close to the planting sites as possible are recommended to ensure the genetic integrity of selected species are as ecologically appropriate as possible. The species composition and sizing may be subject to minor changes from what is proposed in this plan. Careful transportation to the site is critical to plant survivability. Native plant stock can be obtained from the nurseries listed in Table 9.

Table 9. Native plant nurseries.

<p>Sagebrush Nursery 38206 93<sup>rd</sup> St. RR 2 Oliver, BC V0H 1T0 (250) 498-8898</p>	<p>Tipi Mountain Native Plants Box 946 Cranbrook BC V1C 4J6 (250) 427-7010</p>
<p>Bron and Sons Nursery Co. Box 2643, 3315 Carson Rd. Grand Forks, BC, V0H 1H0 (250) 442-2100</p>	<p>PRT Harrop 6320 Harrop - Procter Road Nelson, BC Canada V1L 6P9 Phone: (250) 229-5353</p>

**9 CONCLUSION**

Overall, the construction of the proposed development will impact the riparian area through loss of habitat; however due to the constraints of the property and driveway requirements, the building footprint will require a 5 meter encroachment within the 15 meter development permit area. The loss of habitat within the 15 meter setback can be mitigated by enhancing biodiversity within the riparian and littoral zones through slight grade changes and riparian planting. The riparian planting recommended within the 15 meter setback will provide habitat to birds and wildlife.

If you have any comments or questions, please do not hesitate to contact me.

## 10 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, B.Tech.**

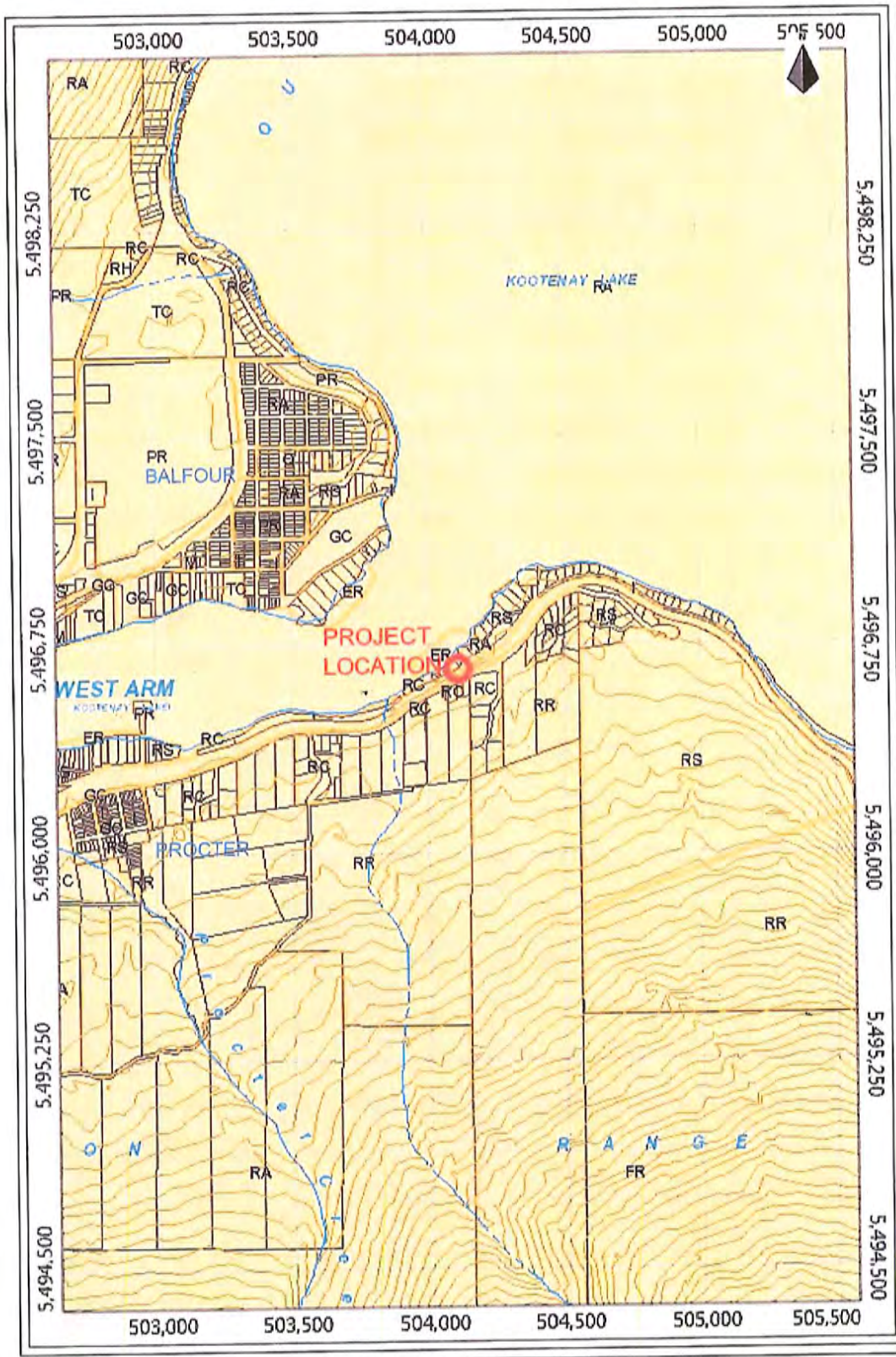


**Sylvie Masse, M.Sc., R.P.Bio.**  
**College of Applied Biology: R.P.Bio. #834**

## REFERENCES

- Braumandl, T. and Curran, M. 1992. A Field Guide for Site Identification and Interpretation for the Nelson Forest Region. Ministry of Forests. Forests Science Program.
- Kipp, S. and Callaway, C. 2002. On the Living Edge. Your Handbook for Waterfront Living.
- [MOE] Ministry of Environment. 2014. Develop with Care. Province of British Columbia. Victoria, British Columbia, Canada.
- [MOE] Ministry of Environment. 2015. General BMPs and Standard Project Considerations. Victoria, British Columbia, Canada.
- [MOE] Ministry of Environment. 2016. Provincial Water Act. Victoria, British Columbia, Canada.
- [MOE] Ministry of Environment. Habitat Wizard. 2016. <http://www.env.gov.bc.ca/habwiz/>. Accessed website on February 2016.
- Poisson Consulting Ltd. and Redfish Consulting Ltd. 2012. Assessment of Lake Levels and their variation on the recruitment of Shore Spawning Kokanee Fry within the West Arm of Kootenay Lake. Prepared for Columbia Operations Fisheries advisory Committee (COFAC).
- Province of British Columbia. 2015. Riparian Areas Regulation. Victoria, British Columbia, Canada.
- Redfish Consulting Ltd. 2011. Observations and Analysis of Shore Spawning Kokanee (*Oncorhynchus nerka*) in the West Arm of Kootenay Lake. Prepared for BC Hydro, Fortis BC and Columbia Power Corporation.
- [RDCK] Regional District of Central Kootenays. 2013. Electoral Area 'E', Comprehensive Land Use Bylaw No. 2260.

**APPENDIX 1  
LOCATION MAP**



# RDCK Map

### Legend

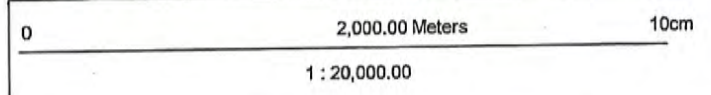
- Streams
- Contour Lines (20m)
- Cadastre / Property Li
- Official Community Pl
- Electoral Boundaries (

### Notes

Map Details

Date Plotted: 3/9/2016

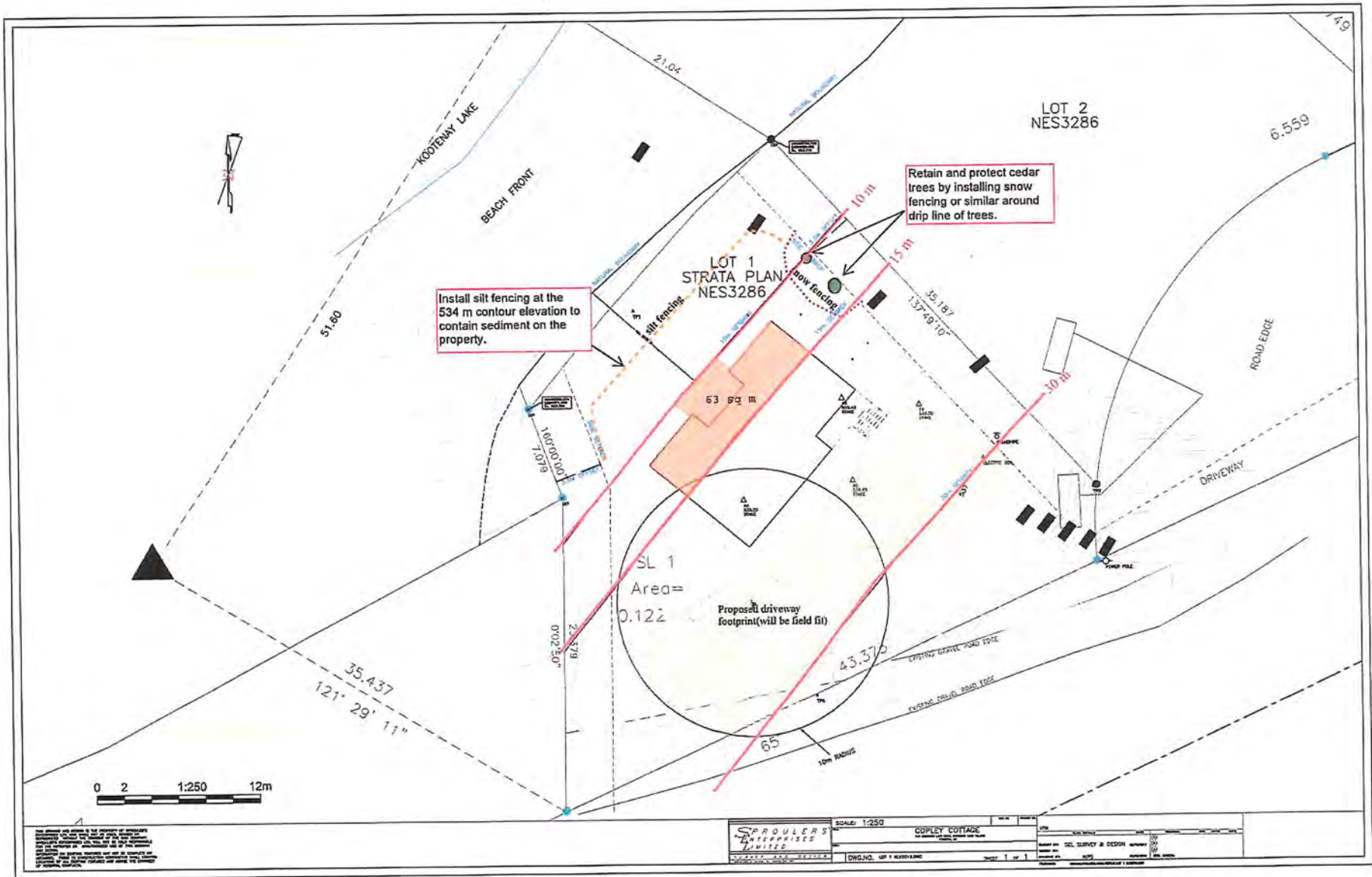
202 Lakeside Drive  
 Nelson, BC  
 1-800-268-7325  
<http://www.rdck.ca>



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

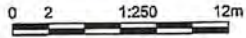
**APPENDIX 2**  
**SITE PLAN**





Install silt fencing at the 534 m contour elevation to contain sediment on the property.

Retain and protect cedar trees by installing snow fencing or similar around drip line of trees.

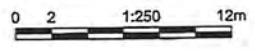
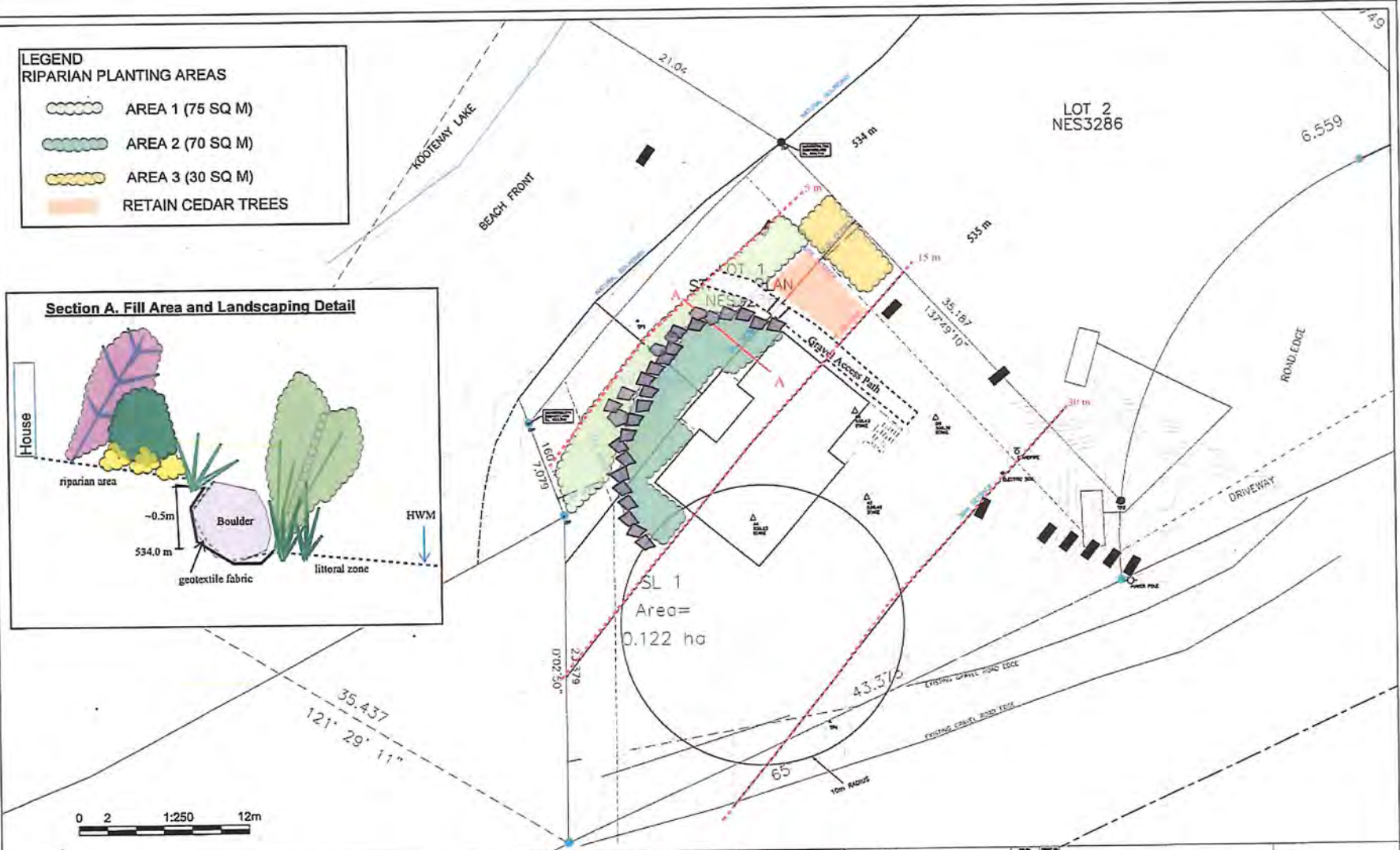
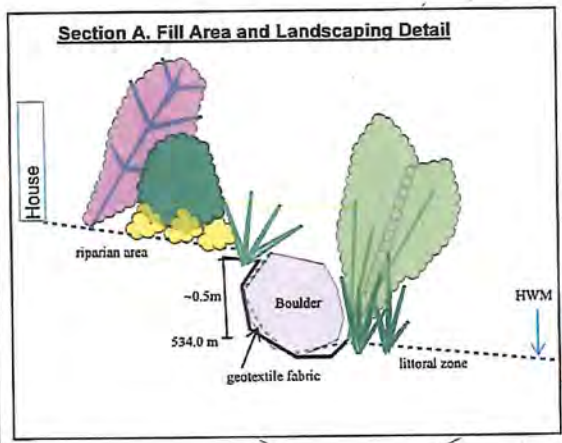


<b>SPROULERS</b> SURVEYORS INC.	SCALE: 1:250	COPLEY COTTAGE	
	DATE: 2014	PROJECT: Copley Cottage	DATE: 2014
DRAWN: J.P. HARRIS	DATE: 2014	PROJECT: Copley Cottage	DATE: 2014
CHECKED: J.P. HARRIS	DATE: 2014	PROJECT: Copley Cottage	DATE: 2014
APPROVED: J.P. HARRIS	DATE: 2014	PROJECT: Copley Cottage	DATE: 2014

**APPENDIX 3**  
**MITIGATION PLAN**

**LEGEND**  
**RIPARIAN PLANTING AREAS**

- AREA 1 (75 SQ M)
- AREA 2 (70 SQ M)
- AREA 3 (30 SQ M)
- RETAIN CEDAR TREES



THIS DRAWING AND ALL INFORMATION CONTAINED HEREIN ARE THE PROPERTY OF SPROULERS' ENGINEERS LIMITED. NO PART OF THIS DRAWING OR INFORMATION CONTAINED HEREIN IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF SPROULERS' ENGINEERS LIMITED.

<b>SPROULERS' ENGINEERS LIMITED</b> 1000 W. 10th Ave. Kelowna, BC V1Y 9V6 TEL: 250-860-8888 FAX: 250-860-8889 WWW.SPROULERS.COM	SCALE: 1:250	<b>COPLEY COTTAGE</b> <small>for general building and site work</small>	DATE:
	DWG. NO. 101-1405-0001	SHEET 1 OF 1	DRAWN BY:

