



# Development Permit Application

Referral Form – RDCK File DP2314E

Date: March 25, 2024

**You are requested to comment on the attached DEVELOPMENT PERMIT for potential effect on your agency's interests. We would appreciate your response WITHIN 30 DAYS (PRIOR TO April 25, 2024). If no response is received within that time, it will be assumed that your agency's interests are unaffected.**

**LEGAL DESCRIPTION & GENERAL LOCATION:**

1434 Highway 31, Queens Bay, Electoral Area 'E'

LOT B, PLAN NEP78423, DISTRICT LOT 12075, KOOTENAY LAND DISTRICT (PID: 026-329-981)

The subject property is located in the community of Balfour, on the western shore of Kootenay Lake within the Queens Bay area and is accessed by Highway 31. Along the south side of the property, there is a one-storey cabin with a raised deck constructed in the 1940s.

**PRESENT USE AND PURPOSE OF PERMIT REQUESTED:**

A one-storey cabin with a raised deck constructed in the 1940s currently exists on the subject property. A concrete patio slab, shed and outhouse also currently occupy the site.

The owners seek to develop a new residence with attached raised deck, a parking pad, retaining walls, and a sewerage system on the subject property. The cantilevered deck would be attached to a proposed new residence located outside of the 15 metre floodplain setback and Watercourse Development Permit (WDP) area. The WDP is required for the proposed demolition of the existing residence and construction of the proposed raised deck footings and posts, and vegetation planting within the riparian area of Kootenay Lake.

At the March 21, 2024 Regular Open meeting the Regional Board approved an exemption to the floodplain setback from Kootenay Lake from 15 metres to 11.42 metres under the RDCK's *Floodplain Management Bylaw No. 2080, 2009* to allow for the construction of post supports and footings in the floodplain for a raised deck.

AREA OF PROPERTY AFFECTED	ALR STATUS	ZONING	OCF
379.2 m <sup>2</sup>	N/A	N/A	Country Residential (RC)

**AGENT:** Weiland Construction c/o Deborah Weiland

**OTHER INFORMATION: ADVISORY PLANNING COMMISSION PLEASE NOTE:**

If your Advisory Planning Commission plans to hold a meeting to discuss this Development Permit application, please note that the applicants must be provided with an opportunity to attend such meeting, in accordance with Section 461, subsection (8) of the *Local Government Act*, which reads as follows:

*"If the commission is considering an amendment to a plan or bylaw, or the issue of a permit, the applicant for the amendment or permit is entitled to attend meetings of the commission and be heard."*

**Please fill out the Response Summary on the back of this form. If your agency's interests are 'Unaffected' no further information is necessary. In all other cases, we would appreciate receiving additional information to substantiate your position and, if necessary, outline any conditions related to your position. Please note any legislation or official government policy which would affect our consideration of this permit.**

**Stephanie Johnson, PLANNER**

**REGIONAL DISTRICT OF CENTRAL KOOTENAY**

- MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE
- HABITAT BRANCH (Environment)
- FRONTCOUNTER BC (MFLNRORD)
- AGRICULTURAL LAND COMMISSION
- ARCHAEOLOGY BRANCH
- ENERGY & MINES
- MUNICIPAL AFFAIRS & HOUSING
- INTERIOR HEALTH, HBE TEAM
- KOOTENAY LAKES PARTNERSHIP (FORESHORE DEVELOPMENT PERMITS)
- SCHOOL DISTRICT NO.
- WATER SYSTEM OR IRRIGATION DISTRICT
- UTILITIES (FORTIS, BC HYDRO, NELSON HYDRO, COLUMBIA POWER)

- REGIONAL DISTRICT OF CENTRAL KOOTENAY
- DIRECTORS FOR:
- A  B  C  D  E  F  G  H  I  J  K
- ALTERNATIVE DIRECTORS FOR:
- A  B  C  D  E  F  G  H  I  J  K
- APHC AREA E
  - RDCK FIRE SERVICES
  - RDCK EMERGENCY SERVICES
  - RDCK BUILDING SERVICES
  - RDCK UTILITY SERVICES
  - RDCK RESOURCE RECOVERY
  - RDCK REGIONAL PARKS

INSERT COMMENTS ON REVERSE . . .

The personal information on this form is being collected pursuant to *Regional District of Central Kootenay Planning Procedures and Fees Bylaw No. 2457, 2015* for the purpose of determining whether the application will affect the interests of other agencies or adjacent property owners. The collection, use and disclosure of personal information are subject to the provisions of FIPPA. Any submissions made are considered a public record for the purposes of this application. Only personal contact information will be removed. If you have any questions about the collection of your personal information, contact the Regional District Privacy Officer at 250.352.6665 (toll free 1.800.268.7325), [info@rdck.bc.ca](mailto:info@rdck.bc.ca), or RDCK Privacy Officer, Box 590, 202 Lakeside Drive, Nelson, BC V1L 5R4.

**RESPONSE SUMMARY**  
**FILE: DP2314E APPLICANT: Deborah Weiland**

**Name:**

**Date:**

**Agency:**

**Title:**

RETURN TO: STEPHANIE JOHNON, PLANNER  
DEVELOPMENT AND COMMUNITY SUSTAINABILITY SERVICES  
REGIONAL DISTRICT OF CENTRAL KOOTENAY  
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Ph. 250-352-8175  
Email: [plandept@rdck.bc.ca](mailto:plandept@rdck.bc.ca)

# RDCK Map







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## Legend

-  Electoral Areas
-  RDCK Streets
-  Cadastre
-  Address Points

## Map Scale:

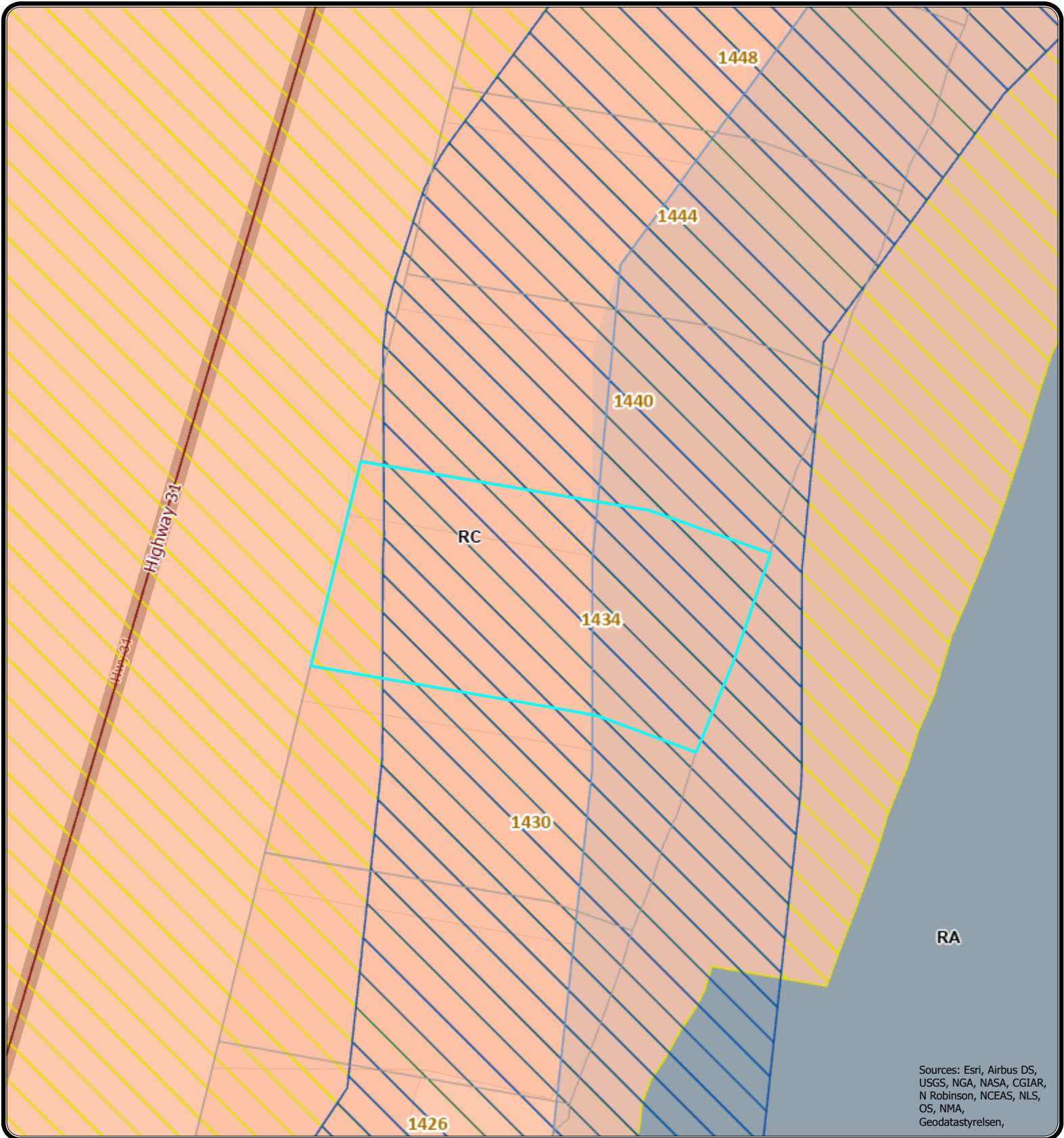
1:564



Date: September 27, 2023

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.

# RDCK Map



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen,



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### Legend

### Development Permit Areas

- Residential Cluster
- Watercourse

### Official Community Plan

- Country Residential

- Resource Area
- Streams and Shorelines
- Electoral Areas
- RDCK Streets
- Cadastre
- Address Points

### Map Scale:

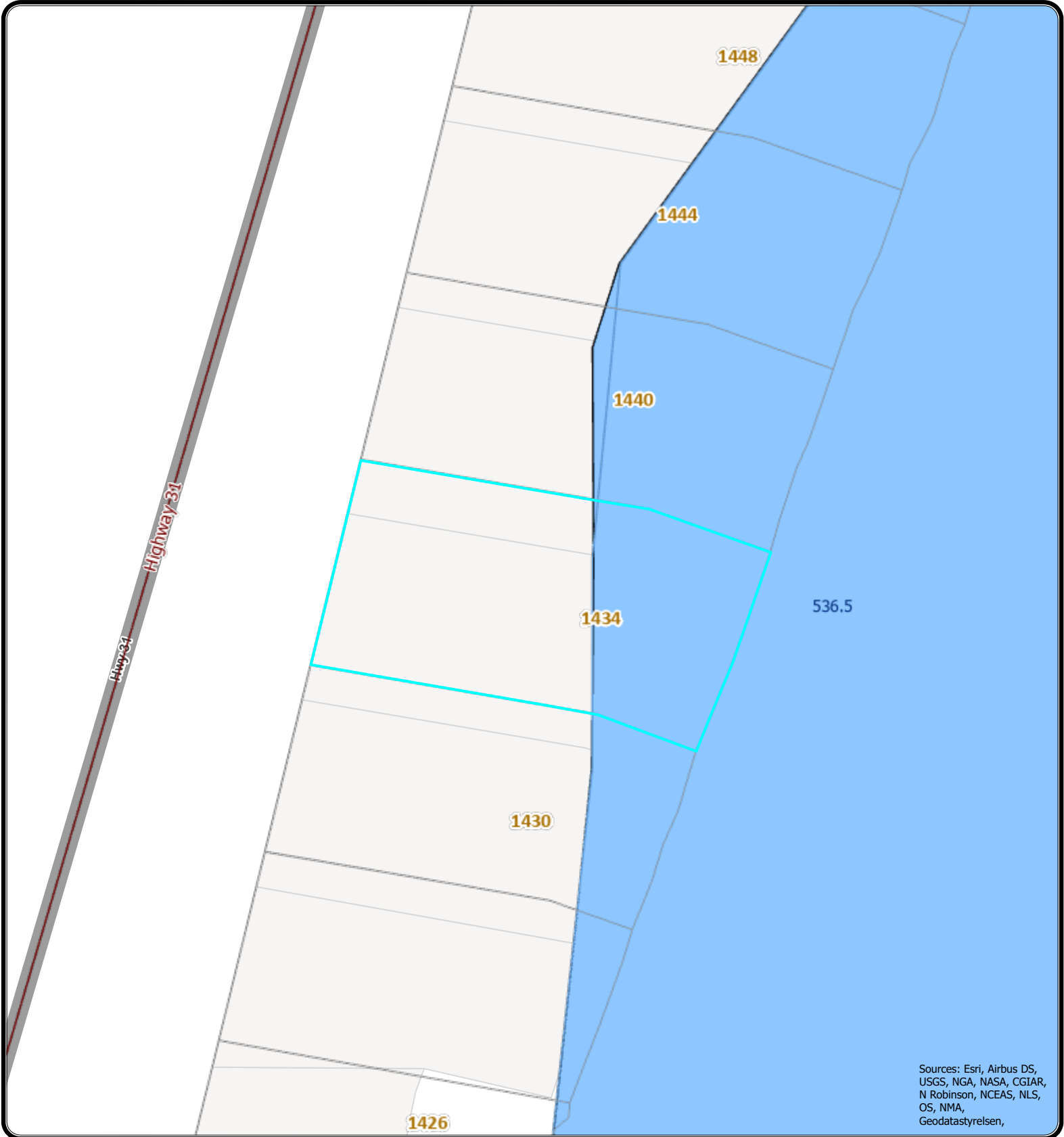
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Date: May 15, 2023



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# RDCK Map









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### Legend

-  Flood Construction Levels - 1990
-  RDCK Streets
-  Streams and Shorelines
-  Cadastre
-  Electoral Areas
-  Address Points

### Map Scale:

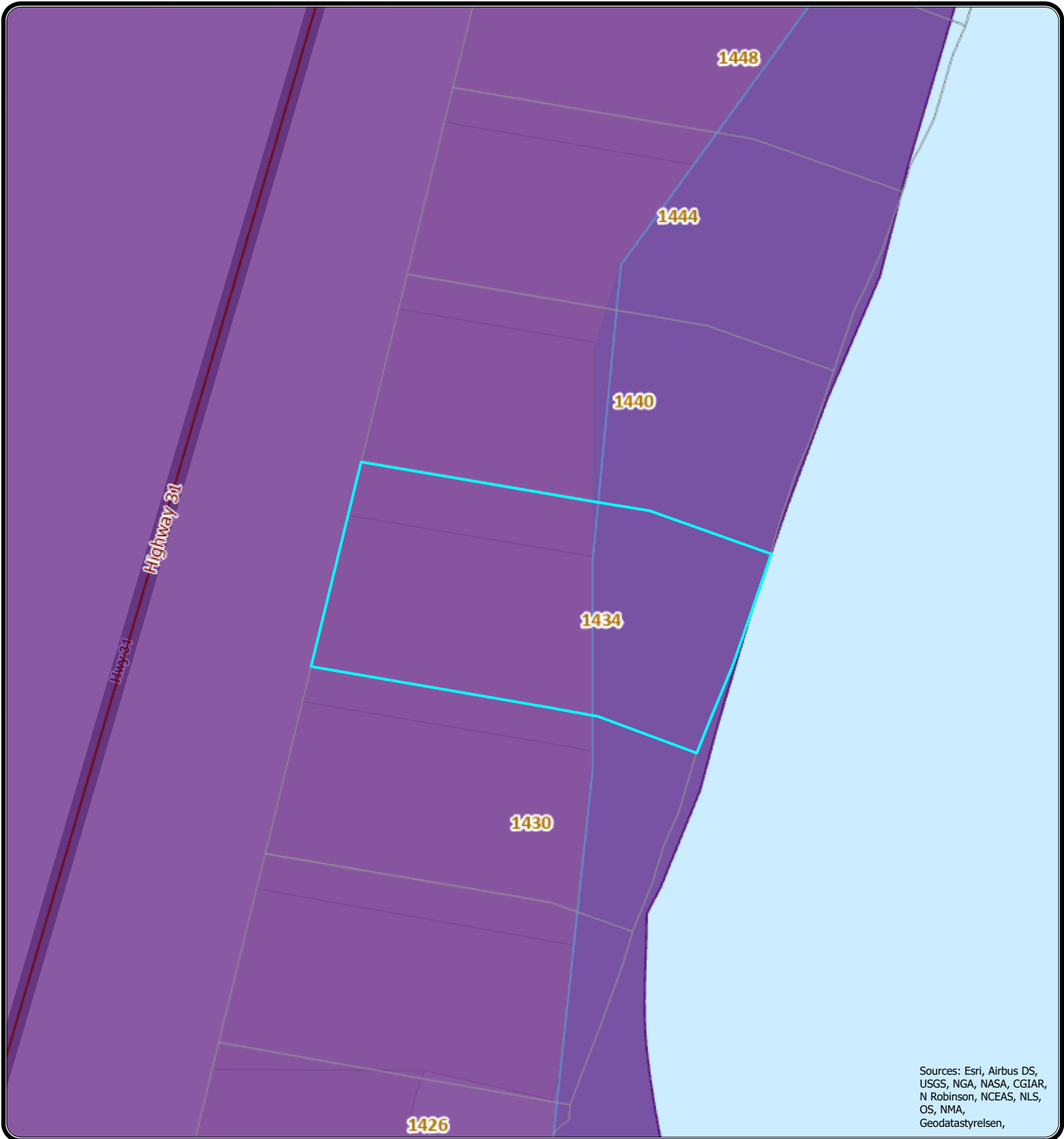
1:564

Date: May 15, 2023



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# RDCK Map









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## Legend

-  Slide Hazard
-  Streams and Shorelines
-  Electoral Areas
-  RDCK Streets
-  Cadastre
-  Address Points

## Map Scale:

1:564

Date: May 15, 2023



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**Watercourse Development Application  
Proposal Summary  
1434 Highway 31  
Queens Bay  
Lot B, Plan NEP79423 Dist Lot 12075, Kootenay Land District**

Date: September 21, 2023

The Watercourse Development Permit is required for proposed demolition and replacement of an existing residential structure, its associated septic facilities, and the associated water intake line on this parcel of land. A relaxation of the Watercourse Development Permit area setback is being sought because the parcel of land is small and therefore extremely restrictive as to where the new structure can be built. The area chosen is the only area that will accommodate the new structure, including its deck which is being used as habitable area and attached to the proposed new structure. The proposed development within the 15 m WDP area of Kootenay Lake includes:

- A raised deck with four posts and footings (33 m<sup>2</sup>) structurally attached to the residence. The deck and its supports will encroach into the 15 m setback up to 12.36 m from the natural boundary. Construction materials used below the 536.5 m elevation will consist of flood tolerant materials such as concrete footings and piers to support wood above the flood level.
- Planting of a mixture of native, low-maintenance shrubs, and forbes on the lake-side of the proposed septic area and below the front edge of the proposed raised deck.

The raised deck attached to the proposed residence will encroach into the 15 m setback from Kootenay Lake by up to 3.58 m (southern corner). The deck will be elevated off the ground by ~3.91 m.

The structure proposal has been assessed by a Qualified Environmental Practitioner, Fiona Lau from Masse Environment, as attached in accordance with the Riparian Areas Regulation who is prepared to carry out the assessment according to Electoral Area 'E' Rural Official Community Plan Bylaw No. 2260, 2013.

**Sincerely,**

Deb Weiland (Applicant)

Weiland Construction

[deb@weilandconstruction.ca](mailto:deb@weilandconstruction.ca)





**1434 Hwy 31, Queens Bay, BC**  
**Riparian Assessment**



Prepared for:

**Deborah Weiland**

**Weiland Construction**

PO Box 221

Nelson, BC, V1L 5P9

Revised November 8, 2023

Prepared by:  
Masse Environmental Consultants  
812 Vernon Street  
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Project Number 2022-1013

**TABLE OF CONTENTS**

Table of Contents ..... i

List of Tables ..... ii

List of Appendices ..... ii

1 Introduction ..... 1

2 Project Overview ..... 2

    2.1 Site Location ..... 2

    2.2 Existing Site Conditions ..... 2

    2.3 Proposed Development ..... 5

    2.4 Services ..... 6

3 Regulatory Overview ..... 6

    3.1 Kootenay Lake Shoreline Management Guidelines ..... 7

4 Environmental Resources ..... 7

    4.1 Fish and Aquatic Habitat ..... 7

    4.2 Vegetation ..... 8

    4.3 Wildlife ..... 11

        4.3.1 Reptiles and Amphibians ..... 11

        4.3.2 Birds ..... 11

        4.3.3 Mammals ..... 12

    4.4 Species at Risk ..... 12

    4.5 Archeological and Heritage Resources ..... 13

5 Impact Assessment ..... 14

6 Measures to Protect the Integrity of the SPEA ..... 15

    6.1 Scheduling of Environmentally Sensitive Activities ..... 15

    6.2 Danger Trees ..... 15

    6.3 Windthrow ..... 15

    6.4 Slope Stability ..... 16

    6.5 Protection of Trees and Vegetation in the SPEA ..... 16

    6.6 Encroachment ..... 17

    6.7 Sediment and Erosion Control ..... 17

    6.8 Stormwater Management ..... 18

    6.9 Floodplain Concerns ..... 18

    6.10 Protection of Fish Wildlife Habitat ..... 19

6.11	Management of Equipment and Fuel/Lubricant Materials .....	19
6.12	Concrete Management .....	20
6.13	Invasive Plant Management.....	20
7	Restoration Plan .....	21
7.1	Environmental Monitoring.....	23
8	Conclusion.....	24
9	Closure .....	25
10	References .....	26

**LIST OF TABLES**

Table 1.	Results of detailed RAPR assessment for Kootenay Lake. ....	7
Table 2.	Environmental and archaeological risk results. ....	7
Table 3.	Plant Species at the Property .....	10
Table 4.	Species at risk with potential occurrence based on iMap BC 10 km radius query. ....	12
Table 5.	Recommended plant species .....	22

**LIST OF APPENDICES**

- Appendix 1. Site Location Map
- Appendix 2. Proposed Development Plans
- Appendix 3. Riparian Assessment Showing SPEA Setbacks
- Appendix 4. Archaeological Change Find Procedure
- Appendix 5. Revegetation Schematic

## 1 INTRODUCTION

Masse Environmental Consultants Ltd. was retained by Deborah Weiland (Contractor, Weiland Construction) on behalf of the property owners, Lisa and Mike Crottey, to conduct a riparian assessment to accompany an application for a Watercourse Development Permit (WDP) for their waterfront property located at 1434 Highway 31, Queens Bay, BC (PID 026-329-981, Lot B, Plan NEP78423, DL 12075, Kootenay Land District (KLD)). The development permit is required for proposed demolition and replacement of an existing residential structure, its associated septic facilities, and the associated water intake line. The Owner is also seeking a site-specific floodplain exemption in order to redevelop the property. The requested relaxation of the 15 m floodplain setback to 12.36 m is being requested to accommodate the proposed raised deck (including post supports and footings) which is attached to the proposed residence located outside the 15 m setback.

A site visit was completed on May 25, 2023, by Fiona Lau B.Tech., A.Sc.T. and Jennifer Ross, M.Sc., P.Chem. to conduct a riparian assessment on the property. The riparian assessment evaluates the existing conditions of the property and riparian areas, identifies habitat values, assesses potential environmental impacts, and recommends measures to mitigate or compensate for the alteration of the riparian area to maintain environmental values. It is based on the following regulatory framework and best management practices documents:

- RDCK Electoral Area 'E' Rural Official Community Plan Bylaw No. 2260, 2013
- RDCK Floodplain Management Bylaw No. 2080, 2009
- British Columbia *Riparian Areas Protection Regulation* B.C. Reg. 178/2019.
- Kootenay Lake Shoreline Management Guidelines
- British Columbia *Water Sustainability Act*
- British Columbia *Wildlife Act*
- Federal *Fisheries Act*
- Federal *Migratory Birds Convention Act*
- Develop with Care. Environmental Guidelines for Urban and Rural Land Development in B.C.
- Requirements and Best Management Practices for Making Changes In and About A Stream in British Columbia
- A Resource for Kootenay Lake Living – RDCK Kootenay Lake Development Permit Area Resource
- On the Living Edge: Your Handbook for Waterfront Living
- British Columbia FireSmart Homeowners Manual and Landscaping Guide
- A Homeowner's Guide to Stormwater Management
- Riparian Factsheet No. 6 – Riparian Plant Acquisition and Planting

This report has been prepared by Jennifer Ross, M.Sc., P. Chem. and reviewed by Fiona Lau B.Tech., A.Sc.T.

I, Fiona Lau, hereby certify that:

- a) I am a Qualified Environmental Professional (QEP), as defined in Section 21 of the *Riparian Areas Protection Regulation* made under the *Riparian Areas Protection Act*;
- b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Weiland Construction which is described in Section 2.3 of this Assessment Report;
- c) I have carried out my assessment of the development proposal, and my assessment is set out in this Assessment Report; and
- d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Minister's technical manual to the *Riparian Areas Protection Regulation*.

## 2 PROJECT OVERVIEW

### 2.1 Site Location

The subject property is located in Queens Bay on Kootenay Lake, within Area E of the RDCK, approximately 30 km northeast of the City of Nelson, BC (see Appendix 1 for Site Location Map). The property is 0.094 acres in size and has 13.57 m of frontage along Kootenay Lake per the legal survey for Plan NEP78423 completed in 2005 by Ward Engineering and Land Surveying Ltd. (Ward Engineering). The subject property is bordered by private properties to the north and south, by Highway 31 to the immediate west and additional private properties further west, and by Kootenay Lake to the east.

The project area is within the Interior Cedar-Hemlock dry warm variant 1 (ICHdw1) biogeoclimatic subzone, which occurs at valley bottom elevations around most of Kootenay Lake (MacKillop and Ehman 2016). The ICHdw1 subzone is characterized by moist, warm springs, hot and dry summers and mild, dry winters with moderately shallow snowpack. Winter rain-on-snow events are frequent and snow-free areas are common, particularly on warm-aspect sites. The ICHdw1 is a highly productive biogeoclimatic unit. Common species on drier sites include: baldhip rose (*Rosa gymnocarpa*), birch-leaved spirea (*Spiraea betulifolia*), Douglas maple (*Acer glabrum*), falsebox (*Paxistima myrsinites*), interior Douglas fir (*Pseudotsuga menziesii*), lodgepole pine (*Pinus contorta*), Oregon grape (*Mahonia spp.*), paper birch (*Betula papyrifera*), ponderosa pine (*Pinus ponderosa*), soopolallie (*Shepherdia canadensis*), Western larch (*Larix occidentalis*), and Western red cedar (*Thuja plicata*) (MacKillop and Ehman 2016).

### 2.2 Existing Site Conditions

The property is situated with an east-facing aspect sloping moderately towards Kootenay Lake. From Highway 31, the MOTI Right-of-Way (ROW) embankment slopes steeply (approximate 1:1 grade) down to

the property. The slope then becomes more moderate (~20 %) within the property and slightly beyond the natural boundary of Kootenay Lake before steepening again to 27 % into Kootenay Lake.

Along the south side of the property, there is a small, one-storey cabin (9.5 m x 4.3 m) with a large, raised deck (7.4 m x ~4.75 m including the exterior staircase) that was constructed in the 1940's (Photo 1, Cover Photo). The wood cabin currently sits on concrete block footings and is set back 12.7 m (measured from the most eastern deck supports) from the surveyed present natural boundary. A wooden walk-out deck was constructed at the north side of the cabin (7.1 m x 1.8 m) and this connects to the wooden staircase (~9 m x 1 m) leading up the highway embankment (Photo 2) and to a small set of concrete stairs. The area under the existing cabin is being used for storage.

North of the cabin is a concrete slab patio (6.1 m x 3.6 m) (Photo 3) set back 14 m from the present natural boundary. A wooden shed (3.65 m x 3 m) (Photo 4) and a wooden outhouse (1.4 m x 1.4 m) (Photo 5) are set back >15 m from the present natural boundary of Kootenay Lake. In addition to the outhouse, the cabin is serviced with a grey water pit and an above-ground seasonal water intake line. The intake line is equipped with a submersible pump.

Evidence of historical tree removal on the property included five large Douglas fir stumps (Photo 6) and one birch stump. Only the double Douglas fir stump located under the existing deck was cleared within the 15 m WDP area (Photo 7).



Photo 1. View of existing cabin and raised deck.



Photo 2. View of highway embankment staircase.



Photo 3. View of concrete slab patio.



Photo 4. View of wooden shed.



Photo 5. View of outhouse.



Photo 6. View of two large Douglas fir stumps previously removed from the property.



Photo 7. View of Douglas fir stump within 15 m setback under raised deck.



The foreshore of Kootenay Lake within Queens Bay has been significantly impacted by the construction of single-family residences, marine rails, water intakes, and landscaping activities including the removal of riparian vegetation and relocation of boulders (Photo 8, Photo 9). The subject property has been less impacted than the properties to the north and south due to the modest development, minimal encroachment into the 15 m setback from the natural boundary, and the retention of three mature (but topped to 10 ft) Douglas fir trees and one mature saskatoon bush within the 15 m WDP area along the northern and southern property boundaries. The beach area of the subject property has been relatively undisturbed and consists of uniform gravel with some re-growth of grasses and invasive weed species.



Photo 8. View of neighbouring properties to the south.



Photo 9. View of neighbouring properties to the north.

During the site visit, the visible high-water mark (HWM) of Kootenay Lake was confirmed at approximately the present natural boundary line as shown on the legal survey for Plan NEP78423 completed in 2005 by Ward Engineering. This HWM is located at an elevation of ~533.4 m based on the Flood Assessment Review completed by Crowsnest Engineering on May 7, 2023. The surveyed present natural boundary<sup>1</sup> will be used as the HWM from which riparian setbacks will be referenced against.

### 2.3 Proposed Development

A preliminary plan for the new residence, parking pad, and retaining walls has been prepared by WSA Engineering Ltd. This plan is accompanied by a sewerage design brief also prepared by WSA Engineering. Both have been included in Appendix 2.

<sup>1</sup> “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.”

The proposed development within the 15 m WDP area of Kootenay Lake includes:

- A raised deck with four posts and footings (33 m<sup>2</sup>) structurally attached to the residence.
  - The deck and its supports will encroach into the 15 m setback up to 12.36 m from the natural boundary. Construction materials used below the 536.5 m elevation will consist of flood tolerant materials such as concrete footings and piers to support wood above the flood level.
- Planting of a mixture of native, low-maintenance shrubs, and forbes on the lake-side of the proposed septic area and below the front edge of the proposed raised deck.

The raised deck attached to the proposed residence will encroach into the 15 m setback from Kootenay Lake by up to 3.58 m (southern corner). A Site-Specific Floodplain Exemption and a relaxation of the WDP permit area setback are required for this construction. The deck will be elevated off the ground by ~3.91 m.

## 2.4 Services

Domestic water for the house will be extracted from Kootenay Lake. A water service line will be installed to the new home approximately at the mid/north section of the property along the alignment of the existing line. This line will be entrenched into the beach substrate to a depth sufficient to prevent freezing during the winter months.

The septic plan includes Type 3 septic system (1,000 L/day flow) with a 12 m<sup>2</sup> dispersal field located within the 30 m setback, and outside of 15 m setback, in accordance with the Sewerage System Standard Practice Manual Version 3 (HPBMOH 2014).

## 3 REGULATORY OVERVIEW

To determine whether the 15 m WDP setback from the HWM of Kootenay Lake aligns with the *Riparian Areas Protection Regulation (RAPR)* criteria, a detailed assessment of the subject property was conducted to calculate the Streamside Protection and Enhancement Area (SPEA) setbacks. Results for the Zones of Sensitivity (ZOS) and SPEA are presented in Table 1 and Appendix 3.

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

Table 1. Results of detailed RAPR assessment for Kootenay Lake.

Feature Type	SPVT <sup>1</sup>	Zones of Sensitivity			SPEA <sup>3</sup>
		LWD <sup>2</sup>	Litter fall	Shade	
Kootenay Lake	TR	15 m	15 m	0 m	15 m

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

<sup>2</sup>LWD- large woody debris

<sup>3</sup>SPEA- streamside protection and enhancement area

### 3.1 Kootenay Lake Shoreline Management Guidelines

The Kootenay Lake Foreshore Inventory Mapping (FIM) (KLP 2023) and the Kootenay Lake Shoreline Management Guidelines documents (Schleppe and Cormano 2013, KLP 2020) were used to help determine site-specific risks for riparian habitat, Ktunaxa Nation cultural values, and archaeological resources along the shoreline. The property is within FIM segment 46 and the FIM indicates that the foreshore is located within an area with high juvenile rearing potential. Table 2 provides the environmental and archaeological risk results identified in the FIM along the shoreline of the property.

Table 2. Environmental and archaeological risk results.

Aquatic Habitat Index Rating	Aquatic Sensitivity	Archaeological Risk	Enhanced Engagement Required
Moderate	Yes	Moderate to High	Yes

The subject parcel was flagged with moderate to high archaeological risk; however, further assessment of archaeological risk is beyond the scope of this report. For further information please consult the Kootenay Lake Shoreline Guidance Document (KLP 2020). Archaeological Chance Find Procedures are provided in Appendix 4.

## 4 ENVIRONMENTAL RESOURCES

### 4.1 Fish and Aquatic Habitat

Kootenay Lake borders the subject property along the east boundary. It is a long, narrow, and deep lake with a surface area of approximately 400 km<sup>2</sup>. Kootenay Lake's main inflows include the Lower Duncan River to the north and the Kootenay River to the south. It drains through the West Arm into the Kootenay River. Kootenay Lake typically experiences one seasonal water level increase annually, which occurs in the late spring and early summer months (late May through July). Lake levels can vary by up to 4 m throughout the year, affecting the extent of exposed shoreline.

The foreshore of the property consists of a sloped beach (20-27 % gradient) with uniform rounded gravel substrate (Photo 10). A few pieces of large woody debris were present (Photo 11) and served as the only source of cover habitat for fish. There was no overhanging vegetation along this section of foreshore and the only boulders observed were placed above the present natural boundary. No aquatic vegetation was observed at the time of the site assessment, though it is likely that some amount of aquatic vegetation exists further out into the lake in deeper water.



Photo 10. View of beach looking east from the residence.



Photo 11. View of beach substrate and small amount of large woody debris.

Kootenay Lake supports a variety of fish species, including several species of regional interest, such as Burbot (*Lota lota*), Bull Trout (*Salvelinus confluentus*), Kokanee (*Oncorhynchus nerka*), Rainbow Trout (*Oncorhynchus mykiss*), Westslope Cutthroat Trout (*Oncorhynchus clarki lewisi*), and White Sturgeon (*Acipenser transmontanus*).

No known white sturgeon spawning or kokanee shore spawning has been reported in this area (DFO 2014, KLP 2020). Kootenay Lake FIM ranks this section of shoreline as high juvenile rearing potential, however potential along the actual property is likely lower based on the sparse cover available to fish.

Mussels were not observed along the foreshore; however, a complete mussel survey was not conducted as part of the riparian assessment.

#### 4.2 Vegetation

The riparian assessment area of Kootenay Lake (i.e., within 30 m of the shoreline) contained both mature native species, and low-growing herbaceous species, including grasses (Cover Photo, Photo 10). Several invasive species have colonized the cleared areas of the property.

Native riparian vegetation (Photos 12-16) included one common snowberry (*Symphoricarpos albus*) bush, three topped mature Douglas fir trees and several regenerating seedlings, three mature Douglas maple clusters, one immature elderberry (*Sambucus sp.*) shrub, one young paper birch tree, one mature saskatoon (*Amelanchier alnifolia*) bush, a patch of thimbleberry (*Rubus parviflorus*), and several mature Western redcedars (~6 trees). Native herbaceous vegetation was dominated by a patch of aster (*Symphyotrichum spp.*) and dandelions (*Taraxacum officinale*). A single yellow salsify plant was identified onsite (Photo 17). This weed has been identified as a priority species for eradication within the Central Kootenay Region by the Central Kootenay Invasive Species Society (CKISS).



Photo 12. View riparian vegetation looking northeast from existing raised deck.



Photo 13. View riparian vegetation looking east from existing raised deck.



Photo 14. Riparian vegetation south of staircase (highway embankment and edge of 30 m riparian area).



Photo 15. Riparian vegetation north of staircase (highway embankment and edge of 30 m riparian area).



Photo 16. Orthophoto provided by Crownest Engineering. Property boundaries estimated.



Photo 17. Invasive yellow salsify plant.

Table 3 provides a list of riparian vegetation species encountered on the property during the riparian assessment.

Table 3. Plant Species at the Property

Common Name	Scientific Name	Common Name	Scientific Name
<b>Trees</b>		<b>Herbaceous (cont.)</b>	
interior Douglas fir	<i>Pseudotsuga menziesii</i>	false Solomon's seal	<i>Smilacina racemosa</i>
paper birch	<i>Betula papyrifera</i>	forget-me-not	<i>Myosotis sp.</i>
Western redcedar	<i>Thuja plicata</i>	grasses	
<b>Shrubs</b>		miner's lettuce	<i>Claytonia perfoliata</i>
common snowberry	<i>Symphoricarpos albus</i>	red clover	<i>Trifolium pratense</i>
Douglas maple	<i>Acer glabrum</i>	<b>Invasive Species</b>	
elderberry	<i>Sambucus sp.</i>	cleavers	<i>Galium aparine</i>
saskatoon	<i>Amelanchier alnifolia</i>	knapweed	<i>Centaurea sp.</i>
thimbleberry	<i>Rubus parviflorus</i>	peavine	<i>Lathyrus sp.</i>
<b>Herbaceous</b>		orange hawkweed	<i>Pilosella aurantiaca</i>
aster	<i>Symphyotrichum spp.</i>	oxeye daisy	<i>Leucanthemum vulgare</i>
black medic	<i>Medicago lupulina</i>	wall lettuce	<i>Mycelis muralis</i>
bracken fern	<i>Pteridium aquilinum</i>	yellow hawkweed	<i>Hieracium spp.</i>
dandelion	<i>Taraxacum officinale</i>	yellow salsify	<i>Tragopogon dubius</i>

### 4.3 Wildlife

Mature riparian vegetation within 30 m of Kootenay Lake is limited to approximately one dozen trees and a saskatoon bush. All of the trees are all located along the property lines, including those at the base of the highway embankment (Photo 16). This provides minimal habitat for wildlife.

#### 4.3.1 Reptiles and Amphibians

Garter snakes (*Thamnophis* spp.), Northern alligator lizard (*Elgaria coerulea*), Northern pacific treefrog (*Pseudacris regilla*), Northern rubber boa (*Charina bottae*), and Western skink (*Plestiodon skiltonianus*) have all been recorded within 5 km of the subject property (BC 2023), but no specific habitat features with high reptile or amphibian value were observed on the property.

#### 4.3.2 Birds

The subject property and the adjacent vegetation along the highway ROW provides some habitat for songbirds, piciformes (woodpeckers, sapsuckers, flickers, etc.), and raptors. No nests were observed during the riparian assessment, but some feeding excavations were noted in one of the Douglas fir stumps onsite (Photo 18), and a Northern flicker (*Colaptes auratus*) was heard calling from a distance. The mature Western redcedar trees provide perching habitat for raptors (Photo 19) and saskatoon bushes provide berries to entice songbirds. During the riparian assessment Canada Goose (*Branta canadensis*) poop was observed along the foreshore of Kootenay Lake confirming their use of the property.

Birds recorded within 5 km of the subject property include barred owl (*Strix varia*), bald eagle (*Haliaeetus leucocephalus*), great blue heron (*Ardea herodias herodias*) and trumpeter swan (*Cygnus buccinator*) (BC 2023, iNaturalist 2023). Many more species are expected to frequent the area transiently.



Photo 18. Piciforme feeding excavations in Douglas fir stump.



Photo 19. Mature Western redcedar perch trees.

#### 4.3.3 Mammals

The property provides minimal habitat for mammals other than red squirrel (*Tamiasciurus hudsonicus*), small rodents, and bats due to the cumulative effects of development (residences and Highway 31) along this section of Kootenay Lake. However, it does provide a potential movement corridor along the shoreline for ungulates, bears, and small carnivores such as American marten (*Martes americana*) and raccoon (*Procyon lotor*).

#### 4.4 Species at Risk

BC Conservation Data Center (CDC) occurrence data and critical habitat for Federally listed species at risk were queried within iMap BC (BC 2023), using a 10 km buffer around the center point of the subject property. The query results are presented in

Table 4. Seven species at risk and/or critical habitat for species at risk were identified within this buffer. The potential occurrence on the property was assessed as likely, possible, unlikely, or very unlikely, according to known species habitat affinities, the habitat profile of the property, and the proximity to mapped occurrences.

Table 4. Species at risk with potential occurrence based on iMap BC 10 km radius query.

Common Name (Scientific Name)	Likelihood of Occurrence on Subject Property	Comment	BC Conservation Status <sup>1</sup>	COSEWIC <sup>2</sup> / SARA <sup>2</sup>
Caribou (Southern Mountain Population) ( <i>Rangifer Tarandus pop. 1</i> )	Very unlikely	Historically inhabited the Southern Selkirk Mountains, with mapped critical habitat within 10 km of the subject property and including the subject property. This population has been extirpated (Habitat ID: 20946, 21013, 21278, 21281, 21288, 211289, 21302, 21395).	Red	E/T
Coeur d'Alene Salamander ( <i>Plethodon idahoensis</i> )	Unlikely	CDC occurrence mapped ~8.9 km east of the subject property near McGregor Lake on Pilot Peninsula of Kootenay Lake (Shape ID: 986, Occurrence ID: 4964). Typically inhabits seepage sites and streamside talus.	Blue	SC
Painted Turtle (Intermountain – Rocky Mountain Population) ( <i>Chrysemys picta pop.2</i> )	Unlikely	CDC occurrence mapped ~9 km northeast of the subject property in Fraser Lake on the east shore of Kootenay Lake (Shape ID: 96554, Occurrence ID: 12181). Inhabits wetlands.	Blue	SC
Western Skink ( <i>Plestiodon skiltonianus</i> )	Possible	CDC occurrences mapped as close as ~6.25 km from the subject property near Coffee Creek. Known to occur around Kootenay Lake (Shape IDs: 29881, 29876, Occurrence IDs: 6929, 6928) but habitat is generally associated with rocks.	Blue	SC



Common Name (Scientific Name)	Likelihood of Occurrence on Subject Property	Comment	BC Conservation Status <sup>1</sup>	COSEWIC <sup>2</sup> / SARA <sup>2</sup>
Whitebark Pine ( <i>Pinus albicaulis</i> )	Very unlikely	CDC occurrences and critical habitat mapped as close as ~3 km from the subject property in all directions (Shape IDs: 136828, 136831, Occurrence IDs: 17117, 17120, Habitat IDs: 94378, 94413, 94467, 95003, 95028, 95044, 95093, 95241, 95253, 95291, 95306, 96716, 133647, 133669). Sub-alpine species.	Blue	E
White Sturgeon (Upper Kootenay River Population) ( <i>Acipenser transmontanus pop. 1</i> )	Possible	Found in the mainstem of Kootenay Lake, known to use the Creston Delta, Duncan Delta, and Crawford Bay (Shape ID: 1370, Occurrence ID: 4745).	Red	E
Wild licorice ( <i>Glycyrrhiza lepidota</i> )	Possible	CDC historical occurrence mapped within the subject property but growth tends to be in moist habitats (Shape ID: 79277, Occurrence ID: 10659).	Blue	NS

<sup>1</sup>Red = Species that is at risk of being lost (extirpated, endangered, or threatened) within British Columbia. Blue = Species considered to be of special concern within British Columbia. <sup>2</sup>(E) Endangered = Facing imminent extirpation or extinction. (T) Threatened = Likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction. (SC) Special concern = May become a threatened or an endangered species because of a combination of biological characteristics and identified threats. (NS) No Status. Information sources: British Columbia Conservation Data Centre.

Many bats species are blue-listed in BC (e.g.: little brown myotis (*Myotis lucifugus*)). The little brown myotis is also listed as ‘endangered’ under the *Species At Risk Act*. The little brown myotis is expected to have a ‘possible’ occurrence rating on the subject property based on masked species polygons mapped in the area. Bat roosting habitat includes tall, live or dead trees with crevices, peeling bark, or cavities (MoE 2016).

#### 4.5 Archeological and Heritage Resources

Kootenay Lake is part of the traditional territory of the Ktunaxa, Sinixt, and Syilx (Okanagan) First Nations and archaeological evidence is documented at multiple shoreline sites. A review of archaeological resources on this property is outside the scope of this report. Archaeological Chance Find Procedures are provided in Appendix 4 for guidance on which protocols to follow in the event of a chance archaeological find, to ensure that archaeological sites are documented and protected as required for compliance with the *BC Heritage Conservation Act*.

## 5 IMPACT ASSESSMENT

The proposed works were assessed based on current site conditions and proposed development activities within the SPEA (15 m from the present natural boundary). Potential impacts include:

- Habitat modification of a ~33 m<sup>2</sup> area of potential riparian vegetation from the proposed construction of a raised deck;
- Habitat modification of a ~15 m<sup>2</sup> area of potential riparian vegetation from the proposed construction of the water intake line;
- Temporary disturbance to wildlife and riparian habitat; and
- Potential spread of invasive vegetation.

The proposed development is sited partially within the existing footprint of the current cabin and does not involve removing any of the established trees or shrubs within the SPEA, which has already been modified and currently supports only three topped Douglas fir trees, one saskatoon bush, and low-value grasses, herbs, and invasive species. To help mitigate for the encroachment of the raised deck into the SPEA, native riparian shrubs will be planted below the front edge of the deck within an area ~25 m<sup>2</sup> in size (12.5 m x 2 m) and native riparian grasses and forbs will be interspersed throughout the rest of the SPEA (Appendix 5). This planting provides enhanced habitat complexity within the SPEA by increasing the area of riparian vegetation onsite and preventing negative impacts associated with invasive plants (which will be removed from the property).

Provided that the recommended mitigation planting and the measures to protect the SPEA (detailed below) are implemented and followed, the negative impacts associated with the proposed development and future use of the property will be minimized. Though the proposed development will contribute to the overall cumulative effects of development along the Kootenay Lake foreshore, the riparian habitat quality and function within the property is expected to be enhanced through the addition of native riparian vegetation and the removal of invasive plant species. Enhanced values include:

- Addition of habitat for songbirds, small mammals, and reptiles such as garter snakes.
- Addition of root matrices that stabilize soils and minimize erosion.

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

This section provides measures to protect the integrity of the SPEA as described in RAPR, as well as recommended best management practices for development and future use of the property.

### **6.1 Scheduling of Environmentally Sensitive Activities**

Demolition and excavation activities, the construction of the foundation and all footings/supports, and the installation of the new water intake line should be completed during the low water period for Kootenay Lake (September through early April) in order to minimize the risk associated with the release of deleterious materials into Kootenay Lake. Other mitigation considerations associated with deleterious materials are discussed in Sections 6.7, 6.11 and 6.12.

Clearing of vegetation should be scheduled outside of the regional nesting period for migratory birds, which extends from early-April to mid-August (ECCC 2023). If this timeline cannot be accommodated and vegetation has to be removed during, or close to, this period of highest risk to nesting birds, a nesting survey should be conducted by an appropriately qualified environmental professional to ensure that there are no active nests that would be impacted.

It is an offence to kill, injure, or disturb nesting birds and the habitat of migratory birds, species at risk, and certain raptors at any time of the year.

### **6.2 Danger Trees**

A certified danger tree assessor was not retained as a part of this assessment, but no hazard tree indicators were observed during the riparian assessment.

Refer to Section 6.5 for measures to protect trees so that they do not become future danger trees as a result of development.

### **6.3 Windthrow**

Assessment of windthrow risk is beyond the scope of this report, and any such assessment should be led by a Registered Professional Forester (RPF).

#### **6.4 Slope Stability**

A geotechnical field review of the subject property was conducted by Crowsnest Engineering. The review concluded that the proposed new residential structure was satisfactory with respect to geotechnical slope stability considerations (Crowsnest Engineering 2023a).

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

All mature trees and shrubs located within the SPEA will be protected from the proposed development activities. The mature trees and shrubs include three topped Douglas fir trees and a saskatoon bush. The retention of this vegetation is important in order to maintain the existing wildlife values, habitat complexity, and shoreline stability around the property.

The following mitigation measures will be implemented to protect the above noted SPEA trees and shrubs and any other mature trees/shrubs that are not necessary to remove for the proposed development:

- Erect a physical barrier to protect the existing trees/shrubs. This barrier should provide for the majority of the root system.
- Excavation or ground disturbance will be avoided within the root zone of these trees/shrubs. Roots of a mature tree typically extend from 1-3 times the height of a tree from the tree's trunk (far beyond the drip line) and are typically located within the upper 0.30 – 0.40 m of soil (MFLNRORD 2019).
- Avoid any change in the grade, ground level, or ground surface characteristics around these trees/shrubs. This includes compaction of the soils due to parking underneath the vegetation and the construction of a large retaining wall immediately adjacent to an established tree.
- Ensure that the trees/shrubs are not damaged during construction, damage includes broken branches, torn bark, or wounds to the trunk. If limbs are damaged, cut or prune the damaged limb with a clean cut near the base of the limb.
- Avoid changes to the natural drainage of the property.
- Avoid the introduction and establishment of invasive weed species. The best way to do this is to know where imported soils are coming from and to ensure they are weed-free. Know the common invasive species in the area (CKISS 2023) and removed them if they begin to establish before they go to seed.
- Avoid the introduction of pollutants that could contaminate the soil next to the trees/shrubs (e.g., fuels and oils leaking from construction vehicles). Refer to Section 6.11 for mitigation measures recommended for fuel and equipment.
- Do not permit any future clearing of vegetation once the proposed development activities have been completed.

## 6.6 Encroachment

The proposed development will encroach into the SPEA up to 10 m from the present natural boundary of Kootenay Lake in order to construct the proposed residence and associated septic facilities. Temporary encroachment up to the present natural boundary will be required for the installation of the new water intake line.

To delineate development boundaries and protect existing riparian habitat during demolition and construction of the new residence and the associated septic facilities, a sediment fence will be installed along the 7.5 m setback line (Section 6.7) and physical barriers will be erected to protect the existing riparian vegetation (Section 6.5). No encroachment mitigation is proposed for the installation of the new water intake line as this should be of short duration and installation should occur during the low water period for Kootenay Lake.

Further development beyond that proposed in this report is strongly discouraged and any future development with the 15 m WDP area (including landscaping) will require a new WDP approval.

## 6.7 Sediment and Erosion Control

In order to prevent erosion of the property and to prevent sediment from entering Kootenay Lake, soil disturbance will be minimized as much as possible and exposed soils will be re-vegetated as soon as possible.

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

- The water line installation will be scheduled during the lower water period for Kootenay Lake (September through early-April). To the extent possible, all other works construction works within the SPEA should also be conducted within this timing window.
- A sediment fence will be installed along the 7.5 m setback line of Kootenay Lake during construction of the new residence and associated septic facilities. Sediment fencing should be properly keyed into the substrate to a minimum depth of 6”.
- If groundwater or surface water is observed coming into the disturbed construction site, it will be conveyed around the development area and away from any exposed soil.
- During construction, activities should be suspended during periods of heavy rain if there is any risk that continued work could result in sediment delivery to Kootenay Lake. Where required, additional mitigation measures, such as sediment fencing, ditching, check dams, or covering soils

may be required to manage turbid wastewater generated by construction or heavy rain events. Turbid wastewater will not be permitted to enter Kootenay Lake.

- During the installation of the water intake line visual monitoring of suspended sediment and turbidity in Kootenay Lake should be conducted. If suspended sediment is generated to the extent that it is migrating away from the property (>30 m), works will be modified to reduce the amount of sediment generated and/or erosion and sediment control measures, such as a sediment curtain, will be installed to contain the sediment.
- Soils or excavated lake substrate will be safely stockpiled in a manner that eliminates the possibility of erosion and sediment transport. Stockpiles will be located as far away from Kootenay Lake as possible.
- Disturbed soils will be revegetated as soon as possible after construction.

## 6.8 Stormwater Management

The proposed development will result in an increase in the total impervious area of the property. The following mitigation measures will help decrease stormwater impacts:

- Pervious materials (e.g., gravel) for use on driveways, parking areas, and pathways. This minimizes stormwater runoff from impervious materials (e.g., asphalt and concrete), which must be managed using natural hydrologic pathways. Storm water will not be permitted to discharge directly to Kootenay Lake.
- A roof rainwater collection system and a similar system for the deck will be designed to direct rainwater into a suitable landscape feature (eg: the proposed riparian shrub area under the raised deck) that can absorb and utilize the runoff. Roof and deck runoff will not be permitted to discharge directly to Kootenay Lake.
- Stormwater discharges must adhere to the *Water Sustainability Act* or any other applicable legislation.

## 6.9 Floodplain Concerns

A small portion of the proposed development is located within the 15 m floodplain setback of Kootenay Lake. A flood assessment was completed by Crowsnest Engineering to support a Site-Specific Floodplain Setback Exemption Application for the proposed development (Crowsnest Engineering 2023b). The proposal provided recommendations for the construction of the foundations and footings for the proposed development and indicated that “the proposed developments would be adequately protected against flooding hazards with return periods of up to 200 years, provided that the recommendation outlined in the report are implemented.”

### 6.10 Protection of Fish Wildlife Habitat

To minimize disturbance to fish, wildlife, and their habitat, the following measures will be implemented:

- Adhere to sediment, stormwater, equipment, fuel, and concrete management best practices outlined in this report to ensure that there is no release of deleterious materials into Kootenay Lake.
- The best timing for the proposed development is September to early-April when Kootenay Lake water levels are low and prior to the period of highest risk to nesting birds in this region (Section 6.1).
- To minimize impacts to fish, the Interim Code of Practice for end-of-pipe fish protection screens for small water intakes in freshwater (DFO 2020) should be followed during the replacement of the water intake line. This includes minimizing the diameter of the water intake line, ensuring that a fish screen is placed at the intake, and installing the water line along a path that minimizes the amount of current and future vegetation disturbance.
- Follow the Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (MoE 2013) if any active raptor nests are discovered within 100 m of the subject property. Active raptor nests are legally protected at all times of the year and some inactive nests (ex: Bald Eagle nests) are similarly protected.
- Follow the Best Management Practices for Bats in British Columbia (MoE 2016) if bats are known to be roosting within 100 m of the subject property and if noise in excess of 150 dB is expected.
- Avoid any modifications to the beach substrate and preserve the remaining woody debris along the foreshore, which provides some cover habitat to juvenile fish.
- Ensure that any power equipment used is well-maintained and leak free.

### 6.11 Management of Equipment and Fuel/Lubricant Materials

Deleterious substances degrade water quality and affect fish and fish habitat. A spill prevention and emergency response plan should be developed by Weiland Construction to minimize the likelihood and impact of a spill of a deleterious substance, such as fuels, oils, and lubricants contained in equipment or vehicles used for construction.

At a minimum, this plan should:

- Ensure that all construction machinery arrives at the property in a clean condition (preferably steam-cleaned), free of fluid leaks, excess oil or grease, mud, and sediment.
- Retain a heavy equipment contractor that can supply equipment using biodegradable hydraulic oil and greases.

- Ensure that each piece of heavy equipment is equipped with its own spill response kit that is appropriate to the types and quantities of fluids stored within. The contents of each kit must be replaced immediately after use.
- Ensure that all equipment operators are familiar with the use of spill kits and their contents.
- Ensure that leaking equipment is removed from the worksite and repaired offsite.
- Create a designated area to park, store, and re-fuel all equipment that is as far away from Kootenay Lake as possible and apply secondary containment (e.g. spill trays) to detect, capture, and contain any potential spills or leaks. It is recommended that the shoulder of Highway 31 be used for this purpose.
- If a spill occurs immediately abate and contained the spill. Report the spill according to the *Spill Reporting Regulation* and then clean up. Any contaminated material will be removed from the subject property and disposed of, along with any contaminated soils, in compliance with the RDCK Resource Recovery Plan and associated bylaws (RDCK 2023).

### 6.12 Concrete Management

Fresh concrete and concrete laden water is caustic (causing elevated water pH) and toxic to aquatic organisms.

To minimize impacts to Kootenay Lake, the following measures will be implemented:

- No concrete, or wastewater that has been in contact with fresh concrete will be disposed of onsite.
- Concrete delivery trucks will either be equipped with a wash water recycling system to capture all wash water used to clean the truck, or a wash water containment bin large enough to capture and contain all wash water will be made available for truck washing.
- Tool washing will occur in a designated wash basin.
- Wash basins should be set aside so that solid material has time to settle and harden. Contents should be disposed of in compliance with Appendix 14.6 of the Standards and Best Practices for Instream Works, (MWLAP 2004).

### 6.13 Invasive Plant Management

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



- All equipment should be thoroughly washed and inspected before entering the project site to prevent the import of new invasive plant seeds and root fragments.
- The amount of soil disturbance should be minimized and exposed soils should be re-vegetated immediately following construction.
- Remove yellow salsify from the property (Photo 17). This is best accomplished by excavating the plant and the entire tap root. Double bag and dispose of the plant as general household waste. Yellow salsify spreads by seed. Remove the flowering head before seeds develop.
- Other priority invasive species such as cleavers, hawkweeds, knapweeds, and oxeye daisy will be removed from the SPEA as part of the mitigation plan.
- Following development, manage new invasive weeds on the property according to guidance from the CKISS to prevent establishment and spread (CKISS 2023).

## 7 RESTORATION PLAN

The Shoreline Management Guidelines for Kootenay Lake outlines general principles for shoreline development in order to achieve a “No Net Loss” of habitats present. The principle is achieved by applying the following priority sequence of mitigation options: 1. *Avoidance* of environmental impacts; 2. *Minimization* of unavoidable impacts; 3. On-site *restoration* of unavoidable impacts; and 4. *Compensation* for residual impacts (KLP 2020).

Minimization and on-site restoration measures have been incorporated into the development plan by retaining the existing high-value riparian vegetation within the SPEA and through onsite riparian planting.

On-site restoration measures include planting native riparian shrubs with a ~25 m<sup>2</sup> area below the front edge of the raised deck, removal of the priority invasive species currently colonizing the central area of the property, and distributing native riparian grasses and forbs to re-colonize the areas formerly impacted by invasive species within the SPEA. Refer to Appendix 5 for the proposed revegetation schematic.

### ***Native Plant Installation:***

A list of the native shrubs, forbes, and grasses recommended for restoration planting is provided in Table 5. These were selected based on their suitability for the property (ecoregion, exposure, and moisture regime), a mature height less than 4 m, as the raised deck will be elevated off the ground by ~3.91 m, and low-maintenance characteristics. Native shrub selection will be dependent on nursery stock and species availability.

Table 5. Recommended plant species

Common Name	Latin Name	Mature Shrub Size	Suggested Pot Size (for planting)
<b>Shrubs</b>			
birch-leaved spirea	<i>Spiraea betulifolia</i>	0.60 - 1.2 m	4" pot or plugs
common ninebark	<i>Physocarpus opulifolius</i>	1.5 - 3.0 m	1 gallon
falsebox	<i>Paxistima myrsinites</i>		1 gallon
fragrant sumac	<i>Rhus aromatica</i>	0.60 - 1.8 m	1 gallon
kinnikinnick	<i>Arctostaphylos uva-ursi</i>	0.10 - 0.20 m	1 gallon
mock orange	<i>Philadelphus sp.</i>	1.8 - 2.4 m	1 gallon
oceanspray	<i>Holodiscus discolor</i>	1.0 – 4.0 m	1 gallon
Oregon grape	<i>Mahonia aquifolium</i>	1.5 - 1.8 m	1 gallon
potentilla	<i>Potentilla fruticosa</i>	0.20 - 1.2 m	1 gallon
red-flowering currant	<i>Ribes sanguineum</i>	3.0 m	1 gallon
rose (ex: baldhip or dwarf)	<i>Rosa spp.</i>	to 1.5 m	1 gallon
saskatoon	<i>Amelanchier sp.</i>	2.5 - 3.5 m)	1 gallon
snowberry	<i>Symphoricarpos albus</i>	0.20 - 2.0 m	1 gallon
soopolallie	<i>Shepherdia canadensis</i>	1.8 - 3.0 m	1 gallon
<b>Forbes</b>			
Canada goldenrod	<i>Solidago lepida</i>	to 1.5 m	4" pot
showy daisy	<i>Erigeron speciosus</i>	0.30 - 0.60 m	4" pot
silky lupine	<i>Lupinus sericea</i>	0.30 - 0.60 m	4" pot
perley everlasting	<i>Anaphalis margaritacea</i>	0.60 - 0.90 m	4" pot
pussytoes	<i>Antennaria spp.</i>	0.15 - 0.35 m	4" pot
wild strawberry	<i>Fragaria virginiana</i>	0.10 - 0.15 m	4" pot
yarrow	<i>Achillea millefolium</i>	0.60 - 0.90	4" pot
<b>Grasses</b>			
Bluebunch wheatgrass	<i>Pseudogenaria spicata</i>	0.30 - 0.90 m	plugs
Elijah blue fescue	<i>Festuca glauca</i>	0.20 - 0.30 m	1 gallon
Karl foerster feather reed grass	<i>Calamagrostis acutiflora</i>	0.90 - 1.8 m	1 gallon

The following re-vegetation strategy is recommended:

- The 25 m<sup>2</sup> revegetation area will be excavated to a depth of 0.3 m (note that this may have to be modified if this area is within the root zone of the nearest Douglas fir). This revegetation area will be filled with a mixture of topsoil and compost.
- Shrubs will be planted at a density of 1-2 plants/m<sup>2</sup> (~0.5 m spacing) per provincial guidelines (MoA 2012, McKenzie and Hill 2023). This equates to 25-50 shrubs within the proposed 25 m<sup>2</sup> area. It is recommended that >25 % of these shrubs will be fruit-bearing for enhanced wildlife value.

- Grass and forbe species will be incorporate into the SPEA in 1 m<sup>2</sup> clusters of plants at a density ~10 plants /m<sup>2</sup> on favourable microsites.
- Planting should occur in the early spring or fall and will not occur during the hottest summer months unless the owners are prepared to irrigate this area daily.
- Potted stock will be a minimum of two years old (MoA 2012).
- Shrub roots will be inoculated with micorhizae during installation.
- Bark mulch will be placed on the soil surface to a depth of 4" leaving small areas around the plant stems mulch free to allow for airflow to the bottom of the plant stem.

The following ongoing maintenance strategy is recommended:

- Remove the invasive plants by hand prior to going to seed during the first two growing seasons.
- Assess plant survivorship one year after planting. If two or more shrubs are lost after at least one growing season and one dormant season, replacement planting will be required.

### **7.1 Environmental Monitoring**

Environmental support is recommended during the development activities and during restoration to ensure that measures to protect the SPEA and the recommendations for mitigation planting are implemented and followed.

The anticipated effort for environmental monitoring (completed by a QEP) and professional guidance on this project includes the following:

- Conduct a site visit prior to construction to:
  - Inspect the installation of the sediment fencing and physical barriers to protect the existing SPEA trees/shrubs.
  - Review other mitigation measures outlined in this report.
  - Ensure that obligations regarding the exercise of due diligence for the protection of environmental values are understood and implemented.
- Provide guidance during the implementation of the restoration plan, as required.
- Conduct a site visit once the restoration plan has been implemented, with all planting completed.
- Prepare an environmental summary report for the entire project upon completion. This will be submitted to the RDCK for closure.
- Complete effectiveness monitoring of the planted area for two growing seasons and provide recommendations for ongoing maintenance and/or replanting, if required. The following indicators of success of riparian plantings will be documented:
  - Plant composition includes only native plant species.

- After two full growing seasons, survival of 80% of plants will indicate that the revegetation plan has been successful.

## **8 CONCLUSION**

Overall, the measures to protect the SPEA will help mitigate the environmental impacts caused by the proposed development. Temporary disturbance to wildlife may occur throughout the development, but any wildlife present are likely accustomed to similar levels of background disturbance given the location, and the duration of works will be short enough such that the resulting disturbance is not anticipated to be of a level that is detrimental to these species. The risk of potential spread of invasive species is expected to be effectively mitigated through the measures outlined for invasive plant management and the restoration plan. The proposed development will modify ~48 m<sup>2</sup> (33 m<sup>2</sup> deck + 15 m<sup>2</sup> water intake) of potential riparian vegetation. The proposed revegetation and invasive plant removal along the foreshore will help mitigate some of the riparian loss caused by the proposed development and provide some additional habitat complexity along the foreshore.

Provided that the recommended mitigation planting and the measures to protect the SPEA are implemented and followed, the negative impacts associated with the proposed development and future use of the property will be minimized.

## 9 CLOSURE

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

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

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

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

Sincerely,



Fiona Lau, B.Tech., A.Sc.T

[fiona@masseenvironmental.com](mailto:fiona@masseenvironmental.com)



Jennifer Ross, M.Sc., P.Chem.

Masse Environmental Consultants

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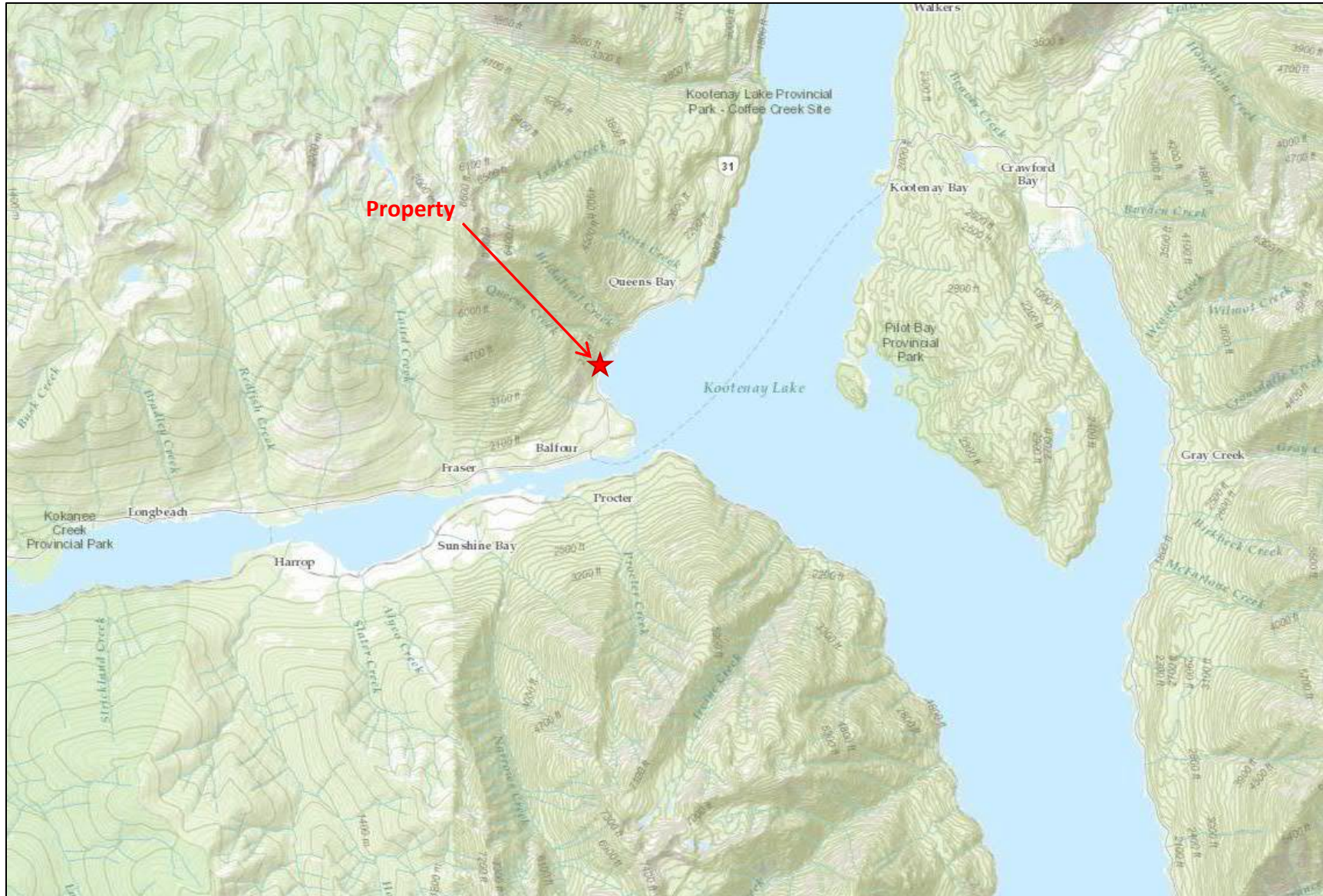
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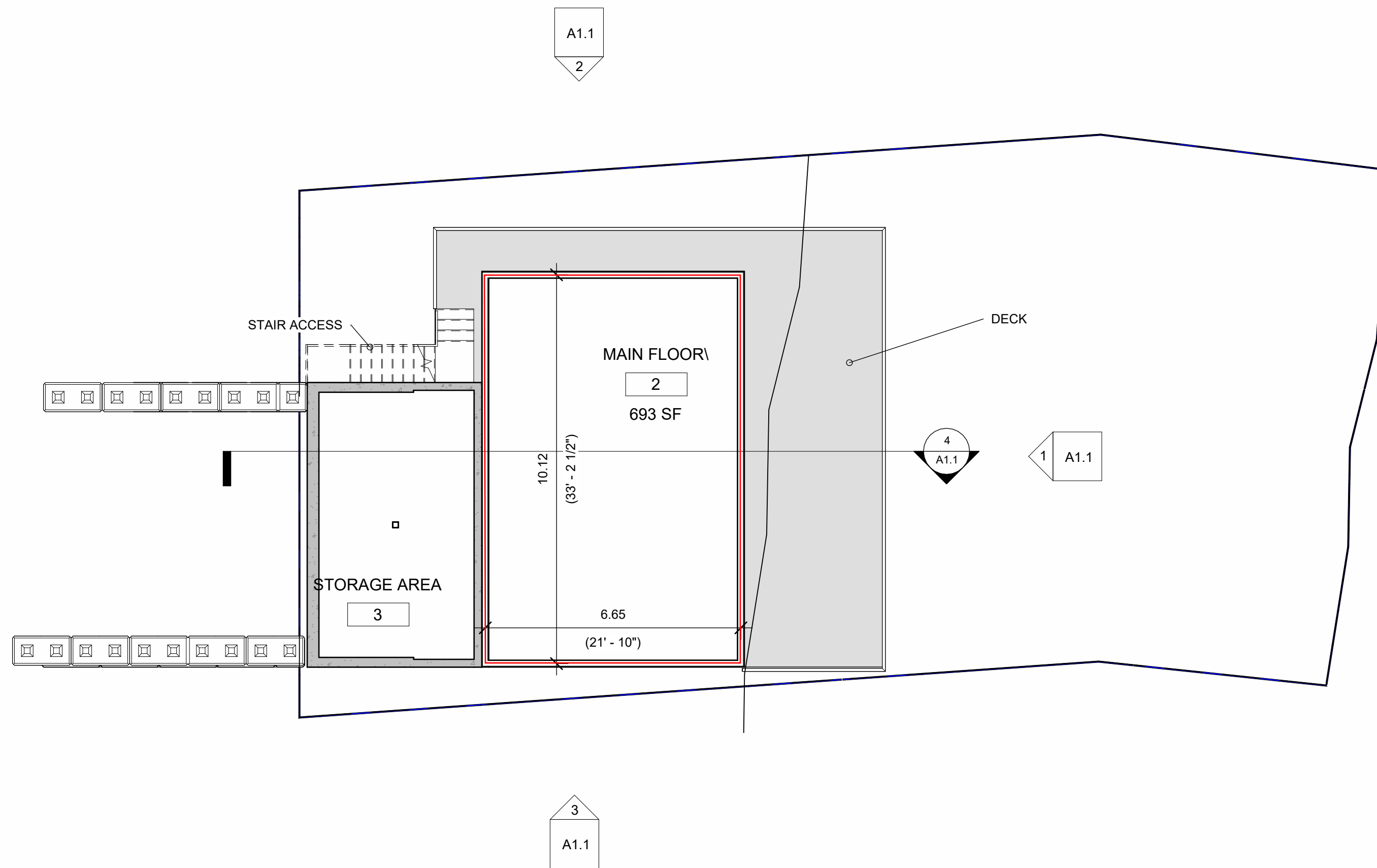


**APPENDIX 1. SITE LOCATION MAP**

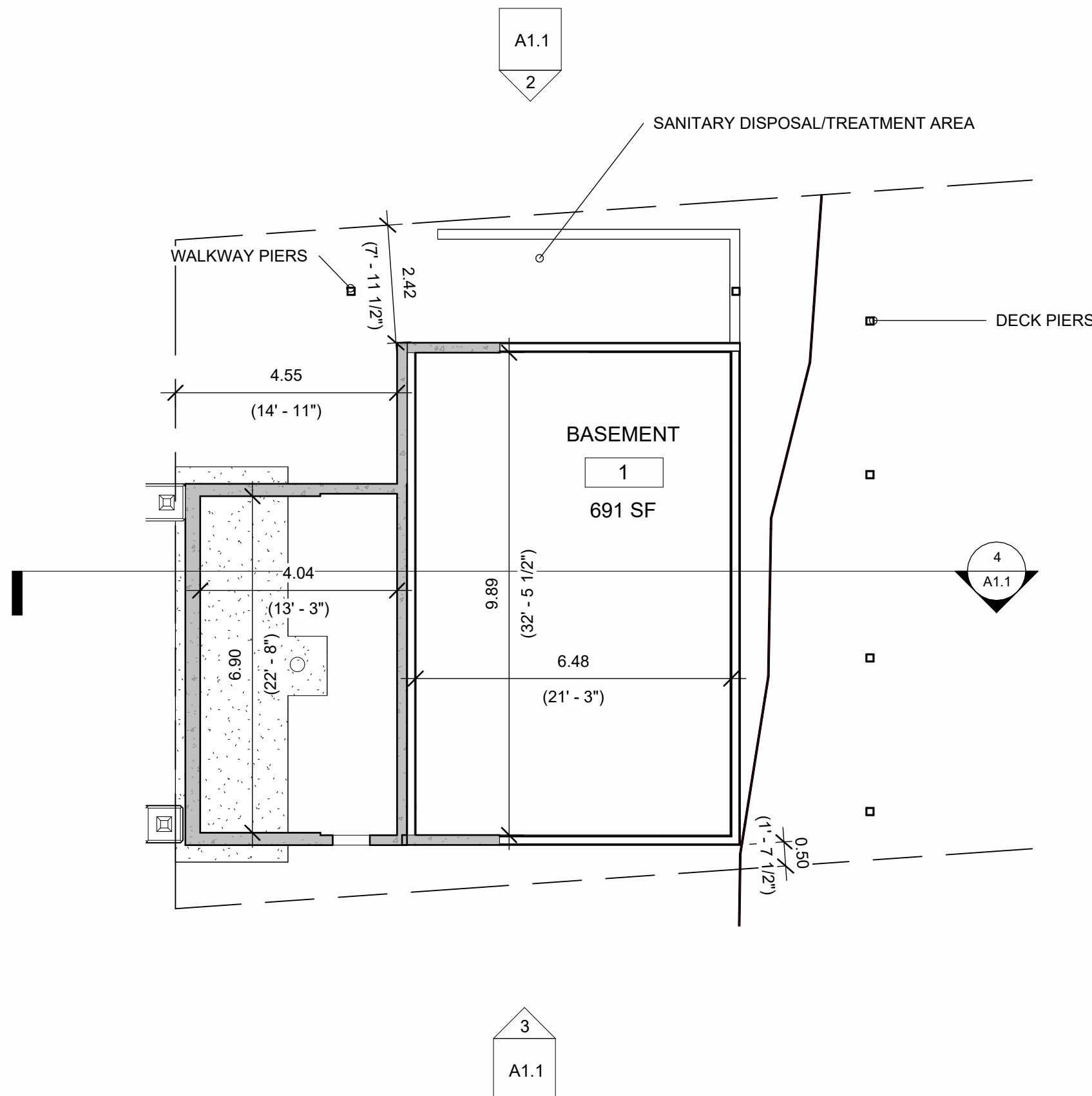
Location Map – 1434 Highway 31 (Queen's Bay)



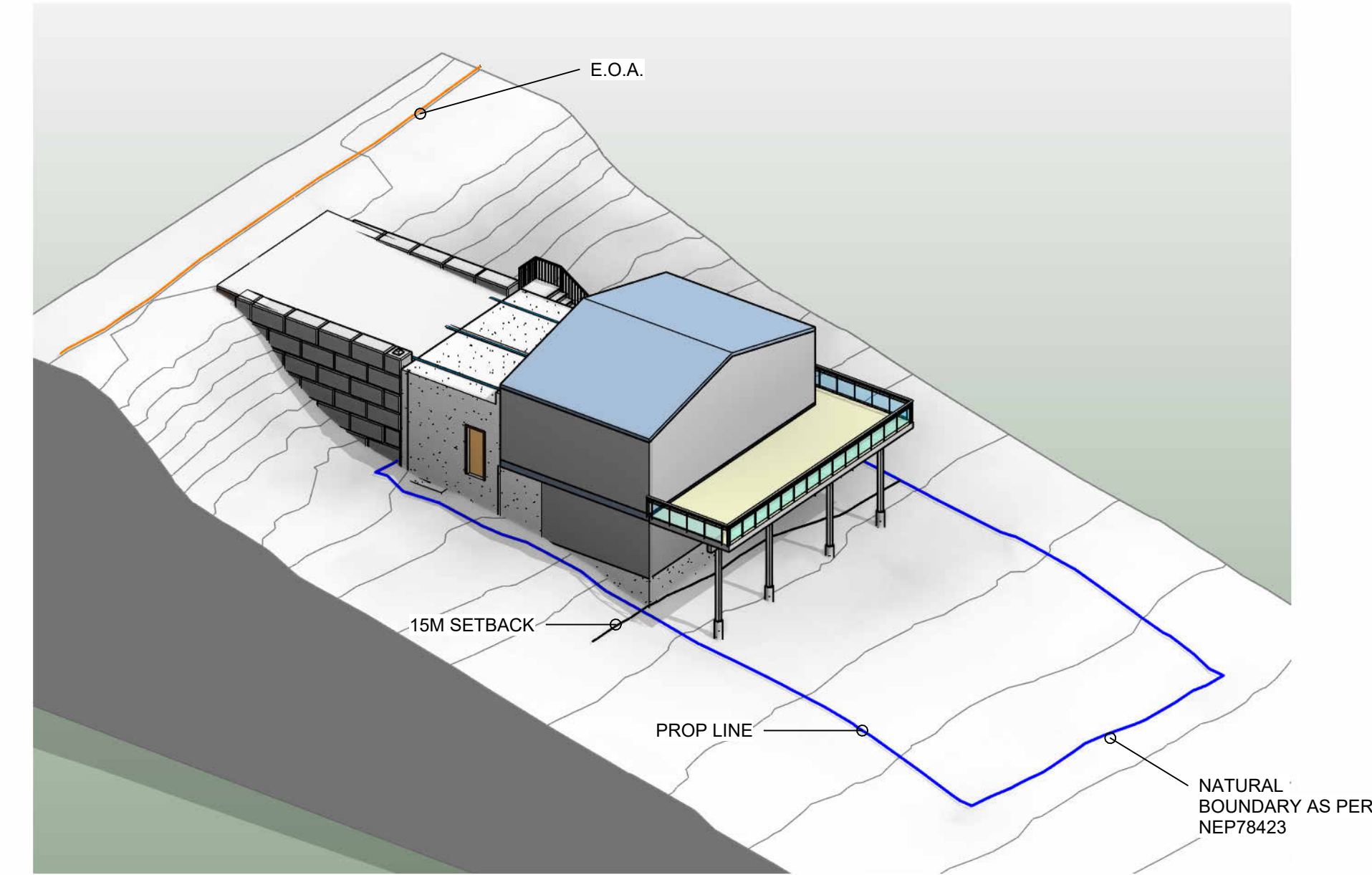
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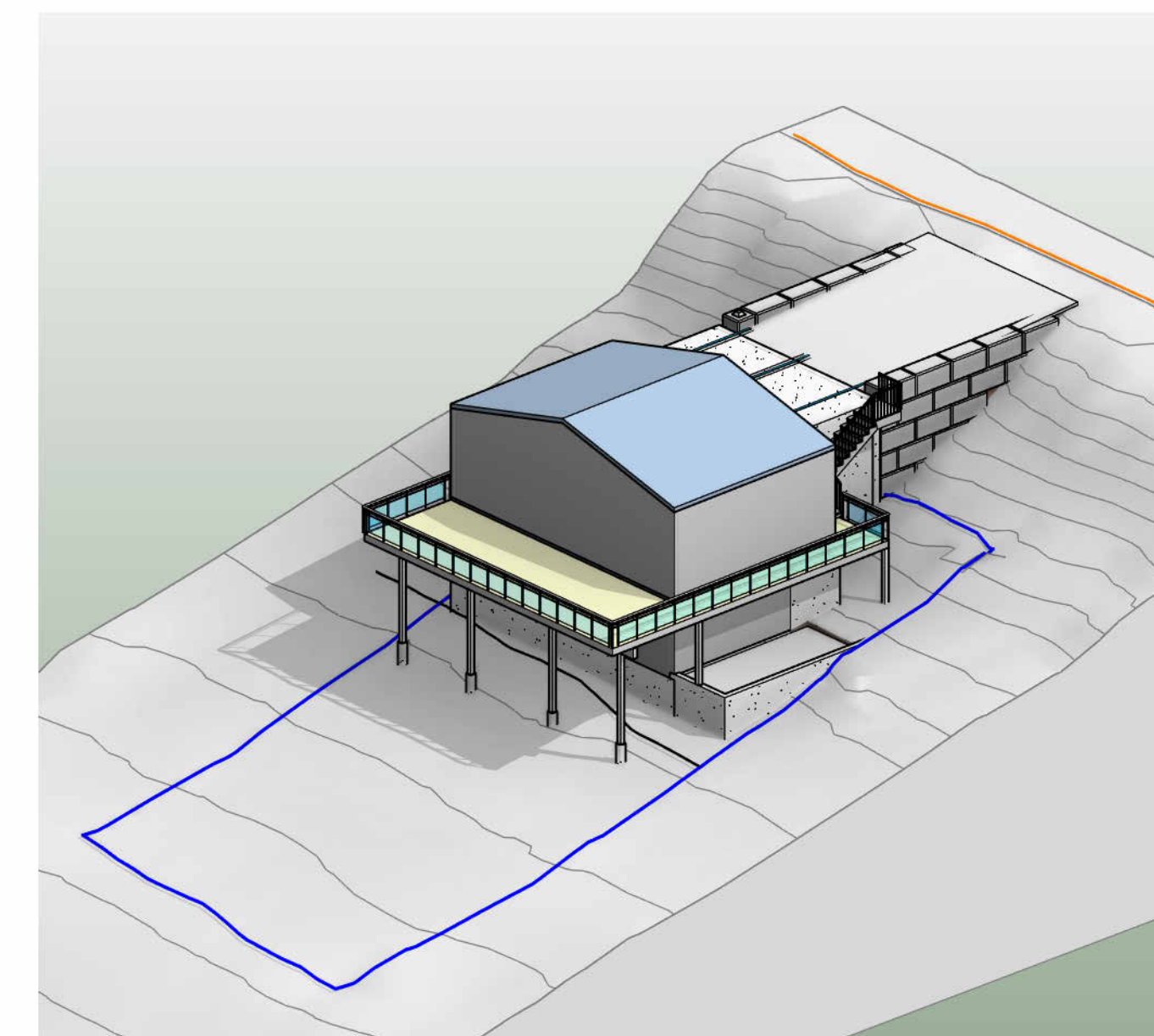
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2 BASEMENT FLOOR  
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3 CONCEPT PERSPECTIVE  
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4 CONCEPT PERSPECTIVE Copy 1  
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Dimensions to Face of Foundation or Framing Stud UNO.

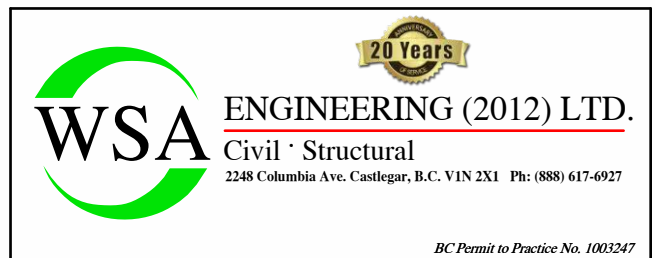
This plan and design is the property of WSA Engineering (2012) Ltd. and is solely for the use of the client with which WSA Engineering (2012) Ltd. has entered into agreement with, and cannot be used in whole or in part without the written consent of WSA Engineering (2012) Ltd.

DO NOT SCALE DRAWINGS  
Written dimensions shall govern.

All dimensions to be verified on site by the contractor/builder. Report all errors or additions to the owner or designer prior to proceeding with the work

No.	Date	Issue/Revision
A1	MAY 05/23	ISSUED FOR FLOODPLAIN EXEMPTION REVIEW
2	APR 26/22	COMPOSITE SLAB ADDED, FOOTPRINT ADJUSTMENTS
1	DEC 20/22	BUILDING FOOTPRINT AND ELEVATION REVISION
A	NOV 17/22	ISSUED FOR REVIEW

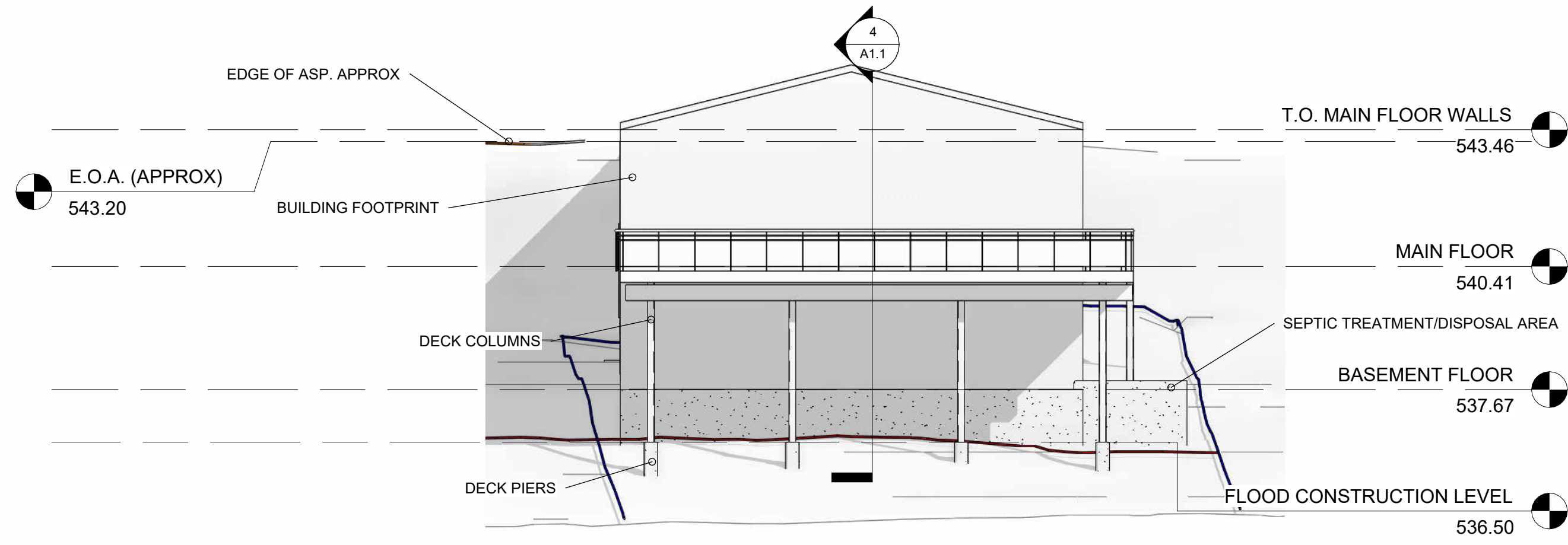
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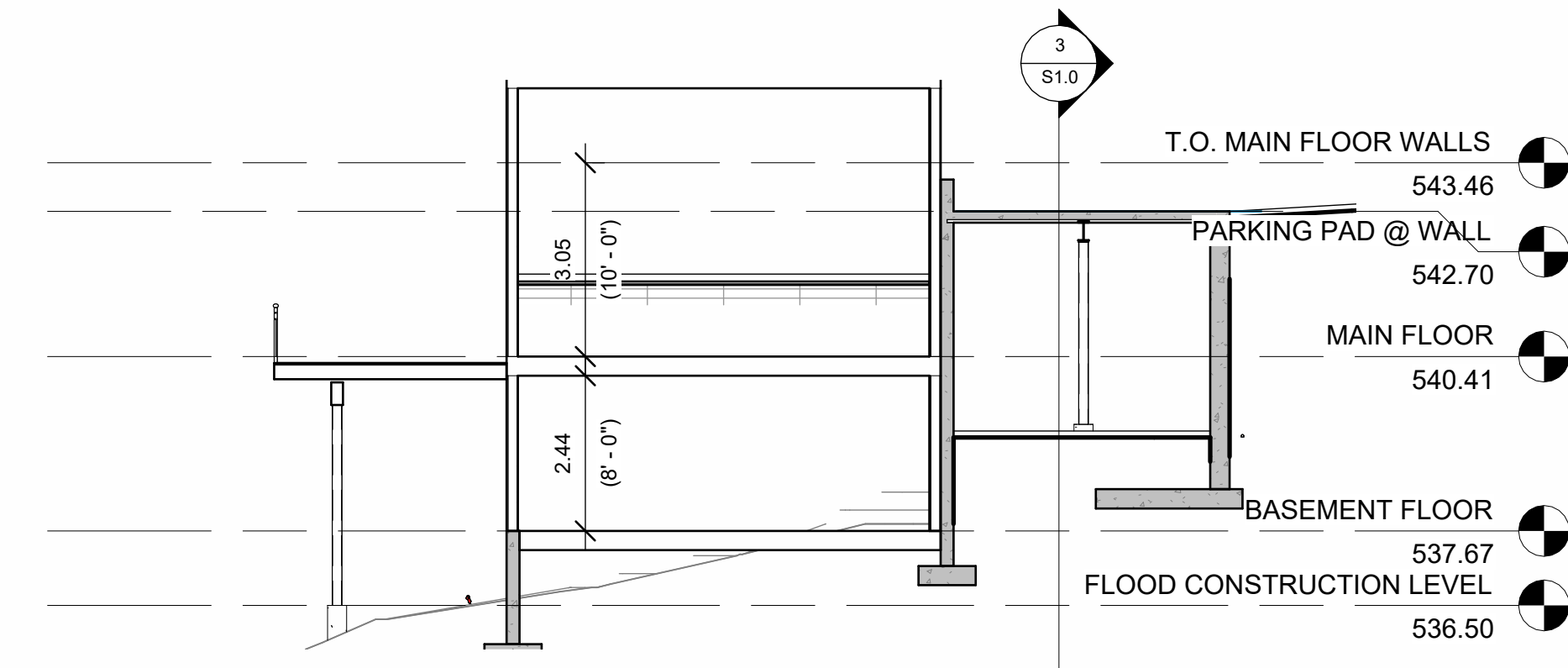
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**Crottey Parking Pad and Retaining Walls**  
  
1434 Hwy 31  
Balfour, BC  
  
Drawing  
**BUILDING CONCEPT**

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Designed	Author	Drawing File	C23253-032 A1
Drawn	Author	Scale	1 : 100
Checked	Checker	Sheet No.	Issue/Rev.
Approved	Approver	<b>A1.0</b>	<b>A1</b>

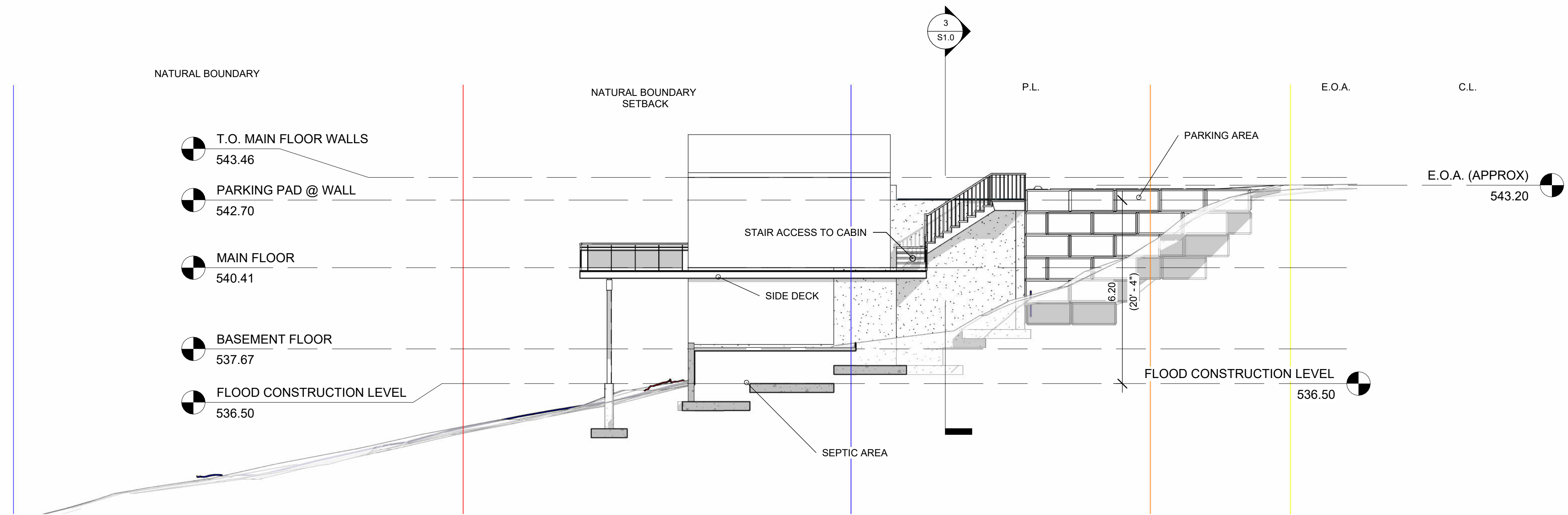
**ISSUED FOR FLOODPLAIN EXEMPTION REVIEW**



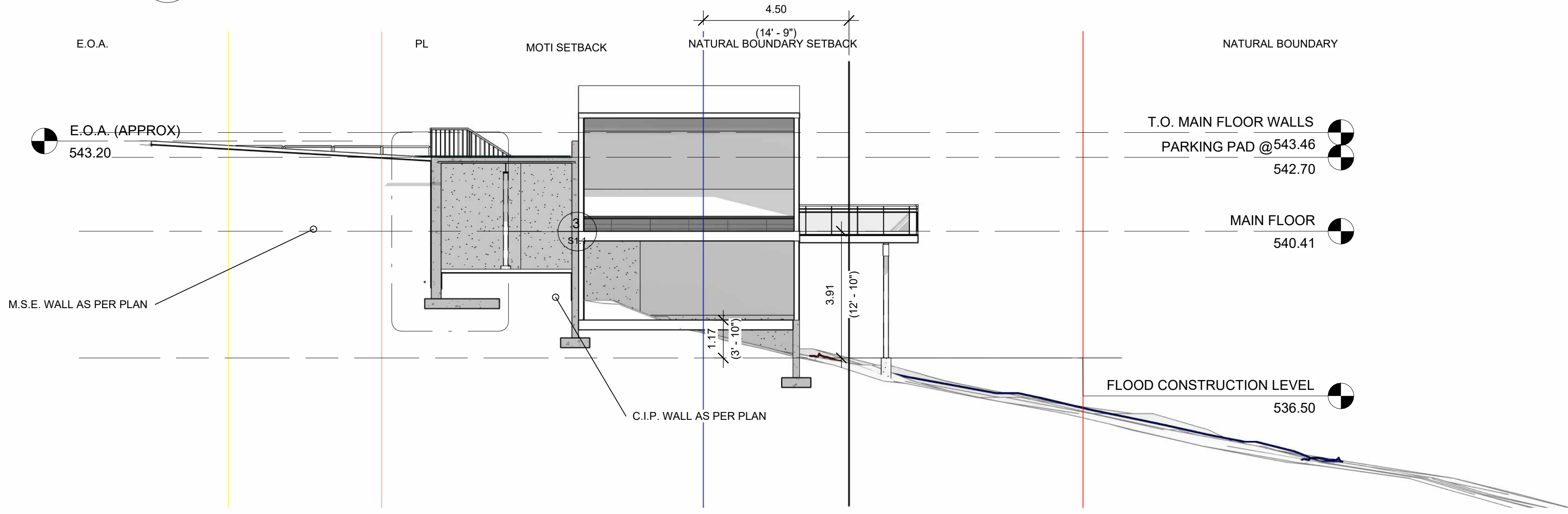
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3 S1.0  
A1.1 1 : 100



2 BUILDING CONCEPT - NORTH  
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3 BUILDING CONCEPT - SOUTH  
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4 CONCEPT SECTION  
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Dimensions to Face of Foundation or Framing Stud UNO.

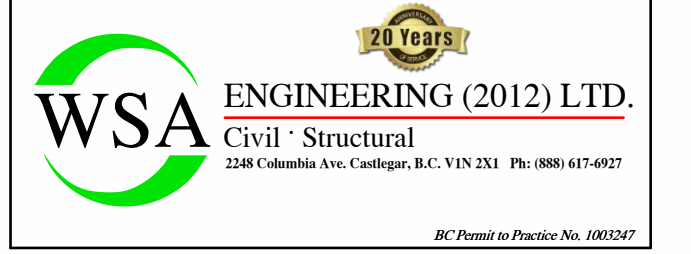
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DO NOT SCALE DRAWINGS  
Written dimensions shall govern.

All dimensions to be verified on site by the contractor/builder. Report all errors or additions to the owner or designer prior to proceeding with the work

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A1	MAY 05/23	ISSUED FOR FLOODPLAIN EXEMPTION REVIEW
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Professional Engineer Stamp:

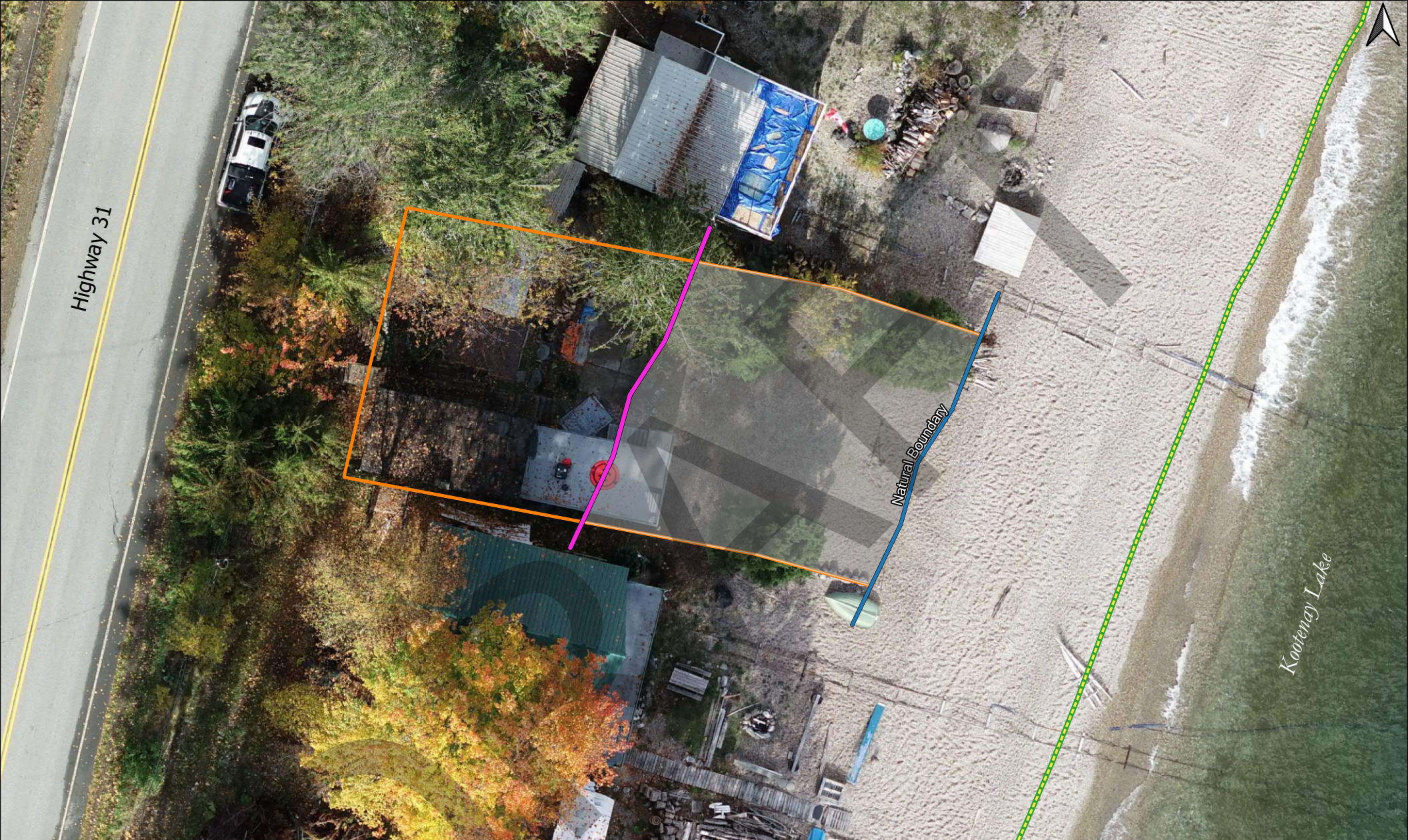


Project  
**Crotty Parking Pad and Retaining Walls**  
  
1434 Hwy 31  
Balfour, BC  
  
Drawing  
**BUILDING CONCEPT - ELEVATION**

Start Date	08/11/22	Project No.	C23253-032
Designed	Designer	Drawing File	C23253-032 A1
Drawn	Author	Scale	1 : 100
Checked	Checker	Sheet No.	A1.1
Approved	Approver	Issue/Rev.	A1

ISSUED FOR FLOODPLAIN EXEMPTION REVIEW

**APPENDIX 3. RIPARIAN ASSESSMENT SHOWING SPEA SETBACKS**

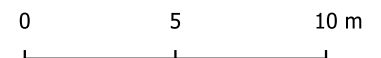


### Queen's Bay - Riparian Assessment Setbacks

- Property Boundary (PID 026-329-981)
- Present Natural Boundary
- Kootenay Lake Setbacks
  - Shade ZOS (30 m)
  - Litterfall and LWD ZOS (15 m)
  - SPEA and WDP Area (15 m)



Map Date: 2023/06/26  
 Projection: NAD83 UTM Zone 11  
 1434 Highway 31, Queens Bay, BC  
 Map Scale: 1: 250  
 Orthoimage Date: October 26, 2022  
 Fortis BC Lake Level: 531.45 m



**APPENDIX 4. ARCHAEOLOGICAL CHANGE FIND PROCEDURE**



## Chance Find Procedures for Archaeological Material

This document provides information on how a developer and/or their contractor(s) can manage for potential archaeological material discoveries while undertaking construction and/or maintenance activities. This document can provide assistance to in-field contractors in the identification of archaeological remains and the procedures to follow if a discovery is made. The discovery of human remains initiates a different course of action and is outlined separately.

Under the provincial *Heritage Conservation Act (HCA)*, archaeological sites that pre-date 1846 are automatically protected whether on public or private land. Protected sites may not be damaged, altered or moved in any way without a Section 12 or 14 Permit as issued through the *HCA*. It is illegal to collect or remove any heritage object from an archaeological site unless authorized to do so under permit.

### **1. Activities occurring outside of known Archaeological Sites:**

When archaeological material is encountered outside of known archaeological site areas work in the vicinity must stop immediately no matter what type of material or feature has been identified. Alteration to an archaeological site can only occur under a Section 12 (Site Alteration Permit) or Section 14 (Heritage Inspection Permit) *Heritage Conservation Act* permit. Such permit applications should be prepared by a professional archaeologist.

If archaeological material is discovered during the course of construction activities:

- 1.1 **Stop Work:** Halt all work in the area of the discovery and safely secure the area. Contact the project manager or site foreman.
- 1.2 **Contact an Archaeologist:** An archaeologist should be contacted as soon as possible. For a list of qualified archaeologists in the area, the proponent is directed to the BC Association of Professional Consulting Archaeologists website: [www.bcaca.ca](http://www.bcaca.ca). The proponent may also wish to contact the Ktunaxa Nation Council's Cultural Resources Stewardship Technician for direction (1-250-420-2739; [nikapell@ktunaxa.org](mailto:nikapell@ktunaxa.org)).

- 1.3 **Archaeologist provides guidance:** The archaeologist will direct the proponent on the next courses of action, which will include notifying the Archaeology Branch and First Nations with interest in the area.

## **2. Activities Occurring within Known Archaeological Site Boundaries:**

Land altering activity within a previously recorded archaeological site must be conducted under a Section 12 HCA Site Alteration Permit (SAP), in some cases with an onsite archaeological monitor. It is common for additional archaeological material and features to be encountered during activities occurring within previously recorded archaeological sites. Minor finds (lithic flakes, diffuse charcoal or fire altered rock) may not require work to stop, however significant finds require a level of assessment by a professional archaeologist, and it is up to the onsite project manager to determine the level of significance based on criteria presented below.

### **2.1 Significant Cultural Finds that Require a Professional Archaeologist (described in detail in Section 4)**

- Intact archaeological features, which can include but are not limited to hearths, cultural depressions (e.g. cache pits, house depressions) and rock alignments or forms (e.g. tipi rings, cairns, blinds)
- Significant archaeological materials, which include but are not limited to, the presence of formed lithic tools (e.g. projectile point, microblade core, scraper), a dense concentration of lithic waste flakes, or artistic items
- Human Remains (described in detail in Section 3)

### **2.2 Archaeological Site Management Options**

- 2.2.1 **Site Avoidance:** If the boundaries of a site have been delineated, redesign the proposed development to avoid impacting the site. Avoidance is normally the fastest and most cost effective option for managing archaeological sites. Site avoidance could also be achieved through minimizing ground disturbance by looking for alternative constructive methods.
- 2.2.2 **Mitigation:** If it is not feasible to avoid the site through project redesign, it is necessary to conduct systematic data collection and analysis within the site prior to its loss. This could include surface collection and/or excavation. This work can be time-consuming and therefore expensive to conduct.
- 2.2.3 **Protection:** It may be possible to protect all or portions of the site which will be impacted through installation of barriers during the development period and possibly for a longer period of time. Methods for barrier construction could include fencing around site boundaries or applying geotextile to the ground surface and capping it with fill. The exact method used would be site-specific.

### **3. Chance Find Procedures for Identified Human Remains**

Procedures in the event of the discovery of human remains during construction are covered in depth by an Archaeology Branch Policy Statement, found on their website at [www.for.gov.bc.ca/archaeology](http://www.for.gov.bc.ca/archaeology), and are summarized below.

- 3.1 Stop all construction activities immediately in the area of found or suspected human remains and contact the RCMP and/or Office of the Coroner.
- 3.2 The coroner must determine whether the remains are of contemporary forensic concern or archaeological/aboriginal.
- 3.3 If the remains are found to be of aboriginal ancestry then the next step involves the relevant First Nations collaboratively determining the appropriate treatment of those remains.

The key to respectfully dealing with ancient aboriginal remains is to involve the appropriate First Nations as early as possible in the process. However this must be done in a manner that does not interfere with the coroner's office ability to conduct their business in the manner that they see fit.

### **4. Site Identification Guide**

The following are characteristics typical to site types found within the Ktunaxa Traditional Territory.

#### **4.1 Artifact Scatters**

Lithic (stone) scatters from the production and maintenance of stone tools are the most common type of archaeological site found in the region. Other materials that may be represented in artifact scatters are Fire Altered Rock (FAR), bone, antler and tooth.

Lithics: What to look for

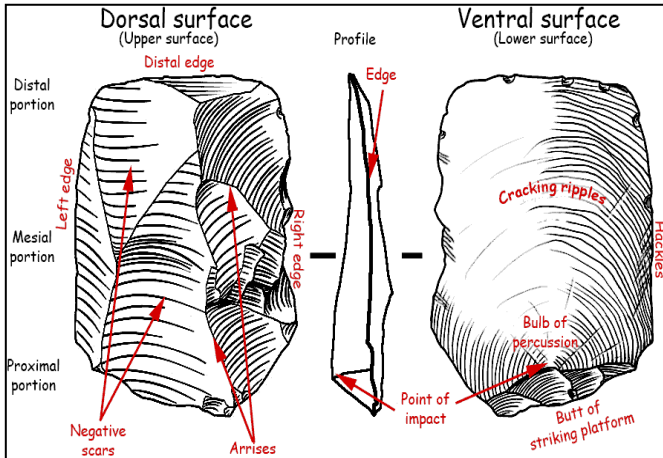


Image 1: Basic flake morphology



Image 2: Examples of lithic flakes

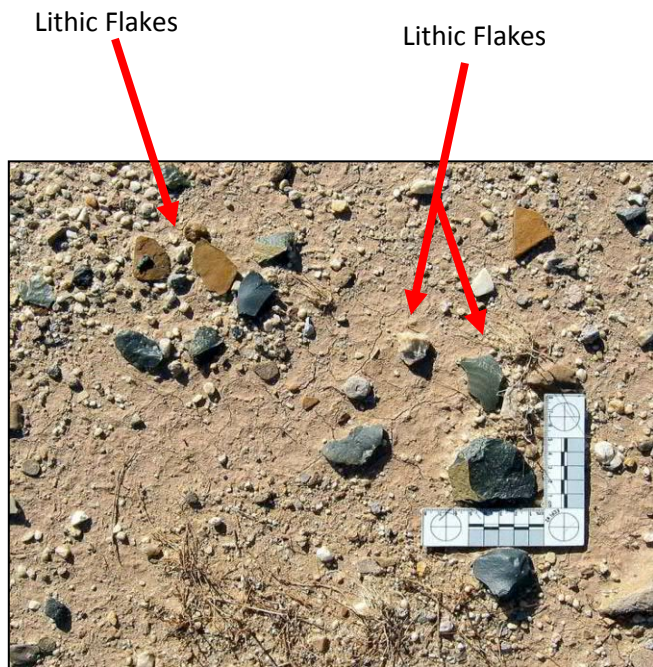


Image 3: Example of lithic scatter found on ground surface



Image 4: Example of formed lithic artifacts

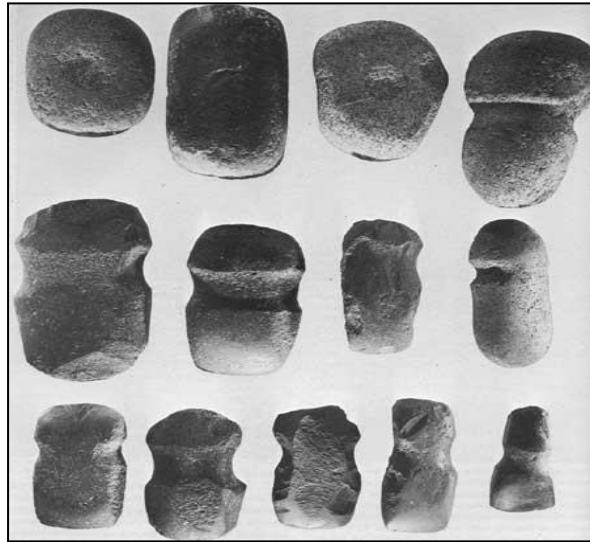


Image 5: Ground stone artifacts

Bone, Tooth and Antler Artifacts: What to Look For

- Obvious shaping
- Incising
- Unnatural holes



Image 6: Bone and Antler artifacts

## 4.2 Fire Broken Rock and Hearths

Fire-broken rock (FBR) results from the use of fire during cooking, heating and processing activities. FBR is often associated with other features including hearths and cultural depressions, but can also be thinly scattered in concentrations away from the features with which they were first associated.

When looking for FBR, note concentrations of roughly fractured rock from rapid heating and cooling, rock showing signs of burning or oxidation and/or reddening or blackening of surrounding matrix.



Image 7: Example of FBR; note the zig/zag pattern of breakage common to FBR

A hearth feature is evidence of a fire pit or other fireplace feature of any period. Hearths were used for cooking, heating, and processing of some stone, wood, faunal, and floral resources and may be either lined with a wide range of materials like stone or left unlined. Occasionally site formation processes (e.g., farming or excavation) deform or disperse hearth features, making them difficult to identify without careful study.

Hearths: What to look for

- FBR
- reddening or blackening of the associated soil/sediment
- charcoal
- layering of FAR and charcoal, and
- depressions in the earth associated with FAR, reddened or blackened matrix and charcoal.



Image 8: Example of a hearth uncovered along the wall of an excavation unit

### 4.3 Cultural Depressions

Any depression seen on the ground surface that appears to have been excavated by man can be a cultural depression and have archaeological significance. These “pits” were dug for a variety of reasons such as for food storage or as a base for a dwelling. They can range in size from 1m across to 7-10m across, and are usually found associated with other artifacts such as FAR and lithic scatters.

To identify a cultural depression, look for:

- Subtle to deep scours on the ground surface that are circular to rectilinear in shape
- A raised rim along the edge of a depression
- Depressions associated with artifacts and FAR
- Depressions associated with fire reddening and blackening of the matrix



Image 9: Example of a large cultural depression in a natural setting

#### 4.6 Rock Alignments

There are several types of rock alignments that occur within the culture area, which include tipi rings, medicine wheels, cairns and blinds. When attempting to identify rock alignments, look for a group of rocks that look purposefully placed as in a circle, pile or line; isolated groups of rock that do not seem to belong to that landscape; and/or rocks which form a pattern.



Image 10: Example of a Cairn or piling of rocks



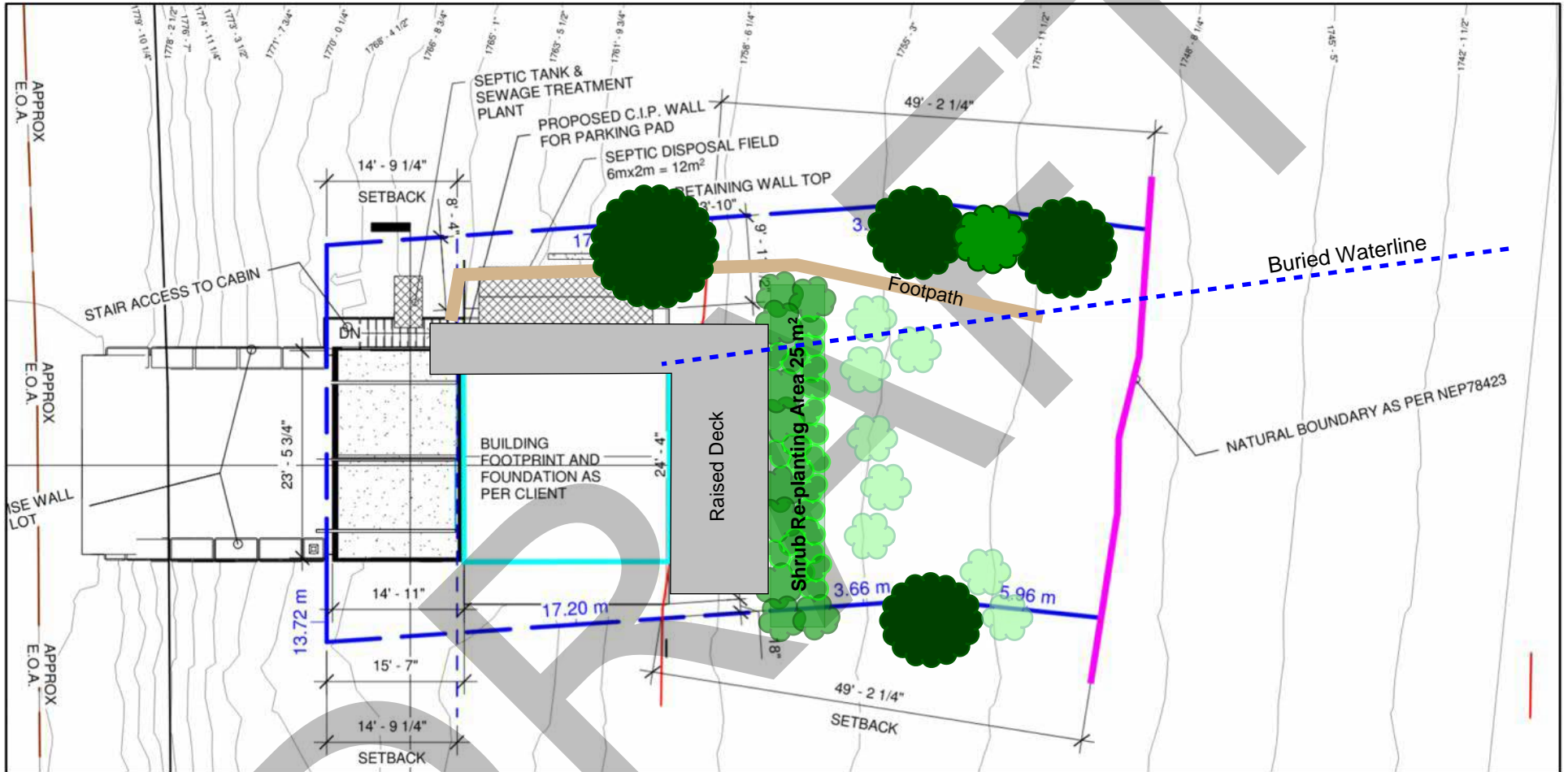
Image 11: Example of a tipi ring in a natural setting









**APPENDIX 5. REVEGETATION SCHEMATIC**

# Revegetation Plan Schematic




(drawing taken from Crowsnest Engineering Flood Assessment Review)



**Legend**

-  Existing Trees
-  Existing Shrub
-  Grass and forb planting area
-  Large Shrub
-  Small Shrub
-  Footpath

**Proposed Development within the 15 m WDP Area:**

-  Raised Deck (~ 33 m<sup>2</sup> footprint)
-  Waterline (subsurface)
-  Footpath (~ 7 m<sup>2</sup> footprint)

**Total footprint = ~ 40 m<sup>2</sup>**