



# Development Permit Application

Referral Form – RDCK File DP2317E

Date: February 27, 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 March 27, 2024). If no response is received within that time, it will be assumed that your agency's interests are unaffected.

**LEGAL DESCRIPTION & GENERAL LOCATION:**

2309 Bealby Road, Rural Nelson, Electoral Area 'E'  
Parcel 2 (See 1361271) of District Lot 1316 Kootenay District  
PID: 011-199-008

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

The subject property is 1.2 hectare (ha) in size, and is located between Kootenay Lake, the CP Rail Line and the Great Northern Rail Trail approximately 1 km northeast of the City of Nelson. West Arm Provincial Park borders the lot to the east. Bose Creek and Unnamed Creek with an "improved pond" also traverse the subject site. A house, two sheds, shower house, outhouse, multiple saunas, driveway access, and a cabin currently exist on the subject lot.

This Watercourse Development Permit (WDP) application is the result of unauthorized development and disturbance activities within 15 metres of Kootenay Lake, Bose Creek and an Unnamed Creek running through the site. The following unauthorized development was completed within the WDP area: removal of mature cottonwood trees, and stream, ground (soils) and vegetation disturbance activities. In addition, the owners would like to remove some of the existing infrastructure on the site and construct a "prospector tent platform," while also undertaking restoration and mitigation activities to remediate the above unauthorized works. A Riparian Assessment has been completed by Masse Environmental LTD. and includes recommended mitigation works.

AREA OF PROPERTY AFFECTED	ALR STATUS	ZONING	OCP
1.2 ha	n/a	n/a	Official Community Plan Bylaw No. 2260 Country Residential (RC)

**AGENT:** Jeremy de Wit

**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

<input checked="" type="checkbox"/> MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE <input checked="" type="checkbox"/> HABITAT BRANCH (Environment) <input checked="" type="checkbox"/> FRONTCOUNTER BC (MFLNRORD)	REGIONAL DISTRICT OF CENTRAL KOOTENAY DIRECTORS FOR: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/> E <input type="checkbox"/> F <input type="checkbox"/> G <input type="checkbox"/> H <input type="checkbox"/> I <input type="checkbox"/> J <input type="checkbox"/> K ALTERNATIVE DIRECTORS FOR:
---	--

<input type="checkbox"/> ARCHAEOLOGY BRANCH <input type="checkbox"/> REGIONAL AGROLOGIST <input type="checkbox"/> ENERGY & MINES <input type="checkbox"/> MUNICIPAL AFFAIRS & HOUSING <input checked="" type="checkbox"/> INTERIOR HEALTH, HBE TEAM <input checked="" type="checkbox"/> KOOTENAY LAKES PARTNERSHIP (FORESHORE DEVELOPMENT PERMITS) <input type="checkbox"/> SCHOOL DISTRICT NO. <input type="checkbox"/> WATER SYSTEM OR IRRIGATION DISTRICT <input checked="" type="checkbox"/> UTILITIES (FORTIS, BC HYDRO, NELSON HYDRO, COLUMBIA POWER)	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/> E <input type="checkbox"/> F <input type="checkbox"/> G <input type="checkbox"/> H <input type="checkbox"/> I <input type="checkbox"/> J <input type="checkbox"/> K <input type="checkbox"/> APHC AREA E <input type="checkbox"/> RDCK FIRE SERVICES <input checked="" type="checkbox"/> RDCK EMERGENCY SERVICES <input checked="" type="checkbox"/> RDCK BUILDING SERVICES <input type="checkbox"/> RDCK UTILITY SERVICES <input type="checkbox"/> RDCK RESOURCE RECOVERY <input type="checkbox"/> RDCK REGIONAL PARKS  INSERT COMMENTS ON REVERSE . . .
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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: DP2317E AGENT: JEREMY DE WIT**

**Name:**

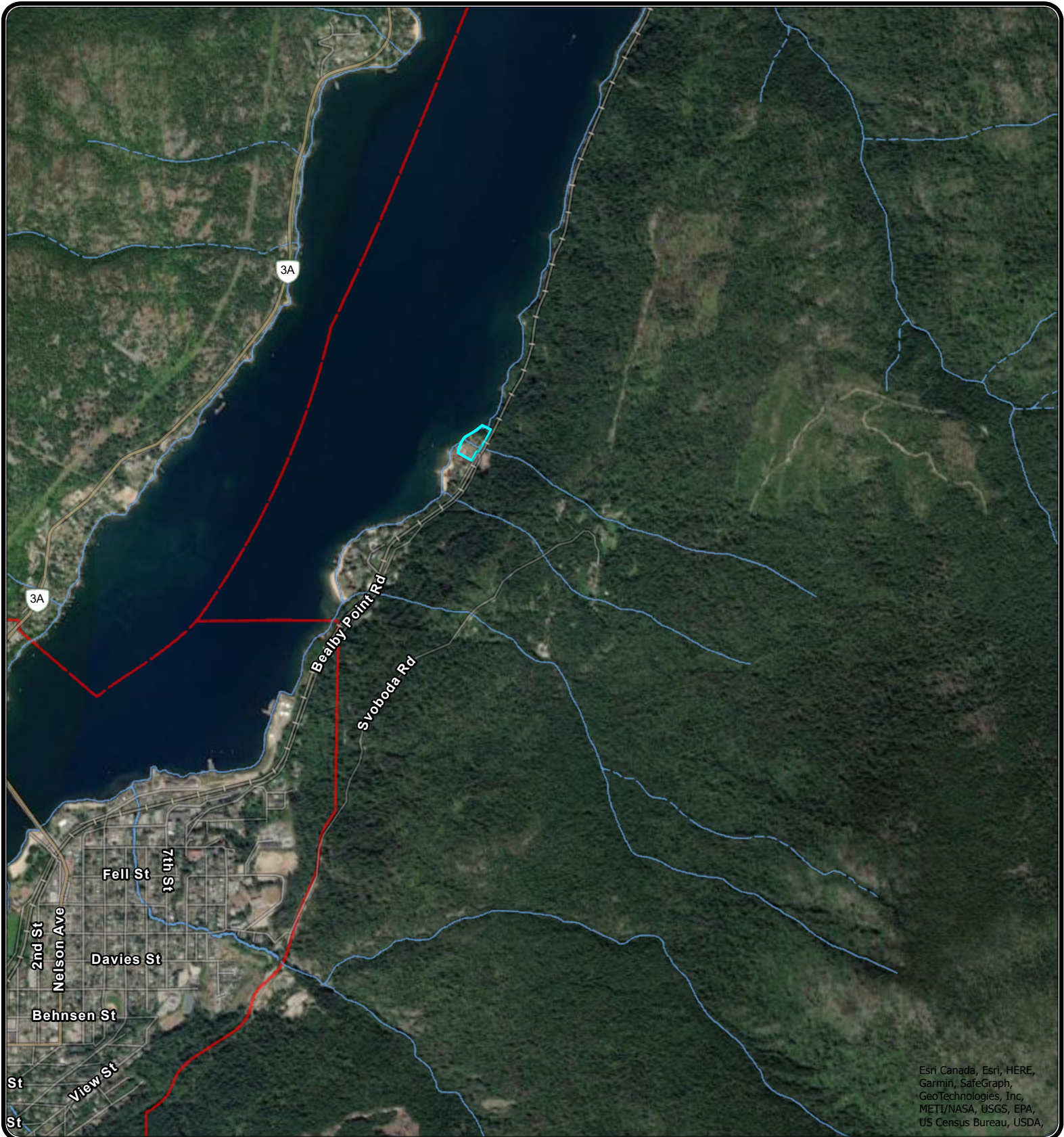
**Date:**

**Agency:**

**Title:**



RETURN TO: **STEPHANIE JOHNSON**, PLANNER  
DEVELOPMENT AND COMMUNITY SUSTAINABILITY SERVICES  
REGIONAL DISTRICT OF CENTRAL KOOTENAY  
BOX 590, 202 LAKESIDE DRIVE  
NELSON, BC V1L 5R4  
Ph. 250-352-1585  
Email: [plandept@rdck.bc.ca](mailto:plandept@rdck.bc.ca)

# RDCK Map



REGIONAL DISTRICT OF CENTRAL KOOTENAY  
Box 590, 202 Lakeside Drive,  
Nelson, BC V1L 5R4  
Phone: 1-800-268-7325 [www.rdck.bc.ca](http://www.rdck.bc.ca)  
[maps@rdck.bc.ca](mailto:maps@rdck.bc.ca)

## Legend

-  Streams and Shorelines
-  Electoral Areas

## Map Scale:

1:36,112

Date: December 20, 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








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Esri, HERE, Garmin,  
SafeGraph,  
GeoTechnologies, Inc.



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Phone: 1-800-268-7325 www.rdck.bc.ca  
maps@rdck.bc.ca

## Legend

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

## Map Scale:

1:4,514

Date: December 20, 2023



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# RDCK Map



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## Legend

### Development Permit Areas

- Industrial and Commercial
- Residential Cluster
- Watercourse

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

## Map Scale:

1:4,514

Date: December 20, 2023



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maps@rdck.bc.ca

### Legend

- Rural Residential
- Streams and Shorelines
- Electoral Areas
- RDCK Streets
- Cadastre
- Address Points
- Country Residential
- Industrial
- Parks and Recreation
- Resource Area

## Official Community Plan

### Map Scale:

1:4,514

Date: December 20, 2023



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# RDCK Map



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### Legend

- Parks and Rec
- Trails
- Water Front Access
- Streams and Shorelines
- Electoral Areas
- RDCK Streets
- Cadastre
- Address Points

### Map Scale:

1:4,514

Date: December 20, 2023



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### Legend

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

### Map Scale:

1:4,514

Date: December 20, 2023



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Phone: 1-800-268-7325 www.rdck.bc.ca  
maps@rdck.bc.ca

### Legend

- Fire Service Areas**
- Electoral Areas
  - RDCK Streets
  - Cadastre
  - Streams and Shorelines
  - Address Points

### Map Scale:

1:4,514

Date: December 20, 2023



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## Development Permit Proposal Summary

Project Name           **2309 Bealby Point Road Site Planning**  
Project Location       **2309 Bealby Point Road | Nelson BC**  
Date                      **January 17, 2024**

### Type

Watercourse Development Permit

### Reason

To remediate past destructive works conducted within riparian watercourse areas on the subject property as outline herein and in the attached Mitigation Plan prepared by Masse Environmental.

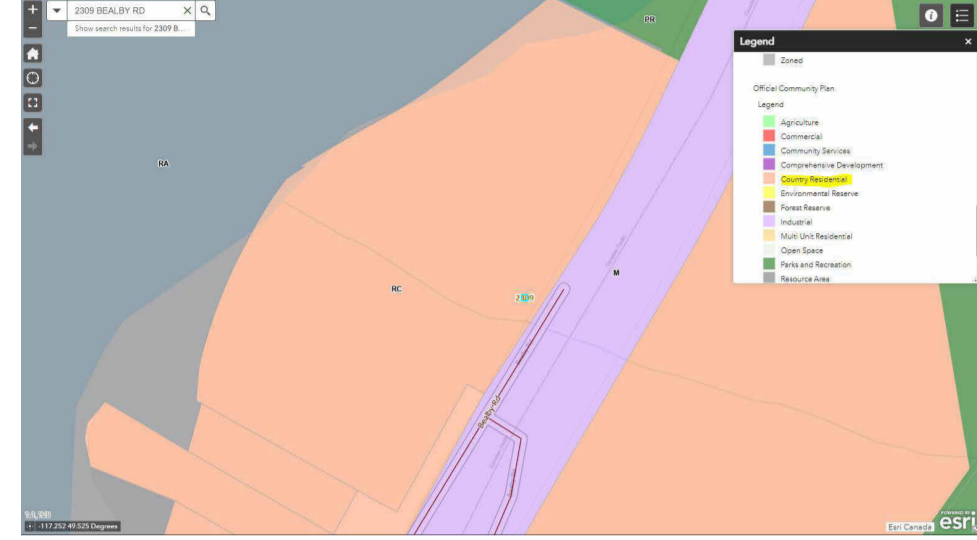
### Proposed Works

- Regrading of Kootenay foreshore, habitat complexing, and riparian planting.
- Removal of unpermitted rock armoring and existing structures within the riparian and SPEA setbacks highlighted on the attached site plan. The structures include: one blacksmith shop, one workers' cabin, and six tent pads identified on the attached site plan prepared by de Wit Designs.
- Relocation of two sleeping barrels and two bathroom barrels to be situated outside of the WDPA identified on the attached site plan prepared by de Wit Designs.
- Install one tent pad from natural materials in place of the six existing tent pads noted above identified on the attached site plan prepared by de Wit Designs.
- Install a septic system as prepared by McNally Technical Services. The septic system will serve as an upgraded system for the existing dwelling, relocated bathroom barrels, and future structures outside of the WDPA that will be applied for separately.



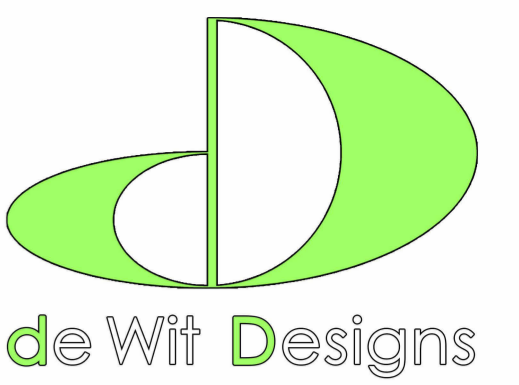
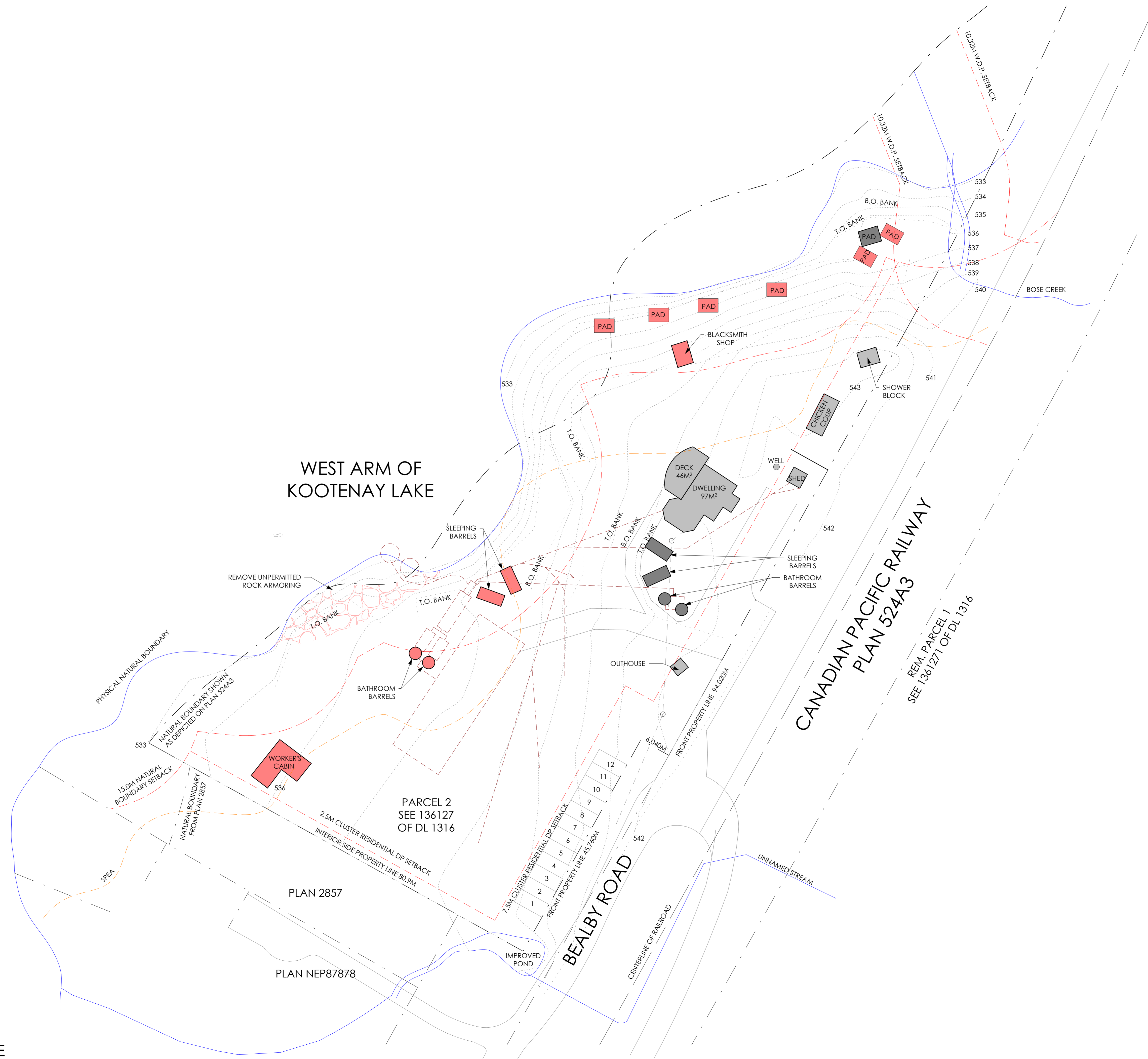
# SITE SUMMARY

ITEM	DESCRIPTION
LEGAL ADDRESS	PARCEL 2, DISTRICT LOT 1316, KOOTENAY LAND DISTRICT, (SEE 136127) PID: 011-199-008
CIVIC ADDRESS	2309 BEALBY RD NELSON V1L 6W2
DISTRICT	ELECTORAL AREA E
AJH	RDCK
OCF	COUNTRY RESIDENTIAL
DEVELOPMENT PERMIT	WDPA, RC
BYLAW REFERENCED	ELECTORAL AREA 'E' RURAL OFFICIAL COMMUNITY PLAN BYLAW NO. 2260, 2013



## SITE PLAN LEGEND

- EXISTING
- EXISTING TO BE DEMOLISHED
- PROPOSED



P.O. BOX 1086  
PRIVILEGE BC  
V0G1L0  
jerry@dwitdesigns.co  
(250) 211-0333

### PROJECT NAME

2309 BEALBY ROAD DEVELOPMENT

### ADDRESS

2309 BEALBY ROAD  
NELSON BC

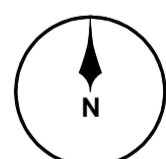
### CLIENT

RICHARD HENRY

### DRAWING NOTES

SURVEY FROM HANGO LAND SURVEYS DATED APRIL 20, 2023  
TITLE NATURAL BOUNDARY FOR PARCEL 2 IS UNRELIABLE AS DEFINED BY THE DL 1316 FIELD NOTES.  
E: THIS PLAN SHOWS THE NATURAL BOUNDARY AS DEPICTED ON PLAN 524A3 AND AN OPINION OF THE LOCATION OF THE PRESENT NATURAL BOUNDARY BASED ON FIELD SURVEY. DIMENSIONS OF THE LOT UNDER SURVEY MAY NOT REFLECT THE CURRENT EXTENT OF TITLE.  
NOTE: AS THE CURRENT EXTENT OF TITLE IS NOT DEFINED BY THE PRESENT NATURAL BOUNDARY, AND AS THE TITLE NATURAL BOUNDARY IS EXTREMELY ILL-DEFINED AS WELL AS AMBIGUOUS, IT IS RECOMMENDED THAT A NATURAL BOUNDARY ADJUSTMENT APPLICATION IS MADE TO THE SURVEYOR GENERAL'S OFFICE PRIOR TO COMMENCING ANY WORK REQUIRING A BUILDING PERMIT

### TRUE



### PROJECT



### REVISIONS/HISTORY

DATE	NUMBER	DESCRIPTION
2024-01-16	-	-

### SHEET NAME

SITE

### SHEET NO.

A2

### REV. NO.



2309 Bealby Road, Rural Nelson, BC  
Riparian Assessment



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

September 25, 2023

## Disclosure Statement

This report has been prepared by Fiona Lau BTech., ASCT, and Jennifer Ross, P Chem.

I, Fiona Lau, hereby certify that:

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

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

Prepared by:

Masse Environmental Consultants

812 Vernon Street

Nelson, BC, V1L 4G4

Project Number 2023-1028

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### 1 INTRODUCTION

Masse Environmental Consultants Ltd. was retained by Richard Henry and Kimberly Nugent (Owners) to conduct a riparian assessment to accompany an application for a Watercourse Development Permit (WDP) for their waterfront property located at 2309 Bealby Road, Nelson, BC (PIDs 011-199-008, 011-196-955, and 011-198-991, Parcels 1 and 2 (SEE 136127I) excluding PL NEP63834, DL 1316, Kootenay Land District (KLD)) and Lot C, Plan NEP2857, DL1316, KLD (Except PL4498). For the purpose of this report the three properties will be combined and referred to as the “Subject Property”.

The development permit is required for proposed development within the WDP area that includes the removal of some of the existing infrastructure on the property, construction of a prospector tent platform, and naturalization and mitigation activities within the WDP area. The Owners are proposing to re-develop the property and create a luxury vacation destination with high-end cottages and dwellings. The riparian assessment report will be used to guide development activities and ensure that new structures are sited outside of the WDP areas.

It was also triggered by enforcement action when stream, ground, and vegetation disturbance activities were conducted within the property without a WDP.

A site visit was completed on April 25, 2023, by Fiona Lau B.Tech., A.Sc.T., Jennifer Ross, M.Sc., P.Chem., and Chanel Gagnon, B.I.T., to conduct a riparian assessment of the property. The riparian assessment evaluates the existing conditions of the riparian area (up to 30 m from the natural boundary of any watercourse), 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
- 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
- A Homeowner's Guide to Stormwater Management

## 2 PROPERTY OVERVIEW

### 2.1 Site Description

#### 2.1.1 Site Location

The subject property is located in Area E of the Regional District of Central Kootenay (RDCK), approximately 1 km northeast of the City of Nelson, BC and has a total area of 8.8 ha (see Appendix 1 for the Location Map). The property has a northwestern aspect and is bordered by Kootenay Lake to the northwest (~210 m of frontage), West Arm Park to the east, private properties to the southeast and south, and is bisected by the Canadian Pacific Railway, the MoTI RoW (Bealby Road), and the Great Northern Rail Trail through the center. The entire property is situated within an alluvial fan of two creeks. Site topography is varied, with the upland portion being steep, forested, and rocky, while the lower portion is gently to moderately sloped (3-22 % slopes) and consists mostly of low cover herbaceous species with some native trees and shrubs within the riparian area.

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 include: interior Douglas fir (*Pseudotsuga menziesii*), Western red cedar (*Thuja plicata*), Western larch (*Larix occidentalis*), lodgepole pine (*Pinus contorta*), paper birch (*Betula papyrifera*), ponderosa pine (*Pinus ponderosa*), black huckleberry (*Gaylussacia baccata*), falsebox (*Paxistima myrsinites*), Prince's pine (*Chimaphila umbellata*), queen's cup (*Clintonia uniflora*), twinflower (*Linnaea borealis*), and pipecleaner moss (*Robust rhytidiopsis*) (MacKillop and Ehman 2016).

#### 2.1.2 Watercourses

Three watercourses were identified within the subject property: Kootenay Lake, Bose Creek and an unnamed stream. Only Kootenay Lake and Bose Creek are currently mapped on RDCK and Provincial web maps; however, we have also shown the alignment of the unnamed stream on the site plan.

Refer to the Site Plan (Appendix 2) for watercourse locations and alignment within the subject property.

### Kootenay Lake

Kootenay Lake borders the subject property along the northwest 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 up to 4 m throughout the year, affecting the extent of exposed shoreline. The assessment was conducted at very low water elevation in April (Cover Photo).

The foreshore of the property is a sloped beach (1-2 % gradient) with substrate consisting mostly of coarse sand with round boulders, cobbles, gravels, and the occasional large woody debris (LWD) (Photo 1 and Photo 2)

The visible natural boundary of Kootenay Lake aligns with the present natural boundary (PNB) shown on the property survey completed by Hango Land Surveying in 2023 (also included in Appendix 2). The natural boundary is commonly referred to as the “high water mark” around a lake or wetland. Based on the definition of high water mark<sup>1</sup>, the natural boundary shown on the site plan (Appendix 2) will be used to delineate the 15 m RDCK WDP area and streamside protection and enhancement area (SPEA) setbacks in accordance with the Riparian Area Protection Regulation (RAPR).



Photo 1. Kootenay Lake foreshore, southern portion of property at low water.

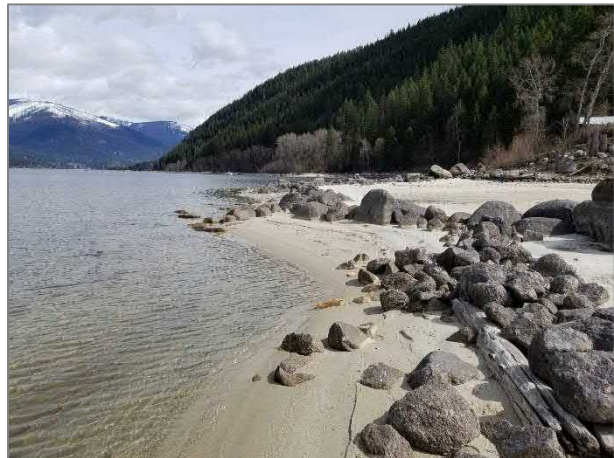


Photo 2. Round boulders, cobble, gravels, and the occasional piece of LWD.

<sup>1</sup> High water mark means the visible high water mark of a watercourse 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 watercourse a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself, and includes the active floodplain (RDCK 2013).

### Bose Creek

Bose Creek (WSC 300-625474-058307) is a 1st order stream with a mapped length of ~1.7 km. It originates on the eastern slopes of the West Arm of Kootenay Lake within the Svoboda Road community and flows northwest into the lake at the northern corner of the subject property (Appendix 2). The stream has a distinct channel within its lower reach (above and below the CP Railway), has an average stream width of 3.5 m, and flows year-round (Photo 3). Bose Creek was assessed up to 100 meters from its mouth. Stream morphology was step-pool (~20 % gradient) with predominantly boulder substrate. The lower reach of the stream was disturbed by the construction of the CP Rail Line; however, intact riparian areas had dense forest cover with overhanging vegetation and instream woody debris. A 600 mm mortared stone culvert conveys water under the CP Railway (Photo 4).



Photo 3. Bose Creek upstream of the CP Railway.



Photo 4. Bose Creek culvert under railway.

### Unnamed Stream

The unnamed stream flows in a poorly defined channel from the upper portion of the property, across exposed bedrock, and through the rock quarry (Photo 5). It then flows through a small double culvert under upper Bealby Road and into a defined ditch between Bealby Road and the CP Rail line. A series of two culverts (700 mm and 400 mm) convey the water under the railway and under lower Bealby Road. This water discharges onto the MoTI RoW where a pond was recently constructed (Refer to Section 2.2). Downstream of the pond, the stream flows through the subject property (Photo 6) and the neighbouring properties to the southeast in a defined, but modified channel, eventually discharging into Kootenay Lake approximately 50 m southwest of the property. Flows were observed in the stream channel downstream of lower Bealby Road on Aug 16, 2023; however, no flow was observed upstream of the channel during this time.



Photo 5. Unnamed stream flowing through quarry.



Photo 6. Unnamed stream flowing between Bealby Road and the CP Railway.

### 2.1.3 Riparian Vegetation

The riparian areas within the subject property have experienced significant disturbance due to development, resulting in large areas of lawn, open rocky areas, and sparse tree and shrub cover (Photo 7 and Photo 8). The northern portion of the property along Kootenay Lake and Bose Creek supports more intact and diverse riparian vegetation with native species including: alder (*Alnus* sp), black cottonwood, Douglas fir, elderberry (*Sambucus* sp.), red osier dogwood (*Cornus sericea*), rose (*Rosa* sp.), raspberry (*Rubus* sp.), snowberry (*Symphoricarpos albus*), and Western redcedar (Photo 9 and Photo 10).

This vegetation provides valuable habitat and supports important ecological functions for fish and wildlife in Kootenay Lake, stabilizes soils, prevents erosion, and acts as a buffer against pollution and surface runoff from upstream areas. Appendix 3 provides a complete list of riparian vegetation species encountered on the property. Note that many species were dormant during the assessment, so this list may not be comprehensive. Multiple invasive species were documented on the property and invasive plants should be managed according to Section 5.11.



Photo 7. Sparse tree and shrub cover within established lawn area at south end of property.



Photo 8. Sporadic trees and lawn along Kootenay lake foreshore below residence.



Photo 9. Young forest Kootenay at north end of property.



Photo 10. Intact riparian vegetation at mouth of Bose Creek.

#### 2.1.4 Aquatic Habitat

##### Kootenay Lake

Fish habitat along this section of Kootenay Lake foreshore consists of shallow water habitat with large boulders and sporadic LWD. Shallow foreshore areas are used for rearing by smaller fishes and broadcast spawning by non-sport fish species (i.e peamouth chub (*Mylocheilus caurinus*) and northern pikeminnow (*Ptychocheilus oregonensis*); Photo 11). Boulders and LWD provide important cover habitat for fish when water levels are higher (Photo 1 and Photo 2).

Emergent vegetation in the northern portion of the property and submergent vegetation mapped near the outlet of Bose Creek are also important features noted which support fish and other aquatic organisms. No known kokanee spawning has been reported in this area (KLP 2023).

## 2309 Bealby Road– Riparian Assessment

Freshwater mussels (*Anodonta* sp.) were observed within the lake adjacent to the subject property (Photo 12); however, a complete mussel survey was not conducted as part of the riparian assessment as no works below the HWM are proposed.

Several species of regional interest reside in Kootenay Lake including Kokanee (*O. nerka*), Rainbow Trout, Bull Trout (*Salvelinus confluentus*; BC-Blue-Listed; SARA Special Concern), White Sturgeon (*Acipenser transmontanus* pop.1; BC Red-Listed, SARA Endangered), Westslope Cutthroat Trout (*O. clarki lewisi*; BC Blue-Listed; SARA Special Concern), and Burbot (*Lota lota* pop.1; BC-Red-Listed).



Photo 11. Juvenile rearing fish habitat.



Photo 12. Freshwater mussels observed in shallow water.

### Bose Creek

Fish presence was not confirmed in Bose Creek during the assessment but a barrier to fish passage (cascade with gradient 24 % over 10 m) was identified ~10 m upstream of the CP railway culvert crossing, which is also a temporary barrier to upstream fish migration. Fish habitat in Bose Creek is limited due to the temporary barrier at the CP railway, the cascade and the steep gradient of the channel (~20% gradient).

### Unnamed Stream

The unnamed stream within the quarry had no defined channel and cascaded over rocky terrain with a slope of ~75 % and some vertical stream gradients. The small section of stream downstream of lower Bealby Road was less disturbed and had cascade-pool morphology, overhanging vegetation, and some undercut banks. Fish presence was not confirmed in the unnamed stream during the assessment as the stream offered very limited fish habitat.

Both these streams support fish habitat in Kootenay Lake by providing nutrient input through leaf litter and insect drop.

#### 2.1.5 Wildlife

Riparian ecosystems offer important habitat features for wildlife, affording them essential resources like water, shelter, and food. These areas frequently serve as migration corridors connecting aquatic, riparian, and upland environments, playing a pivotal role in the life cycles of numerous species.

The subject property provides suitable habitat for snakes and lizards including Northern alligator lizard (*Elgaria coerulea*), wandering garter snake (*Thamnophis elegans vagrans*) and Western terrestrial garter snake (*Thamnophis elegans*). Birds are well reported in the area and include many species of shorebirds, open water species, songbirds, piciformes (woodpeckers, sapsuckers, flickers, etc.), and raptors. Mature conifer and deciduous trees within the riparian areas provide suitable perch and nesting habitat for raptors, while wildlife snags provide ideal nesting and feeding habitat for cavity dwellers and bats. Mixed canopy forests, shrub habitat and structures on the property provide nesting habitat for songbirds while the shoreline provides habitat for nesting shorebirds.

During the site assessment the following observations were documented:

- A large Western terrestrial garter snake was observed basking on a moss-covered rock adjacent to Bose Creek during the site visit (Photo 13).
- Evidence of woodpecker/sapsucker foraging cavities were observed within a decaying stump adjacent to Bose Creek (Photo 14) and in the cedar siding of the beach cabin (Photo 15).
- Violet green swallows (*Tachycineta thalassina*) were observed in abundance feeding and nesting in the area. Multiple nests were being used in and around the one-bedroom beach cabin in the southwestern corner of the property (Photo 15).
- Three grass nests were observed under the eaves on a window ledge of the beach cabin (Photo 16).
- A pair of Canada geese (*Branta canadensis*) were moving through the property along the beach during the site visit.
- Black bear (Photo 17), raccoon, and ungulate tracks were observed on the foreshore during the riparian assessment.
- Yellow-bellied marmots were observed on the property (Photo 18) and are known to inhabit the quarry.



Refer to Appendix 3 for list of wildlife species confirmed or suspected to be present on the subject property.



Photo 13. Terrestrial gartersnake basking along Bose Creek.



Photo 14. Woodpecker cavities observed in snag along Bose Creek.



Photo 15. Violet-green swallow nests in cavity in beach cabin siding.



Photo 16. Songbird nests on window ledge.



Photo 17. American black bear tracks on foreshore at Bose Creek mouth.



Photo 18. Yellow-bellied marmot in quarry.

### 2.1.6 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 identified 8 species occurring within the buffer area. These species are presented in Appendix 3. 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 based on the proximity to mapped occurrences.

Only one of these species was considered to ‘possibly’ occur on the subject property, the Western Screech Owl (*Megascops kennicottii macfarleni*), which is blue-listed in BC and listed as threatened federally (COSEWIC 2012). The Western Screech Owl utilizes riparian forests, specifically with black cottonwood wildlife trees present. It is a species that uses cavities and holes excavated by larger woodpeckers for nesting and roosting.

In addition to the species listed in Appendix 3, many bats species are blue-listed in BC (e.g.: little brown myotis (*Myotis lucifugus*), Western small-footed myotis (*Myotis ciliolabrum*), and the Yuma myotis (*Myotis yumanensis*)). The little brown myotis is also listed as ‘endangered’ under the Species At Risk Act. The little brown myotis and the Yuma myotis are expected to have a ‘likely’ occurrence rating on the subject property. Bat roosting habitat includes tall, live or dead trees with crevices, peeling bark, or cavities.

### 2.2 Existing Development

Historically this property was used as a hobby farm, seasonal campsite, and rock quarry. It supports a single family residence, a beach cabin, and numerous accessory buildings, tent platforms, and access trails to different areas of the property (Photo 19 through Photo 22). A large portion of the lower property (below Bealby Road) has been modified by development, including extensive vegetation removal, road construction, residential development, re-grading, and hardscaping (rock armouring and parking pad).

Existing development activities within the WDP area and in and around watercourses are outlined in Table 1 (see Appendix 2 for Existing Site Plan). Table 1 details the activities performed by the previous Owners and more recent activities completed during the current ownership. The Existing Site Plan only shows the more recent activities, some of which were not authorized by the RDCK, Front Counter BC or MoTI.

The current Owners are temporarily storing two sleeping barrels and two shower barrels ~4 m from the present natural boundary of Kootenay Lake (Photo 19); however, they do plan to reposition these accessory buildings outside the WDP area and on the south side of the main house.

Table 1. Existing Developments within the WDP area and in and around watercourses.

15 m WDP Area	Development Activities	Completed by Previous Owners	Completed by Current Owners
Kootenay Lake	Accessory building “blacksmith shop” (13m <sup>2</sup> )	X	
	Six wooden tent platforms (10 m <sup>2</sup> each)	X	
	Access trail construction (2 trails)	X	
	Carpet boat launch (5 m wide)	X	
	Shoreline re-grading and rock armouring	X	
	Property clean-up		X
	Riparian vegetation removal and soil stripping*	X	X
Bose Creek	Private water intake	X	
	Two tent platforms (10m <sup>2</sup> each, also accounted for in Kootenay Lake WDP area)	X	
	Property clean-up	X	
	Riparian vegetation removal and contaminated soil remediation*	X	
Unnamed stream	Gravel parking area and french drain	X	X
	Creation of pond and placement of rock*		X
	Riparian vegetation removal		X
	Soil disturbance and removal		X
	Cleanup of existing quarry to allow safe road access in the event of a forest fire”		X

\*(Bold font) Indicates known unauthorized activities conducted without proper permitting.



Photo 19. View of subject property looking east showing existing development and rock armouring.



Photo 20. Beach house located along Kootenay Lake, just outside of WDP area.



Photo 21. Tent platforms located along a constructed bench area on the foreshore of Kootenay Lake.



Photo 22. "Black smith shop" located along Kootenay Lake foreshore.

### Unauthorized Activities

Unauthorized activities within the WDP areas completed by the current Owners include the removal of riparian vegetation along Kootenay Lake and Bose Creek including one mature standing dead fir tree (p comm. Richard Henry), seven mature black cottonwood trees (Photo 23 and Photo 24), brush cutting of native shrubs (regenerating black cottonwood, black hawthorn, lodgepole pine, and roses) and stripping of topsoil.

Unauthorized works completed on the unnamed stream by a hired contractor unbeknownst to the current Owners (p comm Richard Henry) was the construction of a pond located at south end of property, outside of property boundaries (Photo 25 and Photo 26). This work involved removal of riparian vegetation (assumed to be mostly shrubs), excavation of the streambed to create a pond, and placement of rock along the new pond edge. This work would have required permission by MoTI and a Section 11 Authorization through Front Counter BC.

As part of the agreement of the sale of the property in 2022, an environmental assessment was completed. Recommended remediation outlined in this report was the responsibility of the Seller (p comm Richard Henry). As part of this agreement, soil remediation activities and property cleanup within the WDP area of Bose Creek was conducted. Based on the information provided in a Stage 1 PSI completed for the property (Bear 2022) and correspondence with Dave Diplock of Bear Environmental, remedial activities included removal of surface materials contaminated with cadmium, lead, and zinc adjacent to the CP railway to a depth of approximately 1 ft. Some rock was relocated during the remedial activities, and a dead birch tree and two fir trees next to Bose Creek were removed. Clean fill and topsoil were

imported to re-grade the remediated area, which was seeded and irrigated until grass cover was established (Photo 27 and Photo 28). A soil relocation agreement was filed with the RDCK for this work.



Photo 23. Mature black cottonwood trees cut along Kootenay Lake foreshore.



Photo 24. Mature black cotton wood trees removed along Kootenay Lake foreshore.



Photo 25. Newly constructed gravel parking area and constructed pond.



Photo 26. Newly constructed pond with rock placed along bank and instream.



Photo 27. Remediation area beside shower house. Photo taken April 25 during initial onsite meeting.



Photo 28. Remediation area behind chicken coop showing successful seed germination.

Works outside of the WDP area that were initially noted by the RDCK as potential unauthorized works within the WDP area include:

- Work within the rock quarry near the unnamed stream, which included relocation of rock to provide fire access to forest area and falling of 10-12 trees (mature black cottonwood, Douglas fir, and Western redcedar) that were determined to be danger trees by AAA Tree and disturbance of rock and soil material.
- Construction of gravel parking pad and French drain (Photo 25). This work involved stripping vegetation, log removal, stockpiling of topsoil (this remains on site), French drain installation, and placement and compaction of parking pad gravel material and rocks.

### Services

A private water intake has been constructed on Bose Creek, ~100 m upstream of the mouth at Kootenay Lake. This is assumed to be water license F003959, which belongs to the property. A small pool has been constructed within the stream to feed the intake, which consists of pvc pipe and a holding tank. Rock has also been used to armour the stream below the tank. The intake is accessed via a road constructed through the quarry. The onsite shower house is serviced with water from this license (pers. comm. Richard Henry).

Well (Tag No. 126544) was drilled in July 2022 to a depth of 156 ft below ground level. This well was constructed to service the existing residence and new residences (once constructed). The yield is recorded as 30 US gallons per minute.

The existing residence is serviced with a concrete septic tank and Type 1 septic field. Both the tank and field are located north of the residence. A preliminary development plan includes the construction of six cabins and a new Type 3 septic facility designed for a maximum of 40 guests (maximum daily design flow of 9,000 L/day) (West Kootenay Septic Solutions 2023). This preliminary plan has been included in Appendix 3.

The new proposed facility includes two 5,000 L/day bio rock treatment tanks, micro-dosing and demand dosing pumps, and a raised sand-mound dispersal field. The field will have a total footprint of 9.3 m x 29.78 m (pers. comm. Alex McNally) and be sited >30 m from Kootenay Lake, the unnamed stream and French drain (West Kootenay Septic Solutions 2023). Refer to Appendix 4 for proposed septic plan.

### 2.3 Proposed Development

The proposed development within the WDP area of Kootenay Lake and Bose includes:

- Removal of most of the existing infrastructure, including the “blacksmith shop” (21 m<sup>2</sup>), six wooden tent platforms (57 m<sup>2</sup> combined), and the carpet boat launch (~12 m<sup>2</sup>).
- Construction of a new tent platform (50 m<sup>2</sup>) in the current location of two platforms at the north end of the property which will be removed. The proposed new platform will be constructed of wood and will support a prospector tent.
- Removal of the rock armouring and imported fill from the beach area in the southern portion of the property, re-grading of bank to a more natural and stable slope at ~ 3 H: 1 V gradient and riparian revegetation and habitat complexing (250 m<sup>2</sup>)
- Revegetation along the upland riparian area of Kootenay Lake foreshore (1185 m<sup>2</sup>) and Bose Creek (70 m<sup>2</sup>) to mitigate against the impacts of the unauthorized vegetation clearing and to help restore the previously impacted foreshore area.
- Installation of a pervious walking path along the top of bank and down to the foreshore (90 m<sup>2</sup>).

Refer to Appendix 5 for the Proposed Development and Mitigation Site Plan.

### 2.4 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 sites along the shoreline and mountain sides of Kootenay Lake. 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 6 for guidance on which protocols to follow in the event of a chance archaeological find, and to ensure that archaeological sites are documented and protected as required for compliance with the BC Heritage Conservation Act.

### 3 REGULATORY OVERVIEW

#### 3.1 Unnamed Stream Regulatory Review

In order to ensure the correct assessment of this stream, its characteristics were compared to the definitions of a “stream” or “watercourse” under the applicable legislation (Table 2). The unnamed stream does not meet the definition of a “stream” under the Area E OCP; however, is considered a watercourse/stream under the RAPR and BC Water Sustainability Act. Any works along the unnamed stream will require a Section 11 Notification or Approval through Front Counter BC.

Table 2. Unnamed stream observations and comparison with legislation

Criteria	Observations	Conclusion
RDCK Area E OCP enabled under the Local Government Act: “Watercourse” means any natural or man made depression with well-defined banks and a bed 0.6 metres (2.0 feet) or more below the surrounding land serving to give direction to a current of water at least six months of the year and/or having a drainage area of two square kilometers (0.8 square miles) or more upstream of the point of consideration.	It was confirmed that the stream flows at least 6 months of the year downstream of Lower Bealby Road. (However, the stream banks are not all well-defined, and only the newly-constructed pond has a bed more than 0.6 m below the surrounding land. The watershed of Bossuet Creek is mapped at 0.86 km <sup>2</sup> .)	The unnamed stream <u>does not meet</u> the definition of a “watercourse”.
Riparian Areas Protection Regulation: A “stream” means (a) a watercourse or body of water, whether or not unusually containing water, and (b) any of the following that is connected by surface flow to a watercourse or body of water referred to in (a): (i) a ditch, whether or not usually containing water; (ii) a spring, whether or not usually containing water; (iii) a wetland.	The unnamed stream is connected to Kootenay Lake (a fish-bearing watercourse) by surface flows. It therefore provides water, food, and nutrients to Kootenay Lake and helps to support fish inhabiting the lake.	The unnamed stream is a “stream” under the RAPR.



Criteria	Observations	Conclusion
<p>Water Sustainability Act:            A “stream” means (a) a natural watercourse, including a natural glacier course, or a natural body of water, whether or not the stream channel of the stream has been modified, or (b) a natural source of water supply, including without limitation, a lake, pond, river, creek, spring, ravine, gulch, wetland or glacier, whether or not usually containing water, including ice, but does not include an aquifer.</p>	The unnamed stream is a modified natural source of water supply.	The unnamed stream is a “stream” under the Water Sustainability Act.

### 3.2 Riparian Area Protection Regulation (RAPR) Review

The default WDP riparian assessment area for Area E of the RDCK is 15 meters from the High-Water Mark (HWM) of a watercourse, including the natural boundary of Kootenay Lake. To determine if this area 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 for Kootenay Lake and Bose Creek on the subject property. Results for the Zones of Sensitivity (ZOSs) and SPEAs are presented in Table 3 and shown on the SPEA Map in Appendix 2. The SPEA was calculated to be between 15 and 30 m along the foreshore of Kootenay Lake, between 10 and 10m along Bose Creek, and 10 m along the unnamed stream.

Table 3. Results of detailed RAPR assessment.

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	1-30 m	15 – 30 m
Bose Creek	TR	10 m	10 m	0 - 10m	10 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

#### Kootenay Lake

As per the RAPR, the large woody debris (LWD) and litter ZOS were plotted 15 m inland from the HWM of Kootenay Lake with the shade ZOS plotted 1 m – 30 m from the HWM from Kootenay Lake based on aspect with respect to Kootenay Lake. The SPEA setback is determined based on the ZOS with the greatest width. Therefore, within the subject property the SPEA is 15 - 30 m from the natural boundary of Kootenay Lake.

Bose Creek

The average channel width of Bose Creek was measured at 3.45 m. As per the RAPR, the LWD and litter fall ZOS's were plotted 10 m with the shade ZOS plotted 0 – 10 m from the HWM. Therefore the resulting SPEA setback 10 m for Bose Creek.

3.3 Kootenay Lake Shoreline Management Guidelines

The Kootenay Lake Foreshore Integrated Management Planning (FIMP; Schleppe and McPherson 2022), the Foreshore Inventory Mapping (FIM; KLP 2023) and the Kootenay Lake Shoreline Management Guidelines (KLP 2020) were used to help determine site-specific risks for riparian habitat, Ktunaxa Nation cultural values, and archaeological resources along the shoreline (Table 4). The property is within FIM segment 243.

Table 4. Aquatic and archaeological risk results.

Aquatic Habitat Index Rating (AHI)	Aquatic Sensitivity	Features	Archaeological Risk	Enhanced Engagement Required
Low (transitions to high at north property boundary)	Yes	Emergent Vegetation Submergent Vegetation Bose Creek	Moderate - High	Yes

4 IMPACT ASSESSMENT

This impact assessment is based on the impacts of unauthorized works and proposed works within the WDP area. Impacts include the alteration of a stream and the permanent loss of current and potential riparian habitat throughout the property. This impacts the health and productivity of Kootenay Lake and aquatic and terrestrial wildlife.

The unauthorized removal of riparian vegetation, the disturbance to riparian area soils, and stream modifications have caused:

- Reduction to potential additions of large organic debris into or around the watercourses, reducing nutrient inputs and cover habitat.
- Reduction of shade to moderate water temperatures.
- Reduction of leaf litter and insect drop inputs that provide food, nutrients, and organic matter for the organisms inhabiting Kootenay Lake, Bose Creek, and the unnamed stream.
- Reduction of high-value habitat for many varieties of birds, small mammals (including bats), and reptiles such as garter snakes.
- Removal of root matrices that stabilize soils and minimize erosion.

- Elimination of the buffer protecting Kootenay Lake, Bose Creek, and the unnamed stream from pollution and surface runoff from upstream areas.
- Alteration of fish habitat and introduction of sediment to the unnamed stream.

Potential impacts during implementation of the riparian restoration are sedimentation into Kootenay Lake and disturbance to nesting birds.

To mitigate for the loss of riparian habitat and to help restore the natural state of the property; the Owners have proposed to restore and re-vegetate two riparian areas: Kootenay Lake foreshore area (~1435 m<sup>2</sup>) and Bose Creek riparian area (70 m<sup>2</sup>). The mitigation plan will be submitted as a stand-alone document.

Overall, the proposed development (tent pad, trail and concrete wall) within the WDP area covers ~140 m<sup>2</sup>, while the proposed restoration of the riparian areas is ~1505 m<sup>2</sup>, ensuring that the loss of riparian vegetation is compensated for and that there will be substantial net habitat gain within the riparian area.

Provided that the recommended mitigation plan and the measures to protect the SPEA (Section 5) are implemented and followed, the negative impacts associated with the unauthorized works and future uses of the property will be minimized and the riparian function within the revegetation areas will be restored over time. The proposed restoration of the property will help to reduce cumulative effects along Kootenay Lake.

## 5 MEASURES TO PROTECT THE INTEGRITY OF THE SPEA

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

### 5.1 Danger Trees

A certified danger tree assessor was not retained as a part of this assessment. The majority of the trees formerly considered to be danger trees were removed from the subject property prior to this assessment. Development should take into account the remaining trees, all of which should be protected.

Further assessment of potential danger trees is outside the scope of this project but should be conducted if further works and/or development are proposed within the re-activated quarry. Note that trees felled within the SPEA of the unnamed stream should be left as coarse woody debris and should be replaced according to the provincial tree replacement criteria.

## 5.2 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). Given the limited number of remaining mature trees along the margin of Kootenay Lake, all mature trees, even if not located within the SPEA, should be retained and protected to ensure windthrow risk is not increased by additional tree falling.

## 5.3 Slope Stability

With the exception of a few sweeping trees observed in the northern portion of Parcel 2, near Bose Creek, no slope stability hazard indicators were observed within Lot C and Parcel 2 during the site visit.

Within the upper portion of the property (Parcel 1), the following slope stability indicators were observed:

- Curved and sweeping trees
- Wet site vegetation on slopes > 50 %
- Numerous springs at the toe of the slope
- A displaced stream channel (the unnamed stream may be Bossuet Creek diverted upstream)
- Loose rock and eroded soils

Further assessment of geotechnical hazard is beyond the scope of this report, and it is recommended that a geotechnical assessment be conducted by a P.Geol, or P.Eng.

## 5.4 Protection of Trees and Vegetation in the SPEA

Clearing of vegetation for the proposed work has already been completed. The remaining native trees and shrubs located within the SPEA should be protected from all future development activities. The retention of the remaining trees and shrubs is important in order to maintain the remaining wildlife values, habitat complexity, and shoreline stability around the site.

The following mitigation measures will be implemented to protect the remaining trees and shrubs:

- Additional clearing of native vegetation within the SPEA will be avoided. If necessary for the proposed construction works and the associated mitigation and restoration activities outlined in this assessment and the accompanying mitigation plan, vegetation clearing will be kept to the minimum possible area and any cleared vegetation will be replaced according to the provincial tree replacement criteria or by replacing each cleared shrub with 2 equivalent native species.
- Snow fencing will be erected by the environmental monitor to delineate the vegetation protection areas prior to commencement of the mitigation/restoration works. This is intended to prevent

damage to trees and shrubs including broken branches, torn bark, wounds to the trunk, and damage to the root system.

- Invasive species will be removed according to Section 5.11.
- Excavation and/or ground disturbance of any kind will be avoided within the root zone of all SPEA trees and 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).
- Any change in the grade, ground level, or ground surface characteristics around all SPEA vegetation will also be avoided, with exception to the restoration areas. This includes compaction of the soils due to parking or material storage underneath the vegetation.
- 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 SPEA vegetation (e.g., fuels and oils leaking from construction vehicles). Refer to Section 5.10 for mitigation measures recommended for fuel and equipment.

## 5.5 Encroachment

Further development beyond that proposed in this assessment report and in the accompanying mitigation plan is strongly discouraged. The proposed mitigation plan has been prepared with the goal of preserving as many of the pre-existing wildlife values and shoreline stability features as possible, and to promote re-establishment of riparian vegetation. It is encouraged that all future development of the property be sited outside of the SPEA setbacks as shown on the SPEA Map (Appendix 2).

## 5.6 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:

- Groundwater and surface water coming into the site have already been diverted around the property by way of Bose Creek and the unnamed stream. Installing a culvert under the access

road within the re-activated quarry will assist in minimizing sediment inputs in this stream during spring freshet.

- Soils will be safely stockpiled in a manner that eliminates the possibility of erosion and sediment transport and stockpiles will be located as far away from Kootenay Lake, Bose Creek, and the unnamed stream as possible.
- Regrading activities will occur during the low water period for Kootenay Lake (late-September to mid-April) in order to minimize the amount of sediment generated by the works.
- 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 more 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 leave the construction site.
- Disturbed soils should be revegetated as soon as possible after construction in order to provide erosion protection against overland flows and high-water levels in Kootenay Lake. Vegetation will be partially established prior to freshet.

## 5.7 Stormwater Management

The following stormwater management measures shall be implemented for the proposed construction and renovations of the residences:

- Groundwater and surface water will be conveyed around any area where disturbed/exposed soils may occur.
- Only pervious materials (e.g., gravel) will be used for 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.
- Roof rainwater collection systems will be designed to direct rainwater into suitable landscape features which can absorb and utilize the runoff. Roof 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.
- The French drain discharge point should be armoured with cobble or vegetated to minimize erosion of the soils.

## 5.8 Floodplain Concerns

There are no proposed structures within the 15 meter floodplain setback of Kootenay Lake.

## 5.9 Protection of Fish and Wildlife Habitat

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

- Adhere to sediment, stormwater, and waste management best practices outlined in this report to ensure that there is no release of deleterious materials into Kootenay Lake.
- The best timing for the mitigation/restoration activities (removal of the rock armouring in the southern portion of the property and re-sloping/re-planting of this area) is late September to early-April when Kootenay Lake water levels are low. It is recommended that restoration planning occur in the late fall so that vegetation has the opportunity to establish prior to freshet.
- The best timing for demolition and removal of the existing infrastructure onsite including the beach cabin, the residence, the blacksmith shop, and the chicken coop is between August 15 and March 31 in order to protect nesting swallows including the cliff and barn swallow.
- Works in and around the remaining trees and shrubs (particularly large trees with cavities and potential bat habitat) should be monitored for nesting birds or bats if works are to be completed during the songbird breeding season (early-April – mid-August) (ECCC 2023b). Monitoring should be completed by a Qualified Environmental Professional (QEP), who will propose measures to protect any active nests, if found.
- 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 or if noise in excess of 150 dB is expected.
- Avoid any modifications to the beach substrate and preserve the remaining foreshore vegetation and boulders, which provide fish habitat during period of inundation.
- Avoid quarry works during the yellow-bellied marmot rearing and hibernation periods. Young are reared in underground burrows generally late-May to July (BC CDC 2010). Hibernation generally occurs from mid-September to mid-March.

## 5.10 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 all Contractors 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.
- 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 whenever possible.
- Park, store, and re-fuel all equipment in a designated area at least 15 m away from Kootenay Lake, Bose Creek, and the unnamed stream. Apply secondary containment (e.g. spill trays) to detect, capture, and contain any potential spills or leaks if this distance cannot be attained.
- 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 Regional District of Central Kootenay Resource Recovery Plan and associated bylaws.

### 5.11 Invasive Plant Management

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

- All equipment should be thoroughly washed and inspected before entering the project site to prevent the import of new invasive plant seeds and root fragments.
- The amount of soil disturbance should be minimized and exposed soils should be re-vegetated immediately following construction.
- Remove Scotch broom from the property (11U.481622.5485757). This can be accomplished by cutting larger plants below ground prior to flowering and seed set (late winter, early spring). This is most effective if the entire plant is removed, no seeds are dropped, and soil disturbance is minimized. Revegetate the area as soon as possible. Scotch broom will have to be cut up into parts and double-bagged in heavy-duty clear plastic. This can then be brought to the landfill for disposal as general waste free of charge (RDCK 2023).
- Other invasive species such as common chicory, common tansy, knapweed, mullein, oxeye daisy, reed canarygrass, and sulfur cinquefoil should be removed from the SPEA. The mitigation plan will provide more details.



## 6 MITIGATION AND MONITORING PLAN

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

Avoidance was not achievable as the disturbance has already occurred; therefore, On-site restoration is being proposed and is presented as a separate Mitigation and Monitoring Plan document (Masse 2023).

The future vacation home development shall follow the practice of “Minimization” by siting all of the proposed homes outside of the 15 m WDP area and it is encouraged that all development is sited also outside of the SPEA setbacks as shown in Appendix 2.

The on-site restoration, which involves revegetation of the degraded site, is aimed to provide compensation for the removal of the seven mature cottonwood trees, loss and disturbance of riparian shrub habitat and provide an overall net habitat benefit to the riparian area. Overtime, the restoration efforts will surpass the pre-existing habitat conditions prior to development of the property. Restoring the function of the riparian area is anticipated to take many years and will require ongoing maintenance and stewardship by the Owners to help ensure the success of the mitigation plan.

This Mitigation and Monitoring Plan provides general prescriptions for site preparation and revegetation, as well as recommendations for the maintenance and monitoring of the revegetated areas. A separate document for Mitigation and Monitoring has been prepared by Masse.

## 7 CONCLUSION

Overall, the unauthorized removal of riparian vegetation, the disturbance to riparian area soils and the proposed development within the 15 m WDP have caused loss of riparian habitat; however, will be restored through riparian mitigation. In addition, the Owners are committed to restoring previously impacted areas and siting future development outside of the WDP area. The goal of the proposed mitigation/restoration plan and the measures to protect SPEA within this report is to help mitigate against habitat loss and to help offset the cumulative impacts (current and historical) along this section of foreshore on Kootenay Lake.

8 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 Owners.

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

Sincerely,



Fiona Lau, BTech., ASCT.

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



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

Masse Environmental Consultants

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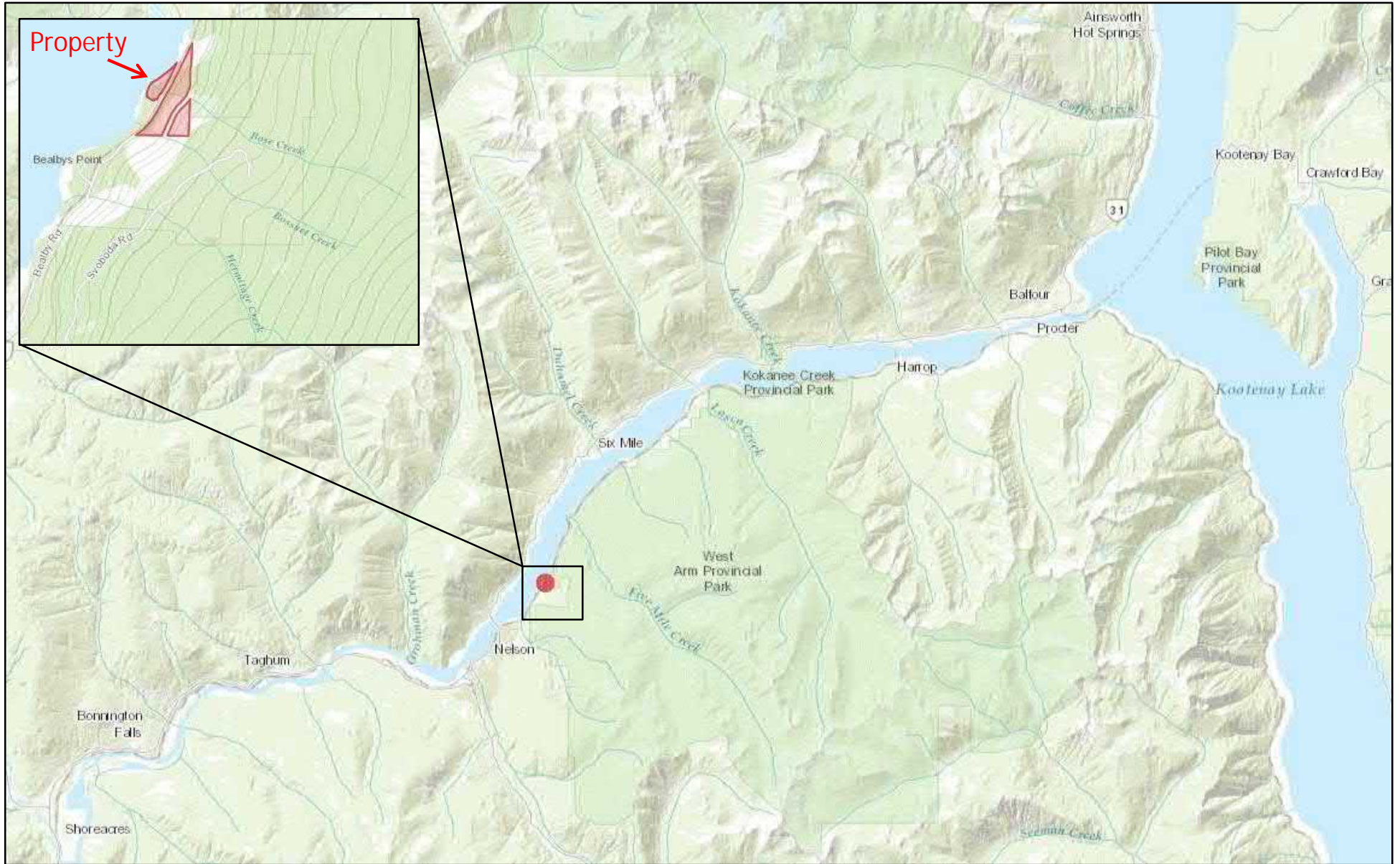
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APPENDIX 1. LOCATION MAP

LOCATION MAP – 2309 BEALBY ROAD, RURAL NELSON, BC



APPENDIX 2. LAND SURVEY, EXISTING SITE PLAN AND SPEA MAP



POSTING PLAN OF PARCEL 2 (SEE 1361271) OF DISTRICT LOT 1316 KOOTENAY DISTRICT; AND LOT C DISTRICT LOT 1316 KOOTENAY DISTRICT PLAN 2857 EXCEPT PART INCLUDED IN PLAN 4498.

Pursuant to Section 68 of the Land Title Act. BCGS 82F.054



UTM NAD83 (CSRS) 2002.0 Zone 11		
IP A1	N 5485591.822	E 481603.570
Point combined factor: 0.999521		
Absolute accuracy 0.04		
IP A2	N 5485369.315	E 481299.605
Point combined factor: 0.999521		
Absolute accuracy 0.04		

The intended plot size of this plan is 560mm in width by 864mm in height (D size) when plotted at a scale of 1:1250



LEGEND

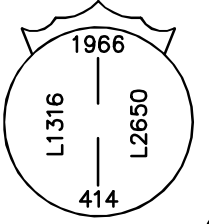
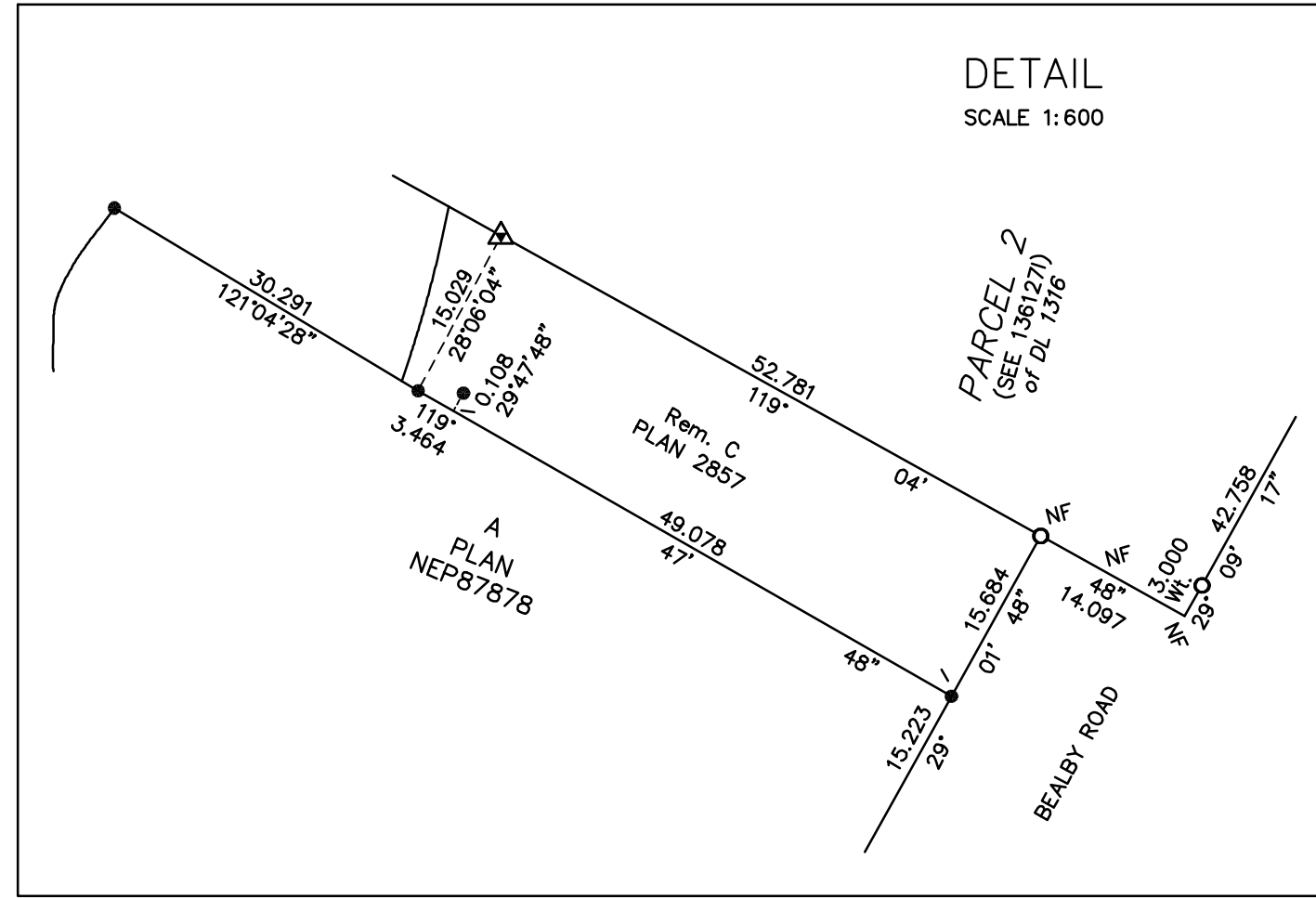
Grid bearings are derived from GNSS observations and are referred to the central meridian of UTM Zone 11 North. The UTM coordinates and estimated absolute accuracy achieved are derived from Natural Resources Canada's Precise Point Positioning (PPP) service. This plan shows horizontal ground-level distances, unless otherwise specified. To compute grid distances, multiply ground-level distances by the combined scale factor of 0.999521. The combined scale factor has been determined based on an ellipsoidal elevation of 528 metres.

Note: This plan shows the natural boundary as depicted on Plan 524A3 and an opinion of the location of the present natural boundary based on field survey. Dimensions of the lot under survey may not reflect the current extent of title.

Note: This plan shows one or more witness posts (shown Wt.) which are not set on the true corner(s).

S.M. Stone mound  
Mp Metal reference post

Found Set  
● ○ Standard iron post  
⊙ ○ Non-standard iron post  
⊕ ○ Standard capped post  
△ ○ Angle iron post  
□ ○ Standard lead plug



WEST ARM OF KOOTENAY LAKE

BEALBY ROAD PLAN R350

CANADIAN PACIFIC RAILWAY PLAN 524A3

DISTRICT LOT 1316

DISTRICT LOT 1240

DISTRICT LOT 1240

DISTRICT LOT 1240



TOPOGRAPHIC SITE PLAN OF  
PART OF PARCEL 2 (SEE  
1361271) OF DL 1316 KD.



**LEGEND**

Dimensions derived from Posting Plan EPP128857.  
All dimensions are in metric.  
Elevations are assumed.  
Contour interval - 1.0m

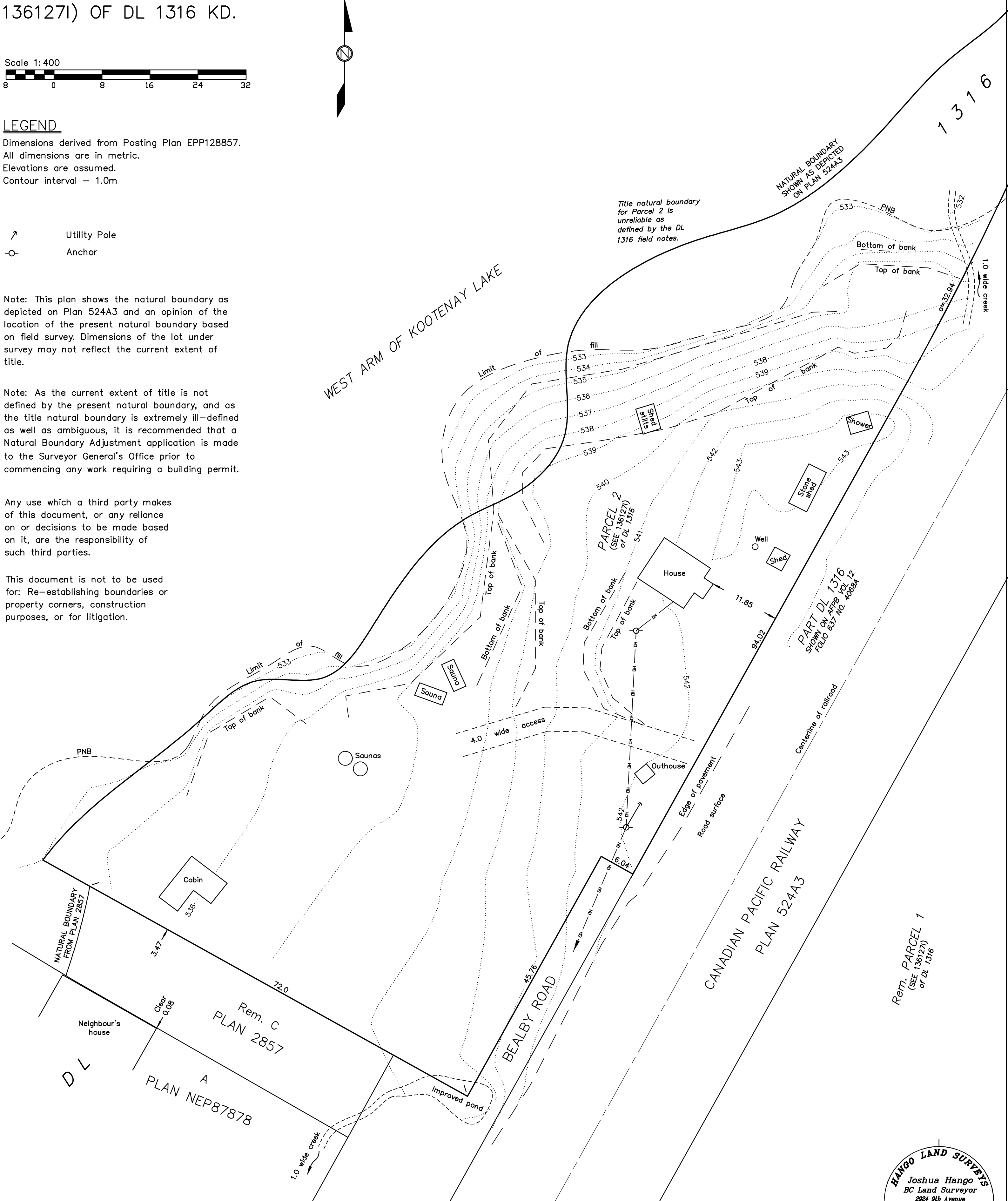
- Utility Pole
- Anchor

Note: This plan shows the natural boundary as depicted on Plan 524A3 and an opinion of the location of the present natural boundary based on field survey. Dimensions of the lot under survey may not reflect the current extent of title.

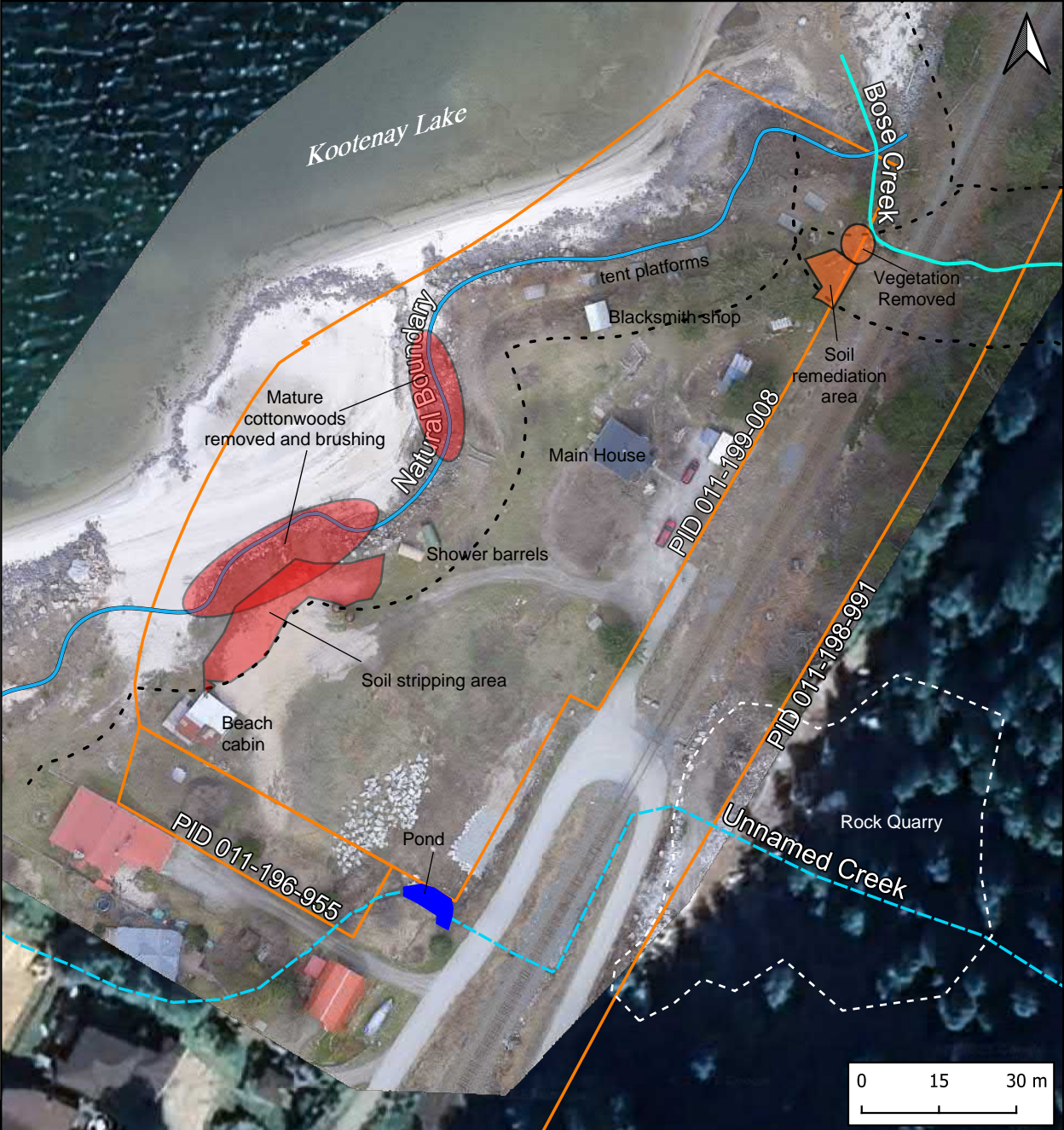
Note: As the current extent of title is not defined by the present natural boundary, and as the title natural boundary is extremely ill-defined as well as ambiguous, it is recommended that a Natural Boundary Adjustment application is made to the Surveyor General's Office prior to commencing any work requiring a building permit.

Any use which a third party makes of this document, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

This document is not to be used for: Re-establishing boundaries or property corners, construction purposes, or for litigation.



**HANGO LAND SURVEYS**  
 Joshua Hango  
 BC Land Surveyor  
 2824 9th Avenue  
 Castlegar, BC V1N 2Z1  
 (250) 365-5342  
 2782-site  
 www.hangolandsurveys.com



## Henry Nugent Mitigation WDP | Existing Site

### WDP Setbacks

- Natural Boundary
- Bose Creek
- - - Unnamed Stream
- - - WDP Setback



Map Date: 09/26/2023  
 Projection: NAD83 UTM Zone 11  
 Project: 2309 Bealby Road  
 Map Scale: 1: 1250  
 Orthoimage Dale: April 20, 2023  
 Fortis BC Lake Level: 530.11 m



Henry Nugent Mitigation WDP | Riparian Assessment | SPEA Setbacks

**Kootenay Lake Setbacks**

- Natural\_Boundary
- - - WDP Area
- LWD/Litterfall ZOS
- - - Shade ZOS
- - - SPEA

**Bose Creek Setbacks**

- Bose Creek
- - - WDP Area
- LWD/Litterfall ZOS
- - - Shade ZOS
- - - SPEA

**Unnamed Creek**

- - - Unnamed Stream



Map Date: 08/14/2023  
 Projection: NAD83 UTM Zone 11  
 Project: 2309 Bealby Road  
 Map Scale: 1: 1200  
 Orthoimage Dale: April 20, 2023  
 Fortis BC Lake Level: 530.11 m

## APPENDIX 3. SPECIES LISTS

Plant Species Encountered on the Property.

Common Name	Scientific Name	Common Name	Scientific Name
Trees		Herbaceous	
black cottonwood	Populus balsamifera	common dandelion	Taraxacum officinale
black hawthorne	Crataegus douglasii	common wormwood	Artemisia absinthium
blue spruce	Picea sp.	false Solomon's seal	Smilacina racemosa
fruit trees		forget-me-knot	Myosotis scorpioides
hybrid spruce	Picea glauca	fragile fern	Cystopteris fragilis
interior Douglas-fir	Pseudotsuga menziesii	goldenrod	Solidago sp.
lodgepole pine	Pinus contorta	hens and chicks	Sempervivum spp.
nut trees		large-leaved avens	Geum macrophyllum
paper birch	Betula papyrifera	iris	Iris sp.
water birch	Betula occidentalis	meadow buttercup	Ranunculus acris
Western hemlock	Tsuga heterophylla	scouring rush	Equisetum spp.
Western larch	Larix occidentalis	stonecrop	Sedum sp.
Western redcedar	Thuja plicata	sweet-clover	Melilotus sp.
Shrubs		violet	Viola sp.
alder	Alnus sp.	Invasives	
non-native barberry	Berberis sp.	common chicory	Cichorium intybus
black gooseberry	Ribes lacustre	common tansy	Tanacetum vulgare
common snowberry	Symphoricarpos albus	curled doc	Rumex crispus
devil's club	Oplopanax horridus	knapweed	Centaurea spp.
Douglas maple	Acer glabrum	mullein	Verbascum thapsus
elderberry	Sambucus sp.	oxeye daisy	Leucanthemum vulgare
kinnikinnick	Arctostaphylos uva-ursi	reed canarygrass	Phalaris arundinacea
lilac	Syringa sp.	scotch broom	Cytisus scoparius
mallow ninebark	Physocarpus malvaceus	sulfur cinquefoil	Potentilla recta
mountain ash	Sorbus sp.	Grasses & Sedges	
nootka rose	Rosa nutkana	Mosses	
ocean spray	Holodiscus discolor		
red osier dogwood	Cornus stolonifera	Submergent Veg	
raspberry	Rubus sp.	Green algae	
rose sp.	Rosa sp.		
tall Oregon grape	Mahonia aquifolium		
thimbleberry	Rubus parviflorus		
willow	Salix sp.		

Wildlife species with confirmed or suspected presence on the property.

Common Name	Scientific Name	Comment
American black bear	<i>Ursus americanus</i>	Tracks observed on foreshore.
American crow	<i>Corvus brachyrhynchos</i>	Observed flying over property during assessment.
American robin	<i>Turdus migratorius</i>	A few individuals observed on the property.
bald eagle	<i>Haliaeetus leucocephalus</i>	Neighbours confirmed presence of two resident individuals.
bats		Assumed based on habitat.
black-capped chickadee	<i>Poecile atricapillus</i>	Heard singing around the property.
Canada goose	<i>Branta canadensis</i>	Two individuals occupying the property during the assessment.
Columbia ground squirrel	<i>Urocitellus columbianus</i>	Observed on property.
common gartersnake	<i>Thamnophis sirtalis</i>	Observed on the property beside Bose Creek.
common loon	<i>Gavia immer</i>	Heard calling in the area from Kootenay Lake.
common raven	<i>Corvus corax</i>	Heard calling in area during assessment.
Idaho forestsnail	<i>Allogona ptychophora</i>	Observed in quarry during assessment.
mallard duck	<i>Anas platyrhynchos</i>	Assumed based on commonality in area.
North-American river otter	<i>Lontra canadensis</i>	Assumed based on commonality in area.
northern flicker	<i>Colaptes auratus</i>	Heard in area during assessment.
osprey	<i>Pandion haliaetus</i>	Observed soaring above property during assessment.
pileated woodpecker	<i>Dryocopus pileatus</i>	Feeding cavities observed on the property.
pine siskin	<i>Spinus pinus</i>	Heard calling in vegetation around quarry during assessment.
raccoon	<i>Procyon lotor</i>	Tracks observed on foreshore.
red squirrel	<i>Tamiasciurus hudsonicus</i>	Observed on property during site visit.
song sparrow	<i>Melospiza melodia</i>	Heard singing around the property.
swallows		Known to nest in residence.
violet-green swallow	<i>Tachycineta thalassina</i>	Observed feeding and flying over the property and nesting in the cabin.
Western terrestrial garter snake	<i>Thamnophis elegans</i>	Observed basking along Bose Creek.
White admiral butterfly	<i>Limenitis arthemis</i>	Observed onsite during assessment.
white-tailed deer	<i>Odocoileus virginianus</i>	Tracks observed on foreshore.
yellow-bellied marmot	<i>Marmota flaviventris</i>	Observed in the quarry during the assessment.
Yellow-rumped warbler	<i>Setophaga coronata</i>	Heard calling in vegetation around quarry during assessment.

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>
Red-tailed Chipmunk ( <i>Neotamias ruficaudus simulans</i> )	Unlikely	CDC occurrences mapped ~8.8 km southwest of the subject property in forested and logged habitat between Sand and Giveout Creeks (Shape ID: 129556, Occurrence ID: 16128).	Blue	NS
Monardella ( <i>Monardella odoratissima</i> ssp. <i>Discolor</i> )	Unlikely	Subject property is within the CDC shapefile. Historical occurrence mapped ~8 km northeast of the subject property in the Harrop-Proctor area (Shape ID: 7836, Occurrence ID: 1244).	Unknown	NS
Caribou (Southern Mountain Population) ( <i>Rangifer Tarandus</i> pop. 1)	Very unlikely	Historically inhabited the Southern Selkirk Mountains on the southwest side of the West Arm of Kootenay Lake, with mapped critical habitat including the subject property. This population has been extirpated (Shape ID: 10261, Occurrence ID: 3979, Habitat IDs: 21275, 21276, 21277, 21281, 21288, 21289, 21290).	Red	E/T
Painted Turtle (Intermountain – Rocky Mountain Population) ( <i>Chrysemys picta</i> pop.2)	Unlikely	CDC occurrences mapped as close as ~4.6 km southwest of the subject property on the south shore of the West Arm of Kootenay Lake (Shape ID: 96321, Occurrence ID: 12177).	Blue	SC
Wester Screech-Owl ( <i>Megascops kennicottii macfarlanei</i> )	Possible	CDC historical occurrence mapped ~950 m southwest of the subject property in the Nelson area (Shape ID: 1186, Occurrence ID: 4733).	Blue	T
Western Skink ( <i>Plestiodon skiltonianus</i> )	Unlikely	CDC occurrences mapped as close as ~ 1 km from the subject property on the north side of the West Arm of Kootenay Lake (Shape IDs: 28837, 29940, Occurrence IDs: 6942, 6943).	Blue	SC
Whitebark Pine ( <i>Pinus albicaulis</i> )	Very unlikely	Critical habitat (alpine) mapped as close as 2.5 km from the subject property on both side of the West Arm of Kootenay Lake (Habitat IDs: 101029, 101220, 101518, 101695, 140407, 140408, 140411, and 140430).	Blue	E
White Sturgeon (Upper Kootenay River Population) ( <i>Acipenser transmontanus</i> pop. 1)	Unlikely	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

<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, and personal sightings.



APPENDIX 4. PROPOSED SEPTIC PLAN

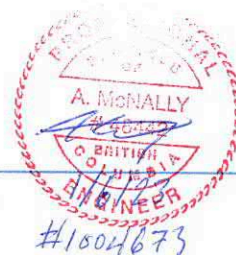


6/1/2023

# 2309 Bealby Rd, Nelson, Site and Soils Report Type 3 System

*Interior Health Authority Filing for Construction of Septic System: Site  
Investigation Report, Record of Design, and Specifications*

Alexander McNally P.Eng  
WEST KOOTENAY SEPTIC SOLUTIONS





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## **Introduction:**

Legal Owner's Name: Richard Henry (613) 484-7752

Date: May 23, 2023

Client Address: 2309 Bealby Rd, Nelson V1L 3E2

St Address: 2309 Bealby Rd, Nelson V1L 3E2

Tax Assessment Roll Number 21-707-06087.200

Property PID Number 011-199-008

## **Summary of Proposed Works:**

See attached drawings Site Plan, Detailed Design, and Layout in Appendix 1

### **RE: 2309 Bealby Rd, Nelson BC, Type 3 30-person system**

This design is for the construction of a new Type 3 septic system at 2309 Bealby Rd, Nelson. This new system will service a planned resort, with 6 cabins (see detailed design for sizes and location). The septic system will service an estimated 30 guests @ 225 L/D/G for a total expected daily design flow of 6,750L/D. The maximum daily design flow for this system is 9000L/D which will allow for potential future expansion for up to 10 guests @ 225 L/D/G. A type 3 system was chosen due to the relatively poor porosity of the soil limiting the flow of effluent as well as address proximity to local bodies of water. The Kootenay Lake is located 44.5m away from the proposed system and a low volume seasonal creek has been redirected over 30m away via a gravel filled French Drain providing a high porosity path to the lake. The relatively poor porosity of the native soil reflected in a KFS of 1089mm/day will act as a natural barrier discouraging water flow between the high porosity French Drain and the dispersal field for the proposed system. However, the poor porosity of native soil combined with space constraints for a high output system necessitate the use of a sand mound system with both timed and demand dosing throughout the day.

The proposed system will not connect to the existing property as it is already serviced by a functioning type 1 system. Gravity will transport the effluent to a 11,356 L (3000 G) Dual Chamber Trikon Precast Concrete holding Tank (or equivalent) with a PL525 Polylock Effluent Filter [100 mm inlet/outlet]. From the holding tank the effluent will flow with gravity into a 4,542 L (1200 G) Dual Chamber Trikon Precast Concrete Tank (or equivalent) acting as a pump chamber with a 100mm inlet and a 50mm outlet. The pump chamber will host a Hydromatic OSP50 pump controller with an Aquaworx transducer for microdosing and demand dosing. Effluent will be pumped from the pump chamber to an index valve which will alternate dosing between two 5000L treatment tanks with every pump activation. Effluent treatment will occur in two BIOROCK ECOROCK 5000-TS tanks with the capacity to each treat 5000L/D which will remove 97% of all biological by-products (including nitrates and phosphates). The treatment tanks will have the capacity to treat 10,000L/D. Due to the cleanliness of the effluent being discharged no further break down of organics will be required to meet type 3 organics standards. Each treatment tank will connect to its own Myer ME45 pump with a Rhombus Duplex panel EZ series C-level sensor for demand dosing. The two treatment tanks will pump clean effluent through a connecting 50mm (2") Sch.



40 PVC (or equivalent) pipe entering a manifold which will maintain a head pressure of 2.2m throughout the dispersal system when the pump is on.

The distribution field will have five ball valves with 50mm to 32mm reducers outfitted to ten 32 mm (1 ¼") Sch. 40 laterals surrounded in drain rock wrapped in geotextile fabric. Each lateral will have 5mm (3/16") orifices, spaced 0.6 m apart, facing up and down with orifice shields installed on the down facing orifices to prevent erosion. The drainage field will be 4.5 m wide and 25 m long with an area of 112.5 m<sup>2</sup>. This area encompasses the laterals which are surrounded in drain rock extending 50 mm (2") above the pipe and 200mm (8") below the pipe which will be wrapped in geotextile fabric. The distribution field will be situated in a sand mound to create adequate absorption relative to the native soil which has a KFS of 1089mm/day. The sand mound will rise 0.6m (2') above ground level and will include a sand toe with a slope of 3:1. This will all be covered by natural organic material also maintaining a slope of 3:1. Care will be taken when back filling to minimize the amount of clay in this surrounding native material layer in order to maximize field absorption. A type 3 combined sand mound design was chosen for this system based on the low porosity of native soil, high capacity of the system and space considerations. The type 3 system will used timed and demand dosing throughout the day. The system has a HLR of 80 L/D/m<sup>2</sup> for type 3 system considerations. This system is designed in accordance with the Ministry of BC's Sewer System Standard Practice Manual and is safe for its intended use.

### ***Site Information:***

- Total parcel size: 3.024 Acres
- Potable Water Source: 160m well located over 30m away from proposed system
- Other water sources: the proposed system is 44.5m from the Kootenay Lake and over 30m away from French Drain controlling flow of low volume seasonal creek

### ***Site and Soil Evaluation Report:***

See Site and Soil Evaluation test photos in Appendix 2

#### ***Test pit #1***

- 0cm - 13cm: Dark brown soil and silty clay loam with abundant roots and organics
- 13cm - 61cm: Medium brown clay loam containing a few roots and organics and some small pockets of tan coloured fine-coarse grained sandy loam
- 61cm - 152cm: Faded orange-brown loam with fine-coarse grained sand and gravel averaging 1-2cm and a few pebbles

#### ***Test pit #2***

- 0 cm - 9cm: Dark brown silty clay loam with abundant shallow roots and some soil and organics



- 9cm - 64cm: Medium brown clay loam with some organics and some small flat pockets of tan coloured fine-coarse grained sandy loam
- 64cm - 110cm: Orange brown loam with coarse grained sand, gravel averaging 1-2cm and a few pebbles

$K_{fs} = 1089 \text{ mm/day} \Rightarrow \text{Type 3 Hydraulic Loading Rate HLR} = 80 \text{ L/D/m}^2$

### ***Limiting Layer/ Design Limit***

- Limiting Layer >150cm

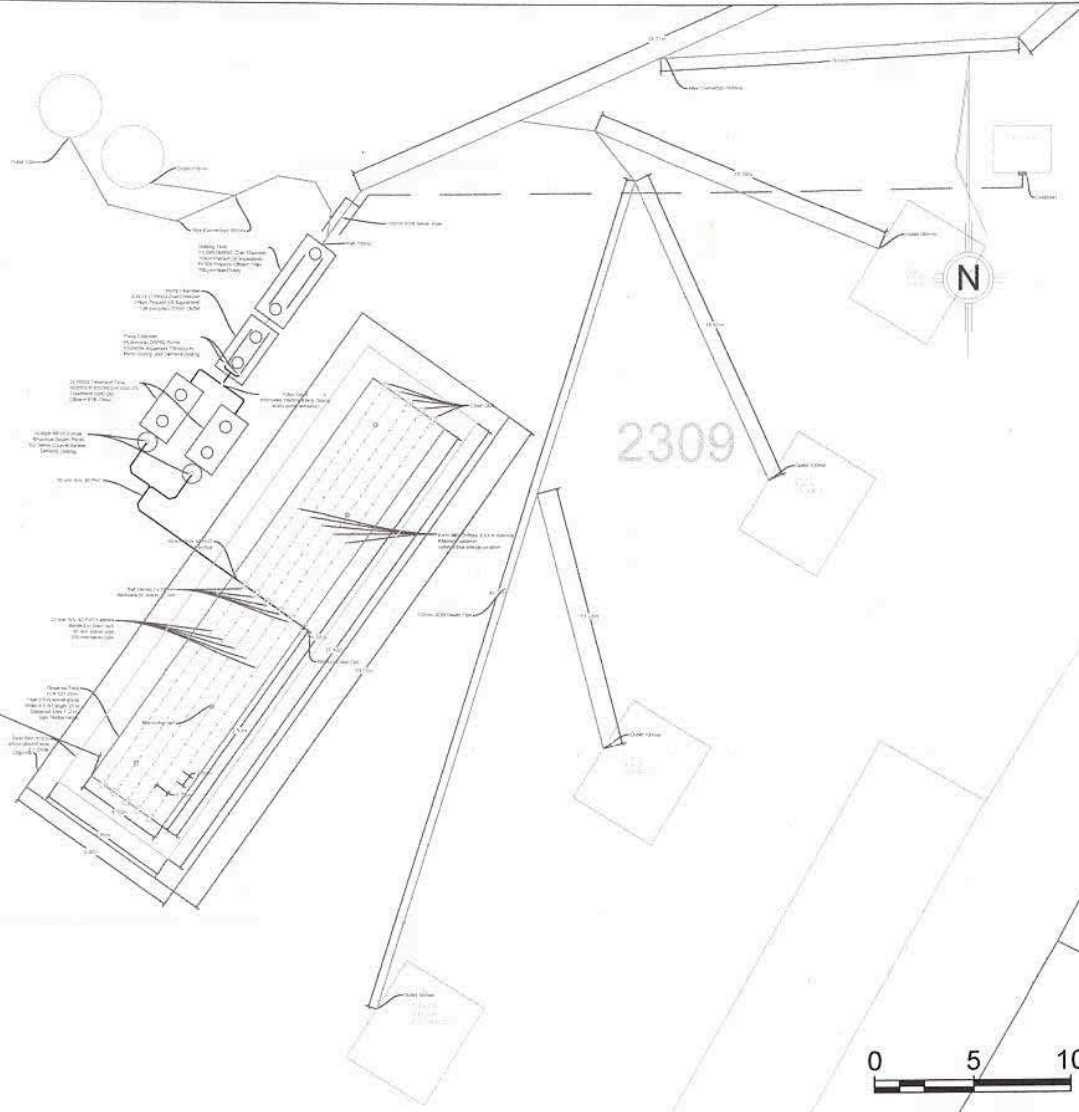
### ***Declaration:***

*These plans and specifications are consistent with standard practice with regard to the Sewerage System Regulations and the Sewerage System Standard Practices Manual of the B.C. Ministry of Health. I have conducted a site evaluation, exercised due diligence, and am a registered On-Site Practitioner authorized to plan and install the system designed herein.*





## *Appendix 1: Site Plan, Detailed Design, Layout*



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Future 2250L/D (+10 guests)
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97% clean return
10. HLR 80 L/D/m<sup>2</sup>
11. Total Dispersal Area 112 m<sup>2</sup>
12. Laterals x10  
32mm Sch.40 PVC  
Length 25 m Width 4.5 m
13. Slope 1% through out system
14. Type 3 Gravity & Pressurized  
All bends 90° - 2 x 45°
15. System design is site specific anyone else using this information does so at their own risk
16. 2.2 m head throughout system
17. Closest Water Body 44.5 Kootenay Lake and >30m French Drain

PID 011-199-008  
 Tax Roll#21-707-06087.200  
 Lot Size 3.024 Acres  
 Lat 49.524517  
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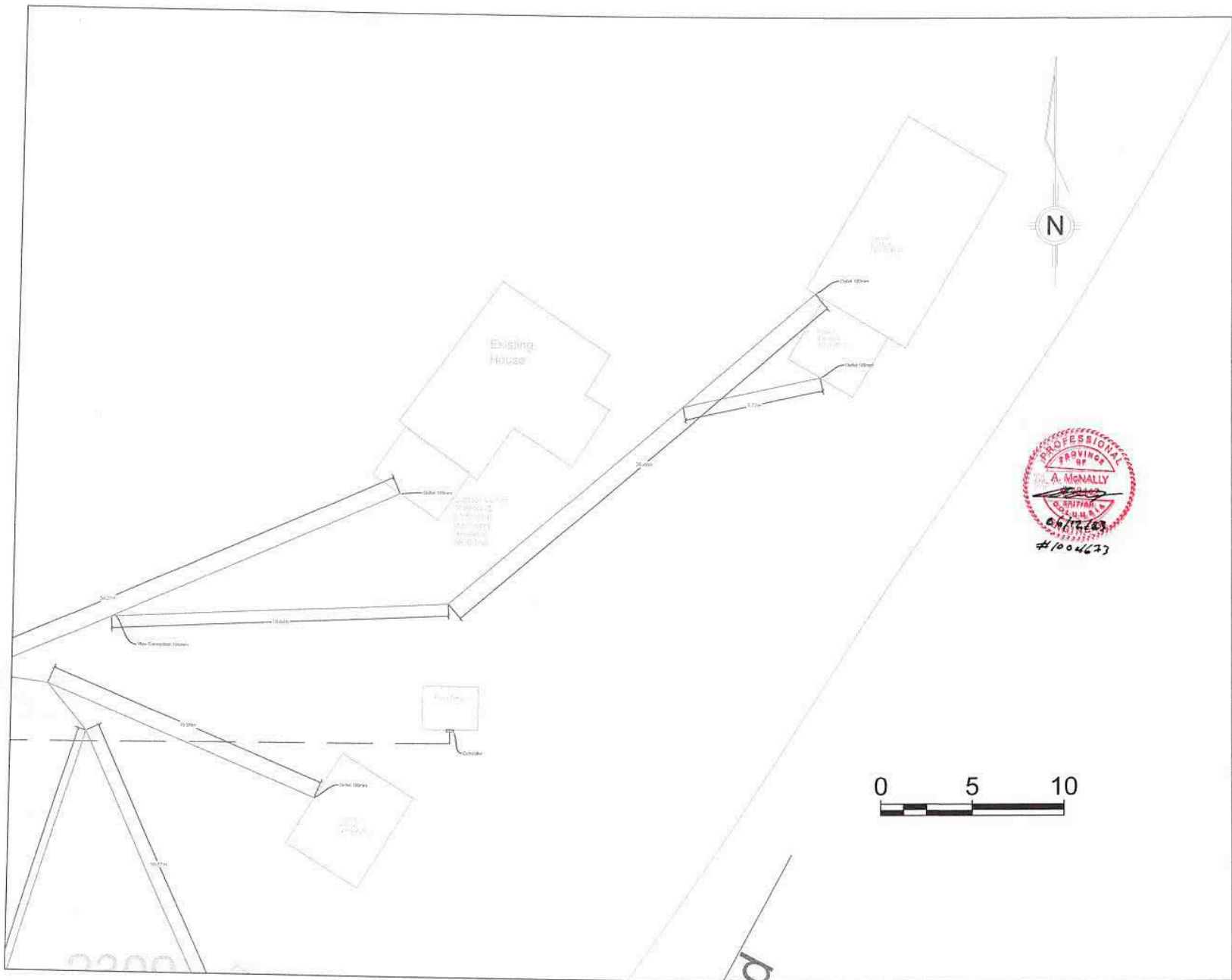
PARCEL 2, DISTRICT LOT 1316,  
 KOOTENAY LAND DISTRICT,  
 (SEE 1361271)

New Type 3 System  
 2309 Bealby Rd, Nelson

McNally Technical Services  
 Alexander McNally P. Eng  
 301 Vernon St, Nelson, BC  
 V1L 4E3

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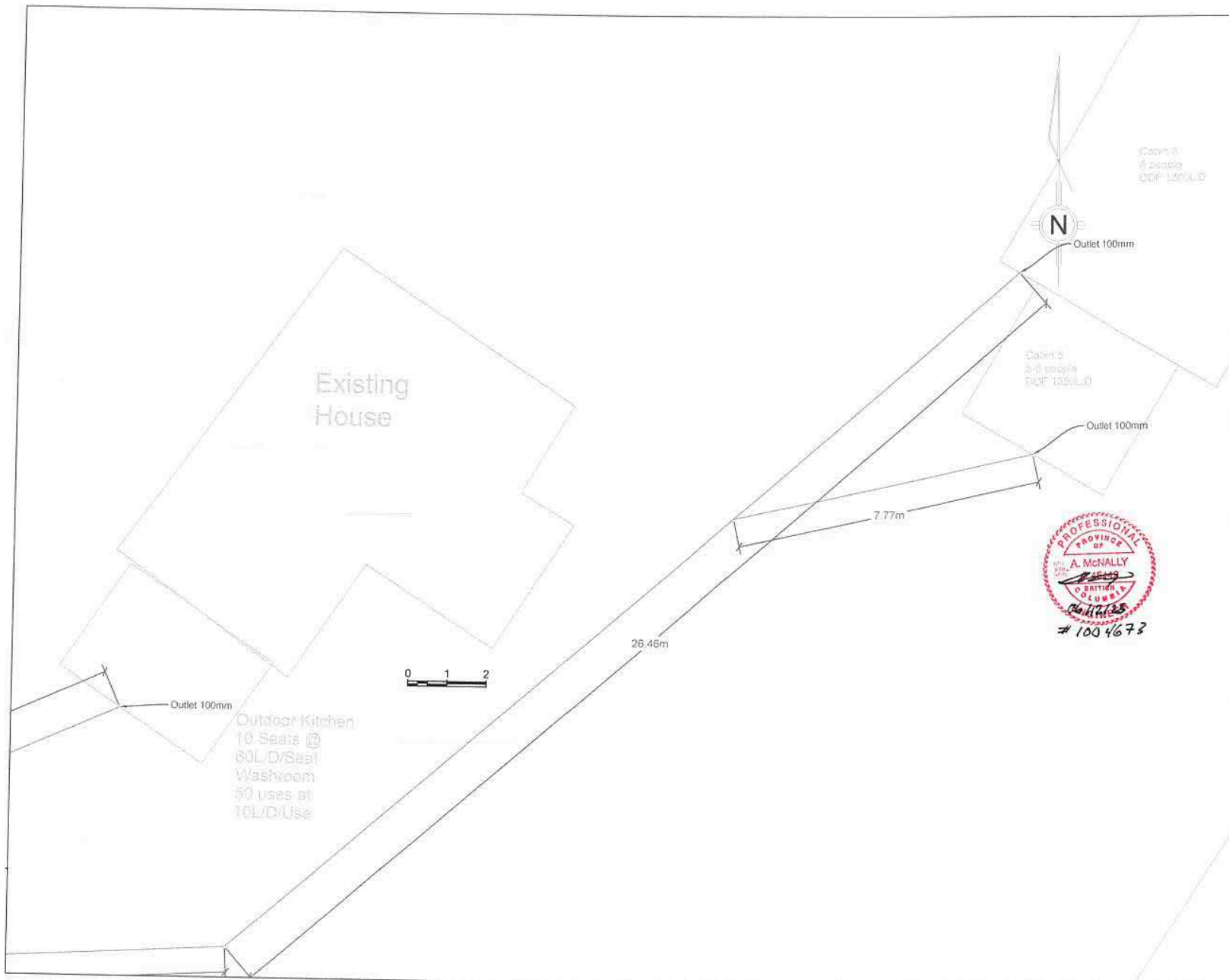
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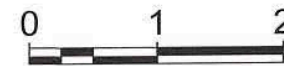
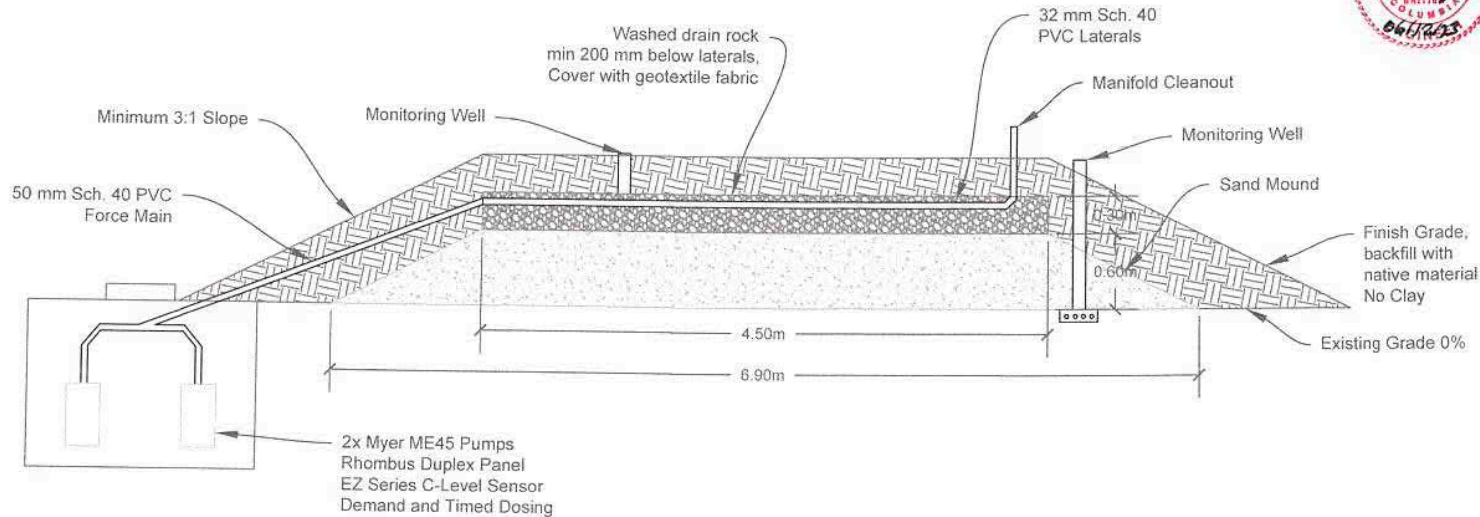
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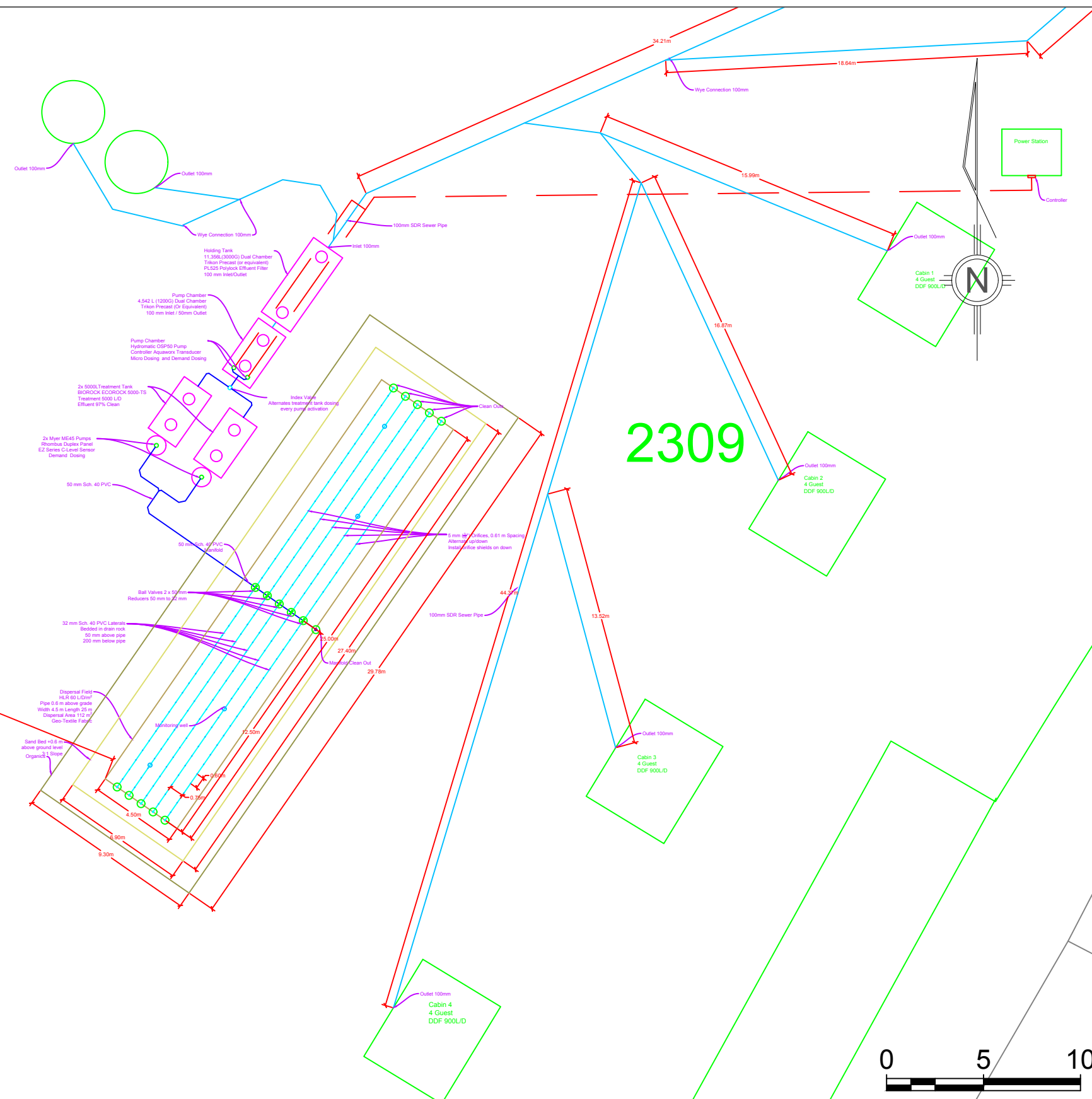
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2309

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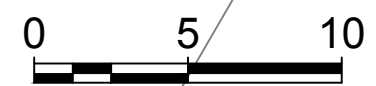
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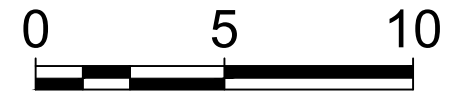
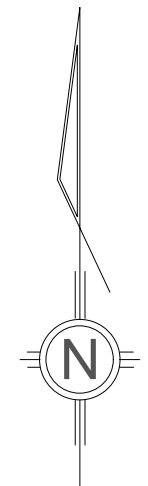
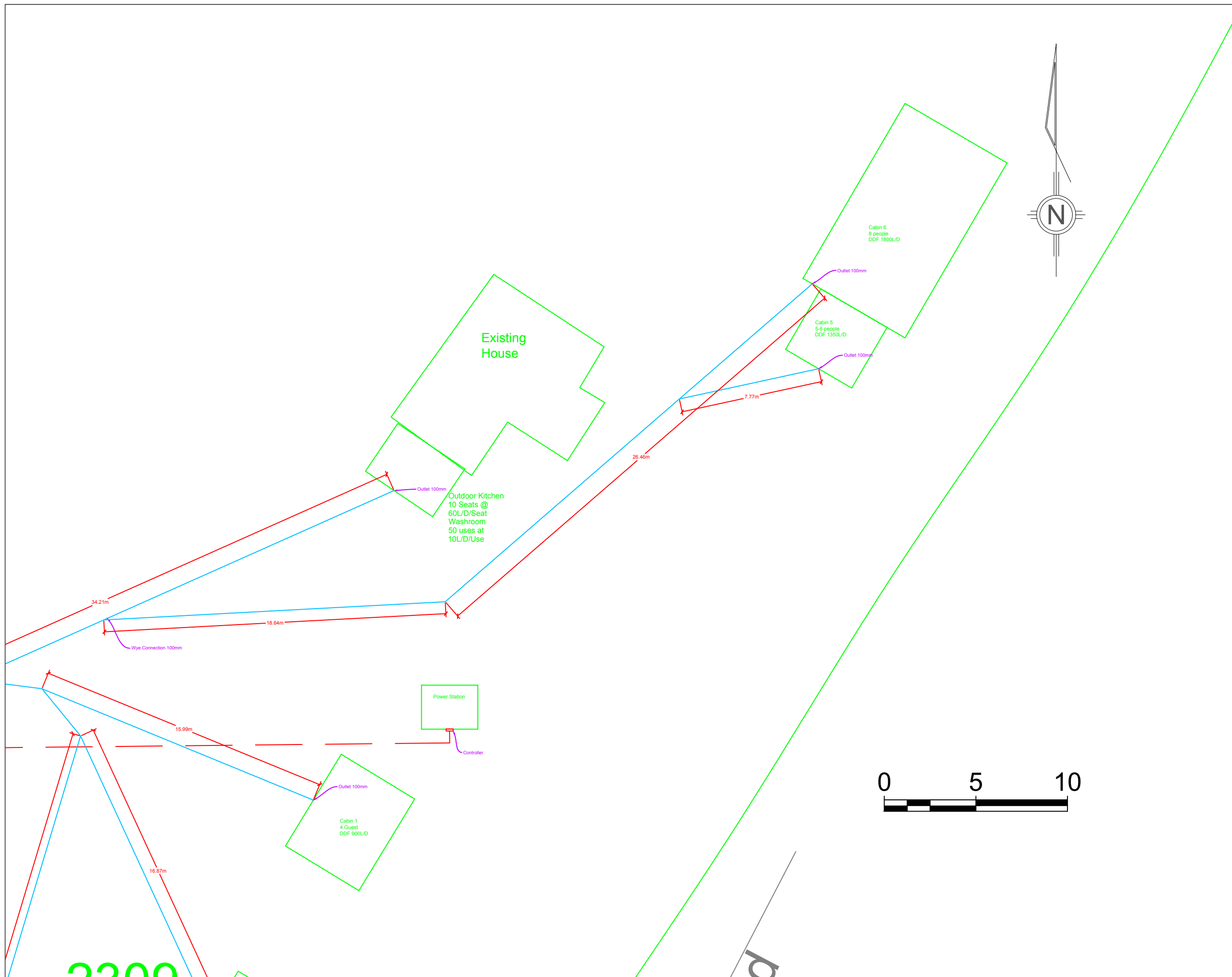
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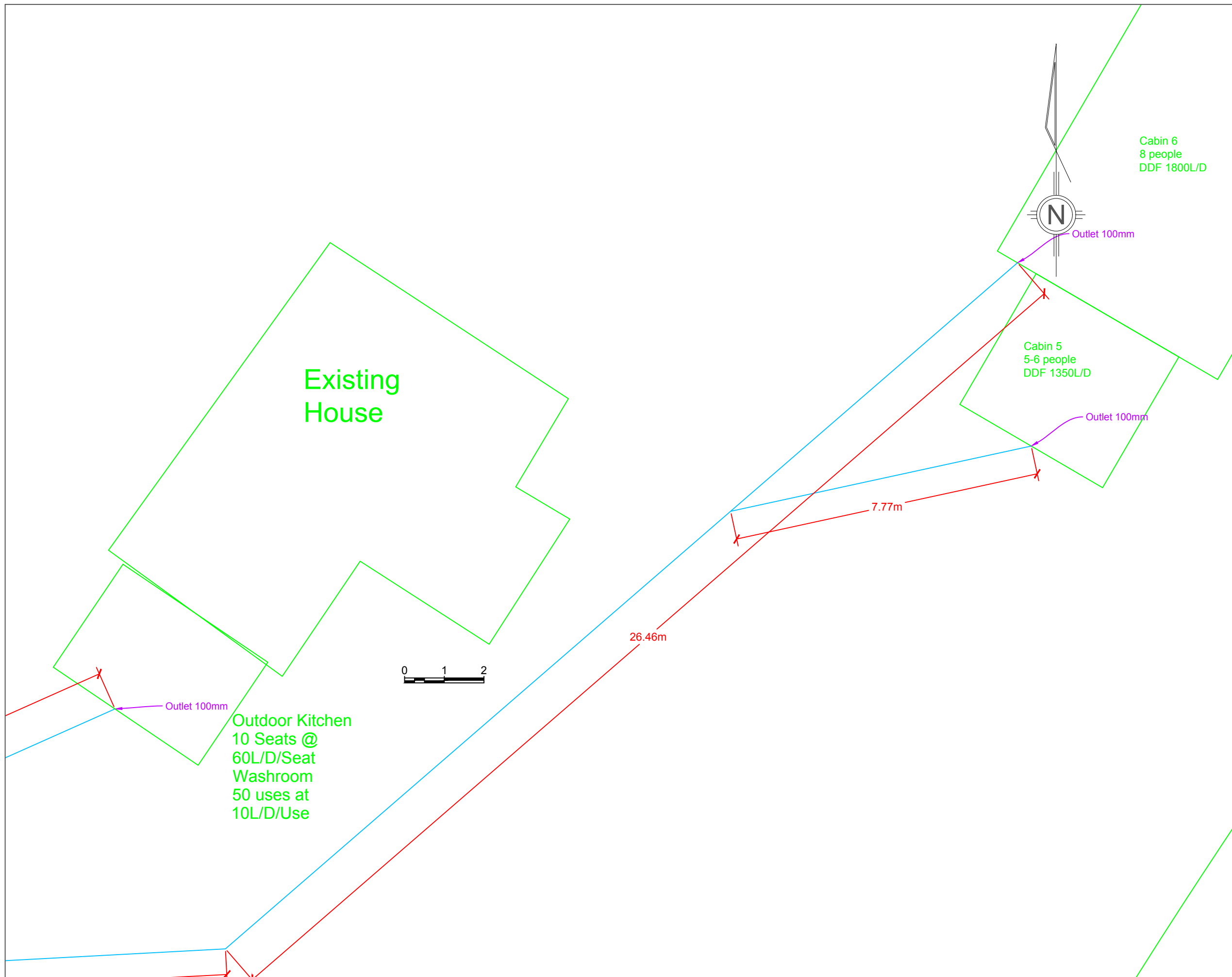
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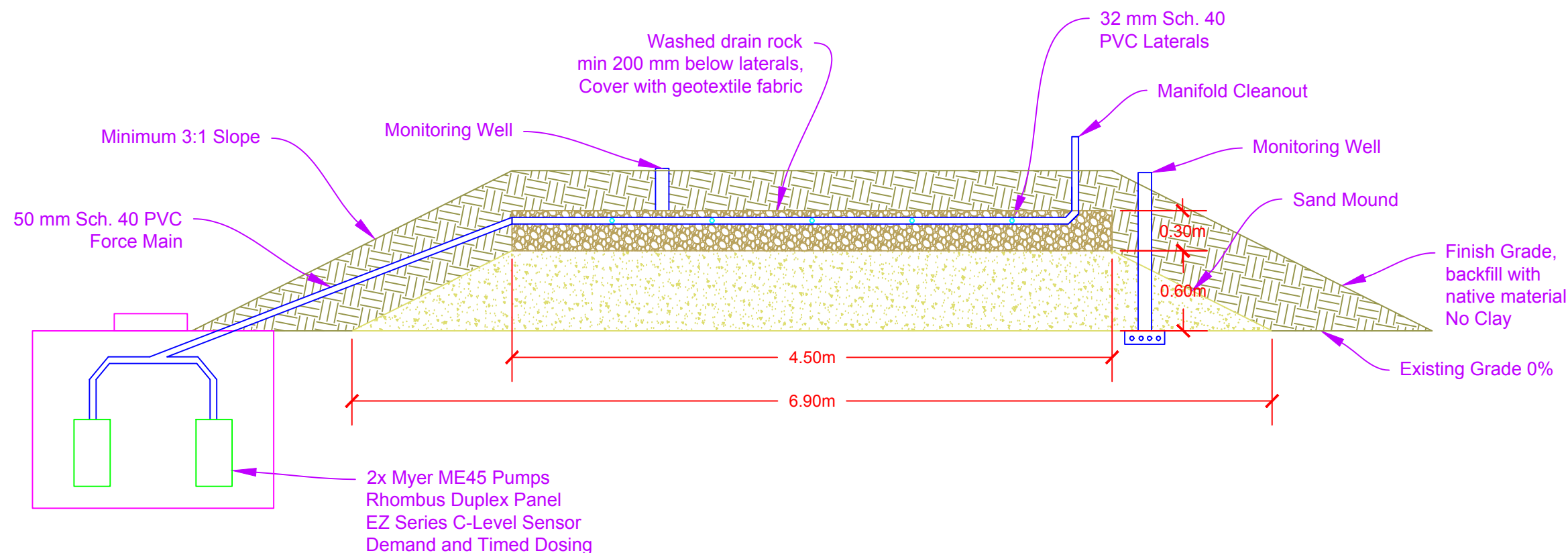
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## Appendix 2: Site & Soil Evaluation Photos

### Test Pit # 1



Fig 1. Test pit #1 profile

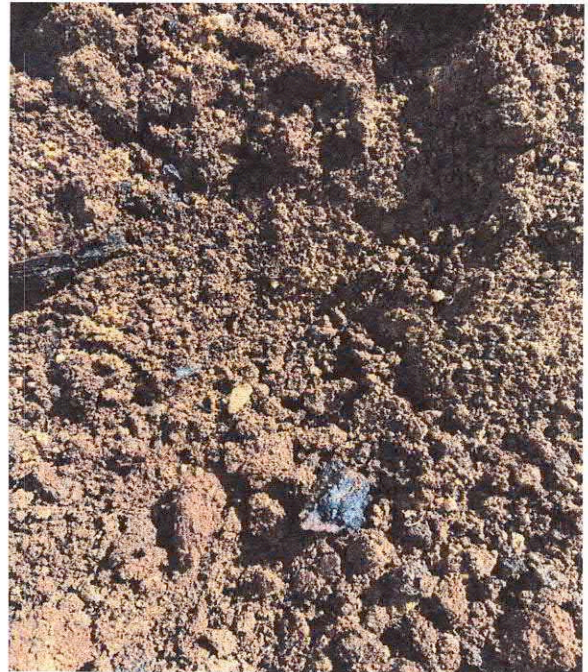


Fig 2. Clay loam with organics and coarse sand

### Test Pit # 2



Fig 3. Test pit #2 profile

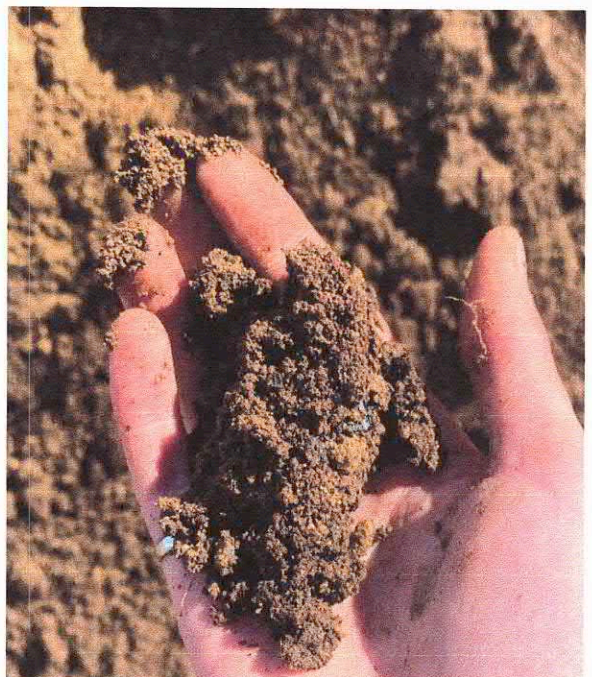


Fig 4. Clay loam containing organics and roots



Fig 5. Pocket of sandy loam with 1-2cm gravel



Fig 6. Excavation smear shows high clay content

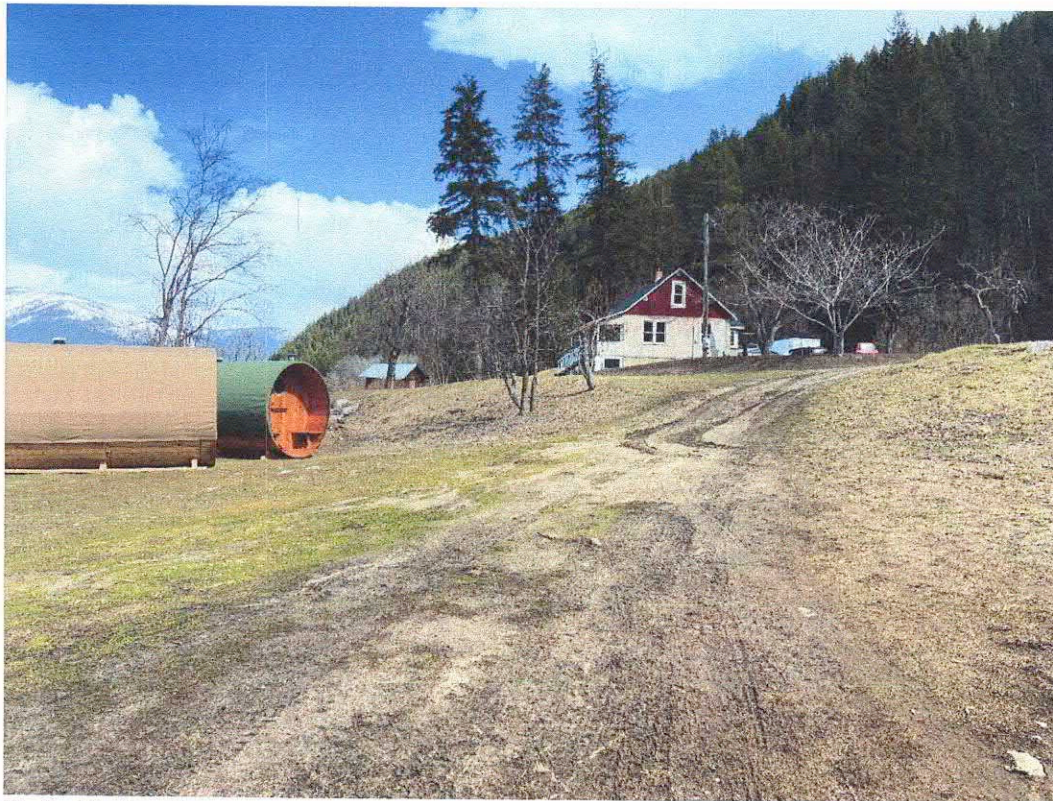
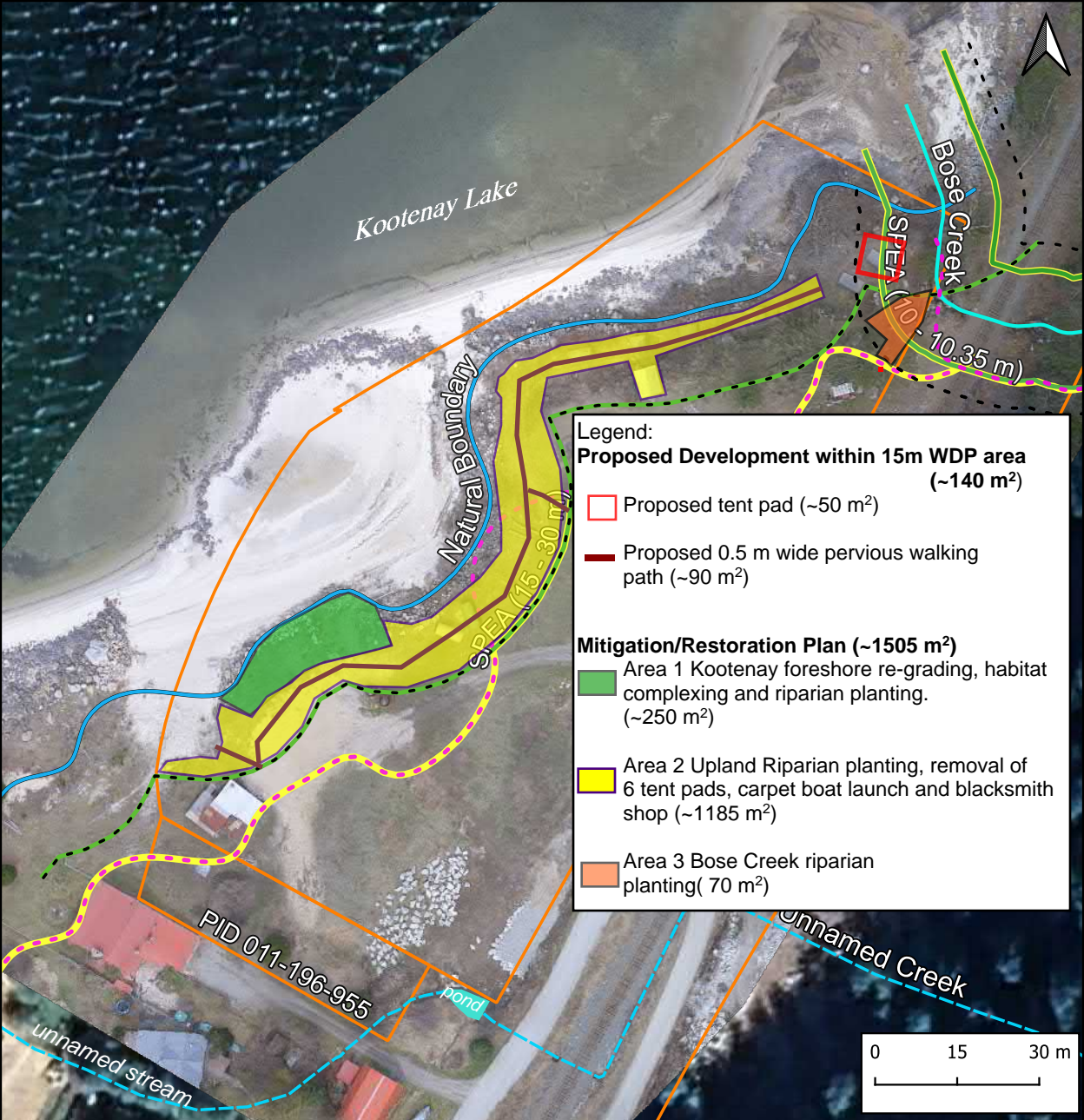


Fig 7. Site location



APPENDIX 5. PROPOSED DEVELOPMENT AND MITIGATION PLAN DRAWING



Henry Nugent Mitigation WDP | Riparian Assessment | SPEA Setbacks

**Kootenay Lake Setbacks**

- Natural\_Boundary
- WDP Area
- LWD/Litterfall ZOS
- Shade ZOS
- SPEA

**Bose Creek Setbacks**

- Bose Creek
- WDP Area
- LWD/Litterfall ZOS
- Shade ZOS
- SPEA

**Unnamed Creek**

- Unnamed Stream



Map Date: 08/14/2023  
 Projection: NAD83 UTM Zone 11  
 Project: 2309 Bealby Road  
 Map Scale: 1: 1200  
 Orthoimage Dale: April 20, 2023  
 Fortis BC Lake Level: 530.11 m

APPENDIX 6. ARCHAEOLOGICAL CHANCE FIND PROCEDURES

## 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

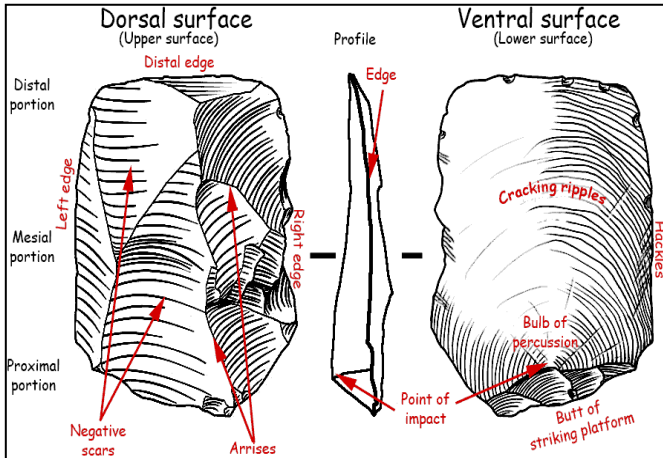


Image 1: Basic flake morphology



Image 2: Examples of lithic flakes

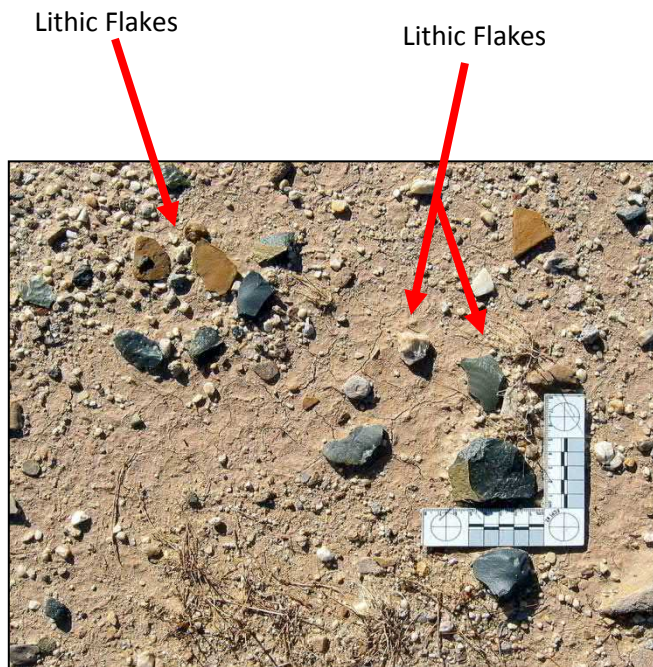


Image 3: Example of lithic scatter found on ground surface



Image 4: Example of formed lithic artifacts

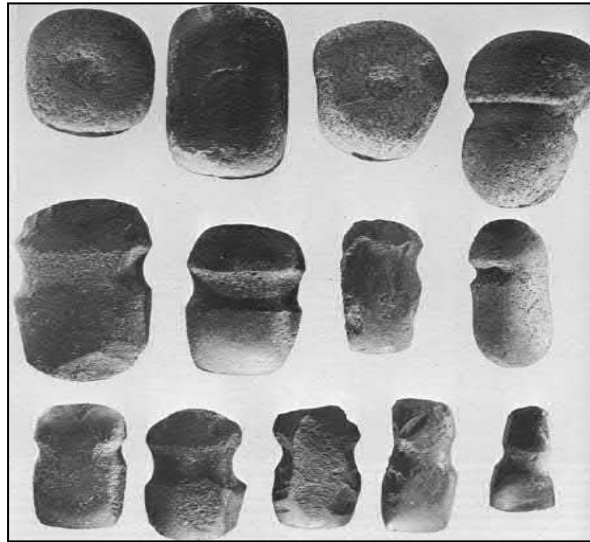


Image 5: Ground stone artifacts

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





2309 Bealby Road, Rural Nelson, BC  
Mitigation Plan



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

Aug 21, 2023



Prepared by:  
Masse Environmental Consultants  
812 Vernon Street  
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Project Number 2023-1028

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### 1 INTRODUCTION

On behalf of Richard Henry and Kimberly Nugent (Owners), Masse Environmental Consultants Ltd. (Masse) has prepared this Mitigation Plan to accompany the Riparian Assessment Report prepared for 2309 Bealby Road, Rural Nelson, BC. Both documents form the principal components of a Watercourse Development Permit (WDP) Application for proposed development and mitigation of unauthorized works (removal or riparian vegetation). The proposed development includes the removal of some of the existing infrastructure on the property, construction of a prospector tent platform, and naturalization and mitigation activities within the WDP area.

This Mitigation Plan provides the details and prescriptions recommended for helping to restore the ecological values of the property (to the extent possible). It is designed to be used in conjunction with the Riparian Assessment Report and does not aim to repeat the information presented in that document unless to simplify or clarify a mitigation measure or best management practices.

### 2 IMPACT ASSESSMENT OVERVIEW AND MITIGATION PLAN STRATEGY

Unauthorized works have occurred within the WDP and Streamside Protection and Enhancement Area (SPEA) according to the Riparian Areas Protection Regulation (RAPR) criteria (MFLNRORD 2019). The Shoreline Management Guidelines for Kootenay Lake (KLP 2020) 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.

To mitigate for the loss of riparian habitat, which has already occurred, the Owners have proposed to restore and re-vegetate two riparian areas: Kootenay Lake foreshore area (~1435 m<sup>2</sup>) and Bose Creek riparian area (70 m<sup>2</sup>). Restoration will focus on habitat complexing by planting native trees, shrubs and forbes and placement of boulder clusters along the toe of the regraded slope.

Overall the proposed development (140 m<sup>2</sup>) with the proposed mitigation and restoration of the riparian areas (1505 m<sup>2</sup>) will provide a net riparian habitat gain and help to reduce cumulative effects along Kootenay Lake.

Provided that the recommended mitigation plan and the measures to protect the SPEA are implemented and followed, the negative impacts associated with the unauthorized works and future uses of the property will be minimized and the riparian function within the revegetation areas will be restored over time.

### 3 REVEGETATION PLAN

The proposed revegetation is designed with a focus on naturalizing the foreshore and will require appropriate growing medium and planting with native potted stock. The final plant species selection and quantities shall be determined by the QEP in consultation with the owners and landscape consultant. The landscape design shall provide mixed plant structure and layering, which meets or exceeds the below prescription. The proposed revegetation will require ongoing maintenance (i.e., irrigation and weeding), until it becomes naturalized over the moderate to long term. The revegetation has been divided into three specific planting areas: Area 1- Kootenay foreshore, Area 2 – Upland riparian planting and Area 3 – Bose Creek riparian planting. Refer to Appendix 1 for Restoration Site Plan.

#### 3.1 Area 1: Kootenay Lake Foreshore (250 m<sup>2</sup>)

- Remove rock and imported fill from bank;
- Re-grade bank to 3 (H): 1 (V) slope, de-compact soils (up to 20 cm), gently smooth, but do not compact;
- Place topsoil medium to a depth of 3" along the face of the slope;
- Apply riparian seed mix at a rate of 25 kg/ha. Refer to Table 1 for recommended seed mix.
- Installation of coir mats. Coir mats and anchors can be purchased from Terrafix Geosynthetics Inc in Surrey or Calgary (<https://terrafixgeo.com/product/erosion-sediment-control/coir-mats-and-logs/>) and installed as per the installation specifications included in Appendix 2;
- Place boulder clusters along toe of slope to provide habitat complexity (Clusters of 3-5 rocks); and
- Plant a mix of ~200 potted stock consisting of native trees, shrubs, grasses, sedges and rushes. Only flood tolerant shrubs shall be planted below the 533.5 m elevation. (Refer to Table 1 for recommended species and Section 3.5 for general planting guidelines).

#### 3.2 Area 2 Upland Riparian (1185 m<sup>2</sup>)

- Remove invasive weeds;
- De-compact surface soils (up to 20 cm) and leave rough and loose;
- Apply 3" of topsoil medium on soil surface where topsoil has been stripped or where needed;
- Apply riparian seed mix at a rate of 25 kg/ha. Refer to Table 1 for recommended seed mix.

- Plant a mix of ~ 600 potted stock consisting of native trees, shrubs, forbes and grasses (Refer to Table 1 for recommended species and Section 3.5 for general planting guidelines).
- Mulch around each plant to a depth of 3”.

### 3.3 Area 3: Bose Creek riparian (70m<sup>2</sup>)

- Plant a mix of ~ 25 potted stock consisting of native trees, shrubs, forbes and grasses (Refer to Table 2 for recommended species and Section 3.5 for general planting guidelines).
- Mulch around each plant to a depth of 3”.

### 3.4 Recommended Plant Species

Recommended riparian seed mix is provided in Table 1 and shall be applied at a rate of 25 kg/ha. The seed mix can be purchased from Interior Seed and Fertilizer in Cranbrook. (<https://interiorseedandfertilizer.ca/>).

A list of trees, shrubs, forbes, and grasses that will be used for revegetation is provided in Table 2. This list provides recommended plant species. Final species selection is at owners’ discretion. Plant selection will be dependent on nursery stock and species availability and may be substituted with approval from the QEP. Sagebrush Nursery located in Oliver BC (<https://sagebrushnursery.com/>), supplies a wide range of native plant species. Refer to Appendix 3 for plant collage of recommended species.

Table 1. Riparian seed mix (applied at a rate of 25 kg/ha)

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

Table 2. Recommended plant species for re-vegetation areas.

Common Name	Latin Name	Suggested Pot Size
<b>Flood tolerant riparian species for Area 1 (planted below 533.5 m)</b>		
Trees		
black cottonwood	<i>Populus trichocarpa</i>	1 – 2 gallon
lodgepole pine	<i>Pinus contorta</i>	1 -2 gallon
water birch	<i>Betula occidentalis</i>	1 -2 gallon
mountain alder	<i>Alnus incana</i>	1 gallon
Shrubs, grasses, sedges and rushes		
Pacific willow	<i>Salix lucinda</i>	5- 10 gallon
red-osier dogwood	<i>Cornus sericea</i>	1 gallon
rose sp.	<i>Rosa sp.</i>	1 gallon
Sandbar willow	<i>Salix exigua</i>	1 gallon
Sitka willow	<i>Salix sitchensis</i>	1 gallon
Canada bluejoint	<i>Calamagrostis canadensis</i>	Plugs, 4" or 1 gallon
beaked sedge	<i>Carex utriculata</i>	Plugs or 4"
Baltic rush	<i>Juncus balticus</i>	Plugs or 4"
<b>Riparian species for Areas 1 ,2 and 3 (planted above 533.5 m)</b>		
Trees		
Black cottonwood	<i>Populus trichocarpa</i>	1 – 2 gallon
Interior Douglas Fir	<i>Pseudotsuga menziesii</i>	5 gallon
lodgepole pine	<i>Pinus contorta</i>	1 -2 gallon
paper birch	<i>Betula papyrifera</i>	5 gallon
Ponderosa pine	<i>Pinus ponderosa</i>	5 gallon
Western white pine	<i>Pinus monticola</i>	5 gallon
trembling aspen	<i>Populus tremuloides</i>	1 -2 gallon
Water birch	<i>Betula occidentalis</i>	1 -2 gallon
Shrubs		
beaked hazelnut	<i>Corylus cornuta</i>	1-5 gallon
blue elderberry	<i>Sambucus cerulea</i>	1-5 gallon
Douglas maple	<i>Acer glabrum</i>	1-5 gallon
Mountain alder	<i>Alnus incana</i>	1 gallon
kinnikinnick	<i>Arctostaphylos uva-ursi</i>	1 gallon
Lewis's mock orange	<i>Philadelphus lewisii</i>	1 gallon
mallow ninebark	<i>Physocarpus malvaceus</i>	1 gallon
oceanspray	<i>Holodiscus discolor</i>	1 gallon
Oregon grape	<i>Mahonia nervosa</i>	1 gallon
Pacific willow	<i>Salix lucinda</i>	5- 10 gallon
red flowering currant	<i>Ribes sanguineum</i>	1 gallon
red-osier dogwood*	<i>Cornus sericea</i>	1 gallon
rose sp. (nootka or woods)	<i>Rosa sp.</i>	1 gallon
sandbar willow	<i>Salix exigua</i>	1 gallon
Sitka mountain ash	<i>Sorbus sitchensis</i>	1-5 gallon
sitka willow	<i>Salix sitchensis</i>	1 gallon
Saskatoon	<i>Amelanchier alnifolia</i>	1-5 gallon
scoulers willow	<i>Salix scouleriana</i>	1 gallon
snowberry	<i>Symphoricarpos albus</i>	1 gallon
Grasses		
"Elijah blue" fescue	<i>Festuca glauca</i> 'Elijah Blue'	1 gallon
Karl Foerster feather reed grass	<i>Calamagrostis acutiflora</i>	1 gallon

These species were selected based on their suitability for the property (ecoregion, exposure, and moisture regime) and based on the following resources:

- Conservation, Restoration and Stewardship of Low Elevation Brushland (GB), Grassland (Gg) and Dry Forest Ecosystems in the West Kootenay Region (McKenzie and Hill 2023).
- British Columbia FireSmart Landscaping Guide
- Invasive Species Council of BC Grow Me Instead Guide
- The EcoGarden Project Plant List for West Kootenay Gardens (CKISS N.D.)
- Riparian Factsheet No. 6 – Riparian Plant Acquisition and Planting (Ministry of Agriculture 2012).
- A Resource for Kootenay Lake Living

### 3.5 General planting guidelines

The following re-vegetation strategy is recommended:

- Planting in clusters vs. grid formation is preferred and produces a more natural appearance.
- Conifer trees shall be planted at minimum 3 m spacing.
- Deciduous trees and shrubs will be planted at a > 1.0 m spacing
- Grasses, sedges and rushes shall be planted at > 0.25 m spacing.
- 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.
- Shrub and tree roots will be inoculated with mycorrhizae during installation.
- Mix 50% compost with native soils into each planting hole.
- Irrigate initially and throughout the growing season (May-September) for a minimum of 3 years until plants are established and thereafter as required.

## 4 MONITORING AND MAINTENANCE

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 plant mortality is >25%, replacement planting will be required.

## 5 ENVIRONMENTAL PROFESSIONAL SUPPORT

In addition to the environmental monitoring proposed for the development activities, environmental support is also recommended during restoration activities to provide guidance during the implementation of this plan and to ensure that the overall intent of the plan is realized, even if modifications are required (e.g., restrictions on plant availability, unforeseen changes to existing site conditions, etc.).

2309 Bealby Road – Mitigation Plan

Sincerely,

A handwritten signature in blue ink that reads "Fiona Lau".

Fiona Lau, BTech., AScT.

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



## 6 REFERENCES

British Columbia FireSmart. N.D. FireSmart BC Landscaping Guide. Available online at:  
[https://firesmartbc.ca/wp-content/uploads/2021/04/FireSmartBC\\_LandscapingGuide\\_Web\\_v2.pdf](https://firesmartbc.ca/wp-content/uploads/2021/04/FireSmartBC_LandscapingGuide_Web_v2.pdf)

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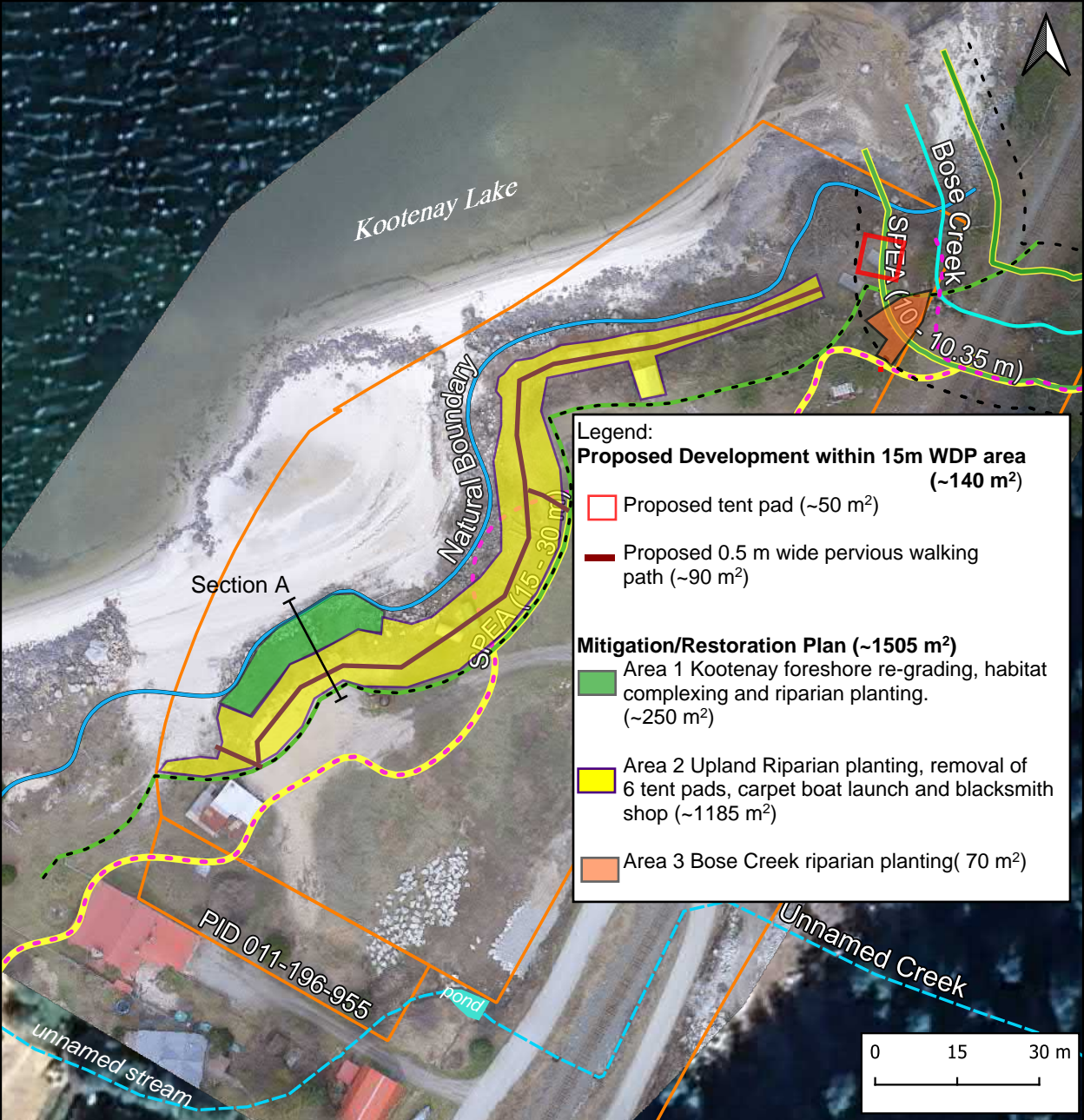
McKenzie, E. and Hill, T. 2023. Conservation, Restoration and Stewardship of Low Elevation Brushland (Gb), Grassland (Gg) and Dry Forest Ecosystems in the West Kootenay Region – Background Information Document. Prepared for the Okanagan Nation Alliance and the Fish & Wildlife Compensation Program (FWCP) Section of the Ministry of Forests, Lands, Natural Resource Operations & Rural Development, Nelson, BC. February 28, 2023. 69 pp.

[MFLNRORD] BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development. 2019. Riparian Areas Protection Regulation Technical Assessment Manual. V 1.1. November 2019.

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[RDCK]. N.D. A Resource for Kootenay Lake Living. Available online at:  
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APPENDIX 1. PROPOSED RESTORATION SITE PLAN AND PROFILE



**Legend:**

**Proposed Development within 15m WDP area (~140 m<sup>2</sup>)**

- Proposed tent pad (~50 m<sup>2</sup>)
- Proposed 0.5 m wide pervious walking path (~90 m<sup>2</sup>)

**Mitigation/Restoration Plan (~1505 m<sup>2</sup>)**

- Area 1 Kootenay foreshore re-grading, habitat complexing and riparian planting. (~250 m<sup>2</sup>)
- Area 2 Upland Riparian planting, removal of 6 tent pads, carpet boat launch and blacksmith shop (~1185 m<sup>2</sup>)
- Area 3 Bose Creek riparian planting (70 m<sup>2</sup>)

Henry Nugent Mitigation WDP | Riparian Assessment | SPEA Setbacks

**Kootenay Lake Setbacks**

- Natural\_Boundary
- WDP Area
- LWD/Litterfall ZOS
- Shade ZOS
- SPEA

**Bose Creek Setbacks**

- Bose Creek
- WDP Area
- LWD/Litterfall ZOS
- Shade ZOS
- SPEA

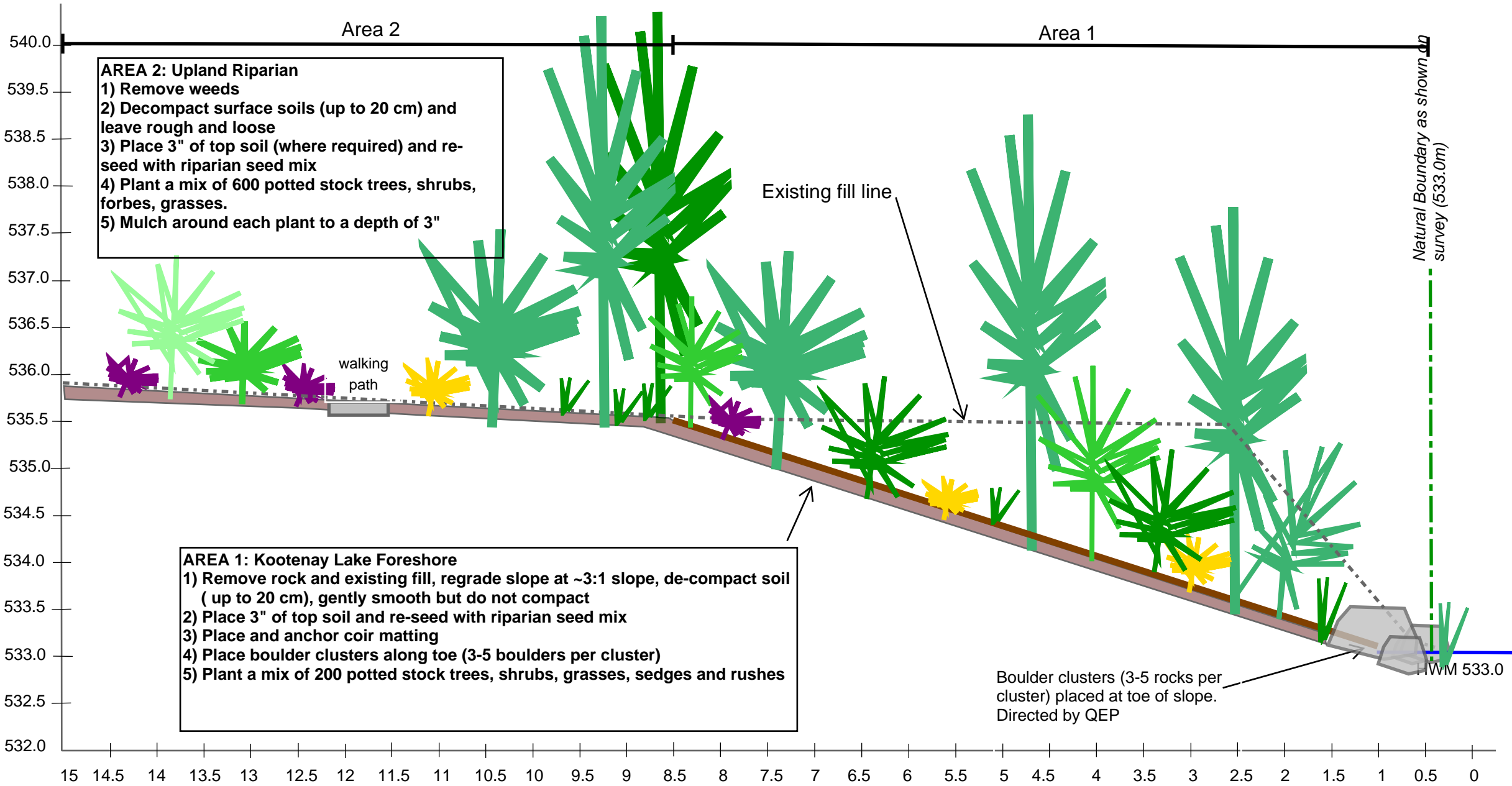
**Unnamed Creek**

- Unnamed Stream



Map Date: 08/14/2023  
 Projection: NAD83 UTM Zone 11  
 Project: 2309 Bealby Road  
 Map Scale: 1: 1200  
 Orthoimage Dale: April 20, 2023  
 Fortis BC Lake Level: 530.11 m

### Section A- Foreshore Restoration



**Notes:**  
 -This is NOT an engineered drawing and is to be used for conceptual purposes only.  
 - Based on Survey completed by Hango Surveying

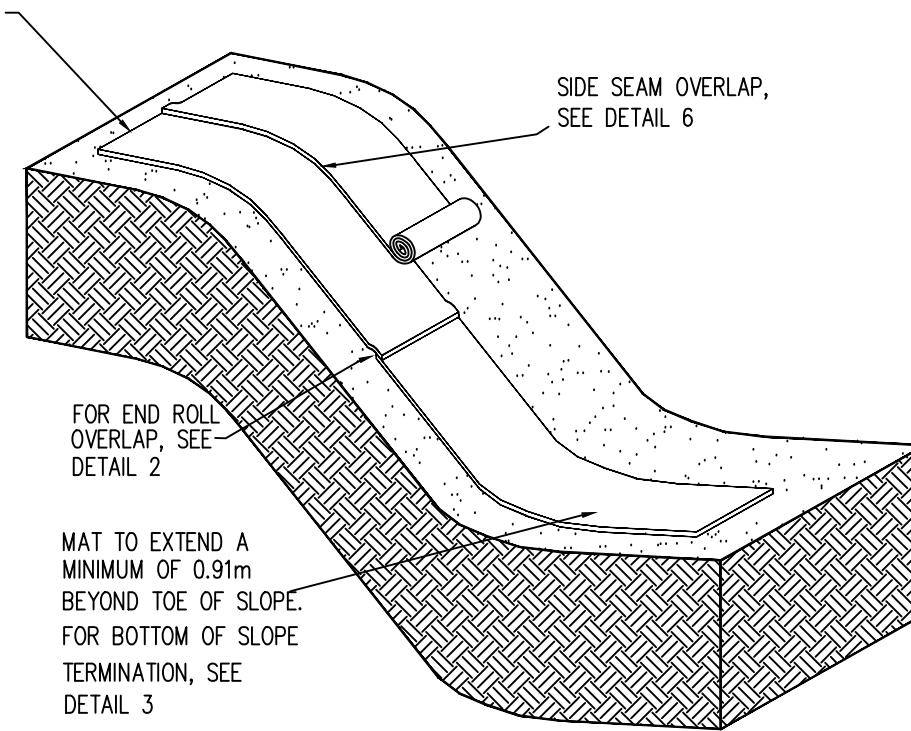
2309 Bealby Road Foreshore Restoration  
 Section A -Conceptual Design Profile  
 Drawn to Scale (as shown)  
 Drawn by: F.L  
 Date:Aug 22, 2023

## APPENDIX 2. COIR MAT APPLICATION DETAILS

**NOTES**

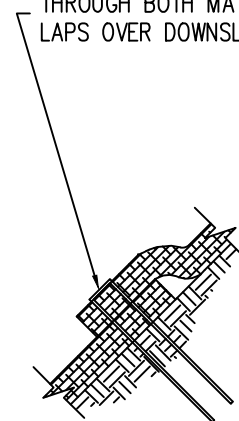
1. NOT TO SCALE.
2. ALL DIMENSIONS ARE IN METERS OR UNLESS OTHERWISE SHOWN.
3. STAPLE PATTERNS ARE DEPENDENT ON SITE CONDITIONS, SEE STAPLE PATTERN GUIDE FOR DETAILS.

EXTEND MAT A MINIMUM OF 0.91m OVER CREST OF SLOPE, SEE DETAIL 4. TRENCHING NEEDED IF A MINIMUM OF 0.91m IS NOT AVAILABLE AT THE CREST OF SLOPE OR IF OVERLAND FLOW IS ANTICIPATED FROM UPLAND SEE DETAIL 5

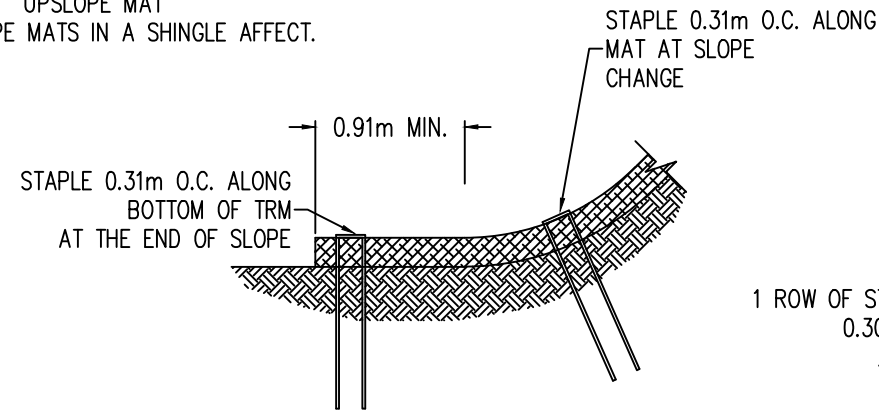


SLOPE DETAIL DETAIL 1

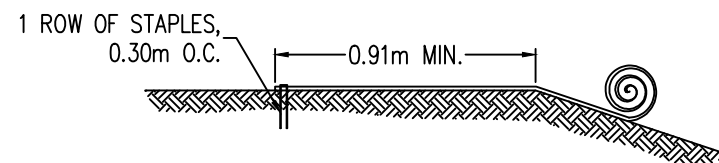
END SEAM OF MAT OVERLAP 0.3m  
PLACE STAPLES, ONE ON EACH CORNER OF BLANKET, 0.15m O.C. ALONG MAT END THROUGH BOTH MATS. UPSLOPE MAT LAPS OVER DOWNSLOPE MATS IN A SHINGLE AFFECT.



END ROLL OVERLAP DETAIL 2

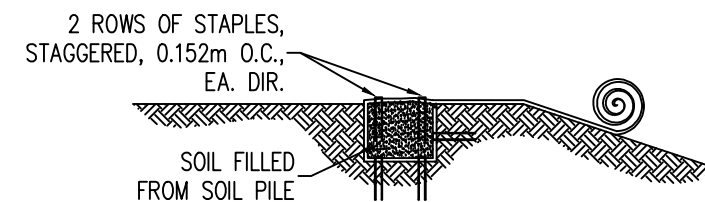


BOTTOM OF SLOPE TERMINATION DETAIL 3

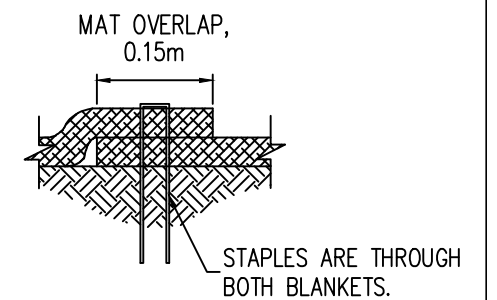


SLOPE CREST ANCHOR METHOD "A" (NO TRENCH) DETAIL 4

DO NOT NEED TO TRENCH MAT IN IF IT CAN BE EXTENDED A MINIMUM OF 0.91m OVER THE CREST OF THE SLOPE.



SLOPE TRENCHING METHOD "B" DETAIL 5



SIDE SEAM OVERLAP STAPLE DETAIL DETAIL 6

**REVISIONS \ ISSUE**

NO.	DESCRIPTION	DATE

Project Number
Date Drawn 06/13/2016
Scale N.T.S.
Designed by
Drawn by
Checked by

**COIR MAT**

APPENDIX 3. NATIVE PLANT COLLAGE

Riparian species- Area 1, 2 and 3



Kinnikinnick



Ocean Spray



Mallow Ninebark



Oregon Grape



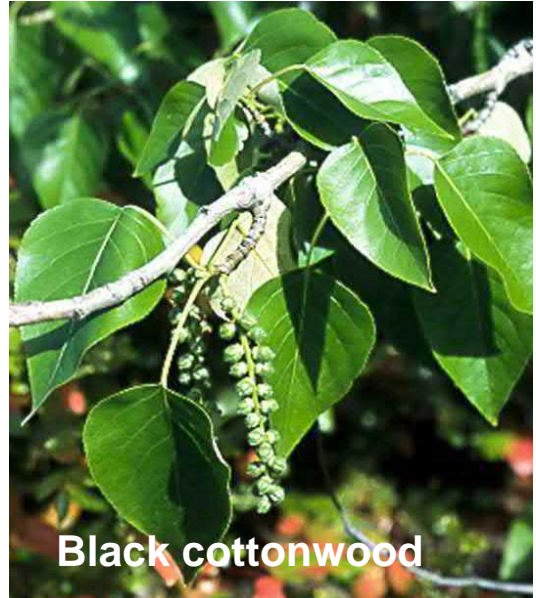
Red Osier Dogwood



Sandbar willow



Saskatoon



Black cottonwood



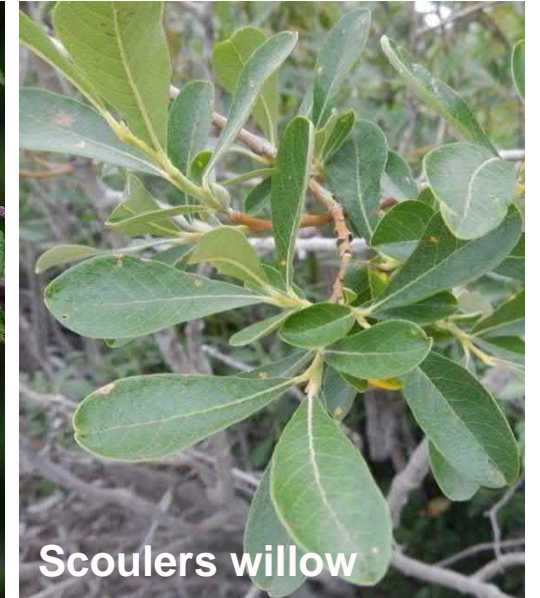
Common snowberry



Douglas Maple



Red flowering currant



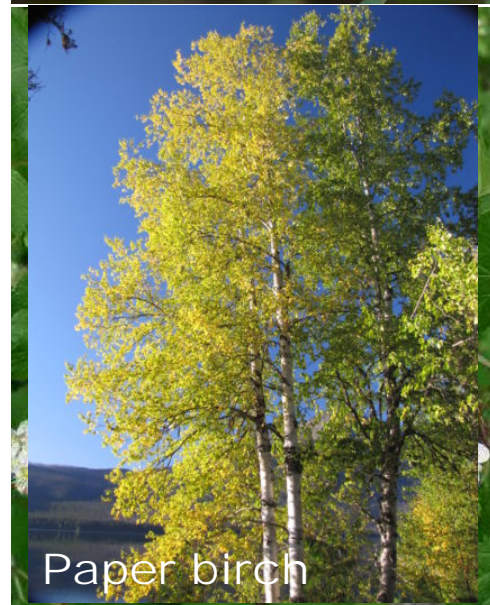
Scoulers willow



White Pine



Trembling aspen



Paper birch



Blue elderberry



Elijah Blue Fescue



Karl Foerster Feather Reed Grass





Ponderosa pine



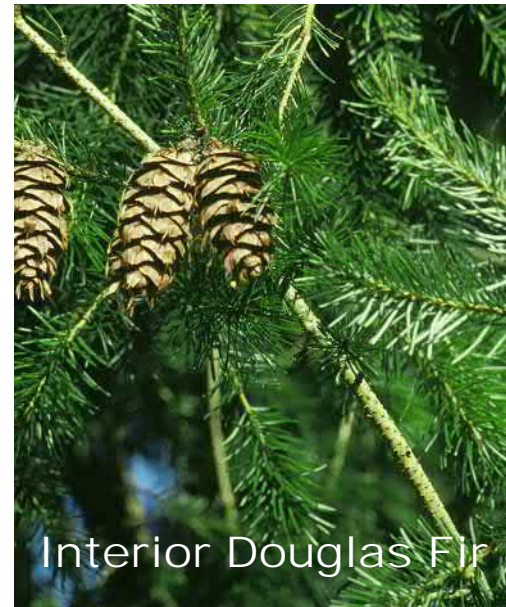
Pacific willow



Mountain ash



Beaked hazelnut



Interior Douglas Fir



Lodgepole pine

Flood tolerant species- Area 1 below 533.5 m



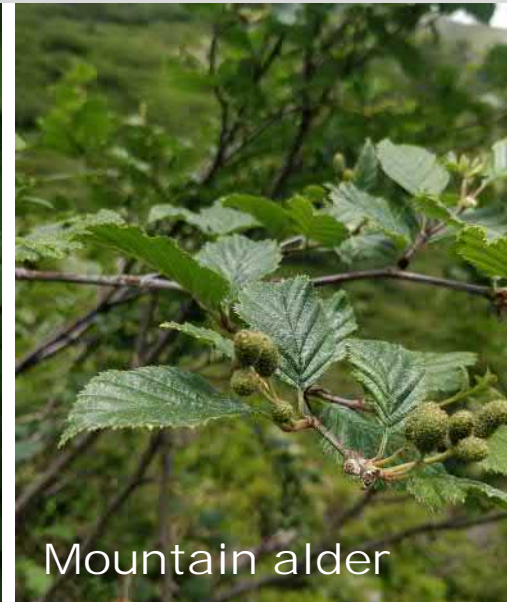
Red Osier Dogwood



Sandbar willow



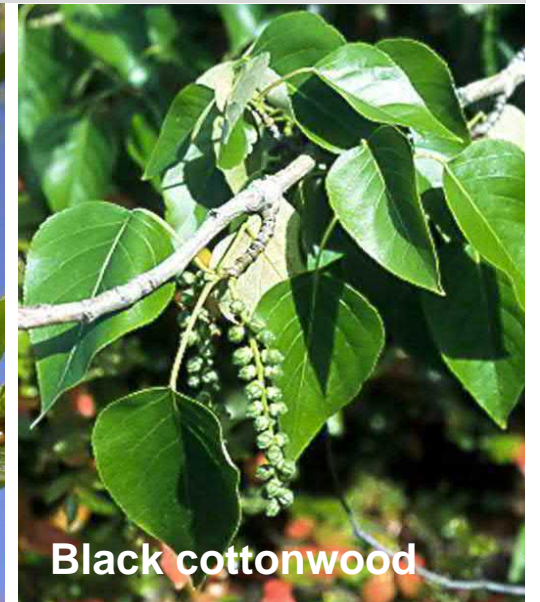
Native rose  
(Nootka or Woods)



Mountain alder



Pacific willow



Black cottonwood



Water birch



Lodgepole pine  
Dinwoodie



Sitka willow



Canada bluejoint  
grass



Beaked sedge



Baltic rush