



REGIONAL DISTRICT OF CENTRAL KOOTENAY
BOX 590, 202 Lakeside Drive, NELSON, BC V1L 5R4
 ph: 250-352-8165 fax:250-352-9300
 email: plandept@rdck.bc.ca

REFERRAL FORM
DEVELOPMENT PERMIT APPLICATION
RDCK Planning File: DP2106E
Date: May 11, 2021

You are requested to comment on the attached DEVELOPMENT PERMIT for potential effect on your agency's interests. We would appreciate your response WITHIN 30 DAYS (PRIOR TO April June 11, 2021). If no response is received within that time, it will be assumed that your agency's interests are unaffected.

LEGAL DESCRIPTION & GENERAL LOCATION:

365, 373, 377 and 381 Park Avenue, PROCTOR, ELECTORAL AREA 'E'
 STRATA LOTS 33, 34, 35 & 36 PLAN NES3286, DISTRICT LOT 873, KOOTENAY LAND DISTRICT, TOGETHER WITH AN INTEREST IN THE COMMON PROPERTY IN PROPORTION TO THE UNIT ENTITLEMENT OF THE STRATA LOT AS SHOWN ON FORM V (PIDs: 027-785-084, 027-785-092, 027-785-106)

PRESENT USE AND PURPOSE OF PERMIT REQUESTED: Combined the subject properties total approximately 0.6 hectares and are located near the end of Park Avenue in Proctor, Electoral Area 'E', which is known as "Kootenay Lake Village". The properties are designated Suburban Residential (RS) under *Electoral Area 'E' Official Community Plan Bylaw (OCP) No. 2260, 2013*. Prior to adoption of the OCP previous development included the construction of a main house (365 Park Avenue), guest house (363 Park Avenue) and a yurt (381 Park Avenue). In addition, the riparian and foreshore areas were landscaped within the property boundaries, which included rock landscaping, graveled pathways and access road(s), stone steps, fire pit area, lawn, and other plantings. The lots are adjacent to Park Avenue and the CP rail line to the south, and Kootenay Lake to the northeast.

This current proposal is to develop the foreshore and incorporate restoration activities, including a new boat house and marine rail construction, re-construction of rock landscaping and restoration of impacted beach areas. The subject lands lie within a Watercourse Development Permit (WDP) area for the protection of the natural environment, its ecosystems and biological diversity. The purpose of the WDP is to regulate development activities in watercourses and their riparian areas to protect aquatic habitat; and to conserve, enhance and, where necessary, restore watercourses and their riparian areas.

AREA OF PROPERTY	ALR STATUS	ZONING	OCP
0.6 hectares	No	N/A	Suburban Residential (RS)

APPLICANT: Charles and Sandra Leatherman c/o Masse Environmental Consultants Ltd.

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

TRANSPORTATION <input checked="" type="checkbox"/> West Kootenay District Office, Nelson <input checked="" type="checkbox"/> HABITAT BRANCH (Environment) FRONT COUNTER BC (FLNRORD)	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:
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- Nelson
- Cranbrook
- AGRICULTURAL LAND COMMISSION
- REGIONAL AGROLOGIST
- ENERGY & MINES
- MUNICIPAL AFFAIRS & HOUSING
- INTERIOR HEALTH
- HBE Team, Nelson
- KOOTENAY LAKES PARTNERSHIP
(FORESHORE DEVELOPMENT PERMITS)
- SCHOOL DISTRICT NO.
- WATER SYSTEM OR IRRIGATION DISTRICT
- UTILITIES (FORTIS, BC HYDRO, NELSON
HYDRO, COLUMBIA POWER)

- A B C D E F G H I J K
- APC AREA E
- RDCK FIRE SERVICES
 - District Chief Nora Hannon – Kaslo, Balfour, Harrop, North Shore & Ymir
 - District Chief George Hamm – Pass Creek, Ootischenia, Robson, Tarry’s & Beasley
 - District Chief Gord Ihlen – Crescent Valley, Passmore, Winlaw, Slocan & Blewett
- RDCK EMERGENCY SERVICES
- RDCK BUILDING SERVICES
- RDCK UTILITY SERVICES
- RDCK RESOURCE RECOVERY
- RDCK REGIONAL PARKS

INSERT COMMENTS ON REVERSE . . .

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

RESPONSE SUMMARY

FILE: DP2106E APPLICANT: Masse Environmental

Name:

Date:

Agency :

Title:

RETURN TO: STEPHANIE JOHNSON, PLANNER
 DEVELOPMENT SERVICES
 REGIONAL DISTRICT OF CENTRAL KOOTENAY
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 NELSON, BC V1L 5R4
 Ph. 250-352-8162
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RDCK Map



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



REGIONAL DISTRICT OF CENTRAL KOOTENAY
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 maps@rdck.bc.ca

Legend

- Official Community Plan
- Electoral Areas
- RDCK Roads
- Cadastre
- Civic Address

Map Scale:

1:2,257

Date: May 11, 2021



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

RDCK Map



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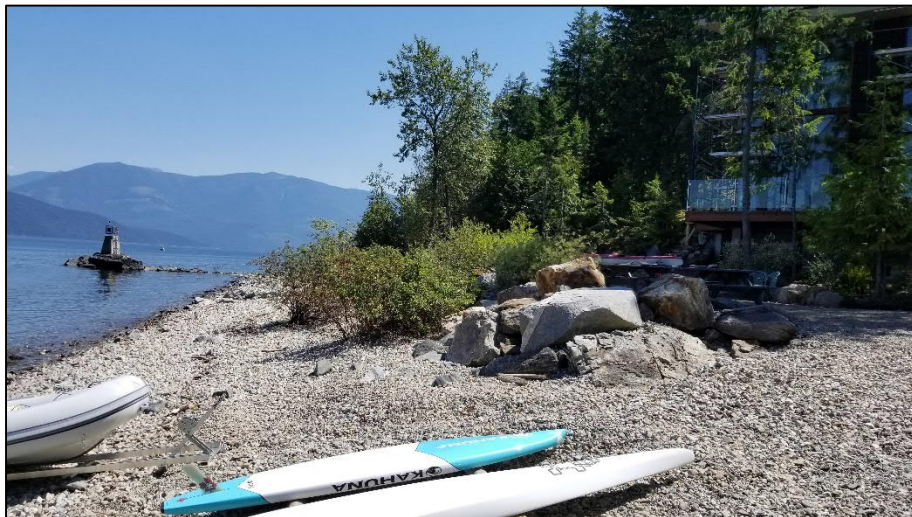


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365, 373, 377 AND 381 PARK AVENUE
PROCTER, BC

Riparian Assessment



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

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

March 31, 2021

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ABBREVIATIONS

- AHI: Aquatic Habitat Index
- DBH: Diameter at Breast-Height
- FIM: Foreshore Inventory Mapping
- GSC: Geodetic Survey of Canada
- HWM: High Water Mark
- LWD: Large Woody Debris
- FLNRORD: Forests, Lands and Natural Resource Operations and Rural Development
- QEP: Qualified Environmental Professional
- RAR: Riparian Area Regulation
- RDCK: Regional District of Central Kootenay
- ROW: Right of Way
- SPEA: Streamside Protection and Enhancement Area
- WDP: Watercourse Development Permit
- ZOS: Zones of Sensitivity

1 INTRODUCTION

Masse Environmental Consultants Ltd. was retained by Charles Brooke Leatherman, Owner, to conduct a riparian assessment to accompany an application for a Waterfront Development Permit on the following properties: 365 Park Avenue (PID 028-301-242), 373 Park Avenue (PID 028-301-251), and 377 Park Avenue (PID 028-301-269). Proposed foreshore development and restoration activities include a new boat house and marine rail construction, re-construction of rock landscaping and restoration of impacted beach areas. Site visits were conducted on July 28, 2020 and November 25, 2020 by Fiona Lau B.Tech., A.Sc.T. and Natasha Osloff Environmental Tech. In addition, a site meeting was held on Sept 30, 2020 with Brooke Leatherman (Owner), Fiona Lau (Masse), Sangita Sudan (RDCK), Nelson Wight (RDCK) and Tim Davis (MFLNRORD) to discuss proposed works and identify any potential Agency concerns.

This riparian assessment evaluates the existing conditions of the property and riparian areas, identifies habitat values, assesses potential environmental impacts, and recommends mitigation measures to protect and compensate for the alterations within the riparian area. It is based on the following regulatory framework and best management practices documents:

- Electoral Area 'E' Rural Official Community Plan Bylaw *No. 2260, 2013*.
- British Columbia *Riparian Areas Regulation*
- Kootenay Lake Shoreline Management Guidelines
- British Columbia *Water Sustainability Act*
- General BMPs and Standard Project Considerations (Ministry of Environment)
- On the Living Edge: Your Handbook for Waterfront Living
- Develop with Care. Environmental Guidelines for Urban and Rural Land Development in British Columbia
- British Columbia Firesmart Homeowners Manual
- Riparian Factsheet No. 6 – Riparian Plant Acquisition and Planting
- BC Tree Replacement Criteria
- A Homeowner's Guide to Stormwater Management.

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

I, Lisa Pavelich, hereby certify that:

- a) I am a qualified environmental professional, 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 Regulation.

2 PROJECT OVERVIEW

2.1 Location

The subject properties are located in Kootenay Lake Village in Procter, BC and are bordered by private properties to the northwest and northeast, Park Avenue to the southwest, and Kootenay Lake to the northeast. The properties cover a total area of ~1.5 acres with ~161 m of frontage on Kootenay Lake (Appendix 1).

The project area is within the Interior Cedar Hemlock dry warm variant 1 (ICHdw1) biogeoclimatic subzone (MacKillop and Ehman 2016). This moist climatic region is characterized by very hot, moist summers; and very mild winters with light snowfall. Soils generally dry out in late summer for varying extents of time ranging from insignificant to extensive. Snowpacks are very shallow to shallow and of short duration and combined with the mild climate result in no significant soil freezing (MacKillop and Ehman 2016).

2.2 Existing Site Conditions

The northeast facing properties are located on the main arm of Kootenay Lake, just south of the outflow into the West Arm and are exposed to strong southerly winds. The Kootenay Lake Village Subdivision was approved before 2013; prior to Electoral Area 'E' Rural Official Community Plan Bylaw *No. 2260, 2013*. Previous development included the construction of a main house on 365 Park Avenue (Photo 1), a guest house on 363 Park Avenue (Photo 2) and a yurt on 381 Park Avenue (Photo 3). In addition, the riparian and foreshore areas were landscaped within the property boundaries, which included rock landscaping, graveled pathways and access road, stone steps, firepit area, lawn, planted rock clusters, and plantings. The Owner developed the properties with care, retaining much of the native riparian vegetation outside of the building footprints with exception to landscaping around both the main house and guest house. Rock landscaping completed along the foreshore during the initial subdivision development is sustaining annual erosion causing rock displacement and imported gravel migration, due to high energy wave action on this section of the lake.

During the site visit, the visible high-water mark (HWM) was determined to be at ~533.75 m elevation based on the location and presence of terrestrial vegetation along the foreshore (see definition of Natural Boundary below), which differs from the natural boundary shown on the 2009 legal survey at ~532.5 m (Appendix 2). A few flood tolerant plants were located below the 533.75 m elevation.

Based on the definition of natural boundary, the 533.75 m elevation will be used as the HWM/Stream Boundary from which the streamside protection area setbacks will be determined as per the Riparian Area Protection Regulation.

“Natural Boundary” means the visible high water mark of any lake, river, stream or other body of water is where the presence and action of the water are so common and usual, and so long continued in all ordinary years, as to mark on the soil of the bed of the body of water a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself.”



Photo 1. View of existing main house and foreshore area.



Photo 2. View of proposed boathouse location in front of the existing guest house.



Photo 3. Existing rock landscaping to be re-constructed below lawn area, southeast of the guest house.



Photo 4. View of lawn area and existing guest house looking northwest.



Photo 5. View of existing firepit area to be restored to natural beach.



Photo 6. View of placed rock to be removed and beach area restored in front of main house.



Photo 7. Yurt along foreshore sited on 381 Park Avenue.

2.3 Proposed Development

The proposed development below the high water mark (HWM) includes:

- Construction of marine rails in Kootenay Lake fronting and within 373 Park Avenue (~68 m²).
- New boathouse and associated beach grading at 373 Park Avenue (35 m²).
- Re-construction of rock landscaping on 373 and 377 Park Avenue (90 m²).
- Restoration of previously impacted beach areas and habitat complexing at 365 Park Avenue (110 m²).

The proposed development within the riparian area above the HWM includes:

- Construction of new boathouse (32m²).
- Riparian vegetation removal and re-planting.

2.3.1 *New Boathouse and beach re-grading activities*

The proposed boathouse (52m²) is sited within private property boundaries; however, it will be partially below the HWM once beach grading activities are completed. This area was historically infilled with imported gravel to make an elevated level area in front of the guest house. The proposed beach grading work will involve de-constructing a rock wall and grading the beach area within and directly in front of the proposed boathouse back to the natural beach elevation (8% +/- 2% gradient). Removed gravel will be spread out over existing pathways and pads, and excess will be spread in a thin layer (< 3" thick) over the upper section of the beach. The boat house will be constructed on marine grade concrete columns below the HWM, which will allow water to pass through. The native beach substrate will be retained as the boathouse floor. Engineering of the boathouse foundation is still to be finalized. Any native shrubs within the footprint of the marine rails will be salvaged and replanted along the foreshore at the direction of a QEP.

2.3.2 *Marine Rails*

The proposed marine rail system includes one set of rails ~45 m in length located mostly below the HWM. The rails extend ~1 m below the average low water level (530 m) for Kootenay Lake. The rail system consists of two parallel low profile metal rails (3 cm in width) that sit ~17 cm above the ground. It will be

1.4 m wide with supporting untreated wood crossbeams 0.1 m (4") x ~0.3 m (12") x 1.8 m (72 ") installed every 3 m along the length of the rail. The cross beams will be embedded into the substrate along the beach to the low water mark (LWM) and below the LWM they will be set directly on the lakebed.

2.3.3 Rock Landscaping

Rock landscaping completed along the foreshore during the initial subdivision development is sustaining annual erosion causing rock displacement and imported gravel migration, due to high energy wave action on this section of the lake. As part of this project, the homeowner would like to replace the imported rock located in front of the guest house and lawn area to the south-east. The footprint of the rock landscaping occurs ~ 90 m² below the HWM. This will involve, dismantling the stacked rock, removing geotextile fabric and re-landscaping the area by grading to a lesser slope, strategically placing rock, embedding boulders, installing alternative subgrade materials (ie. cobbles and gravel and/or coir matting) and integrating native plant pockets within the rock. Integrated planting will be field fit and directed by a QEP specializing in erosion control protection. Any plants removed during construction will be salvaged and re-planted within the newly constructed rock wall. These walls will be <1.2 m (5') in height; therefore, do not require engineering and will be field fit in consultation with the machine operator, Owner and QEP.

Refer to Site Plan and Section Drawings for conceptual design (Appendix 2).

2.4 Services and Site Drainage

Water services for the main house, guest house and yurt are supplied by Procter Water Utility (PWU), a Provincially regulated private supplier which services the Kootenay Lake Village Strata Development. Water is currently extracted from a well-based source and will move to a lake-based system in the future. Currently PWU is building the pump house for the lake based system; however there is no estimated timeline on when the new system will be operational.

Sewer services are also provided by Procter Water Utility. All black water is pumped to a large septic field which was designed to serve both the Strata and the Uplands Strata. Each residence in the Strata is required to maintain a 1,000 gal. septic tank for solids, that is in accordance with the Strata Bylaws and is pumped every 3-5 years.

No new water or sewer services are proposed as part of this development.

3 REGULATORY REVIEW

3.1 Streamside Protection and Enhancement Area

To determine whether the 15 m WDP setback from the High Water Mark (HWM) of Kootenay aligns with Riparian Area Protection Regulation (RAPR) criteria, a detailed assessment of the subject property was conducted to calculate the Streamside Protection and Enhancement Area (SPEA) setbacks. Results for the Zones of Sensitivity (ZOS) and SPEA are presented in Table 1 and Figure 2.

As per the RAPR, the large woody debris (LWD), and litter ZOS were plotted 15 m inland from the HWM of Kootenay Lake. The Shade ZOS was plotted 27-30 m south of the HWM. The SPEA setback is determined based on the ZOS with the greatest width. Therefore, within the subject property the SPEA ranges from 27-30 m from the HWM and generally encompasses the entire lots.

The BC Riparian Areas Regulation (BC 2015) defines “High Water Mark” and “Stream” as follows:

“High Water Mark” means the visible high water mark of a stream where the presence and action of the water are so common and usual, and so long continued in all ordinary years, as to mark on the soil of the bed of the stream a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself, and includes the active floodplain.”

“Stream” includes any of the following that provides fish habitat:

- (a) a watercourse, whether it usually contains water or not;
- (b) a pond, lake, river, creek or brook;
- (c) a ditch, spring or wetland that is connected by surface flow to something referred to in paragraph (a) or (b).

Table 1. Results of detailed RAPR assessment.

Feature Type	SPVT ¹	Zones of Sensitivity			SPEA
		LWD	Litter fall	Shade	
Kootenay Lake	TR	15 m	15 m	27-30m	27-30m

¹ SPVT: site potential vegetation type (TR-tree)

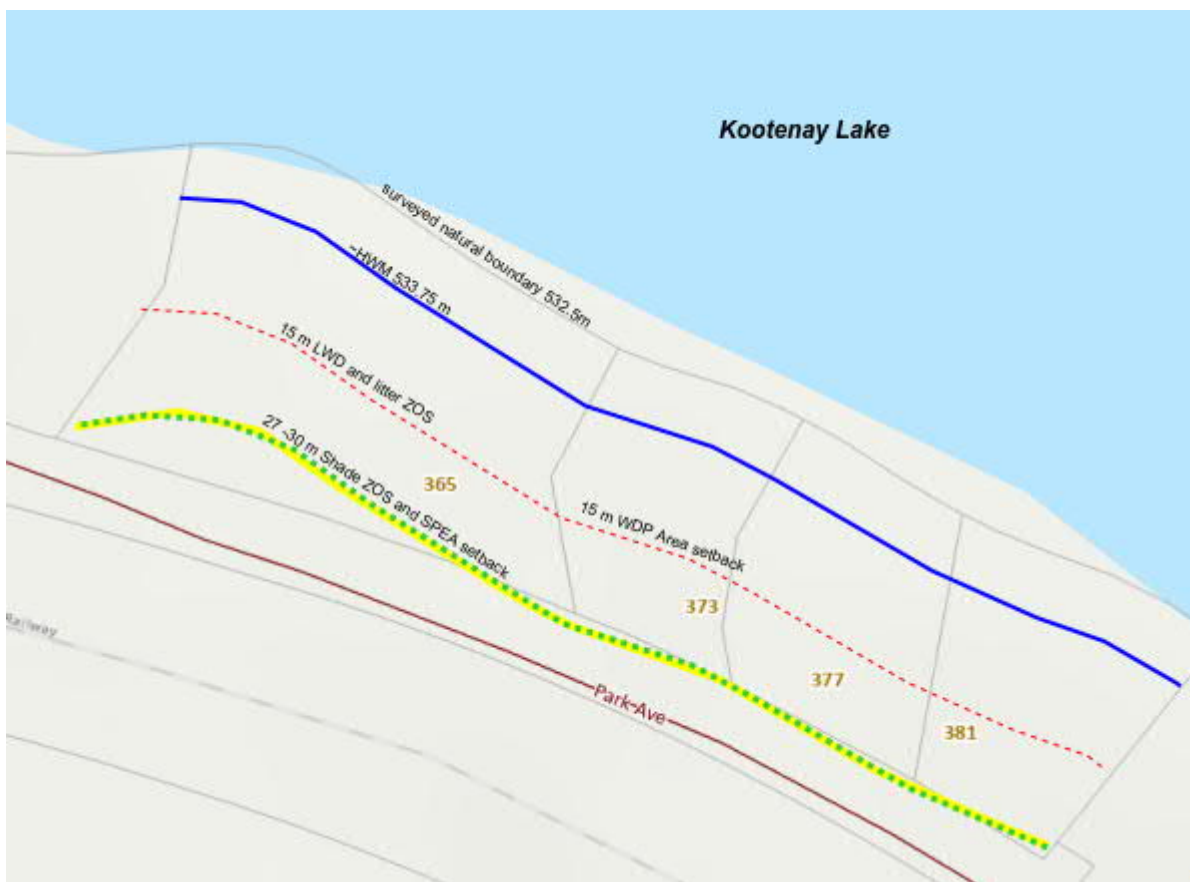


Figure 1. SPEA setback map.

3.2 Kootenay Lake Shoreline Management Guidelines

The Kootenay Lake Foreshore Inventory Mapping (FIM) and the Kootenay Lake Shoreline Management Guidelines documents (EEC 2016, KLP 2018) were used to help determine site specific risk for riparian habitat, Ktunaxa Nation cultural values, and archaeological resources along the shoreline. The property is within FIM segment 214. Table 2 provides the environmental and archaeological risk results identified in the FIM along the shoreline of the property.

Table 2. Environmental and archaeological risk results.

Aquatic Habitat Index Rating (AHI)	Aquatic Sensitivity	Archaeological Risk	Enhanced Engagement Required
High	Yes	Yellow	Yes

3.3 Permitting

The following regulatory permit applications are being applied for as part of this development approval:

- Specific permission for marine rails within crown land of Kootenay Lake.
- Section 11 Authorization Application.

- RDCK Development Permit Area Application.
- RDCK Site Specific Floodplain Exemption Application.

4 RESOURCES

4.1 Fish and Fish Habitat

4.1.1 Kootenay Lake

The foreshore area is gently sloped (~8-10% gradient) with substrate consisting predominantly of cobble and gravel with some boulders (Photos 8 and 9). Fish habitat along the foreshore supports juvenile rearing habitat. Small fry are able to utilize the cobble and boulder substrate for cover. No known spawning has been reported in this area. No aquatic vegetation was observed instream along the foreshore of the property. Kootenay Lake supports a variety of fish species, including several species of regional interest, such as Rainbow Trout, Bull Trout, Kokanee, White Sturgeon, Westslope Cutthroat Trout, and Burbot. Mussels were not observed along the foreshore; however, a complete mussel survey was not conducted as part of the initial site visit. Additional investigation will be conducted prior to marine rail installation; however, mussels are not anticipated to be present based on site characteristics.



Photo 8. View of foreshore looking southeast.

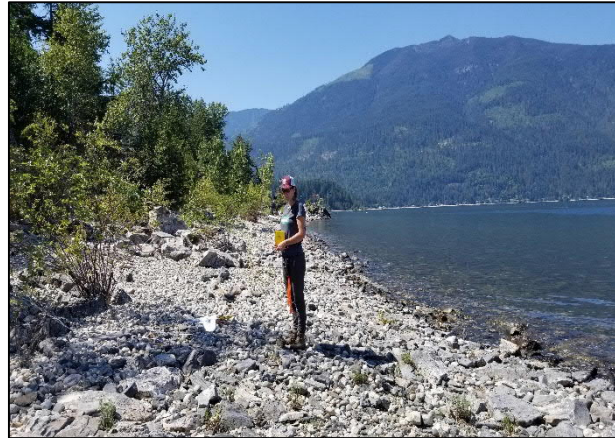


Photo 9. View of foreshore looking northeast.

4.2 Riparian Vegetation

Riparian vegetation along the foreshore below the HWM consists of red osier dogwood (*Cornus stolonifera*), sandbar willow (*Salix exigua*), and Nootka rose (*Rosa nutkana*) changing to Saskatoon (*Amelanchier alnifolia*), Alder sp (*Alnus* sp.), Water birch (*Betula occidentalis*), Mountain alder (*Alnus incana*) and Black cottonwood (*Populus balsamifera*) along the upper edge of the beach. Upland riparian vegetation is a mixed conifer forest with areas of exposed bedrock. Vegetation consists of Douglas fir (*Pseudotsuga menziesii*), Western red cedar (*Thuja plicata*), trembling aspen (*Populus tremuloides*), with understory vegetation consisting of oval leafed blueberry (*Vaccinium ovalifolium*), kinnikinnick (*Arctostaphylos uva-ursi*), thimbleberry (*Rubus parviflorus*), one-leaved foam flower (*Tiarella unifoliata*), nodding onion (*Allium cernuum*), Western licorice fern (*Polypodium hesperium*) and moss sp..



Photo 10. View of deciduous shrubs and trees along foreshore with upland conifer forest habitat.



Photo 11. View of flood tolerant trees and shrubs along highwater mark within riparian area.

4.2.1 Reptiles and Amphibians

The talus slopes and outcrops along the foreshore may provide habitat for northern alligator lizards (*Elgaria coerulea*) and garter snakes (*Thamnophis* spp.). The subject property provides limited breeding habitat, with some foraging habitat for amphibians.

4.2.2 Birds

The subject property is likely visited by other songbirds, waterfowl, and raptors particularly during the spring breeding season. No stick nests were observed, though the mature Douglas-fir above the property provides potential perching and nesting sites for raptors.

4.2.3 Mammals

The property provides potential forage habitat for ungulates, bears and small mammals within the deciduous shrubs, trees and berry bushes growing along the foreshore.

4.3 Species at Risk

A 10 km buffer around the subject property was used to query BC Conservation Data Center records using the [CDC iMap](#) tool. Based on this query, two species at risk occurrences are known within the 10 km of the project area:

- 1) The Upper Kootenay River white sturgeon (*Acipenser transmontanus*) population. The nearest white sturgeon Critical Habitat is at the Crawford Creek delta on the opposite side of Kootenay Lake (Environment Canada 2014).
- 2) A western skink (*Plestiodon skiltonianus*) observation from the east shore of Kootenay Lake near Pilot Bay Provincial Park. The subject property does not provide good skink habitat.

4.4 Archaeological Resources

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

5 IMPACT ASSESSMENT

The entire project footprint is located within the SPEA including the boathouse, marine rails and landscape reconstruction work. Any alteration or removal of vegetation and loss of pervious surface within the SPEA can impact the aquatic habitat of Kootenay Lake and potentially the terrestrial wildlife species which require riparian habitat.

5.1 Aquatic Impacts

The proposed marine rail system (~68 m²) constructed instream should cause minimal disturbance to the foreshore environment since the rail system will sit on the lake bed, does not require an anchoring system and is made of galvanized metal/aluminum which will not rust or leach into the water. The system has been designed so that waves can pass through, causing minimal movement of the structure on the lakebed. The system also allows light penetration to the foreshore and does not cause a barrier to fish movement.

The proposed boathouse structure (20 m²) and inlet area (~15 m²) sited below HWM requires removal of imported fill and rock material and grading to natural beach gradient; consequently, increasing shallow water habitat along the shoreline during high water. The boathouse will have an open bottom which will allow water movement under the structure and provide access to fish during high water; reducing its impact.

The proposed rock landscaping re-construction areas (90 m²) are located mostly within the same footprint of the existing landscaping, potentially with a slight encroachment towards the lake in order to reduce the slope and integrate riparian planting. Provided that the measures to protect the SPEA outlined in Section 6 are followed landscape reconstruction should have no significant impact to the aquatic habitat. If mitigation recommendations, including revegetation with native species (section 7) are followed, then proposed works could provide a net positive impact for aquatic habitat.

5.2 Wildlife Impacts

The installation of the marine rail structure may cause a potential tripping hazard to mammals accessing the shoreline. To mitigate this the rail will be low profile (~17cm high) allowing mammals to step over.

The proposed boathouse structure is located in a pre-disturbed area with limited vegetation; however, will still require the removal of one Interior Douglas fir tree (230 mm DBH) and relocation of a few native shrubs. The construction of the boathouse will cause a net loss of ~32m² of riparian habitat. To mitigate for the loss of riparian habitat a riparian planting plan has been proposed(Section 7).

Provided that measures to protect the SPEA are followed and the recommended mitigation plan is implemented, negative wildlife impacts from the development are not anticipated. Wildlife may benefit from the addition of native species proposed as part of the revegetation plan within the rock landscaping.

6 MEASURES TO PROTECT THE INTEGRITY OF SPEA

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

6.1 Danger Trees

Five Interior Douglas fir trees located next to the guest house were observed to either have damage along the lower trunk and/ or had potential signs of poor health (ie. resinosis) (Table 3). It is recommended that a certified arborist is retained to assess the health of these trees and remove them if considered danger trees.

Table 3. List of potential danger trees

Tree Species	Diameter at breast height (DBH)
Interior Douglas Fir	80 mm
Interior Douglas Fir	334 mm
Interior Douglas Fir	191 mm
Interior Douglas Fir	223 mm
Interior Douglas Fir	143 mm

6.2 Windthrow

A Registered Professional Forester (RPF) was not retained to assess potential windthrow since minimal clearing is proposed within the SPEA. Further assessment of windthrow is beyond the scope of this report, and any such assessment should be led by a RPF, or Professional Arborist.

6.3 Slope Stability

No slope stability hazard indicators were observed during the site visit. Further assessment of geotechnical hazard is beyond the scope of this report, and any such assessment should be led by a P.Geo, or P.Eng.

6.4 Protection of Trees and Vegetation in the SPEA

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

- Staging and access should only occur in previously disturbed areas of the site.
- A QEP should visit the site with the construction contractor prior to development to identify areas of vegetation to be retained.

- In addition to identifying vegetation retention areas, the QEP may make other recommendations regarding material handling and equipment storage to ensure that remaining riparian vegetation is not impacted.
- No pollutants should be allowed to contaminate the soil around trees in the SPEA.

6.5 Encroachment

As the proposed boathouse and marine rail development will occur within the SPEA, further development within 373 Park Ave Avenue is discouraged to preserve the function of the remaining riparian vegetation, and to promote re-establishment of riparian vegetation recommended in the Mitigation Plan in Section 7.

Any future development proposed within the SPEA of any of the subject properties will require a QEP review and an Environmentally Sensitive Watercourse Development Permit.

6.6 Sediment and Erosion Control

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

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

6.7 Stormwater Management

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

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

6.8 Floodplain Concerns

The proposed boathouse structure is located within the 15 meter floodplain setback of Kootenay Lake. The boathouse structure will be attached to the existing guesthouse, therefore the Owner will submit an application to the RDCK to request a site specific exemption of the required Kootenay Lake floodplain setback from 15 meters to 9 meters for the purpose of a boathouse. Deverney Engineering Services Ltd.

has been retained to assess whether the proposed site exemption satisfies the requirements of Section 11.0 of the RDCK Floodplain Management Bylaw 2080,2009. Please refer to the report prepared by Deverney Engineering (Dated March 19, 2021) for further information on application for site specific floodplain exemption.

6.9 Scheduling of Environmentally Sensitive Activities

Works should be scheduled to avoid impacts to SPEA vegetation, aquatic habitat, and nesting birds. The best timing for instream work is February-April when Kootenay Lake water levels are low. Any cutting of riparian vegetation should be completed within the least risk window for nesting birds (August 15-April 15), or will require a nesting survey if completed outside this window.

6.10 Protection of Fish Habitat

Development of the property should protect fish habitat by:

- Limit beach modification to permitted areas and preserve foreshore vegetation and boulders which provide fish habitat during periods of inundation.
- 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.
- Permitting instream works under Section 11 of the *Water Sustainability Act* and having a QEP present to ensure proper isolation of construction work from aquatic habitat.

6.11 Management of Equipment and Fuel/Lubricant Materials

The most likely source of any contaminant is from equipment or vehicles used or stored on-site, either during fueling or from unanticipated leaks or the failure of a hydraulic hose. To minimize the likelihood and impact of a spill within the riparian area, ensure that:

- Each piece of heavy equipment will be equipped with its own spill response kit.
- All staff will be familiar with the use of spill kits and their contents. The contents of the kits will be replaced immediately after use.
- Equipment will be stored in a designated area as far from Kootenay lake as possible and secondary containment will be utilized to capture any potential spills or leaks.

6.12 Invasive Plant Management

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

- All equipment should be thoroughly washed and inspected before entering the project site to prevent the import of new invasive plant seeds and root fragments.
- Amount of vegetation clearing, and soil disturbance should be minimized.
- All exposed soils should be re-vegetated immediately following construction.

7 MITIGATION PLAN

The Shoreline Management Guidelines for Kootenay Lake outlines general principles for shoreline development in order to achieve a “No Net Loss” of habitats present. The principle is achieved by applying the following priority sequence of mitigation options: 1. *Avoidance* of environmental impacts; 2. *Minimization* of unavoidable impacts; 3. On-site *restoration*; and 4. *Offset* residual impacts that cannot be minimized through compensation (KLP 2018). Avoidance was not achievable with the proposed development; therefore, mitigation measures to minimize and restore the foreshore area are being recommended and are described in the following sections.

7.1 Beach Restoration with Habitat Complexing

The previously constructed firepit area (~110 m²) located in front of the main house at 365 Park Avenue will be restored back to natural beach habitat. This area was historically infilled with imported gravel to make an elevated level area. The proposed work will involve de-constructing the placed rock and grading the area back to an elevation consistent with the natural beach substrate at approximately 10% +/- 2% gradient. Gravel will be first dispersed onto existing pathways/gravel pads and any excess spread in a thin layer (<3" thick) on the upper beach area. The upper section of beach is inundated less than 2 months per year and most likely will be washed into the lake during the next high-water event. Impacts to fish habitat are expected to be minimal to nil. Boulders removed from the rock wall will be placed in clusters instream to create interspatial habitat for fish in shallow waters. A QEP will direct relocation works in consultation with the Owner. Clusters of native flood tolerant shrubs will be planted along and below the HWM, with appropriate erosion protection placed on the surface using natural materials (ie. coir matting and/or native beach substrate) at the direction of the QEP.

Refer to Site Plan and Section Drawings for conceptual design (Appendix 2).

7.2 Revegetation

As part of the proposed development, revegetation of disturbed areas will be implemented. This will include:

- Salvage red osier dogwood and willow shrubs removed within project footprint (marine rails, boathouse and rock walls) and replant within rock landscaping or on restored beach area.
- Plant at least 30 flood tolerant shrubs within the restored beach area and integrated into the reconstructed rock landscaping. A list of recommended riparian species that can be planted below the HWM is provided in Table 4.
- Plant a minimum of 15 shrubs and 3 trees around the boathouse above the HWM. The 3 trees will replace the one Interior Douglas fir tree (240 dbh mm) to be removed within the boathouse footprint. A list of recommended riparian species that can be planted above the HWM is provided in Table 4.
- Shrubs should be a minimum of 4" potted stock and trees to be a minimum of 1.5 m in height.
- Planting should not occur during periods of hot dry weather unless they are irrigated daily.
- Locally adapted native plants are preferable to those collected or grown outside the region. The species listed in Table 4 are available from Sagebrush Nursery in Oliver

(<https://sagebrushnursery.com>), or Tipi Mountain Native Plants (<http://tmnp.tipimountain.com/>) near Kimberley.

- Plant species can be substituted with alternative native species, in consultation with the QEP.
- Any additional trees removed next to the guest house deemed a danger by a professional arborist shall be re-placed according to the BC Tree Replacement Criteria (Table 5).
- Replanting of riparian and upland vegetation around the proposed buildings should adhere to principles of rural residential fire protection (for more information see the FireSmart Homeowner's Manual MFLNRO N.D.).
- Ensure the objective of the restoration is to naturalize the riparian area and not create a landscaped garden.
- Regularly irrigate new plantings during the plant establishment period for a minimum of 3 years.

Table 4. Native plants for revegetation.

Common Name	Latin name
<i>Planted below the HWM (all of these species can also be planted above HWM)</i>	
Red osier dogwood	<i>Cornus stolonifera</i>
Sandbar willow	<i>Salix exigua</i>
Sitka willow	<i>Salix sitchensis</i>
Nootka rose	<i>Rosa nutkana</i>
Mountain alder	<i>Alnus incana</i>
Water birch	<i>Betula occidentalis</i>
Blue joint grass	<i>Calamagrostis canadensis</i>
<i>Planted above the HWM</i>	
Western red cedar	<i>Thuja plicata</i>
Western white pine	<i>Pinus monticola</i>
Interior Douglas fir	<i>Pseudotsuga menziesii</i>
Paper birch	<i>Betula papyrifera</i>
Douglas maple	<i>Acer glabrum</i>
Mallow ninebark	<i>Physocarpus malvaceus</i>
Oceanspray	<i>Holodiscus discolor</i>
Blue elderberry	<i>Sambucus caerulea</i>
Oval leaved blueberry	<i>Vaccinium ovalifolium</i>
Common snowberry	<i>Symphoricarpus albus</i>
Blue joint grass	<i>Calamagrostis canadensis</i>
Idaho fescue	<i>Festuca idahoensis</i>
Junegrass	<i>Koeleria macrantha</i>
Pink spirea	<i>Spiraea douglasii</i> spp. <i>menziesii</i>

Table 5. BC Tree Replacement Criteria

Tree diameter at breast height (dbh)	Replacement Criteria
0 mm- 151 mm (6") dbh	2 replacement trees (min height 1.5 m) or 4 shrubs for up to 50% of trees being replaced.
152 mm-304 mm (12") dbh	3 replacement trees (min. height of 1.5 m)
305 mm-456 mm (18") dbh	4 replacement trees (min height 2 m)
457 mm- 609 mm (24") dbh	6 replacement trees (min. height >2.0 m)
610 mm- 914 mm (36") dbh	8 replacement trees (min. height >2.0 m)

8 ENVIRONMENTAL MONITORING

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

- QEP will be onsite for a pre-construction meeting with Owner and Contractor to ensure that all parties are aware of environmental sensitivities and familiar with the proposed mitigation measures.
- QEP will conduct onsite monitoring and provide professional guidance during beach restoration and wall re-construction activities, to ensure that the works are being conducted in compliance with proposed plans and permits.
- QEP will conduct a post construction site visit once planting is complete to assess compliance and completion of the project.
- QEP will prepare an environmental summary report and submit to the RDCK and Regional Habitat Officer.

Further effectiveness monitoring of mitigation measures may also be required. The following indicators of success of riparian plantings should be documented:

- Plant composition includes only trees and shrubs from
- Table 4, or other native species as advised by QEP.
- Establishment of 45 shrubs and 3 trees within the revegetation areas after 3 full years would be a reasonable indication that the mitigation plan has been successfully completed.

9 CONCLUSION

Overall, the construction as proposed will pose minimal ecological risk to Kootenay Lake as long as the recommendations outlined in this report are implemented. The proposed marine rail system located below the HWM will not negatively impact fish disturb natural substrate and the boathouse has been designed to allow waves to pass through. If you have any comments or questions, please do not hesitate to contact the undersigned.

10 CLOSURE

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

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

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

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

Sincerely,



Fiona Lau, ASCT, BTech.
fiona@masseenvironmental.com

Reviewed by:



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

11 REFERENCES

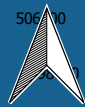
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365, 373, 377, 381 Park Avenue, Procter BC – Riparian Assessment



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

[RDCK] Regional District of Central Kootenays. 2013. Electoral Area 'E' Rural Official Community Plan Bylaw No. 2260, 2013.

APPENDIX 1
LOCATION MAP

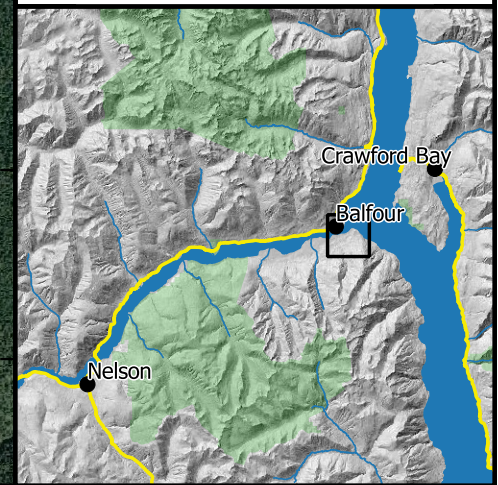


Marine Rail Project Location

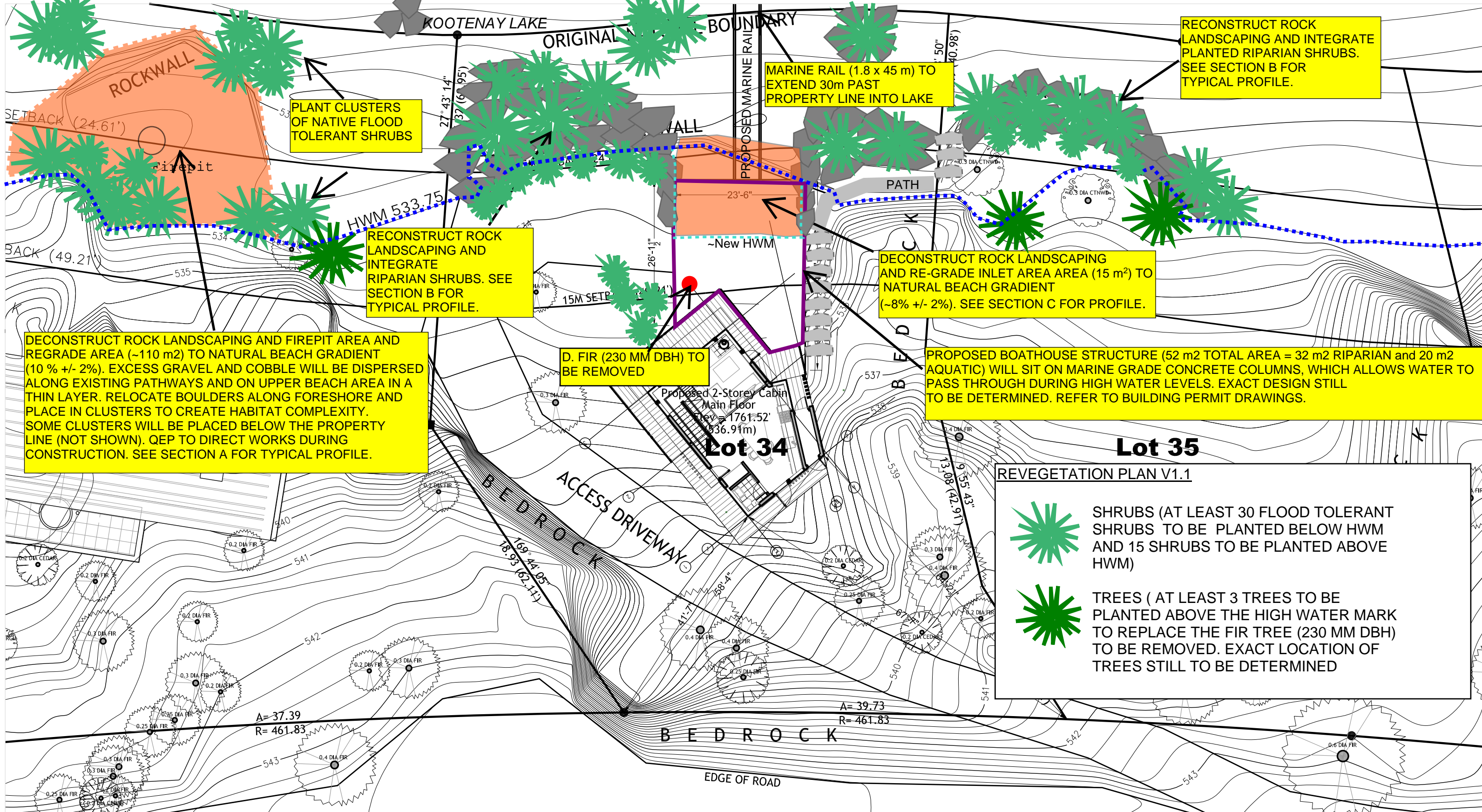
-  Roads
-  Kootenay Lake

1:20000

12/4/2020



APPENDIX 2
SITE PLAN AND MITIGATION PLANS



DECONSTRUCT ROCK LANDSCAPING AND FIREPIT AREA AND REGRADE AREA (~110 m²) TO NATURAL BEACH GRADIENT (10% +/- 2%). EXCESS GRAVEL AND COBBLE WILL BE DISPERSED ALONG EXISTING PATHWAYS AND ON UPPER BEACH AREA IN A THIN LAYER. RELOCATE BOULDERS ALONG FORESHORE AND PLACE IN CLUSTERS TO CREATE HABITAT COMPLEXITY. SOME CLUSTERS WILL BE PLACED BELOW THE PROPERTY LINE (NOT SHOWN). QEP TO DIRECT WORKS DURING CONSTRUCTION. SEE SECTION A FOR TYPICAL PROFILE.

RECONSTRUCT ROCK LANDSCAPING AND INTEGRATE RIPARIAN SHRUBS. SEE SECTION B FOR TYPICAL PROFILE.

MARINE RAIL (1.8 x 45 m) TO EXTEND 30m PAST PROPERTY LINE INTO LAKE

RECONSTRUCT ROCK LANDSCAPING AND INTEGRATE PLANTED RIPARIAN SHRUBS. SEE SECTION B FOR TYPICAL PROFILE.

DECONSTRUCT ROCK LANDSCAPING AND RE-GRADE INLET AREA AREA (15 m²) TO NATURAL BEACH GRADIENT (~8% +/- 2%). SEE SECTION C FOR PROFILE.

D. FIR (230 MM DBH) TO BE REMOVED

PROPOSED BOATHOUSE STRUCTURE (52 m² TOTAL AREA = 32 m² RIPARIAN and 20 m² AQUATIC) WILL SIT ON MARINE GRADE CONCRETE COLUMNS, WHICH ALLOWS WATER TO PASS THROUGH DURING HIGH WATER LEVELS. EXACT DESIGN STILL TO BE DETERMINED. REFER TO BUILDING PERMIT DRAWINGS.

REVEGETATION PLAN V1.1

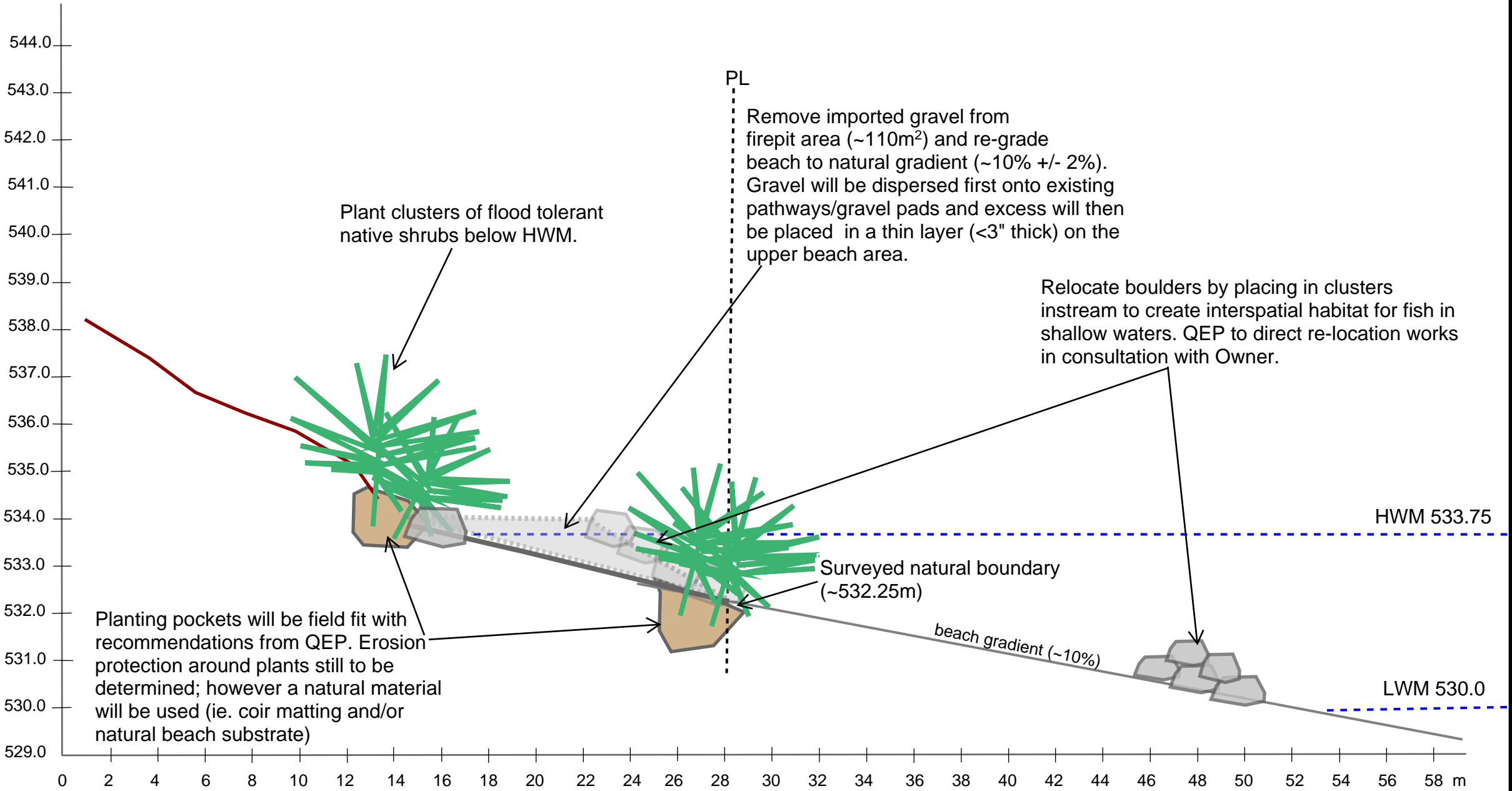
- SHRUBS (AT LEAST 30 FLOOD TOLERANT SHRUBS TO BE PLANTED BELOW HWM AND 15 SHRUBS TO BE PLANTED ABOVE HWM)
- TREES (AT LEAST 3 TREES TO BE PLANTED ABOVE THE HIGH WATER MARK TO REPLACE THE FIR TREE (230 MM DBH) TO BE REMOVED. EXACT LOCATION OF TREES STILL TO BE DETERMINED

OPENSOURCE ARCHITECTURE
 165 East 1st Street, North Vancouver, BC V7L1B2
 T: 604.984.7722 F: 604.984.7726
 www.openspacearchitecture.com

Project: KLV LEATHERMAN BOATHOUSE - LOT 28			
Notes:	Sheet Title: Site Plan - Main		Sheet #:
	Project No.: 20-05	Date:	

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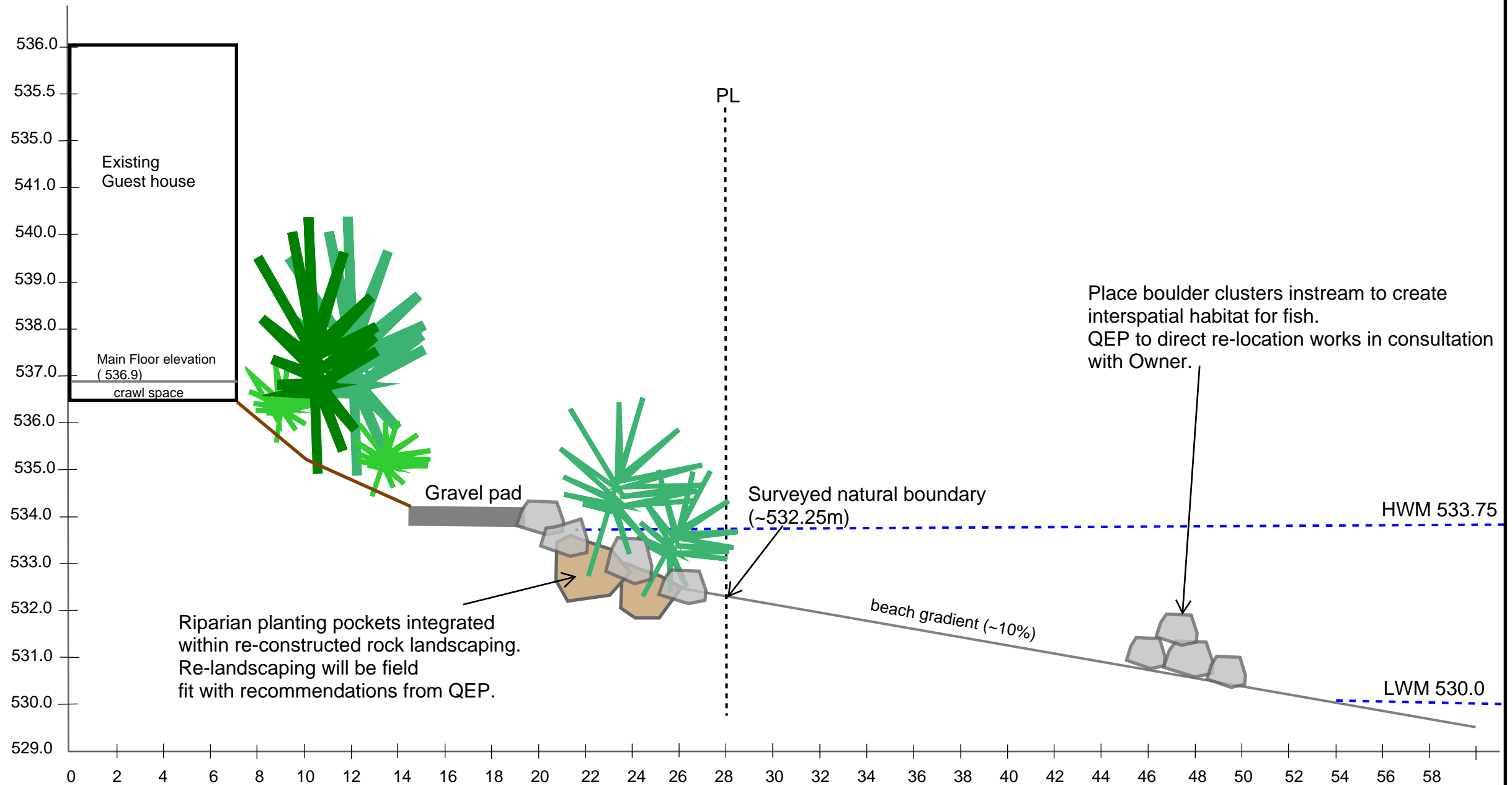
Section A- Foreshore Restoration



Notes:
 -This is NOT an engineered drawing.
 -Lakebed depth was estimated based on onsite clinometer reading and confirmed with legal property survey.

365 Park Avenue Foreshore Restoration
 Section A- Conceptual Design Profile
 Drawn to Scale (as shown)
 Drawn by: F.L
 Date: Mar 31, 2021

Section B- Rock Wall Re-construction

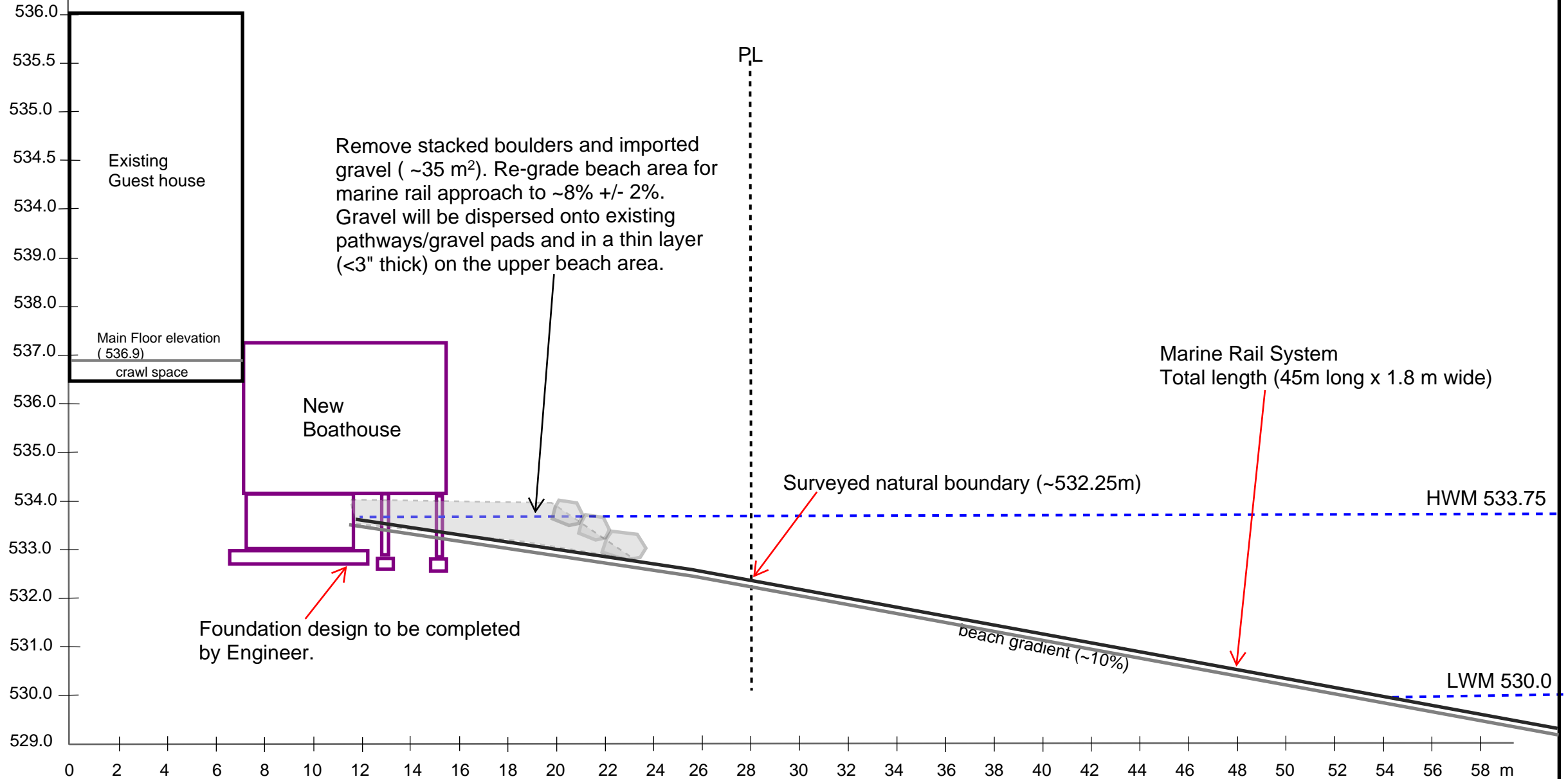


Notes:
 -This is NOT an engineered drawing.
 -Lakebed depth was estimated based on onsite clinometer reading and confirmed with legal property survey.

373 Park Avenue Foreshore Restoration
 Section B-Conceptual Design Profile
 Drawn to Scale (as shown)
 Drawn by: F.L
 Date: Mar 31, 2021



Section C- Marine Rail and Boathouse



Notes:
 -This is NOT an engineered drawing.
 -Lakebed depth was estimated based on onsite clinometer reading and confirmed with legal property survey.

373 Park Avenue Marine Rail
 Section C- Marine rail and boathouse
 Drawn to Scale (as shown)
 Drawn by: F.L
 Date: Mar 19, 2021





Ms. Sandy Leatherman and Mr. Brooke Leatherman
c/o Masse Environmental Consultants Ltd.
812 Vernon Street, Nelson, BC
V1L 4G4

Date: March 19, 2021
File: DE09-0833B

Re: Site Specific Exemption from Floodplain Bylaw,
Leatherman Boathouse, 373 Park Avenue, Procter, BC

Dear Sir and Madam,

This letter-report presents a summary of findings of a Flood Hazard assessment of the site of a proposed Boathouse to be constructed at 373 Park Avenue, Procter, BC.

Legal description is: **Strata Lot 34, DL 873, Kootenay District Plan NES3286.**

Figure 1 is a site plan map of the subject property showing the proposed boathouse structure in relation to existing buildings and property boundaries, including the Natural Boundary.

Figure 2 is a Section drawing showing the boathouse and associated marine railway.

1.0 BYLAWS AND REGULATION

1.1 RDCK Bylaw No. 2080.

This report is prepared in accordance with requirements of **Section 11, Site Specific Exemptions** of the Regional District of Central Kootenay Floodplain Management Bylaw No. 2080, 2009, pursuant to Section 910 of the Local Government Act.

11.0 Site-Specific Exemptions

11.1 An application by a property owner to the Regional District for a site specific exemption of Floodplain Specifications shall be completed in the form provided by the Regional District and submitted in accordance with the instructions on the application. This provision is not a substitute for any requirements under Section 56 of the Community Charter.

11.2 As a condition of a site specific exemption, the property owner will be required at his/her own expense to commission a Professional Engineer's report that addresses exemption precedents in the surrounding area and provide a summary report containing a description of the proposed development, and recommendations for conditions, as applicable.

1.2 Local Government Act (Section 524) – Flood Plain Bylaw Exemption

Requirements for a site-specific exemption are described in the Local Government Act (Section 524) – Flood Plain Bylaw Exemption as follows:

With reference to subsection (7) Subject to the Provincial regulations and a plan or program as local government has developed under those regulations, the local government may exempt a person from the application of subsection (6), or a bylaw under subsection (3), in relation to a specific parcel of land or a use, building, or other structure on the parcel of land, if the government considers it advisable and either

- (a) considers that the exemption is consistent with the Provincial guidelines, or***
- (b) has received a report that the land may be safely used for the use intended, which report is certified by a person who is***
 - (i) a professional engineer or geoscientist and experienced in geotechnical engineering, or***
 - (ii) a person in a class prescribed by the environment minister under subsection (9)***

Such a report may recommend requirements for measures, that may include, but is not limited to items such as erosion / scour protection, special foundation design to address reduced soil bearing capacity under flooding conditions, and limits to use of portions of the building for electrical and mechanical installations.

Under the Local Government Act, a covenant may be placed on the property title that limits the Owner's eligibility for Provincial Floodplain relief.

1.3 Professional Practice Guidelines

Reference has been made to Engineers and Geoscientists BC, Professional Practice Guidelines for Legislated Flood Assessments in a Changing Climate in BC, V 2.1 – August 28, 2018.

2.0 LIMITATIONS OF REPORT

Deverney Engineering Services Ltd. (DESL) has prepared this report for and at the expense of the property owners. The material in it reflects the judgement of DESL in light of the information available to DESL at the time of report preparation.

Findings and recommendations presented in this report are intended to support application for a Site Specific Exemption from the Floodplain Bylaw No. 677, and can be used by the Owner and the Development Approval agencies to adjudicate the proposed development.

Any use that other third parties make of this report, or any reliance on decisions to be based on it is the responsibility of such third parties. DESL accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

3.0 CONFIDENTIALITY AND DISCLOSURE

With reference to Professional Practice Guidelines for Legislated Flood Assessments in a Changing Climate in BC (V 2.1 – August 28, 2018):

“Subject to the following, the Qualified Professional (QP) will keep confidential all information, including documents, correspondence, reports and opinions, unless disclosure is authorized in writing by the client. However, in keeping with Engineers and Geoscientists BC’s Code of Ethics, if the QP discovers or determines that there is a material risk to the environment or the safety, health, and welfare of the public or worker safety, the QP shall notify the client as soon as practicable of this information and the need that it be disclosed to the appropriate parties. If the client does not take the necessary steps to notify the appropriate parties in a reasonable amount of time, the QP shall have the right to disclose that information to fulfill his/her ethical duties, and the client hereby agrees to that disclosure.”

4.0 SITE INVESTIGATION

The site field investigation was conducted by the writer on November 10, 2020 with a follow-up visit on March 11, 2021. The investigation included a reconnaissance assessment of the prospective building site on the subject property as well as nearby areas including lake shoreline conditions. No sub-surface investigation of the subject property was conducted.

Reference was made to observations of soil and shoreline conditions at adjacent properties, to regional soils reports, historic lake water levels (FortisBC), aerial images, and topographic maps. A list of References follows the signature page.

5.0 SITE DESCRIPTION

The subject property is situated on a sloping, north to north-east facing property on the west shore of Kootenay Lake within the Community of Procter. The subject property is bounded on the west by Park Avenue and the CP Railway.

The owners are proposing to construct a boathouse and marine railway between the existing cabin and the shoreline of Kootenay Lake. To function as a boathouse, the building footings are necessarily planned to be constructed below the visible High Water Mark (shown at elevation 533.75m), and below the Designated Flood Construction Level.

The Designated Flood Construction Level (FCL) for Kootenay Lake is the projected 200 - Year Return Period flood water level of **536.5 metres** (1,760.17') - GSC Datum). The FCL includes a Freeboard Allowance of 0.76 metres (2.5').

The Variance request is to allow the encroachment of a portion of the boathouse structure approximately 3 metres into the 15 metre Setback Distance from the Natural Boundary for a **Reduced Setback Distance of 12 metres from the Natural Boundary.**

The owners propose to otherwise conform to the elevation requirements of the Floodplain Bylaw with respect to subsection 6 (a)

(i) the underside of any floor system, or the top of any pad supporting any space or room, including a manufactured home, that is used for dwelling purposes, business or the storage of goods which are susceptible to damage by floodwater shall be above the specified level

6.0 SHORELINE CONDITIONS AND STRUCTURES

6.1 Lake Characteristics

Kootenay Lake is a narrow and relatively deep lake situated between the Selkirk and Purcell Ranges. The lake is situated in a north / south orientation, encompassing a length of approximately 105 km, with width ranging from 3 to 5 km.

Major inflows are from the Kootenay River in the south and the Duncan River in the north. Both rivers are controlled by dams; the Duncan Dam operated by BC Hydro and the Libby Dam operated by the US Army Corps of Engineers.

Outflows from the lake are through the West Arm of Kootenay Lake, with discharge controlled by a constriction point at Grohman Narrows. Lake water levels throughout the year are governed by the 1938 International Joint Commission (IJC) order on Kootenay Lake. The IJC administers the Boundary Water Treaty of 1909 between Canada and the United States.

Specific control of lake level is undertaken between September 1 and March 31. After March 31, efforts are made to keep the lake elevation below 530.145 m (1,739.23'). There is limited control for extreme lake elevations.

Maximum lake water levels occur in the period from late April to June, associated with snowmelt conditions.

The flood of record occurred in 1932 when peak level was 537.18 m (1,762.4'). More recent records of lake levels are summarized by FortisBC over the period 1973 to 2020, covering a 48 year period of record. Those records are summarized in **Appendix 1**.

Annual peak lake levels over the period of record from 1973 to 2020 ranged from a Low of 531.48m (1977) to a High of 534.69m (1974).

Recent high lake levels of interest occurred in 2012; 534.55 m and 2018; 534.07m. Annual minimum lake levels cover a lesser range, from 529.71m (2001) to 530.05m (2011). Average minimum lake level is 530.04m.

A 1:200 year flood level (including freeboard) of 536.5m was adopted in 1979 with floodplain maps issued in August 1981. A freeboard allowance of 0.76m was added to the estimated maximum static water level to include wave action and wind set up.

Predominant wave direction in Kootenay Lake is in the north / south direction, following the general alignment of the valley.

The maximum fetch distance at the subject property is more than 20 km from the north, and approximately 5 km from the east. The property shoreline is sheltered from wind and waves approaching from the south.

The shoreline at the subject property is directly exposed to the predominant wind and waves from the north, so the generalized lake-wide maximum wave setup and wave height allowance of 0.76m is appropriate for this site.

6.1 Beach

The shoreline of Kootenay Lake at the subject property is a sloping area overlain by naturally occurring angular rock fragments of cobble to boulder sizes. Photo 1 shows the existing shoreline from the boathouse location looking northwest. Photo 2 shows the shoreline at the looking southeast through the boathouse site. At this time of year, the rock fragments show a whitish cast coating.

There are bedrock outcroppings visible at boathouse location as the existing house on this site is founded on bedrock. There is a small rocky headland immediately to the northwest of the site that extends approximately 10 – 15 metres lakeward from the shoreline (Photo 1). A smaller rocky point shelters the beach from the southeast (Photo 2)

The dark grey angular rock fragments on the shore are inferred as the product of local bedrock weathering, being of the same lithology as the nearby bedrock outcroppings.

Infill materials between angular rocks are coarse sand and sub-angular gravel to small cobble sizes. These infill materials are lighter brown in colour. These materials are inferred as re-worked beach deposits, and scattered remnant materials from previous shoreline “dressing” conducted during original development of this subdivision.

6.3 Vegetation

There are scattered shrubs, perennial plants and some deciduous trees present on the beach area above the Natural Boundary.

Details and distribution of existing and proposed shoreline restoration plantings are shown on a Re-Vegetation Plan (Revision 1.1) attached in **Appendix 2**.

7.0 EROSION HAZARDS

7.1 Beaches

The whitish angular rock fragments and underlying bedrock are non-erodible. This is a mature and stable shoreline having been exposed to high lake water levels and storm waves for hundreds of years.

Some seasonal removal and re-cycling of the sand and gravel infill materials is expected due to wave action. Such erosion impacts would be limited to the loss of those surface materials, resulting in the re-exposure of the underlying coarser materials.

There is no expectation of shoreline regression affecting the existing cabin structure and the proposed boathouse building.

7.2 Climate Change Considerations

Effects of climate change on erosion hazards are associated with possible occurrence of high lake water levels at a higher frequency compared to the probability model employed during the floodplain mapping.

This can occur as increased frequency of occurrence of water levels at the magnitude of the 200 year return period, and possible occurrence of water levels that exceed the 200 year return period.

Higher frequency of occurrence may be expressed as increased requirements for remedial repairs or maintenance.

Increased event magnitude, i.e. flood levels that exceed the estimated 200-year return period elevations are addressed in part by the 0.76m (2.5') freeboard allowance.

7.3 Other Hazards

Based on the site field assessment and review of existing hazard mapping and aerial images, no other natural hazards were identified at the subject property.

The subject property is separated from upland areas of Procter Point by intervening broken terrain.

There are no up-land sourced watercourses that present overland flooding or debris flood / debris flow hazards to the subject property.

8.0 CONCLUSIONS

Landward regression of shoreline at the subject property is prevented by the presence of existing stable and non-erodible shoreline substrate materials. There is no expectation of landward regression of the lake shoreline under lake water level conditions up to and including the 200 year return period maximum lake level.

Where the 200 year return period is generally accepted as a tolerable level of risk, then the proposed site-specific exemption is consistent with that accepted risk level.

Reduction of the setback distance to approximately 12 metres, as proposed will not increase the likelihood of damage due to flooding in Kootenay Lake above that frequency of occurrence.

Building foundations constructed as proposed are below the FCL. Soil bearing resistance will be reduced by the reduction of soil internal friction and the reduced soil weight under high lake water levels.

Boathouse footings and piers will require Engineered measures to provide adequate soil bearing resistance under all conditions including inundation. In addition, footings and pier bases will require Engineered design for scour and erosion protection due to wave erosion that could expose, degrade, or otherwise damage building foundations under lake water level conditions up to and including the 200 year return period maximum lake level.

9.0 RECOMMENDATIONS – EXEMPTION APPROVAL

It is recommended that consideration be given to approval of the requested Exemption from the Floodplain Bylaw for the proposed building construction on the subject property as follows:

9.1 Floodplain Setback

The proposed relaxed setback distance is **12 metres** from the Natural Boundary.

9.2 Flood Construction Level

Proposed building elevations are below the FCL in fitting with the intent of use as a boathouse, and are therefore **Not Compliant**. Utilities, switchgear and other appliances within the building that are damageable by water will be installed above the FCL elevation.

9.3 Restrictive Covenant

There are no recommendations for a restrictive Covenant to be registered on the subject property.

Any additional / future residential construction on the Subject Property will be undertaken under the RDCK's Floodplain Management Bylaw No. 2080 (or successive Bylaws) that would require hazard assessment if non-conforming.

10.0 RECOMMENDATIONS – SITE WORKS AND CONSTRUCTION

10.1 Erosion Protection

There are no recommendations for additional (new) erosion protection measures.

10.2 Building Design and Construction

In conformance with the Floodplain Management Bylaw, it is recommended that building design consider measures to mitigate possible damage to buildings and contents, including electrical and mechanical installations during periods of high lake water levels up to and including the designated Flood Construction Level of 536.5 m.

Footings are to be designed in consultation with a Geotechnical Engineer to assure suitable subgrade soil bearing resistance in consideration of inundated or near – inundated conditions.

Footings and foundations are to be designed in consultation with a suitably qualified Professional Engineer and constructed in conformance with that design to assure long term stability under possible scour conditions associated with wave action.

10.3 Supervision

It is recommended that verification of building foundation locations with respect to the Relaxed Setback Distance be conducted by a BCLS or other Qualified Registered Professional (QRP).

11.0 SAFE FOR INTENDED PURPOSE

Reference is to be made to the attached Statement prepared in conformance with EGBC's **Professional Practice Guidelines for Legislated Flood Assessments in a Changing Climate in BC** for statements regarding suitability of the property, as being **safe for the purpose intended**, under conditions where the Site-Specific exemption is granted.

12.0 CLOSURE

This report is prepared in accordance with generally accepted engineering practices in this area. No other warranty, express or implied is made.

Variability is inherent in geological features, and actual ground conditions in some parts of the site may differ from those inferred. Subsurface soil conditions have been inferred from the observed exposures. Changes to design details, work procedures and other project considerations may be warranted on the basis of site conditions encountered.

Respectfully submitted

DEVERNEY ENGINEERING SERVICES LTD.

A red circular professional engineer stamp for Norman L. Deverney, #21563, dated March 19, 2021. The stamp includes the text "PROFESSIONAL ENGINEER", "BRITISH COLUMBIA", and "N. L. DEVERNEY # 21563". A handwritten signature "Norman L. Deverney" is written across the stamp, and the date "March 19, 2021" is handwritten below it.

Norman L. Deverney, P.Eng., FEC

Cc: Ms. Fiona Lau, ASCT, Masse Environmental Consultants Ltd.

References

Air Photos Google Earth Images

RAB Bulletin 20, Soil Resources of the Nelson Map Area (82F), Report No. 28, J.R. Jungen, British Columbia Soil Survey, Ministry of Environment, Resource Analysis Branch, 1980.

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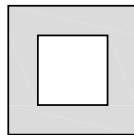
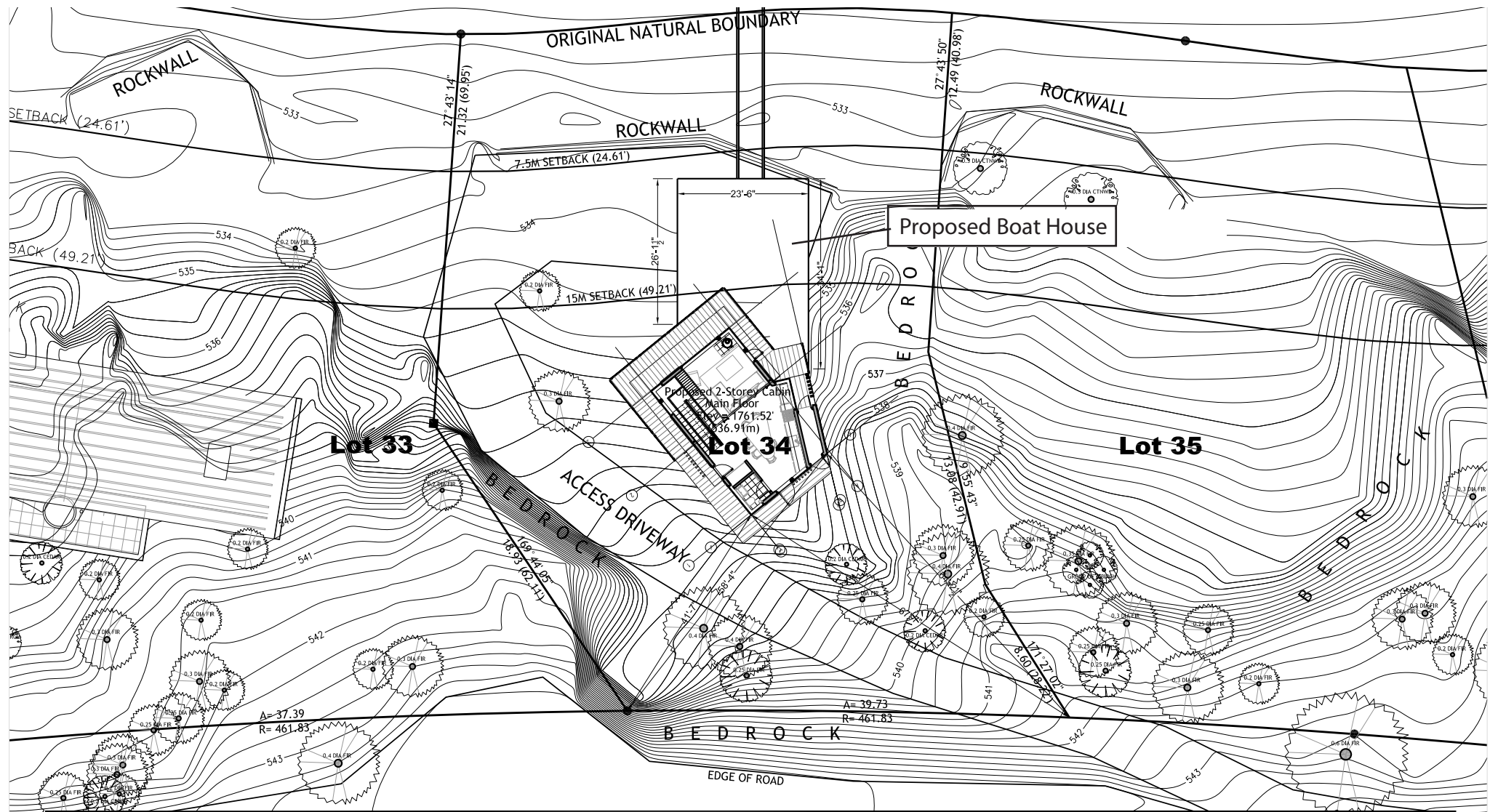
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FortisBC, **Historic Kootenay Lake Water Levels, 1973 – 2020.**



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Project:			
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Notes:	Sheet Title:		Sheet #:
	Site Plan - Main		
	Project No.:	Date:	Scale:
	20-05		1/16" = 1'-0"

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March 2021

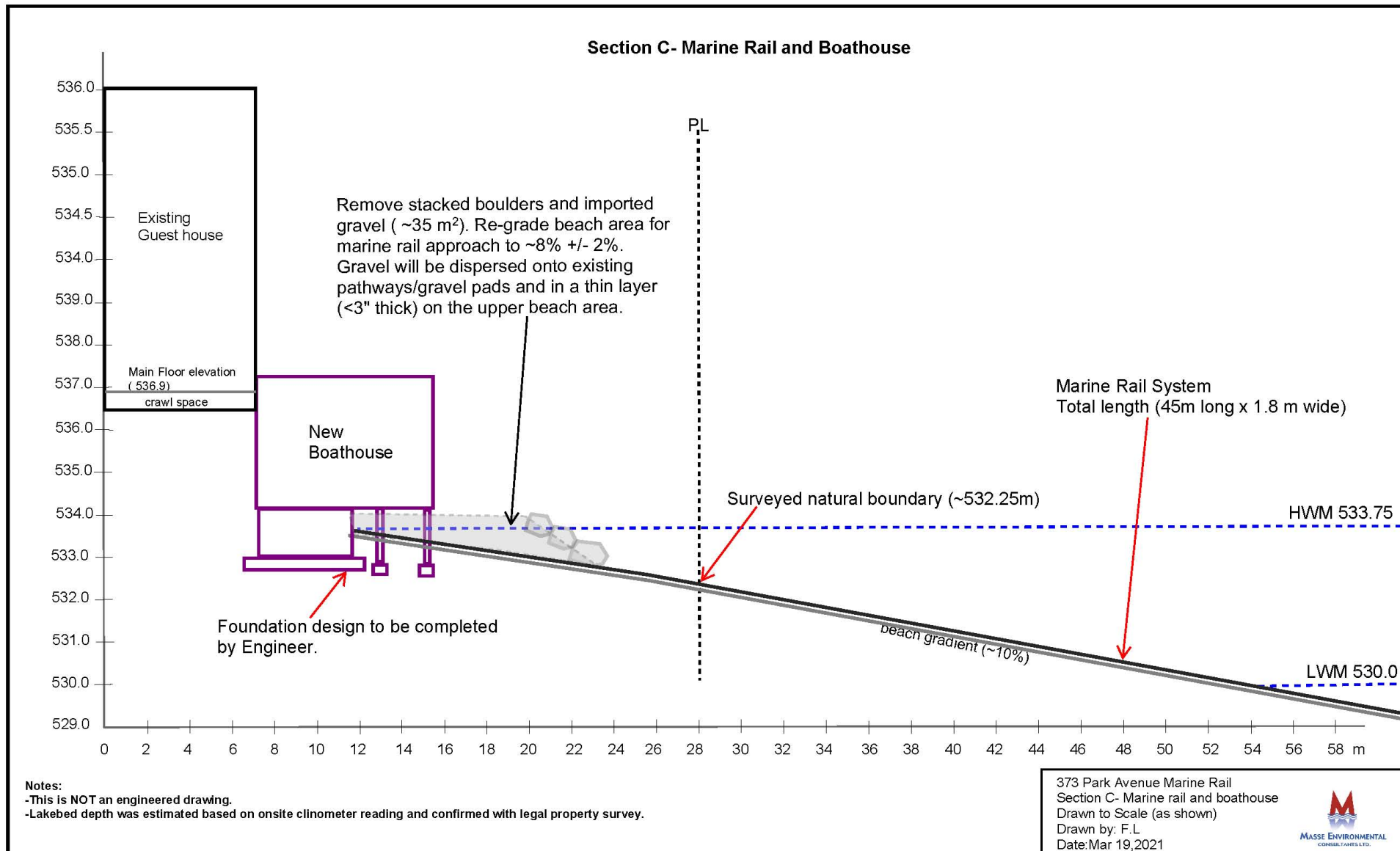
Scale: Reduced From Original

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Figure 1 - Site Plan

Leatherman Boathouse, 373 Park Ave. Procter, BC Strata Lot 34, DL 873, Kootenay District Plan NES3286

Ms. Sandy Leatherman and Mr. Brooke Leatherman



Site Photos (March 11, 2021)

Photo 1 Shoreline of Subject Property Looking Northwest



Existing house on left is on bedrock and above the FCL. The large rocks visible are landscape items that will be de-constructed and re-graded to natural beach gradient. The rounded gravel and small cobble sizes are a mix of native and imported materials. The whitish cobble sizes close to the shoreline are native. The Navigation Marker is on bedrock that shelters this shoreline from winds and waves approaching from the west.

Photo 2 Shoreline of Subject Property at Boathouse Site Looking Southeast



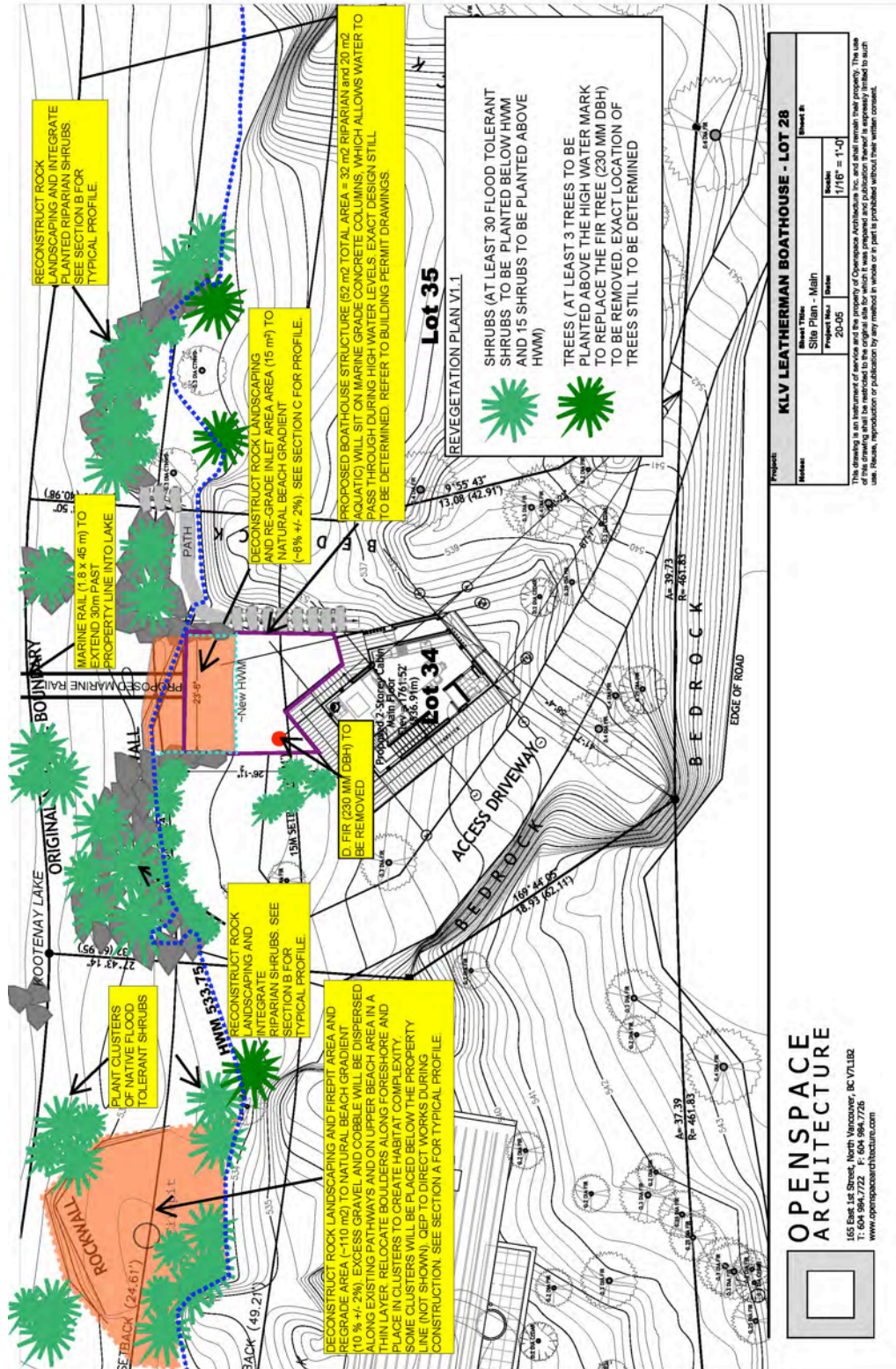
Existing cabin on right is founded on bedrock and is above the FCL (536.9m). Large rock in right foreground is a natural outcropping. Others are placed landscape rocks that will be de-constructed and re-graded to natural beach gradient. The rounded gravel and small cobble sizes are a mix of native and imported materials. The whitish cobble sizes close to the shoreline are native. The Navigation Light is on bedrock that shelters this shoreline from winds and waves approaching from the south.

Appendix 1 Kootenay Lake Water Levels

Kootenay Lake Water Levels at Queens Bay 1973 - 2020

Year	Minimum		Maximum	
	Feet	Metres	Feet	Metres
1973	1739.01	530.05	1745.03	531.89
1974	1739.50	530.20	1754.24	534.69
1975	1738.52	529.90	1747.52	532.64
1976	1739.18	530.10	1747.25	532.56
1977	1738.73	529.96	1743.70	531.48
1978	1738.97	530.04	1747.57	532.66
1979	1738.42	529.87	1743.80	531.51
1980	1738.11	529.78	1748.34	532.89
1981	1738.00	529.74	1749.58	533.27
1982	1738.97	530.04	1749.03	533.10
1983	1738.78	529.98	1748.58	532.97
1984	1738.72	529.96	1747.54	532.65
1985	1738.92	530.02	1747.32	532.58
1986	1739.53	530.21	1748.74	533.02
1987	1738.73	529.96	1746.34	532.28
1988	1738.89	530.01	1745.57	532.05
1989	1739.00	530.05	1746.78	532.42
1990	1739.40	530.17	1749.50	533.25
1991	1739.13	530.09	1750.15	533.45
1992	1738.96	530.04	1745.12	531.91
1993	1738.95	530.03	1745.91	532.15
1994	1739.12	530.08	1745.62	532.06
1995	1738.63	529.93	1749.78	533.33
1996	1739.05	530.06	1751.88	533.97
1997	1739.72	530.27	1752.88	534.28
1998	1738.47	529.89	1749.13	533.13
1999	1738.35	529.85	1750.14	533.44
2000	1738.47	529.89	1748.27	532.87
2001	1737.90	529.71	1745.00	531.88
2002	1737.97	529.73	1751.30	533.80
2003	1738.83	530.00	1748.96	533.08
2004	1738.85	530.00	1746.08	532.21
2005	1738.55	529.91	1747.27	532.57
2006	1739.34	530.15	1751.57	533.88
2007	1740.34	530.46	1750.30	533.49
2008	1737.88	529.71	1749.59	533.28
2009	1738.40	529.86	1747.80	532.73
2010	1738.61	529.93	1748.68	533.00
2011	1740.49	530.50	1751.71	533.92
2012	1739.62	530.24	1753.78	534.55
2013	1739.18	530.10	1749.40	533.22
2014	1739.59	530.23	1750.37	533.51
2015	1740.11	530.39	1747.14	532.53
2016	1740.31	530.45	1748.08	532.81
2017	1738.88	530.01	1751.13	533.74
2018	1739.16	530.10	1752.19	534.07
2019	1738.58	529.92	1746.35	532.29
2020	1738.78	529.98	1750.09	533.43
Max	1740.49	530.50	1754.24	534.69
Min	1737.88	529.71	1743.70	531.48
Mean	1738.95	530.03	1748.59	532.97

Appendix 2 Re-Vegetation Plan, Open Space Architecture Rev. 1.1



FLOOD ASSURANCE STATEMENT

Note: This statement is to be read and completed in conjunction with the current Engineers and Geoscientists BC *Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC* (“the guidelines”) and is to be provided for flood assessments for the purposes of the *Land Title Act*, *Community Charter*, or the *Local Government Act*. Defined terms are capitalized; see the Defined Terms section of the guidelines for definitions.

To: The Approving Authority

Date: March 19, 2021

Regional District of Central Kootenay

202 Lakeside Drive Nelson, BC V1L 5R4

Jurisdiction and address

With reference to (CHECK ONE):

- Land Title Act (Section 86) – Subdivision Approval
- Local Government Act (Part 14, Division 7) – Development Permit
- Community Charter (Section 56) – Building Permit
- Local Government Act (Section 524) – Flood Plain Bylaw Variance
- Local Government Act (Section 524) – Flood Plain Bylaw Exemption

For the following property (“the Property”):

Strata Lot 34, DL 873, Kootenay District Plan NES3286

373 Park Avenue, Procter, BC.

Legal description and civic address of the Property

The undersigned hereby gives assurance that he/she is a Qualified Professional and is a Professional Engineer or Professional Geoscientist who fulfils the education, training, and experience requirements as outlined in the guidelines.

I have signed, sealed, and dated, and thereby certified, the attached Flood Assessment Report on the Property in accordance with the guidelines. That report and this statement must be read in conjunction with each other. In preparing that Flood Assessment Report I have:

[CHECK TO THE LEFT OF APPLICABLE ITEMS]

- 1. Consulted with representatives of the following government organizations:
- 2. Collected and reviewed appropriate background information
- 3. Reviewed the Proposed Development on the Property
- 4. Investigated the presence of Covenants on the Property, and reported any relevant information
- 5. Conducted field work on and, if required, beyond the Property
- 6. Reported on the results of the field work on and, if required, beyond the Property
- 7. Considered any changed conditions on and, if required, beyond the Property
- 8. For a Flood Hazard analysis I have:
 - 8.1 Reviewed and characterized, if appropriate, Flood Hazard that may affect the Property
 - 8.2 Estimated the Flood Hazard on the Property
 - 8.3 Considered (if appropriate) the effects of climate change and land use change
 - 8.4 Relied on a previous Flood Hazard Assessment (FHA) by others
 - 8.5 Identified any potential hazards that are not addressed by the Flood Assessment Report

FLOOD ASSURANCE STATEMENT

9. For a Flood Risk analysis I have:

- 9.1 Estimated the Flood Risk on the Property
- 9.2 Identified existing and anticipated future Elements at Risk on and, if required, beyond the Property
- 9.3 Estimated the Consequences to those Elements at Risk

10. In order to mitigate the estimated Flood Hazard for the Property, the following approach is taken:

- 10.1 A standard-based approach
- 10.2 A Risk-based approach
- 10.3 The approach outlined in the guidelines, Appendix F: Flood Assessment Considerations for Development Approvals
- 10.4 No mitigation is required because the completed flood assessment determined that the site is not subject to a Flood Hazard

11. Where the Approving Authority has adopted a specific level of Flood Hazard or Flood Risk tolerance, I have:

- 11.1 Made a finding on the level of Flood Hazard or Flood Risk on the Property
- 11.2 Compared the level of Flood Hazard or Flood Risk tolerance adopted by the Approving Authority with my findings
- 11.3 Made recommendations to reduce the Flood Hazard or Flood Risk on the Property

12. Where the Approving Authority has not adopted a level of Flood Hazard or Flood Risk tolerance, I have:

- 12.1 Described the method of Flood Hazard analysis or Flood Risk analysis used
- 12.2 Referred to an appropriate and identified provincial or national guideline for level of Flood Hazard or Flood Risk
- 12.3 Made a finding on the level of Flood Hazard or Flood Risk tolerance on the Property
- 12.4 Compared the guidelines with the findings of my flood assessment
- 12.5 Made recommendations to reduce the Flood Hazard or Flood Risk

13. Considered the potential for transfer of Flood Risk and the potential impacts to adjacent properties.

14. Reported on the requirements for implementation of the mitigation recommendations, including the need for subsequent professional certifications and future inspections.

FLOOD ASSURANCE STATEMENT

Based on my comparison between:

[CHECK ONE]

- The findings from the flood assessment and the adopted level of Flood Hazard or Flood Risk tolerance (item 11.2 above)
- The findings from the flood assessment and the appropriate and identified provincial or national guideline for level of Flood Hazard or Flood Risk tolerance (item 12.4 above)

I hereby give my assurance that, based on the conditions contained in the attached Flood Assessment Report:

[CHECK ONE]

- For subdivision approval, as required by the *Land Title Act* (Section 86), “that the land may be used safely for the use intended”:

[CHECK ONE]

- With one or more recommended registered Covenants.
- Without any registered Covenant.
- For a development permit, as required by the *Local Government Act* (Part 14, Division 7), my Flood Assessment Report will “assist the local government in determining what conditions or requirements it will impose under subsection (2) of this section [Section 491 (4)]”.

- For a building permit, as required by the Community Charter (Section 56), “the land may be used safely for the use intended”:

[CHECK ONE]

- With one or more recommended registered Covenants.
- Without any registered Covenant.
- For flood plain bylaw variance, as required by the *Flood Hazard Area Land Use Management Guidelines* and the *Amendment Section 3.5 and 3.6* associated with the *Local Government Act* (Section 524), “the development may occur safely”.
- For flood plain bylaw exemption, as required by the *Local Government Act* (Section 524), “the land may be used safely for the use intended”.

FLOOD ASSURANCE STATEMENT

I certify that I am a Qualified Professional as defined below.

March 19, 2021

Date

Prepared by

Norman L. Deverney, P.Eng., FEC

Name (print)



Signature

Deverney Engineering Services Ltd.

4711 Robertson Road

Nelson, BC, V1L 6N4

Address

250-551-0181

Telephone

deverney.engineering@shawcable.com

Email



(Affix PROFESSIONAL SEAL here)

If the Qualified Professional is a member of a firm, complete the following:

I am a member of the firm
and I sign this letter on behalf of the firm.

Deverney Engineering Services Ltd.
(Name of firm)