



BOARD OF VARIANCE

Friday November 28, 2025
Sunshine Coast Regional District
1975 Field Road, Sechelt, B.C.

AGENDA

CALL TO ORDER 1:00 p.m.

AGENDA

1. Adoption of the Agenda Page 1

MINUTES

2. Board of Variance Meeting Minutes of January 24, 2025 Annex A
(Receipt and Adoption) pp 2 – 6

REPORTS

3. Board of Variance Application BOV00030 Annex B
(1223 Lockyer Road, Electoral Area D – Roberts Creek) pp 7 - 88

NEW BUSINESS

ADJOURNMENT

**SUNSHINE COAST REGIONAL DISTRICT
BOARD OF VARIANCE
January 24, 2025**

Minutes of the Board of Variance Hearing held at the Sunshine Coast Regional District Office located at 1975 Field Road, Sechelt, B.C. The meeting was held in-person in the Cedar Room and online via Zoom.

PRESENT:	Member, Board of Variance Member, Board of Variance	K. Engelland (Chair) K. Child
ALSO PRESENT:	Assistant Manager, Planning Senior Planner Planning Technician III Planning Technician II Corporate Officer / BOV Secretary BOV00026 (Agent/Applicant) BOV00026 (Agent/Applicant) BOV00026 (Property Owners) BOV00027 (Applicant) Recorder Public	K. Jones S. Koberwitz D. Rajala K. Lamb S. Reid Arno Franzke Micah Harding John & Irene Rogers Randy Zimmerman A. O'Brien 1
REGRETS:	Member, Board of Variance	T. Davies

CALL TO ORDER 9:35 a.m.

AGENDA The agenda was adopted as presented.

MINUTES The minutes of July 30, 2024 were received and adopted as presented.

Introductions were made of those present at the meeting.

REPORTS

Board of Variance Application: BOV00026

Subject Property: 13123 Narrows Road, Pender Harbour

Legal Description: LOT F BLOCK 5 DISTRICT LOT 1024 PLAN 19228

Devin Rajala, Planning Technician provided a presentation regarding the Board of Variance application BOV00026 and the rationale for the variance. The variance application is to reconstruct a home and garage/workshop on an existing foundation, and construct new decks, one associated with the home with a reduced footprint further away from the

shoreline and one associated with the garage with a slightly larger footprint extending towards the eastern property line. The former structures were destroyed by a fire on the property in June 2023.

To accommodate the proposal the applicant is requesting a variance to reduce the required setback of 15m from the natural boundary of the ocean to 5.6 m for the construction of a new single unit dwelling and 4.2 m for a new deck structure.

Staff noted that one letter of support from a neighbouring property owner was received during the notification process.

DISCUSSION

The Chair invited comments from the property owner regarding the application.

Irene Rogers, Property Owner addressed the issue of financial hardship due to the insurance coverage and requirements for code upgrades on the reconstruction. Reusing the foundation will help expedite the building process and save on costs. Changes to the deck design were made to reduce the encroachment in the setback from the ocean. There will be less environmental disturbances due to the changes in design and old posts will be moved out of the setback.

John Rogers, Property Owner noted that all of the neighbouring houses are in the same line/setback. Mr. Rogers stated that one neighbour expressed verbal support for their application but did not receive a notification letter.

The Chair asked staff for clarification about the public notification process.

Staff clarified that the legislative requirement for Board of Variance applications is for adjacent property owners to be notified. The letter is sent to the address of the registered owner listed with BC Assessment and it is not always the person occupying the home who receives the letter.

Arno Franzke, Dakota Ridge Builders, Agent/Applicant commented that from a builder's perspective there are cost and environmental benefits of utilizing the existing foundation for the reconstruction.

The Chair asked staff to clarify how the newly adopted riparian bylaw and setback requirements are going to impact this application and future variance applications.

Kevin Jones, Assistant Manager, Planning & Development clarified that applications are reviewed on a case by case basis. The 15 metre setback is provincial best practice and legislatively, the bylaw is the mechanism to protect the foreshore and address environmental concerns. The Planning division is aware that there may be an increase in the number of variance applications. Board of Variance applications will be for cases with hardship, as is with this application due to a fire.

The Board of Variance considered the application and made the following decision:

DECISION #01/25 It was moved and seconded

The Board of Variance recommended that the report titled Board of Variance Application BOV00026 – 13123 Narrows Road – Electoral Area A (Egmont/Pender Harbour) be received for information;

AND THAT the Board of Variance considered Board of Variance Application BOV00026 in conjunction with Section 542 of the *Local Government Act*;

AND FURTHER THAT the variance to reduce the required setback of 15 metres from the natural boundary of the ocean to 5.6 metres for the construction of a new single unit dwelling and 4.2 metres for a new deck structure be approved.

CARRIED

Board of Variance Application: BOV00027

Subject Property: 8552 West Sakinaw Lakeshore, Pender Harbour

Legal Description: LOT 15 DISTRICT LOT 3248 PLAN 11997

Sven Koberwitz, Senior Planner provided a summary of the Board of Variance application BOV00027 and the rationale for the variance. The variance application is to reduce the setback to Sakinaw Lake from 20 metres to 15 metres, in order to allow for the construction of a single-unit dwelling 15 metres from the natural boundary of the lake.

The property had a Board of Variance order approved in 2005, however it expired as construction did not substantially start by 2007. The current owner undertook land alterations and installed a septic field not knowing that the previous order had expired. The owner has revised the development plan with a single unit dwelling sited at 15 metres from the natural boundary. Most of the footprint of dwelling is located outside the 20m setback, with the 3.7m wide deck running along the lakefront elevation of the dwelling accounting for the majority of the proposed encroachment.

The property is subject to Development Permit Area 4: Stream Riparian Assessment Areas. Unauthorized land alteration occurred prior to the issuance of a development permit for Riparian Assessment Areas. This work consisted of land clearing, including blasting, and the installation of a septic system within the 20-metre zoning setback and 30 metre Provincial Riparian Areas Protection Regulation (RAPR) Assessment Area.

A Remediation Approval process was initiated with the Planning Division to address the unauthorized land alteration. The applicant has submitted and received approval from the RAPR team to proceed with the development as proposed, including the already installed septic system. The proposed development is considered acceptable under the hardship exceptions in the RAPR due to site constraints relating to steep slopes to the west of the development area.

A Qualified Environmental Professional has submitted an assessment that evaluates site conditions and factors affecting the development potential of areas beyond the 20-metre setback. These factors include:

- Unsuitable soil conditions for septic systems (supported by Septic Engineer).
- Requirements for continuous power if septic system requires pumping.
- Steep terrain and fractured rock unsuitable for foundation without excessive land alteration.
- Difficult construction access.

The province has accepted and approved the RAPR Assessment and permitted the septic system within the 15 metre SPEA subject to restoration of previously disturbed areas. Restoration of the SPEA will be a condition of the development permit.

DISCUSSION

The Chair asked for clarification around the location of the house/deck and what changes had been made since the original 13 metre requested variance.

Staff clarified the location of the house and deck on the Site Plan that was provided in the staff report. The site plan shows the 20m setback in red and the 15m SPEA in green. The change is the SPEA requirement from the province of 15m. The only land alteration within the SPEA that has occurred is the septic system.

The Chair invited questions and comments from the property owner.

Randy Zimmerman, Property Owner/Applicant noted that the building is almost all beyond the 20m setback. The only part that is within 15m is the deck. The design was modified as much as possible given the steep topography and constraints of the property.

Staff clarified the original 13m setback line on the site plan. The SCRD Development Permit will match the 15m SPEA required by the RAPR assessment approved by the province.

The Board of Variance considered the application and made the following decision:

DECISION #02/25 It was moved and seconded

The Board of Variance recommended that the report titled Board of Variance Application BOV00027 (8552 West Sakinaw Lakeshore Way) – Electoral Area A

AND THAT the Board of Variance considered Board of Variance Application BOV00027 in conjunction with Section 542 of the *Local Government Act*;

AND FURTHER THAT the variance to reduce the setback to Sakinaw Lake from 20 metres to 15 metres, in order to allow for the construction of a single-unit dwelling 15 metres from the natural boundary of the lake be approved.

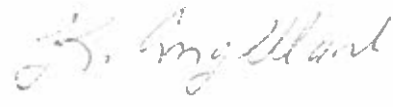
CARRIED

ADJOURNMENT 10:08 a.m.

Certified fair and correct:



S. Reid, Corporate Officer



K. Engelland, Chair, Board of Variance

SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

TO: Board of Variance – November 28, 2025

AUTHOR: Kirin Lamb, Planning Technician II

SUBJECT: **BOARD OF VARIANCE APPLICATION BOV00030 (1223 LOCKYER ROAD) – ELECTORAL AREA D**

RECOMMENDATIONS

- (1) **THAT the report titled Board of Variance Application BOV00030 (1223 Lockyer Road) – Electoral Area D be received for information;**
- (2) **AND THAT the Board of Variance consider this application in conjunction with Section 542 of the *Local Government Act*.**
-

BACKGROUND

A Board of Variance application has been submitted by the owner of 1223 Lockyer Road to reduce the setback to Flume Creek for a building or structure from 17 m to 0 m, to allow for the construction of a residential driveway with vehicle-access bridge over the creek.

The subject property is an irregularly shaped corner lot fronting Lockyer Road and Sunshine Coast Highway. Flume Creek bisects the property from northeast to southwest, running roughly parallel to Lockyer Road. Properties to the east, west and south are similarly developed residential properties. Properties to the north are within the Agricultural Land Reserve.

Table 1 Application Summary

Applicant:	Richard Johnson / Kenton Braine
Civic Address:	1223 Lockyer Road
Legal Description:	LOT A BLOCK 2 DISTRICT LOT 1318 PLAN 17244, PID: 007-297-939
Electoral Area:	D: Roberts Creek
Parcel Area:	~7203 m ² (1.78 ac)
OCP Land Use:	Country Residential
Land Use Zone:	Country Residential One (CR1)
Application Intent:	To allow for the construction of a residential driveway with vehicle-access bridge over Flume Creek

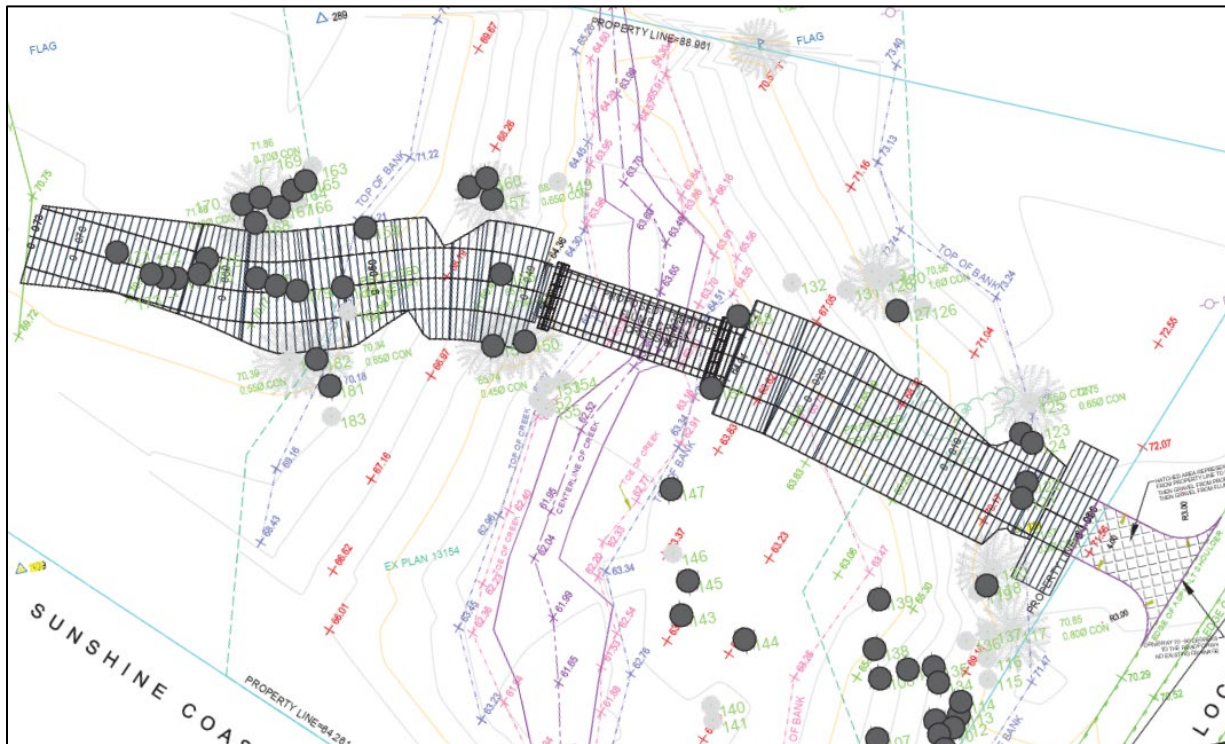
Figure 1 Location Map



The property is subject to Development Permit Area 4: Stream Riparian Assessment Areas, Development Permit Area 2A: Creek Corridor, and Development Permit Area 2B: Ravines.

The Applicant has previously received approvals under the *Water Sustainability Act (WSA)*, *Riparian Areas Protection Regulation (RAPR)*, *Transportation Act* and *Motor Vehicle Act* to proceed with the development as proposed.

Figure 2 Excerpt from Site Plan



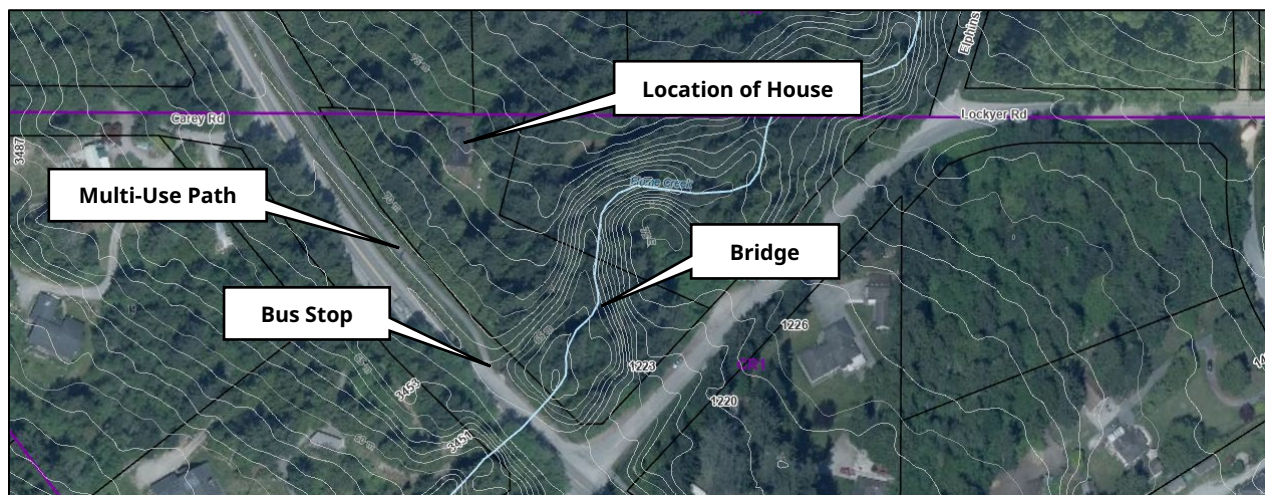
Sunshine Coast Regional District (SCRD) Development Permit DP000408 was issued July 25, 2025, for the subject property to authorize land alterations, including removal of 18 trees,

related to construction of the driveway and bridge. It is noted that, as part of the development permit process, the need for a building permit and variance application may not have been clearly communicated to the applicant.

Development activities were commenced in August 2025, with the aim of completing the work during the appropriate timing window to reduce the risk of harm to fish and fish habitat for Cutthroat Trout and Chum Salmon (Aug 1 to Sep 15).¹ When it came to SCRD’s attention that work had commenced without a building permit, the applicant was notified and they submitted a building permit application on September 10, 2025. Upon reviewing the building permit application, it was flagged that the structure is located within a zoning bylaw setback, and a variance is required prior to issuance of a building permit.

Given the bridge was under construction and due to the fisheries window, it was considered appropriate in this case to not issue a Stop Work Order and to allow for the construction to be completed within the fisheries window. Construction of the bridge structure has now been completed in accordance with the fish timing window. Issuance and completion of a building permit is required to bring the property back into compliance with SCRD bylaws.

Figure 3 Property Aerial and Elevation Contours



DISCUSSION & ANALYSIS

Zoning Bylaw

Zoning Bylaw No. 722 includes the following regulations:

5.14.1 *The setback of a building or structure shall be:*

(b) *the minimum setback from a parcel line not adjacent to a highway, an internal private road, a waterbody or a watercourse shall be as follows:*

¹ "Guidelines for Reduced Risk Instream Work Windows (March 2006)." *Ministry of Environment, Lower Mainland Region.* gov.bc.ca/assets/gov/environment/air-land-water/water/working-around-water/work_windows_low_main.pdf. Accessed 28 Oct. 2025.

Height of building and structure	Setback
≤ 8.5 m	1.5 m
> 8.5 m	4 m

5.16.1 No, building or structure or any part thereof, except a boathouse located within an inter-tidal zone or within the I13 Zone, shall be constructed, reconstructed, moved, located or extended within:

(b) 17 m of the natural boundary of a creek, lake, swamp or pond;

A bridge is considered a structure under *Zoning Bylaw No. 722*. Given the bylaw does not provide any exemption to setback requirements for a bridge, the following variances are required:

- a) Section 5.14.1 (b) to reduce the setback from a parcel line not adjacent to a highway and the setback from a waterbody or watercourse, for a structure under 8.5 m in height from 1.5 m to 0 m
- b) Section 5.16.1 (b) to reduce the setback for a structure from the natural boundary of a creek from 17 m to 0 m

Official Community Plan

The *Roberts Creek Official Community Plan Bylaw No. 641, 2012*, provides policy related to buffering along Sunshine Coast Highway, specifically as it relates to the development of properties designated as Country Residential.

The following OCP policies should be noted:

- 17.4 *The screening of land uses from the Sunshine Coast Highway in the COUNTRY RESIDENTIAL designation shall be required wherever feasible in order to maintain and enhance the visual quality of this area and to minimize the impact of noise and pollution of vehicular traffic. A natural treed vegetation buffer shall be encouraged as a screening method.*
- 17.5 *To restrict access onto the Sunshine Coast Highway particularly for new development within the COUNTRY RESIDENTIAL designation.*

Riparian Assessment

As part of the approved Development Permit, a Qualified Environmental Professional has submitted a Riparian Areas Protection Regulation (RAPR) assessment report for the proposed bridge construction. The province has accepted and approved the RAPR assessment and permitted the driveway and bridge, including removal of 18 trees, within the 18.6 metre SPEA (Streamside Protection and Enhancement Area) subject to implementation of a replanting plan and completion of environmental monitoring. Replanting and environmental monitoring as prescribed are conditions of SCRD Development Permit DP000408, issued July 25, 2025.

Geotechnical Hazard Assessment

A Qualified Professional has submitted an assessment that evaluates slope stability of the ravine and potential for debris flow and flooding. The report indicates that construction of a clear-span bridge as proposed is safe within acceptable hazard-tolerance limits.

Applicant's Rationale and Statement of Hardship

As noted above, the applicant has provided the following rationale of hardship in support of their application, citing barriers which prevent construction of a driveway access onto Sunshine Coast Highway:

- Currently, there is no vehicle access to the property, including no emergency fire or ambulance vehicle access, which poses a risk to the health and safety of the occupants.
- The property frontage along Sunshine Coast Highway conflicts with the existing multi-use path which runs along the entire length of the property, as well as an existing bus stop. Therefore, construction of an access onto Sunshine Coast Highway is not supported by the Ministry of Transportation and Transit (MOTT), meaning Lockyer Road is the only viable option for a driveway access to be located.
- There is no option to locate a vehicle access to the property where it does not cross Flume Creek. The crossing cannot be avoided.

Role of the Board of Variance

Section 540 of the *Local Government Act* allows the Board of Variance to consider variance to a bylaw respecting the siting, size, or dimensions of a structure. Pursuant to Section 542 of the *Local Government Act* the Board of Variance must consider the following questions in its consideration of this application. Staff have provided analysis to assist the Board of Variance in their consideration of the application.

1. Is there a hardship?

As noted above, the proposed development does not conform with Zoning Bylaw setbacks. It is noted that construction of an access onto Sunshine Coast Highway is not supported by the Ministry of Transportation and Transit due to conflicts with an existing multi-use path and bus stop.

2. Does the variance result in inappropriate development of the site?

In addition to this being the only feasible location where a driveway access may be located, *Roberts Creek OCP* policies for lands designated as Country Residential encourage restricting access to Sunshine Coast Highway and maintaining a natural treed buffer along the highway to enhance the visual quality of the area and minimize the impact of noise and pollution of vehicular traffic. The property is designated as Country Residential and the driveway placement as proposed is in alignment with the OCP policies 17.4 and 17.5. Additionally, as noted above, the project has received RAPR and WSA approval.

3. Does the variance adversely affect the natural environment?

An approved RAPR Assessment prepared by a qualified environmental professional has been received in support of the proposed development. As part of the Provincial RAPR and WSA approval, and the issued SCRD Development Permit, implementation of a replanting plan and environmental monitoring is required.

4. Does the variance affect the use and enjoyment of adjacent land?

The variance is not anticipated to have any significant effect on the use and enjoyment of adjacent land, and at the time of authoring this report, staff have not received any feedback suggesting it may.

5. Does the variance alter the permitted uses or densities on a parcel?

The variance does not alter the permitted uses or density.

Notifications

Notification was provided to adjacent neighbours in accordance with Section 541 of the *Local Government Act* and *SCRD Board of Variance Bylaw No. 380, 1993*. No comments have been received at the time of this report. Members of the public will have the opportunity to provide comments at the Board of Variance meeting.

The following SCRD departments and First Nations were also invited to comment (Table 2).

Table 2 Referral Comments

Referral Agency	Comments
SCRD Building Services	Construction of the proposed bridge is subject to the owner obtaining a valid building permit (BP). A BP application has been received, and the permit could be issued upon approval of the variance.
xwesam Roberts Creek Volunteer Fire Department	The proposed bridge has a load rating of 22,000 KGs, which is appropriately engineered to support our heaviest vehicle load of 18,435 KGs GVWR. No concerns with the application as proposed.
shíshálh Nation	The subject property is within the shíshálh swiya (world, birthplace, lands, "Territory" of the shíshálh Nation). The property-owner started ground disturbance and construction without prior engagement with the shíshálh Nation and without completing archaeological studies. shíshálh Nation is therefore requesting a Preliminary Field Reconnaissance (PFR) and a Post-Impact Assessment (PIA).

CONCLUSION

The variance is requested to allow the construction of a residential driveway with vehicle-access bridge over Flume Creek within the 17 m setback area. This application has been submitted based on hardship related to limitations which prevent locating a driveway access where it does not cross Flume Creek.

ATTACHMENTS

Attachment A – Site Plan

Attachment B – Riparian Assessment

Reviewed by:			
Manager	X – K. Jones	Finance	
GM		Legislative	
CAO		Other	

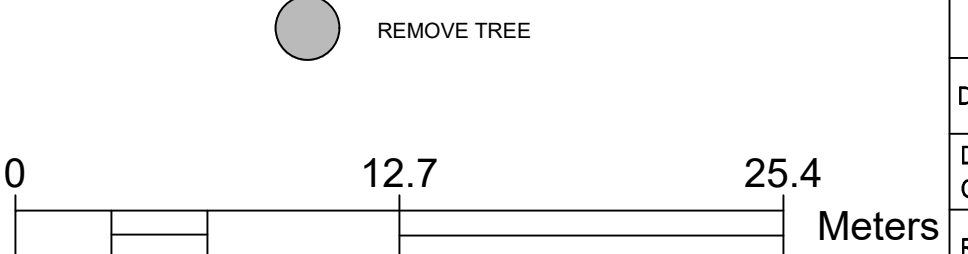


A
PLAN 17244
AREA = 0.720 ha

B
PLAN 17244

ATTENTION

UNITS SHOWN ON THIS PLAN ARE IN METRES
 GEODETIC PROJECTION AND DATUM:
 UTM NAD83 ZONE 10 CSRS(GROUND)



● REMOVE TREE

APPLICATION 2021-02052

**1223 LOCKYER ROAD
 TREE MAP DRIVEWAY PLAN**

DRAWN BY: RJ	DESIGN BY: KB
DRAWING CHECKED:	DESIGN CHECKED:
REFERENCES:	REFS:

SCALE: 1:250
DATE: June 10, 2024
DRAWING NUMBER: K003
SHEET...1...OF...1... REVISION:.....2....

NO.	DATE	REVISION	DWG	DESIGN	NO.	DATE	REVISION	DWG	DESIGN



Barsanti Environmental Services Ltd.
778-908-9711
info@barsantienviro.ca
www.barsantienviro.ca

February 27, 2025
File No. 21.0079

Kenton Braine
By Email: Kenton.braine@yahoo.com

RE: RAPR 7720D, at 1233 Lockyer Road Approved

Barsanti Environmental Services Ltd. (Barsanti Environmental) was retained by Kenton Braine (the Client) to provide the services of a Qualified Environmental Professional (QEP) to prepare a Riparian Areas Protection Regulation (RAPR) Assessment report for development on their project site at the above referenced site location.

The RAPR has been reviewed by the Ministry of Water, Lands and Resources Sustainability and has been approved. The RAPR Assessment Number is 7720D.

Please be aware there are numerous "Measures" listed in Section 4 that are required to be met to remain in compliance with the RAPR. Environmental monitoring of construction works is a condition of the approval. There are also conditions for tree protection listed by the project arborist.

If there are any questions, or if clarification is needed on any part of the report, please do not hesitate to contact me.

BARSANTI ENVIRONMENTAL SERVICES LTD.

Jason Barsanti. R.P.Bio.
Principal Biologist



Appendices

1. Results of RAPR Review
2. RAPR Assessment Report 7720D

Assessment 7720D meets the standards of RAPR

1 message

Riparian Areas WLRS:EX <RiparianAreas@victoria1.gov.bc.ca>
 To: jason <jason@barsantienviro.ca>, Planning <planning@scrd.ca>

RAPR Submission 7720D has been reviewed by the Ministry of Water, Land and Resource Stewardship. This report **meets the assessment and reporting criteria** for regulation to move forward with the development permit process. The local government will be notified shortly.

Additional Note:

- Water Sustainability Act Notification 100390871 is expired and a new application reflecting any design changes will be necessary.
- Tree replacement criteria from page 5 and 6 of the report should be used and will meet RAPR standards, and not the number listed in "replanting recommendation"

Note to the local government: The description of proposed development has been accepted on the basis that this is the final plan for development. If develop DP issuance.

From: RiparianAreas@Victoria1.gov.bc.ca <RiparianAreas@Victoria1.gov.bc.ca>
Sent: Friday, January 31, 2025 11:08 AM
To: jason <jason@barsantienviro.ca>; Riparian Areas, Region 2 WLRS:EX <RARReg2@gov.bc.ca>; Riparian Areas WLRS:EX <RiparianAreas@Victoria1.gov.bc.ca>
Subject: Assesment 7720 has been updated

This assessment has been updated. This notification is sent to you, Fisheries and Oceans Canada (DFO)and the BC Ministry of Environment. Details of this assessment are included in this notification. Check content to ensure correctness. If it is incorrect, modify your assessment.

Assessment Details

Assessment ID:: 7720 **Creation Date:** 2022-06-08
Status: updated **Last Modified:** 2025-01-31

Development Details

Development Type: Other **Proposed Start Date:** 2022-08-01
Area of Development (hectares): .010 **Proposed End Date:** 2022-09-15
Lot Area (hectares): .720 **Nature of Development:** New
Riparian Length: 53.00 **Section 9 Part 7 Activities:** Y

Location Details

Local Government: Sunshine Coast Regional District **DFO Area:** Lower Fraser Area
Region: Lower Mainland **Stream/River Type:** Watercourse
Parcel Identification (PID)/ Parcel Identification Number (PIN): 007-297-939 **Stream/River Name:** Flume Creek
Address Line 1: 1223 Lockyer Road **Watershed Code:** 900-118900
Address Line 2: **Postal Code:**
Latitude: 49°26'2" **Longitude:** 123°39'36"

Developer Details

Contact First Name: Kento **Address Line 1:** 1223 Lockyer Road
Contact Middle Name: **Address Line 2:**
Contact Last Name: Braine **City:** Roberts Creek
Province/State: BC **Postal/Zip Code:** V0N2W1
Email Address: kenton.braine@yahoo.com **Country:** Canada
Company Name: **Phone #:**

Primary QEP Details

Contact First Name: Jason **Address Line 1:** 3265 St Catherines Street
Contact Middle Name: **Address Line 2:**
Contact Last Name: Barsanti **City:** Vancouver
Designation: Biologist **Province/State:** BC
Registration #: 2088 **Postal/Zip Code:** V5V4K6
Email Address: jason@barsantienviro.ca **Country:** Canada
Company Name: Barsanti Environmental Services Ltd **Phone #:** 7789089711

Secondary QEP Details

Name:

Patrick Salls

Company

Address

PO Box 151

Squamish

Canada

FORM 1

Riparian Areas Protection Regulation - Qualified Environmental Professional - Assessment Report

Riparian Areas Protection Regulation: Assessment Report

Please refer to submission instructions and assessment report guidelines when completing this report.

Date 2025-01-30

I. Primary QEP Information

First Name	Jason	Middle Name	
Last Name	Barsanti		
Designation	R.P.Bio.	Company Barsanti Environmental Services Ltd.	
Registration #	2088	Email jason@barsantienviro.ca	
Address	3265 St. Catherines Street		
City	Vancouver	Postal/Zip	V5V4K6 Phone # 7789089711
Prov/state	BC	Country	Canada

II. Secondary QEP Information (use Form 2 for other QEPs)

First Name	Patrick	Middle Name	
Last Name	Sails		
Designation	P. Eng.		
Registration #	42680	Email	
Address	PO Box 151 Garibaldi Highlands		
City	Squamish	Postal/Zip	V0N1T0 Phone # 7786787654
Prov/state	BC	Country	Canada

III. Developer Information

First Name	Kenton	Middle Name	
Last Name	Braine		
Company	Na		
Phone #		Email:	
Address	1223 Lockyer Road		
City	Roberts Creek	Postal/Zip	V0N2W1
Prov/state	BC	Country	Canada

IV. Development Information

Development Type	Other: New driveway access		
Area of Development (ha)	0.01	Riparian Length (m)	53
Lot Area (ha)	0.72	Nature of Development	New
Proposed Start Date	2022-09-01	Proposed End Date	2023-09-01

V. Location of Proposed Development

Street Address (or nearest town)	1223 Lockyer Road		
Local Government	Sunshine Coast Regional District	City	Roberts Creek
Stream Name	Flume Creek		
Legal Description (PID)	007-297-939	Region	Lower Mainland
Stream/River Type	Stream	DFO Area	Lower Fraser
Watershed Code	900-118900		
Latitude	49	26	02 Longitude 123 39 36

Completion of Database Information includes the Form 2 for the Additional QEPs, if needed. Insert that form immediately after this page.

Make duplicates of the complete form fields and paste below each other for additional QEPs

FORM 1

Riparian Areas Protection Regulation - Qualified Environmental Professional - Assessment Report

II. Additional QEP Information

First Name	Ben	Middle Name	
Last Name	Smale		
Designation	P.Eng	Company	Boundary Consulting
Registration #	38244	Email	ben@boundaryconsulting.ca
Address			
City	Postal	Phone #	
Prov/state	Country		

Table of Contents for Assessment Report

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Section 1. Description of Fisheries Resources Values and a Description of the Development proposal

(Provide as a minimum: Species present, type of fish habitat present, description of current riparian vegetation condition, connectivity to downstream habitats, nature of development, specific activities proposed, timelines)

This is Version 4 of the RAPR Assessment No. 7720. In this version, the proposed alignment and design of the driveway is revised to be perpendicular to the banks of the watercourse, and the arborist report is revised and updated.

The following comments were received in response to Version 3:

5/24/24, 12:36 PM Gmail - Assessment #7720C requires amendments

Assessment #7720C requires amendments
26 messages

Riparian Areas WLRS:EX <RiparianAreas@victoria1.gov.bc.ca> 24 November 2023 at 15:52
To: "jason@barsantienviro.ca" <jason@barsantienviro.ca>

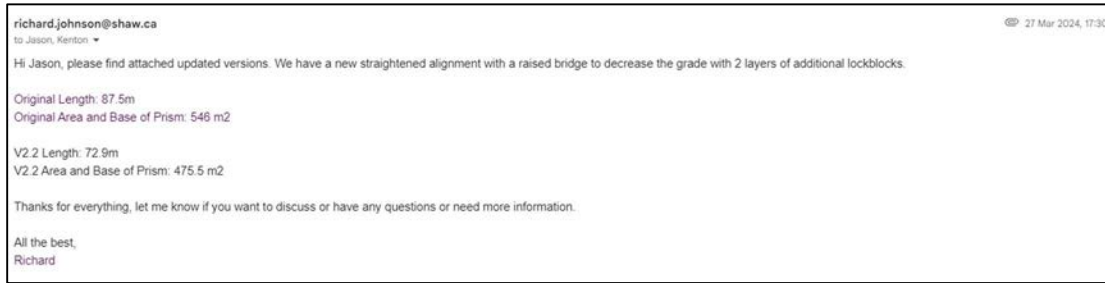
RAPR Submission #7720C has been reviewed by the Ministry of Water, Land and Resource Stewardship. This report has been **rejected** for failing to meet the standards laid out in the Riparian Areas Protection Regulation. Please address deficiencies in the sections outlined below and re-submit report as an amendment to existing file number to RARNS when completed.

- **It is understood previous access to buildings on west side of property are no longer available.**
- As previously stated, the installation of a crossing precludes RAPR boundaries from that area as RAPR boundaries are measured perpendicular to the Stream Boundary. As such, access routes (e.g., driveways) are to be contained within the crossing 'right-of-way' until outside of the SPEA and SPEA protection areas. How does the proposed route been determined to minimize encroachment into the SPEA? Has the route been considered as it relates to the RAPR spirit and intent? It is noted the geotechnical report discusses potential geotechnical hazards in relation to the proposed design but does not address other options in relation to the SPEA. What other options are available?
 - The Geotechnical Engineer states the following:

The objective of our creek and ravine hazard assessment was to determine whether the proposed driveway and bridge alignment are geotechnically appropriate, based on the potential presence of creek and slope hazards such as flooding, erosion and slope instability etc., and to provide recommendations to complete the project in a geotechnically safe manner and minimize long term risk due to geohazards.

- Tree inventory does not include an assessment of the critical root zones of any tree. Tree inventory mapping should clearly show which trees are proposed for removal and which are not. Given that development is to occur within the SPEA, tree protection fencing is to be shown around all protected trees in the vicinity of all proposed works.
- QEP to determine appropriate compensation ratio for removed trees. See Danger Tree measures section in the Manual. What species are recommended? Is onsite enhancement suitable? It is noted that trees proposed for removal are not Danger Trees, but those in conflict with the proposed development, Follow Environmental Mitigation Policy guidelines for avoidance then minimization of impacts.
 - It is noted that the consulting arborist has specified replanting recommendations. This prescription does not align with RAPR standards or methods. Enhancement may also include understory, shrub, and herbaceous species.
- Full development envelope is to be shown in relation to RAPR boundaries and protected areas, Encroachment and tree protection fencing not shown in and around the SPEA.

1. In response to the comment on the proposed route, the Developer has changed the route alignment to shorten the length of the driveway inside the SPEA. Please refer to their comments on the next page. The new proposed site plan is provided in Section 3.



2. In response to the comment on the tree inventory, the project arborist has updated and revised the tree inventory and their assessment of hazard trees due to the storm seasons that have transpired since their original site assessment. Their updated tree inventory report is appended to this RAPR assessment. Their recommendations for tree and tree root zone protection are described in the report and on the site plan in Section 3.

3. Tree Replacement Criteria

The arborist has identified 18 trees for removal. The conditions and rationale are listed in their report. The arborist made efforts to retain tree stems for wildlife trees where appropriate, and recommendations for root wad retention.

Nb. There are recommendations in the arborist report for the number of trees to be replanted. These were made without respect to the RAPR guidelines and should be disregarded.

Additional information on tree assessment, classification and root protection measures, plus recommendations for monitoring by the project arborist are listed in the appended arborist report.

The following information is used to determine the tree replacement criteria for the SPEA on the subject property.

Utilizing the guidelines for tree replacement in riparian areas, it has been determined that **96 trees** are required to mitigate for removals from the SPEA (Table 1). In consultation with the arborist, we recommend that the replacement trees be composed of **40 vine maple** (*Acer circinatum*), **30 Douglas-fir** (*Pseudotsuga menziesii*), and **26 western redcedar** (*Thuja plicata*).

FORM 1

Replacement trees should be a minimum of 2.5 m in height.

Recommendations for monitoring by the project arborist are listed in the appended arborist report.

	Tree Identified for Removal	DBH	Replacement Criteria
1	#108 Hemlock - 70 cm (within SPEA)	700	8
2	#126 WRC - 35 cm (within SPEA)	350	4
3	#127 Maple - 70 cm (within SPEA)	700	8
4	#139 WRC - 18 cm (within SPEA)	180	3
5	#144 WRC - 40 cm (within SPEA)	400	4
6	#145 WRC - 32 cm (within SPEA)	320	4
7	#147 Hemlock - 60 cm (within SPEA)	600	6
8	#148 WRC - 11 cm (within SPEA)	110	2
9	#150 Douglas fir - 105 cm (within SPEA)	1050	10
10	#151 Douglas fir - 65 cm (within SPEA)	650	8
11	#156 WRC - 16 cm (within SPEA)	160	12
12	#158 WRC - 55 cm (within SPEA)	550	6
13	#162 WRC - 50 cm (within SPEA)	500	6
14	#164 WRC - 32 cm (within SPEA)	320	4
15	#177 WRC - 24 cm (within SPEA)	240	3
16	#178 WRC - 13 cm (within SPEA)	130	2
17	#179 WRC - 9 cm (within SPEA)	90	2
18	#184 WRC - 45 cm (within SPEA)	450	4
	Total		96

4. With regard to the development envelope, the site plan has been revised to address this comment.

This is Version 3 of the RAPR Assessment No. 7720. The following comments were received in response to Version 2:

RAPR Submission 7720 has been reviewed by the Ministry of Water, Land and Resource Stewardship. This report has been **rejected** for failing to meet the standards laid out in the Riparian Areas Protection Regulation. Please address deficiencies in the sections outlined below and re-submit report as an amendment to existing file number to RARNS when completed.

- Section 10 of the RAPR.
 - Please provide a rationale for the location of the driveway. The figure on Page 34 shows a driveway outside of the SPEA from the southwest side of the property, can this access not be used? The alignment of the access should be perpendicular through the SPEA to minimize the area of encroachment. If this cannot be achieved, please provide information on why. How does the proposed location meet the BC Environmental Mitigation Policy hierarchy to first avoid and then minimize impacts? Since the area if the SPEA is calculated the increase in SPEA width cannot be legally enforced. Have any areas for restoration or habitat enhancement been identified as potential areas of compensation?
1. Please provide a rationale for the location of the driveway. The figure on Page 34 shows a driveway outside of the SPEA from the southwest side of the property, can this access not be used?

The driveway on the southwest side of the property can not be used to access the site, please refer to the following comments provided by the Developer:

The figure on Page 34 shows an abandoned driveway/pathway that cannot be used as it intersects a Ministry of Transportation and Infrastructure (MOTI) walking and biking path and is adjacent to a bus stop which are both along the 101 Sunshine Coast Highway. Both the walking/biking path and the 101 Sunshine Coast Highway run the entire west property line. Entering and exiting from this abandoned driveway/pathway with a vehicle is prohibited by the Sunshine Coast Regional District (SCRD) and MOTI. Other property lines border on private lots, with the exception of where 1223 Lockyer Road borders Lockyer Road, where the proposed driveway location is. Currently there is no vehicle access to 1223 Lockyer Road including no emergency fire or ambulance vehicle access which poses a risk to the health and safety of the occupants. All building construction and renovations on 1223 Lockyer have been permitted by the SCR D. The alignment location was designed for, reviewed, and approved by the geotechnical engineer and MOTI.



The orange pilon in the photo is approximately where the abandoned access is from Highway 101.

2. The alignment of the access should be perpendicular through the SPEA to minimize the area of encroachment. If this cannot be achieved, please provide information on why.

The project engineers have proposed the layout shown based on the site conditions and topography. This is detailed in the attached reports. The proposed crossing has been accepted by DFO and MoF.

3. How does the proposed location meet the BC Environmental Mitigation Policy hierarchy to first avoid and then minimize impacts? Since the area if the SPEA is calculated the increase in SPEA width cannot be legally enforced. Have any areas for restoration or habitat enhancement been identified as potential areas of compensation?

There is no vehicle access into the site, and there is no option to locate one in a place where it does not cross Flume Creek. The crossing cannot be avoided. The impact of the crossing was minimized by attempting to avoid the root zone of mature trees to as great an extent possible. As can be seen in the air photo below, the site is fully forested within the RAA, the forest is mature and in excellent ecological condition.

With regard to the proposed increased SPEA, this method of compensation has previously been accepted by the RAPR office on other projects that I have submitted and, if I recall correctly, I believe this method was suggested to me by

a RAPR official. I see no reason why the SPEA as recommended cannot be legally enforced.

This is version 2 of the RAPR Assessment No. 7720. The following comments were received in response to the original submission:

1. QEP indicates that his measures rely on other professional reports. QEP must summarize the additional measures required to protect the SPEA, within their RAPR assessment. Please update the report with clear guidance from other professionals summarized in the form.
2. It is not clear in reporting why SPEA (which is below TOB in some locations) does not have slope stability considerations / measures to protect SPEA by offering additional protections from the top of bank. Measures to protect the slope (as well as windthrow, danger tree and tree protection) can and should provide additional protections that push the SPEA larger than the minimum setback distance.
3. Location of driveway crossing does not meet crossing standards and must cross at a discrete perpendicular location, reducing impacts to the SPEA significantly. Amendment of site plan showing discrete crossing is required, and crossing will require a Water Sustainability Act authorization. Crossing must follow Water Sustainability Regulation standards for fish crossing.

In response to those comments,

1. Statements in the measures are updated.
2. An additional secondary QEP, who is a Geotechnical Engineer, has been retained to respond to the concerns in Comment No. 2 above (Appended)
3. Approvals for the crossing have been received from DFO and Ministry of Forests (Appended).

The original report, with revisions, follows.

This RAPR report is being prepared for a proposal to construct a new driveway access into a rural residential property in Roberts Creek, BC (Figure 1).

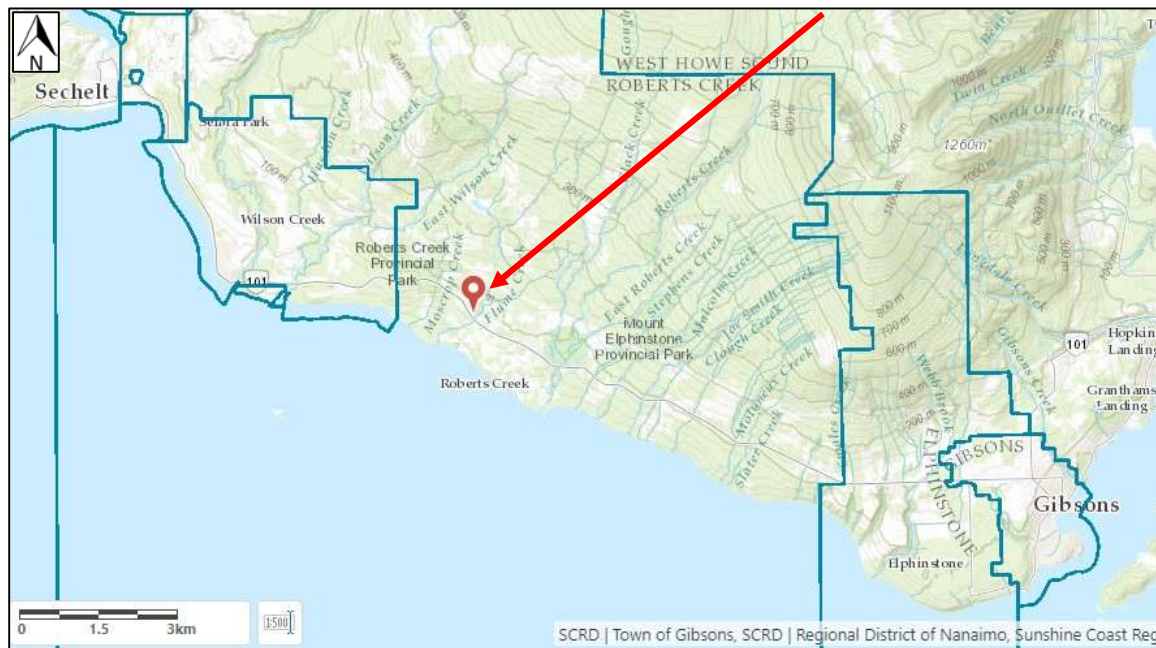


Figure 1. Location of 1223 Lockyer Road in Roberts Creek BC.

The property is presently developed with a single-family home in the northwest portion of the site (Figure 2). The Client is proposing to construct a new driveway to access the house from Lockyer Road. A clear span bridge is required and being proposed to cross Flume Creek. The proposed driveway is illustrated on the site plan.

The basic SPEA on Flume Creek was determined through the Detailed Methodology in this RAPR assessment. The proposed driveway crosses the SPEA of Flume Creek and therefore habitat compensation is being recommended in the form of an expansion of the SPEA on each side of the stream by the same number of square meters of impact that the driveway is occupying on the respective bank of the stream. The proposed compensation SPEA is illustrated on the site plan and described on Section 2, Form 3.

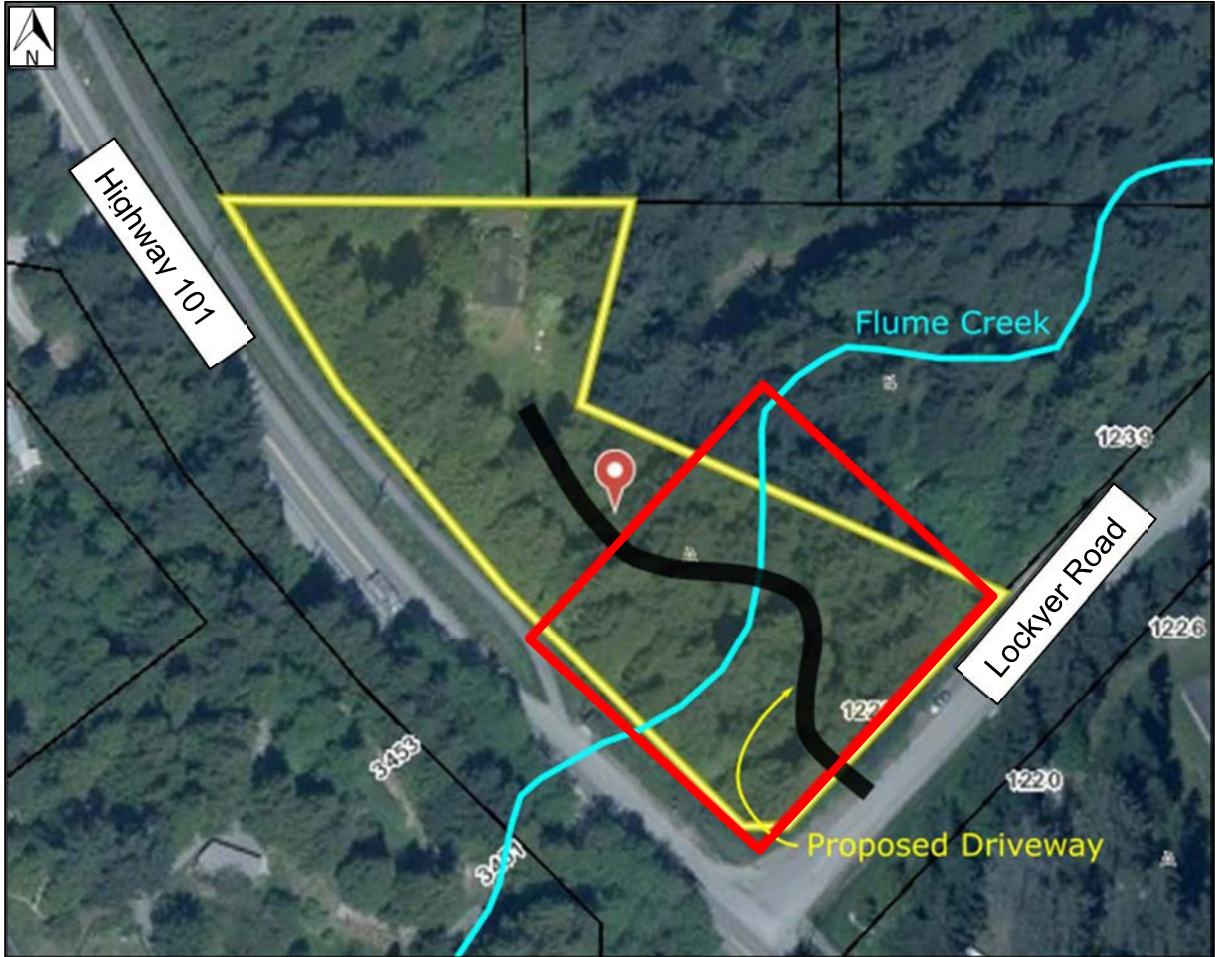


Figure 2. Recent air photo of the subject property highlighting the Riparian Assessment Area (RAA) for the proposed development. SCR D Webmap, 2022-06-07.

Watercourses

One watercourse is the subject of this assessment, Flume Creek.

Flume Creek is a natural watercourse with headwaters on the mountain slopes north of Highway 101. It flows into the Salish Sea approximately 950 m downstream of the site. Where it flows through the assessment area, Flume Creek is in a ravine of approximately 7 to 10 m high and with slopes that range between 25 to 35%.

At the site the channel bed is composed of small cobble, gravel, and sand in a composition of approximately 20:40:40. Areas of exposed bedrock are present in the assessment reach. The channel width is approximately 6 m wide and has a grade of approximately 4.5 percent. It is classified as Cascade-Pool. Large wood debris is abundant in the assessment reach. The subject reach appears to present high quality spawning habitat. There are several recorded obstacles to fish passage, both natural and manmade, downstream of the site, but cutthroat trout and coho are recorded upstream of the site.

Fish Presence was obtained from a stream report in Habitat Wizard; it listed Chum and Coho Salmon and Cutthroat Trout.

Vegetation: Flume Creek flows through a greenfield area in the RAA. Trees are primarily very mature but with young saplings in the understory. The dominant trees include western redcedar, western hemlock and Douglas-fir. The understory is relatively sparse, shrubs and ferns include vaccinium species, salmonberry and sword fern.

Secondary QEP: The proposed location of the bridge is approximately 25 m upstream of a 1200 mm concrete culvert under Highway 101. It is understood that the culvert became plugged during the storms of November 2021 and an area of localized flooding occurred in the RAA. At my request a geotechnical engineer was retained by the Client to provide assessment of floodplain concerns, the slope stability of the ravine banks, and the proposed bridge construction. The bridge design and specifications were provided by the Client's project manager. An ISA certified arborist was also retained by the Client to assess health and potential risk of the existing trees and from the proposed removals required for the development.

In conjunction with this RAPR assessment an application for Notification of instream works was prepared under Section 11 of the Water Sustainability Act (WSA) and a Request for Review (RFR) from DFO was made. Presently these applications are under review.

The WSA Tracking Number is: 390871

FORM 1

Riparian Areas Protection Regulation - Qualified Environmental Professional - Assessment Report

Section 2. Results of Riparian Assessment (SPEA width)

Attach or insert the Form 3 or Form 4 assessment form(s). Use enough duplicates of the form to produce a complete riparian area assessment for the proposed development

One Form 3 follows this page.

FORM 1

Riparian Areas Protection Regulation - Qualified Environmental Professional - Assessment Report

2. Results of Detailed Riparian Assessment

Refer to Section 3 of Technical Manual

Date: 2021-12-08

Description of Water bodies involved (number, type)

1 Stream

Stream	-1-
Wetland	
Lake	
Ditch	
Number of reaches	1
Reach #	1

Channel width and slope and Channel Type (use only if water body is a stream or a ditch, and only provide widths if a ditch)

	Channel Width(m)	Gradient (%)		
starting point	4.5		I, <u>Jason Barsanti</u> (<i>name of qualified environmental professional</i>), hereby certify that: a) I am a qualified environmental professional, as defined in the Riparian Areas Protection Regulation made under the <i>Riparian Areas Protection Act</i> ; b) I am qualified to carry out this part of the assessment of the development proposal made by the developer <u>Kenton Braine</u> (<i>name of developer</i>) ; c) I have carried out an 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 technical manual to the Riparian Areas Protection Regulation.	
upstream	8.6			
	72	3.4		
	7.0			
downstream	8.3			
	6.7			
	6.0			
	3.4			
	5.4	5.5		
	5.0			
	5.7			
Total: minus high /low	55.8			
mean	6.2	4.4		
Channel Type	R/P	C/P		S/P
		X		

Site Potential Vegetation Type (SPVT)

	Yes	No	
SPVT Polygons		X	Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes I, <u>Jason Barsanti</u> (<i>name of qualified environmental professional</i>), hereby certify that: a) I am a qualified environmental professional, as defined in the Riparian Areas Protection Regulation made under the <i>Riparian Areas Protection Act</i> ; b) I am qualified to carry out this part of the assessment of the development proposal made by the developer <u>Kenton Braine</u> (<i>name of developer</i>) ; c) I have carried out an 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 technical manual to the Riparian Areas Protection Regulation.

Polygon No:

LC SH TR

SPVT Type X

Method employed if other than TR

Polygon No:

LC SH TR

SPVT Type

Method employed if other than TR

Polygon No:

SPVT Type

Method employed if other than TR

FORM 1

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Zone of Sensitivity (ZOS) and resultant SPEA

Segment No:	-a-	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons				
LWD, Bank and Channel Stability ZOS (m)	12.4					
Litter fall and insect drop ZOS (m)	18.6					
Shade ZOS (m) max	18.6	South bank	Yes		No	<input checked="" type="checkbox"/>
Ditch	Justification description for classifying as a ditch (manmade, no significant headwaters or springs, seasonal flow)					
Ditch Fish Bearing	Yes		No		If non-fish bearing insert no fish bearing status report	
SPEA maximum	18.6	(For ditch use table3-7)				

Segment No:	-b-	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons				
LWD, Bank and Channel Stability ZOS (m)	12.4					
Litter fall and insect drop ZOS (m)	18.6					
Shade ZOS (m) max	18.6	South bank	Yes		No	<input checked="" type="checkbox"/>
SPEA maximum	18.6	(For ditch use table3-7)				

I, Jason Barsanti (*name of qualified environmental professional*), hereby certify that:

- I am a qualified environmental professional, as defined in the Riparian Areas Protection Regulation made under the *Riparian Areas Protection Act*;
- I am qualified to carry out this part of the assessment of the development proposal made by the developer Kenton Braine (*name of developer*);
- I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
- In carrying out my assessment of the development proposal, I have followed the technical manual to the Riparian Areas Protection Regulation.

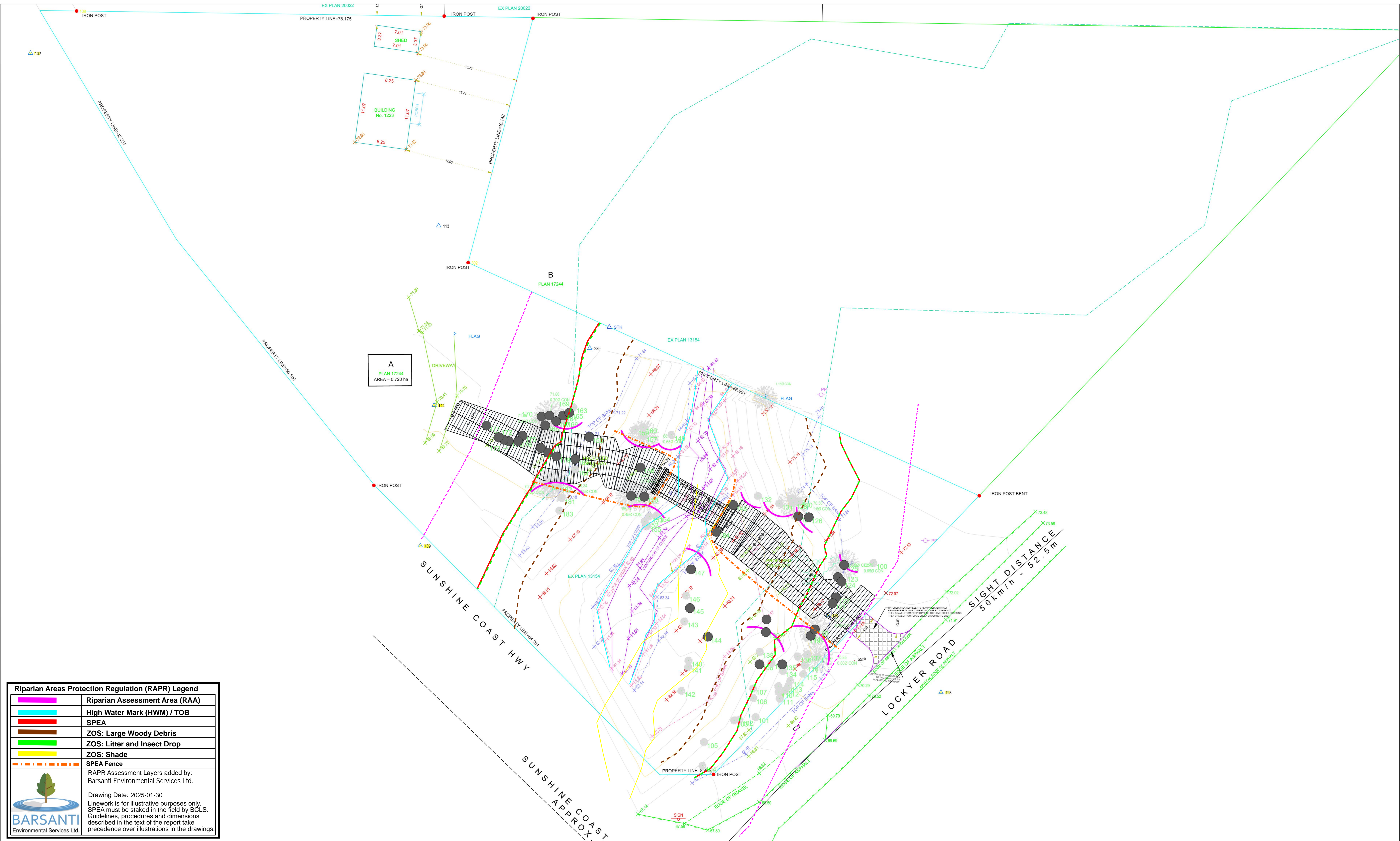
Comments

This Form 2 is for Flume Creek. The SPEA determined through the detailed assessment methodology is 18.6 m measured perpendicularly from the stream boundary.

Section 3. Site Plan

Insert jpg file below

Please see the site plan following this page.



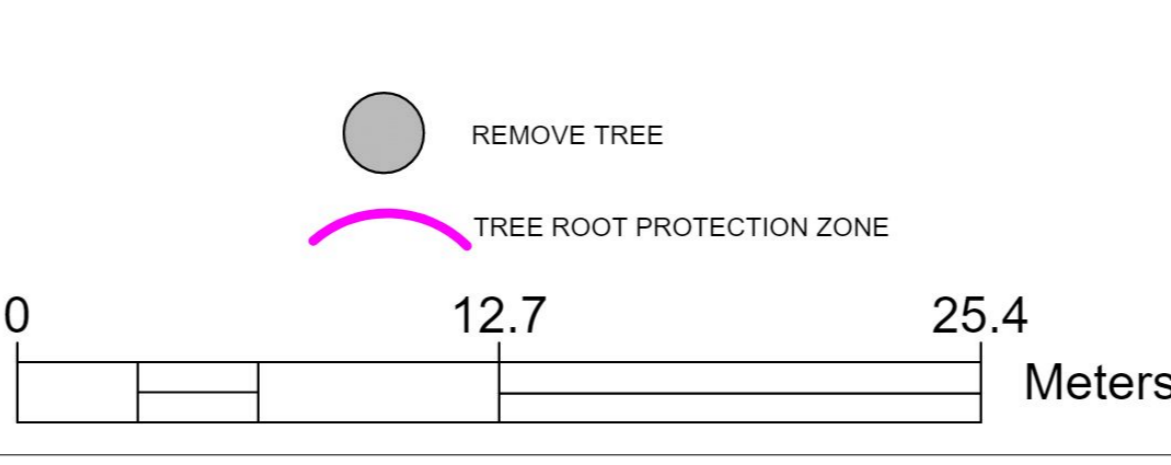
Riparian Areas Protection Regulation (RAPR) Legend	
	Riparian Assessment Area (RAA)
	High Water Mark (HWM) / TOB
	SPEA
	ZOS: Large Woody Debris
	ZOS: Litter and Insect Drop
	ZOS: Shade
	SPEA Fence
	RAPR Assessment Layers added by: Barsanti Environmental Services Ltd.
	Drawing Date: 2025-01-30 Linework is for illustrative purposes only. SPEA must be staked in the field by BCLS. Guidelines, procedures and dimensions described in the text of the report take precedence over illustrations in the drawings.

NO.	DATE	REVISION	DWG	DESIGN	NO.	DATE	REVISION	DWG	DESIGN

ATTENTION

UNITS SHOWN ON THIS PLAN
ARE IN METRES

GEODETIC PROJECTION AND DATUM:
UTM NAD83 ZONE 10 CSRS(GROUND)



DRAWN BY: RJ	DESIGN BY: KB
DRAWING CHECKED:	DESIGN CHECKED:
REFERENCES:	REFS:

APPLICATION 2021-02052	
1223 LOCKYER ROAD	
TREE MAP DRIVEWAY PLAN	
SCALE: 1:250	DATE: October 16, 2024
DRAWING NUMBER: K003	SHEET...1...OF...1... REVISION:.....3....

Section 4. Measures to Protect and Maintain the SPEA

This section is required for detailed assessments. Attach text or document files, as need, for each element discussed in Part 4 of the RAPR. It is suggested that documents be converted to PDF *before* inserting into the assessment report. Use your "return" button on your keyboard after each line. You must address and sign off each measure. If a specific measure is not being recommended a justification must be provided.

<p>1. Danger Trees</p>	<p>The Client has retained Branch Management Inc., ISA Certified Arborists to conduct an assessment of trees for hazards and risk.</p> <p>There are 18 trees in or near the SPEA that will be required to be removed for the proposed development. Reasons for their removal are as follows:</p> <p>Within proposed access route, adjacent to proposed access route, grade alterations rendering the tree not viable, physical characteristics / condition of the tree and increased exposure.</p> <p>The arborist made recommendations for retaining tree stubs and root components for wildlife habitat where viable.</p> <p>As discussed in Section 2, 96 trees are required to be replanted to mitigate for the removal of the 18 trees in the SPEA. Please refer to Section 2 for more details.</p> <p>The arborist report is appended.</p> <p>Local government is advised to ensure tree replacement planting has been completed prior to issuing occupancy permit.</p>
<p>I, <u>Jason Barsanti</u> (<i>name of qualified environmental professional</i>), hereby certify that:</p> <p>e) I am a qualified environmental professional, as defined in the Riparian Areas Protection Regulation made under the <i>Riparian Areas Protection Act</i>;</p> <p>f) I am qualified to carry out this part of the assessment of the development proposal made by the developer <u>Kenton Braine</u> (<i>name of developer</i>);</p> <p>g) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and in carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Minister's technical manual to the Riparian Areas Protection Regulation.</p>	
<p>2. Windthrow</p>	<p>The Client has retained Branch Management Inc., ISA Certified Arborists to conduct a tree</p>

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	<p>assessment, concerns about windthrow are discussed in their report, appended. Branch Management did not indicate a concern with windthrow.</p>
<p>I, <u>Jason Barsanti</u> (<i>name of qualified environmental professional</i>), hereby certify that:</p> <ol style="list-style-type: none"> I am a qualified environmental professional, as defined in the Riparian Areas Protection Regulation made under the <i>Riparian Areas Protection Act</i>; I am qualified to carry out this part of the assessment of the development proposal made by the developer <u>Kenton Braine</u> (<i>name of developer</i>); I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and in carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Minister's technical manual to the Riparian Areas Protection Regulation. 	

<p>3. Slope Stability</p>	<p>A secondary QEP was required to assess the site for floodplain concerns. The Client has retained Ground Up Geotechnical to conduct a slope stability and flood plain assessment. Please refer to the Ground Up Geotechnical and the Boundary Consulting Servies reports appended.</p>
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The Project will require a relatively small amount of disturbance to the SPEA as depicted in permit documentation. Notably, the form of crossing presents the least disruption to the critical nearbank areas adjacent to the thalweg of the creek. Rather than a more traditional curvert crossing, the proposed bridge as drawn does little to manipulate top of bank. The entrances from both sides of the creek are relatively gentle and won't require substantial regrading or retaining wall construction for completion. Outside of minor roadway grading, placement of a trafficking surface, excavation of the bridge foundation, and placement of the bridge, there is very little disturbance proposed to the SPEA at this time.

There are no requirements for this project to regrade the top of bank for the creek. The thalweg of the creek is expected to remain static due to the large surface area presented below the crossing, and the high variability permitted by a spanning bridge rather than a culvert. There is are no other specific mechanisms that require specific attention from a geohazards perspective. Based on our review of the project and the documentation provided by Ground Up, we believe that the Project may be constructed safely for use intended.

<p>I, <u>Ben Smale</u> (<i>name of qualified environmental professional</i>), hereby certify that:</p> <ol style="list-style-type: none"> I am a qualified environmental professional, as defined in the Riparian Areas Protection Regulation made under the <i>Riparian Areas Protection Act</i>; I am qualified to carry out this part of the assessment of the development proposal made by the developer <u>Kenton Braine</u> (<i>name of developer</i>); I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and in carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Minister's technical manual to the Riparian Areas Protection Regulation. 	
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<p>4. Protection of Trees</p>	<p>The Client has retained Branch Management Inc., ISA Certified Arborists to conduct a tree assessment. Recommendations for protection of trees and root zones is provided in their report, appended. Root zones are illustrated on the site plan in Section 3.</p> <p>The arborist makes recommendations to have a certified arborist on site monitoring earth works in and around root zones.</p>
<p>I, <u>Jason Barsanti</u> (<i>name of qualified environmental professional</i>), hereby certify that:</p> <p>a. I am a qualified environmental professional, as defined in the Riparian Areas Protection Regulation made under the <i>Riparian Areas Protection Act</i>;</p> <p>b. I am qualified to carry out this part of the assessment of the development proposal made by the developer <u>Kenton Braine</u> (<i>name of developer</i>);</p> <p>c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and in carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Minister's technical manual to the Riparian Areas Protection Regulation.</p>	

<p>5. Encroachment</p>	<p><i>SPEA protection fencing needs to be established prior to any construction occurring on the site.</i></p> <p>The development is proposed to occur inside the SPEA. It is important that neither any construction personal nor any impacts from construction works occur in an area greater than the absolute minimum required for construction.</p> <p>1.) A BCLS must stake the location of the SPEA prior to the start of construction. The SPEA is to be measured from HWM of Flume Creek.</p> <p>2.) Temporary construction barrier fencing should be installed parallel to the proposed work zone of the driveway and bridge and not extend further out from the centerline of the proposed driveway than absolutely necessary for construction and a safe works site. This recommendation may be reviewed and modified, if necessary, by the environmental monitor during the Pre-construction EM Site meeting (See Section 5).</p> <p>3.) At the completion of construction, the temporary fence may be removed and replaced with permanent fencing that fits with the general aesthetics of the site landscaping.</p>
<p>I, <u>Jason Barsanti</u> (<i>name of qualified environmental professional</i>), hereby certify that:</p> <p>a. I am a qualified environmental professional, as defined in the Riparian Areas Protection Regulation made under the <i>Riparian Areas Protection Act</i>;</p> <p>b. I am qualified to carry out this part of the assessment of the development proposal made by the developer <u>Kenton Braine</u> (<i>name of developer</i>);</p>	

c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and in carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Minister's technical manual to the Riparian Areas Protection Regulation.

<p>6. Sediment and Erosion Control</p>	<p>Sediment transport into fish habitat is a concern during earthworks and construction activities. The best way to prevent sediment being transported to watercourses on the site is to minimize the creation of erodible surfaces by minimizing the area of disturbed of vegetation. Disturbance of soils must be kept to the least amount possible during construction.</p> <p>General measures for ESC are listed below, however, these measures should be tailored to the construction works by the Environmental Monitor at the pre-construction meeting. And, a certified engineer may be required to ensure ESC measures are adequate.</p> <p>At a minimum, a sediment fence should be established parallel to, and on the upland side of the temporary construction fencing and stay in place until the completion of construction when ground cover vegetation is well established.</p> <p>Sediment fence should be installed parallel to and at top-of-bank of Flume Creek for the construction of the roads. During construction of the bridge abutments the fence my be replaced with coir logs to assist access for construction.</p> <p>In addition:</p> <ul style="list-style-type: none"> • All exposed piles of dirt or other erodible materials must be covered by plastic or other impervious material. • No machinery will be washed near the watercourses and no construction related contaminants, concrete washout or other pollutants will be allowed to enter the ground water via infiltration through the ground or otherwise. • All contaminants will be removed from the site to be treated at the appropriate treatment or disposal facility.
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	<ul style="list-style-type: none"> • There will be no refuelling of equipment within 30 m of any watercourse. <p>Environmental Monitoring of construction works is a component of the RAPR and regular monitoring inspections will be carried out by a QEP as detailed in Section 5.</p> <p>Additional or alternate measures for ESC may be at the discretion of the project engineer and or Environmental Monitor.</p>
<p>I, <u>Jason Barsanti</u> (<i>name of qualified environmental professional</i>), hereby certify that:</p> <ol style="list-style-type: none"> I am a qualified environmental professional, as defined in the Riparian Areas Protection Regulation made under the <i>Riparian Areas Protection Act</i>; I am qualified to carry out this part of the assessment of the development proposal made by the developer <u>Kenton Braine</u> (<i>name of developer</i>); I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and in carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Minister's technical manual to the Riparian Areas Protection Regulation. 	
<p>7. Stormwater Management</p>	<p>Stormwater is proposed to be directed off the road surface as sheet flow.</p>
<p>I, <u>Jason Barsanti</u> (<i>name of qualified environmental professional</i>), hereby certify that:</p> <ol style="list-style-type: none"> I am a qualified environmental professional, as defined in the Riparian Areas Protection Regulation made under the <i>Riparian Areas Protection Act</i>; I am qualified to carry out this part of the assessment of the development proposal made by the developer <u>Kenton Braine</u> (<i>name of developer</i>); I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Minister's technical manual to the Riparian Areas Protection Regulation. 	
<p>8. Floodplain Concerns (highly mobile channel)</p>	<p>A secondary QEP was required to assess the site for floodplain concerns. The Client has retained Ground Up Geotechnical to conduct a slope stability and flood plain assessment. Please refer to the Ground Up Geotechnical report, appended.</p>
<p>I, <u>Andrew Sails</u> (<i>name of qualified environmental professional</i>), hereby certify that:</p> <ol style="list-style-type: none"> I am a qualified environmental professional, as defined in the Riparian Areas Protection Regulation made under the <i>Riparian Areas Protection Act</i>; I am qualified to carry out this part of the assessment of the development proposal made by the developer <u>Kenton Braine</u> (<i>name of developer</i>); I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Minister's technical manual to the Riparian Areas Protection Regulation. 	

Section 5. Environmental Monitoring

Attach text or document files explaining the monitoring regimen Use your "return" button on your keyboard after each line. It is suggested that all document be converted to PDF *before* inserting into the PDF version of the assessment report. Include actions required, monitoring schedule, communications plan, and requirement for a post development report.

Environmental Monitoring (EM) is an important component of the RAPR. EM is necessary to ensure the integrity of the SPEA is maintained in accordance with the prescriptions detailed in this report, and with any upcoming reports that may be prepared in support of proposed development plans (e.g. reports prepared per recommendations in the Measures).

Periodic environmental monitoring and reporting are required at minimum at the following intervals, however additional EM sessions are anticipated.

1. A pre-construction meeting to inform the developer and construction personal of all the conditions required for the protection of the SPEA and to observe that Measures described in this report are in place to protect the SPEA.
2. Midway through construction coinciding with those activities with the highest potential for Erosion and Sediment Control (ESC). The second inspection during the construction phase is to observe and document compliance with the recommendations of this RAPR report and to assist the developer and construction personal with staying compliant.
3. A post-construction inspection to verify that functions and features of the SPEA and watercourse are maintained, or to observer any potential impacts to it, and to ensure permanent SPEA protection fencing is in place.

The EM should be a QEP and must have a copy of this RAPR report.

In addition to EM by the QEP, the project engineer will be monitoring construction works, and the project arborist should be on site for the establishment of tree root protection barriers and tree falling works in general.

Section 6. Photos

Provide a description of what the photo is depicting, and where it is in relation to the site plan.



Photo 1. Viewing the general conditions in Flume Creek and the riparian assessment area. The ribbons on the trees roughly approximate the proposed location of the driveway. December 8, 2021.



Photo 2. Alternate view of the general conditions in Flume Creek and the riparian assessment area. The ribbons on the trees roughly approximate the proposed location of the driveway and bridge. December 8, 2021.



Photo 3. Opposite view of the general conditions in Flume Creek and the riparian assessment area. The ribbons on the trees roughly approximate the proposed location of the driveway. December 8, 2021.

Section 7. Professional Opinion

Qualified Environmental Professional opinion on the development proposal’s riparian assessment.

Date

1. I/We Jason Barsanti, Andrew Sails, Ben Smale

Please list name(s) of qualified environmental professional(s) and their professional designation that are involved in assessment.)

hereby certify that:

- a) I am/We are qualified environmental professional(s), as defined in the Riparian Areas Protection Regulation made under the *Riparian Areas Protection Act*;
- b) I am/We are qualified to carry out the assessment of the proposal made by the developer Kenton Braine (name of developer), which proposal is described in section 3 of this Assessment Report (the “development proposal”);
- c) I have/We have carried out an assessment of the development proposal and my/our assessment is set out in this Assessment Report; and
- d) In carrying out my/our assessment of the development proposal, I have/We have followed the specifications of the Riparian Areas Protection Regulation and assessment methodology set out in the minister’s manual; AND

2. As qualified environmental professional(s), I/we hereby provide my/our professional opinion that:

- a) the site of the proposed development is subject to undue hardship, **(if applicable, indicate N/A otherwise)** and
- b) the proposed development will meet the **riparian protection standard** if the development proceeds as proposed in the report and complies with the measures, if any, recommended in the report.

[NOTE: "Qualified Environmental Professional" means an individual as described in section 21 of the Riparian Areas Protection Regulation.]

Appendices:

- 1. Ground Up Geotechnical Report**
- 2. Branch Management Inc. Arborist Report**
- 3. Boundary Consulting Services. Geotechnical Report Review**
- 4. DFO – Approval for Bridge Construction**
- 5. MoF – Approval for Instream Works**



GROUND UP GEOTECHNICAL

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Call: 778.678.7654 Email: info@groundupgeo.ca Visit: www.groundupgeotechnical.ca
Box 151 Garibaldi Highlands, Squamish BC V0N 1T0

January 30, 2022
File #: GUG 21-336-1

Mr. Kenton Braine
1223 Lockyer Road
Roberts Creek, BC
V0N 2W1
By Email: kenton.braine@yahoo.com

Re: Creek & Ravine Hazard Assessment Report for Proposed Vehicle Bridge & Driveway
Address: 1223 Lockyer Road, Roberts Creek, Sunshine Coast Regional District, BC
Legal: LOT A, BLOCK 2, DISTRICT LOT 1318, PLAN VAP 17244
PID: 007-297-939

1.0 INTRODUCTION

As requested, we have completed our creek & ravine hazard assessment report in support of the proposed driveway and vehicle bridge over Flume Creek at 1223 Lockyer Road, Roberts Creek in the Sunshine Coast Regional District (Subject Property). The proposed bridge and driveway alignment are situated within the 'Creek/River Corridor Development Permit Area (DPA #2A) as well as the 'Ravine Hazard Development Permit Area (30m)' (DPA #2B) as defined within Map 5 of the 'Roberts Creek Official Community Plan Bylaw No. 641.4, 2015' and thus, a creek and ravine hazard assessment report is required by the Sunshine Coast Regional District (SCRD) prior to issuing a development permit for the proposed bridge and driveway.

The objective of our creek and ravine hazard assessment was to determine whether the proposed driveway and bridge alignment are geotechnically appropriate, based on the potential presence of creek and slope hazards such as flooding, erosion and slope instability etc., and to provide recommendations to complete the project in a geotechnically safe manner and minimize long term risk due to geohazards. Accordingly, we attended the subject property on July 7, 2020, and again on October 6, 2021, and met with Mr. Kenton Braine (Client & Property Owner) to discuss the project and complete our visual assessment of Flume Creek and its ravine. A Photo Table is attached. No other portions of the property were included in our assessment. This report summarizes our observations, assessment, conclusions, and development conditions associated with the proposed bridge and driveway development. Our services and this report have been provided in accordance with, and are subject to, the attached Terms of Engagement.

Our work has also included a review of SCRD aerial imagery/topographic mapping, the background report "*Geotechnical Hazards Report: Roberts Creek*" prepared by 'Kerr Wood Leidal consulting engineers' in May 2013 for the Sunshine Coast Regional District (SCRD), as well as the attached Driveway Plans and Bridge Profile (attached) showing the proposed bridge and driveway, prepared by Richard Johnson (Project Manager).

2.0 PROPOSED DEVELOPMENT

As shown on the attached Driveway Plans & Bridge Profile, the proposed development will include construction of a private vehicle driveway and bridge over Flume Creek, connecting Lockyer Road with the existing home on the property. We understand the bridge will be constructed with typical reinforced concrete lock block abutments (3 blocks high = 2.25m) supporting a steel and timber bridge deck (designed by others).

From the Driveway Plans & Bridge Profile, we see the bridge clear span between abutments will be approximately 10m. Using the same Plans, we calculate that the underside of the bridge will be elevated above the creek bed by at least 1.95m (underside of abutments at approximately 63.5m elevation, plus 2.25m to top of abutment at 65.75m, minus 0.3m for depth of bridge beam = 65.45m, creek bed below bridge at 63.5m, $65.45\text{m} - 63.5\text{m} = 1.95\text{m}$ clearance between creek bed and underside of bridge beams).

We understand the driveway will be gravel surfaced on the subject property, with asphalt surfacing at the connection to Lockyer Road. We understand the driveway will be excavated into the west ravine slope in order to create driveway grades while on the east ravine slope, more filling will be utilized to create the driveway grade. We envisage the potential requirement for minor fill retainment on the low side of the driveway alignment along the east ravine slope, such as reinforced concrete lock blocks, steel gabion baskets or similar.

3.0 PROPERTY CHARACTERISTICS & OBSERVATIONS

The subject property is a rural residential lot situated at the northwest corner of the intersection of Lockyer Road and the Sunshine Coast Highway. As displayed on the attached SCRD Property Report, the subject property is bounded by the Sunshine Coast Highway to the southwest, similar rural residential properties to the north and northeast, and Lockyer Road to the southeast. The property is hourglass shaped, with approximate dimensions of 150m long by 30 to 60m wide.

Flume Creek flows through the property in a southwestern direction as shown on the attached SCRD Maps Property Reports. Within the property, Flume Creek has cut a ravine along its path, with ravine slopes generally 8 to 10m high and cut to between 30 to 35 degrees along the east ravine slope, and 6 to 7m high and cut to 20 to 25 degrees along the west ravine slope. No evidence of instability, seepage or recent failures or erosion was observed upon the ravine slopes within the property. The ravine slopes were covered with thick tree cover comprising of a variety of trees, from juvenile cedar and spruce all the way up to very large mature fir trees, with trunk diameters approaching 1 to 1.5m. Trees were generally straight/plumb and showed no evidence of slope instability (no leaning or 'pistol butting' etc.).

The creek channel varies between 6 to 9m in width through the property and is incised into hard glacial till like soils (sandy clay and silt with gravel) by at least 0.5m up to 1m along some stretches. The creek channel is approximately 6m wide at the proposed bridge crossing. The creek bed is



comprised of a mix of bedrock and hard glacial till like soils (sandy clay and silt with gravel). Similar soils were observed at exposures upon the ravine slopes.

Figure 1 within the reference paper, *“Surficial Geology and Sand and Gravel Deposits of Sunshine Coast, Powell River, and Campbell River Areas”*¹ suggests that the subject property is underlain by Capilano Marine & Glacio-Marine Deposits, which the paper describes as, *“varied gravelly, sandy, stoney, clay, and clay veneer, normally over till”*. The paper’s soil description is consistent with our observations along the creek channel and upon the ravine slope.

Approximately 25m downstream of the proposed bridge crossing, Flume Creek flows into a 1200mm diameter smooth walled precast concrete culvert and below the Sunshine Coast Highway. A 1200mm diameter corrugated steel culvert was situated 0.45m above the precast concrete culvert, presumably for additional flow capacity during extreme flows. During our site attendance, creek flow into the concrete culvert was measured to be approximately 75mm deep. Based on the staining on the sidewalls of the culvert, we estimate that the annual high water mark is around 1/2 full in the culvert, or 600mm depth of flow in the culvert.

4.0 CREEK FLOOD HAZARD ASSESSMENT

In order to properly assess the creek flood hazard at the proposed bridge site, we need to estimate the 1 in 200 year flood flow for Flume Creek (the designated flood). There exists no historical flow gauge data or floodplain mapping for Flume Creek, therefore our analysis has been comparative and empirical, using nearby Chapman Creek (4km to the west) as a proxy given the similarities in watershed characteristics and channel morphology. Given the scale of the proposed development, we consider this to be an appropriately accurate method of analysis.

Utilizing regional analysis of comparative data² from nearby Chapman Creek, we estimate the 50 year peak flow for Flume Creek (at outlet to sea) to be approximately: $Q_{200} \approx 15\text{m}^3/\text{sec}$, calculated as follows:

Flume $Q_{200} \approx \text{Chapman } Q_{200} \times \text{Flume Drainage Area}^3 / \text{Chapman Drainage Area}$

Flume $Q_{200} \approx 130\text{m}^3/\text{sec} \times 7.5\text{km}^2 / 65.8\text{km}^2$

Flume $Q_{200} \approx 15\text{m}^3/\text{sec}$

We measured Flume Creek’s channel at the bridge site to be approximately 6m wide and 0.75m deep. Assuming an average cross sectional flow velocity of 1.5m/sec during the 200 year peak flow, we would anticipate the creek to overflow its banks by as much as 0.5m depth in the vicinity of the

¹ *Surficial Geology and Sand and Gravel Deposits of Sunshine Coast, Powell River, and Campbell River Areas* authored by J.W. McCammon in 1977, and published by the BC Ministry of Mines & Petroleum Resources

² *‘Chapman Creek Flood Assessment Report’*, prepared for the District of Sechelt by Kerr Wood Leidal Associates Ltd., dated August 2010.

³ See attached Figure 1: Flume Creek Drainage Area



proposed bridge. Accordingly, we estimate that the appropriate flood elevation along Flume Creek in the vicinity of the bridge corresponding to the 200 year creek flood would likely be at most 0.5m above Top of Bank (TOB), or $64.3\text{m (TOB)} + 0.5\text{m} = 64.8\text{m}$ geodetic elevation, approximately 0.65m below the underside of the bridge beams at 65.45m geodetic elevation, and approximately 0.7m below the proposed driveway low point of around 65.5m geodetic elevation.

Given the clear span between abutments is approximately 10m and the underside of the bridge beams are situated at approximately 65.45m geodetic elevation, it is our opinion that the estimated 1 in 200 year Flume Creek flood event would pass under the bridge and between the abutments with plenty of flow capacity to spare.

It is our opinion that during extreme flows in Flume Creek, there is potential for the culverts extending below the Sunshine Coast Highway to back up due to insufficient capacity or debris/log blockages, which could result in the impoundment of floodwaters between the highway fill prism and the proposed bridge site. Given the proposed bridge and driveway details and elevations, we would expect the proposed bridge and driveway to endure such a flood scenario, perhaps with minor damage to driveway fill slopes.

5.0 RAVINE SLOPE HAZARD ASSESSMENT

As discussed above within **Section 3.0** of this report, the ravine slopes adjacent Flume Creek are generally 7 to 9m high and cut to between 30 to 35 degrees along the east side of the ravine, and 6 to 7m high and cut to 20 to 25 degrees along the west side of the ravine. Our ravine slope hazard assessment has assumed that significant excavations into the east ravine slope will not occur as part of driveway construction, and driveway related excavations will not exceed 1m deep into the east ravine slope.

The ravine slopes show no evidence of instability or recent failures or erosion, and we would consider them to be stable under static conditions given the observed soil conditions. During a large seismic event such as the design 1 in 2,475 year earthquake, proposed driveway fills or steeper parts of the east ravine slope may fail, however, we would expect these slope failures to be fairly shallow slumps (likely < 1m deep) given the observed soil conditions and the 7 to 9m slope height. A possible 1m deep slump failure on the eastern ravine slope or the driveway fills would be considered a minor hazard to the driveway and its users. When considering the probability of hazard occurrence (1 in 2,475 years) and the very low probability of a driveway user being present during the seismic event (likely < 30 seconds per day) it is our opinion that the potential risk to the driveway and its users from slope instability is very minor.



6.0 CONCLUSIONS & DEVELOPMENT CONDITIONS

Based on our above creek and ravine hazard assessments, it is our professional geotechnical engineering opinion that the proposed bridge and driveway development as shown on the attached Driveway Plans & Bridge Profile would be sufficiently safe from flood and slope hazards, and therefore may proceed as proposed and in accordance with the below development conditions.

As required by *Section 56 of BC's Community Charter*, it is our professional opinion that the land may be used safely for the use intended, such being a permanent private driveway and bridge crossing, given adherence to the following development conditions. Our assessment has considered a seismic event (earthquake) with an occurrence probability of 2% in 50 years, and a creek flooding event with a return period of 1 in 200 years.

It must be understood by the property owner that over time, minor soil sloughs and slumps are likely to occur along the proposed driveway's east ravine slope segment, and that cleanup and maintenance of such is the responsibility of the property owner. Ground Up Geotechnical Ltd. will not be held responsible for maintenance of the driveway.

To minimize geotechnical risk associated with the project, the following development conditions shall be adhered to:

1. A qualified professional engineer shall be engaged to provide design and field review services for the proposed excavations and fill placement on the ravine slopes, soil retaining systems taller than 1.2m (if proposed), as well as driveway surface drainage.
2. All driveway and abutment bulk fills shall be free draining (less than 8% clay & silt content by mass) granular based materials, such as 150mm minus coarse crushed gravels or 300mm minus shotrock, and well compacted to at least 95% of the materials Modified Proctor Maximum Dry Density.
3. To alleviate the risk of scour during extreme creek flows, the pre-cast concrete lock block abutments shall be placed atop one of the following subgrade surfaces (or a combination): hard glacial till like soils (sandy clay and silt with gravel) or bedrock, or a cast in place reinforced concrete footing/leveling plinth atop such.
4. Tree removal shall be minimized and kept to within the footprint of the proposed driveway excavation and fill footprint. Large trees shall not be undermined or destabilized by excavations.
5. Permanent soil cutslopes on the ravine slopes shall be protected from erosion and revegetated as soon as possible.



7.0 SCRD DPA 3 SLOPE HAZARDS REQUIREMENTS

In accordance with the requirements of the SCRD's OCP for the Roberts Creek area, the 'Roberts Creek Official Community Plan Bylaw No. 641.4, 2015', we must specifically address the below items in *italics* for Development Permit Area (DPA) 3 Slope Hazards (our statements follow each item in **bold**):

a) *Slope profiles with documentation of the limits of slope instability shall be provided. Consideration shall be given to the limits and types of instability and changes in stability that may be induced by forest clearing. The down-slope impact of forest clearing and land development shall also be considered.*

We describe the ravine slope profiles and topography in Section 3.0 of our report and a topographical plan is attached. The minor forest clearing proposed along the driveway alignment will not affect downslope property.

b) *A detailed stability assessment indicating foreseeable slope failure modes and limiting factors of safety, and stability during seismic events.*

See Section 5.0 of this report.

c) *An assessment of shallow groundwater conditions and the anticipated effects of septic systems, footing drains, etc. on local slope stability.*

Shallow groundwater is not present at the property. No drains are proposed with the development.

d) *A recommendation of required setbacks from the crests and/or toes of steep slopes, and a demonstration of suitability for the proposed use.*

Slope setbacks not applicable. See Section 6.0 of this report for suitability for proposed use.

e) *A field definition of the required setback from the top of steep slope.*

Not applicable.

f) *Appropriate land use recommendations such as restrictions on tree cutting, surface drainage, filling and excavation.*

See Section 6.0 of this report.

g) *If required, definition of the site-specific rock fall shadow area, including an indication of the appropriate buffer zone and required protective works.*

Not applicable, no rockfall hazard present.



8.0 CLOSURE

This report was prepared in accordance with current geotechnical engineering practices and principles in British Columbia. Attached is our completed 'Appendix D: Landslide Assessment Assurance Statement' and 'Appendix J: Flood Hazard and Risk Assurance Statement'.

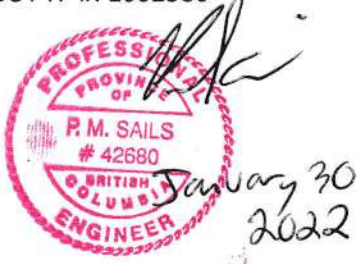
The results and conclusions within this report apply only to the proposed development and subject property and shall not be extrapolated to other properties.

This report has been prepared exclusively for our client, their agent(s) and their design and construction team, yet remains the property of Ground Up Geotechnical Ltd. The Sunshine Coast Regional District is considered an authorized user of this report and may rely on its contents.

Any use of this report by third parties, or any reliance on or decisions made based on it, are the responsibility of such third parties. Ground Up Geotechnical Ltd. does not accept responsibility for damages suffered, if any, by a third party as a result of their use of or reliance on this report.

We trust that this report provides you with the information you require at this time, please do not hesitate to contact us if you have any questions or require anything further.

Sincerely,
Ground Up Geotechnical Ltd.
EGBC PTP #: 1002580



Patrick Sails, P.Eng.
Geotechnical Engineer

Attachments - Terms of Engagement
SCRD Property Report
SCRD Development Permit Areas Plan
Figure 1: Flume Creek Drainage Area
Driveway Plans & Bridge Profile, Richard Johnson, dated April 2021
Photo Table
EGBC Appendix D: Landslide Assessment Assurance Statement
EGBC Appendix J: Flood Hazard and Risk Assurance Statement



TERMS OF ENGAGEMENT

GENERAL

Ground Up Geotechnical Ltd. (the Consultant) shall render the Services, as specified in the agreed Scope of Services, to the Client for this Project in accordance with the following terms of engagement. The Services, and any other associated documents, records or data, shall be carried out and/or prepared in accordance with generally accepted engineering practices in the location where the Services were performed. No other warranty, expressed or implied is made. The Consultant may, at its discretion and at any stage, engage sub-consultants to perform all or any part of the Services.

COMPENSATION

Charges for the Services rendered by the Consultant will be made in accordance with the Consultants Fee Estimate and/or Schedule of Fees if such was provided. All charges will be payable in Canadian Dollars. Invoices will be due and payable by the Client within 30 days of receipt of the invoice without hold back. Interest on overdue accounts is 24% per annum.

REPRESENTATIVES

Each party shall designate a representative who is authorized to act on behalf of that party and receive notices under this Agreement.

TERMINATION

Either party may terminate this engagement without cause upon thirty (30) days' notice in writing. On termination by either party under this paragraph, the Client shall forthwith pay to the Consultant its Charges for the Services performed, including all expenses and other charges incurred by the Consultant for this Project.

If either party breaches this engagement, the non-defaulting party may terminate this engagement after giving seven (7) days' notice to remedy the breach. On termination by the Consultant under this paragraph, the Client shall forthwith pay to the Consultant its Charges for the Services performed to the date of termination, including all fees and charges for this Project.

ENVIRONMENTAL

The Consultant's field investigation, laboratory testing and engineering recommendations will not address or evaluate pollution of soil or pollution of groundwater.

PROFESSIONAL RESPONSIBILITY

In performing the Services, the Consultant will provide and exercise the standard of care, skill and diligence required by customarily accepted professional practices and procedures normally provided in the performance of the Services contemplated in this engagement at the time when and the location in which the Services were performed.

INSURANCE

Ground Up Geotechnical Ltd. is covered by Professional Indemnity Insurance as well as Commercial General Liability Insurance.

LIMITATION OF LIABILITY

The Consultant shall not be responsible for:

1. the failure of a contractor, retained by the Client, to perform the work required for the Project in accordance with the applicable contract documents;
2. the design of or defects in equipment supplied or provided by the Client for incorporation into the Project;
3. any cross-contamination resulting from subsurface investigations;
4. any Project decisions made by the Client if the decisions were made without the advice of the Consultant or contrary to or inconsistent with the Consultant's advice;
5. any consequential loss, injury or damages suffered by the Client, including but not limited to loss of use, earnings and business interruption;
6. the unauthorized distribution of any confidential document or report prepared by or on behalf of the Consultant for the exclusive use of the Client;
7. Any damage to subsurface structures and utilities;

The Consultant will make all reasonable efforts prior to and during subsurface site investigations to minimize the risk of damaging any subsurface utilities/mains. If, in the unlikely event that damage is incurred where utilities were unmarked and/or undetected, the

Consultant will not be held responsible for damages to the site or surrounding areas, utilities/mains or drilling equipment or the cost of any repairs.

The total amount of all claims the Client may have against the Consultant or any present or former partner, executive officer, director, stockholder or employee thereof under this engagement, including but not limited to claims for negligence, negligent misrepresentation and breach of contract, shall be strictly limited to the amount of any professional liability insurance the Consultant may have available for such claims.

No claim may be brought against the Consultant in contract or tort more than two (2) years after the date of discovery of such defect.

DOCUMENTS AND REPORTING

All of the documents prepared by the Consultant or on behalf of the Consultant in connection with the Project are instruments of service for the execution of the Project. The Consultant retains the property and copyright in these documents, whether the Project is executed or not. These documents may not be used on any other project without the prior written agreement of the Consultant.

The documents have been prepared specifically for the Project, and are applicable only in the case where there has been no physical alteration to, or deviation from any of the information provided to the Consultant by the Client or agents of the Client. The Client may, in light of such alterations or deviations, request that the Consultant review and revise these documents.

The identification and classification as to the extent, properties or type of soils or other materials at the Project site has been based upon investigation and interpretation consistent with the accepted standard of care in the engineering consulting practice in the location where the Services were performed. Due to the nature of geotechnical engineering, there is an inherent risk that some conditions will not be detected at the Project site, and that actual subsurface conditions may vary considerably from investigation points. The Client must be aware of, and accept this risk, as must any other party making use of any documents prepared by the Consultant regarding the Project.

Any conclusions and recommendations provided within any document prepared by the Consultant for the Client has been based on the investigative information undertaken by the Consultant, and any additional information provided to the Consultant by the Client or agents of the Client. The Consultant accepts no responsibility for any associated deficiency or inaccuracy as the result of a miss-statement or receipt of fraudulent information.

JOBSITE SAFETY AND CONTROL

The Client acknowledges that control of the jobsite lies solely with the Client, his agents or contractors. The presence of the Consultant's personnel on the site does not relieve the Client, his agents or contractors from their responsibilities for site safety. Accordingly, the Client must endeavor to inform the Consultant of all hazardous or otherwise dangerous conditions at the Project site of which the Client is aware.

The client must acknowledge that during the course of a geotechnical investigation, it is possible that a previously unknown hazard may be discovered. In this event, the Client recognizes that such a hazard may result in the necessity to undertake procedures which ensure the safety and protection of personnel and/or the environment. The Client shall be responsible for payment of any additional expenses incurred as a result of such discoveries, and recognizes that under certain circumstances, discovery of hazardous conditions or elements requires that regulatory agencies must be informed. The Client shall not bring about any action or dispute against the Consultant as a result of such notification.

FIELD SERVICES

Where applicable, field services recommended for the Project are the minimum necessary, in the sole discretion of the Consultant, to observe whether the work of the Client, or a contractor retained by the Client, is being carried out in general conformity with the intent of the Services. Any reduction from the level of services recommended will result in the Consultant providing qualified certifications for the work.

DISPUTE RESOLUTION

If requested in writing by either the Client or the Consultant, the Client and the Consultant shall attempt to resolve any dispute between them arising out of or in connection with this Agreement by entering into structured non-binding negotiations with the assistance of a mediator on a without prejudice basis. The mediator shall be appointed by agreement of the parties. If a dispute cannot be settled within a period of thirty (30) calendar days with the mediator, the dispute shall be referred to and finally resolved by arbitration under the rules of the arbitrator appointed by agreement of the parties or by reference to a Judge of the British Columbia Court.



SCRD Maps

Property Report

1223 LOCKYER RD

1/29/2022

Folio: 746.02410.060 **PID:** 007-297-939

Address: 1223 LOCKYER RD

Jurisdiction: SCRCD

Lot: A **Block:** 2 **Plan:** VAP17244 **District Lot:** 1318

2022 Assessed Value: 679000 **Land Value:** 462000 **Improvement Value:** 217000

Approximate Lot Size (BC Assessment): 1.78 ACRES





SCRD Maps

Property Report

1223 LOCKYER RD

1/29/2022

Folio: 746.02410.060 **PID:** 007-297-939

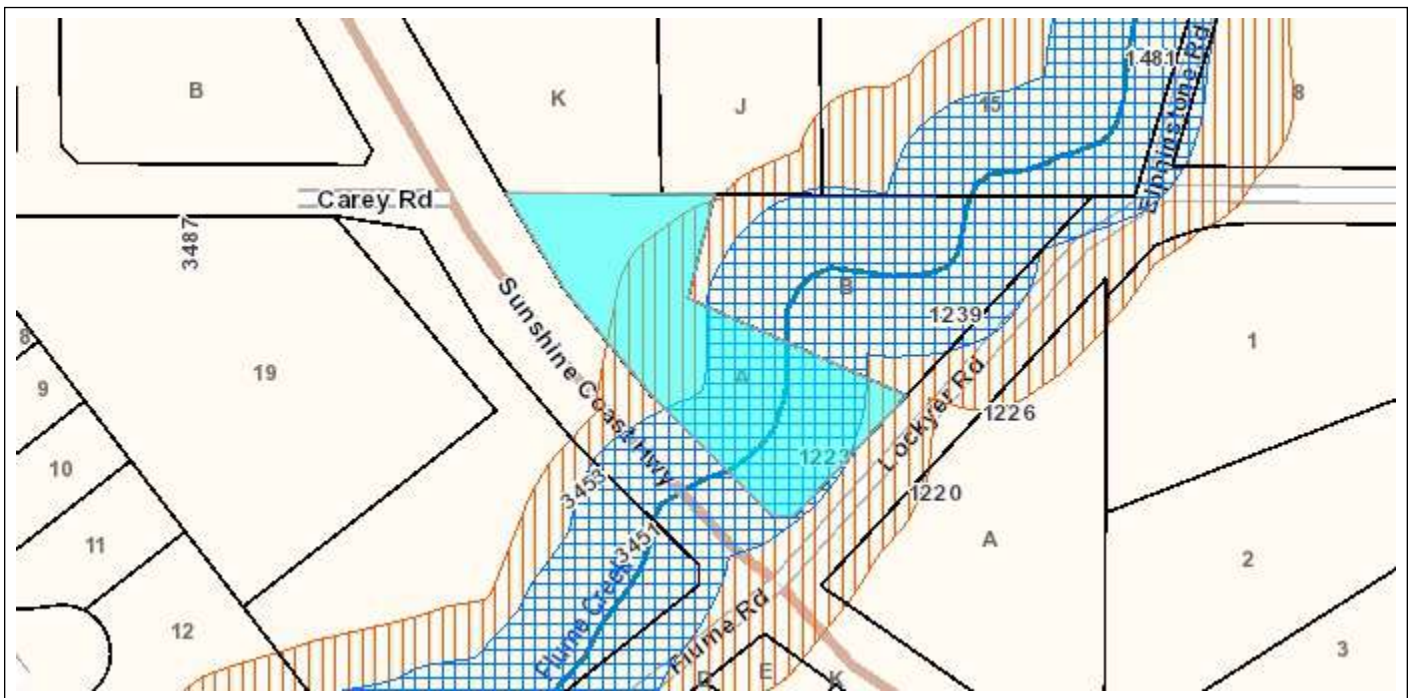
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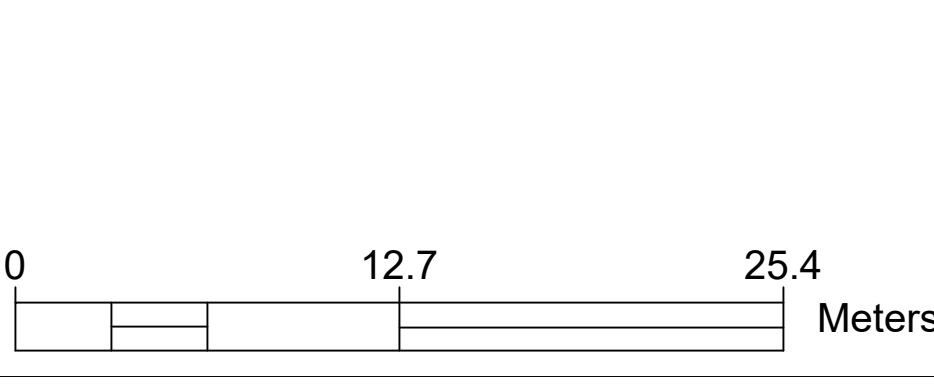
Approximate Lot Size (BC Assessment): 1.78 ACRES





NO.	DATE	REVISION	DWG	DESIGN	NO.	DATE	REVISION	DWG	DESIGN

ATTENTION
 UNITS SHOWN ON THIS PLAN
 ARE IN METRES
 GEODETIC PROJECTION AND DATUM:
 UTM NAD83 ZONE 10 CSRS(GROUND)



DRAWN BY: RJ	DESIGN BY: KB
DRAWING CHECKED:	DESIGN CHECKED:
REFERENCES:	REFS:

APPLICATION 2021-02052
 1223 LOCKYER ROAD
 DRIVEWAY PLAN
 SCALE: 1:250
 DATE: APRIL 15, 2021
 DRAWING NUMBER: K001
 SHEET...1...OF...2... REVISION:.....0....

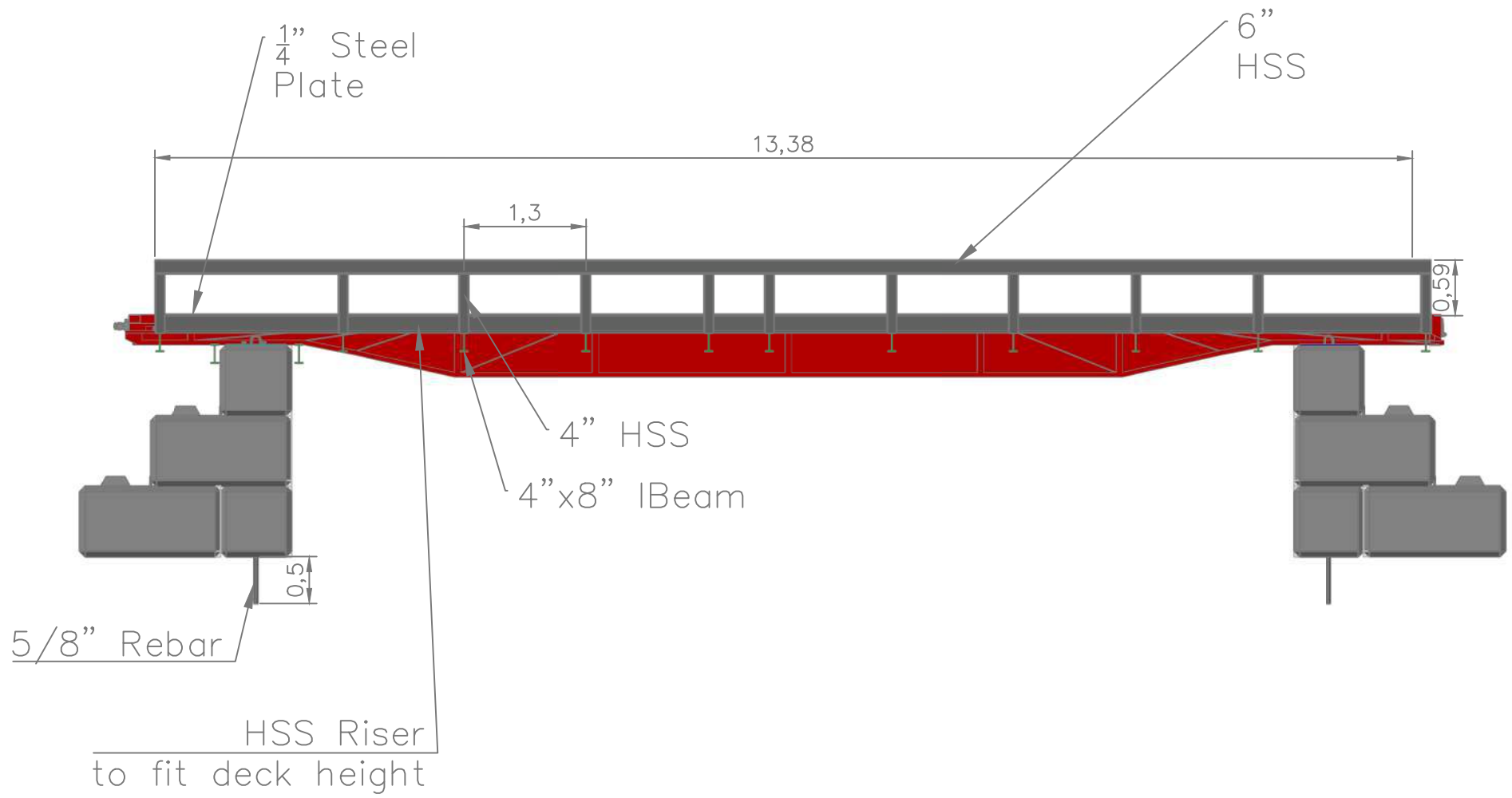




Photo Table from July 7, 2020
1223 Lockyer Road, Roberts Creek, SCRD, BC



Photo 1: Looking upstream at the bridge site. West ravine slope is left, East ravine slope is right.



Photo 2: Looking East across Flume Creek at the bridge site, East ravine slope in background.



Photo 3: Looking West from bridge site at driveway segment up the west ravine slope.



Photo 4: Looking East along driveway segment up the East ravine slope.





Photo 5: Looking West at the driveway alignment & bridge site from atop the East ravine slope.



Photo 6: 1200mm diam. concrete culvert below Sunshine Coast Highway, approx. 25m downstream of bridge site.



Photo 7: Same 1200mm diam. concrete culvert as previous photo but showing the 1200mm diam corrugated steel culvert stacked approx. 0.45m above (partially hidden by blackberry bush).

APPENDIX D: LANDSLIDE ASSESSMENT ASSURANCE STATEMENT

Note: This Statement is to be read and completed in conjunction with the "APEGBC Guidelines for Legislated Landslide Assessments for Proposed Residential Development in British Columbia", March 2006/Revised September 2008 ("APEGBC Guidelines") and the "2006 BC Building Code (BCBC 2006)" and is to be provided for *landslide assessments* (not floods or flood controls) for the purposes of the Land Title Act, Community Charter or the Local Government Act. Italicized words are defined in the APEGBC Guidelines.

To: The Approving Authority Sunshine Coast Regional District Date: January 30, 2022

Jurisdiction and address

With reference to (check one):

- Land Title Act (Section 86) – Subdivision Approval
- Local Government Act (Sections 919.1 and 920) – Development Permit
- Community Charter (Section 56) – Building Permit
- Local Government Act (Section 910) – Flood Plain Bylaw Variance
- Local Government Act (Section 910) – Flood Plain Bylaw Exemption
- British Columbia Building Code 2006 sentences 4.1.8.16 (8) and 9.4.4.4.(2) (Refer to BC Building and Safety Policy Branch Information Bulletin B10-01 issued January 18, 2010)

For the Property: Lot A, Block 2, DL 1318, Plan VAP 17244
Legal description and civic address of the Property 1223 Lochyer Rd., Roberts Creek, SCR.D, BC

The undersigned hereby gives assurance that he/she is a *Qualified Professional* and is a *Professional Engineer* or *Professional Geoscientist*.

I have signed, sealed and dated, and thereby certified, the attached *landslide assessment* report on the Property in accordance with the *APEGBC Guidelines*. That report must be read in conjunction with this Statement. In preparing that report I have:

Check to the left of applicable items

- 1. Collected and reviewed appropriate background information
- 2. Reviewed the proposed *residential development* on the Property
- 3. Conducted field work on and, if required, beyond the Property
- 4. Reported on the results of the field work on and, if required, beyond the Property
- 5. Considered any changed conditions on and, if required, beyond the Property
- 6. For a *landslide hazard analysis* or *landslide risk analysis* I have:
 - 6.1 reviewed and characterized, if appropriate, any *landslide* that may affect the Property
 - 6.2 estimated the *landslide hazard*
 - 6.3 identified existing and anticipated future *elements at risk* on and, if required, beyond the Property
 - 6.4 estimated the potential *consequences* to those *elements at risk*
- 7. Where the *Approving Authority* has adopted a *level of landslide safety* I have:
 - 7.1 compared the *level of landslide safety* adopted by the *Approving Authority* with the findings of my investigation
 - 7.2 made a finding on the *level of landslide safety* on the Property based on the comparison
 - 7.3 made recommendations to reduce *landslide hazards* and/or *landslide risks*
- 8. Where the *Approving Authority* has **not** adopted a *level of landslide safety* I have:

- 8.1 described the method of *landslide hazard analysis* or *landslide risk analysis* used
- 8.2 referred to an appropriate and identified provincial, national or international guideline for *level of landslide safety*
- 8.3 compared this guideline with the findings of my investigation
- 8.4 made a finding on the *level of landslide safety* on the Property based on the comparison
- 8.5 made recommendations to reduce *landslide hazards* and/or *landslide risks*
- 9. Reported on the requirements for future inspections of the Property and recommended who should conduct those inspections.

Based on my comparison between

Check one

- the findings from the investigation and the adopted *level of landslide safety* (item 7.2 above)
- the appropriate and identified provincial, national or international guideline for *level of landslide safety* (item 8.4 above)

I hereby give my assurance that, based on the conditions^[1] contained in the attached *landslide 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 (Sections 919.1 and 920), my report will "assist the local government in determining what conditions or requirements under [Section 920] subsection (7.1) it will impose in the permit".

- 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" associated with the Local Government Act (Section 910), "the development may occur safely".

- for flood plain bylaw exemption, as required by the Local Government Act (Section 910), "the land may be used safely for the use intended".

Patricia M. Sails
 Name (print) _____
 Signature _____

January 30, 2022
 Date _____

^[1] When seismic slope stability assessments are involved, *level of landslide safety* is considered to be a "life safety" criteria as described in the National Building Code of Canada (NBCC 2005), Commentary on Design for Seismic Effects in the User's Guide, Structural Commentaries, Part 4 of Division B. This states:

"The primary objective of seismic design is to provide an acceptable level of safety for building occupants and the general public as the building responds to strong ground motion; in other words, to minimize loss of life. This implies that, although there will likely be extensive structural and non-structural damage, during the DGM (design ground motion), there is a reasonable degree of confidence that the building will not collapse nor will its attachments break off and fall on people near the building. This performance level is termed 'extensive damage' because, although the structure may be heavily damaged and may have lost a substantial amount of its initial strength and stiffness, it retains some margin of resistance against collapse".

Box 151 Canibaldi Highlands
Address
Scamish BC V0N 1T0
778-678-7654
Telephone



(Affix Professional seal here)

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

I am a member of the firm Ground Up Geotechnical Ltd. (EGBC PTP#: 1002580)
and I sign this letter on behalf of the firm. (Print name of firm)

APPENDIX J: FLOOD HAZARD AND RISK ASSURANCE STATEMENT

Note: This Statement is to be read and completed in conjunction with the "APEGBC Professional Practice Guidelines - Legislated Flood Assessments in a Changing Climate, March 2012 ("APEGBC Guidelines") and is to be provided for flood assessments for the purposes of the Land Title Act, Community Charter or the Local Government Act. Italicized words are defined in the APEGBC Guidelines.

To: The Approving Authority
Sunshine Coast Regional District

Date: January 30, 2022

Jurisdiction and address

With reference to (check one):

- Land Title Act (Section 86) – Subdivision Approval
- Local Government Act (Sections 919.1 and 920) – Development Permit
- Community Charter (Section 56) – Building Permit
- Local Government Act (Section 910) – Flood Plain Bylaw Variance
- Local Government Act (Section 910) – Flood Plain Bylaw Exemption

For the Property: Lot A, Block 2, DL 1318, Plan VAP 17244

Legal description and civic address of the Property

1223 Lochyer Rd, Roberts Creek, SCR.D, BC

The undersigned hereby gives assurance that he/she is a *Qualified Professional* and is a *Professional Engineer* or *Professional Geoscientist*.

I have signed, sealed and dated, and thereby certified, the attached flood assessment report on the Property in accordance with the APEGBC Guidelines. That report must be read in conjunction with this Statement. In preparing that report I have:

Check to the left of applicable items

- 1. Collected and reviewed appropriate background information
- 2. Reviewed the proposed *residential development* on the Property
- 3. Conducted field work on and, if required, beyond the Property
- 4. Reported on the results of the field work on and, if required, beyond the Property
- 5. Considered any changed conditions on and, if required, beyond the Property
- 6. For a *flood hazard* analysis or *flood risk* analysis I have:
 - 6.1 reviewed and characterized, if appropriate, floods that may affect the Property
 - 6.2 estimated the *flood hazard* or *flood risk* on the property
 - 6.3 included (if appropriate) the effects of climate change and land use change
 - 6.4 identified existing and anticipated future *elements at risk* on and, if required, beyond the Property
 - 6.5 estimated the potential *consequences* to those *elements at risk*
- 7. Where the Approving Authority has adopted a specific level of *flood hazard* or *flood risk* tolerance or return period that is different from the standard 200-year return period design criteria⁽¹⁾, I have
 - 7.1 compared the level of *flood hazard* or *flood risk* tolerance adopted by the Approving Authority with the findings of my investigation
 - 7.2 made a finding on the level of *flood hazard* or *flood risk* tolerance on the Property based on the comparison
 - 7.3 made recommendations to reduce the *flood hazard* or *flood risk* on the Property

⁽¹⁾ *Flood Hazard Area Land Use Management Guidelines* published by the BC Ministry of Forests, Lands, and Natural Resource Operations and the 2009 publication *Subdivision Preliminary Layout Review – Natural Hazard Risk* published by the Ministry of Transportation and Public Infrastructure. It should be noted that the 200-year return period is a standard used typically for rivers and purely fluvial processes. For small creeks subject to debris floods and debris flows return periods are commonly applied that exceed 200 years. For life-threatening events including debris flows, the Ministry of Transportation and Public Infrastructure stipulates in their 2009 publication *Subdivision Preliminary Layout Review – Natural Hazard Risk* that a 10,000-year return period needs to be considered.

8. Where the *Approving Authority* has **not** adopted a level of *flood risk* or *flood hazard* tolerance I have:
- 8.1 described the method of *flood hazard* analysis or *flood risk* analysis used
 - 8.2 referred to an appropriate and identified provincial or national guideline for level of *flood hazard* or *flood risk*
 - 8.3 compared this guideline with the findings of my investigation
 - 8.4 made a finding on the level of *flood hazard* or *flood risk* tolerance on the Property based on the comparison
 - 8.5 made recommendations to reduce *flood risks*
9. Reported on the requirements for future inspections of the Property and recommended who should conduct those inspections.

Based on my comparison between

Check one

- the findings from the investigation and the adopted level of *flood hazard* or *flood risk* tolerance (item 7.2 above)
- the appropriate and identified provincial or national guideline for level of *flood hazard* or *flood risk* tolerance (item 8.4 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* (Sections 919.1 and 920), my report will "assist the local government in determining what conditions or requirements under [Section 920] subsection (7.1) it will impose in the permit".
- 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* associated with the *Local Government Act* (Section 910), "the development may occur safely".
- for flood plain bylaw exemption, as required by the *Local Government Act* (Section 910), "the land may be used safely for the use intended".

Patrick M. Sails
 Name (print)

P. Sails
 Signature

Box 151 Garibaldi Highlands
 Address

Squamish BC V0N 1T0
 Telephone 778-678-7654

January 30, 2022
 Date



(Affix Professional seal here)

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

I am a member of the firm Ground VP Geotechnical Ltd (EGBC PTP#: 1002580)
 and I sign this letter on behalf of the firm. (Print name of firm)



Branch Management Inc.

P.O. Box 58
Garden Bay, B.C., V0N 1S0
bminc@eastlink.ca
604-813-6661

Kenton Braine
1223 Lockyer Road
Roberts Creek, B.C.

October 18, 2024

Vegetation Assessment: 1223 Lockyer Road, Roberts Creek, B.C.

Scope of work:

- Identify all trees within proposed access route and 10 m either side
- Determine necessary removals and retention measures for retained trees
- Recommend mitigation regarding increased exposure from site preparations and any resulting hazards
- Recommend replanting measures

Date of most recent site visits: Oct 9 & 15, 2024

Table of contents

Page 1	Scope of work, Table of contents, Tree legend, Abbreviations
Page 2	Site map
Page 3 – 7	Tree inventory
Page 7	Relative species information
Page 8	Tree Protection Zones, Specific TPZ Recommendations
Page 8	Alternative stump removal methods
Page 9	Increased exposure / windthrow
Page 10	Summary, Replanting recommendations
Page 11	Replanting guidelines
Page 12	Signature & Qualifications

Tree Legend

Alnus rubra – Red alder (alder)
Thuja plicata – Western red cedar (WRC)
Pseudotsuga menziesii – Douglas fir
Acer macrophyllum – Big leaf maple
Tsuga heterophylla – Western hemlock
Cornus nuttallii – Pacific dogwood

Abbreviations

TPZ – Tree protection zone
R – is radius

Site map



TPZ 's are identified as pink partial circles

Following pages, Vegetation inventory

Tree Tag #	Species	Est. Dbh cm	Est. Height m	Condition
100	Douglas fir	100+	45 – 50	Good
	Comments: Single stem specimen, asymmetrical canopy, healthy crown Action recommended: Retain, TPZ 3 m R, up to East side of trunks of 124 + 125			
108	Hemlock	70	35 - 40	Poor
	Comments: Tree in severe decline Action recommended: Reduce to 10 m snag, or remove			
115	WRC	13	9	Fair
	Comments: Asymmetrical canopy, originates from nurse stump. Not likely to fail Action recommended: Retain			
116	WRC	28	18 - 20	Fair - Good
	Comments: Asymmetrical canopy, minimal grade alterations anticipated. Action recommended: Retain			
117	Douglas fir	110	>40	Good
	Comments: Single stem specimen, healthy crown Action recommended: Retain, TPZ 3.5 m R			
118	Alder	28	13	Poor
	Comments: Phototropic, rubbing against Tree # 117, no long-term future Action recommended: Remove			
119	WRC	11	7	Fair
	Comments: Juvenile tree, asymmetrical canopy. Action recommended: Retain			
120	Douglas fir	100	>40	Good
	Comments: Site prep within 1 m of stem, root plate compromised Action recommended: Remove, partial stump removal recommended			
121	WRC	45	22 - 24	Fair
	Comments: Within 1 m of proposed area Action recommended: Remove			
122	Douglas fir	50	23 - 25	Fair
	Comments: Within access route Action recommended: Remove			
123	WRC	50	21 - 22	Poor
	Comments: Within access route Action recommended: Remove			
124	WRC	32	20	Fair
	Comments: Within access route Action recommended: Remove			
125	Douglas fir	120	>40	Good
	Comments: Within access route Action recommended: Remove			
126	WRC	35	18	Fair
	Comments: Adjacent to access route, considerable grade alterations anticipated Action recommended: Remove, do not pull stump			
127	Maple	70	22 - 23	Dead
	Comments: Hazardous Action recommended: Remove, pull stump			

Tree Tag #	Species	Est. Dbh cm	Est. Height m	Condition
128	Douglas fir	>130	>40	Good
	Comments: Minimal grade alterations anticipated. Action recommended: Retain, TPZ 4 m R			
129	WRC	28	14	Fair
	Comments: Asymmetrical canopy, minimal grade alterations anticipated. Action recommended: Retain, TPZ 4 m R			
130	Douglas fir	75	28 - 30	Poor
	Comments: Poor upper canopy structure, located on the sheltered side of Tree #128. Minimal grade alterations anticipated. Minimal target potential Action recommended: Retain, TPZ 6 m R			
131	WRC	75	35	Fair
	Comments: Asymmetrical canopy, suppressed by Tree #128. Moderate grade alterations anticipated. Action recommended: Retain, TPZ 1 m R – grade below will be built up			
132	WRC	40	24 - 26	Fair
	Comments: Asymmetrical canopy, moderate grade alterations anticipated. Action recommended: Retain, TPZ 1 m R – grade on low side will be built up			
135	Dogwood	35	20	Dead
	Comments: Exposed rot / decay at base of trunk. At risk of failure with increased exposure Action recommended: Remove			
136	WRC	20	15	Fair
	Comments: Minimal – moderate grade alterations anticipated. Action recommended: Retain			
137	WRC	15	10	Fair
	Comments: Juvenile tree, minimal grade alterations anticipated. Action recommended: Retain			
138	WRC	16	12	Fair - Good
	Comments: Juvenile cedar Action recommended: Retain			
139	WRC	18	7	Poor
	Comments: Next to proposed access route. Considerable grade alterations anticipated Action recommended: Remove			
144	WRC	40	25 - 28	Poor
	Comments: Exposed heart rot at base of trunk, minimal crown. Considerable grade alterations anticipated. Action recommended: Remove			
145	WRC	32	20	Poor
	Comments: Minimal crown, multiple leaders. Considerable increase in exposure to wind. Moderate risk of root plate failure Action recommended: Reduce to 5 m nature snag			
146	Alder	45	6	Dead
	Comments: Nature snag, no target potential Action recommended: Retain			
147	Hemlock	60	35	Poor
	Comments: Sparse crown, poor species characteristics, moderate grade alterations anticipated. Considerable increase in exposure to wind Action recommended: Reduce to 5 m nature snag or remove			

Tree Tag #	Species	Est. Dbh cm	Est. Height m	Condition
148	WRC	11	6	Fair
	Comments: Too close to site prep Action recommended: Remove			
149	WRC	55	22 - 24	Fair
	Comments: Low side of root plate exposed from creek activity. Minimal grade alterations anticipated. Low target potential Action recommended: Retain, TPZ 4 m R			
150	Douglas fir	105	>40	Good
	Comments: Moderate – considerable grade alterations anticipated Action recommended: Remove, partial stump removal recommended			
151	Douglas fir	65	>40	Fair
	Comments: Asymmetrical canopy with minimal, slightly sparse crown Action recommended: Remove, do not excavate stump			
152	Douglas fir	50	>40	Fair - Good
	Comments: Asymmetrical canopy, symbiotic relationship with Tree #153. Action recommended: Retain, TPZ 3 m R, up to stump of Tree #150			
153	Douglas fir	90	>40	Good
	Comments: Mature specimen Action recommended: Retain, TPZ 3 m R, up to stump of Tree #150			
154	WRC	38	22 - 24	Fair
	Comments: Asymmetrical canopy, low side of root plate exposed from creek activity, anchorage supported by Tree #153 Action recommended: Retain, TPZ 3 m R, up to stump of Tree #150			
155	WRC	40	22 - 24	Fair
	Comments: Asymmetrical canopy, low side of root plate exposed from creek activity, anchorage supported by Tree #153. Action recommended: Retain, TPZ 4 m R			
156	WRC	16	12	Fair - Good
	Comments: Within proposed access route Action recommended: Remove			
157	Douglas fir	90	>40	Good
	Comments: Moderate grade alterations anticipated Action recommended: Monitor impact of construction on root plate. Retain, TPZ 2 m R			
158	WRC	55	30	Fair - Good
	Comments: Site prep flush with stem Action recommended: Remove, do not pull stump			
159	WRC	48	20	Fair
	Comments: Minimal grade alterations anticipated Action recommended: Retain, TPZ 5 m R			
160	Douglas fir	30	20	Poor - Fair
	Comments: Asymmetrical canopy, minimal crown. Minimal grade alterations anticipated Action recommended: Retain, TPZ 5 m R			
161	WRC	16	12	Poor - Fair
	Comments: Irregular arching stem, minimal grade alterations anticipated. Action recommended: Retain, TPZ 3 m R			

Tree Tag #	Species	Est. Dbh cm	Est. Height m	Condition
162	WRC	50	25	Fair
	Comments: Within proposed access route Action recommended: Remove			
163	WRC	72	35	Fair
	Comments: Minor grade alterations anticipated. Action recommended: Retain			
164	WRC	32	20	Poor
	Comments: Symbiotic relationship with adjacent hemlock, questionable anchorage, moderate grade alterations anticipated Action recommended: Remove, do not pull stump			
165	Hemlock	58	7	Dead
	Comments: Nature snag in advanced stage of decay Action recommended: Tree has failed, laying on ground			
166	Douglas fir	110	>40	Good
	Comments: Minor to moderate grade alterations anticipated Action recommended: Retain, TPZ 5 m R			
167	WRC	13	14	Poor
	Comments: Within proposed access route Action recommended: Remove			
168	Douglas fir	110	>40	Good
	Comments: Considerable grade alterations anticipated; root plate likely to be compromised Action recommended: Remove, do not excavate stump			
169	Douglas fir	45	30	Poor - Fair
	Comments: Within proposed access route Action recommended: Remove			
170	WRC	50	28	Poor - Fair
	Comments: Elevated root plate on butt of first growth nurse log. Considerable grade alterations anticipated with adjacent tree removal Action recommended: Remove			
171	WRC	70	25	Fair
	Comments: Within proposed access route Action recommended: Remove			
172	WRC	8	3	Poor
	Comments: Within proposed access route Action recommended: Remove			
173	WRC	35	20	Fair
	Comments: Within proposed access route Action recommended: Remove			
174	WRC	14	12	Poor
	Comments: Within proposed access route Action recommended: Remove			
175	Hemlock	58	30	Poor
	Comments: Within proposed access route Action recommended: Remove			

Tree Tag #	Species	Est. Dbh cm	Est. Height m	Condition
176	Hemlock	35	28	Poor
	Comments: Within proposed access route Action recommended: Remove			
177	WRC	24	14	Fair
	Comments: Within proposed access route Action recommended: Remove			
178	WRC	13	12	Poor
	Comments: Within proposed access route Action recommended: Remove			
179	WRC	9	7	Dead
	Comments: Within proposed access route Action recommended: Remove			
180	Douglas fir	70	30	Poor - Fair
	Comments: Asymmetrical canopy, appears to have upper canopy trauma with co-dominant stems. Action recommended: Monitor impact of construction. Retain, TPZ 3 m R			
181	Douglas fir	110	>40	Good
	Comments: Moderate grade alterations anticipated Action recommended: Monitor impact of construction. Retain, TPZ 2.5 m R			
182	WRC	28	17	Fair
	Comments: Minimal grade alterations Action recommended: Retain, TPZ 4.5 m R			
183	WRC	35	19	Fair
	Comments: Minimal grade alterations anticipated Action recommended: Retain			
184	WRC	45	12	Poor
	Comments: Within proposed access route Action recommended: Remove			

Relative species information

Hemlock

Generally speaking, the local hemlock species is one of our weakest evergreens. They have poor species characteristics. These include but are not limited to heart rot, sap rot, root rot and foliar diseases such as witches' broom. They are known to have a shallow root plate. Hemlocks are prone to stem and root plate failure, sometimes unpredictably and often under environmental pressures. In my 27 years of field work they have proven to be untrustworthy.

Douglas fir

Generally speaking, Douglas fir is the most well anchored species of our native evergreen throughout the Pacific Northwest. Their root structure is far reaching and usually consists of oblique and tap roots. Their trunk structure and ability to compartmentalize is good. Root plate failures have been rare in my experience. Upper stem failures are infrequent and often the result of an extreme weather event and/or poor canopy structure. One negative characteristic of the Douglas fir is that they are prone to branch failure. Their limb structure is often under heavy tension, and they tend to fail at or near their union with the trunk under normal, expected weather events. Usually, the fracture results in the shedding of a limb which can sometimes collect more in its path as it falls to the ground.

Tree Protection Zone (TPZ)

A tree protection zone is the primary method utilized to protect tree(s) designated for retention during site development. The TPZ encompasses an area that protects the structural root zone of a tree as well as an adequate amount of the biological root zone. These measures should ensure both stability and viability of the tree(s) future. TPZ's should be in place prior to site development.

The following are some general guidelines for trees identified or desired for retention.

- A tree protection zone (TPZ) should be established 1 m beyond the widest part of the drip line of the canopy and continued equally around the circumference of the tree(s)
- An alternative equation for a TPZ is a radius 10x diameter of the stem at 1.4 m
- 2 x 4 material lined with snow fencing or something similar is recommended
- This area should be considered a no entry area for the duration of the development
- There should be no grade alterations positive or negative, temporary, or permanent within the TPZ
- 7.5 -10 cm of mulch may be required within the TPZ during warmer months (May – September) This will aid with water retention and cooling of the root absorption zone. It also acts as an insulator during the winter months and prevents ground freeze
- Incursions into the TPZ should be discussed prior and monitored by a qualified arborist

Specific TPZ recommendations

The proposed access route is 4 m wide with a buffer of approximately 2 m on either side for construction purposes. Trees designated for retention within close proximity to the footprint of the access route have specific notes in the Tree inventory. Those values have been marked as the TPZ's on the site map.

Many of the general TPZ guidelines will be impractical to apply to this project. Some of the distances on the construction side of the project are not in line with the general guidelines for a TPZ. The root plates of retained trees will only be impacted on the construction side. Tree barriers should be in place post tree removals above grade and prior to the arrival of heavy equipment. On-site monitoring and prompt root pruning of exposed roots should be adequate to ensure viability. The ability of heavy equipment and plus or minus grade disturbances to stay within the designated footprint of the site plan is paramount for the successful retention of designated trees.

Alternative stump removal methods

As part of the retention efforts for the perimeter vegetation, there are a few stumps that I recommend partial excavation be performed. This would involve leaving a 1 m stump on the particular tree removed. A vertical boring cut would be performed down the center of the stump and as close to grade as possible. A second perpendicular boring cut could be performed on the half of the stump that is to be removed. A notch across the center and perpendicular cut can be made to allow for the teeth of the excavator bucket to pry apart the half that is to be removed. Essentially, the goal would be to remove 2 quarters of the stump on the site prep side of the project while minimizing disturbance to grade and leave the root plate intact on the side closest to trees designated for retention. This procedure would greatly improve viability for retention of nearby trees.

Increased exposure / windthrow

The direction of the proposed access route is slightly Southeast (more East) to Northwest (more West). The prevailing wind on the Sunshine Coast has consistently been from the Southeast. In my 18 years of local experience as an active tree service and consultant, SE wind events towards the higher end of normal can result in failures and damage. The areas most impacted from these SE winds have been coastal sections West of downtown Sechelt, Halfmoon Bay, Madeira Park and Garden Bay. Inland Roberts Creek, where I consider this parcel to be, does not often experience the brunt of the SE winds.

I would consider the Northwest winds to be the second consistent wind the Sunshine Coast experiences. These winds are often less intense. As with the SE winds, coastal sections are often impacted the most. Outer Francis Peninsula, Davis Bay, portions of Roberts Creek and Gibsons are typically most susceptible. Inland areas are also spared the brunt of the force.

I would consider the area this parcel is situated in to be well treed with mature vegetation, both within the lot boundaries and its surroundings. There is a lot of mature evergreen vegetation East and NE of 1223 Lockyear Rd. The Southern portion of the lot and its vegetation will remain in place, except for 4 recommendations. There is a dense stand of medium and mature vegetation that lines the North side of the pedestrian path located along Hwy 101 that follows the frontage of 1223 Lockyear Rd. Vegetation below the Hwy is also thick and mature. The neighbouring parcel to the North demonstrates a continuation of the existing mature vegetation of 1223 Lockyear Rd.

Increased exposure from the SE will be most notable. I do not predict the impact will be considerable. The location of the parcel, existing vegetation, retention efforts and species characteristics of the dominant Douglas fir were factored into this opinion. I do not anticipate any concerns with wind generated from the South or Southwest. Existing vegetation should be adequate to dampen inland wind from the West and Northwest. The slight jog in the West half of the access route will also disrupt any winds pushing through. I do not suspect any increased exposure related concerns from wind events from the North, which tend to be rare.

I recommend the reduction or removal of Tree #108, primarily due to its current condition, species characteristics and increased exposure. Tree #135 is dead and should be removed, in part because of increased exposure. Tree #145 should be reduced or removed due to its current condition and increased exposure. Tree #147 should be reduced or removed due to its current condition, species characteristics and increased exposure. These 4 trees are listed as trees to be removed in the Summary.

I do not recommend topping any of the mature Douglas fir retained. This is a poor management strategy in my opinion that can result in the decline of the specimen and create a consistent maintenance component for the duration of the tree. Species characteristics of their root plate and stem structure, along with adherence to TPZ recommendations and alternative stump removal procedures should ensure viable retention. Thinning of the crown of the remaining Douglas fir is also not recommended. They are not known for partial stem failure under normal environmental duress. Thinning also often results in a greater frequency of limb failure with this species as well.

Summary

There are a total of 36 trees that I recommend being removed for this project. They are either within the proposed access route or too close to site preparations and / or grade alterations for viable retention. Of these 36 trees, 18 are within the SPEA. Their tag number, species and Dbh are as follows:

#108 Hemlock - 70 cm (within SPEA)	#156 WRC - 16 cm (within SPEA)
#118 Alder - 28 cm	#158 WRC - 55 cm (within SPEA)
#120 Douglas fir - 100 cm	#162 WRC - 50 cm (within SPEA)
#121 WRC - 45 cm	#164 WRC - 32 cm (within SPEA)
#122 Douglas fir - 50 cm	#167 WRC - 13 cm
#123 WRC - 50 cm	#168 Douglas fir - 110 cm
#124 WRC - 32 cm	#169 Douglas fir - 45 cm
#125 Douglas fir - 120 cm	#170 WRC - 50 cm
#126 WRC - 35 cm (within SPEA)	#171 WRC - 70 cm
#127 Maple - 70 cm (within SPEA)	#172 WRC - 8 cm
#135 Dogwood - 35 cm	#173 WRC - 35 cm
#139 WRC - 18 cm (within SPEA)	#174 WRC - 14 cm
#144 WRC - 40 cm (within SPEA)	#175 Hemlock - 58 cm
#145 WRC - 32 cm (within SPEA)	#176 Hemlock - 35 cm
#147 Hemlock - 60 cm (within SPEA)	#177 WRC - 24 cm (within SPEA)
#148 WRC - 11 cm (within SPEA)	#178 WRC - 13 cm (within SPEA)
#150 Douglas fir - 105 cm (within SPEA)	#179 WRC - 9 cm (within SPEA)
#151 Douglas fir - 65 cm (within SPEA)	#184 WRC - 45 cm (within SPEA)

Trees / stumps that are recommended for alternative stump removal measures are identified in the tree inventory. They are Tree #120 & #150.

There are 5 trees for which I recommend that the stumps not be pulled / removed from their location. They are Tree #126, #151, #158, #164, #168.

Adhering to TPZ recommendations and active construction site boundaries is paramount for the successful retention of the perimeter vegetation either side of the access route.

Monitoring by a qualified arborist during the various stages of the tree removal, TPZ establishment and site preparation phases of the project is recommended.

Replanting recommendation

I recommend that the replanting consists of Douglas fir and Western red cedar. They are native and consistent with the existing vegetation. 2 Gallon pots of red cedar with a 1 m specimen on a 1:1 basis. Douglas firs are sometimes harder to obtain. 1-gallon pots on a 2:1 basis or 2 Gallon pots on a 1:1 basis. A good deciduous component would be *Acer circinatum* (Vine maple) 2 for 1, 1-gallon pots. Planting should occur October through December of the year post completion. I do not recommend replanting within the flood plain in the SE corner of the property. The location of the plantings should be determined once the project is complete. The focus should be on where density has been altered or is naturally less on either side of the project.

Tree protection plan / guidelines for new installations

Pre-planting

- Holes prepared should be 2- 3 times the diameter of the root ball
- Ball & Burlap root balls should be examined for tears in the root structure, root pruning may be required
- Potted specimen should be examined for pot bound growth and kneaded apart if necessary
- A conservative application of bone meal fertilizer applied into the hole is recommended
- Soil can be amended if necessary and should be well saturated at time of installation

Installation

- Ball & Burlap plantings should have the burlap untied and folded outwards after the bottom 2/3rds of the root ball has been supported
- Final grade should not exceed the natural flare of the stem(s). It is vital not to plant the specimen too deep, or too shallow
- A layer of mulch should be applied over the prepared area 5-7.5 cm thick
- The layer should be minimal adjacent to the stem and gradually increase away from the stem
- Stake(s) should be installed to support the stem, removal of stakes after 1 – 2 seasons
- Formative pruning may be advantageous at the time of installation, consultation with a qualified arborist is recommended

Post planting

- A general timeframe for a newly planted tree to establish itself is 2 – 3 years
- Consistent watering should be applied during this time frame to ensure vitality
- Inspections every 1 – 2 months is recommended for the first two seasons
- Formative pruning, if necessary, should be performed annually in early fall
- Limb or stem failures should be addressed promptly
- The span of the prepared planting hole, the drip line of the canopy or a radius 10x diameter of the stem should be considered the TPZ for newly planted specimen
- Irrigation (if practical) should be specific for the trees planted, not part of the lawn or ground cover system
- A physical barrier such as chicken wire or a plastic sleeve may be required depending on the frequency of wildlife activity (deer and elk)

Please do not hesitate to contact me if there are any questions or concerns regarding the content of this report.



Bill Davie
Branch Management Inc.
ISA Certified Arborist PN-2687 AT (2004) - TRAQ certification (2023)

Please note: *the writer gives no assurances that the trees assessed are 100% safe. Ultimately, there will always be associated risks with mature vegetation. Undetectable defects and elements of the environment can be unpredictable and result in the failure of any tree or part thereof otherwise considered to be healthy. An opinion based on my experience and training has been put forth to manage risks within limits considered to be acceptable. At the end of the day, I feel the approach to tree management and / or fate of a tree(s) should be decided based on its current health, identified potential concerns and the risk tolerance of those affected by the tree.*

MEMORANDUM

To:	Richard Johnson	Date:		July 21, 2023	
		Project No:		BCS-0144	
Company:	Stevenson Construction Ltd.	T.	604.725.1287	F.	-
		E.	Richard.johnson@shaw.ca		
Cc:	-	T.	-	F.	-
		E.	-		
From:	Micah Smith	T.	604.671.6518	F.	-
		E.	micah@boundaryconsulting.ca		
Subject:	Site Reconnaissance and Geotechnical Report Review 1223 Lockyer Road, Roberts Creek, BC				

PLEASE CALL IF YOU EXPERIENCE ANY DIFFICULTIES IN RECEIVING THIS DOCUMENT.

This message is intended only for the confidential use of the individual or entity to which it is addressed. Any Distribution, copying, or disclosure is strictly prohibited. If you have received this message in error, please notify us immediately by telephone and destroy the original without making a copy. Thank you.

Boundary Consulting Services Ltd. (BCS) presents the following memo summarizing the review of a geotechnical engineering assessment done by Ground Up Geotechnical (Ground Up). This includes a recent site reconnaissance performed at the above-listed site by BCS to address comments by others provided by Richard Johnson (the Client).

A new private driveway and steel bridge is proposed over Flume Creek at the above address (the Project). The Project as depicted in the Ground Up report is not expected to have long term impacts on the Streamside Protection & Enhancement Area (SPEA) from a geotechnical hazard management perspective.

The estimated allowable flow area below the proposed bridge is 18.5 m² while the two existing culverts located approximately 30 m downstream combined provide 1.3 m² of area for stormwater to flow. If significant flood waters were to flow into this project site, the downstream culverts would be the primary driver for flooding and degradation of the SPEA rather than the Project.

A site reconnaissance was conducted by BCS on June 15th, 2023. Site conditions as described by Ground Up are confirmed by BCS.

The Client requested that the following comment be addressed:

“It is not clear in reporting why SPEA (which is below TOB in some locations) does not have slope stability considerations / measures to protect SPEA by offering additional protection from the top of back. Measures to protect the slope (as well as windthrow, danger tree and tree protection) can and should provide additional protections that push the SPEA larger than the minimum setback distance.”



The Project will require a relatively small amount of disturbance to the SPEA as depicted in permit documentation. Notably, the form of crossing presents the least disruption to the critical nearbank areas adjacent to the thalweg of the creek. Rather than a more traditional curvilinear crossing, the proposed bridge as drawn does little to manipulate top of bank. The entrances from both sides of the creek are relatively gentle and won't require substantial regrading or retaining wall construction for completion. Outside of minor roadway grading, placement of a trafficking surface, excavation of the bridge foundation, and placement of the bridge, there is very little disturbance proposed to the SPEA at this time.

There are no requirements for this project to regrade the top of bank for the creek. The thalweg of the creek is expected to remain static due to the large surface area presented below the crossing, and the high variability permitted by a spanning bridge rather than a culvert. There are no other specific mechanisms that require specific attention from a geohazards perspective. Based on our review of the project and the documentation provided by Ground Up, we believe that the Project may be constructed safely for use intended.

It is our understanding that the definition of the SPEA comes from the Riparian Areas Protection Regulation (RAPR) and not from a professional working on this project. Furthermore, Ground Up indicated in their report that:

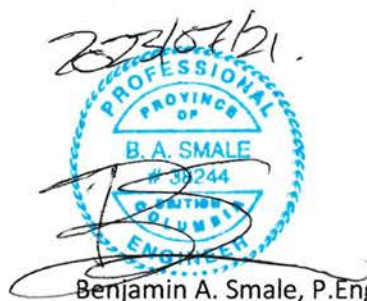
BCS expects that whichever professional is engaged to complete the final design and construction review of the project will review the Ground Up report and oversee the design and construction as specified. BCS further expects that these provisions are reasonable and appropriate to protect the SPEA and any other slopes in the vicinity which could be affected by the Project.

We hope that this document contains the requisite information at this time. Should any further information be required, please do not hesitate to contact our office.

Sincerely,
Boundary Consulting Services Ltd.



Micah Smith, P.Eng.
Project Engineer



Benjamin A. Smale, P.Eng.
Engineer

Attachments: Ground Up Geotechnical – Creek & Ravine Hazard Assessment Report for Proposed Vehicle Bridge & Driveway

The Engineering content of this document has been produced following Boundary Consulting Services Ltd.'s documented quality management progress using engineering standards authenticated by the Professional of Record under Permit to Practice Number 1002593.



Fisheries and Oceans
Canada

Pacific Region
Ecosystem Management Branch
200 – 401 Burrard Street
Vancouver, BC
V6C 3S4

Pêches et Océans
Canada

Région du Pacifique
Direction de la gestion des écosystèmes
Pièce 200 – 401 rue Burrard
Vancouver (C.-B.)
V6C 3S4

July 11, 2022

Your file *Votre référence*

Our file *Notre référence*
22-HPAC-00785

Kenton Braine
1223 Lockyer Road
Roberts Creek, BC
V0N 2W1

Via email: Kenton.Braine@yahoo.com

Dear Kenton Braine,

Subject: Bridge Construction, Flume Creek, Roberts Creek – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

The Fish and Fish Habitat Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your proposal on June 8, 2022. We understand that you propose to:

- Construct a new driveway over Flume Creek via a clear span bridge at 1223 Lockyer Rd.

Our review considered the following information:

- Request for Review package prepared by Jason Barsanti of Barsanti Environmental Services Ltd., received by email on June 8, 2022

Your proposal has been reviewed to determine whether it is likely to result in:

- the death of fish by means other than fishing and the harmful alteration, disruption or destruction of fish habitat which are prohibited under subsections 34.4(1) and 35(1) of the *Fisheries Act*; and
- effects to listed aquatic species at risk, any part of their critical habitat or the residences of their individuals in a manner which is prohibited under sections 32, 33 and subsection 58(1) of the *Species at Risk Act*.

The aforementioned outcomes are prohibited unless authorized under their respective legislation and regulations.

To avoid and mitigate the potential for prohibited effects to fish and fish habitat (as listed above), we recommend implementing the measures listed below:

1. The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.
2. Avoid grubbing of riparian vegetation within temporary disturbances to enable quick recovery and ongoing soil stabilization.
3. Complete the works as quickly as possible once they are started.
4. Equipment is to be operated from the top of bank.
5. Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.
6. Avoid introduction of sediments (e.g., silts, dirt and gravel) in areas where sediments may enter fish bearing waters.
 - a. Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.
7. Do not deposit substances deleterious to fish directly or indirectly into fish bearing waters.
 - a. Develop and implement a spill response plan to avoid the deposit of deleterious substances into the watercourse.
 - b. Prevent substances such as uncured concrete, grout, paint, sediment and preservatives from entering the watercourse.
 - c. Complete cast-in-place concrete works, if required, during dry weather conditions.
 - d. Do not discharge or store cementitious materials and/or wash/contact water in a manner that may cause deleterious substances to leach into the watercourse of environmentally sensitive areas.
8. Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor should be an appropriately qualified professional and ensure mitigation measures are implemented and maintained for the protection of fish and fish habitat.
 - a. Regularly monitor the watercourse for signs of sedimentation during the works, taking corrective action as required.
 - b. Should cast-in-place concrete be required, ensure deployment and testing of concrete containment system prior to initiating concrete pour and monitor continuously throughout pouring activities.
 - c. Ensure appropriate mitigation measures are on site to prevent harm or mortality of fish (e.g, CO₂ diffusers) and personnel are trained in their deployment should an accidental release of concrete into the watercourse occur.
 - d. Oversee deployment of protective measures to prevent uncured concrete from coming into contact with rainwater.
 - e. Ensure concrete has thoroughly cured prior to removal of containment.

Provided that you incorporate these measures into your plans, the Program is of the view that your proposal is not likely to result in the contravention of the above mentioned prohibitions and requirements.

Should your plans change or if you have omitted some information in your proposal, further review by the Program may be required. Consult our website (<http://www.dfo-mpo.gc.ca/pnw-pppe/index-eng.html>) or consult with a qualified environmental consultant to determine if further review may be necessary. It remains your responsibility to remain in compliance with the *Fisheries Act*, the *Species at Risk Act* and the *Aquatic Invasive Species Regulations*.

It is also your Duty to Notify DFO if you have caused, or are about to cause, the death of fish by means other than fishing and/or the harmful alteration, disruption or destruction of fish habitat. Such notifications should be directed to the DFO-Pacific Observe, Record and Report phone line at 1-800-465-4336 or by email at DFO.ORR-ONS.MPO@dfo-mpo.gc.ca.

Please notify the Program by email at Erin.SowerbyGreene@dfo-mpo.gc.ca at least 10 days before starting your project, ensuring your file number and appropriate on-site contact information is included. We recommend that a copy of this letter be kept on site while the work is in progress. It remains your responsibility to meet all other federal, territorial, provincial and municipal requirements that apply to your proposal.

Please note that this Letter of Advice does not provide relief from the obligations set out in the government of British Columbia's Riparian Areas Protection Regulations (RAPR), and cannot be construed to provide authorization pursuant to section 3(2) of the RAPR, for any work, undertaking or activity within the Riparian Assessment Area. For more information on the RAPR, including contacts, please visit: <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/fish/aquatic-habitat-management/riparian-areas-regulation>.

Please note that the advice provided in this letter will remain valid for a period of 1 year from the date of issuance. If you plan to execute your proposal after the expiry of this letter, we recommend that you contact the Program to ensure that the advice remains up-to-date and accurate. Furthermore, the validity of the advice is also subject to there being no change in the relevant aquatic environment, including any legal protection orders or designations, during the 1 year period.

If you have any questions with the content of this letter, please contact Erin Sowerby Greene at our Nanaimo office at 778-268-0327 or by email at Erin.SowerbyGreene@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,



Ian Matchett
A/Senior Biologist
Fish and Fish Habitat Protection Program

c.c.: Jason Barsanti, Barsanti Environmental Services Ltd., jason@barsantienviro.ca

----- Forwarded message -----

From: **Sowerby Greene, Erin** <Erin.SowerbyGreene@dfo-mpo.gc.ca>

Date: Wed, 22 Jun 2022 at 09:33

Subject: Bridge Construction, Flume Creek, Roberts Creek, 1223 Lockyer Rd

To: jason@barsantienviro.ca <jason@barsantienviro.ca>

Hi Jason,

Thanks again for chatting this morning. Here are the questions I have for this project:

1. What are the dimensions of the bridge deck (length and width) so I can approximate the m² of the creek that it will span?
2. What is the footprint for each of the two lockblock abutments? This is to approximate the riparian footprint.
3. Are there any trees being removed nearby the creek? If you're able to provide a map that show which trees are where on the property that would be ideal (in relation to the arborist's report).

Warm regards,

Erin Sowerby Greene
(She/her)

Biologist, Fish and Fish Habitat Protection Program
Fisheries and Oceans Canada / Government of Canada
Erin.SowerbyGreene@dfo-mpo.gc.ca / 778-268-0327

Notification of Authorized Changes In And About A Stream 100390871 - Clear Span Bridge

1 message

Weymer, Janice M FOR:EX <Janice.Weymer@gov.bc.ca>
To: Jason Barsanti <jason@barsantienviro.ca>

28 June 2022 at 09:15

Hello Jason,

FrontCounter BC (FCBC) has accepted your application, assigned a tracking number, and forwarded it to a Habitat Officer for review. Habitat Officer's do not necessarily provide a response to each notification submission. Your receipt of this email is confirmation that your work plan is on record and you do not need to follow up further with either FCBC or Habitat Officer.

The tracking number assigned to your application is: 100390871 Date Submitted: June 8, 2022 Work Window: August 1, 2022, to September 15, 2022

* Please maintain a record of this tracking number for reference in any future correspondence about your proposal and any related follow-up.

Additional considerations for the proposed works:

You are advised that your project may be inspected during and/or post construction. A copy of the application and associated plans/drawings should be available for inspection, upon request, at any location where the changes in and about a stream are being undertaken.

Care shall be exercised during all phases of the work to prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate or any deleterious substances.

Please refer to below listed "Guidance on Changes In and About a Stream" documents, for additional provincial Standards and up-to-date Best Practices for any activity or construction within the stream channel that has or may have an impact on the stream:

- A Users' Guide for Changes In and About A Stream in British Columbia
- Requirements and Best Management Practices for Making Changes In and About A Stream in British Columbia
- Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in B.C.

****Please Note:**

- Notification applications must be submitted at least **45 days before** commencing the change in and about a stream. Only the specific changes in and about a stream listed in the Water Sustainability Regulation (Part 3 "Changes in and About a Stream") are authorized changes that can proceed on notice to a Habitat Officer. Such authorized changes must meet the requirements of the Regulation including any terms and conditions specified by the Habitat Officer. If your proposed work **is not listed or does not meet all of the requirements outlined in Section 39 of the Regulation** your works will not qualify for a notification and will require a change approval under the Water sustainability Act.

- **Emergency Works** submitted under a Notification of Authorized Change (Part 3 of WSR) can only be constructed by the Crown, a Municipality or a Regional District under Section 39(1)(o) and (p) of the WSR. An appropriately Qualified Professional (on behalf of the Crown, a Municipality or a Regional District) should confirm all Emergency Works.
- For any **Urgent Works**, a designated Habitat Officer may authorize a variance for instream works; which gives authority to an applicant to proceed with authorized changes prior to the 45 days deadline. Please contact FrontCounter BC Surrey Office (FrontCounterBC.Surrey@gov.bc.ca) to discuss exceptional circumstances applicable to your project, in which case a decision maker will assess the options available. Please provide as much notice as possible, as not all urgent submissions can be accommodated in the timeframe requested.

***Inadequate planning does not constitute an exceptional circumstance for Urgent Works.

The proponent must also comply with specified terms and conditions for the proposed change from the Habitat Officer. Please refer to this link for more information: <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/water-licences-approvals/apply-for-a-change-approval-or-submit-notification-of-instream-work>.

Sincerely,

Janice Weymer



Janice Weymer

Natural Resource Specialist

FrontCounter BC, Ministry of Forests

South Coast Natural Resource Region, Chilliwack Forest District

46360 Airport Rd, Chilliwack BC V2P 1A5

Phone (778) 704-7105 Fax: (604) 702-5711

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