RYZUK GEOTECHNICAL

Geohazard Assessment for Proposed Rezoning and Subdivision

1900 Stalker Road – Gabriola Island, BC

Prepared for:

Seward Developments Inc.
1820 Argyle Avenue
Nanaimo, BC V9S 3K7

Toby Seward
Toby.seward@shaw.ca

Prepared by:

Ryzuk Geotechnical Ltd.
#100-771 Vernon Avenue
Victoria, BC V8X 5A7

January 30, 2025

PROJECT #: 10195-1

CONTENTS

1. INTRODUCTION

As requested, we have completed a geohazard assessment of the referenced property as required by the Islands Trust as part of the proposed rezoning and subdivision application. Further, we note that the Approving Authority for subdivision on Gabriola Island lies with the Approving Officer of the Ministry of Transportation and Transit (MOTT). The Islands Trust and MOTT are both considered authorized users of this report and may rely on its contents.

We understand the current proposal consists of a 3-lot subdivision and rezoning application, as shown on the attached survey plan by Turner and Associates Land Surveying, (project number 18-045) dated October 12, 2023. We further understand that no construction is currently proposed. Our work in this regard has been carried out in accordance with our proposal dated July 14, 2023, and the accepted Terms of Engagement.

2. SCOPE OF ASSESSMENT

Our assessment has consisted of a review of available background information, as well as our site visit to assess the subsurface soils and visual geotechnical conditions. Our background work has included review of the subdivision layout, online satellite imagery of the terrain (Google Earth), and Quaternary geology mapping. Our site visit was completed on October 21, 2024, and consisted of a walking reconnaissance of the property to review surficial geotechnical conditions. Additionally, a subsurface investigation to assess the depth to native soils was carried out by hand digging test pits. Our assessment and this report have been prepared in accordance with Engineers and Geoscientists of BC's (EGBC) Professional Practice Guidelines for *Landslide Assessments in British Columbia (Version 4.1, published March 1, 2023*), and *Legislated Flood Assessments in a Changing Climate in BC (Version 2.1 published August 28, 2018)*. Our completed Landslide Assessment Assurance Statement along with the Flood Assurance Statement is attached.

3. SITE DESCRIPTION

The property is located along the east side of Stalker Rd. along the southeastern shoreline of Gabriola Island. It is a panhandle lot approximately 3.6 hectares in size and bounded by a residential lot to the north, the Strait of Georgia to the east, Drumbeg Provincial Park to the south, and Stalker Rd. to the west. According to the Regional District of Nanaimo GIS mapping and survey plan provided, the land slopes gently down along the access drive from about 23 m (geodetic) elevation at the road to 19 m. The parcel then widens and slopes down to the present natural boundary (PNB) of the Strait of Georgia between 2 and 3 m elevation. The average slope is between 2 to 5 degrees within the main area of the lot, with the slope above the foreshore descending at approximately 20 degrees or less. Based on Gabriola Island Official Community

Plan (Bylaw No 166) mapping, the lot is not within a Development Permit Area (DPA) and is classified as a “resource” land area. Resource designations are characterized as land parcels being 8.0 hectares or larger and may (or may not) contain environmental, social, or culturally significant features. Resource land designations are also not within Provincial Agricultural Land Reserve’s (ALR) or former Forest Land Reserve’s (FLR).

Currently, there are three cottage type structures and two cabins within the eastern half of the lot. The cottages were observed to be setback 26.1 m (northern cottage), 17.2 m (middle cottage), and 29.5 m (southern cottage) from the Present Natural Boundary (PNB). The cabins are setback upwards of 30 m. The structures are located within a grassy area that is nearly flat/level with sporadic mature trees spread throughout. The western half of the lot (behind the cottages) is more densely forested with bushes and mature trees. Pictures of our site reconnaissance are shown in the attached Photo Log.

3.1 SURFACE AND SUBSURFACE CONDITIONS

Based on available Quaternary Geology mapping (British Columbia Soil Survey Report No 43, Volume 4), the lot is characterized by colluvial deposits consisting of glacial drift overtop very shallow bedrock. Bedrock is expected to belong to the late-cretaceous Nanaimo Group Formations, consisting of Gabriola Sandstone. During our site visit, it was evident that the property is bedrock controlled as several outcrops were noted throughout the property as well as along and above the beach, as shown in the Photo Log.

Our subsurface investigation comprised two hand dug test pits to roughly 0.3 m below surface grade where they were ended due to the density of the native soils. Two representative test pits were excavated along the north and south of the property within the flat/level area noted above and as shown in the attached Site Plan. Stratigraphy comprised topsoil approximately 0.25 m thick which then transitioned to native dense brown sand and gravel with some silt (inferred glacial till) atop shallow sandstone bedrock. The soils and bedrock noted were consistent with geological mapping. No groundwater or seepage was observed in either of the test pits and there was no evidence of water pooling within the lot.

4. LANDSLIDE SAFETY AND HAZARD ASSESSMENT CLASS

For the purposes of the landslide and flood hazard assessment and the corresponding Appendix D and Appendix I statements, Islands Trust and the Province of British Columbia do not have an adopted level of landslide safety or an adopted level of flood hazard or flood risk tolerance. However, MOTT has indicated on previous projects that when considering risk from an event based on its probability of occurrence, the qualified professional must distinguish between damaging events and life-threatening events. For damaging events, a probability of occurrence of 1 in 475 years (10% probability in 50 years) should be considered for landslide hazards, and a probability of occurrence of 1 in 200 years should be considered for flooding hazards. For life threatening catastrophic events, a probability of occurrence of 1 in 10,000 years should be considered. In addition, the BC Building Code requires new construction to be designed to remain

safe for egress due to a seismic event with a probability of occurrence of 1 in 2,475 years (2% probability of exceedance in 50 years). We understand that this is also consistent with current BC Building Code Bulletin B10-01 as such relates to seismic slope stability.

Given the proposed rezoning/subdivision and anticipated geotechnical conditions, we consider the project to fall under Class 1 from *Table B-6: Types of Static and Seismic Slope Stability Analysis* from the EGBC *Guidelines for Landslide Assessments in British Columbia*, which provides guidance on level of effort for hazard assessments. Typical assessment methods for Class 1 include conducting a geotechnical hazard assessment, performing site exploration and in-situ testing of soil/rock/groundwater conditions and associated testing, and slope stability analysis, and consideration of climate change impacts.

5. GEOTECHNICAL ASSESSMENT

Our assessment has considered the following geohazards and return periods for their potential to impact the subject property and proposed development:

- A design seismic event with a 1:2,475-year return period (2% probability of exceedance in 50 years)
- A 500-year indicative return period (0.5% Annual Exceedance Probability) flood and 1.0 Relative Sea Level Rise (RSLR) to the year 2100.

5.1 STATIC/SEISMIC SLOPE STABILITY ASSESSMENT

As described previously, the slope within the lot is bedrock controlled with minimal soil cover and is well vegetated. We note that the slope is classified as gentle with an overall inclination between approximately 2 to 5 degrees, with the foreshore steeper at an inclination of roughly 20 degrees or less. We did not observe any evidence of active slopes or potential for slope instability. We note that no rockfall hazard is present within the site, including from upslope areas. Based on available mapping data, the gentle topography of the lot, and bedrock-controlled terrain, we do not consider there to be a concern of creep/movement.

Based on the available GIS mapping from the Nanaimo Regional District, Section A (shown in the attached Site Plan) was generated based on the contours. We consider this section to generally be the most representative of the overall site conditions and to be the marginally steepest. A slope stability analysis was carried out for both static and seismic scenarios using Slide2 software. The seismic scenario considers an event with a 2% probability of exceedance in 50 years with a Peak Ground Acceleration (PGA) of 0.576g (local value from NBCC 2020 for Site Class ‘C’). Stratigraphy was estimated based on our subsurface investigation and visual observations. Our results yielded a minimum static factor of safety of 5.6 while the seismic scenario yielded a factor of safety of 1.6.

Given the low elevation and gentle terrain we conclude that the site is not subject to global instability nor life threatening catastrophic events. Furthermore, given the gentle slope and

minimal soil cover atop the bedrock, we conclude there is insufficient thickness of soil to develop liquefaction. No further modelling has been completed at this time.

5.2 FLOOD HAZARD ASSESSMENT

We have considered the potential flooding hazard to the site from overland watercourses and from coastal flooding. No overland watercourses or drainages were noted near the property nor mapped nearby on the reference drawing Gabriola, Valdes, Thetis and Kuper Islands Water Allocation Plan developed by the British Columbia Ministry of Environment, Lands, and Parks Vancouver Island Region and therefore no associated hazard is considered to be present. Regarding coastal flooding, given the proximity to the natural boundary of the sea, a review of coastal flooding hazard potential was completed.

Assessment of coastal flooding hazard involves considering high tide in combination with estimated sea level rise to the year 2100, and storm surge and wave runup associated with a design storm with a 1 in 500 annual exceedance probability. These values, in addition to a factor for local subsidence or rebound, are combined to determine a Flood Construction Level (FCL) used to establish the elevation of the underside of a wooden floor system or the top of a concrete slab for habitable spaces (Reference: Province of British Columbia – Flood Hazard Area Land Use Management ("FHALUM") Guidelines, May 2004, Amended January 2018 (Sections 3.5 and 3.6)).

We note that all existing habitable structures are located at least 17 m or more (horizontally) from the PNB. Based on the site survey plan, the structures are located where spot elevations range between approximately 5.9 and 8.3 m (geodetic elevation CVD28BC). The structures do not appear to have any portion below grade, with the floor levels located roughly 0.3 m to 0.6 m above surrounding grade. Based on the Regional District of Nanaimo Coastal Flood Hazard Map Atlas (Electoral Area B 2 of 3) completed by Ebbwater Consulting and Cascadia Coast Research Ltd. in 2019, a FCL of 5.1 m (CGVD 2013) was determined for this area. Further work by Ebbwater and Cascadia in 2022 generated Regulatory Coastal Floodplain Map (Electoral Area B, 3 of 6) which identifies the shoreline area of the property as within the flood extent but does not provide a FCL elevation. Accordingly, we have calculated a FCL for the site using the Combined Method cited in Section 3.5.5.1 of the FHALUM Guidelines. The resulting FCL is provided in Table 1 below.

Table 1: Summary of FCL calculations (Combined Method)

Item:	**(m CGVD28)**	**Notes:**
Higher High Water Large Tide (HHWLT)	2.04	As per CHS[1] – based on Point Atkinson (primary port) and Silva Bay #7550 (secondary port)
Total Storm Surge during "designated storm"	1.3	0.2% AEP storm event (Kerr Wood Leidal, 2011[2])
Estimated wave effect	0.65	As per Guidelines[3]

Uplift	-0.08	-1.06 mm/year for region - As per Guidelines[3]
Sea Level Rise (SLR)	0.75	SLR for 2100 is 1.0 m, 75 years left from 2025
Free Board Factor	0.6	As per Guidelines[4]
FLOOD CONSTRUCTION LEVEL	**5.26**	

[1] Canadian Hydrographic Service

[2] Kerr Wood Leidal – Provincial Guidelines for Coastal Floodplain Mapping, June 2011

[3] Ausenco Sandwell – Climate Change Adaption Guidelines for Sea Dikes and Coastal Flood Hazard Land Use; Guidelines for Management of Coastal Flood Hazard Land Use, 27 January 2011

[4] Province of British Columbia – Flood Hazard Area Land Use Management (FHALUM) Guidelines, May 2004, Amended January 2018 (Sections 3.5 and 3.6)

Based on the available information, the existing residences appear to be above this elevation. We have also considered setback, in accordance with the Provincial Guidelines Section 3.5.5.1, which notes the setback should be at least the greater of 15 m from the year 2100 estimated natural boundary, or the location where the ground surface elevation equals the FCL. Given the non-erodible sandstone bedrock shoreline, we consider the former would be a 15 m setback from the 2.71 m elevation contour (HHWLT + SLR – Uplift), which is likely satisfied although sufficient information is not available on the survey plan to confirm this. The residences all appear to be setback behind the FCL elevation of 5.26 m.

While no construction is anticipated at this time, we recommend any future construction be located above the noted FCL and setback 15 m from the future estimated NB, the location of which should be confirmed by a surveyor. However, a reduced setback may be acceptable and should be assessed by a geotechnical professional at the time of any planning/design.

6. CLOSURE

In summary, we consider the proposed rezoning and subdivision can be completed without undue risk of geohazard with respect to both slope stability and flooding, including anticipated future climate change. It is our professional opinion that that the land may be used safely for the use intended, pursuant to and in accordance with Section 56 of the Community Charter. Our assessment is provided in consideration with Section 86(d) of the Land Title Act, pursuant to the

Guidelines for Landslide Assessments in British Columbia V4.1 and the Legislated Flood Assessments in a Changing Climate in British Columbia V2.1.

This report has been prepared for the exclusive use of our client and the authorized representatives. The Islands Trust and Ministry of Transportation and Transit (MOTT) may also rely on this report for the sole purpose of the current rezoning and subdivision application.

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

We trust the preceding is suitable for your purposes at present. If you require anything further at this time or have any questions with respect to the above, please contact us.

Sincerely,

Ryzuk Geotechnical

Sean Gugay, EIT
Advanced Junior Engineer

Laura Lessingham, P. Geo.
Lead Geoscientist

Permit to Practice Number: 1002996

Attachments:
- Photo Log
- Subdivision Layout Survey
- Site Plan with 2 m contours
- Seismic and Static Slope Model
- Appendix D: Landslide Assessment Assurance Statement
- Appendix I: Flood Assurance Statement
- Checklist and Signoff for an Independent Review

	Photo Log
Photo 1: Flat grassy area of North cottage looking towards the foreshore	
Photo 2: North cottage standing near the foreshore. Shallow bedrock observed with sporadic outcrops (bottom left)	

Photo 3: Foreshore of southern cottage. Average slope of foreshore measured to be 20 degrees or less	
Photo 4: Setback of middle cottage looking south	

Photo 5: Setback of southern most cottage looking south	
Photo 6: Sporadic bedrock outcrops throughout the lot indicating thin soil cover	

Photo 7: Observed native mineral soils (glacial till) intermixed with topsoil from hand dug test pit investigation.	
Photo 8: Forested area behind the cottages (within proposed common property) near property line	

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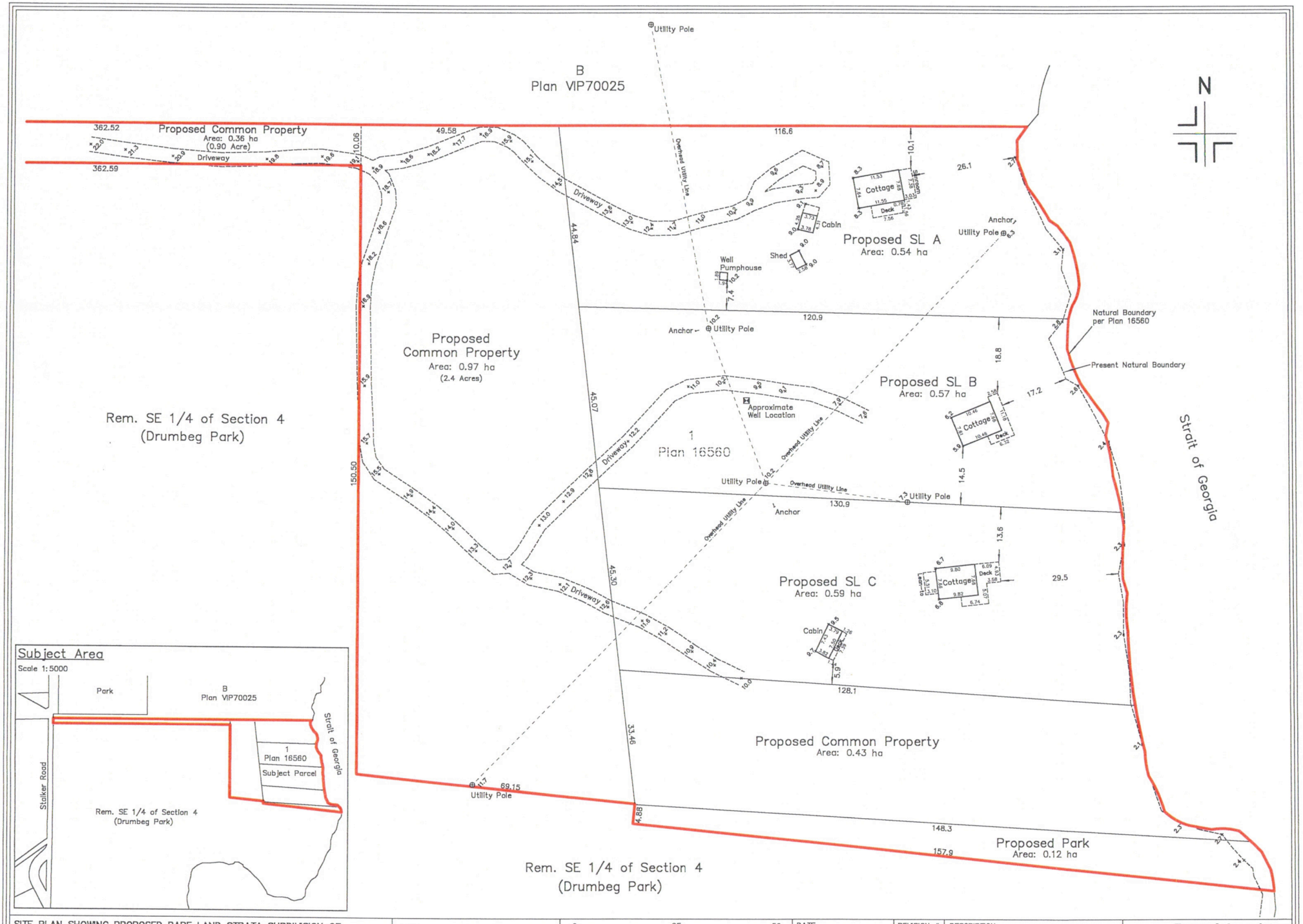


SITE PLAN SHOWING PROPOSED BARE LAND STRATA SUBDIVISION OF:
LOT 1, SECTION 4, GABRIOLA ISLAND,
NANAIMO DISTRICT, PLAN 16560.

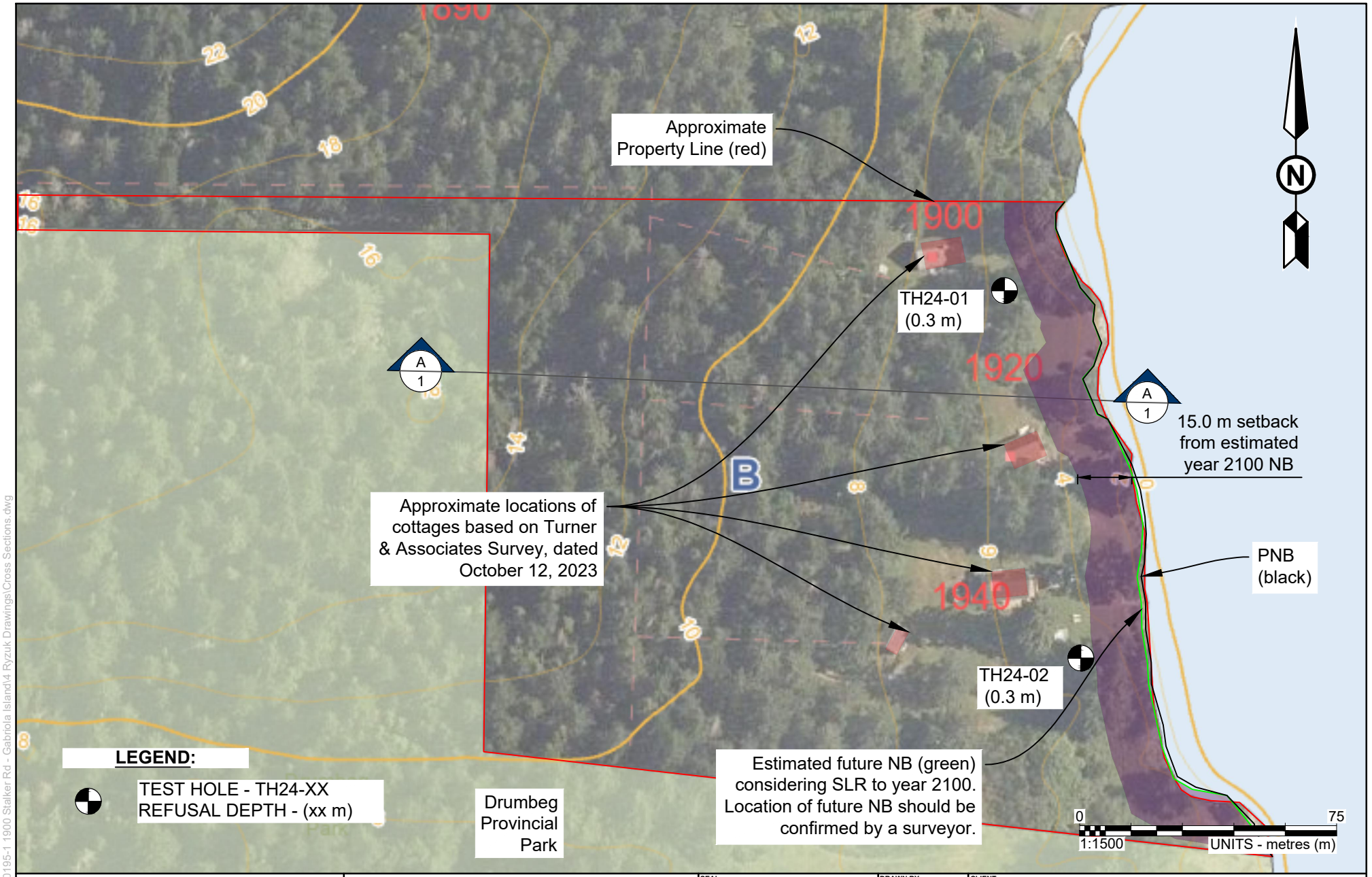
Client: GEOFFREY LITHERLAND			Civic Address: 1900 STALKER ROAD	
File: 18-045	Scale: 1:600	Drawn by: DRW	Date: October 12, 2023	Existing Zoning: Resource (R)

NOTE:
THIS PROPERTY IS AFFECTED BY THE FOLLOWING REGISTERED DOCUMENTS:
UNDERSURFACE RIGHTS M76301,
SRW ES25205 & ES25206.

0 25 50
SCALE 1:600
DISTANCES AND ELEVATIONS SHOWN ARE IN METRES.
GEODETIC ELEVATIONS ARE DERIVED FROM GNSS OBSERVATIONS (CVD28BC DATUM).

DATE	REVISION #	DESCRIPTION
March 12, 2020	First Issue	
October 12, 2023	1	REVISE LOT LAYOUT

Turner & Associates
land surveying™
250.753.9778
435 Terminal Avenue North
Nanaimo, BC V9S 4J8
www.turnersurveys.ca



NOTES

1. This drawing is scaled for 8.5x11 sheet and does not require further scaling to fit. Scales will differ if printed on different sheet size.
2. Background imagery taken from RDN GIS mapping services.
3. All setbacks and boundaries should be confirmed by a surveyor.
4. Estimated future NB based on calculated SLR and spot elevations from survey.

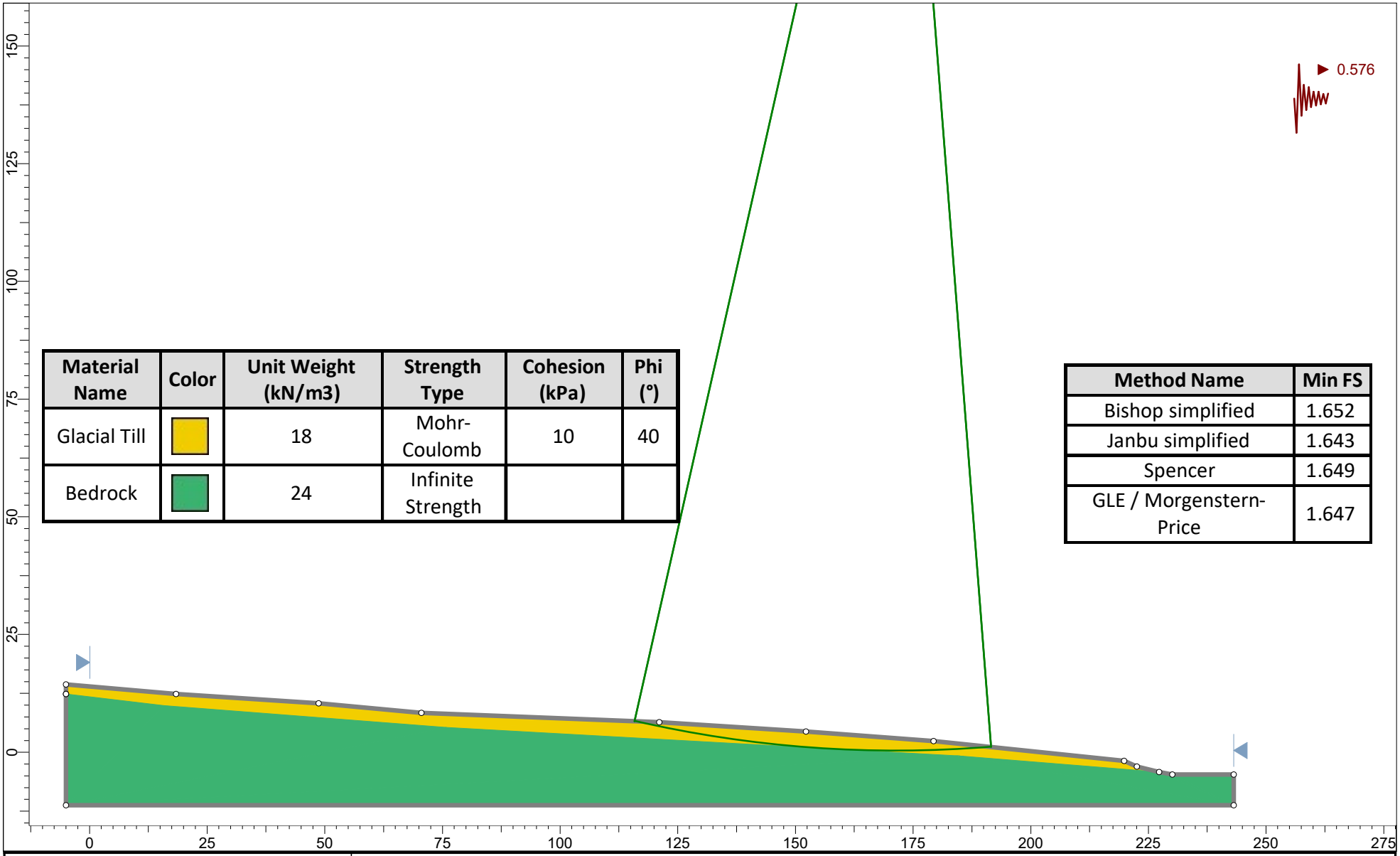
RYZUK GEOTECHNICAL
100 - 771 Vernon Avenue - Victoria, BC V8X 5A7
250-475-3131 mail@ryzuk.com

SEAL

PTPN: 1002996

DRAWN BY: SG	CLIENT: SEWARD DEVELOPMENTS
EOR/LEAD: LBL	PROJECT TITLE: GEOHAZARD ASSESSMENT
REVIEW:	PROJECT ADDRESS: 1900 STALKER ROAD - GABRIOLA ISLAND, BC
SCALE: 1:1500	DRAWING NAME: **SITE PLAN**
DATE: 2024/12/12	PROJECT No.: 10195-1
	SHEET No.: 01 of 01
	REVISION: 00

R:\Ryzuk Data\8-10000 to 8-10999\10195-1 1900 Stalker Rd - Gabriola Island\4 Ryzuk Drawings\Cross Sections.dwg



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)
Glacial Till		18	Mohr-Coulomb	10	40
Bedrock		24	Infinite Strength		

Method Name	Min FS
Bishop simplified	1.652
Janbu simplified	1.643
Spencer	1.649
GLE / Morgenstern-Price	1.647

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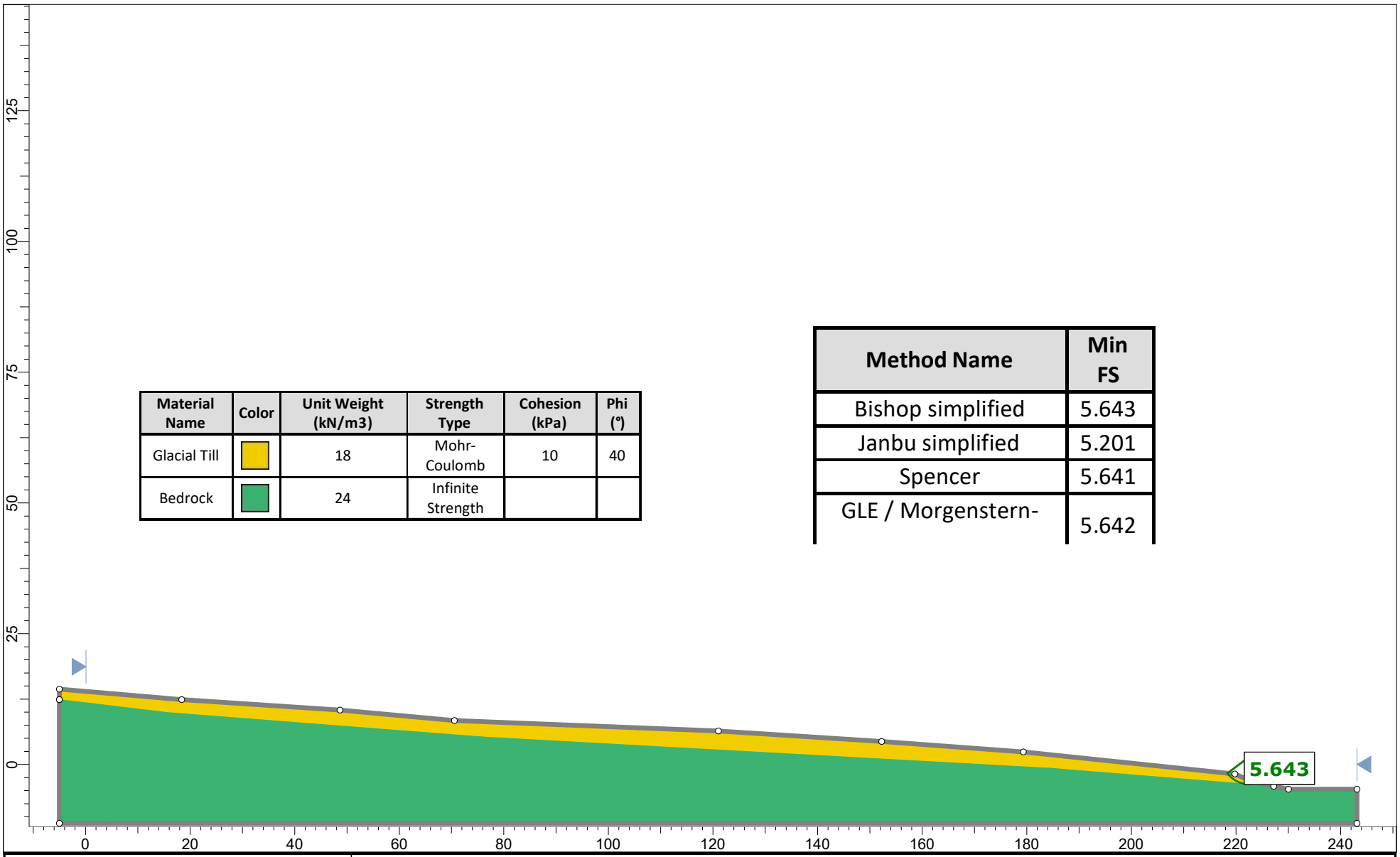
Project	1900 Stalker Road - Gabriola Island, BC		
Group		Scenario	Seismic Stability
Drawn By	SG	Company	Ryzuk Geotechnical
	2024-12-04	File Name	Full2%.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)
Glacial Till		18	Mohr-Coulomb	10	40
Bedrock		24	Infinite Strength		

Method Name	Min FS
Bishop simplified	5.643
Janbu simplified	5.201
Spencer	5.641
GLE / Morgenstern-	5.642



RYZUK GEOTECHNICAL

Project	1900 Stalker Road - Gabriola Island, BC		
Group		Scenario	Static Stability
Drawn By	SG	Company	Ryzuk Geotechnical
	2024-12-04	File Name	Full2%.slmd

LANDSLIDE ASSESSMENT ASSURANCE STATEMENT

Notes: This statement is to be read and completed in conjunction with the Engineers and Geoscientists BC *Professional Practice Guidelines – Landslide Assessments in British Columbia* ("the guidelines") and the current *BC Building Code* (*BCBC*), and is to be provided for Landslide Assessments (not floods or flood controls), particularly those produced for the purposes of the *Land Title Act*, *Community Charter*, or *Local Government Act*. Some jurisdictions (e.g., the Fraser Valley Regional District or the Cowichan Valley Regional District) have developed more comprehensive assurance statements in collaboration with Engineers and Geoscientists BC. Where those exist, the Qualified Professional is to fill out the local version only. Defined terms are capitalized; see the Defined Terms section of the guidelines for definitions.

To: The Approving Authority (or Client) Date: January 30, 2025

Islands Trust

700 North Road, Gabriola Island - BC

Jurisdiction/name and address

With reference to (CHECK ONE):

- ☑ A. *Land Title Act* (Section 86) – Subdivision Approval
- ☐ B. *Local Government Act* (Sections 919.1 and 920) – Development Permit
- ☐ C. Community Charter (Section 56) – Building Permit
- ☐ D. Non-legislated assessment

For the following property (the "Property"):

1900 Stalker Road, Gabriola Island - BC

Civic address of the Property

The undersigned hereby gives assurance that they are a Qualified Professional and a professional engineer or professional geoscientist who fulfils the education, training, and experience requirements as outlined in the guidelines.

I have signed, authenticated, and dated, and thereby certified, the attached Landslide Assessment Report on the Property in accordance with the guidelines. That report must be read in conjunction 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 or other 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, or where the Landslide Assessment is not produced in response to a legislated requirement, 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 those guidelines (per item 8.2) 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)

Where the Landslide Assessment is not produced in response to a legislated requirement, I hereby give my assurance that, based on the conditions[1] contained in the attached Landslide Assessment Report:

A. SUBDIVISION APPROVAL

☑ For subdivision approval, as required by the *Land Title Act* (Section 86), "the land may be used safely for the use intended"

[CHECK ONE]

- ☐ with one or more recommended additional registered Covenants
- ☑ without an additional registered Covenant(s)

B. DEVELOPMENT PERMIT

☐ For a development permit, as required by the *Local Government Act* (Sections 488 and 491), my report will "assist the local government in determining what conditions or requirements it will impose under subsection (2) of [Section 491]"

[CHECK ONE]

- ☐ with one or more recommended additional registered Covenants
- ☐ without an additional registered Covenant(s)

C. BUILDING 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 additional registered Covenants
- ☐ without any additional registered Covenant(s)

[1] When seismic slope stability assessments are involved, Level of Landslide Safety is considered to be a "life safety" criteria, as described in Commentary JJJ of the *National Building Code of Canada* (*NBC) 2015*, Structural Commentaries (User's Guide – NBC 2015: 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."

Laura Lessingham, P. Geo.

Name (print)

January 30, 2025

Date

#100-771 Vernon Avenue

Address

Victoria, BC V8X 5A7

250-475-3131

Telephone

laura@ryzuk.com

Email

(Affix PROFESSIONAL SEAL and signature here)

The Qualified Professional, as a registrant on the roster of a registrant firm, must complete the following:

I am a member of the firm Ryzuk Geotechnical Ltd.

(Print name of firm)

with Permit to Practice Number 1002996

(Print permit to practice number)

and I sign this letter on behalf of the firm.

FLOOD ASSURANCE STATEMENT

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

To: The Approving Authority

Date: January 30, 2025

Islands Trust

700 North Road, Gabriola Island - BC

Jurisdiction and address

With reference to (CHECK ONE):

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

For the following property ("the Property"):

1900 Stalker Road, Gabriola Island - BC

Legal description and civic address of the Property

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

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

[CHECK TO THE LEFT OF APPLICABLE ITEMS]

☐ 1. Consulted with representatives of the following government organizations:

_____

☑ 2. Collected and reviewed appropriate background information

☐ 3. Reviewed the Proposed Development on the Property

☐ 4. Investigated the presence of Covenants on the Property, and reported any relevant information

☑ 5. Conducted field work on and, if required, beyond the Property

☑ 6. Reported on the results of the field work on and, if required, beyond the Property

☑ 7. Considered any changed conditions on and, if required, beyond the Property

8. For a Flood Hazard analysis I have:
   - ☑ 8.1 Reviewed and characterized, if appropriate, Flood Hazard that may affect the Property
   - ☑ 8.2 Estimated the Flood Hazard on the Property
   - ☑ 8.3 Considered (if appropriate) the effects of climate change and land use change
   - ☑ 8.4 Relied on a previous Flood Hazard Assessment (FHA) by others
   - ☐ 8.5 Identified any potential hazards that are not addressed by the Flood Assessment Report

9. For a Flood Risk analysis I have:
   - ☑ 9.1 Estimated the Flood Risk on the Property
   - ☑ 9.2 Identified existing and anticipated future Elements at Risk on and, if required, beyond the Property
   - ☑ 9.3 Estimated the Consequences to those Elements at Risk

10. In order to mitigate the estimated Flood Hazard for the Property, the following approach is taken:
- ☐ 10.1 A standard-based approach
- ☐ 10.2 A Risk-based approach
- ☑ 10.3 The approach outlined in the guidelines, Appendix F: Flood Assessment Considerations for Development Approvals
- ☐ 10.4 No mitigation is required because the completed flood assessment determined that the site is not subject to a Flood Hazard

11. Where the Approving Authority has adopted a specific level of Flood Hazard or Flood Risk tolerance, I have:
- ☐ 11.1 Made a finding on the level of Flood Hazard or Flood Risk on the Property
- ☐ 11.2 Compared the level of Flood Hazard or Flood Risk tolerance adopted by the Approving Authority with my findings
- ☐ 11.3 Made recommendations to reduce the Flood Hazard or Flood Risk on the Property

12. Where the Approving Authority has not adopted a level of Flood Hazard or Flood Risk tolerance, I have:
- ☑ 12.1 Described the method of Flood Hazard analysis or Flood Risk analysis used
- ☑ 12.2 Referred to an appropriate and identified provincial or national guideline for level of Flood Hazard or Flood Risk
- ☐ 12.3 Made a finding on the level of Flood Hazard of Flood Risk tolerance on the Property
- ☑ 12.4 Compared the guidelines with the findings of my flood assessment
- ☐ 12.5 Made recommendations to reduce the Flood Hazard or Flood Risk

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

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

Based on my comparison between:

[CHECK ONE]

☐ The findings from the flood assessment and the adopted level of Flood Hazard or Flood Risk tolerance (item 11.2 above)

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

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

[CHECK ONE]

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

[CHECK ONE]

- ☑ With one or more recommended registered Covenants.
- ☐ Without any registered Covenant.

☐ For a development permit, as required by the *Local Government Act* (Part 14, Division 7), my Flood Assessment Report will "assist the local government in determining what conditions or requirements it will impose under subsection (2) of this section [Section 491 (4)]".

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

[CHECK ONE]

- ☐ With one or more recommended registered Covenants.
- ☐ Without any registered Covenant.

☐ For flood plain bylaw variance, as required by the *Flood Hazard Area Land Use Management Guidelines* and the *Amendment Section 3.5 and 3.6* associated with the *Local Government Act* (Section 524), "the development may occur safely".

☐ For flood plain bylaw exemption, as required by the *Local Government Act* (Section 524), "the land may be used safely for the use intended".

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

January 30, 2025

Date

Laura Lessingham, P.Geo

Prepared by

Laura Lessingham, P.Geo

Name (print)

Signature

Jordan Gybels, P.Eng.

Reviewed by

Jordan Gybels, P.Eng.

Name (print)

Signature

#100 - 771 Vernon Ave

Address

Victoria, BC, V8Z 1T2

2504753131

Telephone

laura@ryzuk.com

Email

(Affix PROFESSIONAL SEAL here)

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

I am a member of the firm Ryzuk Geotechnical Ltd.

and I sign this letter on behalf of the firm.

(Name of firm)

CHECKLIST AND SIGNOFF FOR AN INDEPENDENT REVIEW OF HIGH-RISK PROFESSIONAL ACTIVITIES OR WORK

[Print clearly and legibly]

RE:

Rezoning and Subdivision
Name of project, activity, or work

1900 Stalker Rd. - Gabriola Island, BC
Address of project, activity, or work

PROFESSIONAL OF RECORD

Laura Lessingham, P.Geo.
Name of professional and designation (P.Eng., P.Geo., P.L.Eng., or P.L.Geo.)

Ryzuk Geotechnical Ltd.
Firm name

1002996
Permit to Practice number

#100 - 771 Vernon Ave. - Victc
Address of firm

ITEM	REVIEWED	REMARKS
	INITIALS	Independent review of
Criteria for carrying out Professional Activities or Work		moderate to high risk work and confirmation that requirements
N Applicable codes, standards, and other requirements (laws, regulations, design requirements, etc.)		Report is compliant with current BCBC, local codes, and MOTT requirements.
Geographical and/or environmental conditions and requirements		Gently to moderately sloping
Assumptions for Professional Activities or Work		Bedrock controlled site with
Concept for Professional Activities or Work		Hand dug test pits to refusal.
Test and analysis procedures and results		Slide modeling to confirm
Quality control and quality analysis procedures		Report and
Calculations or analysis of representative elements		Modeling with slide 2 software
Review of representative details		Review of conservative slope
Integration of third-party components and artifacts		CHS data used and third party
Representation of output (e.g., drawings, reports, spreadsheets, models)		Site plan and cross sections for slope stability analysis.
Hazards (current and future) identified in the Risk Assessment		Geological hazards were reviewed and identified
Adequacy and implementation of mitigation measures		none required
Concerns discussed with the Professional of Record		none
For global, repetitive, or iterative design, recommendation for intervals of Independent Review		n/a

[…continued]

INDEPENDENT REVIEWER

Jordan Gybels, P.Eng.

Name of professional and designation
(P.Eng., P.Geo., P.L.Eng., or P.L.Geo.)

Ryzuk Geotechnical Ltd.

Firm name

1002996

Permit to Practice number

#100 - 771 Vernon Ave. - Victoria BC

Address of firm

25/01/30

Date: (yy/mm/dd)

Signature

CHECKLIST AND SIGNOFF FOR AN INDEPENDENT REVIEW OF HIGH-RISK PROFESSIONAL ACTIVITIES OR WORK

[Print clearly and legibly]

TO: PROFESSIONAL OF RECORD **DATE** (yy/mm/dd): 25/01/30

Laura Lessingham, P.Geo.

Name of professional and designation
(P.Eng., P.Geo., P.L.Eng., or P.L.Geo.)

Ryzuk Geotechnical Ltd. 1002996

Firm name Permit to Practice number

#100 - 771 Vernon Ave. - Victoria BC

Address of firm

Rezoning and Subdivision

RE: Name of project, activity, or work

1900 Stalker Rd. - Gabriola Island, BC

Address of project, activity, or work

The undersigned hereby records that an Independent Review of the professional activity or work, based on the documentation prepared by the Professional of Record for the professional activity or work, has been completed by this Independent Reviewer.

I am a member of the firm Ryzuk Geotechnical Ltd.
(Name of firm)

With the Permit to Practice number: 1002996
(Permit to Practice number)

and I sign this letter on behalf of the firm.

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

DATE (yy/mm/dd): 25/01/30

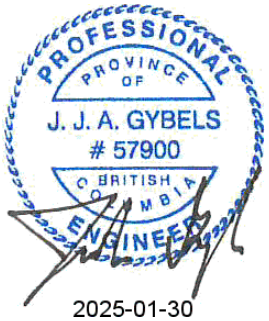
Jordan Gybels, P.Eng.

Name of professional and designation
(P.Eng., P.Geo., P.L.Eng., or P.L.Geo.)

Signed

#100 - 771 Vernon Ave. - Victoria BC

Address



2025-01-30

250-475-3131

Telephone

(Affix PROFESSIONAL SEAL here)

NOTE:1. The above letter must be signed by a Professional Registrant (professional engineer, professional geoscientist, professional licensee engineering, or professional licensee geoscience, licensed to practice by Engineers and Geoscientists BC) qualified to conduct an Independent Review on the Professional Activity or Work being reviewed.

2. This letter is endorsed by Engineers and Geoscientists BC