

To: Electoral Area Services Committee

Date: 2020-01-14

From: Graham Daneluz, Director of Planning & Development

File No: 3090-20-2019-17

Subject: Development Variance Permit 2019-17 for 155 First Ave, Cultus Lake Park, Area H

RECOMMENDATION

THAT DVP 2019-17 for the property at 155 First Ave, Cultus Lake, Area H be referred to the Cultus Lake Park Board for comments respecting on-street parking;

AND THAT upon receipt of comments from the Cultus Lake Park Board DVP 2019-17 be considered by Fraser Valley Regional District Board.

STRATEGIC AREA(S) OF FOCUS

Provide Responsive & Effective Public Services
Support Healthy & Sustainable Community

PRIORITIES

Priority #3 Flood Protection & Management

BACKGROUND

The residential lease lot at 155 First Avenue in Cultus Lake Park is 24.88 feet wide, 65 feet long and 0.037 acres in area. It borders Cultus Lake to the west and First Avenue to the east. It is a small lot consistent in layout with others on its block that were originally created for seasonal cottage use. Details of the property are provided in the table below.

The leaseholders proposes to build a new single family dwelling with a basement and two storeys. The dwelling would have a footprint of 825 sq. ft. (76.6 m²) and a total floor area of 2530 sq. ft. (235 m²). It would cover 51% of the lot.

They have applied for a Development Variance Permit to:

1. reduce to required off-street parking spaces from two to zero to allow residential parking primarily within the road allowance;
2. reduce the minimum building elevation from 45.50 metres GSC to 44.55 metres GSC; and,
3. reduce the rear lot line setback from 3.0 metres to 0.3 metres for a portion of the basement foundation walls.

The application and related information provided by the applicant is included in Attachment 1.

PROPERTY DETAILS

Electoral Area	H		
Address	155 First Avenue		
PID	n/a		
Folio	733.07001.155		
Lot Size	24.88 ft. x 65 ft. = 1617 ft² (approx.)		
Owner	Gwyllyn Goddard	Agent	Wood Tiger Adv.
Current Zoning	Waterfront Residential	Proposed Zoning	No change
Current OCP	n/a	Proposed OCP	No change
Current Use	Residential	Proposed Use	No change
Development Permit Areas	RAR		
Hazards	potential flooding from Cultus Lake; overland storm flows		
Agricultural Land Reserve	no		

ADJACENT ZONING & LAND USES

North	^	Waterfront Residential (R-3), Single Family Home
East	>	Urban Residential (R-2), Single Family Home
West	<	Local Park & Recreation (P-1), Single Family Home
South	v	Waterfront Residential (R-3), Single Family Home

NEIGHBOURHOOD MAP



PROPERTY MAP



DISCUSSION

Many of the lease lots in Cultus Lake Park were laid out between 1928 and 1936. The small 25 by 65 feet lots along First Avenue – a narrow 40 feet wide roadway – were suited to modest seasonal cottages. In contrast, urban residential lots set out in Chilliwack in the same era tend to be roughly twice the size - 60 feet by 120 feet – and they fronted on roads typically 66 feet wide.

The small cottage lots of Cultus Lake Park are under immense pressure today. Most are now primary year-round residences. The amenity and recreational value of Cultus Lake, and the charm of the park community, has pushed the assessed land value of these lots to almost \$1,000,000 (2019). The expectations of leaseholders have risen proportionally. New homes in Cultus Lake Park maximize floor area and push against setbacks and building regulations in all dimensions.

The capacity of the lots and the road infrastructure to support the increased intensity and scale of use is strained. The proposed variances are symptomatic of this tension associated with the transition in use from small seasonal cottage lots to year-round modern 'executive-style' houses.

Parking

Cultus Lake Park Zoning Bylaw No. 1375 requires two off-street parking spaces on lots within the Waterfront Residential (R-3) zone.

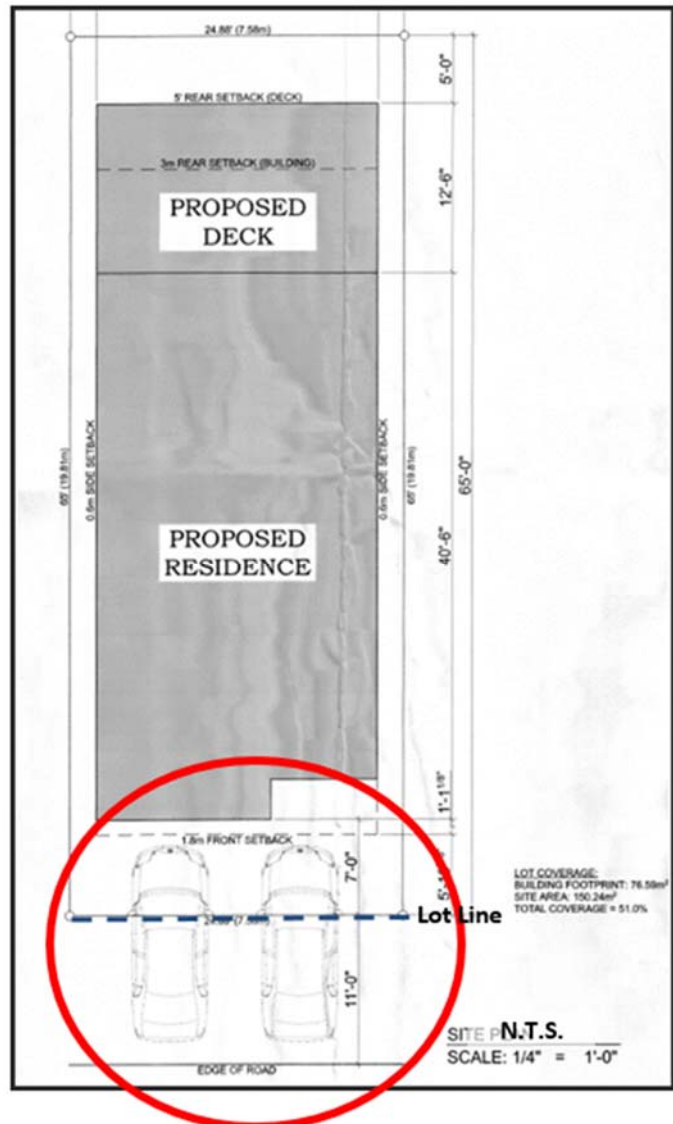
The bylaw allows vehicles using parallel parking spaces to use a portion of the road width. However, the vehicle must be able to park entirely outside the travel lane delineated by the yellow lines painted on the road surface.

The applicant has requested a variance to reduce the number of off-street parking spaces from two to zero to allow the parking configuration shown at right. The proposed parking spaces would be oriented 90 degrees (perpendicular) to the road. They would extend 11 feet into the road allowance, but not into the travelled portion of the road, as shown below.

The applicant provides the following reasons in support of the variance:

- The small lot provides a limited building footprint relative to larger lots in the park;
- Providing two off-street parking spaces would unreasonably reduce useable space on the main floor of the home; and,
- Vehicle parking within the footprint of the home may lead to exposure of occupants to carcinogenic vehicle emissions.

Certainly, the size of the lots and the lack of rear lane access create challenges for providing off-street parking within lease lots. Trade-offs between building area and parking are inherent. Land use patterns in Cultus Lake have developed, in part, by relying on street parking spaces. For these reasons, neighbours seem to support the requested parking variances. The



applicant provided ten letters of support from nearby lease holders. A similar parking variance on First Avenue also attracted strong support from neighbours. It appears that the community generally accepts that residential parking needs will be met within the road allowance on First Avenue.

Nevertheless, there are a variety of issues associated with reliance on on-street parking. First Avenue is a one-way road with a travelled road portion of approximately 16 feet. Most areas outside of the vehicle travelling area are used for residential parking. The relatively narrow road width raises concerns about:

- Road safety for a variety of users; if road shoulders are entirely used for parking pedestrians, cyclists, and mobility scooters must travel in the portion of road intended for vehicles;
- Suitable travel width for road; cars appear to frequently park over the yellow line, in the travelled portion of the road, reducing road capacity;
- Service Vehicle Access (garbage, snow removal, contractors, emergency vehicles); often garbage/ recycling containers are placed on the travelled portion of the road; and,
- Space available for on-street parking will not meet the long-term demand for resident and guest parking.

Redevelopment provides an opportunity to reduce reliance on on-street parking. It is possible for the leaseholder to provide off-street parking spaces and meet the requirements of the zoning bylaw.

The FVRD zoning bylaw requirement for off-street parking is an attempt to address the concerns associated with narrow roads and extensive on-street parking. However, it may need amending to match the needs of the community. It is likely that trade-offs will need to be considered; for example, efforts to increase road safety may reduce the supply of on-street parking.

FVRD and Cultus Lake Park Board (CLPB) have important roles in this. FVRD regulates land use through zoning. CLPB is responsible for local roads, on-street parking, on-street parking permits, road maintenance, snow clearing and a number of related functions. For that reason, staff recommend that the DVP application be referred to the Cultus Lake Park Board for comment on matters within the Park Board's jurisdiction before a decision on the parking variance is made.

Both organizations have indicated support for a parking study to inform a consistent approach for residential parking on waterfront lots in Cultus Lake. In September, 2019, the FVRD Board passed the following resolutions:

THAT the Fraser Valley Regional District Board direct staff to conduct a parking study of waterfront lots in Cultus Lake Park to develop a consistent approach for off-street residential parking;

AND FURTHER THAT the Fraser Valley Regional District Board defer any future development variance permit applications for off-street parking variances until a parking study of waterfront lots in Cultus Lake Park is completed.

This study has been included in draft 2020 budget and work plan for the Electoral Area Planning service. The study could look at parking alternatives, road safety, parking dimensions, and availability and demand.

Minimum Building Elevation

Cultus Lake Park Zoning Bylaw No. 1375 sets out a minimum building elevation of 45.5 metres GSC for single family dwellings. This minimum elevation is intended to ensure that homes are protected from flooding and high ground water associated with 1:200 year lake water levels.

The leaseholder has requested a variance to reduce the minimum building elevation from 45.5 m to 44.55 meters to facilitate a construction of a residence with a below-grade basement and two storeys. The rationale provided by the applicant is that the extra depth will allow construction of a full height basement to increase living and storage area.

In support of this variance, the applicant has submitted:

- A letter by Out of the Box Engineering supporting a flood construction level of 45.5 m GSC and a lower basement elevation within a water-proofed structure; and,
- A report by Madrone Environmental Services LTD identifying a 1:40-1:200 flood hazard and recommending:
 - o A flood construction level of 45.5 m GSC;
 - o Any development below the FCL be designed and signed off by a qualified engineering professional to be geotechnically and structurally engineered to be waterproof; and,
 - o Grading away from the development to an elevation of 45.8 m GSC.

These reports are included as Attachment 2.

The FVRD Hazard Acceptability Thresholds for Development Approvals policy stipulates that new buildings subject to flood hazards with a probability of occurrence of 1:40 to 1:200 are approvable with protective works to mitigate the hazard.

The applicant proposes to provide mitigate in the form of a waterproof foundation. No designs or engineering certifications have been provided regarding the effectiveness of the proposed foundation. While some homes in the park have used this mitigation strategy, it is not a widely accepted practice. The Province of BC *Flood Hazard Area Land Use Management Guidelines* recommends that, "areas used for habitation, business, or storage of goods damageable by floodwaters should be constructed within any building at an elevation such that the underside of the floor system thereof is not lower than the designated flood level." This is consistent with the flood mitigation strategy set out in *FVRD Floodplain Management Bylaw No. 0681* and policies in Electoral Area official community plans.

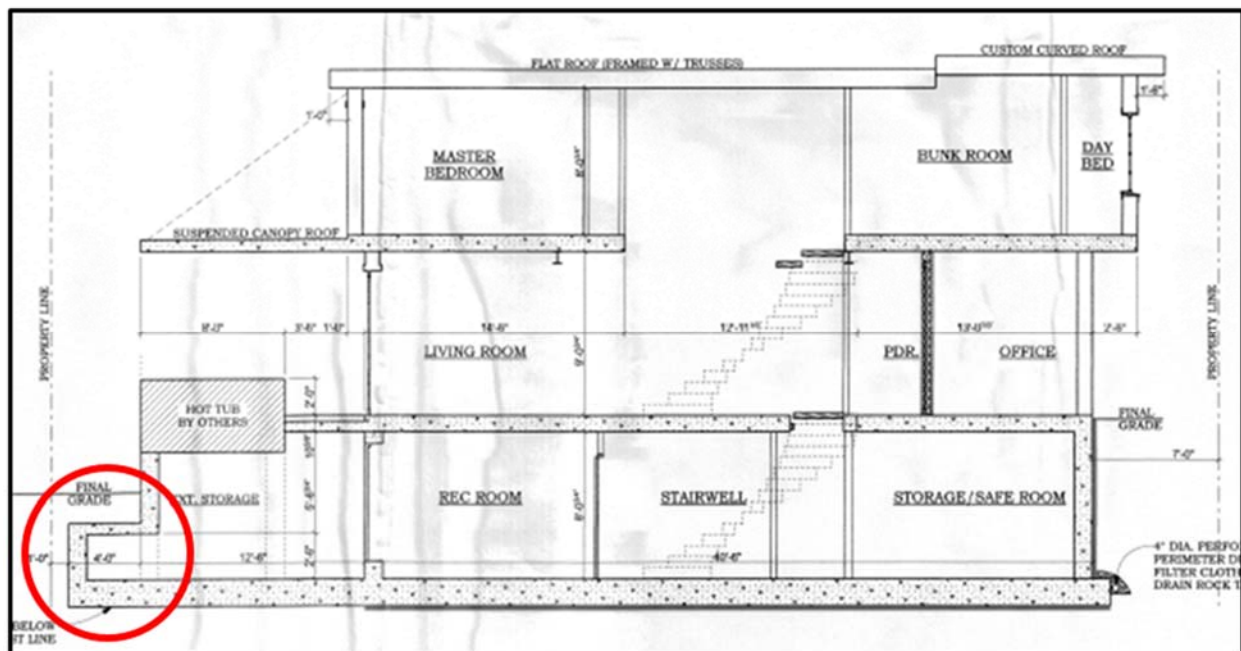
Where local governments are considering a site-specific request to lower the minimum building elevations, or flood construction levels, the provincial guidelines state:

- The local government may alter a bylaw condition to best match the flood hazard provided the level of protection is not altered. This discretion extends to the reduction of elevation requirements, where flood plain mapping exists, by the freeboard (0.6 m).
- In order to avoid setting difficult precedents these site characteristics should be unique to the subject property and environs. The economic circumstances or design and siting preferences of the owner should not be considered as grounds for hardship.

This variance is inconsistent with provincial guidelines and FVRD policies. The submitted reports do not contain hydrological analysis and don't appear to meet the professional practice guidelines prepared by the Engineers and Geoscientists of BC for *Legislated Flood Assessments in a Changing Climate in BC* (the standard for flood hazard report in BC). Furthermore, the proposed mitigation measures are inconsistent with provincial guidelines and no design or engineering certification has been provided to assure their suitability and effectiveness.

Rear Setback

Cultus Lake Park Zoning Bylaw No. 1375 requires that the dwelling be setback at least 3.0 metres from the rear lot line. The applicant proposes to construct a 'bump out' in the foundation forming the basement wall to provide below-grade storage area for a generator (as shown below) and has requested a reduction in the setback to 0.3 meters to facilitate it.



The applicant feels that accessible, out-of-sight underground storage for a generator is required due to the frequency of power outages at Cultus Lake.

This intent can be achieved with a stand-alone in-ground storage structure not connected to the foundation or floor area of the dwelling. In-ground structures are required to be setback only 0.3 metres from all property lines whereas single family dwellings must be setback 3.0 m from the rear property line. No variance would be needed for a stand-alone in-ground generator storage area.

The constant pressure to maximize building dimensions on small lots in Cultus Lake Park creates large challenges for maintaining minimum development standards, such as setbacks, that are intended to support community safety and amenity. As there is an alternative for locating a generator on the lot in a manner that meets many of the applicants objectives, the variance seems to be unnecessary.

Cultus Lake Advisory Planning Commission

The Development Variance Permit application was consider by the Cultus Lake Advisory Planning Commission (APC) on December 15, 2019. The APC recommended that the application be deferred.

CONCLUSION

Staff recommend that the DVP application be referred to the Cultus Lake Park Board for comment on-street parking which is within the jurisdiction of the CLPB. Once comment has been received from the Park Board, the DVP application should be considered by the FVRD Board.

OPTIONS

Option 1 – Refer to Cultus Lake Park Board for comment (Staff recommendation)

MOTION: THAT DVP 2019-17 for the property at 155 First Ave, Cultus Lake, Area H be referred to the Cultus Lake Park Board for a comments respecting on-street parking; AND THAT upon receipt of comments from the Cultus Lake Park Board DVP 2019-17 be considered by Fraser Valley Regional District Board.

Option 2 – Defer consideration until a parking study is complete

If the Board wishes to defer consideration of the application until a parking study is complete, the following motion would be appropriate:

MOTION: THAT the FVRD Board defer consideration of Development Variance Permit 2019-17 for the property at 155 First Ave, Cultus Lake, Area H until a parking study of waterfront lots in Cultus Lake Park is completed and appropriate flood levels are assessed.

Option 3 – Refer to Staff

If the Board wishes to refer the application back to staff for further work with the applicant, the following motion would be appropriate:

MOTION: THAT the Fraser Valley Regional District Board refer the application for Development Variance Permit 2019-17 for the property at 155 First Ave, Cultus Lake, Area H to FVRD Staff for further work with the applicant to address concerns notes in the Corporate Report dated 2020-01-14.

COST

The Development Variance Permit application fee of \$350.00 was paid by the applicant.

COMMENTS BY:

Mike Veenbaas, Director of Financial Services

No further financial comments.

Jennifer Kinneman, Acting Chief Administrative Officer

Reviewed and supported.

SCHEDULE A-4

Permit Application

I / We hereby apply under Part 14 of the *Local Government Act* for a;

☒ Development Variance Permit

☐ Temporary Use Permit

☐ Development Permit

An Application Fee in the amount of \$ 350 as stipulated in FVRD Application Fees Bylaw No. 1231, 2013 must be paid upon submission of this application.

Civic

Address 155 FIRST AVENUE, CULTUS LAKE, PID
FOLIO 733 007001.155 V2R 4Z2

Legal Lot Block Section Township Range Plan

Description LOT 155, NEW WESTMINSTER LAND DISTRICT, LEASE CULTUS LAKE
PARK

The property described above is the subject of this application and is referred to herein as the 'subject property.' This application is made with my full knowledge and consent. I declare that the information submitted in support of the application is true and correct in all respects.

Owner's
Declaration

Name of Owner (print)	Signature of Owner	Date
GWYLLYN S. GODDARD		MAY 21/19
Name of Owner (print)	Signature of Owner	Date

Owner's
Contact
Information

Address	City
155 FIRST AVENUE	CULTUS LAKE
	Postal Code
	V2R 4Z2
Cell	Fax

Office Use Only	Date	File No.
	MAY 22, 2019	3090-20 2019-17
	Received By	Folio No.
		733.07001.155
	Receipt No.	Fees Paid: \$ 350.00
	8735/7	

Agent

I hereby give permission to FRANCIS WALLACE to act as my/our agent in all matters relating to this application.

Only complete this section if the applicant is NOT the owner.

Signature of Owner 	Date MAY 21, 2019
Signature of Owner	Date

Agent's contact information and declaration

Name of Agent FRANCIS WALLACE, MCIP, RPP		Company WOOD TIGER ADVISING
Address 5454 STEELHEAD LANE		City CHILLIWACK
Email		Postal Code V2R 0X7
Phone	Cell SAME	Fax

I declare that the information submitted in support of this application is true and correct in all respects.

Signature of Agent 	Date 21 MAY 2019
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Development Details

PLEASE SEE ATTACHED 'ADDENDUM A'

Property Size _____ Present Zoning _____

Existing Use _____

Proposed Development _____

Proposed Variation / Supplement _____

Reasons in Support of Application _____

(use separate sheet if necessary)

SEE ATTACHED
ADDENDUM A

**Riparian
Areas
Regulation**

Please indicate whether the development proposal involves residential, commercial, or including vegetation removal or alteration; soil disturbance; construction of buildings and structures; creation of impervious or semi-pervious surfaces; trails, roads, docks, wharves, bridges and, infrastructure and works of any kind – within:

yes
☒

no
☐

30 metres of the high water mark of any water body

yes
☐

no
☒

a ravine or within 30 metres of the top of a ravine bank

"Water body" includes; 1) a watercourse, whether it usually contains water or not; 2) a pond, lake, river, creek, or brook; 3) a ditch, spring, or wetland that is connected by surface flow to 1 or 2 above.

Under the *Riparian Areas Regulation* and the *Fish Protection Act*, a riparian area assessment report may be required before this application can be approved.

**Contaminated
Sites Profile**

Pursuant to the *Environmental Management Act*, an applicant is required to submit a completed "Site Profile" for properties that are or were used for purposes indicated in Schedule 2 of the *Contaminated Sites Regulations*. Please indicate if:

yes
☐

no
☒

the property has been used for commercial or industrial purposes.

If you responded 'yes,' you may be required to submit a Site Profile. Please contact FVRD Planning or the Ministry of Environment for further information.

**Archaeological
Resources**

Are there archaeological sites or resources on the subject property?

yes
☐

no
☒

I don't know
☐

If you responded 'yes' or 'I don't know' you may be advised to contact the Archaeology Branch of the Ministry of Tourism, Sport and the Arts for further information.

Required Information

When providing Application Forms to the applicant, Regional District staff shall indicate which of the following attachments are required for this application. **Additional information may also be required at a later date.**

	Required	Received	Details
Location Map			Showing the parcel (s) to which this application pertains and uses on adjacent parcels
Site Plan			Reduced sets of metric plans
At a scale of:			North arrow and scale
1: _____			Dimensions of property lines, rights-of-ways, easements
			Location and dimensions of existing buildings & setbacks to lot lines, rights-of-ways, easements
			Location and dimensions of proposed buildings & setbacks to lot lines, rights-of-ways, easements
			Location of all water features, including streams, wetlands, ponds, ditches, lakes on or adjacent to the property
			Location of all existing & proposed water lines, wells, septic fields, sanitary sewer & storm drain, including sizes
			Location, numbering & dimensions of all vehicle and bicycle parking, disabled persons' parking, vehicle stops & loading
			Natural & finished grades of site, at buildings & retaining walls
			Location of existing & proposed access, pathways
			Above ground services, equipment and exterior lighting details
			Location & dimensions of free-standing signs
			Storm water management infrastructure and impermeable surfaces
			Other:
Floor Plans			Uses of spaces & building dimensions
			Other:
Landscape Plan			Location, quantity, size & species of existing & proposed plants, trees & turf
Same scale as site plan			Contour information (_____ metre contour intervals)
			Major topographical features (water course, rocks, etc.)
			All screening, paving, retaining walls & other details
			Traffic circulation (pedestrian, automobile, etc.)
			Other:
Reports			Geotechnical Report
			Environmental Assessment
			Archaeological Assessment
			Other:

The personal information on this form is being collected in accordance with Section 26 of the *Freedom of Information and Protection of Privacy Act, RSBC 1996 Ch. 165* and the *Local Government Act, RSBC 2015 Ch. 1*. It will only be collected, used and disclosed for the purpose of administering matters with respect to [planning](#), [land use management](#) and related [services delivered](#), or proposed to be delivered, by the FVRD. Questions about the use of personal information and the protection of privacy may be directed to the FVRD Privacy Officer at 45950 Cheam Avenue, Chilliwack, BC V2P 1N6, Tel: 1-800-528-0061 FOI@fvr.ca.

LETTER OF AUTHORIZATION

Registered Authority

Please be advised that I/we, Gwynlyn Goddard
(Print names of ALL Registered Owners or Corporate Director)

Representing, _____
(Corporate name - if applicable)

am/are the registered owner(s);

Site Civic Address:

155 FIRST AVENUE, CULTUS LAKE

Lot# _____ Block _____ Plan _____ PID# _____
FOLIO 733 007001-155
TAX ACCOUNT RPT-1092-2763

Appointed Authorized Agent

Name of Authorized Agent

DOUGLAS WILLIAMS

Company Name

WBW CONSTRUCTION

Mailing Address

383 ALDER ST

City: CULTUS LAKE Postal Code: V2R-4Z1

Email: _____

Phone: _____

Fax: _____

Signature of Authorized Agent

X 

Permission to act:

As my/our Authorized Agent in the matter of the following:

- ☒ to view and obtain copies of all plans and permits
☒ to apply for and obtain building permits for proposed construction to the above reference Civic Address
☒ to apply for Planning File: Development Permit ☐ Development Variance Permit ☒ Subdivision ☐
☐ other: _____

Authorized Signature (Registered Owner or Corporate Director)

This document shall serve to notify the Fraser Valley Regional District that I am/we are the legal owner(s) of the property described above and do authorize the person indicated above ("Authorized Agent") to act on my/our behalf on all matters indicated above ("Permission to act") for the above referenced property. In addition, I/we have read and understand the above application and authorize the Authorized Agent to sign the above on my/our behalf.

X 

Sign

Gwynlyn S. Goddard

Print

Date: MAY 21, 2019

X _____

Sign

Print

Date: _____

The personal information on this form is being collected in accordance with Section 27 of the *Freedom of Information and Protection of Privacy Act, RSBC 1996 Ch. 165* and the *Local Government Act, RSBC 2015 Ch. 1*. It will only be collected, used and disclosed for the purpose of administering matters with respect to planning, land use management and related services delivered, or proposed to be delivered, by the FVRD. Questions about the use of personal information and the protection of privacy may be directed to the FVRD Privacy Officer at 45950 Cheam Avenue, Chilliwack, BC V2P 1N6, Tel: 1-800-528-0061 FOI@fvrd.ca.

Addendum A: Minor Variance Application Supplemental Information

Date: May 21, 2019

Property

Folio 733 007001.155
Tax Account RPT-1092-2763
Legal Description Lot 155, NEW WESTMINSTER DISTRICT,
LEASE CULTUS LAKE PARK

Development Details

Property Size 24'10.5" X 65'
Property Zoning R-3 Waterfront Residential
Existing Use Residential
Proposed Development New residential home with minor variances

Proposed Minor Variation/Supplement

1. Parking

a. Current Bylaw:

- i. Parking space dimensions are specified in Section 3.13 of Zoning Bylaw No. 1375, 2016
 1. Two off-street parking spaces are required.

b. Minor Variance Request:

- i. We request a minor variance to build two side-by-side external parking spaces located in the front yard, with a total depth of 18 feet from the road right-of-way (*see building plans*).

c. Reasons in Support of Minor Variance Application:

- i. Appropriate outdoor parking is required on this property, and therefore we request a minor variance to build two side-by-side exterior off-street parking spaces at the front of the home.
- ii. R-3 Waterfront properties offer reduced property dimensions and have very small footprints to build on relative to the adjacent R-2 Urban Residential properties. To satisfy the required parking requirement, the main floor living space would need to be reduced by the area of two parking spaces, resulting in a disproportionately cramped main floor.

- iii. Health Canada recommends that vehicle parking should not be built within the footprint of a residential home to ensure residents are not exposed to dangerous benzene (carcinogen) vehicle emissions:
 - 1. The report from Health Canada can be found here:
<https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-benzene-residential-indoor-air.html>

d. Existing Examples of this Minor Variance:

- i. The majority of R-3 Waterfront properties exhibit identical parking examples, with external parking located in the front yard.

2. Basement

a. Current Bylaw:

- i. Clause 5.3.5.3 of Zoning Bylaw No. 1375, 2016
 - 1. The "Primary Uses" shall not be lower than 45.5 metres based on the Geodetic Survey of Canada.

b. Variance Request:

- i. We request a minor variance to build at 44.55 metres based on the Geodetic Survey of Canada a Geotechnically- and Structurally-Engineered Waterproofed Basement System (+/- covenants).
 - 1. The proposed Waterproofed Basement System has been used for many years in elevator pits and is time-tested to be durable and effective.

c. Reasons in Support of Minor Variance Application:

- i. R-3 Waterfront properties offer reduced property dimensions and have very small footprints to build on relative to the adjacent R-2 Urban Residential properties. To maximize living space and to accommodate storage, we request a minor variance to build a basement.

d. Existing Examples of this Variance:

- i. Within the past 11 years, five homes were built by our builder (WBW Construction) with Waterproof Basement Systems located below 45.5 metres elevation with no reported water leakages. The following properties were built with Waterproof Basement Systems below 45.5 metres in elevation:
 - 1. 110 First Avenue, Cultus Lake,
 - 2. 113 First Avenue, Cultus Lake.
 - 3. 143 First Avenue, Cultus Lake,
 - 4. 181 First Avenue, Cultus Lake, and
 - 5. 186 First Avenue, Cultus Lake,
- ii. Another builder is currently constructing a home designed with a Waterproof Basement System below 45.5 metres in elevation:

1. 172 First Avenue, Cultus Lake.

3. Storage, Basement Access & Setback Extension

a. Current Bylaw:

- i. Clause 5.3.4.5 of Zoning Bylaw No. 1375, 2016
 1. The underground portions of the basement walls are required to meet the setbacks for the dwelling (1.8m from the front lot line and 3.0m from the rear lot line).
 2. In-ground structures are permitted to be 0.3m from the property line.

b. Variance Request:

- i. We request a variance to build Basement Access & Storage similar to multiple other homes in the neighbourhood.

c. Reasons in Support of Minor Variance Application:

- i. Storage
 1. Generator Storage
 - a. Power outages are common at Cultus Lake especially in the winter when weather can be harsh.
 - b. Limited vehicular access to the Cultus Lake community occurs during winter ice storms, or other inclement weather conditions, causing undrivable roadways due to downed trees, snow, ice, etc.
 - c. We request a minor variance to build an accessible, sheltered storage area for an electric generator to provide power to the home during power outages.
 - d. The proposed gasoline-powered generator will be located in an outside, out-of-sight, sound-resistant, underground storage space.
 - e. This space will also allow for extra storage for daily living.
- ii. Storage & Access to the Basement
 1. The proposed basement space allows for some outdoor, covered storage with access to the home from the back (waterfront).

d. Existing Examples of this Minor Variance:

- i. In the past 11 years our builder (WBW Construction) has built two R-3 Waterfront homes with the above-referenced setback parameters:
 1. 143 First Avenue, Cultus Lake;
 - a. The basement exterior storage / basement access is located 5-feet from the property line.

- b. The lower covered area is located 1-foot (at grade) from property line.
 - 2. 186 First Avenue, Cultus Lake;
 - a. The basement exterior storage / basement access is located 1-foot from the property line.
 - ii. Several other R-3 Waterfront homes were built by other builders with the above-referenced setback parameters:
 - 1. 125 First Avenue, Cultus Lake;
 - a. The basement exterior storage / basement access is located 5-feet from the property line.
 - b. The lower covered area is located 1-foot (at grade) from property line.
 - 2. 136 First Avenue, Cultus Lake;
 - a. The basement exterior storage / basement access is located 5-feet from the property line.
 - 3. 172 First Avenue, Cultus Lake;
 - a. The basement exterior storage / basement access is located 1-foot from the property line.
 - iii. Other properties within the R-2 Urban Residential area (not waterfront) are found to have the same type of basement exterior storage / basement access:
 - 1. 217 First Avenue, Cultus Lake:
 - a. The basement exterior storage / basement access is located 1-foot from the property line.
 - 2. 248 First Avenue, Cultus Lake:
 - a. The basement exterior storage / basement access is located 1-foot from the property line.
 - 3. 260 Fir Street, Cultus Lake:
 - a. The basement exterior storage / basement access is located 1-foot from the property line.
 - 4. 263 Fir Street, Cultus Lake:
 - a. The basement exterior storage / basement access is located 1-foot from the property line.
 - 5. 304 Second Avenue, Cultus Lake:
 - a. The basement exterior storage / basement access is located 1-foot from the property line.
 - 6. 373 Cedar Street, Cultus Lake:
 - a. The basement exterior storage / basement access is located 1-foot from the property line.

- iv. Other examples of this basement building technique are found in some older homes in the neighbourhood but were excluded to highlight examples of homes built in the past 11 years.

Concluding remarks:

1. Until recently, the past interpretation of the building bylaws allowed for R-3 Waterfront structures to incorporate the above-mentioned building elements; variances were not necessary.
2. We respect the variance application process and also the authority of Cultus Lake Parks Board and the FVRD. We feel these minor variances are in keeping with the established built form at Cultus Lake, and believe these requests represent reasonable building practice.
3. This proposed home will improve taxation revenue and is designed to bring aesthetic beauty and functional value to the community.

We are very happy to meet with the authorities and present the variance application details in person. Thank you for your consideration.

Sincerely,



Gwyllyn S. Goddard

November 28, 2019

Letter of Support - Neighbourhood Circulation

Introduction

My name is Gwyllyn Goddard and I am your neighbour living at 155 1st Avenue, Cultus Lake. I moved to the lake in 2010 after opening a family medical practice in Chilliwack. Cultus Lake offered me the peaceful, sheltered, natural space I craved after moving from Downtown Vancouver. As a kid, I grew up in a tiny, safe Saskatchewan community with friendly prairie neighbours. The Cultus Lake community seemed to resonate with the values I grew up with and it has helped me feel connected to my roots. Soon after moving into the neighbourhood, I met a local social worker, the woman who is now my wife (Erin). Together we have come to enjoy friendships in this amazing community. Erin and I decided to make Cultus Lake our home and, with a little luck, we will raise our future children here as well.

Our Distressed Cabin

Our house is a small cabin built in the 1930's on a narrow lot that was hastily built on a wood foundation. This cabin rests partially on wet soil with a large portion of one side making use of a massive cedar tree stump for stability. Unfortunately, age is catching up with this little cabin and we are no longer able to give it everything it needs to prevent wood-rot and disintegration. The foundation, along with the tree stump have decomposed to the extent that it requires complete replacement. Carpenter ants are gradually destroying the infrastructure. The winter months are also very hard because the uninsulated cabin loses heat faster than my fireplace can supply it. The cabin must be replaced with a home that will serve my family. A few years ago I began thinking of ways to transform my house and, in so doing, give back to this community by designing a home that will honour the origins of this cabin and pay tribute to the spirit of this vibrant community.

The Vision

Please see attached: *Addendum - Goddard Home Diagrams & Images.*

Last year we finished designing a 3-bedroom home that we feel is perfect for our small family. It is a modest 847 sq ft. per level (2,541 sq ft total) including a walkout basement facing the lake. Close attention has been paid to the building materials and the quality of the craftsmanship. The new foundation is to be excavated to accommodate a little more living space with basement. During the redesign process, we improved the parking situation that, in its current form, does not have enough room to park even one vehicle on the property. Should our proposal be accepted, my wife and I will no longer have to park one car lengthwise on 1st Avenue. Our design wisely allows three cars to park perpendicular to 1st Avenue using a 40/60 split, with 40 percent of the vehicle parking on private property and 60 percent overlying the Cultus Lake Park road right-of-way. This parking design is sensible, especially considering that the area facing 1st Avenue will only ever be used for vehicles or a driveway.

Variance Requests

Please see attached: *Addendum - Goddard Home Diagrams & Images*.

1. *Flood Construction Level Reduction*

The recently updated Zoning Bylaw requires all new houses be built no lower than 45.5 metres based on the Geodetic Survey of Canada.

My proposed basement requires a relaxation to be slightly lower than the permitted flood level for a house along the lakefront. The flood construction levels for Cultus Lake are set by the Province requiring the Fraser Valley Regional District (FVRD) Board to consider the effect on public safety and liability prior to making a decision regarding a proposed reduction to the flood construction level.

Proposal:

We request a variance to build at a depth of 44.55 metres (0.95 metre or 2.95 ft deeper than allowed). This extra depth will allow me to build a proper basement increasing the living space and adding storage instead of building a crawl space. A Geo-Hazard Assurance Assessment was performed on August 22, 2019 by Madrone Environmental Services Ltd. and concluded that an appropriately engineered basement will not create a natural hazard risk to this, or any other surrounding properties. This report was required by the Fraser Valley Regional District prior to variance approval. Up until very recently, these extensive reports were not required, but are now standard.

2. *Walkout Basement Relaxation*

Due to a recent zoning bylaw amendment, a walkout basement requires a relaxation prior to receiving building permit approval.

Proposed Remedy:

I will have a qualified engineer design a walkout basement that is suitable for a house alongside Cultus Lake. Most new houses along the lake enjoy walkout basements.

3. *Parking Relaxation*

Due to the new building bylaw requirements legislated by the FVRD, my proposed house requires two off-street parking spaces. The site plan

demonstrate what my proposed house will look like if a double attached garage, as required by the FVRD, is constructed.

Proposal:

It is not my intention to build a new house, only to have a double-car garage consume over half the main floor living space. The new parking bylaw does not make sense for lake front properties. The majority of the lakefront front homes built before 2018 incorporate a sensible parking standard. As such, I am requesting a parking relaxation to build three side-by-side external parking spaces located in the front yard, with a total depth of 18 feet from the road right-of-way. This will allow three cars to park perpendicular to 1st Avenue using a 40/60 split, with 40 percent of a vehicle parked on private property and 60 percent overlying the Cultus Lake Park road right-of-way. The result will be three vehicles parked completely off 1st Avenue. The majority of R-3 Waterfront properties exhibit identical parking examples, with external parking located in the front yard.

Conclusion:

Cultus Lake residents may be surprised to learn that new FVRD bylaws require anyone building a house with front-yard parking must first seek approval from three separate levels of government. The variance application process is complex, long and expensive. In the fall of 2018, the CLPB instructed the FVRD to amend the waterfront bylaw due to our unusually narrow lots, the long, wide and straight street already used for parking, and an absence of alley access.

Amending the parking bylaw might not occur for years because it requires that the FVRD fund a parking assessment. Recommendations from this study must pass three separate levels of government prior to becoming law. As yet, there are no plans for the FVRD to address the Cultus Lake waterfront parking problem. Meanwhile, anyone living on 1st Avenue is unable to redesign, renovate, or build a home unless they turn their main floor into a garage, or attempt to get a variance approved.

As part of my variance application process, I am asking you to review, discuss, and also ask questions about our new house proposal. The Cultus Lake Advisory Planning Commission (APC) and the FVRD would like to see support from our neighbours. The Planning Commission is scheduled for **December 18, 2019**. Our family values your signature of support. Thank you for your help!

Sincerely,

Gwyllyn & Erin Goddard
155 1st Avenue
(604) 799-3390

[illegible]

[illegible]

Page 2 of 6

[illegible]

Page 3 of 6

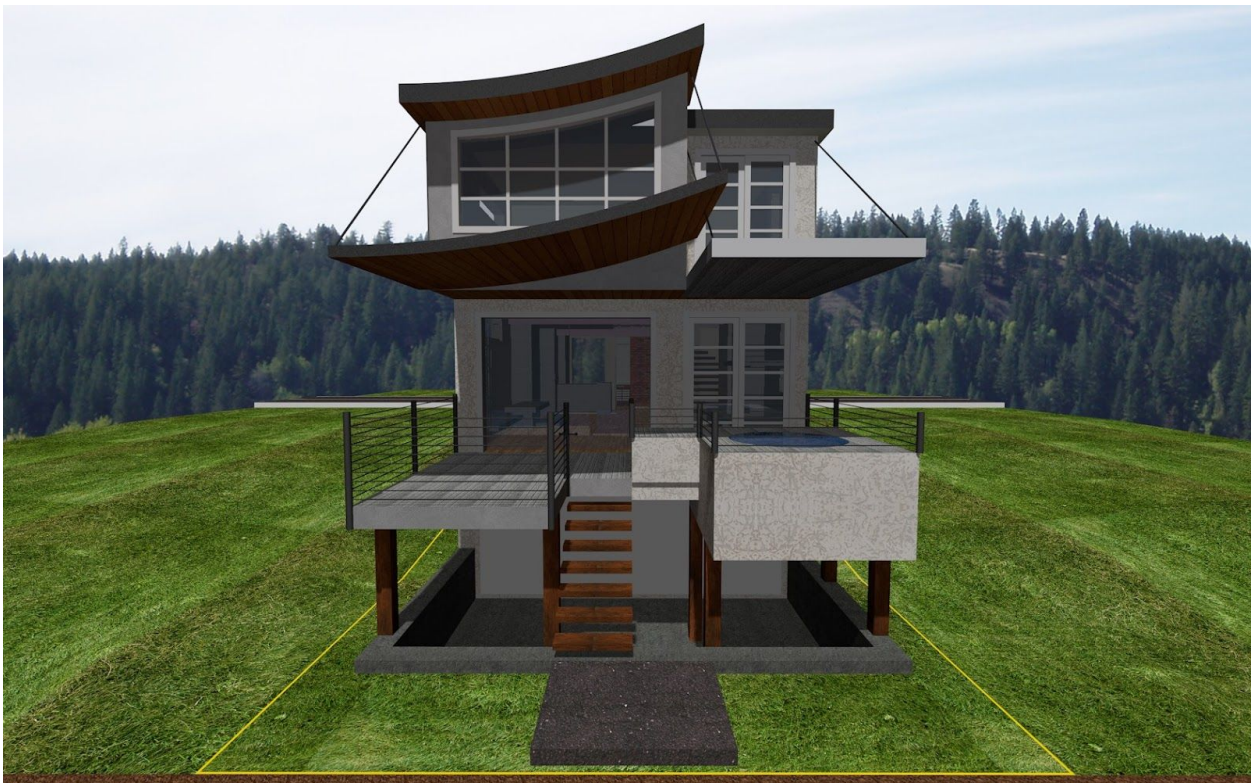
Addendum - Goddard Home Diagrams & Images



Addendum - Goddard Home Diagrams & Images



Addendum - Goddard Home Diagrams & Images



December 9, 2019

Hello!

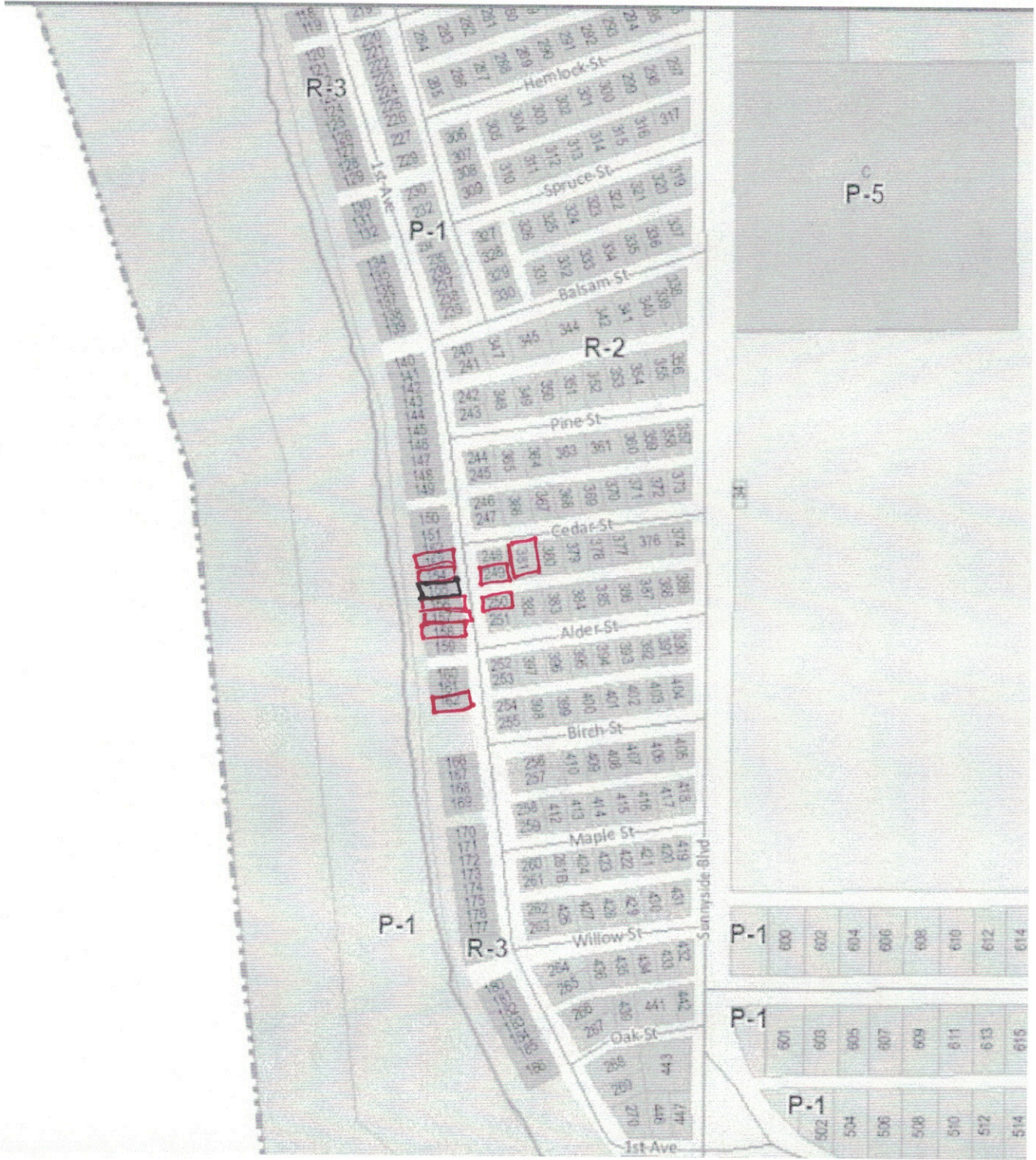
Most property owners are missing from Cultus Lake at this time of year. That said, we were able to get in touch with some of the home owners to discuss our request for bylaw variances.

Of those home owners who understand our variance application, 100% were supportive and were also surprised that these variances would not be granted as common sense. See the attached image of the map identifying the homes of home owners who support our variance requests. See the signed attached support letter. This represents 100% acceptance and support from 100% of the people we were able to speak to:

1. 153 1st Avenue – waterfront, two doors down from to 155 1st Avenue
2. 154 1st Avenue – waterfront, next door to 155 1st Avenue
3. 249 1st Avenue – across the street from to 155 1st Avenue
4. 250 1st Avenue – across the street from to 155 1st Avenue
5. 156 1st Avenue – waterfront, two doors down from to 155 1st Avenue
6. 157 1st Avenue – waterfront, three doors down from to 155 1st Avenue
7. 158 1st Avenue – waterfront, four doors down from to 155 1st Avenue
8. 162 1st Avenue – waterfront, two doors down from to 155 1st Avenue
9. 381 Cedar Street – intersecting , two doors down from to 155 1st Avenue

Thanks,

Gwyllyn S. Goddard
+1-604-799-3390



Goddard Family Home

Letter of Support - Neighbourhood Circulation

Signature Page

Full Name: BRIAN HUNTER

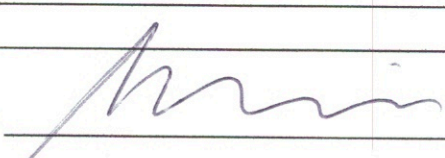
Home Address: 249 FIRST AVE CULTUS LAKE BC V2R 4Z2

Telephone Number: 778 855 3030

Email Address: wwpints@shaw.ca

- ☒ I fully support the proposed relaxations
☐ I support the proposed relaxations with conditions
☐ I do not agree with the proposed relaxations

Comments:

Signature: 

Thank you for your support, Neighbour!

Please call me if you have questions, comments, or concerns?

Gwyll: (604) 799-3390

Goddard Family Home

Letter of Support - Neighbourhood Circulation

Signature Page

Full Name: IAN HUNTER

Home Address: 10840 SEAMOUNT RD RICHMOND V7A 4A6

Telephone Number: (604) 230-4830

Email Address: i.hunter@telus.net

- ☒ I fully support the proposed relaxations
☐ I support the proposed relaxations with conditions
☐ I do not agree with the proposed relaxations

Comments: ➔ 250 1ST AVENUE

Signature: Ian Hunter

Thank you for your support, Neighbour!

Please call me if you have questions, comments, or concerns?

Gwyll: (604) 799-3390

Goddard Family Home

Letter of Support - Neighbourhood Circulation

Signature Page

Full Name: GORDON CAMPBELL

Home Address: 162 FIRST AVENUE, CULTUS LAKE

Telephone Number: 604-426-0116

Email Address: ~~gpc~~ gcpc@shaw.ca

- ☒ I fully support the proposed relaxations
☐ I support the proposed relaxations with conditions
☐ I do not agree with the proposed relaxations

Comments:

THE NEW PARKING REGULATIONS ARE
REDICULOUS. GOOD LUCK WITH YOUR VARIANCE.
I FULLY SUPPORT YOUR PROPOSAL

Signature: Gord Campbell

Thank you for your support, Neighbour!

Please call me if you have questions, comments, or concerns?

Gwyll: (604) 799-3390

Goddard Family Home

Letter of Support - Neighbourhood Circulation

Signature Page

Full Name: Dereeth Campbell

Home Address: 162 First Ave, Cultus Lake

Telephone Number: 604-426-0116

Email Address: clercamp@shaw.ca

- ☒ I fully support the proposed relaxations
☐ I support the proposed relaxations with conditions
☐ I do not agree with the proposed relaxations

Comments:

The new parking regulations make absolutely no sense. They need to be amended to support current off street parking as is currently happening (or has happened in the past).
Space is crucial here both for basements + parking. I support these 2 scenarios

Signature: Dereeth Campbell

Thank you for your support, Neighbour!

Please call me if you have questions, comments, or concerns?

Gwyll: (604) 799-3390

Goddard Family Home

Letter of Support - Neighbourhood Circulation

Signature Page

Full Name: Kathalin Taylor

Home Address: 153 1st Ave Cultus Lake BC, V2R4Z2

Telephone Number: 604-819-0101

Email Address: kathie-taylor@hotmail.com

- ☒ I fully support the proposed relaxations
☐ I support the proposed relaxations with conditions
☐ I do not agree with the proposed relaxations

Comments:

Looking forward to the project!

Signature: Kathalin Taylor

Thank you for your support, Neighbour!

Please call me if you have questions, comments, or concerns?

Gwyll: (604) 799-3390

Goddard Family Home

Letter of Support - Neighbourhood Circulation

Signature Page

Full Name: LISA HENNAN

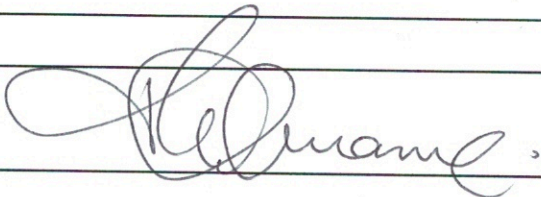
Home Address: 154 1ST AVE

Telephone Number: 778-267-0667

Email Address: lisa.hennan@yahoo.ca

- ☒ I fully support the proposed relaxations
☐ I support the proposed relaxations with conditions
☐ I do not agree with the proposed relaxations

Comments:

Signature: 

Thank you for your support, Neighbour!

Please call me if you have questions, comments, or concerns?

Gwyll: (604) 799-3390

Goddard Family Home

Letter of Support - Neighbourhood Circulation

Signature Page

Full Name: D. RICHARD WENHAM

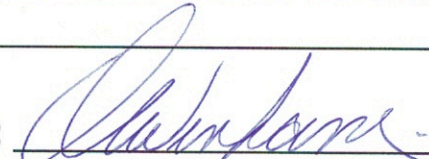
Home Address: 157 1st AVE.

Telephone Number: 604-795-0827

Email Address: DRWENHAM48@GMAIL.COM

- ☒ I fully support the proposed relaxations
☐ I support the proposed relaxations with conditions
☐ I do not agree with the proposed relaxations

Comments:

Signature: 
D. Richard Wenham

Thank you for your support, Neighbour!

Please call me if you have questions, comments, or concerns?

Gwyll: (604) 799-3390

Goddard Family Home

Letter of Support - Neighbourhood Circulation

Signature Page

Full Name: Gary Baker

Home Address: 381 Cedar St., Cultus Lake

Telephone Number: 604-858-4928

Email Address: garywbaker@shaw.ca

- ☒ I fully support the proposed relaxations
☐ I support the proposed relaxations with conditions
☐ I do not agree with the proposed relaxations

Comments:

Not related to the requested 'relaxations'!
A member of our household has asthma
and is very sensitive to smoke. The proposed
building appears to have a wood fireplace.
This we do not support. Please replace
with a gas fireplace!

Signature: Gary Baker

Thank you for your support, Neighbour!

Please call me if you have questions, comments, or concerns?

Gwyll: (604) 799-3390

Goddard Family Home

Letter of Support - Neighbourhood Circulation

Signature Page

Full Name: Sheryl Henderson

Home Address: 381 Cedar St.; Cultus Lake


Telephone Number: 604-858-4928

Email Address: sheryl.henderson@shaw.ca

- ☒ I fully support the proposed relaxations
☐ I support the proposed relaxations with conditions
☐ I do not agree with the proposed relaxations

Comments:

I do support the proposed relaxations as requested by Gwyllyn Toddard. However, I do not support a wood burning fireplace, which is shown in his building plans. This would contribute to air pollution and affect those of us in the neighbourhood with respiratory problems. Moreover, it is my understanding that wood burning fireplaces are not allowed in new houses at Cultus Lake.

Signature: 
Nov. 30, 2019

Thank you for your support, Neighbour!

Please call me if you have questions, comments, or concerns?

Gwyll: (604) 799-3390

Goddard Family Home

Letter of Support - Neighbourhood Circulation

Signature Page

Full Name: BRIAN E JEWEL PAULS

Home Address: 158 1ST AOE CACTUS LK.

Telephone Number: 604 991 6969

Email Address: brianpauls@icloud.com

- ☒ I fully support the proposed relaxations
☐ I support the proposed relaxations with conditions
☐ I do not agree with the proposed relaxations

Comments:

THE PROPOSED PLAN MAKES TOTAL SENSE.

Signature: 

Thank you for your support, Neighbour!

Please call me if you have questions, comments, or concerns?

Gwyll: (604) 799-3390

Goddard Family Home

Letter of Support - Neighbourhood Circulation

Signature Page

Full Name: Elma Pauls

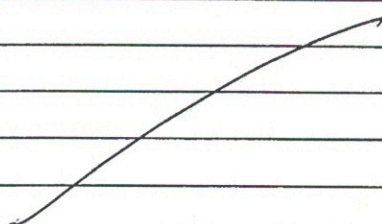
Home Address: #156 - 1st Avenue, Cuthbert Lake
5395 Sumas Prairie Rd, Chilliwack,

Telephone Number: 604-302-2210

Email Address: lepauls@shaw.ca

- ☒ I fully support the proposed relaxations
☐ I support the proposed relaxations with conditions
☐ I do not agree with the proposed relaxations

Comments:



Signature: E. Pauls

Thank you for your support, Neighbour!

Please call me if you have questions, comments, or concerns?

Gwyll: (604) 799-3390



GEO-HAZARD ASSESSMENT

155 1 Avenue, Cultus Lake, BC

FOR:

**Gwyllyn Goddard
155 1 Avenue
Cultus Lake, BC V2R 4Z2**

BY:

**Roberta Adams, M.Sc., P.Geo.
Madrone Environmental Services Ltd**

August 22, 2019

MADRONE ENVIRONMENTAL SERVICES LTD.
#202-2790 GLADWIN ROAD • ABBOTSFORD • BC • V2T 4S7
TEL 604.504.1972 • FAX 604.504.1912 • WWW.MADRONE.CA

DOSSIER: 19.0291

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GEO-HAZARD ASSESSMENT

155 1 Avenue, Cultus Lake, BC

1 Introduction

As requested by Mr. Gwyllyn Goddard (the 'Client') Madrone Environmental Services Ltd. ('Madrone') performed a geo-hazard assessment of 155 1st Ave, Cultus Lake, BC (the 'Land' or 'Property' or 'Site'), PID 000-823-139.

The Land is situated within a development permit area identified in the Fraser Valley Regional District (the 'City') Official Community Plan (OCP) Bylaw, 2011, No. 1115. Among other things, the District wishes to protect existing and future development from natural hazards such as potential instability of adjacent slopes and flooding.

1.1 Scope and Objectives

We understand that the proposed development will include a single-family dwelling, and as such, a development permit and associated FCL variance is being sought. Municipal policies and EGBC guidelines requires that any new development on properties subject to or likely to be subject to geotechnical hazards requires a geotechnical hazard assessment to characterize the hazards, estimate their probability of occurrence, and provide a professional opinion that development is safe for the use intended if mitigation measures are incorporated.

We prepared this report in accordance with the guidelines for geotechnical hazard assessments as described in:

- 1 Fraser Valley Regional District Floodplain Bylaw No. 0681;
- 2 Hazard acceptability thresholds for development approvals by local government (Cave, 1993);

- 3 Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC (APEGBC, 2010); and
- 4 Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC (APEGBC, 2018).

This geotechnical hazard assessment is limited to the property at 155 1st Ave, Cultus Lake, BC. The scope of this report does not extend to other properties; however, we considered the potential for hazards from adjacent areas to affect the subject property.

1.2 Methods

The objective of this assessment is to determine if there are hazards surrounding the property that present a hazard to the proposed dwelling. Our method involves a detailed description of the surficial geology and geomorphology of the site, with a particular focus on slope processes and flooding hazards.

Our geo-hazard analysis involved the review and characterization of the geo-hazards that may affect the Property, followed by a subjective quantitative estimate (e.g. range of annual probability of occurrence) of the geo-hazards. These estimated ranges are then compared to the safety thresholds presented in the revised 1993 report¹ by Dr. Peter Cave, which has been formally adopted by the District of Mission. We consider the Cave (1993) criteria to be an appropriate guideline for risk acceptability in this assessment. Based on these criteria the proposed development is considered a 'New Building' for our hazard criteria.

We have collected and reviewed appropriate background information, conducted fieldwork on and beyond the Property, and considered changed conditions (i.e. climate and land use). For geo-hazard analysis, we have reviewed, characterized, and estimated geo-hazards that may affect the Property, namely, possible slope instability above and below the proposed dwelling location. We have described the method of geo-hazard analysis used, referred to an appropriate and identified regional guideline for levels of geo-hazard safety, compared this guideline with the findings of our investigation, made a finding on the levels of safety on the Property based on the comparison, and made recommendations to reduce geo-hazards.

Roberta Adams visited the site on August 15, 2019 to conduct the site assessment, traversing the area surrounding the property. The area was measured with clinometer, measuring tape, and compass, surficial soil was classified, photographs and GPS placemarks were added to a handheld device. In

¹ Cave, P. W. (1993). Hazard Acceptability Thresholds for Development Approvals by Local Government. *British Columbia Geologic Hazards Workshop, February 20 & 21, 1991.*

particular, we recorded detailed observations of geologic evidence (or lack of evidence) of past flooding.

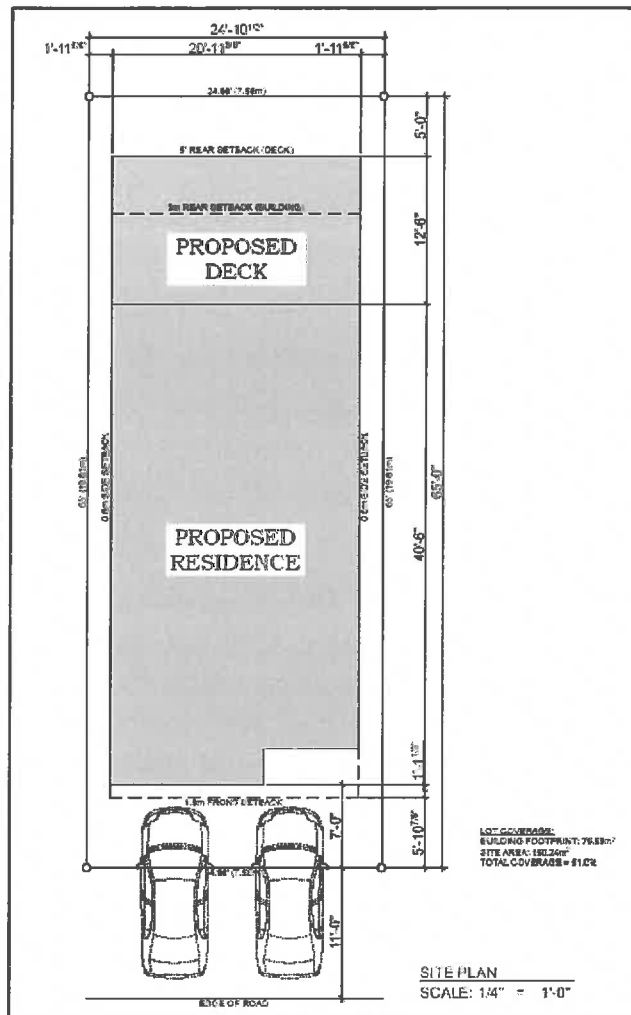


FIGURE 1: PROPOSED DEVELOPMENT, AS PROVIDED BY THE CLIENT, JULY 2019.

2 Background Information

For this assessment, we collected and reviewed:

- iMapBC²
- Air photos from 1940 to 2016 via UBC's Geographic Information Centre
- Previous reports and studies
- FVRD Webmap³
- Surficial Geology Map⁴
- Climate data⁵
- Seismic data⁶

2.1 Air Photo Analysis

As part of our assessment, we reviewed aerial photographs (air photos) available via the University of British Columbia Geographic Information Centre⁷. The photos dated back to 1940, but vary widely in quality, resolution and scale. Having the stereo-pairs (adjacent photos along a flight line) allowed viewing in three dimensions. The purpose is to track the timing of local developments, identify landsliding, or other past instability in the general vicinity of the property, as well as find features that may not be clearly visible during field assessments.

² Government of British Columbia. (updated 2015, September 3). *iMapBC 2.0*. Retrieved from <http://maps.gov.bc.ca/ess/sv/imapbc/>

³ Fraser Valley Regional District. *Fraser Valley Regional District Webmap*. Retrieved from <http://www.fvrd.ca/EN/main/services/mapping/regional-information-map.html>

⁴ Armstrong. (1977). *Surficial Geology, Chilliwack (West Half), British Columbia*. Geological Survey of Canada, Map 1487A. Scale 1:50 000. http://ftp.maps.canada.ca/pub/nrcan_rncan/publications/ess_sst/108/108875/gscmap-a_1485a_e_1980_mn01.pdf

⁵ Environment Canada. (modified January 25, 2017). *1981 - 2010 Climate Normals and Averages - Normals*. Retrieved from http://climate.weather.gc.ca/climate_normals/index_e.html

⁶ Natural Resources Canada. (modified 2017, February 10). *2015 National Building Code of Canada seismic hazard calculator*. Retrieved from http://www.earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/index_2015-en.php

⁷ <https://gic.geog.ubc.ca/> Geographic Information Centre - University of British Columbia.

TABLE 1: AIR PHOTO INTERPRETATION FOR AREA SURROUNDING SUBJECT PROPERTY.

Photo Number(s)	Year Taken	Interpretation
BC207:40	1940	Development along Cultus Lake. Debris slide off forestry road north of Lake on Vedder Mnt.
BC721:83-84	1949	Increased development along shore, small debris slides (raveling) off of forestry road on western bank.
BC1683:6	1959	No notable changes beyond the continued development of area (NN)
BC5065:237-236	1963	NN
BC5318:128-129	1969	Earthworks, logging on site NW of lake tip.
BC5584:64-63	1974	NN
BC78130:253-252	1978	NN
BC83013:112-113	1983	NN
BCC451:213-214	1986	NN
BCB93026:125-126	1993	Ascaphus Creek fan is more exposed, less trees but no sign of debris flow; maybe cleared for recreational use.
BCC96085:32-31	1996	NN
SRS6912:156	2004	Debris on Ascaphus Creek fan, but no change to size.
BCD16415:394-393	2016	NN

2.2 Previous Studies

At the time of publication, we were unable to find any geotechnical reports for similar developments in this area of Cultus Lake, however we were able to review larger regional studies. The following studies were reviewed:

- Geotechnical assessment of slope stability in the Chilliwack Valley, report to Regional District of Fraser Cheam; Thurber Consultants Ltd, June 30th, 1988.
- Emergency response to October 16-18 landslide and flood events near Cultus Lake and in Hatzic Valley; Thurber Engineering Ltd, October 31st, 2003.
- Geotechnical investigation and report, proposed 42 lot development VGES project number 42906 – 04; Valley Geotechnical Engineering Services Ltd, October 31st 2008.
- 2006 Frost Creek fan hazard zones - updated hazard zones at Lindell Beach; northwest hydraulic consultants, July 25th, 2011.
- Climate change impacts on eutrophic lake - Cultus Lake, British Columbia, Canada; Mark Gregory Sumka, Thesis, UBC August 2017.

- Groundwater conditions of the Columbia Valley aquifer, Cultus Lake BC; Mark Zubel, Ministry of Environment, Lands, Parks and Water Management, January 2000.
- Cultus Lake underwater habitat assessment and water quality surveys 2005 final data report; Kynoch Resources, April 2005.
- Cultus Lake watershed numerical groundwater flow model; Shannon Holding and Dr. Diana Allen, SFU, January 2012, prepared for the Department of Fisheries and Oceans Canada.
- Chilliwack River hazard management study interim report; Hay & Company Consultants Inc July 1992.

3 Location Description and Observations

The property is located approximately 10 km due southwest of the City of Chilliwack town center, on the west bank of Cultus Lake in the Columbia Valley. The approximate (unverified) elevation is 45 to 47 m above sea level (a.s.l.).



FIGURE 2: OVERVIEW OF REGION, SUBJECT PROPERTY PINNED IN YELLOW. FROM GOOGLE EARTH PRO.

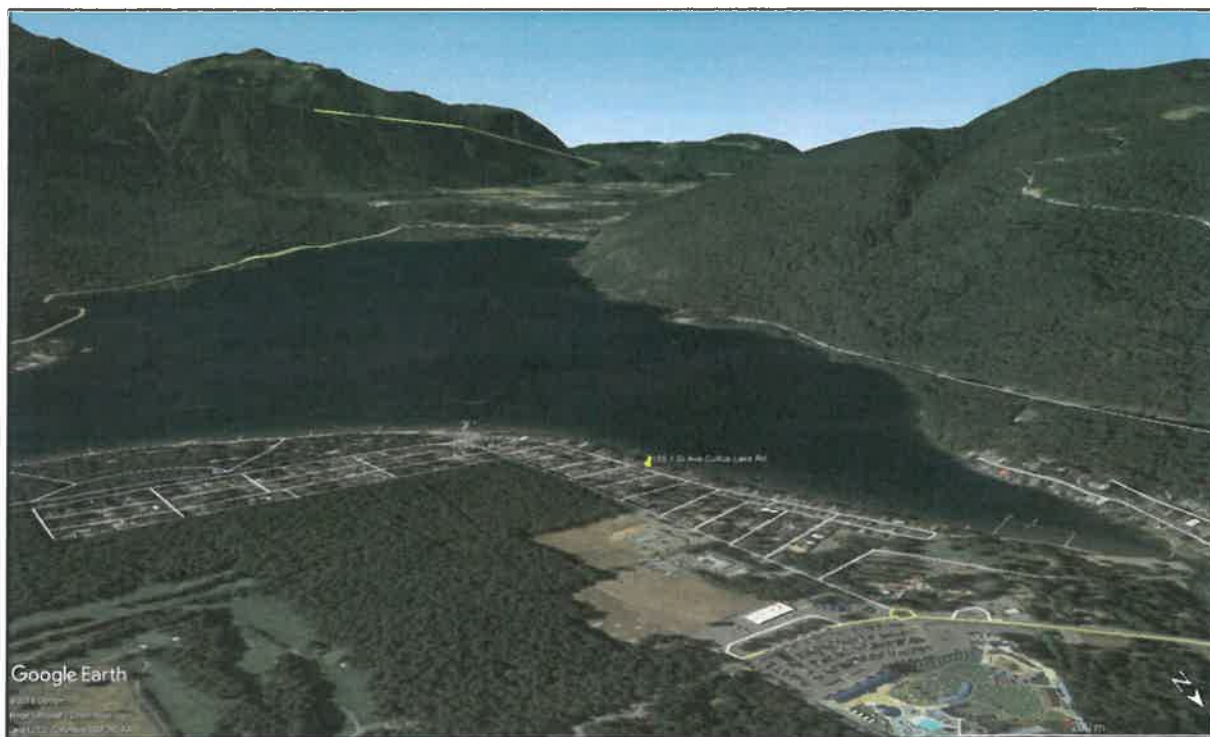


FIGURE 3: PERSPECTIVE VIEW OF SUBJECT PROPERTY, LOOKING SOUTHEAST. FROM GOOGLE EARTH PRO.

3.1 Geology

Bellefontaine et al (1994)⁸ mapped the bedrock geology of the area as Upper Jurassic Kent Formation sedimentary rocks, locally consists of conglomerates and coarse clastics; however, no bedrock outcrops were observed on the subject property.

The surficial geology in the area is Sumas Drift age outwash gravel and sand up to 10+ m thick [Sa]. Further up the valley is mapped as [SAj] postglacial Salish Sediments, mainly channel gravel and minor sand up to 10+ m thick.⁹

Well data from the surrounding area is consistent with the mapped geology and field observations, the majority documenting sand and gravel and cobbles (wells #52963 and 98912)¹⁰.

⁸ Bellefontaine, K., Alldrick, D. and Desjardins, P.J., 1994:

http://webmap.em.gov.bc.ca/mapplace/minpot/bedrock_publications.asp?NTS=103

⁹ Armstrong, J E. Geological Survey of Canada, "A" Series Map 1487A, 1977, 1 sheet, 1:50,000 .

¹⁰ Groundwater Wells and Aquifers: Well Summary <https://maps.gov.bc.ca/ess/hm/imap4m/>

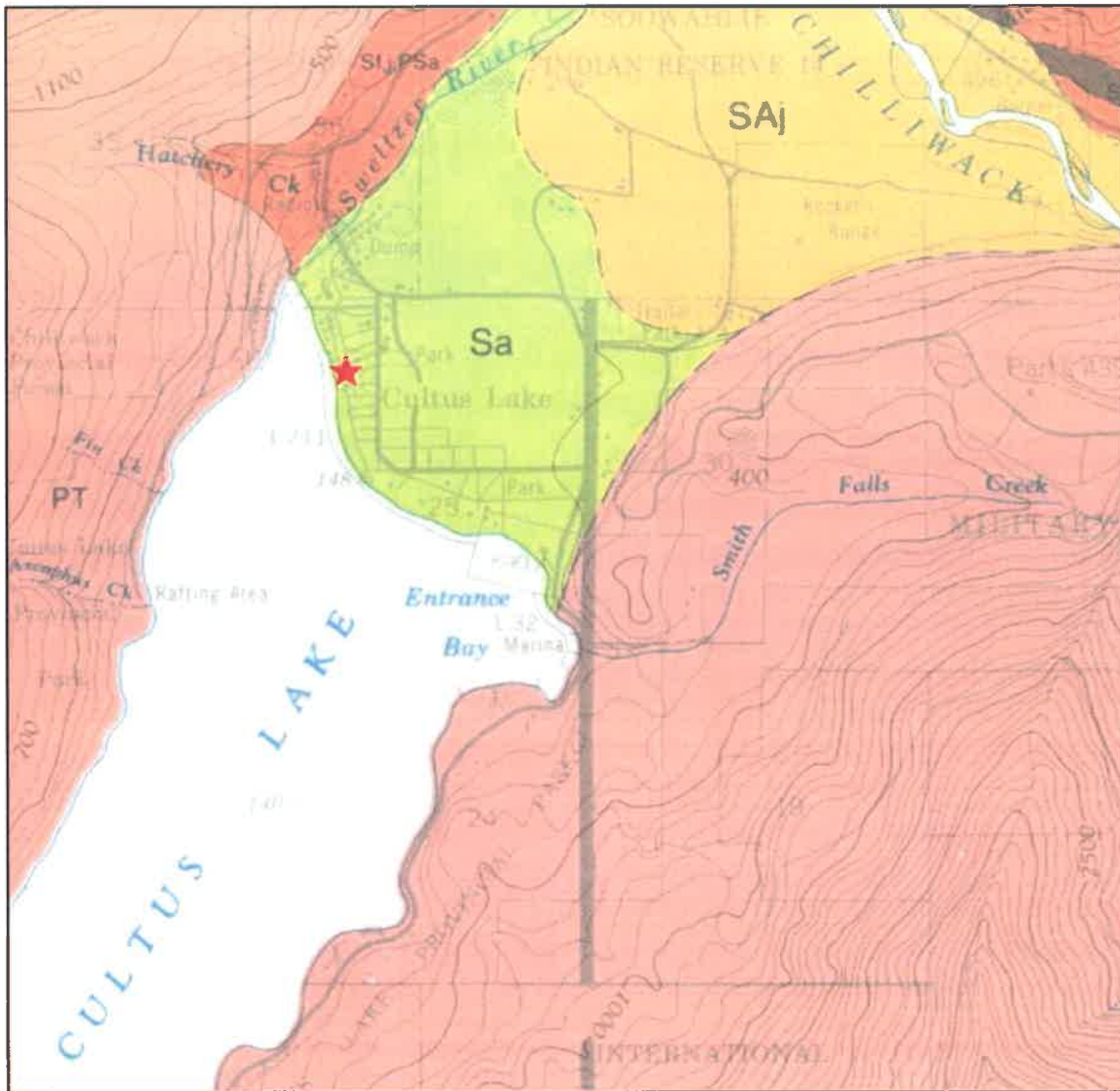


FIGURE 4: SURFICIAL GEOLOGY OF THE AREA, FROM ARMSTRONG (1977). RED STAR IN APPROXIMATE LOCATION OF SUBJECT PROPERTY.

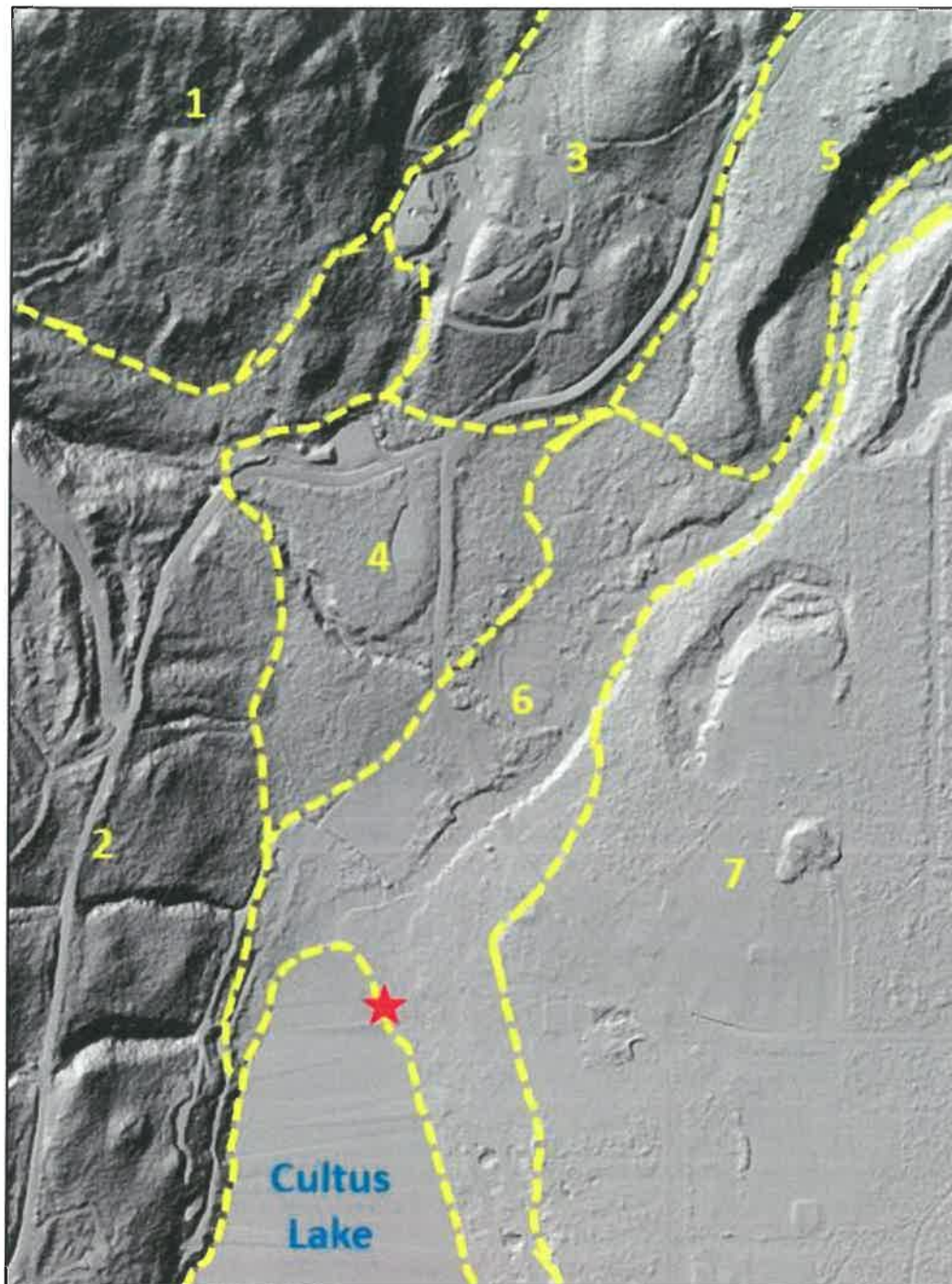


FIGURE 5: SURFICIAL GEOLOGY AND GEOMORPHOLOGY FROM CITY OF CHILLIWACK 1 M RESOLUTION LIDAR.

1= hummocky bedrock, 2= colluvium veneers over bedrock, 3= colluvial mantels, 4= alluvialfan, 5= glacial washed till, 6= fluvial sediments, 7= glaciofluvial sediments. For demonstration purposes only.

3.2 Hydrology and Climate

Climatic conditions at the Property are likely very similar to those recorded at the nearest Environment Canada weather station (i.e. 'Chilliwack, at 11 m elevation')¹¹. During the period 1981-2010, the mean annual precipitation was 1667 mm including a mean annual snowfall of 85 cm, while extreme daily precipitation was 122 mm on Dec 29, 1979. Snow accumulation will be slightly higher due to the elevation difference between the station and the property.

Cultus Lake has input flow from a series of mountain streams from Vedder Mountain to the east and International Ridge to the west. The three major inputs are Frosst Creek, Watt Creek, and Smith Falls Creek; whereas there is only one major outflow stream, Sweltzer Creek, which flows north towards Chilliwack River at a gradient of 0.005¹².

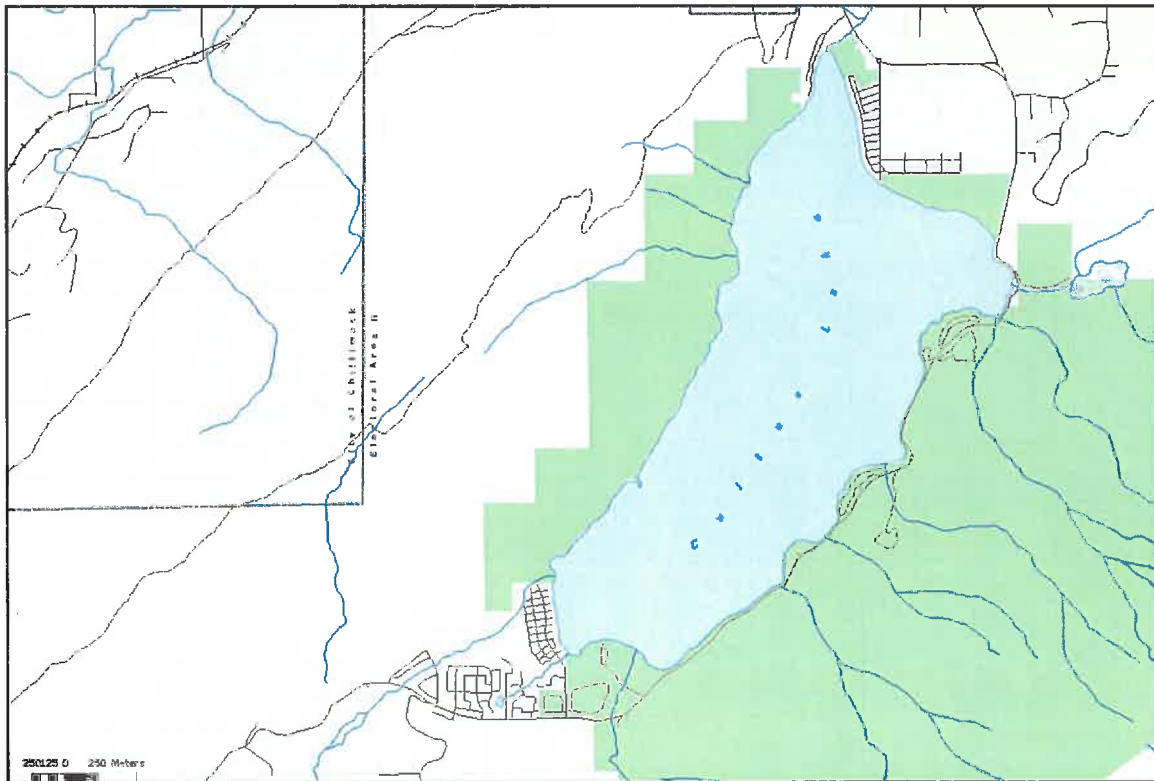


FIGURE 6: HYDROLOGY IN THE AREA, FROM FVRD WEBMAP.

¹¹ Canadian Climate Normals, http://climate.weather.gc.ca/climate_normals/index_e.html

¹² <https://open.library.ubc.ca/cIRcle/collections/ubctheses/24/items/1.0354396>



FIGURE 7: MAPPED STREAMS AND WATER WELLS WITHIN THE SUBJECT PROPERTY AREA. FROM IMAPBC.

3.3 Field Observations

The subject property is located on the eastern side of Cultus Lake near the northern tip. There is an existing house on site; it currently is in line with the majority of existing houses along 1st Avenue. The house utilizes the majority of the parcel, therefore hand-dug pits were dug along the eastern property boundary in the only area available for digging, to determine if there is evidence of past flooding from Cultus Lake.

The pits exposed interbedded sands and gravels of various size, which is consistent with the glacial history of the area. Within the A and B Horizon, I did not see any evidence of recent sediments deposited by flooding of the lake. The easternmost property boundary is approximately 10 m from the shoreline of Cultus Lake.

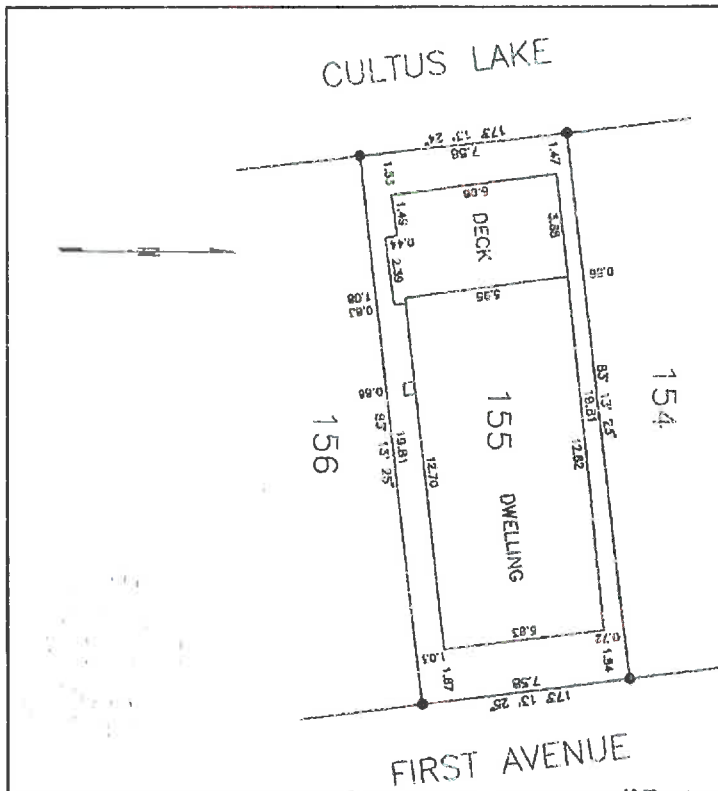


FIGURE 8: MOST RECENT SURVEY ON RECORD, FROM CULTUS LAKE PARK BOARD.



PHOTO 1: PITS DUG RELATIVE TO PROPERTY'S WESTERN BOUNDARY.



PHOTO 2: LOOKING AT PROPERTY FROM EDGE OF CULTUS LAKE, FACING EAST.

4 Geomorphic Hazards

In 1993, Dr. Peter Cave, then Director of Planning for the Regional District of Fraser-Cheam, published a report¹³ recommending levels of (geo)hazard acceptability for development approvals by local government. These levels of geo-hazard safety have been formally adopted by the Fraser Valley Regional District; therefore, we will refer to these criteria for level of geo-hazard safety.

Cave distinguished the following geo-hazards based on their effects:

- 1** inundation by flood waters,
- 2** mountain stream erosion and avulsion,
- 3** debris flows and debris torrents,
- 4** debris floods,
- 5** small-scale, localized landslides,

¹³ Cave, P. W. (1993). Hazard Acceptability Thresholds for Development Approvals by Local Government. *British Columbia Geologic Hazards Workshop, February 20 & 21, 1991.*

- 6 snow avalanches,
- 7 rock fall,
- 8 massive catastrophic landslides, and
- 9 river erosion and avulsion.

Cave identified five municipal responses to a development permit application, ranging from outright refusal, through approval with various conditions, to unconditional approval. He also distinguished seven types of proposed development ranging from minor renovation to major rezoning. Then, for each type of geohazard and each type of development permit, he specified the appropriate municipal response to various ranges of the geohazard's probability of occurrence.

For this purpose of this report, we have combined each applicable type of geo-hazard and the types of approval to form a matrix for the type of proposed development, which is a new building. After reviewing air photos, previous geotechnical reports, and conducting a field assessment, we believe the property is subject to inundation by floodwaters as described in Cave (1993); further analysis is presented below.

In the assessed area and under reasonably foreseeable conditions (including climate change and seismic events), it is our opinion that the property is not subject to any of the other hazards identified by Cave, and they are therefore not analyzed further in this report.

One hazard that may be applicable to the property that was not reviewed due to the scope of work is the effects of a landslide from Vedder Mountain into Cultus Lake (also known as a landslide-induced tsunami). While this is a known hazard in other lakes in the lower mainland i.e. Harrison Lake, we did not find any research related to this hazard for Cultus Lake and are therefore unable to estimate the effects of such a hazard on the development at this time.

TABLE 2: ACCEPTABLE ANNUAL HAZARD PROBABILITIES FOR NEW BUILDING

	Approval without conditions ¹⁴	Approval without conditions, but with covenant ¹⁵	Approval, but with siting or protective requirements ¹⁶	Approval, but with covenant and with siting or protective requirements ¹⁷	Not approvable
	— Increasing probability of occurrence →				
Inundation by Flood	<1:200	N/A	1:40 to 1:200	>1:40	N/A
Mountain Stream Erosion or Avulsion	<1:500	1:100 to 1:500	N/A	N/A	>1:100
Debris Flows/ Debris Torrent	<1:10,000	N/A	1:500 to 1:10,000	1:200 to 1:500	>1:200
Debris Flood	<1:500	N/A	1:200 to 1:500	>1:200	N/A
Localized Landslide	<1:10,000	N/A	1:500 to 1:10,000	1:50 to 1:500	>1:50
Snow Avalanche	<1:10,000	N/A	N/A	1:30 to 1:10,000	>1:30
Rock Fall	1:1000	1:500 to 1:1000	N/A	1:100 to 1:500	>1:100
Catastrophic Landslide	<1:1000*	N/A	N/A	N/A	>1:1000*
River Erosion and Avulsion¹⁸	Setback greater than 100-year erosion limit	Setback between 100-year erosion limit and single-event erosion limit ¹⁹	N/A	Setback less than single-event erosion limit	N/A

*Should be 1:10,000 as per APEGBC Guidelines for Legislated Landslide Assessments (2010)

4.1 Inundation by floodwaters

The property lies on glaciofluvial deposits and is on the west side of Cultus Lake, outside of the 200-year flood limit for the Chilliwack River²⁰. However, the property is subject to the FVRD Bylaw No. 0681, specifically, the following portions of the bylaw apply to the property:

¹⁴ Approval without conditions relating to hazards.

¹⁵ Approval, without siting conditions or protective works conditions, but with a covenant including "save harmless" conditions.

¹⁶ Approval, but with siting requirements to avoid the hazard, or with requirements for protective works to mitigate the hazard, or both

¹⁷ Approval, but with covenant including "save harmless" conditions as well as siting requirements to avoid the hazard, or with requirements for protective works to mitigate the hazard, or both.

¹⁸ Cave did not apply this generally, but only to the Chilliwack River.

¹⁹ Where threat of erosion or avulsion is immediate or extreme, building permit may not be available until approved bank protection is provided

²⁰ FVRD Bylaw No. 0681

Section 6: Floodplain Specifications

a.) Flood Construction Levels:

The following elevations are specified as Flood Construction Levels, except where more than one Flood Construction Level is applicable, the higher elevation shall be the Flood Construction Level:

- i. The Flood Construction Level for a specific property, as determined by interpolation from those Flood Construction Levels shown on Schedule A. Or where the Flood Construction Level is not shown on Schedule A the following shall apply*
- ii. 6.0 metres above the Natural Boundary of the Fraser River.*
- iii. 3.0 metres above the Natural Boundary of Anderson Creek, Anderson River, Carratt Creek, Cascade Creek, Chehalis River, Chilliwack River, Clayburn Creek, Coquihalla River, Deroche Creek, Emory Creek, Frosst Creek, Harrison River, Holachten Creek, Hunter Creek, Jones Creek (Wahleach Creek), Legace Creek, Lillooet River, Lorenzetta Creek, Lost Creek, Nahatlatch River, Nicolum Creek, Norrish Creek, Pattison Creek, Pitt River, Pye Creek, Scuzzy Creek, Siddle Creek, Silverhope Creek, Slesse Creek, Sumallo River, Stave River, Stulkawhits Creek, Squakum Creek, Sweltzer River, Vedder River, Weaver Creek and Yale Creek.*
- iv. 1.5 metres above the Natural Boundary of any other watercourse.*
- v. Specified Lakes:*
 - 1. Hatzic Lake 9.3 metres Geodetic Survey of Canada datum.*
 - 2. Harrison Lake 14.55 metres Geodetic Survey of Canada datum.*
 - 3. Lake Errock 16.5 metres Geodetic Survey of Canada datum.*
 - 4. Lilloette Lake 201.00 metres Geodetic Survey of Canada datum.*
 - 5. Pitt Lake 5.18 metres Geodetic Survey of Canada datum.*
 - 6. Stave Lake 83.8 metres Geodetic Survey of Canada datum.*
- vi. 1.5 metre above Natural Boundary of any other lake, pond or marsh.*

It is our understanding that Cultus Lake lake levels are monitored and adjusted by the Department of Fisheries and Oceans near the Sweltzer River outlet, which accommodates recreation in the summer and increased inflow in the winter. On average, the lake level below 45 m above sea level; as of the date of this report it stands at approximately 44.5 m²¹. Given the regulation of the lake by the DFO at the Sweltzer River outlet, we estimate the 5-year highwater mark as the natural boundary of the lake at this time. Survey elevations surrounding the property were provided by the Cultus Lake Park Board and show that the wharf to the south of the property is within 15 cm of the lake's average water level, and decreasing elevations on wharfs to the north. At this time, no land survey has been done for the property, however for the purposes of this report, we estimate the elevation of the 5-year highwater mark is roughly equivalent to the elevation of the wharfs, and therefore is approximately 45 m. The bylaw requires an FCL of 1.5 m above the natural boundary of the lake; this means that the FCL required for the subject property should be approximately 46.5 m.

²¹ <https://www.fvrd.ca/EN/main/about-the-fvrd/electoral-areas/cultus-lake-water-levels.html>

Given there is no recent topographic survey of the property, we estimated the elevation of the property to be between 45 and 47 meters. Therefore, part of the property is below the required FCL. The Client has requested a variance for their development permit recently; Colin Johnson, P.Eng. of Out-of-the-Box Engineering previously provided a letter recommending an FCL of 45.5 m as reasonable given there has been no previously established 200-year flood level for the lake, and the outlet of the lake is lower than the 45 meter high water mark.

Madrone does not find any evidence to the contrary of Mr Johnson's FCL of 45.5 m as reasonable. A regional flood study of Cultus Lake and the associated watersheds associated with the lake would need to be undertaken in order to give floodplain extent and an exact FCL beyond the general bylaw guidelines.

Madrone took into account the effects of a 200-year flood of the tributary streams or inflow streams, that enter into Cultus Lake. Given that the lake levels are controlled at this time, the size of the lake relative to the stream discharge into the lake, the surficial geology and local hydrogeology relationship, we believe it is likely that there would be minimal flooding during a 200 year event under the current conditions and infrastructure at the outflow. Air photos from the 1940s and 1950s show no evidence of flooding affecting the lake or surrounding area; although in a different watershed, this is significant as the 1948 flooding of the Fraser River is now considered a 100-year event and its effects were seen throughout the lower mainland due to the rapid snow melt causing water levels to rise dramatically. Outside of current conditions and including climate changes, we estimate the approximate annual frequency of flooding to be between 1:40 to 1:200, and therefore recommend approval with protective measures.

The portions of the development that will be below 45.5 m will be within a waterproof structure as described in the plans provided by the developer. Any increase in lake levels would result in laminar flow, and therefore no scour protection would be required for any portion of the development. In addition to the waterproofing as designed by a qualified professional, we recommend the lot is graded away from the dwelling starting at an elevation of 45.8 m.

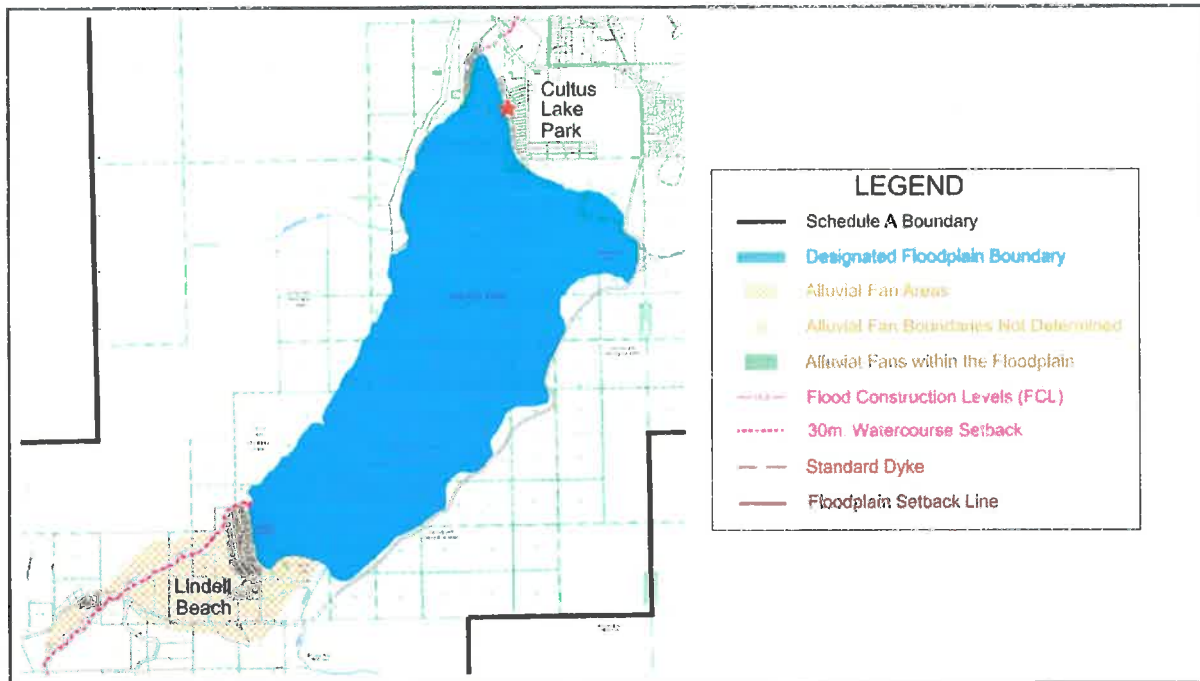


FIGURE 9: ELECTORAL AREA E, SNAPSHOT FROM THE FVRD FLOODPLAIN BYLAW.

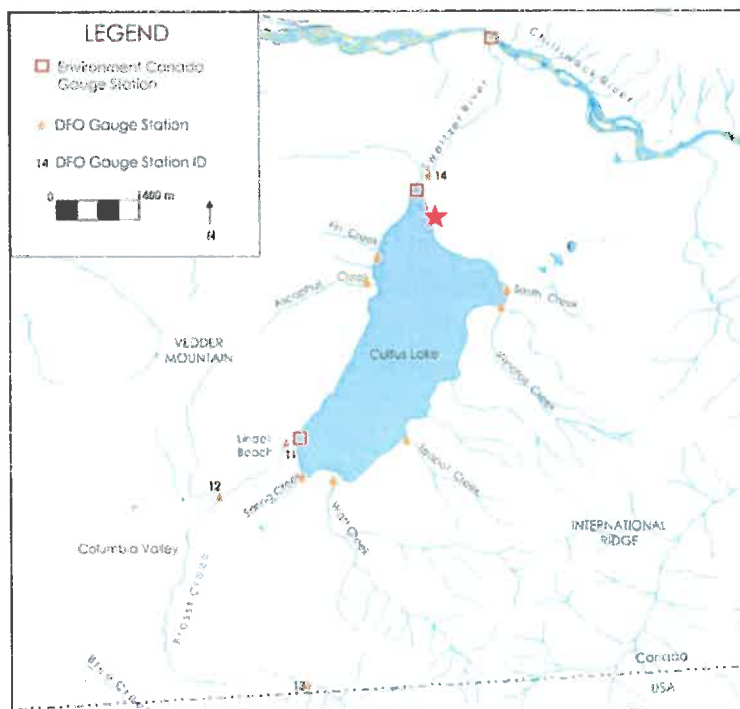


FIGURE 10: MONITORING STATIONS AND LOCAL SURFACE HYDROLOGY, FROM SUMKA 2017.



FIGURE 11: APPROXIMATE LOCATION OF MEASURED WATER LEVELS, UNVERIFIED, FOR DEMONSTRATION PURPOSES ONLY.
45 m average HWM for Cultus Lake level show above property.



PHOTO 3: EASTERN SHORELINE OF CULTUS LAKE, LOOKING NORTH TOWARDS SWELTZER RIVER.

5 Conclusions and Recommendations

We have identified that the property is subject to inundation by floodwaters. We compared these findings with the levels of safety (i.e. regulatory responses) described by Cave (1993) and provide our recommendations for avoidance and protective measures. If the mitigation recommendations are followed, the property is safe for the intended use of single-family dwelling (classified as a new building) with no significant transfer of risk to other properties.

We recommend:

- Any development below the FCL of 45.5 m, as per Mr Johnson, be designed and signed off by a qualified engineering professional to be "geotechnical- and structurally -engineered waterproof" as described in the variance request.
- Grading away from the development to an elevation of 45.8 m.

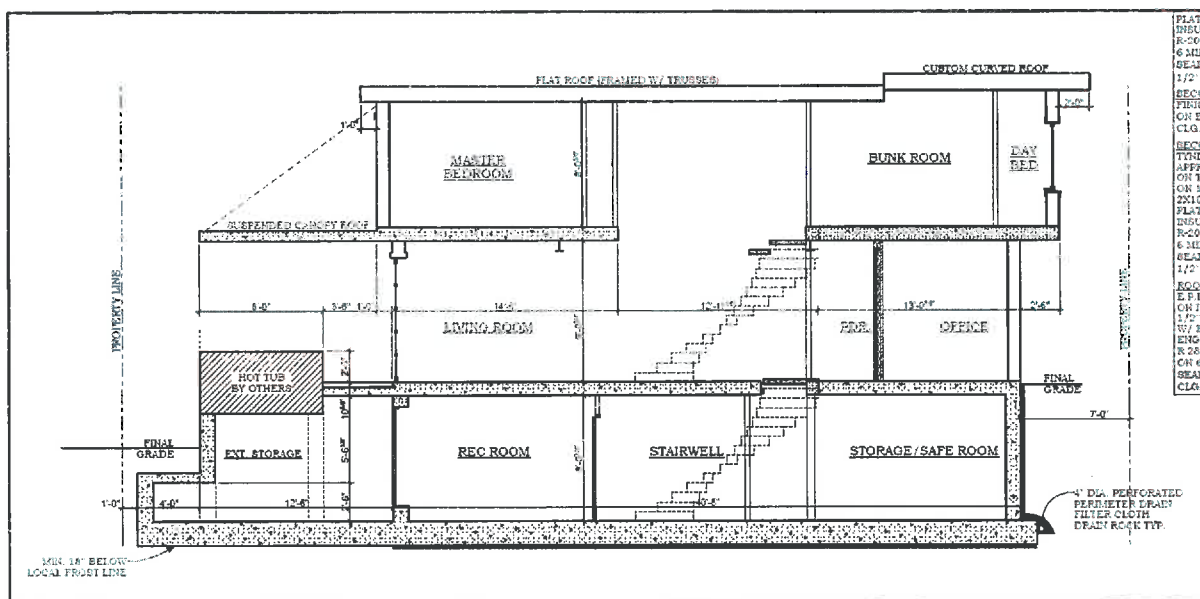


FIGURE 12: PROPOSED DEVELOPMENT, CROSS SECTION, AS PROVIDED BY CLIENT, AUGUST 2019.

TABLE 3: GEOTECHNICAL HAZARDS ASSOCIATED ANNUAL RETURN FREQUENCY AND RESPONSE TO BUILDING APPROVAL APPLICATION AS APPLICABLE TO THE SUBJECT PROPERTY.

Hazard	Annual Return Frequency	Response to Building Approval Application	Recommendations
Inundation by Flood Waters	1:40-1:200	Approval, but with siting or protective requirements	Waterproof design, as designed by a Qualified Professional, for areas of the property below the FCL, and grading away from the house (see details above).
Mountain Stream Erosion or Avulsion	<1:500	Approval without conditions relating to hazards	
Debris Flow / Debris Torrent	<1:500	Approval without conditions relating to hazards	
Debris Flood	<1:10,000	Approval without conditions relating to hazards	
Localized Landslip	<1:10,000	Approval without conditions relating to hazards	
Snow Avalanche	<1:10,000	Approval without conditions relating to hazards	
Rock Fall	<1:10,000	Approval without conditions relating to hazards	
Catastrophic Landslide	<1:1,000	Approval without conditions relating to hazards	

6 Closure

We trust that this report meets the applicable requirements. We grant permission to the Fraser Valley Regional District to use this report. Please contact us if you require further information or services.

Prepared by:

Reviewed by:

**This is a digitally signed duplicate of the official manually signed and sealed document.*



Roberta Adams, M.Sc., P. Geo.

**This is a digitally signed duplicate of the official manually signed and sealed document.*



Ken Hughes-Adams, M.Eng., P. Eng.



APPENDIX A

Limitations and Conditions

The contents of this Report remain the copyright property of Madrone.

By using the Report, including but not limited to providing the Report to other parties or relying on the information, observations, findings, suggestions, recommendations and opinions contained in the Report, a person who uses the Report (User) accepts and agrees to the limitations and conditions set out below.

To the extent that these limitations and conditions of use conflict with any previous agreements between Madrone Environmental Services Ltd. (Madrone) and the Client, these limitations and conditions will prevail.

Madrone grants the Client a non-transferable license to use this Report in connection with the particular project for which it has been prepared. This license does not apply to any draft version of any document. The Client may not use the Report in connection with any other work, or project without prior written approval by Madrone. If the Client is in breach of any obligation to make payment to Madrone, Madrone may revoke the license referred to above and the Client will cause to be returned to Madrone the Report and any associated documents and all copies thereof and the Client will remove from its computer systems any electronic copies of any of the documents.

Unless Madrone provides written consent, no party other than the Client may rely on the observations, data, interpretations, findings, or recommendations of this report, except that regulatory authorities may rely on it with respect to the project for which it was prepared. Madrone will consider any reasonable request by the Client to provide consent for other parties to rely on this report.

If a User, including but not limited to the Client, provides the Report to another party, the User will provide the other party with the entire Report including these limitations and conditions of use, and the User agrees to indemnify Madrone against claims by such other party arising from the failure of the other party to comply with the limitations and conditions of use.

All documents generated as part of the services for the Client with respect to the project for which the Report has been prepared, including drawings, reports, instructions, and correspondence, whether hardcopy or electronic, but excluding draft documents, are inherent components of the Report. To properly understand the information, observations, findings, suggestions, recommendations and opinions contained in the Report, reference must be made to the whole of the Report. Madrone is not responsible for use by any party of portions of the Report without reference to the whole Report and its various components.

The User agrees that the no portion of the Report, whether electronic or hard copy, no matter who owns or uses them, may be altered by any party except Madrone. If Madrone has submitted both

electronic and hard copy versions of the Report, only the signed and sealed hard copy versions shall be considered final and legally binding upon Madrone.

Madrone will maintain professional liability insurance that is usual and customary for similar firms. The total amount of all claims arising from the Report, by all Users, against Madrone or any present or former partner; executive officer, director, stockholder, employee or agent thereof, including but not limited to claims for negligence, and negligent misrepresentation, will be strictly limited to the amount of any professional liability insurance that Madrone may have available for such claims.

Madrone will not be liable for any consequential loss, injury or damages suffered by any User, including but not limited to loss of use, earnings and business interruption.

No User may bring a claim against Madrone in contract or tort more than two (2) years after Madrone's involvement in the project.

Madrone has conducted this investigation and prepared the Report in a manner consistent with the level of care normally exercised by professionals currently practicing in the area under similar conditions and budgetary constraints. No other warranties, either expressed or implied, are made.

Madrone has assumed that information provided to Madrone by the Client or other individuals or organizations is factual, complete, and accurate. Madrone is not responsible for any inaccuracies, deficiencies, or omissions resulting from receipt of incorrect or fraudulent information.

The Report pertains only to development plans and project design disclosed to Madrone by the Client at the time the Report was prepared. The applicability and reliability of any of the information, observations, findings, suggestions, recommendations and opinions contained in the Report are only valid to the extent that there have been no material alterations to or variations from any of the said descriptions provided by the Client to Madrone unless the Client has specifically requested Madrone to review and revise the Report in light of such alterations or variations. If the project does not commence within two (2) years of the Report date, no party may rely on the Report unless Madrone has been engaged to review it.

Madrone has made reasonable efforts to collect information and site observations that are representative of conditions in the relevant portions of the site; however, conditions may vary from place to place and conditions may change with the passage of time. Site information contained in the report pertains specifically to the points and dates of observation.

The findings of this investigation and report are based in part on Madrone's visual observations of site conditions. Madrone's opinions do not extend to portions of the site that were unavailable for direct

observations due to circumstances reasonably beyond Madrone's control. Madrone is not responsible for detecting conditions in areas beyond the site, if the conditions could not reasonably be known by Madrone given restrictions to accessing such areas and the budgetary and time constraints under which the investigation was performed.

Classification and identification of the soils, rocks, and geologic units of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, Madrone does not warrant or guarantee the exactness of the descriptions.

If unexpected conditions are encountered on the site, the Client must notify Madrone in order that Madrone may determine if modifications to the findings are necessary.

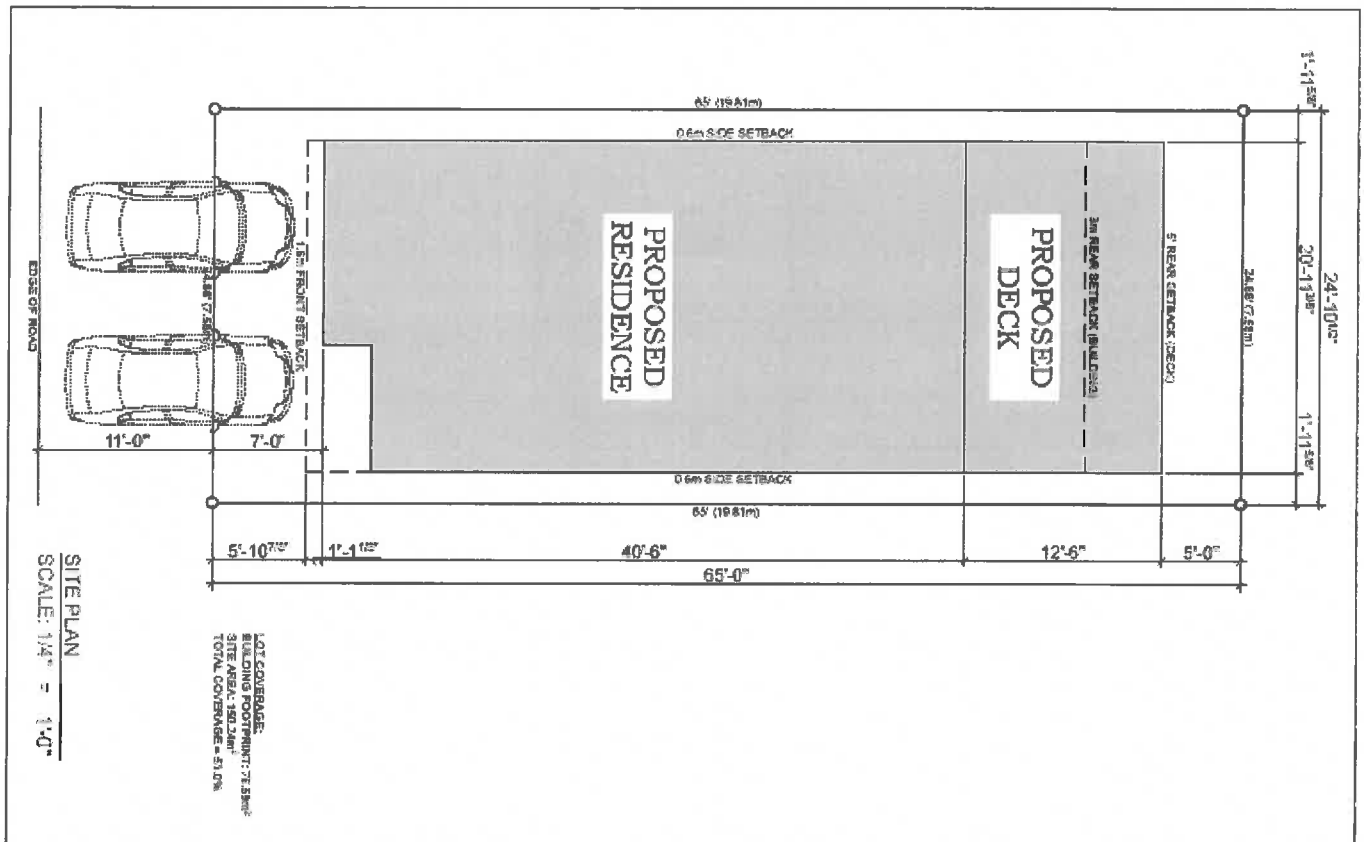
The exploration and review provided in the Report are for geotechnical purposes only unless otherwise specifically stated and identified in the Report. Environmental aspects of soil and groundwater have not been included investigated or addressed in any other way.

Madrone makes no representations whatsoever, as to the legal significance of its findings, or as to other legal matters touched on in the Report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth in the Report.

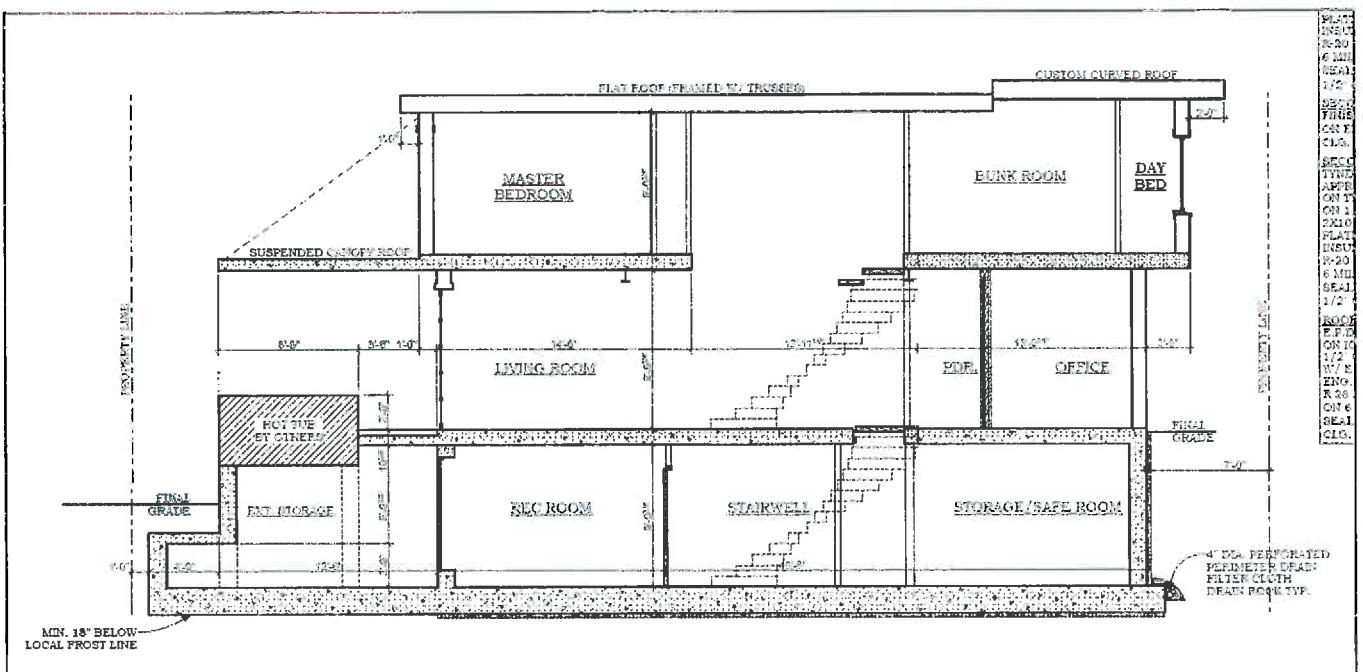


APPENDIX B

Development Figures



APPENDIX FIGURE 1: SITE PLAN, AS PROVIDED BY THE CLIENT, AUGUST 2019



APPENDIX FIGURE 2: PROPOSED DEVELOPMENT, CROSS SECTION, AS PROVIDED BY CLIENT, AUGUST 2019.



APPENDIX C

Assurance Statements

Geo-Hazard Assurance Statement

for Development Approvals

A. Project Information

Date August 22 2019 FVRD File No. _____

Property Information

Project Name & Description 155 1st Ave Cultus Lake BC Geohazard Assessment
Legal Description Lot 155 Land District 36 Lease Cultus Lake Park, Area-Jurisdiction-Roll 15-733-070
Site Address 155 1st Ave Cultus Lake BC PID 000-823-139

Client Information

Name Gwyllyn Goddard
Role ☒ Property Owner ☐ Developer ☐ Other
Client Address 155 1st Ave Cultus Lake BC

Qualified Professional Information

Name Roberta Adams
APEGBC Designation ☐ P.Eng. ☒ P. Geo. ☐ Eng.L ☐ Geo.L
Company Name Madrone Environmental Services Ltd
Mailing Address 202-2790 Gladwin Rd Abbotsford BC
Email Address roberta.adams@madrone.ca Phone # 604-504-1972

Geo-Hazard Report Reference

Title Geohazard Assessment 155 1st Ave Cultus Lake BC 19.0291 Date August 22 2019

Personal information on this form is being collected in accordance with Section 27 of the Freedom of Information and Protection of Privacy Act, RSBC 1996 Ch. 165; Part 9, Division 1 [Building Regulation] and Part 14 [Planning and Land Use Management] of the Local Government Act, RSBC 2015 Ch. 1; and Section 56 of the Community Charter, SBC 2003 Ch. 26 and will only be collected, used and disclosed for the purpose of administering geo-technical hazard reviews and assurance statements related to development approvals. Questions? Contact FVRD Privacy Officer at 45950 Cheam Avenue, Chilliwack, BC V2P 1N6; 604-702-5000 or 1-800-528-0061; or FOI@fvr.ca.



Geo-Hazard Assurance Statement

for Development Approvals

B. Assurance

Based on the contents of this Assurance Statement and the Report, I hereby give assurance that:
(check as applicable)

<input checked="" type="checkbox"/>	Development Permit	The Report will "assist the local government in determining what conditions or requirements under it will impose in the permit", as required by the <i>Local Government Act</i> (Division 7)
<input type="checkbox"/>	Building Permit	
<input type="checkbox"/>	Community Charter	"The land may be used safely for the use intended", as required by the <i>Community Charter</i> (Section 56)
<input type="checkbox"/>	Seismic Slope	The Report addresses the requirements of the BC Building Code 2006, 4.1.8.1.6 (8) and 9.4.4.4 (2), as detailed in the BC Building & Safety Policy Branch Information Bulletin B10-01, Jan 18, 2010
<input checked="" type="checkbox"/>	Floodplain Management Bylaw Exemption	"The land may be used safely for the use intended", as required by the <i>Local Government Act</i> . (Section 524)
<input type="checkbox"/>	Subdivision	"The land may be used safely for the use intended", as required by the <i>Land Title Act</i> (Section 86).
<input type="checkbox"/>	Other (e.g. Zoning Bylaw Amendment, Official Community Plan Amendment, Temporary Use Permit, etc.)	<Insert statement as appropriate>

C. APEGBC Professional Practice Guidelines

The Report and this Assurance Statement should be completed in accordance with the current version of one or both of the following Professional Engineers and Geoscientists of BC (APEGBC).

- *Legislated Flood Assessments in a Changing Climate in BC*
- *Legislated Landslide Assessments for Proposed Residential Development in British Columbia, ("APEGBC Landslide Guidelines")*.

These two documents are collectively referred to as the "APEGBC Guidelines". The italicized words in this Assurance Statement are defined in the APEGBC Guidelines.

The Report has been prepared pursuant to the following APEGBC Guidelines (check one or both as applicable).

- ☒ APEGBC Flood Guidelines
- ☒ APEGBC Landslide Guidelines

Geo-Hazard Assurance Statement

for Development Approvals

If the Report is not prepared pursuant to either of the APEGBC Guidelines, please explain.

D. Background Information

Qualified Professionals **must** confirm and check that each item is included in the Report.

- ☒ 1. Property location map — 8.5 x 11 size
- ☒ 2. Development proposal site plan — 8.5 x 11 size. *If a subdivision, show the parent parcel and all lots to be created, including any remainder.*
- ☒ 3. Description of the proposed development project (including building use) to the extent this is known at the time of Report preparation.
 - ☒ residential
 - ☐ industrial
 - ☐ commercial
 - ☐ institutional
 - ☐ other _____

Geo-Hazard Assurance Statement

for Development Approvals

E. Technical Requirements

Qualified Professionals **must** review, confirm and check completed items (as applicable).

Report Content

- ☒ 4. Relevant information pertaining to the Property and pertinent potential hazards from appropriate background sources, including the FVRD online library.
 - ☒ 5. Time limitation or condition statement to describe extent the FVRD may rely on the Assurance Statement and Report for development approvals, and when resubmittal is recommended.
 - ☒ 6. Maps, illustrations and diagrams to illustrate areas referred to in the Report.
 - ☒ 7. Description of field work conducted on and, if required, beyond the Property.
 - ☐ 8. Contact and consultation with the Fraser Valley Regional District. Provide name and title of contact.
-
- ☒ 9. Review of relevant FVRD bylaws and other statutory requirements.
 - ☒ 10. Restrictive covenants registered against the Property title that pertain to geo-hazards (if registered, the Report provides relevant information about the covenants).
 - ☒ 11. Notation of any visibly apparent natural hazards or other hazards identified in background reports, which are not identified and addressed in this Report. If yes, provide details in Section H: Geo-Hazard Summary Table.
 - ☒ Yes
 - ☐ No
 - ☒ 12. Does the report rely on one or more supporting reports, each of which is independently reviewed, signed and sealed. If yes, provide details in Section H: Geo-Hazard Summary Table.
 - ☒ Yes
 - ☐ No
 - ☐ 13. For subdivision approval, the Report addresses natural hazards for:
 - ☐ the parent parcel prior to subdivision
 - ☐ any lots to be created (including any remainder)

Geo-Hazard Assurance Statement

for Development Approvals

Geo-hazard Assessment, Risk Acceptability and Risk Transfer

- ☒ 14. In considering the above-noted potential hazards that may affect the property, I have:
- ☒ reviewed and characterized the potential hazard(s)
 - ☒ estimated the potential frequency and magnitude of the potential hazard(s)
 - ☒ relied on supporting reports as noted above
 - ☐ relied on a pre-existing assessment of hazard frequency and magnitude
 - ☒ considered the potential effects of climate change in the context identified in the Report
 - ☒ considered the potential effects of changed future conditions (upstream watershed changes, forestry activity, land use changes, sea level rise, etc.) in the context identified in the Report
- ☒ 15. This Assurance Statement pertains to all geo-hazards that are assessed in the Report and any supporting reports, and accurately reflects the contents of those documents.
- ☒ 16. The FVRD has adopted "Hazard Acceptability Thresholds for Development Approvals by Local Government", which provides a specific level of hazard or risk tolerance. I have included a Hazard Summary Table which:
- ☒ lists all the potential hazards addressed by the Report and any supporting reports
 - ☒ provides an annual return frequency and acceptability threshold classification for the unmitigated condition
 - ☒ proposes mitigative measures to appropriately reduce the geo-hazard risk
 - ☒ provides an annual return frequency and acceptability threshold classification for the mitigated condition
- ☒ 17. The Report describes the potential transfer of natural hazard risk to other properties or infrastructure as a result of the proposed project (including any proposed *mitigation works*) and
- ☐ considered the potential for transfer of natural hazard risk
 - ☒ concludes that there is no significant transfer of natural hazard risk
 - ☐ identifies the potential transfer of natural hazard risk and proposes measures to offset such transfer of risk

Geo-Hazard Assurance Statement

for Development Approvals

Mitigation and Design Recommendations (if recommended)

The Report contains the following items:

- ☐ 18. Implementation steps for the identified structural mitigation works (in terms of design, construction and approval).
- ☐ 19. Clearly identified safe locations for building(s), ancillary structures, and onsite utility services (as applicable, such as a septic field) out of the natural hazard area as a preferred development alternative.
- ☐ 20. Commentary on the effectiveness of proposed structural mitigation works in terms of ability to reduce the potential hazard impact, and identification of any residual risk that would remain.
- ☒ 21. Proposed Flood Construction Level (FCL) for future development and including specification of an appropriate method of achieving the FCL.
- ☐ 22. Proposed watercourse setback, which is clearly referenced from the natural boundary, top of bank or another suitable basis.
- ☐ 23. Proposed operation and maintenance actions that will be necessary in order for the level of safety to be maintained in the future, with indications of who should be responsible for those actions and when.

Riparian Area Regulation (if applicable)

- ☐ 24. QP must review RAR assessment report to avoid conflict with Geo-Hazard Report recommendations.

F FVRD Supplemental Requirements

The following points are understood by the Qualified Professional when submitting a Report:

- ☒ 25. Permission is granted to the FVRD to use the Report in considering approval of the proposed development on the property, provided that such permission is limited only to the proposed development project for which the Report was prepared.
- ☒ 26. Methodology used in the Report is described in sufficient detail to facilitate a professional review of the study by the FVRD when necessary.
- ☒ 27. Professional liability insurance coverage of at least \$1 million per claim is carried by the QP.
- ☒ 28. Third party review or supplemental information may be required by the FVRD where complex development proposals warrant.
- ☒ 29. Permission is granted to the FVRD to include the Report in the online FVRD geo-hazard report library (as background information, not for other parties to rely).

Geo-Hazard Assurance Statement

for Development Approvals

G. Qualified Professional (QP)

Prepared by: (QP of Record)

Name Roberta Adams

Designation ☐ P.Eng. ☒ P. Geo. ☐ Eng.L ☐ Geo.L

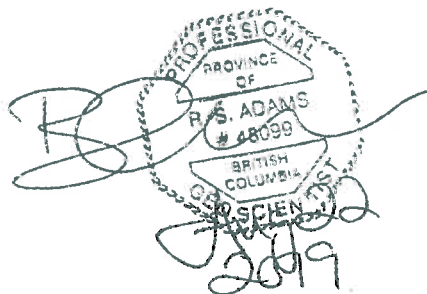
Reviewed by:

Name Ken Hughes-Adams

Designation ☒ P.Eng. ☐ P. Geo.

The Report has received appropriate technical review which is consistent with both the APEGBC Professional Practice Guidelines, and APGBC Quality Management Guidelines. The name of the reviewer is noted in the Report and below.

Professional Seal, Signature and Date:



☒ I am a Qualified Professional as defined in the APEGBC Guidelines, and I fulfill the education, training and experience requirements as outlined in the APEGBC Guidelines

☒ I have signed, sealed, dated and thereby certify, this Assurance Statement and the attached report.

Geo-Hazard Assurance Statement

for Development Approvals

H. Geo-Hazard Summary Table

The geo-hazard report and/or any supporting reports addresses the following hazard types.

Geo-Hazard Type #1		Geo-Hazard Type #2	
Fraser River and tributaries flooding			
Annual Return Frequency (Unmitigated) 1:40-1:200		Annual Return Frequency (Unmitigated)	
Acceptability Threshold Classification	3	Acceptability Threshold Classification	
MITIGATION (if necessary)			
Proposed Mitigation Measures Yes <input checked="" type="radio"/> No <input type="radio"/>		Proposed Mitigation Measures Yes <input type="radio"/> No <input type="radio"/>	
Annual Return Frequency (Mitigated) 1:40-1:200		Annual Return Frequency (Mitigated)	
Acceptability Threshold Classification	3	Acceptability Threshold Classification	
Comments Re: Cultus Lake flooding		Comments	
SUPPORTING REPORT			
Was this report prepared by others? Yes <input checked="" type="radio"/> No <input type="radio"/>		Was this report prepared by others? Yes <input type="radio"/> No <input type="radio"/>	
If yes, list report name, date and author. Colin Johnson, July 12 2019, Flood Level Adjustment Letter		If yes, list report name, date and author.	

Geo-Hazard Type #3		Geo-Hazard Type #4	
Annual Return Frequency (Unmitigated)		Annual Return Frequency (Unmitigated)	
Acceptability Threshold Classification		Acceptability Threshold Classification	
MITIGATION (if necessary)			
Proposed Mitigation Measures Yes <input type="radio"/> No <input type="radio"/>		Proposed Mitigation Measures Yes <input type="radio"/> No <input type="radio"/>	
Annual Return Frequency (Mitigated)		Annual Return Frequency (Mitigated)	
Acceptability Threshold Classification		Acceptability Threshold Classification	
Comments		Comments	
SUPPORTING REPORT			
Was this report prepared by others? Yes <input type="radio"/> No <input type="radio"/>		Was this report prepared by others? Yes <input type="radio"/> No <input type="radio"/>	
If yes, list report name, date and author.		If yes, list report name, date and author.	

Geo-Hazard Assurance Statement

for Development Approvals

Indicate which hazards were **NOT** reviewed:

- ☐ Chilliwack River Valley Erosion or Avulsion
- ☐ Debris Flow and Debris Torrent
- ☐ Debris Flood
- ☐ Fraser River & tributaries flooding
- ☐ Mountain Stream Erosion or Avulsion
- ☐ Major Catastrophic Landslide

- ☒ Seismic Effects/Liquefaction
- ☐ Rockfall - Small Scale Detachment
- ☐ Slope Stability
- ☐ Small Scale Localized Landslide
- ☐ Snow Avalanche
- ☒ Tsunami

Hazard Acceptability Thresholds Classification, as per Hazard Acceptability Thresholds for Development Approvals by Local Government dated November 1993 by Dr. Peter Cave.

- 1 Approval with conditions relating to hazards.
- 2 Approval, without siting conditions or protective works conditions, but with a covenant including "save harmless" conditions.
- 3 Approval, but with siting requirements to avoid the hazard, or with requirements for protective works to mitigate the hazard.
- 4 Approval as (3) above, but with a covenant including "save harmless" conditions as well as siting conditions, protective works or both.
- 5 Not approvable.

Additional Comments

2019-0912
July 12, 2019

Fraser Valley Regional District
Planning Department
45950 Cheam Avenue, Chilliwack, BC

Reference: Flood Level Adjustment – Proposed Residence - 155 First Avenue, Cultus Lake BC

As requested, this writer has researched information in regard to setting a flood level for the above-named property. The researched information is noted below:

- A comprehensive research and report have not been done for establishing the 200-year flood level for Cultus Lake.
- Several reports refer to a 1994 Ministry of Environment memo indicating the natural boundary of Cultus Lake being at an elevation 45m (high water).
- The Fraser Valley Regional District and Cultus Lake Park Board have both adopted an elevation of 46.5m as the required MBE/FCL – which represents 1.5m above the natural boundary level.
- The outlet of Cultus Lake is level controlled so that maximum usable water space is available in the summer months and then lowered during the winter months.
- The outlet is lower than the aforementioned 45m with a typical freeboard for most flood management situations of 0.6m (2 feet).

The plans provided show a FCL of 45.5m. Based on the above information, this writer has no objection to setting the flood level to 45.5m which represents 0.5m above the high water elevation, and recommends that the approving authority accept the lowered flood level. The plans also show a lower basement elevation within a water-proofed structure. A lowered MBE will be provided by others based on their flood-proofing design. The primary need for the lowering of the flood level is for design by others versus buoyancy of the basement.

This writer has no issue with the client and his agents using the 45.5m elevation for their further design (re buoyancy) of the basement of the proposed residence. Please note, however, that the undersigned does not warranty versus flooding the below-grade flood-proofing that is being designed by others for this property.

If there are any questions regarding this report, please do not hesitate to contact the undersigned.

Regards,



Collin S. Johnson, P.Eng.
Attached (Sched B and Geo Hazard Assurance Statement)

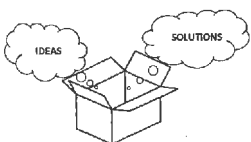
CC Doug Williams

F.V.R.D. BLDG. DEPT

JUL 1 2019

F.V.R.D. BLDG. DEPT

JUL 18 2019



Collin Johnson, P.Eng
Box 274 Agassiz PO, Agassiz, BC V0M 1A0
604-819-9809/johnsonscollin@gmail.com

Geo-Hazard Assurance Statement

for Development Approvals

A. Project Information

Date July 12, 2019 FVRD File No. Dev Variance Permit 2019-17

Property Information

Project Name & Description Proposed Residence (Gwyllyn Goddard)
Legal Description Lot 155 Land District 36 LEASE CULTUS LAKE PARK
Site Address 155 First Avenue, Cultus Lake BC PID Area-Jurisdiction-Roll: 15-733-070

Client Information

Name Doug Willams
Role ☐ Property Owner ☒ Developer ☐ Other
Client Address 383 Alder Street Cultus Lake BC

Qualified Professional Information

Name Collin S Johnson
APEGBC Designation ☒ P.Eng. ☐ P. Geo. ☐ Eng.L. ☐ Geo.L.
Company Name Out of the Box Engineering (0772308 BC Ltd)
Mailing Address PO Box 274 Agassiz PO, Agassiz BC V0M 1A0
Email Address ootbe2013@gmail.com Phone # 604-819-9809

Geo-Hazard Report Reference

Title Flood Level Adjustment - 155 First Ave Cultus Lake Date July 12, 2019

Personal information on this form is being collected in accordance with Section 27 of the Freedom of Information and Protection of Privacy Act, RSBC 1996 Ch. 165; Part 9, Division 1 [Building Regulation] and Part 14 [Planning and Land Use Management] of the Local Government Act, RSBC 2015 Ch. 1; and Section 56 of the Community Charter, SBC 2003 Ch. 26 and will only be collected, used and disclosed for the purpose of administering geo-technical hazard reviews and assurance statements related to development approvals. Questions? Contact FVRD Privacy Officer at 45950 Cheam Avenue, Chilliwack, BC V2P 1N6; 604-702-5000 or 1-800-528-0061; or FOI@fvrd.ca.



Geo-Hazard Assurance Statement

for Development Approvals

B. Assurance

Based on the contents of this Assurance Statement and the Report, I hereby give assurance that:
(check as applicable)

<input checked="" type="checkbox"/>	Development Permit	The Report will "assist the local government in determining what conditions or requirements under it will impose in the permit", as required by the <i>Local Government Act</i> (Division 7)
<input type="checkbox"/>	Building Permit <input type="checkbox"/> Community Charter	"The land may be used safely for the use intended", as required by the <i>Community Charter</i> (Section 56)
<input type="checkbox"/>	<input type="checkbox"/> Seismic Slope	The Report addresses the requirements of the BC Building Code 2006, 4.1.8.1.6 (8) and 9.4.4.4 (2), as detailed in the BC Building & Safety Policy Branch Information Bulletin B10-01, Jan 18, 2010
<input type="checkbox"/>	Floodplain Management Bylaw Exemption	"The land may be used safely for the use intended", as required by the <i>Local Government Act</i> . (Section 524)
<input type="checkbox"/>	Subdivision	"The land may be used safely for the use intended", as required by the <i>Land Title Act</i> (Section 86).
<input type="checkbox"/>	Other (e.g. Zoning Bylaw Amendment, Official Community Plan Amendment, Temporary Use Permit, etc.)	<Insert statement as appropriate>

C. APEGBC Professional Practice Guidelines

The Report and this Assurance Statement should be completed in accordance with the current version of one or both of the following Professional Engineers and Geoscientists of BC (APEGBC).

- *Legislated Flood Assessments in a Changing Climate in BC*
- *Legislated Landslide Assessments for Proposed Residential Development in British Columbia, ("APEGBC Landslide Guidelines")*.

These two documents are collectively referred to as the "APEGBC Guidelines". The italicized words in this Assurance Statement are defined in the APEGBC Guidelines.

The Report has been prepared pursuant to the following APEGBC Guidelines (check one or both as applicable).

- ☒ APEGBC Flood Guidelines
☐ APEGBC Landslide Guidelines

Geo-Hazard Assurance Statement

for Development Approvals

If the Report is **not** prepared pursuant to either of the APEGBC Guidelines, please explain.

The letter report was prepared to provide justification to lower the FCL for the proposed residence

D. Background Information

Qualified Professionals **must** confirm and check that each item is included in the Report.

- ☐ 1. Property location map — 8.5 x 11 size
- ☐ 2. Development proposal site plan — 8.5 x 11 size. *Developer provided BUILDING PLANS which included SITE PLAN. NOT INCLUDED IN MY REPORT*
If a subdivision, show the parent parcel and all lots to be created, including any remainder.
- ☒ 3. Description of the proposed development project (including building use) to the extent this is known at the time of Report preparation.
- ☒ residential
- ☐ industrial
- ☐ commercial
- ☐ institutional
- ☐ other _____

Geo-Hazard Assurance Statement

for Development Approvals

E. Technical Requirements

Qualified Professionals **must** review, confirm and check completed items (as applicable).

Report Content

REPORT PROVIDED WAS SHORT AND SUPPORTING WORKING FCL

- ☒ 4. Relevant information pertaining to the Property and pertinent potential hazards from appropriate background sources, including the FVRD online library.
 - ☐ 5. Time limitation or condition statement to describe extent the FVRD may rely on the Assurance Statement and Report for development approvals, and when resubmittal is recommended.
 - ☐ 6. Maps, illustrations and diagrams to illustrate areas referred to in the Report.
 - ☒ 7. Description of field work conducted on and, if required, beyond the Property.
 - ☐ 8. Contact and consultation with the Fraser Valley Regional District. Provide name and title of contact.
-
- ☒ 9. Review of relevant FVRD bylaws and other statutory requirements.
 - ☐ 10. Restrictive covenants registered against the Property title that pertain to geo-hazards (if registered, the Report provides relevant information about the covenants).
 - ☐ 11. Notation of any visibly apparent natural hazards or other hazards identified in background reports, which are not identified and addressed in this Report. If yes, provide details in Section H: Geo-Hazard Summary Table.
 - ☐ Yes
 - ☐ No
 - ☐ 12. Does the report rely on one or more supporting reports, each of which is independently reviewed, signed and sealed. If yes, provide details in Section H: Geo-Hazard Summary Table.
 - ☐ Yes
 - ☐ No
 - ☐ 13. For subdivision approval, the Report addresses natural hazards for:
 - ☐ the parent parcel prior to subdivision
 - ☐ any lots to be created (including any remainder)

Geo-Hazard Assurance Statement

for Development Approvals

Geo-hazard Assessment, Risk Acceptability and Risk Transfer

- ☒ 14. In considering the above-noted potential hazards that may affect the property, I have:
- REVIEWED SOILS @ SITE AND NEARBY AND RISK IF WATER TABLE RISES*
- ☐ reviewed and characterized the potential hazard(s)
 - ☐ estimated the potential frequency and magnitude of the potential hazard(s)
 - ☐ relied on supporting reports as noted above
 - ☐ relied on a pre-existing assessment of hazard frequency and magnitude
 - ☐ considered the potential effects of climate change in the context identified in the Report
 - ☐ considered the potential effects of changed future conditions (upstream watershed changes, forestry activity, land use changes, sea level rise, etc.) in the context identified in the Report
- ☐ 15. This Assurance Statement pertains to all geo-hazards that are assessed in the Report and any supporting reports, and accurately reflects the contents of those documents.
- ☐ 16. The FVRD has adopted "Hazard Acceptability Thresholds for Development Approvals by Local Government", which provides a specific level of hazard or risk tolerance. I have included a Hazard Summary Table which:
- ☐ lists all the potential hazards addressed by the Report and any supporting reports
 - ☐ provides an annual return frequency and acceptability threshold classification for the unmitigated condition
 - ☐ proposes mitigative measures to appropriately reduce the geo-hazard risk
 - ☐ provides an annual return frequency and acceptability threshold classification for the mitigated condition
- ☐ 17. The Report describes the potential transfer of natural hazard risk to other properties or infrastructure as a result of the proposed project (including any proposed *mitigation works*) and
- ☐ considered the potential for transfer of natural hazard risk
 - ☐ concludes that there is no significant transfer of natural hazard risk
 - ☐ identifies the potential transfer of natural hazard risk and proposes measures to offset such transfer of risk

Geo-Hazard Assurance Statement

for Development Approvals

Mitigation and Design Recommendations (if recommended)

The Report contains the following items:

REPORT NOTES DESIGN REQUIRED BY OTHERS FOR
WATER TIGHT STRUCTURE BELOW GROUND

- ☐ 18. Implementation steps for the identified structural mitigation works (in terms of design, construction and approval).
- ☐ 19. Clearly identified safe locations for building(s), ancillary structures, and onsite utility services (as applicable, such as a septic field) out of the natural hazard area as a preferred development alternative.
- ☐ 20. Commentary on the effectiveness of proposed structural mitigation works in terms of ability to reduce the potential hazard impact, and identification of any residual risk that would remain.
- ☐ 21. Proposed Flood Construction Level (FCL) for future development and including specification of an appropriate method of achieving the FCL.
- ☐ 22. Proposed watercourse setback, which is clearly referenced from the natural boundary, top of bank or another suitable basis.
- ☐ 23. Proposed operation and maintenance actions that will be necessary in order for the level of safety to be maintained in the future, with indications of who should be responsible for those actions and when.

Riparian Area Regulation (if applicable)

- ☐ 24. QP must review RAR assessment report to avoid conflict with Geo-Hazard Report recommendations.

E FVRD Supplemental Requirements

The following points are understood by the Qualified Professional when submitting a Report:

- ☒ 25. Permission is granted to the FVRD to use the Report in considering approval of the proposed development on the property, provided that such permission is limited only to the proposed development project for which the Report was prepared.
- ☐ 26. Methodology used in the Report is described in sufficient detail to facilitate a professional review of the study by the FVRD when necessary.
- ☒ 27. Professional liability insurance coverage of at least \$1 million per claim is carried by the QP.
- ☐ 28. Third party review or supplemental information may be required by the FVRD where complex development proposals warrant.
- ☐ 29. Permission is granted to the FVRD to include the Report in the online FVRD geo-hazard report library (as background information, not for other parties to rely).

Geo-Hazard Assurance Statement

for Development Approvals

G. Qualified Professional (QP)

Prepared by: (QP of Record)

Name Collin Johnson

Designation ☒ P.Eng. ☐ P. Geo. ☐ Eng.L ☐ Geo.L

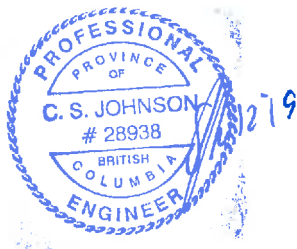
Reviewed by:

Name _____

Designation ☐ P.Eng. ☐ P. Geo.

The Report has received appropriate technical review which is consistent with both the APEGBC Professional Practice Guidelines, and APGBC Quality Management Guidelines. The name of the reviewer is noted in the Report and below.

Professional Seal, Signature and Date:



☒ I am a Qualified Professional as defined in the APEGBC Guidelines, and I fulfill the education, training and experience requirements as outlined in the APEGBC Guidelines

☒ I have signed, sealed, dated and thereby certify, this Assurance Statement and the attached report.

Geo-Hazard Assurance Statement

for Development Approvals

H. Geo-Hazard Summary Table

N/A

The geo-hazard report and/or any supporting reports addresses the following hazard types.

Geo-Hazard Type #1		Geo-Hazard Type #2	
Annual Return Frequency (Unmitigated)		Annual Return Frequency (Unmitigated)	
Acceptability Threshold Classification		Acceptability Threshold Classification	
MITIGATION (if necessary)			
Proposed Mitigation Measures	Yes <input type="radio"/> No <input type="radio"/>	Proposed Mitigation Measures	Yes <input type="radio"/> No <input type="radio"/>
Annual Return Frequency (Mitigated)		Annual Return Frequency (Mitigated)	
Acceptability Threshold Classification		Acceptability Threshold Classification	
Comments		Comments	
SUPPORTING REPORT			
Was this report prepared by others?	Yes <input type="radio"/> No <input type="radio"/>	Was this report prepared by others?	Yes <input type="radio"/> No <input type="radio"/>
If yes, list report name, date and author.		If yes, list report name, date and author.	

Geo-Hazard Type #3		Geo-Hazard Type #4	
Annual Return Frequency (Unmitigated)		Annual Return Frequency (Unmitigated)	
Acceptability Threshold Classification		Acceptability Threshold Classification	
MITIGATION (if necessary)			
Proposed Mitigation Measures	Yes <input type="radio"/> No <input type="radio"/>	Proposed Mitigation Measures	Yes <input type="radio"/> No <input type="radio"/>
Annual Return Frequency (Mitigated)		Annual Return Frequency (Mitigated)	
Acceptability Threshold Classification		Acceptability Threshold Classification	
Comments		Comments	
SUPPORTING REPORT			
Was this report prepared by others?	Yes <input type="radio"/> No <input type="radio"/>	Was this report prepared by others?	Yes <input type="radio"/> No <input type="radio"/>
If yes, list report name, date and author.		If yes, list report name, date and author.	

Geo-Hazard Assurance Statement

for Development Approvals

Indicate which hazards were **NOT** reviewed:

- | | |
|--|--|
| <input type="checkbox"/> Chilliwack River Valley Erosion or Avulsion | <input type="checkbox"/> Seismic Effects/Liquefaction |
| <input type="checkbox"/> Debris Flow and Debris Torrent | <input type="checkbox"/> Rockfall - Small Scale Detachment |
| <input type="checkbox"/> Debris Flood | <input type="checkbox"/> Slope Stability |
| <input type="checkbox"/> Fraser River & tributaries flooding | <input type="checkbox"/> Small Scale Localized Landslide |
| <input type="checkbox"/> Mountain Stream Erosion or Avulsion | <input type="checkbox"/> Snow Avalanche |
| <input type="checkbox"/> Major Catastrophic Landslide | <input type="checkbox"/> Tsunami |

Hazard Acceptability Thresholds Classification, as per Hazard Acceptability Thresholds for Development Approvals by Local Government dated November 1993 by Dr. Peter Cave.

- 1 Approval with conditions relating to hazards.
- 2 Approval, without siting conditions or protective works conditions, but with a covenant including "save harmless" conditions.
- 3 Approval, but with siting requirements to avoid the hazard, or with requirements for protective works to mitigate the hazard.
- 4 Approval as (3) above, but with a covenant including "save harmless" conditions as well as siting conditions, protective works or both.
- 5 Not approvable.

Additional Comments

N/A

BRITISH COLUMBIA BUILDING CODE 2018

SCHEDULE B

Forming Part of Subsection 2.2.7., Division C of the
British Columbia Building Code

Building Permit Number
(for authority having jurisdiction's use)

ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW

- Notes: (i) This letter must be submitted prior to the commencement of construction activities of the components identified below. A separate letter must be submitted by each *registered professional of record*.
(ii) This letter is endorsed by: Architectural Institute of BC, Association of Professional Engineers and Geoscientists of the Province of BC, Building Officials' Association of BC, and Union of BC Municipalities.
(iii) In this letter the words in italics have the same meaning as in the British Columbia Building Code.

To: The *authority having jurisdiction*

Cultus Lake - Fraser Valley Regional District

Name of Jurisdiction (Print)

Re: Proposed Home

Name of Project (Print)

155 First Avenue Cultus Lake BC

Address of Project (Print)

The undersigned hereby gives assurance that the design of the

(Initial those of the items listed below that apply to this *registered professional of record*. All the disciplines will not necessarily be employed on every project.)

☐ ARCHITECTURAL
☒ STRUCTURAL
☒ MECHANICAL
☒ PLUMBING
☒ FIRE SUPPRESSION SYSTEMS
☒ ELECTRICAL
7.1 ☒ GEOTECHNICAL — temporary
8.1 ☒ GEOTECHNICAL — permanent



(Professional's Seal and Signature)

July 12, 2019

Date

components of the plans and supporting documents prepared by this *registered professional of record* in support of the application for the *building* permit as outlined below substantially comply with the British Columbia Building Code and other applicable enactments respecting safety except for construction safety aspects.

The undersigned hereby undertakes to be responsible for *field reviews* of the above referenced components during construction, as indicated on the "SUMMARY OF DESIGN AND FIELD REVIEW REQUIREMENTS" below.

F.V.R.D. BLDG. DEPT
JUL 18 2019

CRP's Initials

BRITISH COLUMBIA BUILDING CODE 2018

Schedule B - Continued

Building Permit Number
(for authority having jurisdiction's use)

155 First Avenue Cultus Lake BC
Project Address

Geotech (7.1, 8.1)
Discipline

The undersigned also undertakes to notify the *authority having jurisdiction* in writing as soon as possible if the undersigned's contract for *field review* is terminated at any time during construction.

I certify that I am a *registered professional* as defined in the British Columbia Building Code.

Collin Johnson P.Eng.

Registered Professional of Record's Name (Print)

Box 274 Agassiz PO

Address (Print)

Agassiz, BC V0M 1A0

Address (Print) (continued)

604-819-9809

Phone Number



July 12, 2019

Date

(If the *Registered Professional of Record* is a member of a firm, complete the following.)

I am a member of the firm Out Of The Box Engineering (DBA 0772308 BC LTD)
and I sign this letter on behalf of the firm. (Print name of firm)

Note: The above letter must be signed by a *registered professional of record*, who is a *registered professional*. The British Columbia Building Code defines a *registered professional* to mean

- (a) a person who is registered or licensed to practise as an architect under the Architects Act, or
- (b) a person who is registered or licensed to practise as a professional engineer under the Engineers and Geoscientists Act.

CRP's Initials

BRITISH COLUMBIA BUILDING CODE 2018

Schedule B - Continued

Building Permit Number
(for authority having jurisdiction's use)

155 First Avenue Cultus Lake BC
Project Address

Geotech (7.1, 8.1)
Discipline

SUMMARY OF DESIGN AND FIELD REVIEW REQUIREMENTS

(Initial applicable discipline below and cross out and initial only those items not applicable to the project.)

ARCHITECTURAL

- 1.1 Fire resisting assemblies
- 1.2 Fire separations and their continuity
- 1.3 Closures, including tightness and operation
- 1.4 Egress systems, including access to exit within suites and floor areas
- 1.5 Performance and physical safety features (guardrails, handrails, etc.)
- 1.6 Structural capacity of architectural components, including anchorage and seismic restraint
- 1.7 Sound control
- 1.8 Landscaping, screening and site grading
- 1.9 Provisions for firefighting access
- 1.10 Access requirements for persons with disabilities
- 1.11 Elevating devices
- 1.12 Functional testing of architecturally related fire emergency systems and devices
- 1.13 Development Permit and conditions therein
- 1.14 Interior signage, including acceptable materials, dimensions and locations
- 1.15 Review of all applicable shop drawings
- 1.16 Interior and exterior finishes
- 1.17 Dampproofing and/or waterproofing of walls and slabs below grade
- 1.18 Roofing and flashings
- 1.19 Wall cladding systems
- 1.20 Condensation control and cavity ventilation
- 1.21 Exterior glazing
- 1.22 Integration of building envelope components
- 1.23 Environmental separation requirements (Part 5)
- 1.24 Building envelope, Part 10 – ASHRAE, NECB or Energy Step Code requirements
- 1.25 Building envelope, testing, confirmation or both as per Part 10 requirements



July 12, 2019

Date

STRUCTURAL

- 2.1 Structural capacity of structural components of the building, including anchorage and seismic restraint
- 2.2 Structural aspects of deep foundations
- 2.3 Review of all applicable shop drawings
- 2.4 Structural aspects of unbonded post-tensioned concrete design and construction

MECHANICAL

- 3.1 HVAC systems and devices, including high building requirements where applicable
- 3.2 Fire dampers at required fire separations
- 3.3 Continuity of fire separations at HVAC penetrations
- 3.4 Functional testing of mechanically related fire emergency systems and devices
- 3.5 Maintenance manuals for mechanical systems
- 3.6 Structural capacity of mechanical components, including anchorage and seismic restraint
- 3.7 Review of all applicable shop drawings
- 3.8 Mechanical systems, Part 10 – ASHRAE, NECB or Energy Step Code requirements
- 3.9 Mechanical systems, testing, confirmation or both as per Part 10 requirements

CRP's Initials

BRITISH COLUMBIA BUILDING CODE 2018

Schedule B - Continued

Building Permit Number
(for authority having jurisdiction's use)

155 First Avenue Cultus Lake BC

Project Address

Geotech (7.1, 8.1)

Discipline

PLUMBING

- 4.1 Roof ~~drainage~~ systems
- 4.2 Site and foundation ~~drainage~~ systems
- 4.3 ~~Plumbing~~ systems and devices
- 4.4 Continuity of fire ~~separations~~ at plumbing penetrations
- 4.5 Functional testing of plumbing related fire emergency systems and devices
- 4.6 Maintenance manuals for ~~plumbing~~ systems
- 4.7 Structural capacity of plumbing components, including anchorage and seismic restraint
- 4.8 Review of all applicable shop drawings
- 4.9 Plumbing systems, Part 10 – ASHRAE, NECB or Energy Step Code requirements
- 4.10 Plumbing systems, testing, confirmation or both as per Part 10 requirements

FIRE SUPPRESSION SYSTEMS

- 5.1 Suppression system classification for type of ~~occupancy~~
- 5.2 Design coverage, including concealed or special areas
- 5.3 Compatibility and location of electrical supervision, ancillary alarm and control devices
- 5.4 Evaluation of the capacity of city (municipal) water supply versus system demands and domestic demand, including pumping devices where necessary
- 5.5 Qualification of welder, quality of welds and material
- 5.6 Review of all applicable shop drawings
- 5.7 Acceptance testing for "Contractor's Material and Test Certificate" as per NFPA Standards
- 5.8 Maintenance program and manual for suppression systems
- 5.9 Structural capacity of sprinkler components, including anchorage and seismic restraint
- 5.10 For partial systems — confirm sprinklers are installed in all areas where required
- 5.11 Fire Department connections and hydrant locations
- 5.12 Fire hose standpipes
- 5.13 Freeze protection measures for fire suppression systems
- 5.14 Functional testing of fire suppression systems and devices

ELECTRICAL

- 6.1 Electrical systems and devices, including high building requirements where applicable
- 6.2 Continuity of fire ~~separations~~ at electrical penetrations
- 6.3 Functional testing of electrical related fire emergency systems and devices
- 6.4 Electrical systems and devices maintenance manuals
- 6.5 Structural capacity of electrical components, including anchorage and seismic restraint
- 6.6 Clearances from ~~buildings~~ of all electrical utility equipment
- 6.7 Fire protection of wiring for emergency systems
- 6.8 Review of all applicable shop drawings
- 6.9 Electrical systems, Part 10 – ASHRAE, NECB or Energy Step Code requirements
- 6.10 Electrical systems, testing, confirmation or both as per Part 10 requirements

GEOTECHNICAL — Temporary

- 7.1 ~~Excavation~~
- 7.2 ~~Shoring~~
- 7.3 ~~Underpinning~~
- 7.4 Temporary construction dewatering

GEOTECHNICAL — Permanent

- 8.1 Bearing capacity of the ~~soil~~
- 8.2 Geotechnical aspects of deep ~~foundations~~
- 8.3 Compaction of engineered fill
- 8.4 Structural considerations of ~~soil~~, including slope stability and seismic loading
- 8.5 ~~Backfill~~
- 8.6 Permanent dewatering
- 8.7 Permanent underpinning



July 12, 2019

Date

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