STAFF REPORT

TO:	CHIEF ADMINISTRATIVE OFFICER
FROM:	BRIGID REYNOLDS, CONSULTING TOWN PLANNER
SUBJECT:	DP2026-04 – 464 MOUNTAIN VIEW CR
MEETING DATE:	JANUARY 27, 2026
SUBJECT PROPERTY:	LOT 23, SECTION 6, RENFREW DISTRICT, PLAN VIP86003 (PID 027-742-679)

PURPOSE

The purpose of this application is to approve a development permit for the construction of a single-family dwelling within the Hazard Lands Development Permit Area (DPA 2).

BACKROUND

The subject property is located on a 931 m2 (0.23 ac) parcel, located at 464 Mountain View Cr. The property is zoned Suburban Residential (R-1). The OCP designates the property as within DPA 2 due to the slope on the property that ranges between 5 to 15 degrees or 9 to 27%. The property is also designated due to the wildfire hazard. This lot is located in the Slopes subdivision.

Reports submitted in support of this application include:

- Geotechnical Hazard Assessment, prepared by Lewkowich Geotechnical Ltd. Dated January 8, 2026
- Wildfire Hazard Assessment for 464 Mountainview Rd, prepared by Inwood Forestry Services, dated December 8, 2025,

Land excavation work started in October 2025 **without prior approval**. As a result, a stop work order was issued November 20th.

Hazard Lands DPA

The OCP designates the property as within DPA 2 due to the slope on the property that ranges between 9 to 27%. The Geotechnical Hazard Assessment confirms that the property is safe for the intended use provided the recommendations in the report are adhered to including oversight by the Geotechnical Engineer at various stages in land clearing and construction. However, land alteration works were started in the fall and a stop work order was issued. Some works continued after the stop work order was issued. Minor land levelling works to avoid erosion and sediment leaving the site were permitted by the contract planner.

A 1.8 m tall stacked rock wall was constructed along the west property line without pre-approval from the Town and was not designed by the Geotechnical Engineer. The geotechnical report states these types of walls can be a rock fall hazard for downslope properties. The report states that stacked rock walls shall have a level (flat) 'no-build' rock fall zone along the based of the wall with a minimum lateral distance equal to the wall height. This stacked retaining wall is not shown on the site plan but its general location has been added by the planner.

The geotechnical engineer has confirmed that this stacked retaining rock wall does meet the requirements. The applicant has stated that this wall will be removed prior to any other land alteration. Approval to remove this retaining wall forms the first phase of this development permit.

The site plan shows additional retaining walls are proposed to be constructed along the east and north side of the property. The submitted drawings show these walls range in height and some appear to measure more that 1.2 m (4 ft). The geotechnical report notes that all retaining walls over 1.2 m in height must be designed by the Geotechnical Engineer. Additionally, Section 4.3.8 of the Zoning Bylaw states the maximum height of retaining walls is 2.0 m. Any proposed retaining wall over 2.0 m in height are not permitted and would require a development variance permit prior to construction.

The OCP designates almost the whole Town as a high wildfire hazard. The DP guidelines provide an exemption for a DP for this hazard when a report prepared by a qualified professional confirming the wildfire risk is low. However, the report prepared by Inwood Forestry Services does not address the DP guidelines and is therefore not eligible for an exemption from this DP. Also, according to the Forest Professionals of BC, the author of the report has not identified that wildfire resiliency as or that they have the credentials to prepare this report. The contract planner has requested this information, but it has not been provided at the time of preparing the report. As a result, the contract planner recommends that these details be submitted prior to the DP being issued.

IMPLICATIONS

a. Financial:

Application fees are collected to cover the cost of processing the application.

b. Policy/Legislation:

The subject property is in Development Permit Area – 2 for hazard lands pursuant to the Official Community Plan.

c. Strategic Priority:
N/A

d. Sustainability:
N/A

e. Communication:
As required by the Development Approval Procedures Bylaw No. 1109, notice of the application was sent to neighbours within 50 m of the subject property a minimum of 10 days prior to Council's consideration of the request. The notice was mailed out on January 16, 2025 and at the time of preparing the staff report no comments have been received.

f. Staffing Implication:
Processing this application is part of the Planning Department's regular duties.

Options

1) Approve the development permit for this application.
2) Approve the development permit with additional requirements.
3) Deny the development permit for this application.

Recommendation

The contract planner recommends option 1 with a phased approach to implementing DP2026-04 for the property located at 464 Mountain View Rd, legally described as Lot 23, Section 6, Renfrew District, Plan VIP86003 (PID 027-742-679) subject to the following conditions:

1. Prior to issuing DP2026-04 the applicant shall provide additional requested information regarding the Wildfire Hazard Assessment report prepared by Inwood Forestry.
2. Prior to any land alteration and building permit issuance:
    a. Register a section 219 covenant including a save harmless clause and the Geotechnical Hazard Assessment prepared by Lewkowich Engineering, dated January 8, 2026 on the certificate of title.
    b. Implement sediment and erosion control measures to prevent sediment from leaving the site and entering the Town's stormwater system.
3. Following confirmation of the registration of the Section 219 covenant, the first land alteration action shall be to remove stacked retaining wall along the west property line.
4. All development shall be in accordance with
    a. Attached site plan
    b. Any retaining wall over 2.0 m in height are not permitted.

c. All recommendations detailed in the Geotechnical Hazard Assessment, prepared by Lewkowich Geotechnical Ltd. dated January 8, 2026 and specifically any retaining wall over 1.2 m in height shall be designed by a geotechnical engineer.
d. All recommendations detailed in the Wildfire Hazard Assessment, prepared by Inwood Forestry Services, dated December 8, 2025.

5. Prior to occupancy permit issuance:
    a. Stormwater requirements require installation of two storm-tec chambers with connections to the storm IC connection. Inspection is required before storm-tec chambers are backfilled.
    b. Submit schedule B letters of assurance from the Geotechnical Engineer for house construction and any retaining wall over 1.2 m in height.

Signed:

Brigid Reynolds

Brigid Reynolds RPP MCIP
Contract Planner

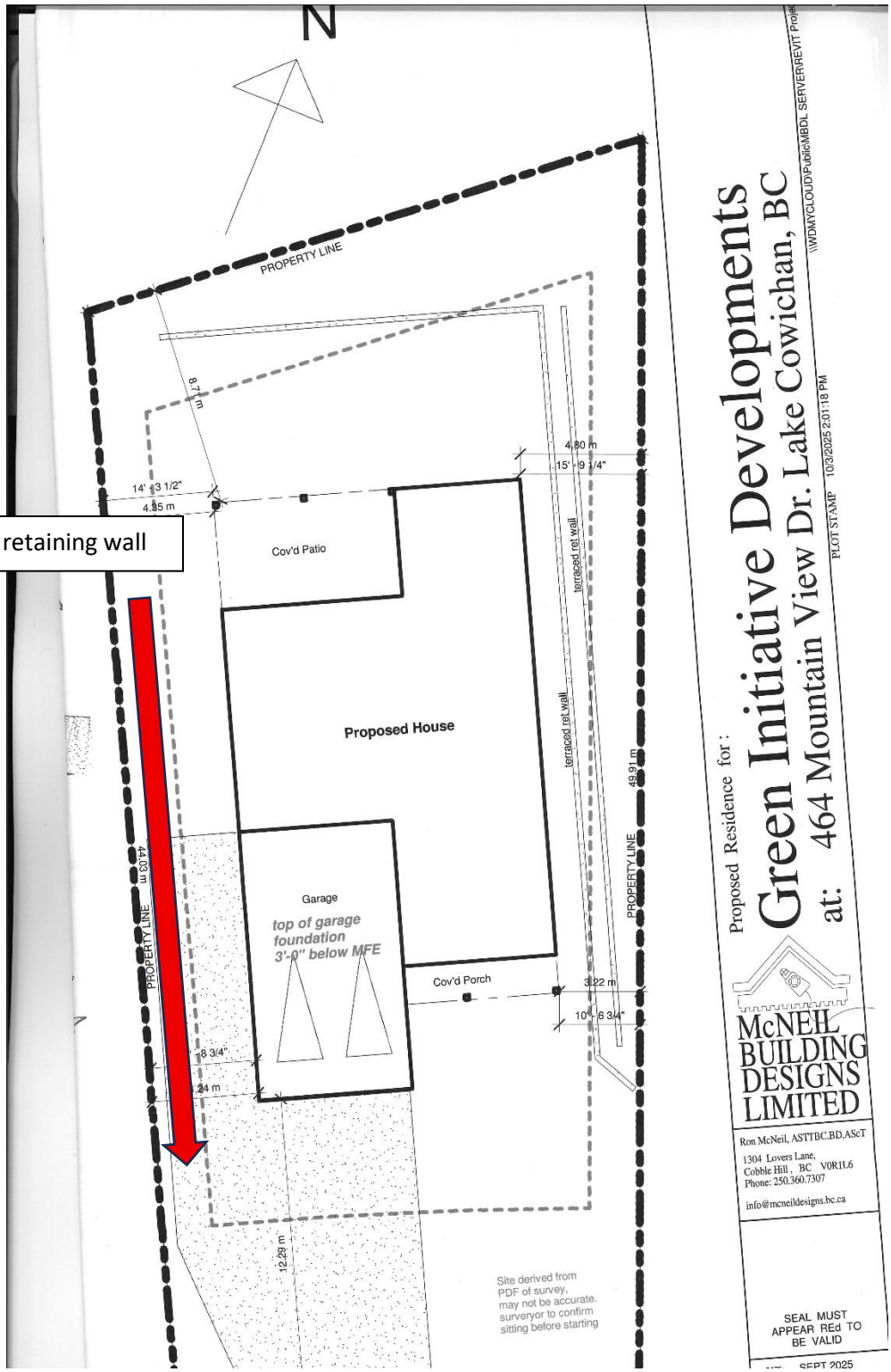
Concurrence:

John T

John Thomas
Chief Administrative Officer

ATTACHMENT 1
SITE PLAN

Unpermitted 1.8 m retaining wall



ATTACHMENT 2
GEOTECHNICAL HAZARD ASSESSMENT PREPARED BY
LEWKOWICH ENGINEERING, DATED JANUARY 8, 2026

ATTACHMENT 3

GEOTECHNICAL HAZARD ASSESSMENT

Single Family Residence

464 Mountain View Drive
Lake Cowichan, BC

Legal Address:
Lot 23, Section 6, Renfrew District,
Plan VIP86003; PID 027-742-679

Prepared For:
Green Initiative Developments
greeninitiativedevelopments@gmail.com

Attention:
Preston Partridge

January 8, 2026

File No.: E5223.01
Revision No.: 00
Prepared by: Stuart Crossfield, P.Geo., P.L.Eng.
Reviewed by: Chris Hudec, M.A.Sc., P.Eng.

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Permit to Practice No.: 1001802

Lewkowich Engineering Associates Ltd.

DISCLAIMER, ACKNOWLEDGEMENTS, AND LIMITATIONS

1. Lewkowich Engineering Associates Ltd. (LEA) acknowledges that this report, from this point forward referred to as "the Report," may be used by the Town of Lake Cowichan (ToLC) as a precondition to the issuance of a development and/or building permit. It is acknowledged that Approving Officers and/or Building Officials of the ToLC may rely on this Report when making a decision on application for development of the land. It is acknowledged that this Report and any conditions contained in the Report may be included in a restrictive covenant under Section 56 of the Community Charter and registered against the title of the property at the discretion of the ToLC.
2. This Report has been prepared in accordance with standard geotechnical engineering practice solely for and at the expense of Green Initiative Developments Ltd. We have not acted for or as an agent of the ToLC in the preparation of this Report.
3. The conclusions and recommendations submitted in this Report are based upon information from relevant publications, a visual site assessment of the property, observed and inferred subsurface conditions, current construction techniques, and generally accepted engineering practices. No other warrantee, expressed or implied, is made. If unanticipated conditions become known during construction or other information pertinent to the development becomes available, the recommendations may be altered or modified in writing by the undersigned.
4. This Report was authored, to the best of our knowledge at the time of issuance, with considerations for local requirements specific to the Authority Having Jurisdiction (AHJ) and their standards for the preparation of such reports, the 2024 British Columbia Building Code (BCBC), and current engineering standards. Updates to bylaws, policies, or requirements of the AHJ, and updates to the BCBC or professional practice guidelines, may impact the validity of this Report.
5. This Report has been prepared by Stuart Crossfield, P.Geo., P.L.Eng., and reviewed by Chris Hudec, M.A.Sc., P.Eng., both adequately experienced and are also members in good standing with the Engineers and Geoscientists of British Columbia (EGBC).

EXECUTIVE SUMMARY

1. The following is a brief synopsis of the property, assessment methods, and findings presented in the Report. The reader must read the Report in its entirety; the reader shall not rely solely on the information provided in this summary.
2. The subject property, 464 Mountain View Drive, Lake Cowichan, from this point forward referred to as "the Property," is located on Vancouver Island within the jurisdictional boundaries of the ToLC. The proposed development for the Property at the time of this Report consists of a new single family residence.
3. A site-specific assessment was conducted to identify any potential geotechnical hazards for the proposed development. Our assessment addresses one potential geotechnical hazard: nearby slopes.
4. The findings confirm the land is considered safe for the use intended, provided the recommendations of this Report are followed.

List of Abbreviations Used in the Report

Abbreviation	Title
AHJ	Authority Having Jurisdiction
BCBC	British Columbia Building Code
CVRD	Cowichan Valley Regional District
DPA	Development Permit Area
EGBC	Engineers and Geoscientists of British Columbia
LEA	Lewkowich Engineering Associates Ltd.
PGA	Peak Ground Acceleration
SLS	Service Limit State
ToLC	Town of Lake Cowichan
ULS	Ultimate Limit State

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 General

a. As requested, LEA has carried out a Geotechnical Hazard Assessment of the subject Property with respect to the proposed development. This Report provides a summary of our findings and recommendations.

1.2 Background

a. We understand the proposed development consists of a new single family residence. We further understand the new residence will be of conventional construction methods, including cast-in-place concrete foundations and a wood-frame superstructure.

b. The Property is located within the jurisdictional limits of the ToLC. The Property is zoned R-1 Suburban. The Property is located within one DPA: Natural Hazard Lands – Floodplain and Steep Slopes (DPA 2). Therefore, we understand a Geotechnical Assessment and report is required to assist in determining what conditions or requirements shall be included in the development permit so that the proposed development is protected from any identified natural hazards and no increase in hazard is posed to existing development on or near the Property. This Report addresses DPA 2 requirements for steep slopes.

1.3 Assessment Methodology

a. This assessment included a desktop review of relevant background information, including applicable ToLC bylaws,[1-2] available development plans, registered covenants on title, aerial photographs, and published geology and topography mapping. We also reviewed published regional-scale natural hazard assessments as commissioned by the CVRD. Please refer to the list of references at the end of this Report.

b. A site reconnaissance was conducted on January 6, 2026, to visually assess site conditions throughout the Property.

c. This assessment was prepared with consideration of the referenced EGBC professional practice guidelines, *Landslide Assessments in British Columbia*.[3] Please refer to the attached EGBC assurance statement.

1.4 Covenant Review

a. As part of our assessment, we have reviewed the legal title of the Property, specifically related to any restrictive covenants that may impact the conclusions or recommendations made in this Report.

b. At the time of this Report, there were no restrictive covenants related to geotechnical hazards registered against the title of the Property.

2.0 SITE CONDITIONS

2.1 Physical Setting

a. The Property is located near the northern limits of the ToLC. The Property is directly bordered by Mountain View Drive to the south and similar R-1 properties in all other directions. See Figure 2.1 below.

Figure 2.1 – Location of the Property (CVRD Maps)

2.2 Terrain and Features

a. In general, the terrain within the Property and surrounding area gently declines from northeast to southwest. Based on available topographic information, the site survey plan (attached) and on-site measurements, the average natural slope angles range from 5 to 15 degrees from horizontal.

b. The Property is near-rectangular with dimensions of approximately 45m long by 20m wide.

c. The Property was previously cleared of vegetation and excavated, and is now covered with granular soils. There is a 1.8m rock retaining wall along the west and Property line described further in Section 2.4.

2.3 Regional Geology

a. Surficial geology mapping for the area indicates the Property falls within an area of predominately moraine deposits consisting of well-drained gravelly sandy loam, with minor fluvial deposits consisting of rapidly-drained very gravelly loamy sand.[4]

b. Bedrock geology mapping for the area indicates the rock is classified as undivided sedimentary rocks from the upper Cretaceous period, generally consisting of boulder, cobble, and pebble conglomerate, coarse to fine sandstone, siltstone, shale, and/or coal. To the north, the rock transitions to the Sicker Group, Nitinat Formation, comprised of calc-alkaline volcanic rock from the middle to upper Devonian period, generally consisting of pyroxene-feldspar phyric agglomerate, breccia, lapilli tuff, massive and pillowed flows, massive tuffite, laminated tuff, jasper, and chert.[5]

2.4 Soil Conditions

a. A subsurface investigation was not completed as part of this assessment. The site reconnaissance allowed for observation of recent excavation and soil exposures throughout the Property. We also reviewed subsurface information from other developments in the immediate area.

b. Based on surficial geology, observed conditions, and LEA experience in the immediate area, we note subsurface soil conditions consist of thin deposits of surficial granular overburden, overlying dense to very dense till-like soil (i.e., silty sand and gravel, cobble) within approximately 0.5 to 1.0m from the ground surface.

c. We observed a 1.8m tall stacked rock wall along the west side of the Property, supporting undocumented reworked fills, comprised of naturally deposited till-like soils cut out from the east side of the property. Small stockpiles of fill were observed including large boulders. The depth to competent till-like soil may be greater in areas of fill. See Figures 2.4.1 to 2.4.3 for general site photos below.

Figure 2.4.1 – Overview of Property from Mountain View Road, looking north.

Figure 2.4.2 – Rear of Property showing existing excavations to dense till soils, looking north.

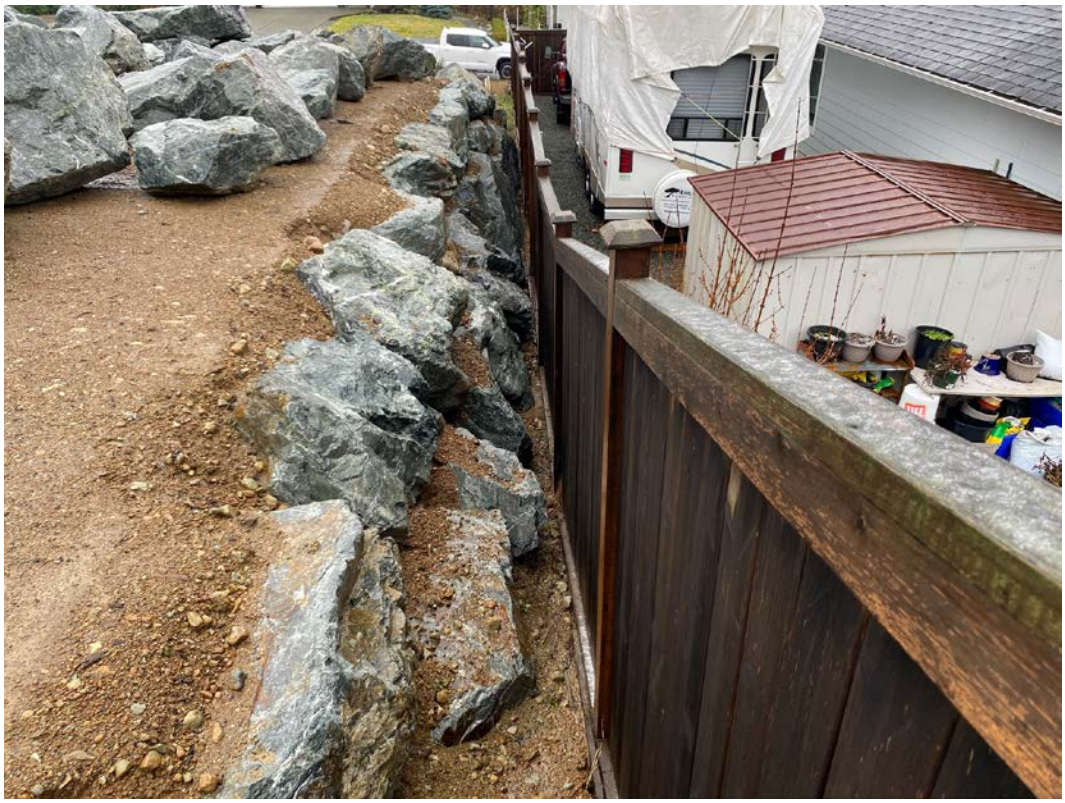


Figure 2.4.3 – West Property boundary showing 1.8m stacked rock wall and fill above, looking south.

2.5 Groundwater Conditions

a. There was no surface water or abnormal groundwater conditions observed during the site reconnaissance.

b. Considering the shallow glacial till subgrade, we expect a shallow perched groundwater table will be seasonally present.

c. Groundwater levels can be expected to fluctuate seasonally with cycles of precipitation. Groundwater conditions at other times and locations can differ from those observed within the time of our investigation.

3.0 SLOPE HAZARD ASSESSMENT

3.1 Debris Slides, Debris Flows, and Debris Floods

a. The Property is located down-slope of the north slope of Cowichan Lake. Therefore, as part of our assessment, we reviewed the referenced regional-scale natural hazard assessments, as commissioned by the CVRD, to determine if the Property is within a mapped debris slide, debris flow, and/or debris flood area, which would necessitate further study. A detailed debris slide, debris flow, and/or debris flood assessment was not completed and is beyond the scope of this Report.

b. We reviewed the referenced ebbwater/Palmer report entitled *Geohazard Risk Assessment North Slope of*

Cowichan Lake report,[6] as well as the more recent Stantec/Palmer report entitled *Debris Flow Runout Model: North Shore Cowichan Lake*.[7] The Stantec/Palmer report predicts the maximum runout limits of modeled debris flows from upslope landslides using LABS software, to a maximum annual encounter probability of 1:6,000 (i.e., 0.8% in 50 year probability).

c. Based on these assessments, the Property is not within any predicted debris flow runout extents.

d. Based on our review of the aforementioned publications, we conclude the chance of a life-threatening / catastrophic debris slide, debris flow, or debris flood event impacting the proposed development area is low, and no further assessment is required.

3.2 Slope Discussions

a. Detailed slope stability analyses are generally required when development is proposed near the top, bottom, or on soil slopes that are steeper than 2H:1V (27 degrees or 50%), or where indicators of global instability are present.

b. The slopes within the Property and the immediate surrounding areas gently decline at average slope angles ranging from 5 to 15 degrees (9 to 27%). Subsurface conditions consist of surficial compact to dense granular overburden and fill, overlying very dense glacial till at shallow depth. Groundwater was not identified during our assessment. The slopes were inspected for indicators of global instability and none were observed.

c. Considering the slopes within and immediately surrounding the Property are less than 2H:1V and there were no indicators of global instability, global slope stability is not a hazard for the Property and proposed development.

d. It should be noted that landslides can be triggered by human activity (i.e. excavation, placement of fill, removal of vegetation, etc.) or by failure of civil infrastructure (i.e. leakage or rupture of water and sewer mains, stormwater disposal from existing development, etc.). The concentrated discharge of collected stormwater can lead to erosion, earth movement, or slope failure.

4.0 DESIGN PHASE

4.1 Foundation Design

a. Prior to construction, the foundation areas should be stripped to remove all unsuitable materials to provide an undisturbed natural subgrade for footing support.

b. Foundation loads should be supported on natural undisturbed material or structural fill, approved for use as a bearing stratum by our office, and may be designed using the following values.

   i. For foundations constructed on dense, naturally deposited, glacial till subgrade, or on structural fill,

placed and compacted as outlined in Section 5.3 below, an SLS bearing pressure of 150 kPa and a ULS of 225 kPa may be used for design purposes. These values assume a minimum 0.45m footing embedment depth.

c. Exterior footings should be provided with a minimum 0.45m depth of ground cover for frost protection.

d. The Geotechnical Engineer should evaluate the bearing soils at the time of construction to confirm that footings are based on appropriate and properly prepared founding material.

4.2 Seismic Criteria

a. Based on the 2024 BCBC (Division B, Part 4, Section 4.1.8.4.), the observed and inferred subsurface conditions would be designated as "Site Class C" (very dense soil or soft rock).

4.3 Lateral Earth Pressures

a. Any retaining wall construction within the Property shall be reviewed by the Structural and/or Geotechnical Engineer(s).

b. Lateral earth pressure coefficients (K) for the design of yielding cast-in-place retaining walls and basement walls are outlined below. It is assumed that there will be a level (0 degree from horizontal) backslope and no additional surcharge on the wall. It is noted that the methods employed are estimates and further analysis may be required after dimensions of the proposed structure have been determined.

c. An average soil friction angle of 30 degrees has been used to calculate the lateral earth pressure coefficients. It is assumed that retained soils are free-draining, well compacted, cohesionless sands and gravels, with a unit weight of 21 kN/m^3.

d. The seismic condition is based on 2020 National Building Code interpolated seismic hazard values for the Property location, a Site Class C site designation, and a 2% in 50-year probability design seismic event, which results in a PGA of 0.689g.

e. The Mononobe-Okabe (M-O) Method has been used to calculate the seismic active lateral earth pressure coefficient. The static active lateral earth pressure coefficient has been calculated using Coulomb's theory. The static passive lateral earth pressure coefficient has been calculated using Rankine's theory.

Table 4.3.1 – Lateral Earth Pressure Coefficients

Lateral Earth Pressure Condition	Earth Pressure Coefficient (K)	
Static Active	Ka	0.30
Static Passive	Kp	3.00
Seismic Active	Kae	0.62

f. The total thrust resulting from lateral earth pressures under each condition can be calculated using the following relationship.

Table 4.3.2 – Calculation for Lateral Earth Pressures

$P = 0.5\ K\ \gamma\ H^2$
P = Total Thrust (kN/m Length of Wall)
K = Earth Pressure Coefficient
γ = Soil Unit Weight (kN/m^3)
H = Height of Wall (m)

g. The seismic active coefficient provides a value that combines both static and dynamic forces to determine total active thrust (Pae). The static component (Pa) acts through a point that is approximately H/3 above the toe of the wall. The dynamic component (ΔPae) acts through a point at approximately 0.6H above the toe of the wall. The total active thrust may then be considered to act at a height from the base of the wall using the following relationship.

Table 4.3.3 – Height from base of wall for Total Active Thrust

$h = [\ Pa\ (H/3) + \Delta Pae\ (0.6H)\ ] \div Pae$
h = Height from Base of Wall (m)
Pae = Total Active Thrust (kN/m)
Pa = Static Active Thrust (kN/m)
ΔPae = Pae – Pa = Dynamic Active Thrust (kN/m)

h. The presented values assume fully drained conditions, through the use of free-draining backfill and foundation drainage.

5.0 CONSTRUCTION PHASE

5.1 Site Grading

a. Considering the gently sloping topography of the land, we expect that some land terracing, cut/fill operations, and/or retaining walls may be required as part of the development. We note the site has already undertaken some land terracing and stacked rock retaining wall.

b. Any permanent soil slopes, created through either cut or fill operations, should not exceed 2H:1V for maintenance-free slopes, subject to geotechnical review. Steeper slopes are possible with the use of engineered fill and/or geosynthetic reinforcement, subject to design by a Geotechnical Engineer.

c. Any permanent soil slopes should be finished with erosion protection measures. Acceptable erosion protection measures include vegetation, rock armouring, and/or erosion control blankets. Other methods of erosion protection may be considered upon request.

d. Adequate setback / subjacent support shall be reviewed by a Geotechnical Engineer for any foundations in proximity to localized slopes or retaining walls.

e. Any proposed retaining walls exceeding 1.2m in height must be designed by a Structural and/or Geotechnical Engineer. Setbacks and/or deepened foundations are generally required for buildings in proximity to downslope retaining walls. As a rule of thumb, buildings should be set back a minimum of 1.5x the wall height from the top of wall. This applies to the existing stacked rock wall along the southern property limit.

f. Stacked rock walls could present a rockfall hazard for downslope development. Therefore, all stacked rock walls shall include a level (flat) "no-build" rockfall zone along the base of the wall with a minimum lateral distance equal to the wall height.

g. LEA shall be consulted prior to the re-use of any on-site materials, for re-use as structural fill, permanent slopes, retaining wall backfill, or otherwise

5.2 General Excavation – Future Building Site

a. Prior to construction, all unsuitable materials should be removed beneath building areas to provide a suitable base of support. Unsuitable materials include any non-mineral material such as vegetation, topsoil, peat, fill, or other materials containing organic matter, as well as any soft, loose, or disturbed soils.

b. Ground water ingressing into any excavations should be controlled with a perimeter ditch located just outside of the building areas, connected to positive drainage.

c. Alluvially deposited fine-grained soils (silt and clay) are particularly moisture sensitive. Extended periods of saturated soil conditions can make these soils unsuitable for bearing purposes, where they could be suitable bearing surfaces when moist or damp. Exposure of these soils to water after excavation (rain or snow) can also make these soils unsuitable for bearing purposes. Therefore, weather conditions dictate whether these soils are suitable for bearing purposes at the time of construction.

d. Prior to placement of concrete footings, any bearing soil that has been softened, loosened, or otherwise disturbed during the course of construction, should be removed or else compacted following our recommendations for structural fill. Compaction will only be feasible if the soil has suitable moisture content and if there is access to heavy compaction equipment. If no structural fill is placed, a smooth-bladed clean up bucket should be used to finish the excavation.

e. The Geotechnical Engineer is to confirm the removal of all unsuitable materials and approve the exposed competent inorganic subgrade, prior to the placement of any structural fill materials.

5.3 Structural Fill

a. Where fill is required to raise areas that will support buildings, foundations, or slabs, structural fill should

be used. The Geotechnical Engineer should first approve the exposed subgrade in fill areas, to confirm the removal of all unsuitable materials.

b. Structural fill should be inorganic sand and gravel. If structural fill placement is to be carried out during the wet season, material with a fines content limited to 5% passing the 75µm sieve should be used, as such a material will not be overly sensitive to moisture, allowing compaction during rainy periods of weather.

c. Structural fill should be compacted to a minimum of 95% of Modified Proctor maximum dry density (ASTM D1557) in foundation and slab areas.

d. Structural fill under foundations and slabs should include the zone defined by a plane extending down and outward a minimum 0.5m from the outer edge of the foundation at an angle of 45 degrees from horizontal to ensure adequate subjacent support. This support zone is shown in Figure 5.3 below.

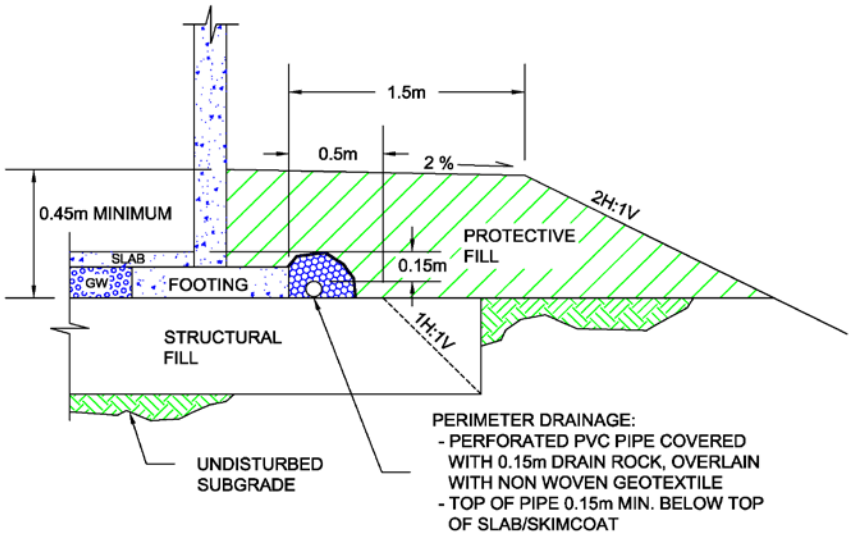


Figure 5.3 – Typical section for structural fill

e. Compaction of fill should include moisture conditioning as needed to bring the fill to the optimum moisture content and compacted using vibratory compaction equipment in lift thicknesses appropriate for the size and type of compaction equipment used.

f. A general guideline for maximum lift thickness is no more than 100mm for light hand equipment such as a "jumping-jack," 200mm for a small roller, and 300mm for a large roller or heavy (>500 kg) vibratory plate compactor or a backhoe mounted hoe-pac or a large excavator mounted hoe-pac, as measured loose.

g. It should be emphasized that the long-term performance of foundations and slabs is highly dependent on the correct placement and compaction of underlying structural fill. Consequently, we recommend that structural fill be observed and approved by the Geotechnical Engineer. This would include approval of the proposed fill materials and performing a suitable program of compaction testing during construction.

5.4 Foundation Drainage

a. Our assessment did not identify any abnormal groundwater conditions that would necessitate special foundation drainage measures outside of Part 9 of the 2024 BCBC. Conventional requirements of the 2024 BCBC pertaining to building drainage are considered suitable at this site.

b. In addition to BCBC requirements, a layer of non-woven geotextile with a minimum weight of 140 g/m2 shall be placed between the 150mm thick drain rock layer and the foundation backfill in order to prevent the migration of fine-grained soil particles into the drainage system.

c. Where below grade living space is present, a HDPE dimpled drainage membrane shall also be installed against the exterior of foundation walls. The drainage membrane shall be installed as per manufacturer specifications (with the membrane's fabric layer facing out / facing the backfill).

d. Alternatively, clear gravel fill could be used as foundation backfill, as approved by the Geotechnical Engineer. Clear gravel fill is typically specified as having less than 10% fines content (i.e., <10% passing the #4 / 4.75mm sieve).

e. The final site grades shall be sloped to direct surface water away from the building and foundation areas.

f. The Geotechnical Engineer is to confirm the correct installation of foundation drainage during construction.

5.5 Stormwater Management

a. We understand that runoff from roof drains and perimeter foundation drains will be collected and piped to the municipal storm sewer system.

6.0 CONCLUSIONS

6.1 Local Government Conformance Statement

a. From a geotechnical point of view, and provided the recommendations in this Report are followed, the land is considered safe for the use intended (defined for the purposes of this Report as a new single-family residence), with the probability of a geotechnical failure resulting in property damage of less than:

   i. 2% in 50 years for geotechnical hazards due to seismic events, including slope stability; and

   ii. 10% in 50 years for all other geotechnical hazards.

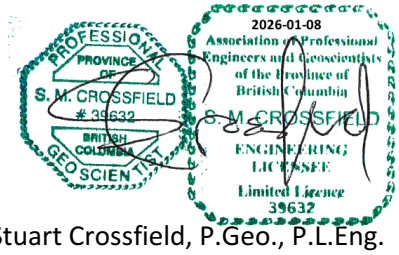
6.2 Geotechnical Quality Assurance

a. The ToLC may request a Geotechnical Engineer to provide professional assurance services during the course of construction. Geotechnical assurance services include review of the geotechnical components of the plans and supporting documents, and responsibility for field reviews of those components during construction.

7.0 CLOSURE

a. Lewkowich Engineering Associates Ltd. appreciates the opportunity to be of service on this project. If you have any comments, or additional requirements at this time, please contact us at your convenience.

Respectfully Submitted,
Lewkowich Engineering Associates Ltd.



Stuart Crossfield, P.Geo., P.L.Eng.
Engineering Geologist

Reviewed By:

January 8, 2026

Chris Hudec, M.A.Sc., P.Eng.
Senior Project Engineer

8.0 ATTACHMENTS

1. Kenyon Wilson Professional Land Surveyors, “Proposed Dwelling Locations For Lot 23, Section 6, Renfrew District, Plan VIP86003”, PID: 027-742-679, Dated November 24, 2025.
2. 2020 National Building Code of Canada Seismic Hazard Values.
3. EGBC, Landslide Assurance Statement.

9.0 REFERENCES

1. Town of Lake Cowichan, Official Community Plan, Bylaw No. 1097-2023, adopted March 26, 2024.
2. Town of Lake Cowichan, Zoning Bylaw No. 1055-2021, consolidated November 26, 2024.
3. EGBC, Landslide Assessments in BC, Ver 4.1, dated March 1, 2023.
4. BC Ministry of Environment, Soils of South Vancouver Island British Columbia, Soil Survey Report No. 44, Sheet 2, 1986.
5. Province of BC, interactive GIS web-map, iMapBC, accessed August 2025.
6. Ebbwater Consulting, with geohazard analysis by Palmer Environmental Consulting, Geotechnical Risk Assessment North Slope of Cowichan Lake, Proj No. P099, dated May 7, 2019.
7. Palmer Environmental Consulting and Stantec Consulting, Debris Flow Runout Model: North Shore Cowichan Lake, dated April 14, 2020.
8. Province of British Columbia, Ministry of Water, Land, and Air Protection, Flood Hazard Area Land Use Management Guidelines, amended by the Ministry of Forests, Lands, Natural Resource Operations, and Rural Development, dated January 1, 2028.

PROPOSED DWELLING LOCATION FOR LOT 23, SECTION 6, RENFREW DISTRICT, PLAN VIP86003

SCALE 1 : 250

5 0 5 10 metres

All distances are in metres unless otherwise shown.

"Approximate"
- wood stake falls in dirt pile
- ground elev. prorated.

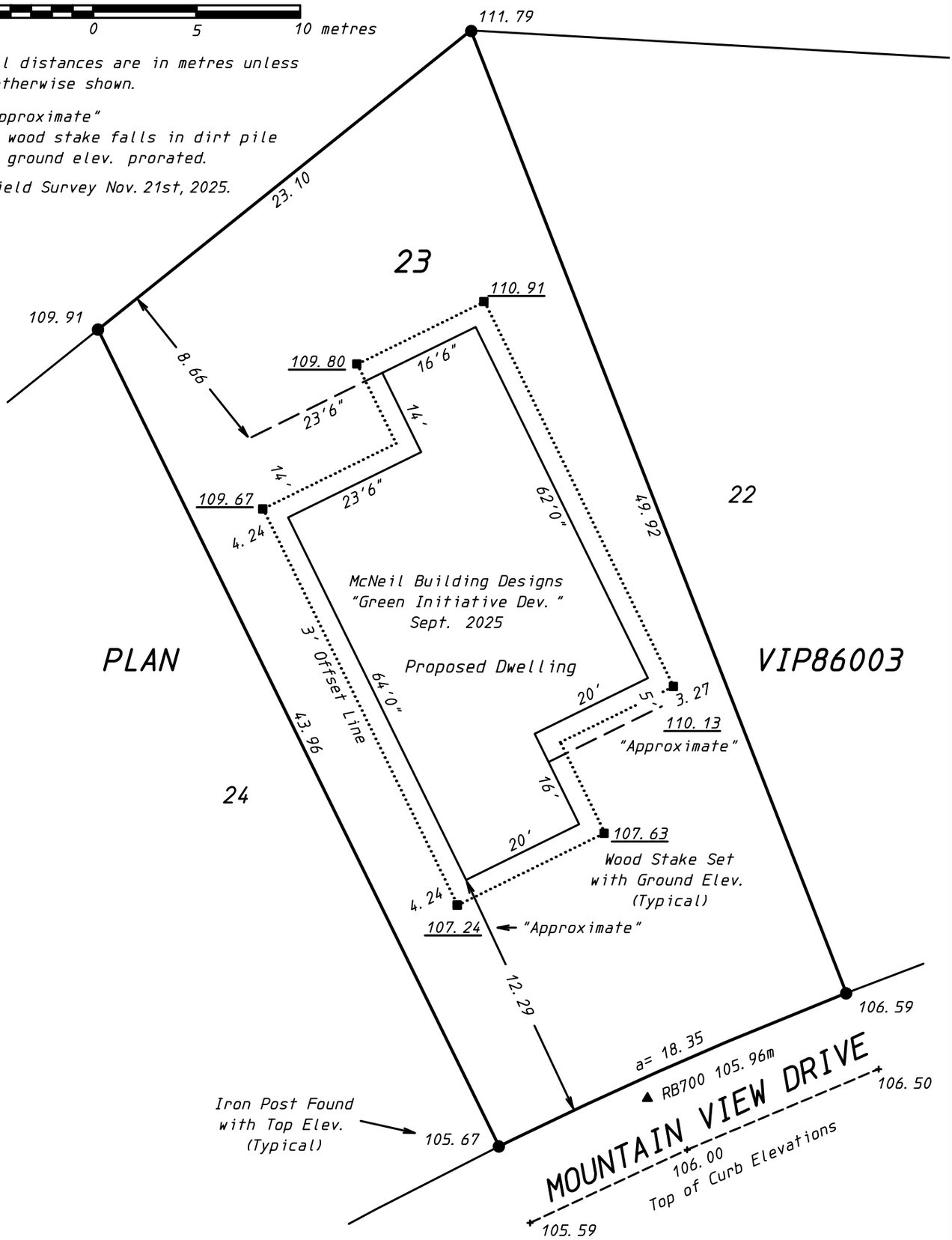
Field Survey Nov. 21st, 2025.

Note: Lot 23 lies within the Town of Lake Cowichan and is Zoned R-1.

Bylaw setback requirements are as follows:

Single unit Residential and Accessory Use

Front	7.5 m
Side (Interior)	2.0 m
Side (Exterior)	3.0 m
Rear	4.5 m



Elevations are derived from RB700 with an assumed Elevation of 105.96 metres

Average Existing Grade was calculated based upon Elevations at Proposed Building Corners shown thus 107.63

Average Natural Grade	109.23 m	
Maximum Permitted Building Height	11.0 m	"To be Confirmed"
Maximum Peak Elevation	120.23 m	

KENYON WILSON
PROFESSIONAL LAND SURVEYORS
156-B GOVERNMENT STREET
DUNCAN, B.C. V9L 1A2 (250) 746-4745

FILE 25-9399.CHK Nov. 24th, 2025

Government of Canada Gouvernement du Canada

Canada.ca › Natural Resources Canada › Earthquakes Canada

2025 - 2020 National Building Code of Canada Seismic Hazard Tool

This application provides seismic values for the design of buildings in Canada under Part 4 of the National Building Code of Canada (NBC) 2020 and 2025, as prescribed in Article 1.1.3.1. of Division B of the respective NBC editions.

Seismic Hazard Values

User requested values

Code edition	NBC 2020
Site designation X_S	X_C
Latitude (°)	48.837
Longitude (°)	-124.052

Please select one of the tabs below.

NBC 2020 | Additional Values | Plots | API | Background Information

The NBC 5% damped spectral acceleration values can be viewed in the NBC tab. Additional hazard values for your site can be found below.

The 5%-damped spectral acceleration ($S_a(T)$, where T is the period, in s) and peak ground acceleration (PGA) values are given in units of acceleration due to gravity (g, 9.81 m/s^2). Peak ground velocity (PGV) is given in m/s. Probability is expressed in terms of percent (%) exceedance in 50 years.

By default, all probabilities for the user-specified site designation are shown. Other site designations can be selected from the respective drop-down menu in the table. In low

hazard regions, a minimum value of 0.001g for T ≤ 2.0s and of 0.0001g for T > 2.0s is assigned. Further information on the calculation of seismic hazard is provided in the *Background Information* tab.

Site Designation: XC	Probability: All	$S_a(0.05)$	$S_a(0.1)$	$S_a(0.2)$	$S_a(0.3)$	$S_a(0.5)$	$S_a(1.0)$	$S_a(2.0)$	$S_a(5.0)$	$S_a(10.0)$	PGA	PGV
X_C	40	0.181	0.265	0.314	0.299	0.218	0.107	0.0461	0.0101	0.00334	0.135	0.112
X_C	30	0.232	0.339	0.4	0.385	0.285	0.142	0.0622	0.0137	0.00469	0.173	0.147
X_C	20	0.31	0.451	0.534	0.525	0.399	0.205	0.093	0.0208	0.00734	0.232	0.208
X_C	14	0.385	0.559	0.664	0.665	0.521	0.276	0.132	0.0297	0.0106	0.289	0.274
X_C	10	0.462	0.67	0.799	0.813	0.654	0.357	0.182	0.041	0.0146	0.348	0.348
X_C	7	0.549	0.797	0.954	0.988	0.812	0.457	0.249	0.0563	0.0199	0.415	0.438
X_C	5	0.639	0.927	1.11	1.17	0.978	0.563	0.323	0.0742	0.026	0.482	0.536
X_C	3.5	0.739	1.08	1.3	1.38	1.17	0.684	0.411	0.0972	0.0346	0.558	0.651
X_C	2.5	0.843	1.23	1.48	1.6	1.36	0.808	0.503	0.123	0.0454	0.636	0.772
X_C	2	0.914	1.34	1.61	1.75	1.5	0.895	0.568	0.143	0.0546	0.689	0.859

Download CSV

← Go back to the seismic hazard calculator form

Date modified: 2025-12-09

LANDSLIDE ASSESSMENT ASSURANCE STATEMENT

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

To: The Approving Authority (or Client)

File No.: E5223.01

Date: January 8, 2026

Town of Lake Cowichan

39 South Shore Road, PO Box 860, Lake Cowichan, BC V0R 2G0

Jurisdiction/name and address

With reference to (CHECK ONE):

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

For the following property (the "Property"):

464 Mountain View Drive, Lake Cowichan

Civic address of the Property

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

I have signed, authenticated, and dated, and thereby certified, the attached Landslide Assessment Report on the Property in accordance with the guidelines. That report must be read in conjunction this statement.

In preparing that report I have:

[CHECK TO THE LEFT OF APPLICABLE ITEMS]

- ☑ 1. Collected and reviewed appropriate background information
- ☑ 2. Reviewed the proposed Residential Development or other development on the Property
- ☑ 3. Conducted field work on and, if required, beyond the Property
- ☑ 4. Reported on the results of the field work on and, if required, beyond the Property
- ☑ 5. Considered any changed conditions on and, if required, beyond the Property
- 6. For a Landslide Hazard analysis or Landslide Risk analysis, I have:
  - ☑ 6.1 reviewed and characterized, if appropriate, any Landslide that may affect the Property
  - ☑ 6.2 estimated the Landslide Hazard
  - ☑ 6.3 identified existing and anticipated future Elements at Risk on and, if required, beyond the Property
  - ☑ 6.4 estimated the potential Consequences to those Elements at Risk
- 7. Where the Approving Authority has adopted a Level of Landslide Safety, I have:
  - ☐ 7.1 compared the Level of Landslide Safety adopted by the Approving Authority with the findings of my investigation
  - ☐ 7.2 made a finding on the Level of Landslide Safety on the Property based on the comparison
  - ☐ 7.3 made recommendations to reduce Landslide Hazards and/or Landslide Risks

8. Where the Approving Authority has **not** adopted a Level of Landslide Safety, or where the Landslide Assessment is not produced in response to a legislated requirement, I have:
   - ☑ 8.1 described the method of Landslide Hazard analysis or Landslide Risk analysis used
   - ☑ 8.2 referred to an appropriate and identified provincial, national, or international guideline for Level of Landslide Safety
   - ☑ 8.3 compared those guidelines (per item 8.2) with the findings of my investigation
   - ☑ 8.4 made a finding on the Level of Landslide Safety on the Property based on the comparison
   - ☐ 8.5 made recommendations to reduce Landslide Hazards and/or Landslide Risks
- ☐ 9. Reported on the requirements for future inspections of the Property and recommended who should conduct those inspections

Based on my comparison between:

[CHECK ONE]

- ☐ the findings from the investigation and the adopted Level of Landslide Safety (item 7.2 above)
- ☑ the appropriate and identified provincial, national, or international guideline for Level of Landslide Safety (item 8.4 above)

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

A. SUBDIVISION APPROVAL

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

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

B. DEVELOPMENT PERMIT

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

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

C. BUILDING PERMIT

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

  [CHECK ONE]
  - ☐ with one or more recommended additional registered Covenants
  - ☑ without any additional registered Covenant(s)

[1] When seismic slope stability assessments are involved, Level of Landslide Safety is considered to be a "life safety" criteria, as described in Commentary JJJ of the *National Building Code of Canada* (*NBC) 2015*, Structural Commentaries (User's Guide – NBC 2015: part 4 of division B). This states:

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

Stuart Crossfield, P.Geo., P.L.Eng
Name (print)

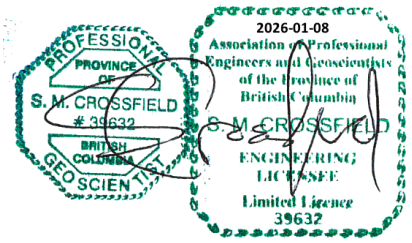
January 8, 2026
Date

1900 Boxwood Road
Address

Nanaimo, BC V9S 5Y2

250-756-0355
Telephone

geotech@lewkowich.com
Email



(Affix PROFESSIONAL SEAL and signature here)

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

I am a member of the firm Lewkowich Engineering Associates Ltd.
(Print name of firm)

with Permit to Practice Number 1001802
(Print permit to practice number)

and I sign this letter on behalf of the firm.

WILDFIRE HAZARD ASSESSMENT FOR 464 MOUNTAINVIEW ROAD

December 8, 2025

Inwood Forestry Services Ltd.

WILDFIRE HAZARD ASSESSMENT FOR 464 MOUNTAINVIEW ROAD

Prepared for:

Section 22 - Disclosure harmful to Personal Privacy

Prepared by:

Inwood Forestry Services Ltd.

5753 Menzies Rd

Duncan BC

V9L 6G7

inwoodforestry@gmail.com

WILDFIRE HAZARD ASSESSMENT FOR 464 MOUNTAINVIEW ROAD

Introduction

In accordance with the town of Lake Cowichan requirements, [redacted] retained Inwood Forestry Services Ltd. (Fraser Grey, RPF) to conduct a wildfire hazard assessment for a proposed house build at 464 Mountainview Rd.

Hazard Assessment

This report covers vegetation and terrain on and around the subject site and provides recommendations on how to reduce the risk of wildfire. Assessment criteria are based on the Home Ignition Zone Assessment by FireSmart Canada.

Field Inspection

Inwood Forestry Services Ltd. conducted a site visit on December 6, 2025 to assess the site and wildfire hazards. From the proposed build site, the extended zone (10-30m from proposed dwelling) was the focus of this inspection. This is based on criteria by FireSmart Canada (see figure 1 and 2).

Location and Description of Proposal Area

The property owner would like to build a house on a gentle slope with established homes on the surrounding lots.

The site of the proposed build is located in the Coastal Western Hemlock (CWH) bio-geoclimatic zone. This zone is characterized by high annual precipitation, cool and wet winters with mild and relatively dry summers. It is characterized by mature second growth Western Hemlock, Big Leaf Maple, Douglas Fir, Alder and Cottonwood. The understorey is comprised of Dull Oregon Grape, Sword Fern, Bracken Fern, Cascara, Vanilla Leaf, Huckleberry, Salmonberry and a minor component of coniferous species.

Fire Hazard Assessment

Forest vegetation

Within a 10-30m radius of the proposed dwelling, the majority of vegetation has been completely cleared to make way for construction. The only vegetation on the lot were several small alder at the north-west corner along a neighbouring fenceline (see figure 3). These do not pose a threat to wildfire safety.

In the neighbouring lots to the north and east there were several conifers which appeared to be well spaced and had been pruned to 2m.

Surface vegetation

Most of the surface vegetation on this site has been removed to accommodate for the proposed dwelling (see figure 4 and 5). It is recommended, that any grass planted in the future be kept to a height of 10cm or less according to Firesmart Canada recommendations.

Woodpiles and other combustibles

During the site inspection, there were no woodpiles or combustibles found within a 10m perimeter of the proposed dwelling other than building materials.

Fire Hazard Abatement Recommendations

Due to the fact that the vegetation has been cleared from this lot, no work is needed at this time to abate the fire hazard at 464 Mountainview Rd. The following are recommendations for future lot development and planning.

- Follow Firesmart Canada recommendations for plants to avoid planting (see figure 6)
- Maintain a 10m perimeter free of combustibles such as woodpiles and coniferous trees
- Ensure that accumulations of leaves, branches and dry grass are removed

Limitations

This report provides an assessment of site conditions based on field observation. Evaluation and results are based on professional judgment. Recommended treatment pertains only to the particular site as disclosed at the time of inspection. The report was prepared considering site-specific circumstances and conditions. It is intended only for use by the client for the purpose for which it was commissioned and for use by local government regulating the activities to which it pertains.

Figure 1: Home Ignition Zone Assessment from Firesmart Canada, showing Immediate, Intermediate and Extended zones.

Extended Zone (10 - 30 metres)

The focus in the Extended Zone is not to eliminate the possibility of fire, but to reduce its intensity.

Surface vegetation
Regularly remove accumulations of branches, dry grass, and pine needles.

Forest vegetation
- Ensure conifer crown spacing is at least 3 metres apart
- Prune conifer branches to 2m from the ground

Figure 2: Extended zone recommendations according to FireSmart Canada.

Figure 3: Small alders along north-west corner of lot.

Figure 4: Vegetation cleared from lot for construction purposes.

Figure 5: Vegetation cleared from lot for construction purposes.

Fire Hazard Plants

Common Name	Scientific Name	Risk Level	Leaf Type
Arborvitae (Cedar)	Thuja spp.	Highest Risk	C
Broom	Genista spp.	Highest Risk	B
Cedrus	Cedar spp.	Highest Risk	C
Douglas Fir	Pseudotsuga menziesii	Highest Risk	C
Firs	Abies spp.	Highest Risk	C
Fountain Grass	Pennisetum spp.	Highest Risk	
Holly	Ilex spp.	Highest Risk	B
Juniper	Juniperus spp.	Highest Risk	C
Pampas Grass	Cortaderia selloana	Highest Risk	
Pine	Pinus spp.	Highest Risk	C
Ponderosa Pine	Pinus ponderosa	Higher Risk	C
Spruce	Picea spp.	Highest Risk	C
Larch	Larix spp.	High Risk	D
Yew	Taxus spp.	Highest Risk	C

Figure 6: Fire Hazard Plants List according to FireSmart Canada