



Geotechnical Report Guide

IMPORTANT INFORMATION FOR THE APPLICANT:

When processing development applications with geotechnical hazards (e.g. erosion, land slip, debris flows, debris torrents, mud flows, rock falls, or subsidence) the Town of Comox relies on expert professional opinions and recommendations in a report prepared by a geotechnical engineer or geoscientist who has reviewed the proposed development. The professional's report may become part of a legal document such as a covenant or permit. The purpose of this Guide is to outline the necessary elements of a Geotechnical Report for use by the Town of Comox.

Prior to engaging the services of a professional to produce a Geotechnical Report for your development, provide your engineer or geoscientist with this Guide. Before you commission the writing of any report, it's recommended that you obtain an acknowledgement from your professional that they have read and are able to comply with the report requirements contained in this Guide. For your convenience, an acknowledgement form is provided in Schedule 1 on page 6 of this Guide.¹

We would be happy to speak with your professional if they have any questions about the Town's requirements for a Geotechnical Report. Please call the Planning Department at 250-339-1118.

CONTEXT:

The authority to require a geotechnical report may be found in a variety of statutes, bylaws, and regulations. Geotechnical Reports may be required in the course of processing applications for development permit, rezoning, development variance permit, subdivision and building permit. Some reports will need to address requirements from multiple sources, depending on the nature of the development.

(Requirements for a Flood Assessment Report in relation to an application for Exemption from the Town of Comox Flood Plain Designation Bylaw are contained in an appendix to the Flood Plain Exemption application form.)

RELEVANT INFORMATION, PROVINCIAL LEGISLATION AND TOWN OF COMOX BYLAWS

- *Comox Planning Procedures Bylaw No. 1780, Section 8 Development Approval Information (DAI)* - authority to require a report in relation to rezoning or development permit applications.
- *Local Government Act section 491(4) and (5)*- authority to require a report in relation to development permit applications where a development permit is for the protection of development from hazardous conditions.
- *Community Charter Section 56* - authority to require a report in relation to building permit applications.
- *Land Titles Act, Section 86(1) (d)* - authority to require a report in relation to subdivision applications.
- Any other information considered relevant by the Engineer or Geoscientist.
- Ensure reference is made to the latest version of these documents which are all updated from time to time.

¹ A completed Schedule 1 is not required to be submitted to the Town but is provided as a convenience to property owners.



GEOTECHNICAL REPORT REQUIREMENTS

Geotechnical Reports must provide a response to all the following report requirements. Incomplete reports will not be accepted which will result in delays. Any report prepared by a professional engineer or geoscientist, in support of a development application **must** contain the following:

- 1. **Information visible in black and white** – the text, figures, plans, and photos incorporated into the report must be clearly visible when printed as a black and white document. Text font and line weight must be sufficiently large to be easily readable when printed at 11 x 8.5 inch size and not be eroded upon scanning and copying of the original document. Discuss with staff as needed.
- 2. **Credentials** - A statement that the professional engineer or geoscientist is:
 - appropriately knowledgeable to provide the Geotechnical Report; and
 - is a member 'in good standing' with the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC).
- 3. Include acknowledgement in the text of the report that the author of the report has:
 - reviewed a title search printout for the subject property; and
 - where applicable, include confirmation that they have reviewed any associated documents such as restrictive covenants, easements, or SRWs concerning land use or natural hazards relevant to the Geotechnical Report.

Since reports on geotechnical hazard issues will be attached to a restrictive covenant, and so that covenant is not unnecessarily long, it is anticipated that the title search printout and associated documents would not be appended to the geotechnical report unless the report author determines such documents are essential to the report.
- 4. Clear **identification of the subject property** in the report by citing the legal address, as printed on a recent title search printout, and the civic address if one has been assigned.
- 5. **In accordance with drawing standards** contained in **Schedule 2, include a plan(s)** showing the location of the property relative to the pertinent site conditions and show zoning, flood plain, or geotechnical setbacks, statutory rights-of-way, and easements marked on plan when relevant to the Geotechnical Report.
- 6. Topographic and geomorphologic description of the site.
- 7. Description of the **intended use of the subject property** that corresponds to the development application(s) being considered by the Town.
 - Consult with Town staff to ensure completeness and consistency of terminology in the description of the use.
 - If onsite liquid waste disposal or storm water detention or retention is permitted it must be included in the description of use. For example, "The intended use of the subject property is the construction of one single family dwelling, accessory buildings, and an onsite liquid waste disposal system".



Geotechnical Report Guide

- 8. Where the report is in conjunction with a **Riparian Areas Regulation** and there is an associated report from a Qualified Environmental Professional (QEP), **citation of the date of the QEP report is required.**

- 9. The following unqualified statement (examples):

- In the case of a **rezoning**:

“Notwithstanding any other statement in this report, this report may be relied upon by the Town of Comox in considering a zoning amendment application to rezone the subject property from <insert existing zone> to <insert proposed zone> as regulated by the *Comox Zoning Bylaw 1850*.”

- In the case of an application for a **development variance permit**:

“Notwithstanding any other statement in this report, this report may be relied upon by the Town of Comox in considering an application to vary the *Comox Zoning Bylaw 1850, section ___* to reduce the minimum <insert the name of the regulation proposed to be varied> from ___ m to ___ m.”

- In the case of an application for a **development permit**:

“Notwithstanding any other statement in this report, this report may be relied upon by the Town of Comox in considering an application for a development permit under sections 491(4) and (5) of the *Local Government Act* for lands within Town of Comox Development Permit Area #13 – Hazardous Areas.”

- In the case of an application for a **building permit**:

“Notwithstanding any other statement in this report, this report may be relied upon by the Town of Comox in considering an application for a building permit under section 56 of the *Community Charter*.”

- In the case of a **variance for on-site waste disposal and a building permit**:

“Notwithstanding any other statement in this report, this report may be relied upon by the Town of Comox (1) in considering a development variance permit application to permit the servicing of the subject property by on-site liquid waste disposal as opposed to connection to the municipal



Geotechnical Report Guide

sanitary sewer system and (2) issuance of a building permit under section 56 of the *Community Charter*.”

- In the case of an application for **subdivision**:

“Notwithstanding any other statement in this report, this report may be relied upon by the Town of Comox in considering a subdivision application under Section 86(1)(d) of the *Land Title Act*.”

- 10. The Geotechnical Report must consider, as applicable to the site:
 - the items listed in **Schedule 3**;
 - the items listed in (Appendix D) as contained in a current edition of the *APEGBC Guidelines for Legislated Landslide Assessments for proposed Residential Developments in BC*. (See **Schedule 4** of this Guide for a sample Appendix “D”); and
 - any other items considered relevant by the engineer or geoscientist.

- 11. The Geotechnical Report includes:
 - a completed **Schedule 3**; and either
 - a completed Appendix D; or
 - a statement that “no landslide hazard exists”.

- 12. The following statement on safety:
 - “**The land identified as <insert property legal address> may be used safely for its intended use.**” or
 - “**The land identified as <insert property legal address> may be used safely for its intended use, provided that the recommendations presented herein are followed.**” or
 - “**The land identified as <insert property legal address> may not be safely used for the intended use.**”

No further qualification of this statement is permitted in the report other than the following:

“This report has been prepared in accordance with standard geotechnical engineering practice.”



Geotechnical Report Guide

- 13. The following is the only signature format and sealing of report by the engineer of record that will be accepted.

Elements of the Report Sign-Off ▼	Example of Report Sign-Off	
<closing>	Submitted by,	Reviewed by,
<Engineer's Name> OR <Engineering Company's Name>	M. Smith OR ABC Engineering Inc.	A. Jones
<certification statement>	I certify this to be a report prepared by:	
<Written signature: Engineer of Record>	<i>M. Smith</i>	<i>A. Jones</i>
<Engineer's Name typed>, P. Eng.	M. Smith, P.Eng.	A. Jones, P.Eng.
Scanned documents may be sent for preliminary review, marked as DRAFT. A signed, sealed original will be required for final submission.		

While it is understood that the Engineer's seal certifies the technical statements provided in the report under the engineer's or the company's name, the statement "I certify this to be a report prepared by," followed by the signature of the engineer of record is required by the Town to meet the statutory requirements of the *Local Government Act*.

- 14. An original, signed and sealed copy of the report to be completed by the geotechnical engineer of record is required to be submitted to the Town.

SCHEDULE 1²

In regard to the following proposed development <provide brief description and location> :

As the Professional Engineer or Geoscientist engaged to provide a Geotechnical Report for this proposed development:

I _____ have read the Town of Comox Geotechnical Report Guide and agree that I am able to comply with the Town's Geotechnical Report requirements.

Signature _____ Date _____

² This Schedule 1 is not required to be submitted to the Town but is provided as a convenience to property owners.

DEVELOPMENT DRAWING STANDARDS

All plans must:

1. be in black and white;
2. utilize text and line weights sufficient to be easily readable when copied or scanned;
3. utilize solid black font lettering and for hard copies, lettering must not be less than 2.0 mm in height;
4. be in metric scale, showing bar scale and statement of metric units, and show all dimensions in metric;
5. be in the smallest scale that will permit all required detail and information to be shown on the plan without congestion and ensuring the information presented is clearly legible;
6. conform to the following scale and sheet size specifications:
 - a. Scale - 1:100, 1:125, 1:200, 1:250, 1:400, 1:500, or multiples of such scales by an integral power of 10.
 - b. The Site Plan, Landscape Plan, and any Site Servicing plan must be prepared on the same scale.
 - c. Sheet Sizes -
 - A size – 216 mm x 280 mm (8.5 x 11 in)
 - B size – 280 mm x 432 mm (11 x 17 in)
 - C size – 432 mm x 560 mm (17 x 22 in)
 - D size – 560 mm x 864 mm (22 x 34 in)
7. be appropriately titled, which includes the street address(es) of the property or legal address if no street address has been assigned;
8. show a north arrow, be orientated so that the top of the plan, if practical, is north and text is arranged that it may be easily read when facing the top of the plan.
9. provide the street names of streets adjacent to the subject property; and
10. provide the design professionals (architect, plan designer's, landscape architect etc.) contact information including phone number and email.

Any shading must

1. utilize shading patterns on plan that are distinct from one another at both full scale and when reduced to A (letter) size format; and
2. be identified by label, legend, or plan/drawing title.

Altitude elevations must be in geodetic and labeled as such.

Any contour intervals must

1. be appropriate to convey slope information with a minimum of 0.5 m; and
2. be labeled on the plan including if they are existing or proposed as of the date submission.

Submission of a revised plan must be accompanied by

1. one copy showing revisions within a bubble/cloud indicating the area that has been changed and
2. one copy with all revision bubbles/clouds highlighted with yellow highlighter.

Subject properties with existing structures – plans must clearly distinguish between what buildings and structures are to be removed in whole or in part and proposed new construction.

Lot lines must be labeled and dimensioned

Landscape plans must also note that all landscape works must conform to the most recent BC Society of Landscape Architect / BC Nursery Trades Association Landscape Standard

SCHEDULE 3

A check to the left of the following items indicates the information was considered in the preparation of this report. Mark the item "NA" if it is not applicable to the proposed development

- Background Information-** includes a review of all available background information and previous geotechnical reports, not limited to reports only on file in the Town of Comox database
 - The engineer should contact the Comox Planning Department to request copies of any Geotechnical Reports on file at the Town that may be applicable to the subject property.
- potential geotechnical hazards** (e.g. land slip, debris flows, alluvial fan areas, debris torrents, mud flows, rock falls).
- Impact outside the construction zone** – an analysis of the slope stability of the site should be included, including those portions of the site not directly impacted by construction. Special consideration should be given to identify areas considered sensitive to disturbance of soil stability including through changes in vegetation or alterations in surface flows of water, as well as potential impact on adjacent properties.
- Bearing Capacity of Soil** – provide a clear assessment of the bearing capacity of the soil for the support of the building and other structures including retaining walls.
- Structural Consideration of the Soil including Slope Stability and Seismic Loading** – provide a clear assessment of the stability of slopes supporting or loading against the building and the design of geotechnical aspects of the interaction between ground and building.
- Excavations** – provide clear assessment of hazards associated with the removal of ground for the purpose of constructing a building or structure. The report should address stability of cut slopes, the location and extent of excavated cuts, the potential impact on adjacent properties, temporary dewatering including pumping and measures to prevent deposit of sediment or soil on adjacent properties, streets or services.
- Backfill and Fill** – provide a clear assessment of backfill against and affecting building and retaining walls. Consideration should include the impact of fill on slope stability and impacts on neighbouring properties.
- Compaction** – where required, provide a clear assessment of compaction of engineered fill, permanent underpinning and the Geotechnical aspects of deep foundations.
- Design**-provide design of shoring and underpinning systems as may be required.
- Dewatering**
- Permanent Dewatering** – provide clear assessment of the installation of drainage systems to maintain groundwater at design levels and pressure. This review should include:
 - pumping, drainage and cut off of ground water;
 - pumping, perimeter and under-slab drainage to maintain the building free of surface run-off, ground seepage and precipitation;
 - design of the moisture or waterproofing membranes for the building walls or slab; and
 - the assessment of impact on neighbouring properties.

Appendix D: Landslide assessment Assurance Statement

from the

Association of Professional Geotechnical Engineers and Geoscientists

of British Columbia

**Guidelines for Legislated Landslide Assessments for Proposed
Residential Developments in BC**

revised May 2010

APPENDIX D: LANDSLIDE ASSESSMENT ASSURANCE STATEMENT

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

To: The *Approving Authority*

Date: _____

Jurisdiction and address

With reference to (check one):

- Land Title Act (Section 86) – Subdivision Approval
- Local Government Act (Sections 919.1 and 920) – Development Permit
- Community Charter (Section 56) – Building Permit
- Local Government Act (Section 910) – Flood Plain Bylaw Variance
- Local Government Act (Section 910) – Flood Plain Bylaw Exemption
- British Columbia Building Code 2006 sentences 4.1.8.16 (8) and 9.4 4.4.(2) (Refer to BC Building and Safety Policy Branch Information Bulletin B10-01 issued January 18, 2010)

For the Property:

Legal description and civic address of the Property

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

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

Check to the left of applicable items

- ___ 1. Collected and reviewed appropriate background information
- ___ 2. Reviewed the proposed *residential development* on the Property
- ___ 3. Conducted field work on and, if required, beyond the Property
- ___ 4. Reported on the results of the field work on and, if required, beyond the Property
- ___ 5. Considered any changed conditions on and, if required, beyond the Property
- ___ 6. For a *landslide hazard analysis* or *landslide risk analysis* I have:
 - ___ 6.1 reviewed and characterized, if appropriate, any *landslide* that may affect the Property
 - ___ 6.2 estimated the *landslide hazard*
 - ___ 6.3 identified existing and anticipated future *elements at risk* on and, if required, beyond the Property
 - ___ 6.4 estimated the potential *consequences* to those *elements at risk*
- ___ 7. Where the *Approving Authority* has adopted a *level of landslide safety* I have:
 - ___ 7.1 compared the *level of landslide safety* adopted by the *Approving Authority* with the findings of my investigation
 - ___ 7.2 made a finding on the *level of landslide safety* on the Property based on the comparison
 - ___ 7.3 made recommendations to reduce *landslide hazards* and/or *landslide risks*

___ 8. Where the *Approving Authority* has **not** adopted a *level of landslide safety* I have:

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

Based on my comparison between

Check one

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

I hereby give my assurance that, based on the conditions^[1] contained in the attached *landslide assessment* report,

Check one

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

Check one

- with one or more recommended registered covenants.
- without any registered covenant.
- for a development permit, as required by the Local Government Act (Sections 919.1 and 920), my report will “assist the local government in determining what conditions or requirements under [Section 920] subsection (7.1) it will impose in the permit”.
- for a building permit, as required by the Community Charter (Section 56), “the land may be used safely for the use intended”

Check one

- with one or more recommended registered covenants.
- without any registered covenant.
- for flood plain bylaw variance, as required by the “Flood Hazard Area Land Use Management Guidelines” associated with the Local Government Act (Section 910), “the development may occur safely”.
- for flood plain bylaw exemption, as required by the Local Government Act (Section 910), “the land may be used safely for the use intended”.

Name (print)

Date

Signature

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

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

Address

_____ (Affix Professional seal here)
Telephone

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

I am a member of the firm _____
and I sign this letter on behalf of the firm. (Print name of firm)

SAMPLE