

DISTRICT OF MAPLE RIDGE PLANNING DEPARTMENT

Geotechnical and Floodplain Report Guidelines

As per sections 86 (1) [c] (v) and 86 (1) (d) of the *Land Title Act* and Section 56 of the *Community Charter*, a Geotechnical Report may be required as part of your development application. The purpose is to ensure that development occurs only on sites that are safe for the use intended.

Landowners and applicants are advised that Geotechnical Reports may only be undertaken by a Qualified Professional (see below for more details) with training or experience in geotechnical engineering. In advising geotechnical consultants as to the extent and type of work necessary to prepare such reports, it should be emphasized that each study will be unique and it is difficult to generalize. However, there is a minimum content which a Geotechnical Report must have in order for it to be acceptable to the District of Maple Ridge (the District). The District requires that the signed and sealed report, prepared by the Qualified Professional, include the following:

1. A topographic and geomorphological description of the site and a statement as to those natural hazards considered likely to impact or be impacted by the site (see list in Community Charter);
2. A review of previous geotechnical studies affecting the site and/or of engineering works in the vicinity or on scientifically relevant sites elsewhere;
3. If warranted, an assessment of the nature, extent, frequency (probability) and potential effect of each identified credible hazard, including a description of the scientific methodology used to define these parameters, on the proposed development, servicing, and structure(s), plus relevant onsite and offsite data;
4. Seismic stability of soil slopes and liquefaction of soils must be addressed when undertaking landslide assessments;
5. The potential impacts of the proposed development, servicing, and structure(s) on surrounding properties;
6. Proposed mitigative works and/or actions designed to reduce hazard risk to a suitable level. Special consideration should be given to passive works (zoning, land use, setbacks, etc.) over active works (re-grading, special drainage facilities, etc.);
7. An assessment of the effect of the mitigative works in terms of its ability to reduce potential impact of the identified hazard;
8. An assessment of the site's ability to infiltrate and detain stormwater by conducting sufficient percolation tests and providing recommendations to the Qualified Professional responsible for civil engineering;
9. A conservative geotechnical stability line, if required, must be shown on the site plan. On sloping sites, the District will require a minimum setback from the geotechnical stability line for any structure over 10 m² (107.6 ft²), to be the zoning setbacks or 6 m, whichever is the greater, unless the Qualified Professional specifies a greater setback requirement. Details on how the geotechnical stability line was determined and the factor of safety

applied must be provided. Note that collaboration with other professional consultants involved in the project may be required to determine the setback line, taking into consideration such factors as stormwater management infrastructure, proximity of septic systems, potential for swimming pools, replanting plans, etc.;

10. Safe building envelope(s) must be shown on the site plan;
11. Professional assurance that “the land may be used safely for the use intended”. The Qualified Professional must state what determining factors were used in defining “safe”;
12. A statement which allows the District to use the report for subdivision and development consideration and approval purposes;
13. Any other recommendations which the Qualified Professional believes appropriate;
14. Geotechnical reports must meet the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC) document, “*Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC*”, <http://www.apeg.bc.ca/ppractice/documents/ppguidelines/guidelineslegislatedlandslide1.pdf> including a signed copy of “*Appendix D: Landslide Assessment Assurance Statement*”; and

For development located within a floodplain:

15. When a proposed development is located within a floodplain, a separate flood hazard assessment report will be required. This report must include the following information in addition to the information required above:
 - i) Provide details about the potential flood hazards;
 - ii) Assess the probability of the next major event;
 - iii) Assess potential impacts on the proposed development, servicing, and structure(s); and assess the potential impacts of the proposed development, servicing and structures on surrounding properties;
 - iv) Provide recommendations and the necessary mitigative measures and details on how these will protect the development;
 - v) Reference the Ministry of Environment’s *Flood Hazard Area Land Use Management Guidelines* http://www.env.gov.bc.ca/wsd/public_safety/flood/pdfs_word/guidelines-2011.pdf and meet the setbacks and flood construction levels required in those guidelines;
 - vi) If proposed mitigative measures are to be constructed on the proposed lots and will result in reduced yard space, the District will require a minimum setback from these works for any structure over 10 m² (107.6 ft²), to be the zoning setbacks or 6 m, whichever is the greater, unless the Qualified Professional specifies a greater setback requirement. The intent is to provide a minimum useable yard space. Any mitigative works will be required to be included in a Flood Hazard Protection Restrictive Covenant;
 - vii) Provide professional assurance that states that “*the land may be used safely for the use intended*”;
 - viii) Include a statement which allows the Approving Officer to use the report for subdivision consideration and approval purposes;
 - ix) Include any other pertinent information; and

- x) Floodplain reports must meet the APEGBC document, “*Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC*”, http://www.apeg.bc.ca/pppractice/documents/Legislated_Flood_Assessment_s.pdf, including a signed copy of “*Appendix J: Flood Hazard and Risk Assurance Statement*”.

Additional Requirements:

1. As a result of the Geotechnical Report, it may be necessary to register a Restrictive Covenant under Section 219 of the *Land Title Act* and in favour of the District. The owner of the land will covenant with the District to use the land only in the manner certified by the Qualified Professional as enabling the safe use of the land for the use intended. The covenant must contain a condition respecting reimbursement by the owner for any expenses that may be incurred by the District as a result of a breach of the covenant.
2. For developments located within a floodplain, a Restrictive Covenant, registrable under Section 219 of the *Land Title Act* and in favour of the District, will be required. The Developer’s Solicitor or Notary Public must prepare the restrictive covenant, which will address terms and conditions to mitigate flooding and damage to property and will identify the appropriate flood proofing elevations in support of development. The covenant will include language regarding flood proofing of buildings and will state:

“that no area used for habitation, business or storage of goods damageable by floodwaters and no furnace or other fixed equipment damageable by floodwaters, shall be located within any building, modular or manufactured home or structure at an elevation such that the underside of the floor system is less than elevation _____ metres geodetic survey of Canada datum”.

The floodplain covenant is a stand-alone covenant, separate from the geotechnical covenant discussed in Item 1 of this section.

3. For retaining walls and services located within a floodplain, a Flood Hazard Protection Restrictive Covenant, registrable under Section 219 of the *Land Title Act* and in favour of the District, will be required.
4. If the Approving Officer or Building Inspector deems it necessary to have the Geotechnical Report peer reviewed due to the complexities of the site, the District may select a Qualified Professional to peer review the report at the expense of the applicant.

Professional Education, Training and Experience:

APEGBC requires that the Qualified Professional (a BC registered Professional Engineer or Professional Geoscientist with training or experience in geotechnical engineering and, if necessary, flood assessments):

- Be knowledgeable about application and approval processes, procedures of subdivision approval, development permit, building permit and floodplain bylaw variances and exemptions, and applicable legislation.
- For flood hazard assessment reports, must have experience in river engineering and hydrology (for more information, see [Guidance for Selection of Qualified Professionals and Preparation of Flood Hazard Assessment Reports](http://www.env.gov.bc.ca/wsd/public_safety/flood/fhm-2012/landuse_documents.html), here: http://www.env.gov.bc.ca/wsd/public_safety/flood/fhm-2012/landuse_documents.html).

- Carry appropriate professional liability insurance or notify the client in writing if they cannot provide this insurance coverage. The written notification must include acknowledgment of this advice by the client. Tertiary coverage to members provided by APEGBC is not considered appropriate professional liability insurance.
- Confirm that he/she has appropriate training and experience to carry out an appropriate level of assessment associated with the complexity of the associated terrain and geology and, if not, involve the required specialist (see *Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC* and *Professional Practice Guidelines – Legislated Flood Assessment in a Changing Climate in BC*).
- If one exists, obtain the adopted level of landslide safety or other landslide assessment approval criteria, or, in the case of flood hazard assessments, the adopted level of flood hazard or flood risk tolerance or other flood assessment approval criteria, for the proposed residential development in the approving jurisdiction.