

TO: Qualified Professionals, Land Owners and Developers

FROM: Development Services

DATE: November 29, 2017

RE: Terms of reference for Natural Hazard and/or Risk Assessments

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The District of Squamish (District) Official Community Plan (OCP) designates certain parts of Squamish as Flood and Debris Flow Hazard Areas. The OCP states that a report prepared by a Qualified Professional (QP) will be required for all development proposals (building permit, subdivision, development permit, rezoning) for land located within an identified natural hazard area. The report shall establish the suitability of the land for development and any required mitigation measures. The OCP requires registration of a “save harmless” restrictive covenant on the land title, under Section 219 of the *Land Title Act*, prior to any subdivision, rezoning or building permit approval in the designated hazard area.


Further, under the provisions of Section 86 of the *Land Title Act*, the Approving Officer – when approving a subdivision which may be subject to flooding, erosion, landslide or avalanche – may require an engineering report certifying that the land may be used safely for the intended purpose and/or require the subdivider to enter into a covenant to establish mitigation requirements. Similar provisions are available under the Strata Property Act and the Bare Land Strata Regulations.

Each lot is unique and carries unique requirements, which require the judgment of the QP completing the assessment. The following is intended to provide general terms of reference for typical requirements when completing flood hazard assessment reports in the District of Squamish. Note that specific terms of reference are available for QP’s completing Cheekeye Fan Hazard Assessments.

**Terms of Reference:**

General:

(i) Natural hazard and risk assessments must be conducted in accordance with the procedures and guidelines set out in the Association of Professional Engineers and Geoscientists of BC (APEGBC) *Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC* and/or *Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC*. Accordingly, the Flood Hazard and Risk Assurance Statement attached to these Terms of Reference is to be filled out and submitted with each flood hazard assessment.


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- (ii) The report must consider the *Flood Hazard Area Land Use Management Guidelines* and other Provincial guidelines for flood hazard assessment and mitigation, clearly documenting any areas of the report that diverge from the guidelines.
  - (iii) The report must clearly identify the hazards assessed, as well as any hazards that are not applicable to the subject area and/or which may or may not affect the subject area but were intentionally excluded from the scope of the assessment.
  - (iv) If the QP deems it so, he/she must specifically conclude that the proposed land use is 'safe for the intended use'.
  - (v) The report should include limitations and qualifications of the assessment.
  - (vi) The hazard and risk assessment must undergo a documented checking and review process before being finalized and delivered to the District of Squamish. The review process typically involves an internal review by another QP within the same firm. Where an appropriate internal reviewer is not available, an external reviewer may be engaged.
  - (vii) Typically, a draft report should be submitted for District review. The final report must be signed and sealed by the QP and reviewer.
  - (viii) The District will retain hazard and risk assessment reports for reference upon conclusion of the land use application.
  - (ix) Depending on the complexity of the site, nature of hazard, scope of development under consideration, elements at risk, availability/quality/reliability of background information and field data, the degree of judgment on which the assessment is based, QP's training/experience and the capability of the Approving Authority to review and respond, an independent peer review may be required by the District. Costs of the peer review are to be borne by the developer.

**Land Use Application:**

- (i) The report must include a full description of the proposed land use(s) including the number, type and zoning of lots and/or units. The report must be accompanied by a site plan showing the full scope of the proposed land use.
- (ii) The report must contain a legal description of the subject parcel(s).

**Mitigation Measures:**

- (i) The report must specify all mitigation measures required to allow the QP to conclude the site is 'safe for the intended use'.

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- (ii) The QP must consider access/egress for lands where roads may be impacted by a hazard. Development proposals shall incorporate safe refuge areas and secondary road accesses where the District determines that evacuation is not a realistic option.
  - (iii) The QP must certify that the development and any mitigation does not result in a transfer of risk to other lands or negative impacts on floodway conveyance.
  - (iv) Typical hazard mitigation measures include (but are not limited to) specification of Flood Construction Level(s), setbacks, erosion/scour protection requirements, construction/upgrade of Protective Works, establishing flood ways/site coverage requirements, and establishing Statutory Right of Ways for Protective Works.
  - (v) Upon acceptance from the District, hazard and/or risk assessments will be registered as a Section 219 covenant on title establishing appropriate mitigation measures and indemnifying the District.

**The Qualified Professional (QP):**

- (i) The QP must be registered as either a Professional Engineer or Professional Geoscientist with APEGBC in the discipline of geological, geotechnical or civil engineering.
- (ii) The QP must meet the requirements outlined in the Association of Professional Engineers and Geoscientists of BC (APEGBC) document entitled “Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC”.
- (iii) The QP as pertaining to *Debris Floods* and *Debris Flows* must also meet any applicable requirements outlined in the APEGBC document entitled “Guidelines for Legislated Landslide Assessments for Proposed Residential Development in British Columbia”.
- (iv) The QP must have developed demonstrable experience and expertise in the applicable matter including hydrotechnical, hydrology, coastal engineering, slope assessment, debris flow, river engineering and other fields as applicable to the nature of the hazard.
- (v) It is the responsibility of the professional engineer or professional geoscientist to determine whether he/she is qualified by training or experience to undertake and accept responsibility for hazard and/or risk assessments for proposed developments (APEGBC Code of Ethics Principle 2).
- (vi) The QP must hold and provide evidence of valid professional liability insurance coverage of at least \$1 million per claim.

**Supporting Documents:**

The Qualified Professional should contact the District to confirm the most recent studies and hazard information prior to initiating work.

## APPENDIX J: FLOOD HAZARD AND RISK ASSURANCE STATEMENT

Note: This Statement is to be read and completed in conjunction with the "APEGBC Professional Practice Guidelines - Legislated Flood Assessments in a Changing Climate, March 2012 ("APEGBC Guidelines") and is to be provided for flood assessments 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

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 flood 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 *flood hazard* analysis or *flood risk* analysis I have:
  - \_\_\_ 6.1 reviewed and characterized, if appropriate, floods that may affect the Property
  - \_\_\_ 6.2 estimated the *flood hazard* or *flood risk* on the property
  - \_\_\_ 6.3 included (if appropriate) the effects of climate change and land use change
  - \_\_\_ 6.4 identified existing and anticipated future *elements at risk* on and, if required, beyond the Property
  - \_\_\_ 6.5 estimated the potential *consequences* to those *elements at risk*
- 7. Where the *Approving Authority* has adopted a specific level of *flood hazard* or *flood risk* tolerance or return period that is different from the standard 200-year return period design criteria<sup>(1)</sup>, I have
  - \_\_\_ 7.1 compared the level of *flood hazard* or *flood risk* tolerance adopted by the *Approving Authority* with the findings of my investigation
  - \_\_\_ 7.2 made a finding on the level of *flood hazard* or *flood risk* tolerance on the Property based on the comparison
  - \_\_\_ 7.3 made recommendations to reduce the *flood hazard* or *flood risk* on the Property

<sup>(1)</sup> *Flood Hazard Area Land Use Management Guidelines* published by the BC Ministry of Forests, Lands, and Natural Resource Operations and the 2009 publication *Subdivision Preliminary Layout Review – Natural Hazard Risk* published by the Ministry of Transportation and Public Infrastructure. It should be noted that the 200-year return period is a standard used typically for rivers and purely fluvial processes. For small creeks subject to debris floods and debris flows return periods are commonly applied that exceed 200 years. For life-threatening events including debris flows, the Ministry of Transportation and Public Infrastructure stipulates in their 2009 publication *Subdivision Preliminary Layout Review – Natural Hazard Risk* that a 10,000-year return period needs to be considered.

8. Where the *Approving Authority* has not adopted a level of *flood risk* or *flood hazard* tolerance I have:
- \_\_\_ 8.1 described the method of *flood hazard analysis* or *flood risk analysis* used
  - \_\_\_ 8.2 referred to an appropriate and identified provincial or national guideline for level of *flood hazard* or *flood risk*
  - \_\_\_ 8.3 compared this guideline with the findings of my investigation
  - \_\_\_ 8.4 made a finding on the level of *flood hazard* of *flood risk* tolerance on the Property based on the comparison
  - \_\_\_ 8.5 made recommendations to reduce *flood 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 *flood hazard* or *flood risk* tolerance (item 7.2 above)
  - the appropriate and identified provincial or national guideline for level of *flood hazard* or *flood risk* tolerance (item 8.4 above)

I hereby give my assurance that, based on the conditions contained in the attached flood assessment report,

- Check one
- for subdivision approval, as required by the *Land Title Act* (Section 86), "that the land may be used safely for the use intended".
- Check one
- with one or more recommended registered *covenants*.
  - without any registered *covenant*.
- for a development permit, as required by the *Local Government Act* (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

\_\_\_\_\_  
Address

\_\_\_\_\_  
Telephone

(Affix Professional seal here)

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)