

# DP2

## DEVELOPMENT PERMIT GUIDELINES: HAZARD LANDS

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The Hazard Lands Development Permit Guidelines are intended to ensure development takes place appropriately within two distinct classifications of hazards: Steep Slopes and Flood Prone Areas.

**Steep Slopes:** are those determined to have a minimum of 20% grade requiring additional studies and/or limitations to ensure development is either not compromised and or that development does not compromise adjacent lands.

**Flood Prone:** are those determined to fall within the 200 year Flood Plain as defined by the Province of British Columbia.

In order to provide further clarification of the guidelines within this section, pictures or graphic images are provided; and where a particular guideline is graphically illustrated, the notation “(illustr)” appears.



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## DP2 Hazard Lands Guidelines User Guide:

The following User Guide provides the main components required for each Hazard Land Development Permit application:

### 1. REVIEW and CONSIDER

- A. Definitions for Further Clarification
- B. Development Restrictions
- C. Development Guidelines

### 2. SUBMIT COMPLETE APPLICATION

(Exact submission requirements to be confirmed by Staff)

- D. Provide Qualifications of all Consultants
- E. Identify Hazard Areas:
  - Steep Slopes
  - Flood Prone
- F. Development Feasibility Study
- G. Stormwater Management Plan  
(if required—applies to Steep Slope Areas only)

### 3. REVIEW ADDITIONAL REQUIREMENTS

- H. Inspections and Monitoring

NOTE: Notwithstanding the Hazard Land Guidelines listed in this section, a submission requirement may be waived, at the discretion of the General Manager, Planning and Development, if deemed unrelated to the type of development proposed in the Development Permit Application.

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## A. Definitions

For development in the Hazard Lands Development Permit Area, **REVIEW** and **CONSIDER** the following Definitions as follows:

Steep Slopes	Flood Prone
<b>Arborist:</b> A professional certified by the International Society of Arboriculture.	
<b>Gross Floor Area:</b> All the area of the floor enclosed by the outside edge of the exterior walls of a building, including stairways, elevators and storage and mechanical rooms.	
<b>Qualified Professional (QP):</b> A Professional Engineer (PEng) or a Professional Geoscientist (PGeo) with demonstrated expertise and knowledge in geotechnical and/or steep slope development hazards. Must be registered with an appropriate professional organization in British Columbia; act under that association’s Code of Ethics; be subject to disciplinary action by that association; and be reasonably relied on, through demonstrated suitable education, experience, accreditation and knowledge relevant to the subject matter, to provide advice within their area of expertise.	<b>Qualified Professional (QP):</b> A Professional Engineer (PEng) with demonstrated expertise and knowledge in water resources, drainage and stormwater management. Must be registered with an appropriate professional organization in British Columbia; act under that association’s Code of Ethics; be subject to disciplinary action by that association; and be reasonably relied on, through demonstrated suitable education, experience, accreditation and knowledge relevant to the subject matter, to provide advice within their area of expertise.

## B. Development Restrictions

For development in the Hazard Lands Development Permit Area, **REVIEW** and **CONSIDER** the following Development Restrictions as follows:

Steep Slopes	Flood Prone
1. Habitable buildings are not permitted on hazardous lands where future danger cannot or should not be mitigated.	
2. Areas subject to flooding, outlined in Figure 66 of this Official Community Plan, must remain free of development or be strictly developed, in accordance with Surrey Council Policy No. O-55.	
3. New large or greenfield developments or subdivisions are not permitted within flood prone areas of the City, as shown in Figure 66 of this Official Community Plan.	

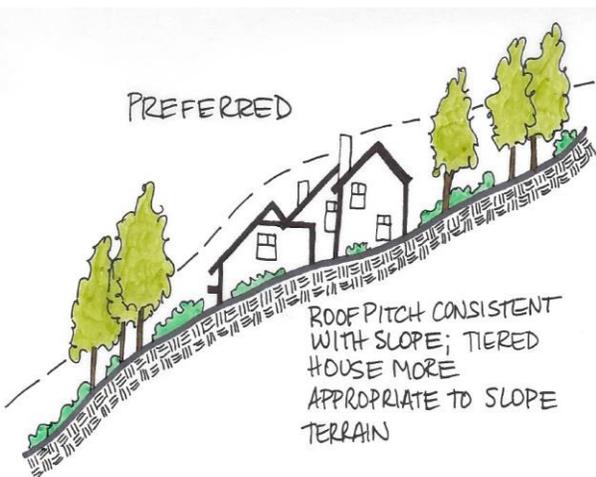
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## C. Development Guidelines

For development in the Hazard Lands Development Permit Area, **REVIEW** and **CONSIDER** the following Development Guidelines as follows:

Steep Slopes	Flood Prone
<p>4a. <b>Overall Site:</b> If roads are required to access development, ensure road construction is done safely, preserving and slopes greater than twenty-five percent (25%) as undisturbed areas.</p>	<p>4b. <b>Overall Site:</b> Development within flood prone areas must take a coordinated approach to ensure soil and Building Permit issues and requirements are jointly met.</p>
<p>5a. <b>Overall Site:</b> Incorporate required parking into the natural landscape to minimize the requirement for lot grading (e.g. avoid large, flat parking areas).</p>	<p>5b. <b>Overall Site:</b> In lowland areas, including agricultural lands, fill placement shall be consistent with existing Surrey Bylaws, including the Surrey Stormwater Drainage Regulation and Charges Bylaw and the Soil Conservation and Preservation By-law, as amended.</p>
<p>6. <b>Overall Site:</b> Protect the important ecological and aesthetic values of environmentally significant features such as wildlife trees and ecologically-rare vegetative communities as the Best Management Practice to maintaining slope stability and preventing drainage and erosion problems.</p>	
<p>7. <b>Overall Site:</b> Minimize cut and fill excavation to preserve the natural topography of the hillside. (illustr).</p>	



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## C. Development Guidelines (cont.)

For development in the Hazard Lands Development Permit Area, **SUBMIT** information with the Development Permit application that details the following:

Steep Slopes	Flood Prone
<p>8a. <b>Building and Construction:</b> Building, structures and paved surfaces shall be sited:</p> <ul style="list-style-type: none"> <li>a) away from areas subject to natural hazards, including, but not limited to, erosion, sloughing, rock fall, or land slippage;</li> <li>b) to minimize cutting into slopes;</li> <li>c) to avoid the use of retaining walls over 1.2 m in height. Retaining walls higher than 1.2 m shall be tiered or used with a landscaping break which complements the natural slope of the land (<i>illustr.</i>);</li> <li>d) to avoid encroaching into the critical root zones of those trees being retained.</li> </ul>	<p>8b. <b>Building and Construction:</b> Building, structures and paved surfaces shall be sited away from areas subject to flooding.</p>
<p>9a. <b>Building and Construction:</b> Ensure the location and construction of any underground structures, such as parkades, do not create conflicts with underground streams or other sub-surface water movements.</p>	<p>9a. <b>Building and Construction:</b> In existing areas, new development shall build to sufficiently meet the recommended Provincial Flood Construction Level (FCL) or as determined by a Qualified Professional or the City of Surrey.</p>



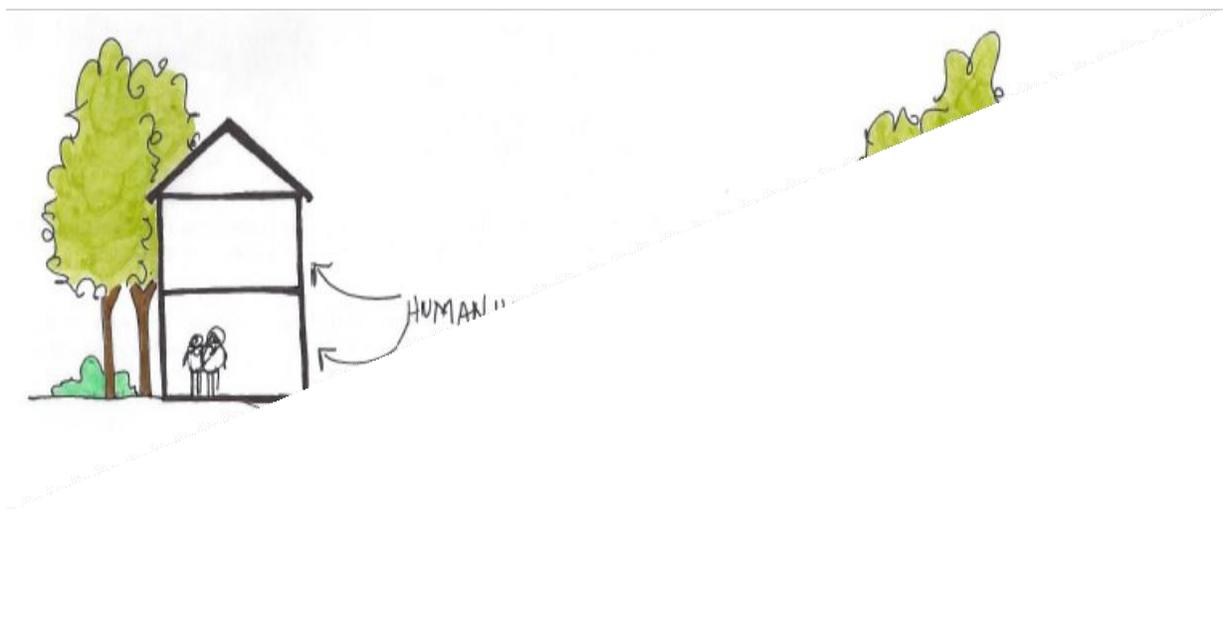
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## C. Development Guidelines (cont.)

For development in the Hazard Lands Development Permit Area, **REVIEW** and **CONSIDER** the following Development Guidelines as follows:

Steep Slopes	Flood Prone
	<p>10. <b>Building and Construction:</b> Minor modifications to an existing building or structure may be considered provided the area of the addition does not exceed twenty percent (20%) of the existing Gross Floor Area and the foundations within the floodplain are designed to minimize the loss of floodplain storage.</p>
	<p>11. <b>Building and Construction:</b> Where a building or structure intrudes partially or completely within a floodplain (<i>illustr.</i>) any modification to the building foundation should be consistent with current Surrey Bylaws and policies, as amended. Consistency with all floodplain requirements shall be met prior to the issuance of a Building Permit.</p>
	<p>12. <b>Building and Construction:</b> Land shall remain free of buildings and structures for human habitation except where:</p> <ul style="list-style-type: none"> <li>a) the foundation is out of the area of the floodplain;</li> <li>b) those portions of a building or structure capable of being used for human habitation are located above the floodplain elevation. (<i>illustr.</i>)</li> </ul>



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## C. Development Guidelines (cont.)

For development in the Hazard Lands Development Permit Area, **SUBMIT** information with the Development Permit application that details the following:

Steep Slopes	Flood Prone
<p>13. <b>Soils:</b> Develop an understanding of the environmental and geological conditions of the site prior to any construction to ensure that the most appropriate methods and materials are used to develop a site.</p>	
<p>14. <b>Trees and Landscaping:</b> Ensure the site is re-vegetated, post construction, with species best suited to provide and support slope stabilization.</p>	
<p>15. <b>Trees and Landscaping:</b> Vegetate existing plant materials of significant size and/or relocate within the same development site.</p>	
<p>16a. <b>Subdivision:</b> Ensure hillside subdivision layouts and specifications recognize severe climate conditions, the difficulty of road maintenance, the movement of pedestrians and any other environmental factors that can contribute to an overall sustainable development.</p>	<p>16b. <b>Subdivision:</b> Subdivision within flood prone areas, excluding agricultural lands, shall not be allowed except where the realignment of lot lines would improve building location and lessen the impact of flooding.</p>
<p>17. <b>Subdivision:</b> Avoid including portions of a site, with thirty percent (30%) slope or greater, in the lot size calculation, or where sufficient land with a slope less than thirty percent (30%) is not available.</p>	
<p>18. <b>Subdivision:</b> Create larger lots or cluster developments to avoid significant disturbance to steep slope sites.</p>	

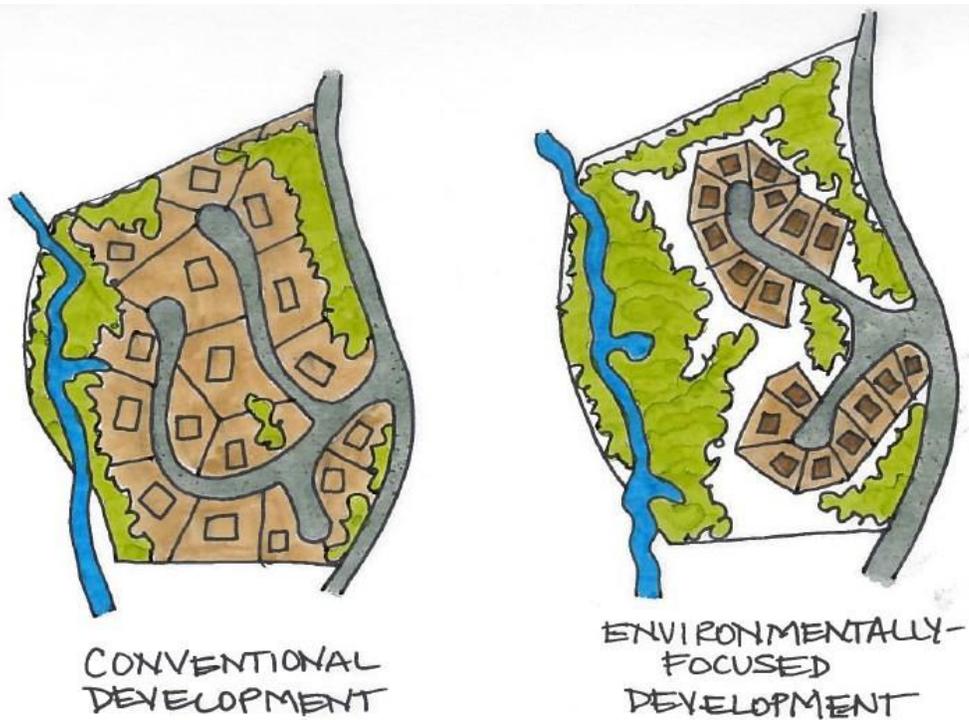
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## C. Development Guidelines (cont.)

For development in the Hazard Lands Development Permit Area, **SUBMIT** information with the Development Permit application that details the following:

Steep Slopes	Flood Prone
19. <b>Subdivision:</b> Ensure subdivision planning and design allows for as much untouched native and natural green space as possible. <i>(illustr.)</i>	
20. <b>Subdivision:</b> Direct more density to less sensitive parts of a site striving to achieve a minimum of thirty-five percent (35%) of the gross site as permanent open space. <i>(illustr.)</i>	



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## D. Submission Requirements—Consultant Qualifications

For development in the Hazard Lands Development Permit Area, **SUBMIT** information with the Development Permit application that provides the qualifications for each separate consultant used per development proposal, as follows:

Steep Slopes	Flood Prone
<p>21. <input type="radio"/> A list of <b>ALL</b> registered Qualified Professionals, with demonstrated education, expertise, accreditation and knowledge relevant to geotechnical, steep slope development hazards, water resources, drainage and/or storm-water management who will be involved with the development.</p>	
<p>22. <input type="radio"/> A written statement, including all documentation, verifying the qualifications of all Qualified Professionals (QP) responsible for preparing report submissions or involved in monitoring site conditions for Steep Slopes.</p>	
<p>23. <input type="radio"/> Where more than one Qualified Professional is needed, a written statement identifying <b>THE PRIMARY QP</b> for the entire development in order to ensure all required reports are prepared by qualified professionals and are coordinated both in content and in execution.</p>	

## E. Submission Requirements—Identify Hazard Areas

For development in the Hazard Lands Development Permit Area, **SUBMIT** information with the Development Permit application detailing the location of the Hazard Lands in context with the development proposal:

Steep Slopes	Flood Prone
<p>24a. <input type="radio"/> <b>Steep Slopes:</b> Refer to this Official Community Plan, Implementation Section II (d) Implementation Instruments, Development Permits, DP2 Hazard Lands and Figure 65, Steep Slope Hazard Lands Development Permit Area to determine the location of the Steep Slope Development Permit Area in Surrey.</p>	<p>24b. <input type="radio"/> <b>Flood Prone:</b> Refer to this Official Community Plan, Implementation Section II (d) Implementation Instruments, Development Permits, DP2 Hazard Lands and Figure 66: Flood Prone Hazard Lands Development Permit Area to determine the location of the Flood Prone Development Permit Area in Surrey.</p>

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## F. Submission Requirements—Development Feasibility Study

For development in the Hazard Lands Development Permit Area, **SUBMIT** a Development Feasibility Study with the Development Permit application that details the following:

Steep Slopes	Flood Prone
<p>25. <b>Overall Site:</b> Information on how site grading will provide for a smooth and stable transition between the development site and adjacent properties including site cross-sections.</p>	
<p>26. <b>Overall Site:</b> A plan showing what areas are to be cleared, what areas of cut and fill are proposed and the estimated sequence and timing of the clearing and re-contouring operation.</p>	
<p>27a. <b>Building and Construction:</b> Measures, including sequencing and timing of earthworks, that will be put into place to prevent and mitigate possible erosion, sloughing, rock falling, or land slippage during <b>ALL</b> (pre, during and post) stages of development for both the subject property <b>AND</b> any adjacent property affected by the proposed development.</p>	<p>27b. <b>Building and Construction:</b> Measures, including sequencing and timing of earthworks, that will be put into place to prevent and mitigate possible flooding during <b>ALL</b> (pre, during and post) stages of development for both the subject property <b>AND</b> any adjacent property affected by the proposed development.</p>
<p>28. <b>Soils:</b> A comprehensive geotechnical report providing soil stability analysis in relation to the slope and its ability to accommodate development. Aspects to be addressed in this report include, but are not limited to, information about soil bearing capacity, recommendations on building foundation types, provisions about permanent and/or temporary placement of soil, stipulations on stormwater management (both during and after construction) and recommendations related to accessory buildings, landscaping, vegetation and slope maintenance</p>	
<p>29. <b>Soils:</b> Provide a detailed report, prepared by a Qualified Professional, illustrating how the development meets a minimum level of safety for geotechnical failures, as set out in the BC Building Code or as specified in the Association of Professional Engineers and Geoscientists of BC (APEG) Guidelines for Legislated Landslide Assessments for Proposed Residential Development, or whichever is greater. The City reserves the right to modify this guideline to suit the proposed development.</p>	

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## F. Submission Requirements—Development Feasibility Study (cont.)

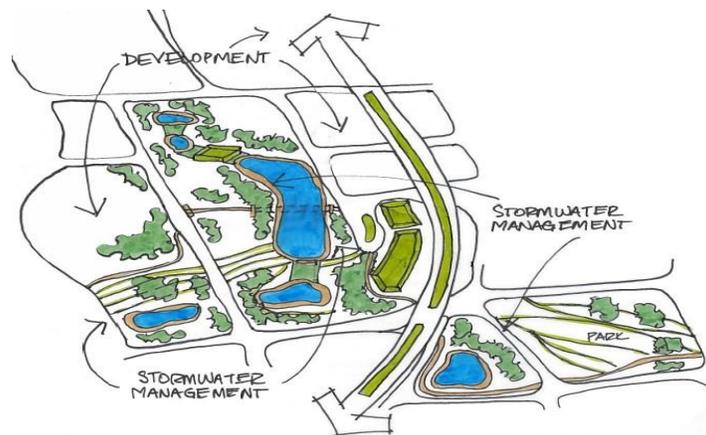
For development in the Hazard Lands Development Permit Area, **SUBMIT** a Development Feasibility Study with the Development Permit application that details the following:

Step Slopes	Flood Prone
<p>30. <b>Trees and Vegetation:</b> A site report prepared by an Arborist detailing the number of trees and the species or species mix and the condition and health of existing trees with details about how tree removal will impact any remaining trees or landscaping, whether on site or immediately adjacent to the site</p>	
<p>31. <b>Trees and Vegetation:</b> Include a tree survey, and any related reports, as prepared by an Arborist, as part of a Building Permit application for an infill lot (e.g. any lot that is not part of a recent subdivision for which a tree survey was submitted). The tree survey shall identify trees that are protected under Surrey’s Tree Protection By-law making recommendations as to the retention or removal of trees where it is necessary to accommodate construction that cannot be located elsewhere. The Arborist must confirm that the grading and servicing plans for the development have been reviewed and that there are no conflicts with the trees proposed to be retained. Resolution of conflicts, if any exist, shall be undertaken before a Building Permit is issued.</p>	
	<p>32. <b>Drainage:</b> A report detailing the type of drainage system that will be used to specifically prevent erosion, protect natural watercourses and protect properties that are either above, below or adjacent to the development site.</p>

## G. Stormwater Management Plan

For development in the Steep Slope Hazard Area, using plans, elevations, profiles and/or reports, **SUBMIT** a **STORMWATER MANAGEMENT PLAN** detailing, illustrating and describing the following:

33. **Drainage:** Depending on the size of the development and complexity of the site conditions, a Stormwater Management Plan may be required for the entire site and downstream drainage areas. (*illustr.*) Specific details to be addressed in the Management Plan include information about the:
- a) Hydrological conditions prior to and after development
  - b) Existing groundwater conditions, especially spring and interflow areas prior to and after development.
  - c) Protection of natural flow paths, volumes and storage resources
  - d) Impacts on trees, vegetation and other environmental features due to changes in drainage patterns
  - e) Water quality prior to, during, and after development
  - f) Sediment and erosion control
  - g) On and off-site drainage impacts (e.g. drainage from an upper lot to a lower lot).



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## H. Inspections and Monitoring

For development in the Hazard Lands Development Permit Area, REVIEW additional inspection and monitoring requirements that may be required for Development Permit applications:

- 34.  Retain the QP who prepared the Development Feasibility Study, to carry out field inspections during the construction of the project to confirm that the construction is in compliance with the recommendations of the Development Feasibility Study. This is a condition of the Building Permit for development within hazard lands identified in Figure 65 and 66. The QP must provide the Building Inspector with field reports related to the geotechnical aspects of the project and, at the time of final inspection of the completed building project, the QP must certify, in writing to the Building Inspector, that all aspects of the construction have been completed in compliance with their design and recommendations.
- 35.  Further to DP2.1 of these Hazard Lands Development Permit Guidelines, Restrictive Covenants may be required as part of the development approval process for any hazardous lands (steep slopes or flood areas) to ensure any technical reports and specifications for the site, during and after construction, run with the lands and are followed as required by any future property owners.