



Jane S. Kiker  
kiker@ekwlaw.com

August 13, 2015

Via Email [Plancom@shorelinewa.gov](mailto:Plancom@shorelinewa.gov)

Planning Commission  
City of Shoreline  
17500 Midvale Avenue N  
Shoreline, WA 98133

RE: 2015 Critical Areas Ordinance Update: Innis Arden Club's Proposed Modifications to Staff Proposal Addressing Alteration and Classification of Geologic Hazard Areas

Dear Planning Commissioners:

To supplement its July 16, 2015 preliminary comments on the City's CAO Update, the Innis Arden Club submits for the Planning Commission's consideration the attached Exhibits A and B containing revisions to the proposed Code language respecting the alteration and classification of geologic hazard areas, SMC 20.80.224 and SMC 20.80.220, respectively.<sup>1</sup> In brief, the revisions would allow certain development activity in any landslide hazard area where it is supported by a site-specific evaluation by a qualified professional. In addition, delineation of such areas would be based on such a site-specific evaluation. The Club's proposed language is fully supported by the July 16, 2015 comments by Garry Horvitz, P.E. LED, Senior Principal Geotechnical Engineer at Hart Crowser.

Several commentators, including the Club in its preliminary comments, have noted that, based on Best Available Science ("BAS"), it would be overbroad to include a blanket prohibition on all activity in certain "steep slope" geologic hazard areas even where a qualified professional report analyzed the site and approved the activity with recommended mitigation. Such a blanket prohibition is not supported by Best Available Science ("BAS") per the May 29, 2015 BAS memo prepared by Amec Foster Wheeler, which advises that "site specific conditions are unique and site-specific studies represent BAS." (Emphasis added).

The proposed blanket prohibition is similarly inconsistent with State Department of Commerce Sample Code Provisions for Designating and Protecting Critical Areas recommendations, which do not differentiate between categories of landslide hazard areas for

---

<sup>1</sup> Attachment A to June 18, 2015 Agenda/Staff Report. In the attached Exhibits, the Club's proposed changes are in red, and are overlaid on Staff's proposed language.

August 13, 2015

Page 2 of 3

purposes of regulating proposed alterations. Instead, they address such alterations proposals universally, as follows:

2. Alterations.

Alterations of an erosion or landslide hazard area and/or buffer may only occur for activities for which a hazards analysis is submitted and certifies that:

- a. The development will not increase surface water discharge or sedimentation to adjacent properties beyond pre-development conditions;
- b. The development will not decrease slope stability on adjacent properties; and
- c. Such alterations will not adversely impact other critical areas.<sup>2</sup>

As noted previously, the Cities of Bothell (BMC 14.04.870), Edmonds (EMC 23.80.060 and .070), and Kirkland (KZC 85.15), are examples of other Washington cities that have adhered to this guidance requiring, as we have proposed here, alterations determinations to be based on site-specific evaluations, regardless of the landslide hazard area classification.<sup>3</sup> As in those cities, the modification we have proposed in Exhibit A does not rely on a patchwork of exemptions for certain alterations or certain slopes, but simply requires that all land use proposals in moderate/high or very high landslide areas be supported by a site-specific evaluation by a qualified professional. Per Section SMC 20.80.224.C, which would not be modified, a conclusion in the site-specific evaluation that a proposed alteration cannot be safely undertaken/mitigated would result in project denial.

As further addressed in its preliminary comments, the Club also supports modification of the proposed new “15-foot rule” for determining the geographic/topographic extent of certain landslide hazard areas, and urges the Planning Commission to instead adopt the language in the attached Exhibit B related to the same, requiring that such delineations also be determined pursuant to a site-specific scientific evaluation. The Code – like many other jurisdictions’ codes – has long-defined the top and bottom edge of the hazard area as “a distinct topographic break” in the slope. However, there is no scientific support for redefining this “distinct break” between hazardous and non-hazardous slopes to include a minimum 15-foot distance, horizontally as Staff now proposes.

As previously noted, Geotech Garry Horvitz calls this “15-foot rule” an arbitrary measurement and explains that the extent of a geologic hazard area depends entirely on site specific geologic conditions and any proposed site specific activities. Thus, he concludes, the definition of the top and toe of a hazardous slope should be determined through the BAS site

---

<sup>2</sup> See, July 16, 2015 Agenda Packet and Staff Report Attachment C, Section “X.50.090”.

<sup>3</sup> Cited Code excerpts are attached as Exhibit C for the Commissioners’ convenience.

EGLICK KIKER WHITED PLLC

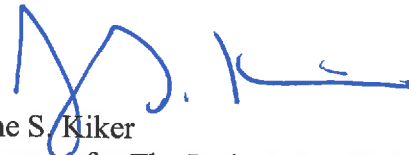
August 13, 2015  
Page 3 of 3

specific geotechnical report. As discussed (and quoted) in the Club's preliminary comments, the City of Bellevue is an example of a municipality that takes this approach.

Revising the proposed Code language as the Club proposes is straightforward and would re-ground the City's geologic hazard area standards in science, eliminating arbitrary, non-scientific distinctions between activities permitted in differently classified geologic hazard areas. Please feel free to contact me if you have any questions regarding these comments. We can also make Mr. Horvitz available to address any technical questions that may arise. Meanwhile, thank you for your consideration of these comments as well as those expressed in the July 16, 2015 letter on behalf of the Club.

Sincerely,

EGLICK KIKER WHITED PLLC



Jane S. Kiker  
Attorney for The Innis Arden Club

Enclosures

cc: Client  
Associate Planner Juniper Nammi: [jnammi@shorelinewa.gov](mailto:jnammi@shorelinewa.gov)  
PCD Director Rachel Markle: [rmarkle@shorelinewa.gov](mailto:rmarkle@shorelinewa.gov)  
City Attorney Margaret King: [mking@shorelinewa.gov](mailto:mking@shorelinewa.gov) [per her request]  
City Manager Debbie Tarry: [dtarry@shorelinewa.gov](mailto:dtarry@shorelinewa.gov)  
Commissioner Chair Keith Scully: [kscully@shorelinewa.gov](mailto:kscully@shorelinewa.gov); [keith@newmanlaw.com](mailto:keith@newmanlaw.com)  
Commissioner Vice Chair Easton Craft: [ecraft@shorelinewa.gov](mailto:ecraft@shorelinewa.gov)  
Commissioner Donna Moss: [dross@shorelinewa.gov](mailto:dross@shorelinewa.gov)  
Commissioner William Montero: [wmontero@shorelinewa.gov](mailto:wmontero@shorelinewa.gov)  
Commissioner David Maul: [dmaul@shorelinewa.gov](mailto:dmaul@shorelinewa.gov)  
Commissioner Laura Mork: [lmork@shorelinewa.gov](mailto:lmork@shorelinewa.gov)  
Commissioner Jack Malek: [jmalek@shorelinewa.gov](mailto:jmalek@shorelinewa.gov)

**EXHIBIT A**

**20.80.224 GEOLOGIC HAZARDS- Development standards.**

A. Activities and uses shall be prohibited in geologic hazard areas and their required buffers except as provided for in this Title.

B. **Activities allowed in all geologic hazard areas and buffers.** The activities listed below are allowed in the identified geologic hazard areas types pursuant to SMC 20.80.0XX Allowed Activities. Additional exemptions are listed in SMC 20.80.030 and 20.80.040, but do not apply within the shoreline jurisdiction. These activities do not require submission of a critical area report.

1. All exempt activities per SMC 20.80.040, unless critical area report is required for the exemption;
2. Installation of fences as allowed without a building permit in Chapter 20.50 Development standards; and
3. Non-structural interior remodel, maintenance, or repair of structures which do not meet the development standards of this chapter for landslide or seismic areas, if the maintenance or repair does not increase the footprint or height of the structure and there is no increased risk to life or property as a result of the proposed maintenance or repair.
4. **Landslide and Seismic Hazard Areas.** No additional activities allowed without submission of a critical area report in landslide and seismic hazard areas.
5. **Erosion Hazard Areas.** If the site does not contain another type of critical area or critical area buffer and does not exceed any other threshold contained in SMC 20.50.320, then up to 1,500 square feet may be cleared on any lot in an erosion hazard area without a permit, unless the site also contains another type of critical area or any other threshold contained in SMC 20.50.320 would be exceeded.

C. **Alteration.** The City shall approve, condition, or deny proposals in a geologic hazard area as appropriate based upon the effective mitigation of risks posed to property, health, and safety. The objective of mitigation measures shall be to render a site containing a geologic hazard as safe as one not containing such hazard. Conditions may include limitations of proposed uses, modification of density, alteration of site layout, and other appropriate changes to the proposal. Where potential impacts cannot be effectively

mitigated to eliminate a significant risk to public health, safety, and property, or important natural resources, the proposal shall be denied.

**D. Alteration of Moderate and to High Risk Landslide Hazards.**

Formatted: No bullets or numbering

1. Development activities and uses that result in unavoidable alterations may be permitted proposed in moderate and to high risk landslide hazard areas or their buffers in accordance with an approved shall be evaluated by a qualified professional through the preparation of the geotechnical-geologic hazard critical area report prepared by a qualified professional that certifies:

Formatted: Indent: Left: 0", Hanging: 0.5"

- a. The development, as conditioned, will not increase surface water discharge or sedimentation to adjacent properties beyond pre-development conditions;
- b. The development, as conditioned, will not decrease slope stability on adjacent properties; and
- c. Such alterations will not adversely impact other critical areas.

However, for proposals that include no development, construction, or impervious surfaces, the City, in its sole discretion, may waive the requirement for a geotechnical report. The recommendations contained within the geotechnical critical area report shall be incorporated into the proposed alteration of the landslide hazard area or their buffers.

2. The geotechnical engineer and/or geologist, qualified professional preparing the report shall provide assurances that the risk of damage from the proposal, both on-site and off-site, are minimal subject to the conditions set forth in the report, that the proposal will not increase the risk of occurrence of the potential landslide hazard, and that measures to eliminate or reduce risks have been incorporated into the report's recommendations.

**C. Alteration of Very High Risk Landslide Hazard Areas.**

Development shall be prohibited in very high risk landslide hazard areas or their buffers except as granted by a critical areas special use permit, or a critical areas reasonable use permit per SMC 20.30.333 and 20.30.336, unless otherwise allowed by the exemptions or allowed activities provisions of this Title, or subject to the provisions of the Shoreline Master Program where the proposed development activity is located within the shoreline jurisdiction.

## EXHIBIT B

### 20.80.220 GEOLOGIC HAZARDS- Classification.

Geologic hazard areas shall be classified according to the criteria in this section as follows:

#### A. Landslide Hazard Areas.

Landslide Hazard Areas are those areas potentially subject to landslide activity based on a combination of geologic, topographic and hydrogeologic factors as classified in SMC 20.80.220(B) with slopes 15 percent or steeper within a vertical elevation change of at least 10 feet. A slope is delineated by establishing its toe and top, and is measured by averaging the inclination over at least 10 feet of vertical relief. (see Figure 20.80.220(B)). The edges of the hazard are identified where the characteristics of the slope cross section change from one landslide hazard classification to another or no longer meet any classification.

1. The toe of a slope is a distinct topographic break which separates slopes inclined at less than 15 percent from slopes above that are 15 percent or steeper. A distinct topographic break should be determined in a geologic hazard critical area report prepared by a qualified professional is an area that extends at least 15 feet horizontally away from the slope and that slopes less than 15 %.
2. The top of a slope is a distinct topographic break which separates slopes inclined at less than 15 percent from slopes that are 15 percent or steeper below. A distinct topographic break should be determined in a geologic hazard critical area report prepared by a qualified professional is an area that is at least 15 feet horizontally away from the slope and that slopes less than 15%.
3. Hazard area classifications differentiated based on percent slope shall be delineated based on locating the top and toe of the slope characterized by a distinct topographic break between the 40% slope and adjacent slopes less than 40 percent, as determined in a geologic hazard critical area report prepared by a qualified professional. change that extends at least 15 feet horizontally away from the slope and that slopes less than 40 percent, as determined by two (2) foot contour intervals, not averaging over the full landslide hazard area.

EXHIBIT C

**Bothell Municipal Code**

**14.04.800 Designation of geologically hazardous areas.**

Geologically hazardous areas include areas susceptible to erosion, sliding, earthquake, or other geological events. They pose a threat to the health and safety of citizens when incompatible development is sited in areas of significant hazard. Such incompatible development may not only place itself at risk, but also may increase the hazard to surrounding development and use. Areas susceptible to one or more of the following types of hazards shall be designated as a geologically hazardous area:

- A. Erosion hazard;
- B. Landslide hazard;
- C. Seismic hazard; and
- D. Other geological events including mass wasting, debris flows, rock falls, and differential settlement. (Ord. 1946 § 3, 2005).

**14.04.810 Designation of specific hazard areas.**

A. Erosion Hazard Areas. Erosion hazard areas are those areas identified by the U.S. Department of Agriculture's Natural Resources Conservation Service as having a "moderate to severe," "severe," or "very severe" rill and inter-rill erosion hazard<sup>19</sup> and/or those areas containing soils which, according to the USDA Soil Conservation Service Soil Classification System, may experience severe to very severe erosion hazard. Erosion hazard areas are also those areas impacted by shore land and/or stream bank erosion and those areas within a river's channel migration zone.

B. Landslide Hazard Areas. Landslide hazard areas are areas of historic failure or potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include areas susceptible because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors. Example of these may include, but are not limited to the following:

- 1. Areas of historic failures, such as:<sup>20</sup>
  - a. Those areas delineated by the U.S. Department of Agriculture's Natural Resources Conservation Service as having a "severe" limitation for building site development;
  - b. Those areas mapped by the Washington State Department of Ecology (Coastal Zone Atlas) or the Washington State Department of Natural Resources (slope stability mapping) as unstable (U or class 3), unstable old slides (UOS or class 4), or unstable recent slides (URS or class 5); or

- c. Areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published by the U.S. Geological Survey or Washington State Department of Natural Resources;
  2. Areas with all three of the following characteristics:<sup>21</sup>
    - a. Slopes steeper than 15 percent;
    - b. Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and
    - c. Springs or groundwater seepage.
  3. Areas that have shown movement during the Holocene epoch (from 10,000 years ago to the present) or that are underlain or covered by mass wastage debris of that epoch;<sup>22</sup>
  4. Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials;<sup>23</sup>
  5. Slopes having gradients steeper than 80 percent subject to rock fall during seismic shaking;<sup>24</sup>
  6. Areas potentially unstable because of rapid stream incision, stream bank erosion, and undercutting by wave action;<sup>25</sup>
  7. Areas that show evidence of, or are at risk from snow avalanches;<sup>26</sup>
  8. Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding;<sup>27</sup> and
  9. Any area with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet except areas composed of consolidated rock. A slope is delineated by establishing its toe and top and is measured by averaging the inclination over at least 10 feet of vertical relief.<sup>28</sup>
- C. Seismic Hazard Areas. Seismic hazard areas are areas subject to severe risk of damage as a result of earthquake induced ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, or surface faulting. One indicator of potential for future earthquake damage is a record of earthquake damage in the past. Ground shaking is the primary cause of earthquake damage in Washington. The strength of ground shaking is primarily affected by:<sup>29</sup>
1. The magnitude of an earthquake;
  2. The distance from the source of an earthquake;
  3. The type of thickness of geologic materials at the surface; and



4. The type of subsurface geologic structure.

Settlement and soil liquefaction conditions occur in areas underlain by cohesionless, loose, or soft-saturated soils of low density, typically in association with a shallow groundwater table.

D. Other Hazard Areas. Geologically hazardous areas shall also include areas determined by the director to be susceptible to other geological events including mass wasting, debris flows, rock falls, and differential settlement. (Ord. 1946 § 3, 2005).

**14.04.820 Classification of geologically hazardous areas.**

All geologic hazard areas should be classified according to the following categories for each geologic hazard type.

Classification	Documentation and Data Sources
Known or Suspected Risk	Documentation or projection of the hazard by a qualified professional exists.
Risk Unknown	Documentation or projection of the lack of hazard by a qualified professional exists, or data are not available to determine the presence or absence of a geologic hazard.

(Ord. 1946 § 3, 2005).

**14.04.830 Mapping of geologically hazardous areas.**

A. The approximate location and extent of geologically hazardous areas are shown on the adopted critical areas maps. The adopted critical areas maps include:

1. U.S. Geological Survey landslide and seismic hazard maps;
2. Washington State Department of Natural Resources seismic hazard maps for Western Washington;
3. Washington State Department of Natural Resources slope stability maps;
4. Federal Emergency Management Administration flood insurance maps; and
5. Locally adopted maps.

B. These maps are to be used as a guide for the city, project applicants and/or property owners and may be continuously updated as new critical areas are identified. They are a reference and do not provide a final critical areas designation. (Ord. 1946 § 3, 2005).

Allowed Activities

**14.04.840 Activities allowed in geologically hazardous areas.**

The following activities are allowed in geologically hazardous areas pursuant to BMC 14.04.150, Allowed activities, and do not require submission of a critical areas report:

- A. Erosion and Landslide Hazard Areas. Except as otherwise provided for in this chapter, only those activities approved and permitted consistent with an approved critical areas report in accordance with this chapter shall be allowed in erosion or landslide hazard areas.
- B. Seismic Hazard Areas. The following activities are allowed within seismic hazard areas:
  - 1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly;
  - 2. Additions to existing single-story residences that are 250 square feet or less; and
  - 3. Installation of fences.
- C. Other Hazard Areas. The director may allow the following activities within other geologically hazardous areas, if the activity will not increase the risk of the hazard:
  - 1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly;
  - 2. Additions to existing residences that are 250 square feet or less; and
  - 3. Installation of fences. (Ord. 1946 § 3, 2005).

**Critical Areas Report Requirements**

**14.04.850 Critical areas report – Additional requirements for geologically hazardous areas.**

- A. Preparation by a Qualified Professional. A critical areas report for a geologically hazardous area shall be prepared by an engineer or geologist, licensed in the state of Washington, with experience analyzing geologic, hydrologic, and groundwater flow systems, and who has experience preparing reports for the relevant type of hazard.
- B. Area Addressed in Critical Areas Report. The following areas shall be addressed in a critical areas report for geologically hazardous areas:
  - 1. The project area of the proposed activity; and

2. All geologically hazardous areas within 200 feet of the project area or that have potential to be affected by the proposal;

C. Geological Hazards Assessment. A critical areas report for a geologically hazardous area shall contain an assessment of geological hazards including the following site- and proposal-related information at a minimum:

1. Site and Construction Plans. The report shall include a copy of the site plans for the proposal showing:
  - a. The type and extent of geologic hazard areas, any other critical areas, and buffers on, adjacent to, within 200 feet of, or that are likely to impact the proposal;
  - b. Proposed development, including the location of existing and proposed structures, fill, storage of materials, and drainage facilities, with dimensions indicating distances to the floodplain, if available;
  - c. The topography, in two-foot contours, of the project area and all hazard areas addressed in the report; and
  - d. Clearing limits;
2. Assessment of Geological Characteristics. The report shall include an assessment of the geologic characteristics of the soils, sediments, and/or rock of the project area and potentially affected adjacent properties, and a review of the site history regarding landslides, erosion, and prior grading. Soils analysis shall be accomplished in accordance with accepted classification systems in use in the region. The assessment shall include, but not be limited to:
  - a. A description of the surface and subsurface geology, hydrology, soils, and vegetation found in the project area and in all hazard areas addressed in the report;
  - b. A detailed overview of the field investigations, published data, and references; data and conclusions from past assessments of the site; and site specific measurements, test, investigations, or studies that support the identification of geologically hazardous areas; and
  - c. A description of the vulnerability of the site to seismic and other geologic events;
3. Analysis of Proposal. The report shall contain a hazards analysis including a detailed description of the project, its relationship to the geologic hazard(s), and its potential impact upon the hazard area, the subject property, and affected adjacent properties; and

4. **Minimum Buffer and Building Setback.** The report shall make a recommendation for the minimum no-disturbance buffer and minimum building setback from any geologic hazard based upon the geotechnical analysis.

D. **Incorporation of Previous Study.** Where a valid critical areas report has been prepared within the last five years for a specific site, and where the proposed land use activity and surrounding site conditions are unchanged, said report may be incorporated into the required critical areas report. The applicant shall submit a hazards assessment detailing any changed environmental conditions associated with the site.

E. **Mitigation of Long-Term Impacts.** When hazard mitigation is required, the mitigation plan shall specifically address how the activity maintains or reduces the pre-existing level of risk to the site and adjacent properties on a long-term basis (equal to or exceeding the projected lifespan of the activity or occupation). Proposed mitigation techniques shall be considered to provide long-term hazard reduction only if they do not require regular maintenance or other actions to maintain their function. Mitigation may also be required to avoid any increase in risk above the pre-existing conditions following abandonment of the activity. (Ord. 1946 § 3, 2005).

**14.04.860 Critical areas report – Additional technical information requirements for specific hazards.**

In addition to the general critical areas report requirements of BMC 14.04.190 and 14.04.850, critical areas reports for geologically hazardous areas must meet the requirements of this section. Critical areas reports for two or more types of critical areas must meet the report requirements for each relevant type of critical area.

A. **Erosion and Landslide Hazard Areas.** In addition to the basic critical areas report requirements, the technical information for an erosion hazard or landslide hazard area shall include the following information at a minimum:

1. **Site Plan.** The critical areas report shall include a copy of the site plan for the proposal showing:
  - a. The height of slope, slope gradient, and cross-section of the project area;
  - b. The location of springs, seeps, or other surface expressions of groundwater on or within 200 feet of the project area or that have potential to be affected by the proposal;<sup>30</sup> and
  - c. The location and description of surface water runoff features;
2. **Hazards Analysis.** The hazards analysis component of the critical areas report shall specifically include:
  - a. A description of the extent and type of vegetative cover;

- b. A description of subsurface conditions based on data from site-specific explorations;
  - c. Descriptions of surface and groundwater conditions, public and private sewage disposal systems, fills and excavations, and all structural improvements;
  - d. An estimate of slope stability and the effect construction and placement of structures will have on the slope over the estimated life of the structure;
  - e. An estimate of the bluff retreat rate that recognizes and reflects potential catastrophic events such as seismic activity or a 100-year storm event;
  - f. Consideration of the run-out hazard of landslide debris and/or the impacts of landslide run-out on down slope properties and critical areas;
  - g. Consideration of the effects of erosion on down slope properties and other critical areas;
  - h. A study of slope stability including an analysis of proposed cuts, fills, and other site grading;
  - i. Recommendations for building siting limitations; and
  - j. An analysis of proposed surface and subsurface drainage, and the vulnerability of the site to erosion;
3. Geotechnical Engineering Report. The technical information for a project within a landslide hazard area shall include a geotechnical engineering report prepared by a licensed engineer that presents engineering recommendations for the following:
- a. Parameters for design of site improvements including appropriate foundations and retaining structures. These should include allowable load and resistance capacities for bearing and lateral loads, installation considerations, and estimates of settlement performance;
  - b. Recommendations for drainage and subdrainage improvements;
  - c. Earthwork recommendations including clearing and site preparation criteria, fill placement and compaction criteria, temporary and permanent slope inclinations and protection, and temporary excavation support, if necessary; and
  - d. Mitigation of adverse site conditions including slope stabilization measures and seismically unstable soils, if appropriate;
4. Erosion and Sediment Control Plan. For any development proposal on a site containing an erosion hazard area, an erosion and sediment control plan shall be required.

The erosion and sediment control plan shall be prepared in compliance with requirements set forth in the city of Bothell's adopted storm water and water quality standards;

5. **Drainage Plan.** The technical information shall include a drainage plan for the collection, transport, treatment, discharge, and/or recycle of water prepared in accordance with the city of Bothell adopted surface water standards. The drainage plan should consider on-site septic system disposal volumes where the additional volume will affect the erosion or landslide hazard area;

6. **Mitigation Plans.** Hazard and environmental mitigation plans for erosion and landslide hazard areas shall include the location and methods of drainage, surface water management, locations and methods of erosion control, a vegetation management and/or replanting plan, and/or other means for maintaining long-term soil stability; and

7. **Monitoring Surface Waters.** If the director determines that there is a significant risk of damage to downstream receiving waters due to potential erosion from the site, based on the size of the project, the proximity to the receiving waters, or the sensitivity of the receiving waters, the technical information shall include a plan to monitor the surface water discharge from the site. The monitoring plan shall include a recommended schedule for submitting monitoring reports to the city.

**B. Seismic Hazard Areas.** In addition to the basic report requirements, a critical areas report for a seismic hazard area shall also meet the following requirements:

1. The site map shall show all known and mapped faults within 200 feet of the project area or that have potential to be affected by the proposal.

2. The hazards analysis shall include a complete discussion of the potential impacts of seismic activity on the site (for example, forces generated and fault displacement).

3. A geotechnical engineering report shall evaluate the physical properties of the subsurface soils, especially the thickness of unconsolidated deposits and their liquefaction potential. If it is determined that the site is subject to liquefaction, mitigation measures appropriate to the scale of the development shall be recommended and implemented.

**C. Other Geologically Hazardous Areas.** In addition to the basic requirements, the director may require additional technical information to be submitted when determined to be necessary to the review the proposed activity and the subject hazard. Additional technical information that may be required, includes, but is not limited to:

1. **Site Plan.** The site plan shall show all hazard areas located within 200 feet of the project area or that have potential to be affected by the proposal; and

2. Hazards Analysis. The hazards analysis shall include a complete discussion of the potential impacts of the hazard on the project area and of the proposal on the hazard. (Ord. 1946 § 3, 2005).

Performance Standards

**14.04.870 Performance standards – General requirements.**

A. Alterations of geologically hazardous areas or associated buffers may only occur for activities that:

1. Will not increase the threat of the geological hazard to adjacent properties beyond pre-development conditions;
2. Will not adversely impact other critical areas;
3. Are designed so that the hazard to the project is eliminated or mitigated to a level equal to or less than pre-development conditions; and
4. Are certified as safe as designed and under anticipated conditions by a qualified engineer or geologist, licensed in the state of Washington.

B. Critical Facilities Prohibited. Critical facilities shall not be sited within geologically hazardous areas unless there is no other practical alternative. (Ord. 1946 § 3, 2005).

**14.04.880 Performance standards – Specific hazards.**

A. Erosion and Landslide Hazard Areas. Activities on sites containing erosion or landslide hazards shall meet the standards of BMC 14.04.870, Performance standards – General requirements, and the specific following requirements:

1. Buffer Requirement. A buffer shall be established from all edges of landslide hazard areas. The size of the buffer shall be determined by the director to eliminate or minimize the risk of property damage, death, or injury resulting from landslides caused in whole or part by the development, based upon review of and concurrence with a critical areas report prepared by a qualified professional.

a. Minimum Buffer. The minimum buffer shall be equal to the height of the slope or 50 feet, whichever is greater.

b. Buffer Reduction. The buffer may be reduced to a minimum of 10 feet when a qualified professional demonstrates to the director's satisfaction that the reduction will adequately protect the proposed development, adjacent developments, and uses and the subject critical area.

- c. Increased Buffer. The buffer may be increased where the director determines a larger buffer is necessary to prevent risk of damage to proposed and existing development;
2. Alterations. Alterations of an erosion or landslide hazard area and/or buffer may only occur for activities for which a hazards analysis is submitted and certifies that:
  - a. The development will not increase surface water discharge or sedimentation to adjacent properties beyond pre-development conditions;
  - b. The development will not decrease slope stability on adjacent properties; and
  - c. Such alterations will not adversely impact other critical areas;
3. Design Standards. Development within an erosion or landslide hazard area and/or buffer shall be designed to meet the following basic requirements unless it can be demonstrated that an alternative design that deviates from one or more of these standards provides greater long-term slope stability while meeting all other provisions of this chapter. The requirement for long-term slope stability shall exclude designs that require regular and periodic maintenance to maintain their level of function. The basic development design standards are:
  - a. The proposed development shall not decrease the factor of safety for landslide occurrences below the limits of 1.5 for static conditions and 1.2 for dynamic conditions. Analysis of dynamic conditions shall be based on a minimum horizontal acceleration as established by the current version of the International Building Code;
  - b. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography;
  - c. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation;
  - d. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties;
  - e. The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes; and
  - f. Development shall be designed to minimize impervious lot coverage;
4. Vegetation Retention. Unless otherwise provided or as part of an approved alteration, removal of vegetation from an erosion or landslide hazard area or related buffer shall be prohibited;



5. **Seasonal Restriction.** Clearing shall be allowed only from May 1st to October 1st of each year; provided, that the city may extend or shorten the dry season on a case-by-case basis depending on actual weather conditions, except that timber harvest, not including brush clearing or stump removal, may be allowed pursuant to an approved forest practice permit issued by the city or the Washington State Department of Natural Resources;

6. **Utility Lines and Pipes.** Utility lines and pipes shall be permitted in erosion and landslide hazard areas only when the applicant demonstrates that no other practical alternative is available. The line or pipe shall be located above ground and properly anchored and/or designed so that it will continue to function in the event of an underlying slide. Storm water conveyance shall be allowed only through a high-density polyethylene pipe with fuse-welded joints, or similar product that is technically equal or superior;

7. **Point Discharges.** Point discharges from surface water facilities and roof drains onto or upstream from an erosion or landslide hazard area shall be prohibited except as follows:

a. Conveyed via continuous storm pipe downslope to a point where there are no erosion hazards areas downstream from the discharge;

b. Discharged at flow durations matching pre-developed conditions, with adequate energy dissipation, into existing channels that previously conveyed storm water runoff in the pre-developed state; or

c. Dispersed discharge upslope of the steep slope onto a low-gradient undisturbed buffer demonstrated to be adequate to infiltrate all surface and storm water runoff, and where it can be demonstrated that such discharge will not increase the saturation of the slope;

8. **Subdivisions.** The division of land in landslide hazard areas and associated buffers is subject to the following:

a. Land that is located wholly within a landslide hazard area or its buffer may not be subdivided. Land that is located partially within a landslide hazard area or its buffer may be divided; provided, that each resulting lot has sufficient buildable area outside of, and will not affect, the landslide hazard or its buffer;

b. Access roads and utilities may be permitted within the landslide hazard area and associated buffers if the city determines that no other feasible alternative exists; and

9. **Prohibited Development.** On-site sewage disposal systems, including drain fields, shall be prohibited within erosion and landslide hazard areas and related buffers.

B. **Seismic Hazard Areas.** Activities proposed to be located in seismic hazard areas shall meet the standards of BMC 14.04.870, Performance standards – General requirements.

C. Other Hazard Areas. Activities on sites containing or adjacent to other geologically hazardous areas, shall meet the standards of BMC 14.04.870, Performance standards – General requirements. (Ord. 1946 § 3, 2005).

## Edmonds City Code

### Chapter 23.80 GEOLOGICALLY HAZARDOUS AREAS

#### Sections:

#### Part I. Designation, Rating and Mapping

23.80.000 Geologically hazardous areas compliance requirements flowchart.

23.80.010 Designation, rating and mapping - Geologically hazardous areas.

23.80.020 Designation of specific hazard areas.

23.80.030 Mapping of geologically hazardous areas.

#### Part II. Allowed Activities – Geologically Hazardous Areas

23.80.040 Allowed activities – Geologically hazardous areas.

#### Part III. Additional Report Requirements – Geologically Hazardous Areas

23.80.050 Special study and report requirements – Geologically hazardous areas.

#### Part IV. Development Standards – Geologically Hazardous Areas

23.80.060 Development standards – General requirements.

23.80.070 Development standards – Specific hazards.

#### Part I. Designation, Rating and Mapping

#### **23.80.000 Geologically hazardous areas compliance requirements flowchart.**

See Figure 23.80.000 at the end of this chapter. [Ord. 3527 § 2, 2004].

#### **23.80.010 Designation, rating and mapping – Geologically hazardous areas.**

Geologically hazardous areas include areas susceptible to erosion, land sliding, earthquake, or other geological events. They pose a threat to the health and safety of citizens when incompatible development is sited in areas of significant hazard. Such incompatible development may not only place itself at risk, but also may increase the hazard to surrounding development and use. Areas susceptible to one or more of the following types of hazards shall be designated as a geologically hazardous area:

- A. Erosion hazard;
- B. Landslide hazard; and
- C. Seismic hazard. [Ord. 3527 § 2, 2004].

**23.80.020 Designation of specific hazard areas.**

A. Erosion Hazard Areas. Erosion hazard areas are at least those areas identified by the U.S. Department of Agriculture's Natural Resources Conservation Service as having a "moderate to severe," "severe," or "very severe" rill and inter-rill erosion hazard. Erosion hazard areas are also those areas impacted by shoreland and/or stream bank erosion. Within the city of Edmonds erosion hazard areas include:

1. Those areas of the city of Edmonds containing soils that may experience severe to very severe erosion hazard. This group of soils includes, but is not limited to, the following when they occur on slopes of 15 percent or greater:
  - a. Alderwood soils (15 to 25 percent slopes);
  - b. Alderwood/Everett series (25 to 70 percent slopes);
  - c. Everett series (15 to 25 percent slopes);
2. Any area with slopes of 15 percent or greater and impermeable soils interbedded with granular soils and springs or ground water seepage; and
3. Areas with significant visible evidence of ground water seepage, and which also include existing landslide deposits regardless of slope.

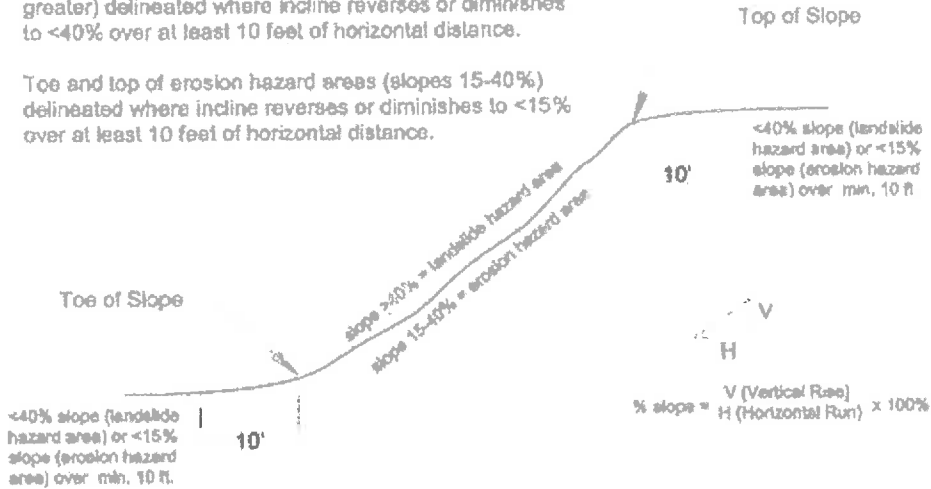
B. Landslide Hazard Areas. Landslide hazard areas are areas potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include areas susceptible because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors. Within the city of Edmonds landslide hazard areas specifically include:

1. Areas of ancient or historic failures in Edmonds which include all areas within the earth subsidence and landslide hazard area as identified in the 1979 report of Robert Lowe Associates and amended by the 1985 report of GeoEngineers, Inc.;

Simple Slope Calculation

Toe and top of landslide hazard areas (slopes of 40% or greater) delineated where incline reverses or diminishes to <40% over at least 10 feet of horizontal distance.

Toe and top of erosion hazard areas (slopes 15-40%) delineated where incline reverses or diminishes to <15% over at least 10 feet of horizontal distance.



Note: Slope, gradient changes and incline reversals or breaks below percent slopes defining landslide hazard areas (40%) and erosion hazard areas (15%) shall be included as part of a larger slope unless they are 10 horizontal feet or longer

Figure 1

2. Any area with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet except areas composed of consolidated rock. A slope is delineated by establishing its toe and top (as defined in Figure 1 in subsection (B)(1) of this section) and is measured by averaging the inclination over at least 10 feet of vertical relief or 25 feet of horizontal distance. Benches, steps and variations in gradient shall be incorporated into a larger slope if they do not meet criteria defining toe and/or top depicted in Figure 1 in subsection (B)(1) of this section (see also Figure 2 at the end of this subsection). If the toe or top of a slope is located off of a subject property, then the location of the toe or top shall be delineated 200 horizontal feet from the property boundary or at its natural location, whichever is closer to the subject parcel (see Figure 2 at the end of this subsection);

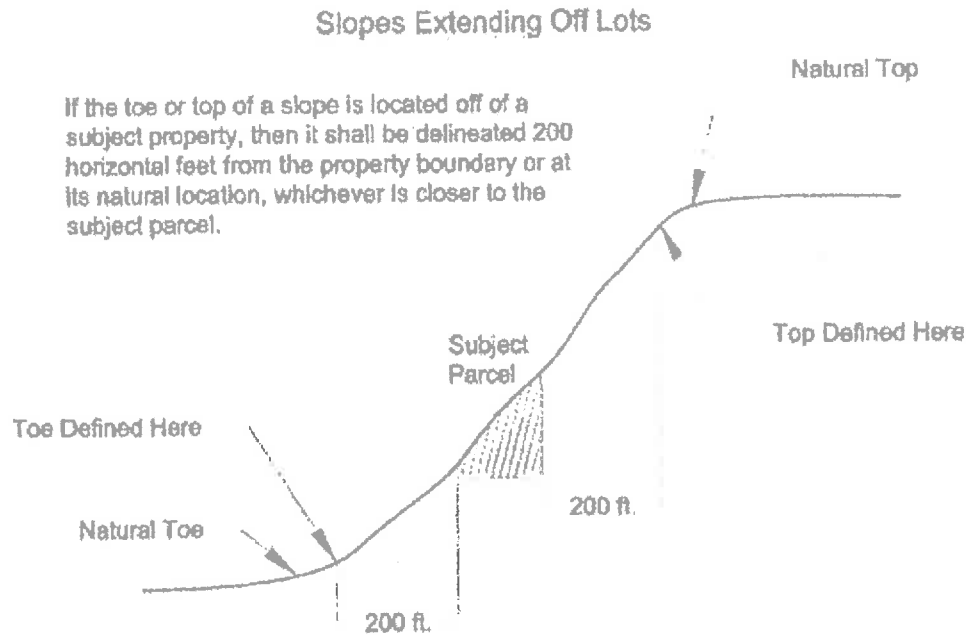


Figure 2

3. Any area potentially unstable as a result of rapid stream incision or stream bank erosion; and
4. Any area located on an alluvial fan, presently subject to, or potentially subject to, inundation by debris flow or deposition of stream-transported sediments.

C. Seismic Hazard Areas. Seismic hazard areas are areas subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, or surface faulting. Settlement and soil liquefaction conditions occur in areas underlain by cohesionless, loose, or soft-saturated soils of low density, typically in association with a shallow ground water table. [Ord. 3527 § 2, 2004].

### **23.80.030 Mapping of geologically hazardous areas.**

A. The approximate location and extent of geologically hazardous areas are shown on the city of Edmonds critical areas inventory. In addition, resources providing information on the location and extent of geologically hazardous areas in Edmonds include:

1. Washington Department of Ecology coastal zone atlas (for marine bluffs);
2. U.S. Geological Survey geologic maps, landslide hazard maps, and seismic hazard maps;

3. Washington State Department of Natural Resources seismic hazard maps for Western Washington;
4. Washington State Department of Natural Resources slope stability maps;
5. National Oceanic and Atmospheric Administration tsunami hazard maps; and
6. Federal Emergency Management Administration flood insurance maps.

B. The critical areas inventory and the resources cited above are to be used as a guide for the city of Edmonds development services department, project applicants and/or property owners and may be continuously updated as new critical areas are identified. They are a reference and do not provide a final critical area designation. [Ord. 3527 § 2, 2004].

#### Part II. Allowed Activities -- Geologically Hazardous Areas

##### **23.80.040 Allowed activities – Geologically hazardous areas.**

The following activities are allowed in geologically hazardous areas as consistent with ECDC 23.40.220, Allowed activities, Chapter 19.10 ECDC, Building Permits – Earth Subsidence and Landslide Hazard Areas, and Chapter 18.30 ECDC, Storm Water Management, and do not require submission of a critical area report:

A. Erosion and Landslide Hazard Areas. Except as otherwise provided for in this title, only those activities approved and permitted consistent with an approved critical areas report in accordance with this title shall be allowed in erosion or landslide hazard areas.

B. Seismic Hazard Areas. The following activities are allowed within seismic hazard areas:

1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly;
2. Additions to existing single-story residences that are 250 square feet or less; and
3. Installation of fences. [Ord. 3527 § 2, 2004].

#### Part III. Additional Report Requirements -- Geologically Hazardous Areas

##### **23.80.050 Special study and report requirements – Geologically hazardous areas.**

Critical area report requirements for geologically hazardous areas are generally met through submission to the director of one or more geotechnical engineering reports. In addition to the general critical areas report requirements of ECDC 23.40.090, critical areas reports for geologically hazardous areas must meet the requirements of this section and Chapters 18.30 and 19.10 ECDC as applicable. Critical areas reports for two or more types of critical areas must

meet the report requirements for each relevant type of critical area. Geotechnical report(s) submitted for the purpose of critical areas review are required as necessary in addition to reports, data and other information mandated per ECDC Titles 18 and 19.

A. Preparation by a Qualified Professional. A critical areas report for a geologically hazardous area shall be prepared by an engineer or geologist licensed in the state of Washington, with experience analyzing geologic, hydrologic, and ground water flow systems, and who has experience preparing reports for the relevant type of hazard. Critical areas studies and reports on geologically hazardous areas shall be subject to independent review pursuant to ECDC 23.40.090(B).

B. Area Addressed in Critical Areas Report. The following areas shall be addressed in a critical areas report for geologically hazardous areas:

1. The project area of the proposed activity; and
2. All geologically hazardous areas within 200 feet of the project area or that have the potential to be affected by the proposal.

C. Geological Hazards Assessment. A critical areas report for a geologically hazardous area shall contain an assessment of geological hazards including the following site- and proposal-related information at a minimum:

1. Site and Construction Plans. The report shall include a copy of the site plans for the proposal showing:

- a. The type and extent of geologic hazard areas, any other critical areas, and buffers on, adjacent to, within 200 feet of, or that are likely to impact the proposal;
- b. Proposed development, including the location of existing and proposed structures, fill, storage of materials, and drainage facilities, with dimensions indicating distances to the floodplain, if available;
- c. The topography, in two-foot contours, of the project area and all hazard areas addressed in the report; and
- d. Clearing limits;

2. Assessment of Geological Characteristics. The report shall include an assessment of the geologic characteristics of the soils, sediments, and/or rock of the project area and potentially affected adjacent properties, and a review of the site history regarding landslides, erosion, and prior grading. Soils analysis shall be accomplished in accordance with accepted classification systems in use in the region. The assessment shall include, but not be limited to:



- a. A description of the surface and subsurface geology, hydrology, soils, and vegetation found in the project area and in all hazard areas addressed in the report;
- b. A detailed overview of the field investigations, published data, and references; data and conclusions from past assessments of the site; and site-specific measurements, tests, investigations, or studies that support the identification of geologically hazardous areas; and
- c. A description of the vulnerability of the site to seismic and other geologic events;

3. **Analysis of Proposal.** The report shall contain a hazards analysis including a detailed description of the project, its relationship to the geologic hazard(s), and its potential impact upon the hazard area, the subject property, and affected adjacent properties; and

4. **Minimum Buffer and Building Setback.** The report shall make a recommendation for the minimum no-disturbance buffer and minimum building setback from any geologic hazard based upon the geotechnical analysis.

**D. Incorporation of Previous Study.** Where a valid critical areas report has been prepared within the last five years for a specific site, and where the proposed land use activity and surrounding site conditions are unchanged, said report may be incorporated into the required critical areas report. The applicant shall submit a hazards assessment detailing any changed environmental conditions associated with the site.

**E. Mitigation of Long-Term Impacts.** When hazard mitigation is required, the mitigation plan shall specifically address how the activity maintains or reduces the preexisting level of risk to the site and adjacent properties on a long-term basis (equal to or exceeding the projected lifespan of the activity or occupation). Proposed mitigation techniques shall be considered to provide long-term hazard reduction only if they do not require regular maintenance or other actions to maintain their function. Mitigation may also be required to avoid any increase in risk above the preexisting conditions following abandonment of the activity.

**F. Additional Technical Information Requirements for Erosion and Landslide Hazard Areas.** In addition to the basic critical areas report requirements for geologically hazardous areas provided in subsections A through E of this section, technical information for erosion and landslide hazard areas shall meet the requirements of Chapter 19.10 ECDC and include the following information at a minimum:

1. **Site Plan.** The critical areas report shall include a copy of the site plan for the proposal showing:
  - a. The height of slope, slope gradient, and cross-section of the project area;

b. The location of springs, seeps, or other surface expressions of ground water on or within 200 feet of the project area or that have the potential to be affected by the proposal; and

c. The location and description of surface water runoff features;

2. Hazards Analysis. The hazards analysis component of the critical areas report shall specifically include:

a. A description of the extent and type of vegetative cover;

b. A description of subsurface conditions based on data from site-specific explorations;

c. Descriptions of surface and ground water conditions, public and private sewage disposal systems, fills and excavations, and all structural improvements;

d. An estimate of slope stability and the effect construction and placement of structures will have on the slope over the estimated life of the structure;

e. An estimate of the bluff retreat rate that recognizes and reflects potential catastrophic events such as seismic activity or a 100-year storm event;

f. Consideration of the run-out hazard of landslide debris and/or the impacts of landslide run-out on down-slope properties;

g. A study of slope stability including an analysis of proposed cuts, fills, and other site grading;

h. Recommendations for building siting limitations; and

i. An analysis of proposed surface and subsurface drainage, and the vulnerability of the site to erosion;

3. Geotechnical Engineering Report. The technical information for a project within a landslide hazard area shall include a geotechnical engineering report prepared by a licensed engineer that presents engineering recommendations for the following:

a. Parameters for design of site improvements including appropriate foundations and retaining structures. These should include allowable load and resistance capacities for bearing and lateral loads, installation considerations, and estimates of settlement performance;

b. Recommendations for drainage and subdrainage improvements;

c. Earthwork recommendations including clearing and site preparation criteria, fill placement and compaction criteria, temporary and permanent slope inclinations and protection, and temporary excavation support, if necessary; and

d. Mitigation of adverse site conditions including slope stabilization measures and seismically unstable soils, if appropriate;

4. Erosion and Sediment Control Plan. For any development proposal on a site containing an erosion hazard area, an erosion and sediment control plan shall be required. The erosion and sediment control plan shall be prepared in compliance with requirements set forth in Chapter 18.30 ECDC.

G. Limited Report Requirements for Stable Erosion Hazard Areas. At the director's discretion, detailed critical areas report requirements may be waived for erosion hazard areas with suitable slope stability. Report requirements for stable erosion hazard areas may be met through construction documents that shall include at a minimum an erosion and sediment control plan prepared in compliance with requirements set forth in Chapter 18.30 ECDC.

H. Seismic Hazard Areas. In addition to the basic critical areas report requirements for geologically hazardous areas provided in subsections A through E of this section, a critical areas report for a seismic hazard area shall also meet the following requirements:

1. The site map shall show all known and mapped active faults within 200 feet of the project area or that have the potential to be affected by the proposal.
2. The hazards analysis shall include a complete discussion of the potential impacts of seismic activity on the site (for example, forces generated and fault displacement).
3. A geotechnical engineering report shall evaluate the physical properties of the subsurface soils, especially the thickness of unconsolidated deposits and their liquefaction potential. If it is determined that the site is subject to liquefaction, mitigation measures appropriate to the scale of the development shall be recommended and implemented. [Ord. 3527 § 2, 2004].

#### Part IV. Development Standards – Geologically Hazardous Areas

##### **23.80.060 Development standards – General requirements.**

A. Alterations of geologically hazardous areas or associated buffers may only occur for activities that:

1. Will not increase the threat of the geological hazard to adjacent properties beyond predevelopment conditions;
2. Will not adversely impact other critical areas;

3. Are designed so that the hazard to the project is eliminated or mitigated to a level equal to or less than predevelopment conditions; and

4. Are certified as safe as designed and under anticipated conditions by a qualified engineer or geologist, licensed in the state of Washington.

B. Critical Facilities Prohibited. Critical facilities shall not be sited within geologically hazardous areas unless there is no other practical alternative. [Ord. 3527 § 2, 2004].

### **23.80.070 Development standards – Specific hazards.**

A. Erosion and Landslide Hazard Areas. Activities on sites containing erosion or landslide hazards shall meet the requirements of ECDC 23.80.060, Development Standards – General Requirements, and the specific following requirements:

1. Buffer Requirement. A buffer shall be established from all edges of landslide hazard areas. The size of the buffer shall be determined by the director consistent with recommendations provided in the geotechnical report to eliminate or minimize the risk of property damage, death, or injury resulting from landslides caused in whole or part by the development, based upon review of and concurrence with a critical areas report prepared by a qualified professional.

a. Minimum Buffer. The minimum buffer shall be equal to the height of the slope existing within the project area or 50 feet, whichever is greater;

b. Buffer Reduction. The buffer may be reduced to a minimum of 10 feet when a qualified professional demonstrates to the satisfaction of the director that the reduction will adequately protect the proposed development, adjacent developments and uses and the subject critical area;

c. Increased Buffer. The buffer may be increased where the director determines that a larger buffer is necessary to prevent risk of damage to proposed and existing development;

2. Alterations. Alterations of an erosion or landslide hazard area and/or buffer may only occur for activities for which a hazards analysis is submitted and certifies that:

a. The development will not increase surface water discharge or sedimentation to adjacent properties beyond predevelopment conditions;

b. The development will not decrease slope stability on adjacent properties; and

c. Such alterations will not adversely impact other critical areas;

3. Design Standards. Development within an erosion or landslide hazard area and/or buffer shall be designed to meet the following basic requirements unless it can be

demonstrated that an alternative design that deviates from one or more of these standards provides greater long-term slope stability while meeting all other provisions of this title. The requirement for long-term slope stability shall exclude designs that require regular and periodic maintenance to maintain their level of function. The basic development design standards are:

- a. The proposed development shall not decrease the factor of safety for landslide occurrences below the limits of 1.5 for static conditions and 1.2 for dynamic conditions. If stability at the proposed development site is below these limits, the proposed development shall provide practicable approaches to reduce risk to human safety and improve the factor of safety for landsliding. In no case shall the existing factor of safety be reduced for the subject property or adjacent properties;
- b. Structures and improvements shall be clustered to avoid geologically hazardous areas and other critical areas;
- c. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography;
- d. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation;
- e. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties;
- f. The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes; and
- g. Development shall be designed to minimize impervious lot coverage;

4. **Vegetation Retention.** Unless otherwise provided or as part of an approved alteration, removal of vegetation from an erosion or landslide hazard area or related buffer shall be prohibited;

5. **Seasonal Restriction.** Clearing shall be allowed only from May 1st to October 1st of each year; provided, that the director may extend or shorten the dry season on a case-by-case basis depending on actual weather conditions, except that timber harvest, not including brush clearing or stump removal, may be allowed pursuant to an approved forest practice permit issued by the city of Edmonds or the Washington State Department of Natural Resources;

6. **Point Discharges.** Point discharges from surface water facilities and roof drains onto or upstream from an erosion or landslide hazard area shall be prohibited except as follows:

- a. Conveyed via continuous storm pipe downslope to a point where there are no erosion hazard areas downstream from the discharge;
- b. Discharged at flow durations matching predeveloped conditions, with adequate energy dissipation, into existing channels that previously conveyed storm water runoff in the predeveloped state; or
- c. Dispersed discharge upslope of the steep slope onto a low-gradient, undisturbed buffer demonstrated to be adequate to infiltrate all surface and storm water runoff, and where it can be demonstrated that such discharge will not increase the saturation of the slope; and

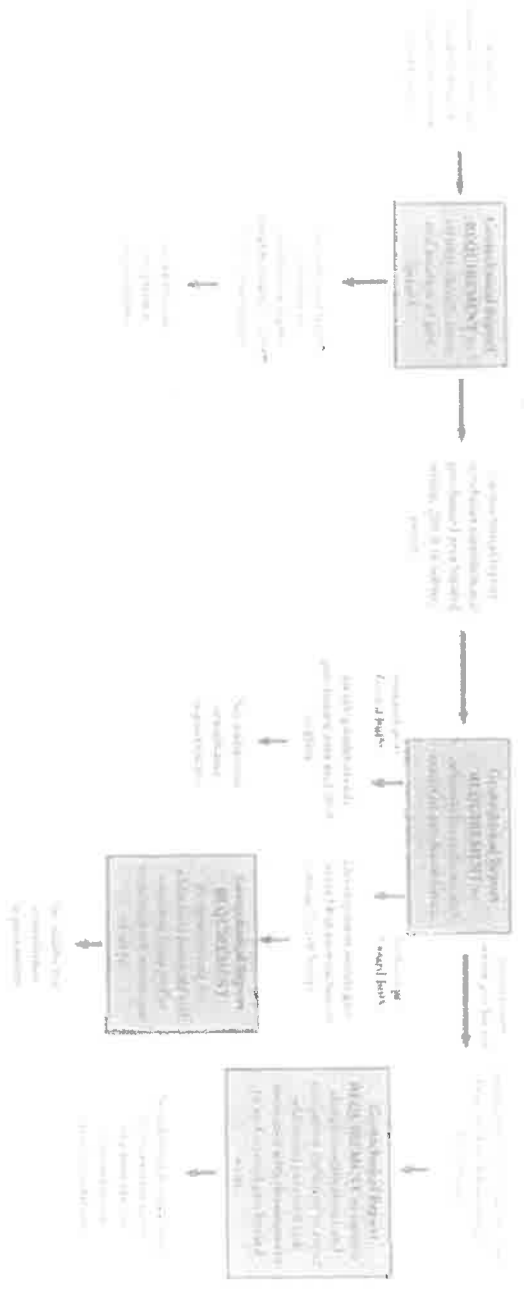
7. Prohibited Development. On-site sewage disposal systems, including drain fields, shall be prohibited within erosion and landslide hazard areas and related buffers.

B. Earth Subsidence and Landslide Hazard Area. In addition to the requirements of this chapter, development proposals for lands located within the earth subsidence and landslide hazard area as indicated on the critical areas inventory shall be subject to the provisions of Chapter 19.10 ECDC.

C. Seismic Hazard Areas. Activities proposed to be located in seismic hazard areas shall meet the standards of ECDC 23.80.060, Development Standards – General Requirements. [Ord. 3527 § 2, 2004].

CITY OF EDMONDS CRITICAL AREAS  
Critical Areas Compliance Requirements\*

Geologically Hazardous Areas



\*Report requirements may be met through submission of a single critical area report or multiple reports in combination.

Figure 23.80.000

## **Kirkland Zoning Code**

### **85.05 User Guide**

1. This chapter establishes special regulations that apply to development on property containing geologically hazardous areas. These regulations add to and, in some cases, supersede other regulations of this code. See Chapter 95 KZC for additional regulations that address trees and other vegetation within and outside of geologically hazardous areas.

2. If you are interested in developing property that contains a geologically hazardous area, or if you wish to participate in the City's decision on a proposed development on any of these areas, you should read this chapter.

3. For properties within jurisdiction of the Shoreline Management Act, see Chapter 83 KZC.

(Ord. 4252 § 1, 2010; Ord. 4010 § 3, 2005)

[Back to Top](#)

### **85.10 Applicability**

1. **General** – This chapter applies to any property that contains any of the following:

- a. An erosion hazard area.
- b. A landslide hazard area.
- c. A seismic hazard area.

2. **Conflict with Other Provisions of this Code** – The provisions of this chapter supersede any conflicting provisions of this code. The other provisions of this code that do not conflict with the provisions of this chapter apply to property that contains a geologically hazardous area. If more than one (1) provision of this chapter applies to the subject property because of the presence on the subject property of more than one (1) type of geologically hazardous area, then the regulations that provide the greatest protection from the hazardous area shall apply to the area governed by multiple regulations.

3. **SEPA Compliance** – Nothing in this chapter or the decisions made pursuant to this chapter in any way affect the authority of the City to review, condition, and deny projects under SEPA.

[Back to Top](#)

### **85.12 Environmentally Sensitive Areas (ESA) Maps**

As part of the City's SEPA Ordinance, City Council adopts, and from time to time amends, a map folio entitled "Kirkland Sensitive Areas." This folio contains maps entitled "Seismic



Hazards” and “Landslide and Erosion Hazards.” These maps will be used as a guide only to determine the presence of seismic hazards, erosion hazards, and landslide hazards, and the determination regarding whether these hazards exist on or near the subject property will be based on the actual characteristics of these areas and the definitions of this code.

[Back to Top](#)

### 85.13 Definitions

The following definitions apply throughout this code, unless, from the context, another meaning is clearly intended:

1. Environmentally Sensitive Areas Maps – As defined in Chapter 90 KZC.
2. Erosion Hazard Areas – Those areas containing soils which, according to the USDA Soil Conservation Service King County Soil Survey dated 1973, may experience severe to very severe erosion hazard. This group of soils includes, but is not limited to, the following when they occur on slopes of 15 percent or greater: Alderwood gravelly sand loam (AgD), Kitsap silt loam (KpD), Ragnar Indianola Association (RdE) and portions of the Everett gravelly sand loams (EvD) and Indianola Loamy fine sands (InD).
3. Geologically Hazardous Areas – Landslide hazard areas, erosion hazard areas and seismic hazard areas.
4. Landslide Hazard Areas – Both of the following:
  - a. High Landslide Hazard Areas – Areas sloping 40 percent or greater, areas subject to previous landslide activities and areas sloping between 15 percent and 40 percent with zones of emergent groundwater or underlain by or embedded with impermeable silts or clays.
  - b. Moderate Landslide Hazard Areas – Areas sloping between 15 percent and 40 percent and underlain by relatively permeable soils consisting largely of sand and gravel or highly competent glacial till.
5. Seismic Hazard Areas – Those areas subject to severe risk of earthquake damage as a result of seismically induced settlement or soil liquefaction, which conditions occur in areas underlain by cohesionless soils of low density usually in association with a shallow groundwater table.

[Back to Top](#)

### 85.14 Erosion Hazard Areas

Regulations to control erosion are contained within KMC Title 15 and in other codes and ordinances of the City. Development activity within erosion hazard areas is regulated using these

other provisions of this code and other City codes and ordinances and may be subject to increased scrutiny and conditioning because of the presence of an erosion hazard area.

[Back to Top](#)

### **85.15 Required Information – Landslide Hazard Areas and Seismic Hazard Areas**

The City may require the applicant to submit some or all of the following information, consistent with the nature and extent of the proposed development activity, for any proposed development activity in a landslide hazard area or seismic hazard area or on property which may contain one (1) of these areas based on the environmentally sensitive areas maps or preliminary field investigation by the Planning Official:

1. A topographic survey of the subject property, or the portion of the subject property specified by the Planning Official, with contour intervals specified by the Planning Official. This mapping shall contain the following information:
  - a. Delineation of areas containing slopes 15 percent or greater.
  - b. The proximity of the subject property to streams.
  - c. The location of structured storm drainage systems on the subject property.
  - d. Existing vegetation, including size and type of significant trees.
2. A geotechnical investigation, prepared by a qualified geotechnical engineer or engineering geologist, to determine if a landslide hazard area or seismic hazard area exists on the subject property.
3. A geotechnical report, prepared by a qualified geotechnical engineer or engineering geologist, showing and including the following information:
  - a. A description of how the proposed development will or will not affect slope stability, surface and subsurface drainage, erosion, and seismic hazards on the subject and adjacent properties.
  - b. Evidence, if any, of holocene or recent landsliding, sloughing, or soil creep.
  - c. The location of springs, seeps, or any other surface expression of groundwater, and the location of surface water or evidence of seasonal runoff or groundwater.
  - d. Identification of existing fill areas.
  - e. Soil description in accordance with the United Soil Classification Systems.

- f. Depth to groundwater and estimates of potential seasonal fluctuations.
4. Geotechnical recommendations, prepared by a qualified geotechnical engineer, for special engineering or other mitigation techniques appropriate to the hazard area along with an analysis of how these techniques will affect the subject and adjacent properties, including discussions and recommendations on the following:
- a. The present stability of the subject property, the stability of the subject property during construction, the stability of the subject property after all development activities are completed and a discussion of the relative risks and slide potential relating to adjacent properties during each stage of development.
  - b. Location of buildings, roadways, and other improvements.
  - c. Grading and earthwork, including compaction and fill material requirements, use of site solids as fill or backfill, imported fill or backfill requirements, height and inclination of both cut and fill slopes and erosion control and wet weather construction considerations and/or limitations.
  - d. Foundation and retaining wall design criteria, including bearing layer(s), allowable capacities, minimum width, minimum depth, estimated settlements (total and differential), lateral loads, and other pertinent recommendations.
  - e. Surface and subsurface drainage requirements and drainage material requirements.
  - f. Assessment of seismic ground motion amplification and liquefaction potential.
  - g. Other measures recommended to reduce the risk of slope instability.
  - h. Any additional information believed to be relevant by the geotechnical engineer preparing the recommendations or requested by the Planning Official.

[Back to Top](#)

### **85.20 Required Review – Landslide Hazard Areas and Seismic Hazard Areas**

1. General – Except as specified in subsection (2) of this section, the City will administratively review and decide upon any proposed development activity within a landslide hazard area or seismic hazard area.
2. Other Approval Required – If the proposed development on the subject property requires approval through Process I, IIA, or IIB, described in Chapters 145, 150, and 152 KZC, respectively, the proposed development activity within the landslide hazard area or seismic hazard area will be reviewed and decided upon as part of that other process.

[Back to Top](#)

### 85.25 Performance Standards – Landslide Hazard Areas and Seismic Hazard Areas

(See also Chapter 95 KZC)

As part of any approval of development in a landslide hazard area or seismic hazard area, the City may require the following to protect property and persons:

1. Implementation of the geotechnical recommendations to mitigate identified impacts, along with a written acknowledgment on the face of the plans signed by the architect, engineer, and/or designer that he/she has reviewed the geotechnical recommendations and incorporated these recommendations into the plans.
2. Funding of a qualified geotechnical engineer or engineering geologist, selected and retained by the City subject to a 3-party contract, to review the geotechnical report and recommendations.
3. That a qualified geotechnical professional be present on-site during land surface modification and foundation installation activities, and submittal by a geotechnical engineer of a final report prior to occupancy, certifying substantial compliance with the geotechnical recommendations and geotechnical-related permit requirements.
4. The retention of any and all trees, shrubs, and groundcover, and implementation of a revegetation plan including immediate planting of additional vegetation.
5. Specifically engineered foundation and retaining wall designs.
6. The review of all access and circulation plans by the Department of Public Works.
7. Limitation or restriction of any development activity that may:
  - a. Significantly impact slope stability or drainage patterns on the subject property or adjacent properties;
  - b. Cause serious erosion hazards, sedimentation problems or landslide hazards on the subject property or adjacent properties; or
  - c. Cause property damage or injury to persons on or off the subject property.
8. Dedication of one (1) or more natural greenbelt protective easements or tracts.

(Ord. 4010 § 3, 2005)