

**Chapter 18.55
CRITICAL AREAS**

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Article XVI. Geologically Hazardous Areas – Designation

18.55.600 Purpose.

The primary purpose of *geologically hazardous area* regulations is to avoid and minimize potential impacts to life and property from geologic hazards.

18.55.610 Designation of geologically hazardous areas.

Geologically hazardous areas include areas susceptible to *erosion*, *landsliding*, earthquake, or other geological events. They pose a threat to the health and safety of citizens when incompatible *development* is sited in *hazard* 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*.

18.55.620 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 or identified by a special study as having a "moderate to severe," "severe," or "very severe" *erosion* potential.

B. High Landslide Hazard Areas. High Landslide hazard areas are areas potentially subject to high risk of 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. Examples of these may include, but are not limited to, the following:

1. Areas of historic failures, such as:

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*; or

b. Areas designated as Quaternary slumps, earthflows, mudflows, or *landslides* on maps published by the U.S. Geological Survey or State Department of Natural Resources; or

c. Areas identified on King County's 2017 map of unstable slopes and as amended.

2. Areas with all three of the following characteristics:

a. Slopes steeper than 15 percent; and

b. Hillsides intersecting geologic contacts with a relatively permeable sediment overlying relatively impermeable sediment; and

c. Springs or ground water seepage. ;

3. Areas that have shown movement during the Holocene epoch post-glacial period (from 106,000 years ago to the present) or that are underlain or covered by mass wastage debris of that epochtime period, as shown on U.S. Geological Survey, Washington Department of Natural Resources, or King County maps;

4. Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials;

54. Areas potentially unstable because of rapid *stream* incision, stream bank *erosion*, and undercutting by wave action; and

65. Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by *debris flows* or catastrophic flooding; and.

C. *Moderate Landslide Hazard Areas.* Moderate landslide hazard areas are areas at moderate risk of 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. Examples of these may include, but are not limited to, the following:

71. Areas with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet. A slope is delineated by establishing its toe and measured by averaging the inclination over at least 10 feet of vertical relief.

ED. *Seismic Hazard Areas.* Seismic hazard areas are locations subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, tsunami, 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:

1. The magnitude of an earthquake;
2. The distance from the source of an earthquake;
3. The type or thickness of geologic materials at the surface; and
4. The type of subsurface geologic structure.

Settlement, and soil liquefaction, and lateral spreading conditions occur in areas underlain by cohesionless, loose, or soft-saturated soils of low density, typically in association with a shallow ground water table. Tsunami or seiche waves triggered by an earthquake or seismically-induced landslides can inundate shoreline-adjacent land, such as along Lake Washington or the lower reaches of the Sammamish River.

In Kenmore, seismic hazard areas include liquefaction-prone areas and a potential strand of the Southern Whidbey Island Fault Zone known as the Kenmore Lineament as designated by the Washington Department of Natural Resources.

DE. *Other Hazard Areas.* Geologically hazardous areas shall also include areas determined by the city manager to be susceptible to other geological events including mass wasting, debris flows, and differential settlement.

Article XVII. Geologically Hazardous Areas – Report Requirements

18.55.630 Critical areas report.

A. A *critical areas* report shall be required for all proposed *alterations* of properties that are located within 200 feet of any *geologically hazardous area*. Requirements for *critical areas* reports for *geologically hazardous areas* are available from the *city manager*.

B. In the event that the *applicant's* geotechnical consultant and the *City's* geotechnical reviewer cannot resolve the geotechnical issues and do not agree on required development conditions, the *city manager* may require a third-party review of the *critical areas* report. The *applicant's* consultant and the *City's* reviewer shall select a mutually agreed upon *qualified professional* to provide the final opinion. The *applicant* shall fund this review and shall make substantive changes to the proposed *alteration* or provide additional analysis as directed by the third-party reviewer.

Article XVIII. Geologically Hazardous Areas – Performance Standards

18.55.640 Performance standards – General requirements.

BA. Structures and site improvements shall be *clustered* to avoid *geologically hazardous areas* and other *critical areas*;

AB. *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 determined to be safe as sited and designed and under anticipated conditions by a qualified engineer or geologist, or engineering geologist, as appropriate, licensed in the State of Washington.

BC. *Critical Facilities Prohibited*. *Critical facilities* shall not be sited within *geologically hazardous areas* unless there is no other *practical alternative*. If so sited, the design shall be adequate to mitigate the effects of the hazard.

18.55.650 Performance standards – Specific hazards.

A. ~~Erosion and Landslide Hazard Areas. Activities on sites containing erosion or landslide hazards~~ areas shall meet the following requirements:

1. ~~Buffer~~ Not Required for *Erosion Hazard Areas*. No *buffer* is required from an area categorized as only an *erosion hazard area*.
2. Best Management Practices. Best management practices for sediment and erosion control shall be implemented in an erosion hazard area.
- ~~53. Vegetation Shall Be Retained. 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.~~
- ~~64. Seasonal Restriction. Clearing Site development work shall be allowed only from May 1st to October 1st of each year; provided, that the City manager 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 Department of Natural Resources.~~
- ~~75. 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. Such utilities shall be designed by qualified professionals to resist ground movement and erosion. 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. Stormwater conveyance shall be allowed only through a high-density polyethylene pipe with fuse-welded joints, or similar product that is technically equal or superior.~~
- ~~86. 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 or downslope from the discharge; or
 - b. Discharged at flow durations matching predeveloped conditions, with adequate energy dissipation, into existing channels that previously conveyed stormwater 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 stormwater runoff, and where it can be demonstrated that such discharge will not increase the saturation of the slope.~~

~~37.~~ *Alterations.* In addition to meeting the requirements in KMC 18.55.640, A ~~alterations of an erosion hazard area or a landslide hazard area and/or its buffer~~ may only occur for activities for which a special study is submitted and certifies demonstrating that:

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

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

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

B. Landslide Hazard Areas. In addition to meeting the requirements in KMC 18.55.640, activities on sites containing landslide hazards shall meet the following requirements:

21. General Standards. The following standards shall apply in all landslide hazard areas:

a. *Buffer Required for Landslide Hazard Areas.* A *buffer* shall be established from all edges of *landslide hazard areas*. The size of the *buffer* shall be determined by the *city manager* 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 area* report prepared by a *qualified professional*.

ai. *Minimum Buffer.* The minimum *buffer* shall be equal to the height of the slope, as measured from the toe to the top, or 50 feet, whichever is greater.

bii. *Buffer Reduction.* The *buffer* may be reduced to a minimum of 4025 feet when a *qualified professional* demonstrates to the *city manager's* satisfaction based upon review of a special study that the reduction will adequately protect the proposed *development*, adjacent *developments* and *uses* and the subject *critical area* through slope stability improvements or structural means.

ciii. *Increased Buffer.* The *buffer* may be increased where the *city manager* determines a larger *buffer* is necessary to prevent risk of damage to proposed and existing *development*.

d. *Building Setback.* A building ~~setback~~ is required from the edge of the *buffer* per KMC 18.55.270.

5b. *Vegetation Shall Be Retained.* 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.

8c. *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~~ *landslide hazard areas* downstream ~~or downslope~~ from the discharge;

b. Discharged at flow durations matching predeveloped conditions, with adequate energy dissipation, into existing channels that previously conveyed stormwater 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 stormwater runoff, and where it can be demonstrated that such discharge will not increase the saturation of the slope.

7d. *Utility Lines and Pipes.*

i. 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 *landslide*. It must be demonstrated by the applicant that a utility line within the landslide hazard area has been designed in a manner that does not negatively impact the stability of the slope, minimizes or eliminates the potential for rupture or failure, and assures that in the event of failure there will not be a life/safety risk. Stormwater conveyance shall be allowed only through a high-density polyethylene pipe with fuse-welded joints, or similar product that is technically equal or superior. Automatic shutoff valves shall be provided on petroleum or natural gas lines to isolate the landslide area.

ii. Access roads ~~and to serve~~ utilities may be permitted within a *landslide hazard area* and associated *buffer* if the *City* determines that no other feasible alternative exists, and the road is designed so as not to lower the stability of the slope. Such a road shall not be used for general ingress/egress to the property unless otherwise approved as part of a development proposal.

6e. Seasonal Restriction. Permitted Clearing site development work shall be allowed only from May 1st to October 1st of each year; provided, that the City manager 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 Department of Natural Resources. An exception may be granted by the city manager for emergency repair of structures or landslides when waiting for the clearing window will (1) create a life-threatening risk, (2) do additional damage to the structure, or (3) damage adjacent property or structures.

f. Trails. Trails shall be permitted when all of the following conditions have been met:

i. The proposed trail shall not decrease the existing factor of safety within the landslide hazard area or any required buffer.

ii. The proposed trail is for non-vehicular use only, and is a maximum of 4 (four) feet wide;

iii. The trail shall not be sited within a landslide hazard area or associated buffer when there is such a high risk of landslide activity that the use of the trail would be hazardous; and

iv. The trail shall be designed and constructed using an engineered drainage system or other methods to prevent the trail surface from becoming a drainage course.

9g. Subdivisions. The division of land in *landslide hazard areas* and associated *buffers* is subject to the following:

ai. Land that is located wholly within a landslide hazard area or its minimum buffer as required by 18.55.650.B.1.a KMC may shall not be subdivided.

ii. Land that is located partially within a landslide hazard area or its minimum buffer may be divided; provided, that each resulting lot has sufficient buildable area outside of, and will not affect, or be affected by, the landslide hazard area or its buffer, and. For single-family residential subdivisions and short subdivisions on sites in the R-4 zone located partially within a landslide hazard area and its minimum buffer, minimum lot size in the area outside of the landslide hazard area and its buffer may be reduced to 5,400 sq.ft. with no limitation on the percentage of smaller lots, regardless of KMC 18.21.030 footnote 16. These smaller lots shall be located so as to have the least impact on surrounding properties in terms of consistency of street frontages and privacy of abutting properties and the lot area shall exclude access easements and access panhandles.

iii. Access roads shall be allowed within a *landslide hazard area* and associated *buffer* only if the *City* determines that no other feasible alternative exists, and the road is designed so as not to lower the stability of the slope.

40h. Prohibited *Development*. On-site sewage disposal systems, including drain fields, shall be prohibited within *landslide hazard areas* and related *buffers*.

2. High Landslide Hazard Areas – Additional Standards.

a. No new *alteration* shall be permitted in a high *landslide hazard area* unless approved as a *reasonable use exception*, KMC 18.55.180.

b. Modifications to a previously approved *alteration*, including remodeling of an existing residence, in a high *landslide hazard area* may be permitted only if a *critical areas report* is submitted demonstrating that the proposal is determined to be safe as sited and designed and under anticipated conditions by a qualified engineer, or engineering geologist, as appropriate, licensed in the State of Washington.

3. Moderate Landslide Hazard Areas – Additional Standards.

4a. Design Standards. *Alterations of a moderate landslide hazard area and/or its buffer may only occur for activities for which a critical areas report is submitted.* *Alterations within an erosion hazard area, 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/article*. 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:

ai. 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;

eii. *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;

eiii. *Structures* and improvements shall be located to preserve the most critical portion of the *site* and its natural landforms and *vegetation*;

eiv. The proposed *development* shall not decrease slope stability on adjacent properties or result in greater risk or a need for increased *buffers* on neighboring properties;

fv. The use of *retaining walls* that allow the maintenance of existing natural slope area is preferred over graded artificial slopes; and

gvi. *Development* shall be designed to minimize impervious *lot* coverage.

14C. Slopes Created by Previous Grading. Artificial slopes meeting the criteria of a *landslide hazard area* based on slope steepness and height that were created through previous permitted *grading* or are legally non-conforming may be further altered or graded provided the applicant provides information from a *qualified professional* demonstrating that the naturally occurring slope, as it existed prior to the permitted *grading*, did not meet any of the criteria for a *landslide hazard area* and that a new hazard will not be created. Previously graded slopes meeting the criteria of a landslide hazard area that were not permitted or were illegally created are considered to be landslide hazard areas.

BD. Seismic Hazard Areas. Activities proposed to be located in *seismic hazard areas* shall meet the standards of KMC [18.55.640](#), Performance standards – General requirements, and the International Building Code. Development or renovation of property in designated tsunami or seiche zones, when identified by the USGS or Washington State Department of Natural Resources, may be allowed if taking into account *Designing for Tsunamis, Seven Principles for Planning and Designing for Tsunami Hazards* (National Tsunami Hazard Mitigation Program, 2001) and following the regulations for floodways.

GE. Other Hazard Areas. Activities on sites containing or adjacent to other *geologically hazardous areas* shall meet the standards of KMC [18.55.640](#), Performance standards – General requirements.