

## GEOLOGICALLY HAZARDOUS AREAS

### Why are geologically hazardous areas being protected?

Geologically hazardous areas are those areas susceptible to erosion, sliding, earthquakes, or other geological events. The types of geologically hazardous areas recognized in the Sammamish Municipal Code include erosion, landslide, and seismic hazards.

Erosion areas are protected to prevent soil from eroding off a property and carrying harmful chemicals into streams and lakes. Landslide and seismic areas are protected due to the potential threat to the health and safety of the public that may occur when something happens that causes the ground to have a catastrophic failure.

### What is protected within a geologically hazardous area buffer and setback?

For erosion hazard areas, wetland, streams, and lakes are protected from a build up of silt and chemicals that can cause significant harm to the native plants and animals, and ecosystem. As such, ground cover and vegetation are to be protected to the greatest extent possible.

Within landslide and seismic areas, the structure of the ground itself needs to be protected. This may require that vegetation be undisturbed, limiting development that places the weight of buildings onto unstable slopes, and limiting impervious surfaces.

### How is a geologically hazardous area defined?

Generally, the City designates erosion hazard areas as areas in the City that are underlain by soils that are subject to severe erosion when disturbed by wind, rain, or other activities. Currently, the City’s definition of erosion hazard areas includes reference to the USDA Soil Conservation Service and the 1973 King County Soils Survey.

One type of erosion hazard area is mapped as the Erosion Hazard Near Sensitive Water Bodies overlay, which is where sloped areas that drain directly to Lake Sammamish are sensitive to the impacts of increased erosion and sediment loads from development. Within the Erosion Hazard Near Sensitive Water Bodies overlay, there is a portion designated as the No-Disturbance Area, which was established to prevent damage from erosion. These designations originate from the East Lake Sammamish Non-Point Basin Protection Plan, circa 1994. This important basin plan was adopted prior to the creation of regulations for stormwater and drainage reviews. However, more recent stormwater and drainage regulations now provide greater protections to these areas.

The City defines landslide hazards as areas that are potentially subject to risk of ground movement and areas of steep slopes. This definition also includes areas mapped by the USDA Natural Resources Conservation Service, the US Geological Survey, and the Department of Natural Resources.<sup>1</sup>

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<sup>1</sup> [SMC 21.04.040.195](#)

Seismic hazard areas are defined as susceptible to liquefaction, according to the Liquefaction Susceptibility Map of King County<sup>2</sup>. Liquefaction takes place when loosely packed, water-logged ground loses its strength during earthquakes or other strong ground shaking.

**How are geologically hazardous areas currently protected?**

For normal erosion hazard areas, regulations limit work during the Wet Season to minimize sediment from flowing off-site. For the Erosion Hazard Near Sensitive Water Bodies Overlay and No-Disturbance Area, development is subject to strict stormwater and drainage standards. However, in the No-Disturbance Area, development is limited to single-family residences and public infrastructure.

Landslide Hazard Areas are protected by a required buffer of 50 feet, which may be reduced to 15 feet (based on a geotechnical report). In addition to this buffer, a 15-foot setback to any new development is also required. Further protection includes limitations on the removal of vegetation.

For Seismic Hazard Areas, development proposals must include a geotechnical report documenting that the development is adequately engineered to prevent structural failure during earthquakes.

In landslide hazard areas, a minimum buffer of 50 feet shall be established from the top and toe of the slope to protect structures that may be impacted by a landslide event. The buffer can be extended as required to mitigate a landslide or erosion hazard or to protect the public health, safety, and welfare. Alternatively, the buffer may be reduced to a minimum of 15 feet if, based on a critical areas study, the City determines that the critical area will be adequately protected.

A building setback is also required from the edge of the critical area buffer. However, certain activities may be allowed in the building setback including:

1. Landscaping;
2. Uncovered decks, less than 18 inches above grade;
3. Building overhangs that do not extend more than 18 inches into the setback area;
4. Impervious ground surfaces, such as driveways and patios; provided, that such improvements may be subject to special drainage provisions adopted for the various critical areas; and
5. Trails.

While seismic hazards do not include a development buffer or setback, development must adhere to all applicable building requirements and alterations must provide mitigation based on the best available engineering and geological practices to eliminate or minimize the risk of damage, death, or injury caused by seismically induced settlement or soil liquefaction.

<sup>2</sup> [Liquefaction Susceptibility Map of King County, Washington, Washington Division of Geology and Earth Sciences, OFR 2004-20, Palmer et al., September, 2004, as revised.](#)

**Using Best Available Science (BAS), how should geologically hazardous areas be protected?**

Erosion hazard areas should be protected by limiting areas allowed to be disturbed, limiting work during the Wet Season, increasing erosion and sediment controls during construction, minimizing to the greatest extent possible the removal of any vegetation, requiring post-construction revegetation, and creating penalties for lack of sediment/erosion containment during construction.

Landslide hazard areas should be protected by creating a clear definition that identifies landslide hazard areas, limiting ground disturbance, minimizing allowance to reduce the buffer to 25 feet, minimizing footprint (by square footage or percentage) of any allowed encroachments, and requiring a buffer to the side of landslide hazard areas (instead of just top and toe).

Additionally, seismic conditions should be considered in development proposals, and development standards should be revised to include references to surface rupture, seismic induced landslides, and other earth movement for improved protection.

**How are geologically hazardous areas currently identified in the field, as well as on a map?**

The City of Sammamish had advisory maps for erosion, seismic, and landslide hazards areas. Then there is a non-advisory map for the Erosion Hazard Near Sensitive Water Bodies Overlay. These are displayed on the City’s GIS database<sup>3</sup>.

Often, field verification and site-specific assessment are required to delineate geologically hazardous areas and associated buffers. Geologic conditions are field verified by a qualified geotechnical professional for certain development depending on the location and type of geologically hazardous area.

**Using BAS, how should geologically hazardous areas be identified in the field and on a map?**

BAS supports that geologically hazardous areas should be identified in the field by licensed civil engineers with a geotechnical specialty and licensed geologists and documented in a report provided to the City.

A publicly available advisory map would help both the public and staff to determine when such investigations may be necessary.

Landslide Hazard Areas should include slopes that are surveyed in a strict grid pattern and should be based on a slope that calculates an entire subject property.

<sup>3</sup> Sammamish Property Tool can be viewed at: [ArcGIS Web Application](#)

**How would a geologically hazardous area map be updated?**

A site-specific geologically hazardous area map would be updated based on the field verification of the presence and boundary of a regulated geologically hazardous area by a qualified professional through a report provided as part of an application submittal.

Potential landslide hazard areas due to steep slopes could potentially be mapped using available GIS contour data.

**Who would be responsible for updating the map for geologically hazardous areas?**

The City should ultimately be responsible for the updating of any city maps regarding geologically hazardous areas. However, updates should be made as critical area/geotechnical reports are provided to the City as part of development proposal applications. Applicants should provide mapping data (shapefiles), in order for the City to update the maps accordingly.

**Summary of Geologic Hazardous Area Changes Being Considered**

**CATEGORY 1 – No Action Needed; Changes Integrated into Draft Code Amendments**

Changes required by the Growth Management Act, clarifications, and other minor changes.

- Consider including designation criteria for erosion, landslide, and seismic hazard areas for clarity of application in SMC 21.03.020.W. The applicable definitions in the Technical Terms and Land Use Definition section should be consistent with the designation criteria.
- Revise the definition of erosion hazard area to remove ambiguity and outdated references that are no longer used by the United States Department of Agriculture (USDA).
- Provide additional specificity to determine how to identify and survey slopes.
- Provide additional specificity to differentiate between surficial sluff and earth slide movement for landslide hazard areas.
- Provide additional limitations for grading activities within designated erosion hazard areas.
- Update the definition of a ‘qualified professional’ for geologically hazardous areas to require the critical areas report to be prepared by a licensed civil engineer with a geotechnical specialty and a licensed geologist.
- Improve the cross-references for seismic hazards in relationship to the Building Code Administration.
- Establish how geologically hazardous area boundaries and buffers relate to other critical areas buffers to improve clarity of application.

**CATEGORY 2 - Requires Planning Commission & City Council Direction for Code Amendment Integration**

Changes don't impact the project timeline, require additional budget, or require further policy/impact analysis.

- Remove reference to the 'no-disturbance area' and 'properties that drain to no-disturbance areas' if no longer applicable.
- Consider expanding the designation criteria for 'seismic hazard areas' to include references to surface rupture, seismic-induced landslides, and lateral spreading.
- Consider allowing for a reduction of the required development buffer from a landslide hazard area when a suitable assessment is performed. It is possible to safely develop on steep slopes when adequate investigation is conducted and appropriate precautions are taken.
- Consider establishing standards for testing and risk-scoring soil sample analyses.

**CATEGORY 3 - Requires Planning Commission & City Council Direction for Future Workplans**

Changes may impact stakeholders and/or require additional budget and staff time.

- Include additional language to describe that all maps are advisory.
- Consider requiring submittal of GIS data for identified geologically hazardous areas and provide access to all critical area reports with an online mapping tool for public use, in alignment with the goals and policies of the Comprehensive Plan.