

CITY OF MEDICAL LAKE

Geologically Hazardous Areas Determination Report

Best Available Science Review

City limits and proposed urban growth expansion areas
Prepared from the City’s geologic hazards research record

KEY DETERMINATION

The available datasets identify limited erosion hazard areas associated with five highly erodible soil map units where slopes exceed 15 percent. No mapped landslide, volcanic, or mining hazards were identified. Seismic review indicates predominantly bedrock conditions and little or no liquefaction concern, with no fault mapped inside the city limits.

1. Executive Summary

The City of Medical Lake evaluated the categories of geologically hazardous areas identified in WAC 365-190-120: erosion, landslide, seismic, coal mine or mining, and volcanic hazards. The determination used publicly available federal and state geospatial information identified in the City's research record, principally the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey and the Washington Department of Natural Resources (DNR) Washington Geologic Information Portal.

For erosion hazards, the City reviewed mapped soil units and their slope ranges. Twenty-nine soil map units were identified within the study geography. Five units include slopes above 15 percent and were identified as highly erodible where the actual slope exceeds 15 percent. The source material locates most of these areas on state-owned property between Medical Lake and West Medical Lake, with a smaller area near the water tower in the northeast corner of the city.

For landslide, seismic, volcanic, and mining hazards, the City reviewed Washington Geologic Information Portal mapping. The source material reports no historic landslide failures, no mapped landslide-susceptible land, no volcanic hazards, and no mining hazards within the City. The City's seismic review found predominantly bedrock conditions and little or no liquefaction concern. A north-south fault is mapped near West Medical Lake and continues south past the city limits, but the source material states that no fault is mapped within the City.

2. Purpose and Scope

This report documents the evidence, screening method, data reviewed, and resulting determination of which geologically hazardous areas exist within the City of Medical Lake. It also reports data for proposed urban growth expansion areas where the source material evaluated those areas together with the city limits. This is a planning-level inventory based on mapped information. It is not a parcel-specific geotechnical investigation and does not replace site-specific professional analysis when required by development regulations or when field conditions indicate a potential hazard.

3. Regulatory Basis and Hazard Categories

WAC 365-190-120 states that geologically hazardous areas include areas susceptible to erosion, sliding, earthquakes, or other geological events. The City therefore organized its review into the following five screening categories:

- Erosion hazard areas
- Landslide hazard areas
- Seismic hazard areas
- Coal mine or other mining hazard areas
- Volcanic hazard areas

4. Best Available Science and Review Method

4.1 Data Sources

USDA NRCS Web Soil Survey: Soil map units and mapped slope ranges used to screen for erosion hazards.
[Source website](#)

Washington Geologic Information Portal: State geologic mapping used to review landslide inventory and susceptibility, liquefaction, faults, volcanic hazards, and mining hazards. [Source website](#)

WAC 365-190-120: State classification framework for geologically hazardous areas. [Source website](#)

4.2 Screening Procedure

Step	Method
Define the study geography	Review the city limits and, where included in the underlying work, proposed urban growth expansion areas.
Compile soil and slope data	Use NRCS soil mapping to list every soil map unit and its published slope range.
Identify erosion candidates	Select map units identified as highly erodible where slopes exceed 15 percent, then describe their general mapped locations.
Review state geologic hazard layers	Use DNR portal data to screen for historic landslides, landslide susceptibility, liquefaction, mapped faults, volcanic hazards, and mining hazards.
Compare with state hazard criteria	Consider the additional slope and geomorphic circumstances listed for landslide hazards.
Document determinations and limitations	State which hazards are identified, which are not identified in the reviewed mapping, and where future mapping or site-specific review remains appropriate.

5. Erosion Hazard Evaluation

5.1 Complete Soil and Slope Inventory

The NRCS review identified the following 29 soil map units in the city limits and proposed urban growth expansion areas. The table reproduces the soil names and slope ranges contained in the City’s source material.

Map unit ID	Soil type	Mapped slope range
1020	Cocolalla ashy silt loam	0 to 3%
1021	Cocolalla-Hardesty complex	0 to 3%
1030	Emdent ashy silt loam	0 to 3%
2080	Gibbs ashy silt loam	0 to 8%
2085	Tucannon ashy silt loam	0 to 8%
3026	Phoebe, dry-Battleplain complex	0 to 8%
3040	Cheney-Alecanyon complex	0 to 8%
3041	Alecanyon, very stony-Cheney complex	0 to 8%

Map unit ID	Soil type	Mapped slope range
3044	Cheney ashy silt loam	0 to 8%
3045	Rockly-Deno complex	0 to 15%
3048	Rockly-Hardesty complex	0 to 15%
3091	Glenrose ashy silt loam	8 to 25%
3114	Rockly-Fourmound complex	0 to 15%
3115	Northstar-Rock outcrop complex	3 to 15%
3117	Northstar-Rock outcrop-Rockly complex	0 to 15%
3118	Rockly-Cocolalla complex	0 to 8%
3126	Rock outcrop-Northstar complex	15 to 30%
3140	Springdale gravelly ashy coarse sandy loam	0 to 8%
5040	Spokane-Swakane complex	3 to 15%
5041	Spokane-Swakane complex	15 to 30%
5310	Kramerhill ashy loam	3 to 15%
5313	Kramerhill-Spokane complex	8 to 25%
6093	Reardan silt loam	0 to 8%
6096	Broadax-Reardan silt loams	3 to 25%
6200	Morical ashy silt loam	0 to 15%
6201	Morical ashy silt loam	15 to 30%
7101	Pits-Dumps complex	Not specified
8001	Saltese muck	0 to 3%
2vz54	Caldwell silt loam	0 to 3%

5.2 Highly Erodible Soil Units on Slopes Over 15 Percent

The source material identifies five soil map units as highly erodible where slope exceeds 15 percent. Because several published slope ranges span both sides of the 15 percent threshold, the hazard designation applies to the portions of those map units where the actual mapped or field-verified slope is greater than 15 percent, not automatically to every location within the unit.

ID	Soil type	Slope range	Screening result
3091	Glenrose ashy silt loam	8 to 25%	Hazard where slope >15%
5041	Spokane-Swakane complex	15 to 30%	Hazard where slope >15%
5313	Kramerhill-Spokane complex	8 to 25%	Hazard where slope >15%
6096	Broadax-Reardan silt loams	3 to 25%	Hazard where slope >15%
6201	Morical ashy silt loam	15 to 30%	Hazard where slope >15%

5.3 Location and Determination

Most identified high-erodibility soil areas are described as occurring on state-owned property between Medical Lake and West Medical Lake. A smaller area is described near the water tower in the northeast corner of the City. The source material notes that a map will be produced in the future. Until that map is completed, the soil map unit and slope criteria above provide the documented basis for identifying potential erosion hazard areas.

6. Landslide Hazard Evaluation

The City used the Washington Geological Information Portal landslide inventory and susceptibility information to determine whether the study area contains known failures or terrain susceptible to landsliding. The reviewed information found no historic failures within the City of Medical Lake and no land mapped as susceptible to landslides.

The City also evaluated the additional circumstances listed in the source material and determined that none occur within the City:

Criterion reviewed	City determination
Holocene movement or debris	No areas showing movement during the Holocene epoch or underlain or covered by Holocene mass-wastage debris.
Planes of weakness	No slopes parallel or subparallel to bedding planes, joint systems, fault planes, or similar subsurface weaknesses.
Rockfall slopes	No slopes steeper than 80 percent that are subject to rockfall during seismic shaking.
Erosion or wave undercutting	No potentially unstable areas caused by rapid stream incision, stream-bank erosion, wave undercutting, or stream channel migration.
Snow avalanche	No areas showing evidence of, or risk from, snow avalanches.
Canyons and alluvial fans	No canyon or active alluvial fan areas subject to debris flows or catastrophic flooding.

Criterion reviewed	City determination
Qualifying steep slopes	No non-bedrock areas with slopes of 40 percent or steeper and vertical relief of at least 10 feet, based on the stated screening criterion.

Determination: No landslide hazard areas were identified from the reviewed inventory, susceptibility mapping, or supplemental state criteria.

7. Seismic Hazard Evaluation

The seismic review considered earthquake-induced ground shaking, slope failure, settlement or subsidence, soil liquefaction, surface faulting, and tsunami exposure. The City’s source material records the following results:

- Tsunami: no risk identified due to the inland location.
- Liquefaction: land within the City and proposed urban growth expansion areas is described as mostly bedrock, with little or no liquefaction susceptibility concern.
- Surface faulting: no fault is reported within the City. A north-south fault is mapped near West Medical Lake and continues south past the city limits.
- Earthquake-related slope failure: no landslide-susceptible land was identified in the landslide review.

Determination: The reviewed mapping did not identify a discrete significant seismic hazard area within the City. This planning-level finding does not mean that earthquake shaking cannot occur; rather, the specific mapped conditions used to classify unusually hazardous seismic areas were not identified in the reviewed data.

8. Volcanic Hazard Evaluation

The Washington Geologic Information Portal was reviewed for volcanic hazard information. The source material reports no volcanic hazard areas within the City of Medical Lake.

Determination: No volcanic hazard areas were identified.

9. Mining and Coal Mine Hazard Evaluation

The Washington Geologic Information Portal was reviewed for mining hazard information. The source material reports no mining hazards within the City of Medical Lake.

Determination: No mining or coal mine hazard areas were identified.

10. Consolidated Determination

Hazard category	Data reviewed	Result	City determination
Erosion	NRCS soil types and slope ranges	Five highly erodible units where slope exceeds 15%	Present in limited mapped areas

Hazard category	Data reviewed	Result	City determination
Landslide	DNR inventory, susceptibility, and supplemental criteria	No historic failures or susceptible terrain identified	Not identified
Seismic	DNR liquefaction and fault mapping; landslide review	Mostly bedrock; little or no liquefaction concern; no city fault	No discrete significant area identified
Volcanic	DNR volcanic hazard mapping	No hazard mapped	Not identified
Mining / coal mine	DNR mining hazard mapping	No hazard mapped	Not identified

11. Limitations and Implementation

- The findings reflect the datasets and interpretations documented in the City’s source material. Geographic information systems are screening tools and may not capture small, unmapped, newly recognized, or site-specific conditions.
- The soil inventory covers the city limits and proposed urban growth expansion areas as described in the source material. Final regulatory maps should clearly distinguish city limits from expansion areas.
- A future erosion hazard map should overlay the five identified soil map units with a slope surface so that only portions exceeding 15 percent are classified under the stated criterion.
- Development proposals in or near a mapped potential hazard area may warrant field verification or a site-specific geotechnical assessment by a qualified professional.
- The City should retain the source datasets, map dates, layer names, map scale, and GIS processing steps with the final critical areas record so the determination can be reproduced and updated.

12. References

1. [Washington Administrative Code, WAC 365-190-120, Geologically Hazardous Areas](#)
2. [USDA Natural Resources Conservation Service, Web Soil Survey](#)
3. [Washington Department of Natural Resources, Washington Geologic Information Portal](#)

Report basis: City-provided “Geologically Hazardous Areas Summary” and the data transcribed in that document. No map was included in the source material.