

City of Woodinville, Washington

Comprehensive Plan-Geologic Hazard and Critical Aquifer Recharge Areas Update





Purpose

- Review and update Geologically Hazardous Areas defined in Woodinville Municipal Code WAC 21.24.290 to WAC 21.24.310 for “best available science
- Review and update Woodinville Critical Aquifer Recharge Areas (CARA) WMC 21.24.190 – 21.24.200



Geologic Hazard Maps Prepared

- Landslide Hazard Areas
- Liquefaction Hazard Areas
- Erosion Hazard Areas
- Problem Soil Areas
- Fault Hazard Areas
- Critical Aquifer Recharge Areas



Sources of Reviewed Data

- King County
- United States Geological Survey (USGS)
- Washington Department of Natural Resources (DNR)
- United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS)
- Tetra Tech and Watershed Company reports



LiDAR Imagery

- Base layer for all hazard maps based on available LiDAR imagery (Laser imaging Distance and Ranging) 2003 King County LiDAR data
- LiDAR imagery used to create Digital Elevation Model (DEM) to form the base layer upon which all subsequent Geologic Hazard Areas were superimposed over.



Landslide Hazard Areas-Data Sources

- Previous landslide hazard maps (Tetra Tech, King County, DNR, and Watershed Company)
- Existing surficial geologic maps (USGS, DNR)
- 2003 LiDAR DEM hill shade imagery

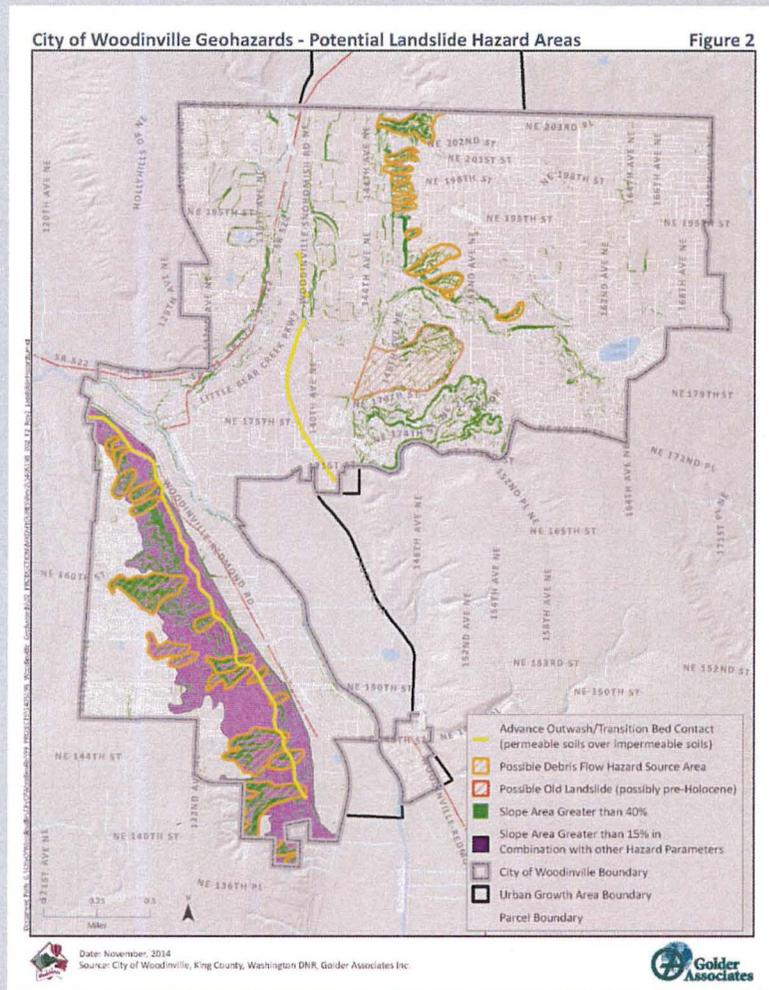


Landslide Hazard Map

- Using Geographic Information System (GIS), five layers were created:
 - Slopes greater than 15 per cent with landslide attributes (ie geology, springs and seeps)
 - Slopes steeper than 40 percent
 - Areas of known or suspected landslides. Includes areas interpreted from DEM hill shade geomorphic evaluation
 - Debris flow hazard areas mapped from DEM hill shade geomorphic evaluation



Landslide Hazard Areas





Liquefaction Hazard Areas Data Sources

- Data Sources utilized included:
 - King County mapped seismic hazards defined in King County Sensitive Areas Ordinance-GIS layer
 - DNR mapped liquefaction susceptibility layer-GIS layer
 - Review of geologic maps comparing Quaternary alluvium to mapped liquefaction areas by DNR and King County
 - Reviewed DNR water bodies that may be surrounded by loose saturated sediments-GIS layer



Erosion Hazard Areas Data Sources

- Key factors are soil type and slope inclination
- Data Sources reviewed included:
 - USDA NRCS mapping for King County
 - Soils Survey Geographic (SSURGO) for King and Snohomish Counties-GIS layer
 - Slopes inclination of 15 percent or greater



Problem Soil Areas Defined

- Areas potentially underlain by organic peat or soft compressible soils that could present differential settlement issues for structures if foundation and subgrade is not properly designed.
- Corresponds quite closely with areas outlined as Liquefaction Hazard Areas



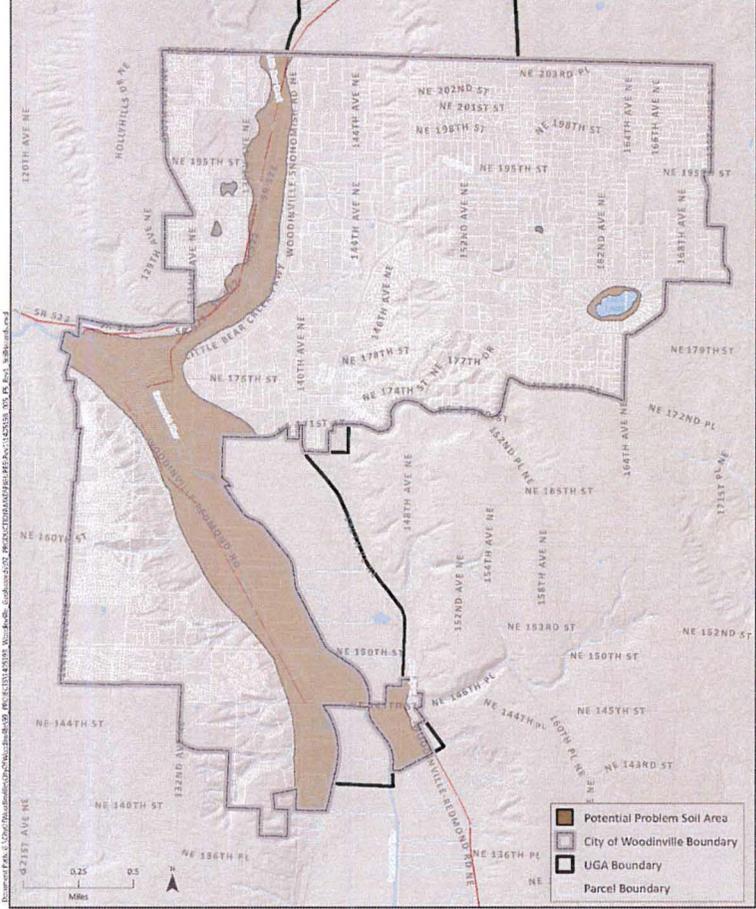
Problem Soil Areas –Data Sources

- Combined mapped Liquefaction Area layer with areas that may contain peat and compressible organic soils such as closed topographic depressions-kettle ponds, such as Lake Leota, that could contain these types of soils.



Problem Soil Areas

City of Woodinville Geohazards - Potential Problem Soil Areas **Figure 5**



Date: October, 2014
Source: City of Woodinville, King County, Golder Associates Inc.





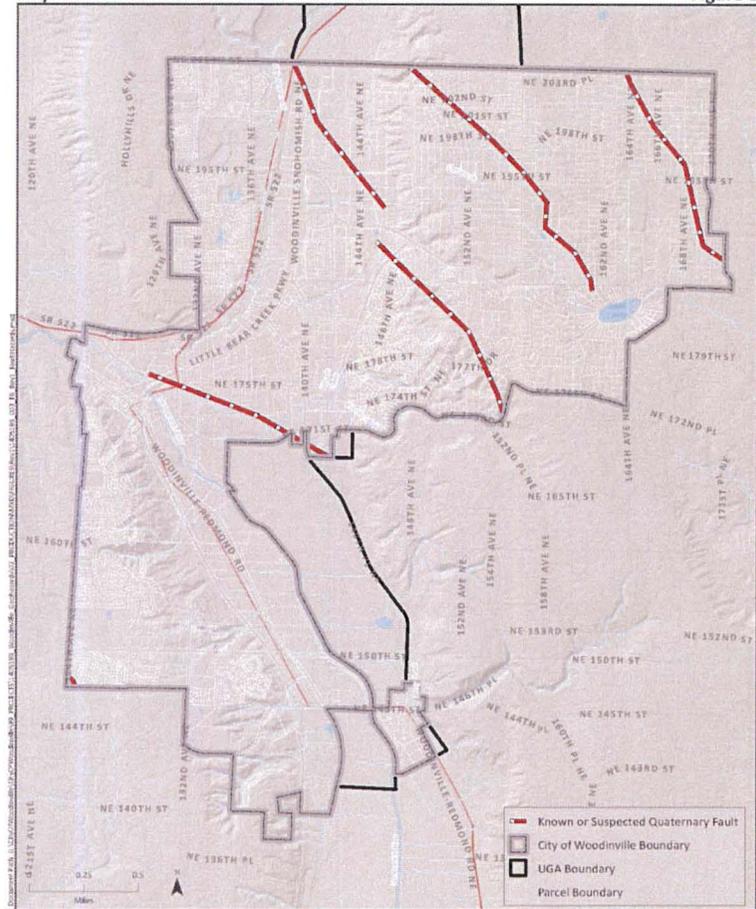
Fault Hazard Areas-Data Sources

- DNR
- USGS
- Fault lineaments based largely on geophysical profiles suggesting disrupted Quaternary stratigraphy
- Lineaments likely part of the projection of the Southern Whidbey Island fault zone



Fault Hazard Areas

City of Woodinville Geohazards - Potential Fault Hazards Figure 6



Date: October, 2014
Source: City of Woodinville, King County, Washington DNR





Critical Aquifer Recharge Areas (CARA)

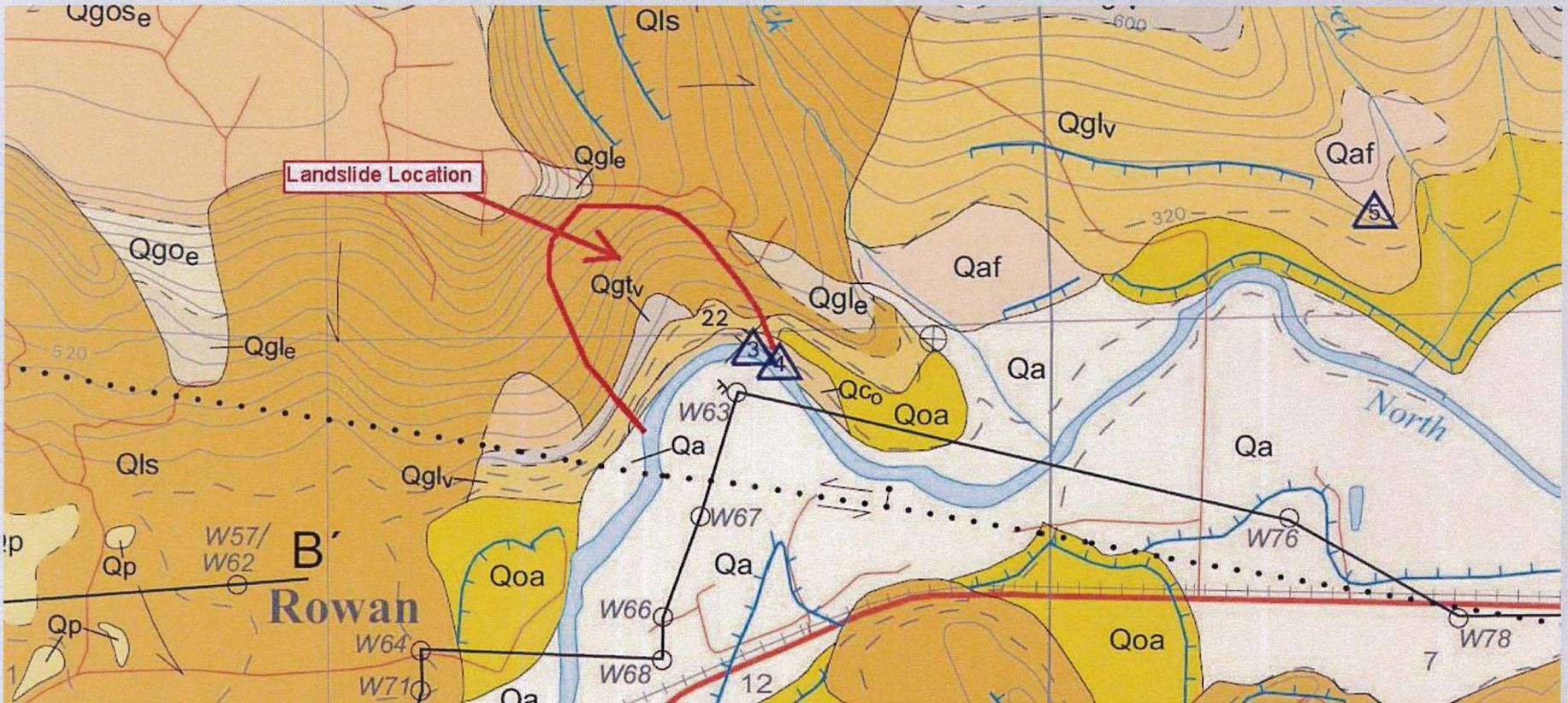
- Defined in WMC 21.24.200 as those areas designated by Chapter 365-190-080(2)
- The CARA map in the Comp plan update dated May 29, 2014 was reviewed and evaluated with surficial geologic map dated September 2014
- The delineated CARA areas correspond to specific geologic units. The recharge areas include Vashon advance and recessional outwash



Oso landslide Comparison



Oso landslide geologic setting





Oso landslide

