STRATUM GROUP
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October 3, 2022

Kurt Hunt
196 Rosehip Road
Eastsound, WA 98245

Re: Geology Hazard Assessment
San Juan County Parcel 171714010000
Orcas Island, WA

Dear Mr. Hunt:

It is my understanding that you are proposing building a home on Parcel 17171401000. The home development will include an access driveway off of Atticus Lane and a septic drainfield. The property has been mapped as having potential landslide and erosion hazards based on the presence of slopes greater than 50% and the presence of class 'e' soils with slopes greater than 15% on portions of the properties and adjoining properties.

Based on my geology assessment a home can located on the property outside of any geology hazard areas as long as the home is located at least 10 feet back from the top edge of the steep slope on the northern portion of the property.

This geologic hazard assessment included a field inspection of the subject property and vicinity. My evaluation also included review of initial site plans for the property and an on site meeting post my initial site visit, available geologic mapping, reports and papers, lidar (light detecting and ranging) imagery and my own notes and observations I have made in the vicinity of the site and at locations with similar geologic conditions.

GENERAL GEOLOGY

The Geologic Map of the Bellingham 1:100,000 Quadrangle, Washington (Lapen, 2000) indicates that the subject property is underlain by bedrock of the East Sound Group (Figure 1). East Sound Group consists primarily of metamorphosed sedimentary volcaniclastic rocks. The age of the rocks range from 415 million to 260 million years. The original setting for this formation is thought to be a long lasting volcanic island arc located off the coast of ancient North America (Brown, 2014) that was later accreted to the North American margin and then further faulted into its current location. Former tectonic thrust faults in the near vicinity juxtapose East Sound Group with the Turtleback Complex and faults zones within the East Sound Group are

mapped as well.

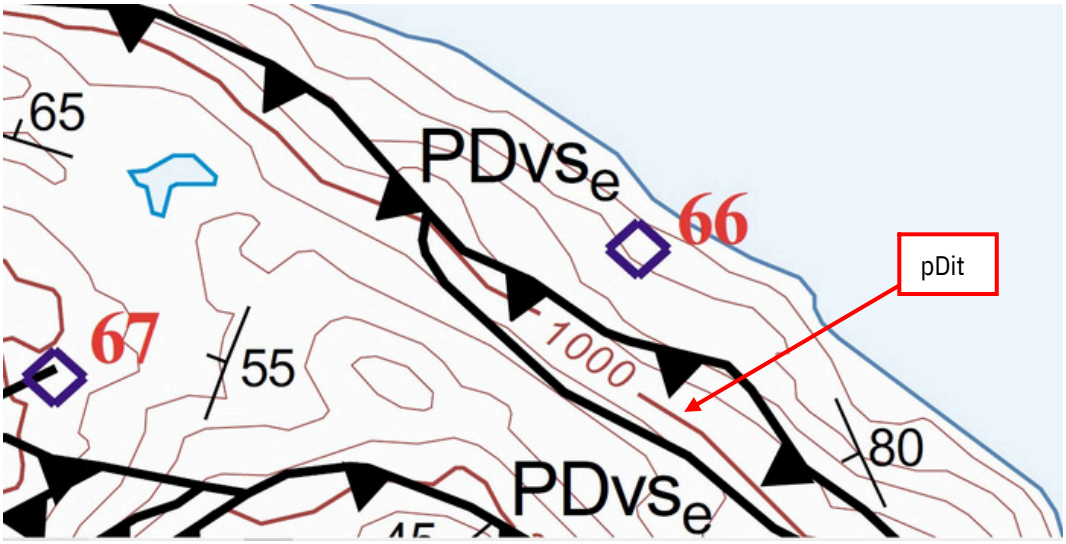


Figure 1. Geology map of property area (Lapen, 2000). PDvse = Permian to Devonian East Sound Group volcanic and sedimentary rocks, pDit = pre Devonian Turtleback Complex. Dark lines with triangle hatchers are thrust faults with teeth on upper fault section.

My observations on the subject property and vicinity are consistent with the above-described mapping. The site is underlain by metamorphosed volcanic clastic sandstone and siltstone consistent with East Sound Group rocks. No areas of significant shearing of the bedrock (tectonic fault zones) were observed. There are some area of thin glacial sediment on limited areas of level ground on the property near Atticus Lane associated with glacial ice that covered the area between 18,000 and 14,000 years ago.

Soils on the property are thin colluvium of fractured bedrock and bedrock outcrops with limited areas of weathered glacial drift.

SPECIFIC SITE OBSERVATIONS

The property is located along Raccoon Point Road with access to the building area of the property via Atticus Lane, a road that spurs off of Raccoon Point Road. Pertinent site features are shown on the lidar bare earth imagery of the property and vicinity (Figure 2) and are discussed below.

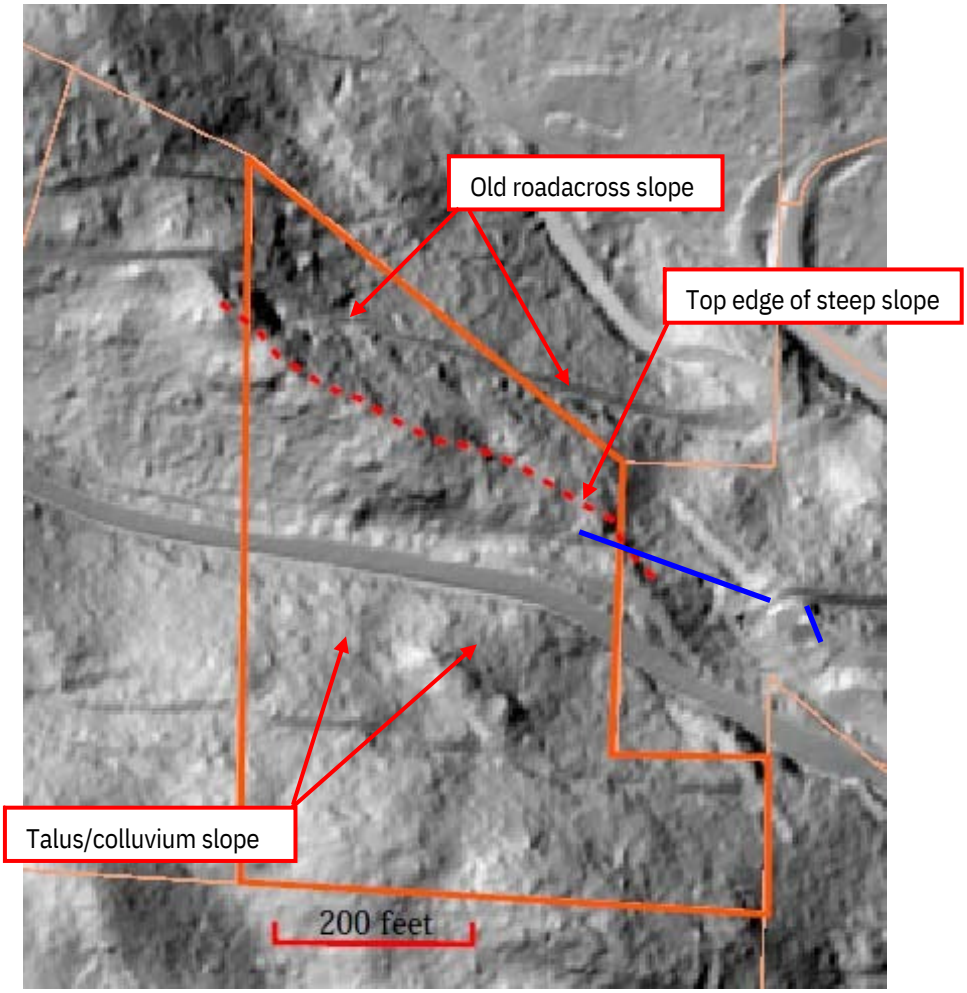


Figure 2. Lidar bare earth image of property and vicinity.

The area of the property above Raccoon Point Road is steep and underlain by a rocky slope of colluvium/talus. The slope is near the angle of repose and was partially cut into by Raccoon Point Road. Some raveling of the loose rocks is present and a tree had recently fallen onto the Raccoon Point Road (2021) and pulled loose rocks down the slope (Figure 3). Bedrock outcrops on the slope are low and the slope becomes less steep upslope and no potential rock fall sources are present.

Figure 3. View of loose rocky slope above Raccoon Point Road with slope ravel from recent tree fall.

North of Raccoon Point Road the property is level to undulating with moderate slopes. Raccoon Point Road is built up on rocky fill above theses gentle slope and level portions of the site. Atticus Lane spurs off of Raccoon Point Road onto the property and then extends to the northwest for access to properties to the northwest of the subject property.

The area north of Atticus Lane to the steep slope down to the north is area of very gentle slopes with much of the gentle slope area sloping towards the south away from the steep slope area on the north. There are limited areas of glacial soils over bedrock near Atticus Lane. The rest of the area is underlain by fractured bedrock and well drained rocky soils.

The gentle slope area north of Atticus Lane is bounded on the north by a steep slope underlain by bedrock outcrops, talus and colluvium of loose rock. The steep slope is not subject to landslides, but minor slope ravel and slope creep on the steeper areas of loose rock is an ongoing process.

There is a limited area of rock fall failures towards the west boundary of the property associated with an old abandoned road that cuts across the slope (Figure 4).

Figure 4. One of two rock fall areas above old road cut on steep slope

CONCLUSIONS AND RECOMMENDATIONS

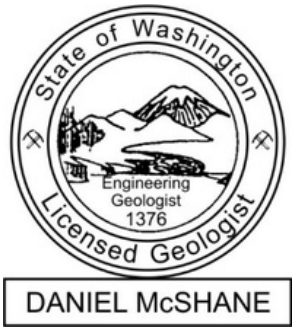
Based on my inspection of the subject property and vicinity, I conclude that the home can be located outside of any landslide or erosion hazard if it is located on the gentle slope area between Atticus Lane and the steep slope on the north side of the property. The home foundation should be located at least 10 feet from the top edge of the steep slope to the north so that differential settlement or long term slope ravel does not impact the building foundation. The proposed access driveway and septic drain field area is located outside of any landslide or erosion hazard areas. Furthermore, the proposed development will not increase the risk of landslides or erosion on or off the site.

Soil bearing for the home foundation can utilize a bearing value of 3,000 psf as long as the foundation excavation extends though all organic soils and roots. If deep root zones are encountered these areas can be over excavated and fill with structural fill of crushed rock.

Stormwater from the home should be directed to dispersion and infiltration areas to the south of the home and not directed towards the steep slope to the north. Similarly the stormwater from the driveway can be dispersed towards the south. The fractured bedrock areas around the home site and access driveway will allow for dispersed infiltration of stormwater.

Cutting or limbing of trees for view purposes is acceptable on the steep slope areas. However,

waste vegetation and debris should not be piled on the slope as the slope is steep enough that doing so could create a wet unstable mass.

Stratum Group appreciates the opportunity to be of service to you. Should you have any questions please contact our office at (360) 714-9409. If conditions appear different than those described in this report, or other concerns arise, we request that we be notified so we can review those areas and modify our recommendations as required.
Sincerely yours,
Stratum Group

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