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December 22, 2021

William Sheldon
4826 W. Foothill Drive
Coeur D'Alene, ID 83814

**Subject: Addendum to Geologic Hazard Evaluation with Coastal Bluff
Development Setbacks, 90051 Cape Arago Highway, Lighthouse
Beach, Coos County**

Dear William Sheldon:

As requested, SHN is providing this letter in regard to geologic hazards and appropriate mitigation at 90051 Cape Arago Highway in the Lighthouse Beach area near Cape Arago, west of the town of Charleston. We understand that you are the current owner of the property and that you wish to further develop the site with a new shop building. As the site is located atop an eroding coastal bluff, an appropriate building setback should be considered for the new building footprint.

SHN previously prepared a geologic hazard report for the former owner (SHN, 2015) of the property. At that time, the existing residential structure was located in close proximity to the edge of the bluff. The exterior deck on the seaward edge of the residence was partially overhanging the bluff due recent erosion of the bluff face and retreat of the bluff edge. Due to the precarious setting and imminent threat posed to the residence, it was recommended by SHN that the structure be relocated landward a minimum of 50 feet. Based on a review of Google Earth imagery, it appears the structure was relocated approximately 50 feet landward from the coastal bluff edge.

At this time, we understand that you desire to build a detached shop building on the property, which currently consists of two adjoining bluff top parcels. Specifically, you would like to build north of the existing residence and require additional documentation relative to the bluff stability hazard posed to the site with a determination as to whether the recommendations provided in SHN's 2015 report remain valid. We also understand that Coos County has requested additional documentation due to the lapse in time since the previous report was submitted.

Previous Reporting

SHN's geologic hazard assessment in 2015 included a description of the geologic setting, a review of time-series aerial photographs depicting changes in the bluff edge, and a qualitative assessment of the bluff retreat hazard posed to the developments at the site. We estimated the amount of bluff retreat that was observed over the course of a 70-year aerial photographic record. Based on an assumed economic lifespan of 50 years for any existing and future developments at the site, we concluded that a minimum building setback of 50 feet from the top of the coastal bluff would be appropriate.



As described above, the existing residence at the time of our site visit in 2015 was abandoned due to its precarious location near the top edge of the precipitously steep bluff face. The existing residence was subsequently relocated 50 feet landward from the bluff edge to its current location.

Proposed Shop Building

Site conditions are relatively uniform across the site; therefore, the conditions and hazards described in our 2015 reporting are consistent throughout the property and include the area of the proposed shop building. Geologic conditions at the site have not changed substantially since our previous reporting; therefore, hazards remain as described in 2015 and our recommendations remain valid. From a geologic hazard standpoint, a minimum 50-foot setback from the top of bluff is appropriate for the proposed shop building.

It is worth noting that the recommended 50-foot setback applies at the time of construction and should be measured in the field from top of bluff edge immediately prior to locating the building footprint. The bluff face is expected to experience ongoing erosion in the future that will result in incremental landward retreat of the top of bluff edge over the course of the new shop building's lifespan. Therefore, the reference point from which to measure the setback may change if there is a lapse of time between the submission of this report and issuance of a building permit for the project.

Please also note that our 2015 investigation and report includes a discussion regarding the level of geologic hazards relative to the proximity of the coastal bluff. Specifically, the level of hazard and risk posed to any structure increases substantially with decreasing distance from the bluff edge. Therefore, it is prudent to develop structures as far from the bluff as feasible. The recommended 50-foot setback is intended as a minimum buffer. Septic drain fields similarly should be setback as much as is feasible from the top of bluff edge. The currently proposed development should also incorporate appropriate site drainage of roof runoff to minimize the potential impact to bluff stability, as discussed in detail in SHN's 2015 report.

Conclusions

In the absence of significant changes to the geologic conditions at the site, the observations, conclusions, and recommendations provided in SHN's 2015 report for the site remain valid. The recommended building setback of 50 feet from the top of bluff edge is intended to provide a reasonable factor of safety to mitigate the hazard associated with coastal erosion and future bluff retreat at the site. As discussed above, the recommended building setback should be measured in the field at the time of the building footprint being located in order to account for any bluff erosion that may occur between the submission of this report and the issuance of a building permit.



William Sheldon

Addendum to Geohazard Report with Coastal Bluff Setback Recommendations—90051 Cape Arago Highway

December 22, 2021

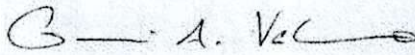
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Closure and Limitations

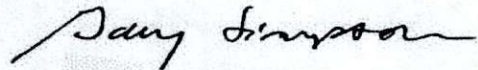
This focused assessment was performed to determine if site conditions have occurred following submission of our 2015 report. No additional site characterization of geologic conditions has been performed as part of this current investigation. Please note that the limitations discussed in the 2015 report remains applicable and should be reviewed in detail. We assume this level of effort is consistent with the conditions of approval requested by the local building authority. This report is not intended as an assessment of state regulations pertaining to new coastal developments.

Please call either of us at 707-441-8855 if you have any questions or require additional clarification regarding our recommendations.

SHN



Giovanni A. Vadurro, E 2385
Engineering Geologist



Gary Simpson, CEG
Geoscience Director

