

August 2, 2020

**Mr. Joshiah Kipperberg
King's Homes, Inc.
(253) 225 3684**

**Reference: Limited Geological Sites Reconnaissance
Kitsap County Parcel No. 282302-4-048-2001 and 282302-4-049-2000
10631 (and Adjacent Parcel) Orchard Avenue SE
Olalla, Washington**

DEAR MR. KIPPERBERG:

Resolve Environmental and Geotechnical, Incorporated (Resolve) is pleased to provide this letter report for the limited geological site reconnaissance at the above-referenced properties. Resolve understands that the object of the investigation was to perform a limited visual inspection of the sites and geologic conditions wherein proposed future construction will be undertaken. We understand that the reconnaissance is related to Kitsap County permitting requirements.

The subject sites are located along Olalla Valley Road SE, Olalla, Kitsap County, Washington. The Kitsap County Parcel Nos. are 282302-4-048-2001 and 282302-4-049-2000. The latitude is approximately 47 degrees, 27 minutes, 04.1 seconds north, and -122 degrees, 33 minutes, 20.1 seconds west. The sites are surrounded by rural Single-Family Residences (SFRs) in a rural, residential setting. Orchard Avenue SE is along the western margin of the subject sites, and provides access to the sites. A Vicinity Map is attached to this report.

A Washington State Licensed Geologist from Resolve (Ronald P. Nance, P.G.) performed the Limited Geological Reconnaissance on site on July 29, 2020. Our observations were preceded by a review of local geologic databases, local geology, and areas slope evaluations of the immediate vicinity.

Soil and Slope Research

The following information provides a basis for a general understanding of the subject soils and geologic conditions. Further information is provided in the Conclusions and Recommendations section of this Reconnaissance Report.

--Kitsap County Maps:

- Assessors GIS Critical Areas Map: Indicates a Moderate Hazard Critical Areas, and a stream channel mapped for the far eastern portion of the sites.
- Landslide Hazards Map: Does not map any Landslide Hazard for the sites.
- Erosion Hazard Map: Indicates a potential Moderate Erosion Hazard Areas for the far eastern margin of the sites.
- No Seismic Hazards are noted for the subject sites. Also, no liquefaction hazards were noted for these areas.
- The WA DOE Coastal Atlas Map does not extend to the subject sites.

USDA Soils

The United States Department of Agriculture (USDA) Soil Survey of Kitsap County Areas, Washington, information indicates the following soil types exist on the project sites:

- #15 Harstine gravelly ashy sandy loam (0 to 6 percent slopes)
- #17 Harstine gravelly ashy sandy loam (6 to 15 percent slopes)

A soils map and the soil survey descriptions of these soil types are attached to this report.

The soils actually observed on and in the immediate vicinity of the sites indicated that the soils listed by the USDA soil map profile were accurate. Only minor variation was observed across most of the (observable) sites. Most soils on the sites appeared to be the gravelly ashy sandy loam of the Harstine units, with some silt and ash content being slightly lower than described by the USDA profile. Soils observed for the near subsurface across most of the proposed construction areas of the sites were described in the field as brown, dense to very dense, silty sand with gravel (USCS-SM) and brown, dense to very dense, dry to damp sand with gravel and minor silt (USCS SP-SM).

Soils were probed with a ½-inch aluminum alloy T-Probe. Construction on the sites is proposed for the central western portion of both of the parcels. In the likely construction areas, only two to three inches of penetration were noted atop the very dense soils. Up to 6 inches of penetration into loose fill, disturbed soils, and vegetated areas on surrounding slopes with moderate to heavy applied pressure was observed. While most of the soils observed on the construction sites could potentially be used for structural backfill and construction, soils in the near surface on surrounding slopes have mixed organic debris that, while potentially suitable for landscaping, would not be suitable for backfill.

Most of the local terrain had been cleared of most trees, with some deciduous trees, shrubs, grasses and blackberries remaining on site. Downgradient there was an abundance of Scott's Broom. There were relatively mild slopes on the likely construction sites. Most slopes were 6 to 10 percent, with the exception of the bank on the roadcut area, which had been built up for the roadway. It is considerably distant from the proposed construction area. One area had been cut by a previous owner of the property, but the current owner reports that this area will be filled in.

In general, water will flow eastward, toward the topographic low and stream pathway to the far east. No significant slide debris or slumping were noted on or near the specific proposed construction areas, and no bowing of trees suggesting creep of the soils was noted. All areas observed are considered stable at this time. Overall, no large-scale cracks or lineations were noted across the sites or vicinity.

Existing Drainage

No drainage pipes or systems were observed on the parcel, although there was likely previous development of SFRs or similar structures on the sites that had some form of developed drainage. One well and pump house was observed at the southern portion of the site. The well reportedly serves both of the sites. No standing or running water was noted on or near the construction sites at the time of our site visit.

GEOLOGIC SETTING

The sites lies within the central Puget Lowland. North of Olympia, Washington, this lowland is glacially carved, with a depositional and erosional history including at least four separate glacial advances and retreats. The Puget Lowland is bounded to the west by the Olympic Mountains and to the east by the Cascade Range. The lowland is filled with glacial and non-glacial sediments consisting of interbedded sand, gravel, silt, and clay.

Conclusions and Recommendations

If the recommendations of this report are utilized and maintained, the proposed construction of the SFR appears unlikely to be affected by the slopes on the sites. Also, soils on the sites are not likely to affect the subject construction, if foundations are placed into the dense to very dense soils in the subsurface. Some excavation of soils in the SFR areas will be necessary due to unsuitable soils in the very near surface. Soils are likely to be dense to very dense beginning at about one foot below the existing ground surface.

Although it is not currently proposed, it is Resolve's opinion that the subject SFRs should not be constructed on or adjacent to the relatively lower elevation eastern portion of the parcel, or within the topographic low areas without first determining the nature of the soils and waterways. Disturbance of these areas during construction should also be avoided.

It is our opinion that, considering the very dense soils and relatively low-angle slopes, a full-scale Geotechnical Engineering Investigation is not warranted for the specific construction sites if proper footing design and drainage are applied, and inspection of soils prior to pouring of footings or slabs by a geologist or engineer is conducted. A discussion of Kitsap County critical areas mapping is presented below:

- Per 19.400.420, the parcels are mapped as a Moderate Hazard Critical Area at the far eastern margins. However, the subject construction sites appear to be at some distance from any slopes that could be potentially considered unstable, subject to heavy erosion, or hazardous to health and human safety. The slopes of the sites are not considered to be likely to have any significant effect on the construction of the SFR at the proposed location if appropriate drainage and BMPs are applied.
- Per 19.400.425, the parcels are not mapped as having potential for Landslide Hazards. It is considered likely that some of the surface materials on the slopes of the sites will undergo weathering at a very gradual rate, as they do in most other areas in the Puget Sound region. The relatively low-angle slopes, the dense to very dense soils in the subsurface, and the vegetation on and around the construction sites are likely to mitigate any sliding. If slopes on and around the SFR are drained properly, and are vegetated or otherwise developed, this will further preclude local, potential sliding or sloughing. The type of near-surface duff and topsoil encountered around the likely SFR areas are considered likely to creep only very slowly down dip over time, and construction of the SFRs is not likely to be impacted by creep.
- Per 19.400.430, No Seismic Hazards are mapped for the sites. Also, no Liquefaction Hazards are noted for the sites. Fault lines that are mapped in the overall region are considered likely to be splays of, or related to, the Seattle Fault zone (per Lamb and Polenz, 2012), and (according to carbon dating) have apparently not been active since A.D. 900 to 930 (Atwater, 1999). Persons living on (or building on) or around slopes are likely to be aware that it is always considered possible in the Puget Sound region that major seismic events can trigger landslides or geological incidents, as the overall region is known for tectonic movement.

- The parcels are mapped as having a potential for Moderate Erosion Hazards on the far eastern margin. This is likely due to the stream pathway along the eastern margin, and some of the local variations in stream channels. No significant erosion rills were noted on the slopes of the construction sites, and it is likely that relatively-permeable, near-surface silty sand units, vegetation, loose surficial soils, and forest duff will mitigate erosion on the sites. Even in some of the finer grained or sandier soils, erosion is anticipated to be at a low rate on the proposed building sites if proper drainage is developed. Best Management Practices should be undertaken in all site activities.

Drainage

Resolve suggests that infiltration techniques could be employed for stormwater mitigation. The sites appear to be adequate for infiltration, and the SFRs will reportedly utilize an infiltration pit to the south of the construction sites. If this method does not appear to be appropriate for the final design on the sites, an engineer may be required for more sophisticated designs.

Other

Disturbed and denuded areas where utilities or other elements are emplaced will have to be mitigated. Native plants may possibly be planted on slopes or in the immediate vicinity of the sites for mitigation purposes. The following table depicts some suggested plants should such mitigation be desired:

Table 1: Suggested Slope Mitigation Plants and Approximate Coverages

Native Plantings	Sizing	Min. Spacing	# of Plants	Sq.ft. Coverage
Ocean Spray (Holodiscus discolor)	1 gallon	5 feet	3 plants	30
Salal (Gaultheria shallon)	1 gallon	5 feet	5 plants	50
Red-Flowering Current (Ribes Sanguineum)	1 gallon	5 feet	5 plants	45
Thimbleberry (Rubus parviflorus)	1 gallon	5 feet	4 plants	36
Snowberry (Symphoricarpos albus)	1 gallon	5 feet	5 plants	50
Nootka Rose (Rosa Nutkana)	1 gallon	5 feet	3 plants	27

The above-listed plants may or may not be utilized or be selected by the client, however they have been shown in the past to be adequate cover for disturbed areas. Resolve does not retain a certified biologist or botanist, and provides these as suggestions only.

It is our opinion that this geological reconnaissance report satisfies the intent of Kitsap County Critical Areas ordinances for geologically hazardous areas. It is our opinion that this report provides a prudent, current overview of geologic conditions on the sites.

Limitations

Our conclusions are based on the information obtained from available databases, limited field observation of the subject sites, and on our interpretation of the visible surface conditions only. No subsurface evaluation or geotechnical engineering report was conducted per the client-requested scope of work. We make no other warranty, either expressed or implied. If conditions are encountered that appear to be different than those described in this report, we should be notified so that we may review and verify or modify our recommendations.

Resolve appreciates the opportunity to provide these services, and hopes the information presented in this report provides for your needs and requirements. Please feel free to call with any comments or questions regarding this letter report. Our telephone number is (360) 865-1843.

Sincerely,
Resolve Environmental & Geotechnical, Inc.



Ronald P. Nance, P.G.
Senior Geologist and Environmental Professional
WA License No. 2533

Josiah Orch Sites Vicinity Map

10631 is directly South of the other subject site.

Legend

- Fragaria
- ✈ Vaughan Ranch Airfield-Wn13



**Resolve Environmental
& Geotechnical, Inc.**

(360) 865-1843
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Figure 1 : **Vicinity Map**

Project No. 20-127
Date: August, 2020

Permit Number: 20-03414

**PROJECT: Limited Geological Reconnaissance
Kitsap Parcel Nos. 282302-4-048-2001 & 282302-4-049-2000
10631 (& Adjacent South) Orchard Road SE
Olalla, Washington**

Prepared for: Mr. Kipperberg; King's Homes

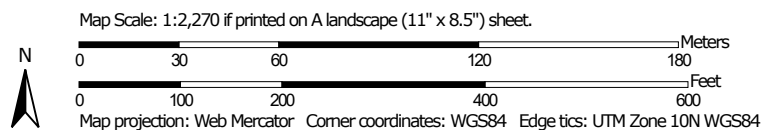


USDA INFORMATION

Soil Map—Kitsap County Area, Washington
(King's Homes Site Soils Map)



Soil Map may not be valid at this scale.



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey
Permit Number: 20-03414

7/31/2020
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Soil Map—Kitsap County Area, Washington
(King's Homes Site Soils Map)


MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kitsap County Area, Washington

Survey Area Data: Version 16, Jun 4, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 9, 2018—May 23, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
14	Harstine gravelly ashy sandy loam, 0 to 6 percent slopes	17.0	65.5%
15	Harstine gravelly ashy sandy loam, 6 to 15 percent slopes	9.0	34.5%
Totals for Area of Interest		26.0	100.0%

Kitsap County Area, Washington

14—Harstine gravelly ashy sandy loam, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2rtvg

Elevation: 200 to 490 feet

Mean annual precipitation: 30 to 55 inches

Mean annual air temperature: 48 to 52 degrees F

Frost-free period: 180 to 200 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Harstine and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Harstine

Setting

Landform: Ridges

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Crest

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Sandy glacial drift with an influence of volcanic ash over dense glaciomarine deposits

Typical profile

Oi - 0 to 0 inches: slightly decomposed plant material

Oe - 0 to 1 inches: moderately decomposed plant material

Bw1 - 1 to 6 inches: gravelly ashy sandy loam

Bw2 - 6 to 14 inches: gravelly ashy sandy loam

Bw3 - 14 to 22 inches: gravelly ashy sandy loam

Bw4 - 22 to 32 inches: gravelly ashy sandy loam

2Cd1 - 32 to 38 inches: gravelly loamy sand

2Cd2 - 38 to 61 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 6 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low
(0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Forage suitability group: Limited Depth Soils (G002XN302WA)
Other vegetative classification: Limited Depth Soils
(G002XN302WA)
Hydric soil rating: No

Minor Components

Indianola

Percent of map unit: 5 percent
Landform: Kames, terraces, eskers
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Norma

Percent of map unit: 3 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Dupont

Percent of map unit: 3 percent
Landform: Troughs, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

Mckenna

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Bellingham

Percent of map unit: 2 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Kitsap County Area, Washington

Survey Area Data: Version 16, Jun 4, 2020



Kitsap County Area, Washington

15—Harstine gravelly ashy sandy loam, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2rtvj

Elevation: 200 to 390 feet

Mean annual precipitation: 30 to 55 inches

Mean annual air temperature: 48 to 52 degrees F

Frost-free period: 180 to 200 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Harstine and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Harstine

Setting

Landform: Ridges

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Nose slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Sandy glacial drift with an influence of volcanic ash over dense glaciomarine deposits

Typical profile

Oi - 0 to 0 inches: slightly decomposed plant material

Oe - 0 to 1 inches: moderately decomposed plant material

Bw1 - 1 to 6 inches: gravelly ashy sandy loam

Bw2 - 6 to 14 inches: gravelly ashy sandy loam

Bw3 - 14 to 22 inches: gravelly ashy sandy loam

Bw4 - 22 to 32 inches: gravelly ashy sandy loam

2Cd1 - 32 to 38 inches: gravelly loamy sand

2Cd2 - 38 to 61 inches: gravelly loamy sand

Properties and qualities

Slope: 6 to 15 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low
(0.00 to 0.00 in/hr)

Depth to water table: About 24 to 37 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Forage suitability group: Limited Depth Soils (G002XN302WA)
Other vegetative classification: Limited Depth Soils
(G002XN302WA)
Hydric soil rating: No

Minor Components

Indianola

Percent of map unit: 5 percent
Landform: Eskers, kames, terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Dupont

Percent of map unit: 3 percent
Landform: Troughs, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

Norma

Percent of map unit: 3 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

Mckenna

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Neilton

Percent of map unit: 2 percent
Landform: Outwash terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear

Hydric soil rating: No

Data Source Information

Soil Survey Area: Kitsap County Area, Washington

Survey Area Data: Version 16, Jun 4, 2020

