EXHIBIT 6: Geotechnical

EXHIBIT 6.a: Aspect Geotechnical Engineering Report (2/13/25)

GEOTECHNICAL ENGINEERING REPORT

Johnson Residential Development
Parcel Numbers: 232601-4-001-2009, 242601-3-003-2008, and 252601-2-047-2007
Poulsbo, Washington

Prepared for: Montebanc Management, LLC

Project No. AS240561-02 • February 13, 2025 FINAL

Aspect
A Geosyntec Company

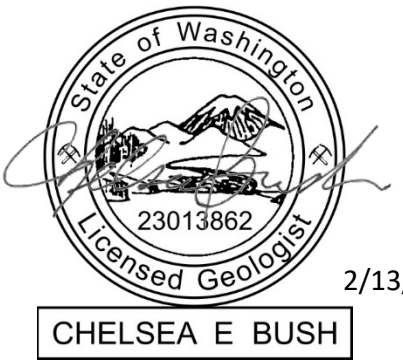
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Aspect Consulting



2/13/2025



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Chelsea E. Bush, LG
Professional Geologist
chelsea.bush@aspectconsulting.com

Erik O. Andersen, PE
Senior Principal Geotechnical Engineer
erik.andersen@aspectconsulting.com

Alison J. Dennison, LEG
Senior Engineering Geologist
alison.dennison@aspectconsulting.com

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1 Introduction

This report summarizes Aspect Consulting, a Geosyntec company's, (Aspect) geologic hazard assessment and geotechnical engineering evaluation for the proposed residential development (Project) on three parcels north of State Route 305 in Poulsbo, Washington, known as Kitsap County (County) parcel numbers 232601-4-001-2009, 242601-3-003-2008, and 252601-2-047-2007 (collectively the Site; Figure 1). We performed our services in accordance with our agreed upon scope of work dated November 22, 2024, and authorized by you on December 18, 2024.

1.1 Scope of Services

The purpose of this study is to provide information concerning the distribution and characteristics of subsurface soils and groundwater conditions, to assess the geologic hazards present at and near the Site, and to present geotechnical engineering design recommendations for the proposed residential development. The results of our explorations, analysis, conclusions, and recommendations presented in this report include the following:

- Site and Project description.
- Distribution and characteristics of subsurface soils and groundwater.
- Geologic hazards assessment.
- Seismic design criteria in accordance with the current version of the International Building Code (IBC) with Washington State amendments as adopted by the City of Poulsbo (City).
- Suitable foundation types, anticipated settlements, and associated design criteria including allowable soil-bearing pressures, settlement estimates, and basement or slab-on-grade considerations.
- Lateral earth pressures for design of residential basement and exterior site retaining walls up to 8 feet in height.
- General Site earthwork considerations, including
  - Evaluation of the on-Site soils for use as structural fill;
  - Temporary and permanent slope inclinations;
  - Structural fill materials and preparation; and
  - Wet weather/wet conditions considerations.
- General stormwater recommendations.

A vicinity map (Figure 1), a site exploration plan showing the locations of the explorations (Figure 2), exploration logs (Appendix A), and geotechnical laboratory testing results (Appendix B) are provided as attachments to this report.

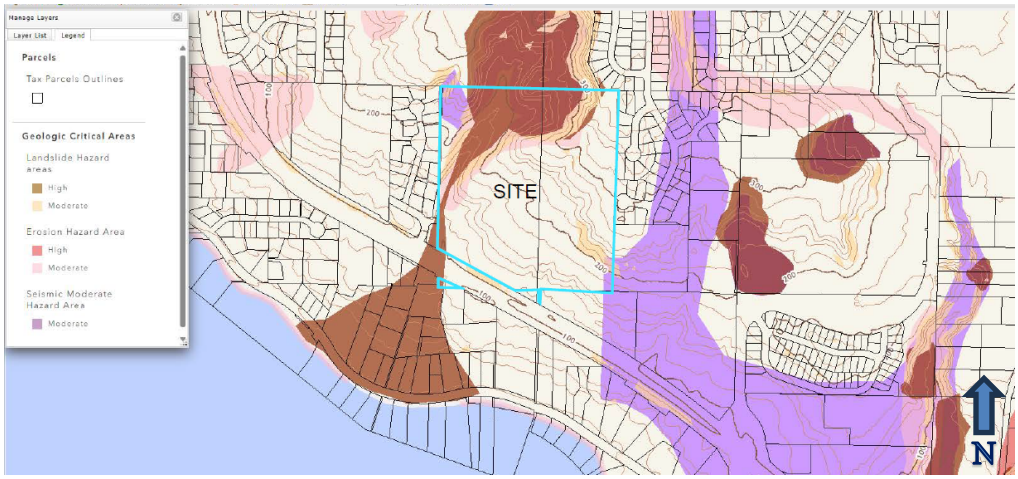
1.2 Project Description

This project will include the construction of a new residential development with 80 to 90 residences and associated infrastructure at the Site. Based on current Project plans, site development will involve approximately 110,000 cubic yards of cut and 148,380 cubic yards of fill (ESM, 2024).

The County's geologic hazard map designates four hazards on the Site (Graphic 1 below):

- High landslide hazard, defined as steeper than 30 percent slopes
- Moderate landslide hazard, defined as slopes between 15 to 30 percent
- A moderate erosion hazard
- A moderate seismic hazard

The high and moderate landslide hazards and erosion hazard are mapped along a roughly north-to-south trending ravine trending from the northwest to the southwest portion of the Site. The moderate erosion hazard is in the northwest portion of the Site. The moderate seismic hazard is mapped in the northwest corner of the Site. Moderate slopes are also mapped on slopes in the southeast portion of the Site. The Site is not mapped as or within the zone of influence (300 feet) of a liquefaction hazard or fault zone.



Graphic 1. *County Geologic Hazards Map (County, 2024)*

The City's standard buffer is 25 feet from the top, toe, and all edges of geologically hazardous areas and areas of geologic concern, unless otherwise specified.

2 Surface Conditions

Aspect conducted a geologic reconnaissance on November 21, 2024, and January 2 and January 3, 2025, we observed visible geologic features such as the slope configuration and the presence of outcrops, seeps, scarps, cracks, and springs. To supplement our field observations, we reviewed County geohazards maps; County parcel maps and information; geologic maps; geomorphic maps; Light Detection and Ranging (LiDAR) studies and images; current and historical aerial photographs, oblique coastal photographs, and topographic maps; and nearby subsurface exploration logs. The following sections discuss the results of our assessment.

2.1 Site Conditions

The Site consists of three undeveloped parcels: 232601-4-001-2009, 242601-3-003-2008, and 252601-2-047-2007. The west parcel (232601-4-001-2009) is approximately 19 acres and measures 1,300 feet north to south and 660 feet east to west, with State Highway 305 crossing through the southwest corner of the parcel. The east parcel (242601-3-003-2008) is approximately 15 acres and measures approximately 1,300 feet north to south and 440 feet east to west and is north of State Highway 305. The south property (252601-2-047-2007) is about 0.03 acres and measures approximately 90 feet north to south and 15 feet east-to-west (County, 2025). The Site is accessed on the east side from Crystallia Court NE. The Site contains an unpaved trail system constructed with cut slopes and graded paths (Photograph 1).

2.2 Topography

The Site generally slopes down from the northeast to the southwest, with an overall change in elevation of about 240 feet and an average inclination of 16 percent (9 degrees). A ravine drainage runs from north to south on the west side of the Site, with the western slopes of the drainage measuring about 100 feet high with a measured inclination of 35 degrees (70 percent), and eastern slope measuring about 100 feet high with a measured inclination of about 25 degrees (46 percent). The Site contains several smaller slopes that are oriented roughly northeast to southwest.

2.3 Drainage

We observed areas of standing water in the ravine drainage along the west side of the Site, and areas of very saturated soils along the southern property boundary (Photograph 2). We noted several 6-inch-diameter, smooth-walled plastic pipes running underneath portions of the trail system that moved water downslope. Surface drainage conditions, as well as groundwater conditions at the Site, will vary with fluctuations in precipitation, Site usage (such as irrigation), and off-Site land use.



Photograph 1. *Unpaved trail at the Site, view to the east.*



Photograph 2. *Area of standing water in the southwest portion of the Site, north of State Highway 305, view to the north.*

2.4 Vegetation

The Site is generally vegetated with mature evergreens up to 40 inches diameter at breast height, young to mature alder, fern, and woody underbrush. Limited numbers of evergreens located on the slopes had slight trunk curvature, indicating some soil movement over time (Photograph 3). The central and southern portion of the Site and within the ravine drainage along the west side of the Site is vegetated with young to mature alder, dense understory of blackberry, and woody underbrush (Photograph 4). We observed horsetail in the south portion of the Site, indicating the presence of saturated soils. Within the ravine drainage in the northwest portion of the Site we observed tilted and downed alders.



Photograph 3. *Vegetation at the Site, view to the south.*



Photograph 4. *Vegetation in the southern portion of the Site, view to the north.*

3 Subsurface Conditions

A description of the subsurface conditions at the Site is provided in the following sections based on a review of published geologic maps, publicly available well logs near the Site, nearby subsurface explorations by others, our experience with the local geology, and our own subsurface explorations.

3.1 Geologic Mapping

The Site is located within the geologic area known as the Puget Lowland, east of Liberty Bay in Poulsbo, Washington. The Puget Lowland is a complex tectonic environment, and an area of subsidence flanked by two mountain ranges—the Cascades to the east, and the Olympics to the west. The sediments within the Puget Lowland result from repeated cycles of glacial and non-glacial deposition and erosion. The most recent, the Vashon Stade of the Fraser Glaciation (about 13,000 to 16,000 years ago), is responsible for most of the present day geologic and topographic conditions. During the Vashon Stade, the Cordilleran Glacier advanced southward into the Puget Lowland, depositing lacustrine and fluvial sediments in front of the glacier. Pre-glacial and proglacial sediments were overridden and consolidated by the advancing glacier, creating dense and hard soil deposits. At the interface between the advance soils and the glacial ice, the Cordilleran Glacier sculpted and smoothed the surface, and then deposited a consolidated basal till. As the glacier retreated northward to British Columbia, it left an unconsolidated sediment veneer over glacially consolidated deposits. Unconsolidated recessional and post-glacial alluvial and mass-wasting soils have since accumulated in various locations across the landscape.

The geologic map indicates the Site is underlain by Quaternary Vashon till, described as a diamict of dense to very dense silt, sand, gravel, cobbles, and boulders that were deposited directly under the glacial ice (Polenz et al, 2013).

Pre-Vashon silt (Qpf) is mapped at the head of the ravine in the higher-elevation northwest corner of the Site. Pre-Vashon silt is described as gray or brown, compact, silty, and clay with some sand and rare dropstones, generally thought to be glaciolacustrine but may include non-glacial deposits. Glaciolacustrine is material deposited in a lake environment; however, it has been directly over-ridden by a glacier causing it to be over consolidated.

Pre-Vashon drift (Qpd) is mapped at the lower-elevation ravine bottom; it is described as a till deposit, similar to the Vashon till but associated with a different, older glacial advance.

Although not mapped, human-placed fill and colluvium could be present at the Site. Fill is human-placed materials that is often found in developed areas and can be highly variable. Fill was likely created when the trail system was constructed. Colluvium is often present on and at the base of steep slopes. Colluvium is generally loose to medium dense soil that mantles the slope surface due to accumulating soil creep, slope wash, and sloughing.

3.2 Subsurface Investigation

On January 2 and 3, 2025, Aspect oversaw the advancement of 14 test pits, designated ATP-01 through ATP-14, terminated between 10 and 13 feet below ground surface (bgs). Detailed descriptions of the subsurface conditions and soil characteristics are provided in the exploration logs in Appendix A. The locations of the test pits are shown on Figure 2.

3.3 Stratigraphy

Below forest duff and topsoil, we encountered Vashon recessional outwash (Qgo) in test pits in the northeast portion of the Site. Recessional outwash is a fluvial deposit laid down during the retreat of the Vashon-age glacier. The geologic map shows this unit about 2,300 feet northwest, in a lower lying area.

On the remainder of the Site, we encountered pre-Vashon glaciolacustrine deposits with varying degrees of weathering. A geologic map presenting inferred geologic contacts based on our subsurface investigation is presented as Figure 3. A summary table of the units encountered at the respective depths is presented in Table 1 following the descriptions.

3.3.1 Topsoil

Topsoil refers to a unit that contains a high percentage of organics. We encountered topsoil at the ground surface in all of the test pits, extending from 0.5 to 1.5 feet bgs. The topsoil consisted of loose[1], dark brown silt (ML)[2] with sand, abundant wood debris, and roots.

3.3.2 Vashon Recessional Outwash

Underlying the topsoil in test pits ATP-05, ATP-08, ATP-09, ATP-11, ATP-12, and ATP-14, Vashon recessional outwash was encountered. Test pits ATP-08, ATP-09, ATP-12, and ATP-14 were terminated in this material, 10 and 13 feet bgs. The recessional outwash consisted of medium dense, moist, gray brown, sand with silt, gravel and cobbles (SP-SM), silty sand with gravel and cobbles (SM), and gravel with sand and cobbles (GP).

3.3.3 Pre-Vashon Fines: Glaciolacustrine Deposits

Underlying the Vashon recessional outwash in test pits ATP-05 and ATP-11, glaciolacustrine deposits were encountered 9 and 4 feet bgs, respectively. Underlying topsoil in test pits ATP-01 through ATP-04, ATP-06 and ATP-07, ATP-10, and ATP-13, glaciolacustrine deposits were encountered. We interpreted the glaciolacustrine deposits to be part of the pre-Vashon silt (Qpf), in agreement with geologic mapped material in the ravine in the northwest corner of the Site. The deposit consisted of medium dense to dense, sand with silt (SM) and silt with sand (SM) with varied degrees of weathering.

[1] Relative density was assessed at various depth intervals in the explorations qualitatively with a 0.5-inch-diameter, pointed steel T-probe and qualitatively with a dynamic cone penetrometer test (DCPT).

[2] Soils were classified per the Unified Soil Classification System (USCS) in general accordance with ASTM International (ASTM) D2488, *Standard Practice for Description and Identification of Soils* (ASTM, 2022).

The upper horizon of the deposit has been highly weathered, underlain by a slightly less weathered horizon, and lastly underlain by a relatively unweathered horizon. The amount of weathering decreases with depth while the density of the material increases. The highly-weathered glaciolacustrine deposits are loose, moist to very moist, brown silt with sand (ML) with iron-oxide staining and few root fragments. The weathered glaciolacustrine deposits are dense, moist, gray brown silt with sand (ML) with 0.1- to 0.2-inch-thick iron-oxide stained sand partings.

The relatively unweathered glaciolacustrine deposits are very dense, blue gray silt with sand (ML) with 0.1- to 0.2-inch-thick sand partings

Table 1. Geologic Units Encountered

Exploration Number	Depth of Topsoil (feet bgs)	Depth of Vashon Recessional Outwash (feet bgs)	Depth of Highly-Weathered Glaciolacustrine (feet bgs)	Depth of Weathered Glaciolacustrine (feet bgs)	Depth of Glaciolacustrine Deposits (feet bgs)	Total Depth (feet bgs)	Ground Surface Elevation[1]
ATP-01	0-1	NE	1-4	4-12	12-13	13	125
ATP-02	0-1	NE	1-4	4-12	NE	12	130
ATP-03	0-1.5	NE	1.5-4	4-9	9-12.5	12.5	180
ATP-04	0-1.5	NE	1.5-5	5-10	NE	10	165
ATP-05	0-2	2-9	NE	9-12	12-13	13	160
ATP-06	0-3	NE	NE	3-5	5-13	13	180
ATP-07	0-1.5	NE	1.5-4	4-10	10-11.5	11.5	195
ATP-08	0-1.5	1.5-12	NE	NE	NE	12	335
ATP-09	0-1.5	1.5-10	NE	NE	NE	10	260
ATP-10	0-1	NE	NE	4-12.5	NE	12.5	240
ATP-11	0-1.5	1.5-4	NE	4-8	8-13	13	210
ATP-12	0-1.5	1.5-13	NE	NE	NE	13	290
ATP-13	0-1	NE	1-5.5	5.5-12	NE	12	265
ATP-14	0-1.5	1.5-12	NE	NE	NE	12	260

Notes:
1. Elevations from LiDAR (Kitsap County Opsw, 2018). NAVD88 refers to North American Vertical Datum of 1988.
2. bgs= below ground surface

3.4 Groundwater

We encountered groundwater seepage in test pits ATP-02, ATP-05 to ATP-06, ATP-09 and ATP-14 between 2 and 7 feet bgs, as shown in Table 2 below. We interpreted the observed seepage to be perched groundwater and not representative of a regional groundwater table. A perched groundwater condition occurs when surface water percolates into the shallow subsurface and collects on relatively impermeable materials. In this case, the topsoil and highly-weathered glaciolacustrine units are considered low permeability units, while the glaciolacustrine deposits are essentially impermeable. Sand partings in the upper highly-weathered and weathered glaciolacustrine deposits allow water to move through the upper units and perch on top of the glaciolacustrine deposits.

Table 2. Groundwater Seepage

Exploration Number	Depth to Groundwater Seepage (feet bgs)	Elevation of Groundwater (feet[1])
ATP-02	2.5	126.5
ATP-05	2	140
ATP-06	2	178
ATP-09	7	262
ATP-14	2	253

Notes:

1. Elevations from LiDAR (Kitsap County Opsw, 2018). NAVD88 refers to North American Vertical Datum of 1988.
2. Groundwater seepage is not related to the groundwater table, it is representative of a perched groundwater condition.
3. Bgs = below ground surface

3.5 Laboratory Testing Results

Geotechnical laboratory tests were conducted on select samples to characterize engineering and index properties. Two grain size distributions and three fines content (particles passing the No. 200 sieve) analyses were completed, and the natural moisture contents of these soil samples were also determined and are presented on the test pit logs. The test methodology and results of all the laboratory testing are presented in Appendix B along with a summary table including the geologic unit classification.

Table 3. Summary of Particle Size Analysis Results and Moisture Content

Exploration Number	Sample Depth (feet bgs)	Percent Gravel	Percent Sand	Percent Fines	Moisture Content (percent)	USCS[2]	Geologic Unit
ATP-01	2	NT[1]	NT	75	35	SM	Highly weathered glaciolacustrine deposits
ATP-03	12	NT	NT	87	27	SM	Glaciolacustrine deposits
ATP-08	4	62.2	34.6	4.7	4.6	GP	Vashon Recessional Outwash
ATP-09	4	0	60.8	39.2	30.2	SM	Vashon Recessional Outwash
ATP-10	10	NT	NT	85	25.6	SM	Weathered Glaciolacustrine deposits

Notes:
1. NT – Not tested
2. SM – Silty sand
3. GP – Clean gravel
4. USCS – Unified Soils Classification System

4 Geologic Hazard and Associated Design Considerations

The following sections describe the mapped and observed geologic hazards at the Site and the design considerations associated with those hazards.

4.1 Seismic Hazards

The Site is located within the Puget Lowland physiographic province, an area of active seismicity that is subject to earthquakes on shallow crustal faults and deeper subduction zone earthquakes. The Site area lies about 7 miles northwest of the Seattle fault zone, which consists of shallow crustal tectonic structures that are considered active (evidence for movement within the Holocene [since about 15,000 years ago]) and is believed to be capable of producing earthquakes of magnitude 7.3 or greater. The recurrence interval of earthquakes on this fault zone is believed to be on the order of 1,000 years or more. The most recent large earthquake on the Seattle fault occurred about 1,100 years ago (Pratt et al., 2015). There are also several other shallow crustal faults in the region capable of producing earthquakes and strong ground shaking.

The Site also lies within the zone of strong ground shaking from earthquakes associated with the Cascadia Subduction Zone (CSZ). Subduction zone earthquakes occur due to rupture between the subducting oceanic plate and the overlying continental plate. The CSZ can produce earthquakes up to magnitude 9.3 and the recurrence interval is thought to be on the order of about 500 years. A recent study estimates the most recent subduction zone earthquake occurred around 1700 (Atwater et al., 2015).

Deep intraslab earthquakes, which occur from tensional rupture of the sinking oceanic plate, are also associated with the CSZ. An example of this type of seismicity is the 2001 Nisqually earthquake. Deep intraslab earthquakes typically are magnitude 7.5 or less and occur approximately every 10 to 30 years.

The following sections present descriptions of seismic design considerations for the Project.

4.1.1 Ground Response

Seismic design of the planned residences will likely be in accordance with the 2018 International Building Code (ICC, 2018), which references the American Society of Civil Engineers (ASCE) Standard ASCE/SEI 7-16, Minimum Design Loads for Buildings and Other Structures (ASCE, 2017) for seismic design. Supplements 1, 2, and 3 to ASCE/SEI 7-16 (ASCE, 2018; ASCE, 2021a and ASCE, 2021b) should be referenced where applicable per Washington State Building Code Council Emergency Rule WSR 22-11-010 (WSR 22-11-010; WA Building Code, 2022). In accordance with these codes, the seismic design will consider a “Maximum Considered Earthquake” (MCE) ground motion with a 2 percent probability of exceedance in 50 years, or a return period of 2,475 years.

The effects of Site-specific subsurface conditions on the MCE ground motion at the ground surface are determined based on the “Site Class.” The Site Class can be correlated

to the average standard penetration resistance (N-value), average shear wave velocity, or average undrained strength (for fine-grained soils) in the upper 100 feet of the soil profile. Based on density of the glaciolacustrine deposits, we conclude the soil profile for the residences gaining support from this deposit can be classified as Site Class C (Very Dense Soil and Soft Rock).

The spectral response acceleration parameters adjusted for Site Class C in accordance with the 2018 IBC and ASCE/SEI 7-16 and its supplements are presented in Table 4 for the MCE.

Table 4. Seismic Design Parameters

Design Parameter	Recommended Value
Site Class	C – Very Dense Soil and Soft Rock
Peak Ground Acceleration (PGA)	0.576g(1)
Short Period Spectral Acceleration (S_s)	1.374g
1-Second Period Spectral Acceleration (S_1)	0.485g
Site Coefficient (F_a)	1.200
Site Coefficient (F_v)	1.500(2)
Design Short Period Spectral Acceleration (S_{DS})	1.099g
Design 1-Second Period Spectral Acceleration (S_{D1})	0.485g

Notes:
1. g = gravitational force.
2. Based on the latitude and longitude of the Site: 47.724333°N, 122.625457°W, World Geodetic System 1984 (WGS84).
3. The risk category used was II, residential use.
   Based on the ASCE online hazard tool (ASCE, 2025).

4.1.2 Surficial Ground Rupture

A trace of an east-west trending thrust fault zone (Seattle fault zone) projects through the middle of Bainbridge Island, with the nearest known active fault trace (an unnamed fault) located approximately 6.7 miles south of the Site (USGS, 2010). Due to the suspected long recurrence interval and the proximity of the Site to the mapped fault trace, the potential for surficial ground rupture at the Site is considered low during the expected life of the Project and is not a design consideration.

4.1.3 Liquefaction

Liquefaction occurs when loose, saturated, and relatively cohesionless soil deposits temporarily lose strength from earthquake shaking. The primary factors controlling the onset of liquefaction include intensity and duration of strong ground motion, characteristics of subsurface soil, *in situ* stress conditions, and the depth to groundwater.

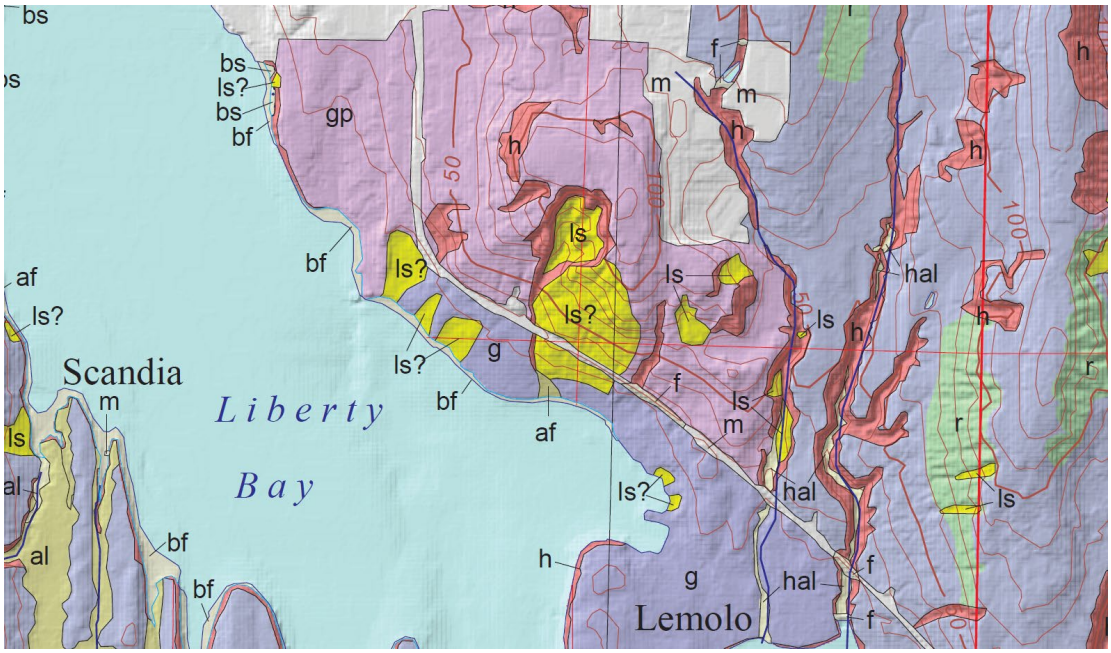
The pre-Vashon deposits underlying the Site are fine-grained and glacially over-ridden; therefore, not susceptible to soil liquefaction. Liquefaction is not a design consideration for the Project.

4.2 Landslide Hazards

Two types of landslides are common on similar inland slopes: deep-seated rotational landslides and surficial landslides (Varnes, 1978). These types of landslides are described in further detail in the following subsections. Landslides may be triggered by natural causes such as precipitation, or an earthquake, or by man-made features, such as broken water pipes or improperly managed stormwater flow.

The results of our review of publicly available resources are as follows:

- The Site is mapped as "Stable," and described as slopes that generally rise less than 15 percent in grade and are underlain by stable material (Ecology, 1979).
- Analysis using LiDAR maps did not identify this slope as a landslide (McKenna, et al., 2008).
- The geomorphic map indicates the Site may be a landslide (ls?), meaning it may be a surface of a deep-seated landslide as indicated by uphill scarps, bulbous toes and a position in hillslope hollows (Graphic 2 below; Haugerud, 2009).
- Aspect reviewed the newest publicly available LiDAR data for the Site and surrounding area (DNR, 2018), which shows bowl-shaped topography and hummocky terrain in the northwest portion of the Site, which may indicate a historic landslide in the ravine but lacks the surface roughness to indicate recent slide activity southeast of this area on the Site.
- We reviewed coastal aerial photographs (Ecology, 2025) and aerial photographs (Google, 2025 and NETR, 2025) of the Site area from 1951 through 2024 and did not observe any loss of vegetation at the Site that would suggest recent slope movement.



***Graphic 2**.Geomorphic Map Indicating a Possible Deep-Seated, Rotational Landslide (Haugerud, 2009)*

4.2.1 Deep Seated Rotational Landslides

Rotational landslides consist of deep-seated failures that typically involve slip along a curved shear plane. Rotational landslides may transport large masses of semi-intact soil downslope, resulting in alternating steep headscarps along the upper portion of the failure plane, with more gently sloping benches composed of displaced soil.

The north- and northwest-facing slopes of the ravine in the northwest portion of the Site have indicators of slope movement, including bowl-shaped topography, hummocky terrain, and tilted and downed trees. If these are landslide areas, the failures would occur to the north and northwest, at least 100 feet from the area of planned development. It is our opinion a 100-foot setback distance from the top of the slope will be adequate for the planned development.

4.2.2 Surficial Landslides

Surficial landslides are also commonly referred to as shallow flows or colluvial landslides. They consist of relatively shallow failures that typically involve sliding of the loose colluvial soil and overlying vegetation that typically mantle steep slopes. Surficial landslides are typically triggered by a significant increase in the moisture content within the upper soil layer of a slope and commonly result from periods of extended or heavy precipitation, groundwater seepage, or concentrated surface water discharge onto a slope.

Surficial landslides can also occur over time in a process called ‘creep,’ in which surficial soils slowly move downslope. Surface creep is typically evidenced by curvatures in shade-intolerant trees on the slope. Shallow flows occur within the upper several feet of a slope and typically do not extensively affect the deep-seated or overall stability of a slope.

We observed few evergreens with slight trunk curvature on the Site slopes, which may indicate surface creep. Surficial failures along the Site slope would likely be limited to the outer weathered soils and would not affect the overall slope stability.

4.3 Erosion Hazards

The County maps an erosion hazard within the ravine drainage in the northwestern portion of the Site. Erosion hazards indicate areas where accelerated erosion may occur based on factors including soil type, condition and steepness of slope, proximity to shoreline, and vegetative cover. The erosion risk increases on sloped areas, whether natural or excavated during construction.

Based on our observation of the Site and subsurface conditions, it is our opinion that the erosion hazard at the Site is high but can be adequately managed with standard temporary erosion and sedimentation control (TESC) and best management practices (BMPs) during construction. After construction, permanent erosion control methods, including revegetating the Site with native vegetation, can be implemented.

5 Conclusions and Recommendations

From our geotechnical investigation, we conclude that the Site is suitable for the proposed residential development, provided the recommendations contained herein are incorporated into the Project design and construction.

Based on current Project plans, site development will involve approximately 110,000 cubic yards of cut and 148,380 cubic yards of fill (ESM, 2025). A qualified and highly experienced earthworks Contractor will be needed for the movement of the soil throughout the Project.

5.1 Geologically Hazardous Area Considerations

Four geologic hazards are mapped on and within the area of influence of the Site including: high landslide hazard, moderate landslide hazards, moderate erosion hazards, and a moderate seismic hazard (Graphic 1). The high landslide hazard, moderate erosion hazard, and the moderate seismic hazard are all located in the northwest corner of the Site, in a ravine area with a mapped non-fish habitat watercourse at the base. No development is planned on or within 100 feet of these mapped hazards. Based on our data review, reconnaissance, subsurface explorations, and our understanding of the Project, no additional setbacks are recommended.

A limited area of moderate landslide hazard, defined as slopes between 15 to 30 percent, are mapped near the southeast corner of the Site. We do not recommend a setback from this area.

5.2 Foundations

Based on the results of our subsurface explorations, shallow foundations or spread footings may be used for building support. Bearing surfaces for the footings should be prepared as described in Section 6.2, Site Preparation. Foundations should be placed on medium dense or better native soil, generally located 2 to 4 feet bgs.

5.2.1 Shallow Foundations

For shallow foundations bearing on medium dense or better, native, relatively undisturbed, and suitably prepared Vashon recessional outwash, weathered glaciolacustrine, and unweathered glaciolacustrine deposits, we recommend an allowable foundation bearing pressure of 2,500 pounds per square foot (psf) be utilized for design purposes, including both dead and live loads for the planned structures. This same bearing pressure can be used for structural fill compacted to a minimum of 95 percent maximum dry density (MDD; ASTM D1557; ASTM, 2022) This value may be increased by one-third (to 3,300 psf) for short-term wind or seismic loading. Perimeter footings should be buried at least 18 inches into the surrounding soil for frost protection; interior footings require only 12 inches burial below adjacent interior finished grade. No footing should be founded in or above yielding/loose or organic soils.

Assuming construction is accomplished as recommended above, we estimate total settlement of spread foundations of less than about 1 inch and differential settlement between two adjacent load-bearing components supported on competent soils of less than

0.5 inches for the anticipated foundation loads. We anticipate that most of the estimated settlement will occur during construction, effective immediately after loads are applied.

Wind, earthquakes, and unbalanced earth loads will subject the planned residence to lateral forces. Lateral forces on a structure will be resisted by a combination of sliding resistance of its base or footing on the underlying soil and passive earth pressure against the buried portions of the structures.

An allowable coefficient of friction of 0.35 may be assumed along the interface between the base of the footing and subgrade soils. An allowable passive earth pressure of 400 pounds per cubic foot (pcf) may be assumed for soils adjacent to footings or other below-grade elements and accounting for nearby sloping ground conditions. The upper 1 foot of passive resistance should be neglected in design. The recommended coefficient of friction and passive pressure values include a factor of safety of 1.5 to limit deflection.

5.2.2 Slab-On-Grade Support

Slab-on-grade subgrade preparation should be completed in the same manner as shallow foundations described above in Section 5.2 (for foundations) except for interior slabs-on-grade beneath enclosed heated/air-conditioned interior spaces (such as those covered with flooring and carpet).

For interior slabs-on-grade, we recommend the uppermost 6 inches of the subgrade consist of compacted capillary break material (in lieu of 6 inches of crushed surfacing base course [CSBC]) to provide uniform support and moisture control. The capillary break material should consist of free-draining, clean, fine gravel, and coarse sand with a maximum particle size of about 1 inch and less than 3 percent material passing the U.S. No. 200 sieve by weight (fines). Angular material manufactured by crushing is preferred over rounded material such as bank run sand and gravel, to provide a subgrade surface that is not easily disturbed by workers laying steel rebar and concrete formwork. The capillary break material should be compacted to a relatively firm and unyielding condition and evaluated by Aspect prior to placement of steel rebar and formwork.

For building areas where moisture intrusion would be detrimental to the interior finished space (such as air-conditioned office areas that may be covered with flooring), consideration should be given to placement of a moisture protection barrier over the capillary break. Detailed design and performance issues with respect to moisture intrusion control as it relates to the interior environment of the structure are beyond the expertise of Aspect. Moisture protection barriers are specifically for moisture control and should not be confused with vapor barriers required for soil gas mitigation associated with naturally occurring gases (radon, methane) or gases related to environmental contamination (hydrocarbons, solvents, oils, volatile organic compounds). An environmental engineer and building envelope specialist or contractor should be consulted to address these issues, as needed.

For slabs-on-grade designed as a beam on elastic subgrade, we recommend using an initial vertical modulus (Kv1) of 200 pounds per cubic inch (pci) if bearing on the sequence of subgrade materials described above. The Kv1 value is appropriate for a 1-foot by 1-foot slab and needs to be adjusted based on the actual width (B) of the slab to a design vertical modulus (Ks) using the following equation below:

$K_s = K_{v1}(B+1)^2/(4B^2)$,

where B = slab width (in feet).

5.3 Wall Considerations

Low retaining walls, up to 10 feet in height, may be incorporated in the Project design to accommodate grade differentials across the Site. They may be incorporated as basement walls, stepped foundations, or retaining walls unassociated with a building.

Yielding walls, such as cantilever retaining walls, should be designed using a lateral earth pressure based on an equivalent fluid having a unit weight of 35 pcf, plus 1 pcf for each degree of backslope inclination. Nonyielding or restrained walls should be designed for an equivalent fluid weight of 55 pcf plus 1pcf for each degree of backslope inclination.

Walls should be backfilled with freely-draining sand and gravel and equipped with a footing drain to assure that hydrostatic pressures do not develop. Free-draining wall backfill material that meets the gradation requirements described in Section 9-03.12(2) of the Washington State Department of Transportation (WSDOT) Standard Specifications for Gravel Backfill for Walls (WSDOT, 2025), should be specified.

Earthquake shaking will subject retaining walls to a temporary additional earth pressure. We estimated the lateral seismic soil pressure increment using the Mononobe-Okabe method, with consideration of the possible backfill soil properties and MCE. We recommend an average seismic soil pressure increment of 10H (where H is the height of the wall) represented by a uniform rectangular pressure along the height of the wall.

For exterior Site retaining walls that are separate from new residence buildings, not more than 8 feet tall, and which are set back by at least 10 feet from a habitable structure, it is not necessary to design for incremental additional seismic soil pressure.

Over-compaction of the backfill behind walls should be avoided. In this regard, we recommend compacting the backfill to about 90 percent of the MDD (ASTM D1557; ASTM, 2022). Heavy compactors and large pieces of construction equipment should not operate within 5 feet of any embedded wall to avoid the buildup of excessive lateral pressures. Compaction close to the walls should be accomplished using hand-operated vibratory plate compactors.

Lateral forces that may be induced on the wall due to other surcharge loads should be considered by the structural engineer.

5.4 Stormwater Drainage Considerations

The presence of relatively impermeable glaciolacustrine deposits combined with our observations of surface water on the west side of the Site, concentrated stormwater infiltration is infeasible at the Site. We recommend stormwater management be accomplished using low impact development (LID) methods combined with conventional methods, including catch basins and storm drainpipes that discharge into an appropriate system. LID methods, such as small raingardens, bioswales, and dispersion, are feasible provided the systems incorporate underdrains and/or overflow redundancy to account for the low permeability and low-infiltration capacity of the Site soils.

Based on the current plans, a stormwater facility is located at the base of the Site, along the southern end near State Highway 305. This will allow all stormwater collections to gravity flow to the large facility. One test pit, ATP-02, was excavated near the west end of the facility and encountered 1 foot of topsoil underlain by about 4 feet of loose, silty with sand (ML), high-weathered, glaciolacustrine deposits underlain by about 8 feet of dense, silty with sand (ML), weathered glaciolacustrine deposits. Groundwater seepage was observed 2.5 feet bgs.

5.4.1 Foundation and Wall Drainage

Given the presence of designated wetlands in the low-lying ravine area in the northwest area of the Site, the sloping topography, and the presence of essentially impervious glacial till and glaciolacustrine deposits at the Site, foundation and wall drainage will be crucial.

The outside edges of all perimeter footings, and the upslope sides of all walls, should be provided with a drainage system consisting of 4-inch-diameter, perforated, rigid plastic pipe embedded in a clean, free-draining sand and gravel meeting the requirements of Section 9-03.12(4) of the WSDOT Standard Specifications for Gravel Backfill for Drains (WSDOT, 2025). The drainpipe and surrounding drain rock should be wrapped in filter fabric to minimize the potential for clogging and/or ground loss due to piping. A washed rock drain curtain at least 1-foot-thick should extend from the footing continuously upward to within 1 foot of the ground surface. A layer of low permeability soils should be used on the upper foot to reduce potential for surface water to enter these footing drains. The foundation drainage system should tie in with the permanent wall drainage systems and under-slab drainage system, if needed. The footing drains should include cleanouts to allow periodic maintenance and inspection.

Final grades around the proposed structures should be sloped such that surface water drains away from the structures. Water from hard surfaces should be collected and diverted to the stormwater outfall system. Roof drain downspouts should not be connected to the foundation drains and under-slab drains, in order to reduce the potential for clogging and flooding foundation drains.

6 Construction Considerations

Based on the explorations performed and our understanding of the Project, it is our opinion that the planned excavations can be completed with standard construction equipment. The topsoil and glaciolacustrine deposits contain a significant percentage of fines, making them moisture sensitive and subject to disturbance when wet. The topsoil contains significant amounts of organics, making it unsuitable for reuse as structural fill. Excavations of topsoil should be exported from the Site or used as landscaping fill.

The Vashon recessional outwash material encountered in the northern portion of the Site may be used for structural fill, as long as the density requirements are achieved. The contractor should anticipate the presence of potential obstructions, including possible cobbles and boulders.

Discussions about ways to reuse the glaciolacustrine deposits occurred at the time this report was prepared. An experienced Contractor would be required to successfully reuse the material and cement or kiln dust would likely be needed to treat the material if the soil moisture content were too high.

Fill placement and compaction could only be completed during the dry, summer months. If wet weather occurred, construction would be required to stop until dry conditions returned. A sheepsfoot roller would be used for compaction and benching on sloped areas would be required. An Aspect/Geosyntec representative would be required to observe the Contractors means and methods. A separate company would be required for frequent, in-place density testing.

We recommend that earthwork activities be specified in accordance with the following WSDOT Standard Specifications, except where specifically addressed in this report (WSDOT, 2025). Appropriate erosion control measures should be in accordance with Section 1-07.15, Temporary Water Pollution/Erosion Control, and should be implemented prior to beginning earthwork activities.

6.1 Wet Weather Earthwork

Earthwork is typically most economical when performed under dry weather conditions. If earthwork is to be performed or fill is to be placed in wet weather or under wet conditions when soil moisture content is above optimum and difficult to control, the following recommendations apply:

- Earthwork should be performed in small areas to minimize exposure.
- Excavation or removal of unsuitable soils should be followed promptly by the placement and compaction of the specified structural fill.
- The size, type, and access of construction equipment used may have to be limited to prevent soil disturbance.
- The ground surface within the construction area should be graded to promote runoff of surface water away from slopes and to prevent water ponding.

- The ground surface within the construction area should be properly covered and under no circumstances should be left uncompacted and/or exposed to moisture.
- Soils that become too wet for compaction should be removed and replaced with specified structural fill.
- Excavation and placement of fill should be observed by Aspect/Geosyntec to verify that all unsuitable materials are removed prior to placement, compaction requirements are met, and Site drainage is appropriate.
- Erosion and sedimentation control should be implemented in accordance with City requirements and BMPs.

6.2 Site Preparation

Site preparation within the proposed construction footprint should include removal of topsoil containing roots, organics, debris, and any other deleterious material. All soil with significant root debris, including the highly weathered glaciolacustrine deposits, should be removed from the planned foundations areas.

6.3 Structural Fill

Soils placed beneath or around foundations, walls, utilities, slabs-on-grade, or below pavements should be considered structural fill. For these fill areas, we provide the following recommendations:

- Structural fill to be used below foundations should consist of material meeting the requirements for Class A Gravel Backfill for Foundations, as described in Section 9-03.12(1)A of the WSDOT *Standard Specifications* (WSDOT, 2025). If desired, lean concrete or controlled density fill (CDF) can also be used as structural fill under foundations. If lean concrete is used, a 2-sack mix is recommended.
- The uppermost 6 inches of structural fill beneath slabs-on-grade should consist of capillary break consisting of free-draining, clean, fine gravel and coarse sand with a maximum particle size of 1 inch and less than 3 percent material passing the U.S. No. 200 sieve by weight (fines).
- Drain rock to surround footing and under-slab drainage pipes should consist of material meeting the requirements of Gravel Backfill for Drains as specified in Section 9-03.12(4) of the WSDOT *Standard Specifications*.
- Structural fill placed within 12 inches (behind) basement walls (if not cast directly against shoring) should consist of free-draining sand and gravel meeting the requirements for Gravel Backfill for Walls per WSDOT *Standard Specifications* Section 9-03.12(2), or similar locally available material approved by Aspect/Geosyntec.
- Structural fill to be used for general excavation backfill outside of the areas where materials are specified above should consist of material meeting the requirements for Gravel Borrow per WSDOT *Standard Specifications* Section 9-03.14(1).

6.3.1 Reuse of On-Site Soils as Structural Fill

The suitability of excavated Site soils for use as structural fill depends on the gradation and moisture content of the soil when it is placed. As the amount of fines (the portion passing through a No. 200 sieve) increases, the soil becomes increasingly sensitive to small changes in moisture content and adequate compaction becomes more difficult to achieve. Soil containing more than about 5 percent fines typically cannot be consistently compacted to a dense, nonyielding condition when the moisture content is greater than about 3 to 4 percent above or below optimum. Kiln dust and cement can be added to soil with high moisture content to lower the moisture and to achieve the required compaction specifications. A pugmill mixing operation will need to be established to uniformly distribute the cement or kiln dust into the on-Site soil. An earthworks Contractor with experience in soil amendment will be needed if this is contemplated.

Aspect/Geosyntec and a separate company will be required for placement observations and in-place density testing. The amount of cement or kiln dust to add to the soil will be determined at the time of construction based on soil type, moisture content, and the contractor's method(s) of mixing. Soil considered for use as structural fill must also be free of organic and other compressible materials.

The Vashon recessional outwash deposits may be used as structural fill provided the materials are screened to ensure they are relatively free of organics, cobbles, boulders, and other deleterious debris. Based on our explorations, the material is over optimum moisture content and would need to be moisture-conditioned in order to achieve adequate compaction.

6.3.2 Compaction

In general, suitable structural fill material for the Project is fill placed within 3 percent of its optimum moisture content per ASTM International (ASTM) Standard D1557 (modified Proctor test) that does not contain deleterious materials or particles larger than 3 inches in diameter (ASTM, 2022). Structural fill material should be compacted to a minimum of 95 percent of the MDD based on ASTM D1577. Structural fill adjacent to a wall should be compacted to a minimum of 90 percent of the MDD based on ASTM D1557.

The procedure to achieve the specified minimum relative compaction depends on the size and type of compacting equipment, the number of passes, thickness of the layer being compacted, and certain soil properties. When size of the excavation restricts the use of heavy equipment, smaller equipment can be used, but the soil must be placed in thin enough lifts to achieve the required compaction. A sufficient number of in-place density tests should be performed as the fill is placed to verify the required relative compaction is being achieved. The frequency of the in-place density testing can be determined at the time of construction when more details of the Project grading and backfilling plans are available and the Contractor has been selected.

Generally, loosely compacted soils are a result of poor construction technique or improper moisture content. Soils with a high percentage of silt or clay are particularly susceptible to becoming too wet, and coarse-grained materials easily become too dry, for proper compaction. Silty or clayey soils with a moisture content too high for adequate compaction should be dried, as necessary, or moisture conditioned by mixing with drier

materials, or other methods. A sheepsfoot roller should be used with materials containing high percentages of silt and clay (materials passing the 200 sieve). A particle-size analysis, natural moisture content, and a proctor should be completed on the materials requiring compaction and density testing.

6.4 Temporary and Permanent Slopes

Maintenance of safe working conditions, including temporary excavation stability, is the sole responsibility of the contractor. All temporary cuts exceeding 4 feet in height that are not protected by trench boxes, or otherwise shored, should be sloped in accordance with Part N of Washington Administrative Code (WAC) 296-155 (WSL, 2019), as shown in Table 5 below.

Table 5. Temporary Excavation Cut Slope Recommendations

Soil Unit	WAC Soil Classification	Maximum Temporary Slope	Maximum Height (ft)
Topsoil, Fill	Type C	1.5H:1V[2]	12
Vashon Recessional Outwash, Highly-Weathered Glaciolacustrine Deposits, and Weathered Glaciolacustrine Deposits	Type C	1.5H:1V[2]	12
Glaciolacustrine Deposits	Type A	0.75H:1V	20

Notes:
1. H:V = Horizontal to Vertical

With time and the presence of seepage and/or precipitation, the stability of temporary unsupported cut slopes can be significantly reduced. We recommend planning the construction schedule to have excavation occur during the summer months and to minimize the amount of time that the temporary slopes will be unsupported during construction. The contractor should monitor the stability of the temporary cut slopes and adjust the construction schedule and slope inclination accordingly. Vibrations created by traffic and construction equipment may cause caving and raveling of the face of the temporary slopes. At no time should soil stockpiles, equipment, and other loads be placed immediately adjacent to an excavation.

The cut-slope inclinations provided here are for planning purposes only and are applicable to excavations without inflowing perched groundwater or runoff. The contractor shall be responsible for safe working conditions at the Site.

Permanent slopes for the Project should be no steeper than 2H:1V (horizontal:vertical).

7 Additional Project Design and Construction Monitoring

At the time of this report, site grading, structural plans, and construction methods were not finalized, and the recommendations presented herein are preliminary. We are available to provide additional geotechnical consultation as the Project design develops, and possibly changes, from that upon which this report is based. Additional explorations, testing, and assessments may be needed as the Project plans develop. The information and recommendations contained herein should be brought to the attention of the appropriate design team personnel and incorporated into the Project plans and specifications.

We recommend a pre-construction meeting be organized at the start of construction including you, your contractor, and Aspect/Geosyntec. During this meeting, we will understand the goals and schedule to be upheld during construction. We will also discuss effective lines of communication. The integrity of the Project and the overall Site stability depends on proper site preparation and construction procedures. In addition, engineering decisions may have to be made in the field in the event that variations in subsurface conditions become apparent.

8 References

American Society of Civil Engineers (ASCE), 2018, Supplement 1, Minimum Design Loads for Buildings and Other Structures, ASCE Standard 7-16, effective December 12, 2018.

American Society of Civil Engineers (ASCE), 2021a, Supplement 2, Minimum Design Loads for Buildings and Other Structures, ASCE Standard 7-16, effective October 14, 2021.

American Society of Civil Engineers (ASCE), 2021b, Supplement 3, Minimum Design Loads for Buildings and Other Structures, ASCE Standard 7-16, effective November 5, 2021.

American Society of Civil Engineers (ASCE), 2025, ASCE 7 Hazard Tool, https://asce7hazardtool.online/, accessed January 20, 2025.

ASTM International (ASTM), 2022, Annual Book of ASTM Standards, West Conshohocken, Pennsylvania.

Atwater, B.F., S. Musumi-Rokkaku, D. Satake, Y. Tsuji, K. Ueda, and D.K. Yamaguci (Atwater et al.), 2015, The orphan tsunami of 1700—Japanese clues to a parent earthquake in North America, U.S. Geological Survey, Professional Paper 1707.

ESM Consulting Engineers LLC (ESM), 2024, Johnson Feasibility, Prepared for: Montebanc Management, LLC, Job No. 2090-004-022; EN-08, Page 1 of 1, October 18, 2024.

Google, 2025, Google Earth Pro Program, Years reviewed: 1994, 2004, 2005, 2006, 2007, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2020, 2021, 2022, 2023 and 2024, accessed January 23, 2025.

Haugerud, R.A., 2009, Preliminary geomorphic map of the Kitsap Peninsula, Washington, USGS, Open-File Report 2009-1033, Version 1.0, Scale 1:36,000.

International Code Council (ICC), 2018, International Building Code (IBC), Prepared by International Code Council, First Printing August 2017.

Kitsap County (County), 2025, Kitsap County Parcel Details and Parcel Map Application, https://psearch.kitsapgov.com/pdetails/default.aspx, accessed on January 23, 2025.

McKenna, J.P., D.J. Lidke, and J.A. Coe (McKenna et al.), 2008, Landslides Mapped from LiDAR Imagery, Kitsap County, Washington: U.S. Department of the Interior, U.S. Geological Survey, Open File Report 2008-1292, Version 1.0.

Nationwide Environmental Title Research, LLC (NETR), 2025, Historical Aerials, Years reviewed: 1951, 1969, 1981, 1994, 2006, 2009, 2011, 2013, 2015, 2017, 2019 and 2021, https://www.historicaerials.com/, accessed January 23, 2025.

Polenz, Michael, Petro, G.T., Contreras, T.A., Stone, K.A., Paulin, G.I., and Cokiar, Recep, 2013, Geologic map of the Seabeck and Poulsbo 7.5-minute quadrangles, Kitsap and Jefferson Counties, Washington: Washington Division of Geology and Earth Resources, Map Series 2013-02, scale 1:24,000.

Pratt, T.L., K.G. Troost, J.K. Odum, and W.J. Stephenson (Pratt et al.), 2015, Kinematics of shallow backthrusts in the Seattle fault zone, Washington State, Geosphere, v. 11, no. 6, p. 1–27, doi:10.1130/GES01179.1.

U.S. Geological Survey (USGS), 2010, Quaternary fault and fold database for the United States, http://earthquake.usgs.gov/hazards/qfaults/, accessed January 15, 2025.

Varnes, D.J., 1978, Slope movement types and processes, in Schuster, R.L., and Krizek, R.J., eds., Landslides—Analysis and control: National Research Council, Washington, D.C., Transportation Research Board, Special Report 176, p. 11–33.

Washington State Building Code Council (WA Building Code), 2022, Emergency Rule WSR 22-11-010, Effective Mar 6, 2022.

Washington State Department of Ecology (Ecology), 1979, Coastal Zone Atlas of Washington, Shoreline and Coastal Zone Management Program, Volume 10, https://fortress.wa.gov/ecy/coastalatlas/tools/Map.aspx, accessed January 23, 2025.

Washington State Department of Ecology (Ecology), 2025, Coastal Zone Atlas of Washington, Shoreline Photos from June 10, 1977, May 19, 1992, and July 24, 2016, available at: https://fortress.wa.gov/ecy/coastalatlas/, accessed January 23, 2025.

Washington State Department of Natural Resources (DNR), 2019, Washington Lidar Portal, Kitsap County Opsw 2018, Olympics South Opsw 2019 DTM hillshade and Puget Lowlands 2005, lidarportal.dnr.wa.gov, accessed January 23, 2025.

Washington State Department of Transportation (WSDOT), 2025, Standard Specifications for Road, Bridge, and Municipal Construction, M 41-10, 2024.

9 Limitations

Work for this project was performed for Montebanc Management, LLC (Client), and this report was prepared consistent with recognized standards of professionals in the same locality and involving similar conditions, at the time the work was performed. No other warranty, expressed or implied, is made by Aspect Consulting, a Geosyntec company, (Aspect).

Recommendations presented herein are based on our interpretation of site conditions, geotechnical engineering calculations, and judgment in accordance with our mutually agreed-upon scope of work. Our recommendations are unique and specific to the project, site, and Client. Application of this report for any purpose other than the project should be done only after consultation with Aspect.

Variations may exist between the soil and groundwater conditions reported and those actually underlying the site. The nature and extent of such soil variations may change over time and may not be evident before construction begins. If any soil conditions are encountered at the site that are different from those described in this report, Aspect should be notified immediately to review the applicability of our recommendations.

It is the Client's responsibility to see that all parties to this project, including the designer, contractor, subcontractors, and agents, are made aware of this report in its entirety. At the time of this report, design plans and construction methods have not been finalized, and the recommendations presented herein are based on preliminary project information. If project developments result in changes from the preliminary project information, Aspect should be contacted to determine if our recommendations contained in this report should be revised and/or expanded upon.

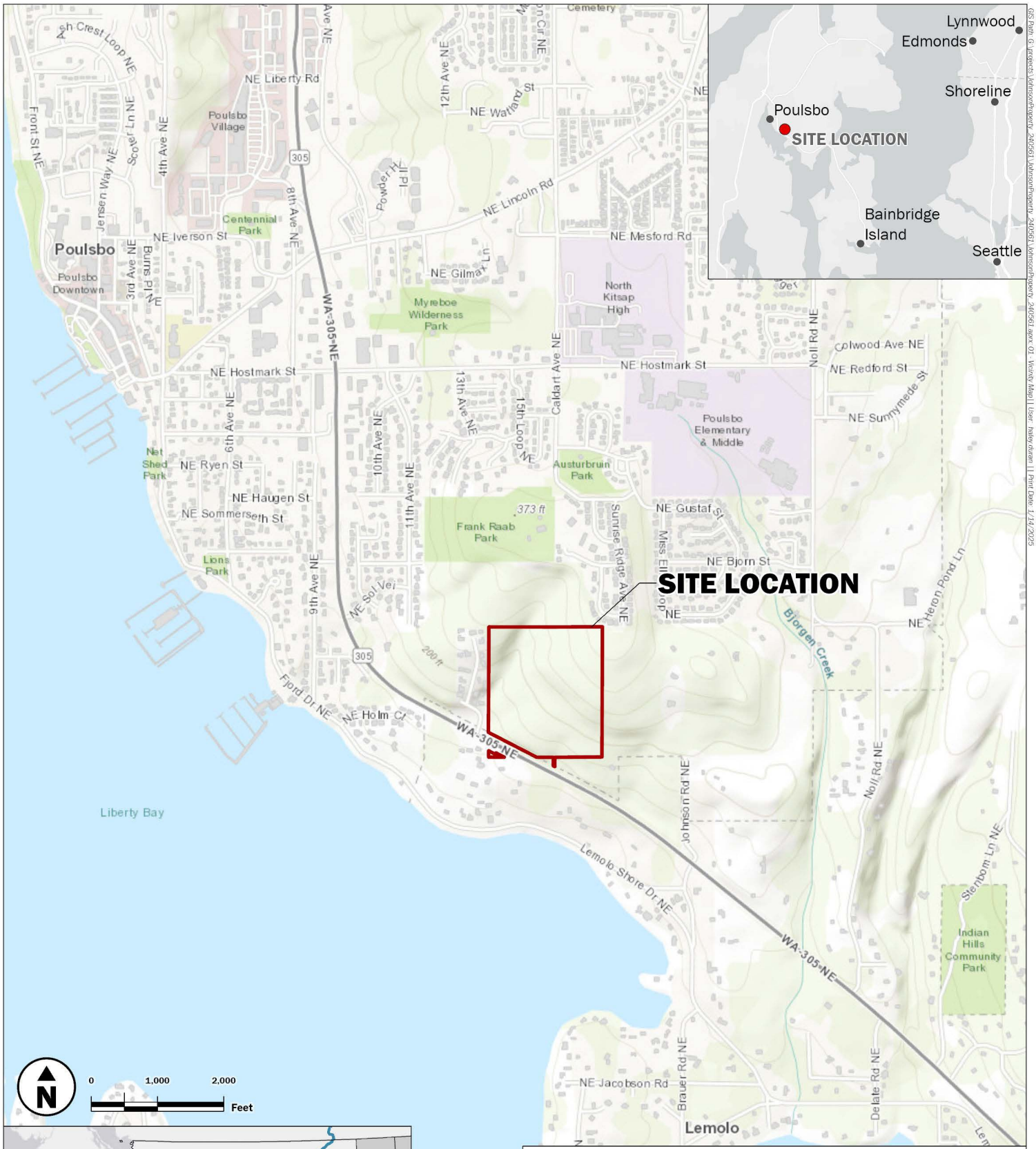
The scope of work does not include services related to construction safety precautions. Site safety is typically the responsibility of the contractor, and our recommendations are not intended to direct the contractor’s site safety methods, techniques, sequences, or procedures. The scope of our work also does not include the assessment of environmental characteristics, particularly those involving potentially hazardous substances in soil or groundwater.

All reports prepared by Aspect for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect. Aspect’s original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

Please refer to Appendix C titled “Report Limitations and Guidelines for Use” for additional information governing the use of this report.

We appreciate the opportunity to perform these services. If you have any questions please call Alison J. Dennison, LEG, Senior Engineering Geologist at 206-780-7717.

FIGURES



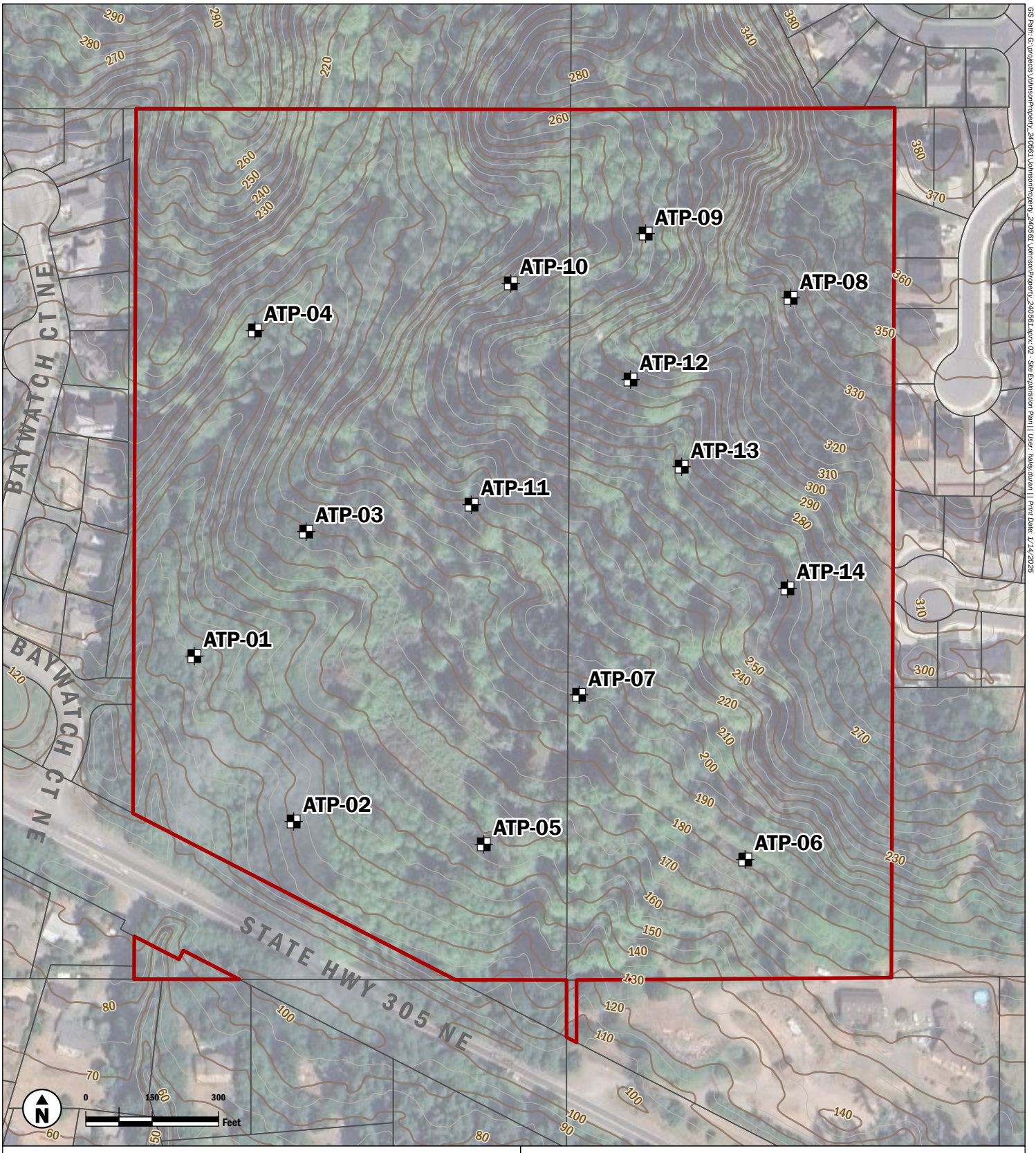
Vicinity Map

Geotechnical Engineering Report
Johnson Residential Development
State Route 305
Poulsbo, Washington

Aspect CONSULTING	JAN-2025	BY: AJD / HMD	FIGURE NO. 1
	PROJECT NO. 240561	REVISED BY: ---/---	

Data source credits: None || Basemap Service Layer Credits: County of Kitsap, King County, WA State Parks GIS, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS, Esri, HERE, Garmin, USGS, EPA, County of Kitsap, Bureau of Land Management, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA

GIS Path: G:\projects\Johnson\Property_240561\Johnson\Property_240561\Johnson\Property_240561.aprx || Vicinity Map || User: haleyduran || Print Date: 1/14/2025



Aspect Test Pit

Site Boundary

Kitsap County Parcels

Topo Contours 5ft

Topo Contours 10ft

Topography Contours from Kitsap County

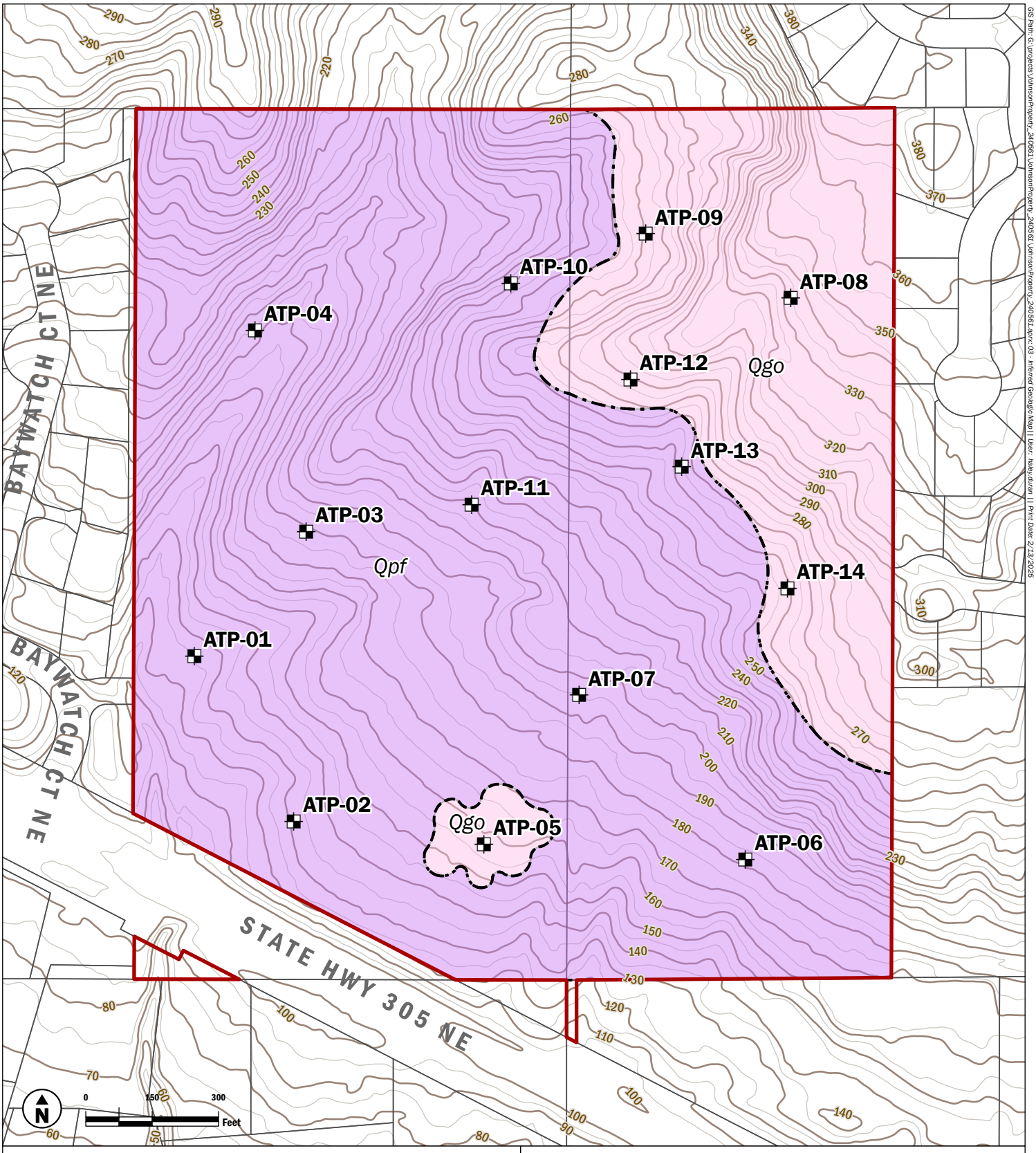
Site Exploration Plan

Geotechnical Engineering Report
Johnson Residential Development
State Route 305
Poulsbo, Washington

Aspect CONSULTING	JAN-2025	BY: AJD / HMD	FIGURE NO. 2
	PROJECT NO. 240561	REVISED BY: ---/---	

GIS Path: G:\projects\JohnsonProperty_240561\JohnsonProperty_240561.aprx; 02- Site Exploration Plan|| User: haley.duran || Print Date: 1/14/2025

Data source credits: None || Basemap Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA



GIS Path: G:\projects\JohnsonProperty_240561\JohnsonProperty_240561.\JohnsonProperty_240561.aprx: 03 - Inferred Geologic Map | User: haley.duran | | Print Date: 2/13/2025

Aspect Test Pit

Site Boundary

Kitsap County Parcels

Topo Contours 5ft

Topo Contours 10ft

Inferred Geologic Contact

Vashon Recessional Outwash (Qgo)

Glaciolacustrine Deposits, part of the Pre-Vashon Fines Unit (Qpf)

Topography Contours from Kitsap County

Inferred Geologic Map

Geotechnical Engineering Report
Johnson Residential Development
State Route 305
Poulsbo, Washington

Aspect Consulting	FEB-2025	BY: AJD / HMD	FIGURE NO. 3
	PROJECT NO. AS240561-02	REVISED BY: ---/---	

Data source credits: None | | Basemap Service Layer Credits: NA

APPENDIX A

Subsurface Exploration Logs

A. Subsurface Explorations

On January 2 and 3, 2025, Aspect observed the excavation of 14 test pits, ATP-01 through ATP-14. The test pits were excavated by High Meadows Excavating, LLC., an experienced and local excavation contractor, under subcontract to Aspect. Test pits were excavated using a Zaxis 85 USB tracked excavator. An Aspect representative, Chelsea Bush, LG, was present throughout the field exploration program to determine the locations of the explorations, observe the explorations, assist in sampling, and to prepare descriptive logs of each exploration. Samples were obtained from select soil units to aid in the determination of engineering properties of the subsurface materials and laboratory testing. The locations of explorations are shown on Figure 2 and were collected with a Global Positioning System (GPS).

Detailed descriptions of the subsurface conditions encountered in our explorations, as well as the depths where characteristics of the soils changed, are indicated on the logs presented herein. The depths indicated on the log where conditions changed may represent gradational variations between soil types. Soils were described per the Unified Soils Classification System (USCS) in general accordance with the ASTM International Standard Practice for Description and Identification of Soils (ASTM D2488; ASTM, 2022). The depths on the logs where conditions changed may represent gradational variations between soil types and actual transitions may be more gradual. The subsurface conditions depicted are only for the specific date and locations reported, and therefore, are not necessarily representative of other locations and times. A key to the symbols and terms used on the logs is provided in the Exploration Log Key.

The relative density/consistency of the soils was evaluated qualitatively with a 0.5-inch-diameter steel T-probe and observation of digging difficulty. Relative density was quantitatively assessed with Dynamic Cone Penetrometer Testing (DCPT) at various depth intervals within the test pits. The test pits were backfilled with the excavated soils.

The DCPT method involves a 15-pound steel mass falling 20 inches to strike an anvil, which drives a 1.5-inch-diameter, 45-degree cone into the soil. The number of blows required to drive the cone 1.75 inches is considered one data point. The DCPT data has been calibrated with Standard Penetration Test (SPT, ASTM Method D1586) results to provide a more refined estimate of soil relative density and consistency.

The test pits were backfilled with the excavated soils and tamped into place to reduce the amount of settlement.

Coarse-Grained Soils - More than 50%[1] Retained on No. 200 Sieve	Gravels - More than 50%[1] of Coarse Fraction Retained on No. 4 Sieve	≤5% Fines	GW	Well-graded GRAVEL Well-graded GRAVEL WITH SAND
			GP	Poorly-graded GRAVEL Poorly-graded GRAVEL WITH SAND
		≥15% Fines	GM	SILTY GRAVEL SILTY GRAVEL WITH SAND
			GC	CLAYEY GRAVEL CLAYEY GRAVEL WITH SAND
	Sands - 50%[1] or More of Coarse Fraction Passes No. 4 Sieve	≤5% Fines	SW	Well-graded SAND Well-graded SAND WITH GRAVEL
			SP	Poorly-graded SAND Poorly-graded SAND WITH GRAVEL
		≥15% Fines	SM	SILTY SAND SILTY SAND WITH GRAVEL
			SC	CLAYEY SAND CLAYEY SAND WITH GRAVEL
Fine-Grained Soils - 50%[1] or More Passes No. 200 Sieve	Silts and Clays Liquid Limit Less than 50%		ML	SILT SANDY or GRAVELLY SILT SILT WITH SAND SILT WITH GRAVEL
			CL	LEAN CLAY SANDY or GRAVELLY LEAN CLAY LEAN CLAY WITH SAND LEAN CLAY WITH GRAVEL
			OL	ORGANIC SILT SANDY or GRAVELLY ORGANIC SILT ORGANIC SILT WITH SAND ORGANIC SILT WITH GRAVEL
	Silts and Clays Liquid Limit 50% or More		MH	ELASTIC SILT SANDY or GRAVELLY ELASTIC SILT ELASTIC SILT WITH SAND ELASTIC SILT WITH GRAVEL
			CH	FAT CLAY SANDY or GRAVELLY FAT CLAY FAT CLAY WITH SAND FAT CLAY WITH GRAVEL
			OH	ORGANIC CLAY SANDY or GRAVELLY ORGANIC CLAY ORGANIC CLAY WITH SAND ORGANIC CLAY WITH GRAVEL
Highly Organic Soils			PT	PEAT and other mostly organic soils

"WITH SILT" or "WITH CLAY" means 5 to 15% silt and clay, denoted by a "-" in the group name; e.g., SP-SM • "SILTY" or "CLAYEY" means >15% silt and clay • "WITH SAND" or "WITH GRAVEL" means 15 to 30% sand and gravel. • "SANDY" or "GRAVELLY" means >30% sand and gravel. • "Well-graded" means approximately equal amounts of fine to coarse grain sizes • "Poorly graded" means unequal amounts of grain sizes • Group names separated by "/" means soil contains layers of the two soil types; e.g., SM/ML.

Soils were described and identified in the field in general accordance with the methods described in ASTM D2488. Where indicated in the log, soils were classified using ASTM D2487 or other laboratory tests as appropriate. Refer to the report accompanying these exploration logs for details.

1. Estimated or measured percentage by dry weight
2. (SPT) Standard Penetration Test (ASTM D1586)
3. Determined by SPT, DCPT (ASTM STP399) or other field methods. See report text for details.

GEOTECHNICAL LAB TESTS

MC	=	Natural Moisture Content
PS	=	Particle Size Distribution
FC	=	Fines Content (% < 0.075 mm)
GH	=	Hydrometer Test
AL	=	Atterberg Limits
C	=	Consolidation Test
Str	=	Strength Test
OC	=	Organic Content (% Loss by Ignition)
Comp	=	Proctor Test
K	=	Hydraulic Conductivity Test
SG	=	Specific Gravity Test

CHEMICAL LAB TESTS

Organic Chemicals

BTEX	=	Benzene, Toluene, Ethylbenzene, Xylenes
TPH-Dx	=	Diesel and Oil-Range Petroleum Hydrocarbons
TPH-G	=	Gasoline-Range Petroleum Hydrocarbons
VOCs	=	Volatile Organic Compounds
SVOCs	=	Semi-Volatile Organic Compounds
PAHs	=	Polycyclic Aromatic Hydrocarbon Compounds
PCBs	=	Polychlorinated Biphenyls

Metals

RCRA8	=	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, (d = dissolved, t = total)
MTCA5	=	As, Cd, Cr, Hg, Pb (d = dissolved, t = total)
PP-13	=	Ag, As, Be, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se, Tl, Zn (d=dissolved, t=total)

FIELD TESTS

PID	=	Photoionization Detector
Sheen	=	Oil Sheen Test
SPT[2]	=	Standard Penetration Test
NSPT	=	Non-Standard Penetration Test
DCPT	=	Dynamic Cone Penetration Test

COMPONENT DEFINITIONS

Descriptive Term		*Size Range and Sieve Number*
Boulders	=	Larger than 12 inches
Cobbles	=	3 inches to 12 inches
Coarse Gravel	=	3 inches to 3/4 inches
Fine Gravel	=	3/4 inches to No. 4 (4.75 mm)
Coarse Sand	=	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	=	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	=	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	=	Smaller than No. 200 (0.075 mm)

ESTIMATED[1] PERCENTAGE

% by Weight		*Modifier*	*% by Weight*		*Modifier*
<1	=	Subtrace	15 to 25	=	Little
1 to <5	=	Trace	30 to 45	=	Some
5 to 10	=	Few	>50	=	Mostly

MOISTURE CONTENT

Dry	=	Absence of moisture, dusty, dry to the touch
Slightly Moist	=	Perceptible moisture
Moist	=	Damp but no visible water
Very Moist	=	Water visible but not free draining
Wet	=	Visible free water, usually from below water table

RELATIVE DENSITY

Non-Cohesive or Coarse-Grained Soils

Density[3]		*SPT*[2] *Blows/Foot*	*Penetration with 1/2" Diameter Rod*
Very Loose	=	0 to 4	≥ 2'
Loose	=	5 to 10	1' to 2'
Medium Dense	=	11 to 30	3" to 1'
Dense	=	31 to 50	1" to 3"
Very Dense	=	> 50	< 1"

CONSISTENCY

Cohesive or Fine-Grained Soils

Consistency[3]		*SPT*[2] *Blows/Foot*	*Manual Test*
Very Soft	=	0 to 1	Penetrated >1" easily by thumb. Extrudes between thumb & fingers.
Soft	=	2 to 4	Penetrated 1/4" to 1" easily by thumb. Easily molded.
Medium Stiff	=	5 to 8	Penetrated >1/4" with effort by thumb. Molded with strong pressure.
Stiff	=	9 to 15	Indented ~1/4" with effort by thumb.
Very Stiff	=	16 to 30	Indented easily by thumbnail.
Hard	=	> 30	Indented with difficulty by thumbnail.

GEOLOGIC CONTACTS

Observed and Distinct — Observed and Gradual — Inferred

Aspect CONSULTING

Exploration Log Key

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Aspect CONSULTING	Johnson Property - AS240561		Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.		*Coordinates (Lat,Lon WGS84)* 47.7241, -122.6303 (est)	*Exploration Number* **ATP-01**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 125' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/2/2025	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
								TOPSOIL SILT WITH SAND (ML); loose, moist, dark brown; non-plastic; fine to medium sand; roots up to 1 inch in diameter.	
1	124	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.							1
			S1			DCPT =3,8,8		**HIGHLY WEATHERED GLACIOLACUSTRINE DEPOSITS** SANDY SILT (ML); medium dense, moist, light brown; non-plastic; fine to medium sand; roots up to 0.5 inches in diameter; iron-oxide staining.	
2	123								2
3	122								3
4	121		S2	35 ●		DCPT =6,18,13 FC,MC FC=75%		**WEATHERED GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); medium dense, moist, gray brown; low plasticity; fine to medium sand; 0.1-to 0.2-inch-thick fine sand (SP) partings with iron-oxide staining.	4
5	120								5
6	119								6
7	118								7
8	117								8
9	116								9
10	115		S3						10
11	114								11
12	113							**GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); very dense, moist, blue gray; low plasticity; fine to medium sand; 0.1-to 0.2-inch-thick fine sand (SP) partings.	12
13	112		S4					Bottom of exploration at 13 ft. bgs. Note: No test pit caving observed.	13
14	111								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-01
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Aspect CONSULTING	Johnson Property - AS240561	Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.	*Coordinates (Lat,Lon WGS84)* 47.7234, -122.6297 (est)	*Exploration Number* **ATP-02**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 130' (est)
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/2/2025	*Top of Casing Elev. (NAVD88)* NA
			Depth to Water (Below GS) 2.5' (Seep)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
0	130							**TOPSOIL** SILT WITH SAND (ML); loose, moist, dark brown; non-plastic; fine to medium sand; roots up to 1 inch in diameter.	0
1	129	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.						**HIGHLY WEATHERED GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); loose, very moist, light brown; non-plastic; fine to medium sand; trace woody debris and small roots; iron-oxide staining.	1
2	128	1/2/2025							2
3	127							Groundwater seep at 2.5 feet bgs.	3
4	126		S1			DCPT =12,13,8		**WEATHERED GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); dense, moist, light brown; low plasticity; fine to medium sand; trace, fine, subangular to subrounded gravel.	4
5	125								5
6	124								6
7	123								7
8	122								8
9	121								9
10	120		S2						10
11	119								11
12	118							Bottom of exploration at 12 ft. bgs. Note: No test pit caving observed.	12
13	117								13
14	116								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-02

Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Aspect CONSULTING	Johnson Property - AS240561		Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.		*Coordinates (Lat,Lon WGS84)* 47.7246, -122.6297 (est)	*Exploration Number* **ATP-03**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 180' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/2/2025	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
1	179	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.						**TOPSOIL** SILT WITH SAND (ML); loose, moist, dark brown; non-plastic; fine to medium sand; roots up to 1 inch in diameter.	1
2	178							**HIGHLY WEATHERED GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); medium dense, moist, light brown; non-plastic; fine to medium sand; fine to coarse, subangular to subrounded gravel; roots up to 2 inches in diameter; iron-oxide staining.	2
3	177					T-probe =5"			3
4	176					T-probe =3" FC,MC FC=87%		**WEATHERED GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); dense, moist, light brown; low plasticity; fine to medium sand; 0.1- to 0.2-inch-thick fine sand (SP) partings with iron-oxide staining.	4
5	175		S1						5
6	174								6
7	173								7
8	172								8
9	171							**GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); very dense, moist, blue gray; low plasticity; fine to medium sand; 0.1- to 0.2-inch-thick fine sand (SP) partings.	9
10	170								10
11	169								11
12	168		S2						12
13	167							Bottom of exploration at 12.5 ft. bgs. Note: No test pit caving observed.	13
14	166								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-03
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Aspect CONSULTING	Johnson Property - AS240561		Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.		*Coordinates (Lat,Lon WGS84)* 47.7255, -122.6295 (est)	*Exploration Number* **ATP-04**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 165' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/2/2025	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
1	164	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.						**TOPSOIL** SILT WITH SAND (ML); loose, moist, dark brown; non-plastic; fine to medium sand; roots up to 1 inch in diameter.	1
2	163							**HIGHLY WEATHERED GLACIOLACUSTRINE DEPOSITS** SANDY SILT WITH GRAVEL (ML); medium dense, moist, light brown; low plasticity; fine to coarse sand; fine to coarse, subangular to subrounded gravel; subangular to subrounded cobbles up to 4 inches in diameter; iron-oxide staining.	2
3	162								3
4	161		S1			DCPT =3,8,9			4
5	160							**WEATHERED GLACIOLACUSTRINE DEPOSITS** SANDY SILT (ML); very dense, moist, gray; low plasticity; fine to medium sand; 0.1- to 0.2-inch-thick fine sand (SP) partings.	5
6	159								6
7	158								7
8	157								8
9	156								9
10	155		S2					Bottom of exploration at 10 ft. bgs. Note: No test pit caving observed.	10
11	154								11
12	153								12
13	152								13
14	151								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-04
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Aspect CONSULTING	Johnson Property - AS240561	Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.	*Coordinates (Lat,Lon WGS84)* 47.7233, -122.6286 (est)	*Exploration Number* **ATP-05**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 160' (est)
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/2/2025	*Top of Casing Elev. (NAVD88)* NA
			Depth to Water (Below GS) 2' (Seep)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
1	159	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.						**TOPSOIL** SILT WITH SAND (ML); loose, moist, dark brown; non-plastic; fine to medium sand; roots up to 1 inch in diameter.	1
2	158	▽ 1/2/2025						4-inch-diameter roots at 1.5 feet bgs.	2
3	157							**VASHON RECESSIONAL OUTWASH** SAND WITH SILT AND GRAVEL (SP-SM); medium dense, moist, light brown; fine to coarse sand; fine to coarse, subangular to subrounded, faceted gravel; subangular to subrounded cobbles up to 5 inches in diameter; iron-oxide staining. Groundwater seep at 2 feet bgs.	3
4	156		S1			DCPT =8,16,22			4
5	155								5
6	154								6
7	153								7
8	152								8
9	151		S2					**WEATHERED GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); very dense, moist, gray brown; low plasticity; fine to medim sand; 0.1-to 0.2-inch-thick fine sand (SP) partings with iron-oxide staining.	9
10	150								10
11	149								11
12	148							**GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); very dense, moist, blue gray; low plasticity; fine to medim sand; 0.1-to 0.2-inch-thick fine sand (SP) partings with iron-oxide staining.	12
13	147							Bottom of exploration at 13 ft. bgs. Note: No test pit caving observed.	13
14	146								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: ▽ Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-05
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Aspect CONSULTING	Johnson Property - AS240561	Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.	*Coordinates (Lat,Lon WGS84)* 47.7232, -122.6269 (est)	*Exploration Number* **ATP-06**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 180' (est)
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/2/2025	*Top of Casing Elev. (NAVD88)* NA
			Depth to Water (Below GS) 2' (Seep)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
1	179	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.						**TOPSOIL** SANDY SILT WITH GRAVEL (ML); loose, moist, dark brown; non-plastic; fine to coarse sandl fine to coarse, subangular to subrounded gravel; roots up to 3 inches in diameter.	1
2	178	▽ 1/2/2025						Groundwater seep at 2 feet bgs.	2
3	177							**WEATHERED GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); medium dense, very moist, light brown; low plasticity; fine to coarse sand; fine to coarse, subangular to subrounded gravel; iron-oxide staining.	3
4	176		S1			DCPT =8,13,11			4
5	175							**GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); very dense, moist, blue gray; low plasticity; fine to medium sand; 0.1-to 0.2-inch-thick fine sand (SP) partings.	5
6	174								6
7	173								7
8	172								8
9	171								9
10	170								10
11	169								11
12	168								12
13	167		S2					Bottom of exploration at 13 ft. bgs. Note: No test pit caving observed.	13
14	166								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: ▽ Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-06
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Johnson Property - AS240561

Geotechnical Exploration Log

Project Address & Site Specific Location: Poulsbo, WA, See Figure 2.			Coordinates (Lat,Lon WGS84): 47.7239, -122.6280 (est)	Exploration Number: **ATP-07**
Contractor: High Meadows Excavating, LLC	Equipment: Hitachi Zaxis 85B	Sampling Method: Grab	Ground Surface Elev. (NAVD88): 195' (est)	
Operator: Dave Monsaas	Exploration Method(s): Trackhoe	Work Start/Completion Dates: 1/2/2025	Top of Casing Elev. (NAVD88): NA	Depth to Water (Below GS): No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
1	194	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.						**TOPSOIL** SILT WITH SAND (ML); loose, moist, dark brown; non-plastic; fine to medium sand; roots up to 1 inch in diameter.	1
2	193							**HIGHLY WEATHERED GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); medium dense, very moist, light brown; low plasticity; fine to medium sand 0.1-to 0.2-inch-thick fine sand (SP) partings with iron-oxide staining.	2
3	192								3
4	191		S1			DCPT =13,9,19		**WEATHERED GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); dense, very moist, light brown; low plasticity; fine to medium sand 0.1-to 0.2-inch-thick fine sand (SP) partings.	4
5	190								5
6	189								6
7	188								7
8	187								8
9	186								9
10	185							**GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); very dense, moist, blue gray; low plasticity; fine to medium sand; 0.1-to 0.2-inch-thick fine sand (SP) partings.	10
11	184		S2					Bottom of exploration at 11.5 ft. bgs. Note: No test pit caving observed.	11
12	183								12
13	182								13
14	181								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-07

Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Aspect CONSULTING	Johnson Property - AS240561		Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.		*Coordinates (Lat,Lon WGS84)* 47.7256, -122.6267 (est)	*Exploration Number* **ATP-08**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 335' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/3/2025	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
1	334	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.						**TOPSOIL** SILT WITH SAND (ML); loose, moist, dark brown; non-plastic; fine to medium sand; roots up to 1 inch in diameter.	1
2	333							**VASHON RECESSIONAL OUTWASH** GRAVEL WITH SAND AND COBBLES (GP); medium dense, moist, gray brown; fine to coarse sand; fine to coarse, subangular to subrounded gravel; subangular to subrounded cobbles up to 5 inches in diameter.	2
3	332								3
4	331	DCPT blow counts elevated due to presence of cobbles.	S1	4.6 ●		DCPT =8,16,30 PS,MC FC=4.7%		Becomes dense.	4
5	330								5
6	329								6
7	328								7
8	327								8
9	326							Becomes with subangular to subrounded cobbles up to 8 inches in diameter.	9
10	325								10
11	324								11
12	323		S2					Bottom of exploration at 12 ft. bgs. Note: No test pit caving observed.	12
13	322								13
14	321								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-08

Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Aspect CONSULTING	Johnson Property - AS240561		Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.		*Coordinates (Lat,Lon WGS84)* 47.7258, -122.6276 (est)	*Exploration Number* **ATP-09**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 260' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/3/2025	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 7' (Seep)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
1	259	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.						**TOPSOIL** SILTY SAND WITH GRAVEL AND COBBLES (SM); loose, moist, dark brown; fine to coarse sand; fine to coarse, subangular to subrounded gravel; subangular to subrounded cobbles up to 4 inches in diameter; roots up to 2 inches in diameter.	1
2	258					T-probe =6"		**VASHON RECESSIONAL OUTWASH** SILTY SAND WITH GRAVEL AND COBBLES (SM); medium dense, moist, gray brown; fine to coarse sand; fine to coarse, subangular to subrounded gravel; subangular to subrounded cobbles up to 4 inches in diameter; iron-oxide staining.	2
3	257								3
4	256		S1	30.2		T-probe =4" PS,MC FC=39.2%		SILTY SAND (SM); medium dense, wet, light brown; fine to medium sand; iron-oxide staining.	4
5	255								5
6	254								6
7	253	1/3/2025							7
8	252								8
9	251	Bottom of exploration at 10 feet bgs due to cave-in.							9
10	250		S2					Bottom of exploration at 10 ft. bgs. Note: Test pit caved in from sidewalls between 9 and 10 feet bgs.	10
11	249								11
12	248								12
13	247								13
14	246								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-09
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Aspect CONSULTING	Johnson Property - AS240561		Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.		*Coordinates (Lat,Lon WGS84)* 47.7256, -122.6284 (est)	*Exploration Number* **ATP-10**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 240' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/3/2025	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
								TOPSOIL SILT WITH SAND (ML); loose, moist, dark brown; non-plastic; fine to medium sand; roots up to 1 inch in diameter.	
1	239	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.							1
								HIGHLY WEATHERED GLACIOLACUSTRINE DEPOSITS SILT WITH SAND (ML); loose to medium dense, moist, light brown; low plasticity; fine to medium sand; few small roots and organics; mottled iron-oxide staining.	
2	238								2
3	237							2-foot-diameter granodiorite boulder at 3 feet bgs.	3
4	236		S1			T-probe =3"		**WEATHERED GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); dense, moist, light brown; low plasticity; fine to medium sand; 0.1-to 0.2-inch-thick fine sand (SP) partings with iron-oxide staining.	4
5	235								5
6	234								6
7	233								7
8	232								8
9	231								9
10	230		S2	25.6		FC=85%		**GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); very dense, moist, light brown; low plasticity; fine to medium sand; 0.1-to 0.2-inch-thick fine sand (SP) partings with iron-oxide staining.	10
11	229								11
12	228		S3						12
								Bottom of exploration at 12.5 ft. bgs. Note: No test pit caving observed.	
13	227								13
14	226								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-10
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Aspect CONSULTING	Johnson Property - AS240561		Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.		*Coordinates (Lat,Lon WGS84)* 47.7247, -122.6286 (est)	*Exploration Number* **ATP-11**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 210' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/3/2025	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
1	209	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.						**TOPSOIL** SILT WITH SAND (ML); loose, moist, dark brown; non-plastic; fine to medium sand; roots up to 1 inch in diameter.	1
2	208							**VASHON RECESSIONAL OUTWASH** SANDY SILT WITH GRAVEL (ML); loose, very moist, mottled light brown; non-plastic; fine to coarse sand; fine to coarse, subangular to subrounded gravel; few organics and roots up to 1 inch in diameter; iron-oxide staining.	2
3	207					T-probe =6"		1-foot-diameter granodiorite boulder at 3 feet bgs.	3
4	206							**WEATHERED GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); dense, moist, gray brown; non-plastic; fine to medium sand; 0.1-to 0.2-inch-thick fine sand (SP) partings with iron-oxide staining.	4
5	205		S1						5
6	204								6
7	203								7
8	202							**GLACIOLACUSTRINE DEPOSITS** SILT WITH SAND (ML); dense, moist, blue gray; non-plastic; fine to medium sand; 0.1-to 0.2-inch-thick fine sand (SP) partings.	8
9	201								9
10	200								10
11	199								11
12	198								12
13	197		S2					Bottom of exploration at 13 ft. bgs. Note: No test pit caving observed.	13
14	196								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-11
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Aspect CONSULTING	Johnson Property - AS240561	Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.	*Coordinates (Lat,Lon WGS84)* 47.7252, -122.6276 (est)	*Exploration Number* **ATP-12**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 290' (est)
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/3/2025	*Top of Casing Elev. (NAVD88)* NA
			Depth to Water (Below GS) No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
1	289	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.						**TOPSOIL** SILT WITH SAND (ML); loose, moist, dark brown; fine to medium sand; roots up to 1 inch in diameter.	1
2	288							**VASHON RECESSIONAL OUTWASH** SILTY SAND WITH GRAVEL AND COBBLES (SM); medium dense, moist, gray brown; fine to coarse sand; fine to coarse, subangular to subrounded gravel; subangular to subrounded cobbles up to 3 inches in diameter.	2
3	287		S1			T-probe =6"			3
4	286					T-probe =3"			4
5	285							Becomes with subangular to subrounded cobbles up to 6 inches in diameter.	5
6	284							SAND WITH SILT, GRAVEL, AND COBBLES (SP-SM); dense, moist, gray brown; fine to coarse sand; fine to coarse, subangular to subrounded gravel; subangular to subrounded cobbles up to 8 inches in diameter.	6
7	283								7
8	282		S2						8
9	281								9
10	280							GRAVEL WITH SILT, SAND, AND COBBLES (GP-GM); dense, moist, gray brown; fine to coarse sand; fine to coarse, subangular to subrounded gravel; subangular to subrounded cobbles up to 8 inches in diameter.	10
11	279								11
12	278								12
13	277							Bottom of exploration at 13 ft. bgs. Note: No test pit caving observed.	13
14	276								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-12
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Aspect CONSULTING	Johnson Property - AS240561	Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.	*Coordinates (Lat,Lon WGS84)* 47.7249, -122.6273 (est)	*Exploration Number* **ATP-13**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 265' (est)
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/3/2025	*Top of Casing Elev. (NAVD88)* NA
			Depth to Water (Below GS) No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
								TOPSOIL SILT WITH SAND (ML); loose, moist, dark brown; non-plastic; fine to medium sand; roots up to 1 inch in diameter.	
1	264	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.							1
								HIGHLY WEATHERED GLACIOLACUSTRINE DEPOSITS SILT WITH SAND (ML); medium dense, moist, light brown; low plasticity; fine to medium sand; few woody debris and small roots; iron-oxide staining.	
2	263								2
3	262		S1			T-probe =3"			3
4	261					T-probe =3"			4
5	260								5
								WEATHERED GLACIOLACUSTRINE DEPOSITS SILT WITH SAND (ML); dense, moist, light brown; low plasticity; fine to medium sand; 0.1-to 0.2-inch-thick fine sand (SP) partings with iron-oxide staining.	
6	259								6
7	258		S2						7
8	257								8
9	256								9
10	255								10
11	254								11
			S3						
12	253							Bottom of exploration at 12 ft. bgs. Note: No test pit caving observed.	12
13	252								13
14	251								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-13
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

Aspect CONSULTING	Johnson Property - AS240561	Geotechnical Exploration Log	
	Project Address & Site Specific Location Poulsbo, WA, See Figure 2.	*Coordinates (Lat,Lon WGS84)* 47.7244, -122.6267 (est)	*Exploration Number* **ATP-14**
Contractor High Meadows Excavating, LLC	*Equipment* Hitachi Zaxis 85B	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 260' (est)
Operator Dave Monsaas	*Exploration Method(s)* Trackhoe	*Work Start/Completion Dates* 1/3/2025	*Top of Casing Elev. (NAVD88)* NA
			Depth to Water (Below GS) 2' (Seep)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Blows/foot ▲ Water Content (%)● 0 10 20 30 40 50	Blows/6"	Tests	Material Type	Description	Depth (ft)
0								**TOPSOIL** SILT WITH SAND (ML); loose, moist, dark brown; fine to medium sand; roots up to 1 inch in diameter.	0
1	259	Backfilled with excavated material in one-foot-thick lifts and tamped with the excavator bucket.							1
2	258	1/3/2025						**VASHON RECESSIONAL OUTWASH** SILTY SAND WITH GRAVEL AND COBBLES (SM); medium dense, moist, brown; fine to coarse sand; fine to coarse, subangular to subrounded gravel; subangular to subrounded cobbles up to 6 inches in diameter; iron-oxide staining.	2
3	257								3
4	256		S1			DCPT =7,14,19		Becomes gray brown and without iron-oxide staining.	4
5	255								5
6	254								6
7	253		S2					SAND WITH SILT, GRAVEL, AND COBBLES (SP-SM); dense, very moist, gray brown; fine to coarse sand; fine to coarse, subangular to subrounded gravel; subangular to subrounded cobbles up to 5 inches in diameter.	7
8	252								8
9	251								9
10	250								10
11	249		S3						11
12	248							Bottom of exploration at 12 ft. bgs. Note: No test pit caving observed.	12
13	247								13
14	246								14

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: CB
Approved by: AJD 1/13/2025

Exploration Log ATP-14

Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE \\ASP-BAI-01\PROJECTS\GINTW\PROJECTS\AS240561 JOHNSON PROPERTY POULSBO.GPJ February 10, 2025

APPENDIX B

Geotechnical Laboratory Testing Results

B. Geotechnical Laboratory Testing Results

Geotechnical laboratory tests were conducted on selected soil samples collected during the field exploration program. The tests performed, and the procedures followed are outlined below. The laboratory tests were conducted in general accordance with appropriate ASTM International (ASTM) test methods and were conducted by Hayre McElroy & Associates, LLC.

B.1. Moisture Content Determination, MC

The five samples submitted for particle-size analyses and the five samples submitted for fines content determination were analyzed for water content by the ASTM D 2216 test method. This test method allows for the laboratory determination of the moisture (water) content of a soil sample by measuring and recording the mass of a sample before and then after drying. Test results are illustrated graphically on the logs in Appendix A.

B.2. Particle-Size Analyses, PF

Two select soil samples were submitted for particle-size with #200 sieve analysis in general accordance with ASTM D-2216, D-2419, D-4318, and D-5821 methods. This test method allows for the laboratory determination of the percent of the size fractions (by weight) of coarse-grained soil and the percent of fines in a soil sample, as well as the grain size diameter percentages of the material. The result of the test is presented in this appendix as curves depicting the percent finer by weight versus particle size.

B.3. Fines Content Determination, FC

The fines content was determined on three selected soil samples in general accordance with ASTM D1140. The results of the tests are shown in the table below, on the exploration logs, and tabulated in this appendix.

Aspect CONSULTING

Project name: Johnson Property
Project # AS240561
8883

Please send report to:
alison.dennsion@aspectconsulting.com
chelsea.bush@aspectconsulting.com

Laboratory Testing Schedule

Lab Test Procedure (ASTM)		Unit pricing from:	HMA 2024
PS	Sieve analysis and #200 wash (includes MC)		$120
FC	minus No. 200 wash (D1140)		$90

	Exploration	Sample	Depth (ft.)	Lab Tests	Line Total ($)	Test Notes
A	ATP-01	S-2	2	FC	90	Include Moisture Content
B	ATP-03	S-2	12	FC	90	Include Moisture Content
C	ATP-10	S-2	10	FC	90	Include Moisture Content
D	ATP-08	S1	4	PS	120	Include Moisture Content
E	ATP-09	S1	4	PS	120	Include Moisture Content

Test	No. of samples per test	Subtotal		
PS	2	$240		
FC	3	$270	RDER SUBMITTED ON:	1/14/2025
			ULTS REQUESTED BY:	ASAP
TOTAL:	5 samples	$510		

710 2nd Ave, Suite 550
Seattle, Washington, 98104

hayremcelroy & associates, llc

9644 153rd Ave NE
Redmond, WA 98052
p 425.869.6750

Moisture Content
ASTM D-2216

HMA Project Number: 08-175
Project Name: Johnson Property
Description: Soil
Lab Number: 8883

Received Date: 01/15/25
Start Date: 01/15/25
Finish Date: 01/16/25
Technician: HL

Lab #	Tare ID	Boring	Sample #	Depth (ft)	Weight of Moist Soil + Tare (g)	Weight of Dry Soil + Tare (g)	Tare Weight (g)	Weight of Water (g)	Moisture Content (%)
8883-A	PDX-01	**ATP-01**	S-2	2'	698.54	520.61	12.56	177.93	**35.0**
8883-B	NY-01	**ATP-03**	S-2	12'	593.03	469.51	12.58	123.52	**27.0**
8883-C	SEA-01	**ATP-10**	S-2	10'	587.00	470.01	12.56	116.99	**25.6**
8883-D	SF-01	**ATP-08**	S1	4'	1785.45	1707.42	12.59	78.03	**4.6**
8883-E	ATL-01	**ATP-09**	S1	4'	958.82	739.57	12.43	219.25	**30.2**

Oven No.	Oven In-Calibration	Calibration Due	Balance	In Calibration	Calibration Due
B23ERS-0026	8/9/2024	August 2025	545249	8/9/2025	August 2025

hayremcelroy & associates, llc

9644 153rd Ave NE
Redmond, WA 98052
p 425.869.6750

Fines Content
ASTM C117

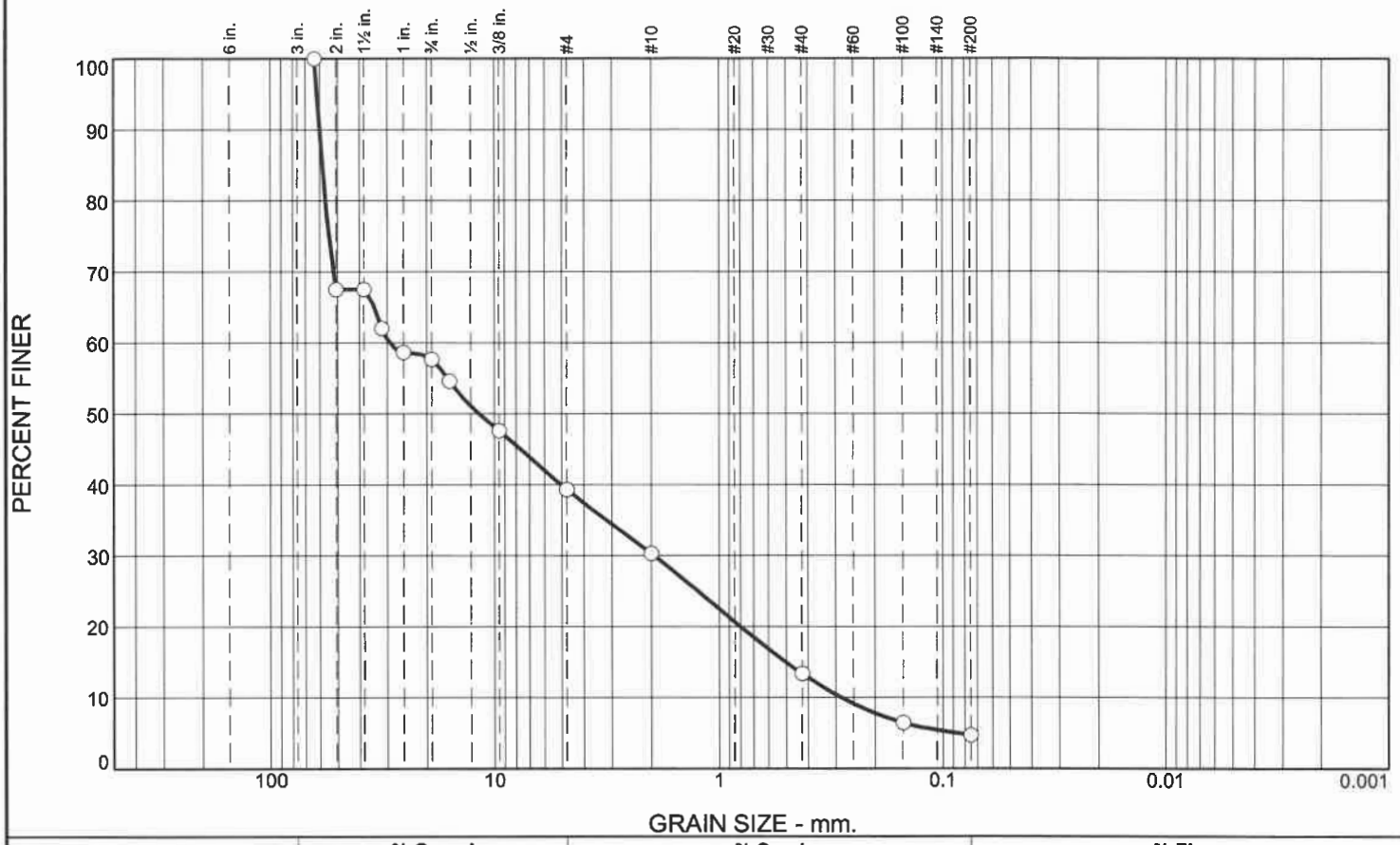
Project Number: 08-175
Project Name: Johnson Property
Sample ID: Soil
Spec: FC
HMA LAB NO 8883

Technician: HL
Received: 01/15/25
Start Date: 01/16/25
Finish Date: 01/17/25

Lab Number	Boring	Sample	Depth (ft)	Tare #	Tare Weight (g)	Tare+Dry Weight Before Wash (g)	Tare+Dry Weight After Wash (g)	% Retained	% PASSING
8883-A	**ATP-01**	S-2	2'	PDX-01	12.56	520.61	139.42	24.97	**75.03**
8883-B	**ATP-03**	S-2	12'	NY-01	12.58	469.51	72.05	13.02	**86.98**
8883-C	**ATP-10**	S-2	10'	SEA-01	12.56	470.01	82.64	15.32	**84.68**

Oven No.	Oven In-Calibration	Calibration Due	Balance		In Calibration	Calibration Due
B23ERS-0026	8/9/2024	August 2025	545249		8/9/2025	August 2025

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	42.3	18.4	9.0	16.9	8.7	4.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2 1/2"	100.0		
2"	67.5		
1 1/2"	67.5		
1 1/4"	62.0		
1"	58.7		
3/4"	57.7		
5/8"	54.6		
3/8"	47.6		
#4	39.3		
#10	30.3		
#40	13.4		
#100	6.5		
#200	4.7		

* (no specification provided)

Soil Description

Poorly graded GRAVEL with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 60.0814 D_{85}= 58.3581 D_{60}= 29.3048
D_{50}= 11.6632 D_{30}= 1.9453 D_{15}= 0.5019
D_{10}= 0.2821 C_u= 103.90 C_c= 0.46

Classification

USCS= GP AASHTO=

Remarks

MC - 4.6%

Source of Sample: ATP-08 **Depth:** 4 ft.
Sample Number: S1

Date: 01/17/2025

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Aspect Consulting
Project: Johnson Property
Project #AS240561
Project No: Lab #8883

Figure

Tested By: HL **Checked By:** JM

GRAIN SIZE DISTRIBUTION TEST DATA

1/17/2025

Client: Aspect Consulting
Project: Johnson Property
Project #AS240561
Project Number: Lab #8883
Location: ATP-08
Depth: 4 ft. **Sample Number:** S1
Material Description: Poorly graded GRAVEL with sand
Date: 01/17/2025
USCS Classification: GP
Testing Remarks: MC - 4.6%
Tested by: HL **Checked by:** JM

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 1621.20
Tare Wt. = 12.59
Minus #200 from wash = 5.1%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
1707.47	12.59	0.00	2 1/2"	0.00	100.0
			2"	550.40	67.5
			1 1/2"	550.40	67.5
			1 1/4"	643.50	62.0
			1"	700.80	58.7
			3/4"	717.60	57.7
			5/8"	769.70	54.6
			3/8"	888.10	47.6
			#4	1028.60	39.3
			#10	1181.40	30.3
			#40	1467.80	13.4
			#100	1585.40	6.5
			#200	1615.10	4.7

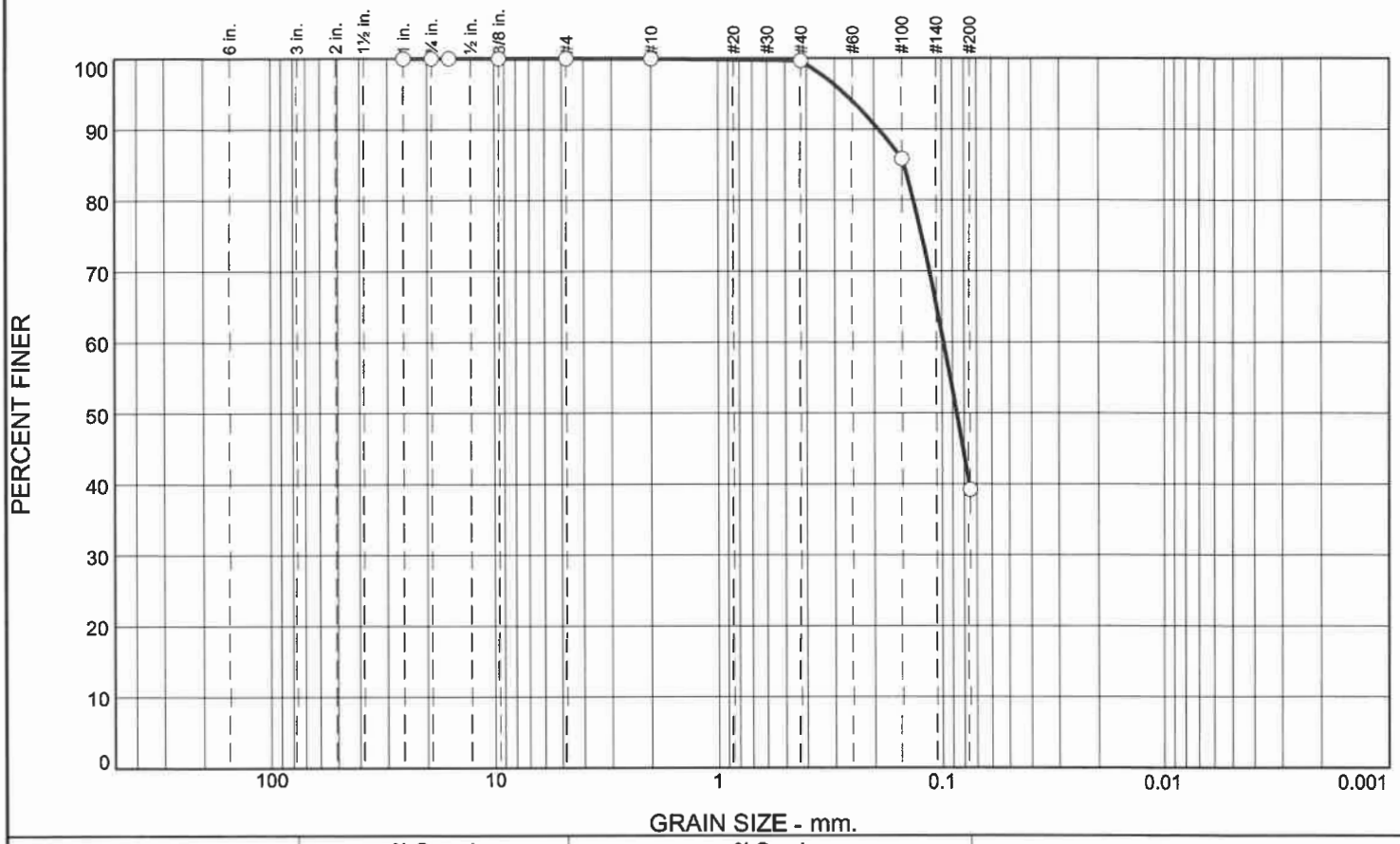
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	42.3	18.4	60.7	9.0	16.9	8.7	34.6			4.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0875	0.2821	0.5019	0.8015	1.9453	5.0463	11.6632	29.3048	56.5651	58.3581	60.0814	61.7833

Fineness Modulus	C_u	C_c
5.98	103.90	0.46

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	60.5	39.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	100.0		
5/8"	100.0		
3/8"	100.0		
#4	100.0		
#10	100.0		
#40	99.7		
#100	85.9		
#200	39.2		

* (no specification provided)

Soil Description

Silty SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1905 D_{85}= 0.1472 D_{60}= 0.0984
D_{50}= 0.0862 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

MC - 30.2%

Source of Sample: ATP-09 **Depth:** 4 ft.
Sample Number: S1

Date: 01/17/2025

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Aspect Consulting
Project: Johnson Property
Project #AS240561
Project No: Lab #8883

Figure

Tested By: HL **Checked By:** JM

GRAIN SIZE DISTRIBUTION TEST DATA

1/17/2025

Client: Aspect Consulting
Project: Johnson Property
Project #AS240561
Project Number: Lab #8883
Location: ATP-09
Depth: 4 ft.
Sample Number: S1
Material Description: Silty SAND
Date: 01/17/2025
USCS Classification: SM
Testing Remarks: MC - 30.2%
Tested by: HL
Checked by: JM

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 635.31
Tare Wt. = 12.43
Minus #200 from wash = 14.3%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
739.57	12.43	0.00	1"	0.00	100.0
			3/4"	0.00	100.0
			5/8"	0.00	100.0
			3/8"	0.00	100.0
			#4	0.00	100.0
			#10	0.30	100.0
			#40	2.40	99.7
			#100	102.80	85.9
			#200	442.00	39.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.3	60.5	60.8			39.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.0758	0.0862	0.0984	0.1336	0.1472	0.1905	0.2700

Fineness Modulus
0.18

APPENDIX C

Report Limitations and Guidelines for Use

REPORT LIMITATIONS AND GUIDELINES FOR USE

Geoscience is Not Exact

The geoscience practices (geotechnical engineering, geology, and environmental science) are far less exact than other engineering and natural science disciplines. It is important to recognize this limitation in evaluating the content of the report. If you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or property, you should contact Aspect Consulting (Aspect).

This Report and Project-Specific Factors

Aspect's services are designed to meet the specific needs of our clients. Aspect has performed the services in general accordance with our agreement (the Agreement) with the Client (defined under the Limitations section of this project's work product). This report has been prepared for the exclusive use of the Client. This report should not be applied for any purpose or project except the purpose described in the Agreement.

Aspect considered many unique, project-specific factors when establishing the Scope of Work for this project and report. You should not rely on this report if it was:

- Not prepared for you;
- Not prepared for the specific purpose identified in the Agreement;
- Not prepared for the specific subject property assessed; or
- Completed before important changes occurred concerning the subject property, project, or governmental regulatory actions.

If changes are made to the project or subject property after the date of this report, Aspect should be retained to assess the impact of the changes with respect to the conclusions contained in the report.

Reliance Conditions for Third Parties

This report was prepared for the exclusive use of the Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against liability claims by third parties with whom there would otherwise be no contractual limitations. Within the limitations of scope, schedule, and budget, our services have been executed in accordance with our Agreement with the Client and recognized geoscience practices in the same locality and involving similar conditions at the time this report was prepared.

Property Conditions Change Over Time

This report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by events such as a change in property use or occupancy, or by natural events, such as floods,

earthquakes, slope instability, or groundwater fluctuations. If any of the described events may have occurred following the issuance of the report, you should contact Aspect so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical, Geologic, and Environmental Reports Are Not Interchangeable

The equipment, techniques, and personnel used to perform a geotechnical or geologic study differ significantly from those used to perform an environmental study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually address any environmental findings, conclusions, or recommendations (e.g., about the likelihood of encountering underground storage tanks or regulated contaminants). Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding the subject property.

We appreciate the opportunity to perform these services. If you have any questions please contact the Aspect Project Manager for this project.