UPDATED GEOTECHNICAL ENGINEERING REPORT

Silverdale Recycling and Garbage Facility
8843 Dickey Road NW
Silverdale, Washington 98383

Prepared for: Parametrix, Inc.

Project No. 170361-D-01 • January 24, 2023 FINAL

Aspect CONSULTING

earth + water

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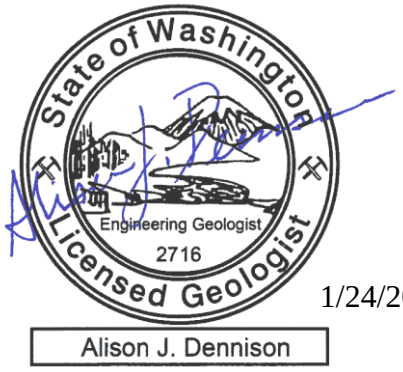

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Alison J. Dennison, LEG
Senior Engineering Geologist
adennison@aspectconsulting.com

Erik O. Andersen, PE
Principal Geotechnical Engineer
eandersen@aspectconsulting.com.

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1 Introduction

This updated report presents the results of a geotechnical engineering evaluation for the 60% Design of the proposed redevelopment plans for Kitsap County's (County) existing Silverdale Recycling and Garbage Facility (RAGF; Project) at 8843 Dickey Road NW in Silverdale, Washington (Site). We prepared a Geotechnical Engineering Report dated December 20, 2019, for the Project as proposed then (Aspect, 2019), and a draft Updated Geotechnical Engineering Report for the Project as proposed then (Aspect, 2022). The County has updated the Project plans and this report has been revised accordingly for the Project's 60% Design. This finalized, updated report supersedes our December 20, 2019, and our draft February 2, 2022, geotechnical engineering report.

Aspect performed our current services in accordance with our subconsultant agreement authorized on November 12, 2021, and our previous services with our agreement authorized on September 27, 2019. We previously prepared a feasibility report for the Project in 2018 and have included the results of that study (Aspect, 2018) in this report.

1.1 Project Description

The Site is located in the central area of Kitsap County (Figure 1). The Site consists of one Kitsap County Parcel Number 192501-1-021-2008 that covers a total of 29.9 acres. The existing RAGF is located in the southeastern portion of this parcel and the planned RAGF Project area encompasses about 16.4 acres (Figure 2 and 3, respectively). The remainder of the parcel is shared use, occupied by Kitsap County Roads Division and Pyramid Materials. The area of the existing RAGF will be improved and expanded to the north, west, and south. The existing conditions are shown on Figure 2 and the proposed conditions are shown on Figure 3. Full Project details are presented in the Facility Master Plan (Parametrix, 2019) and 60% Review Submittal (Parametrix, 2022). The Project details relevant to geotechnical assessments are discussed in this report.

The existing RAGF provides opportunities for residents and small businesses to drop off municipal solid waste (MSW), recyclable materials, and limited household hazardous waste (HHW) for proper disposal (Parametrix, 2019). This Project includes upgrades of existing services including an attendant building, three refuse sheds, a recycle area, a limited HHW area, and an area for appliances.

The Project also includes demolition and replacement of the attendant building at a new location, a gravity-fed septic system for off-site sewer, upgrading utilities (cameras, lights), a new refuse shed, a new operator warming station, a portable restroom, a new enclosure for limited HHW, a container storage area, improved access and traffic flow, improved handling of stormwater, and a potential future expansion for vehicle scales. Cuts and fills on the order of 4 to 32 feet are planned to accommodate the new Site features, with the larger cuts and fills mainly for the improved access at the west end of the Project area.

1.2 Scope of Services

Our scope of work included subsurface investigations (borings and test pits) to characterize the subsurface soil and groundwater conditions, geotechnical engineering analyses to develop design criteria for new structure foundations, pavement design, and key earthwork considerations. The results are presented in this report and include:

- Site and Project description
- Seismic design considerations in accordance with the 2018 International Building Code (IBC), as adopted by the County
- Evaluation of geotechnical hazards at the Site and identification of mitigation strategies, as needed
- Foundation and wall design parameters including types of foundation systems, allowable soil bearing pressure(s), footing requirements, anticipated total and differential settlements, lateral resistance and lateral earth pressures and recommendations for slabs-on-grade
- Temporary excavation considerations and permanent slope recommendations
- Stormwater infiltration feasibility at the Site and drainage considerations and recommendations
- Recommendations for rigid and flexible pavement design sections for heavy truck and passenger vehicle driveway and parking areas at the Site
- Site earthwork considerations including imported structural fill recommendations, and an evaluation of the suitability of re-use of on-Site soil as structural fill
- Earthwork requirements for buried utilities, including pipe zone and trench backfill requirements

Copies of our exploration logs and geotechnical laboratory testing results are attached as appendices to this report.

2 Surface Conditions

Aspect assessed the surface conditions of the Site through a literature review and field observations. We conducted a Site reconnaissance on November 15, 2017, September 27, 2019, October 16, 2019, and November 16, 2021, and subsurface investigations on October 23 and 30, 2019 and November 30, 2021. The following sections discuss the results of our assessment.

2.1 Site Conditions and Topography

The Site is located in the central area of Kitsap County, which is developed with mostly single-family residences to the south, an elementary school to the east, and an aggregate mine to the northwest. The Site is directly bordered by Dickey Road NW to the south and a portion to the east near the northeast and southeast corners of the Site, the Kitsap Humane Society to the east, and Kitsap County Roads Division to the north and west (Parametrix, 2019). The Site is accessed from the south with an asphalt-paved road leading to the fenced and gated facility (Figure 2).

The facility consists of an asphalt paved roadway, associated drive lanes with level areas for different items for disposal, a large gravel area for the recycle area, a smaller gravel area for the limited HHW and appliances, an attendant building, and three refuse sheds (Figure 2). There are small areas of concrete around the refuse sheds for the pickup and delivery of the dumpsters. The refuse sheds are built into the slope, similar to a daylight basement, with a concrete retaining wall supporting the upslope area. The customers access the top of the dumpster at the high side of the shed while the delivery trucks access the dumpsters at the lower level to pick up and deliver the dumpsters.

In general, from the area of the existing development, the Site slopes down in all directions with slopes up to 6 degrees (11 percent) and limited areas that may be slightly steeper but not taller than 10 vertical feet. The central portion of the Site is at approximate Elevation 416 feet (Parametrix, 2017). The entrance to the Site from Dickey Road NE is Elevation 428 feet. There is a gentle rise to Elevation 436 feet to the east, but then drops down to Elevation 410 feet. West of the entrance roadway, parallel to Dickey Road NW is a mound that slopes down in all directions. The top of the mound slopes gently up to the west and is about 5 feet higher than Dickey Road NW and up to 30 feet higher than the area to the north.

2.2 Drainage

During our reconnaissance on November 15, 2017, after recent rainfall, we observed small areas (less than 5 square-feet) of standing water on asphalt paved areas within the gravel recycling area, within the gravel surface of the limited HHW area, and flowing water in the roadside ditches along Dickey Road NW to the south and east of the Site. Similar wet areas were observed on September 27, 2019, October 16, 2019, and November 16, 2021.

The roof-gutter downspouts from the sheds discharged onto the ground surface adjacent to the sheds. Roadside ditches along the south and east sides of the Site drained towards the southeast corner of the Site and into a culvert that crossed under Dickey Road NW

traveling to the southeast. Stormwater sheet flows across the asphalt and concrete surfaces and into the adjacent vegetated areas. The northwest half of the Site drains to the north. Surface drainage conditions will vary with fluctuations in precipitation, Site usage (such as irrigation), and off-Site land use.

2.3 Vegetation

The northern and southeastern portions of the Site are vegetated with mature evergreens, some deciduous trees, ferns, and forest undergrowth. The western and southern portions of the Site are vegetated with low brush, young deciduous trees, and grass. No hydrophilic (water-loving) vegetation was observed, which, when present, indicates perennially wet, saturated soils. A critical areas review of the Site will be performed by others.

3 Subsurface Conditions

Our understanding of subsurface conditions at the Site is based on our subsurface explorations consisting of test pits excavated on October 23, 2019, and November 30, 2021, and borings advanced on October 30, 2019, along with our review of aerial photos, historical topographic maps, published geologic mapping of the area, well logs in the vicinity of the Site, and nearby subsurface explorations. Our understanding is also based on our experience with the local geology and our own local subsurface exploration data.

3.1 Geologic Setting

The Site is located within the Puget Lowland, a broad area of tectonic subsidence flanked by two mountain ranges: the Cascades to the east and the Olympics to the west. The sediments within the Puget Lowland are the result of repeated cycles of glacial and nonglacial deposition and erosion. The most recent cycle, 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 3,000-foot-thick Cordilleran Glacier advanced into the Puget Lowland.

As the Cordilleran Glacier advanced southward, lacustrine and fluvial sediments were deposited in front of the glacier. Preglacial 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 Cordilleran Glacier retreated northward from the Puget Lowland to British Columbia, it left an unconsolidated sediment veneer over glacially consolidated deposits.

The geologic map indicates that the Site is underlain by modified land (ml), described as locally derived sand, pebbles, cobbles, boulders, silt, clay, and diamicton excavated and redistributed to modify topography (Polenz et al., 2013). The modified land is surrounded by Vashon ice-contact deposits (Qgic), described as cobble and pebble gravel, sand, ablation till, flow till, lodgment till, lacustrine mud, and rare boulders.

3.2 Subsurface Explorations

Aspect conducted subsurface investigations on October 23 and October 30, 2019, and November 30, 2021, to collect subsurface soil and groundwater information. Ten test pits, ATP-01 through ATP-21, were completed to depths between 6 to 19 feet below the existing ground surface (bgs). Four borings, AB-01 through AB-04, were completed to depths between 16.5 to 26.5 feet bgs. Two monitoring wells, AMW-01 and AMW-02 were completed to approximately 26 feet bgs. A summary of our field explorations, including geologic soil units and groundwater observations, are presented in the following sections. Detailed descriptions of the subsurface conditions encountered in our explorations, as well as the depths where characteristics of the soils changed, are on the boring logs presented in Appendix A. Locations of the explorations are shown on Figure 2 and 3.

3.3 Stratigraphy

Our explorations encountered a relatively thin layer of topsoil overlying fill and/or native soil consisting of Vashon lodgment till (Qgt) or Vashon advance outwash sand (Qgas). These older Vashon deposits underlie the mapped Vashon ice-contact deposits.

The soil conditions we observed in the subsurface explorations are described in stratigraphic order from top to bottom below. 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 surficial unit that contains a high percentage of organics. Topsoil was encountered at the ground surface extending 0.3 to 2 feet bgs in borings AB-01, AB-02, AB-04 and all test pits, ATP-01 through ATP-21.

3.3.2 Fill

Fill refers to human-placed material. Fill was encountered underlying the topsoil in borings AB-01, AB-02, AB-04 and test pits ATP-02, ATP-07, ATP-10, ATP-13, ATP-15, ATP-17, ATP-20, and ATP-21 extending 3 to 18 feet bgs. Fill was encountered at the ground surface in borings AB-03, AMW-01, and AMW-02, extending 0.5 to 3 feet bgs. Test pits ATP-15, ATP-20, and ATP-21 were terminated in fill 18 to 19 feet bgs (the practical depth limitation for the excavator). The fill was identified by color, presence of organics, and lower density. The fill generally consisted of very loose to dense, dry to moist, gray to light brown to brown to dark brown, gravel (GP) to silty sand (SM) [1] with gravel and iron-oxide staining.

The Standard Penetration Test (SPT)[2] blow count in the fill ranged from 5 to greater than 50 blows per foot, indicating the fill was typically loose to very dense. Several of the greater than 50 blows per foot density readings were considered elevated due to the size of the gravels being larger than the sampler. The fill exhibits relatively low shear strength and moderate to high compressibility characteristics. It is also moisture-sensitive due to the presence of silt in the fill and moderate permeability.

Our interpretations of the extents and depths of fill at the Site are based on limited, isolated, and discontinuous subsurface data across the Site. Variation in the subsurface conditions should be expected and verification of our interpretations and recommendations can only be completed at the time of construction.

3.3.3 Vashon Lodgment Till

Vashon lodgment till was encountered underlying the topsoil in boring AB-04 and test pits ATP-01, ATP-05, ATP-06, ATP-08, ATP-09, and ATP-11, ATP-12, and ATP-14 to the depths explored, 6 to 26 feet bgs. Vashon lodgment till was encountered underlying

[1] 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, 2018).
[2] SPT blow count refers to standard penetration test (SPT) N-values, in accordance with ASTM International (ASTM) D1586.

the fill in borings AB-01, AB-02, AB-03, AMW-01, AMW-02 and in test pits ATP-02, ATP-07, ATP-10, and ATP-13 to the depths explored, 6.5 to 26.5 feet bgs.

Vashon lodgment till consisted of very dense, moist, gray, silty sand (SM) with variable amounts of gravel and cobbles. The upper 1 to 5 feet of this unit was weathered with iron-oxide staining and was slightly less dense in borings AB-03 and AWM-01, and test pits ATP-02, ATP-05, ATP-09, ATP-11 through ATP-14.

Vashon lodgment till can contain large cobbles and boulders that can impede earthwork activities. Encountering such obstructions should be expected during construction work at the Site. Overall, the SPT blow counts in the Vashon lodgment till were greater than 50 blows per foot. Vashon lodgment till exhibits high shear strength and low compressibility characteristics, making it suitable for support of new structure foundations. The very dense nature and high silt/clay content (fines) of this unit yields very low permeability causing an impediment to groundwater movement. It has moderate to high moisture sensitivity due to its significant fines content.

3.3.4 Vashon Advance Outwash Sand

Vashon advance outwash sand was encountered in test pits ATP-03, ATP-04, ATP-16, ATP-17, and ATP-19 underlying the topsoil up to about 1 foot bgs and extending to the depths explored, 8 to 19 feet bgs. Vashon advance outwash was also encountered underlying the fill in test pit ATP-18, extending 7 to 18.5 feet bgs. In the geologic sequence, this unit typically underlies the Vashon lodgment till but was not encountered in any of the other explorations.

The upper 1.5 to 5 feet of this unit was weathered to a brown and yellow color, had iron-oxide staining, and was less dense. Vashon advance outwash consisted of loose to very dense, moist, gray brown to gray, silty sand (SM) with few gravel.

Vashon advance outwash exhibits moderate to high shear strength and low compressibility characteristics, making it suitable for support of new structure foundations.

Table 1. Geologic Units Encountered

Exploration Number	Depth of Topsoil (feet bgs)	Depth of Fill (feet bgs)	Depth of Vashon Lodgment Till (feet bgs)	Depth of Vashon Advance Outwash (feet bgs)	Total Depth (feet bgs)	Ground Surface Elevation
AB-01	0-0.3	0.3-10	10-25.5	NE	25.5	417
AB-02	0-0.3	0.3-7.5	7.5-16.5	NE	16.5	417
AB-03	NE	0-0.5	0.5-26.5	NE	26.5	415
AB-04	0-1.5	NE	1.5-26	NE	26	416
AMW-01	NE	0-2.5	2.5-25.5	NE	25.5	415
AMW-02	NE	0-3	3-26	NE	26	424
ATP-01	0-0.3	NE	0.3-17.5	NE	17.5	415
ATP-02	0-0.7	0.7-5	5-13	NE	13	412
ATP-03	0-1	NE	NE	1-9	9	404
ATP-04	0-1	NE	NE	2.5-8	8	396
ATP-05	0-1.5	NE	1.5-12	NE	12	401
ATP-06	0-0.5	NE	0.5-6	NE	6	415
ATP-07	0-0.7	0.7-4	4-13	NE	13	424
ATP-08	0-1.5	NE	1.5-10	NE	10	410
ATP-09	0-2	NE	2-8	NE	8	400
ATP-10	0-0.5	0.5-4	4-6.5	NE	6.5	431
ATP-11	0-0.5	NE	0.5-15	NE	15	398
ATP-12	0-0.5	NE	0.5-15	NE	15	393
ATP-13	0-0.5	0.5-5	5-15	NE	8	396
ATP-14	0-0.5	NE	0.5-8	NE	19	400
ATP-15	0-0.5	0.5-19	NE	NE	19	438
ATP-16	0-0.5	NE	NE	0.5-19	18.5	400
ATP-17	0-0.5	0.5-7	NE	7-18.5	19	400
ATP-18	0-0.5	NE	NE	0.5-19	10	409
ATP-19	0-0.5	NE	NE	0.5-10	18	410
ATP-20	0-0.5	0.5-18	NE	NE	18	458
ATP-21	0-0.5	0.5-18	NE	NE	15	424

Notes: NE – not encountered.

3.4 Groundwater

Groundwater seepage was encountered 3 to 13 feet bgs in 10 of the test pits at the contact between the fill and the Vashon lodgment till or within the Vashon advance outwash, as presented in Table 2. A perched groundwater condition occurs when surface water percolates into the shallow subsurface and collects on relatively impermeable materials. In this case, the topsoil, fill, weathered Vashon lodgment till, and weathered Vashon

advance outwash materials are low permeability, while the unweathered Vashon lodgment till is essentially impermeable. We would anticipate the perched groundwater condition to develop during the wet, winter months. Groundwater conditions at the Site will vary with fluctuations in precipitation, Site usage (such as irrigation), and off-Site land use.

Table 2. Depths to Groundwater

Exploration Number	Depth to Groundwater (feet bgs)	Geologic Unit Groundwater
ATP-02	5	Perched on Vashon lodgment till
ATP-12	3	Perched on Vashon lodgment till
ATP-13	6	Perched on Vashon lodgment till
ATP-14	3	Perched on Vashon lodgment till
ATP-15	13	Perched within fill
ATP-16	2	Perched within gravelly layer in Vashon advance outwash
ATP-17	6	Perched within gravelly layer in Vashon advance outwash
ATP-18	4	Perched on Vashon advance outwash
ATP-19	4.5	Perched on unweathered Vashon advance outwash
ATP-21	4	Perched within fill

Notes: NE – not encountered.

Monitoring wells were installed in borings AMW-01 and AMW-02. On December 3 and December 16, 2019, August 10, 2020, and November 16, 2021 monitoring well AMW-01 was dry. On January 20, 2023, groundwater was measured at Elevation 392.5 feet (22.5 feet below top of casing [btc]). Monitoring well AMW-02 was dry on December 3 and December 16, 2019, however, groundwater was measured at Elevation 402.85 feet (20.95 feet btc), 405.1 feet (18.7 feet btc), and 413 feet (10.8 feet btc) on August 10, 2020, November 16, 2021, and January 20, 2023, respectively. A pressure transducer was installed in both wells to record groundwater levels and the data is presented as a hydrograph showing groundwater elevations on Figure 4 below.

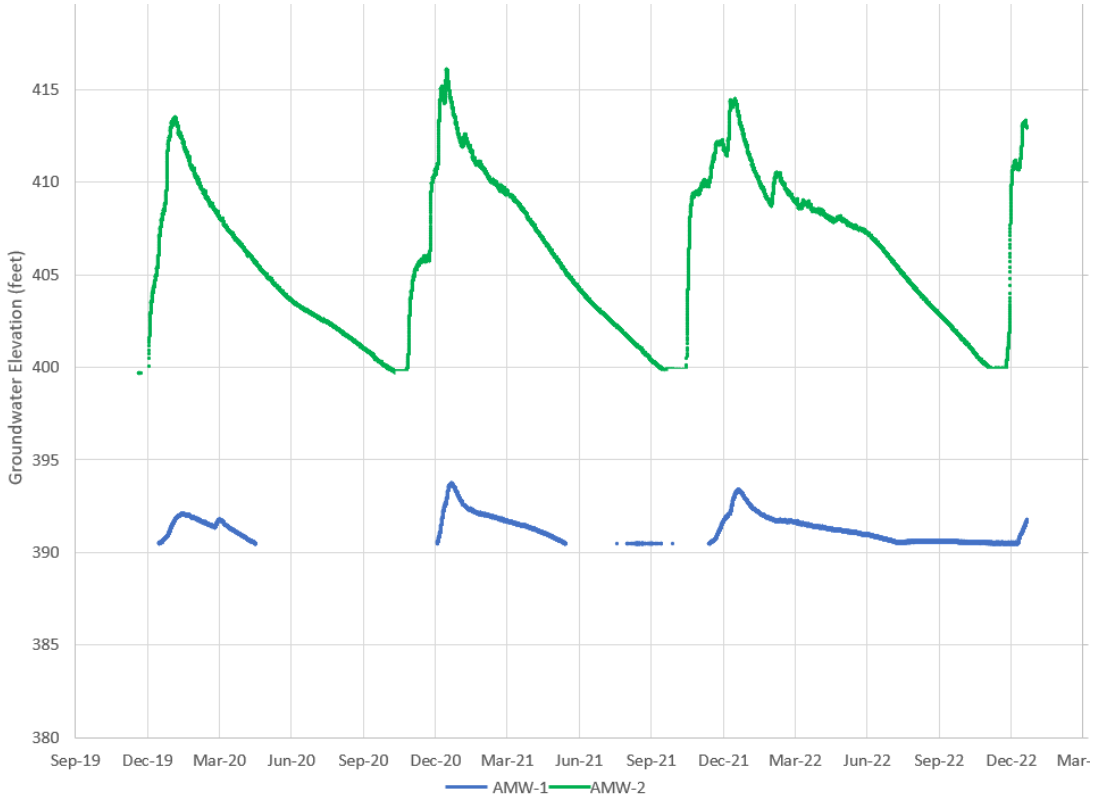

Figure 4. *Hydrograph of Transducer Data*

3.5 Laboratory Results

Laboratory tests were conducted on select samples to characterize engineering and index properties of the Site soils. Sixteen grain-size distributions with natural moisture contents were completed. 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. Select results are also presented on the boring logs presented in Appendix A.

4 Geologic Hazards

The following sections describe the geologic hazards at and near the Site and associated considerations for seismic design, erosion hazards, and slope stability.

4.1 Seismic Considerations

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 lies about 2.4 miles north 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 area 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.

4.1.1 Ground Response

Seismic design of the buildings will be in accordance with the 2018 International Building Code (IBC) which references the American Society of Civil Engineers (ASCE) Standard ASCE/SEI 7-16, *Minimum Design Loads for Buildings and Other Structures* (ASCE, 2018) for seismic design. 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 the average N-value from our explorations, we conclude the Site soil profile can be classified as Site Class C (very dense soil and soft rock).

The design spectral response acceleration parameters adjusted for Site Class C in accordance with the 2018 IBC and ASCE/SEI 7-16 are presented in Table 3 below.

Table 3. Seismic Design Parameters

Design Parameter	Recommended Value
Site Class	C
Peak Ground Acceleration (PGA)	0.170g[1,2]
Short Period Spectral Acceleration (S_s)	1.481g
1-Second Period Spectral Acceleration (S_1)	0.527g
Site Coefficient (F_a)	1.200
Site Coefficient (F_v)	1.300
Design Short Period Spectral Acceleration (S_{DS})	1.185g
Design 1-Second Period Spectral Acceleration (S_{D1})	0.517g

Notes:
1. PGA per section 19.700.725-E(2) of the County Critical Areas Ordinance
2. g = gravitational force
3. Based on the latitude and longitude of the Site: 47.64467°N, 122.72121°W, World Geodetic System 1984 (WGS84)
4. The risk category used was II, residential use
5. Based on the American Society of Civil Engineers (ASCE) hazard tool (ASCE, 2018)

4.2 Surficial Ground Rupture

A trace of an east-west trending thrust fault zone (Seattle fault zone) projects near the Site, with the nearest known active fault trace (an unnamed fault) located approximately 2.4 miles south of the Site (USGS, 2010). Recent Light Detection and Ranging (LiDAR) did not indicate the potential for a fault on the Site (DNR, 2018). Accounting for the suspected long recurrence interval (greater than 1,000 years) and the offset of the Site from the known preferred rupture surface, the potential for surficial ground rupture at the Site is considered low during the expected life of the structures.

4.3 Liquefaction

Liquefaction occurs when loose, saturated, and relatively cohesionless soil deposits temporarily lose strength from seismic 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.

Liquefaction maps for the area indicate that the Site has low susceptibility to liquefaction (DNR, 2004). Given the relative density, grain size distribution, depth to groundwater, and geologic origin of the soils at the Site, soil liquefaction is not a design consideration for this Site and Project.

4.4 Erosion Hazard

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 relatively low and can be addressed through standard temporary erosion and sedimentation control (TESC) best management practices (BMPs) during construction. TESC measures should be used in accordance with the local BMPs. Specific TESC measures may include appropriately placed silt fencing, straw wattles, rock check dams, and plastic covering of exposed slope cuts and soil stockpiles. Outside of the proposed construction areas, the existing vegetation should be retained.

Permanent erosion control within the areas of construction should be achieved through pavement surfacing or the reestablishment of vegetation.

Areas on/near the Site slopes exposed to construction activities should be aggressively revegetated. Depending on the weather patterns, slope inclination, and degree of disturbance, the placement of an erosion-control blanket to provide temporary ground cover while vegetation takes root, or the use of live-staking, may be required to ensure successful establishment of new vegetation.

Irrigation should be installed to allow for ease of inspection and with easily accessible shut-off valves for winterizing. At no time should uncontrolled runoff or surface water be allowed to flow across the Site.

4.5 Landslide Hazard

No landslides were inventoried or mapped at the Site or within 1,000 feet of the Site (McKenna et al., 2008; and Polenz et al., 2013). Review of LiDAR images did not reveal evidence of landslide headscarps at or near the Site (DNR, 2018). The images do show that grading of the surface has occurred.

Aerial images of the Site and surrounding area were reviewed for the years 1951 through 2019 (NETR, 2017; Kitsap County, 2017; and Google, 2019). The photographs indicated that sand and gravel mining/quarry operations began between 1951 and 1969 and are ongoing.

5 Conclusions and Recommendations

Project plans include the construction of new structures, permanent cut and fill walls, buried utilities, stormwater ponds, roadways, and Site grading. The native Vashon lodgment till and advance outwash encountered at the Site are suitable bearing soils for the planned structures, retaining walls, and pavements. Recommendations for building foundations, slabs, retaining walls, temporary and permanent excavations and building drainage, are provided in Sections 5.1 through 5.5.

Native Vashon lodgment till, which underlies the planned stormwater pond on the east side of the Site (Koch Pond), is infeasible for large-scale stormwater infiltration due its high relative density and high fines content. For the two additional proposed stormwater ponds planned, one at the northwest corner of the Site (Strawberry North Pond) and one to the west (Strawberry Pond), seasonal perched groundwater exists at or above pond bottom elevation, rending these locations also infeasible for stormwater infiltration. A geomembrane liner is planned for the Strawberry Pond and the Strawberry North Pond due to the location over a critical aquifer. Detailed discussions and recommendations regarding stormwater management are provided in Section 5.6.

The planned new access roadway will involve significant fills and cuts. Our test pits along the access roadway revealed a substantial thickness of existing undocumented fill, exceeding 18 feet thick at some locations. Building a new roadway over the existing fill is accompanied by a higher potential for post-construction settlement. More detailed discussions regarding the proposed access roadway, and site-wide pavement design and construction recommendations, are provided in Section 5.7

5.1 Foundations

Spread footings and/or thickened edge slabs-on-grade are suitable foundations for the proposed buildings. Bearing surfaces for the footings should be prepared as described below. The bearing pressures provided below are for both dead and live loads, an increase in the allowable bearing pressures of one-third may be used for short-term wind or seismic loading. Perimeter footings or thickened slab edges should be buried at least 18 inches into the surrounding soil for frost protection; interior footings require only 12 inches burial below adjacent finished grade. No footing should be founded in or above yielding/loose or organic soils.

5.1.1 Attendant Building and Refuse Shed

In the area of the new attendant building, planned grades are estimated about 6 feet below existing grades. At this grade, test pit ATP-06 encountered very dense, Vashon lodgment till.

The new refuse shed, north of the existing refuse sheds, will be cut into the existing grades with a concrete retaining wall to support the cut and the shed. Boring AB-01 encountered about 10 feet of fill overlying Vashon lodgment till. The estimated height of the retaining wall is 8 feet meaning that the retaining wall footing would be about 10 feet below the existing grade, matching the depth of the Vashon lodgment till.

For spread footings and retaining wall footings bearing directly on Vashon lodgment till, such as the new attendant building and the new refuse shed, respectively, we recommend an allowable foundation bearing pressure of 3,000 pounds per square foot (psf) be utilized for design purposes.

5.1.2 Operator Warming Station and Limited HHW Building

The new operator warming station, east of the northern existing refuse shed, is planned at about the existing grade, indicating that the foundation will be about 18 inches below the existing ground surface. Boring AB-02 encountered about 7.5 feet of fill overlying very dense Vashon lodgment till. The fill material consisted of loose, silty sand with gravel. The operator warming station will be a small, lightly loaded, one-story, wood-framed shelter.

A new enclosure for the limited HHW area is planned along the west side of the Project area. The enclosure will be a three-sided, open-front, covered building. Planned grades will closely match the existing grades. Test pit ATP-02 encountered about 7.5 feet of fill overlying very dense Vashon lodgment till. The fill material consisted of medium dense, silty sand with gravel and cobbles.

Both the new operator warming station and new limited HHW building would be constructed over existing loose to medium dense sand and gravel fill. For these structures, we recommend excavating the existing fill down to a depth of at least 4 feet, compacting the exposed fill at that depth, and then backfilling with structural fill up to the planned foundation elevation. Aspect should evaluate the base of the excavation prior to placement of the structural fill. If soft clay-rich or organic-rich material is exposed at the minus 4-foot subgrade level, additional sub-excavation should be done under observation and guidance of the Aspect representative.

Aspect should also evaluate whether the removed fill is suitable for reuse as structural fill. The structural fill should extend out at a 1H:1V (Horizontal:Vertical) plane from the base of the planned footing subgrade or otherwise be overbuilt (horizontally) beyond the edge of the planned footing equal to D/2 where D is the depth of the structural fill below the planned footing subgrade.

For the operator and warming station buildings, bearing on at least 2½ feet of properly compacted structural fill over variable existing fill, the building foundations should be designed using an allowable foundation bearing pressure of 2,500 psf.

5.1.3 Settlement

We estimate the total settlement of the foundation designed in accordance with our recommendations will be less than 1 inch. Differential settlements can be expected to be less than half the total settlement. The majority of these settlements will occur during construction as the loads are applied.

5.2 Slab-on-Grade

Concrete slab-on-grade floors may be used in buildings, and is also planned for the white goods area near the limited HHW area along the west side of the Project area. Slabs should be supported over a drainage layer placed directly on the native, Vashon lodgment

till or structural fill prepared as described in the Foundation section (above Section 5.1) of this report.

To provide uniform support for the floor slab, we recommend the floor slab be underlain by a compacted sand and gravel base, which will also serve as capillary break. This capillary break should consist of a minimum of 6 inches of free-draining, crushed rock or well-graded sand and gravel compacted to at least 95 percent maximum dry density (MDD; ASTM D1557; ASTM, 2018). It should have a maximum particle size of 0.75 inches, with no more than 80 percent passing the No. 4 sieve and less than 5 percent fines (material passing the U.S. Standard No. 200 sieve).

For enclosed buildings that may be heated/air-conditioned and where moisture wicking up through the slab would be detrimental to floor coverings or equipment, a 10-mil polyethylene vapor barrier should be placed directly over the capillary break. If used, the vapor barrier should be installed in accordance with manufacturer's recommendations.

Slab-on-grade floors prepared as described above and designed as beam on elastic foundation can utilize a modulus of subgrade reaction of 150 pounds per cubic inch (pci).

5.3 Retaining Walls

Based on our project understanding, an 8-foot-tall foundation wall will be used for the new refuse shed and a 4-foot-tall retaining wall will be used for the new recycle area.

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 pounds per cubic foot (pcf). Nonyielding or restrained walls should be designed for an equivalent fluid weight of 55 pcf. A level backslope and adequate drainage is assumed for the recommended earth pressure values. If either wall will have an inclined backslope, the design equivalent fluid pressure should be increased by an additional 1 pound per cubic foot for each degree of inclination. For example, a non-yielding wall with a 2H:1V (26.5 degree) inclined backslope, should be designed for an equivalent fluid pressure of 81.5 pounds per cubic foot.

Adequate drainage should consist of a subsurface drain combined with a free-draining wall backfill material that meets the gradation requirements described in Section 9-03.12(2) of the Standard Specifications for Gravel Backfill for Walls (WSDOT, 2021). Refer to the following section, *Drainage Considerations*, for detailed subsurface drain recommendations.

Earthquake shaking will subject 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 8H (where H is the height of the wall) represented by a uniform rectangular pressure along the height of the wall.

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

Wind, earthquakes, and unbalanced earth loads will subject the proposed structures to lateral forces. Lateral forces will be resisted by passive and frictional resistance of below-grade portions of foundation elements.

We recommend using an ultimate passive equivalent fluid density of 450 pcf and an ultimate base friction coefficient of 0.67. We recommend applying a factor of safety of at least 1.5 for determining allowable values for passive pressure and base friction coefficient for design (i.e., allowable passive pressure of 300 pcf and allowable base friction value of 0.45). Passive resistance within the top 2 feet should be neglected unless the ground surface is protected by a concrete slab or pavement.

5.4 Temporary and Permanent Slopes

Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the Contractor. All temporary cuts in excess of four 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 (WAC, 2009), as shown in Table 4 below.

Table 4. Temporary Excavation Cut Slope

Soil Unit	OSHA Soil Classification	Maximum Temporary Slope	Maximum Height (ft)
Fill/Topsoil	C	1.5H:1V	20
Weathered Vashon Lodgment Till	B	1H:1V	20
Weathered Vashon Advance Outwash	B	1H:1V	20
Vashon Lodgment Till	A	0.75H:V	20
Vashon Advance Outwash	A	0.75H:V	20

The estimated maximum cut slope inclinations are provided for planning purposes only and are applicable to excavations without groundwater seepage, or runoff, and assume dewatered conditions. Flatter slopes will likely be necessary in areas where groundwater seepage exists, or where construction equipment surcharges are placed in close proximity to the crest of the excavation.

With time and the presence of seepage and/or precipitation, the stability of temporary unsupported cut slopes can be significantly reduced. Therefore, all temporary slopes should be protected from erosion by installing a surface water diversion ditch or berm at the top of the slope. In addition, 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 temporary slopes. In such an event, lateral support for the temporary slopes should be provided by the Contractor to prevent loss of ground support.

Permanent cut and fill slopes up to 22 feet in height are planned along the access roadway on the western portion of the Site. The permanent slopes for the Project should be no steeper than 2H:1V.

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

5.5 Drainage Considerations

The outside edge of all perimeter footings and embedded walls should be provided with a drainage system consisting of a 4-inch-diameter, perforated, rigid pipe embedded in free-draining gravel meeting the requirements of Section 9-03.12(4) of the Standard Specifications for Gravel Backfill for Drains (WSDOT, 2021). The footing and wall drains should be a minimum of 1 foot thick, and a layer of low permeability soils should be used over the upper foot of the drain section to reduce potential for surface water to enter the drain curtain. Prefabricated drain mats combined with relatively free-draining backfill may be used as an alternative to washed-rock footings and wall drains.

Final grades around the proposed structures should be sloped such that surface water drains away from the structures. Downspouts and roof drains should not be connected to the foundation drains in order to reduce the potential for flooding foundation drains and clogging. The footing drains should include cleanouts to allow for periodic maintenance and inspection.

5.6 Stormwater Infiltration

The Project's current layout includes a total of three stormwater ponds: one on the west side of the Project area (Strawberry Pond), one at the northwest end of the Project area (Strawberry North Pond) and one on the east side (Koch Pond).

The bottom of south cell (detention pond) of the Strawberry Pond is planned at Elevation 405.67 feet while the north cell (treatment wetland) is planned at Elevation 398 feet. Test pits ATP-16, ATP-17, and ATP-18 encountered Vashon advance outwash at the planned bottom of the pond. Perched groundwater within the advance outwash was encountered at Elevations 393, 398, and 404 feet.

The bottom of Strawberry North Pond is planned at Elevation 404.21 feet. Two test pits, ATP-03 and ATP-04, around the pond area encountered Vashon advance outwash at the planned bottom of the pond, while test pit ATP-05, and the two borings AMW-01 and AB-02, encountered Vashon lodgment till at the planned bottom of the pond. Groundwater was measured just below Elevation 395 feet with the pressure transducer in AMW-01.

The bottom of south cell (detention pond) of the Koch Pond is planned at Elevation 392 feet while the north cell (treatment wetland) is planned at Elevation 390.5 feet. The test pits, ATP-09, ATP-11, ATP-12, and ATP-13, encountered Vashon lodgment till at the planned bottom of the pond. No groundwater was encountered.

Stormwater infiltration facilities are designed to collect stormwater runoff and convey it into unsaturated and pervious receptor soils where it can infiltrate and disperse. This requires permeable soil, absence of shallow groundwater, absence of shallow perching

stratum or restrictive layer, and an absence of nearby facilities that may be sensitive to increases in groundwater level, or discharge of groundwater to surface sources. As a result, minimum vertical separations between infiltration facilities and surrounding groundwater and hydraulically restrictive material are specified in the County's Stormwater Design Manual (County, 2016).

Vashon lodgment till is present at the planned bottom of Koch Pond and a portion of the North Strawberry Pond. This material is glacially consolidated and has a high fines content (15 to 42 percent silt and clay). We consider the Vashon lodgment till to be infeasible for stormwater infiltration.

Our explorations reveal Vashon advance outwash at the planned bottom of Strawberry Pond. In general, advance outwash tends to be less cemented and more pervious than lodgment till, but exceptions are common. At this location, the seasonal presence of perched groundwater at or above the proposed pond bottom level, renders the area infeasible for stormwater infiltration. Therefore, a geomembrane liner is planned at the Strawberry Pond and the North Strawberry Pond.

Stormwater management could be accomplished using Low Impact Development (LID) methods combined with conventional methods, including dispersion and catch basins and storm lines that discharge into an appropriate system. LID methods, such as small raingardens, bioswales, and permeable pavement, might be feasible provided the systems are designed with the appropriate separation to the hydraulically restrictive layer (lodgment till or advance outwash) and incorporate underdrains and/or overflow redundancy to account for the low permeability and low-infiltration capacity of the Site soils.

The fill encountered at the Site has the potential for infiltration using these LID methods. At the time this report was issued, final stormwater plans had not been determined, therefore, we are available to provide geotechnical engineering evaluation and support for testing and/or design of the stormwater conveyance system.

5.7 Pavement Design Considerations

Flexible (asphalt) and rigid (concrete) pavements are feasible for the Project.

Significant cuts and fill are planned along the entrance roadway alignment. Near the entrance off Dickey Road NW, about 10 feet of fill is planned, and increasing up to 32 feet and then thinning down to near existing grade. Around the last corner into the facility, a cut up to 10 feet deep is planned.

Significant fills greater than 18 feet thick (the maximum reach of the trackhoe), were encountered in our test pits in the new access road area. The fill encountered is mostly free of organics and deleterious material, it is in a medium dense condition.

It is our opinion that the majority of the existing fill in the vicinity of the planned access roadway pavement area is suitable for supporting the pavements and can appropriately provide adequate support to the roadway. However, it is possible that certain areas or portions of the existing fill that were not exposed in our test pits contain significant amounts of organics or other deleterious materials and are prone to settlement. Building a

new roadway over existing fill carries an increased risk of future settlement. Future maintenance of the completed roadway surface should be expected.

For new pavements constructed at or near existing grade, subgrade preparation should include removal of any organics and deleterious debris. If soft deposits or zones of loose fill are exposed at the pavement subgrade elevation during construction and are not suitable for supporting new pavement sections, the materials should be removed and replaced with structural fill.

Long-term storage/parking of heavy trucks over asphalt pavement will result in rutting of the pavement due to asphalt creep. Rigid (concrete) pavement sections will provide greater resistance to rutting over time and improved reliability and serviceability and should be considered in parking/storage areas for heavy vehicles and containers.

5.7.1 Pavement Design

In light-duty passenger vehicle driveway and parking areas, a pavement section consisting of at least 3 inches of hot mix asphalt (HMA) over 6 inches of Crushed Surfacing Base Course (CSBC) is recommended. However, along access drives or in the areas of heavy haul truck parking, we recommend a minimum pavement section of 5 inches of HMA over 10 inches of CSBC. We recommend CSBC for the pavement base course, and Crushed Surfacing Top Course (CSTC) may be used over the CSBC for the upper 2 to 3 inches of the base course section. CSBC and CSTC, as specified in Section 9-03.9(3) of the Standard Specifications, should be used as course for pavements (WSDOT, 2021).

Where concrete pavement is planned, such as for heavy truck driveway and long-term parking/storage areas, we recommend the rigid concrete pavement section consist of 8 inches of concrete over 8 inches of CSBC. The concrete should have a minimum 28-day compressive strength of 4,000 pounds per square inch (psi).

6 Earthwork and Construction Recommendations

Based on the explorations performed and our understanding of the Project, it is our opinion that the Contractor should be able to complete planned excavations, cuts, and fills with standard construction equipment. However, while not directly observed in our subsurface explorations, the presence of potential obstructions, such as small boulders or other large debris, in any of the materials encountered should be anticipated.

Significant cuts up to 10 feet and significant fills up to 32 feet are planned for the access roadway. The Contractor must use care when preparing subgrades and placing the fill material. Recommendations for these activities has been provided in future sections.

The soils encountered contain a significant percentage of fines (particles passing the U.S. Standard No. 200 sieve), making them moisture sensitive and subject to disturbance when wet. We recommend planning the earthwork portions of the Project during the drier summer months. From a geotechnical standpoint, some of the existing fill materials and Vashon lodgment till appear suitable for reuse as structural fill on the Project provided the materials are screened to ensure they are relatively free of organics and other deleterious debris and can be moisture-conditioned for compaction.

6.1 Wet Weather Earthwork

The soils encountered during explorations at the Site contain a high percentage of fines (silty and clay, soil particles passing the No. 200 sieve) and are typically moisture sensitive and will be difficult to handle, prepare, or compact with construction equipment during periods of wet weather. 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 difficult to control, we provide the following recommendations:

- Earthwork should be performed in small areas to minimize exposure to wet weather. Excavation or the removal of unsuitable soils should be followed promptly by the placement and compaction of clean structural fill. The size and type of construction equipment used may have to be limited to prevent soil disturbance.
- If bearing surfaces are open during the winter season or periods of wet weather, it may be helpful to provide a layer of crushed rock or gravel to help preserve the subgrade. If gravel is used to protect the bearing surfaces, it should meet the gradation requirements for Class A Gravel Backfill for Foundations, as described in Section 9-03.12(1)A of the Standard Specifications (WSDOT, 2021).
- The ground surface within the construction area should be sealed by a smooth drum vibratory roller (or equivalent) and under no circumstances should be left uncompacted and exposed to moisture. Soils which become too wet for compaction should be removed and replaced with clean granular materials.
- Local BMPs for erosion protection should be strictly followed.

6.2 Site Preparation

Site preparation within the proposed construction footprint should include removal of topsoil containing roots, organics, debris, and any other deleterious materials. The suitable bearing soils should consist of undisturbed, medium dense or better Vashon lodgment till or Vashon advance outwash. The Contractor must use care during Site preparation and excavation operations so that any bearing surfaces are not disturbed.

If disturbance does occur, the disturbed material should be removed to expose undisturbed material or be compacted in place to acceptable criteria as determined by Aspect. Overexcavated soils in footing subgrade areas should be replaced with compacted CSBC specified in Section 9-03.9(3) of the Standard Specifications (WSDOT, 2021) and placed as structural fill.

All bearing surfaces should be trimmed neat and the bottom of the excavation should be carefully prepared. All loose or softened soil should be removed or compacted in place prior to placing reinforcing steel bars, concrete, structural fill, or capillary break materials. We recommend that all bearing surfaces be observed by Aspect prior to placing steel and concrete to verify the recommendations in this report have been followed.

If bearing surfaces are open during the winter season or periods of wet weather, it may be helpful to provide a layer of crushed rock or gravel to help preserve the subgrade. If gravel is used to protect the bearing surfaces, it should meet the gradation requirements for Class A Gravel Backfill for Foundations, as described in Section 9-03.12(1)A of the Standard Specifications (WSDOT, 2021).

6.3 Structural Fill

Structural fill is anticipated to be required for the minor grade adjustments, foundation support, thick pavement support, and for utility trench backfill. Some of the existing fill materials and native soils appear suitable for reuse as structural fill provided the materials are screened to ensure they are relatively free of organics and other deleterious debris and can be moisture-conditioned for compaction. For these applications, we provide the following recommendations:

- Excavation and placement of fill should be observed by Aspect to verify that all unsuitable materials are removed, and suitable compaction is achieved.
- Imported structural fill should consist of relatively freely draining, uniformly graded sand and gravel. We recommend Gravel Borrow, as specified in Section 9-03.14(1) of the Standard Specifications (WSDOT, 2021), be specified for imported structural fill.
- CSBC as specified in Section 9-03.9(3) of the Standard Specifications (WSDOT, 2021) should be underneath new pavement.
- Structural fill should be at or within 3 percent of optimum moisture content at the time of placement and should be compacted to at least 95 percent of the MDD (as determined by test method ASTM D 1557). Density testing should be completed for the fill materials placed in the access roadway and testing frequency should be

discussed with Aspect. Density testing results should be provided to Aspect for review.

- Over-compaction of the backfill behind retaining walls should be avoided. In this regard, we recommend compacting the backfill to about 90 percent of the MDD (as determined by test method ASTM D1557). 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.
- The moisture content of the structural fill should be controlled to within 3 percent of the optimum moisture. Optimum moisture is the moisture content corresponding to the MDD (as determined by test method ASTM D 1557).
- Non-structural fill areas (e.g., general grading, landscape, or common areas not beneath or around structures, utilities, slabs-on-grade, or below paved areas) that can accommodate some settlement may be placed and compacted to a relatively firm and unyielding condition.

6.3.1 Compaction Considerations

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. Structural fill should be placed and compacted in lifts with a loose thickness no greater than 12 inches when using relatively large compaction equipment, such as a vibrating plate attached to an excavator (hoe pack) or drum roller. If small, hand-operated compaction equipment is used to compact structural fill, lifts should not exceed 6 inches in loose thickness.

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 by Aspect at the time of final design, when more details of the Project grading and backfilling plans are available.

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.

6.4 Utility Construction Considerations

6.4.1 Pipe Support and Bedding

The fill encountered in our completed subsurface explorations is generally expected to provide suitable foundation support for the utilities, provided it is free of organics/deleterious debris and is not disturbed during construction, and appropriate provisions for bedding and backfilling are included. Disturbance of trench bottoms can be minimized by excavating with a smooth-bladed bucket wherever possible and limiting foot traffic on the trench bottoms. If very soft, organic rich, or otherwise unsuitable soils

are encountered at the invert level of utilities, we recommend that they be removed and replaced with bedding materials or a geosynthetic fabric may be used to maintain separation between the bedding and poor subgrade soil. The fill could contain oversized particles that if encountered, should be removed from the utility subgrade and replaced with bedding materials.

We recommend that pipe bedding meet the requirements of Section 7-08.3(1)C of the Standard Specifications (WSDOT, 2021). Specific recommendations relative to the bedding of the proposed underground pipelines include:

- Bedding for the proposed pipes should meet the gradation requirements for Gravel Backfill for Pipe Zone Bedding, Section 9-03.12(3) of the Standard Specifications (WSDOT, 2021).
- Prior to installation of the pipe, the bedding material should be shaped to fit the lower portion of the pipe exterior with reasonable closeness to provide continuous support along the pipe.
- Backfill around the pipe should be placed in layers and tamped around the pipe to obtain complete contact. Pipe zone bedding material should extend at least 6 inches above the crown of the pipe, for the full width of the trench. In areas where a trench box is used, the bedding material should be placed before the trench box is advanced.
- Where a trench box is used and restraint of the installed pipe appears to be in question, we recommend that pipe restraint in the form of a cable and winch system be used inside the pipe so that the joints of previously laid pipe are not pulled apart as the trench box is advanced.

6.4.2 Trench Backfill and Compaction Criteria

For general structural fill and compaction considerations, refer to Section 6.3 of this report. The following criteria for trench backfill and compaction is provided.

Trench backfill should follow the requirements of Section 7-08.3(3) of the Standard Specifications (WSDOT, 2021). During placement of the initial lifts, the trench backfill material should not be bulldozed into the trench or dropped directly on the pipe. Furthermore, heavy vibratory equipment should not be permitted to operate over the pipe until at least 2 feet of backfill has been placed. The trench backfill should be placed in 8- to 12-inch, loose lifts and compacted using mechanical equipment.

Trench backfill more than 2 feet below the finish grades should be compacted to at least 90 percent of the MDD (ASTM D1557). Within the proposed building pads or extents of the access roadways, the upper 2 feet of the backfill should be compacted to at least 95 percent MDD to provide an adequate subgrade for the future buildings and pavement sections.

6.5 Pavement Construction Considerations

The native Vashon lodgment till, Vashon advance outwash, and the fill, if properly compacted, will provide suitable support for new pavement sections provided that any zones of concentrated organics and deleterious debris are removed from the pavement subgrade. If zones of loose fill are exposed at the pavement subgrade elevation during construction and are not suitable for supporting new pavement sections, the materials should be removed and replaced with structural fill.

It is our opinion that the majority of the fill in the vicinity of the planned pavement area is suitable for supporting the pavements or can be compacted in-place to create a suitable surface.

All pavement subgrades should be carefully prepared. Prior to placing base course and pavement, all standard pavement subgrades should be inspected by Aspect and proof-rolled with a fully loaded 10-cubic-yard dump truck or equivalent. Aspect should observe and evaluate the proof rolling operation. Any soft areas detected by the proof-rolling or other methods should be compacted in-place or over-excavated to firm ground and backfilled with compacted structural fill to the design subgrade elevation. To provide for quality construction practices and materials, we recommend all pavement work and mix-design considerations conform to WSDOT standards.

The recommended pavement section is not intended to support extensive construction traffic, such as dump trucks and concrete Redi-mix trucks. Pavements subject to heavy construction traffic may be damaged and require repair.

Drainage is an essential aspect of pavement performance. We recommend providing all paved areas with positive drainage to remove surface water and water within the base course. This will be particularly important in cut sections or at low points within the paved areas, such as at catch basins.

7 Recommendations for Continuing Geotechnical Services

Throughout this report, we have provided recommendations where we consider it would be appropriate for Aspect to provide additional geotechnical input to the design and construction process. Additional recommendations are summarized in this section.

7.1 Additional Design and Consultation Services

Before construction begins, we recommend that Aspect:

- Continue to meet with the design team as needed to address geotechnical questions that may arise throughout the remainder of the design process.
- Review the geotechnical elements of the Project plans and specifications to see that the geotechnical engineering recommendations are properly interpreted.

7.2 Additional Construction Services

We are contracted to provide geotechnical engineering and monitoring services during construction. The integrity of the geotechnical elements 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.

During the construction phase of the Project, Aspect should perform the following tasks:

- Review applicable submittals
- Observe and evaluate subgrade and structural fill placement for all footings and slabs-on-grade
- Evaluate pavement subgrade prior to placement of base coarse
- Attend meetings, as needed
- Address other geotechnical engineering considerations that may arise during construction

The purpose of our observations is to verify compliance with design concepts and recommendations, and to allow design changes or evaluation of appropriate construction methods should subsurface conditions differ from those anticipated prior to the start of construction.

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Washington State Legislature, 2009, Washington Administrative Code (WAC). April 1, 2009.

Limitations

Work for this project was performed for Parametrix, Inc. (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, LLC (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.

Risks are inherent with any site involving slopes and no recommendations, geologic analysis, or engineering design can assure slope stability. Our observations, findings, and opinions are a means to identify and reduce the inherent risks to the Client.

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.

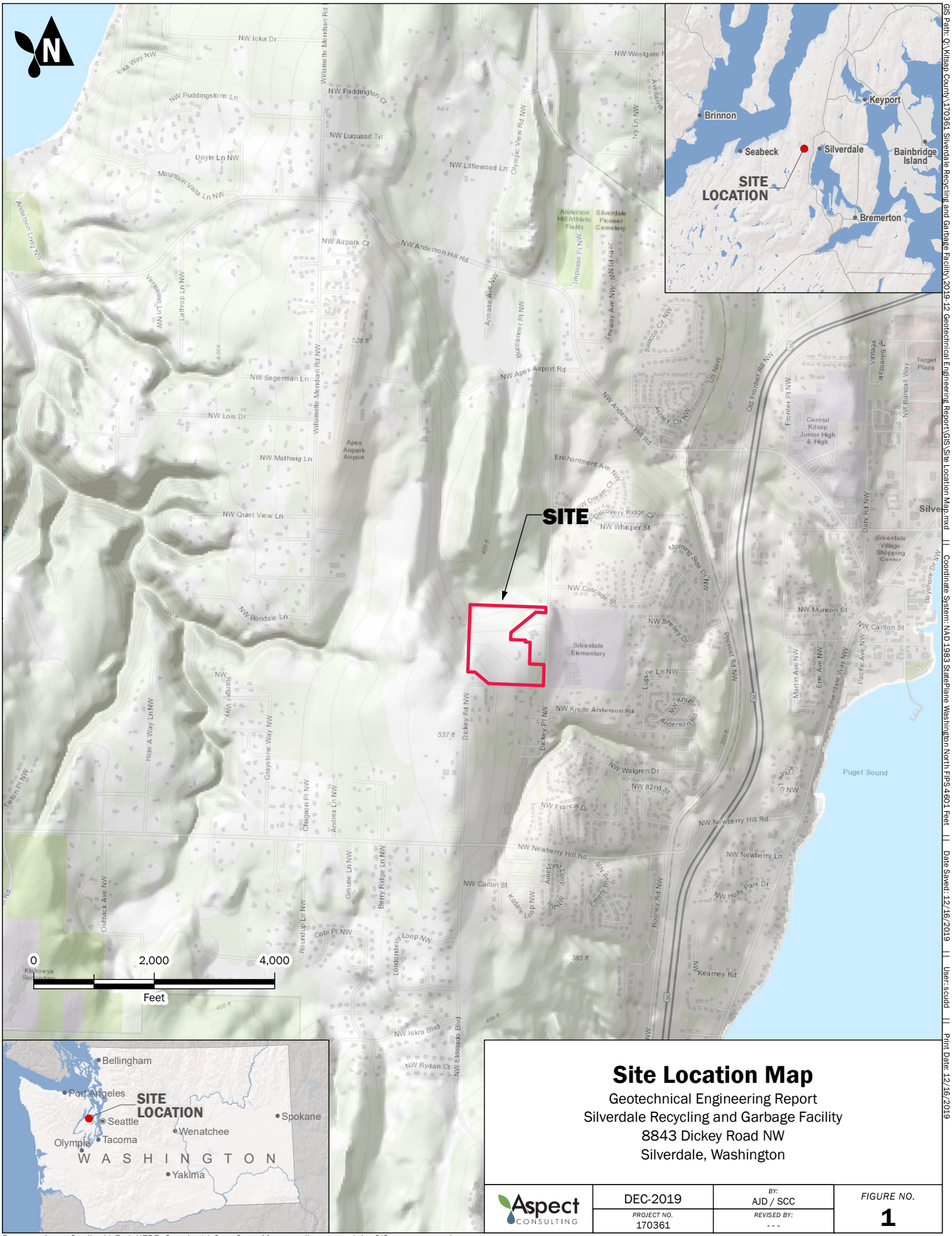
The scope of work does not include services related to construction safety precautions. Site safety is typically the Responsibility of the Contractor, and our recommendations are not intended to direct the contractor’s site safety methods, techniques, sequences, or procedures. The scope of our work also 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, Senior Engineering Geologist, at 206-780-7717.

FIGURES



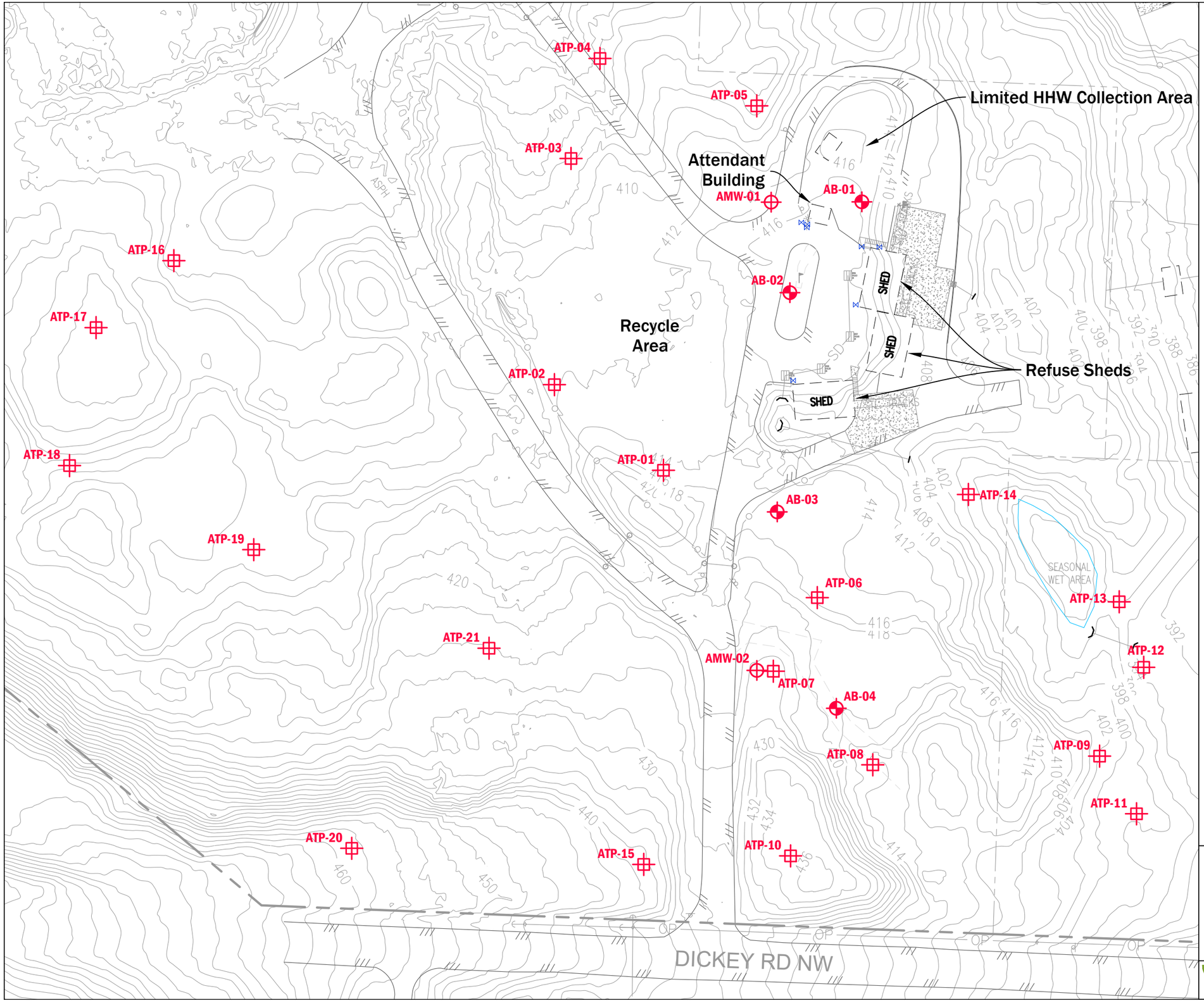
Site Location Map

Geotechnical Engineering Report
Silverdale Recycling and Garbage Facility
8843 Dickey Road NW
Silverdale, Washington

Aspect CONSULTING	DEC-2019	BY: AJD / SCC	FIGURE NO. 1
	PROJECT NO. 170361	REVISED BY: ---	

Basemap Layer Credits || Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

GIS Path: Q:\Kitsap County\170361 Silverdale Recycling and Garbage Facility\2019-12 Geotechnical Engineering Report\GIS\Site Location Map.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 12/16/2019 || User: scudd || Print Date: 12/16/2019



Legend

- Boring Location
- Test Pit Location
- Monitoring Well Location

0 80 160 Feet

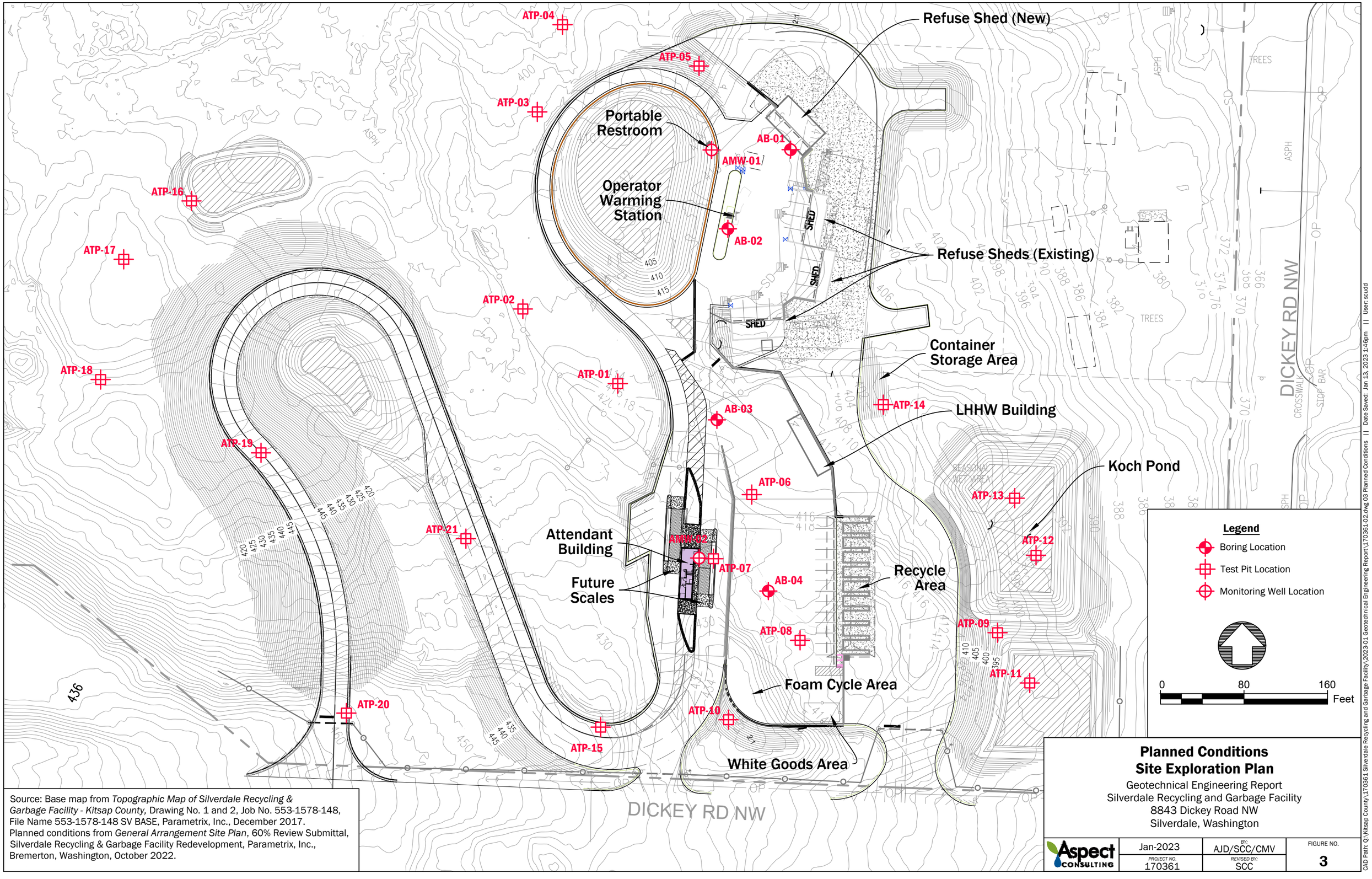
Source: Base file provided by Parametrix, Inc., *Topographic Map of Silverdale Recycling & Garbage Facility - Kitsap County,* Drawing No. 1 and 2, Job No. 553-1578-148, File Name 553-1578-148 SV BASE, December 2017.

Existing Conditions Site Exploration Plan

Geotechnical Engineering Report
Silverdale Recycling and Garbage Facility
8843 Dickey Road NW
Silverdale, Washington

Aspect Consulting	Jan-2022	BY: AJD/SCC/CMV	FIGURE NO. 2
	PROJECT NO. 170361	REVISED BY: -	

CAD Path: Q:\Kitsap County\170361 Silverdale Recycling and Garbage Facility\2019-12 Geotechnical Engineering Report\170361-02.dwg 02 Existing Conditions || Date Saved: Jan 06, 2022 9:51am || User: cvanslyke



Source: Base map from *Topographic Map of Silverdale Recycling & Garbage Facility - Kitsap County,* Drawing No. 1 and 2, Job No. 553-1578-148, File Name 553-1578-148 SV BASE, Parametrix, Inc., December 2017. Planned conditions from *General Arrangement Site Plan*, 60% Review Submittal, Silverdale Recycling & Garbage Facility Redevelopment, Parametrix, Inc., Bremerton, Washington, October 2022.

Planned Conditions Site Exploration Plan

Geotechnical Engineering Report
Silverdale Recycling and Garbage Facility
8843 Dickey Road NW
Silverdale, Washington

Aspect Consulting	Jan-2023	BY: AJD/SCC/CMV	FIGURE NO. 3
	PROJECT NO. 170361	REVISED BY: SCC	

CAD Path: Q:\Kitsap County\170361 Silverdale Recycling and Garbage Facility\2023-01 Geotechnical Engineering Report\170361-02.dwg 03 Planned Conditions || Date Saved: Jan 13, 2023 1:46pm || User: scudd

APPENDIX A

Exploration Logs

A. Exploration Methods

On October 23, 2019, Aspect observed ten test pits, ATP-01 through ATP-10, on October 30, 2019 Aspect observed six machine drilled borings, AB-01 through AB-04, AMW-01, and AMW-02, and on November 30, 2021 Aspect observed eleven test pits ATP-11 through ATP-21. An Aspect representative was present throughout the field exploration program to observe the explorations, assist in sampling, and to prepare descriptive logs of the exploration. Samples were obtained from select soil units to aid in the determination of engineering properties of the subsurface materials. The locations of explorations ATP-01 through ATP-10, AB-01 through AB-04, AMW-01, and AMW-02 are shown on Figure 2 and 3 and were collected in the field through survey. The locations of explorations ATP-11 through ATP-21 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 here in Appendix A. The depths indicated on the log where conditions changed may represent gradational variations between soil types. Soils were classified per the Unified Soil Classification System (USCS) in general accordance with ASTM D2488, *Standard Practice for Description and Identification of Soils (Visual and Manual Procedure)*. 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.

A.1. Borings

The borings were advanced by Holocene Drilling Inc. (Holocene), an experienced and licensed local driller, under subcontract to Aspect. Drilling was completed with a Diedrich D50, track-mounted drill rig advancing hollow-stem augers. The hollow-stem auger method consisted of advancing a continuous string of 5-foot-long open-flight augers and a conical hollow auger head with a 4.5-inch inner diameter and about a 7.5-inch outer diameter. A center plug is seated inside of the conical hollow auger head to ensure soil removal. The augers return soil cuttings to the surface between the annular space between the drill stem and the boring wall, leaving the hollow-stem free from soil.

Samples were obtained every 2.5 feet to 10 or 15 feet bgs and then every 5 feet to the depths explored using the Standard Penetration Test (SPT) in general accordance with ASTM International (ASTM) Method D1586 (ASTM, 2018). The SPT method involves driving a 2-inch-outside-diameter split-barrel sampler with a 140-pound hammer free-falling from a distance of 30 inches. The number of blows for each 6-inch interval is recorded, and the number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance (“N”) or blow count. The resistance, or N-value, provides a measure of the relative density of granular soils or the relative consistency of cohesive soils. If a total of 50 blows are recorded for a single 6-inch interval, the test is terminated, and the blow count is recorded as 50 blows for the total

inches of penetration. Samples were placed in labeled plastic jars and taken to a laboratory for further classification.

Upon completion, borings AB-01 through AB-04 were backfilled with 3/8-inch bentonite chips in accordance with requirements of the Washington State Department of Ecology.

Upon completion, the borings, AMW-01 and AMW-02 were completed as monitoring wells constructed with a 2-inch-diameter threaded Schedule 40, polyvinyl chloride (PVC), slotted screen and blank casing. Well screens were 0.010-inch (10 slot) slotted screen. An artificial filter pack consisting of 10/20 silica sand was placed below and around the well screen, then a minimum 3-foot-thick annular bentonite seal was placed above the filter pack. A concrete surface seal with a metal, flush-mount monument was installed at the ground surface to protect the well.

A.2. Test Pits

The test pits were excavated by High Meadows Excavating, an experienced and local excavation contractor, under subcontract to Aspect. Test pits were excavated using a Hitachi EX150 tracked excavator. The locations are shown on Figure 2 and 3.

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.

APPENDIX A

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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.

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

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed refuse shed footprint		*Coordinates (Lat,Lon WGS84)* 47.6447, -122.7212	*Exploration Number* **AB-01**
Contractor Holocene Drilling, Inc.	*Equipment* D50 Tracked Drill Rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface Elev. (NAVD88)* 417'	
Operator Kevin	*Exploration Method(s)* 7.5" O.D x 4.5" I.D. Hollow-Stem Auger	*Work Start/Completion Dates* 10/30/2019	*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)
		Hand excavated to 1.5 feet bgs.						TOPSOIL; approximately 3 inches thick.	
								FILL SILTY SAND WITH GRAVEL (SM); very dense, moist, gray with iron-oxide staining; fine to coarse sand; fine to coarse, subangular to subrounded gravel; trace small roots.	
	415	Backfilled with bentonite chips to 0.5 feet bgs, then capped with existing material.	S-1		21 31 21			Blow count overstated due to gravel content.	
5			S-2		10 20 20			Becomes dense, decrease in observed roots. Blow count overstated due to gravel content.	5
	410		S-3		12 25 32			Becomes very dense with subtrace organics. Blow count overstated due to gravel content. Areas of sandy silt (ML) with brown banding and areas of very moist silty sand (SM).	
10			S-4		24 50/6"			**VASHON LODGEMENT TILL** SILTY SAND (SM); very dense, moist, gray; fine to coarse sand; few fine, subangular to subrounded gravel.	10
	405								
15			S-5		13 31 41				15
	400								

Legend

Sample Type
- ◯ No Soil Sample Recovery
- ◪ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢⊣ Liquid Limit

Water Level
- No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: MvA

Exploration Log AB-01
Sheet 1 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed refuse shed footprint		*Coordinates (Lat,Lon WGS84)* 47.6447, -122.7212	*Exploration Number* **AB-01**
Contractor Holocene Drilling, Inc.	*Equipment* D50 Tracked Drill Rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface Elev. (NAVD88)* 417'	
Operator Kevin	*Exploration Method(s)* 7.5" O.D x 4.5" I.D. Hollow-Stem Auger	*Work Start/Completion Dates* 10/30/2019	*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)
			S-6		30 50/3"			**VASHON LODGEMENT TILL** SILTY SAND (SM); very dense, moist, gray; fine to coarse sand; few fine, subangular to subrounded gravel. (continued)	
	395								
25			S-7		50/5"				25
								Bottom of exploration at 25.5 ft. bgs.	
	390								
30									30
	385								
35									35
	380								

Legend

Sample Type
- ◯ No Soil Sample Recovery
- ◪ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢—⊣ Liquid Limit

Water Level
- No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: MvA

Exploration Log AB-01
Sheet 2 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed operator warming station footprint		*Coordinates (Lat,Lon WGS84)* 47.6445, -122.7214	*Exploration Number* **AB-02**
Contractor Holocene Drilling, Inc.	*Equipment* D50 Tracked Drill Rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface Elev. (NAVD88)* 417'	
Operator Kevin	*Exploration Method(s)* 7.5" O.D x 4.5" I.D. Hollow-Stem Auger	*Work Start/Completion Dates* 10/30/2019	*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)
0	415	Hand excavated to 1.5 feet bgs. Backfilled with bentonite chips to 0.5 feet bgs, then capped with existing material.	S-1	▲	2 3 2			TOPSOIL; approximately 3 inches thick. **FILL** SILTY SAND WITH GRAVEL (SM); loose, moist, gray with iron-oxide staining; fine to coarse sand; fine to coarse, subangular to subrounded gravel.	
5	410		S-2	▲	2 3 3			GRAVEL (GP); loose, dry, gray; clean coarse, subangular to rounded gravel.	5
			S-3	▲	13 34 33			**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL (SM); very dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel;.	
10	405		S-4	▲	23 24 26				10
			S-5	▲	23 26 50/5"			Poor recovery due to rock in sampler shoe.	
15	400		S-6	▲	12 27 31			Bottom of exploration at 16.5 ft. bgs.	15

Legend

Sample Type
- ◯ No Soil Sample Recovery
- ◪ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢⊣ Liquid Limit

Water Level
- No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: AJD

Exploration Log AB-02
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Silverdale RAGF - 170361

Geotechnical Exploration Log

Project Address & Site Specific Location	Coordinates (Lat,Lon WGS84)	Exploration Number
8843 Dickey Road NW, Silverdale, WA, In center of Site in proposed road area	47.6440, -122.7215	**AB-03**

Contractor	Equipment	Sampling Method	Ground Surface Elev. (NAVD88)
Holocene Drilling, Inc.	D50 Tracked Drill Rig	Autohammer; 140 lb hammer; 30" drop	415'

Operator	Exploration Method(s)	Work Start/Completion Dates	Top of Casing Elev. (NAVD88)	Depth to Water (Below GS)
Kevin	7.5" O.D x 4.5" I.D. Hollow-Stem Auger	10/30/2019	NA	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)
								FILL GRAVEL (GP); approximately 6 inches of gravel surfacing.	
								WEATHERED VASHON LODGEMENT TILL SILTY SAND (SM); dense, moist, gray; fine to coarse sand; few fine, subangular to subrounded gravel; 1/4-inch interbed of sand with iron-oxide staining.	
		Backfilled with bentonite chips to 0.5 feet bgs, then capped with existing material.	S-1	▲	5 13 33				
5	410		S-2	▲	12 33 36			**VASHON LODGEMENT TILL** SILTY SAND (SM); dense, moist, gray; fine to coarse sand; few fine, subangular to subrounded gravel; 1/4-inch interbed of sand with iron-oxide staining.	5
			S-3	▲	33 50/6"			Decrease in gravel content observed.	
10	405		S-4	▲	23 40 46				10
15	400		S-5	▲	50/6"			No coarse gravel observed.	15

Legend

Sample Type: ◪ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢—⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: AJD

Exploration Log AB-03

Sheet 1 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In center of Site in proposed road area		*Coordinates (Lat,Lon WGS84)* 47.6440, -122.7215	*Exploration Number* **AB-03**
Contractor Holocene Drilling, Inc.	*Equipment* D50 Tracked Drill Rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface Elev. (NAVD88)* 415'	
Operator Kevin	*Exploration Method(s)* 7.5" O.D x 4.5" I.D. Hollow-Stem Auger	*Work Start/Completion Dates* 10/30/2019	*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)
			S-6		50/6"			**VASHON LODGEMENT TILL** SILTY SAND (SM); dense, moist, gray; fine to coarse sand; few fine, subangular to subrounded gravel; 1/4-inch interbed of sand with iron-oxide staining. (continued) with few fine to coarse gravel.	
25	390		S-7		27 50/5"			Observed areas of very moist less silty sand.	25
								Bottom of exploration at 26 ft. bgs.	
30	385								30
35	380								35

Legend

Sample Type: ◪ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: AJD

Exploration Log AB-03
Sheet 2 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, Near proposed scales footprint		*Coordinates (Lat,Lon WGS84)* 47.6435, -122.7212	*Exploration Number* **AB-04**
Contractor Holocene Drilling, Inc.	*Equipment* D50 Tracked Drill Rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface Elev. (NAVD88)* 416'	
Operator Kevin	*Exploration Method(s)* 7.5" O.D x 4.5" I.D. Hollow-Stem Auger	*Work Start/Completion Dates* 10/30/2019	*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; approximately 18 inches thick.	
	415							**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL (SM); very dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel. No recovery.	
		Backfilled with bentonite chips to 0.5 feet bgs, then capped with existing material.	S-1		25 50/6"				
5			S-2		33 43 36				5
	410		S-3		30 50/5"				
10			S-4		30 50/6"				10
	405								
15			S-5		32 50/5"			SILTY SAND (SM); very dense, moist, gray; fine to coarse sand; few fine, subangular to subrounded gravel.	15
	400								

Legend

Sample Type
- ◯ No Soil Sample Recovery
- ◪ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢⊣ Liquid Limit

Water Level
- No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: AJD

Exploration Log AB-04
Sheet 1 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, Near proposed scales footprint		*Coordinates (Lat,Lon WGS84)* 47.6435, -122.7212	*Exploration Number* **AB-04**
Contractor Holocene Drilling, Inc.	*Equipment* D50 Tracked Drill Rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface Elev. (NAVD88)* 416'	
Operator Kevin	*Exploration Method(s)* 7.5" O.D x 4.5" I.D. Hollow-Stem Auger	*Work Start/Completion Dates* 10/30/2019	*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)
			S-6		30 50/2"			SILTY SAND WITH GRAVEL (SM); very dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel.	
	395								
25			S-7		25 50/5"				25
	390							Bottom of exploration at 26 ft. bgs.	
30									30
	385								
35									35
	380								

Legend

Sample Type
- ◯ No Soil Sample Recovery
- ◩ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢—⊣ Liquid Limit

Water Level
- No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: AJD

Exploration Log AB-04
Sheet 2 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Silverdale RAGF - 170361

Geotechnical Exploration Log

Project Address & Site Specific Location	Coordinates (Lat,Lon WGS84)	Exploration Number
8843 Dickey Road NW, Silverdale, WA, Edge of proposed pond footprint	47.6447, -122.7215	AMW-01

Contractor	Equipment	Sampling Method	Ground Surface Elev. (NAVD88)
Holocene Drilling, Inc.	D50 Tracked Drill Rig	Autohammer; 140 lb hammer; 30" drop	415'

Operator	Exploration Method(s)	Work Start/Completion Dates	Top of Casing Elev. (NAVD88)	Depth to Water (Below GS)
Kevin	7.5" O.D x 4.5" I.D. Hollow-Stem Auger	10/30/2019	NA	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)
		DOE Well No. BLU 254 Flush-mount monument set in concrete	S-1		12 15 16			**FILL** SILTY SAND (SM); dense, slightly moist, light to dark brown; fine to coarse sand; trace, fine, subangular gravel.	
		2-inch-diameter PVC pipe set in bentonite chips						**WEATHERED VASHON LODGEMENT TILL** SILTY SAND (SM); dense, slightly moist, brown yellow; fine to coarse sand; fine to coarse, subangular to subrounded gravel.	
5	410		S-2		18 16 45			**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL (SM); very dense, slightly moist, light gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel.	5
			S-3		15 39 46			Becomes moist, gray.	
10	405		S-4		25 36 50				10
			S-5		30 35 42				
		2-inch-diameter PVC pipe set in sand							
15	400		S-6		22 50/5.5"				15
		2-inch-diameter perforated PVC pipe set in sand							

Legend

Sample Type
- ◯ No Soil Sample Recovery
- ◩ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢⊣ Liquid Limit

Water Level
- No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: AJD

Exploration Log AMW-01
Sheet 1 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, Edge of proposed pond footprint		*Coordinates (Lat,Lon WGS84)* 47.6447, -122.7215	*Exploration Number* **AMW-01**
Contractor Holocene Drilling, Inc.	*Equipment* D50 Tracked Drill Rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface Elev. (NAVD88)* 415'	
Operator Kevin	*Exploration Method(s)* 7.5" O.D x 4.5" I.D. Hollow-Stem Auger	*Work Start/Completion Dates* 10/30/2019	*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)
			S-7		50/5.5"			**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL (SM); very dense, slightly moist, light gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel. (continued)	
25	390	6-inches of sand placed at bottom of borehole	S-8		50/6"				25
								Bottom of exploration at 25.5 ft. bgs.	
30	385								30
35	380								35

Legend

Sample Type
- ◯ No Soil Sample Recovery
- ◩ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢⊣ Liquid Limit

Water Level
- No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: AJD

Exploration Log AMW-01
Sheet 2 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed pond footprint, near ATP-07		*Coordinates (Lat,Lon WGS84)* 47.6436, -122.7215	*Exploration Number* **AMW-02**
Contractor Holocene Drilling, Inc.	*Equipment* D50 Tracked Drill Rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface Elev. (NAVD88)* 424'	
Operator Kevin	*Exploration Method(s)* 7.5" O.D x 4.5" I.D. Hollow-Stem Auger	*Work Start/Completion Dates* 10/30/2019	*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)
								FILL SILTY SAND WITH GRAVEL (SM); medium dense, moist, brown; fine to coarse sand; fine to coarse, subangular to subrounded gravel.	
		DOE Well No. BLU 255 Flush-mount monument set in concrete	S-1		12 25 32				
	420	2-inch-diameter PVC pipe set in bentonite chips						**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL (SM); dense, slightly moist, light gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel.	
5			S-2		13 23 28			Becomes moist, gray.	5
			S-3		12 15 16			SILTY SAND (SM); dense, moist, gray; fine to coarse sand; trace fine to coarse, subangular to subrounded gravel.	
	415								
10			S-4		23 32 41			SILTY SAND WITH GRAVEL (SM); very dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel.	10
			S-4 and S-5 Combined			PS, MC FC=25.3%			
	410	2-inch-diameter PVC pipe set in sand							
15			S-5		32 50/5"				15
		2-inch-diameter perforated PVC pipe set in sand							
	405								

Legend

Sample Type
- ◯ No Soil Sample Recovery
- ◪ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢⊣ Liquid Limit

Water Level
- No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: AJD

Exploration Log AMW-02
Sheet 1 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed pond footprint, near ATP-07		*Coordinates (Lat,Lon WGS84)* 47.6436, -122.7215	*Exploration Number* **AMW-02**
Contractor Holocene Drilling, Inc.	*Equipment* D50 Tracked Drill Rig	*Sampling Method* Autohammer; 140 lb hammer; 30" drop	*Ground Surface Elev. (NAVD88)* 424'	
Operator Kevin	*Exploration Method(s)* 7.5" O.D x 4.5" I.D. Hollow-Stem Auger	*Work Start/Completion Dates* 10/30/2019	*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)
			S-6		30 50/3"			SILTY SAND WITH GRAVEL (SM); very dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel. (continued)	
	400								
25		1 foot of sand placed at bottom of borehole	S-7		30 50/5"			SILTY SAND (SM); very dense, moist, light gray; fine sand. Becomes very moist with fine to coarse sand; few fine to coarse subangular to subrounded gravel.	25
								Bottom of exploration at 26 ft. bgs.	
	395								
30									30
	390								
35									35
	385								

Legend

Sample Type
- ◯ No Soil Sample Recovery
- ◪ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ⊢⊣ Liquid Limit

Water Level
- No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: AJD

Exploration Log AMW-02
Sheet 2 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed pond footprint		*Coordinates (Lat,Lon WGS84)* 47.6441, -122.7219	*Exploration Number* **ATP-01**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 415'	
Operator Andrew Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 10/23/2019	*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; approximately 3 inches thick.	
								VASHON LODGEMENT TILL SILTY SAND WITH GRAVEL AND COBBLES (SM); very dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel; 4-inch to 6-inch diameter cobbles; slight diamict; trace small roots.	
		Test Pit Backfilled with Excavated Soil	S-1			T-Probe =0"-2"			
								Minor iron-oxide staining observed.	
			S-2			T-Probe =0"-2"			
								Becomes light gray.	
5	410							Decrease in observed roots.	5
								Becomes gray.	
								Cobbles of up to 12 inches in diameter observed.	
10	405		S-3	●		PS, MC FC=17.9%			10
15	400		S-4					Bottom of exploration at 17.5 ft. bgs.	15
								Note: No test pit caving observed.	

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: MvA

Exploration Log ATP-01
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed LHHW building footprint		*Coordinates (Lat,Lon WGS84)* 47.6442, -122.7222	*Exploration Number* **ATP-02**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 412'	
Operator Andrew Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 10/23/2019	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 5' (ATD)

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; approximately 8 inches thick.	
								FILL SILTY SAND WITH GRAVEL AND COBBLES (SM); medium dense, moist, light gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel; 4-inch to 6-inch diameter cobbles; trace small roots.	
410		Test Pit Backfilled with Excavated Soil	S-1			T-Probe =6"-8"			
								Becomes soil mixed with concrete slurry.	
			S-2			DCPT =6/8/30		Becomes very moist, brown; trace tree bark fragment.	
		▽ 10/23/2019 Seepage						Becomes wet; water seepage.	
5								Digging becomes difficult.	5
								WEATHERED VASHON LODGEMENT TILL SILTY SAND WITH GRAVEL (SM); dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel.	
405			S-3						
								Digging becomes more difficult.	
10			S-4						10
								VASHON LODGEMENT TILL SILTY SAND WITH GRAVEL AND COBBLES (SM); very dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel; 4-inch to 6-inch diameter cobbles.	
400									
								Bottom of exploration at 13 ft. bgs.	
								Note: Minor caving 0'-5'	
15									15
395									

Legend

Sample Type: ⊠ Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: MvA

Exploration Log ATP-02
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed recycle area footprint		*Coordinates (Lat,Lon WGS84)* 47.6448, -122.7222	*Exploration Number* **ATP-03**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 404'	
Operator Andrew Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 10/23/2019	*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; approximately 12 inches thick.	
								WEATHERED VASHON ADVANCE OUTWASH SAND WITH SILT (SP-SM); loose, slightly moist, brown yellow; fine to coarse sand; trace small charcoal fragment; trace small roots; heavily weathered.	
								Digging becomes difficult.	
		Test Pit Backfilled with Excavated Soil	S-1			T-Probe =3"-6"		SAND WITH SILT (SP-SM); medium dense, slightly moist, gray brown; fine to coarse sand; few, fine to coarse, subangular to subrounded gravel.	
	400								
5			S-2			T-Probe =1"-6"			5
								Digging becomes very difficult.	
								VASHON ADVANCE OUTWASH SAND WITH SILT (SP-SM); very dense, moist, gray brown; fine to coarse sand.	
			S-3	●		MC, PS FC=8.4%			
	395							Bottom of exploration at 9 ft. bgs.	
10								Note: No test pit caving observed.	10
	390								
15									15
	385								

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: MvA

Exploration Log ATP-03

Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed fill slope footprint		*Coordinates (Lat,Lon WGS84)* 47.6450, -122.7221	*Exploration Number* **ATP-04**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 396'	
Operator Andrew Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 10/23/2019	*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; approximately 12 inches thick.	
	395							**VASHON ADVANCE OUTWASH** SAND WITH SILT (SP-SM); dense, slightly moist, gray brown; fine to coarse sand; few, fine to coarse, subangular to subrounded gravel.	
		Test Pit Backfilled with Excavated Soil	S-1			T-Probe =1"-2"		Digging becomes difficult.	
5								SAND WITH SILT (SP-SM); dense, slightly moist, gray brown; fine to coarse sand; few, fine to coarse, subangular to subrounded gravel. Observed iron-oxide staining.	5
	390		S-2			T-Probe =1"-2"		No iron-oxide staining observed.	
			S-3					Bottom of exploration at 8 ft. bgs. Note: No test pit caving observed. Excavated into sloped berm, topsoil is thicker upslope.	
10	385								10
15	380								15

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: MvA

Exploration Log ATP-04
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed pond footprint		*Coordinates (Lat,Lon WGS84)* 47.6449, -122.7215	*Exploration Number* **ATP-05**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 401'	
Operator Andrew Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 10/23/2019	*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)
0	400	Test Pit Backfilled with Excavated Soil	S-1			T-Probe =2"-3"		TOPSOIL; approximately 18 inches thick.	0
								WEATHERED VASHON LODGEMENT TILL SILTY SAND (SM); medium dense, slightly moist, brown yellow; fine to coarse sand; few, fine to coarse, subangular to subrounded gravel; heavily weathered.	
								SILTY SAND WITH GRAVEL (SM); dense, slightly moist, light gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel. Digging becomes very difficult.	
5	395		S-2					**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL AND COBBLES (SM); very dense, slightly moist, light gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel; 4-inch to 8-inch diameter cobbles; diamict.	5
			S-3	●		PS, MC FC=15%			
10	390								10
								Bottom of exploration at 12 ft. bgs. Note: No test pit caving observed.	
15	385								15

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: MvA

Exploration Log ATP-05
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed scales footprint		*Coordinates (Lat,Lon WGS84)* 47.6438, -122.7213	*Exploration Number* **ATP-06**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 415'	
Operator Andrew Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 10/23/2019	*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; approximately 6 inches thick.	
								VASHON LODGEMENT TILL SILTY SAND WITH GRAVEL (SM); very dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel; diamict.	
5	410	Test Pit Backfilled with Excavated Soil	S-1			T-Probe =2"			5
								Bottom of exploration at 6 ft. bgs. Note: No test pit caving observed.	
10	405								10
15	400								15

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: MvA

Exploration Log ATP-06
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed pond footprint		*Coordinates (Lat,Lon WGS84)* 47.6436, -122.7215	*Exploration Number* **ATP-07**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 424'	
Operator Andrew Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 10/23/2019	*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; approximately 8 inches thick.	
								FILL SILTY SAND WITH GRAVEL (SM); medium dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel.	
		Test Pit Backfilled with Excavated Soil	S-1			T-Probe =6"-8"			
			S-2			T-Probe =6"-8"			
	420		S-3			T-Probe =0"-2"			
5								**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL AND COBBLES (SM); very dense, moist, light gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel; 4-inch to 6-inch diameter cobbles; diamict.	5
	415								
10									10
	410							Bottom of exploration at 13 ft. bgs. Note: No test pit caving observed.	
15									15
	405								

Legend

Sample Type: Grab sample

Water Level: Plastic Limit ⊢⊣ Liquid Limit; No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: MvA

Exploration Log ATP-07
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Silverdale RAGF - 170361

Geotechnical Exploration Log

Aspect CONSULTING	*Project Address & Site Specific Location* 8843 Dickey Road NW, Silverdale, WA, In south center of Site adjacent to wetland		*Coordinates (Lat,Lon WGS84)* 47.6434, -122.7211	*Exploration Number* **ATP-08**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 410'	
Operator Andrew Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 10/23/2019	*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; approximately 18 inches thick.	
		Test Pit Backfilled with Excavated Soil						**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL AND COBBLES (SM); very dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel; 4-inch to 6-inch diameter cobbles; diamict.	
5	405								5
10	400							Bottom of exploration at 10 ft. bgs. Note: No test pit caving observed.	10
15	395								15

Legend

Sample Type

Water Level — Plastic Limit ⊢⊣ Liquid Limit — No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: MvA

Exploration Log ATP-08

Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In proposed pond footprint		*Coordinates (Lat,Lon WGS84)* 47.6434, -122.7203	*Exploration Number* **ATP-09**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 400'	
Operator Andrew Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 10/23/2019	*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; approximately 24 inches thick; thicker topsoil/fill upslope.	
		Test Pit Backfilled with Excavated Soil						**WEATHERED VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL AND COBBLES (SM); dense, slightly moist, brown yellow; fine to coarse sand; fine to coarse, subangular to subrounded gravel; 4-inch to 6-inch diameter cobbles.	
5	395		S-1	●		PS, MC FC=41.5%		**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL AND COBBLES (SM); very dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel; 4-inch to 6-inch diameter cobbles.	5
								SILTY SAND WITH GRAVEL (SM); very dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel.	
10	390							Bottom of exploration at 8 ft. bgs. Note: No test pit caving observed. Excavated into sloped terrain, topsoil and weathered lodgement till is thicker upslope.	10
15	385								15

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: MvA

Exploration Log ATP-09
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, In area where existing grade is 10 feet higher than proposed grade		*Coordinates (Lat,Lon WGS84)* 47.6432, -122.7213	*Exploration Number* **ATP-10**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 431'	
Operator Andrew Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 10/23/2019	*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; approximately 6 inches thick.	
	430							**FILL** SILTY SAND WITH GRAVEL (SM); medium dense, moist, brown; fine to coarse sand; fine to coarse, subangular to subrounded gravel.	
		Test Pit Backfilled with Excavated Soil				T-Probe =6"			
						T-Probe =0"-2"		Digging becomes difficult.	
5	425							**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL AND COBBLES (SM); very dense, moist, gray; fine to coarse sand; fine to coarse, subangular to subrounded gravel; 4-inch to 6-inch diameter cobbles.	5
								Bottom of exploration at 6.5 ft. bgs. Note: No test pit caving observed.	
10	420								10
15	415								15

Legend

Sample Type

Plastic Limit ⊢⊣ Liquid Limit

Water Level — No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: HNH
Approved by: MvA

Exploration Log ATP-10
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, See Figures 2 and 3		*Coordinates* NA	*Exploration Number* **ATP-11**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 398' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 11/30/2021	*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)
		Backfilled with excavated spoils.	S-1					**TOPSOIL** SILTY SAND WITH GRAVEL (SM); loose, moist, brown; low plasticity fines; fine to coarse sand; fine to coarse, subangular to subrounded gravel; roots.	
								WEATHERED VASHON LODGEMENT TILL SILTY SAND WITH GRAVEL (SM); medium dense to dense, moist, light brown; low plasticity fines; fine to coarse sand; fine to coarse, subangular to subrounded gravel.	
	395		S-2					**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL (SM); very dense, slightly moist, gray with iron-oxide staining; low plasticity fines; fine to coarse sand; fine to coarse, subangular to subrounded gravel; some rounded cobble.	
5									5
			S-3	●		PS, MC FC=22.7%			
	390								
10			S-4					SILTY SAND (SM); dense to very dense, slightly moist, gray; low plasticity fines; fine to coarse sand; some fine to coarse gravel.	10
								SILTY SAND WITH GRAVEL AND COBBLES (SM); very dense, slightly moist to moist, gray; low plasticity fines; fine to coarse sand; fine to coarse gravel; 4-inch to 6-inch diameter cobbles.	
	385		S-5						
15			S-6					Bottom of exploration at 15 ft. bgs. Note: No seepage or caving observed.	15
	380								

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: DCB
Approved by: AJD 2/1/2022

Exploration Log ATP-11
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, See Figures 2 and 3		*Coordinates* NA	*Exploration Number* **ATP-12**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 393' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 11/30/2021	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 3' (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	393	Backfilled with excavated spoils.						**TOPSOIL** SILTY SAND WITH GRAVEL (SM); loose, moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel; roots.	0
								WEATHERED VASHON LODGEMENT TILL SILTY SAND WITH GRAVEL AND COBBLES (SM); medium dense to dense, moist, light brown; low plasticity fines; fine to coarse sand; fine to coarse gravel; 4-inch to 6-inch diameter cobbles.	
	390	11/30/2021	S-1	●		PS, MC FC=12.8%		Becomes red and brown.	
5			S-2					**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL AND COBBLES (SM); very dense, slightly moist, gray with iron-oxide staining; low plasticity fines; fine to coarse sand; fine to coarse gravel; 4-inch to 6-inch diameter cobbles.	5
	385		S-3						
10			S-4						10
	380								
15			S-5					Bottom of exploration at 15 ft. bgs. Note: No caving observed.	15
	375								

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: DCB
Approved by: AJD 2/1/2022

Exploration Log ATP-12
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, See Figures 2 and 3		*Coordinates* NA	*Exploration Number* **ATP-13**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 396' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 11/30/2021	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 6' (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	395	Backfilled with excavated spoils.	S-1	●		PS, MC FC=26.8%		**TOPSOIL** SILTY SAND WITH GRAVEL (SM); loose, moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel; roots.	0
								FILL SILTY SAND WITH GRAVEL (SM); medium dense to dense, slightly moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel.	
5								**BURIED TOPSOIL** SILTY SAND WITH GRAVEL (SM); medium dense, moist, dark brown; low plasticity fines; fine to coarse sand; fine to coarse gravel; abundant roots.	5
	390	11/30/2021						**WEATHERED VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL (SM); medium dense, very moist, orange brown to yellow brown with iron-oxide staining; low plasticity fines; fine to coarse sand; fine to coarse gravel.	
			S-2					**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL (SM); very dense, slightly moist to moist, gray with iron-oxide staining; low plasticity fines; fine to coarse sand; fine to coarse gravel.	
10									10
	385		S-3					Increased silt content.	
			S-4						
			S-5						
15	380							Bottom of exploration at 15 ft. bgs. Note: No caving observed.	15

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: DCB
Approved by: AJD 2/1/2022

Exploration Log ATP-13
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, See Figures 2 and 3		*Coordinates* NA	*Exploration Number* **ATP-14**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 400' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 11/30/2021	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 3' (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)
		Backfilled with excavated spoils.	S-1					**TOPSOIL** SILTY SAND WITH GRAVEL (SM); loose, moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel; roots.	
		11/30/2021						**WEATHERED VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL (SM); medium dense to dense, slightly moist to moist, orange brown; low plasticity fines; fine to coarse sand; fine to coarse gravel.	
5	395		S-2					**VASHON LODGEMENT TILL** SILTY SAND WITH GRAVEL (SM); very dense, slightly moist, gray with iron-oxide staining; low plasticity fines; fine to coarse sand; fine to coarse gravel.	5
			S-3					Bottom of exploration at 8 ft. bgs. Note: No caving observed.	
10	390								10
15	385								15

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: DCB
Approved by: AJD 2/1/2022

Exploration Log ATP-14

Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, See Figures 2 and 3		*Coordinates* NA	*Exploration Number* **ATP-15**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 438' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 11/30/2021	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 13' (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)
								TOPSOIL SILTY SAND WITH GRAVEL (SM); loose, slightly moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel.	
								FILL SAND WITH SILT AND GRAVEL (SP-SM); loose to medium dense, slightly moist to moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel.	
	435	Backfilled with excavated spoils.	S-1	●		PS, MC FC=10.8%			
5								SILTY SAND WITH GRAVEL (SM); loose to medium dense, slightly moist to moist, gray; low plasticity fines; fine to coarse sand; fine to coarse gravel.	5
	430		S-2	●		PS, MC FC=23.2%		Interbedded layers of gray and brown material.	
10									10
			S-3	●		PS, MC FC=13.2%		SAND WITH SILT AND GRAVEL (SW-SM); medium dense, moist, gray; low plasticity fines; fine to coarse sand; asphalt chunks; organic debris present.	
	425	▽ 11/30/2021						SILTY SAND WITH GRAVEL (SM); medium dense, moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel; organic debris present.	
15									15
	420		S-4						
			S-5					Becomes gray, trace organics.	
								Bottom of exploration at 19 ft. bgs. Note: No caving observed.	

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: DCB
Approved by: AJD 2/1/2022

Exploration Log ATP-15
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, See Figures 2 and 3		*Coordinates* NA	*Exploration Number* **ATP-16**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 400' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 11/30/2021	*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)
		Backfilled with excavated spoils.						**TOPSOIL** SILTY SAND WITH GRAVEL (SM); loose, moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel.	
		12/1/2021						**VASHON ADVANCE OUTWASH** GRAVEL WITH SAND (GP); loose to medium dense, wet, brown and gray; fine to coarse sand; fine to coarse gravel; trace cobbles; stratified.	
			S-1	●		PS, MC FC=1.3%			
5	395		S-2					Becomes dense.	5
			S-3						
10	390		S-4						10
			S-5						
15	385		S-6					SAND WITH SILT AND GRAVEL (SP-SM); dense, wet, brown and gray; low plasticity fines; fine to coarse sand; fine to coarse gravel; trace cobbles; stratified.	15
			S-7					SILTY SAND (SM); dense, moist, gray; low plasticity fines; fine to medium gravel; trace fine gravel.	
			S-8					Bottom of exploration at 19 ft. bgs. Note: No caving observed.	

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: DCB
Approved by: AJD 2/1/2022

Exploration Log ATP-16
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, See Figures 2 and 3		*Coordinates* NA	*Exploration Number* **ATP-17**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 400' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 12/1/2021	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 6' (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	400	Backfilled with excavated spoils.	S-1	67.1 ●		PS, MC FC=54.7%		**TOPSOIL** SILTY SAND WITH GRAVEL (SM); loose, moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel; roots.	0
								FILL SANDY SILT (ML); soft, moist to very moist, brown; high plasticity; trace sand; roots.	
5	395	12/1/2021	S-2						5
			S-3					**VASHON ADVANCE OUTWASH** SAND WITH SILT (SP-SM); medium dense to dense, very moist, gray and brown; low plasticity fines; fine to medium sand; stratified.	
10	390		S-4					SAND WITH SILT AND GRAVEL (SP-SM); dense, wet, gray and brown; low plasticity fines; fine to coarse sand; fine to coarse gravel; stratified.	10
			S-5					SAND WITH SILT (SP-SM); dense, very moist, gray and brown; low plasticity fines; fine to medium sand.	
15	385		S-6					Trace fine gravel.	15
			S-7						
18.5	381.5							Bottom of exploration at 18.5 ft. bgs.	
	380							Note: Caving observed 0-6 ft bgs.	

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: DCB
Approved by: AJD 2/1/2022

Exploration Log ATP-17
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Silverdale RAGF - 170361

Geotechnical Exploration Log

Project Address & Site Specific Location: 8843 Dickey Road NW, Silverdale, WA, See Figures 2 and 3		Coordinates: NA	Exploration Number: **ATP-18**
Contractor: High Meadows Excavating LLC	Equipment: Hitachi EX150 Tracked Excavator	Sampling Method: Grab	Ground Surface Elev. (NAVD88): 409' (est)
Operator: Dave Monsaas	Exploration Method(s): Test Pit	Work Start/Completion Dates: 12/1/2021	Top of Casing Elev. (NAVD88): NA
			Depth to Water (Below GS): 4' (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	409	Backfilled with excavated spoils.	S-1					**TOPSOIL** SILTY SAND WITH GRAVEL (SM); loose, moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel; roots.	0
								VASHON ADVANCE OUTWASH SAND WITH GRAVEL (SP); loose, wet, brown; fine to coarse sand; fine to coarse gravel; 4-inch to 6-inch diameter cobbles.	
	405	▽ 12/1/2021						Becomes medium dense and stratified.	
5			S-2					Becomes dense.	5
	400		S-3						
10			S-4	●		PS, MC FC=1.1%			10
	395		S-5						
15			S-6					Decreased gravel content, dense.	15
	390		S-7						
19	390							Bottom of exploration at 19 ft. bgs. Note: No caving observed.	19

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: ▽ Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: DCB
Approved by: AJD 2/1/2022

Exploration Log ATP-18
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, See Figures 2 and 3		*Coordinates* NA	*Exploration Number* **ATP-19**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 410' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 12/1/2021	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 4.5' (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	410	Backfilled with excavated spoils.	S-1					**TOPSOIL** SILTY SAND WITH GRAVEL (SM); loose, moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel; roots.	0
								WEATHERED VASHON ADVANCE OUTWASH SILTY SAND WITH GRAVEL (SM); loose to medium dense, moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel; some cobble.	
	405								
		12/1/2021 2021							
5			S-2			T-probe =1-3"		**VASHON ADVANCE OUTWASH** SILTY SAND (SM); dense, wet, brown; low plasticity fines; fine to medium sand; some fine gravel; stratified.	5
	400							SILTY SAND WITH GRAVEL (SM); dense, moist, brown to gray; low plasticity fines; fine to coarse sand; fine to coarse gravel.	
10			S-3					Bottom of exploration at 10 ft. bgs. Note: No caving observed.	10
	395								
15									15
	390								

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: DCB
Approved by: AJD 2/1/2022

Exploration Log ATP-19
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, See Figures 2 and 3		*Coordinates* NA	*Exploration Number* **ATP-20**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 458' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 12/1/2021	*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)
0	458							**TOPSOIL** SILTY SAND WITH GRAVEL (SM); loose, slightly moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel.	0
								FILL SILTY SAND WITH GRAVEL (SM); loose, slightly moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel; woody debris present.	
		Backfilled with excavated spoils.							
	455							Asphalt chunks present.	
5			S-1	●		PS, MC FC=21.9%			5
	450							Becomes gray, medium dense.	
10			S-2						10
	445								
15			S-3						15
	440		S-4					Asphalt chunks and woody debris present.	
18	440							Bottom of exploration at 18 ft. bgs.	18

Note: Caving observed 0-5 ft bgs.

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: DCB
Approved by: AJD 2/1/2022

Exploration Log ATP-20

Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

Aspect CONSULTING	Silverdale RAGF - 170361		Geotechnical Exploration Log	
	Project Address & Site Specific Location 8843 Dickey Road NW, Silverdale, WA, See Figures 2 and 3		*Coordinates* NA	*Exploration Number* **ATP-21**
Contractor High Meadows Excavating LLC	*Equipment* Hitachi EX150 Tracked Excavator	*Sampling Method* Grab	*Ground Surface Elev. (NAVD88)* 424' (est)	
Operator Dave Monsaas	*Exploration Method(s)* Test Pit	*Work Start/Completion Dates* 12/1/2021	*Top of Casing Elev. (NAVD88)* NA	*Depth to Water (Below GS)* 4' (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)
								TOPSOIL SILTY SAND WITH GRAVEL (SM); loose, moist, brown; low plasticity fines; fine to coarse sand; fine to coarse gravel.	
		Backfilled with excavated spoils.						**FILL** SILTY SAND (SM); loose, very moist, brown; low plasticity fines; fine to coarse sand; some fine to coarse gravel; trace cobble.	
			S-1	●		PS, MC FC=17.6%			
	420	▽ 12/1/2021						Becomes medium dense, gray; trash debris and asphalt chunks present.	
5								Becomes slightly moist, gray and brown.	5
								Trash and woody debris present.	
	415								
10									10
			S-2						
	410								
15								Woody debris present.	15
			S-3					Becomes gray, medium dense to dense; no debris present.	
			S-4						
	405							Bottom of exploration at 18 ft. bgs. Note: Caving observed 0-4 ft bgs.	

Legend

Sample Type: Grab sample

Plastic Limit ⊢⊣ Liquid Limit

Water Level: ▽ Water Level (Seepage)

See Exploration Log Key for explanation of symbols

Logged by: DCB
Approved by: AJD 2/1/2022

Exploration Log ATP-21
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\WPROJECTS\SILVERDALE RAGF - 170361.GPJ February 2, 2022

APPENDIX B

Geotechnical Laboratory Testing Results

B. Geotechnical Laboratory Testing

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 Aspect and Materials Testing & Consulting, Inc. (MTC).

B.1. Particle-Size Analyses, PS

A particle-size analysis was performed on one selected soil sample in general accordance with ASTM D 6913. 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. The result of the test is presented in this appendix as curves depicting the percent finer by weight versus grain size.

B.2. Moisture Content Determination, MC

Selected soil samples were submitted for analysis of 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 boring logs in Appendix A and tabulated in this appendix.

Table B-1. Summary of Particle Size Analysis Results and Moisture Content

Exploration Number	Sample Depth	Percent Gravel	Percent Sand	Percent Fines	Moisture Content	USCS	Geologic Unit
AMW-02	10 and 15	30.2	44.6	25.3	6	SM	lodgment till
ATP-01	12	39.9	42.2	17.9	6	SM	lodgment till
ATP-03	8	4.4	87.2	8.4	10	SP-SM	advance outwash
ATP-05	8	34.8	50.2	15	5	SM	lodgment till
ATP-09	6	20.1	38.4	41.5	9	ML	lodgment till
ATP-11	7	21.9	55.4	22.7	8	SM	lodgment till
ATP-12	3	37.6	49.6	12.8	16	SM	lodgment till
ATP-13	3	28.3	45	26.8	16	SM	Fill
ATP-15	2.5	39.6	49.5	10.8	7	SP-SM	Fill
ATP-15	7	24.3	52.5	23.2	8	SM	Fill
ATP-15	11.5	18.5	68.3	13.2	16	SP-SM	Fill
ATP-16	2.5	50.5	48.3	1.3	11.7	GP	advance outwash
ATP-17	2.5	0	45.3	54.7	67	ML	Fill
ATP-18	10	38.6	60.3	1.1	7	SP	advance outwash
ATP-20	5	25.5	52.6	21.9	12	SM	Fill
ATP-21	3	10	72.4	17.6	15	SM	Fill

APPENDIX B

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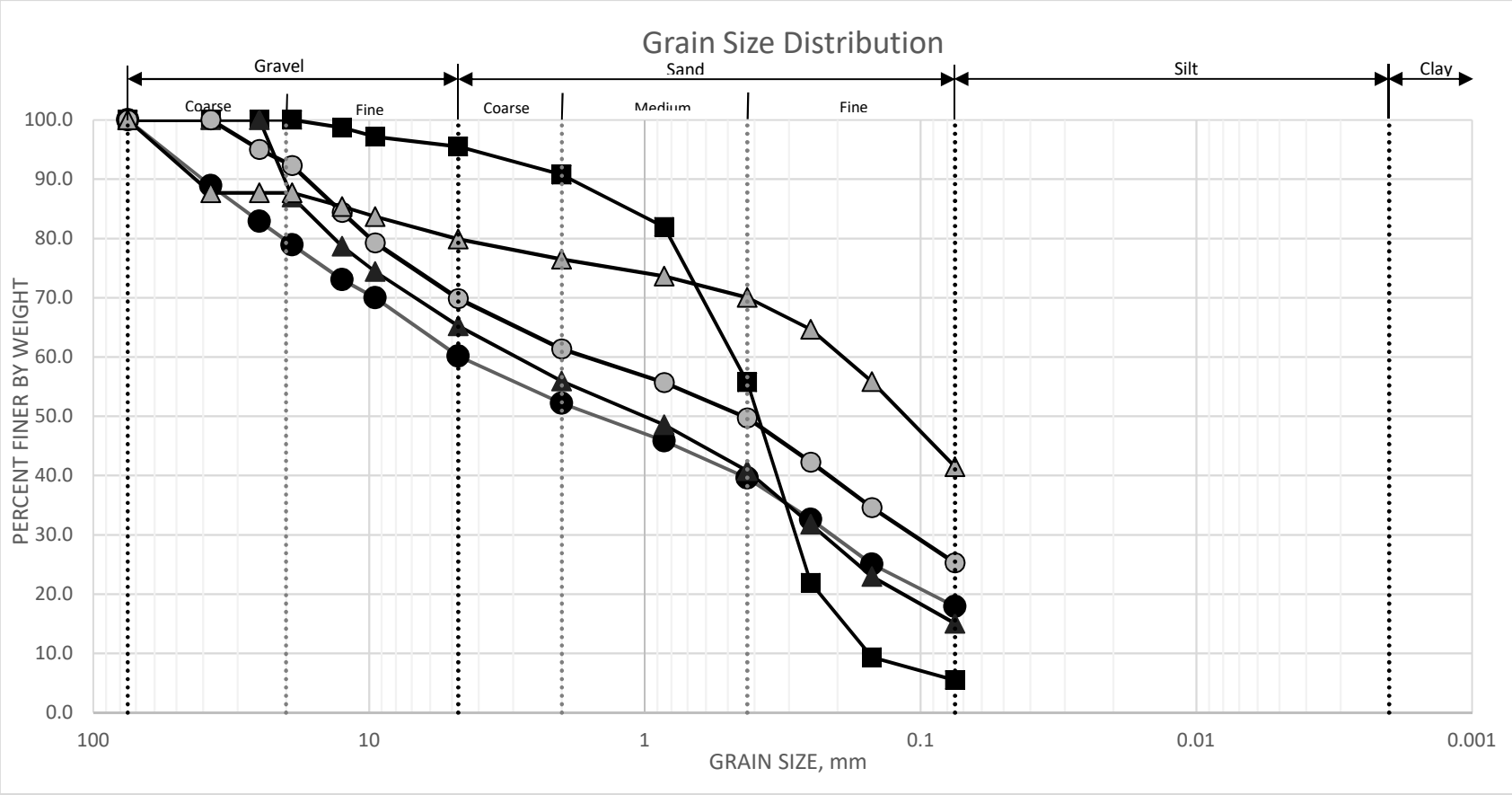
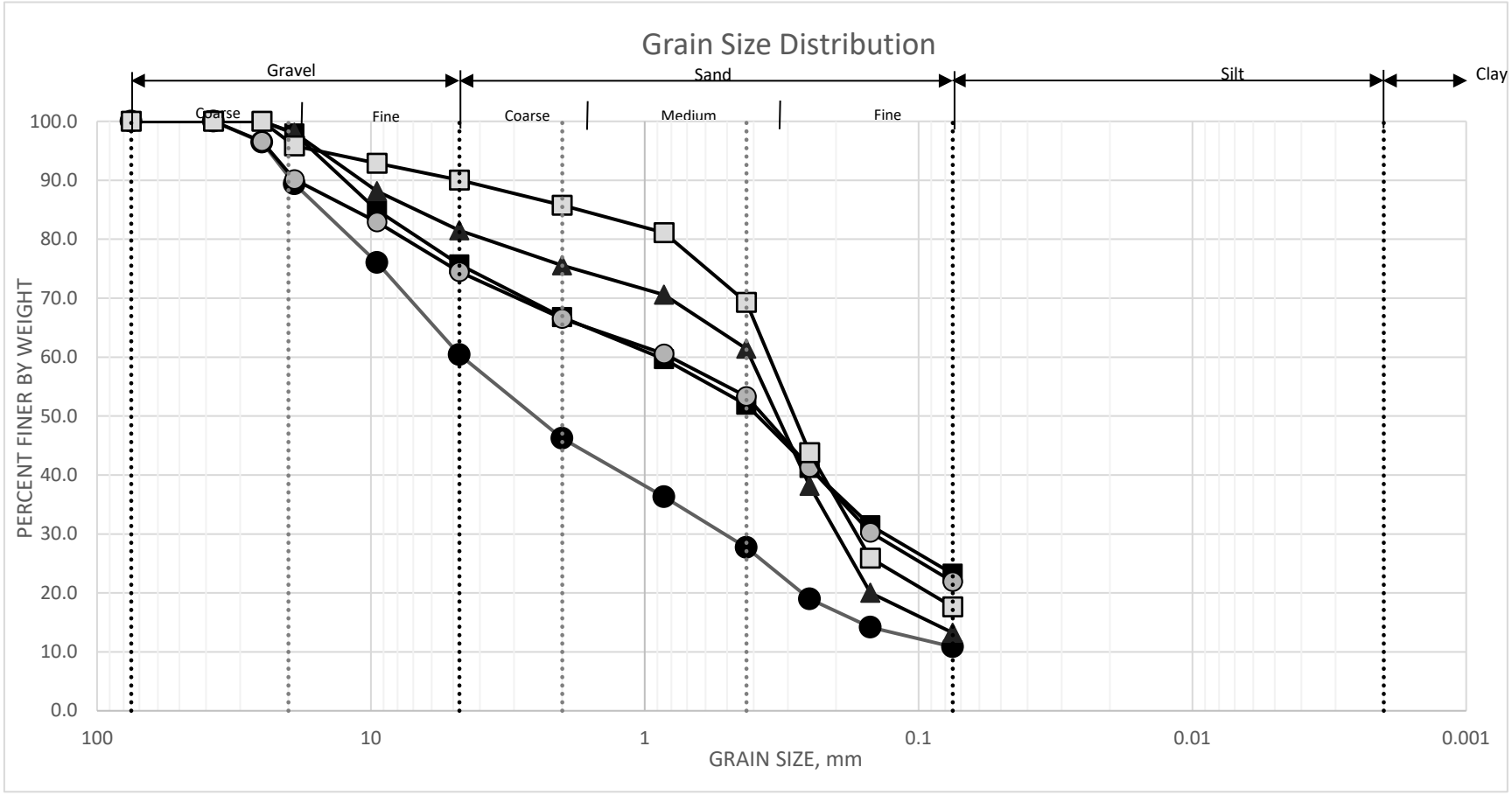
Exploration Number	Sample Depth	Percent Gravel	Percent Sand	Percent Fines	Moisture Content	USCS	Geologic Unit
AMW-02	10 and 15	30.2	44.6	25.3	6	SM	lodgment till
ATP-01	12	39.9	42.2	17.9	6	SM	lodgment till
ATP-03	8	4.4	87.2	8.4	10	SP-SM	advance outwash
ATP-05	8	34.8	50.2	15	5	SM	lodgment till
ATP-09	6	20.1	38.4	41.5	9	ML	lodgment till
ATP-11	7	21.9	55.4	22.7	8	SM	lodgment till
ATP-12	3	37.6	49.6	12.8	16	SM	lodgment till
ATP-13	3	28.3	45	26.8	16	SM	Fill
ATP-15	2.5	39.6	49.5	10.8	7	SP-SM	Fill
ATP-15	7	24.3	52.5	23.2	8	SM	Fill
ATP-15	11.5	18.5	68.3	13.2	16	SP-SM	Fill
ATP-16	2.5	50.5	48.3	1.3	11.7	GP	advance outwash
ATP-17	2.5	0	45.3	54.7	67	ML	Fill
ATP-18	10	38.6	60.3	1.1	7	SP	advance outwash
ATP-20	5	25.5	52.6	21.9	12	SM	Fill
ATP-21	3	10	72.4	17.6	15	SM	Fill



Symbol	Exploration, Sample, Depth (ft bgs)	Moisture Content (%)	Silt/Clay Content (%)	Sand Content (%)	Gravel Content (%)	Geologic Unit
●	ATP-01, S3, 12*	6	17.9	42.2	39.9	Vashon lodgement Till
■	ATP-03, S3, 8	10	8.4	87.2	4.4	Vashon advance outwash
▲	ATP-05, S3, 8*	5	15.0	50.2	34.8	Vashon lodgement Till
○	AMW-02, S4/S5, 10/15*	6	25.3	44.6	30.2	Vashon lodgement Till
□	ATP-09, S1, 6*	9	41.5	38.4	20.1	Vashon lodgement Till

*The sample(s) tested may not include oversized particles and may only be representative of a portion of the sample/site soil conditions.



Symbol	Exploration, Depth (ft bgs)	Moisture Content (%)	Silt/Clay Content (%)	Sand Content (%)	Gravel Content (%)	Geologic Unit
●	ATP-15, 2.5ft	7	10.8	49.5	39.6	Fill
■	ATP-15, 7ft	8	23.2	52.5	24.3	Fill
▲	ATP-15, 11.5ft	16	13.2	68.3	18.5	Fill
◉	ATP-20, 5ft	12	21.9	52.6	25.5	Fill
▣	ATP-21, 3ft	15	17.6	72.4	10.0	Fill

*The sample(s) tested may not include oversized particles and may only be representative of a portion of the sample/site soil conditions.

Project Name: Silverdale Recycling and Garbage Facility
Project Number: 170361

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Sieve Report

Project: Q.C. Silverdale Recycling and Garbage Facility
Project #: 21B077-32
Client: Aspect Cosulting
Source: ATP 11 @ 7'
Sample#: S21-0528

Date Received: December 9, 2021
Date Sampled: December 9, 2021
Sampled By: Client
Date Tested: December 16, 2021
Tested By: Mark Peterson

ASTM D-2487 Unified Soils Classification System
SM, Silty Sand with Gravel
Sample Color:
Gray-Brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

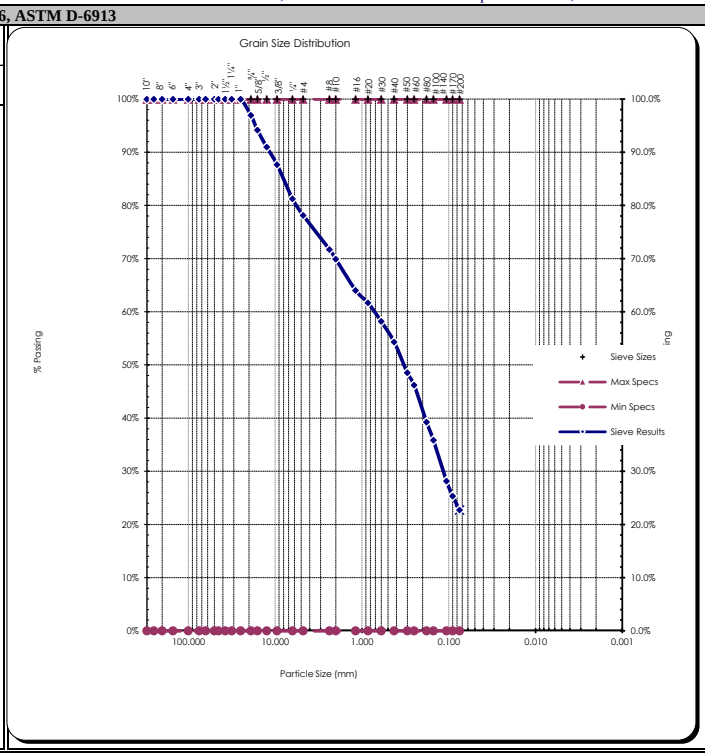
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.016 mm	% Gravel =	21.9%	Coeff. of Curvature, C_C =	0.56
$D_{(10)}$ =	0.033 mm	% Sand =	55.4%	Coeff. of Uniformity, C_U =	22.14
$D_{(15)}$ =	0.049 mm	% Silt & Clay =	22.7%	Fineness Modulus =	2.59
$D_{(30)}$ =	0.117 mm	Liquid Limit =	0.0%	Plastic Limit =	0.0%
$D_{(50)}$ =	0.332 mm	Plasticity Index =	0.0%	Moisture %, as sampled =	8.1%
$D_{(60)}$ =	0.731 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	11.620 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	18/43	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	97%	97%	100.0%	0.0%
5/8"	16.00		94%	100.0%	0.0%
1/2"	12.50	91%	91%	100.0%	0.0%
3/8"	9.50	88%	88%	100.0%	0.0%
1/4"	6.30		81%	100.0%	0.0%
#4	4.75	78%	78%	100.0%	0.0%
#8	2.36	72%	72%	100.0%	0.0%
#10	2.00	70%	70%	100.0%	0.0%
#16	1.18		64%	100.0%	0.0%
#20	0.850	62%	62%	100.0%	0.0%
#30	0.600	58%	58%	100.0%	0.0%
#40	0.425	54%	54%	100.0%	0.0%
#50	0.300		49%	100.0%	0.0%
#60	0.250	46%	46%	100.0%	0.0%
#80	0.180	39%	39%	100.0%	0.0%
#100	0.150	36%	36%	100.0%	0.0%
#140	0.106		28%	100.0%	0.0%
#170	0.090		25%	100.0%	0.0%
#200	0.075	22.7%	22.7%	100.0%	0.0%



Comments:

Reviewed by: Mark Peterson

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980
Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974
Visit our website: www.mtc-inc.net

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Sieve Report

Project: Q.C. Silverdale Recycling and Garbage Facility
Project #: 21B077-32
Client: Aspect Cosulting
Source: ATP 12 @ 3'
Sample#: S21-0529

Date Received: December 9, 2021
Date Sampled: December 9, 2021
Sampled By: Client
Date Tested: December 16, 2021
Tested By: Mark Peterson

ASTM D-2487 Unified Soils Classification System
SM, Silty Sand with Gravel
Sample Color:
Gray-Brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

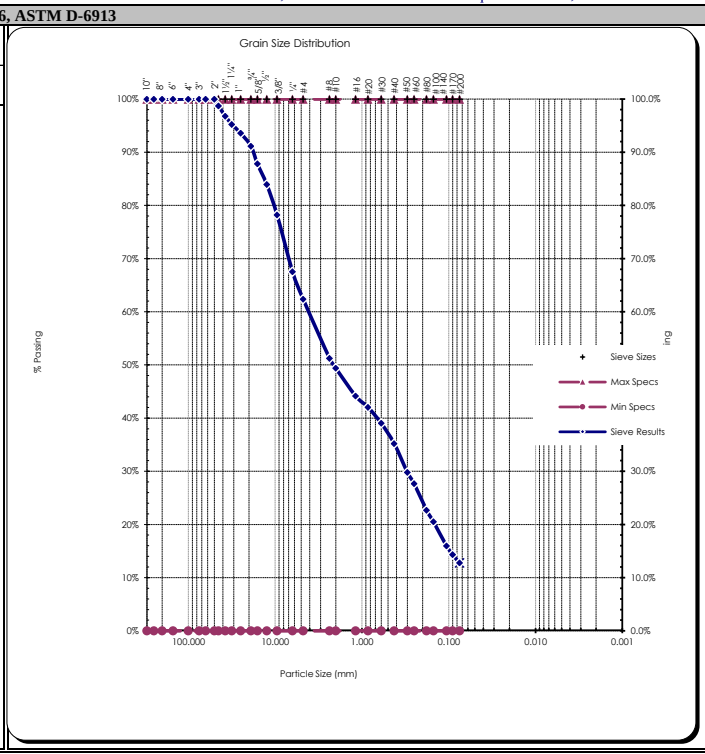
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.029 mm	% Gravel =	37.6%	Coeff. of Curvature, C_C =	0.37
$D_{(10)}$ =	0.059 mm	% Sand =	49.6%	Coeff. of Uniformity, C_U =	72.20
$D_{(15)}$ =	0.097 mm	% Silt & Clay =	12.8%	Fineness Modulus =	3.83
$D_{(30)}$ =	0.304 mm	Liquid Limit =	0.0%	Plastic Limit =	0.0%
$D_{(50)}$ =	2.118 mm	Plasticity Index =	0.0%	Moisture %, as sampled =	15.6%
$D_{(60)}$ =	4.241 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	17.959 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	29/80	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		99%	100.0%	0.0%
1.50"	37.50	97%	97%	100.0%	0.0%
1.25"	31.50		95%	100.0%	0.0%
1.00"	25.00	94%	94%	100.0%	0.0%
3/4"	19.00	91%	91%	100.0%	0.0%
5/8"	16.00		88%	100.0%	0.0%
1/2"	12.50	84%	84%	100.0%	0.0%
3/8"	9.50	78%	78%	100.0%	0.0%
1/4"	6.30		68%	100.0%	0.0%
#4	4.75	62%	62%	100.0%	0.0%
#8	2.36	51%	51%	100.0%	0.0%
#10	2.00	49%	49%	100.0%	0.0%
#16	1.18		44%	100.0%	0.0%
#20	0.850	42%	42%	100.0%	0.0%
#30	0.600	39%	39%	100.0%	0.0%
#40	0.425	35%	35%	100.0%	0.0%
#50	0.300		30%	100.0%	0.0%
#60	0.250	28%	28%	100.0%	0.0%
#80	0.180	23%	23%	100.0%	0.0%
#100	0.150	21%	21%	100.0%	0.0%
#140	0.106		16%	100.0%	0.0%
#170	0.090		14%	100.0%	0.0%
#200	0.075	12.8%	12.8%	100.0%	0.0%



Comments:

Reviewed by: Mark Peterson

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Sieve Report

Project: Q.C. Silverdale Recycling and Garbage Facility
Project #: 21B077-32
Client: Aspect Cosulting
Source: ATP 13 @ 3'
Sample#: S21-0530

Date Received: December 9, 2021
Date Sampled: December 9, 2021
Sampled By: Client
Date Tested: December 16, 2021
Tested By: Mark Peterson

ASTM D-2487 Unified Soils Classification System
SM, Silty Sand with Gravel
Sample Color:
Gray-Brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

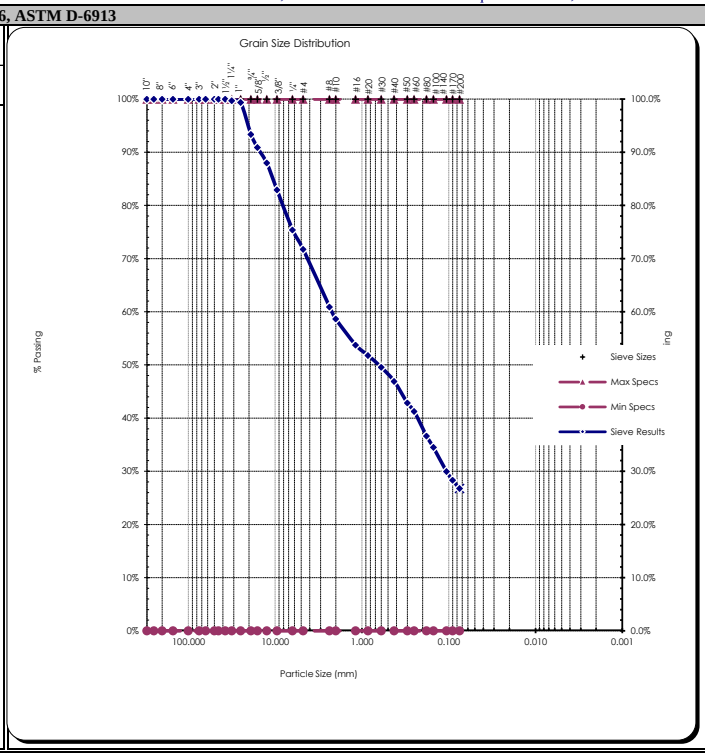
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.014 mm	% Gravel =	28.3%	Coeff. of Curvature, C_C =	0.18
$D_{(10)}$ =	0.028 mm	% Sand =	45.0%	Coeff. of Uniformity, C_U =	79.06
$D_{(15)}$ =	0.042 mm	% Silt & Clay =	26.8%	Fineness Modulus =	3.10
$D_{(30)}$ =	0.106 mm	Liquid Limit =	0.0%	Plastic Limit =	0.0%
$D_{(50)}$ =	0.647 mm	Plasticity Index =	0.0%	Moisture %, as sampled =	15.8%
$D_{(60)}$ =	2.216 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	14.928 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	4/7	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50	100%	100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	99%	99%	100.0%	0.0%
3/4"	19.00	93%	93%	100.0%	0.0%
5/8"	16.00		91%	100.0%	0.0%
1/2"	12.50	88%	88%	100.0%	0.0%
3/8"	9.50	83%	83%	100.0%	0.0%
1/4"	6.30		75%	100.0%	0.0%
#4	4.75	72%	72%	100.0%	0.0%
#8	2.36	61%	61%	100.0%	0.0%
#10	2.00	59%	59%	100.0%	0.0%
#16	1.18		54%	100.0%	0.0%
#20	0.850	52%	52%	100.0%	0.0%
#30	0.600	50%	50%	100.0%	0.0%
#40	0.425	47%	47%	100.0%	0.0%
#50	0.300		43%	100.0%	0.0%
#60	0.250	41%	41%	100.0%	0.0%
#80	0.180	37%	37%	100.0%	0.0%
#100	0.150	34%	34%	100.0%	0.0%
#140	0.106		30%	100.0%	0.0%
#170	0.090		28%	100.0%	0.0%
#200	0.075	26.8%	26.8%	100.0%	0.0%



Comments:

Reviewed by: Mark Peterson

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Sieve Report

Project: Q.C. Silverdale Recycling and Garbage Facility
Project #: 21B077-32
Client: Aspect Cosulting
Source: ATP 16 @ 2.5'
Sample#: S21-0531

Date Received: December 9, 2021
Date Sampled: December 9, 2021
Sampled By: Client
Date Tested: December 16, 2021
Tested By: Mark Peterson

ASTM D-2487 Unified Soils Classification System
GP, Poorly graded Gravel with Sand
Sample Color:
Gray-Brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

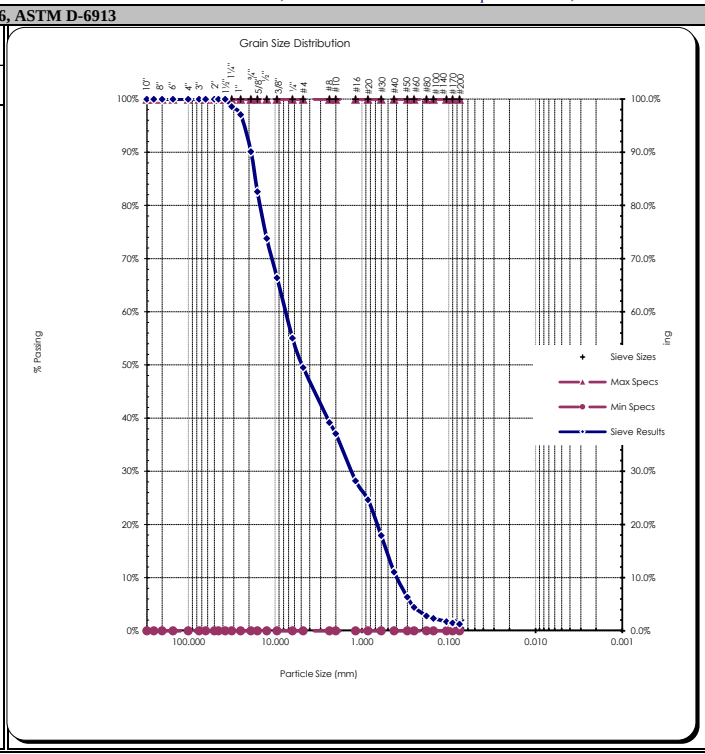
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.265 mm	% Gravel =	50.5%	Coeff. of Curvature, C_C =	0.59
$D_{(10)}$ =	0.397 mm	% Sand =	48.3%	Coeff. of Uniformity, C_U =	19.40
$D_{(15)}$ =	0.525 mm	% Silt & Clay =	1.3%	Fineness Modulus =	5.00
$D_{(30)}$ =	1.346 mm	Liquid Limit =	0.0%	Plastic Limit =	0.0%
$D_{(50)}$ =	4.880 mm	Plasticity Index =	0.0%	Moisture %, as sampled =	11.7%
$D_{(60)}$ =	7.697 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	18.956 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	4/35	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50	100%	100%	100.0%	0.0%
1.25"	31.50		99%	100.0%	0.0%
1.00"	25.00	97%	97%	100.0%	0.0%
3/4"	19.00	90%	90%	100.0%	0.0%
5/8"	16.00		83%	100.0%	0.0%
1/2"	12.50	74%	74%	100.0%	0.0%
3/8"	9.50	66%	66%	100.0%	0.0%
1/4"	6.30		55%	100.0%	0.0%
#4	4.75	50%	50%	100.0%	0.0%
#8	2.36	39%	39%	100.0%	0.0%
#10	2.00	37%	37%	100.0%	0.0%
#16	1.18		28%	100.0%	0.0%
#20	0.850	25%	25%	100.0%	0.0%
#30	0.600	18%	18%	100.0%	0.0%
#40	0.425	11%	11%	100.0%	0.0%
#50	0.300		6%	100.0%	0.0%
#60	0.250	4%	4%	100.0%	0.0%
#80	0.180	3%	3%	100.0%	0.0%
#100	0.150	2%	2%	100.0%	0.0%
#140	0.106		2%	100.0%	0.0%
#170	0.090		1%	100.0%	0.0%
#200	0.075	1.3%	1.3%	100.0%	0.0%



Comments: _____

Reviewed by: Mark Peterson

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Sieve Report

Project: Q.C. Silverdale Recycling and Garbage Facility
Project #: 21B077-32
Client: Aspect Cosulting
Source: ATP 17 @ 2.5'
Sample#: S21-0532

Date Received: December 9, 2021
Date Sampled: December 9, 2021
Sampled By: Client
Date Tested: December 16, 2021
Tested By: Mark Peterson

ASTM D-2487 Unified Soils Classification System
ML, Sandy Silt
Sample Color:
Tan

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

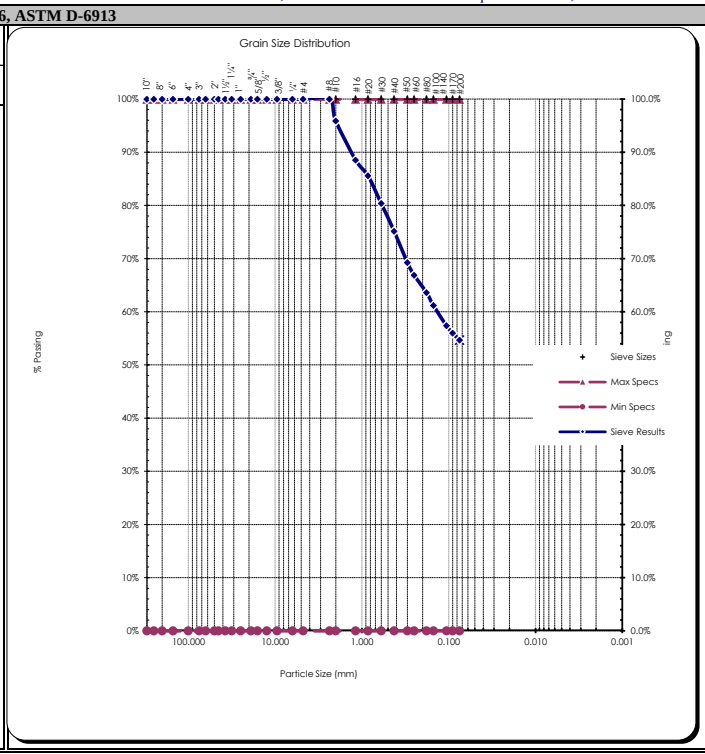
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.007	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 0.91
$D_{(10)}$ =	0.014	mm	% Sand =	45.3%	Coeff. of Uniformity, C_U = 9.94
$D_{(15)}$ =	0.021	mm	% Silt & Clay =	54.7%	Fineness Modulus = 1.01
$D_{(30)}$ =	0.041	mm	Liquid Limit =	0.0%	Plastic Limit = 0.0%
$D_{(50)}$ =	0.069	mm	Plasticity Index =	0.0%	Moisture %, as sampled = 67.1%
$D_{(60)}$ =	0.136	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.345	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	8/11		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50		100%	100.0%	0.0%
3/8"	9.50		100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75		100%	100.0%	0.0%
#8	2.36	100%	100%	100.0%	0.0%
#10	2.00	96%	96%	100.0%	0.0%
#16	1.18		89%	100.0%	0.0%
#20	0.850	86%	86%	100.0%	0.0%
#30	0.600	80%	80%	100.0%	0.0%
#40	0.425	75%	75%	100.0%	0.0%
#50	0.300		69%	100.0%	0.0%
#60	0.250		67%	100.0%	0.0%
#80	0.180	64%	64%	100.0%	0.0%
#100	0.150	61%	61%	100.0%	0.0%
#140	0.106		57%	100.0%	0.0%
#170	0.090		56%	100.0%	0.0%
#200	0.075	54.7%	54.7%	100.0%	0.0%



Comments:

Reviewed by: Mark Peterson

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Sieve Report

Project: Q.C. Silverdale Recycling and Garbage Facility
Project #: 21B077-33
Client: Aspect Cosulting
Source: ATP 18 @ 10'
Sample#: S21-0533

Date Received: December 9, 2021
Date Sampled: December 9, 2021
Sampled By: Client
Date Tested: December 16, 2021
Tested By: Mark Peterson

ASTM D-2487 Unified Soils Classification System
SP, Poorly graded Sand with Gravel
Sample Color:
Gray- Brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

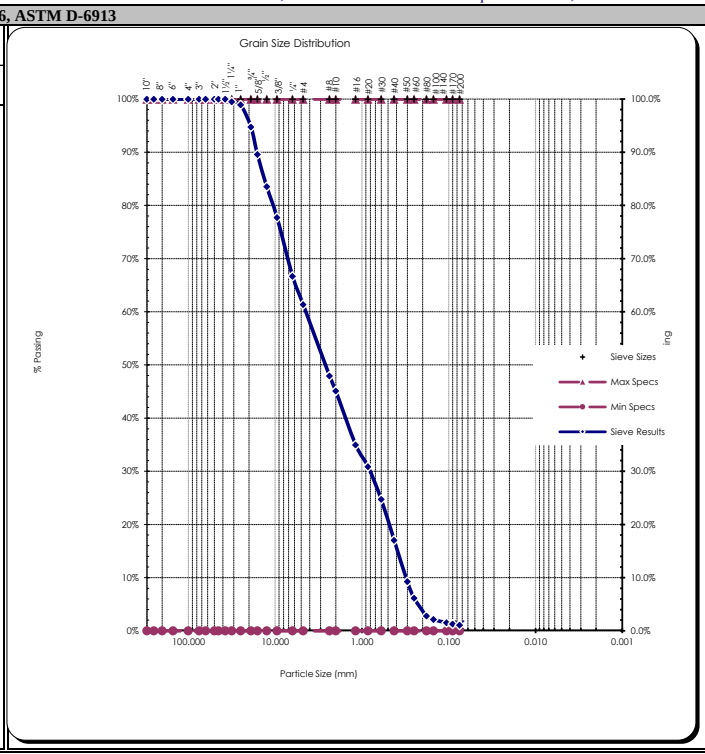
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.226 mm	% Gravel =	38.6%	Coeff. of Curvature, C_C =	0.47
$D_{(10)}$ =	0.312 mm	% Sand =	60.3%	Coeff. of Uniformity, C_U =	14.46
$D_{(15)}$ =	0.392 mm	% Silt & Clay =	1.1%	Fineness Modulus =	4.47
$D_{(30)}$ =	0.814 mm	Liquid Limit =	0.0%	Plastic Limit =	0.0%
$D_{(50)}$ =	2.729 mm	Plasticity Index =	0.0%	Moisture %, as sampled =	7.0%
$D_{(60)}$ =	4.509 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	16.240 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	4/63	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50	100%	100%	100.0%	0.0%
1.25"	31.50		99%	100.0%	0.0%
1.00"	25.00	99%	99%	100.0%	0.0%
3/4"	19.00	95%	95%	100.0%	0.0%
5/8"	16.00		90%	100.0%	0.0%
1/2"	12.50	84%	84%	100.0%	0.0%
3/8"	9.50	78%	78%	100.0%	0.0%
1/4"	6.30		67%	100.0%	0.0%
#4	4.75	61%	61%	100.0%	0.0%
#8	2.36	48%	48%	100.0%	0.0%
#10	2.00	45%	45%	100.0%	0.0%
#16	1.18		35%	100.0%	0.0%
#20	0.850	31%	31%	100.0%	0.0%
#30	0.600	25%	25%	100.0%	0.0%
#40	0.425	17%	17%	100.0%	0.0%
#50	0.300		9%	100.0%	0.0%
#60	0.250	6%	6%	100.0%	0.0%
#80	0.180	3%	3%	100.0%	0.0%
#100	0.150	2%	2%	100.0%	0.0%
#140	0.106		2%	100.0%	0.0%
#170	0.090		1%	100.0%	0.0%
#200	0.075	1.1%	1.1%	100.0%	0.0%



Comments:

Reviewed by: Mark Peterson

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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, LLC (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.