Earth Element Technical Report

Park District Redevelopment
Everett Housing Authority
Everett, Washington

for
MIG, Inc.

August 17, 2023
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1.0 INTRODUCTION

This report presents the results of our geologic hazards and environmentally critical areas (ECA) review services in support of the environmental impact statement (EIS) related to the proposed Park District Redevelopment project for MIG, Inc. (MIG) located in North Everett, Washington. Our understanding of the project is based on discussions and information provided by EA Engineering, Science, and Technology, Inc. (EA) and MIG. Our report focuses on the earth elements for the Park District Redevelopment EIS, and addresses geologic conditions, potential geologic hazards, and general geotechnical criteria related to development of the site. The proposed project site is shown relative to surrounding physical features in Figure 1, Vicinity Map and Figure 2, Site Plan.

1.1. Project Description

The project is a part of a large housing redevelopment project being completed by the Everett Housing Authority (EHA) in the North Everett area. Redevelopment of the Baker Heights neighborhood includes replacing existing abandoned post-WWII era low-income single-story housing units and redeveloping the neighborhood with new mixed-use buildings and associated improvements. Phase 1 of the redevelopment project consisted of redeveloping about 6.3 acres of the southern portion of the neighborhood (Madrona Square) and construction finished in the summer of 2023.

The Park District Redevelopment will occur on the approximately 16-acre neighborhood located north of the Phase 1 redevelopment project. There are separate plans for demolition of the existing post-WWII era low-income single-story housing units prior to commencing the Park District Redevelopment. Construction of the development will likely occur in phases over a period of about 10 years, depending on the market. The proposed project consists of a mixed-use development including housing; retail, civic/service and office uses; and outdoor publicly accessible open space. EHA intends to offer new housing at a range of incomes; provide equitable investment into the diverse and underserved neighborhood; and support the City of Everett’s desire for walkable communities and decarbonization.

The City’s issuance of Determination of Significance (DS) for the proposed project triggered the requirement for an EIS. Based on the results of the EIS scoping, the City determined that the following EIS alternatives be studied within the EIS. These alternatives include:

- Alternative 1 – Proposed Action
- Alternative 2 – Design Alternative
- Alternative 3 – No Action Alternative

Alternative 1 – Proposed redevelopment of the site would consist of up to 1,500 residential housing units; 70,600 gross square feet of retail, civic/service, and office uses; as well as open space and 1,018 structured parking spaces. Townhouses, low-rise buildings, and open space would be used on the east and west sides of the site to act as a buffer to the existing single-family neighborhoods that surround the area. Buildings in the center of the development would consist of mid-rise (five to nine stories) and high-rise (up to 15 stories) residential and mixed-use buildings.

Alternative 2 – Proposed redevelopment would feature the same amounts of new residential, retail, civic/service, and office uses as Alternative 1; however, two more buildings would be built and the maximum height of new buildings would be lowered from 15 to 10 stories. This would result in less open space for the project.
Alternative 3 – The site would remain in its existing condition. All existing buildings and landscaping would remain for the time being; however, demolition and removal of the buildings will ultimately occur under a separate action. According to the State Environmental Protection Act (SEPA) rules, “No Action” does not necessarily mean that nothing would occur on the site, the site could be developed in accordance with the existing zoning. If redevelopment does occur under the existing zoning, which for analysis purposes in this EIS has been assumed, the site would feature residential buildings only; no non-residential uses, such as retail, would be included. The residential buildings would be constructed at a lower maximum height (up to four stories) than Alternatives 1 and 2; therefore, fewer new housing units would be provided. There would be more open space if development occurs under this alternative; however, no large, publicly accessible park would be provided.

We understand that the low-rise buildings along the perimeter of the site will be constructed at grade, while the mid to high-rise buildings on the hillside will have partial to two below-grade levels. The below-grade levels will cut into the hillside on the west and daylight to the east. Associated improvements will consist of sidewalks/hardscape, parking stalls, new access drive lanes and streets, landscaping, and underground utilities.

1.2. Purpose and Scope

The purpose of our services is to: (1) characterize surface conditions, and surface and near-surface soil and groundwater conditions based on available information and recently completed borings by GeoEngineers, (2) identify areas that meet the City of Everett’s criteria for geologically critical areas, such as erosion, landslide, steep slopes, and seismic hazards within and adjacent to the site boundaries, (3) assess potential impacts, and (4) develop, as appropriate for the planning level, mitigation strategies. Our services were completed in general accordance with our proposal dated December 21, 2022.

2.0 FIELD EXPLORATIONS AND LABORATORY TESTING

2.1. Field Explorations

The subsurface soil and groundwater conditions were evaluated through a field exploration program that consisted of drilling and sampling 22 borings (B-1 through B-22) and excavating and sampling 13 test pits (TP-18 through TP-30). The explorations were completed in the vicinity of the proposed development at the approximate locations shown in Figure 2.

The borings were drilled to depths ranging between 20½ and 41 feet below existing site grades and the test pits were excavated to depths ranging from 4½ to 8½ feet below the ground surface. Locations of the explorations were determined in the field by measuring off of existing site features. A description of the field exploration program and logs of the explorations are presented in Appendix A.

2.2. Laboratory Testing

Soil samples obtained from the borings and test pits were transported to our laboratory and evaluated to confirm or modify field classifications, as well as to evaluate engineering properties of the soil. Representative samples were selected for laboratory testing consisting of moisture content, fines content (material passing the U.S. No. 200 sieve) and grain-size distribution (sieve analysis). The tests were performed in general accordance with test methods of the ASTM International (ASTM) and other applicable procedures. A description of the laboratory testing and the test results are presented in Appendix B.
2.3. Previous Explorations

GeoEngineers previously provided geotechnical engineering and infiltration evaluation services during Phase 1 (Madrona Square) of the redevelopment project. Phase 1 services included completing 17 test pits (TP-1 through TP-17) in the Phase 1 area, although several of the test pits (TP-1 through TP-5, TP-8, TP-12, and TP-15 through TP-17) were completed in areas that are now located in the Park District Redevelopment site. Two pilot infiltration tests (PITs) were also completed for stormwater infiltration feasibility for the Phase 1 site located south of 14th Street. Approximate locations of relevant explorations completed during the Phase 1 study are shown in Figure 2 and the test pit exploration logs are included in Appendix C.

3.0 SITE CONDITIONS

3.1. Surface Conditions and Topography

The site is situated near the crest of a moderately sloping east-facing hillside and is bounded by 14th Street to the south, 12th Street to the north, the existing homes along the east side of Fir Street to the east, and the existing homes along the west side of Poplar Street to the west. A small rectangular area extends south of 14th Street and west of Pine Street. The topography at the site slopes down moderately towards the east from approximately elevation 115 to 119 feet along the western edge of the site to about elevation 67 to 73 feet along the eastern edge.

Forty-five residential units exist within the Park District Redevelopment site, which are abandoned and bordered up at this time. The residential buildings are surrounded by lawn and landscape areas. Concrete sidewalks exist adjacent to the streets and concrete paths and/or stairs lead to each unit. Deciduous and coniferous trees are scattered throughout the site. Underground utilities consisting of power, gas, water, and sewer are located throughout the area, while overhead power and telephone lines exist along Poplar Street, 14th Street, Larch Street, and Fir Street.

3.2. Geology

The project site is located near the crest of a glaciated upland on the east side of a major glacial trough now occupied by Possession Sound. The glaciated upland is characterized by north-south elongated ridges comprised of glacially consolidated deposits.

Published geologic information for the project vicinity includes two United States Geological Survey (USGS) maps; one map is of the Everett 7.5’ – Minute Quadrangle, Snohomish County, Washington and the other map is of the Marysville Quadrangle, Snohomish County, Washington (USGS 1985). Mapped units in the immediate project vicinity consist of glacially consolidated Vashon Till deposits (glacial till). Advance outwash deposits are mapped along the eastern perimeter of the site along Pine Street. Although not shown on the geologic maps in the site vicinity, glaciolacustrine deposits were encountered in explorations along the east side of Pine Street (test pits TP-1 through TP-4, TP-19, TP-22, and TP-26).

- Glacial till is generally a non-sorted, non-stratified mixture of sand, gravel and silt that has been overridden by several thousand feet of ice. It typically has high shear strength, low consolidation and low permeability characteristics in the undisturbed state. It typically develops a “weathered” zone where seasonal groundwater perches on top of the relatively impermeable unweathered till and the perched groundwater occurs as seepage following the site topography.
Advance outwash deposits are mostly clean, pebbly sand with increasing amounts of gravel higher in the section deposited by meltwater flowing from the advancing front of the Vashon glacier. This unit typically has high shear strength, low consolidation and moderate permeability characteristics in the undisturbed state.

Glaciolacustrine deposits generally consist of massive to bedded silt, clay and sand with minor amounts of peat and gravel. The glaciolacustrine deposits are generally in a stiff to hard condition due to being overridden by several thousand feet of ice. Cobblestones and boulders may also be present within the glaciolacustrine deposits.

Subsurface soil conditions encountered in the explorations completed within the site vicinity are consistent with the mapped glacial till unit, although glaciolacustrine deposits were encountered in test pits TP-1 through TP-4, TP-19, TP-22, and TP-26, as described above. Advance outwash was not encountered in our explorations.

The site ground surface was modified during past development activities. Fill associated with past grading mantles the native glacial soils and varies in thickness depending on the location with respect to existing buildings and streets, with deeper fill likely located on the downhill side of existing building pads and streets.

3.3. Subsurface Conditions

3.3.1. Soil Conditions

GeoEngineers’ understanding of the subsurface soil conditions in the area of the planned redevelopment is based on the results of our explorations. The approximate locations are presented in Figure 2. The general subsurface conditions consist of topsoil and fill overlying native glacial till and glaciolacustrine deposits. The subsurface soil conditions are summarized below:

- **Asphalt Pavement/Gravel:** Approximately 1 inch of crushed gravel underlain by 3 inches of asphalt concrete pavement was observed in test pit TP-17 that was completed in the parking area at the southwest corner of the site.

- **Sod:** Test pits and borings completed in lawn areas generally encountered 3 to 4 inches of sod/topsoil.

- **Fill/Weathered Glacial Till:** Fill and/or highly weathered native glacial till generally consisting of very loose to medium dense silty sand with occasional gravel and various amounts of organic matter was encountered above the native glacial soils in all of the explorations with the exception of borings B-12 and B-17. Localized areas of cleaner sands were observed in test pits TP-2, TP-11, TP-14, and TP-20. A silty gravel with sand layer was also observed in TP-14, above the localized clean sand layer. Construction debris consisting of brick fragments, and asphalt and concrete debris were observed within the fill in some of the explorations. The fill/weathered glacial till thickness ranged from about 1¾ to 7 feet deep, and it is often difficult to distinguish the looser weathered glacial till deposits from the overlying fill soils.

- **Glacial Till:** Glacial till was encountered below the fill/weathered till in a majority of the explorations. Where encountered, the glacial till extended to the depths explored with the exception of test pit TP-22 where glaciolacustrine deposits were encountered below the till. The glacial till generally consisted of dense to very dense silty sand with variable gravel and cobble content. Occasional layers of hard silt with varying amounts of sand and gravel were also observed within the till.
**Glaciolacustrine Deposits:** Glaciolacustrine deposits were encountered below the fill/weathered glacial soils in test pits TP-1 through TP-4, TP-19, TP-22, and TP-26 along the east side of the site. The glaciolacustrine deposits consisted of medium stiff to hard silt and clay and typically exhibited oxidation staining near the top of the unit. Where encountered, the glaciolacustrine deposits extended to the depths explored.

Although not observed in the explorations, cobbles and boulders are commonly encountered within glacial deposits.

**3.3.2. Groundwater Conditions**

Regional groundwater was not encountered in the explorations; however, shallow groundwater seepage interpreted as perched groundwater was observed in several of the explorations at various depths. Perched water was also interpreted in the three monitoring wells B-3, B-10 and B-14. Perched groundwater should be expected to vary as a function of season, precipitation, and other factors. Seepage zones should also be expected to develop in the fill and weathered glacial till, perched above the relatively unweathered glacial till and glaciolacustrine deposits.

**4.0 GEOLOGIC HAZARDS**

**4.1. City of Everett Geologically Hazardous Areas**

Washington State’s Growth Management Act (Chapter 36.70A of the Revised Code of Washington [RCW]) requires all cities and counties to identify critical areas within their jurisdictions and to formulate development regulations for their protection. Among the critical areas designated by the Growth Management Act are geologically hazardous areas, defined as such because of their potential susceptibility to erosion, sliding, earthquake, or other geologic events, or because of their past use (i.e., landfills). These areas may not be suited for development consistent with public health and safety concerns without conducting specific studies during the design and permitting process.

The City of Everett defines and identifies geologic hazard areas in its Geologically Hazardous Areas Ordinance (Chapter 19.37.080 of the Everett Municipal Code [EMC]) and has developed a Geographic Information Systems (GIS) map that identifies geologically hazardous areas. The geologic hazard areas include landslide hazard areas, seismic/liquefaction hazard areas, erosion hazard areas, and other areas which the City has reason to believe are geologically hazardous.

Geologically hazardous areas are defined per the following under Everett City Code 19.37.080.A:

1. **Landslide hazard areas**

   a. Those areas defined as high and very high/severe risk of landslide hazard in the Dames and Moore Methodology for the Inventory, Classification and Designation of Geologically Hazardous Areas, City of Everett, Washington: July 1, 1991, or as revised through best available science:

      (1) Very high/severe: slopes greater than fifteen percent in the Qtb, Qw, and Qis geologic units; and slopes greater than fifteen percent with uncontrolled fill.
(2) High: slopes greater than forty percent in all other geologic units (not Qtb, Qw, and Qls or uncontrolled fill).

b. Those areas defined as medium risk of landslide hazard in the Dames and Moore Methodology for Inventory, Classification and Designation of Geologically Hazardous Areas, City of Everett, Washington: July 1, 1991, or as revised through best available science, when combined with springs or seeps, immature vegetation, and/or no vegetation:

   (1) Slopes less than fifteen percent for Qtb, Qw, and Qls geologic units and uncontrolled fill.

   (2) Slopes of twenty-five percent to forty percent in all other geologic units.

c. Any area with all three of the following characteristics:

   (1) Slopes greater than fifteen percent; and

   (2) hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and

   (3) springs, ground water seepage, or saturated soils.

d. Any area which has shown movement during the Holocene epoch (from ten thousand years ago to the present) or which is underlain or covered by mass wastage debris of that epoch.

e. Any area potentially unstable as a result of rapid stream incision, stream bank erosion or undercutting by wave action.

f. Areas of historic failures, including areas of unstable, old and recent landslides or landslide debris within a head scarp, and areas exhibiting geomorphological features indicative of past slope failure, such as hummocky ground, slumps, earthflows, mudflows, etc.

g. Any area with a slope of forty percent or steeper and with a vertical relief of fifteen or more feet, except those manmade slopes created under the design and inspection of a geotechnical professional, or slopes composed of consolidated rock.

h. Areas that are at risk of landslide due to high seismic hazard.

   i. Areas that are at risk of landslides or mass movement due to severe erosion hazards.

2. Seismic/liquefaction hazard areas:

   a. Those areas mapped as seismic/liquefaction hazards per the Dames and Moore Methodology for the Inventory, Classification and Designation of Geologically Hazardous Areas, City of Everett, Washington: July 1, 1991, or as revised through best available science.

3. Erosion hazard areas:

a. Those areas defined as high and very high/severe risk of erosion in the Dames and Moore Methodology for the Inventory, Classification and Designation of Geologically Hazardous Areas, City of Everett, Washington: July 1, 1991, or as revised through best available science:

   (1) High erosion hazard areas include slopes of twenty-five to forty percent in Qva and Qal geologic units; and slopes of greater than forty percent in other (not Qva or Qal) geologic units.

   (2) Very high/severe erosion hazard areas include slopes of greater than forty percent in Qva and Qal geologic units.

b. Those areas defined as medium risk of erosion in the Dames and Moore Methodology for the Inventory, Classification and Designation of Geologically Hazardous Areas, City of Everett, Washington: July 1, 1991, or as revised through best available science, when they contain debris and mud flows, gullying or rifling, immature vegetation, or no vegetation:

   (1) Slopes of twenty-five to forty percent in other (not Qva or Qal) geologic units.

4. Other areas which the city has reason to believe are geologically hazardous.

4.2. Landslide Hazard Areas

Based on our review of the City of Everett GIS map, there are no mapped landslide hazards at the site. The site is located on terrain that is moderately inclined to the east, with an overall gradient around 6 to 7.5 percent. There are small, localized areas where steeper slopes exist at the site, such as at steps, small retaining walls, and building platforms; however, these slopes were created through grading activities associated with past development of the site and do not meet the criteria per subsection 19.37.080.A.1.g.

4.3. Seismic/Liquefaction Hazard Areas

The City of Everett GIS map does not show any seismic hazards mapped at the site. It maps the liquefaction susceptibility of the site as very low to moderate to high.

4.3.1. Liquefaction

Liquefaction is a phenomenon where strong vibration or ground shaking, usually from earthquakes, results in development of excess pore pressures in loose, saturated soils and subsequent loss of strength in the soil deposits so affected.

Ground settlement, lateral spreading and/or sand boils may result from soil liquefaction. Structures supported on liquefied soils could suffer foundation settlement or lateral movement that could be severely damaging to the structures.
Conditions favorable for liquefaction occur in loose to medium dense, clean to moderately silty sand that is below the groundwater level.

Based on our recently completed explorations and on published geologic maps, the site is underlain by granular and cohesive soils that are typically dense to very dense and/or very stiff to hard, and the regional groundwater table is very deep. Therefore, in our opinion, potentially liquefiable soils are not present below the site.

4.3.2. Lateral Spreading
Lateral spreading is associated with liquefaction and involves lateral displacements of large volumes of liquefied soil. It can occur on near-level ground as “blocks” of surface soils displaced relative to adjacent “blocks” and generally requires a free face that allows the movement of the earth. In our opinion, there is no risk of lateral spreading at the site because potentially liquefiable soils are not present as discussed above.

4.3.3. Strong Ground Motion
The area is subject to strong ground-shaking either from local shallow crustal earthquakes, Cascadia subduction zone earthquakes, or intra-slab earthquakes that may be relatively shallow to deep.

4.3.4. Surface Rupture
There are no mapped faults in the immediate vicinity of the site, with the exception of the Southern Whidbey Island fault zone mapped approximately 6 miles southwest of the site. Our opinion is that there is a low risk of fault displacement resulting in ground rupture at the surface.

4.4. Erosion Hazard Areas
There are no mapped erosion hazard areas based on our review of the City of Everett GIS map. In our opinion, the erosion potential of the site is low given the relatively moderate gradient of the site.

4.5. Landfill Areas
The nearest landfill is about 2 miles to the south, which is outside of the buffer for methane.

4.6. Smelter Plume
The site is located within the uplands boundary of the Washington Department of Ecology Everett Smelter Cleanup site. Investigations were conducted in August 2016 by the Department of Ecology, consisting of soil sampling for lead and arsenic, which were identified as primary contaminants of concern (COCs). Based on the arsenic concentrations detected in the soil in the investigation, the Department of Ecology recommended cleanup at various areas of the Everett Smelter Cleanup site, including one small area in the northwest portion of the site (between Poplar Street and Larch Street). GeoEngineers previously completed a Construction Soil and Water Management Plan (CSWMP) for the EHA in 2020 as part of the Phase 1 (Madrona Square) development. This CSWMP identifies the small area in the northwest corner of the site, which is shown on Figure 3, Site Plan – Cleanup Area.
5.0 CONCLUSIONS

5.1. Summary of Key Geotechnical Issues

Geotechnical issues for the project include, but are not limited to the following:

- The primary geologic hazard as defined by the City of Everett’s code is strong ground motions. Redevelopment will be accomplished under the seismic design criteria using current design codes (including the IBC and City of Everett codes) and generally accepted standards and practices at the time of design.

- Fill and native glacial soils observed in the explorations completed at the site contain a high percentage of fines and are highly moisture sensitive. We expect that operation of equipment on these soils will not be difficult during the dry season. However, wet season construction can produce significant mud, disturbed soils and turbid water, unless properly planned for in the design documents as required by the City of Everett.

- Temporary excavations may employ temporary cut slopes or shoring consisting of soldier piles with wood lagging or soils nail walls.

- Effective erosion and sedimentation control must be implemented during construction so that potential impacts to adjacent areas are reduced. The erosion and sediment control measures for this project should be in accordance with the requirements of the City of Everett.

- Shallow, perched groundwater zones may be encountered during grading activities on top of the unweathered glacial till or within the fill soils, or within the glacial till unit itself, particularly during the wet winter and spring months. We anticipate that if groundwater seepage is encountered during shallow excavations that it can be handled by excavating interceptor trenches and pumping from sumps.

- It is anticipated that the buildings can be supported on conventional shallow foundations bearing on undisturbed glacially consolidated soils.

- Perimeter footing drains should be installed around new buildings and at least 6-inches of clean crushed rock for uniform support and as a capillary break should be provided under slabs-on-grade.

- Below-grade walls and retaining structures should be used to support grade changes of more than 4 feet in height on site where permanent slopes are not feasible. These walls and retaining structures should be designed with the appropriate lateral earth pressures.

- A project-specific geotechnical study will be required for the project. An environmental study should also be conducted to address the contaminated soils associated with the Everett Smelter Cleanup site.

5.2. Mitigating Potential Impacts

Recommendations for mitigating potential impacts to the planned development is summarized below.

5.2.1. Landslide Hazard Areas

5.2.1.1. Impacts

There are no mapped landslide hazard areas at the site as the site moderately slopes downward to the east between 6 to 7.5 percent. However, there are small, localized areas where steeper slopes exist at the site, such as at steps, small retaining walls, and building platforms. These slopes were created through grading activities associated with past development of the site and do not meet the criteria per subsection 19.37.080.A.1.g.
The impact of landsliding is considered very low for all three of the Alternatives because there are no mapped landslide hazard areas. Clearing and grading will occur for site development for all three Alternatives. Alternative 2 would require the most clearing and grading because there are more proposed buildings with underground parking, followed by Alternative 1 and lastly Alternative 3.

Clearing and grading of the site for development will expose soils, which could result in erosion and may slightly increase the risk of landsliding. Furthermore, the small, localized steep slopes will be cut into, removed or graded flatter under these alternatives which could slightly increase the risk of landsliding. However, through good site planning, clearing and grading, even in the small, localized steep slopes will not adversely impact the site and the potential for landslides.

5.2.1.2. Mitigation
The installation of properly designed temporary and permanent retaining walls and slopes in accordance with the City of Everett regulations will reduce impacts of the Alternatives to potential landsliding.

5.2.2. Seismic/Liquefaction Hazard Design Information
5.2.2.1. Impacts
Potentially liquefiable soils are not present at the site and therefore there is no risk for liquefaction-induced settlement or lateral spreading under any of the three Alternatives. There is a low risk of fault displacement resulting in ground rupture at the surface and this risk is the same for the three Alternatives.

Strong ground motions can affect structures and their foundations if not designed and constructed in accordance with applicable code. Taller structures perform differently than shorter ones; namely, taller buildings are more affected by low-frequency, larger amplitude, longer period shaking whereas smaller buildings are more affected by high-frequency, smaller amplitude, shorter period shaking. The type of construction can also influence the type of impacts. For instance, brick or masonry buildings generally perform poorly in an earthquake. Taller buildings constructed with steel will tend to sway from the seismic waves and are designed and constructed accordingly. These strong ground motions may impact the buildings under all three of the Alternatives; however, with good design and construction, the impact of these strong motions to buildings under the Alternatives can be mitigated.

5.2.2.2. Mitigation
Strong ground motion hazards will be mitigated by following the applicable codes that are valid at the time of design and construction.

5.2.1. Sedimentation and Erosion Control
5.2.1.1. Impacts
Development of the Alternatives will require clearing and grading the existing elements for construction, which will impact the erosion potential of the site. However, the erosion potential of on-site soils within the site boundary is generally low. Construction activities including stripping and grading will expose soils to the erosional effects of wind and water. The amount and potential impacts of erosion are partly related to the time of year that construction occurs. Wet weather construction will increase the amount and extent of erosion and potential sedimentation.

5.2.1.2. Mitigation
Erosion potential can be mitigated through effective methods of erosion and sediment control during construction including efficient surface water management, minimization of the size of disturbed areas,
and erosion resistant slope covers. Erosion and sedimentation control measures should include proper channeling of surface water runoff into lined diversion ditches that incorporate energy dissipaters, and use of straw bales, geotextile silt fences, and straw mulch, as appropriate for temporary protection of exposed soils. Disturbed areas should be finish graded, protected, and vegetated as soon as practicable to reduce the risk of erosion. Erosion and sedimentation control measures should be installed and maintained in accordance with the requirements of the City of Everett.

5.2.2. Earthwork and Grading

5.2.2.1. Impacts
Development of the Alternatives will require earthwork and grading. Earthwork activities can impact adjacent structures and properties if not properly accounted for during design. Earthwork performed during the wet season can generate significant mud and turbid water if not properly planned. All fill placed for site development should be properly placed and compacted as structural fill.

The on-site fill and native glacial soils contain significant fines (particles passing the U.S. Standard No. 200 sieve) and are highly moisture-sensitive and susceptible to disturbance, especially when wet. Dry weather construction will help reduce earthwork costs.

5.2.2.2. Mitigation
Earthwork impacts will be reduced if construction is performed during the dry season and will be mitigated by following the City of Everett requirements.

Structural fill placed to construct pavement areas, placed below foundations and slabs, to backfill retaining walls and utility trenches, and placed against foundations should consist of proper material, which we anticipate will be recommended in a geotechnical report.

Structural fill should be mechanically compacted to a firm condition. Structural fill should be placed in loose lifts not exceeding 12 inches in thickness if using heavy compactors and 6 inches if using hand operated compaction equipment. The actual lift thickness will be dependent on the structural fill material used and the type and size of compaction equipment. Each lift should be moisture conditioned to within 2 percent of the optimum moisture content and compacted to the specified density before placing subsequent lifts. Compaction of all structural fill at the site should be in accordance with the ASTM D 1557 (modified proctor) test method. For planning purposes, structural fill should be compacted to the following criteria:

- All fill placed under proposed buildings should be placed as structural fill compacted to at least 95 percent of the maximum dry density (MDD).
- Structural fill placed against foundations should be compacted to at least 95 percent of the MDD.
- Structural fill placed outside of building footprints should be compacted to at least 90 percent of the MDD, except the upper 2 feet under sidewalks and pavement areas should be compacted to at least 95 percent of the MDD.

5.2.3. Drainage Considerations

5.2.3.1. Impacts
Development of the Alternatives will require drainage measures. Temporary and permanent drainage measures can have a significant impact on the performance of a project. Temporary drainage measures will be needed during construction to reduce the impact to site soils and to control sediment runoff. Shallow
perched groundwater seepage and stormwater may also enter excavations depending on the time of year construction takes place, especially in the winter months. Permanent drainage measures will be needed to protect planned development.

5.2.3.2. Mitigation
Stormwater and shallow perched seepage water entering excavation can likely be handled by digging interceptor trenches in the excavations and pumping from sumps. The seepage water if not intercepted and removed from the excavations will make it difficult to place and compact structural fill and may destabilize cut slopes.

For permanent drainage control, all paved and landscaped areas should be graded so that surface drainage is directed away from buildings to appropriate catch basins. Water collected in roof downspout lines must not be routed to the footing drain lines. Collected downspout water should be routed to appropriate discharge points in separate pipe systems.

5.2.4. Temporary Excavations

5.2.4.1. Impacts
Excavations for site improvements for all three Alternatives will be required, including underground parking for some of the buildings for Alternatives 1 and 2. Excavations can impact adjacent structures, roads, sidewalks, and utilities if not properly designed. The use of inadequately designed open cuts could also impact the stability of adjacent work areas and existing utilities, and endanger personnel. Therefore, excavations may require temporary shoring depending on site constraints and/or use of temporary open cut slopes.

5.2.4.2. Mitigation
Temporary shoring commonly includes soldier pile walls (with or without tiebacks) or soil nail walls. Because of the diversity of construction techniques and available shoring systems, the design of temporary shoring is most appropriately left up to the contractor proposing to complete the installation. However, all temporary shoring must be in accordance with the City of Everett requirements. The City of Everett and other local jurisdictions typically requires that temporary shoring walls be designed to limit deflections to 1 inch or less. The shoring system will be required to be temporary if ground anchors are needed as they will likely extend into the City of Everett right-of-way and a right-of-way street use permit will be required.

Where temporary shoring is not needed, excavations extending more than 4 feet deep can be made as temporary open cut slopes depending on site constraints. The stability of open cut slopes is a function of soil type, groundwater seepage, slope inclination, slope height and nearby surface loads. The contractor performing the work has the primary responsibility for protection of workers and adjacent improvements. Temporary cut slopes and shoring must comply with the provisions of Title 296, Washington Administrative Code (WAC), Part N, “Excavation, Trenching and Shoring” as revised or replaced, and be in accordance with the City of Everett requirements. Because the contractor has control of the construction operations, the contractor should be made responsible for the stability of cut slopes, as well as the safety of the excavations. For planning purposes, temporary unsupported cut slopes more than 4 feet high may be inclined at 1H:1V (horizontal to vertical) maximum steepness within the relatively unweathered dense to very dense glacial till soils. Temporary cuts within the fill, loose to medium dense weathered glacial deposits, and glaciolacustrine deposits may be cut at a maximum inclination of 1½H:1V. These inclinations may need to be flattened if significant caving/sloughing or groundwater seepage occurs. For temporary open cuts:
No traffic, construction equipment, stockpiles, or building supplies be allowed at the top of cut slopes within a distance of at least 5 feet from the top of the cut;

The excavation should not encroach on a 1H:1V influence line projected down from the edges of nearby or planned foundation elements;

Exposed soil along the slope be protected from surface erosion using waterproof tarps or plastic sheeting;

Construction activities be scheduled so that the length of time the temporary cut is left open is reduced to the extent practicable;

Erosion control measures be implemented as appropriate such that runoff from the site is reduced to the extent practicable;

Surface water be diverted away from the excavation; and

The general condition of the slopes be observed periodically by GeoEngineers to confirm adequate stability.

5.2.5. Permanent Slopes

5.2.5.1. Impacts

Permanent slopes for development of the Alternatives must be designed and constructed to remain stable for the long-term and under wet weather and possible seismic events. Improperly designed and/or constructed slopes can fail prematurely or erode during wet weather.

5.2.5.2. Mitigation

Permanent cut or fill slopes should be constructed at inclinations of 2H:1V or flatter. Permanent slopes constructed at 3H:1V or flatter provide better conditions for future maintenance. Structural fill placed to construct permanent fill slopes should be compacted to at least 90 percent of the MDD in accordance with the ASTM D 1557 (modified proctor) test method.

To reduce erosion, newly constructed permanent slopes should be planted or hydroseeded shortly after completion of grading. Until dense vegetation is established, some sloughing and raveling of the slopes should be expected. This may require localized repairs and reseeding. Temporary covering, such as clear heavy plastic sheeting, jute fabric, or erosion control blankets could be used to protect the slopes during periods of rainfall.

5.2.6. Landfill Areas

As discussed earlier, the closest mapped landfill is about 2 miles to the south and outside of any buffers. Therefore, there is no impact or mitigation measures related to landfills required for the project, regardless of the Alternative.

5.2.7. Smelter Plume

5.2.7.1. Impacts

One relatively small area in the northwest portion of the site (between Poplar Street and Larch Street, see Figure 3) was identified by the Department of Ecology as requiring cleanup. Earthwork will be performed in this area and will impact the disposal and potential re-use of soils for structural fill.
5.2.7.2. Mitigation
An environmental study should be completed for the site to identify contaminants in the soil and provide recommendations for soil handling and disposal.

6.0 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS
Provided the mitigation measures are implemented as discussed in this report, no significant unavoidable adverse impacts are expected for the earth element of the Park District Redevelopment alternatives.

7.0 LIMITATIONS
We have prepared this report for the exclusive use of MIG and their authorized agents for the Everett Housing Authority Park District Redevelopment project in Everett, Washington. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geologic, geotechnical and environmental planning services in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

GeoEngineers’ Scope of Services does not constitute a Phase I ESA in general accordance with ASTM International (ASTM) Standard E 1527-21 for Phase I ESAs and the EPA’s Federal Standard 40 CFR Part 312 “Standards and Practices for All Appropriate Inquiries (AAI).” Additionally, our scope of services does not include an environmental compliance audit or an evaluation for the presence of lead-based paint, toxic mold, PCBs in light ballasts, radon, lead in drinking water, asbestos-containing building materials or urea-formaldehyde insulation in on-site structures or debris or other potentially hazardous building materials. Our work specifically excludes the investigation, detection or assessment of the presence of Biological Compounds that are deemed Pollutants in or around any structure. Accordingly, this report includes no interpretations, recommendations, findings or conclusions for the purpose of detecting, assessing or abating Biological Pollutants. The term “Biological Pollutants” includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix D for additional information pertaining to use of this report.

8.0 REFERENCES
City of Everett, Map Everett Online Map Viewer.


Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: ESRI
Projection: NAD 1983 UTM Zone 10N

Vicinity Map
Park District Redevelopment
Everett, Washington

Figure 1
Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features disclosed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Background Survey from Pace Engineers dated 10/1/2019.
Proposed site features from GGLO dated 10/29/2021.

Projection: WA State Plane, North Zone, NAD83, US Foot
Approximate Area Identified by Ecology as Requiring Cleanup for Arsenic Impacts Related to the Everett Smelter Cleanup Site

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.


Projection: WA State Plane HARN, North Zone, NAD83, US-Feet

Site Plan - Cleanup Area
Park District Redevelopment
Everett, Washington
Figure 3
APPENDIX A
Field Explorations
APPENDIX A
FIELD EXPLORATIONS

Subsurface soil and groundwater conditions were evaluated through a field exploration program that consisted of drilling 22 borings (B-1 through B-22) and excavating 13 test pits (TP-18 through TP-30). The locations of the explorations were estimated by measuring from existing features on site such as buildings, light poles, curbs, etc. The approximate locations of the explorations are shown on Figure 2. Exploration locations should be considered accurate to the degree implied by the method used. Ground surface elevations at the exploration locations were estimated based on the site topography.

Borings

Borings B-1 through B-22 were completed from November 7 through 11, 23 and 28, 2022, and were advanced to depths ranging from 20½ to 41 feet below the ground surface (bgs). The borings were completed using a track mounted Diedrich D-50 Turbo drill rig owned and operated by Advanced Drill Technologies, Inc. under subcontract to GeoEngineers.

The borings were continuously monitored by a field staff from our firm who evaluated and classified the soils encountered, obtained representative soil samples, and observed groundwater conditions. Our representative maintained a detailed log of each boring. Disturbed samples of the representative soil types were obtained from the borings using standard penetration test (SPT) sampling procedures. SPT sampling was performed using a 2-inch outside-diameter split-spoon sampler driven with a standard 140-pound hammer in accordance with ASTM International (ASTM) D 1586.

The soils encountered in the borings were typically sampled at 2½- to 5-foot vertical intervals with the SPT split spoon sampler. Samples were obtained by driving the sampler 18 inches into the soil with an automatic hammer free-falling 30 inches. The number of blows required for each 6 inches of penetration is recorded. The standard penetration resistance (“N-value”) of the soil is calculated as the number of blows required for the final 12 inches of penetration (blows per foot). This value is shown on the boring logs. This resistance, or N-value, provides a measure of the relative density of granular soils and the relative consistency of cohesive soils. If the high penetration resistance encountered in the very dense soils precluded driving the total 18-inch sample interval, the penetration resistance for the partial penetration is entered on logs as follows: if the penetration is greater than 6 inches and less than 18 inches, then the number of blows is recorded over the number of inches driven; 30 blows for 6 inches and 50 for 3 inches, for instance, would be recorded as 80/9 inch. The blow counts are shown on the boring logs at the respective sample depths. The SPT is a useful quantitative tool from which soil density/consistency was evaluated.

Soils encountered in the borings were classified in the field in general accordance with ASTM D 2488, the Standard Practice for Classification of Soils, Visual-Manual Procedure, which is summarized in Figure A-1. A log of the borings are provided in Figures A-2 through A-23.

Test Pits

Test pits TP-18 through TP-30 were completed between October 26 and 27, 2022 to depths ranging from approximately 4½ to 8½ feet below the ground surface. The test pits were completed using a rubber-tired backhoe owned and operated by Kelly's Excavating under subcontract to GeoEngineers.
The test pits were continuously monitored by staff from our firm who reviewed and classified the soils encountered, obtained representative soil samples, observed groundwater conditions and prepared a detailed log of each test pit.

Disturbed samples of representative soil types were obtained from the excavator bucket at representative depths. Soils encountered in the test pits were classified in the field in general accordance with ASTM D 2488, the Standard Practice for Classification of Soils, Visual-Manual Procedure, which is summarized in Figure A-1. A log of the test pits are provided in Figures A-24 through A-36.

The test pit logs are based on our interpretation of the field and laboratory data and indicate the various types of soil and groundwater conditions encountered. The logs also indicate the depths at which these soils or their characteristics change, although the change may be gradual.

Observations of groundwater conditions were made during the excavations. The groundwater conditions encountered during excavation of the test pits are presented on the test pit logs. Groundwater conditions observed during the excavation of the test pits represent short-term condition and may or may not be representative of the long-term groundwater conditions at the site. Groundwater conditions observed during test pit excavations should be considered approximate.
### Soil Classification Chart

<table>
<thead>
<tr>
<th>MAJOR DIVISIONS</th>
<th>SYMBOLS</th>
<th>TYPICAL DESCRIPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GRAVEL AND GRAVELLY SOILS</strong></td>
<td><strong>GW</strong></td>
<td>WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES</td>
</tr>
<tr>
<td><strong>GP</strong></td>
<td>POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES</td>
<td></td>
</tr>
<tr>
<td><strong>GM</strong></td>
<td>SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES</td>
<td></td>
</tr>
<tr>
<td><strong>GC</strong></td>
<td>CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES</td>
<td></td>
</tr>
<tr>
<td><strong>SW</strong></td>
<td>WELL-GRADED SANDS, GRAVELLY SANDS</td>
<td></td>
</tr>
<tr>
<td><strong>SP</strong></td>
<td>POORLY-GRADED SANDS, GRAVELLY SAND</td>
<td></td>
</tr>
<tr>
<td><strong>SM</strong></td>
<td>SILTY SANDS, SAND - SILT MIXTURES</td>
<td></td>
</tr>
<tr>
<td><strong>SC</strong></td>
<td>CLAYEY SANDS, SAND - CLAY MIXTURES</td>
<td></td>
</tr>
<tr>
<td><strong>ML</strong></td>
<td>INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY</td>
<td></td>
</tr>
<tr>
<td><strong>CL</strong></td>
<td>INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAY ClAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS</td>
<td></td>
</tr>
<tr>
<td><strong>OL</strong></td>
<td>ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY</td>
<td></td>
</tr>
<tr>
<td><strong>MH</strong></td>
<td>INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS</td>
<td></td>
</tr>
<tr>
<td><strong>CH</strong></td>
<td>INORGANIC CLAYS OF HIGH PLASTICITY</td>
<td></td>
</tr>
<tr>
<td><strong>OH</strong></td>
<td>ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY</td>
<td></td>
</tr>
<tr>
<td><strong>PT</strong></td>
<td>PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Multiple symbols are used to indicate borderline or dual soil classifications.

### Sampler Symbol Descriptions

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="2.4-inch I.D. split barrel" /></td>
<td>2.4-inch I.D. split barrel / Dames &amp; Moore (D&amp;M)</td>
</tr>
<tr>
<td><img src="image" alt="Shelby tube" /></td>
<td>Standard Penetration Test (SPT)</td>
</tr>
<tr>
<td><img src="image" alt="Piston" /></td>
<td>Shelby tube</td>
</tr>
<tr>
<td><img src="image" alt="Direct-Push" /></td>
<td>Piston</td>
</tr>
<tr>
<td><img src="image" alt="Bulk or grab" /></td>
<td>Direct-Push</td>
</tr>
<tr>
<td><img src="image" alt="Continuous Coring" /></td>
<td>Bulk or grab</td>
</tr>
<tr>
<td><img src="image" alt="Continuous Coring" /></td>
<td>Continuous Coring</td>
</tr>
</tbody>
</table>

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

### Groundwater Contact

- Measured groundwater level in exploration, well, or piezometer

### Graphic Log Contact

- Distinct contact between soil strata
- Approximate contact between soil strata
- Contact between geologic units

### Material Description Contact

- Contact between soil of the same geologic unit

### Laboratory / Field Tests

- Percent fines (%F)
- Percent gravel (%G)
- Atterberg limits (AL)
- Chemical analysis (CA)
- Laboratory compaction test (CP)
- Consolidation test (CS)
- Dry density (DD)
- Direct shear (DS)
- Hydrometer analysis (HA)
- Moisture content (MC)
- Moisture content and dry density (MD)
- Mohs hardness scale (Mohs)
- Organic content (OC)
- Permeability or hydraulic conductivity (PM)
- Plasticity index (PI)
- Point load test (PL)
- Pocket penetrometer (PP)
- Sieve analysis (SA)
- Triaxial compression (TX)
- Unconfined compression (UC)
- Unconsolidated undrained triaxial compression (UU)
- Vane shear (VS)

### Sheen Classification

- No Visible Sheen (NS)
- Slight Sheen (SS)
- Moderate Sheen (MS)
- Heavy Sheen (HS)

### Key to Exploration Logs

![Image of key to exploration logs]
### FIELD DATA

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Interval</th>
<th>Recovered (in)</th>
<th>Blows/foot</th>
<th>Sample Name</th>
<th>Testing</th>
<th>Graphic Log</th>
<th>Group Classification</th>
<th>Moisture Content (%)</th>
<th>Graphic Log Group</th>
<th>Classification</th>
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</tr>
<tr>
<td>5</td>
<td></td>
<td>11</td>
<td>50/5&quot;</td>
<td>2</td>
<td></td>
<td>SM</td>
<td>Brownish gray silty fine to medium sand with occasional gravel; trace rootlets (very dense, moist); (fill?)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>6</td>
<td>50/6&quot;</td>
<td>3</td>
<td></td>
<td>SM</td>
<td>Brownish gray silty fine to medium sand with occasional gravel (very dense, moist); (glacial till)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>6</td>
<td>50/6&quot;</td>
<td>4</td>
<td></td>
<td>SM</td>
<td>Gray silty fine to coarse sand with gravel (very dense, moist)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>6</td>
<td>50/6&quot;</td>
<td>5</td>
<td></td>
<td>SM</td>
<td>Brownish gray silty fine to medium sand with occasional gravel (very dense, moist)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>9</td>
<td>50/3&quot;</td>
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<td>SM</td>
<td>Brownish gray silty fine to medium sand with occasional gravel (very dense, moist)</td>
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<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>16</td>
<td>88/10&quot;</td>
<td>8</td>
<td></td>
<td>SM</td>
<td>Gray silty fine sand with occasional gravel (very dense, moist)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
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</table>

**Notes:**
- See Figure A-2 for explanation of symbols.
- Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.

### Log of Boring B-1

**Project:** Park District Master Plan  
**Project Location:** Everett, Washington  
**Project Number:** 21288-002-03  

- **Surface Elevation (ft):** 108  
- **Vertical Datum:** NAVD88  
- **Hammer Data:** Automatic  
- **Drilling Method:** Diedrich D-50 Turbo  
- **Notes:** See "Remarks" section for groundwater observed.
Log of Boring B-1 (continued)

<table>
<thead>
<tr>
<th>Sample Name</th>
<th>Testing</th>
<th>Recovered (in)</th>
<th>Blows/foot</th>
<th>Interval</th>
<th>Graphic Log</th>
<th>Group Classification</th>
<th>Moisture Content (%)</th>
<th>Fines Content (%)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collected Sample</td>
<td></td>
<td>Depth (feet)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>35</td>
<td>11</td>
<td>50/5&quot;</td>
<td>9</td>
<td>SM</td>
<td>Gray silty fine to medium sand with occasional gravel (very dense, moist)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40</td>
<td>11</td>
<td>50/5&quot;</td>
<td>10</td>
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</tr>
</tbody>
</table>

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03
**Log of Boring B-2**

**Project:** Park District Master Plan  
**Project Location:** Everett, Washington  
**Project Number:** 21288-002-03

---

### FIELD DATA

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<thead>
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<th>Depth (feet)</th>
<th>Interval</th>
<th>Blows/foot</th>
<th>Sample Name/Testing</th>
<th>Collected Sample</th>
<th>Interval</th>
<th>Recovered (in)</th>
<th>MATERIAL DESCRIPTION</th>
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<td></td>
<td></td>
<td>Approximately 3 inches of sod and topsoil</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>17</td>
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<td></td>
<td></td>
<td></td>
<td>Dark brown silty fine to medium sand with occasional gravel, organic matter (medium dense, moist) (fill)</td>
</tr>
<tr>
<td>5</td>
<td>18</td>
<td>58</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>Brownish gray silty fine sand with occasional gravel, trace wood debris (very dense, moist)</td>
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<tr>
<td>10</td>
<td>7</td>
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<td>Gray silty fine to medium sand with gravel (very dense, moist) (glacial till)</td>
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<td>50/6'</td>
<td>5</td>
<td></td>
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</tr>
</tbody>
</table>

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**Notes:**

- See Figure A-1 for explanation of symbols.
- Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
- Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.

---

**REMARKS**

**Fines Content (%):** 45  
**Moisture Content (%):** 8

---

**Log Drilled:** 11/8/2022  
**End Drilled:** 11/8/2022  
**Total Depth (ft):** 20.5

---

**METHOD:** Hollow-stem Auger

---

**Elevation (feet):** 95  
**Surface Elevation (ft):** 99

---

**Notes:** Groundwater not observed at time of exploration.
**Log of Boring with Monitoring Well B-3**

**Project:** Park District Master Plan  
**Project Location:** Everett, Washington  
**Project Number:** 21288-002-03

**Figure A-4**

*Note: See Figure A-1 for explanation of symbols.*

Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.

### FIELD DATA

<table>
<thead>
<tr>
<th>Interval</th>
<th>Blows/foot</th>
<th>Collected Sample</th>
<th>Moisture Content (%)</th>
<th>Fines Content (%)</th>
<th>Water Level</th>
<th>Graphite Log</th>
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<tbody>
<tr>
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<td>SM</td>
<td>11</td>
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</tr>
</tbody>
</table>

**MATERIAL DESCRIPTION**

- Approximately 3 inches of sod and topsoil
- Dark brown silty fine to coarse sand with gravel; organic matter (medium dense, moist) (fill)
- Brownish gray silty fine to coarse sand with gravel; oxidation staining (dense, moist) (weathered glacial till)
- Gray silty fine to medium sand with gravel (very dense, moist) (glacial till)
- Gray silty fine to medium sand with occasional gravel (very dense, moist)
- Gray silty fine to coarse sand with gravel (very dense, moist)
- Gray silty fine to medium sand with occasional gravel (very dense, moist)
- Gray silty fine to medium sand with gravel (very dense, moist to wet)
- Perched groundwater observed at 30 feet
- Dark gray sandy silt with occasional gravel (hard, moist)

**WELL LOG**

- Steel surface
- Concrete surface seal
- 3/8-inch bentonite seal
- 2-inch Schedule 40 PVC casing
- Silica sand 10-20
- 2-inch Schedule 40 PVC screen, 0.020-inch slot width
### WELL LOG

<table>
<thead>
<tr>
<th>Interval</th>
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<th>Blows/foot</th>
<th>Sample Name Testing</th>
<th>Water Level</th>
<th>Graphic Log</th>
<th>Group Classification</th>
<th>Moisture Content (%)</th>
<th>Fines Content (%)</th>
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### MATERIALSECTION

- Silica sand 10-202-inch Schedule 40 PVC end plug

### FIELD DATA

- **Elevation (feet):**
  - Sheet 2 of 2
  - Project Number: 21288-002-03
  - Path: P:\21\21288002\GINT\2128800203.GPJ
  - GEOTECH_WELL_%F
  - Date: 2/1/23
  - Path: P:\21\21288002\GINT\2128800203.GPJ
  - GEOTECH_WELL_%F
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<th>Material Description</th>
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<td>5</td>
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<td>Dark brown silty fine to medium sand with gravel; organic matter (medium dense, moist) (fill)</td>
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<td>12</td>
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<td>SM</td>
<td>Brownish gray silty fine sand with occasional gravel (dense to very dense, moist to wet) (glacial till)</td>
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<td>16</td>
<td>94/10</td>
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<td>Becomes wet</td>
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<td>12</td>
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<td>Brownish gray to gray silty fine sand with occasional gravel (very dense, moist)</td>
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Notes:
- See Figure A-1 for explanation of symbols.
- Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
<table>
<thead>
<tr>
<th>Elevation (feet)</th>
<th>Depth (feet)</th>
<th>Interval</th>
<th>Recovered (in)</th>
<th>Blowing Foot</th>
<th>Collected Sample</th>
<th>Sample Name</th>
<th>Testing</th>
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<tr>
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**MATERIAL DESCRIPTION**
- **SM**: Gray silty fine to coarse sand with gravel (very dense, moist to wet)

**REMARKS**
- Perched groundwater observed at 38 feet
### FIELD DATA

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<th>Interval</th>
<th>Blows/foot</th>
<th>Sample Name</th>
<th>Testing</th>
<th>Recovered (in)</th>
<th>Collected Sample</th>
<th>Surface Elevation (ft)</th>
<th>Vertical Datum</th>
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<td>5</td>
<td>SM</td>
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<td></td>
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</table>

### MATERIAL DESCRIPTION

- **TS**: Approximately 3 inches of sod and topsoil
- **SM**: Dark brown silty fine to coarse sand with occasional gravel; organic matter (medium dense, moist) (fill)
- **SM**: Brownish gray silty fine to medium sand with occasional gravel (very dense, moist)
- **SM**: Brownish gray silty fine to medium sand with gravel (dense to very dense, moist to wet) (glacial till)
- **SM**: Brownish gray silty fine to medium sand with gravel (very dense, moist)
- **SM**: Brownish gray silty fine to medium sand with gravel (very dense, moist to wet) (glacial till)
- **SM**: Brownish gray silty fine to medium sand with gravel (very dense, moist)

### REMARKS

- Perched groundwater observed at 7½ feet

---

**Notes:**

- See Figure A-1 for explanation of symbols.
- Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.; Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.

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**Log of Boring B-5**

**Project:** Park District Master Plan  
**Project Location:** Everett, Washington  
**Project Number:** 21288-002-03
Field Data:

- Fines Content (%):
  - Sample Name Testing
  - Recovered (in) Interval Blows/foot Collected Sample Depth (feet)
  - 0 5 10 15 20 25 30 35

Material Description:

- Approximately 3 inches of sod and topsoil
- Brown silty fine to medium sand with occasional gravel; oxidation staining (medium dense, moist) (weathered glacial till?)
- Brownish gray silty fine sand (dense, moist to wet)
- Brownish gray to gray silty fine to medium sand with gravel (very dense, moist) (glacial till)
- Gray silty fine to medium sand with occasional gravel (very dense, moist to wet)
- Gray silty fine to medium sand with gravel (very dense, moist)

Remarks:

- Perched groundwater observed at 5 feet
- Perched groundwater observed at 10 feet

Note: See Figure A-1 for explanation of symbols. Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
### Log of Boring B-6 (continued)

<table>
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<th>Interval</th>
<th>Blows/foot</th>
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<tbody>
<tr>
<td>Collected Sample</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth (feet)</td>
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<td></td>
</tr>
<tr>
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<td></td>
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</tr>
<tr>
<td>Graphic Log</td>
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</tr>
<tr>
<td>Elevation (feet)</td>
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<td>50</td>
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**FIELD DATA**

**MATERIAL DESCRIPTION**

- **REMARKS**
  - Moisture Content (%)
  - Fines Content (%)
<table>
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<th>Depth (feet)</th>
<th>Interval</th>
<th>Recovered (in)</th>
<th>Collected Sample</th>
<th>Sample Name</th>
<th>Testing</th>
<th>Graphic Log</th>
<th>Group Classification</th>
<th>Material Description</th>
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<td>Approximately 3 inches of sod and topsoil</td>
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<td>Brown silty fine to medium sand with gravel; trace rootlets and organic matter (dense, moist) (fill)</td>
</tr>
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<td>SM</td>
<td>SM</td>
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<td></td>
<td>Brownish gray silty fine to medium sand with occasional gravel (dense, moist)</td>
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<td>Brownish gray silty fine to medium sand with gravel (very dense, wet) (glacial till)</td>
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<td></td>
<td>Gray silty fine to medium sand with occasional gravel (very dense, wet)</td>
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<td></td>
<td>Becomes moist</td>
</tr>
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**REMARKS**

- Perched groundwater observed at 7½ feet
- Perched groundwater observed at 10½ feet

Notes:

- See Figure A-1 for explanation of symbols.
- Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.

**Log of Boring B-7**

- **Project:** Park District Master Plan
- **Project Location:** Everett, Washington
- **Project Number:** 21288-002-03

**Figure A-8**

Sheet 1 of 1
Perched groundwater observed at 7½ feet

Approximately 3 inches of sod and topsoil

Brownish gray silty fine to medium sand with occasional gravel; trace organic matter (dense, moist) (fill)

Brownish gray silty fine to medium sand with gravel (dense, moist)

Gray silty fine to medium sand with gravel (very dense, wet) (glacial till)

Becomes moist

Gray silty fine to medium sand with gravel (very dense, wet)

Perched groundwater observed at 7½ feet

Perched groundwater observed at 30 feet

Notes: Refusal at 7 feet on cobble/boulder; moved boring 6 feet west and resumed sampling at 7½ feet.
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<th>Interval</th>
<th>Blows/foot</th>
<th>Sample Name</th>
<th>Testing</th>
<th>Graphic Log</th>
<th>Group Classification</th>
<th>Material Description</th>
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<td>50/5&quot;</td>
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<td></td>
<td>SM</td>
<td>Gray silty fine to medium sand with occasional gravel (very dense, moist)</td>
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**Remarks**

**Log of Boring B-8 (continued)**

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03
Perched groundwater observed at 7½ feet below surface.

**Material Description**
- **Approximately 3 inches of sod and topsoil**
- **Brown silty fine to medium sand with gravel (dense, moist)**
- **Brownish gray silty fine sand (very dense, wet)**
- **Gray silty fine to medium sand with occasional gravel (very dense, moist)**
- **Gray silty fine sand with occasional gravel (dense, moist)**

**Field Data**

<table>
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<tr>
<th>Depth (feet)</th>
<th>Interval</th>
<th>Blows/foot</th>
<th>Sample Name</th>
<th>Testing</th>
<th>Moisture Content (%)</th>
<th>Fines Content (%)</th>
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</tbody>
</table>

**Remarks**
- Perched groundwater observed at 7½ feet below surface.

**Notes:**
- See Figure A-1 for explanation of symbols.
- Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.

**Log of Boring B-9**

- **Project:** Park District Master Plan
- **Project Location:** Everett, Washington
- **Project Number:** 21288-002-03
Approximately 3 inches sod
Brown silty fine to medium sand with occasional gravel (medium dense, moist) (fill)
Gray silty fine to medium sand with occasional gravel (dense to very dense, moist) (glacial till)

Field Data

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<tr>
<th>Elevation (ft)</th>
<th>Depth (ft)</th>
<th>Interval</th>
<th>Recovered (in)</th>
<th>Blows/foot</th>
<th>Collected Sample</th>
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<th>Water Level</th>
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<th>Group Classification</th>
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Notes:

Steel surface
Concrete surface seal
3/8-inch bentonite seal
2-inch Schedule 40 PVC casing
Silica sand 10-20
2-inch Schedule 40 PVC screen, 0.020-inch slot width

Log of Boring with Monitoring Well B-10

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03

Figure A-11
Sheet 1 of 2
<table>
<thead>
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<th>Interval</th>
<th>Depth (feet)</th>
<th>Recoved (in)</th>
<th>Blowing Foot</th>
<th>Sample Name</th>
<th>Testing</th>
<th>Water Level</th>
<th>Group</th>
<th>Classification</th>
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<td>50/4&quot;</td>
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<td>10</td>
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</table>

**FIELD DATA**

**WELL LOG**

- Silica sand 10-20
- 2-inch Schedule 40 PVC end plug

**Log of Boring with Monitoring Well B-10 (continued)**

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03

Figure A-11
Sheet 2 of 2
Log of Boring B-11

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
### FIELD DATA

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<th>Recovered (in)</th>
<th>Sample Name</th>
<th>Testing</th>
<th>Recovered (in)</th>
<th>Graphic Log</th>
<th>Group Classification</th>
<th>Material Description</th>
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<td>SM</td>
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<td>Dark gray silt with sand (hard, moist)</td>
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<td>Interval</td>
<td>Recovered (in)</td>
<td>Blows/foot</td>
<td>Collected Sample</td>
<td>Sample Name</td>
<td>Testing</td>
<td>Graphic Log</td>
<td>Material Description</td>
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<td>76/11&quot;</td>
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<td>Brownish gray silty fine to medium sand with gravel (very dense, moist)</td>
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**REMARKS**

**FIELD DATA**

**MATERIAL DESCRIPTION**

**REMARKS**

**Log of Boring B-12 (continued)**

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03
### Field Data

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<th>Elevation (feet)</th>
<th>Recovered (in)</th>
<th>Blows/foot</th>
<th>Collected Sample</th>
<th>Sample Name Testing</th>
<th>Group Classification</th>
<th>Classification</th>
<th>Moisture Content (%)</th>
<th>Fines Content (%)</th>
<th>Remarks</th>
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<td>15</td>
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<td>1</td>
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<td>0</td>
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<td>95</td>
<td>18</td>
<td>27</td>
<td>2</td>
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<td>Brownish gray silty fine to medium sand (very dense, moist) (glacial till)</td>
<td></td>
<td>10</td>
<td>47</td>
<td></td>
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<td>10</td>
<td>90</td>
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<td>SM</td>
<td>Brownish gray silty fine to medium sand (very dense, moist)</td>
<td></td>
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<td>50/5&quot;</td>
<td>4</td>
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<td>10</td>
<td>47</td>
<td></td>
</tr>
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<td>20</td>
<td>80</td>
<td>5</td>
<td>50/5&quot;</td>
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<td>10</td>
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<td>25</td>
<td>75</td>
<td>5</td>
<td>50/5&quot;</td>
<td>6</td>
<td>SM</td>
<td>Brownish gray silty fine to medium sand with gravel (very dense, moist)</td>
<td></td>
<td>10</td>
<td>47</td>
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</tr>
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**Notes:**
- See Figure A-1 for explanation of symbols.
- Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
- Groundwater not observed at time of exploration.

**Log of Boring B-13**

**Project:** Park District Master Plan

**Project Location:** Everett, Washington

**Project Number:** 21288-002-03
A 2-in well was installed on 11/10/2022 to a depth of 40.5 ft.

Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.

Log of Boring with Monitoring Well B-14

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03

Figure A-15
Sheet 1 of 2
## Field Data

<table>
<thead>
<tr>
<th>Sample Name</th>
<th>Water Level</th>
<th>Blows/foot</th>
<th>Collected Sample</th>
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### Material Description

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<th>Moisture Content (%)</th>
<th>Fines Content (%)</th>
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<tbody>
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</tbody>
</table>

- Dark gray silty fine to medium sand (very dense, moist)

### Well Log

- Silica sand 10-20
- 2-inch Schedule 40 PVC end plug
Approximately 3 inches of sod and topsoil.
Brown silty fine to medium sand with gravel; moderate oxidation staining (medium dense, moist) (weathered glacial till?)
Brownish gray silty fine sand with occasional gravel (very dense, moist) (glacial till)

No recovery with SPT sampler; drove California modified sampler to obtain sample.

Groundwater not observed at time of exploration.
## Log of Boring B-16

**Project:** Park District Master Plan  
**Project Location:** Everett, Washington  
**Project Number:** 21288-002-03

### FIELD DATA

<table>
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<tr>
<th>Depth (feet)</th>
<th>Interval</th>
<th>Collector Sample</th>
<th>Sample Name Testing</th>
<th>Graphic Log</th>
<th>Group Classification</th>
<th>Description</th>
<th>Elevation (feet)</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TS</td>
<td>Approximately 3 inches of sod and topsoil</td>
<td>115</td>
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<tr>
<td>5</td>
<td>42</td>
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<td></td>
<td></td>
<td>SM</td>
<td>Brown silty fine sand with occasional gravel (dense, moist) (fill?)</td>
<td>110</td>
</tr>
<tr>
<td>10</td>
<td>16</td>
<td>50/6'</td>
<td></td>
<td></td>
<td>SM</td>
<td>Brownish gray silty fine to medium sand with gravel (very dense, moist) (glacial till)</td>
<td>105</td>
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<tr>
<td>15</td>
<td>11</td>
<td>50/5'</td>
<td></td>
<td></td>
<td>SM</td>
<td>Brownish gray silty fine to medium sand with occasional gravel (very dense, moist)</td>
<td>100</td>
</tr>
<tr>
<td>20</td>
<td>17</td>
<td>94/11'</td>
<td></td>
<td></td>
<td>SM</td>
<td>Brownish gray silty fine sand with occasional gravel (very dense, moist)</td>
<td>95</td>
</tr>
<tr>
<td>25</td>
<td>11</td>
<td>50/5'</td>
<td></td>
<td></td>
<td>SM</td>
<td>Gray silty fine to medium sand with occasional gravel (very dense, moist)</td>
<td>90</td>
</tr>
</tbody>
</table>

### Notes:

- Groundwater not observed at time of exploration.

**Log of Boring B-16**

Coordinated Data Source: Geographic approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.

**Figure A-17**
Log of Boring B-16 (continued)

MATERIAL DESCRIPTION

- Gray silt fine sand with gravel
- Silty fine sand with gravel

FIELD DATA

- Sample Name: Recovered
- Depth (feet): 35
- Elevation (feet): 80
- Blows/foot: 50/6'
- Moisture Content (%): 10
- Fines Content (%): 10

REMARKS
Notes:

Groundwater not observed at time of exploration.

Log of Boring B-17

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03

Figure A-18
Sheet 1 of 2
Log of Boring B-17 (continued)

<table>
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<th>Interval</th>
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<th>Blownfoot</th>
<th>Collected Sample</th>
<th>Sample Name</th>
<th>Testing</th>
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<th>Classification</th>
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<td>40</td>
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<td></td>
</tr>
</tbody>
</table>

REMARKS

FIELD DATA

MATERIAL DESCRIPTION

Moisture Content (%)

Elevation (feet)

Depth (feet)

Sample Name

Testing

Recovered (in)

Blownfoot

Graphic Log

Group

Classification

Footnotes

Log of Boring B-17 (continued)

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03

Figure A-18
Sheet 2 of 2
Project: Park District Master Plan  
Project Location: Everett, Washington  
Project Number: 21288-002-03

Log of Boring B-18

Log of Boring B-18  

Note: See Figure A-1 for explanation of symbols.  
Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
Approximately 3 inches of sod and topsoil

Brown silty fine to medium sand; trace organics (medium dense, moist) (fill)

Gray silty fine to medium sand with occasional gravel (very dense, moist) (glacial till)

Notes:

Groundwater not observed at time of exploration

Log of Boring B-19

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03

Figure A-20
<table>
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<th>Interval (feet)</th>
<th>Recovered (in)</th>
<th>Blown/foot</th>
<th>Field Name</th>
<th>Testing</th>
<th>Graphic Log</th>
<th>Material Description</th>
<th>Moisture Content (%)</th>
<th>Remark</th>
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<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>5</td>
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<td>50/5*</td>
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**REMARKS**

**Log of Boring B-19 (continued)**

**GeoEngineers**

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03
Perched groundwater observed at 15 feet

- Approximately 3 inches of sod and topsoil
- Brown silty fine sand with occasional gravel; rootlets and organic matter (very loose, moist) (fill)
- Brownish gray silty fine sand with occasional gravel (dense to very dense, moist) (glacial till)
- Brownish gray silty fine to medium sand with gravel (very dense, moist to wet)

Note: See Figure A-1 for explanation of symbols.

Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
Log of Boring B-21

<table>
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<th>End Drilled</th>
<th>Surface Elevation (ft)</th>
<th>Vertical Datum</th>
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Notes:
- Groundwater not observed at time of exploration.
- See Figure A-1 for explanation of symbols.

### Field Data

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<th>Depth (feet)</th>
<th>Blows/foot</th>
<th>Sample Name</th>
<th>Testing</th>
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<tbody>
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<td>4</td>
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</table>

### Material Description

- **TS**: Approximately 5 inches of topsoil
- **SM**: Gray silty fine to medium sand with occasional gravel (very dense, moist) (glacial till)
- **ML**: Gray sandy silt with occasional gravel (hard, moist)
- **SM**: Brown silty fine to medium sand with occasional gravel (dense, moist) (weathered glacial till?)

### Remarks

- Drilled: Hollow-stem Auger
- Advance Drill Technologies, Inc.
- Automatic 140 (lbs) / 30 (in) Drop
- Diedrich D-50 Turbo
- Drilling Method
- Groundwater not observed at time of exploration

---

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03

---

Figure A-22
Sheet 1 of 2
Log of Boring B-21 (continued)

Date: 2/1/23
Path: P:\21\21288002\GINT\2128800203.GPJ
Library: Library\GEOENGINEERS_DF_STD_US_JUNE_2017.GLB\GEOTECH_STANDARD_%F_NO_GW

**REMARKS**

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<tr>
<td>Graphic Log</td>
<td>Group Classification</td>
</tr>
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<td>Moisture Content (%)</td>
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<tr>
<td>Fines Content (%)</td>
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</tr>
</tbody>
</table>

**Fines Content (%)**

**Moisture Content (%)**

**FIELD DATA**

**MATERIAL DESCRIPTION**

**REMARKS**
Perched groundwater observed at 2½ feet

Brown silty fine to medium sand with gravel; trace rootlets (loose, moist) (weathered glacial till)

Brownish gray silty fine to medium sand with gravel (very dense, moist) (glacial till)

Notes:

Perched groundwater observed at 2½ feet

Note: See Figure A-1 for explanation of symbols.

Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.

Log of Boring B-22

Project: Park District Master Plan
Project Location: Everett, Washington
Project Number: 21288-002-03

Figure A-23
Sheet 1 of 1
Approximately 3 inches of sod and topsoil

Brown silty fine to medium sand with occasional gravel (medium dense, moist) (fill)

Brownish gray silty fine to medium sand with occasional gravel (dense, moist) (glacial till)

Gray silty fine to coarse sand with occasional gravel; cemented (very dense, moist)

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 1/2 foot.
Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
Approximately 3 inches of sod and topsoil

Reddish brown silty fine to medium sand with occasional gravel; trace organic matter (very loose to loose, moist) (fill)

Brown silty fine to medium sand with occasional gravel (loose, moist)

Gray clay (very stiff to hard, moist) (glaciolacustrine deposits)

Notes: See Figure A-1 for explanation of symbols.

The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 1/2 foot.

Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
<table>
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<th>Depth (feet)</th>
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<td></td>
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<tr>
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<td>SM</td>
<td>Reddish brown silty fine sand with occasional gravel; trace rootlets (very loose to loose, moist) (fill)</td>
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<td>Probe depth = 2 inches</td>
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<tr>
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<td>SP&amp;M</td>
<td>Brown fine to medium sand with silt (very loose to loose, moist)</td>
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<td></td>
<td></td>
<td>Probe depth = 12 to 18 inches</td>
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<td>112</td>
<td>4</td>
<td>SC</td>
<td>Brownish gray clayey fine to medium sand with occasional gravel (dense, moist) (glacial till)</td>
<td></td>
<td></td>
<td></td>
<td>Probe depth = 10 to 12 inches</td>
</tr>
<tr>
<td>111</td>
<td>5</td>
<td>SM</td>
<td>Gray silty fine to medium sand with occasional gravel; cemented (very dense, moist)</td>
<td></td>
<td></td>
<td></td>
<td>Probe depth = 10 inches</td>
</tr>
</tbody>
</table>

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 1/2 foot.
Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
**Log of Test Pit TP-21**

**Project:** Park District Master Plan  
**Project Location:** Everett, Washington  
**Project Number:** 21288-002-03

---

### MATERIAL DESCRIPTION

<table>
<thead>
<tr>
<th>Elevation (ft)</th>
<th>Depth (ft)</th>
<th>Testing Sample Name</th>
<th>Graphic Log</th>
<th>Material Description</th>
<th>MOISTURE Content (%)</th>
<th>Fines Content (%)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>114</td>
<td>0</td>
<td>SM</td>
<td></td>
<td>Approximately 3 inches of sod and topsoil</td>
<td></td>
<td></td>
<td>Probe depth = 6 inches</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>SM</td>
<td></td>
<td>Reddish brown silty fine to medium sand with gravel; trace rootlets (loose, moist) (fill)</td>
<td>9</td>
<td></td>
<td>Probe depth = 1 to 2 inches</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>SM</td>
<td></td>
<td>Brownish gray silty fine to medium sand with gravel (dense, moist) (glacial till)</td>
<td></td>
<td></td>
<td>Probe depth = 1 to 2 inches</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>SM</td>
<td></td>
<td>Gray silty fine to medium sand with occasional gravel, cemented (dense, moist)</td>
<td></td>
<td></td>
<td>Probe depth = 1 to 2 inches</td>
</tr>
</tbody>
</table>

---

Notes: See Figure A-1 for explanation of symbols.  
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.  
Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>SAMPLE</th>
<th>MATERIAL DESCRIPTION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TS</td>
<td>Approximately 3 inches of sod and topsoil</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>SM</td>
<td>Reddish brown silty fine sand with occasional gravel; trace rootlets (loose, moist) (fill)</td>
<td>Probe depth = 6 inches</td>
</tr>
<tr>
<td>3</td>
<td>SM</td>
<td>Brownish gray silty fine sand with occasional gravel (dense, moist) (glacial till)</td>
<td>Probe depth = 6 to 8 inches</td>
</tr>
<tr>
<td>4</td>
<td>SM</td>
<td>Brownish gray silty fine sand with occasional gravel (dense, moist) (glacial till)</td>
<td>Probe depth = 2 to 3 inches</td>
</tr>
<tr>
<td>5</td>
<td>CL</td>
<td>Gray clay (very stiff to hard, moist) (glaciolacustrine deposits)</td>
<td>Probe depth = 2 inches</td>
</tr>
</tbody>
</table>

Notes: See Figure A-1 for explanation of symbols. The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot. Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Group</th>
<th>Classification</th>
<th>Material Description</th>
<th>Moisture Content (%)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SM</td>
<td>Brown silty fine to medium sand</td>
<td>Approximately 3 inches of sod and topsoil</td>
<td></td>
<td>Probe depth = 2 to 6 inches</td>
</tr>
<tr>
<td>2</td>
<td>SM</td>
<td>Light brown silty fine to medium</td>
<td>Brown silty fine to medium sand with gravel and cobbles; concrete,</td>
<td>Probe depth = 2 to 6</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>SM</td>
<td>sand with occasional gravel</td>
<td>Light brown silty fine to medium sand with gravel (loose, moist)</td>
<td>Probe depth = 2 to 6</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>SM</td>
<td>cemented (dense, moist)</td>
<td>Gray silty fine to medium sand with occasional gravel; cemented (dense, moist)</td>
<td></td>
<td>Probe depth = 2 to 6 inches</td>
</tr>
</tbody>
</table>

Notes: See Figure A-1 for explanation of symbols.

The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 1/2 foot.

Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
### Log of Test Pit TP-24

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Sample Name</th>
<th>Group</th>
<th>Classification</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>TS</td>
<td>SM</td>
<td>Approximately 3 inches of sod and topsoil</td>
<td>Probe depth = 6 inches</td>
</tr>
<tr>
<td>1</td>
<td>SM</td>
<td>ML</td>
<td>Brown silty fine to medium sand with occasional gravel; trace rootlets (loose, moist) (fill)</td>
<td>Probe depth = ½ inch</td>
</tr>
<tr>
<td>2</td>
<td>ML</td>
<td></td>
<td>Tan silt with sand; cemented (hard, moist) (glacial till)</td>
<td>Probe depth = ½ inch</td>
</tr>
<tr>
<td>3</td>
<td>SM</td>
<td></td>
<td>Gray silty fine sand; cemented (very dense, moist)</td>
<td>Probe depth = ½ inch</td>
</tr>
</tbody>
</table>

**Notes:** See Figure A-1 for explanation of symbols. The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot. Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
<table>
<thead>
<tr>
<th>Elevation (feet)</th>
<th>Depth (feet)</th>
<th>Testing Sample</th>
<th>Sample Name</th>
<th>Testing</th>
<th>Graphic Log</th>
<th>Group Classification</th>
<th>Moisture Content (%)</th>
<th>Fines Content (%)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td></td>
<td>T5</td>
<td>SM</td>
<td></td>
<td>Approximately 3 inches of sod and topsoil</td>
<td></td>
<td></td>
<td>Probe depth = 2 to 4 inches</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td></td>
<td>SM</td>
<td>SM</td>
<td></td>
<td>Reddish brown silty fine to medium sand with gravel; occasional concrete debris (loose, moist) (fill)</td>
<td></td>
<td></td>
<td>Probe depth = 2 to 4 inches</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td></td>
<td>SM</td>
<td>SM</td>
<td></td>
<td>Brown silty fine to coarse sand with gravel (loose, moist)</td>
<td></td>
<td></td>
<td>Probe depth = 2 to 4 inches</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td></td>
<td>SM</td>
<td>SM</td>
<td></td>
<td>Gray silty fine to medium sand with occasional gravel; cemented (dense, moist) (glacial till)</td>
<td></td>
<td></td>
<td>Probe depth = 2 to 4 inches</td>
</tr>
</tbody>
</table>

Notes: See Figure A-1 for explanation of symbols. The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot. Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
**Log of Test Pit TP-26**

**Project:** Park District Master Plan  
**Project Location:** Everett, Washington  
**Project Number:** 21288-002-03

---

### SAMPLE

<table>
<thead>
<tr>
<th>Elevation (feet)</th>
<th>Depth (feet)</th>
<th>Testing Sample</th>
<th>Sample Name</th>
<th>Testing</th>
<th>Graphic Log</th>
<th>Material Description</th>
<th>Moisture Content (%)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>TS</td>
<td>Approximately 3 inches of sod and topsoil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>SM</td>
<td>Brown silty fine to medium sand with occasional gravel; trace rootlets (loose, moist) (fill?)</td>
<td>18</td>
<td>Probe depth = 3 to 6 inches</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>CL</td>
<td>Gray sandy clay (very stiff to hard, moist) (glaciolacustrine deposits)</td>
<td></td>
<td>Probe depth = 1 to 2 inches</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Notes:** See Figure A-1 for explanation of symbols.  
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.  
Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.  
Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
<table>
<thead>
<tr>
<th>Elevation (feet)</th>
<th>Depth (feet)</th>
<th>Sample</th>
<th>Testing Sample Name</th>
<th>Sample Name</th>
<th>Testing</th>
<th>Graphic Log</th>
<th>Group</th>
<th>Classification</th>
<th>Material Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Ts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Approximately 3 inches of sod and topsoil</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Brown silty fine sand with gravel; trace rootlets and organic matter (loose, moist) (fill)</td>
<td>Probe depth = 3 to 6 inches</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Brown silty fine to coarse sand with gravel (medium dense, moist)</td>
<td>Probe depth = 2 to 4 inches</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gray silty fine to medium sand with gravel; cemented (dense, moist) (glacial till)</td>
<td>Probe depth = 1 to 2 inches</td>
</tr>
</tbody>
</table>

Notes: See Figure A-1 for explanation of symbols. The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 1/2 foot. Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021, by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021, by PACE Engineers, Inc.
Approximately 3 inches of sod and topsoil

Dark brown to black silty fine to coarse sand with gravel; organic matter (very loose to loose, moist) (fill)

Brown silty fine to medium sand with gravel; cemented (dense, moist) (glacial till)

**Notes:**
- See Figure A-1 for explanation of symbols.
- The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 1/2 foot.
- Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
Approximately 3 inches of sod and topsoil

Brown silty fine to coarse sand with gravel; trace rootlets and organic matter (loose, moist) (fill)

Probe depth = 2 to 4 inches

Probe depth = 3 inches

Probe depth = 2 to 3 inches

Probe depth = ½ inch

Becomes gray, very dense

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
<table>
<thead>
<tr>
<th>Elevation (feet)</th>
<th>Depth (feet)</th>
<th>Sample Name</th>
<th>Group</th>
<th>Classification</th>
<th>MATERIAL DESCRIPTION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>TS</td>
<td>S</td>
<td>Silty fine to coarse sand with gravel; trace rootlets (very loose to loose, moist) (fill)</td>
<td>Approximately 3 inches of sod and topsoil</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>SM</td>
<td>S</td>
<td>Silty fine to coarse sand with gravel; trace rootlets (very loose to loose, moist) (fill)</td>
<td>Probe depth = 6 inches</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>SM</td>
<td>S</td>
<td>Silty fine to coarse sand with gravel; trace rootlets (very loose to loose, moist) (fill)</td>
<td>Probe depth = 8 to 12 inches</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>SM</td>
<td>S</td>
<td>Silty fine to coarse sand with gravel; trace rootlets (very loose to loose, moist) (fill)</td>
<td>Probe depth = 4 inches</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>SM</td>
<td>S</td>
<td>Silty fine to coarse sand with gravel; trace rootlets (very loose to loose, moist) (fill)</td>
<td>Probe depth = ½ inch</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ⅛ foot.
Coordinates Data Source: Horizontal approximated based on survey dated March 11, 2021 by PACE Engineers, Inc. Vertical approximated based on survey dated March 11, 2021 by PACE Engineers, Inc.
APPENDIX B
LABORATORY TESTING

Soil samples obtained from the explorations were visually classified in the field before being transported to our laboratory and evaluated to confirm or modify field classifications, as well as to evaluate index properties of the soil samples. Representative samples were selected for laboratory testing consisting of moisture content, percent fines and grain size distribution (sieve analysis). The tests were performed in general accordance with test methods of the ASTM or other applicable procedures.

Visual Classifications
All soil samples obtained from the explorations were visually classified in the field and/or in our laboratory using a system based on the Unified Soil Classification System (USCS) and ASTM classification methods. ASTM test method D 2488 was used to visually classify the soil samples, while ASTM D 2487 was used to classify the soils based on laboratory tests results. These classification procedures are incorporated in the exploration logs shown in Appendix A.

Moisture Content Testing
Moisture content tests were completed in general accordance with ASTM D 2216 for representative samples obtained from the explorations. The results of these tests are presented on the exploration logs in Appendix A at the depths at which the samples were obtained.

Percent Passing U.S. No. 200 Sieve
Selected samples were “washed” through the U.S. No. 200 mesh sieve to determine the relative percentage of coarse- and fine-grained particles in the soil. The percent passing value represents the percentage by weight of the sample finer than the U.S. No. 200 sieve. These tests were conducted in general accordance with ASTM D 1140, and the results are shown on the exploration logs at the representative sample depths.

Grain Size Distribution
Sieve analyses were performed on selected samples in general accordance with ASTM C 136. The wet sieve analysis method was used to estimate the percentage of soil greater than the U.S. No. 200 mesh sieve. The results of the sieve analyses were plotted, classified in general accordance with the USCS, and presented on Figures B-1 through B-4.
Figure B-1

Sieve Analysis Results
Park District Master Plan
Everett, Washington

PERCENT PASSING BY WEIGHT

GRAIN SIZE IN MILLIMETERS

U.S. STANDARD SIEVE SIZE

3" 2 1/2" 1 1/4" 3/4" 3/8" #4 #10 #20 #40 #60 #100 #140 #200

<table>
<thead>
<tr>
<th>COBBLES</th>
<th>GRAVEL</th>
<th>SAND</th>
<th>SILT OR CLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COARSE</td>
<td>FINE</td>
<td>COARSE</td>
<td>MEDIUM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Boring Number</th>
<th>Depth (feet)</th>
<th>Moisture (%)</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B-2</td>
<td>5</td>
<td>8</td>
<td>Silty fine sand with occasional gravel (SM)</td>
</tr>
<tr>
<td>2</td>
<td>B-4</td>
<td>5</td>
<td>12</td>
<td>Silty fine sand with occasional gravel (SM)</td>
</tr>
<tr>
<td>3</td>
<td>B-6</td>
<td>5</td>
<td>12</td>
<td>Silty fine sand (SM)</td>
</tr>
<tr>
<td>4</td>
<td>B-9</td>
<td>7.5</td>
<td>10</td>
<td>Silty fine sand (SM)</td>
</tr>
</tbody>
</table>

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The grain size analysis results were obtained in general accordance with ASTM C 136. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052

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Figure B.4

Sieve Analysis Results

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Boring Number</th>
<th>Depth (feet)</th>
<th>Moisture (%)</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>▲</td>
<td>TP-27</td>
<td>2</td>
<td>6</td>
<td>Fine to medium sand with silt (SP-SM)</td>
</tr>
<tr>
<td>▲</td>
<td>TP-24</td>
<td>2</td>
<td>17</td>
<td>Silt with sand (ML)</td>
</tr>
<tr>
<td>▲</td>
<td>TP-20</td>
<td>4</td>
<td>5</td>
<td>Silty fine sand with gravel (SM)</td>
</tr>
</tbody>
</table>

Note: This report may not be reproduced, except in full, without written approval of GeoEngineers, Inc. Test results are applicable only to the specific sample on which they were performed, and should not be interpreted as representative of any other samples obtained at other times, depths or locations, or generated by separate operations or processes.

The grain size analysis results were obtained in general accordance with ASTM C 136. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052
APPENDIX C
EXPLORATION LOGS FROM PHASE 1 STUDIES

Included in Appendix C are relevant logs from the following reports:


### Log of Test Pit TP-1

**Date Excavated:** 9/5/2019  
**Total Depth:** 12.5 ft  
**Logged By:** AP  
**Checked By:** CWM  
**Excavator Equipment:** Komatsu WB 140 Rubber-tired Backhoe  
**Groundwater:** not observed  
**Caving:** not observed

<table>
<thead>
<tr>
<th>Surface Elevation (ft)</th>
<th>68</th>
<th>Vertical Datum</th>
<th>NAVD88</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easting (X)</td>
<td>1307765</td>
<td>Northing (Y)</td>
<td>368225</td>
</tr>
</tbody>
</table>

**Coordinate System:** WA State Plane North  
**Horizontal Datum:** NAD83 HARN (feet)

#### Notes:
- The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 1/2 foot.
- Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

---

<table>
<thead>
<tr>
<th>Elevation (feet)</th>
<th>Depth (feet)</th>
<th>Sample Name (Testing)</th>
<th>Group</th>
<th>Classification</th>
<th>Material Description</th>
<th>Moisture Content (%)</th>
<th>Fines Content (%)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>SM</td>
<td>SOD</td>
<td>2 to 3 inches sod/topsoil</td>
<td>6</td>
<td></td>
<td>Probe depth of 0.5 inches</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>SM</td>
<td>Brown silty fine to medium sand with gravel, small roots (loose to medium dense, moist) (fill)</td>
<td></td>
<td></td>
<td>Probe depth of 1 inch</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>SM</td>
<td>Brown-gray silty fine to medium sand with occasional gravel, small roots, wood debris (medium dense, moist)</td>
<td>28</td>
<td></td>
<td>Probe depth of 4 inches</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>SM</td>
<td>Gray-brown clay, slight oxidation staining (stiff to hard, moist) (glaciolacustrine deposits)</td>
<td>33</td>
<td>98</td>
<td>Rough excavating</td>
<td></td>
</tr>
</tbody>
</table>

---

**Log of Test Pit TP-1**

**Project:** Baker Heights Development  
**Project Location:** Everett, Washington  
**Project Number:** 21288-002-00

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**GeoEngineers**

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**Date:** 10/21/19  
**Path:** GeoEngineers.com/WAN/PROJECTS/21288002/GINT/2128800200.GPJ  
**DBLibrary/Library:** GeoEngineers_DF_STD_US_JUNE_2017.GLB/GEI8_TESTPIT_1P_GEOTEC_
2 to 3 inches sod/topsoil

Brown silty fine to medium sand with occasional gravel and cobbles; small roots (medium dense, moist) (fill)

Brown fine sand with silt (medium dense, moist)

Gray clay; slight oxidation staining (stiff, moist) (glaciolacustrine deposits)

Probes:
- Depth of 0.5 inches
- Depth of 1 inch
- Depth of 2 inches

Notes: See Figure A-1 for explanation of symbols.

The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot. Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.
### Log of Test Pit TP-3

**Project:** Baker Heights Development  
**Project Location:** Everett, Washington  
**Project Number:** 21288-002-00  
**Date Excavated:** 9/5/2019

<table>
<thead>
<tr>
<th>Surface Elevation (ft)</th>
<th>68</th>
<th>Easting (X)</th>
<th>1307791</th>
<th>Coordinate System</th>
<th>WA State Plane North</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Datum</td>
<td>NAVD88</td>
<td>Northing (Y)</td>
<td>367733</td>
<td>Horizontal Datum</td>
<td>NAD83 HARN (feet)</td>
</tr>
</tbody>
</table>

#### SAMPLE

<table>
<thead>
<tr>
<th>Elevation (feet)</th>
<th>Depth (feet)</th>
<th>Group</th>
<th>Classification</th>
<th>MATERIAL DESCRIPTION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
<td>SOD</td>
<td>SM</td>
<td>1 to 2 inches sod/topsoil</td>
<td>Probe depth of 0.5 inches</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td>Brown silty fine to medium sand with gravel; small roots, glass shards (loose to medium dense, moist) (fill)</td>
<td>Probe depth of 0.5 inches</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>CL</td>
<td></td>
<td>Gray lean clay, slight oxidation staining (medium stiff to stiff, moist) (glaciolacustrine deposits?)</td>
<td>Probe depth of 4 inches</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Probe depth of 5 inches</td>
</tr>
</tbody>
</table>

**Notes:** See Figure A-1 for explanation of symbols.  
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.  
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

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**GeoEngineers**

Figure A-4  
Sheet 1 of 1
2 to 3 inches sod/topsoil

Brown silty fine to medium sand (medium dense, moist) (fill)

Gray clay, slight oxidation staining (stiff to very stiff, moist) (glaciolacustrine deposits)

Probe depth of 1 inch
Probe depth of 0.5 inches
Probe depth of 0.5 inches
Probe depth of 0.5 inches

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot. Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.
# Log of Test Pit TP-5

**Project:** Baker Heights Development  
**Project Location:** Everett, Washington  
**Project Number:** 21288-002-00

<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>Elevation (feet)</th>
<th>Depth (feet)</th>
<th>MATERIAL DESCRIPTION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOD</td>
<td>1</td>
<td>0.5</td>
<td>5 to 6 inches sod/topsoil</td>
<td></td>
</tr>
<tr>
<td>SM</td>
<td>2</td>
<td>1</td>
<td>Light brown silty fine to medium sand with gravel and cobbles, small roots (medium dense, moist) (fill)</td>
<td>Probe depth of 0.5 inches</td>
</tr>
<tr>
<td>SM</td>
<td>3</td>
<td>2</td>
<td>Gray silty fine to coarse sand with occasional gravel and cobbles (dense, moist) (glacial till)</td>
<td>Probe depth of 0.5 inches</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** See Figure A-1 for explanation of symbols.  
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.  
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.
<table>
<thead>
<tr>
<th>Sample Name</th>
<th>Testing Material</th>
<th>Group Classification</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOD</td>
<td>5 to 6 inches sod/topsoil</td>
<td>SM Light brown silty fine to medium sand with gravel (medium dense, moist) (fill)</td>
<td>Probe depth of 0.5 inches</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SM Gray silty fine to medium sand with gravel and occasional cobbles (dense, moist) (glacial till)</td>
<td>Probe depth of 0.5 inches</td>
</tr>
</tbody>
</table>

Notes: See Figure A-1 for explanation of symbols. The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 1/2 foot. Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.
<table>
<thead>
<tr>
<th>Elevation (feet)</th>
<th>Depth (feet)</th>
<th>Testing Sample</th>
<th>Group</th>
<th>Classification</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>1</td>
<td>SOD</td>
<td>6 inches sod/topsoil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>SM</td>
<td>Brown silty fine to medium sand with gravel, small roots (medium dense, moist) (fill)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>Probe depth of 0.5 inches</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>Probe depth of 0.5 inches</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>ML</td>
<td>Gray sandy silt with occasional gravel (hard, moist) (glacial till)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>Probe depth of 0.5 inches</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.
### Log of Test Pit TP-15

**Project:** Baker Heights Development  
**Project Location:** Everett, Washington  
**Project Number:** 21288-002-00

**Date Excavated:** 9/5/2019  
**Total Depth (ft):** 7  
**Logged By:** AP  
**Checked By:** CW  
**Excavator Equipment:** Komatsu WB 140 Rubber-tired Backhoe  
**Groundwater:** not observed  
**Caving:** not observed

<table>
<thead>
<tr>
<th>Elevation (ft)</th>
<th>Depth (ft)</th>
<th>Group</th>
<th>Classification</th>
<th>Material Description</th>
<th>Moisture Content (%)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>SM</td>
<td></td>
<td>3 to 4 inches sod/topsoil</td>
<td>4</td>
<td>Probe depth of 4 inches</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>SM</td>
<td></td>
<td>Light brown silty fine to medium sand with gravel, small roots (loose to medium dense, moist) (fill)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>SM</td>
<td></td>
<td>Gray silty fine to medium sand with occasional gravel and cobbles (dense, moist) (glacial till)</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** See Figure A-1 for explanation of symbols.  
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.  
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.
## Log of Test Pit TP-16

**Project:** Baker Heights Development  
**Project Location:** Everett, Washington  
**Project Number:** 21288-002-00

<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>MATERIAL DESCRIPTION</th>
<th>Moisture Content (%)</th>
<th>Fines Content (%)</th>
<th>PROBE DEPTHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOD</td>
<td>4 inches sod/topsoil</td>
<td></td>
<td></td>
<td>Probe depth of 0.5 inches</td>
</tr>
<tr>
<td>SM</td>
<td>Brown silty fine to medium sand with gravel and occasional cobbles, small roots (medium dense, moist) (fill)</td>
<td></td>
<td></td>
<td>Probe depth of 0.5 inches</td>
</tr>
<tr>
<td>SM</td>
<td>Gray silty fine sand with gravel and occasional cobbles (dense, moist) (glacial till)</td>
<td>13</td>
<td>50</td>
<td>Probe depth of 0.5 inches</td>
</tr>
</tbody>
</table>

**Notes:**  
See Figure A-1 for explanation of symbols.  
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.  
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.

---

**Log of Test Pit TP-16**

<table>
<thead>
<tr>
<th>Date Excavated</th>
<th>Total Depth (ft)</th>
<th>Logged By</th>
<th>AP</th>
<th>Excavator Equipment</th>
<th>Checked By</th>
<th>CWM</th>
<th>Coordinate System</th>
<th>Horizontal Datum</th>
<th>Vertical Datum</th>
<th>Groundwater not observed</th>
<th>Caving not observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/5/2019</td>
<td>8</td>
<td></td>
<td></td>
<td>Komatsu WB 140 Rubber-tired Backhoe</td>
<td></td>
<td></td>
<td>WA State Plane North</td>
<td>NAD83 HARN (feet)</td>
<td>NAVD88</td>
<td>Groundwater not observed</td>
<td>Caving not observed</td>
</tr>
<tr>
<td>SAMPLE</td>
<td>MATERIAL DESCRIPTION</td>
<td>REMARKS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>----------------------</td>
<td>---------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1 inch of crushed rock</td>
<td>Probe depth of 1 inch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3 inches asphalt concrete pavement</td>
<td>Probe depth of 1 inch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Gray fine gravel with silt and sand (medium dense, moist) (fill)</td>
<td>Probe depth of 1 inch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gray silty fine to medium sand with occasional gravel (medium dense, moist)</td>
<td>Probe depth of 0.5 inches</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reddish brown silty fine to medium sand with occasional gravel</td>
<td>Probe depth of 1 inch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gray silty fine to medium sand with occasional gravel (dense, moist) (glacial till)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on Topographic Survey.
APPENDIX D

Report Limitations and Guidelines for Use
APPENDIX D
REPORT LIMITATIONS AND GUIDELINES FOR USE¹

This appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

It is important to recognize that the geoscience practices (geotechnical engineering, geology and environmental science) rely on professional judgment and opinion to a greater extent than other engineering and natural science disciplines, where more precise and/or readily observable data may exist. To help clients better understand how this difference pertains to our services, GeoEngineers includes the following explanatory “limitations” provisions in its reports. Please confer with GeoEngineers if you need to know more how these “Report Limitations and Guidelines for Use” apply to your project or site.

Geotechnical Services Are Performed for Specific Purposes, Persons and Projects

This report has been prepared for use by MIG, EHA, and their authorized agents. The information contained herein is not applicable to other sites or projects.

GeoEngineers structures its services to meet the specific needs of its clients. No party other than the party to whom this report is addressed may rely on the product of our services unless we agree to such reliance in advance and in writing. Within the limitations of the agreed scope of services for the project, and its schedule and budget, our services have been executed in accordance with our agreement with Everett Housing Authority and generally accepted geotechnical practices in this area at the time this report was prepared. We do not authorize, and will not be responsible for, the use of this report for any purposes or projects other than those identified in the report.

A Geotechnical Engineering or Geologic Report is Based on a Unique Set of Project-Specific Factors

This report has been prepared for the proposed Everett Housing Authority Park District Redevelopment project in Everett, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, it is important not to rely on this report if it was:

- Not prepared for you,
- Not prepared for your project,
- Not prepared for the specific site explored, or
- Completed before important project changes were made.

¹ Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.
For example, changes that can affect the applicability of this report include those that affect:

- The function of the proposed structure;
- Elevation, configuration, location, orientation or weight of the proposed structure;
- Composition of the design team; or
- Project ownership.

If changes occur after the date of this report, GeoEngineers cannot be responsible for any consequences of such changes in relation to this report unless we have been given the opportunity to review our interpretations and recommendations. Based on that review, we can provide written modifications or confirmation, as appropriate.

Subsurface Conditions Can Change

This geotechnical or geologic 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 man-made events such as construction on or adjacent to the site, new information or technology that becomes available subsequent to the report date, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. If more than a few months have passed since issuance of our report or work product, or if any of the described events may have occurred, please contact GeoEngineers before applying this report for its intended purpose so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical and Geologic Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies the specific subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied its professional judgment to render an informed opinion about subsurface conditions at other locations. Actual subsurface conditions may differ, sometimes significantly, from the opinions presented in this report. Our report, conclusions and interpretations are not a warranty of the actual subsurface conditions.

Geotechnical Engineering Report Recommendations Are Not Final

The recommendations included in this report should not be considered final. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for the recommendations in this report if we do not perform construction observation.

We recommend that you allow sufficient monitoring, testing and consultation during construction by GeoEngineers to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes if the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective means of managing the risks associated with unanticipated conditions.
A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by members of the design team or by contractors can result in costly problems. GeoEngineers can help reduce the risks of misinterpretation by conferring with appropriate members of the design team after submitting the report, reviewing pertinent elements of the design team’s plans and specifications, participating in pre-bid and preconstruction conferences, and providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final boring, test pit and testing logs based upon their interpretation of field logs and laboratory data. The logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Photographic or electronic reproduction is acceptable, but separating logs from the report can create a risk of misinterpretation.

Give Contractors a Complete Report and Guidance

To help reduce the risk of problems associated with unanticipated subsurface conditions, GeoEngineers recommends giving contractors the complete geotechnical engineering or geologic report, including these “Report Limitations and Guidelines for Use.” When providing the report, you should preface it with a clearly written letter of transmittal that:

■ Advises contractors that the report was not prepared for purposes of bid development and that its accuracy is limited; and
■ Encourages contractors to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer.

Contractors Are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor’s procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and adjacent properties.

Biological Pollutants

GeoEngineers’ Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants, and no conclusions or inferences should be drawn regarding Biological Pollutants as they may relate to this project. The term “Biological Pollutants” includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

A Client that desires these specialized services is advised to obtain them from a consultant who offers services in this specialized field.