KIEWIT-HOFFMAN
EAST LINK CONSTRUCTORS

SOUNDTRANSIT

East Link Extension
Contract E360

Geotechnical Data and Design Report

Revision No. 2
Draft

Signed copy of GDDR is submitted for permit review only.

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48062
REGISTERED
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4/17/17

McMILLEN JACOBS ASSOCIATES

March 2017

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Technical Memorandum

To:	Jay Kelley, City of Redmond	Project:	East Link E360 Design/Build Contract
From:	Lynn Salvati	cc:	Andy Mencke
Date:	January 22, 2018	Job No.:	5480.2
Subject:	OTC Station – Minimum Footing Depth		

This memorandum is to clarify a statement included in the East Link Extension Contract E360 Geotechnical Data and Design Report, May 2017.

As part of Table 7.1, there are defined minimum bearing depth values provided for shallow foundations at the OTC Station site. As part of the permit review provided by the City, a question was raised on how this bearing depth requirement applied to foundation PF9 (stair stringer).

The foundation for the stair stringer falls under the "all other shallow foundations" category in Table 7.1. With a minimum depth of 2 feet, the factored bearing resistance would be 3.9 ksf without eccentricity or 3.5 ksf with eccentricity.

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Distribution

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Revision Log

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1	2/3/17	Complete draft issued to Kiewit-Hoffman for review
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1.0 Introduction

The East Link Extension project will extend Sound Transit's Link light rail system from the City of Seattle to the City of Redmond. Contract E360 ("Project") is the last contract of the East Link Extension project and includes approximately 1.8 miles of new track and two new stations. The location of the Project is shown in the Vicinity Map (Figure 1).

1.1 Purpose and Scope

This Geotechnical Data and Design Report (GDDR) presents the procedures and results of the field exploration and laboratory testing programs completed for the E360 Design-Build Contract. The scope of work included performing subsurface explorations, in situ testing, geotechnical laboratory testing, and groundwater monitoring. This report also summarizes the geotechnical conditions for E360, and provides geotechnical engineering recommendations for design and construction of the Project. This GDDR supersedes preliminary design memos.

1.2 Datum and Stationing

Ground elevations were measured with respect to the North American Vertical Datum of 1988. Horizontal positions were recorded as northings and eastings according to the Sound Transit Datum, which is calculated using NAD83 Washington State Plane North. Unless otherwise noted, the stationing noted in the report refers to the Eastbound (EB) Track stationing (STA). The Westbound Track has stationing slightly offset from the Eastbound Track.

1.3 Project Description

The proposed alignment begins on the north side of NE 20th Street at the intersection with 136th Place NE in Bellevue (STA EB 691+26). Existing conditions include private commercial/industrial properties occupied by predominately single-story structures and asphalt parking lots. The alignment heads north towards State Route 520 (SR 520) and then turns east and follows SR 520 east and then north to the project terminus at NE 40th Street (STA EB 784+38). Existing conditions along this portion of the alignment consist of undeveloped right-of-way owned and maintained by WSDOT, including a Maintenance Spoils Processing Site (referred to as the "Sweeper Site") located south of the SR 520 eastbound lanes between 140th Avenue NE and NE 24th Street (approx. STA EB 704 to EB 715).

1.3.1 Aerial Guideway

At the western end of the alignment, Contract E360 starts at-grade and transitions to an aerial guideway within the first 500 feet (approx. STA EB 695+70). The aerial guideway is approximately 4,600 feet in length, or about half of the 1.8-mile alignment, and is supported by mechanically stabilized earth (MSE) retaining walls at its ends and single-pier bents in between. The guideway will carry the tracks over 140th Avenue NE, NE 24th Street, and the 148th Avenue NE interchange, which includes several on-ramps and off-ramps for SR 520. The guideway transitions back to at-grade as it approaches the Overlake Village Station (approx. STA EB 742+80).

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1.3.2 At-Grade and Retained Cut Guideway

The E360 alignment is at grade for approximately 4,700 feet, which includes the first 500 feet (approx.) of the alignment as it approaches the aerial guideway, and then again between the Overlake Village Station and the Overlake Transit Center Station. Retaining walls will be constructed along the track, where necessary, to support the soils on either side of the track. Cast-in-place walls, soil nail walls, and cantilever walls will be used to retain the soil in this section of the alignment.

1.3.3 Stations

The Overlake Village Station is located west of 152nd Avenue NE and east of SR 520 (approx. STA EB 743 to STA EB 750). The Overlake Transit Center Station is located at the eastern terminus of the E360 alignment, south of NE 40th Street (approx. STA EB 779 to STA EB 784). Both station platforms are at-grade.

1.3.4 Pedestrian Bridge

The Project includes one pedestrian bridge, approximately 250 feet in length, located just east of the Overlake Village Station (approx. STA EB 749+80), which provides pedestrian access to the station across SR 520. The pedestrian bridge will be supported on spread footings, while the access ramp on the east end of the bridge will be supported on a combination of spread footings and drilled shafts.

1.3.5 Retaining Walls, Vaults, and Other Structures

Construction and operation of the track guideway will require a number of retaining walls and track walls. In addition, there are several underground vault structures and above-ground structures that require geotechnical design recommendations. These are summarized in Table 1-1, Table 1-2, and Table 1-3. The design team is considering eliminating Wall 4 (BSW-2), the WSDOT Access Road, and the Valley Creek Vault; however, geotechnical design recommendations for these project elements are still presented in this document in case the structures remain in the final design. If Wall 4 (BSW-2) is eliminated, the site should be regraded to accommodate the grade change.

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Table 1-1. Project Walls

Number	Type	Height	Length	Start, End EB Station
Wall 1 (EB MSE-1)	MSE	12	150	694+20, 695+70
Wall 2 (WB MSE-1)	MSE	16	150	694+20, 695+70
Bent D51	Cast-in-place	9.5	34	695+71
Wall 3 (BSW-1)	Soldier pile	15	65	696+80, 697+10
Wall 4 (BSW-2)	Soil nail	11	90	740+10, 740+80
Bent D84	Cast-in-place	8.5	28	741+40
Wall B3 (EB MSE-2)	MSE	8	140	741+40, 742+80
Wall 6 (WB MSE-2)	MSE	14	140	741+40, 742+80
Wall B4 (EBW-1)	Cast-in-place	13	340	749+90, 753+30
Wall 13 (EBW-2)	Soil nail	25	460	753+30, 757+90
Wall 13a (EBW-3)	Cast-in-place	22	160	757+90, 759+50
Wall 14 (EBW-4)	Soil nail	28	660	759+50, 766+10
Wall 15 (EBW-5)	Soldier pile	16	290	766+10, 769+00
Wall B6 (EBW-6)	Cast-in-place	10	980	769+00, 778+80
Wall 16 (WBW-1)	Cast-in-place	8	760	749+40, 757+00
Wall B5 (WBW-1)	Cast-in-place	8	2040	757+00, 777+40
OTC-WW	Soil nail	28	670	777+70, 784+40
OTC-HW	Soil nail	28	50	784+40
OVS Walls	Cast-in-place		varies	742+80, 749+90
WSDOT Access Road	MSE	20	530	710+45, 714+30

Table 1-2. Project Vaults

Name	Type	Depth	Start, End EB Station
Park Place	Detention	10	694+00
Valley Creek	Detention	12	705+00, 706+00
Traction Power Substation (TPSS)	Detention	10	717+50, 718+50
Overlake Village Station Infiltration Facility	Infiltration	30	743+00, 746+00

Table 1-3. Project Structures

Name	Start, End EB Station
Aerial Guideway	695+45, 741+65
TPSS - NE 24th St	716+00, 718+00
OVS Station Platform	744+40, 748+00
OVS Pedestrian Bridge	748+60, 749+90
TPSS - OTC	772+50, 775+00
OTC Parking Garage	778+60, 782+60
OTC Station Platform	779+50, 783+30

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1.4 Limitations

This report has been prepared for the exclusive use of Kiewit-Hoffman and its consultants and contractors for the E360 Project only. The data presented in this report is based on the subsurface conditions encountered by McMillen Jacobs Associates at the time that the geotechnical investigation for the Project was conducted. The report also contains information and data collected from other relevant studies, as well as our professional experience and judgment. Subsurface conditions may vary between exploration locations and with time. As a result, conditions which differ from those summarized in the report, and which are unanticipated, can and do occur. McMillen Jacobs Associates cannot be held responsible for the interpretation by others for the data contained herein.

Within the limitations of scope, schedule and budget, our services have been performed in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in this area. No other warranty, express or implied, is made.

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2.0 Site Conditions

2.1 Topography

The Project site is located in Bellevue and Redmond along SR 520. The ground surface along the Project alignment gains approximately 150 feet in elevation, from about El. 199 feet to El. 354 feet, from its western terminus to its eastern terminus. Most of the elevation gain occurs from east of 140th Avenue NE to the Overlake Village Station; the elevation gain from east of Overlake Village Station to Overlake Transit Center Station is only about 20 feet.

2.2 Regional Geology

The project is located in the central portion of the Puget Lowland, an elongated topographic and structural depression bordered by the Cascade Mountains on the east and the Olympic Mountains on the west. This lowland is characterized by low, rolling relief with broad valleys and deeply cut ravines. In general, the ground surface elevation is within 500 feet of sea level.

The Puget Lowland has been glaciated repeatedly during the past two million years by glaciers that advanced southward from British Columbia. The last ice sheet reached the central Puget Sound region about 14,500 years ago. The alternating glacial and interglacial episodes have filled the Puget Lowland with a complex sequence of glacial and non-glacial (deposited between glaciations) sediments. Since the ice exceeded 3,000 feet in thickness in the project area during the most recent glaciation, soils deposited prior to the recession of the last ice sheet are generally overconsolidated.

Additionally, post-glacial deposits (river and lake deposits, landslide deposits, man-made fill, etc.) are present near the ground surface in some locations. The recent Holocene and recessional deposits are normally consolidated. Thick sequences of glacial and interglacial sediments overlie bedrock in the vicinity of the Project. Bedrock near the Project is expected to be at a depth exceeding 1,300 feet (Yount et al., 1985).

2.3 Regional Seismicity

Based on the regional tectonics, three types of seismic sources provide contributions to the seismic hazard.

- Deep earthquakes, which occur within the subducting Juan de Fuca plate, usually have a magnitude less than 7.5. In the Puget Sound region, deep earthquakes occur at depths of about 28 to 37 miles. The range of distances between the earthquake source and the site is the same as the depths. The shaking from deep earthquakes is typically weaker but felt over a wider area when compared to shallow earthquakes. The Nisqually Earthquake (M=6.8) in 2001 is the most recent example of a deep earthquake in this area.

- Subduction earthquakes occur at the interface of the subducting Juan de Fuca plate and the North American plate. Huge areas of slip may occur resulting in earthquakes with a magnitude of up to 9. The strong shaking could continue for several minutes and many aftershocks will occur. The

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most recent interplate event on the Cascadia Subduction Zone is believed to have occurred in 1700. This fault zone is over 60 miles from the site.

- Shallow earthquakes occur within the North American plate at depths typically less than 10 miles and magnitudes of 7.5 or less. The Seattle Fault Zone (SFZ) is the closest source for shallow earthquakes for this project. The north trace of the SFZ is less than 5 miles from the Project site. The most recent movement along the SFZ is believed to be a magnitude 7 to 7.5 event 1,100 years ago.

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3.0 Subsurface Exploration and In Situ Testing Program

3.1 Existing Subsurface Data

Existing subsurface data along the E360 alignment includes information provided in the Contract E360 Geotechnical Data Report (GDR), Final RFP Submittal (HJH Final Design Partners, 2015). The results of 65 geotechnical explorations were presented in the GDR; 39 of them were performed by HJH to complete the Final RFP, 18 were performed by CH2M Hill during preliminary engineering, and the remainder were previous explorations by others. Seventeen borings have standpipe piezometers installed for long-term groundwater monitoring. The depth of exploration ranges from 6 feet to 126.5 feet below ground surface.

The results from 30 additional geotechnical explorations (16 borings, 14 test pits) have been collected for this report from the following references for past projects in the vicinity:

- GeoEngineers, 2008. Geotechnical Engineering Services Report, 31st to 36th Street/SR 520 Bridge, Redmond, Washington.
- HWA Geosciences, Inc., 2002. Geotechnical Report, Overlake Transit Facility.
- GeoEngineers, 2000. Geotechnical Engineering Services Report, Daytona Building Project, Redmond, Washington.
- Washington State Department of Transportation (WSDOT), 1997. Memorandum for SR 520, OL-2663, NE 40th Interchange Stormwater Detention Vault.
- Hong West & Associates, 1997. Geotechnical Report for SR 520 / NE 40th Street Interchange.

All existing explorations are summarized in Table A.2-1, and the exploration locations are shown in Figures 2 through 10. Existing exploration logs are provided in Appendix A.2.

3.2 E360 Design-Build Exploration Program

McMillen Jacobs Associates coordinated and observed 34 new E360 Design-Build geotechnical explorations (27 borings, 7 test pits) to support final design. These explorations were completed to provide subsurface data at the proposed drilled shaft foundations for the aerial guideway and to provide alignment specific information in the areas of some of the retaining walls toward the east end of the Project. The borings were completed by Holocene Drilling, Inc. during the period 8 August to 28 September 2016 and ranged in depth from 40 feet to 120 feet. The test pits were completed by Kiewit-Hoffman on 18 August 2016 and ranged in depth from 6 to 8 feet. McMillen Jacobs Associates' personnel were on-site to observe drilling and excavation operations, prepare field logs of each exploration, and collect soil samples for geotechnical laboratory testing. No further explorations are planned for the design elements discussed in this report. Additional explorations may be required for a pedestrian bridge at OTC, which will be provided in a separate report.

True North Land Surveying, Inc. located the explorations by optical survey, and provided their coordinates and elevations following completion of the exploration program. The exploration locations are shown in Figures 2 through 10 and the exploration details are summarized in Table A.1-1. Borehole and test pit logs for the new E360 Design-Build explorations are provided in Appendix A.1.

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Drilling, sampling, and field logging procedures are described in the following sections. Data recording methods and in-situ test procedures are also provided.

3.2.1 Exploration Methods

Holocene Drilling, Inc. completed the geotechnical borings using mud-rotary drilling methods with a truck-mounted or track-mounted drill rig. The mud-rotary method consists of drilling an approximately 4-inch to 6-inch diameter borehole in the ground using a tri-cone roller bit and drilling mud (either a mineral-based or polymer-based drilling fluid). The mud is used to wash the soil cuttings from the borehole, to cool the bit, and to maintain borehole stability. The tri-cone bit is used to advance the borehole. Drilling mud is pumped from a mud tub at the surface, down the drill rods, and out through the bit. The drilling mud carries soil cuttings up the annular space between the drill rods and the borehole wall, back up to the mud tub at the surface. Cuttings carried by the drilling mud are allowed to settle out in the mud tub and the drilling fluid is re-circulated back down the borehole. Casing is occasionally used if borehole stability is still problematic. After completing the borings, Holocene decommissioned the borings by backfilling the open borehole with bentonite chips in accordance with Washington Administrative Code (WAC) 173-160-450.

Kiewit-Hoffman completed the test-pit explorations using a mini-excavator. Excavated materials were placed back in the excavations and the locations were graded using the excavator bucket.

3.2.2 Sampling Methods

3.2.2.1 Driven Samples

Driven soil samples were obtained by removing the drilling assembly from the borehole and driving a standard 2-inch O.D., 18-inch long split-spoon (or split-barrel) sampler via the Standard Penetration Test (SPT; See 3.4.1). These samples are considered disturbed. A driven sample can recover up to 18 inches of soil. Split-spoon samples were visually classified and described on the borehole logs, then placed in plastic Ziploc bags for possible laboratory testing.

3.2.2.2 Undisturbed Samples

Relatively undisturbed soil samples of fine-grained soils were recovered from several soil borings using steel, thin-walled Shelby tubes. The 3-inch O.D., 30-inch long sampling tubes are pushed 24 inches into the soil at the bottom of the borehole and retrieved, and then sealed at both ends to maintain the integrity of the samples for laboratory testing. These relatively undisturbed samples were used for soil shear strength and consolidation testing.

3.2.2.3 Grab Samples

Disturbed grab samples were recovered from the test pit explorations by taking excavated soils from the excavator bucket or adjacent pile and placing directly into plastic Ziploc bags for possible laboratory testing.

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3.2.3 Boring and Test Pit Logs

The boring log (or test pit log) is a written record of the subsurface conditions encountered during drilling or excavation. Boring and test pit logs are included in Appendix A and provide a description of each identified soil unit and graphically illustrate the geologic units encountered at each boring location. The Unified Soil Classification System (USCS) is used to describe the various soil types encountered in the borings and a graphical symbol for each identified soil layer is included on the boring logs. The boring logs show the type and depth of soil samples, sample recoveries, and uncorrected SPT N-values, if applicable. Other information included on the boring logs includes groundwater monitoring well installation diagrams, groundwater levels, ground surface elevations and coordinates.

Material descriptions shown on the logs are based on the material recovered from the borings; however, there are instances where a sample was not recovered, or recovery was poor. In these instances, the material descriptions were inferred from the drill action (e.g., ease or difficulty of drilling, rate of advancement) and the cuttings observed in the drilling mud circulating up from the borehole. These descriptions were noted on the logs and should be considered as only general indicators of subsurface conditions at those depths.

3.3 Groundwater Monitoring

Groundwater level measurements were obtained from the existing piezometers and added to the existing data from the RFP documents. Plots and summary tables of groundwater level measurements are included in Appendix B. The measured high and low groundwater levels are also shown on the interpreted subsurface profile in Figures 11 through 21, along with the baseline groundwater level from the Contract E360 Geotechnical Baseline Report (GBR), Final RFP Submittal (HJH Final Design Partners, 2015). No additional piezometers or observation wells were installed in the new E360 Design-Build boreholes.

3.4 In Situ Geotechnical Testing

3.4.1 Standard Penetration Testing (SPT)

SPTs were performed by driving a 2-inch O.D., 1.375-inch I.D. split-spoon sampler into the soil at the bottom of the borehole with an auto-hammer. An auto-hammer delivers energy per blow to the split-spoon sampler equivalent to a 140-pound hammer falling freely from a height of 30 inches. The actual energy delivered depends on the condition and efficiency of the drill rig hammer. The number of blows to advance the sampler the final 12 inches (or portion thereof) of the 18-inch drive is recorded as the Standard Penetration Resistance, or N-value. The N-value provides a relative indication of soil density (for granular soils) or consistency (for fine-grained soils). If the penetration resistance exceeded 50 blows for 6 inches or less of penetration, the test was terminated and the number of blows along with the penetration distance was recorded on the boring log. The presence of gravels or cobbles larger than the sampler can impact measured penetration resistances and may result in artificially high values. A soil sample is collected in conjunction with the test, as described in Section 3.2.2.1. The SPT N-values are provided in the exploration logs included in Appendix A.1. The reported SPT N-values are uncorrected field values. An energy ratio of 75% was assumed for all SPT N-values when calculating corrected N-values. This value is consistent with typical energy ratios measured for automatic trip hammers, and with measured values for Holocene's hammers that were available.

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3.4.2 Downhole Geophysical Testing

Downhole geophysical testing was performed in three boreholes during the current exploration program: E360-K-009, E360-K-012, and E360-K-023. The primary purpose of this testing was to obtain estimates of the soil shear wave velocity, which is used to identify boundaries between soil layers and to evaluate the appropriate site classification for seismic design. The testing was performed by Philip H. Duoos, Geophysical Consultant, under subcontract to McMillen Jacobs Associates.

Schedule 40 polyvinyl chloride (PVC) inclinometer casing was grouted into the selected open boreholes after drilling was completed. The downhole shear wave and compression wave velocities were measured after the grout was cured for at least 48 hours. A description of these measurements and the procedures used for collecting the downhole measurements is included in the report from Philip H. Duoos in Appendix D.

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4.0 Geotechnical Laboratory Testing

4.1 Existing Laboratory Testing

Geotechnical testing results for existing borings were provided in the Contract E360 Geotechnical Data Report, Final RFP Submittal (HJH Final Design Partners, 2015). A summary of the existing geotechnical laboratory testing is provided in Table C.3-1. Copies of the results are included in Appendix C.3.

The following sections describe the geotechnical laboratory testing performed for the current exploration program. Results of geotechnical laboratory testing for the current exploration program are included in Appendix C.1 and Appendix C.2.

4.2 Geotechnical Index Testing

Index tests were completed on selected soil samples recovered from the soil borings to confirm soil sample classification, in accordance with ASTM standards. Geotechnical index tests include water content, grain size distribution (sieve analysis), and Atterberg limits. Geotechnical index tests were performed by Hong West and Associates, Inc. (HWA) from Bothell, Washington.

4.2.1 Classification

Using the USCS, coarse-grained soils (greater than 50 percent coarser than 0.075 mm) are classified based on particle-size distribution. Fine-grained soils (greater than 50 percent finer than 0.075 mm) are classified based on Atterberg limits. Field descriptions of the soil samples are based on ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). When geotechnical index testing results were available, descriptions were reviewed and modified as necessary in accordance with ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes.

4.2.2 Water Content Determination

The water content of the samples retrieved from the explorations was determined in general accordance with ASTM D2216, Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass. The water content is shown graphically on the borehole logs in Appendix A.1, and the results are included in Appendix C.1.

4.2.3 Grain Size Analyses

The grain size distribution of selected samples was determined in general accordance with the ASTM D422, Standard Test Method for Particle-Size Analysis of Soils. Two general procedures were used to determine the grain size distribution of soil, including sieve analysis and minus 200 wash.

Grain size analysis results could potentially be affected by sample type and drilling method. The sample type or, more specifically, the inside diameter of the sampler, directly impacts the maximum particle size that can be sampled. For example, the largest diameter particle that can be sampled by a 2-inch SPT sampler (1.375 inch I.D.) is approximately 1.3 inches, regardless of the maximum particle size of the soil unit being sampled. The drilling method could also potentially impact grain size analysis data. During mud-rotary drilling, drilling mud can infiltrate open deposits of sand and gravel. This process can affect

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the sample by "cleaning" the sample (removing fines), adding bentonite clay (contained in the drilling mud) to the sample, or varying degrees of both. Field staff removed drilling mud from mud-rotary borehole samples to the extent practical; however, it is often impossible to completely clean the samples.

Grain size curves are included in Appendix C.1.

4.2.4 Atterberg Limits Determination

Atterberg limits tests were performed in general accordance with ASTM D4318, Standard Test Method for Liquid Limit (LL), Plastic Limit (PL), and Plasticity Index (PI) of Soils. Summary plasticity charts are included in Appendix C.1. The results are also shown graphically on the exploration logs in Appendix A.1.

4.3 Soil Corrosion Testing

Selected samples were tested for a suite of common corrosion parameters, including pH, resistivity, oxygen reduction potential (redox), chlorides content, and sulfates content. Soil measurements were determined by the U.S. Environmental Protection Agency (EPA)-approved and ASTM-approved analytical methods. Soil corrosion tests were performed by AmTest, Inc. from Kirkland, Washington. Results are provided in Appendix C.2. A description of the corrosion parameters are provided below.

- **pH** is an indication of the acidity or alkalinity of soil, and is measured in pH units on a scale that ranges from 0 to 14, with a pH of 7 as the neutral point. Soil pH is defined as the negative logarithm of the hydrogen ion concentration. As the amount of hydrogen ions in the soil increases, the soil pH decreases, thus becoming more acidic. High soil acidity can result from high organic content or the presence of pollutants. From a pH of 7 to 0, the soil is increasingly acidic; from a pH of 7 to 14, the soil is increasingly alkaline or basic. Soils commonly have a pH range of about 5 to 8.

- **Resistivity** is a measure of the tendency for electrical currents produced during the corrosion process to flow freely through the electrolyte. A decrease in resistivity relates to an increase in potential corrosion activity. In general, for gravelly soils with little fine matrix, typical resistivity values range from about 50,000 to 100,000 ohm centimeters (ohm-cm). For soils that are silty or clayey, the resistivity decreases to range from about 1,000 to 20,000 ohm-cm.

- **Redox potential** is a measure of the oxidizing or reducing strength of soil and is a factor in the amount of available oxygen in the soil. Where the soil is oxidizing (aerobic), the value of the potential is more positive than where the soil is reducing (anaerobic). Anaerobic soil conditions are ideal for sustaining colonies of sulfate-reducing bacteria (SRB). SRBs reduce sulfates to form hydrogen sulfide, which leads to graphitization of iron and pitting corrosion in steels. The most favorable soil pH for SRBs is 7.0, with activity decreasing to either side of this value. Therefore, soils which show the presence of sulfides or sulfates with a neutral pH and a low Redox potential would be corrosive to iron and steel.

- **Chlorides** are ions that convert to hydrochloric acid, which can cause corrosion of metals. Its presence tends to decrease soil resistivity.

- **Sulfates** are ions that can lead to damage to metallic and concrete structures.

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4.4 Geotechnical Engineering Property Tests

Engineering property tests were performed on relatively undisturbed soil samples obtained from the thin-walled Shelby tube samples retrieved from the mud-rotary borings.

4.4.1 One-Dimensional Consolidation Test

Incremental loading consolidation tests were performed on relatively undisturbed soil samples in general accordance with ASTM D2435-04, Standard Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading.

The consolidation test measures the coefficient of consolidation for estimating the rate of soil consolidation and provides an estimate of the maximum past pressure (pre-consolidation pressure). These parameters were used to evaluate strength-deformation properties and the degree of over-consolidation of the tested soils. Determination of the maximum past pressure helps in providing a better understanding of the strength-deformation behavior obtained from triaxial tests results. The results of the one-dimensional consolidation tests are in Appendix C.1. The results include plots of both percent consolidation and void ratio versus stress on a logarithmic scale.

4.4.2 Consolidated-Undrained (CU) Triaxial Compression Tests

CU triaxial compression tests with pore pressure measurements were performed on selected, relatively undisturbed soil samples in general accordance with ASTM D4767-11, Standard Test Method for Consolidated Undrained Triaxial Compression Test for Cohesive Soils. The CU tests use a displacement-controlled testing machine to measure the unconfined compressive strength of the specimen, the excess pore water pressure that develops within the specimen as it is sheared, and the shear strength based on total or effective stress. The results of the CU triaxial compression tests are summarized in Appendix C.1.

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5.0 Subsurface Conditions

5.1 Engineering Soil Units

Soils encountered and tested in the geotechnical exploration program have been grouped based on common engineering properties into eight engineering soil units (ESUs). Soil type, index and strength tests, and expected behavior are used to differentiate the ESUs. The eight ESUs used for this Project are described briefly below. These ESUs are broken into two groups: non–overridden and glacially overridden. Regardless of depositional environment, glacially overridden ESUs have been covered by at least one glacier and are overconsolidated.

The Contract E360 Final RFP Geotechnical Baseline Report produced by HJH (2015) included ESU descriptions that differ from the ESUs below. The ESU descriptions below indicate how the ESUs in the RFP document relate, where appropriate.

5.1.1 Non-Overridden ESUs

- **Engineered and Non-Engineered Fill (ENF):** This ESU consists of very loose to very dense cohesionless fill and soft to stiff cohesive fill. Wood and other debris may be found in these deposits. This ESU consists of soils characterized by their recent man-made placement and larger variability in soil properties. ENF is typically grouped in ESU VII in the RFP documents.

- **Recent Granular Deposits (RGD):** This ESU consists of loose to dense, or locally very dense, sand and sandy silt with variable amounts of silt, clay, and gravel. RGD is typically grouped in ESU II in the RFP documents.

- **Recent Clay and Silt (RCS):** This ESU consists of soft to stiff, silt and clay with variable amounts of sand and gravel, and localized layers and lenses of medium dense to dense clayey sand. RCS is typically grouped in ESU I in the RFP documents.

- **Recent Organic Deposits (ROD):** This ESU consists of very soft to soft organic soils, including but not limited to clay and fibrous peats. ROD is typically grouped in ESU VI in the RFP documents.

5.1.2 Glacially Overridden ESUs

- **Till and Till-Like Deposits (TLD):** This ESU is a dense to hard cohesive mixture of gravel, sand, silt, and clay that is highly spatially variable with layers and lenses of clean sand and gravel and local lenses of fractured clay and silt. This ESU can be transitional in nature with CSG. Cobbles and boulders are common in this unit. Typically, more than 20% by weight of the TLD ESU passes the No. 200 sieve (0.074 mm). TLD is typically grouped in ESU V in the RFP documents.

- **Cohesionless Sand and Gravel (CSG):** This ESU consists of dense to very dense silty sand to sandy gravel with variable amounts of silt and local lenses of clay and clayey silt. Cobbles and boulders can be found in these deposits. It is also common to find layers and lenses of all other

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glacially overridden ESUs within CSG. Typically, less than 30% by weight of the CSG ESU passes the No. 200 sieve (0.074 mm). CSG is typically grouped in ESU III in the RFP documents.

- **Cohesionless Silt and Fine Sand (CSF):** This ESU consists of dense to very dense silt, fine sandy silt, and silty fine sand. The soils in this ESU are predominantly cohesionless with lenses of clayey silt and clay locally. Typically, at least 80% by weight of CSF passes the No. 100 sieve (0.149 mm), and the plasticity index is less than 4. A review of the existing RFP boring logs shows that CSF was encountered in ESUs III, IV, and V.

- **Cohesive Clay and Silt (CCS):** This ESU consists of very stiff to hard, interbedded silt and clay with multiple layers, lenses, and dikes of cohesionless silt, sand, and gravel of varying lateral extent and thickness. Scattered cobbles and boulders (dropstones) can be found in these deposits as well as local layers and lenses of glacially overridden peat. Slickensides, shear zones, and sand partings are found locally. Typically, the plasticity index of CCS is greater than or equal to 4. CCS is typically grouped in ESU IV in the RFP.

5.2 Subsurface Profile

Figures 11 through 21 show the interpreted subsurface conditions along the Project alignment, including approximate contacts between ESUs, high and low groundwater level measurements, and the baseline groundwater level from the RFP documents. The profile stationing, ground surface elevations, and borehole offsets are referenced to the proposed Eastbound Track centerline. To improve clarity, not all explorations used in design and summarized in this GDDR are shown on the profile.

The profile shows the greatest depth to glacially overridden deposits is in the portion of the alignment west of Overlake Village Station, up to 100 feet below existing ground surface between Aerial Guideway bents D56 and D58. The depth to glacially overridden deposits decreases to within about 20 feet of ground surface or less between Overlake Village Station and Overlake Transit Center Station.

5.3 Groundwater and Hydrogeology

The baseline static groundwater level from the RFP documents is shown on the profile in Figures 11 through 21. Perched groundwater is not depicted in the figures.

Perched groundwater is unconfined groundwater separated from an underlying regional water table by unsaturated soil. It should be expected that silt and sand layers or lenses within the fine-grained ESUs (RCS, TLD, CSF, and CCS) contain perched groundwater. Perched groundwater should also be expected on top of the fine-grained ESUs. In the coarse-grained portions of TLD, CSG, and CSF, where interbeds and lenses of fine-grained materials exist, irregularities in the surface of the layers and lenses will pond or trap water and preclude water movement courses.

5.4 Hazardous or Contaminated Soil Conditions

A Phase II Environmental Site Assessment (ESA) report provided in the RFP documents (GeoEngineers, 2015b) details the results of previous environmental sampling and testing at two locations along the project alignment: WSDOT's Sweeper Site between approximate STA EB 704+00 and STA EB 715+00,

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and the fill mound at the SR 520 off-ramp to northbound 148th Ave NE between approximate project STA EB 733+00 and EB 737+00.

The extent of tested soils at the WSDOT Sweeper Site is approximately 900 feet by 60 feet, and up to 5 feet in depth, according to the ESA report. Contaminants of concern detected at the site were lube oil-range hydrocarbons and carcinogenic polycyclic aromatic hydrocarbons (cPAHs). No additional environmental sampling or testing was performed during the current E360 Design-Build exploration program.

The extent of tested soils at the fill mound (south of project alignment from approx. STA 733 to 737) is approximately 500 feet by 250 feet, and up to 45 feet in depth. Contaminants of concern detected at the site were lube-oil hydrocarbons, cPAHs, non-carcinogenic PAHs, and lead. Contaminants were detected between elevations 365 and 333 feet. No contaminants of concern were detected within the top 5 to 10 feet of the explorations. No additional environmental sampling or testing was performed during the current E360 Design-Build exploration program.

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6.0 Geotechnical Design Parameters

6.1 Code Basis of Design

The Sound Transit Link Design Criteria Manual (DCM) specifies which codes are applicable to the elements of the project. Additionally, Authorities Having Jurisdiction (AHJ), such as the cities of Redmond and Bellevue and the Washington State Department of Transportation (WSDOT), also enforce code compliance. The order of precedence of these codes for all structures except the pedestrian bridge is spelled out in the RFP in a document titled "East Link Letter of Concurrence/Structures within Third Parties ROW Basis of Design." The code basis of design for the pedestrian bridge is covered in the RFP in a document titled "Basis of Design for Pedestrian Bridges within Third Parties' ROW." Based on a review of these documents and the referenced codes, we are using the following codes as a design basis in the preparation of this report:

- All foundations that support the trackway or pedestrian bridge, or lie within the WSDOT right-of-way will be designed using the AASHTO LRFD Bridge Design Specifications, 7th Edition (AASHTO BDS).
- All other foundations will be designed using the International Building Code 2015 (IBC).
- All retaining walls (except soil nail walls) that support the trackway or lie within the WSDOT right-of-way will be designed using the AASHTO BDS.
- Soil nail walls will be designed using the WSDOT Geotechnical Design Manual (GDM), which incorporates by reference the Federal Highway Administration Geotechnical Engineering Circular No. 7 (FHWA GEC7).
- All other retaining walls will be designed using the IBC.

6.1.1 Seismic Design

Additionally, the DCM places additional seismic criteria on all structures that support or impact the trackway. The DCM requires the use of a two-tiered approach to seismic design that uses both an Operating Design Earthquake (ODE) and a Maximum Design Earthquake (MDE). The design objective for structures during the ODE is to respond without significant structural damage, which can be repaired during normal operating hours. For the MDE, structures are to be designed survive the deformation imposed on the structure, to avoid major failure, and to maintain life safety. The goal is to provide adequate strength and ductility to prevent collapse of the structure.

The two-tiered system is used in conjunction with the following two design codes:

- The 7th Edition of the "AASHTO LRFD Bridge Design Specifications" (2014)
- The 2nd Edition of the "AASHTO Guide Specifications for LRFD Seismic Bridge Design" (2011)

The two-tiered seismic design approach presented in the DCM is more stringent than the requirements of the AASHTO manuals. Additionally, the DCM requires the use of a "near-fault adjustment factor" for structures located less than 9.4 miles from an active fault, and the entire Project is within 9.4 miles of the Seattle Fault Zone. The adjustment consists of a 20% increase in spectral values with corresponding period longer than 1-second. This adjustment decreases linearly to zero at a period of 0.5-second.

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Structures within the right-of-way for State Route 520 must be designed to meet the requirements of the Washington State Department of Transportation (WSDOT). The WSDOT Geotechnical Design Manual (GDM) (WSDOT, 2015) references the same two AASHTO manuals as the DCM, and does not include an adjustment for near-fault structures. Therefore, by using the DCM criteria, the design spectral acceleration values will meet or exceed all applicable codes.

6.2 Engineering Properties for Soils

The engineering soil properties for the ESUs that are anticipated to be encountered for E360 are provided in Table 6-1. These properties are based on in situ testing, downhole seismic testing, laboratory testing, and our experience on local construction projects in similar soil deposits.

Table 6-1. Engineering Properties of ESUs

Engineering Soil Unit (ESU)	Unit Weight, γ (pcf)	Effective Strength		Undrained Shear Strength [(a)] (psf)	At-Rest Coeff., K_0	Max. Shear Modulus, G_{max} (ksi)
		ϕ' (deg)	c' (psf)			
ENF	124 ± 6	32 +6/-0	0	NA	0.5 +0.1/-0.2	10 ± 5
RGD	124 ± 4	32 +6/-0	0	NA	0.5 +0.1/-0.2	20 ± 10
ROD	110 ± 10	26 ± 2	0	300 ± 200	0.55 ± 0.05	1 ± 0.5
RCS	120 ± 5	30 ± 4	0	1,000 +1,000/-800	0.5 ± 0.1	8 ± 5
CCS	125 ± 5	33 ± 4	270 ± 35	7,000 ± 2,000	1.2 ± 0.4	55 ± 20
CSF	125 ± 5	37 ± 4	0	NA	1.0 +1.0/-0.4	55 ± 20
CSG	128 ± 5	39 +5/-1	0	NA	1.0 +1.0/-0.4	75 ± 30
TLD	128 ± 6	39 +5/-1	0	NA [(b)]	1.0 +1.0/-0.4	100 ± 40

[a] Values provided for intact (undisturbed) soils only.
[b] Zones of cemented and/or cohesive TLD can have undrained shear strengths of up to 9,000 psf.
NA = not applicable.

The recommendations provided in this report are generally based on the first value listed in Table 6-1; however, the range given provides upper and lower bound values which have also been considered in the recommendations and design calculations at specific locations. For example, where design methodologies based on in situ data like SPT N-values are used, such as the AASHTO BDS procedures for drilled shaft axial capacity, our analyses are based on this data, and the range given in Table 6-1 reflects this data.

For all of the ESUs, a Poisson's ratio of 0.20 to 0.30 is recommended for drained loading conditions. For undrained loading conditions, a Poisson's ratio of 0.45 to 0.50 is recommended.

6.3 Corrosion Potential for Soils

Corrosion testing was performed on soil samples from 5 to 15 feet below ground surface near the TPSS site (approx. STA 716+00) and east of the OVS site (approx. STA 753+00). The soils tested were found to be non-aggressive (Lazarte et al., 2015, AASHTO BDS) if metal loss rates need to be calculated for structural design or design of grounding elements. If grounding elements will be placed in engineered fills, the corrosion potential for those fill soils may need to be evaluated.

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6.4 Design Groundwater Elevation

Near the west end of the alignment, groundwater is within a few feet of the ground surface or within a few feet of the base of the SR520 embankment, and generally gets deeper further to the east. The design groundwater level is shown graphically on the Subsurface Profile (Figures 11 through 21).

6.5 Seismic Design Parameters

As described in Section 6.1, the project will incorporate various codes for seismic design. The following sections provide design guidance for implementing the seismic conditions of these codes.

6.5.1 Building Code Design Parameters

The AASHTO BDS and the IBC utilize the same definitions of Site Class. Based on the shear wave velocity tests, SPT blow counts, and laboratory tests performed for the project, the Site Class will vary across the alignment. The recommended Site Classes are presented in Table 6-2.

Table 6-2. Recommended Site Class

Station Range	Site Class
Project Start to 697+50	D
697+50 to 700+00	C
700+00 to 701+20	D
701+20 to 702+00	C
702+00 to 708+00	D
708+00 to 711+00	E
711+00 to 713+50	D
713+50 to Project End (including stations)	C

For the portions of the project designed using the AASHTO BDS with ODE and MDE events, the recommended design spectral acceleration values are shown graphically on Figures 22 and 23, respectively. The AASHTO BDS was used to develop these spectra using ordinates provided in the GBR and confirmed using USGS design tools. For portions of the project designed by AASHTO and not subject to the MDE and ODE events, the recommended design values are based on an earthquake with a 1,000-year return interval as required by the AASHTO BDS and derived using USGS design tools, and are shown on Figure 24. For the structures designed using the IBC, the recommended values are presented on Figure 25, derived using USGS design tools (USGS, 2016).

6.6 Liquefaction Susceptibility

Liquefaction susceptibility was evaluated at each bent for both the ODE and MDE using empirical procedures from Idriss and Boulanger (2008). Fine-grained soils were considered susceptible to liquefaction if they met the criteria recommended in Bray and Sancio (2006). Liquefaction is considered when then factor of safety for liquefaction triggering is less than 1.2.

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6.6.1 Aerial Guideway and Abutments

The results of the liquefaction susceptibility analyses are provided by bent in Table 6-3. There was a low SPT N-value reported in E360-B-024 at a depth of 65 feet below the ground surface in a glacially overridden deposit. However, it was noted on the boring log that heave was likely observed in this layer. Therefore, that N-value was not considered in the susceptibility analysis because it was considered unreliable, and that boring is not located at a bent location.

Although there are scattered layers and lenses that may liquefy during either an ODE or MDE event, no consistent or pervasive liquefiable layer was found in this section of the aerial guideway. Given the discontinuous thin lenses of liquefiable soils, these liquefiable lenses are not considered to be a slope stability hazard. Therefore, no lateral spreading forces are provided for the lateral design of the drilled shafts.

Reduced lateral resistance in liquefiable soil is considered using p-multipliers as discussed in Section 7. Also, liquefaction-induced settlement will result in downdrag loads on the drilled shafts, which are discussed in Section 7.

6.6.2 At-Grade Trackway and Stations

At the locations of the stations and the at-grade trackway between them, the soils below the groundwater table are glacially overridden. Therefore, the risk of liquefaction at these locations is negligible.

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Table 6-3. Summary of Liquefaction Potential

Bent	Boring	Elevation of Potentially Liquefiable Soil Lenses (feet)	
		ODE	MDE
D51	E360-K-003	No Liquefaction	No Liquefaction
D52	E360-K-004	No Liquefaction	No Liquefaction
D53	E360-K-005	No Liquefaction	No Liquefaction
D54	B-D-ES-6	187.8 to 182.8	187.8 to 182.8
D55	E360-K-007	No Liquefaction	193.6 to 189.1
D56	E360-K-008	181.4 to 177.9	181.4 to 177.9
D57	E360-K-009	No Liquefaction	138.2 to 133.2
D58	E360-K-010	No Liquefaction	165.9 to 161.9
D59	E360-K-011	171.6 to 166.6	171.6 to 166.6
D60	E360-B-011	No Liquefaction	No Liquefaction
D61	E360-B-012	177 to 175.5	177 to 175.5
		174 to 168	174 to 168
D62	E360-K-012	No Liquefaction	183.8 to 178.8
D63	E360-B-014	No Liquefaction	No Liquefaction
D64	E360-K-013	No Liquefaction	220.3 to 215.3
D65	E360-K-014	No Liquefaction	No Liquefaction
D66	E360-K-015	No Liquefaction	No Liquefaction
D67	E360-K-015/ BD-ES-8	No Liquefaction	No Liquefaction
D68	E360-K-017	No Liquefaction	No Liquefaction
D69	E360-K-018	No Liquefaction	No Liquefaction
D70	E360-K-019	No Liquefaction	No Liquefaction
D71	E360-B-022	No Liquefaction	No Liquefaction
D72	E360-K-020	No Liquefaction	No Liquefaction
D73	E360-K-021	No Liquefaction	No Liquefaction
D74	E360-K-022	No Liquefaction	No Liquefaction
D76	B-D-ES-11p	No Liquefaction	No Liquefaction
D77	E360-K-023	No Liquefaction	No Liquefaction
D78	E360-K-023/ E360-K-025	No Liquefaction	No Liquefaction
D79	E360-K-025	No Liquefaction	No Liquefaction
D80	E360-K-026	No Liquefaction	No Liquefaction
D81	E360-K-027	No Liquefaction	No Liquefaction
D82	E360-K-028	No Liquefaction	No Liquefaction
D83	E360-K-029	No Liquefaction	No Liquefaction
D84	E360-K-030	No Liquefaction	No Liquefaction

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7.0 Geotechnical Design Considerations

7.1 Shallow Foundations

Shallow foundations will be designed on this project using various design codes. The following three sections provide design recommendations in accordance with the appropriate code:

- Trackway Structures – designed in accordance with the AASHTO LRFD code using the seismic modifications of the Sound Transit DCM
- OVS Pedestrian Bridge – designed in accordance with the AASHTO LRFD code with no seismic modifications
- Other Structures – designed in accordance with the IBC

7.1.1 Trackway Structures

Shallow foundations may be used for support of trackway structures. It is our understanding that this will only apply at the stations, since the guideway will be on an aerial section west of the OVS and in a ballasted section between OVS and OTC. For foundations bearing on TLD or ENF/RGD with a minimum width of 2 feet and a minimum bearing depth of 2 feet, we recommend designing spread footings using the following parameters:

- Nominal bearing resistance: 12 ksf
- Factored bearing resistance (Strength Limit States): 5.4 ksf
- Factored bearing resistance (Extreme Event Limit States): 12 ksf
- Factored bearing resistance (Service Limit States): 5.4 ksf. This will limit settlement to less than 1 inch.
- Nominal sliding coefficient: 0.62
- Factored sliding coefficient (Strength Limit States): 0.50
- Factored sliding coefficient (Extreme Event Limit States): 0.62
- Nominal Passive Resistance: 400 pcf equivalent fluid pressure. This value is based on the assumption that the footings are constructed in an open cut, and the passive resistance is provided by compacted backfill material.
- Factored Passive Resistance (Strength Limit States): 200 pcf equivalent fluid pressure
- Factored Passive Resistance (Extreme Event Limit States): 400 pcf equivalent fluid pressure

The bearing resistance increases with increasing bearing depth. If deeper foundation elements are required, these will be analyzed on a case-by-case basis.

7.1.1.1 Trackway Subgrade

Between the western end of the project and the start of the aerial guideway section, the track will be supported on a structural slab. This slab is partially at-grade and partially supported on an MSE

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embankment. For the design of the foundation, we recommend using a modulus of subgrade reaction (k_1) value of 80 kcf when the slab is at grade and 600 kcf when the slab is supported on MSE backfill. The modulus value should be adjusted for the size of the foundation using the following equation:

$$k_s = k_1 \left[\frac{(B+1)}{2B}\right]^2$$

where B is the smaller plan dimension of the foundation.

For the portion of the guideway constructed as a ballasted section, from OVS to OTC, subgrade soils generally consist of ENF/RGD, TLD, and CSG, all of which are suitable subgrade soils for the Sound Transit standard ballasted track section. This section consists of a minimum of 8 inches of subballast beneath 12 inches of ballast. The ballast thickness should be measured from the bottom of the rail tie..

7.1.2 OVS Pedestrian Bridge

Shallow foundations (spread footings) are feasible for support of the OVS Pedestrian Bridge (including the approach ramp). For foundations bearing on TLD or ENF/RGD with a minimum width of 8 feet and a minimum bearing depth of 4 feet, we recommend designing spread footings using the following parameters.

- Nominal bearing resistance: 20 ksf
- Factored bearing resistance (Strength Limit States): 9 ksf
- Factored bearing resistance (Extreme Event Limit States): 20 ksf
- Factored bearing resistance (Service Limit States): 9 ksf. This will limit settlement to less than 1 inch. In accordance with the AASHTO BDS, differential settlement analysis is not required when total settlement is less than 1 inch.
- Nominal sliding coefficient: 0.62
- Factored sliding coefficient (Strength Limit States): 0.50
- Factored sliding coefficient (Extreme Event Limit States): 0.62
- Nominal Passive Resistance: 400 pcf equivalent fluid pressure. This value is based on the assumption that the footings are constructed in an open cut, and the passive resistance is provided by compacted backfill material.
- Factored Passive Resistance (Strength Limit States): 200 pcf equivalent fluid pressure
- Factored Passive Resistance (Extreme Event Limit States): 400 pcf equivalent fluid pressure

7.1.3 Other Structures

The recommended design parameters for all structures that are designed using the International Building Code (IBC), including all structures that are not within the WSDOT right-of-way and do not support the trackway, are provided in Table 7-1. The recommended design parameters are presented in Table 7-1 should be used in conjunction with the LRFD load combinations presented in the IBC.

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Table 7-1. Spread Footing Recommended IBC Design Parameters

Foundation	Overlake Village Station Entrance, TVM, and Platform Canopies	Overlake Transit Center				All Other Shallow Foundations
		Vertical Circulation Tower	Station Canopies	Garage - Strip Footings	Garage - Isolated Footings	
Bearing Unit(s)	ENF or TLD	ENF or TLD	ENF or TLD	ENF or TLD	ENF or TLD	Any unit except RCS or ROD
Minimum Bearing Depth (ft)	2	3	2	5	5	2
Minimum Foundation Width (ft)	3	4	3	5	6	2
Nominal Bearing Resistance (ksf)	10	20	12	18	23	8.7
Factored Bearing Resistance (ksf)	4.5	9.0	5.4	8.1	10	3.9
Nominal Bearing Resistance (ksf) with Eccentricity[a]	8.8	14	8.7	16	18	7.8
Factored Bearing Resistance (ksf) with Eccentricity[a]	4.0	6.3	3.9	7.2	8.1	3.5
Nominal Sliding Coefficient	0.62	0.62	0.62	0.62	0.62	0.62
Factored Sliding Coefficient	0.50	0.50	0.50	0.50	0.50	0.50
Nominal Passive Resistance (pcf equivalent fluid pressure) [b]	400	400	400	400	400	400
Factored Passive Resistance (pcf equivalent fluid pressure) [b]	200	200	200	200	200	200
Vertical Modulus of Subgrade Reaction, k_1 (kcf)	500	500	500	500	500	200

NOTES:

a - This resistance can only be applied to the portion of the footing that remains in contact with the ground. In other words, if the eccentricity is large enough to put a portion of the footing into uplift, no bearing resistance can be included from the uplifted section.

b – This value is based on the assumption that the footings are constructed in an open cut, and the passive resistance is provided by compacted backfill material.

Using the design values presented above, it is anticipated that settlement of spread footings will be on the order of 1 inch or less. If required during structural design, the deflection response of foundation subgrades should be calculated based on the k_1 value presented in Table 7-1, modified for the size of the foundation using the following equation:

$$k_s = k_1 \left[\frac{(B+1)}{2B}\right]^2$$

where B is the smaller plan dimension of the foundation.

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7.2 Deep Foundations

7.2.1 Aerial Guideway

In accordance with the Sound Transit Design Criteria Manual, the engineering analyses for the aerial guideway foundations are in accordance with the AASHTO BDS. This section provides design recommendations for the drilled shafts. Where liquefiable soils are present, the axial and lateral capacities are reduced to reflect the reduced strength of the liquefied soils in the appropriate limit states.

Currently, 2.8-meter (9.2-foot) diameter drilled shafts are being considered for support of the aerial guideway bents, while 2.0-meter (6.6-foot) diameter drilled shafts are being considered for support of the aerial guideway abutments. The recommendations in the following sections apply to these foundation sizes. We understand that the drilled shafts for the aerial guideway will be constructed using an oscillator and full-length temporary casing, and our recommendations apply to this construction method.

7.2.1.1 Axial Loading

Figures 26 through 58 show the factored axial resistances recommended for the geotechnical design of the shafts based on the expected geotechnical conditions with depth. The side resistances of the shafts were calculated using the alpha method for cohesive soils and the beta method for cohesionless soils using the equations presented in the AASHTO BDS. Tip resistances were also calculated using the equations presented in the AASHTO BDS for cohesive and cohesionless soils.

The AASHTO BDS defines a cohesive intermediate geomaterial (IGM) as a cohesive material with an undrained shear strength greater than 2.5 times atmospheric pressure, or about 5,300 psf. Most of the CCS ESU meets this definition. However, the AASHTO BDS procedure for calculating resistance in an IGM defines an IGM as a soft rock, and relies on parameters such as joint spacing and aperture, which do not apply to glacially overconsolidated clays like the CCS. The tip resistance equations for cohesive soils presented in the AASHTO BDS are generally applicable for undrained shear strengths of up to about 9,000 psf, and thus are applicable to the CCS materials with undrained shear strength ranging from 5,000 to 9,000 psf. Since the alpha factors for side resistance provided in the AASHTO BDS are not applicable for shear strengths greater than about 5,300 psf, the alpha values presented by Chen et al (2011) for CCS with undrained shear strength greater than 5,300 psf were used.

The axial resistances provided in the figures have been calculated using the resistance factors presented in the AASHTO BDS. The axial resistance factors have been reduced by 20 percent for Bents D52 through D83 due to the lack of redundancy as described in the AASHTO BDS, Section 10.5.5.2.4. Since Bents D51 and D84 are supported on two shafts, this reduction was not applied to these bents. In accordance with the WSDOT Bridge Design Manual (WSDOT, 2016), Table 7.8.1-1, no reduction factor for axial capacity is needed for group effects (i.e. the group efficiency factor is 1.0) at Bents D51 and D84 since the shafts are installed in a glacially overconsolidated material.

The Service Load limit state values shown in the figures are based on 1-inch of allowable settlement of the shaft. Calculations indicate that group effects at Bents D51 and D84 will result in approximately ¼-inch of additional settlement at these bents; thus, we calculated the Service Limit resistance based on 0.75

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inches of settlement for a single shaft so that the additional settlement due to group effects would still limit the total settlement to less than 1 inch.

Figures 26 through 58 should be used in conjunction with the load combinations presented in the AASHTO BDS. Table 7-2 indicates which figure will apply at each bent.

Table 7-2. Guideway Axial Load Design Parameters

Bent	Approximate Station	Axial Load Figure
D51	695+71	Figure 26
D52	696+96	Figure 27
D53	698+53	Figure 28
D54	700+10	Figure 29
D55	701+67	Figure 30
D56	703+07	Figure 31
D57	704+47	Figure 32
D58	705+87	Figure 33
D59	707+27	Figure 34
D60	708+67	Figure 35
D61	710+07	Figure 36
D62	711+47	Figure 37
D63	712+87	Figure 38
D64	714+27	Figure 39
D65	715+67	Figure 40
D66	717+07	Figure 41
D67	718+47	Figure 42
D68	719+87	Figure 43
D69	721+31	Figure 44
D70	722+74	Figure 45
D71	724+18	Figure 46
D72	725+62	Figure 47
D73	727+05	Figure 48
D74	728+86	Figure 49
D76	730+69	Figure 50
D77	731+96	Figure 51
D78	733+45	Figure 52
D79	734+85	Figure 53
D80	736+25	Figure 54
D81	737+65	Figure 55
D82	739+05	Figure 56
D83	740+40	Figure 57
D84	741+40	Figure 58

7.2.1.1.1 Downdrag

Downdrag loads are transferred to the shaft when the surrounding soils move downward relative to the shaft, typically due to soil settlement. There are two sources of downdrag loads for the Aerial Guideway Bents: consolidation settlement and liquefaction-induced settlement. Consolidation settlement is expected at WSDOT's Sweeper Site. WSDOT will continue to place fill at the Sweeper Site, and the RCS encountered in the borings there will consolidate and settle under the increased load from the fill.

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Layers of soil that were found to be susceptible to liquefaction are assumed to settle after liquefaction, resulting in downdrag forces on the shaft. In accordance with the AASHTO BDS, Section 3.11.8, liquefaction-induced downdrag should not be combined with downdrag from consolidation settlement. It is also recommended that liquefaction-induced downdrag loads be considered with post-earthquake loads, not concurrently with earthquake loads. All soil above and within the liquefiable zone are considered to contribute to downdrag. Within the liquefiable zone, the downdrag forces are estimated using the residual strength of the liquefiable deposits, calculated as recommended in the WSDOT GDM. Above the liquefaction zone, the downdrag force is based on the skin friction in the deposit.

Drilled shafts must extend below the deepest extent of downdrag, so the axial capacity figures only show the capacity values below that level. Downdrag loads from consolidation should be considered with the strength and service level limit states, so side resistance in these limit states is only considered below the consolidating layer. For evaluation of strength limit states, AASHTO BDS considers downdrag load as a component of the permanent load with a load factor of 1.25 (maximum) to 0.35 (minimum). Section C3.11.8 of the AASHTO BDS states that transient loads can act to reduce downdrag, and references the FHWA drilled shaft manual (FHWA, 2010) for design guidelines. The manual indicates that for the geotechnical strength limit state (i.e. for determining required shaft length) two load combinations should be checked. The first load combination consists of factored permanent loads plus factored downdrag loads. The second load combination consists of the full factored Strength Limit State load without downdrag. In other words, transient loading (such as live load due to light rail vehicles) does not need to be added to the downdrag load. For the structural strength limit state (i.e. for determining the required structural strength of the shaft), the manual recommends using a load combination consisting of the full factored Strength Limit State load plus the factored downdrag load. We recommend using these load combinations to evaluate the required shaft at these limit states.

Liquefaction-induced settlement downdrag loads should only be considered with the extreme event limit states and should not be combined with the downdrag loads used in the strength limit state. If the liquefaction susceptibility at the bent is different for the ODE and MDE, then two extreme event axial capacity curves are provided. Where applicable, downdrag loads are presented on the axial capacity figures.

7.2.1.1.2 Preloading at Bent D59

In order to reduce the impacts of future filling on Bent D59, we recommend preloading the area around Bent D59. At a minimum, the top of the preload surcharge should be at Elevation 245 and should cover the plan area shown in Figure 59. In calculating these required dimensions, we have assumed a density of the preload fill equal to 124 pcf. This density should be achieved if the fill is compacted to a firm and unyielding state. However, if this density cannot be achieved, a larger amount of fill will need to be placed. The surcharge must be in place long enough for 90% of the settlement to occur. If this cannot be accomplished, the capacities shown on Figure 34 will no longer be applicable, and we will need to reevaluate the capacity prior to the completion of design.

Onsite soils may be used for the preload; however, due to the relatively steep slopes proposed, the preload should consist of soils that are predominantly sand and gravel. Soils that are predominantly silt or clay

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should not be used. The geotechnical engineer should approve all soils prior to their use as preload material.

If this level of surcharge is used, we anticipate that the preload will need to remain in place for up to 12 months. We will monitor settlement during the preload period and if the settlements are achieved earlier, as shown by the monitoring data, the load can be removed. Several inches of settlement are calculated to occur in this area due to the preloading, and we recommend monitoring settlement at SR520 for adverse impacts as discussed in Section 9.

7.2.1.2 Lateral Loading

The lateral loads acting on the elevated guideway will be resisted by the drilled shafts. Based on the AASHTO BDS, the horizontal movement criteria for the drilled shafts should be based on the tolerance of the structure to lateral movement. It is recommended that the deflection calculation consider the stiffness of the shaft and the surrounding soil, using a software package such as LPILE. For the purposes of design, we have developed p-y spring parameters to represent the lateral resistance of the soil for each ESU, which are presented in Table 7-3. The depth ranges of each ESU are shown for each bent on the axial capacity figures (Figures 26 through 58). Although there are scattered layers and lenses that may liquefy during either an ODE or MDE event, no consistent or pervasive liquefiable layers were found. Therefore, no lateral spreading forces are provided for the lateral design of the drilled shafts.

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Table 7-3. Recommended LPILE Design Parameters

ESU	Soil Model	Unit Weight (pcf)	φ (deg)	Su (ksf)	k (pci)	ε50
Loose ENF/RGD	SAND	124	32	-	25	-
Medium Dense ENF/RGD	SAND	126	35	-	75	-
Dense ENF/RGD	SAND	128	38	-	155	-
Loose ENF/RGD (below GWT)	SAND	61.6	32	-	20	-
Medium Dense ENF/RGD (below GWT)	SAND	63.6	35	-	50	-
Dense ENF/RGD (below GWT)	SAND	65.6	38	-	90	-
Soft RCS/ROD	SOFT CLAY	120	-	0.5	-	0.02
Medium Stiff RCS	SOFT CLAY	120	-	1	-	0.01
Stiff RCS	SOFT CLAY	120	-	2	-	0.007
Soft RCS/ROD (below GWT)	SOFT CLAY	57.6	-	0.5	-	0.02
Medium Stiff RCS (below GWT)	SOFT CLAY	57.6	-	1	-	0.01
Stiff RCS (below GWT)	SOFT CLAY	57.6	-	2	-	0.007
CCS	STIFF CLAY	125	-	7	-	0.004
CCS (below GWT)	STIFF CLAY	62.6	-	7	-	0.004
Disturbed CCS (below GWT)	STIFF CLAY	62.6	-	5	-	0.005
CSF	SAND	125	37	-	120	-
CSF (below GWT)	SAND	62.6	37	-	80	-
CSG	SAND	128	39	-	190	-
CSG (below GWT)	SAND	65.6	39	-	110	-
TLD	SAND	128	39	-	190	-
TLD (below GWT)	SAND	65.6	39	-	110	-

NOTES:

GWT = Groundwater Table

In the project area, Disturbed CCS is not found above the GWT.

Recommended Soil Models: SAND = Sand (Reese et al, 1974), SOFT CLAY = Soft Clay in the Presence of Free Water, STIFF CLAY = Stiff Clay with No Free Water

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7.2.1.2.1 Lateral Resistance of Liquefied Soils

The reduced lateral resistance in liquefied soils can be accounted for by applying scaling factors, or p-multipliers (m_p), to the p-y resistances. The p-multipliers for the liquefiable layers at each bent are provided in Table 7-4 based on recommendation provided in Ashford et al. (2011).

Liquefied soils will reduce the lateral loads that can develop against the shaft in the adjacent nonliquefied layers above and below the liquefied soil. Therefore, we recommend reducing the lateral resistance of the layers above and below the potentially liquefiable soil with a p-multiplier as well. The value of m_p can be estimated as linearly increasing from the value given in Table 7-4 to a m_p value of 1.0 (no reduction) over a distance equal to the shaft diameter, both above and below the liquefiable zone.

Table 7-4. Recommended p-multipliers (m_p) for Potentially Liquefiable Layers

Bent	Boring	Elevation of Potentially Liquefiable Soil Lenses (feet)		m_p
		ODE	MDE	
D54	B-D-ES-6	187.8 to 182.8	187.8 to 182.8	0.2
D55	E360-K-007	No Liquefaction	193.6 to 189.1	0.3
D56	E360-K-008	181.4 to 177.9	181.4 to 177.9	0.15
D57	E360-K-009	No Liquefaction	138.2 to 133.2	0.2
D58	E360-K-010	No Liquefaction	165.9 to 161.9	0.2
D59	E360-K-011	171.6 to 166.6	171.6 to 166.6	0.15
D61	E360-B-012	177 to 175.5	177 to 175.5	0.1
		174 to 168	174 to 168	0.05
D62	E360-K-012	No Liquefaction	183.8 to 178.8	0.3
D64	E360-K-013	No Liquefaction	220.3 to 215.3	0.3

7.2.2 OVS Pedestrian Bridge

The ramp to the pedestrian bridge at the east end may include deep foundations for support. In accordance with the Sound Transit Design Criteria Manual, the pedestrian bridge deep foundations will need to be designed in accordance with the AASHTO BDS. This section provides factored resistances for drilled shaft design. The geotechnical conditions are relatively uniform in the vicinity of the pedestrian bridge foundations, and can be represented by a single soil profile: 8 feet of medium dense sand (ESUs ENF and RGD) overlying glacially overridden deposits (ESUs TLD and CSG). The pedestrian bridge bents will be supported on 2-meter (6.56-foot) diameter drilled shafts. Figure 60 shows the recommended factored axial resistances to use for design of the shafts.

The pedestrian bridge foundation design should also consider the lateral resistance of shafts. Based on the AASHTO BDS, the horizontal movement criteria for the drilled shafts should be based on the tolerance of the structure to lateral movement. It is recommended that the deflection calculation consider the stiffness the shaft and the surrounding soil, using a software package such as LPILE. Recommended soil parameters for input into LPILE are summarized in Table 7-5.

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Table 7-5. Recommended LPILE Parameters for OVS Pedestrian Bridge

Depth (feet)	Soil Model	Unit Weight (pcf)	φ (deg)	S_u (ksf)	k (pci)	ε50
0 – 8	SAND	124	32	-	20	-
8 – GWT	SAND	128	39	-	225	-
GWT – 100	SAND	65.6	39	-	225	-

NOTES:
"GWT" is groundwater table. For the OVS Pedestrian Bridge, assume GWT is at Elevation 298.
Recommended Soil Model: SAND = Sand (Reese et al, 1974)

7.2.3 Light Pole Foundations

The light pole foundations should be designed in accordance with the IBC. The current design of the light pole foundations includes a 2.5-foot diameter, 8-foot deep concrete shaft. For this size shaft, we recommend designing the light poles for an allowable axial capacity of 25 kips in conjunction with the IBC allowable stress design (ASD) load combinations. For lateral analysis, it is recommended that a deflection calculation be completed that considers the stiffness the shaft and the surrounding soil, using a software package such as LPILE. For the purposes of design, we recommend using the LPILE parameters for the Medium Dense ENF/RGD soil unit, which are presented Table 7-3.

7.2.4 OCS Pole Foundations

The DCM only states that working stress methods (also known as ASD) shall be used for the design of OCS pole foundations. Since a majority of the OCS poles will be within the WSDOT right-of-way, we recommend using the simplified method presented in the WSDOT GDM, Section 17.2.1. The OCS poles at the OVS, OTC, and along the at-grade portion of the trackway will be founded on small drilled shafts. The current design calls for the OCS poles to be supported on 3-foot diameter, 13-foot deep drilled shafts. For this size shaft, we recommend the following design parameters:

- Allowable axial capacity: 32 kips
- Internal friction angle of soils: 32 degrees
- Allowable lateral bearing pressure: 1400 psf

7.3 Below Grade Structures (Vaults)

There are three detention vaults (Park Place, Valley Creek, and TPSS) and the OVS infiltration vault (OVSIF) that are part of the Project, as described in Section 1. All of the vaults will be below grade structures.

7.3.1 Earth Pressures

The lateral earth pressures for the design of the permanent vault structures are shown in Table 7-6.

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The permanent structures will be a relatively stiff, reinforced concrete boxes restrained from movement; therefore, at-rest earth pressures are recommended.

Seismic earth pressures calculated using the Mononabe-Okabe method are provided in Table Table 7-6 based on the PGA from the IBC design response spectrum. The Park Place vault and Valley Creek vault are in locations that are Site Class D. The TPSS vault and OVSIF are in locations that are Site Class C. The PGA for both Site Class C and D for IBC is 0.34 g. A ductility factor is not considered in the calculation of k_h, but a height-dependent reduction factor calculated using the procedure described in NCHRP Report 611 (TRB, 2008) is employed in the k_h calculation (FHWA, 2011; TRB 2008) for vault walls over 20 feet. Only the OVSIF has walls over 20 feet high, and a height-dependent reduction factor of 0.89 is used for those vault walls. The total lateral seismic earth pressure, which consists of the static active earth pressure and the seismic increment of earth pressure, is provided on Table 7-6. The total lateral seismic earth pressure can be separated into its two components, the static active and seismic inertial increment, so that different load factors can be applied to each. The active component of the total lateral seismic earth pressure is 40 pcf for the Park Place Vault and 38 pcf for the othe other three vaults.

Table 7-6. Lateral Earth Pressures for Vault Walls

Lateral Pressures	Park Place Vault	Valley Creek & TPSS Vaults	OVSIF
Static Case (Above the Water Table)			
At-Rest Earth Pressure: Equivalent Fluid Weight	60 pcf	58 pcf	58 pcf
Static Case (Below the Groundwater Table – El 196.5)			
At-Rest Earth Pressure: Equivalent Fluid Weight	30 pcf	N/A	N/A
Hydrostatic Pressure: Fluid Weight	62.4 pcf	N/A	N/A
Seismic Case: Station Walls: IBC, PGA = 0.34			
Active Earth Pressure Plus Seismic Increment	80pcf	77 pcf	71 pcf

N/A: Not Applicable

7.3.2 Surcharge Pressures

The load from soil above the vaults and maintenance vehicle traffic above and adjacent to the vaults need to be considered in the design of the final structure. A minimum vertical surcharge of 250 psf (based on standard vehicle traffic) should be included for vehicle traffic adjacent to or above the vault. Additionally, the surcharge due to a 45,000 pound outrigger load should be considered. Both surcharge conditions should be checked, but they do not need to be applied simultaneously.

The MSE walls at the western abutment of the aerial guideway – Wall 1 (EB MSE-1) and Wall 2 (WB MSE-1) – and the preload for those MSE walls will load the Park Place vault walls. The magnitudes of these surcharges decrease with increasing horizontal distance from the preload fill. For a preload fill height of 13 feet and 2H:1V side slopes, Figures 61 and 62 show the estimated vertical and lateral surcharge pressures, respectively, for horizontal offsets ranging from 1 foot to 50 feet from the toe of the preload fill slope. These figures can be used to estimate the appropriate surcharge pressures depending on

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the final design location of the Park Place vault. Surcharge pressures from the preload are separate from and in addition to vehicle or outrigger surcharges on the Park Place vault.

7.3.3 Hydrostatic and Uplift Resistance

Hydrostatic and buoyant forces will act on vaults that are constructed below the groundwater table. Only the Park Place vault will have a base below the groundwater level. The Valley Creek vault, OVSIF, and TPSS vaults are above the groundwater table, and will be constructed to provide drainage behind the walls, so hydrostatic forces are not considered.

At the Park Place vault, uplift resistance will be provided by the weight of the structure and the backfill. The permanent structure will need to resist buoyant forces of 700 psf at the deeper portion of the vault where the sump is located and 450 psf over the shallower portion of the vault. The hydrostatic forces for Park Place vault are included in Table 7-6.

Dewatering will need to continue during the construction of Park Place vault until the final structure's walls extend above the water table and the weight of the structure and the backfill reaches or exceeds 110% of the buoyant forces.

7.3.4 Bearing Capacity

The recommended allowable bearing capacities are presented in the following subsections. The allowable bearing capacities include a factor of safety of about 3 against bearing capacity failure; however, we also recommend designing the foundations for a maximum settlement of one inch. All recommended allowable bearing capacity values may be increased by one-third for temporary conditions such as seismic or wind loading.

7.3.4.1 Park Place Vault

The current design of the Park Place Vault includes a mat foundation covering the plan dimensions of the vault, about 48 by 70 feet. Settlement will control the bearing capacity of this type of foundation. In order to limit the settlement to less than one inch, we recommend designing the mat for an allowable bearing capacity of 2.5 ksf.

7.3.4.2 Valley Creek Vault

Design of the Valley Creek Vault is still ongoing, and the dimensions of the footings are unknown at this time. It is likely that it will be founded on strip footings that are a minimum of 3 feet wide and bearing a minimum of 8 feet below final grade. If these minimums are met, the vault may be designed using an allowable bearing capacity of 8 ksf.

7.3.4.3 TPSS Vault

The current design of the TPSS Vault includes strip footings that are 3 feet wide and bear a minimum of 10 feet below final grade. For these dimensions, the footings can be designed for an allowable bearing capacity of 9 ksf.

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7.3.4.4 OVSIF

The current design of the OVSIF includes exterior and interior strip footings. The exterior footings are 8 feet wide and bear 2 feet below the finished grade of the interior of the vault. The interior footings are 4 feet wide and bear 3.25 feet below the finished grade of the interior of the vault. For these dimensions, the exterior footings can be designed for an allowable bearing capacity of 6 ksf and the interior footings can be designed for an allowable bearing capacity of 7.5 ksf.

7.4 Retaining Walls

There are several types of retaining walls that are used along the project alignment, as described in Section 1. Walls that support trackway structures are designed in accordance with the AASHTO BDS, with the addition of the two-tiered seismic design approach of the DCM. Retaining walls not supporting the trackway should be designed in accordance with the IBC.

7.4.1 Cast-in-place (CIP) Walls

CIP walls will be used as track walls and support grade breaks at the stations. The loads and resistances for the CIP walls are developed using a soil unit weight of 124 pcf and an internal friction angle of 32 degrees. These values may be conservative for well-compacted select fill material.

7.4.1.1 Earth Pressures

Active earth pressures are used because the CIP walls free to rotate. The earth pressures assume the groundwater is below the base of wall, and that drainage is provided behind the walls. The recommended earth pressures are provided in

Table 7-7. The passive pressures assume that the base of excavation that does not slope down from the base of the wall. It is recommended that the top 2 feet of passive pressure should be ignored.

Seismic earth pressures were calculated using the Mononabe-Okabe method, and are provided in

Table 7-7 below. The seismic earth pressures provided are incremental seismic components, and should be used in conjunction with the active earth pressures. All the CIP walls are in locations which are Site Class C. It is assumed that the CIP walls can accommodate 1 to 2 inches of movement during an earthquake, so a ductility factor is used for the MDE and IBC events. For the MDE and IBC events, with the ductility factor, k_h is ½ of the PGA. The ductility factor was not applied to the ODE based on requirements in the ST DCM. Trackway Wall B4 (EBW-1), Wall 13a (EBW-3), Wall B6 (EBW-6), Wall 16 (WBW-1), and Wall B5 (WBW-1) are designed in accordance with the AASHTO BDS for both ODE and MDE Events. Station walls are designed in accordance with IBC.

The CIP walls will be above the groundwater level and constructed with drainage provisions, so hydrostatic forces are not considered.

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Earth pressures are provided for walls with level backfill and for walls with backfill sloping up to 4H:1V. For walls with a sloping backfill steeper than 4H:1V, a limit equilibrium analysis must be performed to estimate the earth pressure on the wall.

Table 7-7. Lateral Earth Pressures for CIP Walls

Lateral Earth Pressures	Level Backfill, Vertical Wall	Sloping Backfill (max 4H:1V), Vertical Wall
Static Case: CIP Walls - Track: Wall B4 (EBW-1), Wall 13a (EBW-3), Wall B6 (EBW-6), Wall 16 (WBW-1), Wall B5 (WBW-1), Station Walls		
Active Earth Pressure: Equivalent Fluid Weight	38 pcf	42 pcf
Ultimate (Nominal) Passive Resistance of Backfill	725 pcf	
Seismic Case: Wall B4 (EBW-1), Wall 13a (EBW-3), Wall B6 (EBW-6), Wall 16 (WBW-1), Wall B5 (WBW-1): ODE, PGA & kh = 0.22g		
Incremental Seismic Earth Pressure	21 pcf	38 pcf
Nominal Passive Resistance for Seismic Conditions	575 pcf	
Seismic Case: Wall B4 (EBW-1), Wall 13a (EBW-3), Wall B6 (EBW-6), Wall 16 (WBW-1), Wall B5 (WBW-1): MDE, PGA=0.57g, kh=0.285g		
Incremental Seismic Earth Pressure	30 pcf	63 pcf
Nominal Passive Resistance for Seismic Conditions	550 pcf	
Seismic Case: TPSS and Station Walls: IBC, PGA=0.34g, kh=0.17g		
Incremental Seismic Earth Pressure	15 pcf	25 pcf
Nominal Passive Resistance for Seismic Conditions	600 pcf	

7.4.1.2 Surcharge Pressures

If construction equipment or traffic will be able to access the area immediately behind the wall, an additional uniform horizontal pressure of 150 psf should be added to the walls for construction equipment surcharge. This is based on general construction loading – if individual large pieces of equipment will be used behind a wall, the design should incorporate the loading from that specific piece of equipment.

Between approximate stations 750+35 and 760+70, 152nd Ave NE and Augusta Drive are constructed on top of MSE walls adjacent to the SR 520 ROW. In these areas, including Wall B4 (EBW-1), a surcharge load should be added to the earth pressure loads to represent the additional loading on the E360 walls from the existing MSE wall. The surcharge load can be based on an assumed backfill weight of 130 pcf times the height of the MSE wall at that location. An additional 250 psf traffic surcharge should be included on top of the MSE wall.

7.4.1.3 Bearing Capacity

For CIP walls designed in accordance with the AASHTO BDS, the recommended nominal (ultimate) bearing capacity is 10 ksf. The CIP walls will be cast-in place footings, so a coefficient of friction of 0.62 is recommended for nominal (ultimate) sliding resistance. These values should be used with the resistance factors provided in Table 11.5.7.1 of the BDS.

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For CIP walls designed in accordance with the IBC, the recommended allowable bearing capacity is 3.3 ksf. An allowable coefficient of friction of 0.41 is recommended for sliding resistance.

7.4.1.4 Existing 36th Street Bridge

The configuration of the cast in place wall beneath the 36th Street Bridge (Wall 13a (EBW-3), EB STA 757+90 to 759+50) is dependent upon the ability to temporarily expose the pile cap at the bridge abutment during construction. It is likely that the wall will need to be designed with the footing completely on the toe side of the wall.

To reduce the risk to the existing structure, we recommend that only the pile cap, and not the drilled shafts, be exposed during construction. Furthermore, we recommend that an analysis be conducted to verify that the lateral and axial capacity of the existing drilled shafts will not be reduced below the design capacity of the shafts by removal of overburden during construction. Temporary cut slopes beneath the bridge should be no steeper than 1H:1V unless they are supported by temporary shoring or protected with a shotcrete facing as the excavation proceeds.

7.4.2 Abutment Walls

There will be concrete walls at each abutment (D51, EB STA 695+71 and D84, EB STA 741+40) perpendicular to the tracks at the end of the MSE walls. These walls will be cast-in-place walls constructed on top of a pile cap and two drilled shafts.

7.4.2.1 Earth Pressures

The abutment walls are partially restrained by wingwalls, and will be adjacent to soil in the MSE walls during compaction efforts, so at-rest pressures are provided for the design of the wall. The recommended earth pressures are provided in Table 7-8. The earth pressures assume the groundwater is below the base of wall. No passive pressures are provided because the lateral earth pressures will be resisted by the drilled shafts.

The abutment walls support the track so they are designed in accordance with the AASHTO BDS, with the addition of the two-tiered seismic design approach of the DCM. Seismic earth pressures were calculated using the Mononabe-Okabe method, and are provided in Table 7-8 below. The total lateral seismic earth pressure, which consists of the static active earth pressure and the seismic increment of earth pressure, is provided on Table 7-8. The total lateral seismic earth pressure can be separated into its two components, the static active and seismic inertial increment, so that different load factors can be applied to each. The abutment wall at D83 is in located in Site Class C, and the abutment wall at D51 is located in Site Class D. If the walls can accommodate 1 to 2 inches of movement during an earthquake, a ductility factor is used for the MDE events. For the MDE event, with the ductility factor, k_h is ½ of the PGA. The ductility factor was not applied to the ODE based on requirements in the ST DCM.

The walls will be above the groundwater level and constructed with drainage provisions, so hydrostatic forces are not considered.

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Table 7-8. Lateral Earth Pressures for Abutment Walls

Lateral Earth Pressures	D51 Abutment	D84 Abutment
Static Case		
At-Rest Earth Pressure: Equivalent Fluid Weight	50 pcf	50 pcf
Seismic Case: ODE, kh=PGA		
PGA	0.26g	0.22g
Active Earth Pressure Plus Seismic Increment	53 pcf	48 pcf
Seismic Case: MDE, 1 to 2 inches movement acceptable, PGA=0.57g, kh=0.285g		
Active Earth Pressure Plus Seismic Increment	56 pcf	56 pcf
Seismic Case: MDE, 1 to 2 inches movement not acceptable, PGA=0.57g, kh=0.57g		
Active Earth Pressure Plus Seismic Increment	118 pcf	118 pcf

Note, for the seismic design, the active earth pressure plus seismic inertial increment is provided as an equivalent fluid weight. If these components need to be separated for LRFD design, the active earth pressure is 28 pcf.

7.4.3 Soldier Pile Walls

A cantilevered soldier pile and lagging wall will be used for Wall 15 (EBW-5, EB STA 766+10 to 769+00), and a solider pile and lagging wall with corner struts is an option for Wall 3 (BSW-1, EB STA 696+80 to 697+10). The required embedment depth of the soldier piles should be based on achieving moment equilibrium, but the minimum recommended embedment for the piles is 10 feet.

7.4.3.1 Earth Pressures for Wall 15 (EBW-5)

The recommended lateral earth pressures for Wall 15 (EBW-5) are shown in Figure 63. Active earth pressures are used because cantilever soldier pile walls are free to rotate. The earth pressures assume the groundwater is below the base of wall, and that drainage is provided behind the walls. The passive pressures assume that the base of excavation does not slope down from the base of the wall. It is recommended that the top 2 feet of passive pressure should be ignored. The ultimate (unfactored) passive soil pressures for the embedded section are shown in Figure 63. In the granular soils at Wall 15 (EBW-5) it is recommended that the passive pressures act over the soldier pile spacing or three shaft diameters, whichever is less. For the strength limit load case, it is recommended that a resistance factor of 0.75 be applied to the passive pressure, based on AASHTO BDS Table 11.5.6.1 (AASHTO, 2014).

Seismic earth pressures were calculated using the Mononabe-Okabe method, and are provided in Figure 63. The total lateral seismic earth pressure, which consists of the static active earth pressure and the seismic increment of earth pressure, is provided in Figure 63. The total lateral seismic earth pressure can be separated into its two components, the static active (from the static case) and seismic inertial increment, so that different load factors can be applied to each.

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Wall 15 is located in Site Class C soils. It is assumed that the cantilever walls can accommodate 1 to 2 inches of movement during an earthquake, so a ductility factor is used for the MDE. With the ductility factor, k_h is ½ of the PGA for the MDE. The ductility factor was not applied to the ODE based on requirements in the ST DCM.

7.4.3.2 Earth Pressures for Wall 3 (BSW-1)

The recommended lateral earth pressures for Wall 3 (BSW-1) are shown in Figure 64. These pressures assume that there will be a 2H:1V back slope behind the wall. Apparent earth pressures are recommended because the soldier pile walls will be supported by corner struts. The ultimate (unfactored) passive soil pressures for the embedded section are shown in Figure 64. In the cohesive soils at BSW-1, it is recommended that the passive pressures act over the soldier pile diameter. For the strength limit load case, it is recommended that a resistance factor of 0.75 be applied to the passive pressure, based on AASHTO BDS Table 11.5.6.1 (AASHTO, 2014).

The generalized limit equilibrium method (GLE) was used to develop seismic earth pressures. The recommend incremental seismic earth pressures are provided in Figure 64. Wall 3 is located in Site Class D soils. It is assumed that the wall can accommodate 1 to 2 inches of movement in rotation during an earthquake, so a ductility factor is used for the MDE. With the ductility factor, k_h is ½ of the PGA for the MDE. The ductility factor was not applied to the ODE based on requirements in the ST DCM.

7.4.3.3 Hydrostatic Pressures

Hydrostatic forces will act on walls that are constructed below the groundwater table. Wall 15 (EBW-5) will be constructed above the groundwater table, and will be constructed with drainage provisions, so hydrostatic forces are not considered. Wall 3 (BSW-1) will extend below the groundwater level; therefore, hydrostatic pressures are included on Figure 64.

7.4.3.4 Surcharge Pressures

If construction equipment will be able to access the area immediately behind the wall, an additional uniform horizontal pressure of 240 psf over a depth of 0 to 10 feet and 120 psf over a depth of 10 to 20 feet should be added to the walls for construction equipment surcharge. This is based on general construction loading – if individual large pieces of equipment will be used behind a wall, the design should incorporate the loading from that specific piece of equipment.

7.4.4 MSE Walls

The MSE walls constructed at the eastern and western abutments of the aerial guideway section, as well as the access road for the WSDOT Sweeper Site (if needed), will consist of proprietary wall systems. It is recommended that the MSE wall be designed using the recommended resistance factors provided in Table 7-9 from the AASHTO BDS and designed and constructed in general accordance with Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes (Berg et al., 2009). The MSE walls should have a minimum embedment of 2 feet or 5% of the wall height, whichever is greater with a minimum reinforcement length of 70% of the wall height or 6 feet, whichever is greater.

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Table 7-9. Typical MSE Wall Resistance Factors, Φ

Stability Mode	Resistance Factor	
	Static	Seismic
External Stability		
Bearing resistance	0.65	0.90
Sliding	1.00	1.00
Overall (global) stability	0.65	0.90
Internal Stability		
Tensile resistance of metallic reinforcement and connectors: Strip reinforcements Grid reinforcements	 0.75 0.65	 1.00 0.85
Tensile resistance of geosynthetic reinforcement and connectors	0.90	1.20
Pullout resistance of tensile reinforcement (metallic or geosynthetic)	0.90	1.20

Additionally, we recommend the area around the western abutment be preloaded to reduce settlement of the embankment and reduce the risk of damage to the MSE wall facing after installation. We recommend placing a preload surcharge consisting of general fill at least 4 feet above top of rail. The top surface of the surcharge should extend at least 2 feet laterally beyond the horizontal extents of the MSE walls. In calculating these required dimensions, we have assumed a density of the preload fill equal to 124 pcf. This density should be achieved if the fill is compacted to a firm and unyielding state. However, if this density cannot be achieved, a larger amount of fill will need to be placed. If this level of surcharge is used, we anticipate that the preload will need to remain in place for up to 6 months. We will monitor settlement during the preload period and if the settlements are achieved earlier, as shown by the monitoring data, the preload can be removed.

The planned construction sequence has the Park Place vault being constructed prior to the placement of the preload surcharge. In order to minimize the impact of the preload on the vault, the vault has been located away from the planned preload area such that the nearest corner of the vault is about 17 feet from the preloaded area. At this distance, we predict that the settlement of the vault during the preload will be less than one-half inch. If this changes, and other structures will be in place prior to the preload, we should be notified so that we can evaluate the impact of the preloading on the structure.

7.4.5 Soil Nail Walls

Soil nail walls will be designed in accordance with the WSDOT Bridge Design Manual, which incorporates FHWA GEC 7 – Soil Nail Walls (Lazarte et al., 2015) by reference.

The soils in the vicinity of the soil nail walls along the track alignment are generally either normally consolidated sands (ESUs ENF or RGD) or glacially overconsolidated sands (ESUs TLD or CSG). In some locations the CSG and TLD is weathered, so reduced bond strengths were used. The recommended ultimate bond strengths for soil nails with a minimum diameter of 6 inches are based on tremie grouting per the recommendations in FHWA GEC 7, which have been confirmed by local experience, and are given as follows:

- RGD or ENF: 3 kips/foot
- Weathered CSG or TLD: 7 kips/foot

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- CSG or TLD: 12 kips/foot

It is recommended that the soil nail walls be designed using the recommended factors of safety provided in FHWA GEC 7 and summarized in Table 7-10. The values for Global Stability (excavation) represent the minimum construction safety factors for noncritical (1.20) and critical (1.35) walls as recommended in the WSDOT GDM. The WSDOT GDM considers critical walls those that underpin or support other infrastructure such as buildings, bridge abutments, other retaining walls, or critical utilities. We recommend designing Wall 13 (EBW-2), Wall 14 (EBW-4), OTC West Wall, and OTC North Headwall as critical walls, and Wall 4 (BSW-2) as a noncritical wall.

Table 7-10. Minimum Recommended Factors of Safety for the Design of Soil Nail Walls

Failure Mode	Resisting Component	Minimum Recommended Factors of Safety		
		Static Loads		Seismic Loads (Temporary and Permanent Structures)
		Temporary Structure	Permanent Structure	
External Stability	Global Stability (long term)	1.35	1.5	1.1
	Global Stability (excavation)	1.20 - 1.35		NA
	Sliding	1.3	1.5	1.1
	Bearing Capacity	2.5	3.0	2.3
Internal Stability	Pullout Resistance	2.0		1.5
	Nail Bar Tensile Strength	1.8		1.35
Facing Strength	Facing Flexure	1.35	1.5	1.1
	Facing Punching Shear	1.35	1.5	1.1
	H.-Stud Tensile (A307 Bolt)	1.8	2.0	1.5
	H.-Stud Tensile (A325 Bolt)	1.5	1.7	1.3

The soil nail walls shown in the design drawings (Wall 13 (EBW-2), Wall 14 (EBW-4), OTC West Wall, OTC North Headwall, and Wall 4 (BSW-2)) are in locations which are classified as Site Class C. In accordance with the DCM, the two-tiered seismic design approach will be used, and the MDE will be the controlling case. For this event, the walls should be designed for a PGA of 0.57g. A ductility factor of ½ can be applied to the MDE PGA because the soil nail walls are expected to accept 1 to 2 inches of movement without creating a life safety concern.

7.4.5.1 Existing Walls at 152nd Ave NE and Augusta Drive

Between approximate stations 750+35 and 760+70, 152nd Ave NE and Augusta Drive are constructed on top of MSE walls adjacent to the SR 520 ROW. In these areas, a surcharge load should be added to the earth pressure loads to represent the additional loading on the E360 walls from the existing MSE wall. The surcharge load can be based on an assumed backfill weight of 130 pcf times the height of the MSE wall at that location. An additional 250 psf traffic surcharge should be included on top of the MSE wall. Where there is greater than 6 feet between the existing MSE walls and the E360 walls, and a level backfill

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(4H:1V or less), it is assumed that construction equipment could travel between the walls, and the construction and traffic surcharge described in Section 7.4.1.2 should be applied. In addition to the surcharge described in this section, we do not recommend that construction surcharges or traffic be allowed behind walls with a sloping backfill steeper than 4H:1V.

7.5 Shallow, Short-Term Excavations

Shallow, short-term excavations may be required for demolition and construction. For temporary excavations exceeding 4 feet in height and less than 20 feet in height, excavations should be sloped in accordance with the Washington Administrative Code (WAC) 296-155-657 and WAC 296-155-66403, or be shored. Sloping or benching for excavations greater than 20 feet deep must be designed by a registered professional engineer.

It is anticipated that ENF, RGD, TLD, and CSG may be encountered in shallow excavations. If sloped sides are used, ENF and RGD should be classified as Type C. CSG should be considered Type B. Coarse-grained TLD should be classified as Type B. Fine-grained (cohesive) TLD may be classified as Type A. Temporary cut slopes less than 20 feet deep should be constructed with slopes that do not exceed the values in Table 7-11 below. These maximum allowable slopes assume the excavation is dewatered, if necessary.

Table 7-11. Maximum Allowable Slopes for Temporary Excavations

Excavation depth	Type C	Type B	Type A
Greater than 4 feet and less than 20 feet	1.5H:1V	1H:1V	0.75H:1V

Note: WAC 296-155 Part N requires periodic monitoring of temporary slopes by a competent person. These side slopes may need modification depending on actual ground conditions and slope performance.

The slopes provided above are applicable to temporary cuts. Permanent slopes that are incorporated into the project must be designed by a registered professional engineer.

7.6 Hydrogeologic Recommendations

7.6.1 Dewatering Recommendations

It is our understanding that, with the exception of the Park Place vault, no excavations extend deeper than the design groundwater elevation shown on the Subsurface Profile (Figures 11 to 21). However, the excavations will likely encounter perched groundwater at shallower elevations. Within the excavations, the inflow of this perched water can be handled with sumps within the excavation. Some zones may require additional dewatering measures, such as vacuum lances. The water collected from the sumps will require testing and may require treatment before it is discharged.

At the Park Place vault, the regional groundwater level is above the bottom of the excavation, but the fine-grained soils are expected to produce little groundwater. Therefore, temporary excavation support

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system for the tank should be designed to facilitate drainage to temporary sumps installed in the bottom of the excavation. The placement of sumps is usually determined on an as needed basis by the contractor, and the location and number of sumps are often moved as the excavation is advanced. Layers of RGD or ENF maybe encountered in the excavation of the Park Place vault and these units will produce more water, and vacuum well points may be needed.

To construct the bottom slab of the vault, it will be necessary to keep the excavation bottom dry. This can be accomplished with interior drain trenches and perimeter sumps with pumps. The drain trenches would be backfilled with perforated drain pipe and crushed angular washed rock, and the vault bottom slab cast on top of the drain system.

7.6.2 OVS Infiltration Vault (OVSIF)

The OVSIF includes an infiltration vault that will be constructed to a depth of 28 to 32 feet below ground surface. The vault can be designed using the recommendations presented in the report "Hydrogeology and Geotechnical Engineering Report, Overlake Village Regional Stormwater Infiltration Facility, Redmond, Washington" (AMEC, 2013). This report was included in the Request for Proposal as item V3-05.17.02.

7.6.3 Low Impact Development (LID) Recommendations

Low impact development (LID) reduces the impact of development by controlling stormwater pollution and protecting natural watersheds and urban communities. The objectives of low impact development are as follows:

- Minimize disturbance
- Preserve and recreate natural landscape
- Reduce effective impervious cover
- Increase hydrologic disconnects and drainage flow paths
- Enhance off-line storage
- Facilitate detention and infiltration opportunities

In part, these objectives are achieved through attenuating, storing, and infiltrating stormwater using natural features. The infiltration rates for the surface and subsurface soils are needed to design such facilities.

LID can reduce the volume of runoff. This can translate into a reduction in the volume of water that requires treatment. LID considerations for the Project include the following:

- Infiltration – City of Redmond Stormwater Technical Notebook Issue No. 6 (2017) states that infiltration facilities are typically not approved as a means to meet flow control or water quality treatment requirements if the long term infiltration rate is less than 1 inches per hour. The infiltration rate for the glacial till at the station sites is expected to be less than 0.25 inches per hour based on the geotechnical test data and ESU permeability estimates. Since the infiltration rate is expected to be less than 0.25 inches per hour, infiltration facilities are not recommended in the TLD. Infiltration rates into the shallow TLD are low; therefore, infiltration into the shallow

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TLD is not recommended. However, the CSG material below the TLD may be suitable for infiltration.

- Runoff Conveyance Practices – Conveyance systems can be used to route excess runoff through and offsite during large storm events that exceed runoff containment capacity. Creation of grass-lined channels and long flow paths, re-grading paved areas, creating check dams, and providing rough surfaces can slow and redirect runoff and promote infiltration, filtration, and biologic uptake of pollutants.
- Filtration – Filtration can provide the same benefits as described for runoff conveyance by reducing the amount of offsite runoff. Filtration practices include installing vegetated filter strips or buffers to slow runoff and allow for biologic filtration of pollutants.
- Runoff Storage – Runoff storage practices involve capturing surface runoff for reuse or gradual infiltration. For example, runoff could be stored in landscaped depressions and treated and/or reused for irrigation.

Other considerations for LIDs include street sweeping, frequent cleaning of catch basins, disconnection of paved areas from drainage infrastructure, and sediment control. A Certified Erosion and Sediment Control Lead (CESCL) should visit the site periodically during construction to observe LID practices and erosion control BMPs during construction. There also will be a Storm Water Pollution Prevention Plan (SWPPP) provided by the contractor detailing their methods to minimize sediment and other pollutants entering the stormwater runoff.

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8.0 Construction Considerations

8.1 Earthwork

Glacially overridden deposits are dense to hard, and some TLD ESUs may be cemented in places, making them very difficult to excavate. When cemented, unconfined compressive strengths can reach 100 to 200 psi in these deposits. Boulders and cobbles are likely to be encountered in excavations for drilled shafts, soldier piles, and in the mass excavation for OVSIF. Boulders will be more prevalent in the TLD ESU, and concentrations of boulders can be found at erosional contacts. The contractor should be prepared to deal with delays and complications due to encountering boulders while drilling shafts, soldier piles, and soil nails.

Excavation of the dense to very dense glacially overridden soils will result in material “bulking,” or an increase in the volume of excavated soil. We estimate that the glacially overridden ESUs will have bulking factors of 35% to 45%.

The Project work will remove structures within the station footprints. The concrete and CDF may need to be disposed of at different facilities than the unadulterated excavation spoils.

8.1.1 Foundation Subgrade Conditions

Following excavation, any soft or disturbed soils at the base of excavation should be removed until firm and unyielding soils are reached, or the overexcavation reaches a depth of two feet below bearing grade. A layer of filter fabric should be placed at the base of the overexcavation, and structural fill should be placed and compacted to reach the subgrade elevation. Standing water should be removed prior to placing concrete. The condition of the subgrade should be observed by a geotechnical engineer to confirm that there are no loosened or disturbed soils before any slabs are poured, and that the actual subgrade soils are consistent with interpretations and our design.

8.1.2 Structural Fill

Imported structural fill should consist of clean, free-draining sand and gravel free from organic matter or other deleterious materials such as WSDOT “Gravel Borrow” (WSDOT Standard Specification, section 9-03.14(1)). Care should be taken to prevent mixing with unsuitable soils, and to ensure that structural fill is properly compacted.

Structural fill soils should be placed in loose, horizontal lifts less than 12 inches in thickness, and compacted to at least 95% of the maximum dry density as determined using test method ASTM D-1557 (Modified Proctor). The procedure to achieve the specified minimum relative compaction depends on the size and type of compacting equipment, the number of passes, thickness of the layer being compacted, and certain soil properties.

The compaction characteristics of the structural fill material must be determined from representative samples, prior to placement and compaction of the structural fill. A study of compaction characteristics

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should include determination of the moisture vs. compacted density curve, maximum compacted dry density, and optimum moisture content. On-site quality control should include in situ density testing and measurement of natural moisture contents of these soils at the time of placement.

If earthwork is performed during extended periods of wet weather or in wet conditions, the structural fill should conform to the recommendations provided in “Wet Weather Earthwork” below.

8.1.3 Temporary Erosion and Sediment Control

The contractor will be required to submit a temporary erosion and sediment control (TESC) plan. The plan should detail the best management practices (BMPs) that will be implemented to prevent waste or eroded materials from entering natural or man-made water or sewage removal systems. Typical BMPs include a wheel wash, silt fences, straw wattles, berms, dust control, and good housekeeping.

8.1.3.1 Wet Weather Earthwork

Earthwork should be performed in small areas to minimize exposure to wet weather. The size and type of construction equipment used may have to be limited to prevent soil disturbance. Under some circumstances, it may be necessary to excavate soil with a backhoe to minimize subgrade disturbance caused by equipment traffic.

Excavation or removal of unsuitable soil should be followed promptly by placement and compaction of wet weather structural fill. Wet weather structural fill should consist of clean, granular soil with less than 5% passing the U.S. Standard No. 200 sieve, based on wet sieving the fraction passing the 1/4-inch sieve. The fine-grained portion of the structural fill soil should be nonplastic.

Temporary slopes should be protected from exposure to rain and runoff, to preserve slope stability. The ground surface within the construction area should be graded to promote runoff of surface water and prevent the ponding of water. Bales of straw and/or geotextile silt fences should be strategically located to control erosion and the movement of soil.

8.2 Dewatering

Most of the construction for the Project will occur above the groundwater level. Some zones of perched water may be encountered during excavation; however, it is expected that isolated zones will quickly bleed off and not produce significant long-term groundwater seepage. If isolated zones remain, targeted dewatering via vacuum well point(s) from inside the excavation may be used. Vacuum well points may also be used in the RGD and ENF layer to control groundwater seepage, if needed.

At the Park Place vault and Wall 3 (BSW-1), where there is construction required below the groundwater table, we do not anticipate that installation and operation of an active dewatering system will be necessary to construct the excavations. Sumps and pumps would provide the most efficient method to control water from inside the excavation.

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The contractor should be required to submit a dewatering system design and analysis that indicates maximum allowable piezometric levels beneath the base of the vault and factors of safety for uplift at each stage of construction. The treatment and discharge of water collected during dewatering will be the contractor's responsibility; details regarding this system should be submitted with the dewatering system design. Details for dewatering discharge will be provided in the SWPPP.

8.3 Soil Nails

Soil nail walls can be constructed with conventional drilling equipment commonly used in the Seattle area. Performance of a soil nail wall depends on the workmanship and construction practices of the contractor. Any surface water needs to be directed away from the face of the excavation.

The stand-up time of unsupported soils is a critical design consideration for soil nail walls. Soil nailing works well in soils that are able to stand unsupported in a nearly vertical, 3- to 6-foot cut for one to two days. The TLD ESU should have stand-up times in that range. The CSG, RGD, and ENF ESUs have varying amounts of fines, so there may be some zones in the CSG/RGD/ENF soils that will not be stable in an unsupported state. In these zones, it is recommended that the soil nails be installed through a sloped berm, and/or that a drill bench and flashcrete be used to provide temporary support for the wall face.

Verification tests and proof tests should be performed on soil nails installed using the same means and methods as the production soil nails. If the means or methods change during construction or the ESUs encounter change, additional tests will be required. It is recommended that the criteria for verification, proof, and creep tests for soil nails recommended by the FHWA (Lazarte et al., 2015) be used to determine if the soil nails are acceptable.

The soil nail construction and testing should be observed by a geotechnical engineer. The geotechnical engineer should record the soils encountered while the holes are drilled for the soil nails, and should note the grout mix used to encapsulate the nails. During soil nail installation, the date, time, nail details, drill-hole diameter, inclination, and length should be recorded. All soil nail testing results should be recorded as well.

8.4 Soldier Pile Walls

Soldier pile can be installed with conventional equipment typically used within the Seattle area. As with soil nail walls, the performance of a secant pile or soldier pile and lagging wall depends on the workmanship and construction practices of the contractor.

Soldier piles will extend below the base of excavation. Below the water table, it is recommended that casing or drilling fluid be used to reduce the potential for caving of the drilled shafts before the shafts are backfilled. Casing or drilling fluid may be needed to reduce the potential for caving in deposits encountered above the water table that also are not stable in an unsupported state. Drilling fluid or water may be required to limit heave even if casing is used when drilling in granular deposits below the water table. Following shaft excavation, any soft or disturbed soils at the base of shaft should be cleaned out. It is recommended that the backfill material (lean-mix concrete) be tremied into the shafts once excavation

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is complete. Boulders should be expected when drilling in the TLD ESU and may be encountered in the CSG ESU.

Excavations should not expose vertical lifts greater than 4 feet in height before installing lagging. Some zones of perched water may remain trapped within the ground even with site dewatering in place and may require additional dewatering measures (for example vacuum lances) prior to lagging placement to prevent flowing ground in localized zones. Any voids that develop behind the lagging should be promptly backfilled with lean concrete or CDF.

The construction of soldier pile walls should be observed by a geotechnical engineer. The geotechnical engineer should record the soils encountered in each pile. During the pile installation, the date, time, pile size, pile length, pile tip elevation, backfill method, and backfill material should be noted.

8.5 CIP Walls

Following excavation, any soft or disturbed soils at the base of excavation should be removed until firm and unyielding soils are reached, or the overexcavation reaches a depth of two feet below bearing grade. A layer of filter fabric should be placed at the base of the overexcavation, and structural fill should be placed and compacted to reach the subgrade elevation.. Standing water should be removed prior to placing concrete. The condition of the subgrade should be observed by a geotechnical engineer to confirm that there are no loosened or disturbed soils before any wall footings are poured.

It is recommended that at least 18 inches of free draining material, such as gravel backfill for walls (WSDOT 9-03.12(2)) over a drain surrounded by gravel backfill for drains (WSDOT 9-03.12(4)) be placed behind the wall to prevent the buildup of hydrostatic pressures consistent with WSDOT standard plans

8.6 MSE Walls

For the MSE Walls, existing soils should be excavated to the base of wall elevation and imported structural fill (WSDOT “Gravel Borrow for Structural Earth Wall”) should be used as wall backfill. Prior to placing the structural fill, any standing water should be drained from the area and the subgrade material proof rolled. Structural fill should be compacted to a minimum of 95 percent modified Proctor Dry Density (ASTM D 1557). The maximum loose lift thickness should not exceed 12 inches. If earthwork is performed during extended periods of wet weather or in wet conditions, the structural fill should conform to the recommendations provided in the Wet Weather Earthwork section.

The MSE walls serving as aerial guideway abutments will have concrete panel facing in accordance with WSDOT specifications. The MSE wall in the WSDOT Sweeper Site may consist of a rock-filled wire mesh facing system. The facing fill aggregate should be fractured rock (quarry spalls). The fractured aggregate should be free of soil, fines and debris, with 100% passing an 8-inch sieve and 0% passing a 4-inch sieve. The fractured aggregate must be uniformly graded between the maximum and minimum sieve sizes. Aggregate should be installed and compacted in lifts not to exceed 12 inches.

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Geosynthetic material should be placed to separate the MSE wall backfill material from the facing fill aggregate. The geosynthetic material should conform to the requirements outlined in WSDOT Standard Specification Section 9-33.1 for Construction Geotextile for Underground Drainage, Moderate Survivability, Class A. Geogrid reinforcement and geosynthetic material should not be visible or exposed to sunlight within the completed wall, but have a minimum cover depth of 6 inches.

The ground surface in front of the walls should be graded in a manner to divert surface water away from the wall. Drainage for the MSE wall should include a perforated drain pipe located at the bottom of the wall.

8.7 Drilled Shafts

8.7.1 Aerial Guideway Shafts (or Large-Diameter Shafts)

Drilled shafts for the aerial guideway should be constructed in accordance with WSDOT Standard Specification Section 6-19.

Below the water table, the granular soils may cave unless supported by either a temporary casing or drilling fluid. We understand that the drilled shafts for the aerial guideway will be constructed using an oscillator and full-length temporary casing. The Contractor should also be prepared to encounter, and have measures ready to mitigate, heaving sands below the water table while drilling the foundations. The Contractor should demonstrate how they will monitor the rate of groundwater infiltration and the occurrence of heave during excavation if they propose to excavate without the use of added water or slurry.

The Contractor should be prepared to drill through very loose to very dense soil that has the potential to contain cobbles and boulders, as well as materials that may contain bricks, concrete debris, wood, and other deleterious materials. Boulders should be expected when drilling in the TLD ESU and may be encountered in the CSG ESU.

The construction of the drilled shafts should be observed by a geotechnical engineer. The geotechnical engineer should record the soils encountered in each shaft during drilling. During the drilled shaft construction, the date, time, shaft diameter, shaft depth, backfill method, and backfill material should be noted. Following shaft excavation, any soft or disturbed soils at the base of shaft should be cleaned out and the base of the drilled shafts should be inspected. We recommend that the Contractor use a shaft inspection device (SID) equipped with a camera for visual inspection of the excavation base. If water or slurry is used to excavate the shaft, the SID should also have a sediment depth gauge. We recommend no more than 1.5 inches of sediment on the bottom of all drilled shaft excavations, which is consistent with the recommendations in the FHWA drilled shaft manual (FHWA, 2010) for shafts that are designed with significant end-bearing resistance. The base of the drilled shaft excavations will require additional clean out prior to concrete placement if sloughing has occurred from the excavation walls, or if significant accumulation of suspended soils occurs.

The reinforcement cage should not be placed until after shaft inspection has been completed. If there is more than 3 inches of water or slurry present within the shaft excavation prior to concrete placement, it is

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recommended that concrete be tremied into the excavation with a concrete pump. Concrete placement by gravity feed is not allowed. Otherwise, if the Contractor proposes to place concrete in the dry by free-fall method, the concrete should be directed down through the middle of the reinforcement cage without damaging the cage.

Cross-hole sonic logging (CSL) testing must be performed on all drilled shafts to confirm shaft dimensions in general accordance with ASTM Standard D6760. FHWA drilled shaft manual (FHWA, 2010) recommends that one CSL access tube be furnished and installed for each foot of drilled shaft diameter, rounded up to the next highest whole number. The access tubes shall extend from the bottom of the drilled shaft to at least two feet above the top of the drilled shaft. If the reinforcing cage for the drilled shaft does not extend to the bottom of the drilled shaft, a sufficient number of reinforcing bars should be extended to the bottom of the drilled shaft excavation to secure the CSL access tubes in position. Care must be taken to prevent damage to the CSL access tubes during construction. Splice joints, if necessary, must be watertight.

8.7.2 OCS and Light Pole Shafts (or Small-Diameter Shafts)

Below the water table, it is recommended that casing or drilling fluid be used to reduce the potential for caving of the drilled shafts before the shafts are backfilled. Casing or drilling fluid may be needed to reduce the potential for caving in deposits encountered above the water table that also are not stable in an unsupported state. Drilling fluid or water may be required to limit heave even if casing is used when drilling in granular deposits below the water table. Following shaft excavation, any soft or disturbed soils at the base of shaft should be cleaned out. It is recommended that the concrete be placed in the shafts once excavation is complete. Boulders should be expected when drilling in the TLD ESU and may be encountered in the CSG ESU.

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9.0 Monitoring Considerations

9.1 Prescriptive Requirements

The prescriptive requirements for geotechnical instrumentation are covered in Specification Section 31 09 00. Prior to commencing construction, an Instrumentation Installation and Monitoring Plan (in accordance with Specification 31 09 00) will be submitted to Sound Transit describing the zone of influence of construction, how the effects of construction on adjacent facilities will be monitored, the monitoring frequency, evaluation procedures, and mitigation options. The prescriptive requirements for vibration monitoring are covered in Specification Section 01 57 15. Additionally, the Project Requirements provide further guidance and definitions for the monitoring program. The following paragraphs summarize the required monitoring.

9.1.1 Vibration Monitoring

Section 01 57 15 covers vibration monitoring. In this section, it is stated that the vibration monitoring should be completed in the locations shown in the Contract Documents; however, the locations are not shown on the RFP Contract Drawings. We recommend that 5 vibration monitors be available through the duration of the project. These monitors should be placed in areas of active construction and be moved as required to cover all activities.

9.1.2 Monitoring of Excavations

The Project Requirements indicate that the design-builder "*shall monitor buildings, structures, roadways, and utilities within the zone of influence.*" The Project Requirements define the zone of influence near an open excavation as: "*Construction of excavations whose bases fall within a line sloping down and away from the foundation support zone of any adjacent structure or utility at 45 degrees or more from the horizontal.*"

The Project Requirements define the zone of influence near a shaft excavation as "*three shaft diameters radius from drilled shaft operations.*"

9.1.3 Monitoring of Shoring Walls

In accordance with Specification Section 31 09 00, paragraph 3.04.G, structure settlement points shall be installed at the top of every other pile for soldier pile walls, and at intervals of no more than 25 feet on all other walls.

9.1.4 Specific Monitoring Locations

In addition to the general requirements outlined above, Specification Section 31 09 00, paragraph 1.09.B gives eight locations where a corrective action plan will be required; therefore, monitoring will be required for these structures. Since the RFP is not prescriptive about the type and scale of the monitoring, we have assumed structure settlement points and utility settlement points would be sufficient for monitoring.

1. 140th Ave. NE Bridge

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2. NE 24th Street Bridge
3. 148th Ave. NE Bridge
4. NE 36th Street Bridge
5. Retaining Walls at Augusta Drive
6. Retaining Walls at 152nd Ave. NE
7. High Pressure gas line at 148th Ave. NE
8. Fiber Optic line at Augusta Drive

9.2 Recommended Instrumentation Program

In general, it is our opinion that the minimum requirements for geotechnical monitoring, as outlined in Sections 9.1.1 through 9.1.4 are appropriate for the work to be performed and meet the standard of care. However, we recommend installing some additional instrumentation in areas of higher risk, which are described in more detail in the following sections. The recommended instrumentation program is summarized on Table 9-1.

9.2.1 Preload Monitoring

9.2.1.1 Wall 1 (EB MSE-1) and Wall 2 (WB MSE-1)

We have recommended that a period of preloading be conducted to reduce settlement of the MSE walls due to the presence of soft to medium stiff, normally consolidated clays beneath the proposed abutment. We recommend installing a total of 6 settlement plates at the base of the preload fill to monitor the rate of settlement during preload to determine when the preload can be removed. We also recommend installing a piezometer to monitor the pore pressures within the clay layer and verifying that the pore pressures dissipate in conjunction with the slowing of settlement being measured in the survey points.

9.2.1.2 Bent D59

We have recommended that a period of preloading be conducted to reduce downdrag on the drilled shaft at Bent D59 due to the presence of soft to medium stiff, normally consolidated clays at the shaft location. We recommend installing a total of 4 settlement plates at the base of the preload fill to monitor the rate of settlement during preload to determine when the preload can be removed. We also recommend installing a piezometer to monitor the pore pressures within the clay layer and verifying that the pore pressures dissipate in conjunction with the slowing of settlement being measured in the survey points.

9.2.2 Existing MSE Walls at 152nd Ave NE and Augusta Drive

Although the risk of excessive settlement occurring along the proposed soil nail walls beneath the existing MSE walls is low, the consequences of this settlement could be significant because of several deep utilities. In Table 9-1, we have included surface settlement points along the tops of both the proposed and existing walls in accordance with the project specifications. However, we also recommend installing inclinometers between the two walls. If one of the walls should indicate signs of movement, the inclinometers will provide additional information to determine the cause of the movement, and we would be able to enact a recovery plan faster and with less risk of damage occurring to the existing wall.

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Table 9-1. Summary of Recommended Instrumentation

Location	Approximate Station Range	Type	Number	Anticipated Depth (ft)	Reading Schedule	Required by Specifications?
Wall 1 (EB MSE-1) and Wall 2 (WB MSE-1)	694+17 to 695+71	SU	6	N/A	D	No
Wall 1 (EB MSE-1) and Wall 2 (WB MSE-1)	694+17 to 695+71	SU	14	N/A	B	Yes
Wall 1 (EB MSE-1) and Wall 2 (WB MSE-1)	~694+60	VW	1	30	C	No
140th Ave NE Bridge	700+47 to 701+49	SS	6	N/A	A	Yes
140th Ave NE	700+47 to 701+49	UT	4	N/A	A	Yes
Bent D59	~707+27	SU	4	N/A	D	No
Bent D59	~707+27	VW/EX	1	65	C	No
Bent D59/SR 520	~707+27	SU	3	N/A	D	No
NE 24th St Bridge	716+70 to 720+30	SS	6	N/A	A	Yes
NE 24th St	700+47 to 701+49	UT	15	N/A	A	Yes
148th Ave NE Bridge	732+10 to 732+90	SS	4	N/A	A	Yes
148th Ave NE	731+50 to 732+74	UT	9	N/A	A	Yes
Wall B3 (EB MSE-2) and Wall 6 (WB MSE-2)	740+15 to 742+77	SU	15	N/A	B	Yes
Wall 13 (EBW-2)	753+34 to 757+88	SU	19	N/A	B	Yes
Wall 13 (EBW-2)/152nd Ave NE	753+34 to 757+88	IN	5	40	B	No
152nd Ave NE	752+60 to 757+88	SS	5	N/A	B	Yes
NE 36th St Bridge	757+88 to 759+54	SS	8	N/A	A	Yes
Wall 14 (EBW-4)	759+54 to 766+08	SU	27	N/A	B	Yes
Wall 14 (EBW-4) / Augusta Dr	759+54 to 760+00	IN	1	40	B	No
Augusta Dr	752+60 to 757+92	SS	1	N/A	B	Yes
Fiber Optic Line at Augusta Dr	~763+73	UT	5	N/A	A	Yes
Wall 15 (EBW-5)	766+08 to 769+00	SS	25	N/A	B	Yes
OTC Soil Nail Wall	778+50 to 784+00	SS	16	N/A	B	Yes
Various Locations	N/A	VM	5	N/A	C	Yes

POINT TYPES

SS - Structure Settlement Point

SU - Surface Settlement Point

UT - Utility Monitoring Point

IN - Inclinometer

VM - Vibration Monitor

VW - Vibrating Wire Piezometer (grouted)

VW/EX – Single point borehole extensometer with integrated vibrating wire piezometer

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Table 9-1. (continued) Summary of Recommended Instrumentation

Location	Approximate Station Range	Type	Notes
Wall 1 (EB MSE-1) and Wall 2 (WB MSE-1)	694+17 to 695+71	SU	Settlement plates to monitor consolidation during preload.
Wall 1 (EB MSE-1) and Wall 2 (WB MSE-1)	694+17 to 695+71	SU	Every 25 feet along wall. Install as close to base of wall as practicable to check for additional settlement during construction.
Wall 1 (EB MSE-1) and Wall 2 (WB MSE-1)	~694+60	VW	Monitor pore pressure in clay layer during preload and MSE wall construction.
140th Ave NE Bridge	700+47 to 701+49	SS	4 points installed on bridge deck, 2 points installed on 2 bridge columns closest to shaft construction.
140th Ave NE	700+47 to 701+49	UT	Monitor utilities within 3 shaft diameters of construction (3 points on FO on west side, 1 point on electric box on east side).
Bent D59	~707+27	SU	Settlement plates to monitor consolidation during preload.
Bent D59	~707+27	VW/EX	Monitor pore pressure and deformation in clay layer during preload.
Bent D59/SR 520	~707+27	SU	Settlement points on edge of pavement to monitor settlement during preload.
NE 24th St Bridge	716+70 to 720+30	SS	4 points installed on bridge deck, 2 points installed on 2 bridge columns closest to shaft construction.
NE 24th St	700+47 to 701+49	UT	Monitor utilities within 3 shaft diameters of construction (3 points on each of 5 utility lines - 1 FO, 2 Storm Sewer, 1 Sanitary Sewer, 1 Water).
148th Ave NE Bridge	732+10 to 732+90	SS	4 points installed on bridge deck.
148th Ave NE	731+50 to 732+74	UT	3 points on high pressure gas line in 148th Ave ROW. 3 points each on 2 water lines within 3 shaft diameters of construction.
Wall B3 (EB MSE-2) and Wall 6 (WB MSE-2)	740+15 to 742+77	SU	Every 25 feet along wall. Install as close to base of wall as practicable to monitor settlement of subgrade.
Wall 13 (EBW-2)	753+34 to 757+88	SU	Every 25 feet along top of soil nail wall.
Wall 13 (EBW-2)/152nd Ave NE	753+34 to 757+88	IN	Every 100 feet between soil nail wall and existing MSE wall.
152nd Ave NE	752+60 to 757+88	SS	Install SS near top of existing MSE wall above each inclinometer location.
NE 36th St Bridge	757+88 to 759+54	SS	Install points on bridge deck.
Wall 14 (EBW-4)	759+54 to 766+08	SU	Every 25 feet along top of soil nail wall.
Wall 14 (EBW-4) / Augusta Dr	759+54 to 760+00	IN	Short length of existing MSE wall.
Augusta Dr	752+60 to 757+92	SS	Install SS near top of existing MSE wall above the inclinometer location.
Fiber Optic Line at Augusta Dr	~763+73	UT	Monitored per Project Requirements.
Wall 15 (EBW-5)	766+08 to 769+00	SS	Installed on every other soldier pile.
OTC Soil Nail Wall	778+50 to 784+00	SS	Every 25 feet along wall.
Various Locations	N/A	VM	Monitoring is required by specs, but no quantities are given. Assume 5 locations based on typical standard of care. The vibration monitors will be used for the entire project duration, but will likely be moved periodically to follow construction.

READING SCHEDULES

A - Daily during construction, weekly after construction until 3 consecutive readings are stable

B - Twice per week during mass excavation or filling, weekly after completion of wall until 3 consecutive readings are stable

C - Continuous (datalogger)

D - Weekly while preload material is in place.

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BLDG-2018-00983, BLDG-2018-00985

Figures

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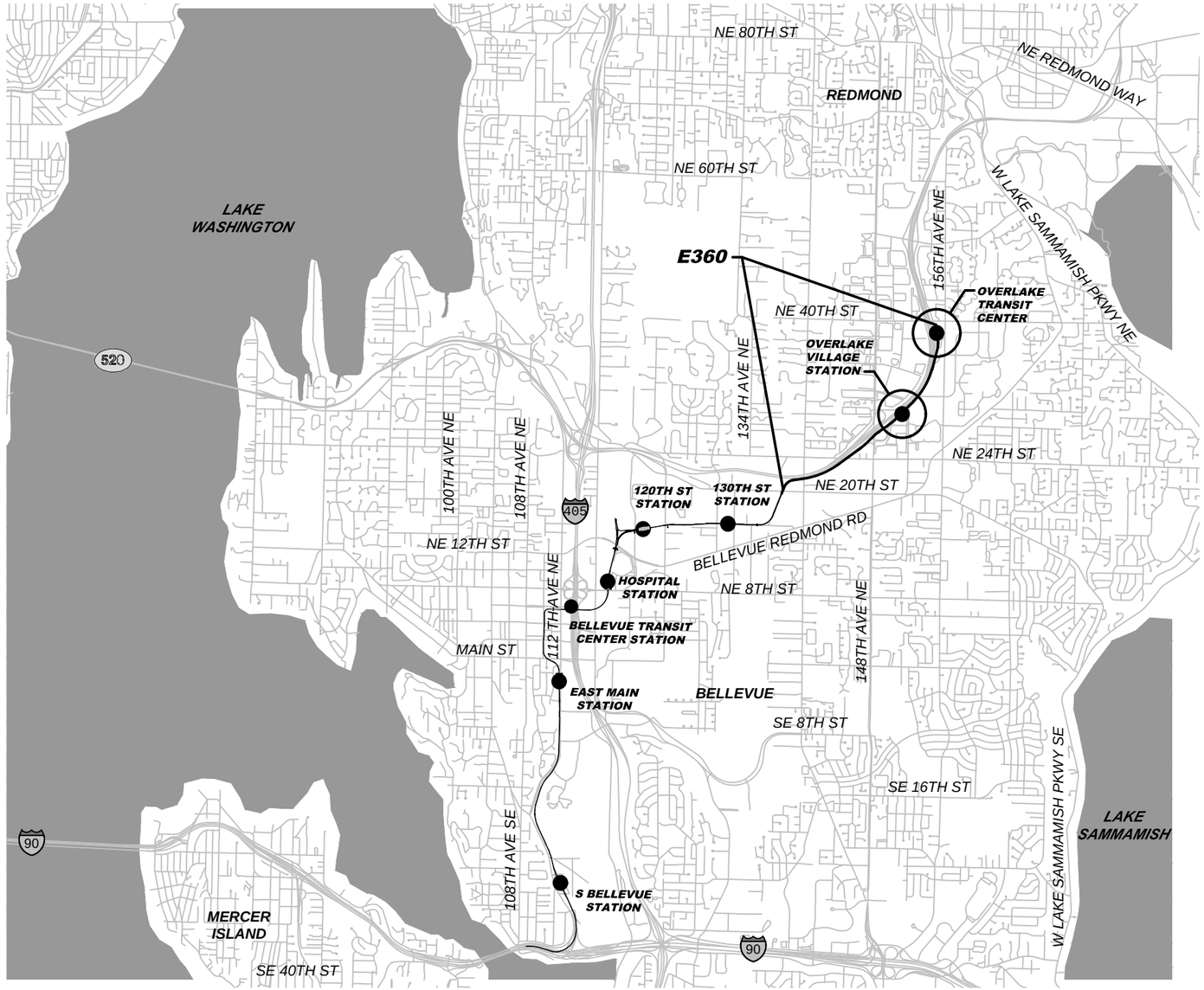

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EAST LINK EXTENSION CONTACT E360
GEOTECHNICAL DATA AND DESIGN REPORT

VICINITY MAP
FIGURE 1

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xE360-BZ7-SFP100
xE360-B25-SFP100
xE360-L88-BORINGS
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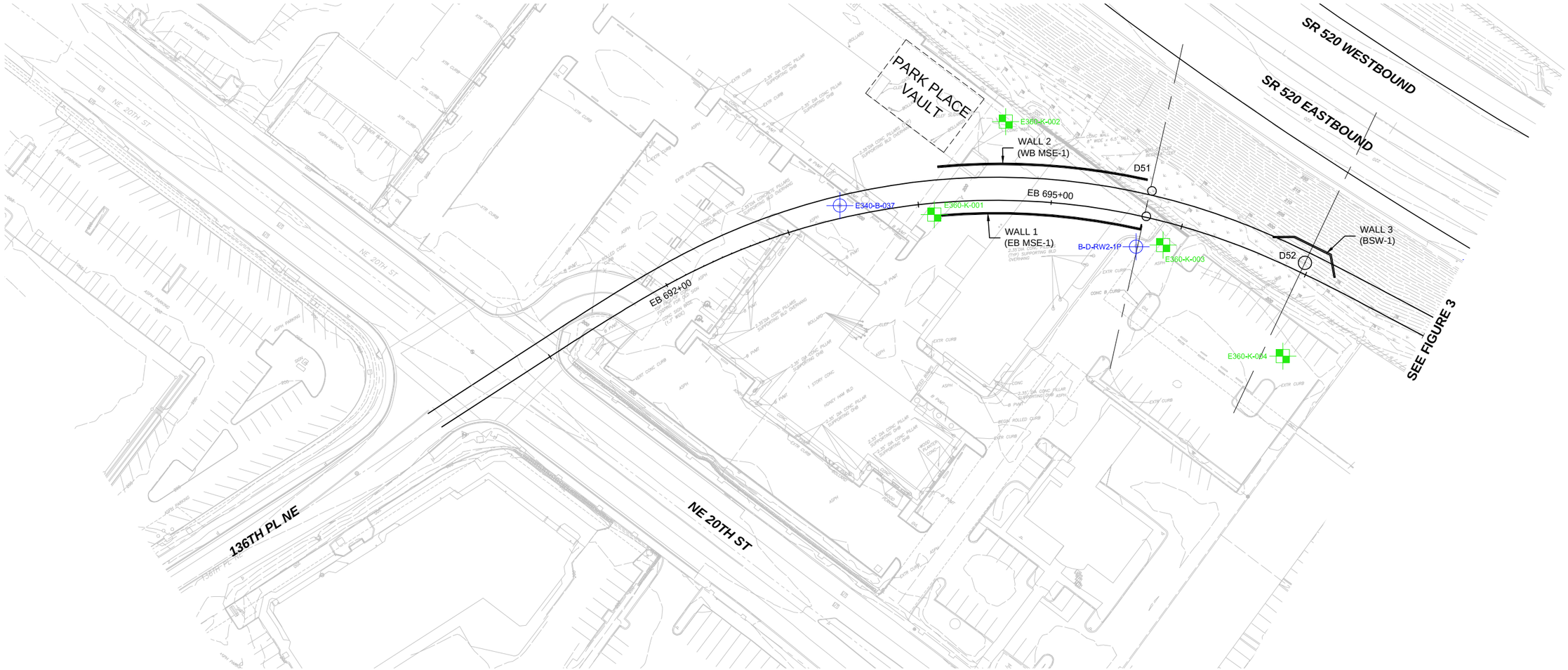
E360-STRUCTURE OUTLINES



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E360-K-XXX - E360 DESIGN-BUILD BORING

E360-B-037 - PREVIOUSLY COMPLETED BORING BY OTHERS

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SCALE IN FEET

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SITE COPY

BLDG-2018-00887, BLDG-2018-00959, BLDG-2018-00893,

BLDG-2018-00983, BLDG-2018-00985

SOUNDTRANSIT

EAST LINK EXTENSION CONTRACT E360
GEOTECHNICAL DATA AND DESIGN REPORT
SITE AND EXPLORATION PLAN
START TO EB STA 698+00
FIGURE 2

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xE360-L88-SFP100
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xE360-L88-KAP STA 40
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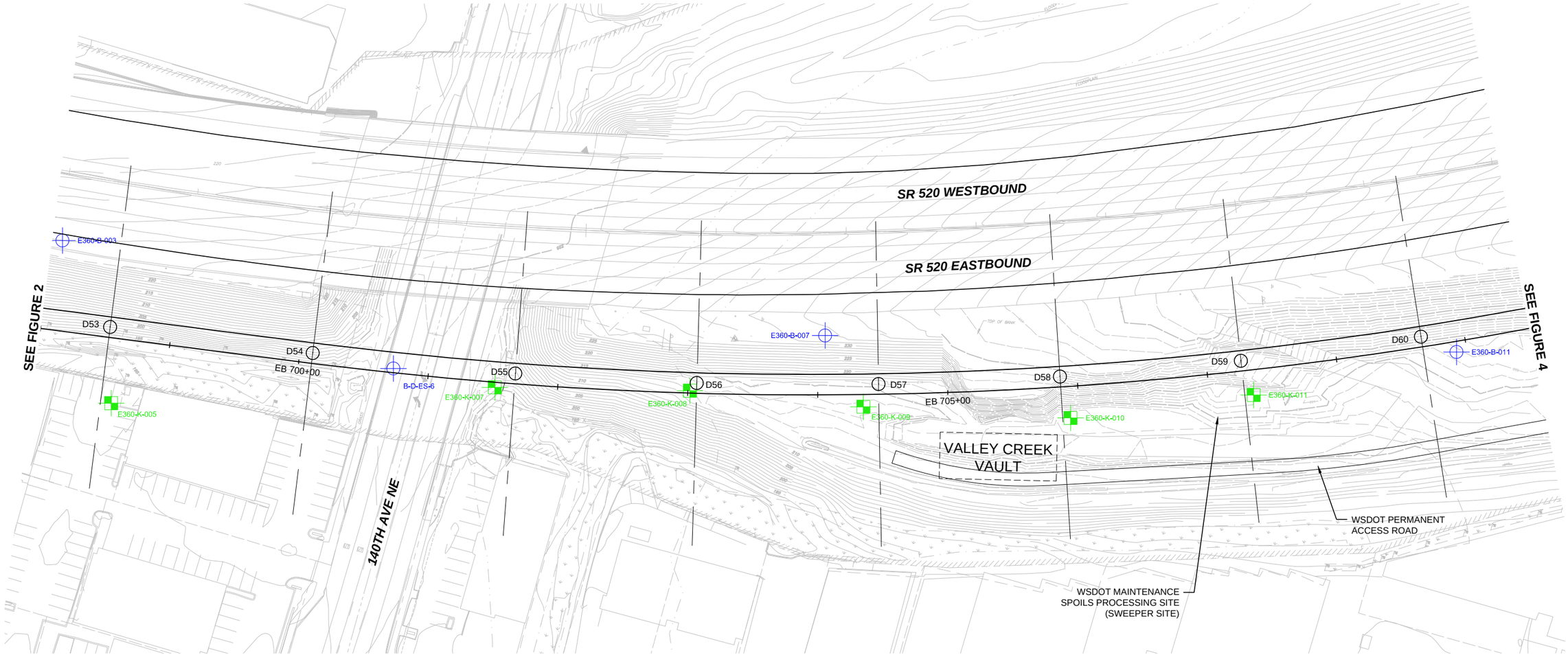

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E360-B-037 - PREVIOUSLY COMPLETED BORING BY OTHERS

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BLDG-2018-00983, BLDG-2018-00985
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EAST LINK EXTENSION CONTRACT E360
GEOTECHNICAL DATA AND DESIGN REPORT
SITE AND EXPLORATION PLAN
EB STA 698+00 TO EB STA 709+50
FIGURE 3

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xE340-L87-KAP100
xE360-L88-BOREN05
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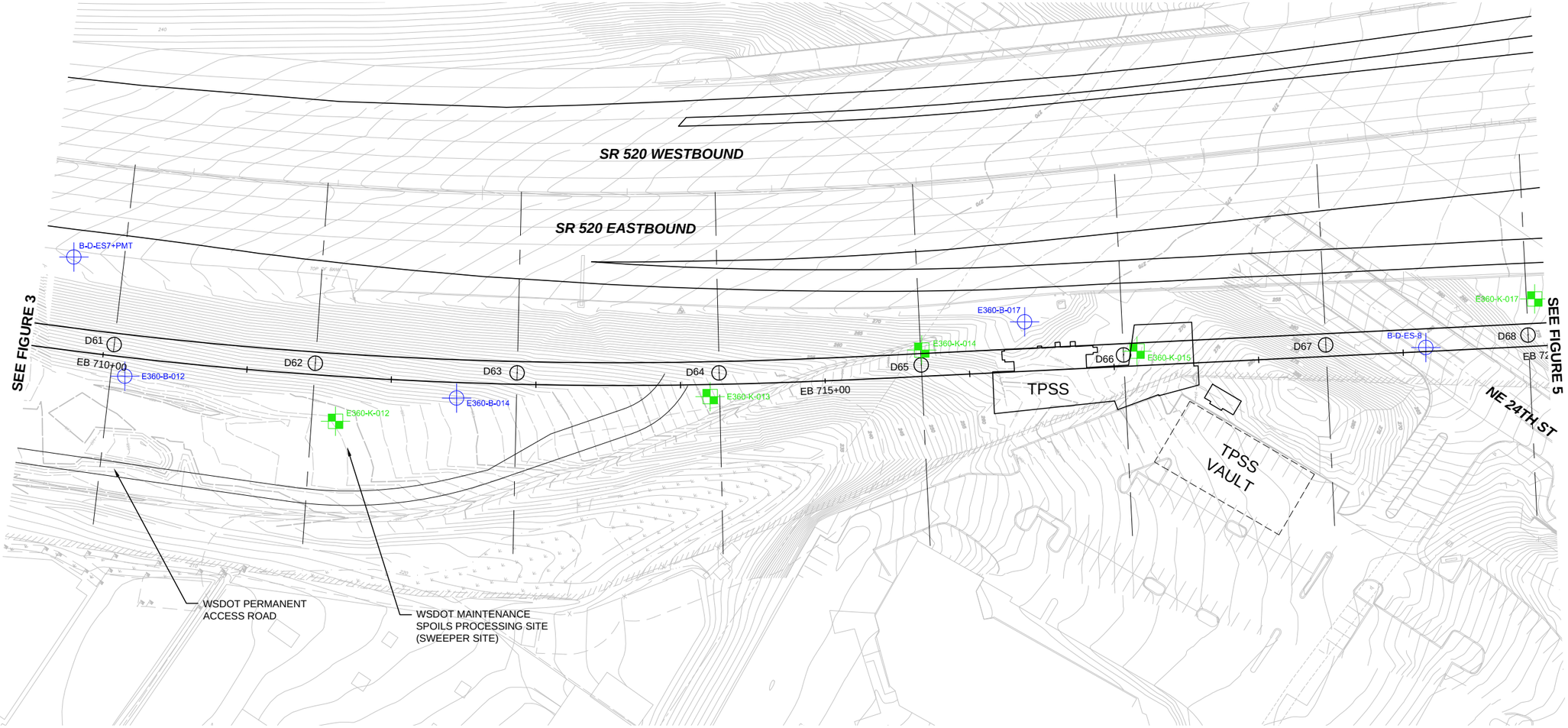
E360-STRUCTURE OUTLINES
xE360-L88-KAP STA 40



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SCALE IN FEET

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BLDG-2018-00983, BLDG-2018-00985
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GEOTECHNICAL DATA AND DESIGN REPORT
SITE AND EXPLORATION PLAN
EB STA 709+50 TO EB STA 720+00
FIGURE 4

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xE360-L88-CAP100
xE360-L88-SWP100
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xE360-B25-SFP100
xE340-L87-CRP100
xE340-L87-KAP100
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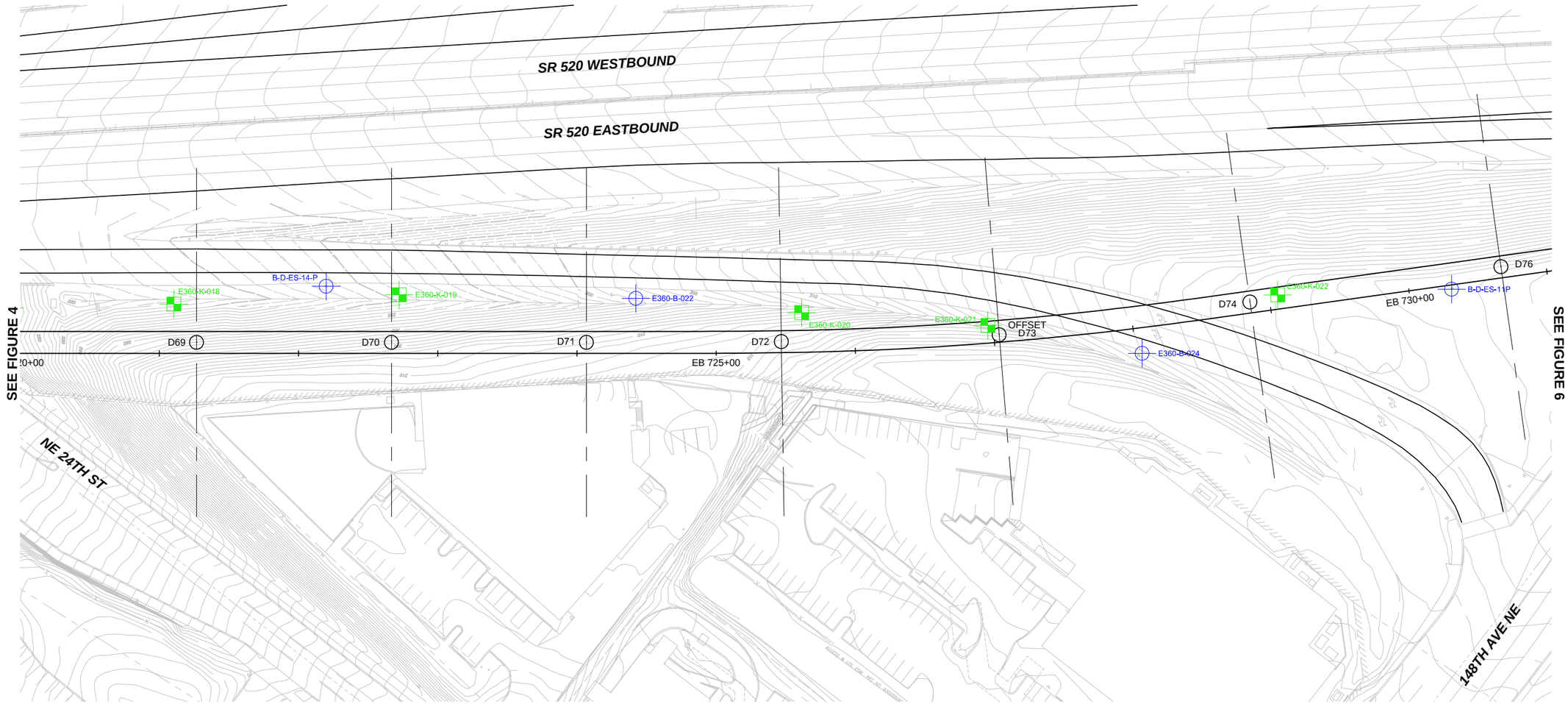
xE360-L88-KAP STA 40



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E360-B-037 - PREVIOUSLY COMPLETED BORING BY OTHERS

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BLDG-2018-00983, BLDG-2018-00985
SOUNDTRANSIT

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GEOTECHNICAL DATA AND DESIGN REPORT
SITE AND EXPLORATION PLAN
EB STA 720+00 TO EB STA 731+00
FIGURE 5

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xE360-L88-RPP100
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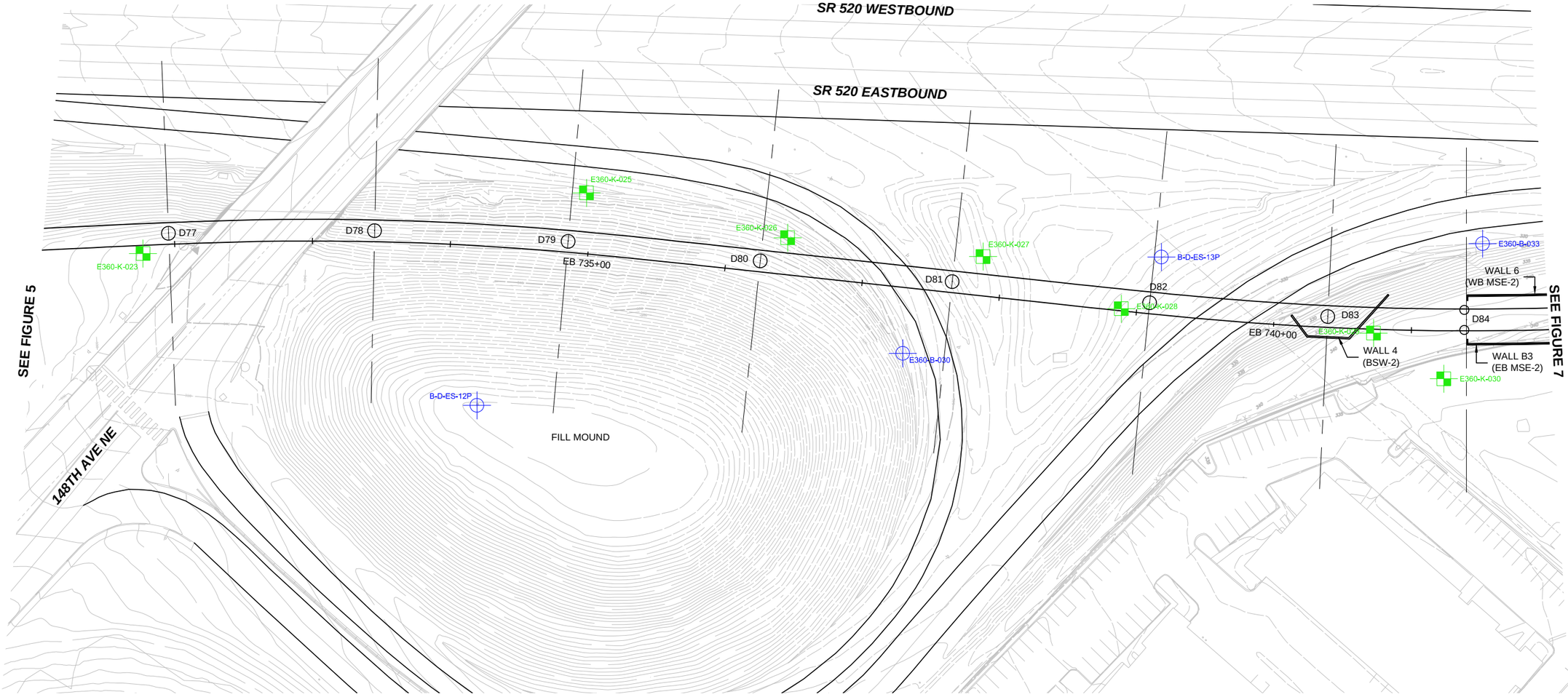

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GEOTECHNICAL DATA AND DESIGN REPORT
SITE AND EXPLORATION PLAN
EB STA 731+00 TO EB STA 742+00
FIGURE 6

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xE340-L87-CRP100
xE340-L87-KAP100
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xEL-1737cn
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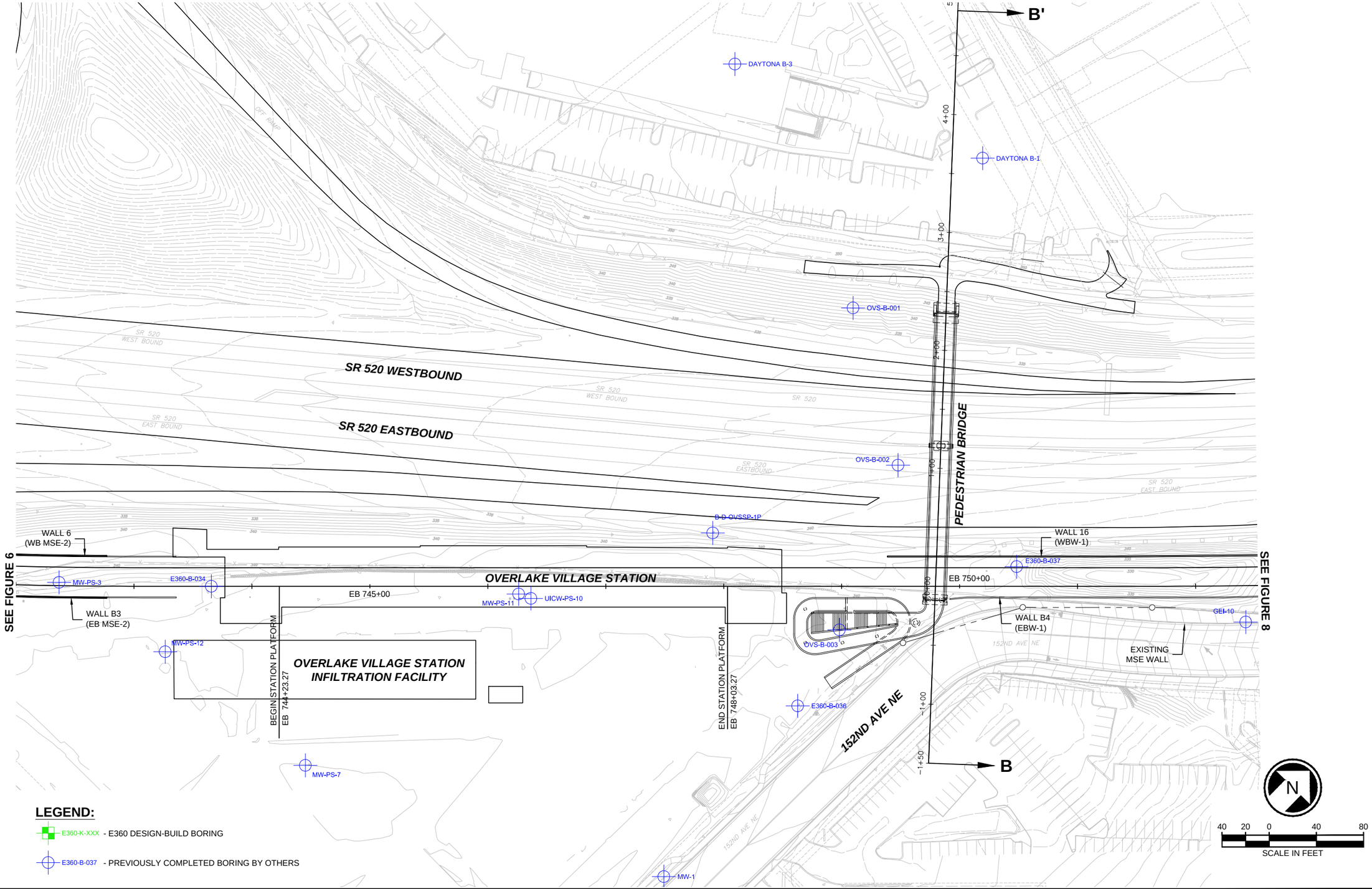

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SOUNDTRANSIT

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GEOTECHNICAL DATA AND DESIGN REPORT
SITE AND EXPLORATION PLAN
EB STA 742+00 TO EB STA 752+50
FIGURE 7

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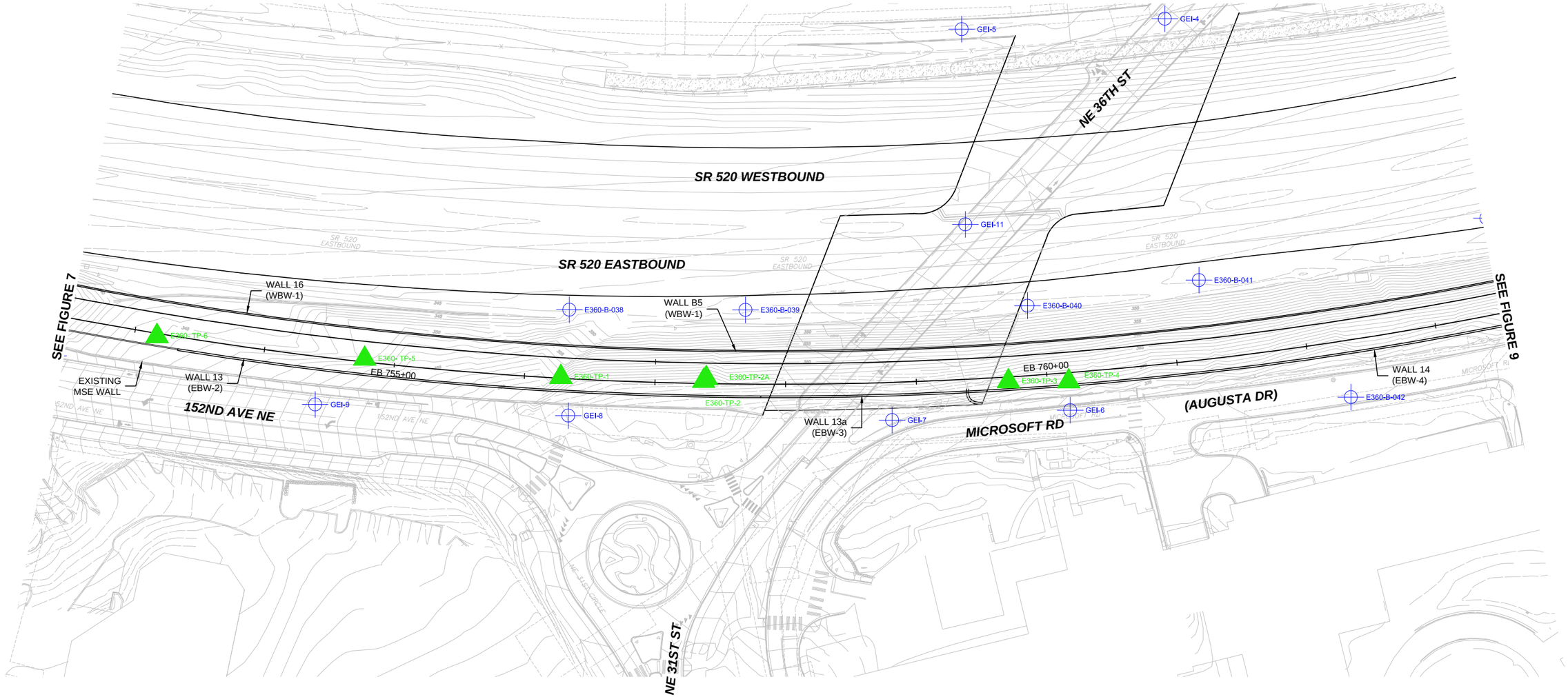

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E360-TP-1 - E360 DESIGN-BUILD TEST PIT

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GEOTECHNICAL DATA AND DESIGN REPORT
SITE AND EXPLORATION PLAN
EB STA 752+50 TO EB STA 763+50
FIGURE 8

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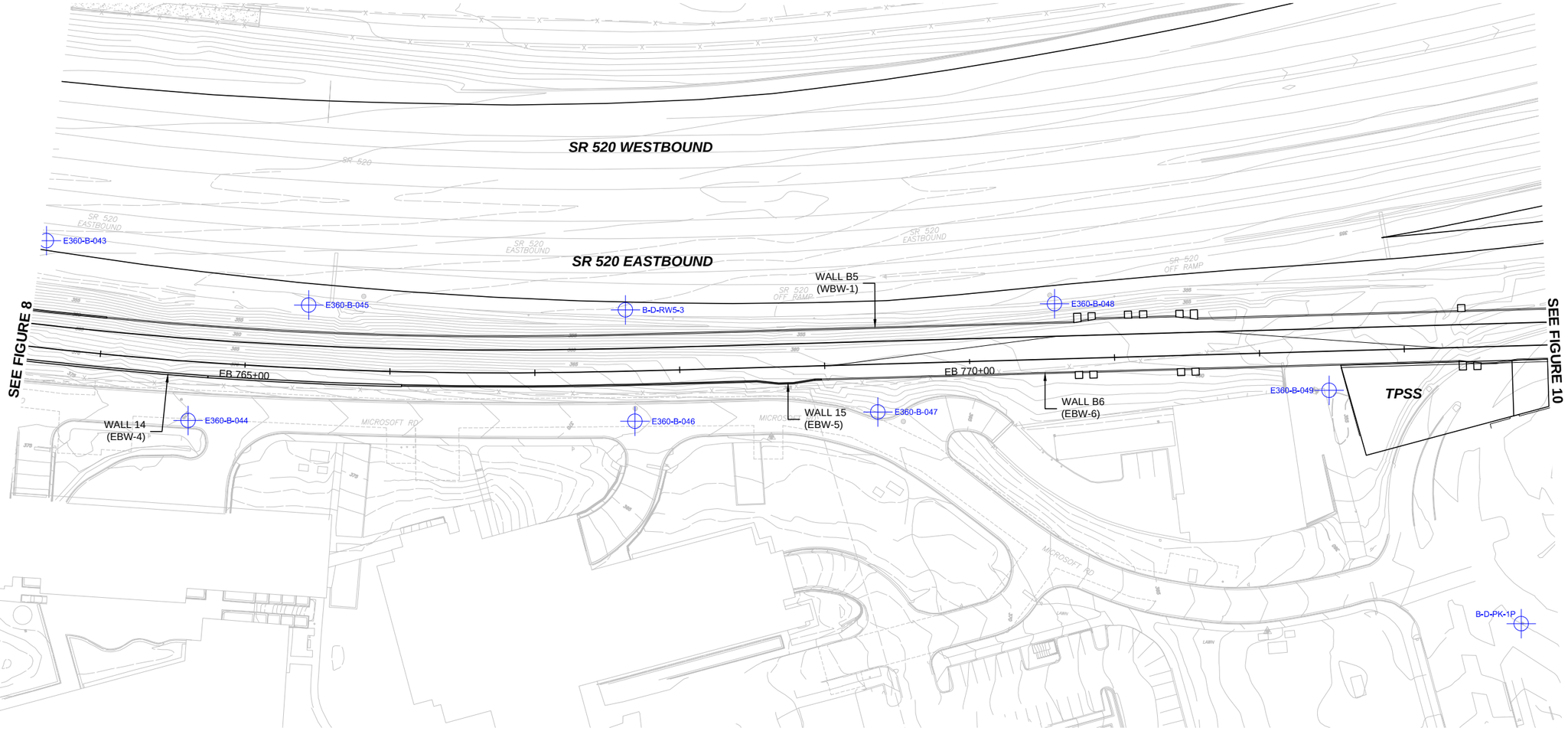
E360-STRUCTURE OUTLINES



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GEOTECHNICAL DATA AND DESIGN REPORT
SITE AND EXPLORATION PLAN
EB STA 763+50 TO EB STA 774+00
FIGURE 9

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xEL-1740sf
xEL-1743rx
xEL-1743sf
xEL-2037rx
xEL-2037sf
xEL-2040rx
xEL-2040sf
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xE360-L88-SPP100
xE360-L88-SWP100
xE360-L88-RPP100
xE360-B25-SFP100
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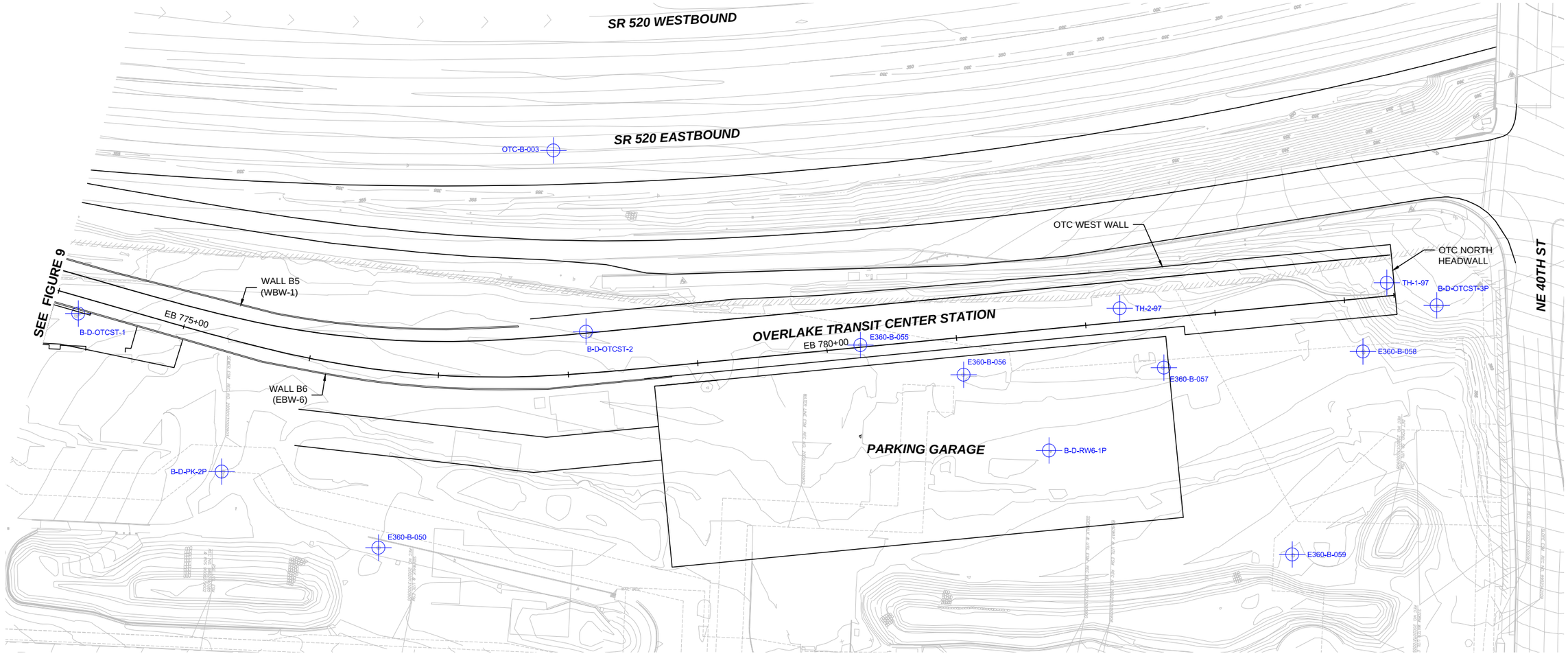

LEGEND:

E360-K-XXX - E360 DESIGN-BUILD BORING

E360-B-037 - PREVIOUSLY COMPLETED BORING BY OTHERS

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BLDG-2018-00983, BLDG-2018-00985

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GEOTECHNICAL DATA AND DESIGN REPORT
SITE AND EXPLORATION PLAN
EB STA 774+00 TO OTC STATION
FIGURE 10

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UNIFIED SOIL CLASSIFICATION SYSTEM (USCS Based on ASTM D2488 & D2487)				
MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL	TYPICAL DESCRIPTION
COARSE-GRAINED SOILS (50% or more retained on No. 200 sieve)	GRAVELS (more than 50% retained on No. 4 sieve)	CLEAN GRAVELS (less than 5% fines)	GW	WELL-GRADED GRAVEL
			GP	POORLY GRADED GRAVEL
		GRAVELS (with 5 to 12% fines)	GW-GM	WELL-GRADED GRAVEL WITH SILT
			GW-GC	WELL-GRADED GRAVEL WITH CLAY
			GP-GM	POORLY GRADED GRAVEL WITH SILT
			GP-GC	POORLY GRADED GRAVEL WITH CLAY
		GRAVELS WITH FINES (more than 12% fines)	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SANDS (less than 50% retained on No. 4 sieve)	CLEAN SANDS (less than 5% fines)	SW	WELL-GRADED SAND
			SP	POORLY GRADED SAND
		SANDS (with 5 to 12% fines)	SW-SM	WELL-GRADED SAND WITH SILT
			SW-SC	WELL-GRADED SAND WITH CLAY
			SP-SM	POORLY GRADED SAND WITH SILT
			SP-SC	POORLY GRADED SAND WITH CLAY
		SANDS WITH FINES (more than 12% fines)	SM	SILTY SAND
			SC	CLAYEY SAND
FINE-GRAINED SOILS (50% or more passes No. 200 sieve)	SILTS & CLAYS (liquid limit less than 50)	INORGANIC	ML	SILT
			CL	LEAN CLAY
		ORGANIC	OL	LOW PLASTICITY ORGANIC CLAY
	SILTS & CLAYS (liquid limit greater than 50)	INORGANIC	MH	ELASTIC SILT
			CH	FAT CLAY
		ORGANIC	OH	HIGH PLASTICITY ORGANIC CLAY
	SILT/CLAY (liquid limit between 12 and 25)	INORGANIC	CL-ML	CLAYEY SILT / SILTY CLAY
HIGHLY ORGANIC SOILS	PRIMARILY ORGANIC MATTER		PT	PEAT

NON OVERRIDDEN DEPOSITS:

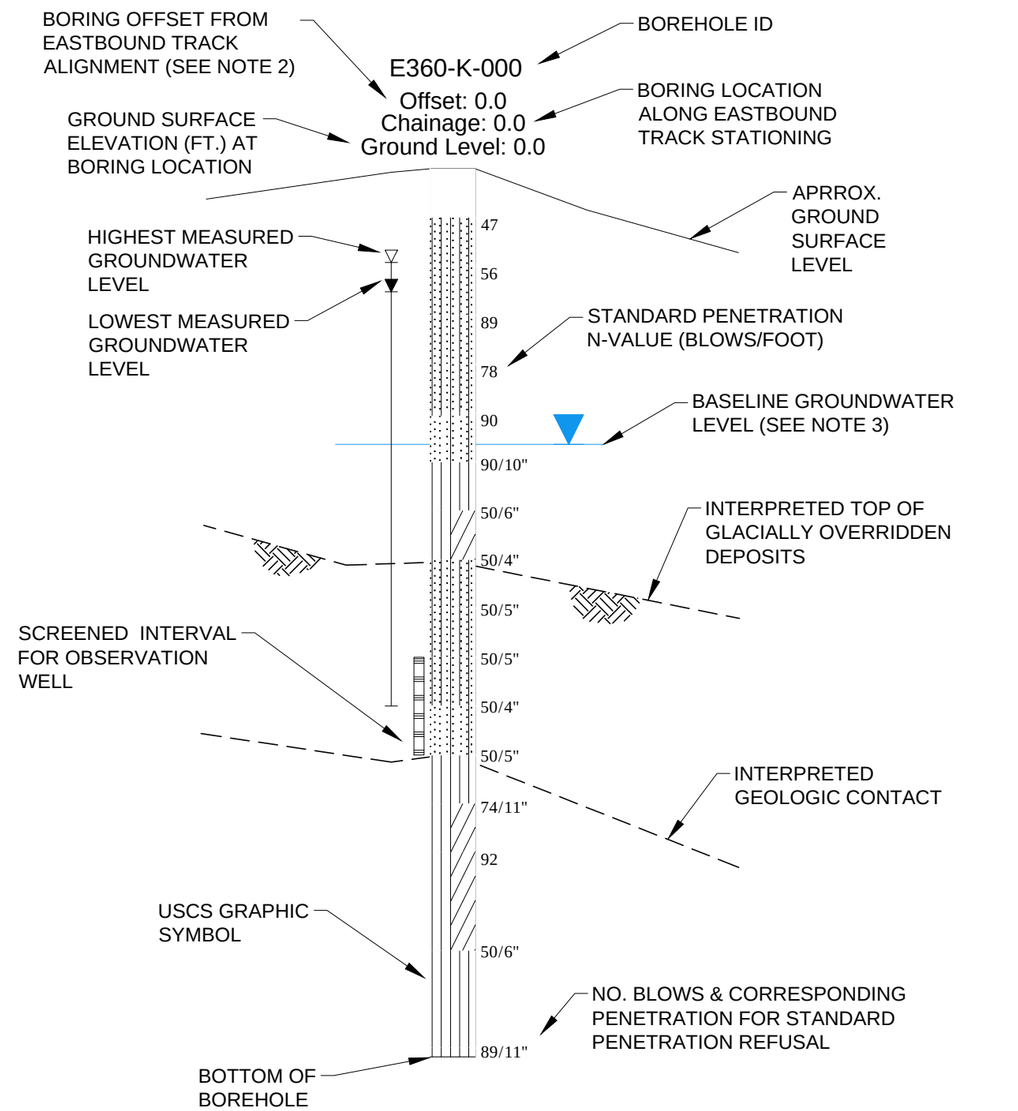
- ENF
- RGD
- RCS
- ROD

GLACIALLY OVERRIDDEN DEPOSITS:

- CSG
- TLD
- CSF
- CCS

OTHER SYMBOLS:

- BLANK / NO RECOVERY
- PAVEMENT



NOTES:

1. COMPLETE ESU DESCRIPTIONS ARE PROVIDED IN SECTION 5 OF THE GEOTECHNICAL DATA AND DESIGN REPORT (GDDR).
2. POSITIVE BOREHOLE OFFSETS REPRESENT THE DISTANCE, IN FEET, TO THE SOUTH OR EAST OF THE PROPOSED EASTBOUND TRACK ALIGNMENT. NEGATIVE BOREHOLE OFFSETS REPRESENT THE DISTANCE, IN FEET, TO THE NORTH OR WEST OF THE PROPOSED EASTBOUND TRACK ALIGNMENT.
3. GROUNDWATER LEVEL IS TAKEN FROM REPORT TITLED "CONTRACT E360 GEOTECHNICAL BASELINE REPORT, FINAL RFP SUBMITTAL" PREPARED BY HJH FINAL DESIGN PARTNERS, DATED 24 JUNE 2015.

PROFILE DESIGNATION — A - A'

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BLDG-2018-00983, BLDG-2018-00985
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XREF LIST:
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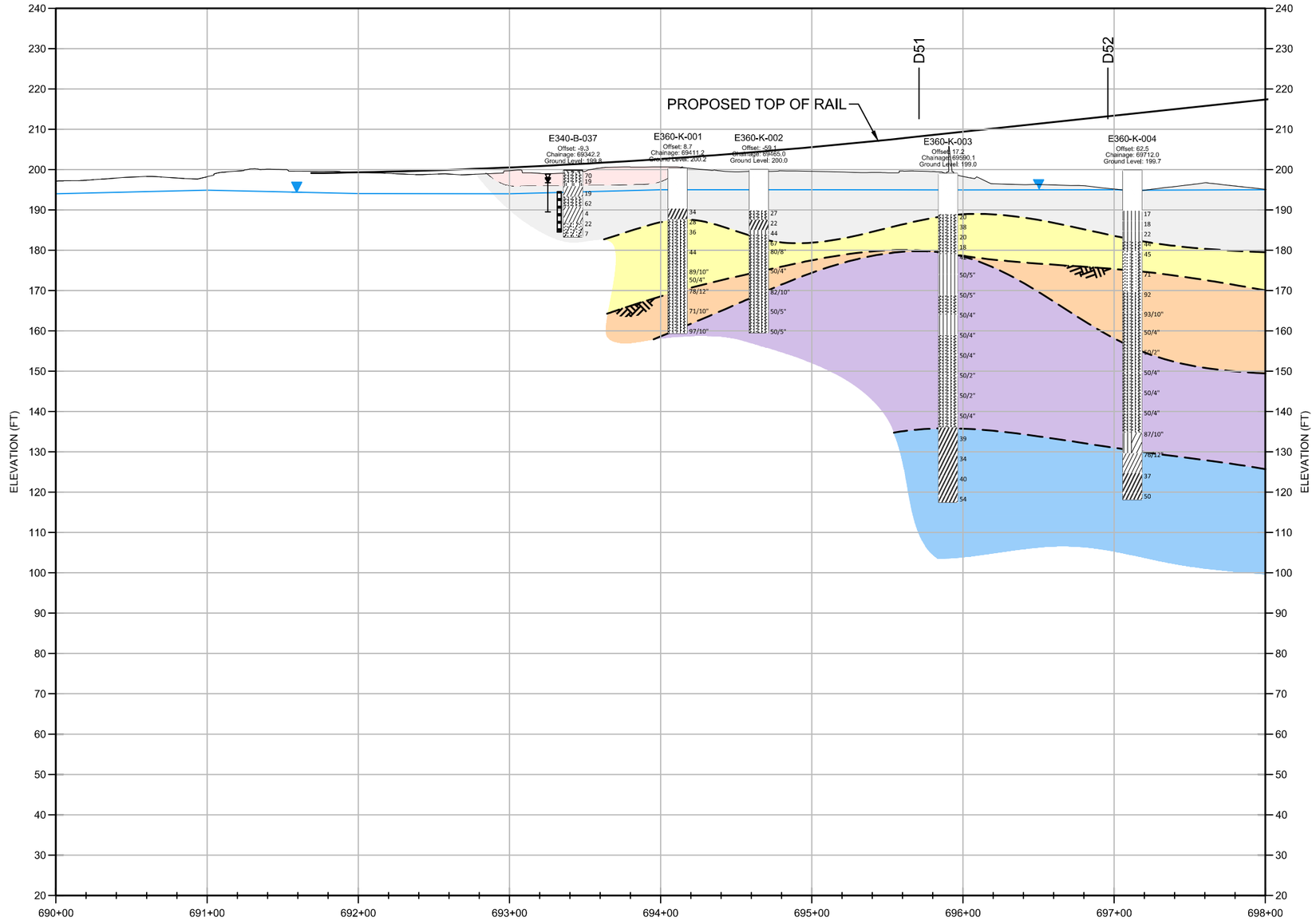

NOTES:

1. CONTACTS BETWEEN ENGINEERING SOIL UNITS (ESU'S) REPRESENT THE INTERPRETATION OF SUBSURFACE CONDITIONS BASED ON INFORMATION FROM THE BOREHOLES.
2. COMPLETE ESU DESCRIPTIONS ARE PROVIDED IN SECTION 5 OF THE GEOTECHNICAL DATA AND DESIGN REPORT (GDDR).
3. GROUND SURFACE SHOWN ON THE PROFILE IS APPROXIMATE CENTERLINE OF THE PROPOSED EASTBOUND TRACK ALIGNMENT.
4. POSITIVE BOREHOLE OFFSETS REPRESENT THE DISTANCE, IN FEET, TO THE SOUTH OR EAST OF THE PROPOSED EASTBOUND TRACK ALIGNMENT. NEGATIVE BOREHOLE OFFSETS REPRESENT THE DISTANCE, IN FEET, TO THE NORTH OR WEST OF THE PROPOSED EASTBOUND TRACK ALIGNMENT.
5. GROUNDWATER LEVEL IS TAKEN FROM REPORT TITLED "CONTRACT E360 GEOTECHNICAL BASELINE REPORT, FINAL RFP SUBMITTAL" PREPARED BY HJH FINAL DESIGN PARTNERS, DATED 24 JUNE 2015.

LEGEND:

INTERPRETED GEOLOGIC CONTACT

INTERPRETED TOP OF GLACIALLY OVERIDDEN DEPOSITS

GROUND WATER LEVEL

NON OVERRIDDEN DEPOSITS:

ENF RGD RCS ROD

GLACIALLY OVERRIDDEN DEPOSITS:

CSG TLD CSF CCS

15 7.5 0 15 30
VERT. FEET

40 20 0 40 80
HORIZ. FEET

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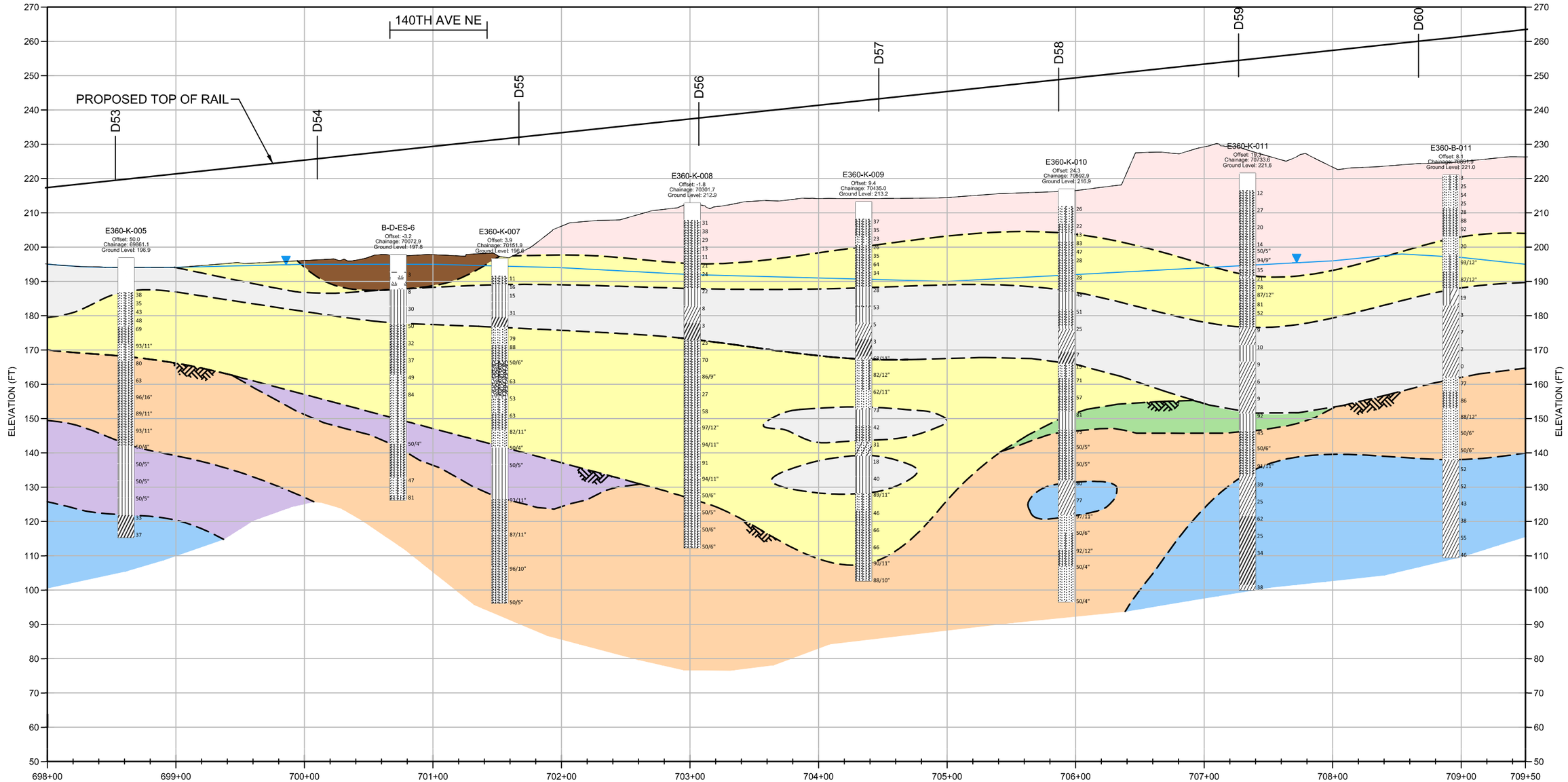
GEOTECHNICAL DATA AND DESIGN REPORT
SUBSURFACE PROFILE - A
START TO EB STA 698+00
FIGURE 12

03/15/17 | 2:58 PM | SLA
I:\5480.0 E360 FINAL DESIGN PHASE\CAD\EXHIBITS\GDDR\FINALS 100 DESIGN\E360-GDDR-FIG-11.DWG



EASTBOUND STATION

NOTES:

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3. GROUND SURFACE SHOWN ON THE PROFILE IS APPROXIMATE CENTERLINE OF THE PROPOSED EASTBOUND TRACK ALIGNMENT.
4. POSITIVE BOREHOLE OFFSETS REPRESENT THE DISTANCE, IN FEET, TO THE SOUTH OR EAST OF THE PROPOSED EASTBOUND TRACK ALIGNMENT. NEGATIVE BOREHOLE OFFSETS REPRESENT THE DISTANCE, IN FEET, TO THE NORTH OR WEST OF THE PROPOSED EASTBOUND TRACK ALIGNMENT.
5. GROUNDWATER LEVEL IS TAKEN FROM REPORT TITLED "CONTRACT E360 GEOTECHNICAL BASELINE REPORT, FINAL RFP SUBMITTAL" PREPARED BY HJH FINAL DESIGN PARTNERS, DATED 24 JUNE 2015.

LEGEND:

INTERPRETED GEOLOGIC CONTACT

INTERPRETED TOP OF GLACIALLY OVERIDDEN DEPOSITS

GROUND WATER LEVEL

NON OVERRIDDEN DEPOSITS:

ENF RGD RCS ROD

GLACIALLY OVERRIDDEN DEPOSITS:

CSG TLD CSF CCS

15 7.5 0 15 30
VERT. FEET

40 20 0 40 80
HORIZ. FEET

McMILLEN JACOBS ASSOCIATES

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

SOUNDTRANSIT

EAST LINK EXTENSION CONTRACT E360
GEOTECHNICAL DATA AND DESIGN REPORT
SUBSURFACE PROFILE - A
EB STA 698+00 TO EB STA 709+50
FIGURE 13

03/15/17 | 3:20 PM | SLA
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XREF LIST:
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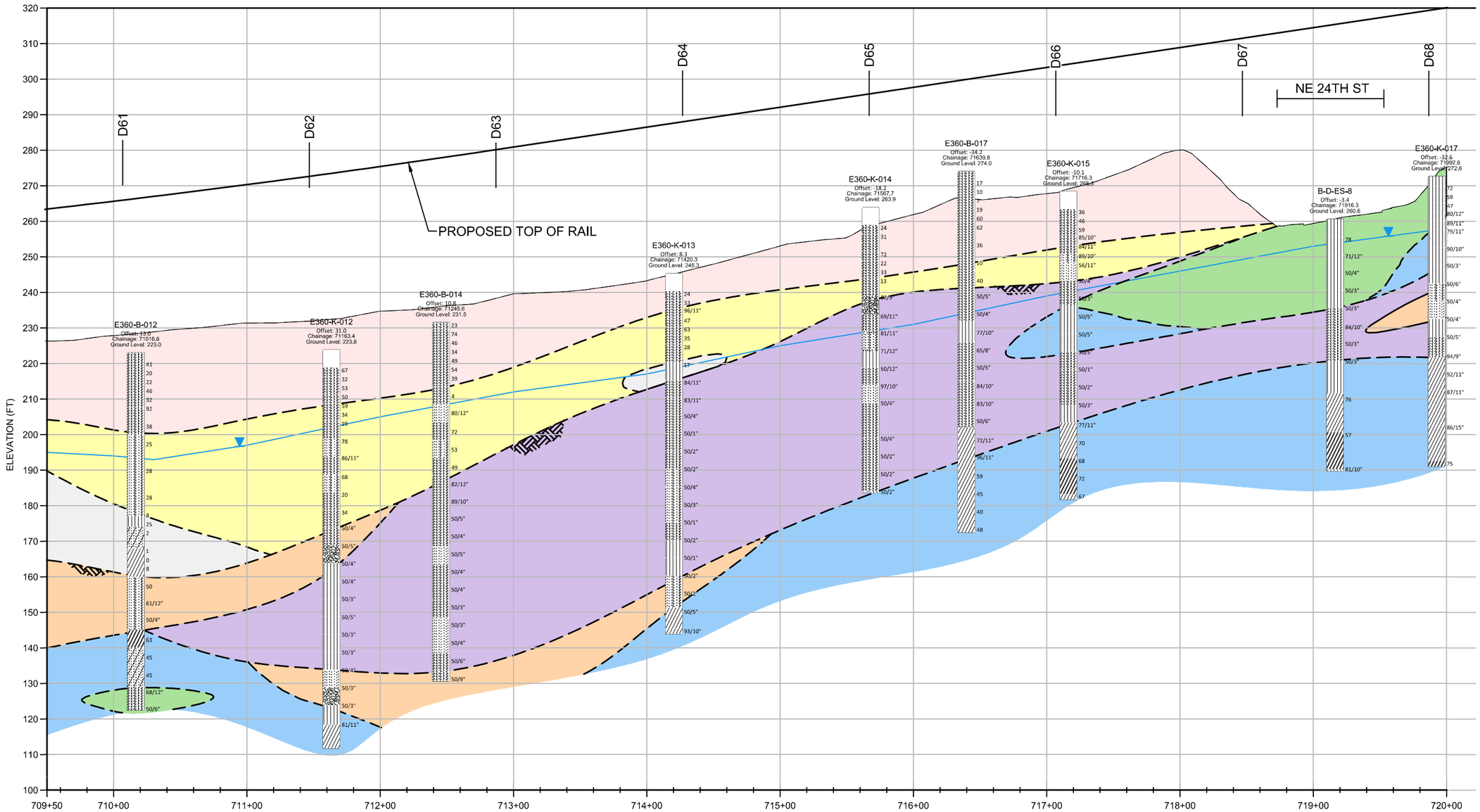
..\..\..\Xrefs\xE360-LBB-KAV100
..\..\..\Xrefs\xE360-LBB-SEE100
E360-FIG-13-GEO



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LEGEND:

INTERPRETED GEOLOGIC CONTACT

INTERPRETED TOP OF GLACIALLY OVERIDDEN DEPOSITS

GROUND WATER LEVEL

NON OVERRIDDEN DEPOSITS:
ENF RGD RCS ROD

GLACIALLY OVERRIDDEN DEPOSITS:
CSG TLD CSF CCS

15 7.5 0 15 30
VERT. FEET

40 20 0 40 80
HORIZ. FEET

McMILLEN JACOBS ASSOCIATES

SITE COPY
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BLDG-2018-00983, BLDG-2018-00985
SOUNDTRANSIT

EAST LINK EXTENSION CONTRACT E360
GEOTECHNICAL DATA AND DESIGN REPORT
SUBSURFACE PROFILE - A
EB STA 709+50 TO EB STA 720+00
FIGURE 14

02/02/17 | 2:28 PM | DMOORE
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XREF LIST:
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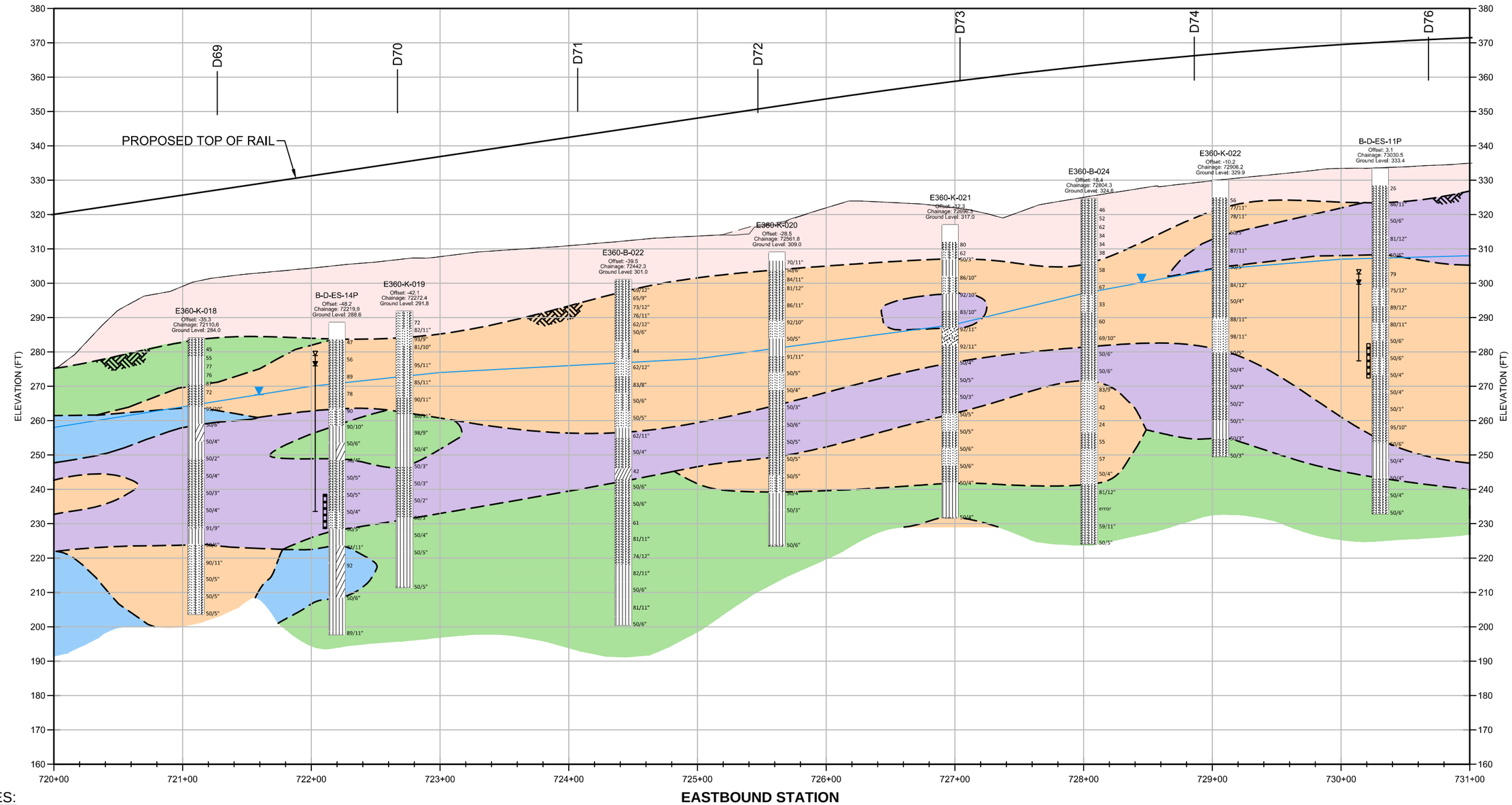
E360-FIG-14-GEO
..\..\..\Xrefs\xE360-L88-KAV100
..\..\..\Xrefs\xE360-L88-SEE100



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LEGEND:

INTERPRETED GEOLOGIC CONTACT

INTERPRETED TOP OF GLACIALLY OVERIDDEN DEPOSITS

GROUND WATER LEVEL

NON OVERRIDDEN DEPOSITS:

ENF RGD RCS ROD

GLACIALLY OVERRIDDEN DEPOSITS:

CSG TLD CSF CCS

15 7.5 0 15 30
VERT. FEET

40 20 0 40 80
HORIZ. FEET

McMILLEN JACOBS ASSOCIATES

SITE COPY
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BLDG-2018-00983, BLDG-2018-00985
SOUNDTRANSIT

EAST LINK EXTENSION CONTRACT E360
GEOTECHNICAL DATA AND DESIGN REPORT
SUBSURFACE PROFILE - A
EB STA720+00 TO EB STA 731+00
FIGURE 15

03/15/17 | 4:28 PM | SLA
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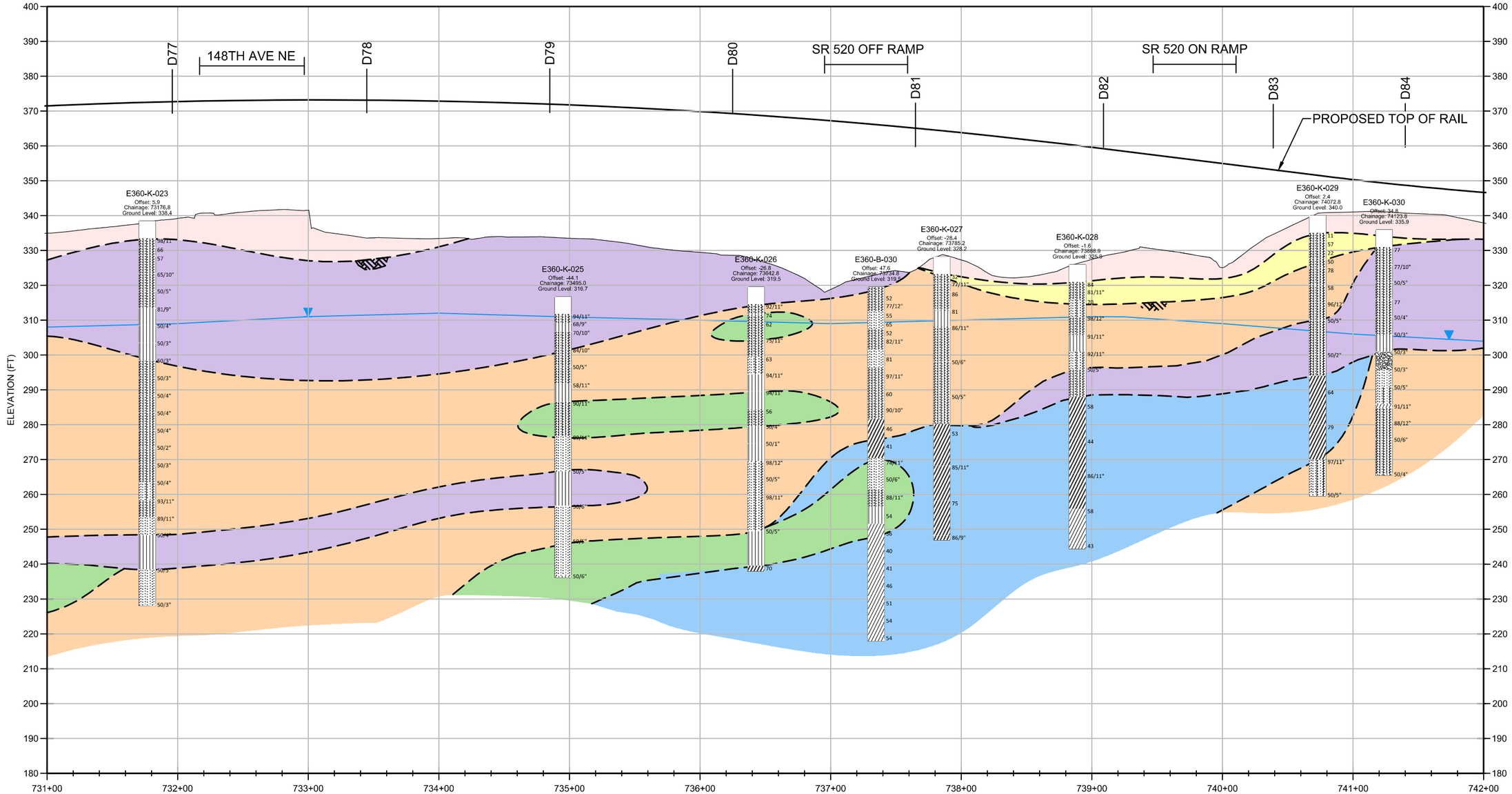
XREF LIST:
xE360-FIG-T822x34
E360-FIG-14
E360-FIG-15-GEO - NEW2
..\..\..\Xrefs\xE360-L88-KAV100
..\..\..\Xrefs\xE360-L88-SEE100



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LEGEND:

INTERPRETED GEOLOGIC CONTACT

INTERPRETED TOP OF GLACIALLY OVERIDDEN DEPOSITS

GROUND WATER LEVEL

NON OVERRIDDEN DEPOSITS:

ENF | RGD | RCS | ROD

GLACIALLY OVERRIDDEN DEPOSITS:

CSG | TLD | CSF | CCS

15 7.5 0 15 30
VERT. FEET

40 20 0 40 80
HORIZ. FEET

McMILLEN JACOBS ASSOCIATES

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BLDG-2018-00983, BLDG-2018-00985
SOUNDTRANSIT

EAST LINK EXTENSION CONTRACT E360
GEOTECHNICAL DATA AND DESIGN REPORT
SUBSURFACE PROFILE - A
EB STA 731+00 TO EB STA 742+00
FIGURE 16

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XREF LIST:
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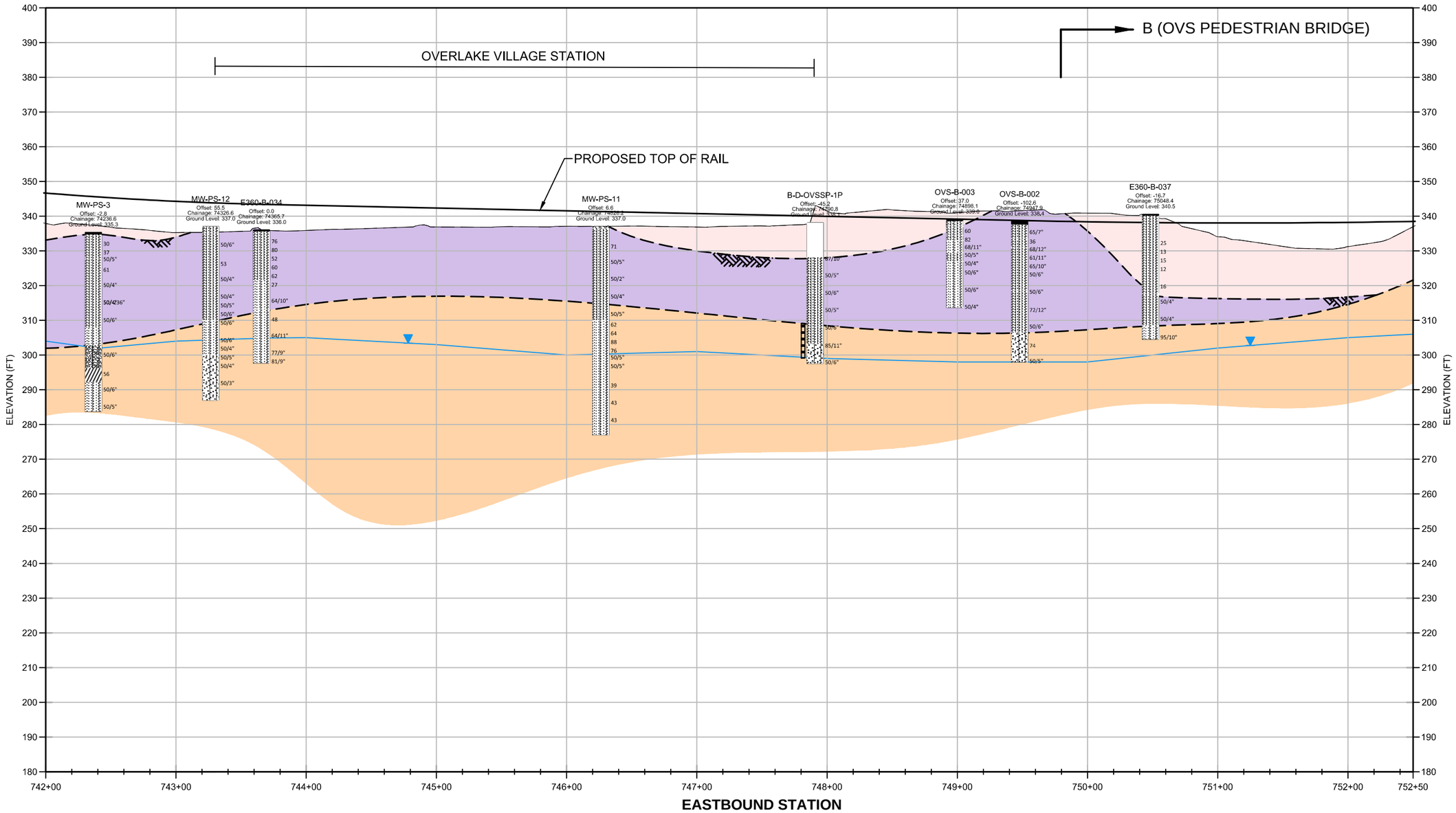
E360-FIG-16-GEO
..\..\..\Xrefs\xE360-L88-KAV100
..\..\..\Xrefs\xE360-L88-SEE100
E360-FIG-15
E360-FIG-14-GEO



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LEGEND:

INTERPRETED GEOLOGIC CONTACT

INTERPRETED TOP OF GLACIALLY OVERIDDEN DEPOSITS

GROUND WATER LEVEL

NON OVERRIDDEN DEPOSITS:

ENF | RGD | RCS | ROD

GLACIALLY OVERRIDDEN DEPOSITS:

CSG | TLD | CSF | CCS

15 7.5 0 15 30
VERT. FEET

40 20 0 40 80
HORIZ. FEET

McMILLEN JACOBS ASSOCIATES

SITE COPY
BLDG-2018-00887, BLDG-2018-00918, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985
SOUNDTRANSIT

EAST LINK EXTENSION CONTRACT E360
GEOTECHNICAL DATA AND DESIGN REPORT
SUBSURFACE PROFILE - A
EB STA 742+00 TO EB STA 752+50
FIGURE 17

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I:\5480.0 E360 FINAL DESIGN PHASE\CAD\EXHIBITS\GDDR\FINALS 100 DESIGN\E360-GDDR-FIG-16.DWG

XREF LIST:
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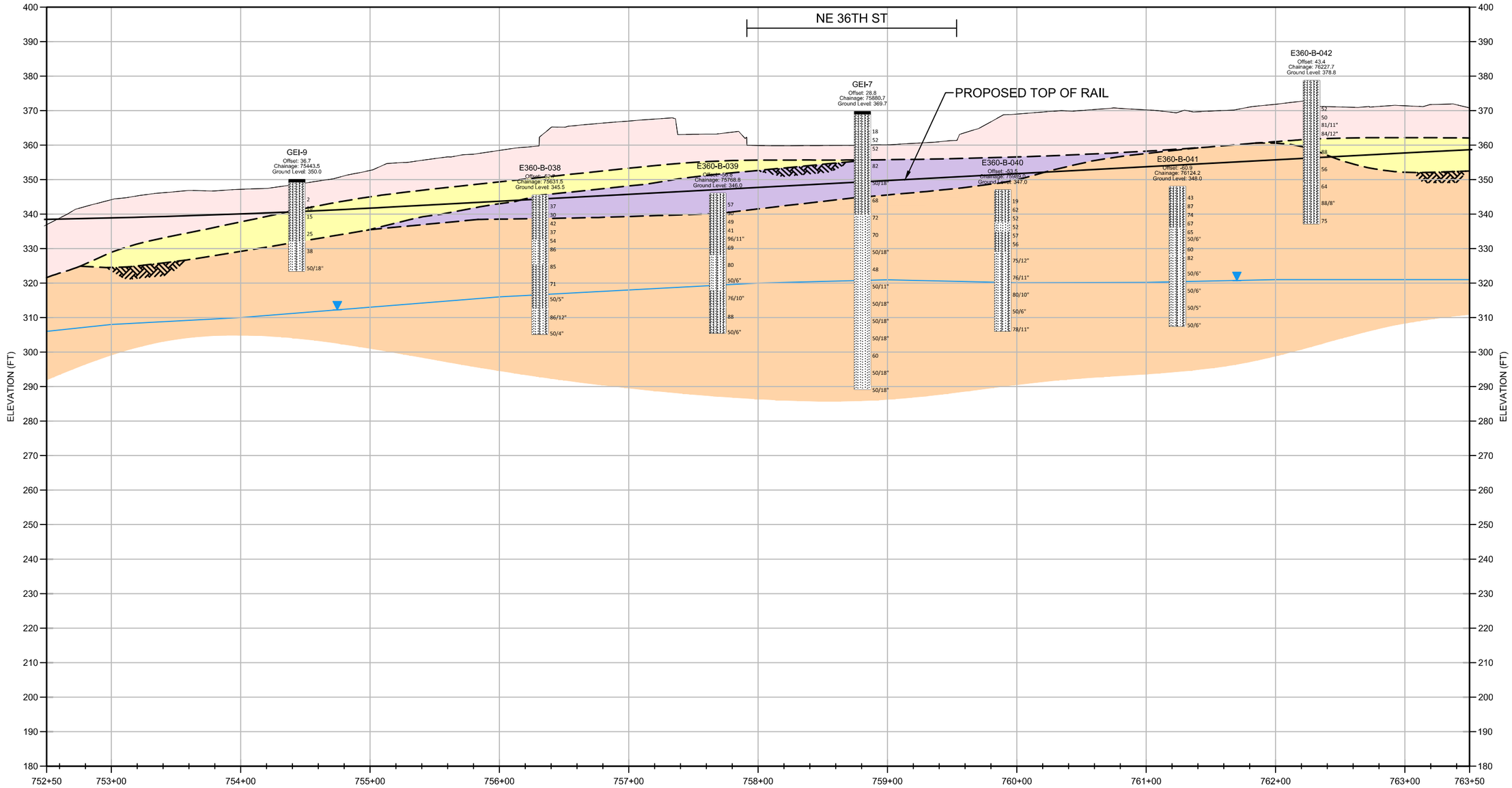
E360-FIG-17-GEO
;IE360-FIG-16
..\..\..\Xrefs\xE360-L88-KAV100
..\..\..\Xrefs\xE360-L88-SEE100



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LEGEND:

INTERPRETED GEOLOGIC CONTACT

INTERPRETED TOP OF GLACIALLY OVERIDDEN DEPOSITS

GROUND WATER LEVEL

NON OVERRIDDEN DEPOSITS:

ENF RGD RCS ROD

GLACIALLY OVERRIDDEN DEPOSITS:

CSG TLD CSF CCS

15 7.5 0 15 30
VERT. FEET

40 20 0 40 80
HORIZ. FEET

McMILLEN JACOBS ASSOCIATES

SITE COPY
BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985
SOUNDTRANSIT

EAST LINK EXTENSION CONTRACT E360
GEOTECHNICAL DATA AND DESIGN REPORT
SUBSURFACE PROFILE - A
EB STA 752+50 TO EB STA 763+50
FIGURE 18

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XREF LIST:
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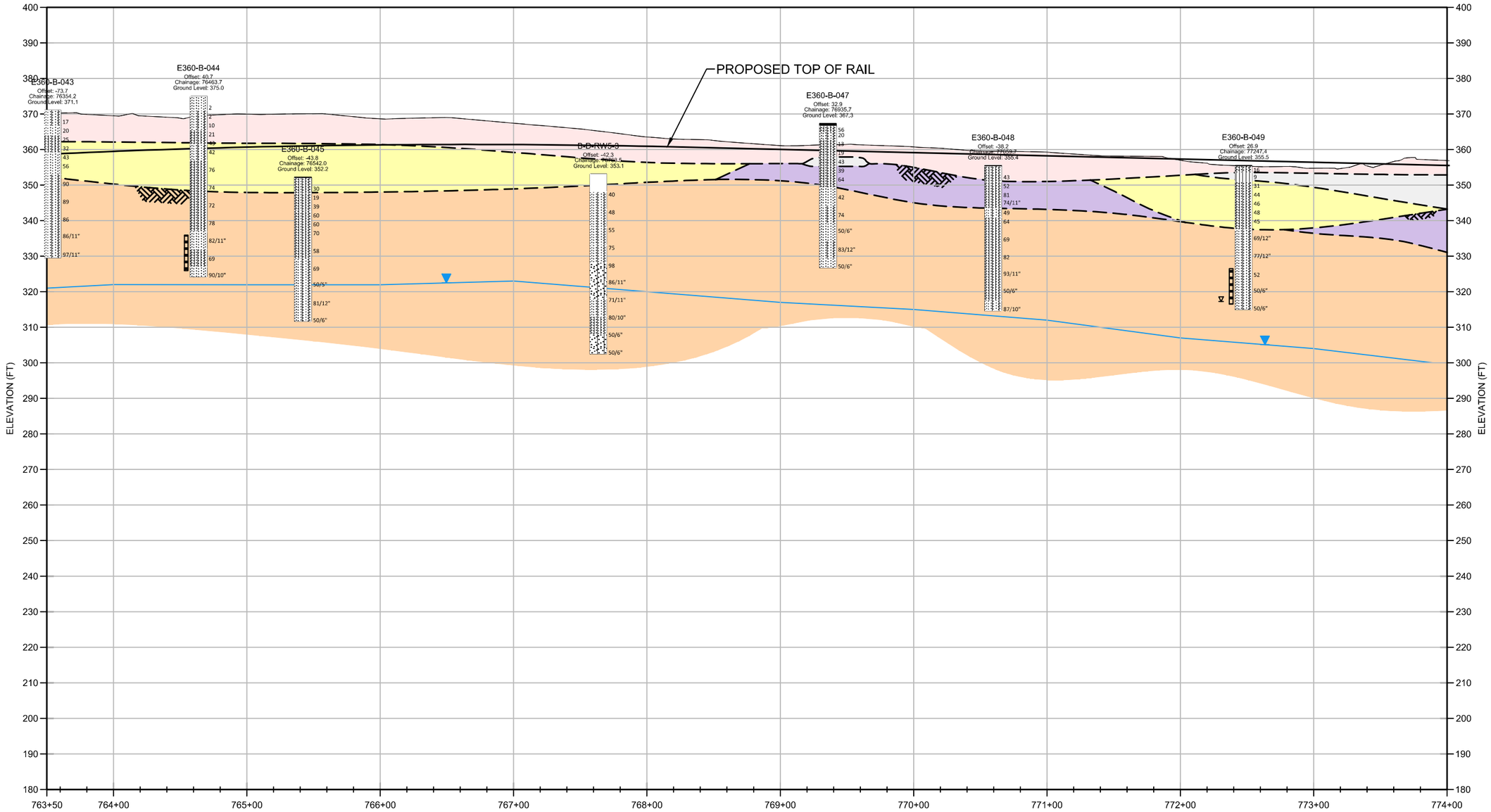
E360-FIG-18-GEO
..\..\..\Xrefs\xE360-L88-KAV100
..\..\..\Xrefs\xE360-L88-SEE100



EASTBOUND STATION

NOTES:

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LEGEND:

INTERPRETED GEOLOGIC CONTACT

INTERPRETED TOP OF GLACIALLY OVERIDDEN DEPOSITS

GROUND WATER LEVEL

NON OVERRIDDEN DEPOSITS:

ENF RGD RCS ROD

GLACIALLY OVERRIDDEN DEPOSITS:

CSG TLD CSF CCS

15 7.5 0 15 30
VERT. FEET

40 20 0 40 80
HORIZ. FEET

McMILLEN JACOBS ASSOCIATES

SITE COPY
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BLDG-2018-00983, BLDG-2018-00985

SOUNDTRANSIT

EAST LINK EXTENSION CONTRACT E360
GEOTECHNICAL DATA AND DESIGN REPORT
SUBSURFACE PROFILE - A
EB STA 763+50 TO EB STA 774+00
FIGURE 19

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XREF LIST:
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E360-FIG-19-QEO
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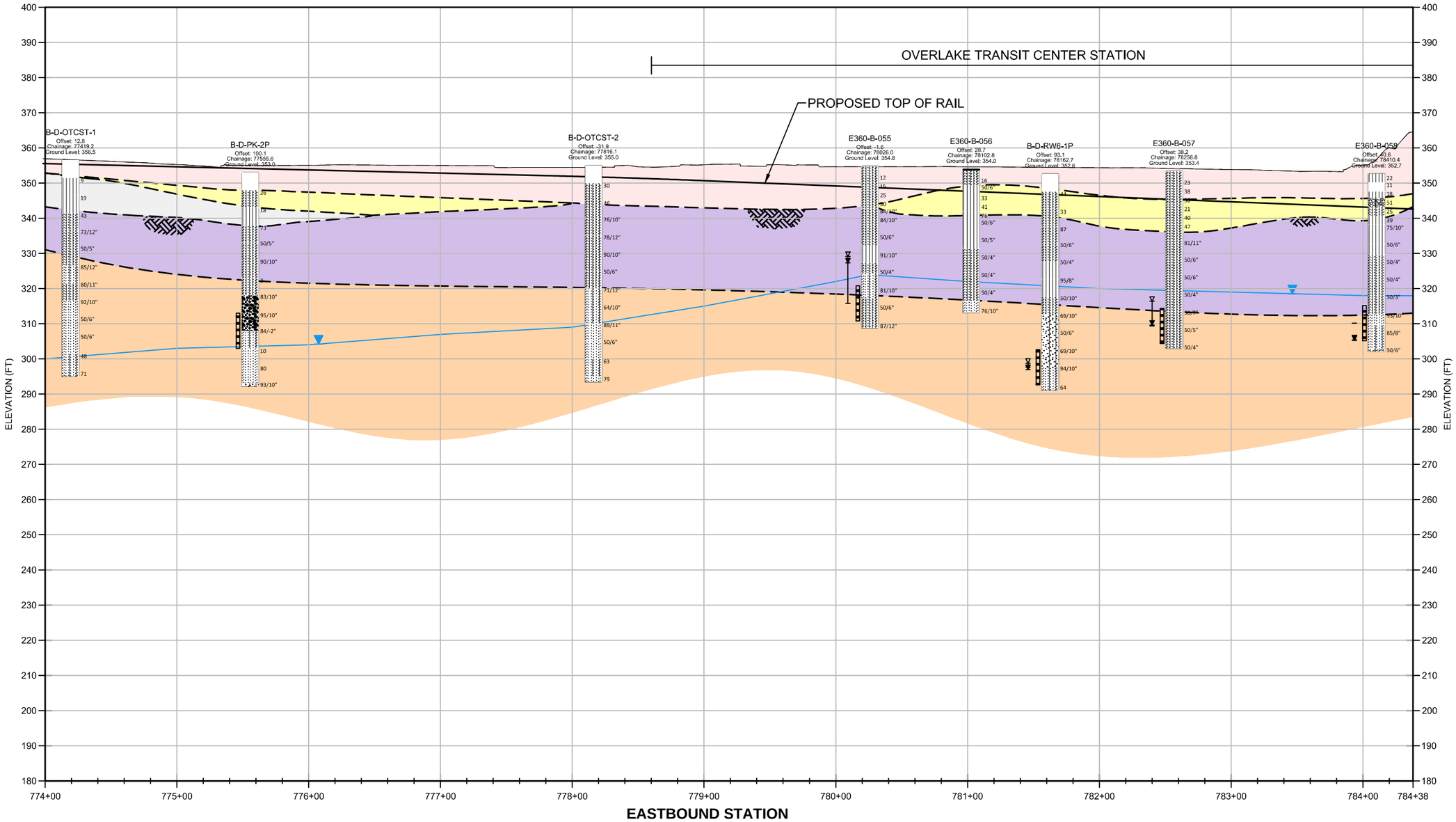
..\..\..\Xrefs\xE360-L88-SEE100



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LEGEND:

INTERPRETED GEOLOGIC CONTACT

INTERPRETED TOP OF GLACIALLY OVERIDDEN DEPOSITS

GROUND WATER LEVEL

NON OVERRIDDEN DEPOSITS:

ENF RGD RCS ROD

GLACIALLY OVERRIDDEN DEPOSITS:

CSG TLD CSF CCS

15 7.5 0 15 30
VERT. FEET

40 20 0 40 80
HORIZ. FEET

McMILLEN JACOBS ASSOCIATES

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BLDG-2018-00983, BLDG-2018-00985
SOUNDTRANSIT

EAST LINK EXTENSION CONTRACT E360
GEOTECHNICAL DATA AND DESIGN REPORT
SUBSURFACE PROFILE - A
EB STA 774+00 TO OTC STATION
FIGURE 20

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XREF LIST:
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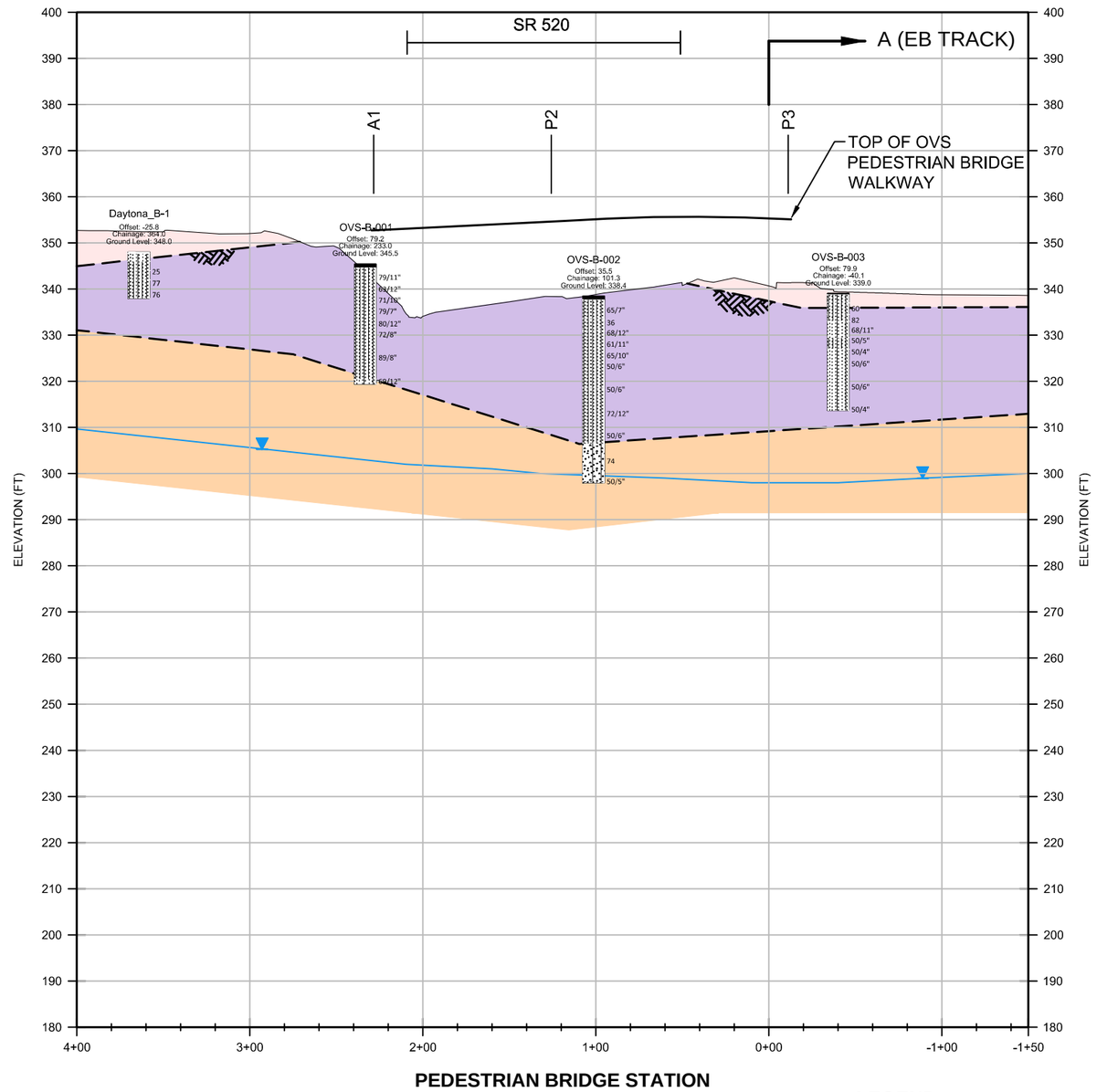
E360-FIG-21-GEO



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LEGEND:

INTERPRETED GEOLOGIC CONTACT

INTERPRETED TOP OF GLACIALLY OVERIDDEN DEPOSITS

GROUND WATER LEVEL

NON OVERRIDDEN DEPOSITS:

ENF | RGD | RCS | ROD

GLACIALLY OVERRIDDEN DEPOSITS:

CSG | TLD | CSF | CCS

15 7.5 0 15 30
VERT. FEET

40 20 0 40 80
HORIZ. FEET

McMILLEN JACOBS ASSOCIATES

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BLDG-2018-00983, BLDG-2018-00985
SOUNDTRANSIT

EAST LINK EXTENSION CONTRACT E360
GEOTECHNICAL DATA AND DESIGN REPORT
SUBSURFACE PROFILE - B
OVERLAKE VILLAGE PEDESTRIAN BRIDGE
FIGURE 21

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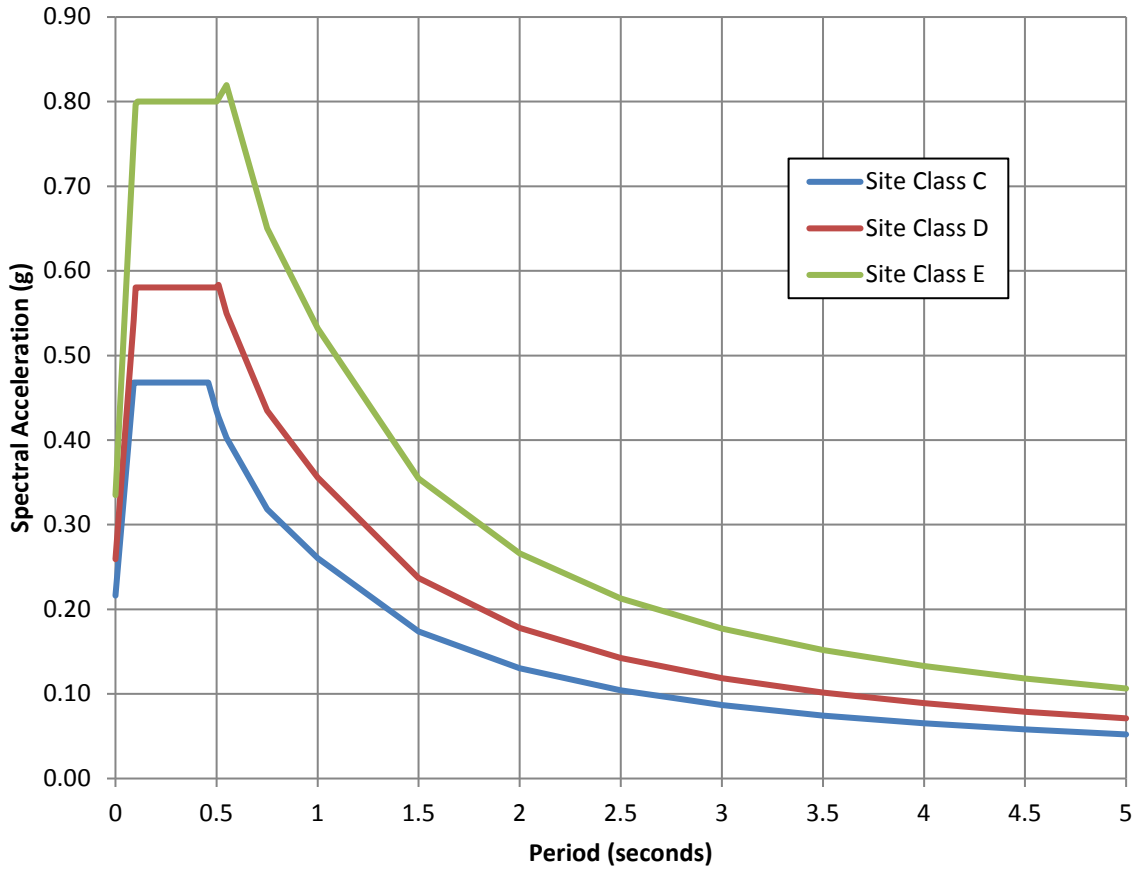
Site Class	C	D	E
F_{PGA}	1.2	1.44	1.86
F_a	1.2	1.49	2.05
F_v	1.67	2.28	3.41
A_s (PGA)	0.22	0.26	0.33
S_{DS}	0.47	0.58	0.80
S_{D1}	0.22	0.30	0.44
T_s (sec)	0.46	0.51	0.55
T_0 (sec)	0.09	0.10	0.11



NOTE: At periods greater than 0.5 seconds, spectral response includes near-source adjustment factor per Sound Transit Design Criteria Manual, Section 8A.5.2.1

Tabulated Data

Period (sec)	0	0.09	0.1	0.11	0.46	0.5	0.51	0.55	0.75	1	1.5	2	2.5	3	3.5	4	4.5	5
Site Class C	0.22	0.47	0.47	0.47	0.47	0.43	0.43	0.40	0.32	0.26	0.17	0.13	0.10	0.09	0.07	0.07	0.06	0.05
Site Class D	0.26	0.54	0.58	0.58	0.58	0.58	0.58	0.55	0.43	0.36	0.24	0.18	0.14	0.12	0.10	0.09	0.08	0.07
Site Class E	0.33	0.75	0.80	0.80	0.80	0.80	0.80	0.82	0.65	0.53	0.35	0.27	0.21	0.18	0.15	0.13	0.12	0.11

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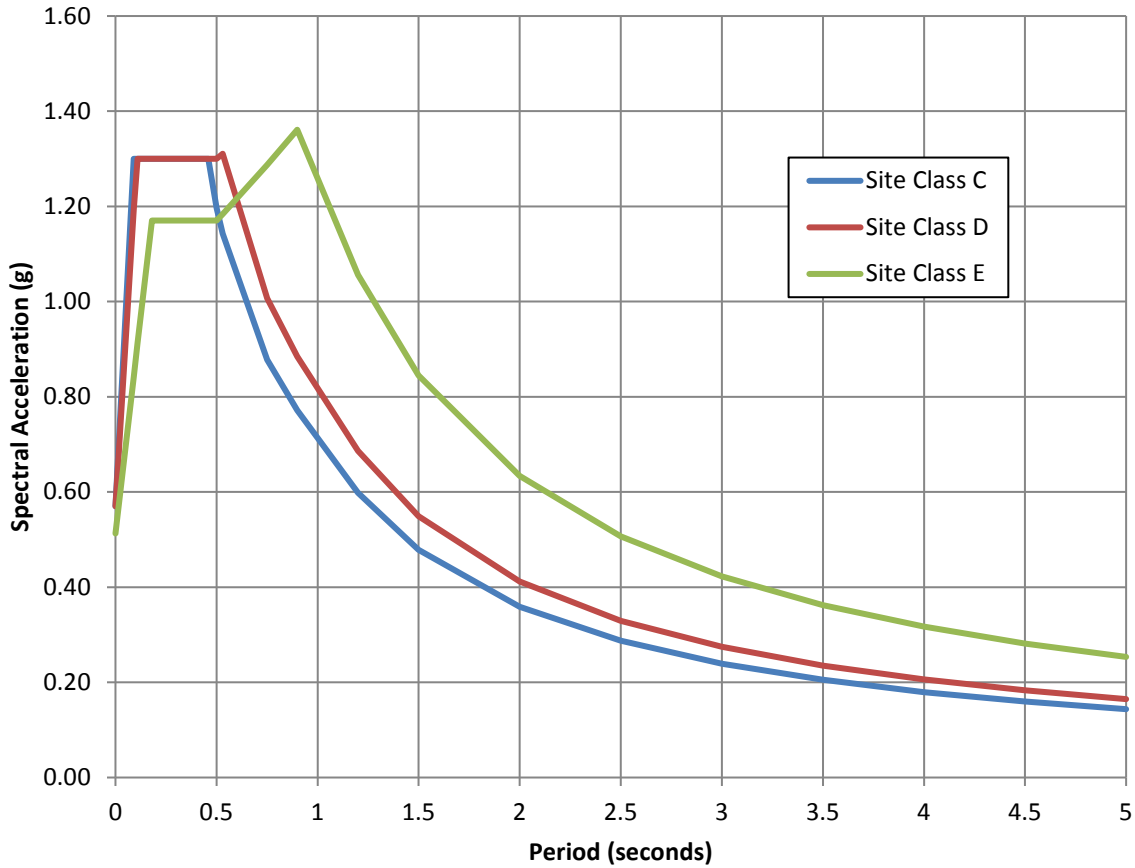
BLDG-2018-00983, BLDG-2018-00985

Figure 22
Acceleration Response Spectra
Operating Design Earthquake (ODE)

Site Class	C	D	E
F_{PGA}	1.00	1.00	0.90
F_a	1.00	1.00	0.90
F_v	1.36	1.56	2.40
A_s (PGA)	0.57	0.57	0.51
S_{DS}	1.30	1.30	1.17
S_{D1}	0.60	0.69	1.06
T_s (sec)	0.46	0.53	0.90
T_0 (sec)	0.09	0.11	0.18



NOTE: At periods greater than 0.5 seconds, spectral response includes near-source adjustment factor per Sound Transit Design Criteria Manual, Section 8A.5.2.1

Tabulated Data

Period (sec)	0	0.09	0.11	0.18	0.46	0.5	0.53	0.75	0.9	1.2	1.5	2	2.5	3	3.5	4	4.5	5
Site Class C	0.57	1.30	1.30	1.30	1.30	1.20	1.14	0.88	0.77	0.60	0.48	0.36	0.29	0.24	0.21	0.18	0.16	0.14
Site Class D	0.57	1.19	1.30	1.30	1.30	1.30	1.31	1.01	0.88	0.69	0.55	0.41	0.33	0.27	0.24	0.21	0.18	0.16
Site Class E	0.51	0.84	0.91	1.17	1.17	1.17	1.18	1.29	1.36	1.06	0.84	0.63	0.51	0.42	0.36	0.32	0.28	0.25

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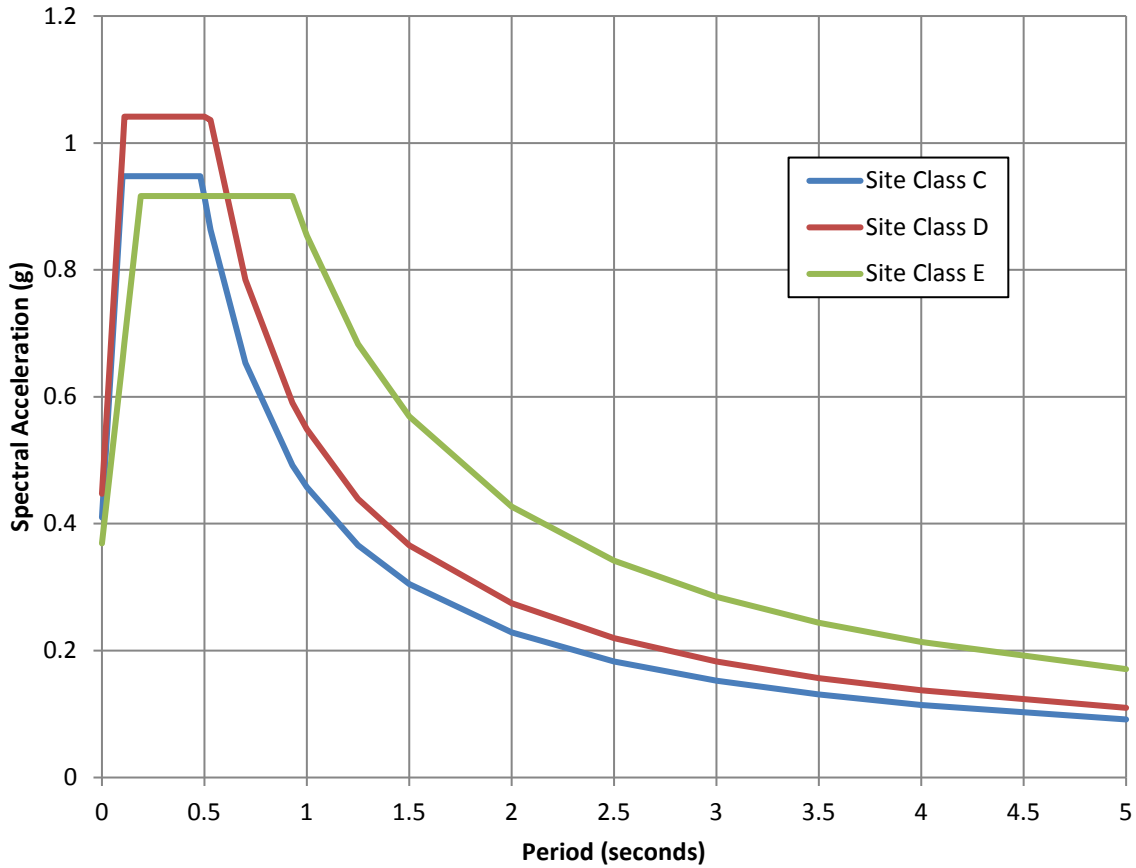
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 23
Acceleration Response Spectra
Maximum Design Earthquake (MDE)

Site Class	C	D	E
F_{PGA}	1.00	1.09	0.90
F_a	1.03	1.13	1.00
F_v	1.50	1.80	2.80
A_s (PGA)	0.41	0.45	0.37
S_{DS}	0.95	1.04	0.92
S_{D1}	0.46	0.55	0.85
T_s (sec)	0.48	0.53	0.93
T_0 (sec)	0.10	0.11	0.19



Tabulated Data

Period (sec)	0	0.1	0.11	0.19	0.48	0.5	0.53	0.7	0.93	1	1.25	1.5	2	2.5	3	3.5	4	5
Site Class C	0.41	0.95	0.95	0.95	0.95	0.92	0.86	0.65	0.49	0.46	0.37	0.31	0.23	0.18	0.15	0.13	0.11	0.09
Site Class D	0.45	0.99	1.04	1.04	1.04	1.04	1.04	0.78	0.59	0.55	0.44	0.37	0.27	0.22	0.18	0.16	0.14	0.11
Site Class E	0.37	0.66	0.69	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.68	0.57	0.43	0.34	0.28	0.24	0.21	0.17

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SITE COPY
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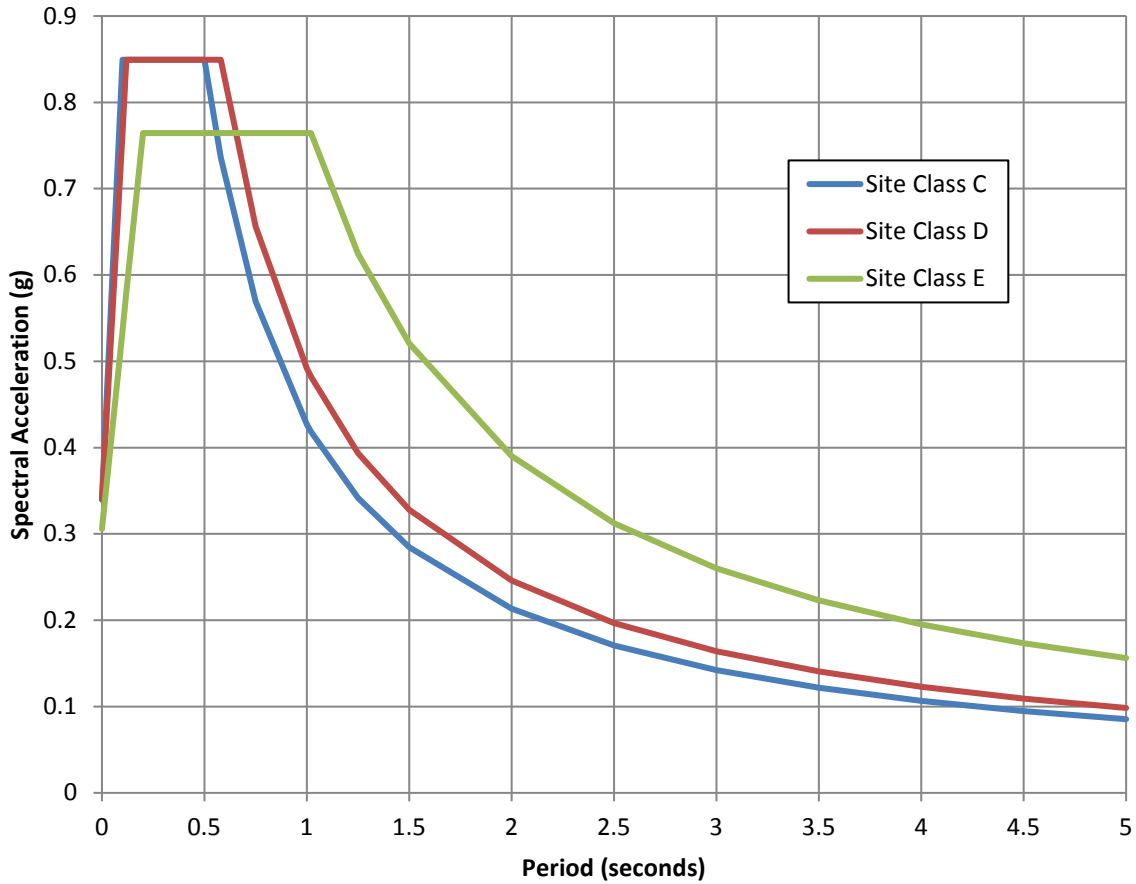
BLDG-2018-00983, BLDG-2018-00985

Figure 24
Acceleration Response Spectra
AASHTO BDS (1,000-yr Return Period)

Site Class	C	D	E
F_a	1.00	1.00	0.90
F_v	1.31	1.51	2.40
S_{MS}	1.27	1.27	1.15
S_{M1}	0.64	0.74	1.17
S_{DS}	0.85	0.85	0.76
S_{D1}	0.43	0.49	0.78
PGA (g)	0.34	0.34	0.31
T_s (sec)	0.50	0.58	1.02
T_0 (sec)	0.10	0.12	0.20
T_L (sec)	6	6	6



Tabulated Data

Period (sec)	0	0.1	0.12	0.2	0.5	0.58	0.75	1	1.02	1.25	1.5	2	2.5	3	3.5	4	4.5	5
Site Class C	0.34	0.85	0.85	0.85	0.85	0.74	0.57	0.43	0.42	0.34	0.28	0.21	0.17	0.14	0.12	0.11	0.09	0.09
Site Class D	0.34	0.76	0.85	0.85	0.85	0.85	0.66	0.49	0.48	0.39	0.33	0.25	0.20	0.16	0.14	0.12	0.11	0.10
Site Class E	0.31	0.54	0.58	0.76	0.76	0.76	0.76	0.76	0.76	0.62	0.52	0.39	0.31	0.26	0.22	0.20	0.17	0.16

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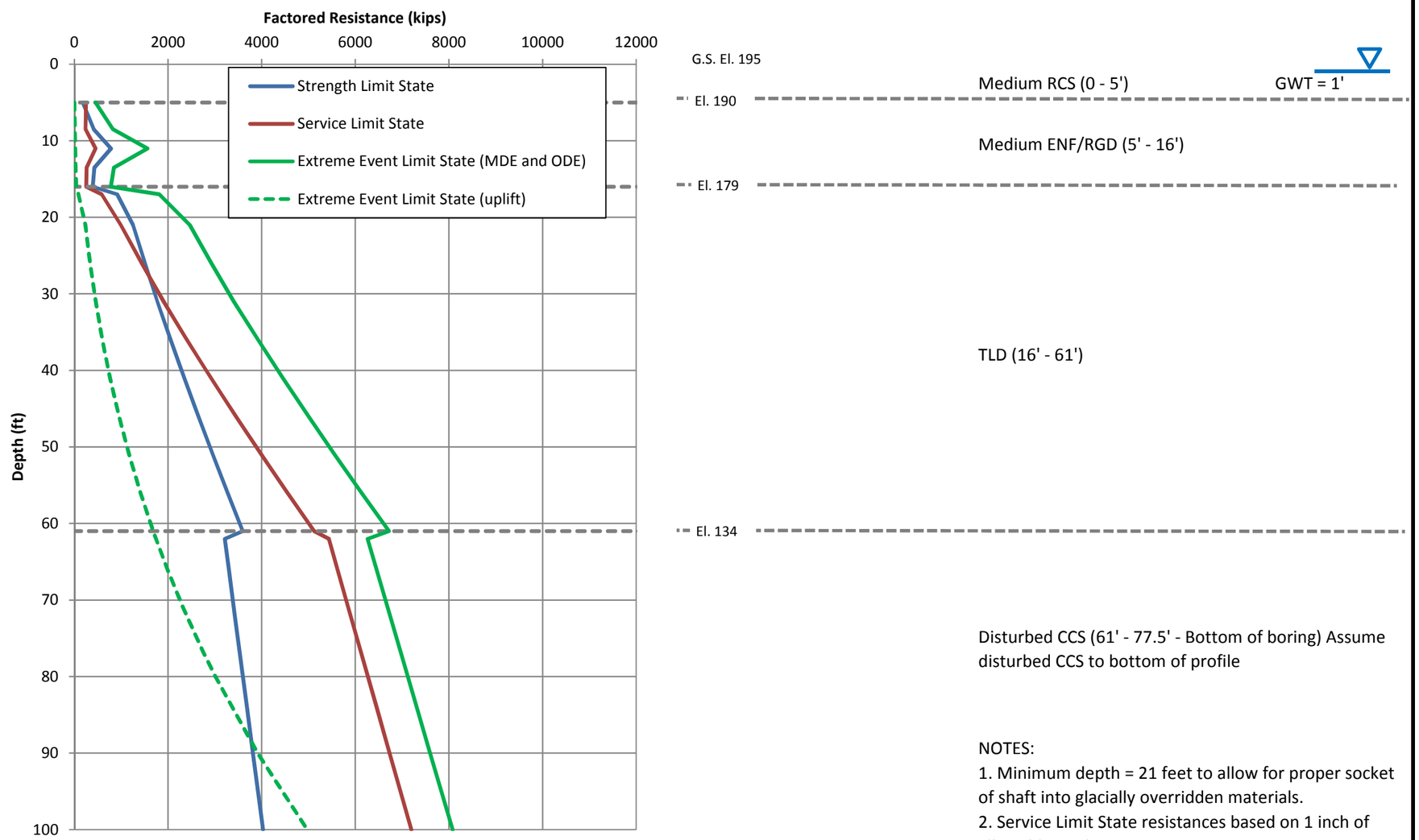
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 25
Acceleration Response Spectra
IBC

2.0 m Diameter Shaft



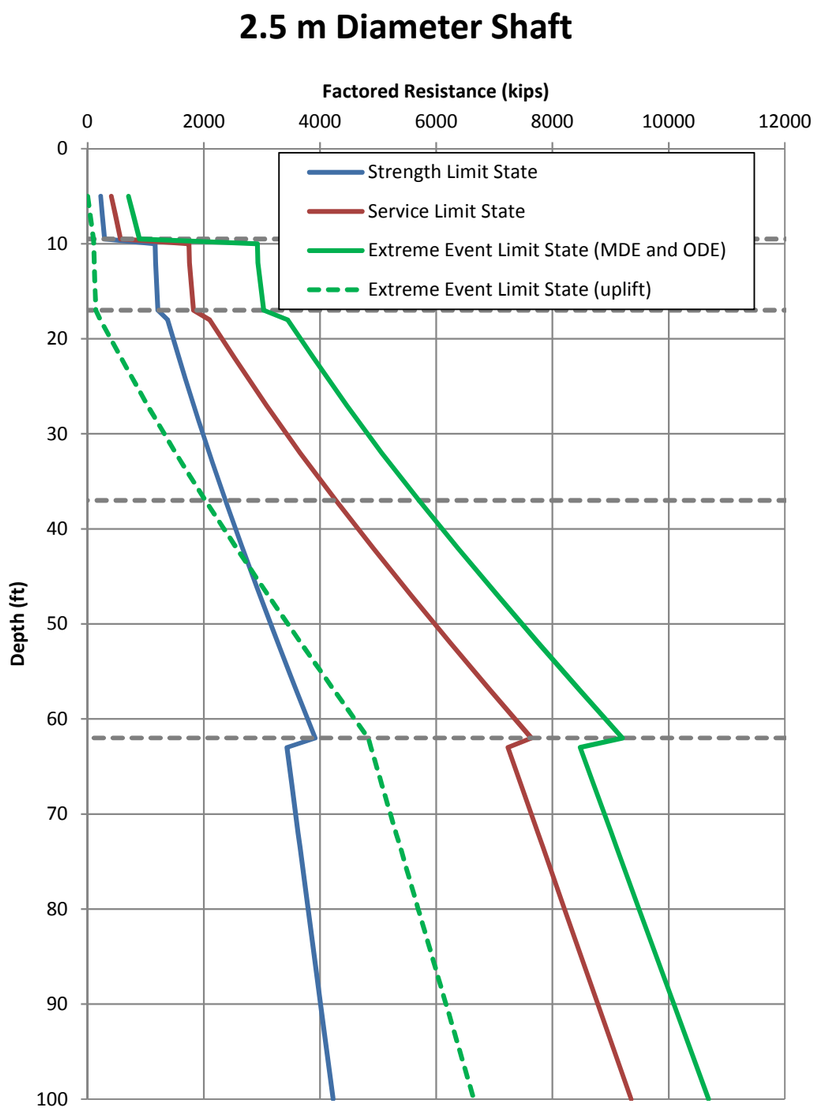
NOTES:
1. Minimum depth = 21 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

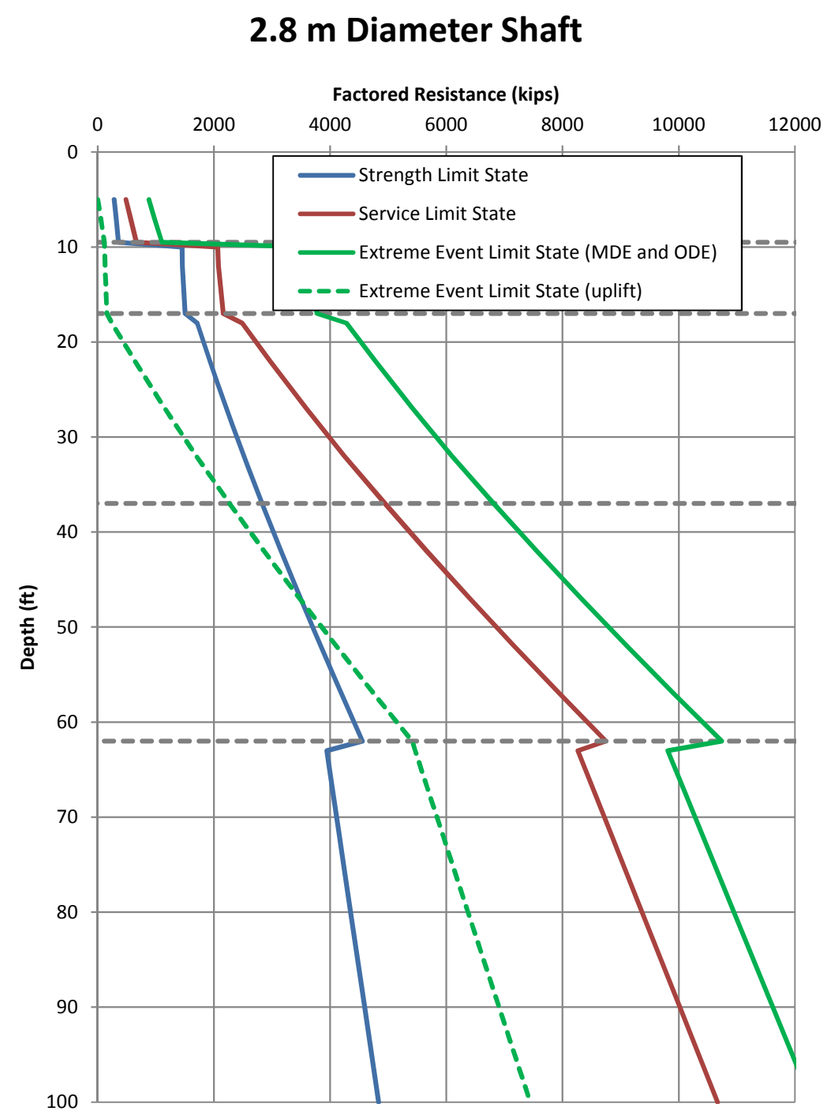
Bent D51 (Boring E360-K-003)

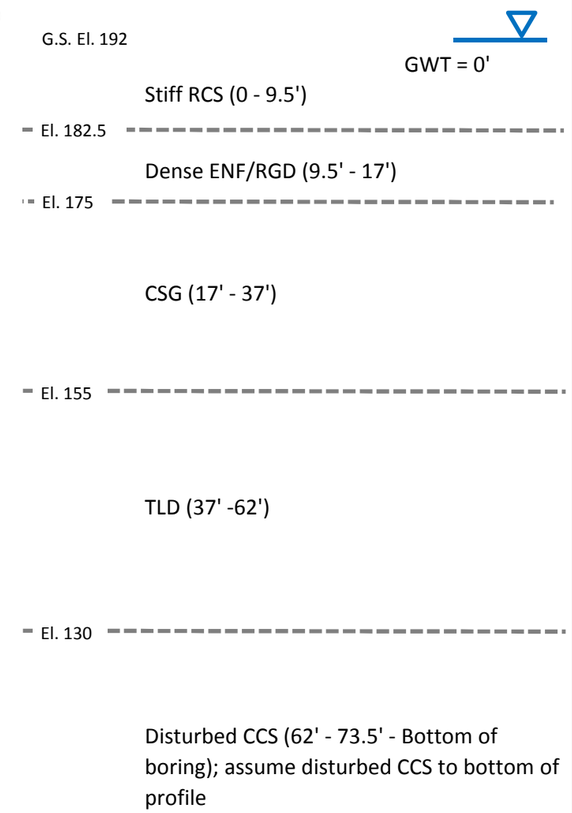
McMILLEN JACOBS ASSOCIATES

Figure 26
Factored Shaft Resistance
Bent D51

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985







NOTES:
1. Minimum depth = 22 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

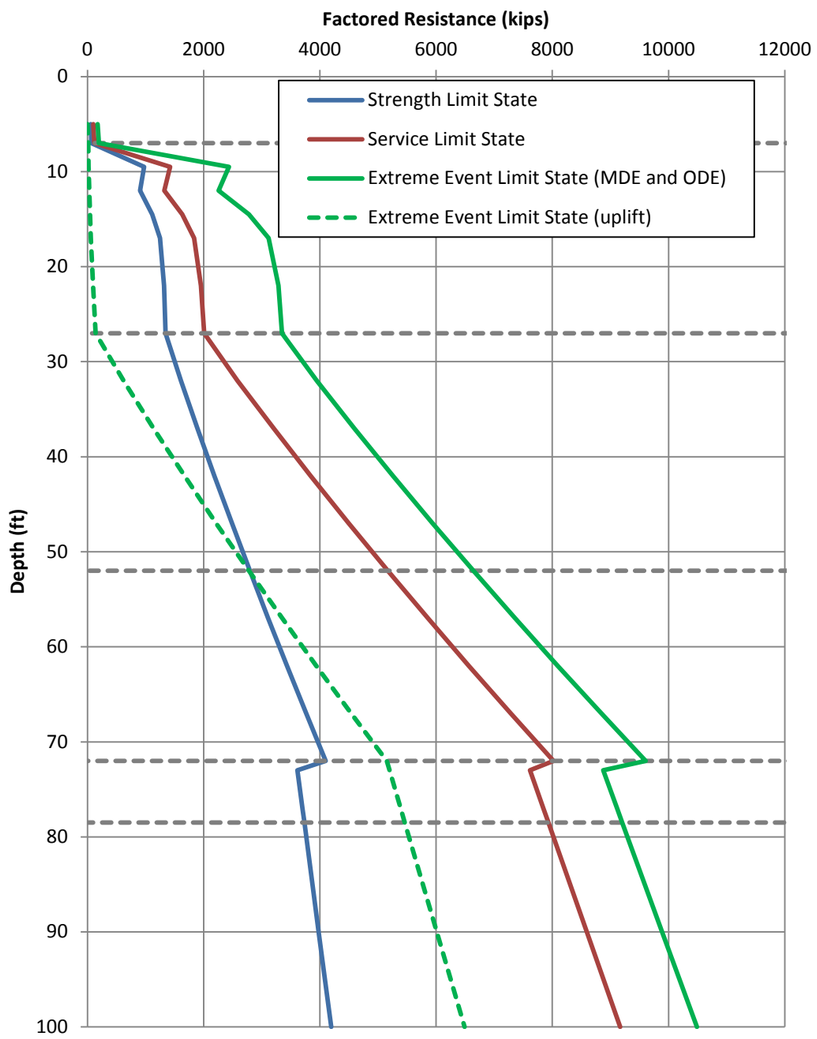
Bent D52 (Boring E360-K-004)

McMILLEN JACOBS ASSOCIATES

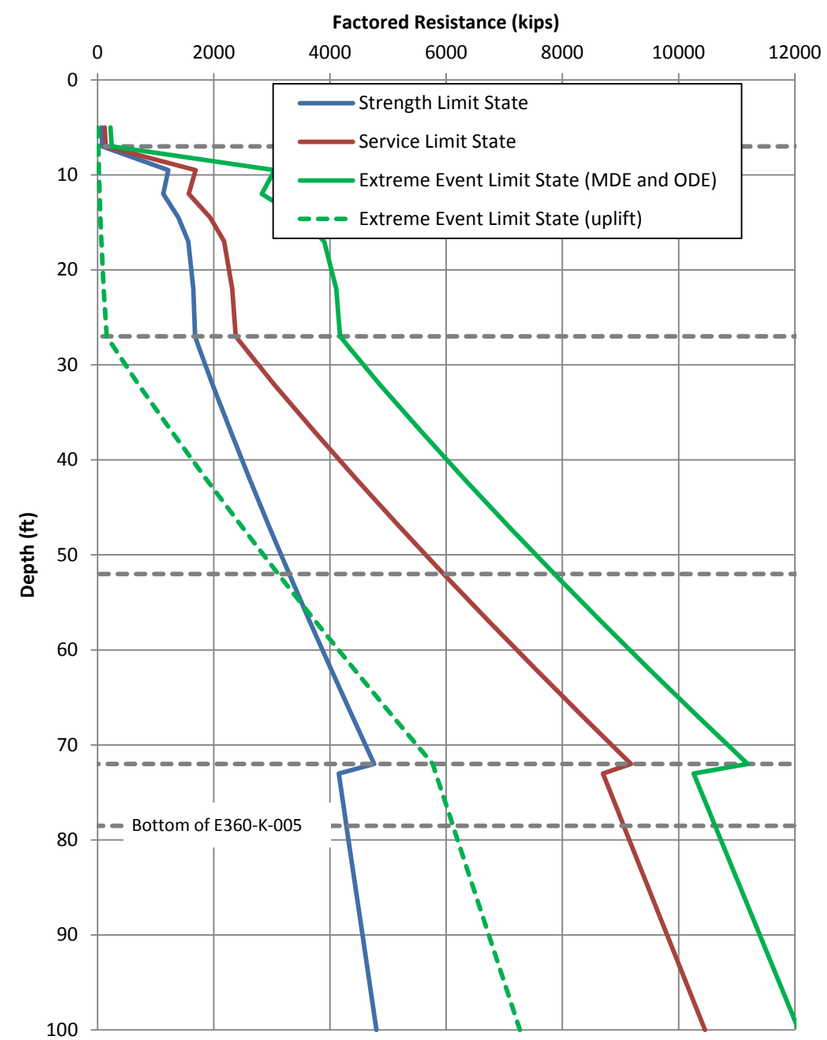
Figure 27
Factored Shaft Resistance
Bent D52

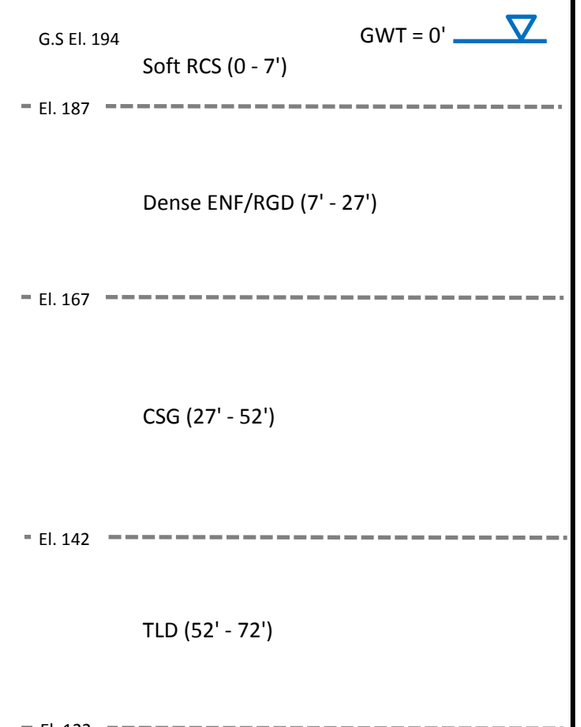
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft





NOTES:
1. Minimum depth = 32 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

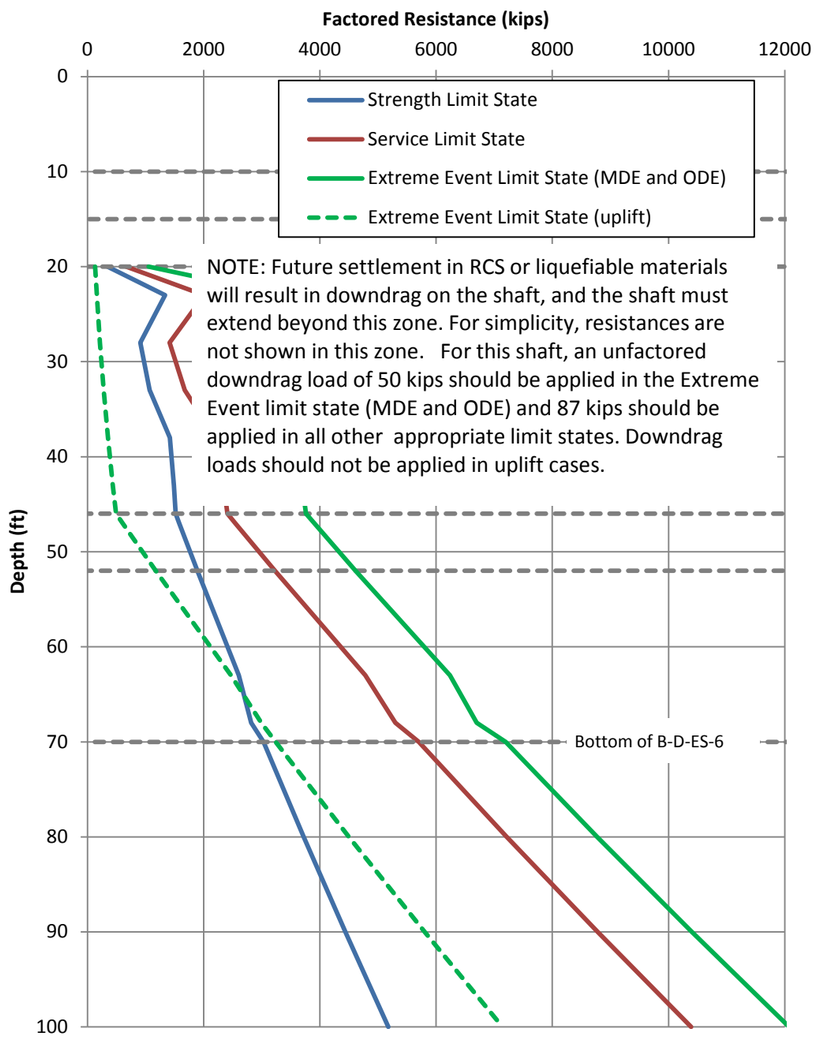
Bent D53 (Boring E360-K-005)

McMILLEN JACOBS ASSOCIATES

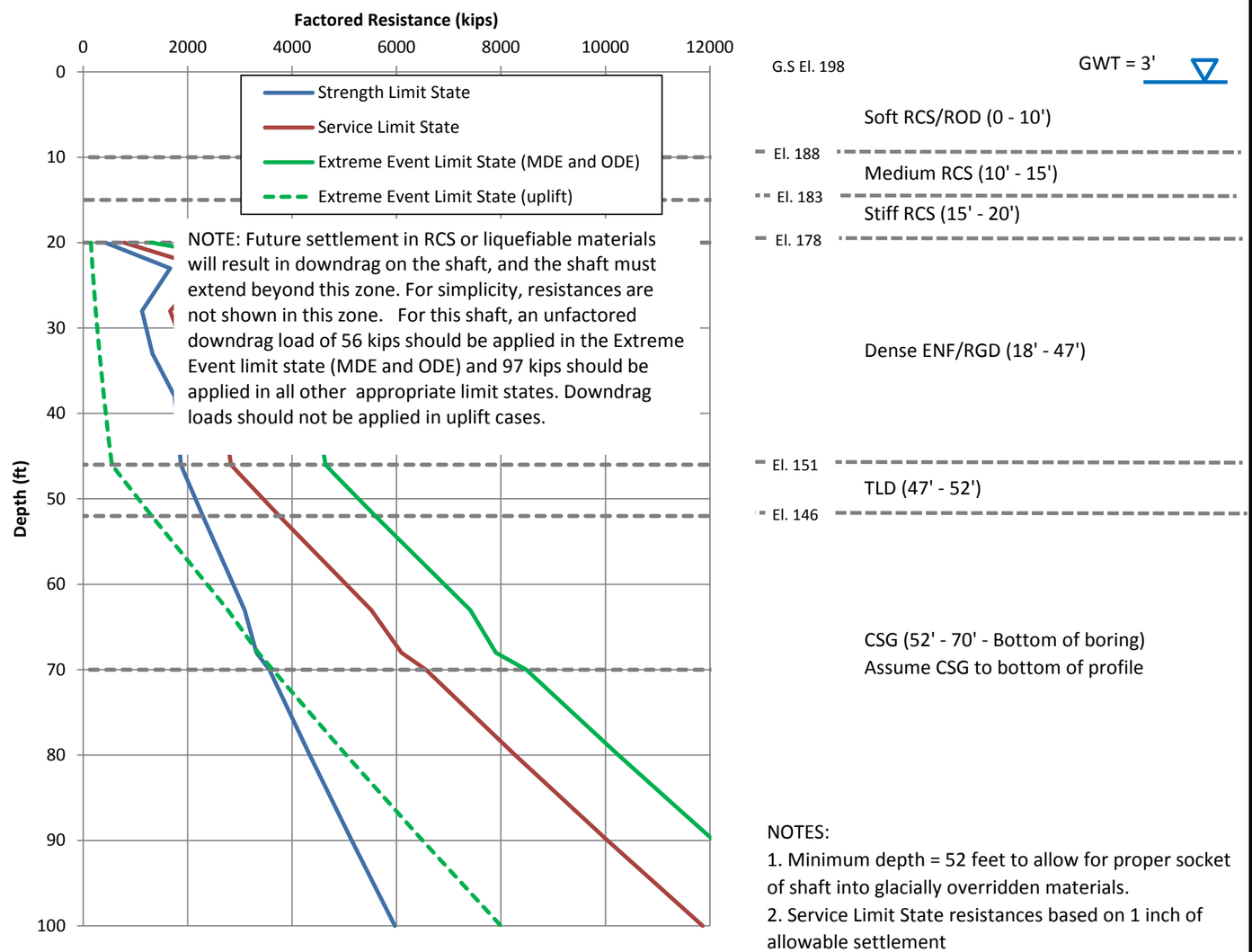
Figure 28
Factored Shaft Resistance
Bent D53

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft



NOTES:
1. Minimum depth = 52 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

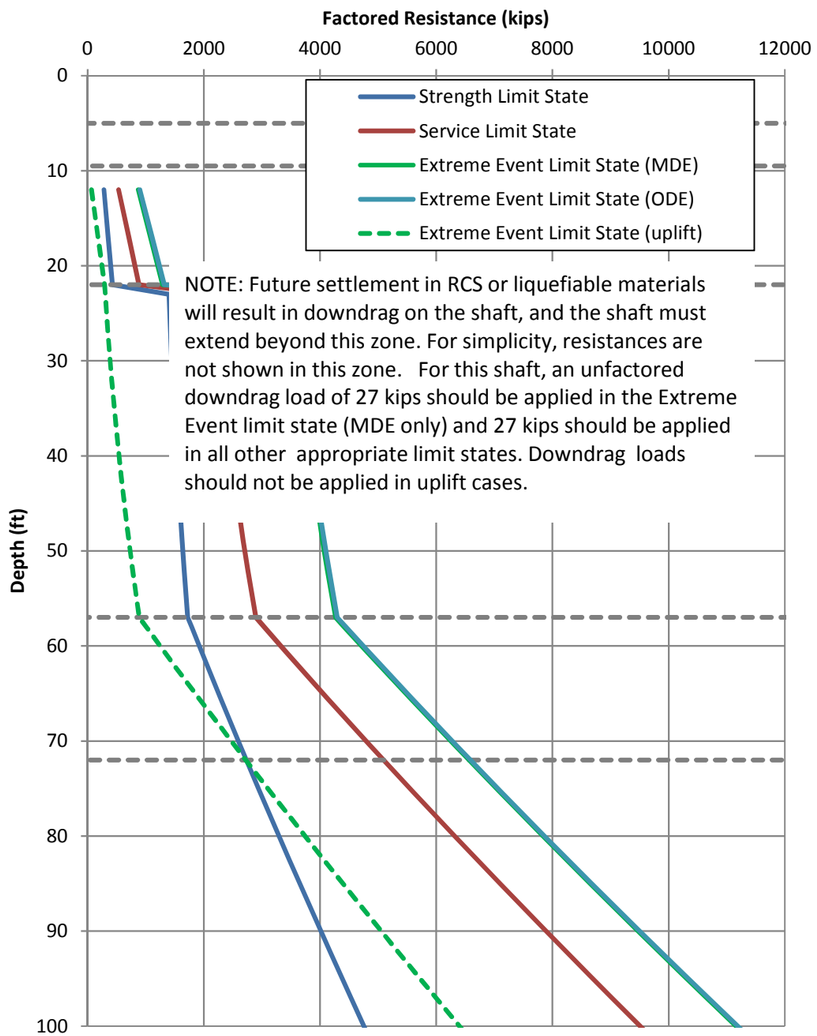
Bent D54 (Boring B-D-ES-6)

McMILLEN JACOBS ASSOCIATES

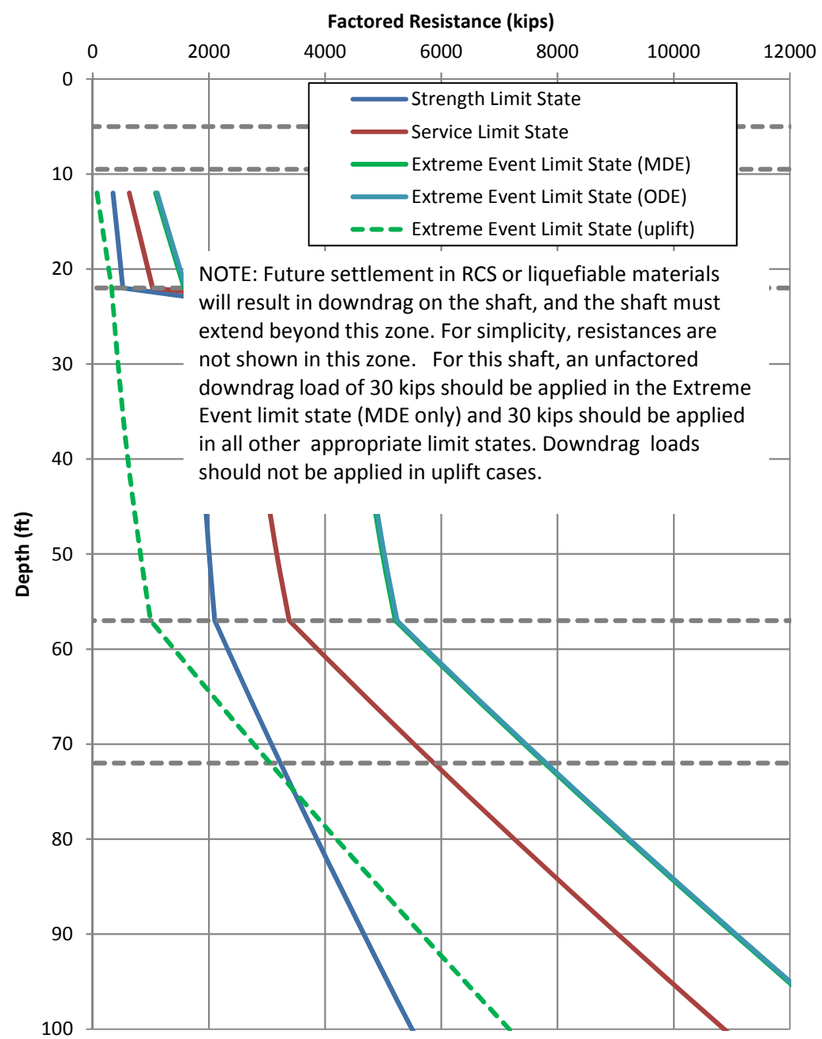
Figure 29
Factored Shaft Resistance
Bent D54

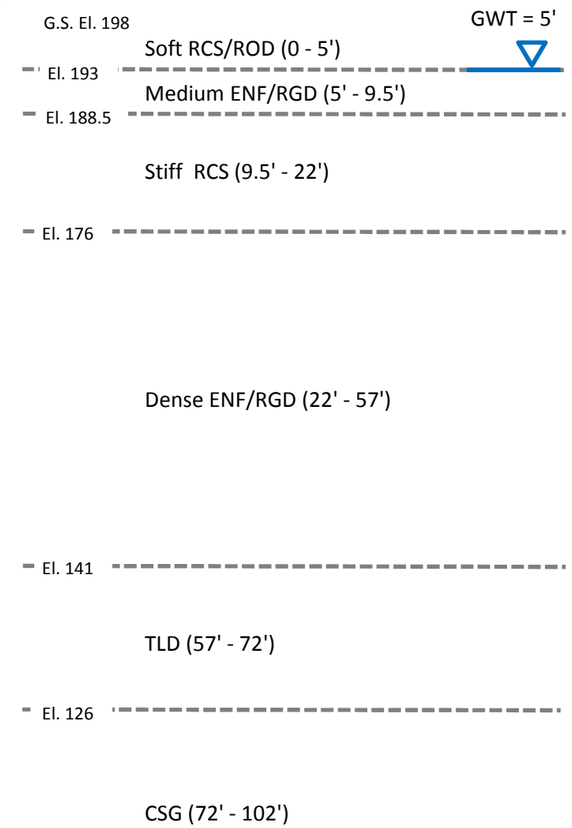
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft





NOTES:
1. Minimum depth = 62 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

Bent D55 (Boring E360-K-007)

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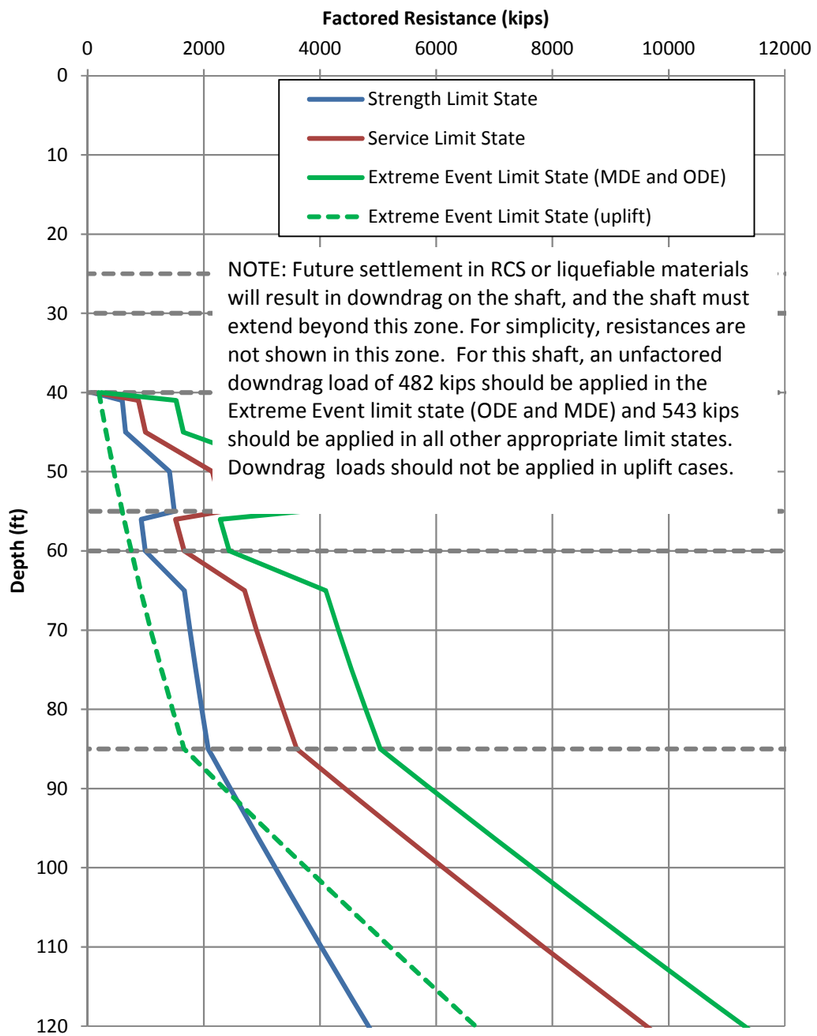
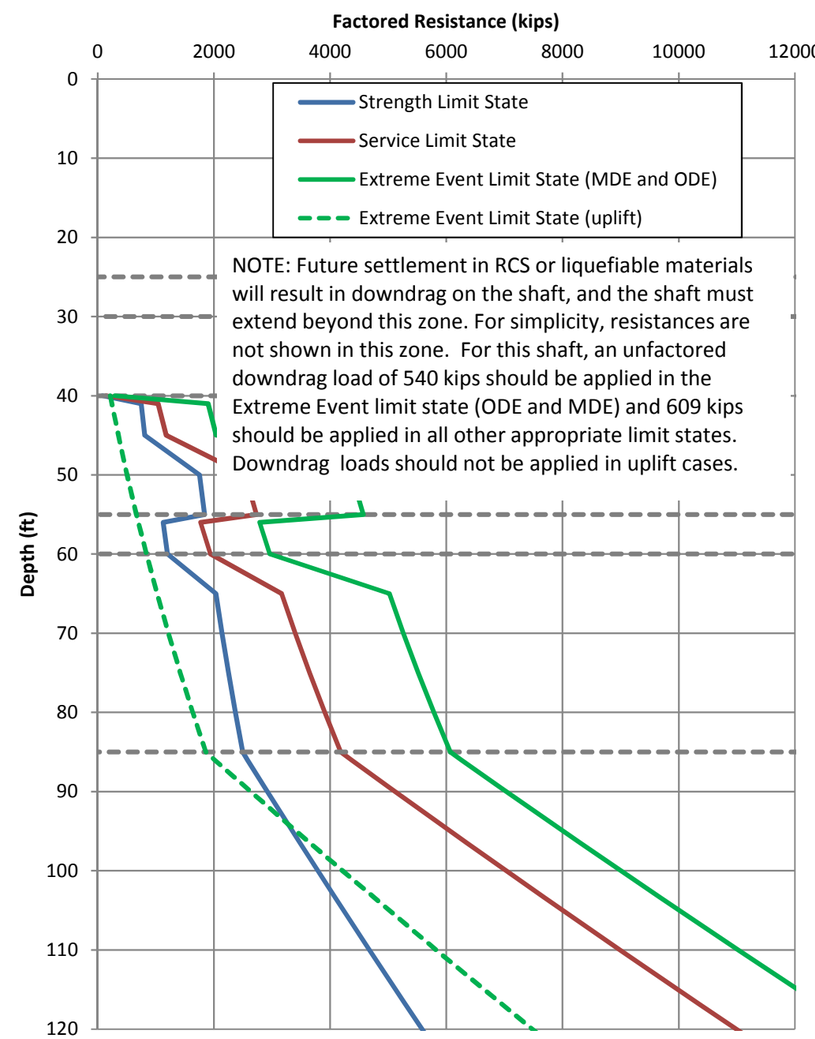
Figure 30
Factored Shaft Resistance
Bent D55

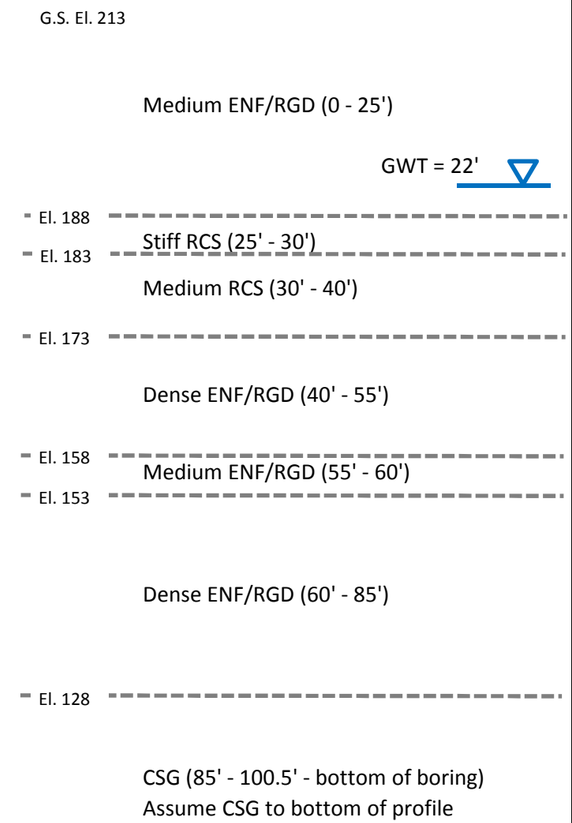
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft





NOTES:
1. Minimum depth = 90 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

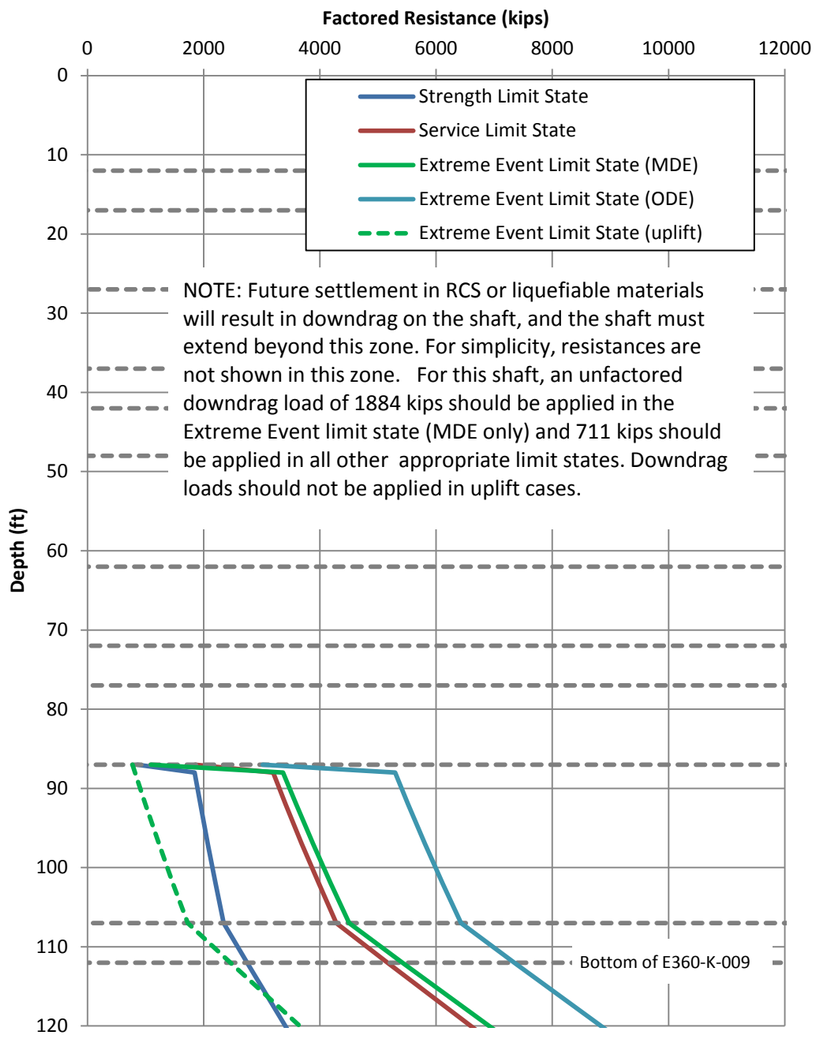
Bent D56 (Boring E360-K-008)

McMILLEN JACOBS ASSOCIATES

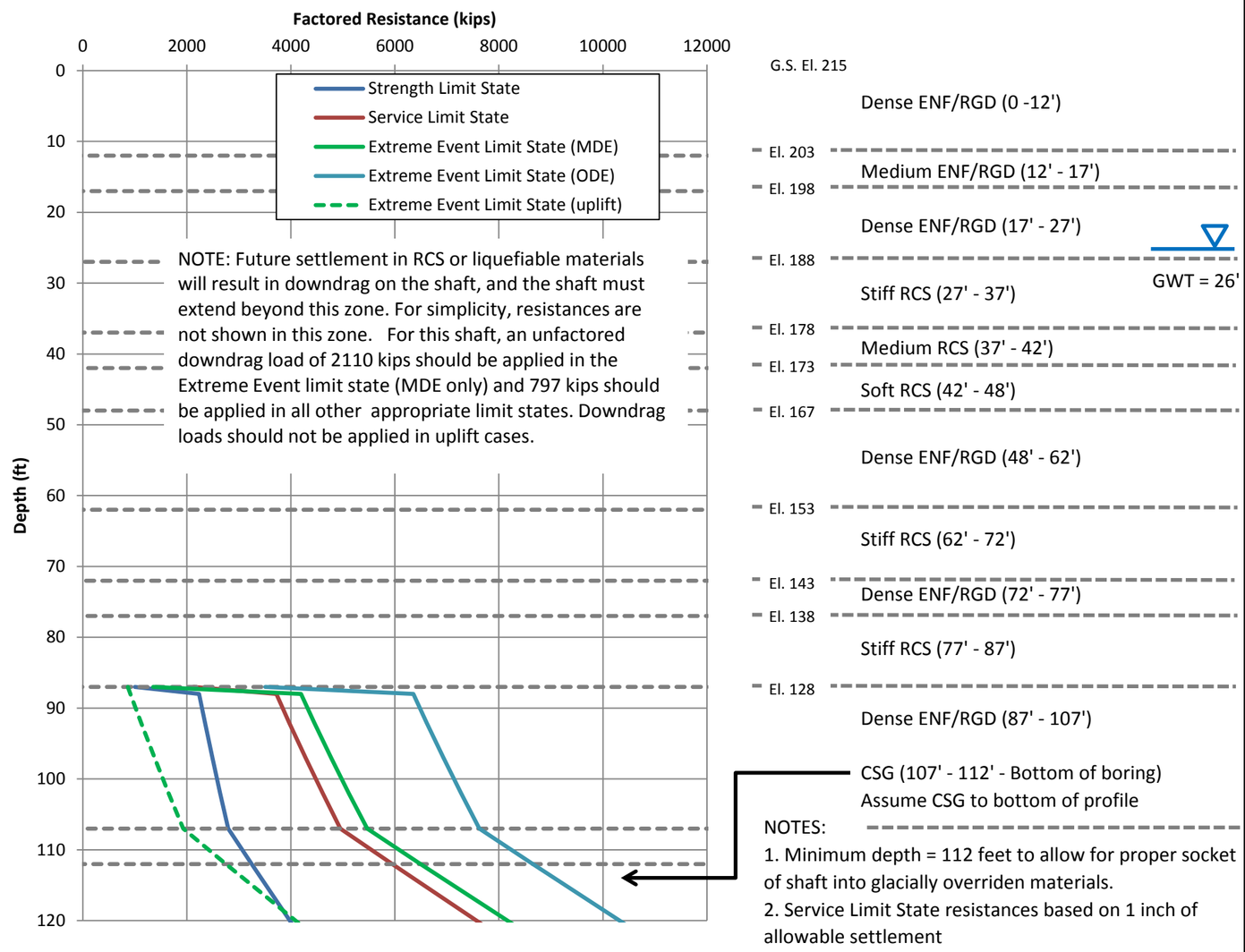
Figure 31
Factored Shaft Resistance
Bent D56

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft



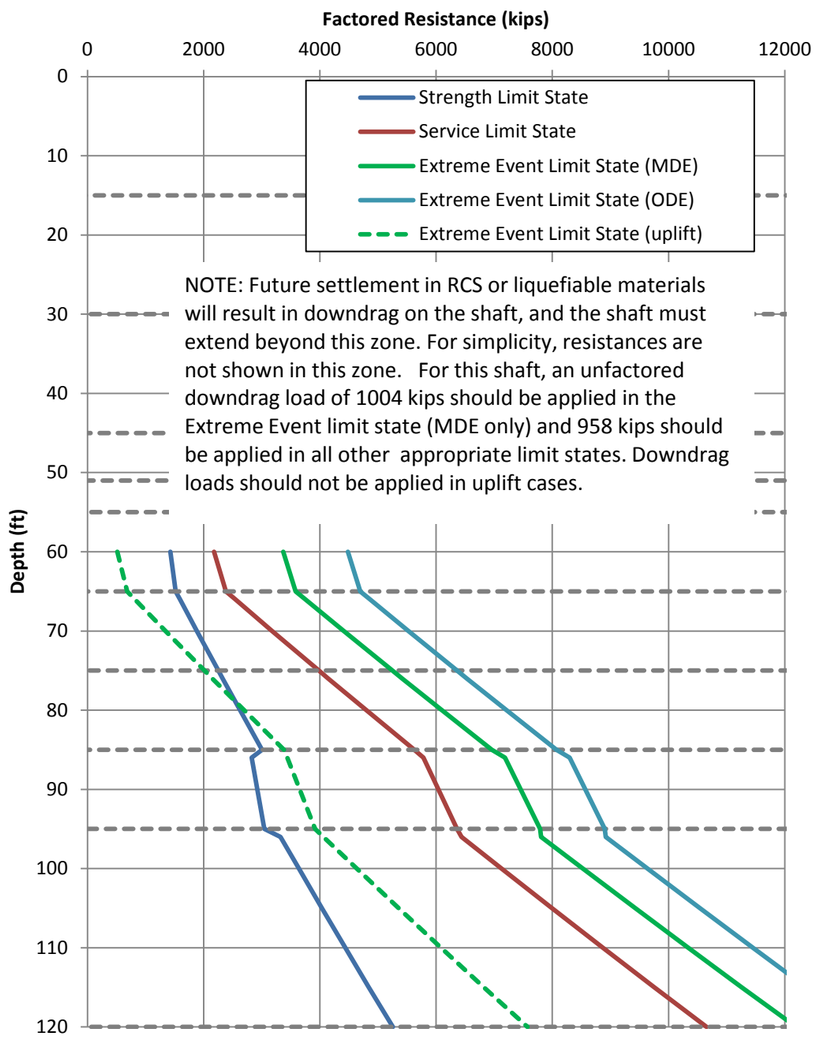
Bent D57 (Boring E360-K-009)

McMILLEN JACOBS ASSOCIATES

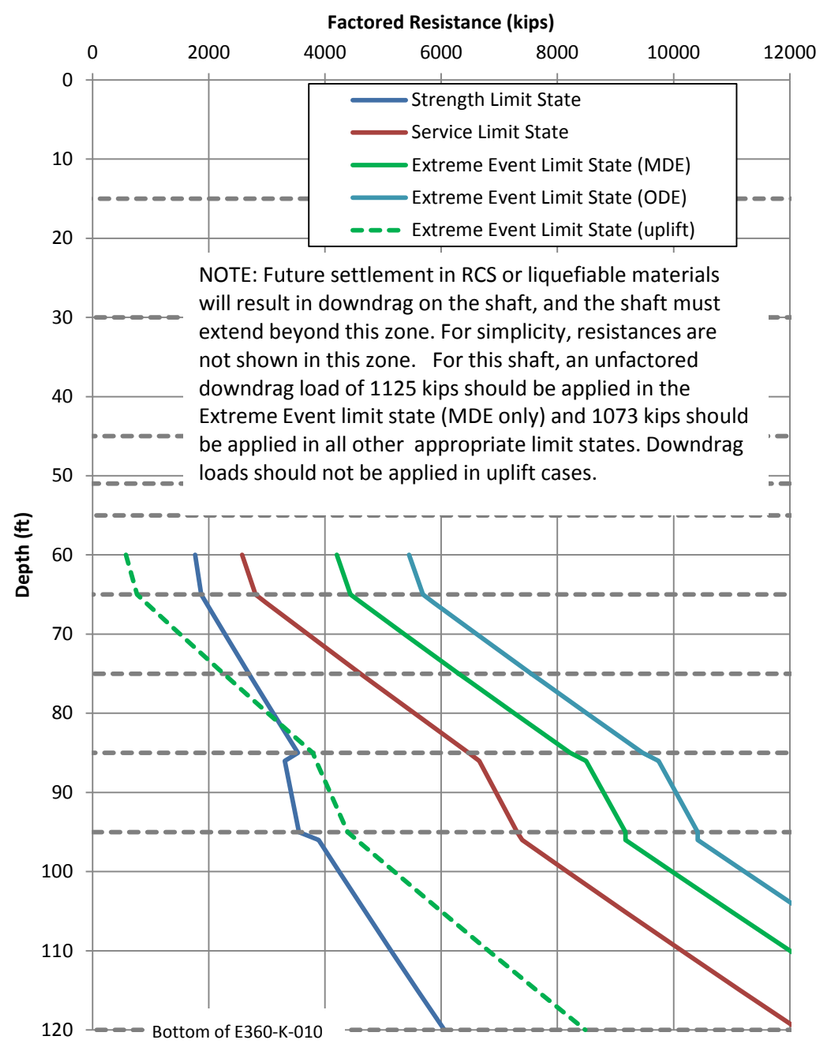
Figure 32
Factored Shaft Resistance
Bent D57

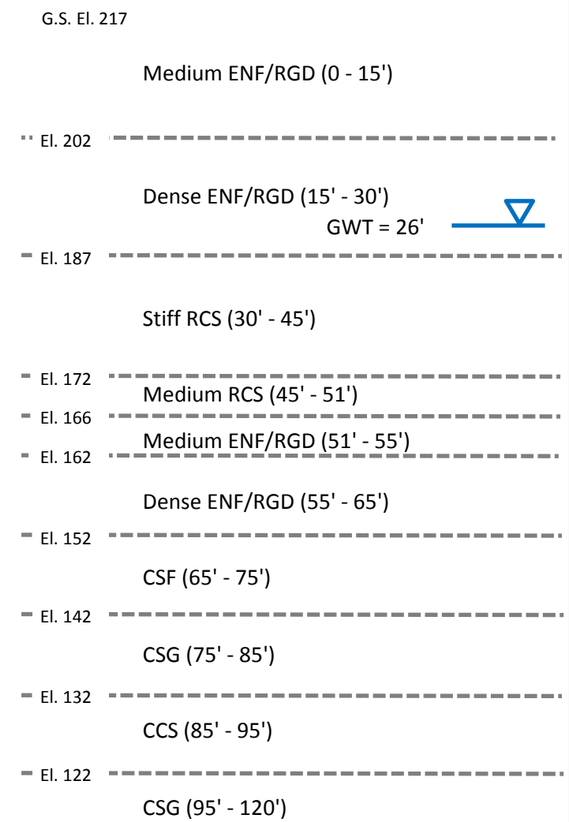
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft





NOTES:
1. Minimum depth = 70 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

Bent D58 (Boring E360-K-010)

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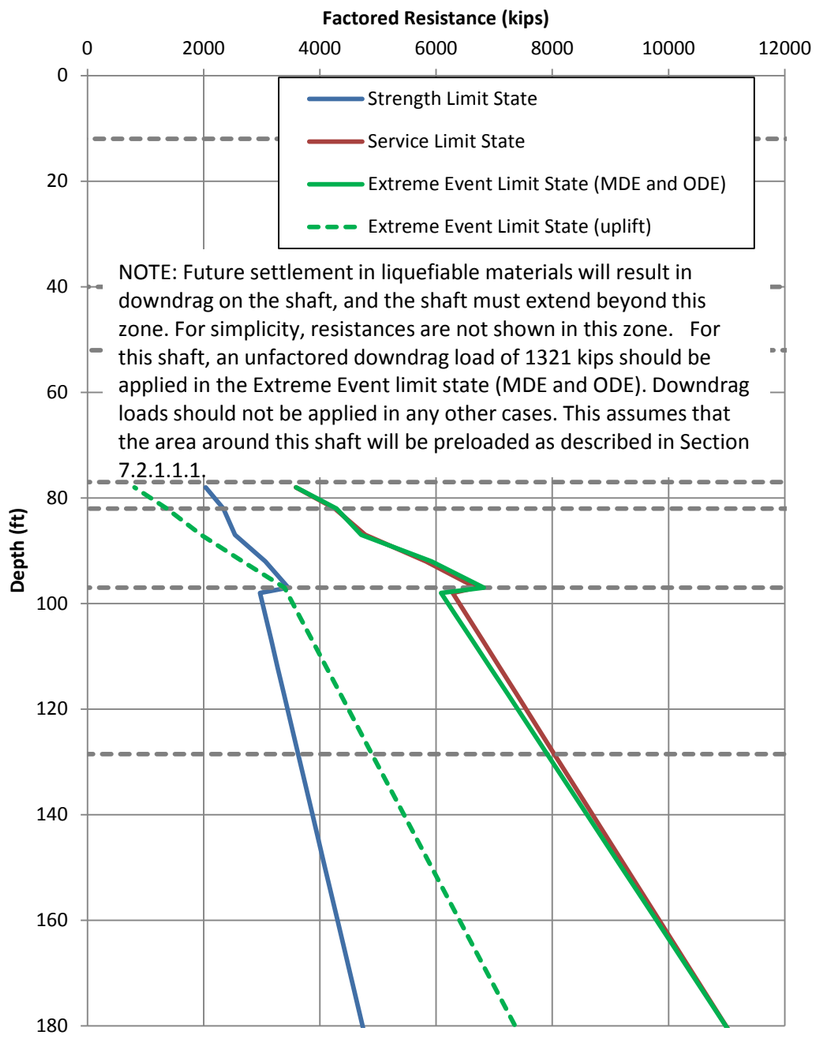
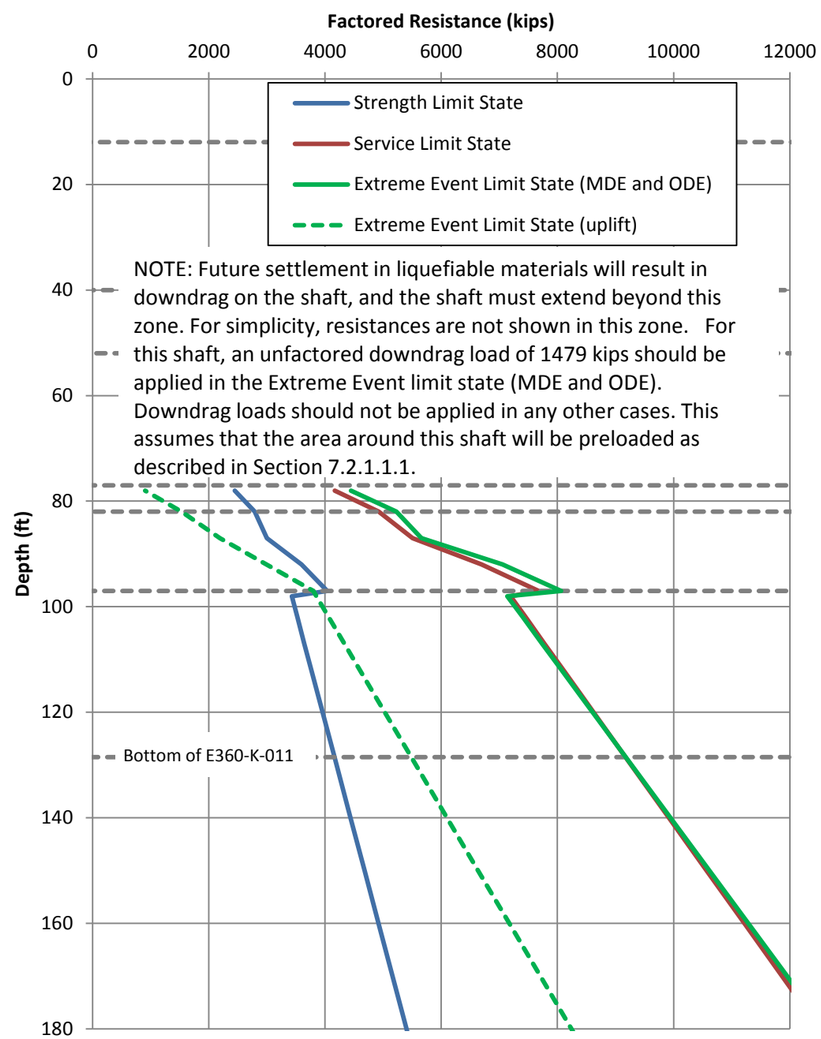
Figure 33
Factored Shaft Resistance
Bent D58

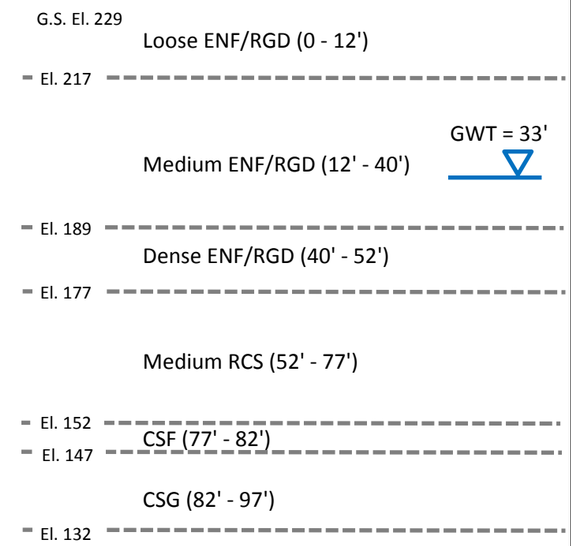
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft





NOTES:
1. Minimum depth = 82 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

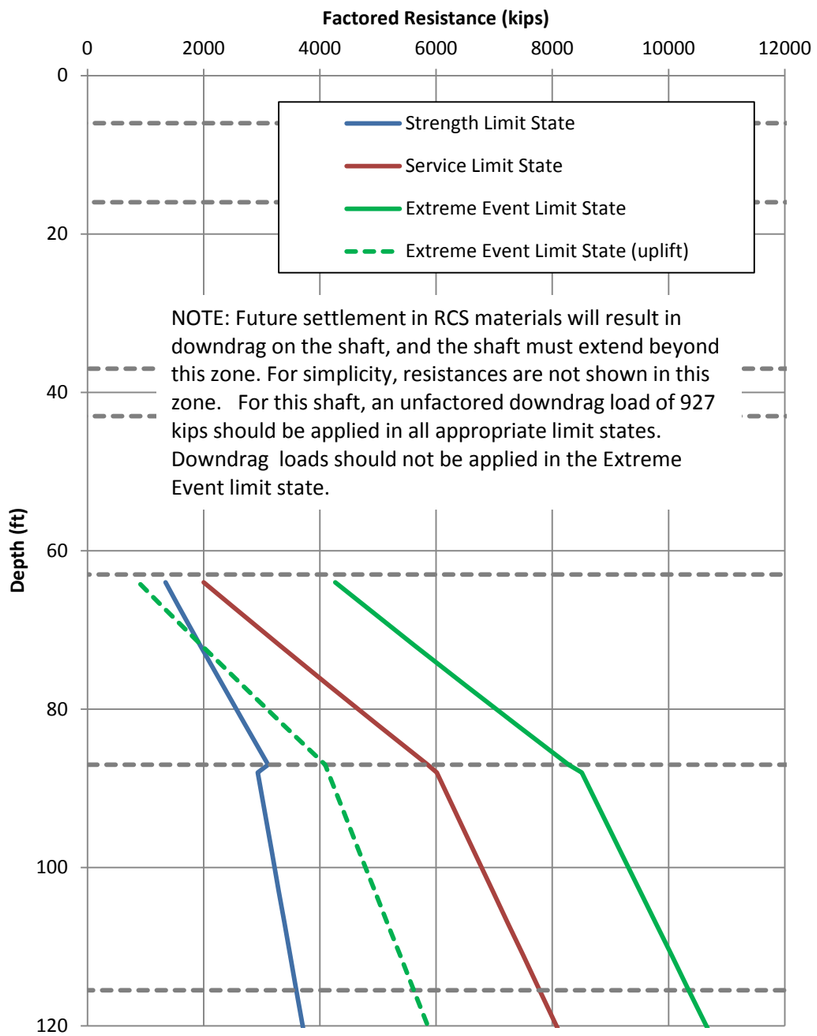
Bent D59 (Boring E360-K-011)

McMILLEN JACOBS ASSOCIATES

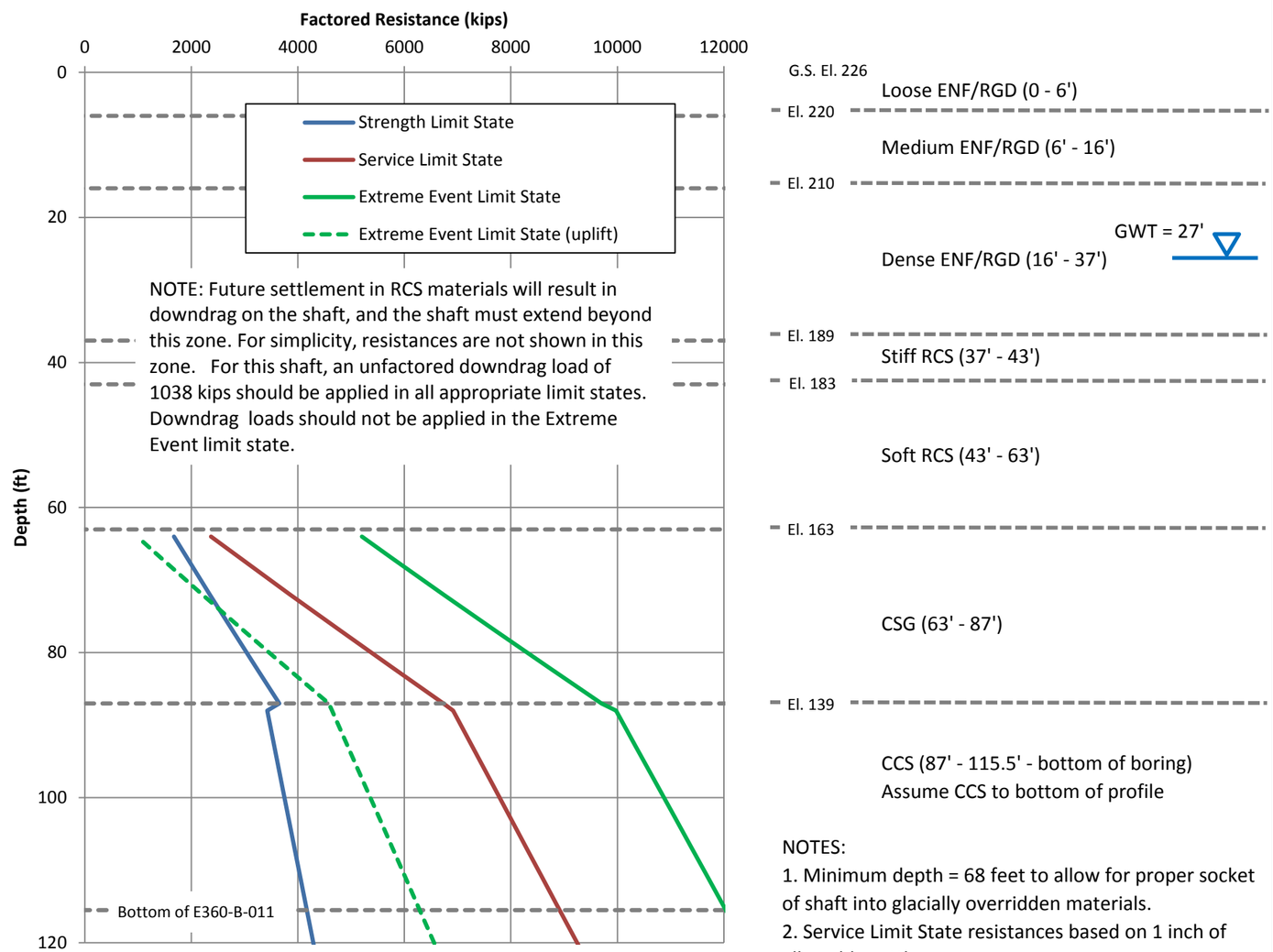
Figure 34
Factored Shaft Resistance
Bent D59

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft



NOTES:
1. Minimum depth = 68 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

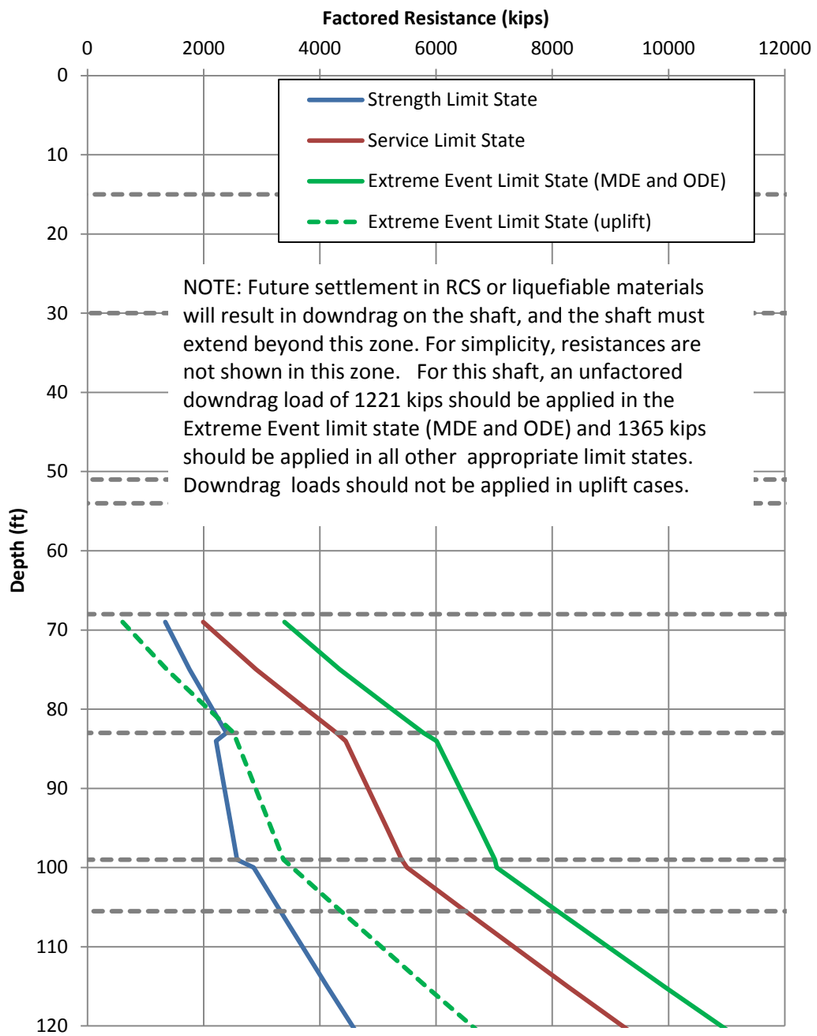
Bent D60 (Boring E360-B-011)

McMILLEN JACOBS ASSOCIATES

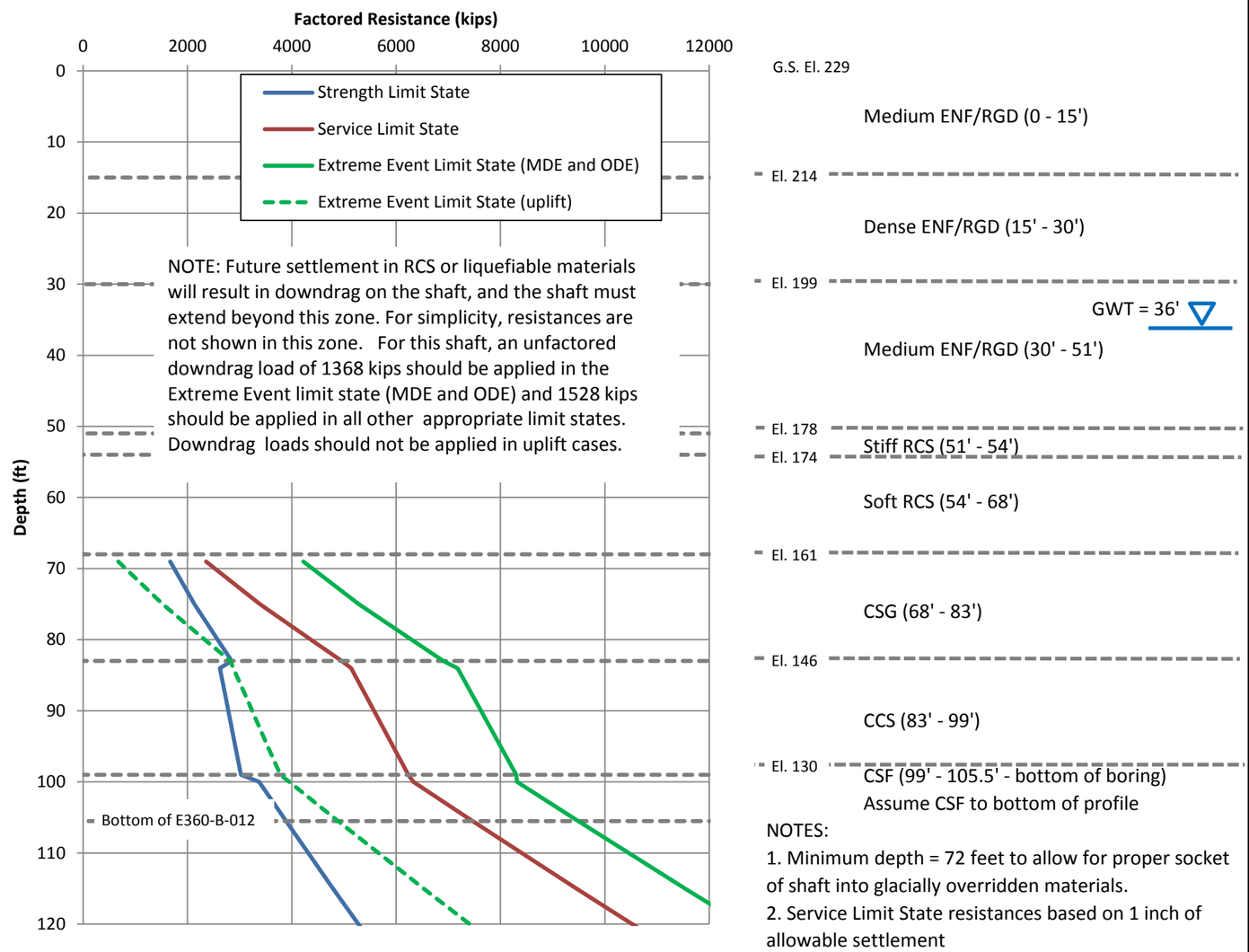
Figure 35
Factored Shaft Resistance
Bent D60

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft



NOTES:

1. Minimum depth = 72 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

Bent D61 (Boring E360-B-012)

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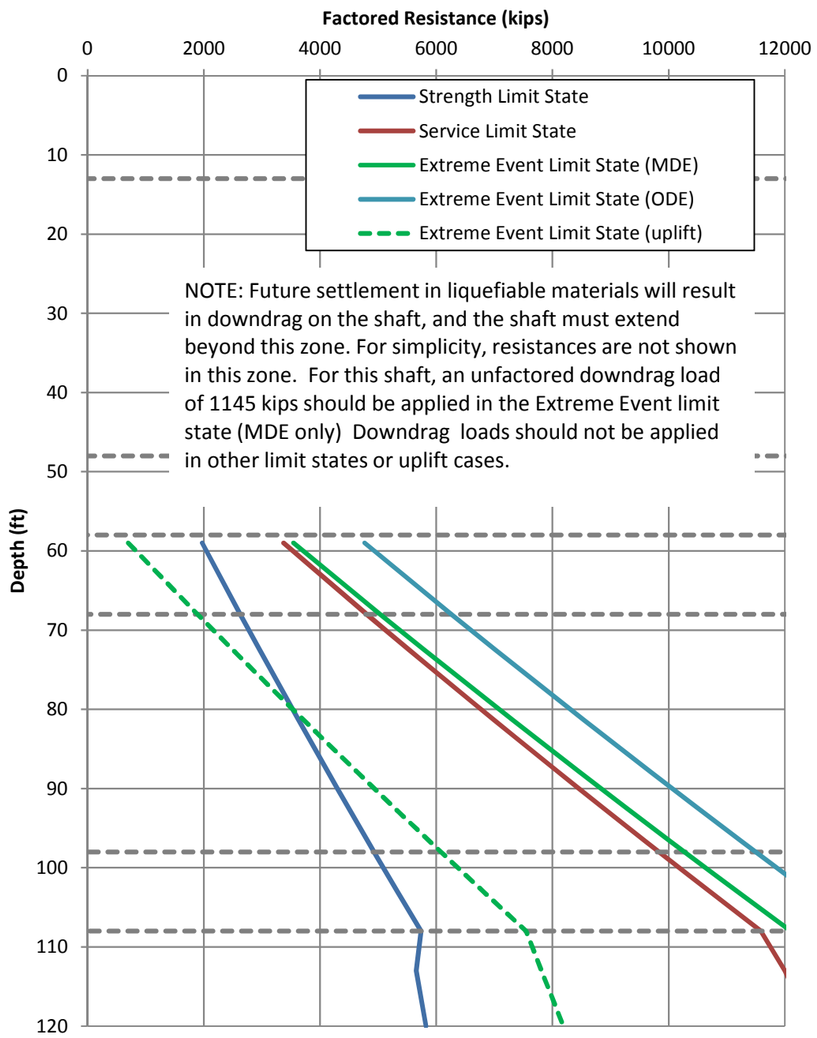
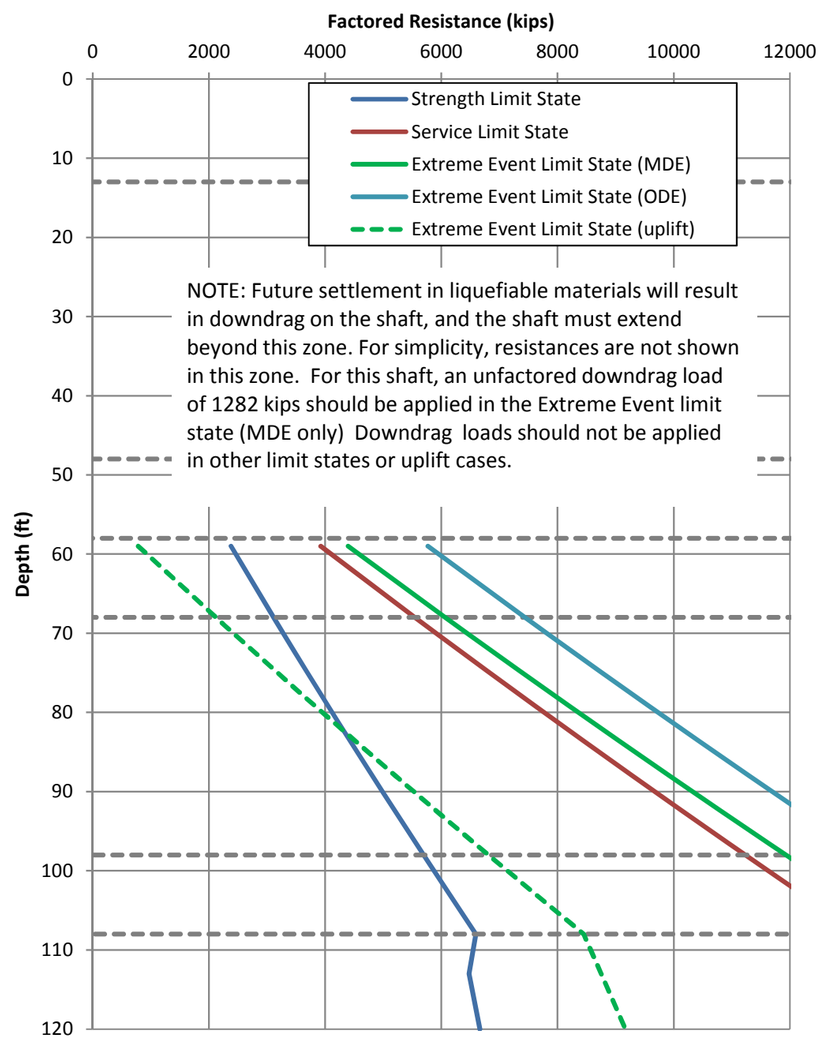
Figure 36
Factored Shaft Resistance
Bent D61

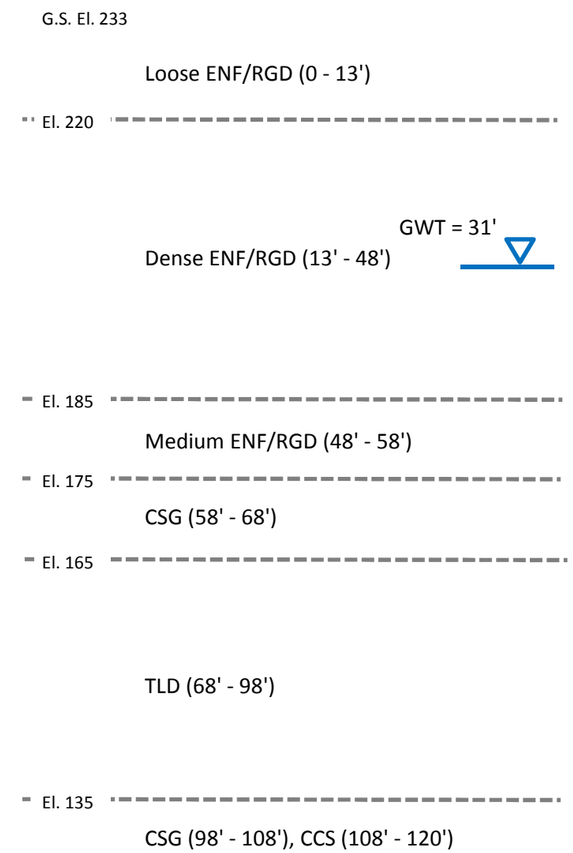
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft





NOTES:
1. Minimum depth = 63 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

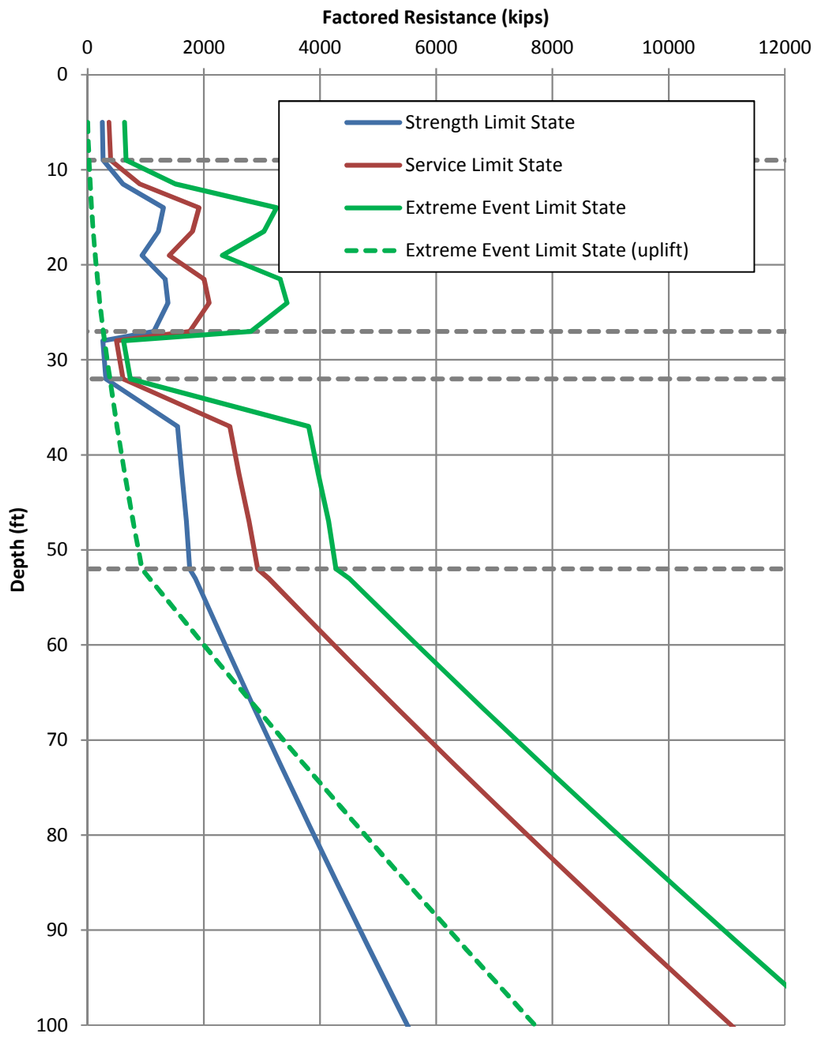
Bent D62 (Boring E360-K-012)

McMILLEN JACOBS ASSOCIATES

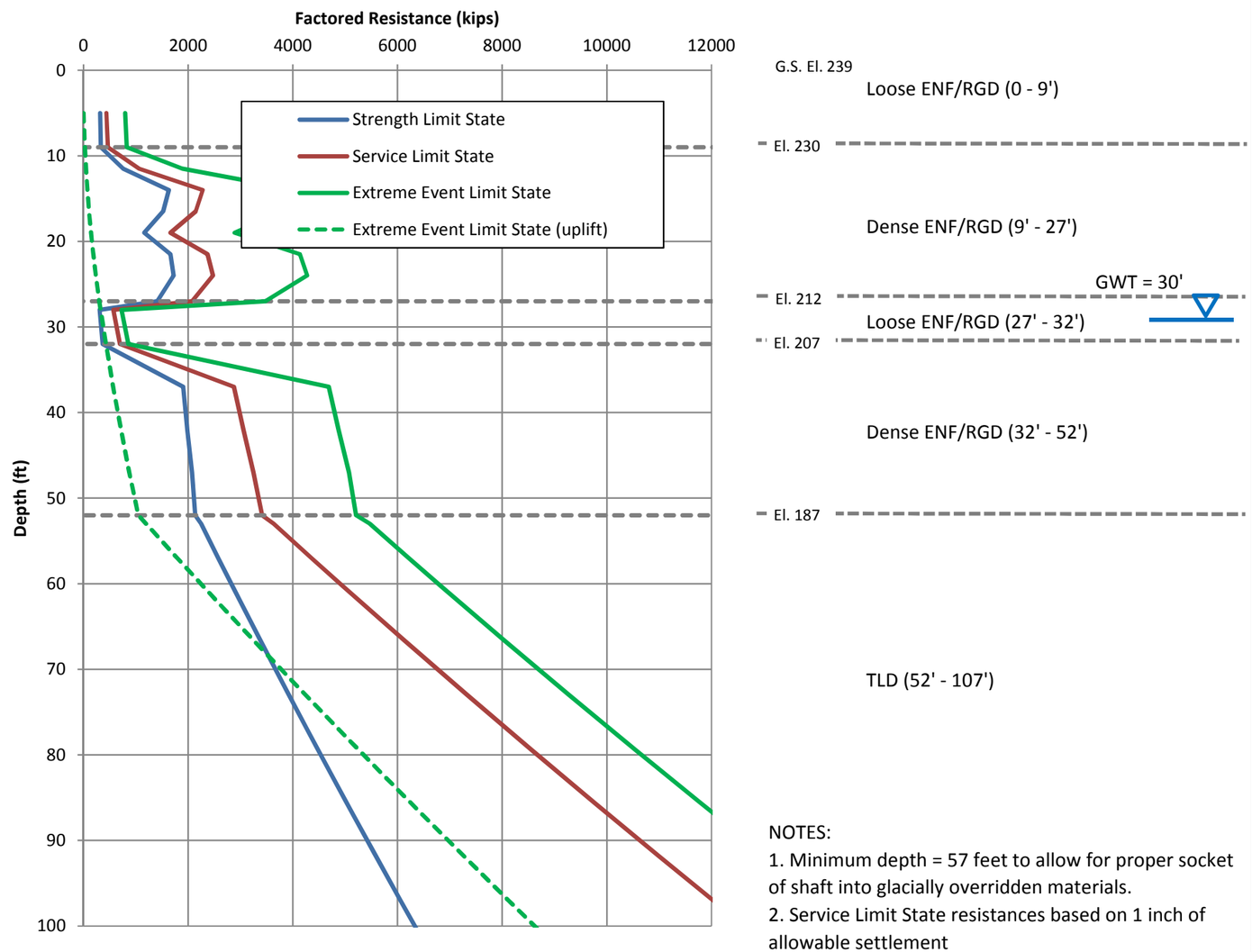
Figure 37
Factored Shaft Resistance
Bent D62

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft



NOTES:
1. Minimum depth = 57 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

Bent D63 (Boring E360-B-014)

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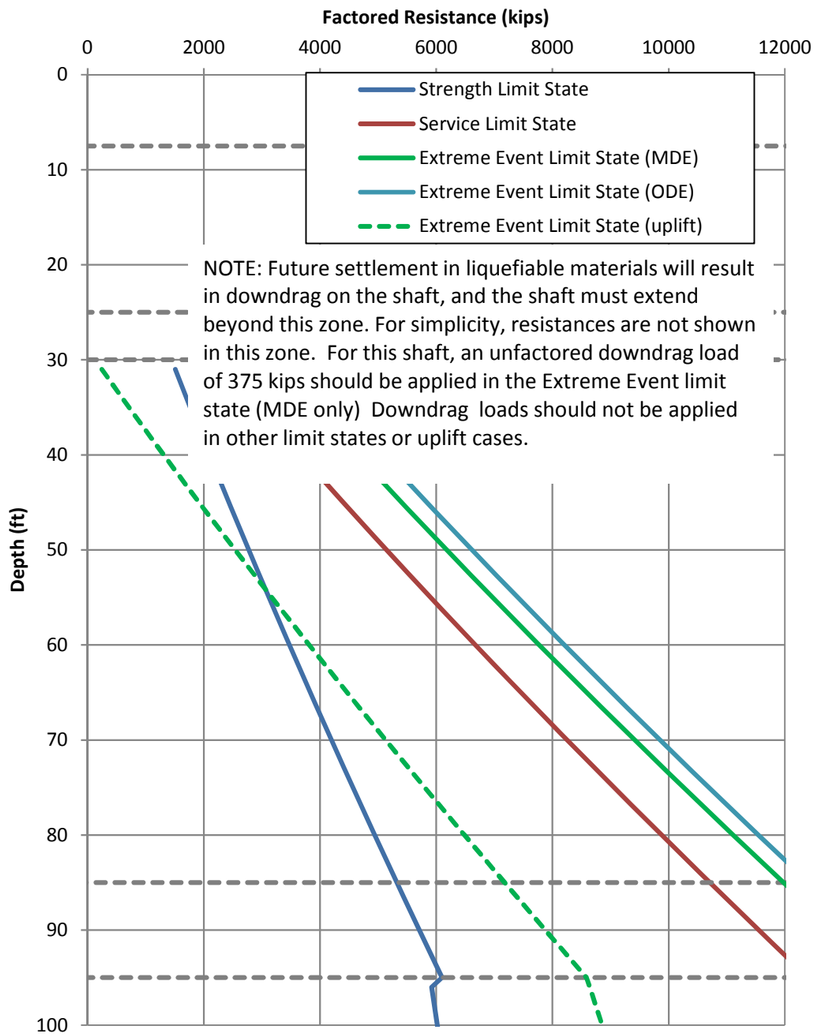
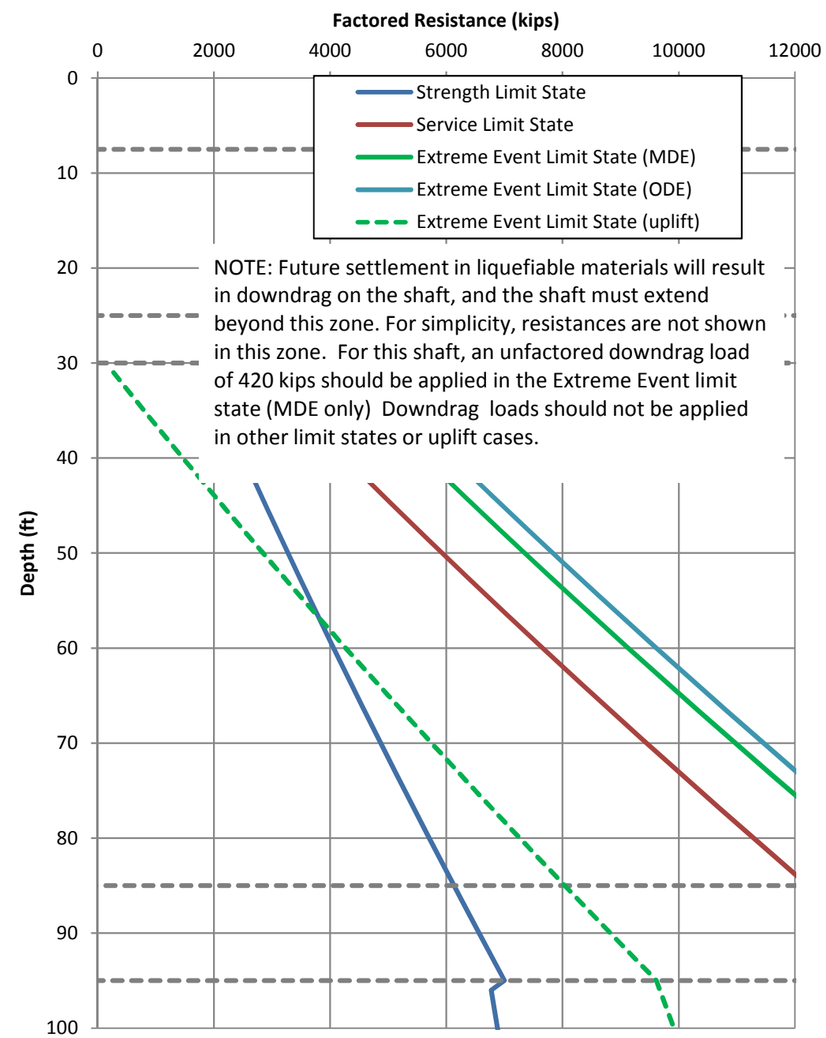
Figure 38
Factored Shaft Resistance
Bent D63

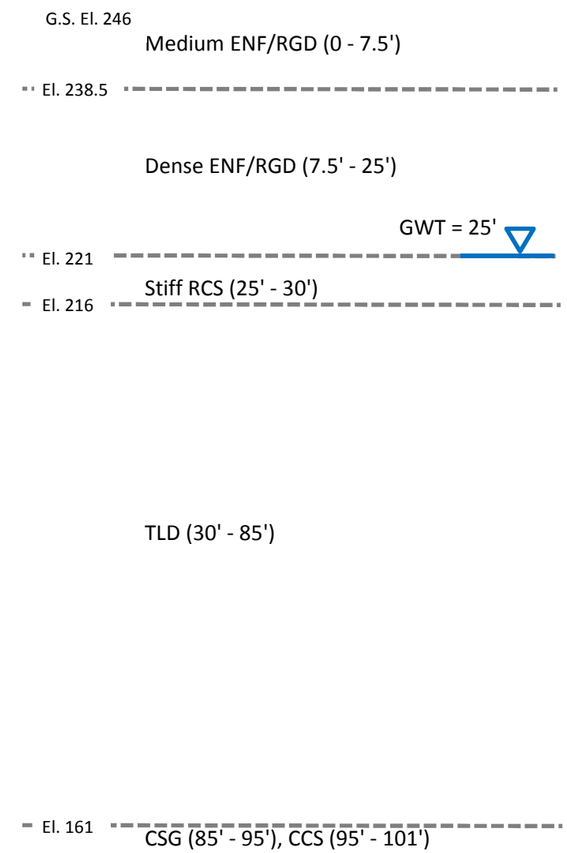
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft





NOTES:

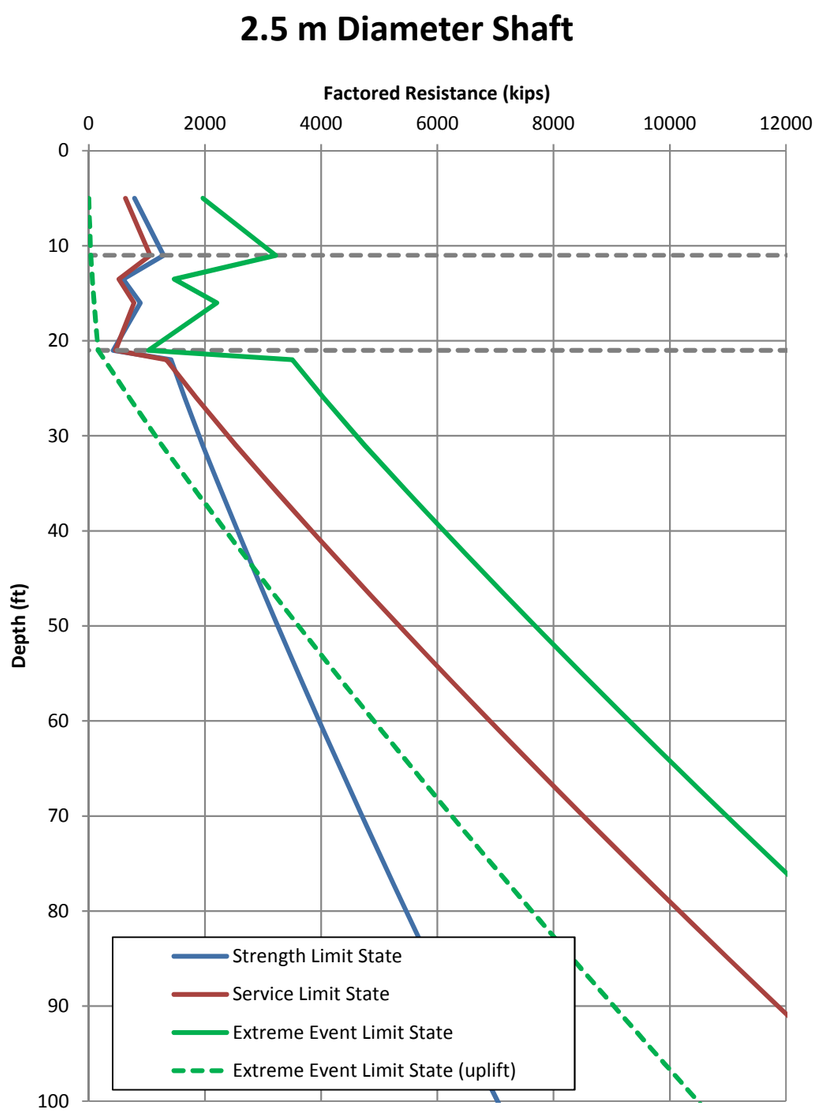
1. Minimum depth = 35 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

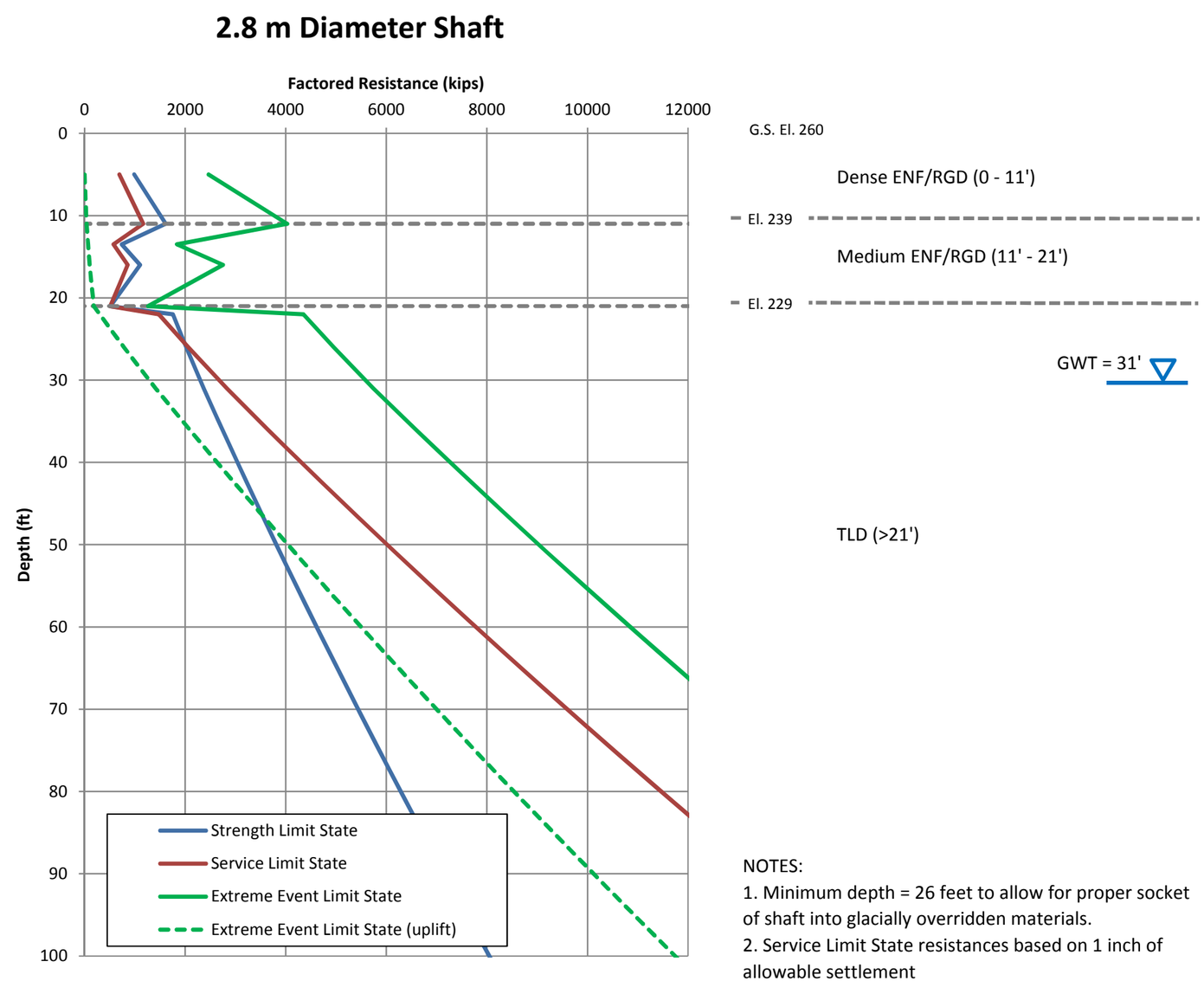
Bent D64 (Boring E360-K-013)

McMILLEN JACOBS ASSOCIATES

Figure 39
Factored Shaft Resistance
Bent D64

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985





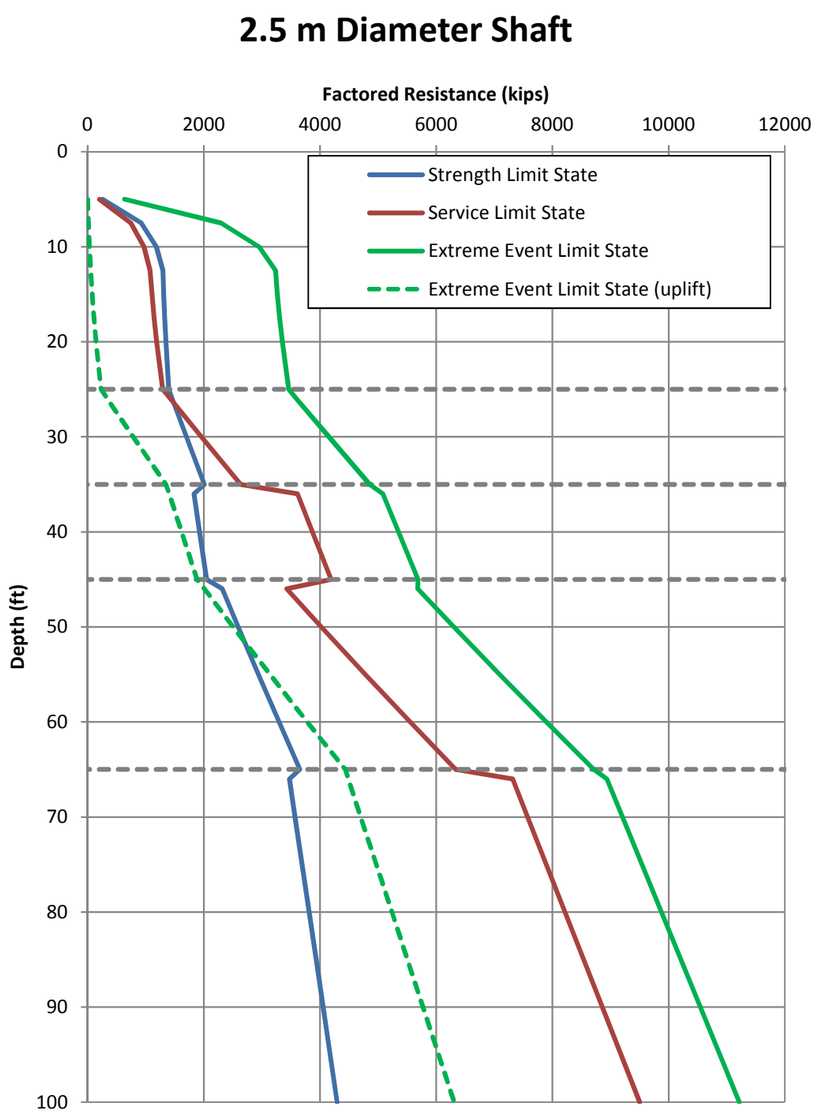
NOTES:
1. Minimum depth = 26 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

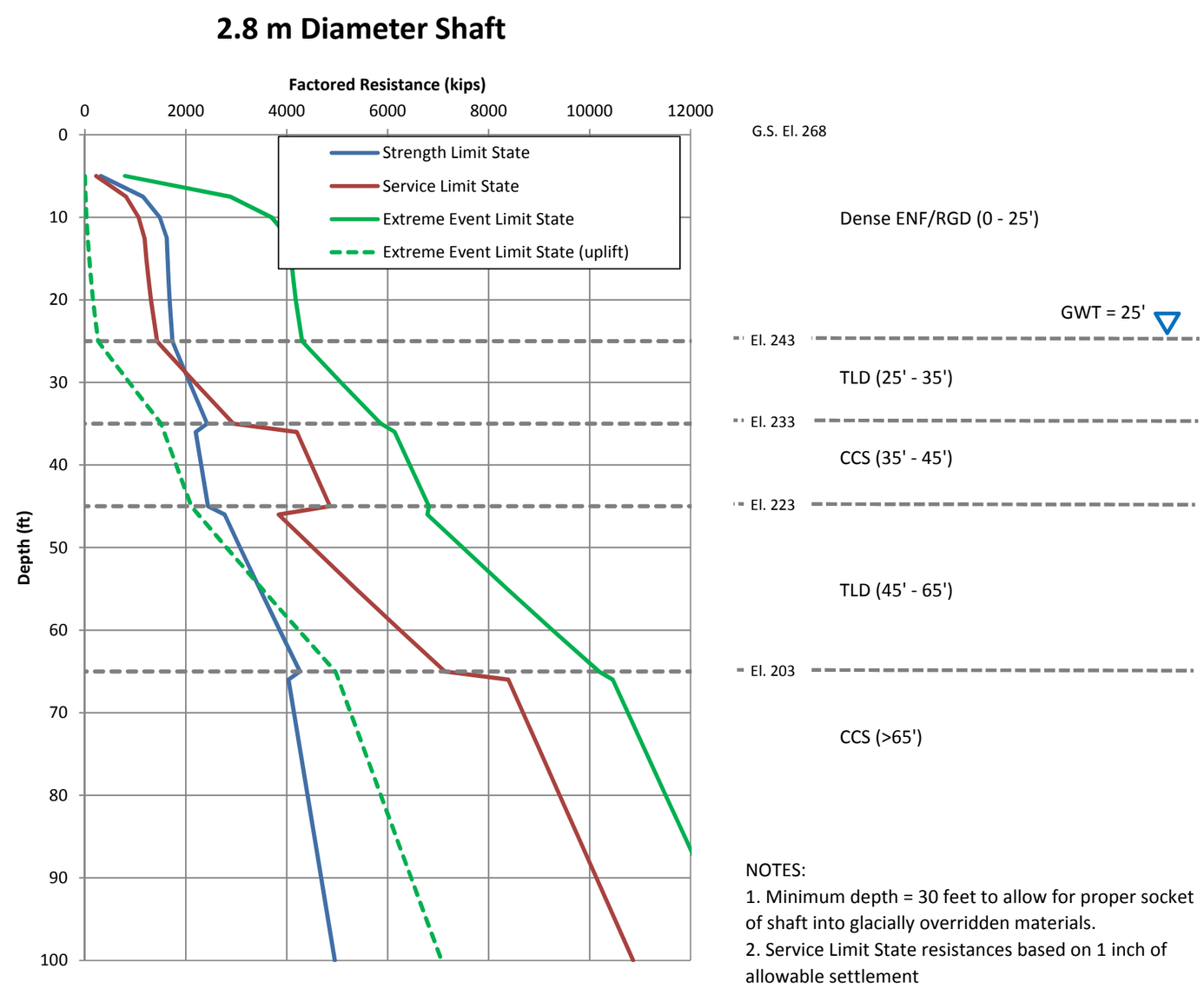
Bent D65 (Boring E360-K-014)

McMILLEN JACOBS ASSOCIATES

Figure 40
Factored Shaft Resistance
Bent D65

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985





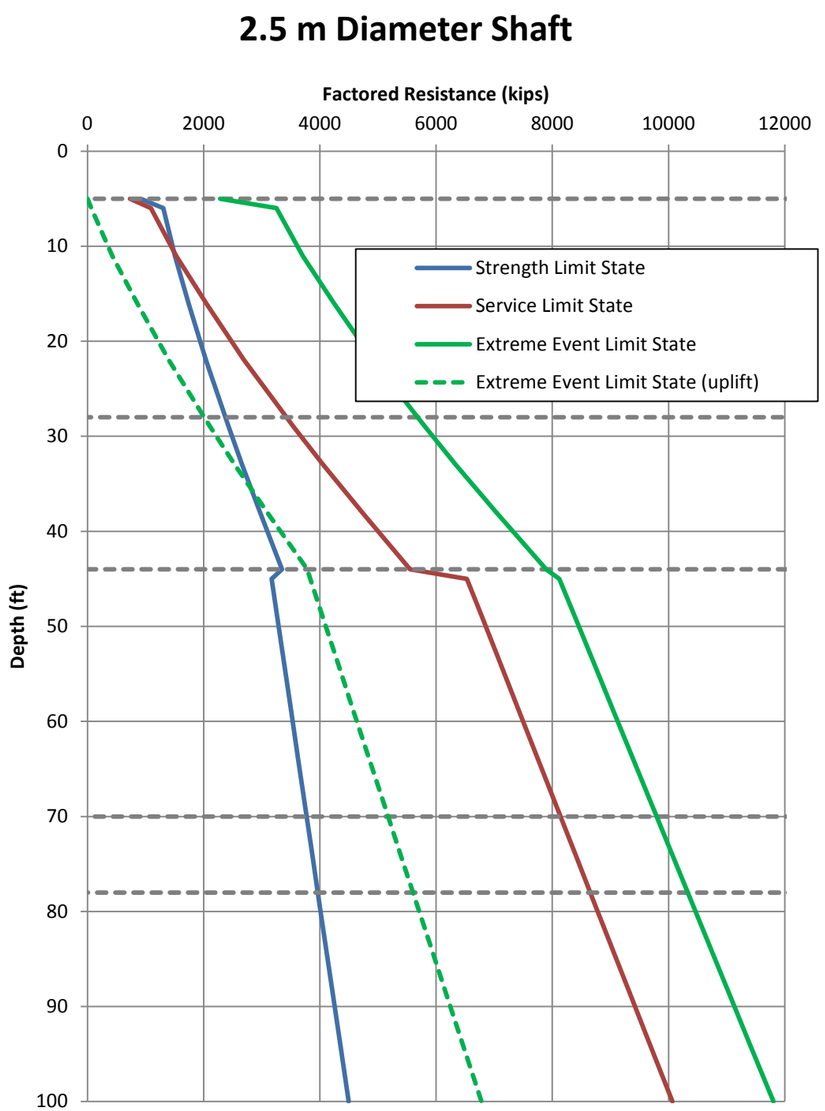
NOTES:
1. Minimum depth = 30 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

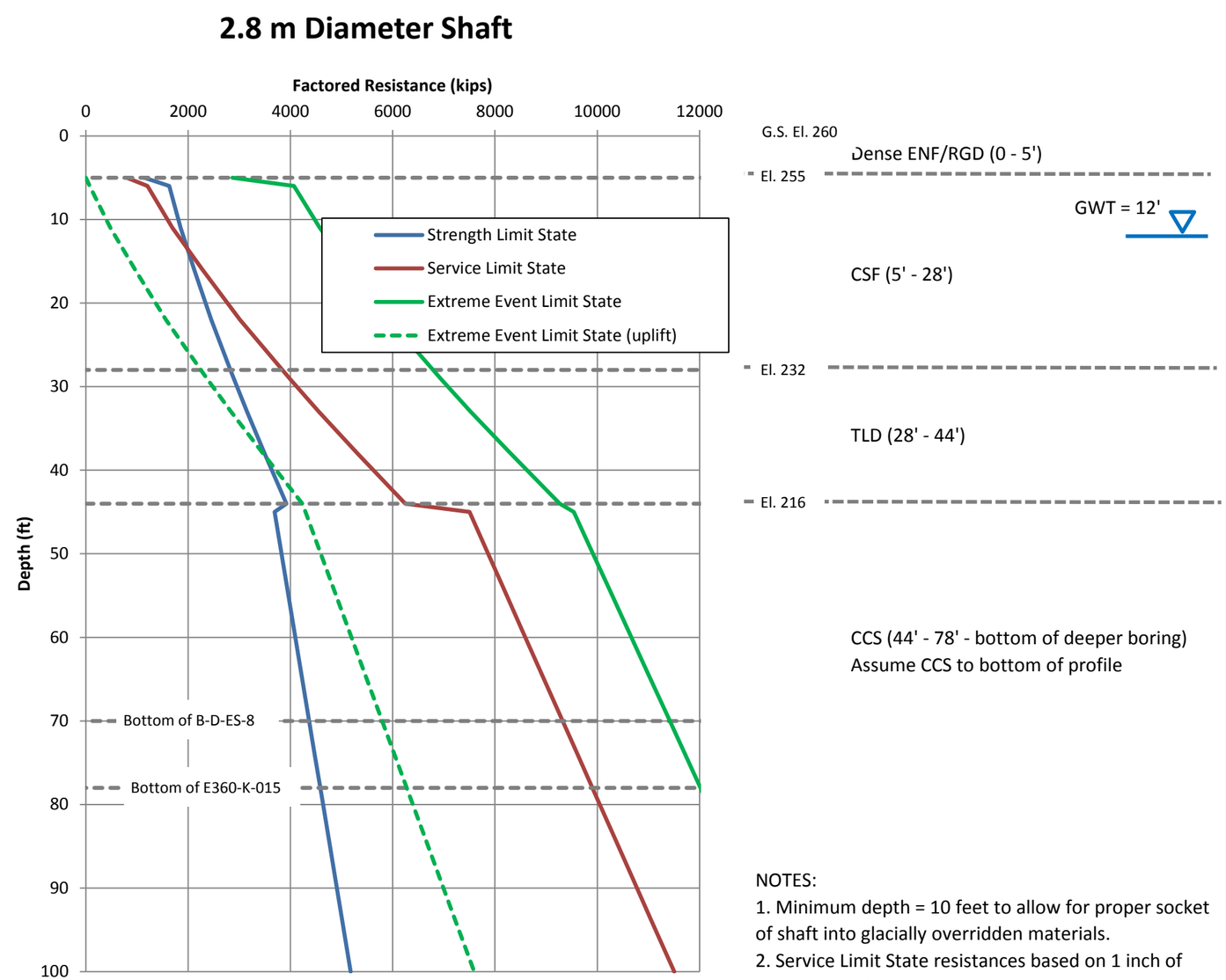
Bent D66 (Boring E360-K-015)

McMILLEN JACOBS ASSOCIATES

Figure 41
Factored Shaft Resistance
Bent D66

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985





NOTES:
1. Minimum depth = 10 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

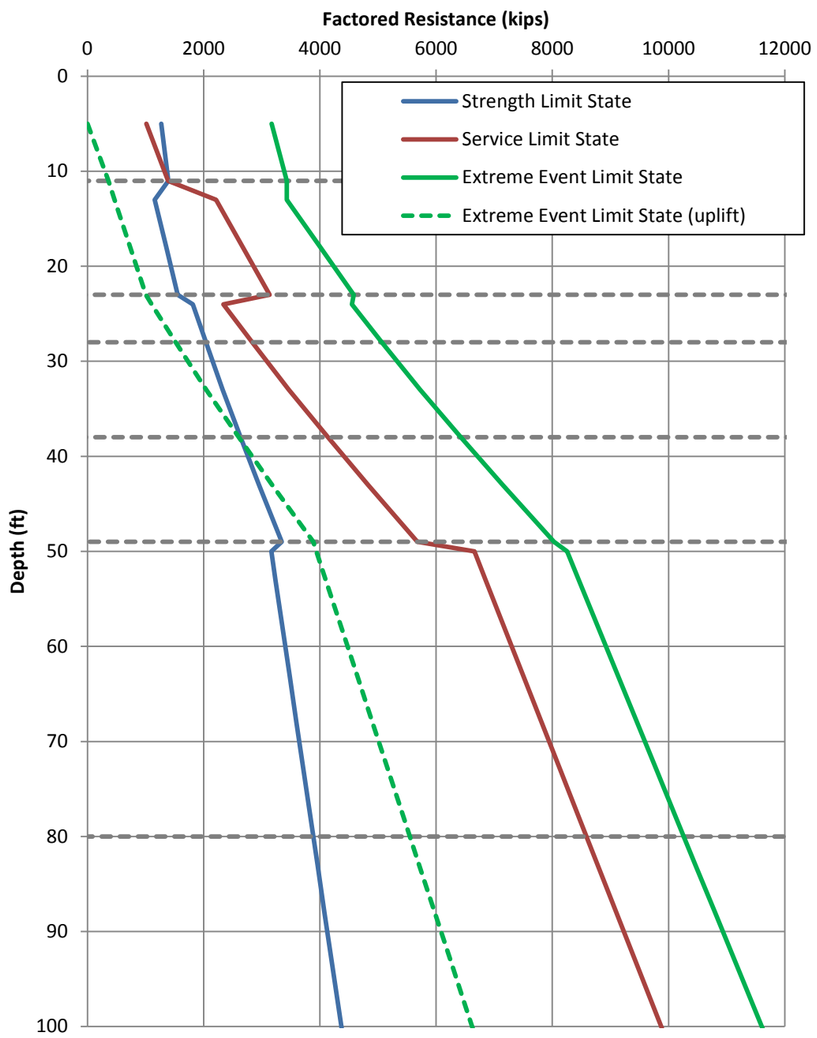
Bent D67 (Borings E360-K-015 and BD-ES-8)

McMILLEN JACOBS ASSOCIATES

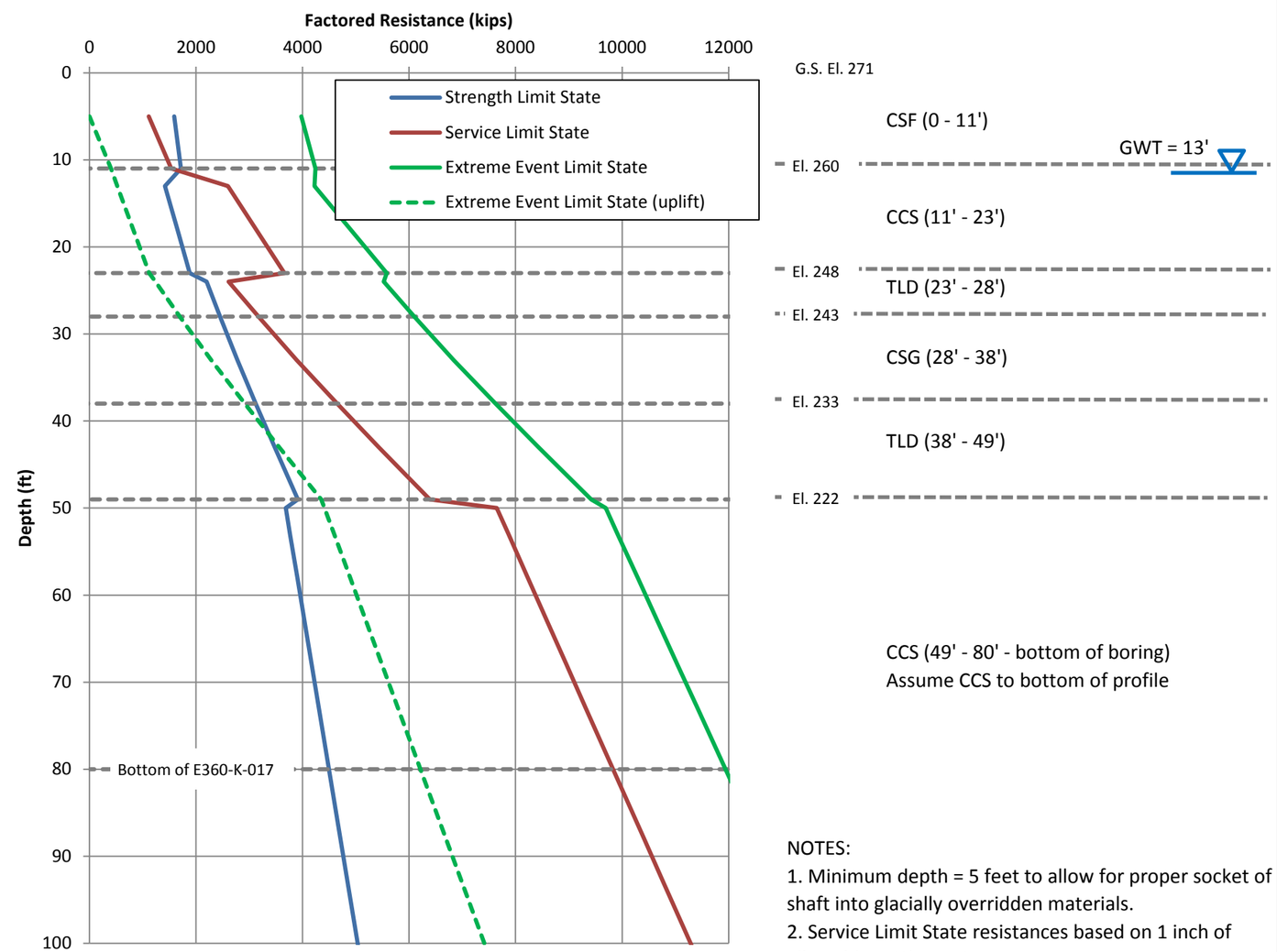
Figure 42
Factored Shaft Resistance
Bent D67

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft



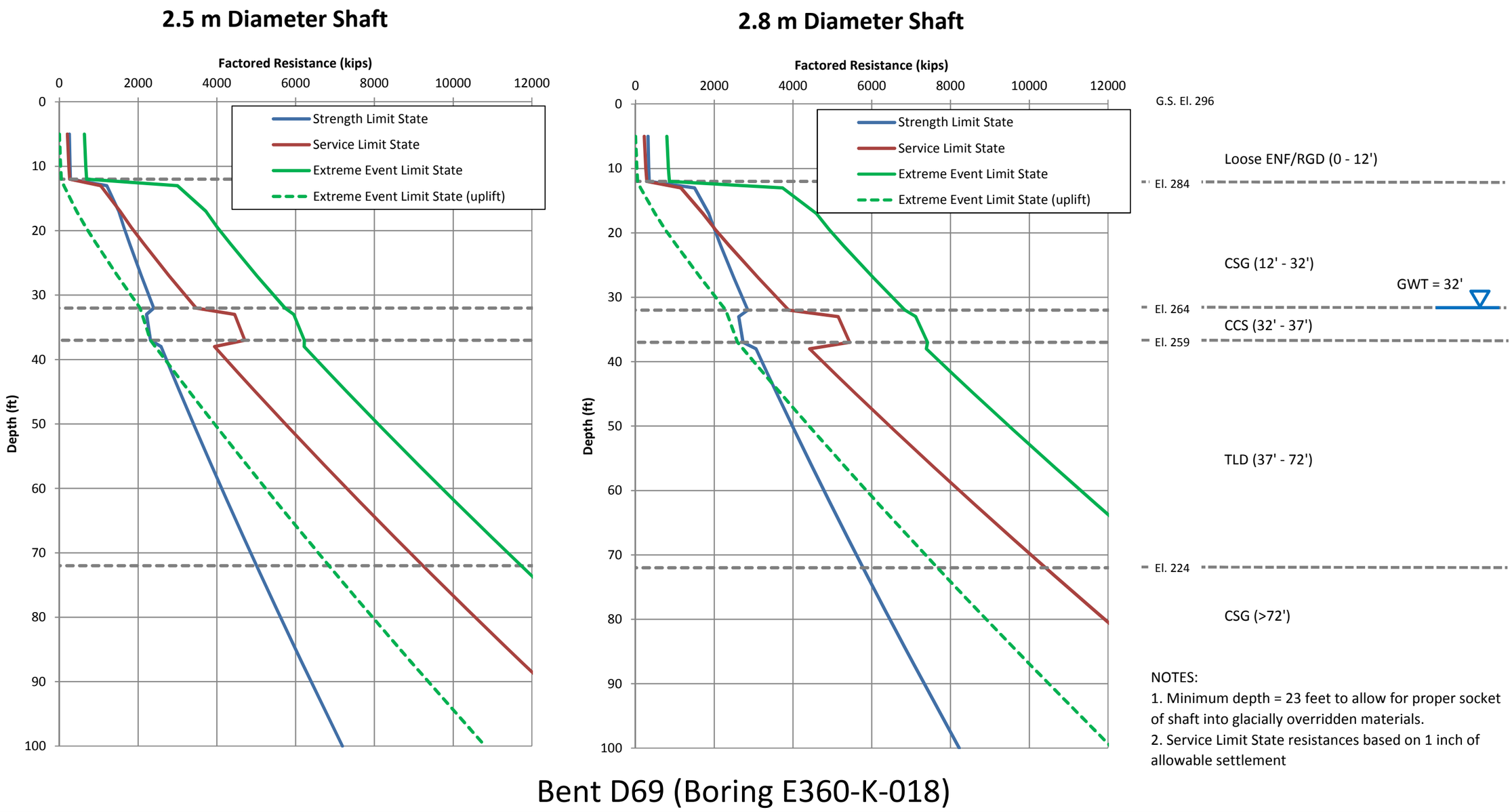
NOTES:
1. Minimum depth = 5 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

Bent D68 (Boring E360-K-017)

McMILLEN JACOBS ASSOCIATES

Figure 43
Factored Shaft Resistance
Bent D68

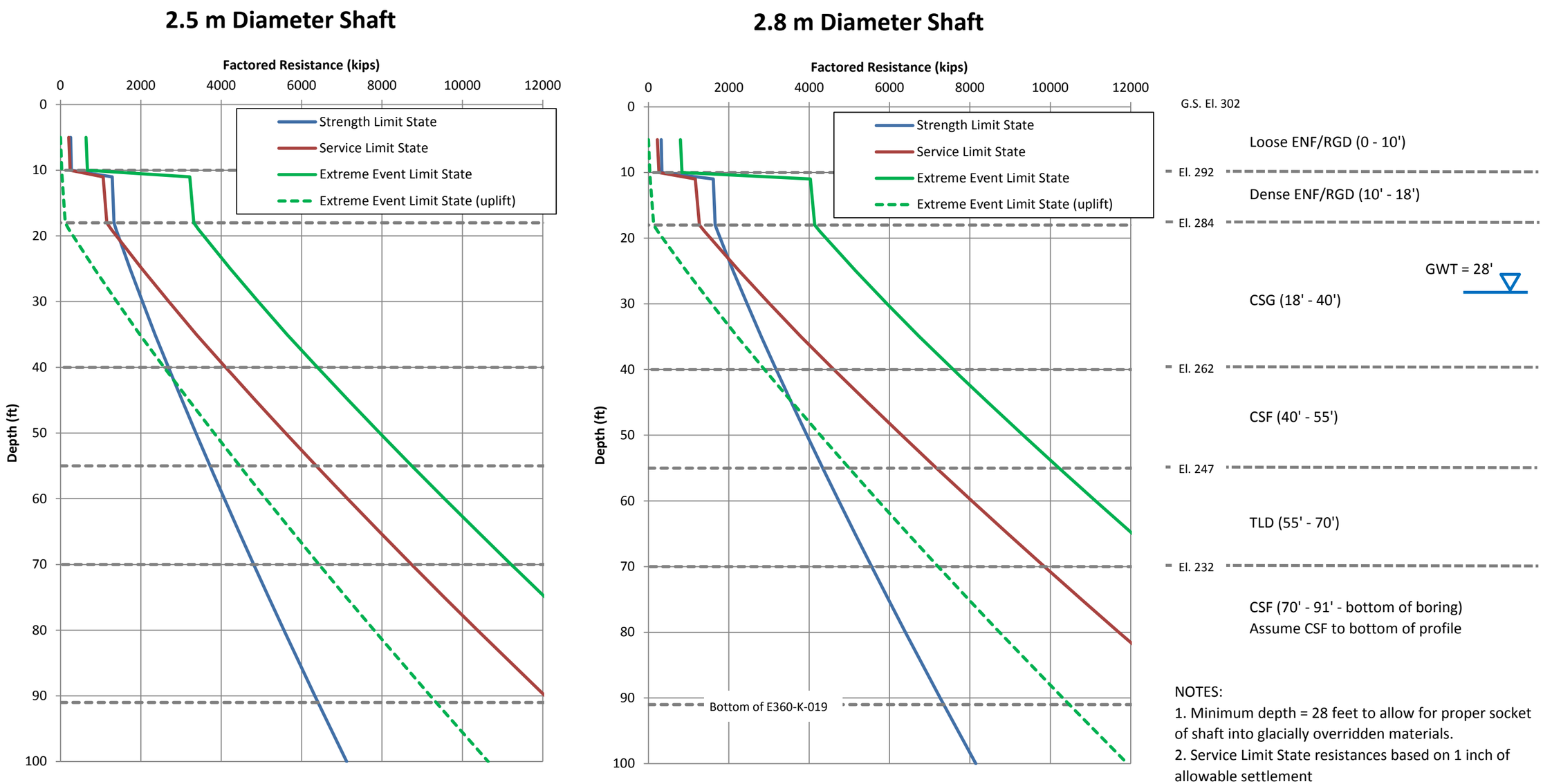
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



McMILLEN JACOBS ASSOCIATES

Figure 44
Factored Shaft Resistance
Bent D69

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



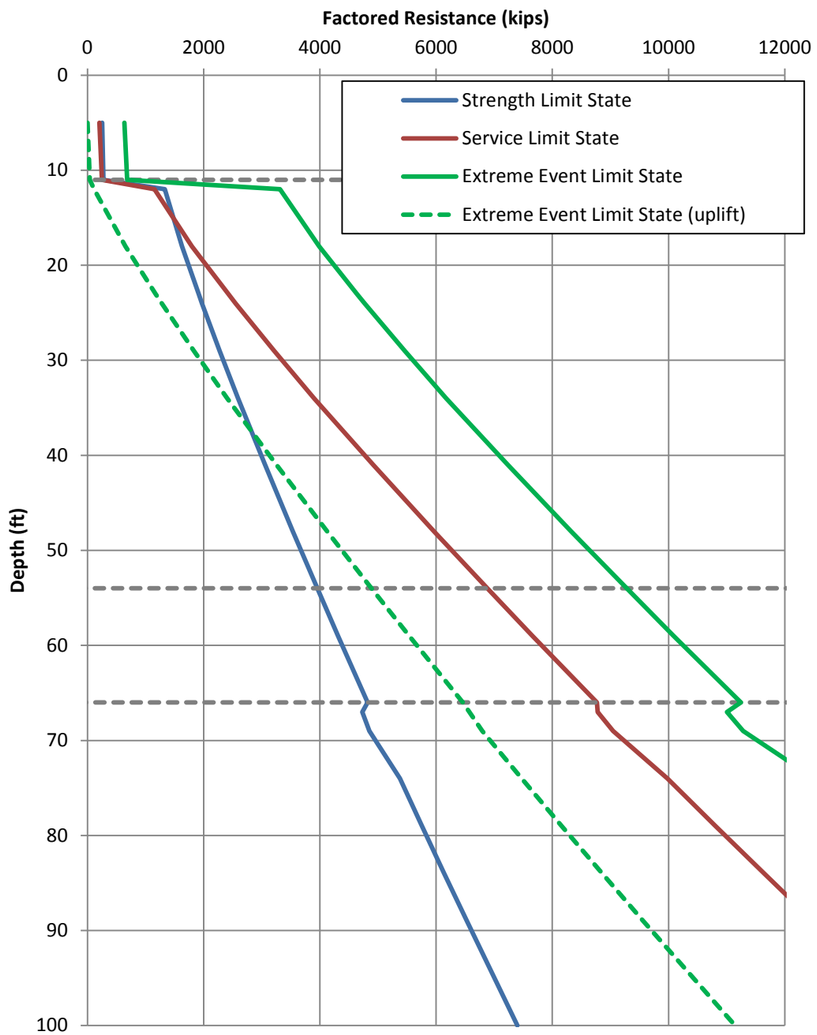
Bent D70 (Boring E360-K-019)

McMILLEN JACOBS ASSOCIATES

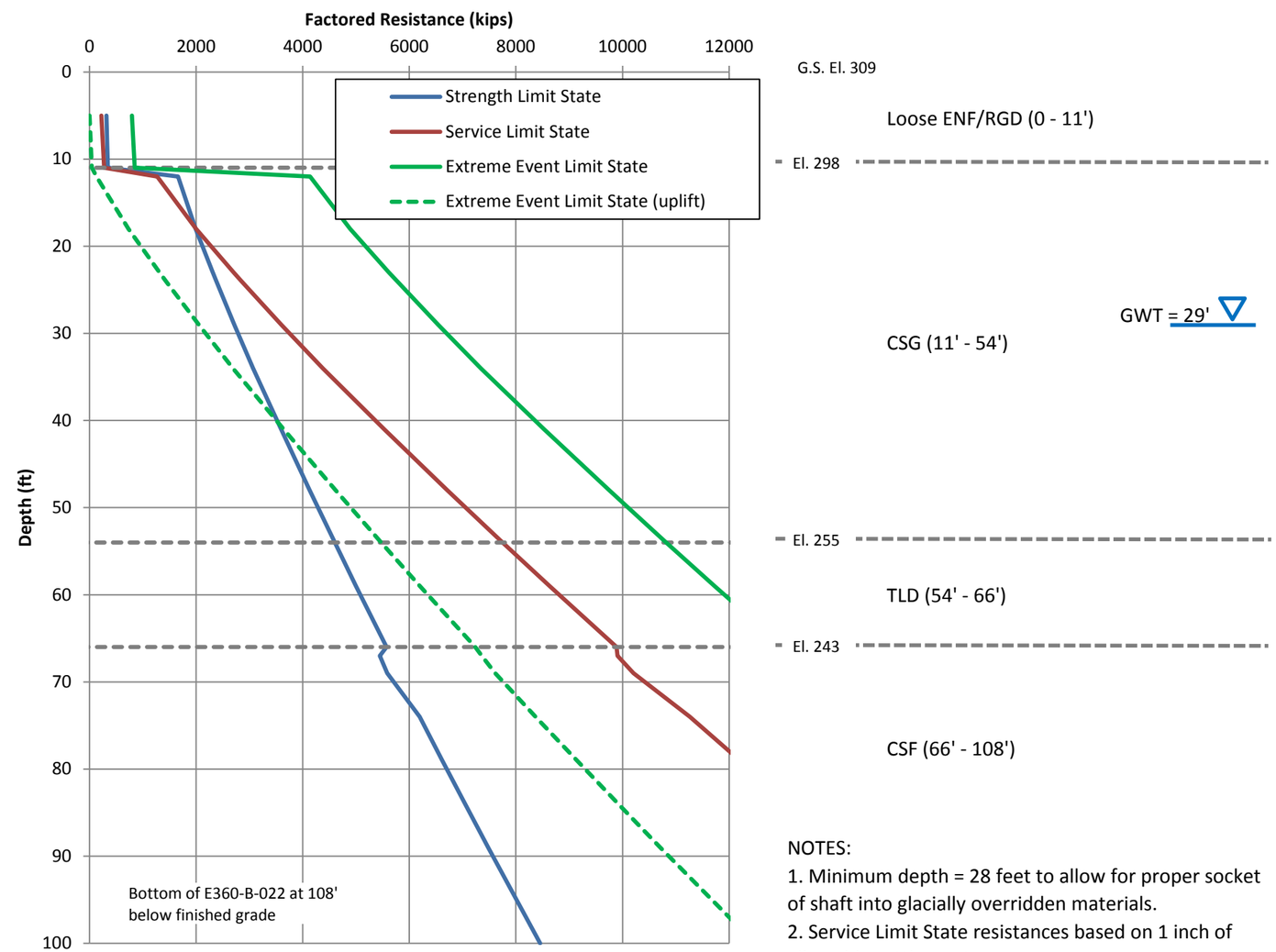
Figure 45
Factored Shaft Resistance
Bent D70

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft



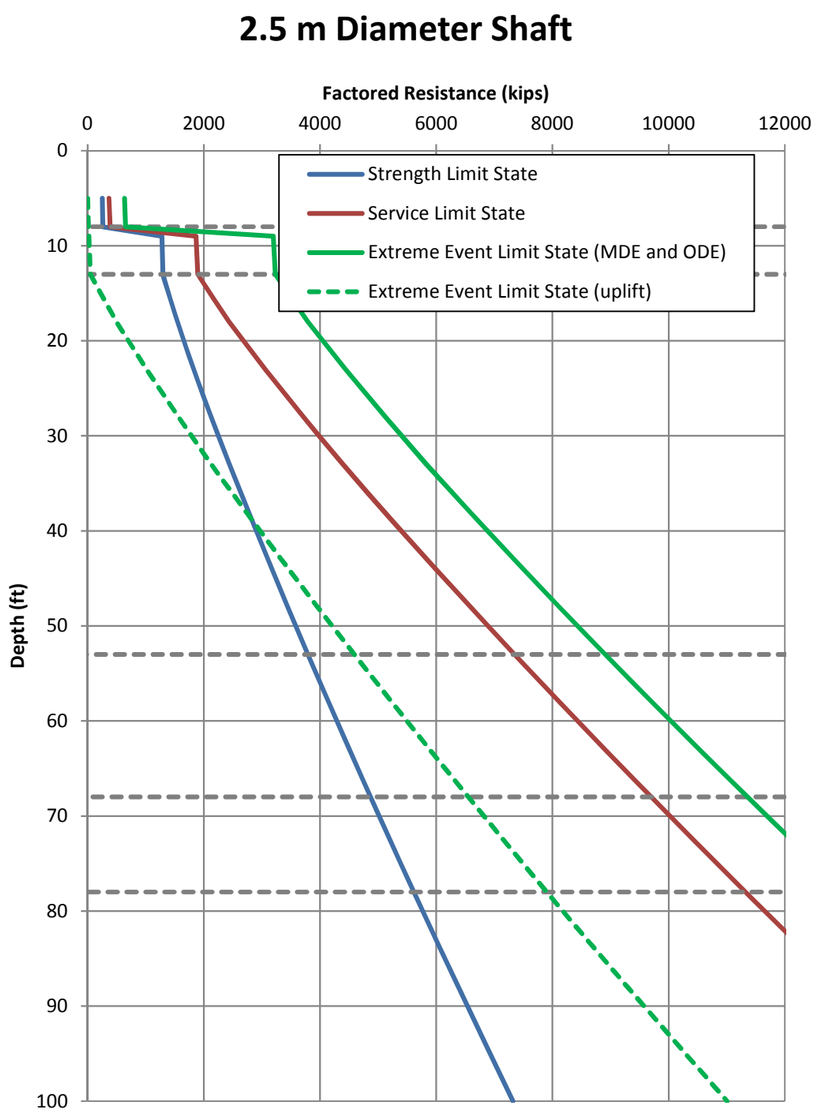
NOTES:
1. Minimum depth = 28 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

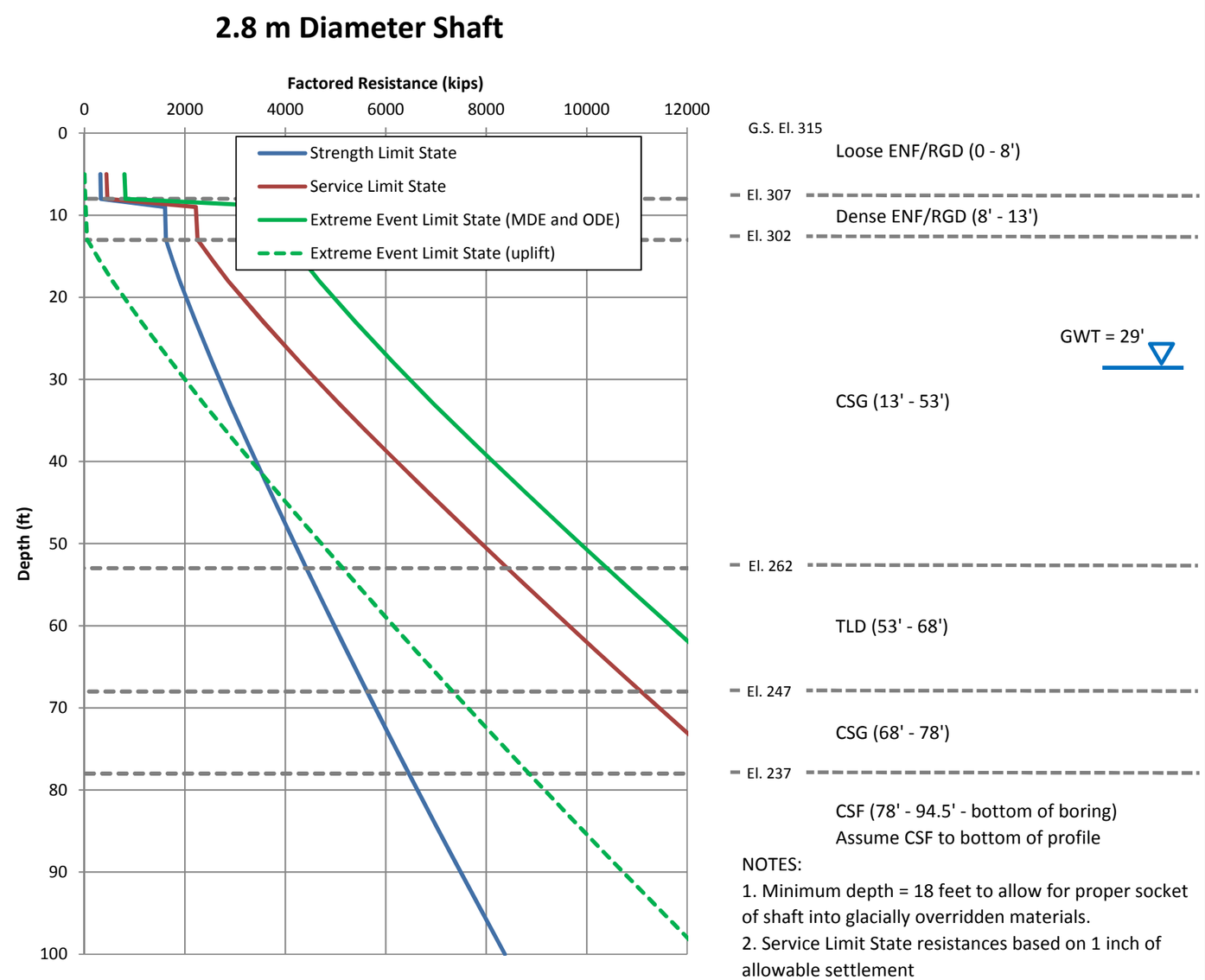
Bent D71 (Boring E360-B-022)

McMILLEN JACOBS ASSOCIATES

Figure 46
Factored Shaft Resistance
Bent D71

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985





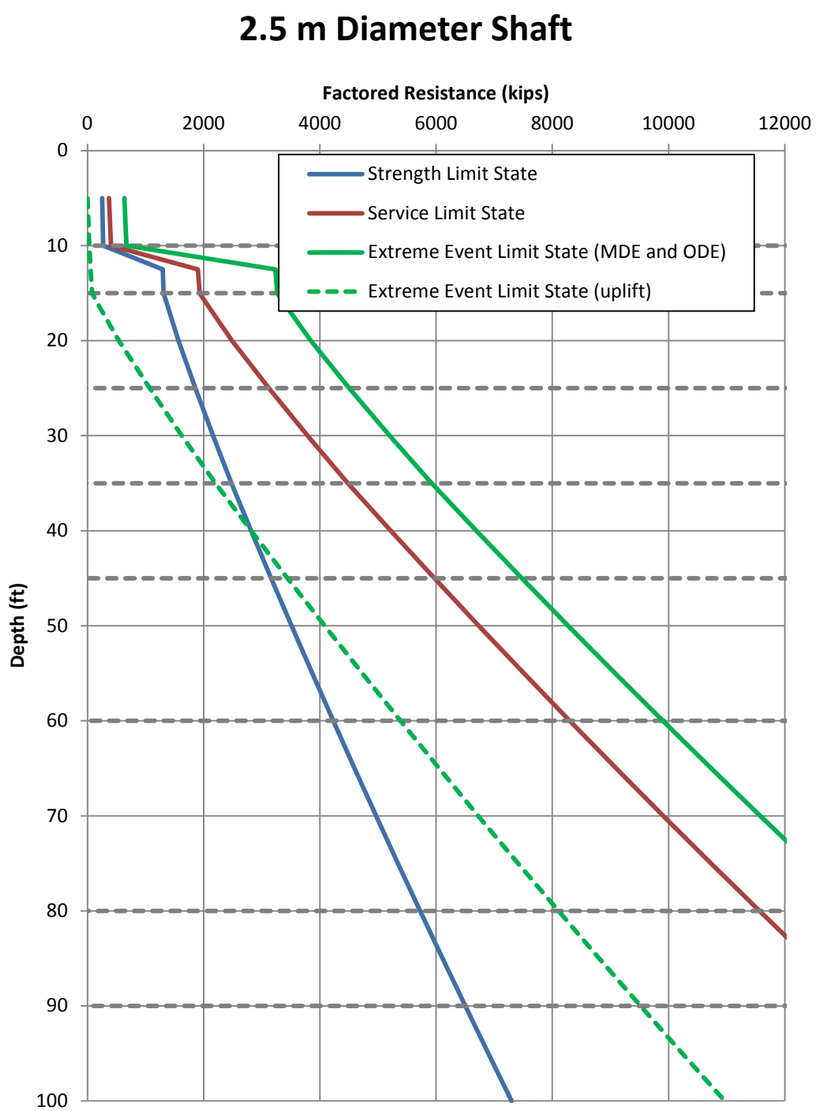
NOTES:
1. Minimum depth = 18 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

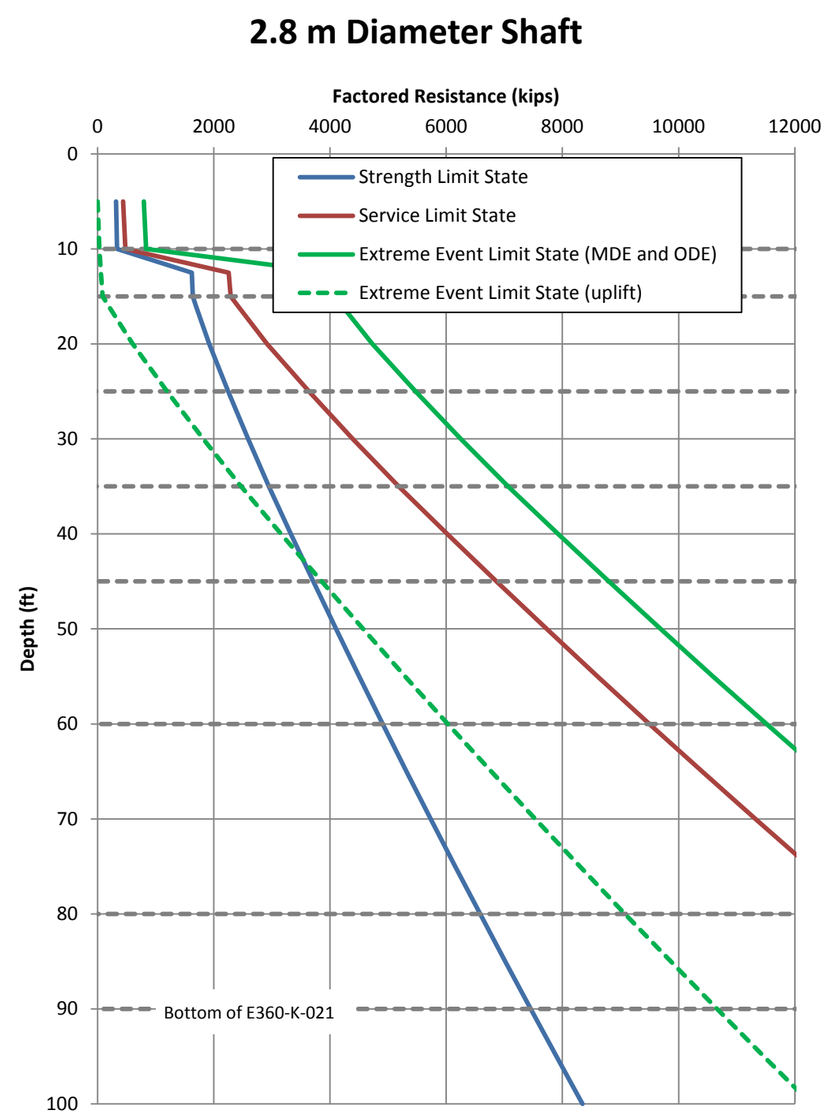
Bent D72 (Boring E360-K-020)

McMILLEN JACOBS ASSOCIATES

Figure 47
Factored Shaft Resistance
Bent D72

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985





G.S. El. 321

Loose ENF/RGD (0 - 10')

El. 311

Dense ENF/RGD (10' - 15')

El. 306

CSG (15' - 25')

El. 296

TLD (25' - 35')

GWT = 34'

El. 286

CSG (35' - 45')

El. 276

TLD (45' - 60')

El. 261

CSG (60' - 80')

El. 241

CSF (80' - 90'); CSG found in last 0.3' of boring, assume CSG below 90'

NOTES:

1. Minimum depth = 20 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

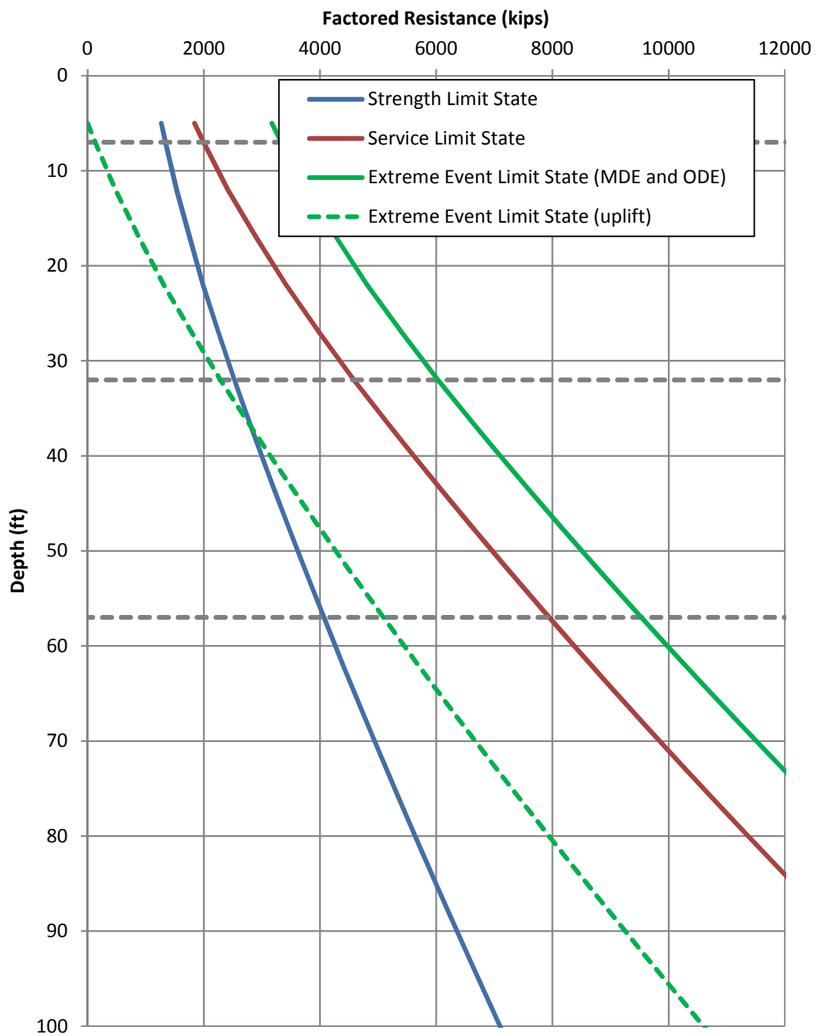
Bent D73 (Boring E360-K-021)

McMILLEN JACOBS ASSOCIATES

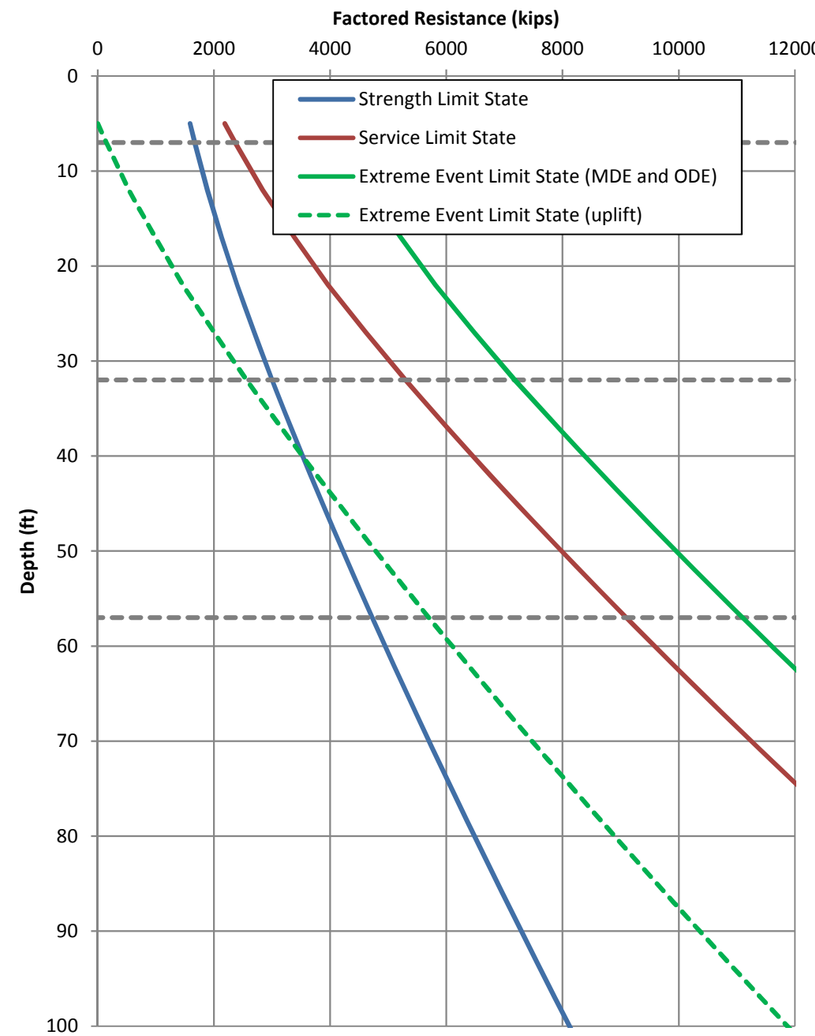
Figure 48
Factored Shaft Resistance
Bent D73

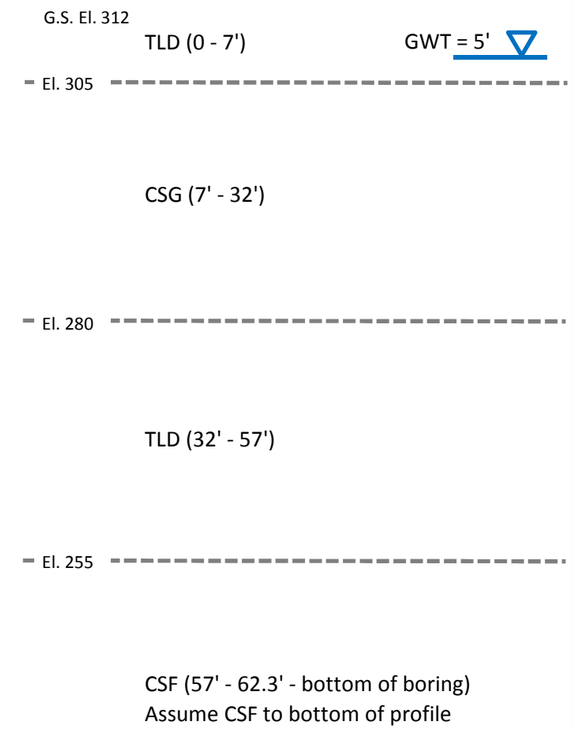
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft





NOTES:

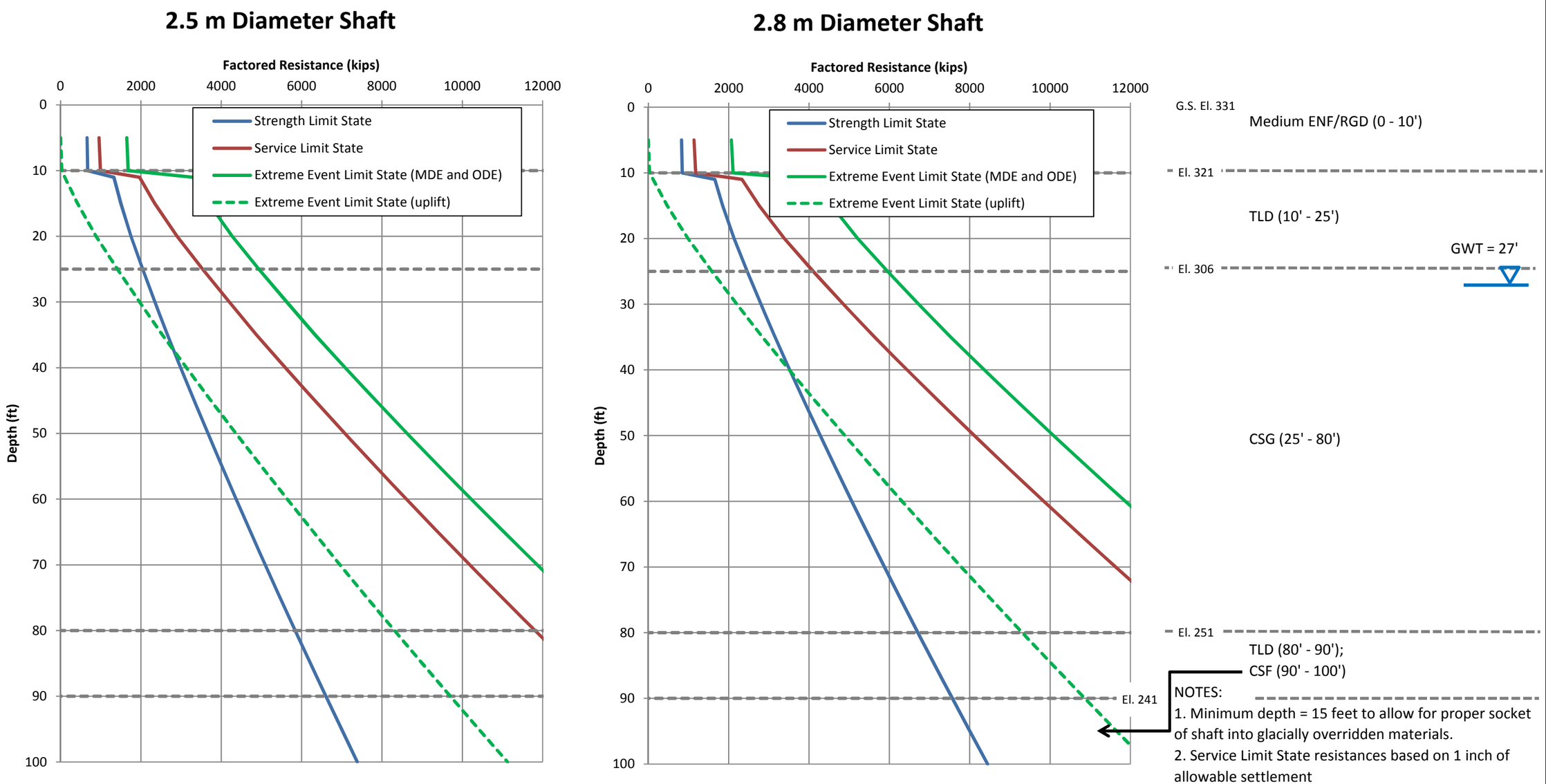
1. Analysis and depths based on future ground surface elevation 312 (Future WSDOT ramp).
2. Minimum depth = 5 feet to allow for proper socket of shaft into glacially overridden materials.
3. Service Limit State resistances based on 1 inch of allowable settlement

Bent D74 - Revised Location (Boring E360-K-022)

McMILLEN JACOBS ASSOCIATES

Figure 49
Factored Shaft Resistance
Bent D74 - Revised Location

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

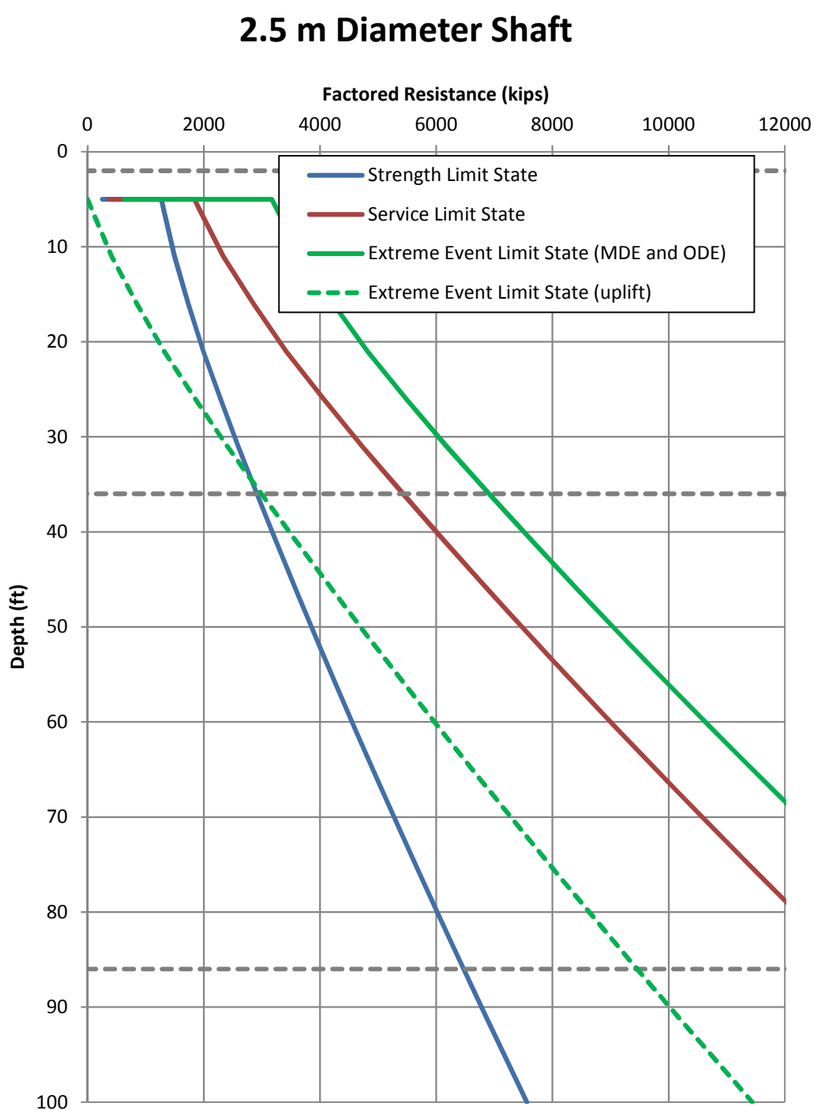


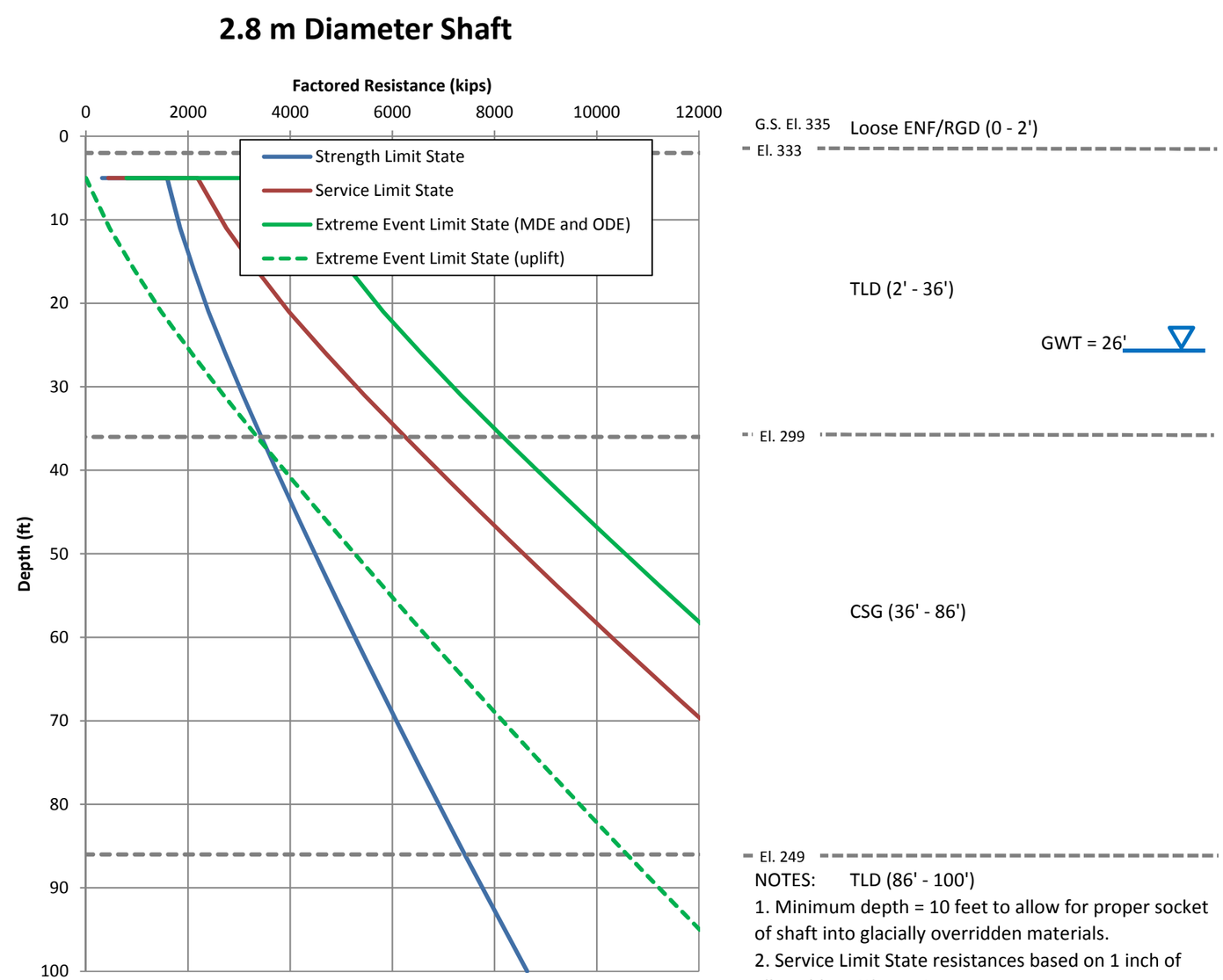
Bent D76 (Boring B-D-ES-11p)

McMILLEN JACOBS ASSOCIATES

Figure 50
Factored Shaft Resistance
Bent D76

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985





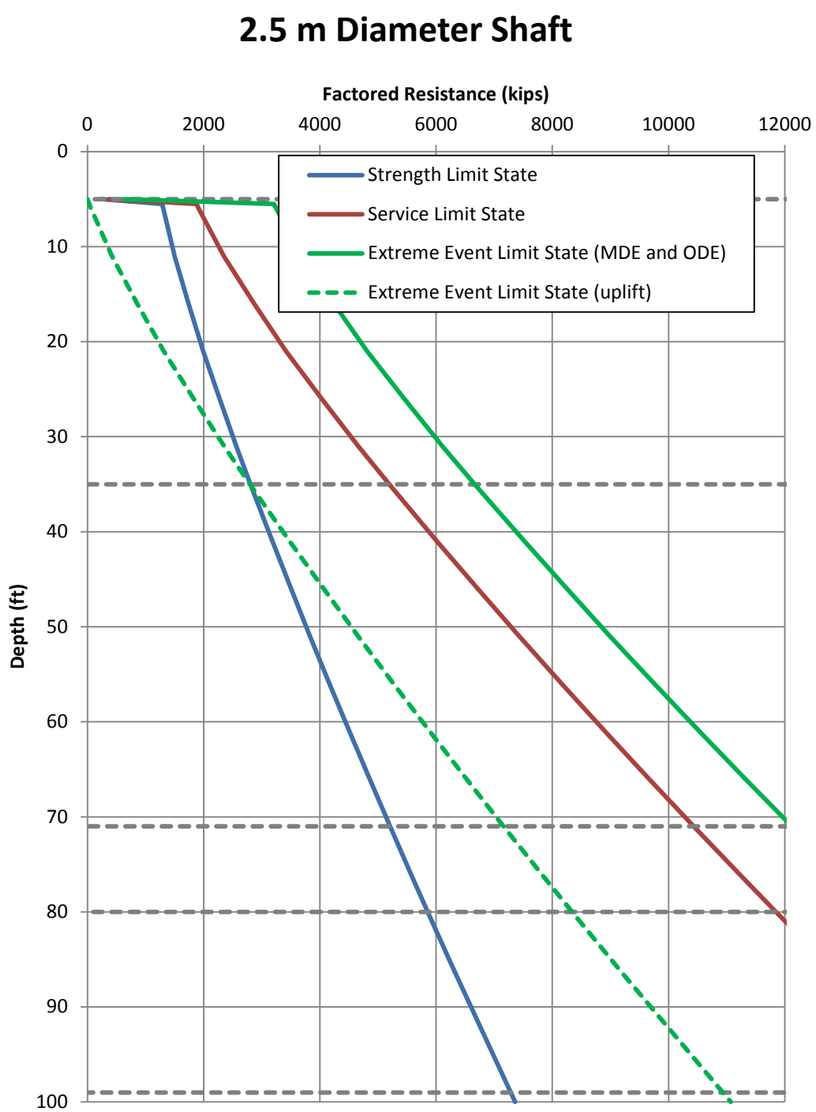
NOTES:
1. Minimum depth = 10 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

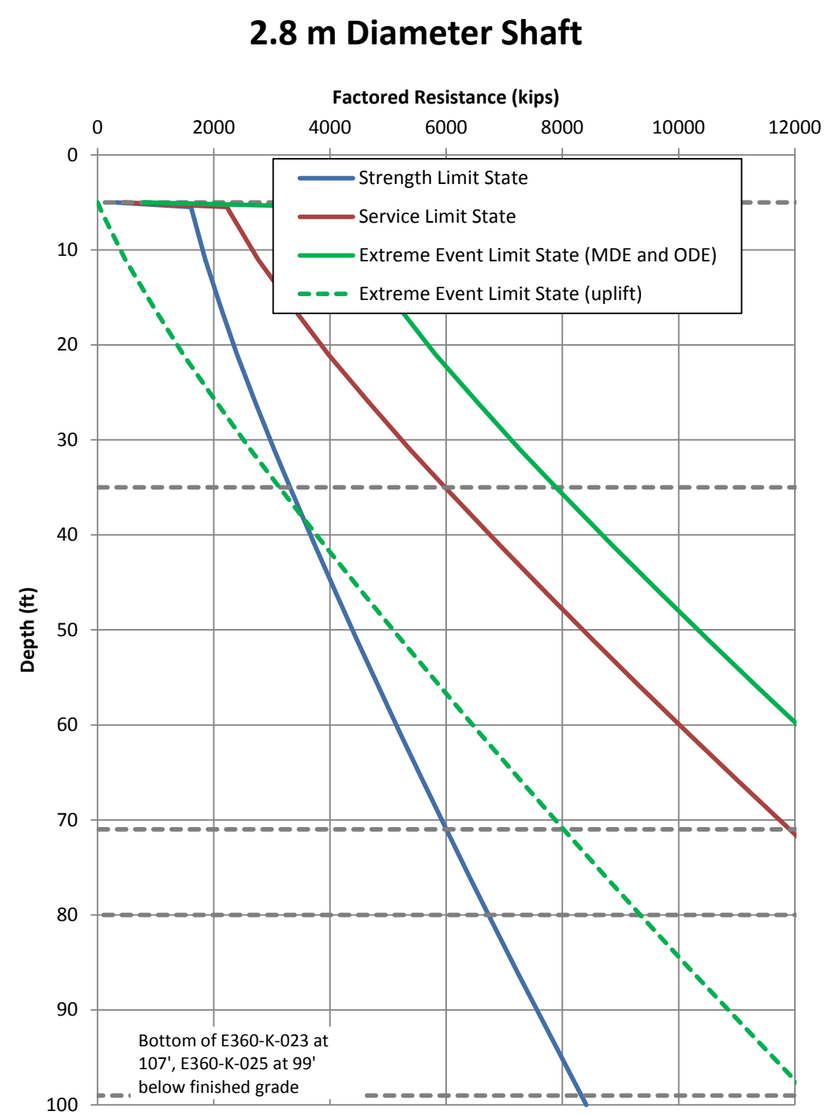
Bent D77 (Boring E360-K-023)

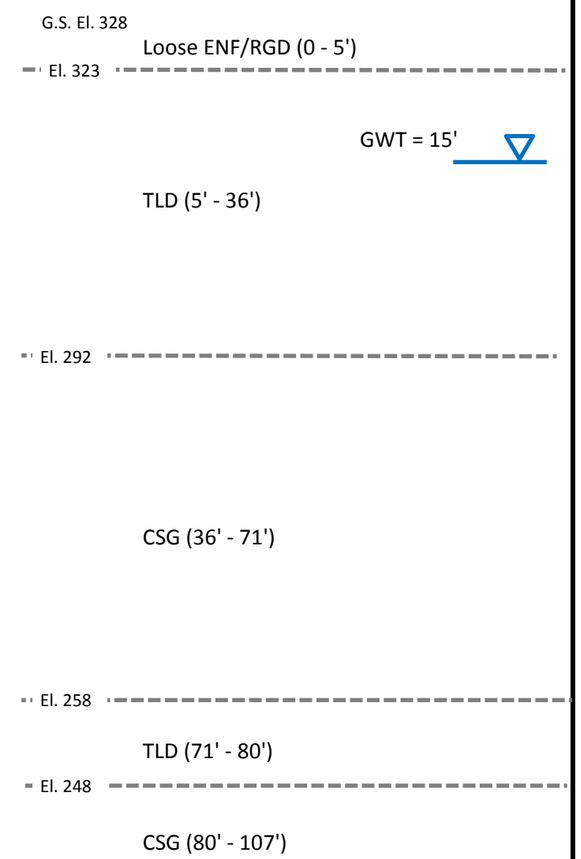
McMILLEN JACOBS ASSOCIATES

Figure 51
Factored Shaft Resistance
Bent D77

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985







NOTES:
1. Minimum depth = 10 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

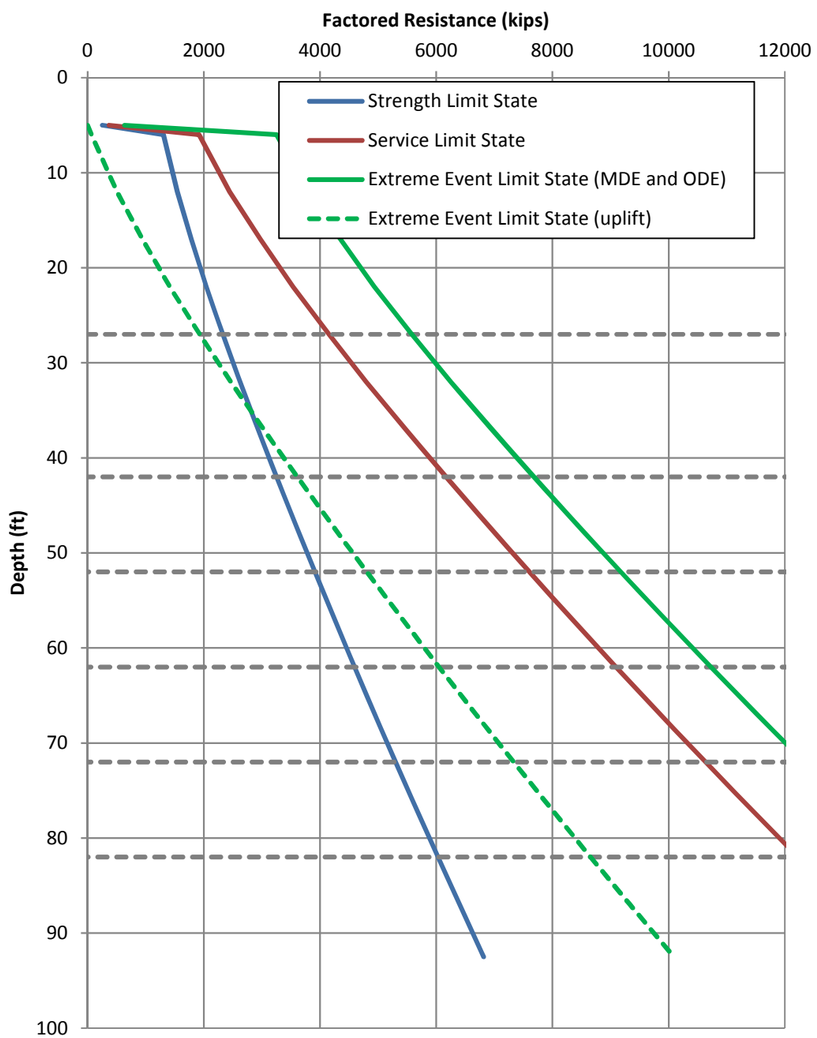
Bent D78 (Borings E360-K-023 and E360-K-025)

McMILLEN JACOBS ASSOCIATES

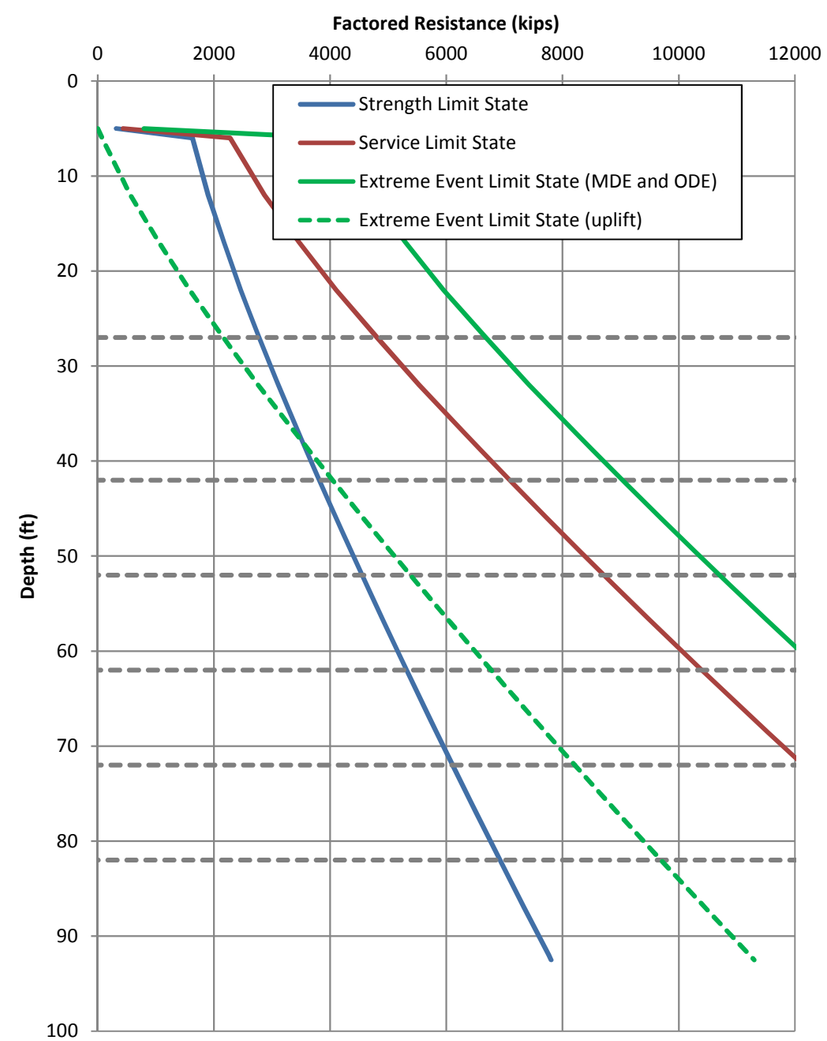
Figure 52
Factored Shaft Resistance
Bent D78

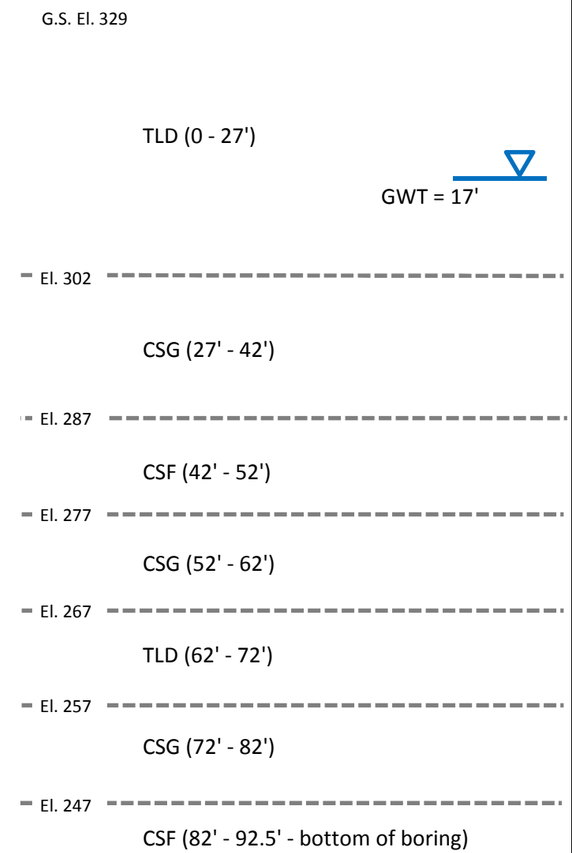
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft





NOTES:

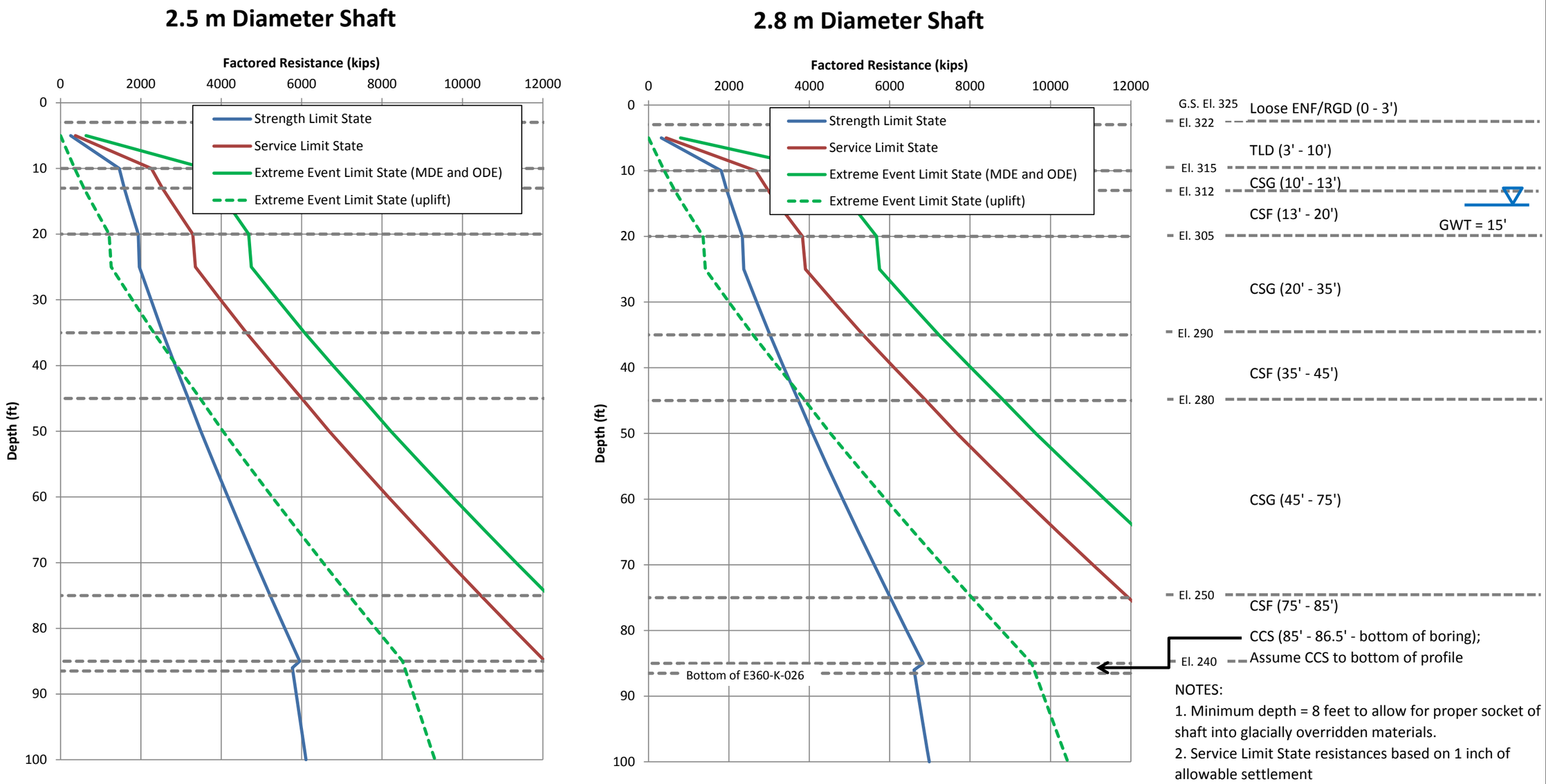
1. Minimum depth = 9 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

Bent D79 (Boring E360-K-025)

McMILLEN JACOBS ASSOCIATES

Figure 53
Factored Shaft Resistance
Bent D79

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



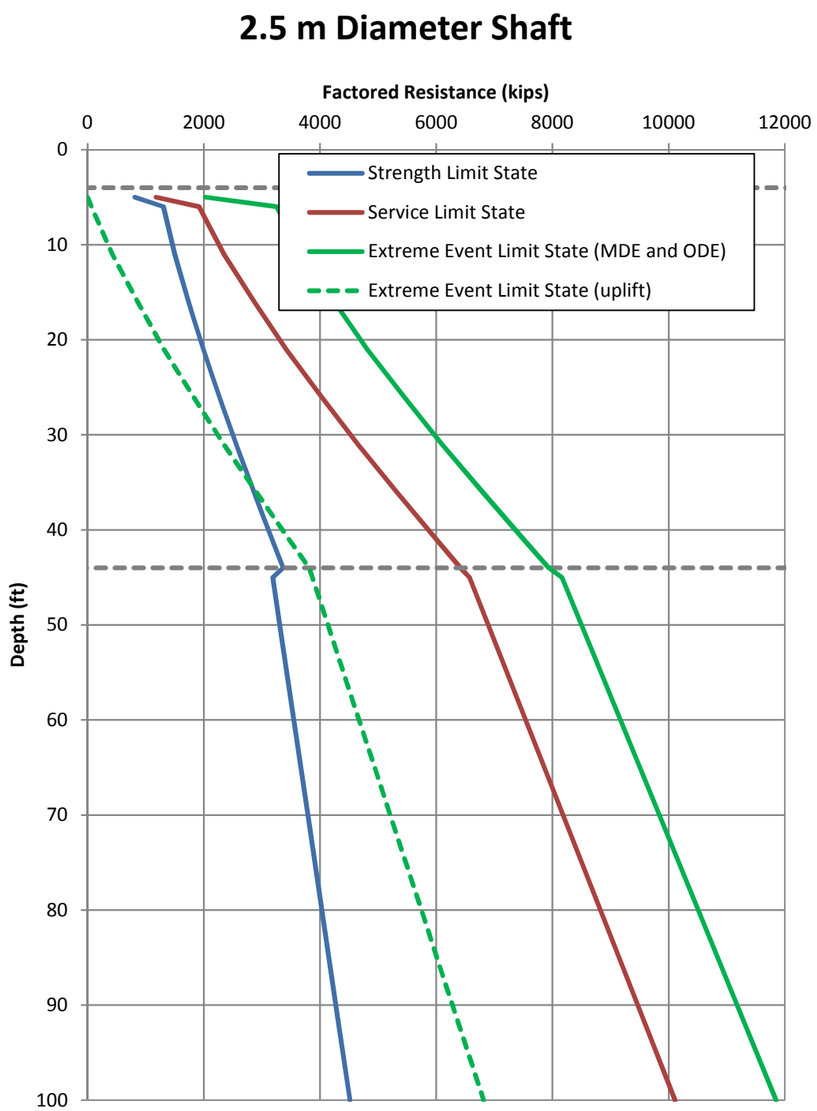
NOTES:
1. Minimum depth = 8 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

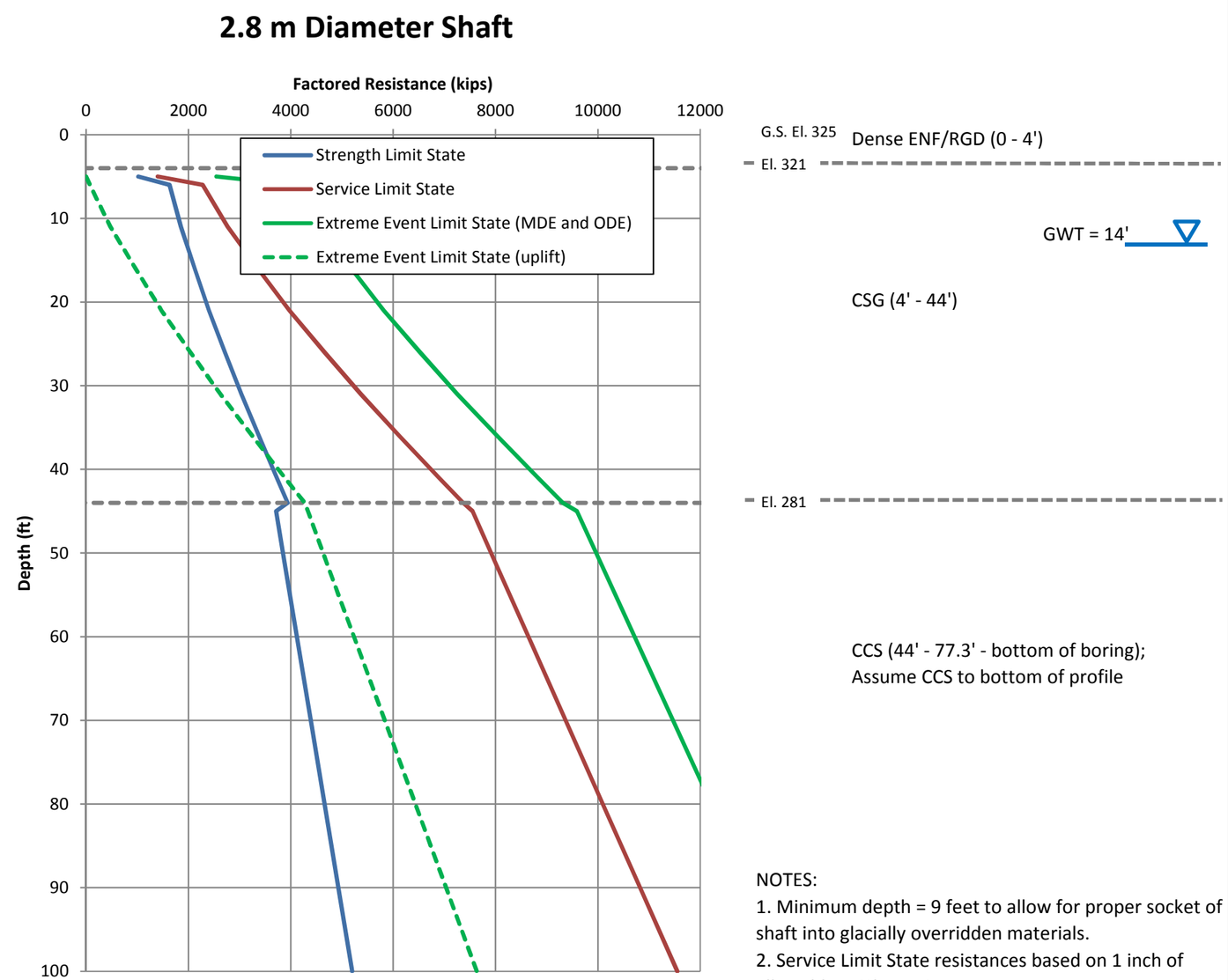
Bent D80 (Boring E360-K-026)

McMILLEN JACOBS ASSOCIATES

Figure 54
Factored Shaft Resistance
Bent D80

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985





NOTES:
1. Minimum depth = 9 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

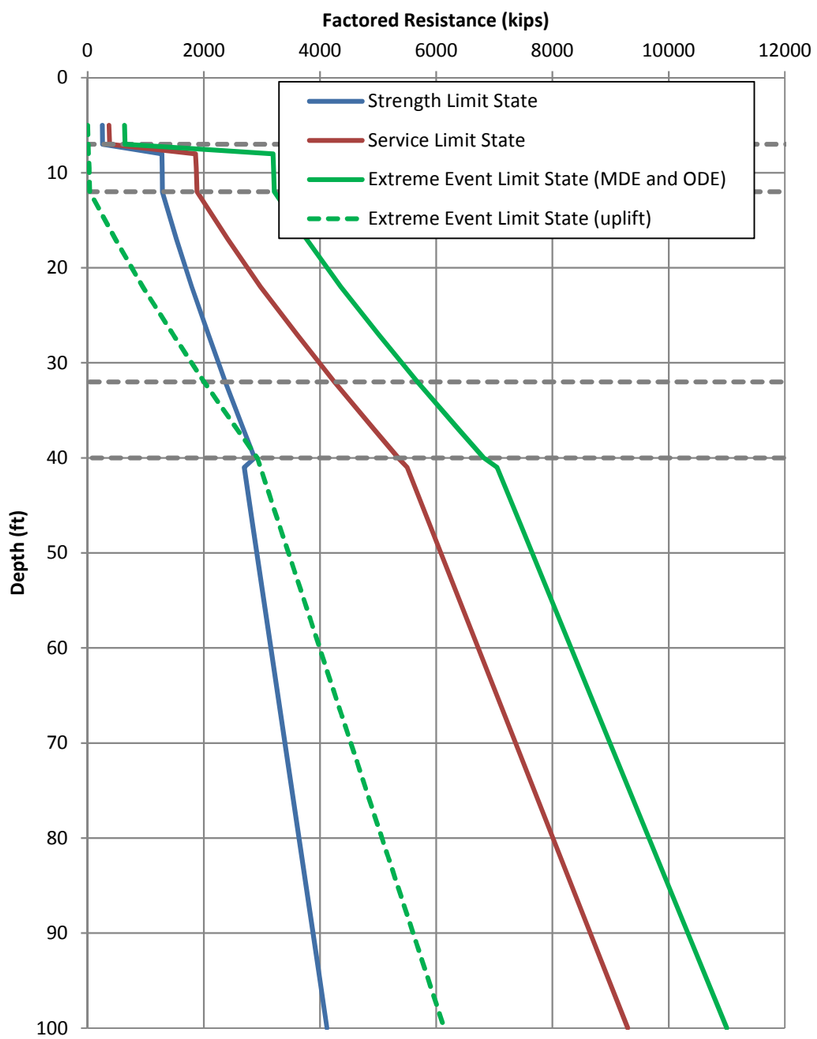
Bent D81 (Boring E360-K-027)

McMILLEN JACOBS ASSOCIATES

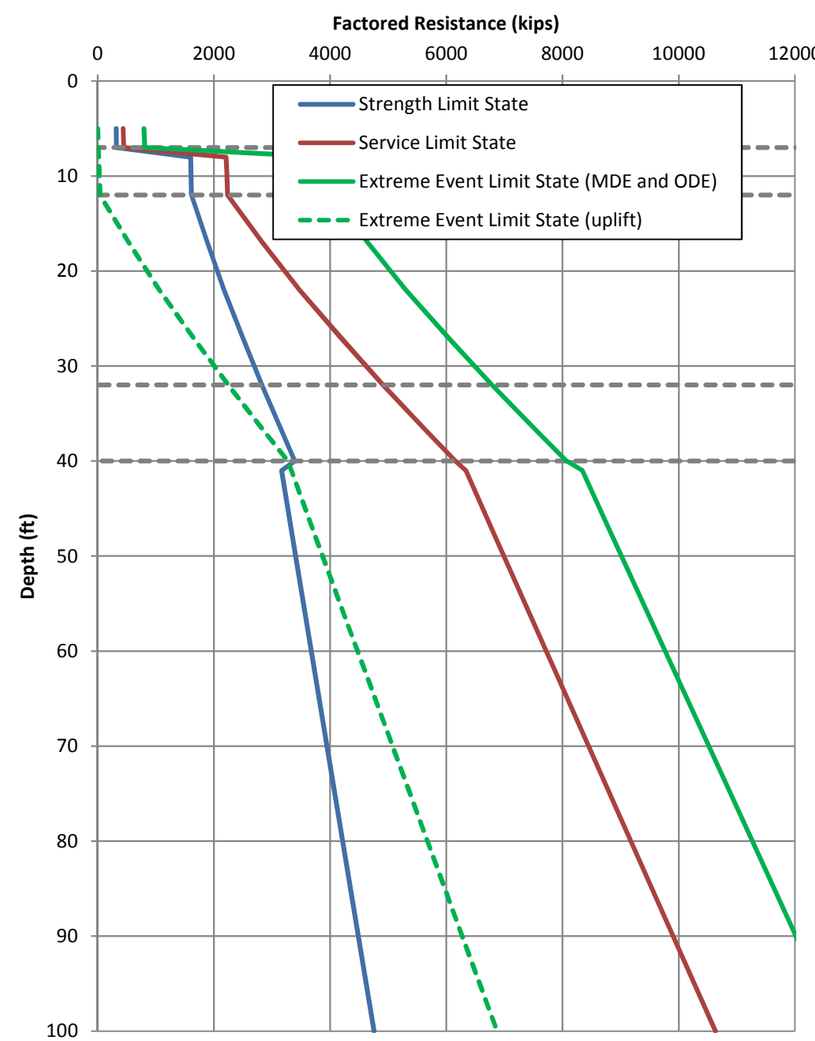
Figure 55
Factored Shaft Resistance
Bent D81

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.5 m Diameter Shaft



2.8 m Diameter Shaft



G.S. El. 327

Loose ENF/RGD (0 - 7')

El. 320

Dense ENF/RGD (7' - 12')

El. 315

GWT = 18'

CSG (12' - 32')

El. 295

TLD (32' - 40')

El. 287

CCS (40' - 83.5' - bottom of boring);
Assume CCS to bottom of profile

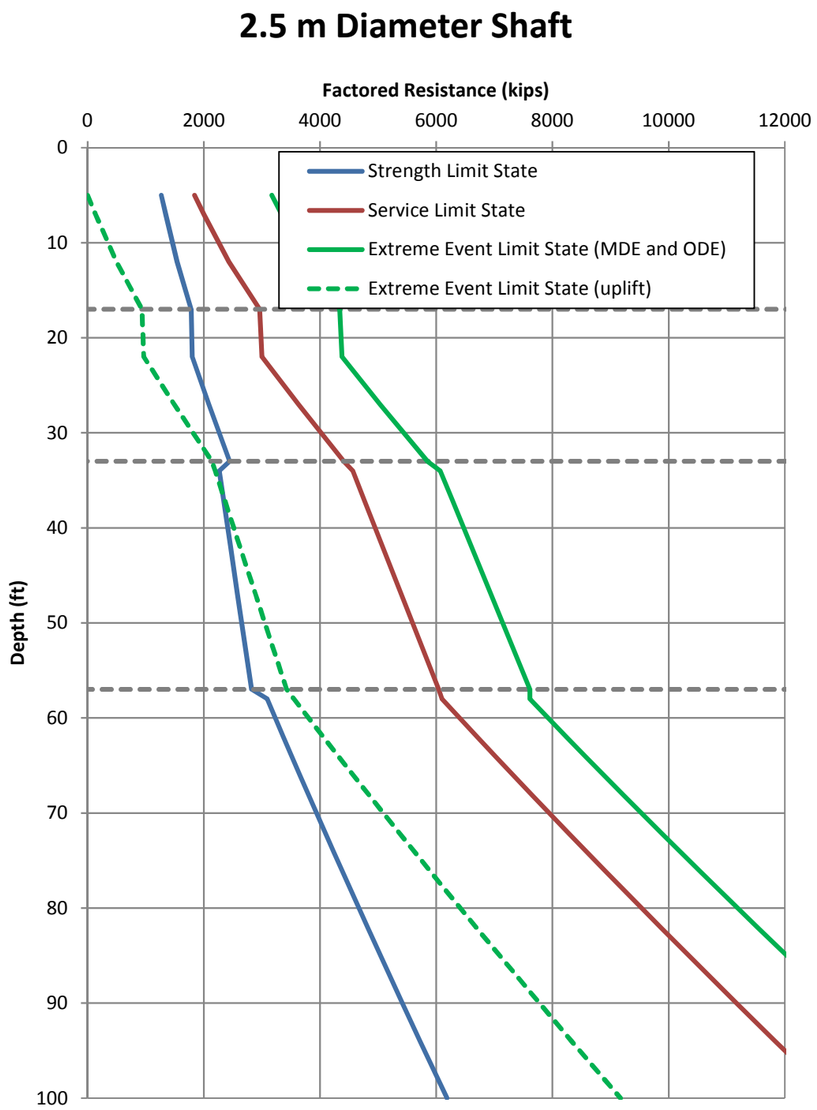
NOTES:
1. Minimum depth = 17 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

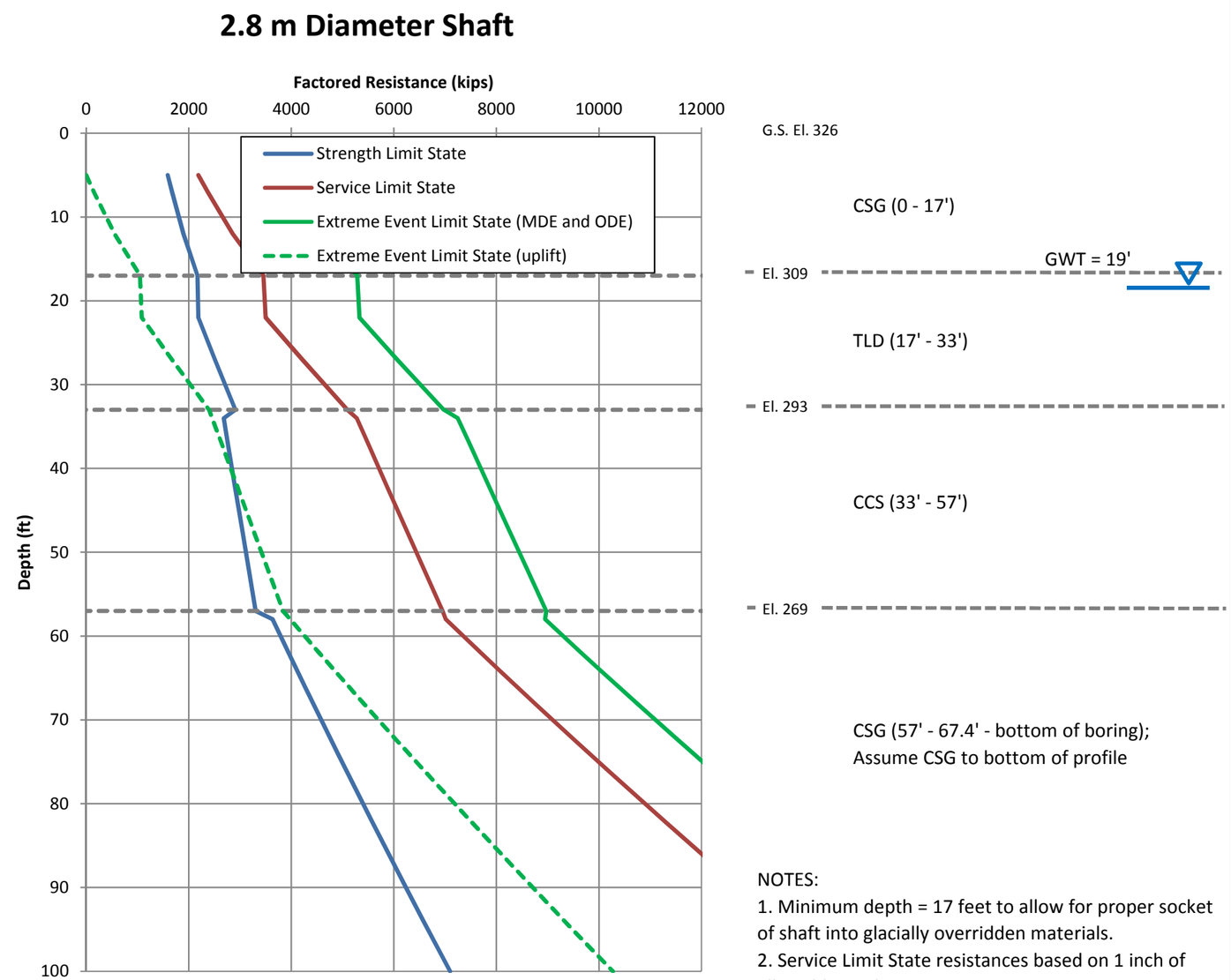
Bent D82 (Boring E360-K-028)

McMILLEN JACOBS ASSOCIATES

Figure 56
Factored Shaft Resistance
Bent D82

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985





NOTES:
1. Minimum depth = 17 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

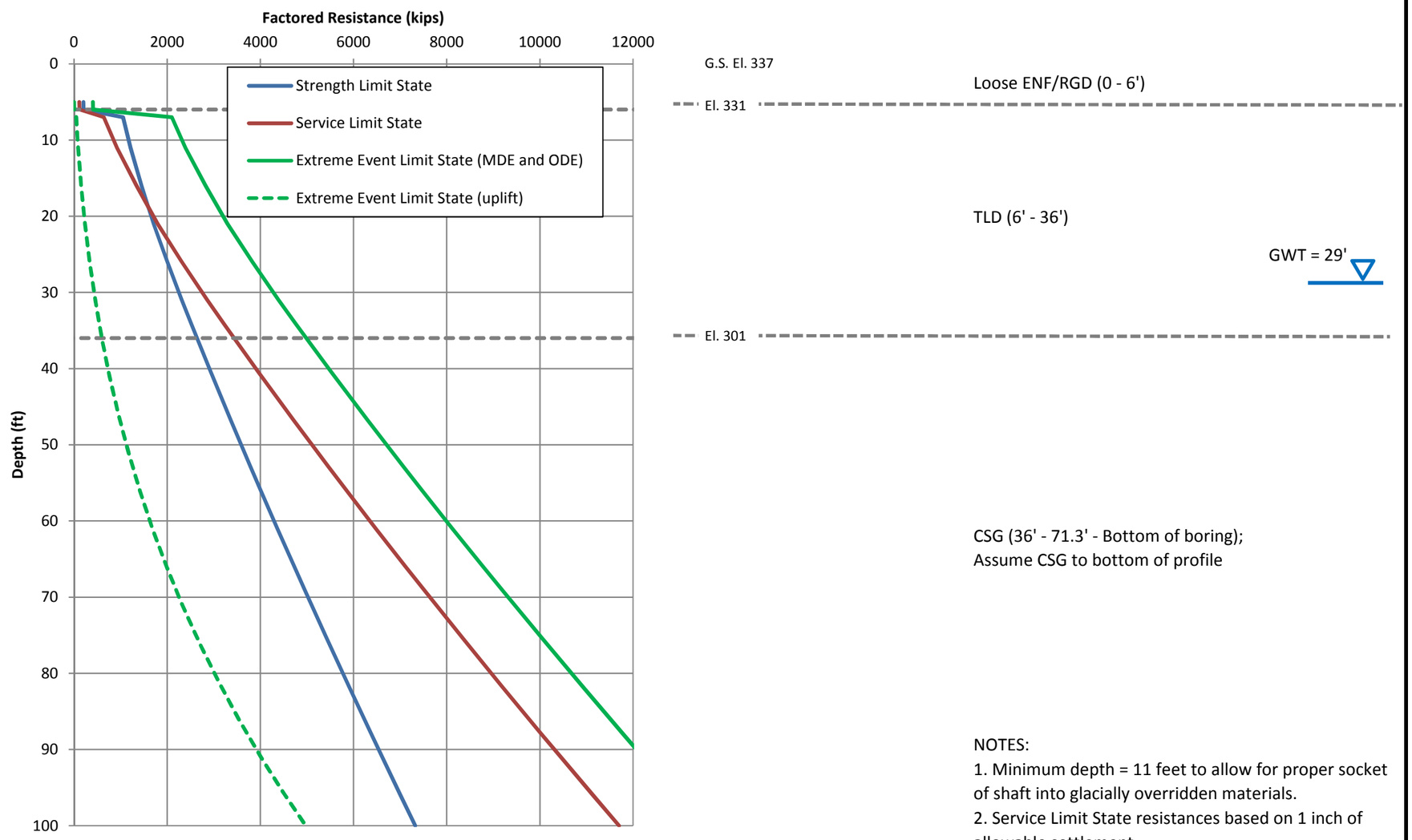
Bent D83 (Boring E360-K-029)

McMILLEN JACOBS ASSOCIATES

Figure 57
Factored Shaft Resistance
Bent D83

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

2.0 m Diameter Shaft



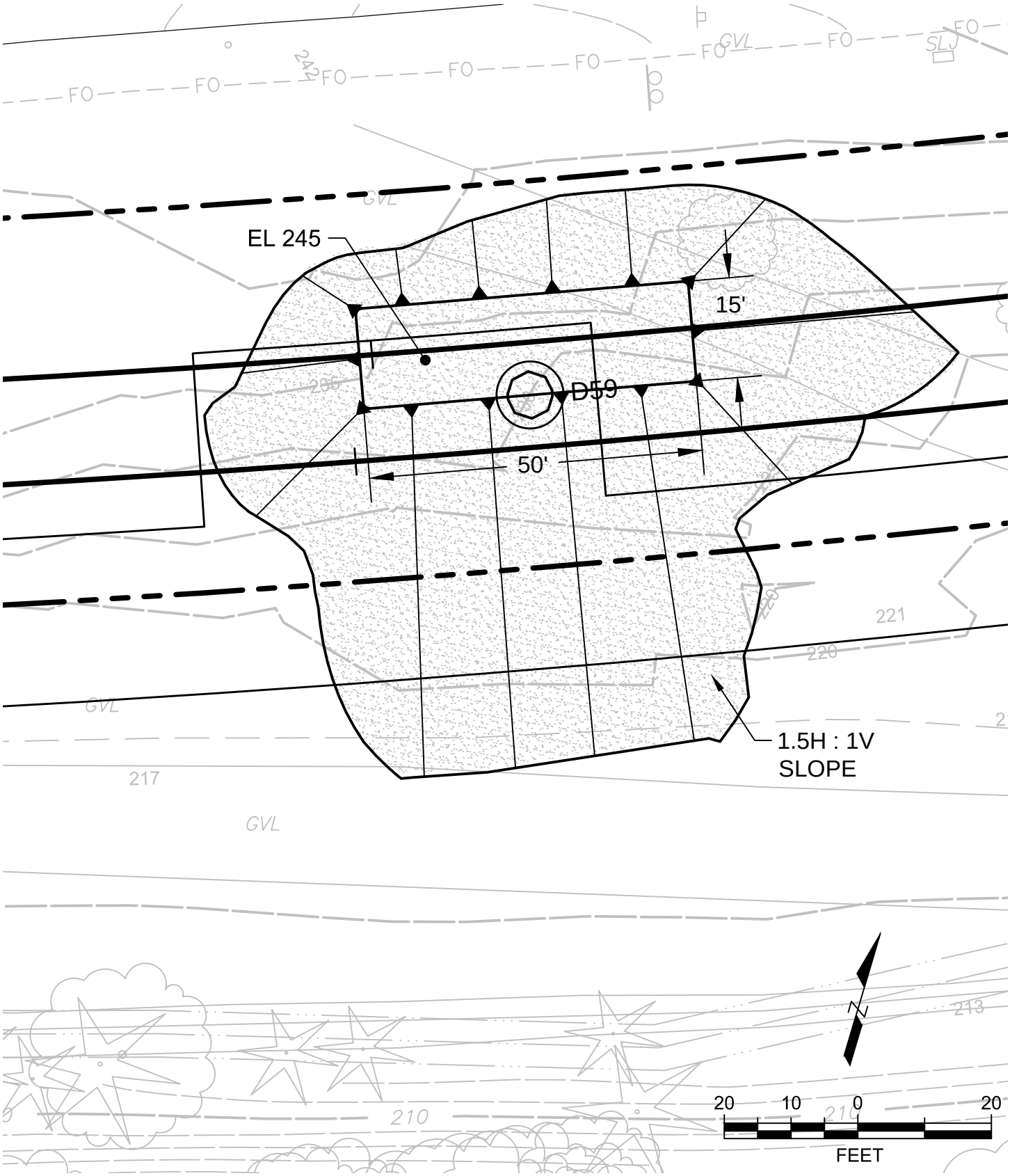
NOTES:
1. Minimum depth = 11 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

Bent D84 (Boring E360-K-030)

McMILLEN JACOBS ASSOCIATES

Figure 58
Factored Shaft Resistance
Bent D84

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

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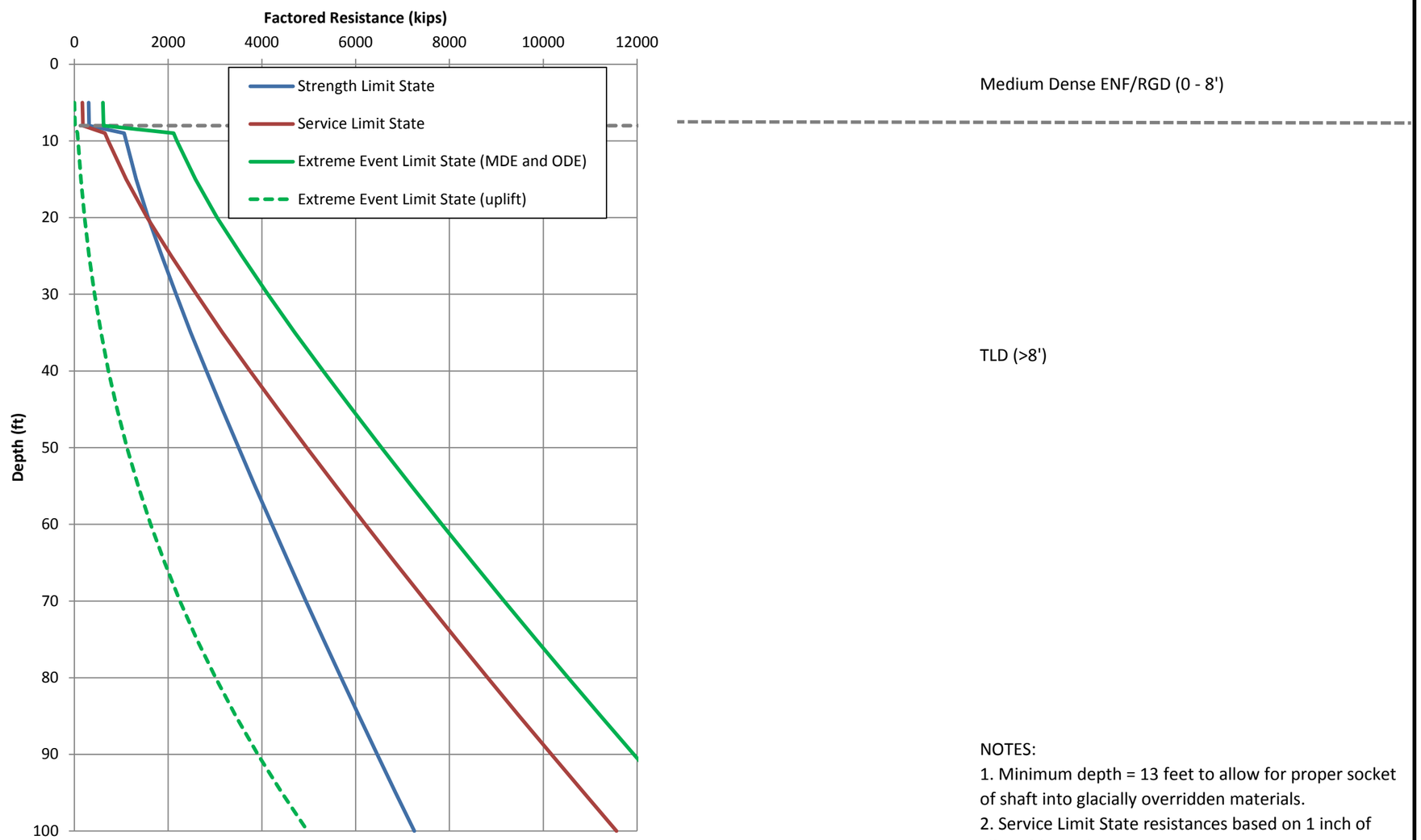
FIGURE 59
Preload at Bent D59

2.0 m Diameter Shaft



NOTES:
1. Minimum depth = 13 feet to allow for proper socket of shaft into glacially overridden materials.
2. Service Limit State resistances based on 1 inch of allowable settlement

OVS Pedestrian Bridge

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Figure 60
Factored Shaft Resistance
OVS Pedestrian Bridge

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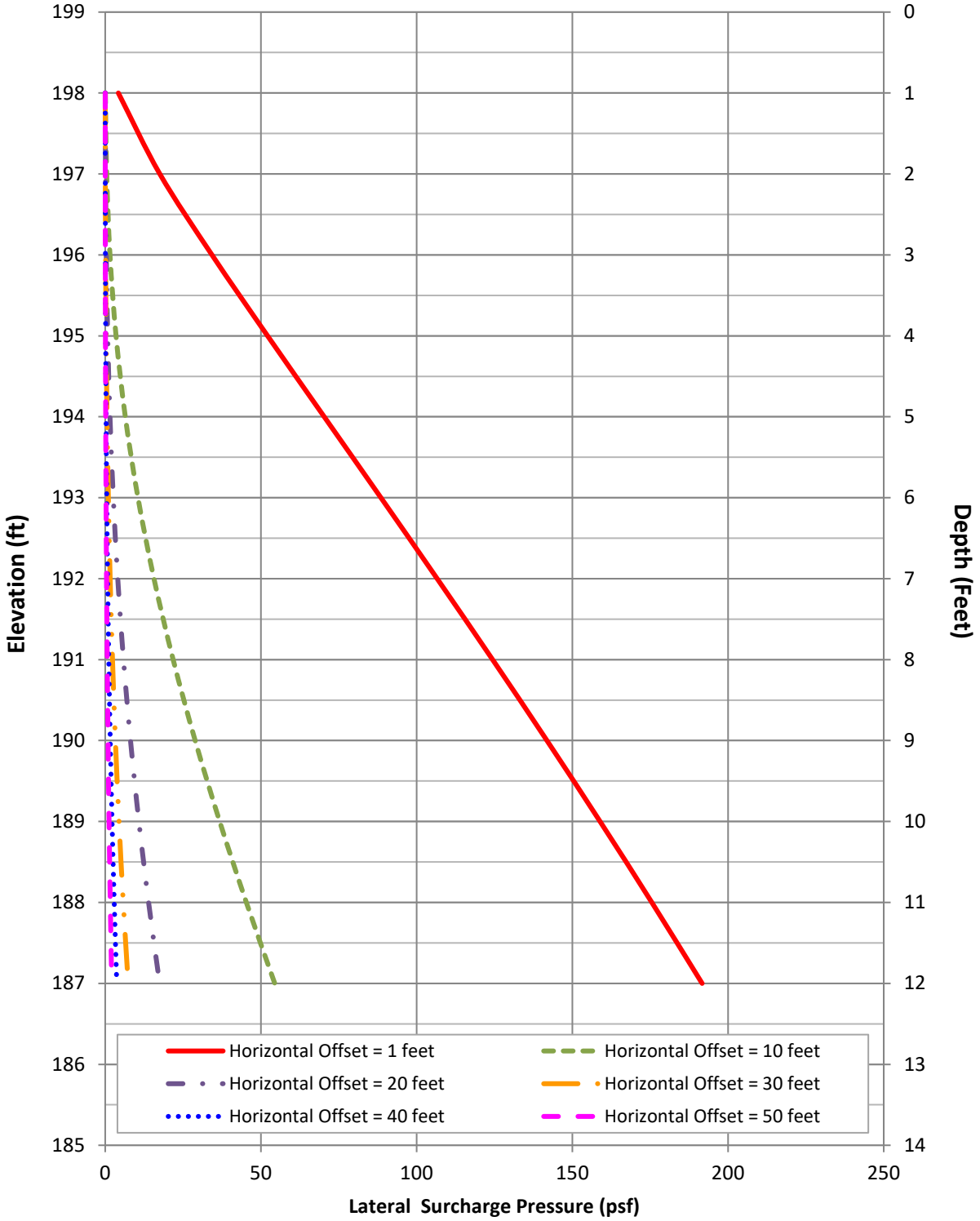
BLDG-2018-00983, BLDG-2018-00985

Vertical Surcharge Pressures Applied on the Park Place Vault from MSE Wall Preload Fill



Notes:

1. Ground surface at Park Place Vault is assumed to be Elevation 199 feet (NAVD88).
2. Horizontal Offset is from the toe of a preload fill 2H:1V slope with an assumed height of 13 feet.

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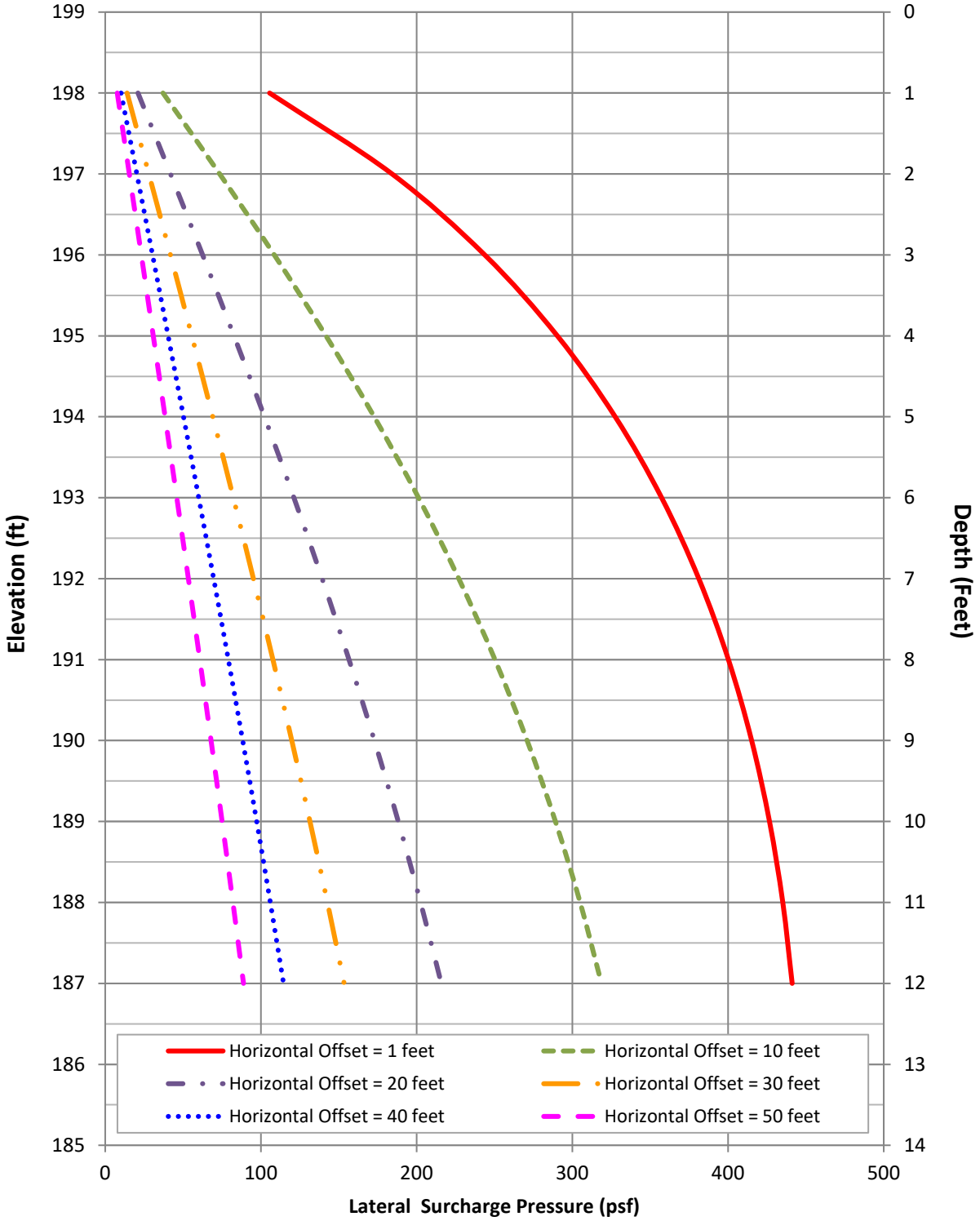
BLDG-2018-00983, BLDG-2018-00985

Lateral Surcharge Pressures Applied on the Park Place Vault from MSE Wall Preload Fill



Notes:

1. Ground surface at Park Place Vault is assumed to be Elevation 199 feet (NAVD88).
2. Horizontal Offset is from the toe of a preload fill 2H:1V slope with an assumed height of 13 feet.

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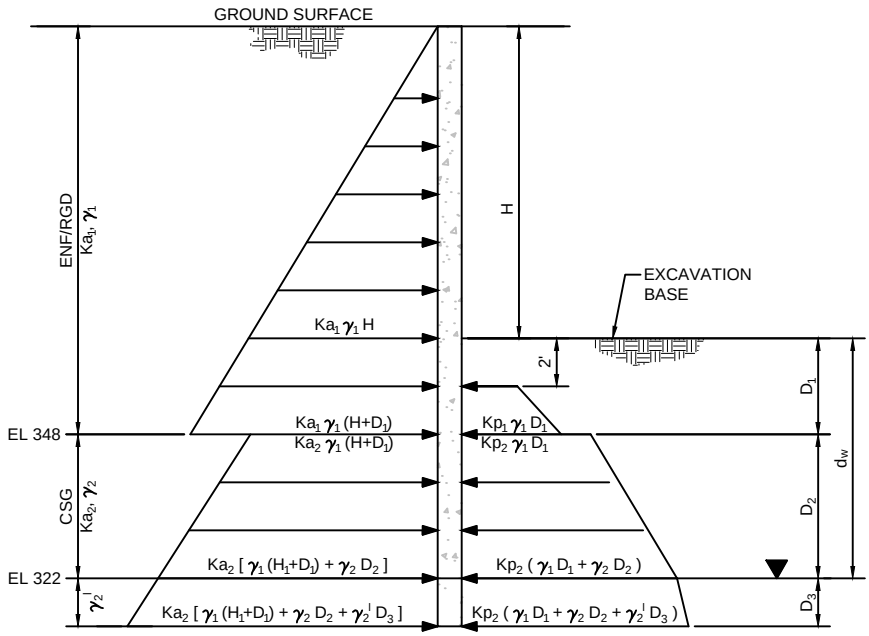
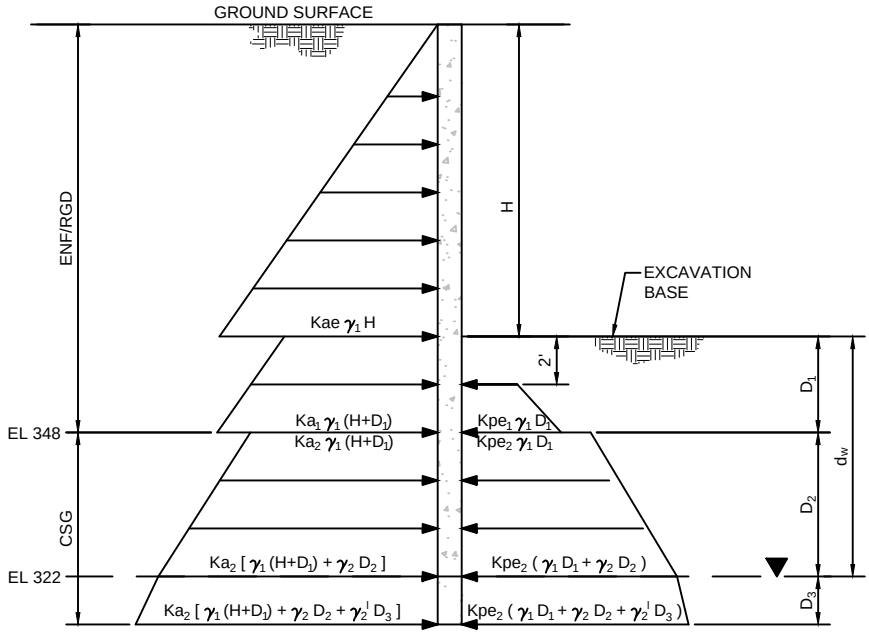
BLDG-2018-00983, BLDG-2018-00985



STATIC CASE

LEGEND:

H = WALL HEIGHT
D = EMBEDMENT DEPTH = $D_1+D_2+D_3$
d_w = DEPTH TO GROUNDWATER
γ = TOTAL UNIT WEIGHT OF SOIL
γ' = SUBMERGED UNIT WEIGHT OF SOIL
Ka = ACTIVE EARTH PRESSURE COEFFICIENT
Kp = PASSIVE EARTH PRESSURE COEFFICIENT
Kae = SEISMIC ACTIVE EARTH PRESSURE COEFFICIENT
Kpe = SEISMIC PASSIVE EARTH PRESSURE COEFFICIENT
▼ =GROUNDWATER LEVEL



SEISMIC CASE

NOTES:
(STATIC AND SEISMIC CASE)

1. ALL DIMENSIONS IN FEET.
2. ALL PRESSURES IN POUNDS PER SQUARE FOOT (PSF).
3. ACTIVE PRESSURE ACTS OVER ENTIRE WALL FACE ABOVE EXCAVATION BASE AND OVER ONE CONCRETED SOLDIER PILE DIAMETER BELOW EXCAVATION BASE.
4. PASSIVE PRESSURE ACTS OVER THREE TIMES CONCRETED SOLDIER PILE DIAMETER OR THE PILE SPACING, WHICHEVER IS LESS.
5. IGNORE THE UPPER 2 FEET OF EMBEDMENT FOR PASSIVE RESISTANCE.
6. FOR CONSTRUCTION AND STORAGE SURCHARGE INCLUDE A UNIFORM LATERAL PRESSURE OF 240 PSF FROM THE GROUND SURFACE TO A DEPTH OF 10 FEET AND 120 PSF FROM A DEPTH OF 10 FEET TO 20 FEET. ADDITIONAL SURCHARGE MUST BE DEVELOPED BY CONTRACTOR FOR GREATER LOADS.
7. PASSIVE PRESSURE SHOWN IS UNFACTORED. APPLY RESISTANCE FACTOR IN ACCORDANCE WITH AASHTO.
8. FOR ODE, Kh = As (PGA)
   FOR MDE, Kh = 1/2As (PGA)
   ASSUMING WALL CAN WITHSTAND 1 TO 2 INCHES OF DEFORMATION.

BASIC SOIL PARAMETERS - WALL EBW-5

SOIL	γ (pcf)	γ' (pcf)	ϕ (degrees)	c
ENF/RGD (1)	124	61.6	32	0
CSG (2)	128	65.6	39	0

DESIGN PARAMETERS FOR LATERAL LOADS - WALL EBW-5

SOIL	Ka	Kp	ODE		MDE	
			Kae	Kpe	Kae	Kpe
ENF/RGD (1)	0.31	5.9	0.444	4.7	0.516	4.5
CSG (2)	0.23	11.1	N/A	8.6	N/A	8.0

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BLDG-2018-00983, BLDG-2018-00985

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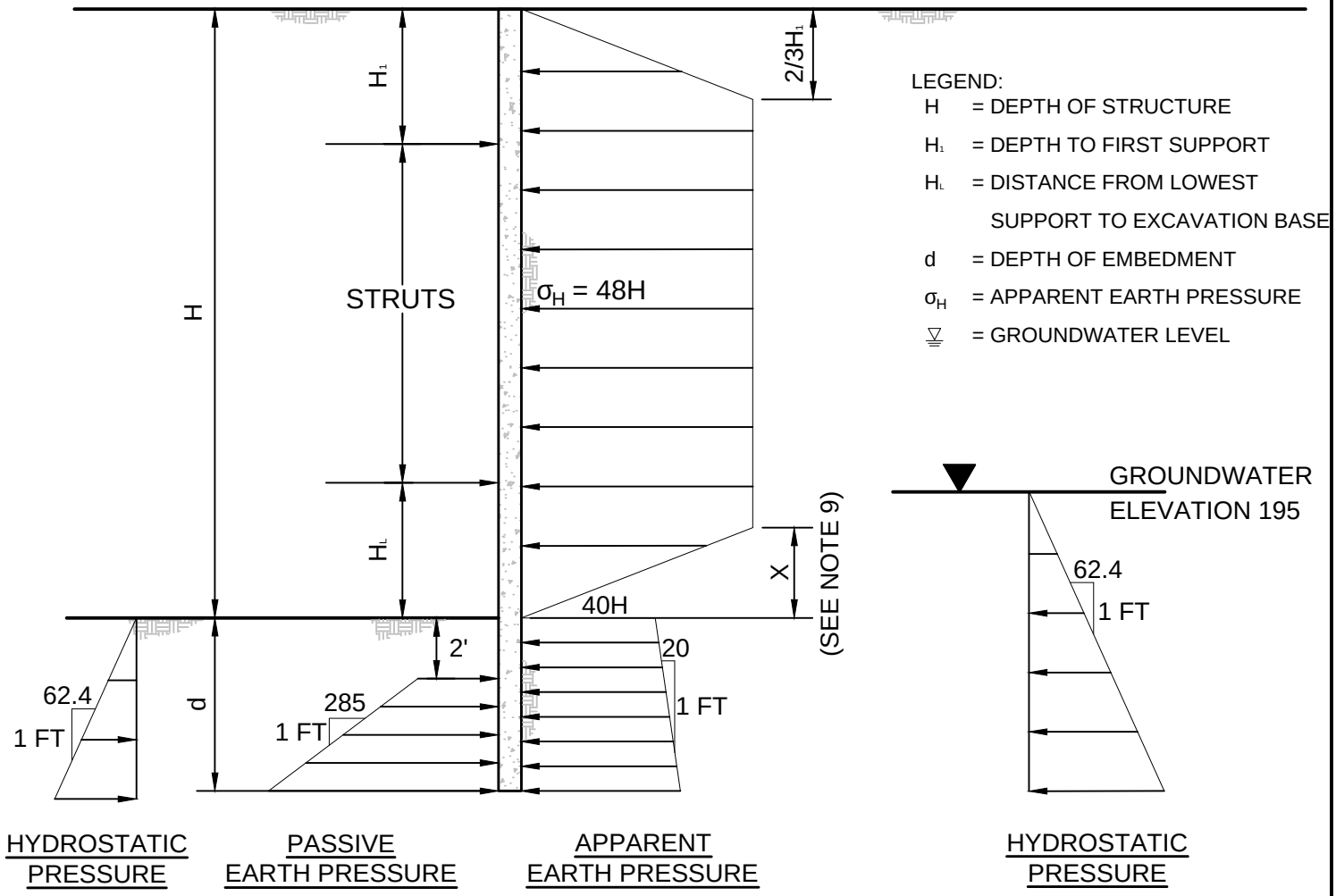
FIGURE 63
Lateral Earth Pressures
Wall 15 (EBW-5)



NOTES:

1. THIS LOADING DIAGRAM INTENDED FOR TEMPORARY AND PERMANENT SUPPORT OF EXCAVATION WITH ONE OR MORE BRACING LEVELS.
2. LOWER HYDROSTATIC PRESSURES CAN BE USED FOR THE TEMPORARY (CONSTRUCTION) CASE IF DEWATERING IS USED.
3. DIMENSIONS ARE IN FEET.
4. PRESSURES ARE IN PSF.
5. PASSIVE PRESSURES ARE UNFACTORED ULTIMATE VALUES.
6. IGNORE TOP 2 FEET OF PASSIVE RESISTANCE.
7. PASSIVE PRESSURE ACTS OVER ONE PILE DIAMETER.
8. FOR CONSTRUCTION SURCHARGE INCLUDE A UNIFORM LATERAL PRESSURE OF 240 PSF FROM THE GROUND SURFACE TO A DEPTH OF 10 FEET AND 120 PSF FROM THE DEPTH OF 10 FEET TO 20 FEET.
9. FOR TEMPORARY SUPPORT OF EXCAVATION WITH ONE BRACING LEVEL, $X = \frac{2}{3}(H-H_1)$. FOR TEMPORARY SUPPORT OF EXCAVATION WITH MORE THAN ONE BRACING LEVEL, $X = \frac{2}{3} H_L$.
10. AN INCREMENTAL SEISMIC EARTH PRESSURE SHOULD BE APPLIED OVER THE DEPTH OF THE STRUCTURE (H) IN SEISMIC ANALYSES. THE INCREMENTAL SEISMIC EARTH PRESSURE IS A UNIFORM LATERAL PRESSURE OF 30H IN THE MDE AND 25H IN THE ODE. PASSIVE PRESSURES SHOULD BE REDUCED TO AN EQUIVALENT FLUID PREESURE OF 260 PSF IN THE MDE AND 255 PSF IN THE ODE.

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BLDG-2018-00983, BLDG-2018-00985

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FIGURE 64
Lateral Earth Pressures
WALL 3 (BSW-1)

Appendix A

Exploration Logs

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Appendix A.1

E360 Design-Build Exploration Logs

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Table A.1-1. Summary of E360 Design-Build Explorations

Boring	Northing	Easting	Date Completed	Boring Depth (feet)	Ground Elev. (feet)	GW Install[1]	Drilling Method[2]	Drilling Contractor	Comments
E360-K-001	560251.59	1642322.46	9/26/2016	40.8	200.25	-	MR	Holocene Drilling, Inc.	
E360-K-002	560339.60	1642325.65	9/27/2016	40.4	199.95	-	MR	Holocene Drilling, Inc.	
E360-K-003	560332.82	1642475.90	9/27/2016	81.5	198.85	-	MR	Holocene Drilling, Inc.	
E360-K-004	560317.09	1642597.70	9/28/2016	81.5	199.73	-	MR	Holocene Drilling, Inc.	
E360-K-005	560349.24	1642742.13	9/24/2016	81.5	196.86	-	MR	Holocene Drilling, Inc.	
E360-K-007	560436.81	1643024.04	8/31/2016	100.41	196.6	-	MR	Holocene Drilling, Inc.	
E360-K-008	560472.87	1643169.59	8/12/2016	100.5	212.86	-	MR	Holocene Drilling, Inc.	
E360-K-009	560495.18	1643301.61	8/10/2016	110.5	213.23	-	MR	Holocene Drilling, Inc.	Downhole Geophysics Test
E360-K-010	560527.82	1643457.67	8/12/2016	120.33	216.89	-	MR	Holocene Drilling, Inc.	
E360-K-011	560581.05	1643589.15	8/09/2016	121.5	221.55	-	MR	Holocene Drilling, Inc.	
E360-K-012	560756.37	1643985.19	8/11/2016	112	223.8	-	MR	Holocene Drilling, Inc.	Downhole Geophysics Test
E360-K-013	560912.45	1644192.50	8/09/2016	101.3	245.31	-	MR	Holocene Drilling, Inc.	
E360-K-014	561019.51	1644297.25	8/15/2016	80.17	263.92	-	MR	Holocene Drilling, Inc.	
E360-K-015	561100.40	1644422.13	8/15/2016	86.5	268.34	-	MR	Holocene Drilling, Inc.	
E360-K-017	561281.17	1644632.31	8/18/2016	81.5	272.59	-	MR	Holocene Drilling, Inc.	
E360-K-018	561352.79	1644726.08	8/23/2016	80.41	284.03	-	MR	Holocene Drilling, Inc.	
E360-K-019	561453.43	1644852.93	8/24/2016	80.41	291.81	-	MR	Holocene Drilling, Inc.	
E360-K-020	561613	1645094	8/26/2016	85.5	309	-	MR	Holocene Drilling, Inc.	
E360-K-021	561684	1645208	8/29/2016	85.33	317	-	MR	Holocene Drilling, Inc.	
E360-K-022	561824.44	1645363.11	8/17/2016	80.25	329.91	-	MR	Holocene Drilling, Inc.	
E360-K-023	562000.79	1645568.87	8/16/2016	110.25	338.42	-	MR	Holocene Drilling, Inc.	Downhole Geophysics Test
E360-K-025	562245.89	1645781.75	9/01/2016	80.5	316.71	-	MR	Holocene Drilling, Inc.	
E360-K-026	562317.60	1645912.92	9/06/2016	81.5	319.52	-	MR	Holocene Drilling, Inc.	
E360-K-027	562400.73	1646028.52	8/29/2016	81.25	328.15	-	MR	Holocene Drilling, Inc.	
E360-K-028	562438.39	1646128.82	8/30/2016	81.5	325.92	-	MR	Holocene Drilling, Inc.	
E360-K-029	562546	1646278	8/19/2016	80.42	340	-	MR	Holocene Drilling, Inc.	
E360-K-030	562554.32	1646338.14	8/17/2016	70.33	335.89	-	MR	Holocene Drilling, Inc.	
E360-TP-1	563653	1647368	8/18/2016	6.5	357	-	-	Kiewit-Hoffman	
E360-TP-2	563742	1647431	8/18/2016	8	355	-	-	Kiewit-Hoffman	
E360-TP-2A	563745	1647431	8/18/2016	6	354	-	-	Kiewit-Hoffman	
E360-TP-3	563936	1647561	8/18/2016	6.5	363	-	-	Kiewit-Hoffman	
E360-TP-4	563974	1647587	8/18/2016	6.5	370	-	-	Kiewit-Hoffman	
E360-TP-5	563536	1647273	8/18/2016	7	348	-	-	Kiewit-Hoffman	

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BLDG-2018-00983, BLDG-2018-00985

Table A.1-1. Summary of E360 Design-Build Explorations (Continued)

Boring	Northing	Easting	Date Completed	Boring Depth (feet)	Ground Elev. (feet)	GW Install[1]	Drilling Method[2]	Drilling Contractor	Comments
E360-TP-6	563414	1647170	8/18/2016	7.5	343	-	-	Kiewit-Hoffman	

Notes:

1. MW = Monitoring Well, VWP = Vibrating Wire Piezometer
2. MR = Mud Rotary, HSA = Hollow Stem Auger
3. Test Pit (E360-TP-xx series) locations were not surveyed and are approximate. Borehole locations E360-K-020, E360-K-021, and E360-K-029 are also estimated.

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Key to Log of Borings and Test Pits
Project: E360 East Link Extension
Bellevue, WA

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS Based on ASTM D2488 & D2487)					
MAJOR DIVISIONS			GROUP/SYMBOL		TYPICAL DESCRIPTION
COARSE-GRAINED SOILS (50% or more retained on No. 200 sieve)	GRAVELS (more than 50% retained on No. 4 sieve)	CLEAN GRAVELS (less than 5% fines)	GW		WELL-GRADED GRAVEL
			GP		POORLY GRADED GRAVEL
		GRAVELS (with 5 to 12% fines)	GW-GM		WELL-GRADED GRAVEL WITH SILT
			GW-GC		WELL-GRADED GRAVEL WITH CLAY
			GP-GM		POORLY GRADED GRAVEL WITH SILT
			GP-GC		POORLY GRADED GRAVEL WITH CLAY
		GRAVELS WITH FINES (more than 12% fines)	GM		SILTY GRAVEL
			GC		CLAYEY GRAVEL
	SANDS (less than 50% retained on No. 4 sieve)	CLEAN SANDS (less than 5% fines)	SW		WELL-GRADED SAND
			SP		POORLY GRADED SAND
		SANDS (with 5 to 12% fines)	SW-SM		WELL-GRADED SAND WITH SILT
			SW-SC		WELL-GRADED SAND WITH CLAY
			SP-SM		POORLY GRADED SAND WITH SILT
			SP-SC		POORLY GRADED SAND WITH CLAY
		SANDS WITH FINES (more than 12% fines)	SM		SILTY SAND
			SC		CLAYEY SAND
FINE-GRAINED SOILS (50% or more passes No. 200 sieve)	SILTS & CLAYS (liquid limit less than 50)	INORGANIC	ML		SILT
			CL		LEAN CLAY
		ORGANIC	OL		LOW PLASTICITY ORGANIC CLAY
	SILTS & CLAYS (liquid limit greater than 50)	INORGANIC	MH		ELASTIC SILT
			CH		FAT CLAY
		ORGANIC	OH		HIGH PLASTICITY ORGANIC CLAY
	SILT/CLAY (liquid limit between 12 and 25)	INORGANIC	CL-ML		CLAYEY SILT / SILTY CLAY
HIGHLY ORGANIC SOILS	PRIMARILY ORGANIC MATTER		PT		PEAT

Notes:

1. Dual symbols (symbols separated by a hyphen, e.g. SP-SM, slightly silty fine SAND) are used for soils between 5% and 12% fines or when liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.

Abbreviations

AL	Atterberg Limit
MC	Moisture Content
SA	Sieve Analysis
TV	Torvane
PP	Pocket Penetrometer

Sample Symbols

	SPT Sample 2" OD
	Shelby Tube Sample
G	Grab Sample

Engineering Soil Units (ESU)

	(ENF) Engineered Fill
	(RGD) Recent Granular Deposits
	(RCS) Recent Clays and Silts
	(ROD) Recent Organic Deposits
	(CCS) Cohesive Clay and Silt
	(CSF) Cohesionless Silt and Fine Sand
	(CSG) Cohesionless Sand and Gravel
	(TLD) Till Like Deposits

AL / MC Symbols

Blows / Ft

20 40 60 80

Moisture Content

Liquid Limit / Plastic Limit

Relative Density or Consistency

Coarse - Grained Soils	
Relative Density	N, SPT Blows/Foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

Fine - Grained Soils	
Relative Density	N, SPT Blows/Foot
Very Soft	< 2
Soft	2 - 4
Medium Stiff	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	> 30

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BLDG-2018-00983, BLDG-2018-00985

Modifiers & Percentages

Modifiers	Criteria
Trace	Particles present at levels estimated at <5%.
Slightly (Clayey, Silty, Sandy or Gravelly)	Particles present at levels estimated at 5% to 12%.
Clayey, Silty, Sandy or Gravelly	Particles Present at levels estimated at 12% to 30%.
Very (Clayey, Silty, Sandy or Gravelly)	Percentage of minor constituent estimated to be >30%.
With (Cobbles or Boulders)	Present at any concentration, estimate percentage.

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-001

Date(s) Drilled: 09/26/2016 - 09/26/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 40.8 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 200.2 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1642322.46E,560251.59N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
196 / 5 / 191							Blank	NONE		A vac truck was used to clear the first 8 feet.
10		28%	S1	6-12-22			CH	Hard, moist, gray brown, slightly sandy CLAY (CH); sample not intact RCS		
186 / 15		44%	S2	12-7-21			SM	Medium dense, moist, brown, very silty SAND (SM); trace gravel RGD		
181 / 20		78%	S3	13-14-22			SM	Dense, moist, brown, silty SAND (SM); trace gravel RGD		
176 / 25		56%	S4	18-22-22			SM	Dense, moist, brown, silty SAND (SM); fine to medium sand RGD		
		0%	S5	8-39-50/4"			SM	No recovery RGD		
171		83%	S6	50/4"			SM	Very dense, moist, gray, slightly gravelly, very silty SAND (SM); pockets of silt RGD		

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Boring E360-K-001

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-001

Date(s) Drilled: 09/26/2016 - 09/26/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 40.8 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 200.2 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1642322.46E,560251.59N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			58%	S7	28-50/6"			SM	Very dense, moist, gray, slightly gravelly, silty SAND (SM); fine to coarse sand CSG		
166	35		42%	S8	21-50/4"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel CSG		
161	40		83%	S9	47-50/4"			SM	Very dense, moist, gray to brown, very silty SAND (SM); trace gravel TLD		Borehole completed at 40.8ft. below ground surface (bgs).
156	45										
151	50										
146	55										
141											

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

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Boring E360-K-001

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-002

Date(s) Drilled: 09/27/2016 - 09/27/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 40.4 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 200.0 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1642325.65E,560339.60N	Elevation Source: Surveyed	

ELEV. (FT)	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
						Blank	NONE		A vac truck was used to clear the first 8 feet.
195	5								
190	10		67%	S1	5-12-15	SM	Medium dense, moist, brown, silty SAND (SM); trace gravel, fine to coarse sand RCS		MC, SA
			22%	S2	4-10-12	CH	Very stiff, moist, brown, CLAY (CH); trace sand RCS		
185	15		78%	S3	5-19-25	ML	Hard, moist, brown, sandy SILT (ML); fine to medium sand RCS		
						SM	Dense, moist, brown, very silty SAND (SM); trace gravel RCS		MC, SA
			78%	S4	23-29-38	SM	Very dense, moist, brown, gravelly, silty SAND (SM); fine to coarse sand RGD		
180	20		71%	S5	30-50/2"	SM	Very dense, moist, brown, very silty SAND (SM); trace gravel RGD		
175	25		0%	S6	50/4"	SM	(SM); No recovery CSG		

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

GRAPHIC LOG

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

McMILLEN JACOBS ASSOCIATES

Boring E360-K-002

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-002

Date(s) Drilled: 09/27/2016 - 09/27/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 40.4 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 200.0 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1642325.65E,560339.60N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			42%	S7	32-50/4"			SM	Very dense, moist, brown, very silty SAND (SM); trace gravel TLD		
165	35		100%	S8	50/5"			SM	Very dense, moist, brown, very silty SAND (SM); trace gravel, laminated sandy silt TLD		
160	40		100%	S9	50/5"			SM	Very dense, moist, gray, slightly gravelly, silty SAND (SM); fine to coarse sand TLD		Borehole completed at 40.4ft. below ground surface (bgs).
155	45										
150	50										
145	55										

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-002

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-003

Date(s) Drilled	09/27/2016 - 09/27/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Truck Diedrich D-120	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	81.5 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	199.0 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1642475.90E,560332.82N	Elevation Source	Surveyed		

ELEV. (FT)	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
									NONE		A vac truck was used to clear the first 7 feet.
194	5							Blank			Increased drill chatter at 8'
189	10		61%	S1	9-8-12			SM	Medium dense, moist, gray, very silty SAND (SM); trace gravel RGD		Increased drill chatter at 12'
			61%	S2	19-18-20			SM	Dense, moist, gray, slightly gravelly, very silty SAND (SM); RGD		
184	15		61%	S3	14-12-8			SM	Medium dense, moist, gray, very silty SAND (SM); non-plastic RGD		MC, SA, AL
			61%	S4	13-9-9			SM	Medium dense, moist, gray, very silty SAND (SM); non-plastic RGD		
179	20		72%	S5	9-10-32			ML	Hard, moist, gray, very sandy SILT (ML); slow dilatancy, non-plastic TLD		MC, Minus 200, AL
174	25		0%	S6	50/5"			ML	No recovery TLD		

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-003

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-003

Date(s) Drilled: 09/27/2016 - 09/27/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 199.0 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1642475.90E,560332.82N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S7	50/5"			SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, low to medium plasticity silt TLD		
164	35		83%	S8	50/4"			ML	Hard, moist, gray, sandy SILT (ML); trace gravel, medium to rapid dilatancy, ow to medium plasticity silt TLD		
159	40		83%	S9	50/4"			SM	Hard, moist, gray, very silty SAND (SM); trace gravel TLD		
154	45		83%	S10	50/4"			SM	Very dense, moist, gray, silty SAND (SM); trace gravel TLD		
149	50		0%	S11	50/2"			SM	No recovery TLD		
144	55		83%	S12	50/2"			SM	Very dense, moist, gray, clayey, silty SAND (SM); trace gravel, no dilatancy, fine to coarse sand TLD		

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-003

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-003

Date(s) Drilled: 09/27/2016 - 09/27/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 199.0 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1642475.90E,560332.82N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			83%	S13	50/4"			SM	Very dense, moist, gray, very silty SAND (SM); fine sand, hit clay at 63' TLD		
									Hard, moist, gray, sandy CLAY (CH); trace gravel CCS		Drillers indicated a change in drilling at 63'
134	65		100%	S14	13-17-22			CH			MC, Minus 200, AL TV = 2200 psf
129	70		100%	S15	10-14-20			CH	Hard, moist, gray, CLAY (CH); trace sand, trace gravel, no dilatancy, medium toughness CCS		TV = 2200 - 2800 psf
124	75		100%	S16	13-17-23			CH	Hard, moist, gray, CLAY (CH); trace sand, trace gravel, no dilatancy, medium toughness CCS		TV = 1800 - 2800 psf
119	80		100%	S17	18-21-33			CH	Hard, moist, gray, CLAY (CH); no dilatancy, medium toughness CCS		TV = 2800 psf
114	85										Borehole completed at 81.5ft. below ground surface (bgs).

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Boring E360-K-003

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-004

Date(s) Drilled: 09/28/2016 - 09/28/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 199.7 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1642597.70E,560317.09N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
					Blank	NONE		A vac truck was used to clear the first 3.5 feet.
195 / 5								
190 / 10		61%	S1	7-6-11	ML	Very stiff, moist, gray, SILT (ML); low plasticity RCS		MC, AL
		56%	S2	12-9-9	ML	Medium dense, moist, gray, sandy SILT (ML); low plasticity RCS		
185 / 15		56%	S3	15-11-11	ML	Medium dense, moist, gray, very sandy SILT (ML); trace gravel, low to medium plasticity RCS		
		72%	S4	18-25-19	SM	Very dense, moist, gray, silty SAND (SM); trace gravel RGD		MC, SA
180 / 20		72%	S5	24-21-24	SP-SM	Dense, moist, gray, slightly silty SAND (SP-SM); trace coarse sand, trace fine gravel, fine to medium sand, thinly laminated silt RGD		
175 / 25		83%	S6	24-29-42	SP-SM	Very dense, moist, gray, slightly gravelly, slightly silty SAND (SP-SM); fine to coarse sand CSG		MC, SA
170								

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT (20, 40, 60, 80); MC / LL/PL

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-004

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-004

Date(s) Drilled	09/28/2016 - 09/28/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Truck Diedrich D-120	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	81.5 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	199.7 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1642597.70E,560317.09N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			89%	S7	32-43-49			SM	Very dense, moist, gray, silty SAND (SM); trace gravel, fine to medium sand CSG		
165	35		90%	S8	12-43-50/4"			SM	Very dense, moist, gray, silty SAND (SM); trace gravel, fine to medium sand CSG		Drillers thickened drilling mud to try and displace gravel slough in the borehole
160	40		83%	S9	50/4"			SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, fine to coarse sand CSG		
155	45		0%	S10	50/2"			SM	No recovery TLD		Increased drill chatter below 45'
150	50		83%	S11	50/4"			SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, fine to coarse sand TLD		
145	55		83%	S12	50/4"			SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, fine to medium sand TLD		
140											

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McMILLEN JACOBS ASSOCIATES

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-004

Date(s) Drilled: 09/28/2016 - 09/28/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 199.7 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1642597.70E,560317.09N	Elevation Source: Surveyed	

ELEV. (FT)	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			0%	S13	50/4"			SM	No recovery TLD		
135	65		100%	S14	37-50/4"			CL-ML	Hard, moist, gray green, slightly gravelly, very sandy CLAY (CL-ML); low plasticity TLD		MC, AL, Minus 200
130	70		100%	S15	26-50/6"			CL	Hard, moist, gray, sandy CLAY (CL); trace gravel CCS		TV = 2500 - 3500 psf
125	75		100%	S16	8-16-21			CH	Hard, moist, gray, CLAY (CH); trace sand CCS		MC, AL TV = 2000 - 2800 psf
120	80		100%	S17	17-21-29			CH	Hard, moist, gray, CLAY (CH); trace sand, sample not intact CCS		
115	85										Borehole completed at 81.5ft. below ground surface (bgs).
110											

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-004

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-005

Date(s) Drilled: 09/24/2016 - 09/24/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 196.9 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1642742.13E,560349.24N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
							Blank	NONE		A vac truck was used to clear the first 7.5 feet.
192 / 5										
187 / 10		78%	S1	11-18-20			SP-SM	Dense, moist, brown, slightly silty SAND (SP-SM); trace fine gravel, fine to coarse sand RGD		MC, SA
		67%	S2	15-17-18			SP-SM	Dense, moist, brown, slightly silty SAND (SP-SM); trace fine gravel RGD		
182 / 15		78%	S3	12-17-26			SP-SM	Dense, moist, brown, slightly silty SAND (SP-SM); trace fine gravel, thinly laminated silt RGD		
		89%	S4	15-24-24			SP-SM	Dense, moist, brown, slightly silty SAND (SP-SM); trace fine gravel RGD		
177 / 20		89%	S5	15-29-40			SM	Very dense, moist, brown, silty SAND (SM); trace gravel, thinly laminated silt RGD		MC, SA
172 / 25		100%	S6	30-43-50/5"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); trace gravel, fine to coarse sand RGD		

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-005

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-005

Date(s) Drilled	09/24/2016 - 09/24/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Truck Diedrich D-120	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	81.5 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	196.9 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1642742.13E,560349.24N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (□ BLOWS/FT 20 40 60 80; ○ MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			83%	S7	21-40-40			SM	Very dense, moist, gray, silty SAND (SM); trace fine gravel, laminated silt CSG		Increased drill chatter at 30'
162	35		89%	S8	21-29-34			SM	Very dense, moist, light brown, slightly gravelly, silty SAND (SM); fine to medium sand CSG		MC, SA
157	40		58%	S9	46-50/10"			SM	Very dense, moist, gray, slightly gravelly, very silty SAND (SM); CSG		
152	45		83%	S10	39-50/5"			SM	Very dense, moist, gray, slightly gravelly, silty SAND (SM); fine to coarse sand CSG		
147	50		83%	S11	43-50/5"			SM	Very dense, moist, gray, very silty SAND (SM); trace gravel CSG		
142	55		100%	S12	50/4"			ML	Very dense, moist, gray, slightly gravelly, very sandy SILT (ML); TLD		

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BLDG-2018-00983, BLDG-2018-00985

McMILLEN JACOBS ASSOCIATES

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-005

Date(s) Drilled: 09/24/2016 - 09/24/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 196.9 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1642742.13E,560349.24N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S13	50/5"			ML	Very dense, moist, gray, slightly gravelly, very sandy SILT (ML); fine to coarse sand TLD		
132	65		42%	S14	50/5"			ML	Very dense, moist, gray, slightly gravelly, very sandy SILT (ML); TLD		Drillers had difficulty getting drill rods back down to the bottom of the borehole after retrieving sample S14 Increased drill chatter at 68'
127	70		0%	S15	50/5"			ML	No recovery TLD		
122	75		100%	S16	7-11-22			CH	Hard, moist, gray, sandy CLAY (CH); CCS		MC, AL, Minus 200 TV = 2000 - 2800 psf
117	80		100%	S17	11-13-24			CH	Hard, moist, gray, sandy CLAY (CH); CCS		MC, AL, Minus 200 TV = 2000 - 2800 psf
112	85										Borehole completed at 81.5ft. below ground surface (bgs).

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-005

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-007

Date(s) Drilled	08/30/2016 - 08/31/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	LS
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	100.4 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	196.6 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643024.04E,560436.81N	Elevation Source	Surveyed		

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
							Blank	NONE		
192 / 5		56%	S1	6-6-5			SM	Medium dense, moist, gray, silty SAND (SM); trace fine gravel, medium sand RGD		
		78%	S2	5-7-9			ML	Very stiff, moist, gray, slightly sandy SILT (ML); trace wood, fine sand RCS		MC, AL
187 / 10		67%	S3	10-6-9			ML	Stiff, moist, brown, sandy SILT (ML); fine sand RCS		
		87%	ST1				ML	Moist, brown, slightly sandy SILT (ML); fine sand RCS		Shelby tube sample ST1 at 12.5 feet MC, AL
182 / 15		67%	S4	13-17-14			ML	Hard, moist, brown, slightly sandy SILT (ML); low plasticity, fine sand RCS		MC, AL, Minus 200
		87%	ST2				CH	Moist, brown, CLAY (CH); sand lense at top RCS		MC, AL Shelby tube sample ST2 at 17 feet, pushed at 300 psi for the first 12" and at 500 psi for the remaining 18"
177 / 20		100%	ST3				SP	Moist, brown, SAND (SP); trace silt RGD		Shelby tube sample ST3 at 20 feet, pushed at 500 psi for the first 20" and at 1500 psi for the remaining 6"
		44%	S5	44-44-35			SP	Very dense, moist, brown, SAND (SP); trace silt, fine to medium sand RGD		
172 / 25		83%	S6	34-43-45			SM	Very dense, moist, brown, silty SAND (SM); fine to medium sand RGD		MC, SA
167										

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Boring E360-K-007

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-007

Date(s) Drilled	08/30/2016 - 08/31/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	LS
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	100.4 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	196.6 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643024.04E,560436.81N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S7	50/6"			GM	Very dense, moist, brown to gray, slightly sandy, silty GRAVEL (GM); scattered clay, fine to coarse gravel RGD		
162	35		78%	S8	15-31-32			GP-GM	Very dense, moist, brown, very sandy, slightly silty GRAVEL (GP-GM); medium sand, fine to coarse gravel RGD		Significant drill chatter below 35'
157	40		83%	S9	8-22-31			ML	Hard, moist, brown, slightly sandy SILT (ML); trace gravel RGD		
								SP-SM	Very dense, moist, gray to brown, slightly silty SAND (SP-SM); fine to medium sand RGD		
152	45		83%	S10	22-31-32			SM	Very dense, moist, brown, silty SAND (SM); fine to medium sand RGD		MC, SA
147	50		100%	S11	32-50/5"			SP	Very dense, moist, gray, SAND (SP); trace silt RGD		
142	55		51%	S12	50/4"			ML	Very dense, moist, gray, very sandy SILT (ML); trace gravel, fine to coarse sand TLD		
137											

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-007

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-007

Date(s) Drilled	08/30/2016 - 08/31/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	LS
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	100.4 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	196.6 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643024.04E,560436.81N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			61%	S13	50/5"			ML	Very dense, moist, gray, very sandy SILT (ML); trace gravel TLD		Significant drill chatter at 64'
132	65										
127	70		100%	S14	42-50/5"			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand CSG		
122	75										
117	80		82%	S15	37-50/5"			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand CSG		MC, SA
112	85										
107											

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BLDG-2018-00983, BLDG-2018-00985

McMILLEN JACOBS ASSOCIATES

Boring E360-K-007

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-007

Date(s) Drilled: 08/30/2016 - 08/31/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: LS
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 100.4 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 196.6 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1643024.04E,560436.81N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			90%	S16	46-50/4"			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand CSG		
102	95										
97	100		81%	S17	50/5"			SM	Very dense, moist, brown, silty SAND (SM); fine to medium sand CSG		Borehole completed at 100.41ft. below ground surface (bgs).
92	105										
87	110										
82	115										
77											

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-007

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-008

Date(s) Drilled: 08/11/2016 - 08/12/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Luke Ferguson	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 100.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 212.9 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1643169.59E,560472.87N	Elevation Source: Surveyed	

ELEV. (FT)	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
								Blank	ENF		Drillers used hollow stem auger to drill and case the first 5 feet.
208	5		67%	S1	8-15-16			SM	Dense, moist, brown, silty SAND (SM); trace coarse sand, trace fine gravel, trace roots, fine sand ENF		
			78%	S2	16-18-20			SM	Dense, moist, brown, silty SAND (SM); trace coarse sand, trace fine gravel, trace roots, fine sand ENF		
203	10		67%	S3	11-14-15			SM	Medium dense, moist, brown, silty SAND (SM); trace coarse sand, trace fine gravel, fine to medium sand ENF		
			28%	S4	8-5-8			SM	Medium dense, moist, brown, very silty SAND (SM); trace coarse sand, trace fine gravel, fine sand ENF		
198	15		50%	S5	6-5-6			SM	Medium dense, moist, brown, very silty SAND (SM); trace coarse sand, trace fine gravel, fine sand ENF		
			61%	S6	8-9-12			SM	Medium dense, moist, gray, silty SAND (SM); trace coarse sand, trace fine gravel, fine to medium sand RGD		Drillers noted loose drilling and gravel.
193	20		39%	S7	13-14-10			SM	Medium dense, moist, gray, silty SAND (SM); trace coarse sand, fine to medium sand RGD		
188	25		44%	S8	6-11-11			ML	Very stiff, moist, gray, slightly sandy SILT (ML); low plasticity RCS		

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-008

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-008

Date(s) Drilled	08/11/2016 - 08/12/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Luke Ferguson	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	100.5 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	212.9 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643169.59E,560472.87N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (□ BLOWS/FT 20 40 60 80; ○ MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S9	0-5-3			CL	Medium stiff, moist, gray, CLAY (CL); trace fine sand, medium plasticity RCS		MC, AL
			100%	S10							MC, AL Shelby tube sample S10 at 31.5 feet, pushed at 500 to 1000 psi to 12", could not be advanced further.
178	35		100%	S11	1-2-1			CH	Soft, moist, gray, CLAY (CH); trace fine sand RCS		
			100%	S12							MC, AL Shelby tube sample S12 at 37 feet, pushed at 500 psi to 30"
173	40		67%	S13	6-12-11			SM	Medium dense, moist, gray, silty SAND (SM); fine to medium sand, with very thinly bedded silt RGD		
168	45		78%	S14	36-44-26			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand RGD		
163	50		80%	S15	24-36-50/3"			SM	Very dense, moist, gray, slightly gravelly, very silty SAND (SM); fine to medium sand RGD		MC, SA
158	55		78%	S16	17-13-14			SM	Medium dense, moist, gray, silty SAND (SM); fine to medium sand RGD		

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Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-008

Date(s) Drilled: 08/11/2016 - 08/12/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Luke Ferguson	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 100.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 212.9 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1643169.59E,560472.87N	Elevation Source: Surveyed	

ELEV. (FT)	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			83%	S17	19-26-32			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand RGD		
148	65		100%	S18	47-50/6"			SM	Very dense, moist, gray, very silty SAND (SM); fine to medium sand RGD		
143	70		91%	S19	44-50/5"			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand RGD		Increased drill chatter
138	75		67%	S20	32-44-47			SM	Very dense, moist, gray, very silty SAND (SM); fine to medium sand RGD		
133	80		82%	S21	44-50/5"			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand RGD		Increased drill chatter
128	85		50%	S22	50/6"			SM	Very dense, moist, gray, very silty SAND (SM); fine to medium sand CSG		

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McMILLEN JACOBS ASSOCIATES

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-008

Date(s) Drilled	08/11/2016 - 08/12/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Luke Ferguson	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	100.5 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	212.9 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643169.59E,560472.87N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			60%	S23	50/5"			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand CSG		
118	95		67%	S24	50/6"			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand CSG		
113	100		67%	S25	50/6"			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand CSG		Borehole completed at 100.5ft. below ground surface (bgs).
108	105										
103	110										
98	115										

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-008

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-009

Date(s) Drilled: 08/09/2016 - 08/10/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Luke Ferguson	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 110.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 213.2 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1643301.61E,560495.18N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
							Blank	NONE		
209 / 5		33%	S1	17-15-22			SM	Dense, moist, brown, silty SAND (SM); trace gravel, medium to coarse sand ENF		
204		78%	S2	5-15-20			SM	Dense, moist, brown, gravelly, silty SAND (SM); trace rootlets, fine gravel, medium to coarse sand ENF		MC, SA
10		67%	S3	5-11-12			SP-SM	Medium dense, moist, brown, slightly silty SAND (SP-SM); trace fine gravel, medium to coarse sand ENF		
199		67%	S4	13-13-13			SM	Medium dense, moist, gray to brown, very silty SAND (SM); trace fine gravel, medium sand RGD		
15		72%	S5	17-15-20			SM	Dense, moist, gray to brown, silty SAND (SM); medium sand RGD		MC, SA Increased drill chatter
194		17%	S6	20-25-39			SM	Very dense, moist, gray, silty SAND (SM); RGD		
20		0%	S7	10-12-22			SM	No recovery RGD		Increased drill chatter
189 / 25		50%	S8	8-12-16			ML	Very stiff, moist, gray, very sandy SILT (ML); trace wood, fine sand RCS		
184										

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-009

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-009

Date(s) Drilled: 08/09/2016 - 08/10/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Luke Ferguson	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 110.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 213.2 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1643301.61E,560495.18N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			67%	S9	10-23-30	SM	Very dense, moist, brown, silty SAND (SM); medium sand RCS		
						ML	Hard, moist, gray, slightly sandy SILT (ML); non plastic RCS		
179	35		83%	S10	3-3-2	ML	Medium stiff, moist, gray, SILT (ML); trace fine sand RCS		
						CL	Medium stiff, moist, gray, CLAY (CL); trace sand, fine sand RCS		
174	40		100%	S11	0-1-2	CH	Soft, moist, gray, CLAY (CH); RCS		MC, AL
				S12					Holocene decided to remove the auger casing so they can fit inclinometer casing and tremie pipe in the borehole upon completion
169	45		100%	S13	6-18-50/5"	CL	Medium stiff, moist, gray, slightly silty CLAY (CL); RCS		Driller indicated gravel between 43' and 45' MC, AL
						SP-SM	Dense, moist, gray, slightly silty SAND (SP-SM); medium sand RGD		
164	50		83%	S14	32-50/6"	SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); medium sand RGD		Significant drill chatter at 53'
159	55		100%	S15	12-50/5"	SP	Very dense, moist, gray to brown, SAND (SP); trace gravel, coarse sand RGD		
154									

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-009

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-009

Date(s) Drilled	08/09/2016 - 08/10/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Luke Ferguson	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	110.5 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	213.2 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643301.61E,560495.18N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S16	25-34-39			SP-…	Very dense, moist, gray to brown, slightly silty SAND (SP-SM); coarse sand RGD		
								ML	Hard, moist, gray, SILT (ML); trace fine sand, non plastic, fine sand RCS		
149	65		89%	S17	24-21-21			SM	Dense, moist, gray, very silty SAND (SM); nonplastic silt RCS		MC, AL, Minus 200
144	70		61%	S18	15-18-13			SC	Dense, moist, gray, clayey SAND (SC); fine to medium sand RGD		
139	75		94%	S19	4-7-11			ML	Very stiff, moist, gray, SILT (ML); RCS		Driller noted softer drilling at 74' MC, AL
134	80		67%	S20	21-22-18			ML	Hard, moist, gray, SILT (ML); trace gravel, trace sand, with laminated sand RCS		Increased drill chatter
129	85		100%	S21	39-50/5"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); trace gravel, fine to medium sand RGD		
124											

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-009

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-009

Date(s) Drilled: 08/09/2016 - 08/10/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Luke Ferguson	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 110.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 213.2 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1643301.61E,560495.18N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
		67%	S22	28-23-23			SM	Dense, moist, gray, silty SAND (SM); fine to medium sand RGD		
119 / 95		61%	S23	23-28-38			SM	Very dense, moist, gray, silty SAND (SM); trace fine gravel, fine to medium sand RGD		
114 / 100		94%	S24	25-30-36			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand RGD		
109 / 105		82%	S25	40-50/5"			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand CSG		MC, SA
104 / 110		60%	S26	38-50/4"			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand CSG		Borehole completed at 110.5ft. below ground surface (bgs).
99 / 115										
94										

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-009

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-010

Date(s) Drilled	08/11/2016 - 08/12/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Truck Diedrich D-120	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	120.3 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	216.9 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643457.67E,560527.82N	Elevation Source	Surveyed		

ELEV. (FT)	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
						Blank	ENF		Drillers used a hollow stem auger to drill and case the first 10 feet.
212	5		94%	S1	13-15-11	SP-SM	Medium dense, moist, brown gray, slightly silty SAND (SP-SM); trace fine gravel, medium sand ENF		Sample S2 was skipped
207	10		67%	S3	5-9-13	SM	Medium dense, moist, brown, silty SAND (SM); trace fine gravel ENF		
			78%	S4	5-6-7	SM	Medium dense, moist, gray brown, silty SAND (SM); ENF		
						ML	Stiff, moist, sandy SILT (ML); trace wood, trace fine gravel RGD		
202	15		83%	S5	17-36-47	SM	Very dense, moist, gray, silty SAND (SM); trace fine gravel, medium sand RGD		
			78%	S6	18-21-26	SM	Dense, moist, gray, silty SAND (SM); trace gravel RGD		
197	20		72%	S7	17-21-7	SM	Dense, moist, gray, very silty SAND (SM); trace gravel, fine to coarse sand RGD		
192	25		67%	S8	15-14-14	SM	Medium dense, moist, gray brown, silty SAND (SM); trace gravel, fine to coarse sand RGD		

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

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Boring E360-K-010

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-010

Date(s) Drilled	08/11/2016 - 08/12/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Truck Diedrich D-120	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	120.3 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	216.9 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643457.67E,560527.82N	Elevation Source	Surveyed		

ELEV. (FT)	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			72%	S9	15-22-26	ML	Hard, moist, brown, sandy SILT (ML); trace fine gravel, pockets of medium sand RCS		
182	35		78%	S10	22-26-25	SM	Very dense, moist, brown, very silty SAND (SM); fine to medium sand RCS		
177	40		94%	S11	16-11-14	ML	Very stiff, moist, gray, very sandy SILT (ML); fine sand RCS		
						CL	Very stiff, moist, gray, CLAY (CL); trace silt RCS		
172	45								
			100%	S12	4-3-4	CH	Medium stiff, moist, gray, CLAY (CH); RCS		MC, AL
167	50								
			100%	S13	20-13-6	SP-SM	Medium dense, moist, gray, slightly silty SAND (SP-SM); fine to medium sand RGD		
162	55		78%	S14	20-32-39	SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand RGD		MC, SA

PENETRATION RESISTANCE BLOWS/FT: □ BLOWS/FT 20 40 60 80; ○ MC LL/PL

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-010

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-010

Date(s) Drilled	08/11/2016 - 08/12/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Truck Diedrich D-120	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	120.3 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	216.9 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643457.67E,560527.82N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			83%	S15	21-27-30			SM	Very dense, moist, gray, silty SAND (SM); RGD		
152	65		78%	S16	21-36-45			ML	Hard, moist, gray brown, SILT (ML); trace sand CSF		MC, AL, Minus 200
147	70		50%	S17	21-35-38			SM	Very dense, gray, silty SAND (SM); medium sand CSG		
142	75		79%	S18	50/5"			SM	Very dense, gray, silty SAND (SM); trace fine gravel, fine to coarse sand CSG		
137	80		0%	S19	50/5"						
132	85		100%	S20	25-33-47			CL	Hard, moist, gray brown, CLAY (CL); trace sand CCS		

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-010

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-010

Date(s) Drilled: 08/11/2016 - 08/12/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 120.3 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 216.9 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1643457.67E,560527.82N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S21	20-32-45			CL	Hard, moist, gray, CLAY (CL); trace sand CCS		
122	95		100%	S22	47-50/5"			SP	Very dense, moist, gray, SAND (SP); trace silt, fine to medium sand CSG		
117	100		50%	S23	50/6"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); fine to medium sand CSG		
112	105		83%	S24	42-50/6"			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand CSG		
107	110		76%	S25	50/4"			SP	Very dense, moist, gray, SAND (SP); trace silt, fine to medium sand CSG		
102	115										

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-010

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-010

Date(s) Drilled	08/11/2016 - 08/12/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Truck Diedrich D-120	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	120.3 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	216.9 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643457.67E,560527.82N	Elevation Source	Surveyed		

ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
		76%	S26	50/4"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); fine to medium sand CSG		Borehole completed at 120.33ft. below ground surface (bgs).
92 125										
87 130										
82 135										
77 140										
72 145										

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-010

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-011

Date(s) Drilled: 08/08/2016 - 08/09/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Luke Ferguson	Checked By: LS
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 121.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 221.6 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1643589.15E,560581.05N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
							Blank	ENF		Drillers used hollow stem auger to drill and case the first 5 feet.
217 / 5		56%	S1	4-6-6			SM	Medium dense, moist, dark brown, very silty SAND (SM); trace Metal, trace organics, fine to medium sand, (topsoil) ENF		
212 / 10		78%	S2	4-13-14			SM	Medium dense, moist, brown, silty SAND (SM); trace Metal, trace organics, fine to medium sand ENF		MC, SA
							SM	Medium dense, moist, gray, silty, gravelly SAND (SM); fine to medium sand ENF		
207 / 15		89%	S3	12-11-9			SM	Medium dense, moist, gray, very silty SAND (SM); trace gravel, trace rootlets ENF		Drillers noted soft drilling at 19'
202 / 20		61%	S4	5-5-9			SM	Medium dense, moist, brown, very silty SAND (SM); trace gravel, trace wood ENF		Increased drill chatter
		20%	S5	50/5"			SM	Very dense, moist, gray brown, slightly gravelly, silty SAND (SM); ENF		
197 / 25		33%	S6	44-50/3"			SM	Very dense, moist, gray brown, slightly gravelly, silty SAND (SM); ENF		Increased drill chatter
		72%	S7	16-17-18			SM	Very dense, moist, gray brown, slightly gravelly, silty SAND (SM); ENF		
192								Dense, moist, brown, silty SAND (SM); trace gravel		

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Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-011

Date(s) Drilled: 08/08/2016 - 08/09/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Luke Ferguson	Checked By: LS
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 121.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 221.6 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1643589.15E,560581.05N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
						CL	ENF		
			50%	S8	2-5-16	SM	Very stiff, moist, gray, CLAY (CL); medium plasticity ENF Medium dense, moist, gray, very silty SAND (SM); trace gravel, fine to medium sand RGD		
			94%	S9	19-32-46	SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, fine to medium sand RGD		MC, SA
187	35		67%	S10	37-50/6"	SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, fine to medium sand RGD		
			89%	S11	35-39-42	SM	Very dense, moist, gray brown, silty SAND (SM); trace gravel, fine to coarse sand RGD		
182	40		56%	S12	15-25-27	SM	Very dense, moist, gray brown, silty SAND (SM); RGD		
177	45		100%	S13	7-5-4	CL	Stiff, moist, gray, CLAY (CL); trace sand RCS		MC, AL
172	50		94%	S14	12-4-6	ML	Stiff, moist, gray, sandy SILT (ML); fine sand RCS		MC, AL
167	55		100%	S15	2-3-6	CL	Stiff, moist, gray, CLAY (CL); trace sand, trace gravel RCS		
162									

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

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Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-011

Date(s) Drilled: 08/08/2016 - 08/09/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Luke Ferguson	Checked By: LS
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 121.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 221.6 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1643589.15E,560581.05N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S16	1-2-4	CL	Medium stiff, moist, gray, CLAY (CL); trace sand RCS		MC, AL
157	65		100%	S17	0-3-6	CL	Stiff, moist, gray, slightly sandy CLAY (CL); fine sand RCS		
152	70		83%	S18	27-42-50/6"	ML	Hard, moist, gray, sandy SILT (ML); fine sand CSF		
147	75		83%	S19	28-28-17	SM	Dense, moist, gray, very silty SAND (SM); fine to medium sand, with very thinly bedded coarse sand CSG		MC, Minus 200
142	80		67%	S20	50/6"	SM	Very dense, moist, gray, silty SAND (SM); trace fine gravel, fine to medium sand CSG		
137	85		63%	S21	41-50/5"	SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, , fine to medium sand, with silt laminations CSG		
132							Hard, moist, gray, CLAY (CL); CCS		Drillers noted a change in drilling at 88' PP = 5000 psf

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

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Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-011

Date(s) Drilled: 08/08/2016 - 08/09/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Luke Ferguson	Checked By: LS
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 121.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 221.6 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1643589.15E,560581.05N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
		94%	S22	10-14-25			CL	Hard, moist, gray, CLAY (CL); CCS		
127 / 95		100%	S23	7-10-15			CL	Hard, moist, gray, CLAY (CL); CCS Very stiff, moist, gray, CLAY (CL); with very thinly laminated fine sand CCS		
122 / 100		83%	S24	27-32-30			CH	Hard, moist, gray, CLAY (CH); trace fine sand CCS		MC, AL
117 / 105		100%	S25	7-10-15			CH	Very stiff, moist, gray, CLAY (CH); trace fine sand, with very thinly laminated fine sand CCS		
112 / 110		100%	S26	8-11-23			CH	Hard, moist, gray, CLAY (CH); trace fine sand CCS		
107 / 115										
102										

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Boring E360-K-011

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-011

Date(s) Drilled: 08/08/2016 - 08/09/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Luke Ferguson	Checked By: LS
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 121.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 221.6 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1643589.15E,560581.05N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
		100%	S27	11-16-22			CL	Hard, moist, gray, CLAY (CL); trace sand, trace gravel, some socketed pieces of fine gravel. CCS		
97 / 125										Borehole completed at 121.5ft. below ground surface (bgs).
92 / 130										
87 / 135										
82 / 140										
77 / 145										
72										

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Boring E360-K-011

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-012

Date(s) Drilled	08/10/2016 - 08/11/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	112.0 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	223.8 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643985.19E,560756.37N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
								Blank	NONE		Drillers used hollow stem auger to drill and case the first 5 feet.
219	5		94%	S1	22-31-36			SM	Dense, slightly moist, gray, slightly silty SAND (SM); trace gravel, fine sand, fine gravel ENF		Increased drill chatter
			83%	S2	21-15-17			SM	Dense, moist, gray, slightly gravelly, silty SAND (SM); fine to coarse sand ENF		MC, SA
214	10		67%	S3	18-23-30			SM	Dense, moist, gray, very silty SAND (SM); trace wood, fine to medium sand ENF		
			61%	S4	14-19-31			SM	Dense, moist, brown to gray, very silty SAND (SM); fine to coarse sand, 2-inch piece of wood at bottom of sample ENF		
209	15		28%	S6	20-26-33			SM	Dense, moist, gray, very silty SAND (SM); fine to coarse sand RGD		
			67%	S7	11-14-20			SM	Dense, moist, gray, slightly silty SAND (SM); trace gravel, fine to coarse sand RGD		
204	20		56%	S8	9-11-8			SM	Medium dense, moist, gray, silty SAND (SM); trace gravel, fine to medium sand RGD		
199	25		61%	S9	24-41-37			SP-SM	Very dense, moist, brown to gray, slightly silty SAND (SP-SM); trace gravel, fine to medium sand RGD		

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-012

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-012

Date(s) Drilled	08/10/2016 - 08/11/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	112.0 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	223.8 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643985.19E,560756.37N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			0%	S10	36-50/5"			SM	No recovery RGD		Increased drill chatter below 30'
189	35		44%	S11	21-40-28			SP-SM	Very dense, moist, brown to gray, slightly silty SAND (SP-SM); trace fine gravel, fine to medium sand RGD		
184	40		39%	S12	19-11-9			SM	Medium dense, moist, brown to gray, slightly gravelly, silty SAND (SM); fine to coarse sand RGD		
179	45		78%	S13	18-16-18			SM	Dense, moist, gray to brown, silty SAND (SM); trace fine gravel, fine to coarse sand RGD		Drillers spent 1 hour reaming hole through gravel from 48' to 50'
174	50		0%	S14	50/4"			SM	No recovery CSG		
169	55		79%	S15	50/5"			GP	Very dense, moist, gray, GRAVEL (GP); CSG		Hard drilling below 55'

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-012

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-012

Date(s) Drilled	08/10/2016 - 08/11/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	112.0 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	223.8 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643985.19E,560756.37N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			51%	S16	50/4"			ML	Hard, moist, gray, very sandy SILT (ML); trace fine gravel, low plasticity, fine sand TLD		
159	65		0%	S17	50/4"			ML	No recovery TLD		Driller indicates very hard drilling
154	70		67%	S18	50/3"			ML	Hard, moist, gray, sandy SILT (ML); trace fine gravel, fine gravel TLD		
149	75		99%	S19	50/5"			ML	Hard, moist, gray, sandy SILT (ML); non plastic, medium to coarse sand TLD		Increased drill chatter below 75'
144	80		67%	S20	50/3"			ML	No recovery TLD		
139	85		67%	S21	50/3"			ML	Hard, moist, gray, sandy SILT (ML); trace fine gravel, low plasticity, fine to coarse sand, fine gravel TLD		

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McMILLEN JACOBS ASSOCIATES

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-012

Date(s) Drilled	08/10/2016 - 08/11/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	112.0 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	223.8 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1643985.19E,560756.37N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S22	50/4"			SP	Very dense, moist, gray, slightly gravelly SAND (SP); medium to coarse sand CSG		
129	95		100%	S23	50/3"			GP	Very dense, moist, gray, sandy GRAVEL (GP); trace silt, scattered clay, fine to coarse sand CSG		
124	100		67%	S24	50/3"			ML	Hard, moist, sandy SILT (ML); trace gravel, low plasticity CCS		
119	105		100%	S25	31-50/5"			ML	Hard, moist, gray, slightly sandy SILT (ML); fine to coarse sand CCS		
								CL	Hard, moist, gray, CLAY (CL); trace sand, trace gravel, fine gravel CCS		
114	110										
109	115										Borehole completed at 112ft. below ground surface (bgs).

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Boring E360-K-012

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-013

Date(s) Drilled	08/09/2016 - 08/09/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	LS
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	101.3 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	245.3 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1644192.50E,560912.45N	Elevation Source	Surveyed		

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
							Blank	ENF		Drillers used a hollow stem auger to drill and case the first 5 feet.
241 / 5		78%	S1	5-9-15			SM	Medium dense, moist, brown, silty SAND (SM); trace fine gravel, trace organics, trace rootlets ENF		
236		67%	S2	7-13-20			SM	Dense, moist, brown gray, very silty SAND (SM); trace gravel ENF		
10		72%	S3	46-50/5"			SM	Very dense, moist, gray, slightly gravelly, silty SAND (SM); fine to coarse sand RGD		
231		67%	S4	7-21-26	MC		SM	Dense, moist, gray, slightly gravelly, silty SAND (SM); fine to coarse sand RGD		MC, SA
15		50%	S5	15-24-39			SM	Very dense, moist, gray brown, very silty SAND (SM); trace gravel, fine to coarse sand RGD		Increased drill chatter
226		61%	S6	10-20-15			SM	Dense, moist, gray, very silty SAND (SM); trace gravel RGD		
20		56%	S7	11-13-15			SM	Medium dense, moist, gray brown, silty SAND (SM); trace gravel RGD		Increased drill chatter
221 / 25		61%	S8	9-5-12			ML	Very stiff, moist, gray brown, sandy SILT (ML); trace clay, trace fine gravel RCS		
216										Increased drill chatter

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

McMILLEN JACOBS ASSOCIATES

Boring E360-K-013

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-013

Date(s) Drilled	08/09/2016 - 08/09/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	LS
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	101.3 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	245.3 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1644192.50E,560912.45N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			76%	S9	4-34-50/5"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel, fine to coarse sand TLD		
211	35		59%	S10	19-33-50/5"			SM	Very dense, moist, brown gray, silty SAND (SM); trace gravel, fine to coarse sand TLD		Increased drill chatter
206	40		100%	S11	50/4"			SM	Very dense, moist, gray, silty SAND (SM); trace gravel TLD		Hard drilling, drillers noted mud loss
201	45		100%	S12	50/1"			SM	Very dense, moist, gray, silty SAND (SM); trace gravel, fine to medium sand TLD		
196	50		98%	S13	50/2"			SM	Very dense, moist, gray, silty SAND (SM); trace gravel, fine to medium sand TLD		
191	55		98%	S14	50/2"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); trace gravel, fine to medium sand TLD		
186											Increased drill chatter

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McMILLEN JACOBS ASSOCIATES

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-013

Date(s) Drilled	08/09/2016 - 08/09/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	LS
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	101.3 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	245.3 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1644192.50E,560912.45N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			51%	S15	50/4"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); TLD		
181	65		0%	S16	50/3"						
176	70		100%	S17	50/1"			SM	Very dense, moist, gray, silty SAND (SM); fine sand TLD		Drillers note a change in drilling between 70-75 feet.
171	75		98%	S18	50/2"			ML	Hard, moist, gray, sandy SILT (ML); fine to medium sand TLD		
166	80		100%	S19	50/1"			ML	Hard, moist, gray, sandy SILT (ML); fine to medium sand TLD		
161	85		98%	S20	50/2"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); fine to medium sand CSG		
156											

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-013

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-013

Date(s) Drilled: 08/09/2016 - 08/09/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: LS
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 101.3 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 245.3 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1644192.50E,560912.45N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
		0%	S21	50/2"				Very dense, moist, gray, slightly silty SAND (SP-SM); fine to medium sand CSG		
151 95		99%	S22	50/5"			CL	Hard, moist, gray, slightly sandy CLAY (CL); fine sand CCS		Drillers note a change in drilling at 94'
146 100		100%	S23	37-43-50/4"			CL	Hard, moist, gray, slightly sandy CLAY (CL); fine sand CCS		MC, AL
141 105										Borehole completed at 101.3ft. below ground surface (bgs).
136 110										
131 115										
126										

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-013

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-014

Date(s) Drilled	08/15/2016 - 08/15/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Julia Irizarry	Checked By	LS
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	80.2 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	263.9 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1644297.25E,561019.51N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
								Blank	ENF		
259	5		83%	S1	4-9-15			SM	Medium dense, moist, brown to gray, slightly gravelly, silty SAND (SM); fine to coarse sand ENF		
			78%	S2	11-14-17			SM	Dense, moist, gray, silty SAND (SM); trace gravel, fine to coarse sand ENF		
254	10		83%	S3				SM	Moist, slightly gravelly, very silty SAND (SM); fine gravel ENF		MC, SA
			56%	S4	15-32-40			SM	Very dense, moist, gray, slightly gravelly, silty SAND (SM); fine to coarse sand, fine gravel ENF		
249	15		58%	S5	10-11-11			SM	Medium dense, moist, slightly gravelly, silty SAND (SM); ENF		
			50%	S6	15-19-14			SM	Dense, moist, gray to brown, very silty SAND (SM); trace fine gravel ENF		
244	20		39%	S7	11-6-7			SM	Medium dense, moist, dark brown, very silty SAND (SM); trace organics, fine to coarse sand RGD		
239	25		100%	S8	32-50/3"			GP-GM	Very dense, moist, gray, silty, sandy GRAVEL (GP-GM); TLD		

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-014

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-014

Date(s) Drilled	08/15/2016 - 08/15/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Julia Irizarry	Checked By	LS
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	80.2 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	263.9 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1644297.25E,561019.51N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
				S9	18-19-50/5"			SM	Very dense, moist, gray, very silty SAND (SM); trace fine gravel, fine to coarse sand TLD		
229	35		100%	S10	31-50/5"			GP-GM	Very dense, moist, gray, slightly silty, slightly sandy GRAVEL (GP-GM); TLD		
								SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); fine to medium sand TLD		
224	40		69%	S11	21-50/6"			GM	Very dense, moist, gray, silty, sandy GRAVEL (GM); TLD		Increased drill chatter between 40' and 45'
								ML	Very dense, moist, gray, slightly gravelly, sandy SILT (ML); TLD		
219	45		13%	S12	50/12"			SM	Very dense, moist, gray, very silty SAND (SM); trace gravel TLD		Significant drill chatter between 45' and 50'
214	50		65%	S13	47-50/4"			SP	Very dense, moist, gray, slightly silty, SAND (SP), trace gravel, fine to coarse sand TLD		
209	55		76%	S14	50/4"				Very dense, moist, gray, very silty SAND (SM); trace gravel, fine to coarse sand, sandy silt laminations TLD		Increased drill chatter between 55' and 65' Drillers note the hole collapsed from 55' to 63.5'

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-014

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-014

Date(s) Drilled	08/15/2016 - 08/15/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Julia Irizarry	Checked By	LS
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	80.2 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	263.9 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1644297.25E,561019.51N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
								SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, fine to coarse sand, sandy silt laminations TLD		
199	65		51%	S15	50/4"			SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, fine to coarse sand TLD		Increased drill chatter between 65' and 70'
194	70		0%	S16	50/2"			SM	No recovery TLD		Increased drill chatter between 70' and 75'
189	75		0%	S17	50/2"						
184	80		0%	S18	50/2"			CL	Very dense, dry, gray, sandy CLAY (CL); trace gravel, fine to coarse sand TLD		Borehole completed at 80.17ft. below ground surface (bgs).
179	85										

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-014

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-015

Date(s) Drilled: 08/12/2016 - 08/15/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dan Dreyfus	Checked By: LS
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 86.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 268.3 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1644422.13E,561100.40N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
					Blank	ENF		Drillers used hollow stem auger to drill and case the first 5 feet.
264 / 5		94%	S1	21-15-21	SM	Dense, moist, brown, silty SAND (SM); trace gravel, fine to medium sand ENF		
259		56%	S2	20-20-26	SM	Dense, moist, gray to brown, very silty SAND (SM); trace gravel ENF		
10		94%	S3	23-29-30	SM	Very dense, moist, gray to brown, slightly gravelly, very silty SAND (SM); coarse sand, fine gravel ENF		MC, SA
254		80%	S4	35-50/4"	SM	Very dense, moist, gray, silty SAND (SM); trace gravel ENF		
15		63%	S5	34-50/5"	SM	Very dense, moist, gray to brown, silty SAND (SM); trace gravel, fine sand RGD		Increased drill chatter
249		69%	S6	8-39-50/4"	SP-SM	Very dense, moist, gray to brown, slightly silty SAND (SP-SM); trace gravel RGD		
20		12%	S7	2-6-50/5"	SP	Very dense, moist, brown, slightly gravelly SAND (SP); trace silt RGD		The top 15" was fine gravel. The driller indicated that the gravel is slough, and he will make drilling mud thicker to try and keep it stable
244 / 25		51%	S8	50/4"	SM	Very dense, gray, very silty SAND (SM); trace gravel, fine to coarse sand TLD		Increased drill chatter
239								

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-015

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-015

Date(s) Drilled	08/12/2016 - 08/15/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dan Dreyfus	Checked By	LS
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	86.5 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	268.3 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1644422.13E,561100.40N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			0%	S9	50/3"	SM	No recovery TLD		
						ML	Hard, moist, gray, SILT (ML); low plasticity CCS		Driller indicates a change in drilling at 32'
234	35		99%	S10	50/5"				
229	40		79%	S11	50/5"	ML	Hard, moist, gray, SILT (ML); low plasticity CCS		Increased drill chatter
224	45		79%	S12	50/5"	SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, fine to medium sand TLD		Drill chatter
219	50		0%	S13	50/1"	SM	No recovery TLD		The drillers had trouble getting the tri-cone bit out of the hole
214	55		0%	S14	50/2"	SM	No recovery TLD		
209									

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

GRAPHIC LOG

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

McMILLEN JACOBS ASSOCIATES

Boring E360-K-015

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-015

Date(s) Drilled	08/12/2016 - 08/15/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dan Dreyfus	Checked By	LS
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	86.5 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	268.3 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1644422.13E,561100.40N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			33%	S15	50/3"			ML	Very dense, moist, gray, sandy SILT (ML); trace gravel, fine sand TLD		
204	65		100%	S16	17-27-50/5"			CL	Hard, moist, gray, slightly sandy CLAY (CL); trace gravel CCS		Possible transition zone from TLD to CCS Driller indicates a change in drilling
199	70		100%	S17	22-26-44			CL	Hard, moist, gray, slightly sandy CLAY (CL); pockets of fine sand CCS		
194	75		100%	S18	29-27-41			CH	Hard, moist, gray, CLAY (CH); CCS		MC, AL, Minus 200
189	80		0%	S19	30-34-38						
184	85		100%	S20	20-29-38			CL	Hard, moist, gray, CLAY (CL); low to medium plasticity CCS		MC, AL
179											Borehole completed at 86.5ft. below ground surface (bgs).

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-015

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-017

Date(s) Drilled	08/17/2016 - 08/18/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Julia Irizarry	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	81.5 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	272.6 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1644632.31E,561281.17N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
						ML	Very dense, moist, gray to brown, sandy SILT (ML); nonplastic CSF		
			94%	S1	17-32-40	ML	Very dense, moist, gray to brown, sandy SILT (ML); nonplastic, contains sand laminations CSF		MC, AL, Minus 200
268	5		83%	S2	18-24-35	ML	Very dense, moist, brown to gray, very sandy SILT (ML); nonplastic CSF		MC, AL, Minus 200
			89%	S3	17-21-26	ML	Dense, moist, brown to gray, very sandy SILT (ML); fine sand CSF		
263	10		96%	S4	30-50/6"	ML	Very dense, moist, gray to brown, very sandy SILT (ML); fine sand, contains sand laminations CSF		
			91%	S5	18-39-50/5"	ML	Very dense, moist, sandy SILT (ML); trace fine gravel, very thinly bedded sand CCS		
258	15		100%	S6	29-50/5"	ML	Very dense, moist, brown to gray, sandy SILT (ML); low plasticity, fine to medium sand CCS		
253	20		100%	S7	40-50/4"	ML	Very dense, moist, gray to brown, sandy SILT (ML); trace gravel CCS		MC, AL, Minus 200
248	25		100%	S8	50/3"	ML	Very dense, moist, gray, slightly gravelly, very sandy SILT (ML); fine to coarse sand TLD		
243									

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

GRAPHIC LOG

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-017

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-017

Date(s) Drilled	08/17/2016 - 08/18/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Julia Irizarry	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	81.5 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	272.6 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1644632.31E,561281.17N	Elevation Source	Surveyed		

ELEV. (FT)	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			50%	S9	50/6"	SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); fine to medium sand CSG		
238	35		76%	S10	50/4"	SP	Very dense, moist, gray, SAND (SP); trace silt, trace gravel, fine to coarse sand CSG		
233	40		63%	S11	50/4"	ML	Very dense, moist, gray, slightly sandy SILT (ML); trace coarse sand, trace fine gravel TLD		Increased drill chatter between 40' and 45'
228	45		79%	S12	50/5"	SM	Very dense, moist, brown to gray, silty SAND (SM); fine to medium sand TLD		
223	50		33%	S13	30-44-50/3"	SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand TLD		Increased drill chatter between 50' and 55'
						CL	Hard, moist, gray, sandy CLAY (CL); trace gravel, very thinly bedded sand CCS		
218	55		88%	S14	26-42-50/5"	CL	Hard, moist, gray, sandy CLAY (CL); trace gravel CCS		MC, SA, AL
213									

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

McMILLEN JACOBS ASSOCIATES

Boring E360-K-017

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-017

Date(s) Drilled: 08/17/2016 - 08/18/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Julia Irizarry	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 272.6 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1644632.31E,561281.17N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S15	26-37-50/5"			CL	Hard, moist, gray to olive, sandy CLAY (CL); trace coarse sand, sandy silt laminations CCS		
208	65										
203	70		100%	S16	36-50/9"			CL	Hard, moist, gray, sandy CLAY (CL); low plasticity CCS		
198	75										
193	80		67%	S17	22-32-43			CH	Hard, moist, gray, sandy CLAY (CH); trace gravel CCS		MC, AL, Minus 200
188	85										Borehole completed at 81.5ft. below ground surface (bgs).
183											

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

McMILLEN JACOBS ASSOCIATES

Boring E360-K-017

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-018

Date(s) Drilled: 08/19/2016 - 08/23/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Jacob Facey	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.4 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 284.0 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1644726.08E,561352.79N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
280			83%	S1	16-21-24	SM	Dense to very dense, moist, light brown to gray, very silty SAND (SM); trace gravel, fine to medium sand, coarse gravel CSF		
	5		100%	S2	18-26-29	ML	Very dense, moist, light brown to gray, sandy SILT (ML); trace gravel, fine sand, non plastic, medium bedded SP at 10.1' CSF		
275			83%	S3	21-36-41				MC, SA, AL
	10		89%	S4	27-30-46				
270			89%	S5	26-38-49				MC, SA, AL
	15		83%	S6	28-32-40	SM	Very dense, moist, gray to brown, silty SAND (SM); trace gravel, fine to medium sand CSG		MC, SA
265									
	20		94%	S7	30-45-50/4"	ML	Very dense, moist, gray to brown, sandy SILT (ML); with thinly laminated silty sand CCS		
260									
	25		100%	S8	50/6"	CL-ML	Hard, moist, gray, slightly sandy SILT (CL-ML); trace coarse sand, low plasticity TLD		MC, AL
255									

PENETRATION RESISTANCE BLOWS/FT: □ BLOWS/FT (20, 40, 60, 80); ○ MC LL/PL

GRAPHIC LOG

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-018

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-018

Date(s) Drilled: 08/19/2016 - 08/23/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Jacob Facey	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.4 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 284.0 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1644726.08E,561352.79N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S9	50/4"			ML	Hard, moist, gray, very sandy SILT (ML); trace gravel, low plasticity TLD		Increased drill chatter between 30' and 35'
250	35		98%	S10	50/2"			SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, fine to medium sand TLD		Increased drill chatter between 35' and 40'
245	40		100%	S11	50/4"			SM	Very dense, moist, gray, very silty SAND (SM); fine sand TLD		
240	45		33%	S12	50/3"			SM	Very dense, moist, gray, very silty SAND (SM); TLD		
235	50		100%	S13	50/4"			SM	Very dense, moist, dark gray, very silty SAND (SM); trace gravel TLD		
230	55		100%	S14	41-50/3"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); fine to medium sand TLD		
225								ML	Very dense, moist, gray, sandy SILT (ML); trace gravel, low plasticity, this is a medium bedded silt within the SP-SM TLD		

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Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-018

Date(s) Drilled: 08/19/2016 - 08/23/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Jacob Facey	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.4 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 284.0 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1644726.08E,561352.79N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			83%	S15	50/6"			SP-SM	Very dense, moist, brown and gray, slightly silty SAND (SP-SM); fine to medium sand CSG		
220	65		82%	S16	40-50/5"			SP-SM	Very dense, moist, brown and gray, slightly silty SAND (SP-SM); fine to medium sand CSG		
215	70		79%	S17	50/5"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); fine to medium sand CSG		
210	75		60%	S18	50/5"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); fine to coarse sand CSG		
205	80		60%	S19	50/5"						
200	85										Borehole completed at 80.41ft. below ground surface (bgs).
195											

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-018

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-019

Date(s) Drilled: 08/23/2016 - 08/24/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.4 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 291.8 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1644852.93E,561453.43N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (□ BLOWS/FT 20 40 60 80; ○ MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			83%	S1	0-34-38			SP-SM	Very dense, moist, brown, slightly silty SAND (SP-SM); trace gravel, fine sand ENF		
287	5		82%	S2	32-50/5"			SP	Very dense, moist, gray, SAND (SP); trace gravel, trace silt ENF		
			93%	S3	21-43-50/3"			SP	Very dense, moist, gray brown, SAND (SP); trace gravel, fine to medium sand CSG		Coarse gravel stuck in sampler
282	10		100%	S4	31-50/4"			SP-SM	Very dense, moist, gray brown, slightly silty SAND (SP-SM); trace gravel CSG		
277	15		94%	S5	28-45-50/5"			SP-SM	Very dense, moist, light brown, slightly silty SAND (SP-SM); trace coarse sand, fine sand, thin laminations of silt CSG		
272	20		100%	S6	24-35-50/5"			SP-SM	Very dense, moist, brown, slightly silty SAND (SP-SM); trace gravel, fine to medium sand CSG		
267	25		88%	S7	28-40-50/5"			SM	Very dense, moist, light brown, silty SAND (SM); trace gravel, fine to medium sand CSG		MC, SA

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Boring E360-K-019

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-019

Date(s) Drilled	08/23/2016 - 08/24/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	80.4 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	291.8 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1644852.93E,561453.43N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			91%	S8	36-50/5"			ML	Hard, moist, brown, very sandy SILT (ML); CSF		MC, Minus 200
257	35		100%	S9	48-50/3"			ML	Hard, moist, gray, sandy SILT (ML); trace gravel, nonplastic CSF		MC, AL, Minus 200
252	40		100%	S10	50/4"			ML	Hard, moist, gray, sandy SILT (ML); trace gravel CSF		
247	45		100%	S11	50/3"			SM	Very dense, moist, gray, silty SAND (SM); trace gravel TLD		
242	50		67%	S12	50/3"			SM	Very dense, moist, gray, silty SAND (SM); trace gravel TLD		Increased drill chatter
237	55		0%	S13	50/2"			SM	No Recovery TLD		Heavy drill chatter

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Boring E360-K-019

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-019

Date(s) Drilled: 08/23/2016 - 08/24/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.4 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 291.8 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1644852.93E,561453.43N	Elevation Source: Surveyed	

ELEV. (FT)	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S14	50/3"	ML	Very dense, moist, gray, very sandy SILT (ML); fine sand CSF		
227	65		76%	S15	50/4"	ML	Very dense, moist, gray, very sandy SILT (ML); fine sand CSF		
222	70		100%	S16	50/5"	ML	Very dense, moist, gray, slightly sandy SILT (ML); fine sand, nonplastic CSF		MC, AL, Minus 200
217	75								Recovered material in bit only.
212	80		40%	S17	50/5"	SM	Very dense, moist, gray, very silty SAND (SM); fine sand CSF		Borehole completed at 80.41ft. below ground surface (bgs).
207	85								

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

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Boring E360-K-019

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-020

Date(s) Drilled	08/25/2016 - 08/26/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Jacob Facey	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Dietrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	85.5 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	309.0 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1645094.00E,561613.00N	Elevation Source	Estimated		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
								Blank	ENF		
			82%	S1	20-50/5"			ML	Very dense, moist, brown, very sandy SILT (ML); trace gravel, low plasticity ENF		
304	5		100%	S2	50/6"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel, fine to coarse sand CSG		
			82%	S3	34-50/5"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel, fine to coarse sand CSG		
299	10		83%	S4	31-50/6"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel, fine to coarse sand CSG		
294	15		37%	S5	36-50/5"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel, fine to coarse sand CSG		
289	20		90%	S6	42-50/4"			SP	Very dense, moist, brown, slightly gravelly SAND (SP); trace silt, fine to coarse sand CSG		
284	25		71%	S7	50/5"			ML	Very dense, moist, very sandy SILT (ML); trace gravel, could be a lens within the SM layer CSG		

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Boring E360-K-020

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-020

Date(s) Drilled	08/25/2016 - 08/26/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Jacob Facey	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Dietrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	85.5 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	309.0 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1645094.00E,561613.00N	Elevation Source	Estimated		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			73%	S8	41-50/5"			SM	Very dense, moist, brown, slightly gravelly, silty SAND (SM); CSG		
274	35		71%	S9	50/5"			SP	Very dense, moist, brown, SAND (SP); trace silt CSG		
269	40		76%	S10	50/4"			SM	Very dense, moist, brown to gray, very silty SAND (SM); trace gravel CSG		
264	45		50%	S11	50/3"			SM	Very dense, moist, brown to gray, silty SAND (SM); trace gravel TLD		Increased drill chatter from 45' to 50'
259	50		50%	S12	50/6"			SM	Very dense, moist, brown to gray, very silty SAND (SM); trace gravel TLD		
254	55		51%	S13	50/5"			SM	Very dense, moist, brown to gray, silty SAND (SM); trace gravel TLD		Increased drill chatter from 55' to 60'

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-020

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-020

Date(s) Drilled: 08/25/2016 - 08/26/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Jacob Facey	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Dietrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 85.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 309.0 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1645094.00E,561613.00N	Elevation Source: Estimated	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			61%	S14	50/5"			SM	Very dense, moist, brown to gray, silty SAND (SM); trace gravel CSG		
244	65		61%	S15	50/5"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); trace gravel CSG		Increased drill chatter from 65' to 70' Driller had difficulty pulling rods out above 30' when retrieving sample S15
239	70		76%	S16	50/4"			ML	Hard, moist, gray, slightly sandy SILT (ML); trace gravel, low plasticity CSF		
234	75		100%	S17	50/3"			ML	Hard, moist, gray, slightly sandy SILT (ML); trace gravel CSF		Hole collapsed up to 30', drillers redrilled to 75' the next day Heavy drill chatter from 80' to 82' Drillers had difficulty getting SPT sampler to the bottom of the hole
229	80										
224	85		83%	S18	50/6"			SM	Very dense, moist, gray, silty SAND (SM); fine sand CSF		Borehole completed at 85.5ft. below ground surface (bgs).

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-020

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-021

Date(s) Drilled	08/26/2016 - 08/29/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Jacob Facey	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	85.3 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	317.0 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1645208.00E,561684.00N	Elevation Source	Estimated		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
								Blank	ENF		
312	5		83%	S1	25-38-42			SM	Very dense, moist, brown, silty SAND (SM); trace gravel ENF		
			94%	S2	21-26-36			SP-SM	Very dense, moist, brown, slightly silty SAND (SP-SM); ENF		
307	10		100%	S3	50/3"			ML	Very dense, moist, gray to brown, very sandy SILT (ML); trace gravel, fine to medium sand CSG		Increased drill chatter at 12'
302	15		90%	S4	36-50/4"			SP-SM	Very dense, moist, brown, slightly silty SAND (SP-SM); trace gravel CSG		
297	20		90%	S5	42-50/4"			ML	Hard, moist, gray, SILT (ML); TLD		MC, AL, Drillers had difficulty removing rods after sampling
292	25		90%	S6	33-50/4"			SM	Very dense, moist, brown, very silty SAND (SM); trace gravel, fine to medium sand TLD		

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BLDG-2018-00983, BLDG-2018-00985

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Boring E360-K-021

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-021

Date(s) Drilled	08/26/2016 - 08/29/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Jacob Facey	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	85.3 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	317.0 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1645208.00E,561684.00N	Elevation Source	Estimated		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			54%	S7	42-50/5"			SW	Very dense, moist, gray to brown, slightly gravelly SAND (SW); fine to coarse sand CSG		
282	35		91%	S8	42-50/5"			SM	Very dense, moist, brown, silty SAND (SM); fine to coarse sand CSG		
277	40		51%	S9	50/4"			SM	Very dense, moist, brown, very silty SAND (SM); trace gravel TLD		
272	45		60%	S10	50/5"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel, fine to coarse sand TLD		Increased drill chatter between 45' and 50'
267	50		100%	S11	50/3"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel TLD		
262	55		60%	S12	50/5"			SP	Very dense, moist, gray, SAND (SP); trace silt, trace gravel, fine to coarse sand CSG		

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-021

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-021

Date(s) Drilled	08/26/2016 - 08/29/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Jacob Facey	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	85.3 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	317.0 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1645208.00E,561684.00N	Elevation Source	Estimated		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			79%	S13	50/5"			SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, fine sand CSG		
252	65		67%	S14	50/6"			SP	Very dense, moist, gray, SAND (SP); trace silt, trace gravel, fine to coarse sand CSG		
247	70		50%	S15	50/6"			SM	Very dense, moist, gray, silty SAND (SM); fine sand CSG		MC, SA
242	75		63%	S16	50/4"			ML	Very dense, moist, gray, sandy SILT (ML); trace gravel CSF		
237	80										
232	85		63%	S17	50/4"			SM	Very dense, moist, gray, silty SAND (SM); fine to medium sand CSG		Borehole completed at 85.33ft. below ground surface (bgs).

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BLDG-2018-00983, BLDG-2018-00985

McMILLEN JACOBS ASSOCIATES

Boring E360-K-021

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-022

Date(s) Drilled: 08/17/2016 - 08/17/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.2 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 329.9 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1645363.11E,561824.44N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
								Blank	ENF		
325	5		94%	S1	18-22-34			SM	Very dense, moist, tan, gravelly, very silty SAND (SM); fine to medium sand ENF		MC, SA
			100%	S2	27-50/5"			SM	Very dense, moist, tan, gravelly, very silty SAND (SM); CSG		
320	10		100%	S3	28-50/5"			SM	Very dense, moist, tan, silty SAND (SM); trace gravel CSG		
315	15		99%	S4	50/5"			SM	Very dense, moist, brown, silty SAND (SM); fine to medium sand, pockets of silt TLD		
310	20		100%	S5	37-50/5"			SM	Very dense, moist, tan, very silty SAND (SM); trace gravel, fine to medium sand TLD		MC, SA
305	25		99%	S6	50/5"			SM	Very dense, moist, tan, silty SAND (SM); fine sand CSG		

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BLDG-2018-00983, BLDG-2018-00985

McMILLEN JACOBS ASSOCIATES

Boring E360-K-022

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-022

Date(s) Drilled: 08/17/2016 - 08/17/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.2 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 329.9 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1645363.11E,561824.44N	Elevation Source: Surveyed	

ELEV. (FT)	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			75%	S7	34-50/6"	SM	Very dense, moist, tan, silty SAND (SM); trace gravel, fine sand CSG		
295	35		76%	S8	50/4"	SM	Very dense, moist, tan, silty SAND (SM); trace gravel, fine to coarse sand CSG		
290	40		91%	S9	38-50/5"	ML	Very dense, moist, tan, SILT (ML); trace fine sand CSG		
						SP	Very dense, moist, tan, SAND (SP); trace silt, trace gravel, medium sand CSG		
285	45		100%	S10	48-50/5"	SP	Very dense, moist, tan to gray, SAND (SP); trace silt, trace gravel, medium sand CSG		
280	50		100%	S11	50/5"	SM	Very dense, moist, tan, very silty SAND (SM); trace gravel, fine to medium sand TLD		
275	55		76%	S12	50/4"	SM	Very dense, moist, tan, very silty SAND (SM); trace gravel, fine to coarse sand TLD		

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-022

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-022

Date(s) Drilled: 08/17/2016 - 08/17/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.2 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 329.9 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1645363.11E,561824.44N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			0%	S13	50/3"			SM	No Recovery TLD		
265	65		98%	S14	50/2"			SM	Very dense, moist, tan, very silty SAND (SM); trace gravel, fine to coarse sand TLD		
260	70		100%	S15	50/1"			ML	Very dense, moist, gray, very sandy SILT (ML); trace gravel, low to medium plasticity TLD		
255	75		100%	S16	50/3"			SM	Very dense, moist, tan, silty SAND (SM); trace gravel, fine to coarse sand CSF		
250	80		33%	S17	50/3"			SM	Very dense, moist, tan, silty SAND (SM); trace gravel, fine to coarse sand CSF		Borehole completed at 80.25ft. below ground surface (bgs).
245	85										

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-022

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-023

Date(s) Drilled: 08/15/2016 - 08/16/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dan Dreyfus	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 110.2 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 338.4 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1645568.87E,562000.79N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
					Blank	ENF		Drill chatter
334 / 5		76%	S1	21-48-50/5"	SM	Very dense, moist, gray to brown, gravelly, silty SAND (SM); fine to medium sand TLD		MC, SA Increased drill chatter
329 / 10		72%	S2	18-21-45	SM	Very dense, moist, brown, gravelly, silty SAND (SM); fine to medium sand TLD		MC, SA Increased drill chatter
324 / 15		50%	S3	15-21-36	SM	Very dense, moist, gray, silty SAND (SM); trace gravel, trace wood, fine to coarse sand TLD		
319 / 20		40%	S4	15-50/4"	SM	Very dense, moist, gray, very silty SAND (SM); trace gravel, fine to coarse sand TLD		Fine gravel slough observed at top of sample S4; drillers added more Quik-Gel to drilling mud to stabilize the borehole Drill chatter
314 / 25		60%	S5	50/5"	SM	Very dense, moist, gray, very silty SAND (SM); trace gravel TLD		Drill chatter, very slow drilling
309		78%	S6	31-50/3"	ML	Very dense, moist, gray, very sandy SILT (ML); low plasticity, fine to coarse sand TLD		Drill chatter

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

GRAPHIC LOG

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-023

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-023

Date(s) Drilled	08/15/2016 - 08/16/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dan Dreyfus	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Truck Diedrich D-120	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	110.2 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	338.4 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1645568.87E,562000.79N	Elevation Source	Surveyed		

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
		76%	S7	50/4"			ML	Very dense, moist, gray, very sandy SILT (ML); fine to coarse sand, with pockets of sand TLD		
304 35		100%	S8	50/3"			ML	Very dense, moist, gray, very sandy SILT (ML); trace gravel TLD		Gravel stuck in sampler
299 40		100%	S9	50/3"			SM	Very dense, moist, brown to gray, very silty SAND (SM); trace gravel, fine to coarse sand CSG		
294 45		100%	S10	50/3"			SM	Very dense, moist, brown to gray, very silty SAND (SM); fine to coarse sand CSG		
289 50		100%	S11	50/4"			SM	Very dense, moist, brown, very silty SAND (SM); trace gravel, fine to coarse sand CSG		
284 55		100%	S12	50/4"			SM	Very dense, moist, brown, very silty SAND (SM); trace gravel, fine to coarse sand CSG		
279										

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BLDG-2018-00983, BLDG-2018-00985

McMILLEN JACOBS ASSOCIATES

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-023

Date(s) Drilled	08/15/2016 - 08/16/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dan Dreyfus	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Truck Diedrich D-120	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	110.2 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	338.4 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1645568.87E,562000.79N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			0%	S13	50/4"			SM	No recovery CSG		
274	65		98%	S14	50/2"			SM	Very dense, moist, tan, silty SAND (SM); trace gravel CSG		Drill chatter below 65'
269	70		100%	S15	50/3"			SM	Very dense, moist, tan, silty SAND (SM); trace gravel, medium sand CSG		
264	75		76%	S16	50/4"			SP-SM	Very dense, moist, gray to brown, slightly silty SAND (SP-SM); trace gravel, fine to medium sand CSG		
259	80		82%	S17	43-50/5"			SM	Very dense, moist, tan to gray, slightly gravelly, silty SAND (SM); fine to coarse sand CSG		MC, SA
254	85		54%	S18	39-50/5"			SP	Very dense, moist, tan to gray, SAND (SP); trace silt, medium sand, with very thinly bedded silt CSG		
249											

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Boring E360-K-023

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-023

Date(s) Drilled: 08/15/2016 - 08/16/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dan Dreyfus	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Truck Diedrich D-120	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 110.2 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 338.4 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1645568.87E,562000.79N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
		76%	S19	50/4"			ML	Hard, moist, gray, slightly sandy SILT (ML); trace gravel TLD		
244 95										
239 100		60%	S20	50/5"			SP	Very dense, moist, gray, SAND (SP); trace silt, fine to medium sand CSG		
234 105										
229 110		0%	S21	50/3"			SP	Very dense, moist, gray to brown, SAND (SP); trace silt, fine sand, with very thinly bedded silt CSG		Inclinometer casing installed from 0' to 105' Borehole completed at 110.25ft. below ground surface (bgs).
224 115										
219										

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Boring E360-K-023

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-025

Date(s) Drilled: 09/01/2016 - 09/01/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 316.7 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1645781.75E,562245.89N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
								Blank	NONE		
312	5		70%	S1	21-44-50/5"			SM	Very dense, moist, brown, gravelly, silty SAND (SM); fine to coarse sand TLD		MC, SA
			33%	S2	18-50/3"			ML	Very dense, moist, brown, very sandy SILT (ML); trace gravel, fine to coarse sand TLD		
307	10		60%	S3	20-50/4"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel, medium sand TLD		
302	15		60%	S4	34-50/4"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel CSG		
297	20		79%	S5	50/5"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel, medium to coarse sand CSG		
292	25		45%	S6	8-50/5"			ML	Hard, moist, brown, slightly sandy SILT (ML); low to medium plasticity, fine to medium sand CSG		
287											

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-025

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-025

Date(s) Drilled: 09/01/2016 - 09/01/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 316.7 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1645781.75E,562245.89N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			59%	S7	25-40-50/5"			SM	Very dense, moist, brown, silty SAND (SM); fine sand CSF		
282	35										
277	40		91%	S8	39-50/5"			SP	Very dense, moist, gray, SAND (SP); trace silt, fine to coarse sand CSG		
272	45										
267	50		100%	S9	50/5"			ML	Very dense, moist, gray, very sandy SILT (ML); trace gravel TLD		
262	55										
257											

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-025

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-025

Date(s) Drilled: 09/01/2016 - 09/01/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 316.7 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1645781.75E,562245.89N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S10	50/6"			SP	Very dense, moist, gray, SAND (SP); trace silt, fine to medium sand CSG		
252	65										
247	70		79%	S11	50/5"			SP	Very dense, moist, gray, SAND (SP); trace silt, fine sand CSF		
242	75										
237	80		83%	S12	50/6"			ML	Hard, moist, gray, sandy SILT (ML); fine sand CSF		Borehole completed at 80.5ft. below ground surface (bgs).
232	85										
227											

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-025

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-026

Date(s) Drilled: 09/06/2016 - 09/06/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 319.5 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1645912.92E,562317.60N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
					Blank	NONE		
315 / 5		94%	S1	38-42-50/5"	SM	Very dense, moist, brown, very silty SAND (SM); trace gravel, fine to coarse sand CSG		
		89%	S2	23-35-39	ML	Very dense, moist, brown, slightly sandy SILT (ML); fine sand, with sand laminations CSF		
310 / 10		39%	S3	28-29-33	SM	Very dense, moist, brown, slightly silty SAND (SM); fine to medium sand CSF		
					SM	Very dense, moist, brown, very silty SAND (SM); fine sand CSF		
305 / 15		82%	S4	25-50/5"	SM	Very dense, moist, brown, silty SAND (SM); trace gravel, fine to coarse sand CSG		
300 / 20		78%	S5	19-28-35	SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); trace gravel, fine sand CSG		
295 / 25		100%	S6	44-50/5"	ML	Very dense, moist, brown, very sandy SILT (ML); trace gravel, fine to coarse sand CSG		
290								

PENETRATION RESISTANCE BLOWS/FT: BLOWS/FT 20 40 60 80; MC LL/PL

GRAPHIC LOG

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-026

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-026

Date(s) Drilled: 09/06/2016 - 09/06/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 319.5 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1645912.92E,562317.60N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			82%	S7	44-50/5"			ML	Very dense, moist, brown, sandy SILT (ML); fine sand CSF		
285	35		78%	S8	27-27-29			SM	Very dense, moist, brown, very silty SAND (SM); fine to coarse sand CSF		
280	40		51%	S9	50/4"			ML	Hard, moist, brown, sandy SILT (ML); trace gravel, fine to coarse sand CSG		
275	45		0%	S10	50/1"			ML	No recovery CSG		
270	50		75%	S11	48-50/6"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); fine to medium sand CSG		
265	55		79%	S12	50/5"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); fine to medium sand CSG		
260											

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McMILLEN JACOBS ASSOCIATES

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-026

Date(s) Drilled: 09/06/2016 - 09/06/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 319.5 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1645912.92E,562317.60N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			82%	S13	48-50/5"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); trace silt, fine sand CSG		
255	65										
250	70		100%	S14	50/5"			ML	Hard, moist, gray, slightly sandy SILT (ML); fine sand CSF		
245	75										
240	80		100%	S15	29-30-40			CH	Hard, moist, gray, CLAY (CH); trace sand CCS		MC, AL
235	85										Borehole completed at 81.5ft. below ground surface (bgs).
230											

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

McMILLEN JACOBS ASSOCIATES

Boring E360-K-026

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-027

Date(s) Drilled: 08/29/2016 - 08/29/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.2 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 328.2 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1646028.52E,562400.73N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL / DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
							Blank	NONE		
324										
5		67%	S1	5-8-24			SM	Dense, moist, brown, silty SAND (SM); trace gravel RGD		
		100%	S2	27-50/5"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel, fine to medium sand CSG		
319										
10		72%	S3	38-40-46			SM	Very dense, moist, brown, slightly gravelly, silty SAND (SM); fine to medium sand CSG		MC, SA
314										
15		78%	S4	16-37-44			SM	Very dense, moist, gray, silty SAND (SM); CSG		
							ML	Hard, moist, brown, sandy SILT (ML); fine sand, nonplastic CSG		
309										
20		82%	S5	36-50/5"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel, low plasticity, fine to medium sand CSG		
304										
25										
299										

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Boring E360-K-027

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-027

Date(s) Drilled	08/29/2016 - 08/29/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track CME 850	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	81.2 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	328.2 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1646028.52E,562400.73N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			50%	S6	50/6"			SM	Very dense, moist, brown, silty SAND (SM); trace gravel, fine to medium sand CSG		
294	35										
289	40		60%	S7	50/5"			SM	Very dense, moist, brown, very silty SAND (SM); trace coarse sand, trace fine gravel CSG		
284	45										
279								CH	Hard, moist, gray, CLAY (CH); trace sand, trace gravel CCS		Drillers indicate a change in drilling at 48'
	50		100%	S8	14-23-30						MC, AL
274	55										
269											

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-027

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-027

Date(s) Drilled: 08/29/2016 - 08/29/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.2 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 328.2 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1646028.52E,562400.73N	Elevation Source: Surveyed	

ELEV. (FT) / WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
		100%	S9	35-50/5"			CH	Hard, moist, gray, slightly sandy CLAY (CH); trace gravel CCS		Drillers had difficulty getting SPT sampler to bottom of borehole for sample S9
264 65 259										
70		100%	S10	19-31-44			CH	Hard, moist, gray, sandy CLAY (CH); trace gravel CCS		MC, SA, AL
254 75 249										
80		93%	S11	30-36-50/3"			CH	Hard, moist, gray, slightly sandy, slightly gravelly CLAY (CH); CCS		
244 85 239										Borehole completed at 81.25ft. below ground surface (bgs).

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McMILLEN JACOBS ASSOCIATES

Boring E360-K-027

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-028

Date(s) Drilled: 08/30/2016 - 08/30/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Jacob Facey	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 325.9 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1646128.82E,562438.38N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
								Blank	NONE		
321	5		83%	S1	22-34-50/6"			SM	Very dense, moist, gray brown, silty SAND (SM); RGD		
			100%	S2	31-50/5"			SM	Very dense, moist, gray brown, silty SAND (SM); trace gravel RGD		
316	10		78%	S3	27-33-37			SP-SM	Very dense, moist, gray brown, slightly silty SAND (SP-SM); pockets of very silty sand CSG		
311	15		75%	S4	48-50/6"			SM	Very dense, moist, gray brown, silty SAND (SM); fine to medium sand CSG		
306	20		82%	S5	26-41-50/5"			SM	Very dense, moist, gray brown, silty SAND (SM); CSG		
								ML	Very dense, moist, gray, SILT (ML); trace sand, low plasticity CSG		
301	25		70%	S6	26-42-50/5"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); pockets of very silty sand CSG		

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Boring E360-K-028

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-028

Date(s) Drilled: 08/30/2016 - 08/30/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Jacob Facey	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 325.9 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1646128.82E,562438.38N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			60%	S7	50/5"			SM	Very dense, moist, gray, very silty SAND (SM); TLD		
291	35										
								CH	Hard, moist, dark gray, sandy CLAY (CH); slow dilatancy CCS		Drillers noted a change in drilling at 38'
286	40		100%	S8	15-28-30						MC, AL, Minus 200
281	45										
276	50		100%	S9	15-16-28			CH	Hard, moist, dark gray, sandy CLAY (CH); trace gravel CCS		
271	55										

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Boring E360-K-028

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-028

Date(s) Drilled: 08/30/2016 - 08/30/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Jacob Facey	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track CME 850	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 81.5 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 325.9 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1646128.82E,562438.38N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (□ BLOWS/FT 20 40 60 80; ○ MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S10	30-36-50/5"			CH	Hard, moist, dark gray, sandy CLAY (CH); CCS		
261	65										
256	70		100%	S11	14-26-32			CL	Hard, moist, dark gray, sandy CLAY (CL); CCS		MC, AL, Minus 200
251	75										
246	80		100%	S12	16-20-23			CL	Hard, moist, dark gray, CLAY (CL); trace sand CCS		
241	85										Borehole completed at 81.5ft. below ground surface (bgs).

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Boring E360-K-028

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-029

Date(s) Drilled: 08/19/2016 - 08/19/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.4 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 340.0 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1646278.00E,562546.00N	Elevation Source: Estimated	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
						Blank	NONE		
335	5		50%	S1	7-5-6	SM	Medium dense, moist, brown red, silty SAND (SM); trace gravel RGD		
			94%	S2	18-28-29	SM	Very dense, moist, brown red, silty SAND (SM); trace gravel RGD		
330	10		61%	S3	11-10-12	SM	Medium dense, moist, gray, silty SAND (SM); fine sand RGD		
			78%	S4	19-22-28	SM	Very dense, moist, gray, slightly gravelly, very silty SAND (SM); CSG		MC, SA
325	15		94%	S5	22-31-47	SM	Very dense, moist, tan, silty SAND (SM); trace fine gravel CSG		
320	20		89%	S6	28-25-33	SM	Very dense, moist, tan, very silty SAND (SM); fine to medium sand CSG		
315	25		83%	S7	46-50/6"	SM	Very dense, moist, gray, silty SAND (SM); trace gravel, fine to medium sand CSG		MC, SA

PENETRATION RESISTANCE BLOWS/FT: □ BLOWS/FT 20 40 60 80; ○ MC LL/PL

GRAPHIC LOG

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Boring E360-K-029

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-029

Date(s) Drilled	08/19/2016 - 08/19/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	80.4 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	340.0 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1646278.00E,562546.00N	Elevation Source	Estimated		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			99%	S8	50/5"			SM	Very dense, moist, gray, silty SAND (SM); trace gravel TLD		
305	35										
300	40		100%	S9	50/2"			SM	Very dense, moist, gray, very silty SAND (SM); trace gravel TLD		
295	45										
								CH	Hard, moist, gray, CLAY (CH); trace sand CCS		Drillers think they hit clay at 46'
290	50		100%	S10	17-24-40						MC, AL
285	55										

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Boring E360-K-029

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-029

Date(s) Drilled: 08/19/2016 - 08/19/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 80.4 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 340.0 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1646278.00E,562546.00N	Elevation Source: Estimated	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S11	16-31-48			CH	Hard, moist, gray, CLAY (CH); trace sand CCS		
275	65										
270	70		100%	S12	45-47-50/5"			SP-SM	Very dense, moist, gray, slightly silty SAND (SP-SM); CSG		MC, SA
265	75										
260	80		60%	S13	50/5"			SP-...	Very dense, moist, gray, slightly silty SAND (SP-SM); CSG		
255	85										Borehole completed at 80.42ft. below ground surface (bgs).

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Boring E360-K-029

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-030

Date(s) Drilled: 08/17/2016 - 08/17/2016	Geotechnical Consultant: McMillen Jacobs Associates	Logged By: Dale Moore	Checked By: DD
Drilling Method/ Rig Type: Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor: Holocene Drilling Inc.	Total Depth of Borehole: 70.3 ft	
Hole Diameter: 4.88 in	Hammer Weight/Drop (lb/in.)/Type: 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum: 335.9 ft / NAVD88	
Location: Bellevue, WA	Coordinates: 1646338.14E,562554.31N	Elevation Source: Surveyed	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
								Blank	NONE		Asphalt surface
331	5		94%	S1	22-31-46			SM	Very dense, moist, tan, very silty SAND (SM); trace gravel, fine to coarse sand TLD		MC, SA
326	10		94%	S2	22-27-50/4"			SM	Very dense, moist, tan, very silty SAND (SM); trace gravel TLD		
321	15		79%	S3	50/5"			SM	Very dense, moist, tan, very silty SAND (SM); trace gravel, fine to coarse sand TLD		
316	20		78%	S4	40-37-40			SM	Very dense, moist, tan, very silty SAND (SM); trace gravel TLD		
311	25		100%	S5	50/4"			SM	Very dense, moist, tan, very silty SAND (SM); trace gravel, fine to coarse sand TLD		

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Boring E360-K-030
Sheet 1 of 3

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-030

Date(s) Drilled	08/17/2016 - 08/17/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	70.3 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	335.9 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1646338.14E,562554.31N	Elevation Source	Surveyed		

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S6	50/3"			ML	Very dense, moist, tan, slightly sandy SILT (ML); trace gravel, medium to coarse sand TLD		
301	35		100%	S7	50/3"			GP	Very dense, moist, brown, sandy GRAVEL (GP); trace silt, medium to coarse sand CSG		
296	40		100%	S8	50/3"			SP	Very dense, moist, brown, slightly gravelly SAND (SP); trace silt CSG		
291	45		79%	S9	50/5"			SP-SM	Very dense, moist, brown, slightly silty SAND (SP-SM); trace gravel, fine to coarse sand CSG		
286	50		100%	S10	48-41-50/5"			CL	Hard, moist, brown, sandy CLAY (CL); trace gravel CSG		MC, AL, Minus 200
								SM	Very dense, moist, gray, slightly silty SAND (SM); trace coarse sand CSG		
281	55		75%	S11	38-50/6"			SM	Very dense, moist, tan, silty SAND (SM); fine to medium sand CSG		MC, SA

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Boring E360-K-030

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Boring E360-K-030

Date(s) Drilled	08/17/2016 - 08/17/2016	Geotechnical Consultant	McMillen Jacobs Associates	Logged By	Dale Moore	Checked By	DD
Drilling Method/ Rig Type	Mud rotary/Track Diedrich D-50 Turbo	Drilling Contractor	Holocene Drilling Inc.	Total Depth of Borehole	70.3 ft		
Hole Diameter	4.88 in	Hammer Weight/Drop (lb/in.)/Type	140 lb / 30 in / Automatic	Ground Surface Elevation/Datum	335.9 ft / NAVD88		
Location	Bellevue, WA	Coordinates	1646338.14E,562554.31N	Elevation Source	Surveyed		

ELEV. (FT)	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	NUMBER	BLOW COUNTS	PENETRATION RESISTANCE BLOWS/FT (BLOWS/FT 20 40 60 80; MC LL/PL)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
			100%	S12	50/6"				Very dense, moist, tan, silty SAND (SM); fine to medium sand CSG		
271	65							SM			
266	70		76%	S13	50/4"			SP-...	Very dense, moist, tan, slightly silty SAND (SP-SM); fine to medium sand CSG		Borehole completed at 70.33ft. below ground surface (bgs).
261	75										
256	80										
251	85										

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Boring E360-K-030

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Test Pit E360-TP-1

Date(s): **08/18/2016 - 08/18/2016**	Geotechnical Consultant: **McMillen Jacobs Associates**	Logged By: **Dale Moore**	Checked By **DD**
Excavation Method: **Mini Excavator**	Pit Depth: **6.5 Ft**		
Contractor: **Kiewit**	Ground Surface Elevation: **357.0 Ft**		
Location: **Bellevue**	Coordinates: **1647367.97E, 563652.81N**		

DEPTH (FT)	SAMPLE TYPE	NUMBER	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
1	G	S1		ML	Moist, brown, very sandy SILT (ML); with cobbles, intact cohesive pieces, possible weathered till .		
2							Harder to excavate
3	G	S2		SM	Moist, brown gray, silty SAND (SM); trace gravel, with cobbles, medium sand.		
4							Harder to excavate
5	G	S3		SM	Moist, gray, slightly silty SAND (SM); trace gravel, medium sand.		
6							
7							Test pit final depth 6.5ft. below ground surface (bgs).
8							
9							

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Test Pit E360-TP-1

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Test Pit E360-TP-2

Date(s): **08/18/2016 - 08/18/2016**	Geotechnical Consultant: **McMillen Jacobs Associates**	Logged By: **Dale Moore**	Checked By **DD**
Excavation Method: **Mini Excavator**	Pit Depth: **8.0 Ft**		
Contractor: **Kiewit**	Ground Surface Elevation: **355.0 Ft**		
Location: **Bellevue**	Coordinates: **1647431.37E, 563741.84N**		

DEPTH (FT)	SAMPLE TYPE	NUMBER	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
1, 2, 3, 4	G	S1		ML	Moist, brown, sandy SILT (ML); trace gravel, with cobbles, some intact cohesive pieces; possible weathered fill.		
5, 6, 7	G	S2		ML	Moist, brown, sandy SILT (ML); trace gravel, with cobbles.		
8							Test pit final depth 8ft. below ground surface (bgs).
9							

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Test Pit E360-TP-2

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Test Pit E360-TP-2A

Date(s): **08/18/2016 - 08/18/2016**	Geotechnical Consultant: **McMillen Jacobs Associates**	Logged By: **Dale Moore**	Checked By **DD**
Excavation Method: **Mini Excavator**	Pit Depth: **6.0 Ft**		
Contractor: **Kiewit**	Ground Surface Elevation: **354.0 Ft**		
Location: **Bellevue**	Coordinates: **1647430.68E, 563744.77N**		

DEPTH (FT)	SAMPLE TYPE	NUMBER	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
1 2 3 4 5				ML	Moist, brown, sandy SILT (ML); trace gravel, with cobbles.		Same sequence as E360-TP-2, more garbage in hole.
6 7 8 9							Test pit final depth 6ft. below ground surface (bgs).

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BLDG-2018-00983, BLDG-2018-00985

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Test Pit E360-TP-2A

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Test Pit E360-TP-3

Date(s): **08/18/2016 - 08/18/2016**	Geotechnical Consultant: **McMillen Jacobs Associates**	Logged By: **Dale Moore**	Checked By **DD**
Excavation Method: **Mini Excavator**	Pit Depth: **6.5 Ft**		
Contractor: **Kiewit**	Ground Surface Elevation: **363.0 Ft**		
Location: **Bellevue**	Coordinates: **1647561.38E, 563935.56N**		

DEPTH (FT)	SAMPLE TYPE	NUMBER	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
	G	S1		GM	Sandy, silty GRAVEL (GM); with cobbles.		
1							Harder to excavate
2	G	S2		SM	Moist, brown, silty SAND (SM); trace gravel, with cobbles, some loose, intact cohesive pieces.		
3							
4					Moist, brown, silty SAND (SM); with cobbles, trace gravel, some loose, intact cohesive pieces.		Harder to excavate
5	G	S3		SM			
6							
7							Test pit final depth 6.5ft. below ground surface (bgs).
8							
9							

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McMILLEN JACOBS ASSOCIATES

Test Pit E360-TP-3

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Test Pit E360-TP-4

Date(s): **08/18/2016 - 08/18/2016**	Geotechnical Consultant: **McMillen Jacobs Associates**	Logged By: **Dale Moore**	Checked By **DD**
Excavation Method: **Mini Excavator**	Pit Depth: **6.5 Ft**		
Contractor: **Kiewit**	Ground Surface Elevation: **370.0 Ft**		
Location: **Bellevue**	Coordinates: **1647587.18E, 563973.80N**		

DEPTH (FT)	SAMPLE TYPE	NUMBER	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
1, 2	G	S1		SM	Moist, brown, very silty SAND (SM); trace gravel, with cobbles.		
3, 4	G	S2		ML	Moist, gray, sandy SILT (ML); trace gravel, with cobbles, fine to coarse sand, some loose, intact cohesive pieces.		Harder to excavate
5, 6	G	S3		SP-SM	Moist, slightly silty SAND (SP-SM); with cobbles, trace gravel, some loose, intact cohesive pieces.		
7, 8, 9							Test pit final depth 6.5ft. below ground surface (bgs).

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McMILLEN JACOBS ASSOCIATES

Test Pit E360-TP-4

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Test Pit E360-TP-5

Date(s): **08/18/2016 - 08/18/2016**	Geotechnical Consultant: **McMillen Jacobs Associates**	Logged By: **Dale Moore**	Checked By **DD**
Excavation Method: **Mini Excavator**	Pit Depth: **7.0 Ft**		
Contractor: **Kiewit**	Ground Surface Elevation: **348.0 Ft**		
Location: **Bellevue**	Coordinates: **1647272.79E, 563535.85N**		

DEPTH (FT)	SAMPLE TYPE	NUMBER	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
1	G	S1		ML	Moist, brown, sandy SILT (ML); trace wood, trace sand, with cobbles.		
2							
3	G	S2		SM	Moist, brown to red, silty SAND (SM); trace wood, trace gravel, with cobbles,		
4							Harder to excavate
5	G	S3		SM	Moist, gray, slightly gravelly, silty SAND (SM); with cobbles, fine sand, fine to coarse gravel, some loose, intact cohesive pieces.		
6	G	S4					
7							Test pit final depth 7ft. below ground surface (bgs).
8							
9							

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McMILLEN JACOBS ASSOCIATES

Test Pit E360-TP-5

Project: E360 East Link Extension
Project Location: Bellevue, WA
Project Number: 5480.0

Log of Test Pit E360-TP-6

Date(s): **08/18/2016 - 08/18/2016**	Geotechnical Consultant: **McMillen Jacobs Associates**	Logged By: **Dale Moore**	Checked By **DD**
Excavation Method: **Mini Excavator**	Pit Depth: **7.5 Ft**		
Contractor: **Kiewit**	Ground Surface Elevation: **343.0 Ft**		
Location: **Bellevue**	Coordinates: **1647169.86E, 563413.55N**		

DEPTH (FT)	SAMPLE TYPE	NUMBER	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	ESU	REMARKS AND TESTS
1					Gray to brown, gravelly, silty SAND (SM); trace wood, some loose, intact cohesive pieces.		
2	G G G	S1 S2 S3		SM			
3							
4					Moist, brown to red, silty SAND (SM); trace gravel, with cobbles, fine sand.		Harder to excavate
5	G	S4		SM			
6					Moist, gray, sandy SILT (ML); fine sand, with cobbles.		
7	G	S5		ML			
8							Test pit final depth 7.5ft. below ground surface (bgs).
9							

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McMILLEN JACOBS ASSOCIATES

Test Pit E360-TP-6

Appendix A.2

Existing Exploration Logs

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Table A.2-1. Summary of Existing Explorations

Boring	Northing	Easting	Date Completed	Boring Depth (ft)	Ground Elev.[4] (ft)	GW Install[1]	Drilling Method[2]	Drilling Contractor	Source Document[3]
E340-B-037	560215.864	1642260.725	3/01/2013	16.5	199.8	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
E360-B-003	560460.498	1642673.885	5/13/2013	101.5	222.0	-	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-007	560540.611	1643259.105	5/12/2013	101.5	232.1	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
E360-B-011	560653.080	1643731.321	5/14/2013	111.5	221.0	-	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-012	560702.598	1643846.334	5/15/2013	100.5	223.0	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
E360-B-014	560815.630	1644046.473	5/17/2003	100.8	231.5	-	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-017	561074.838	1644346.065	5/16/2013	101.5	274.0	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
E360-B-022	561551.359	1644991.877	5/19/2013	100.5	301.0	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
E360-B-024	561733.270	1645309.032	5/20/2013	100.5	324.6	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
E360-B-030	562309.556	1646030.927	5/19/2013	101.5	319.5	-	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-033	562646.519	1646294.734	5/13/2013	41.3	332.0	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
E360-B-034	562746.582	1646491.375	9/07/2013	38.3	336.0	-	HSA	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-036	563022	1646917	9/07/2013	51.4	338.0	MW	HSA	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-037	563236.612	1646967.035	5/16/2013	35.9	340.5	-	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-038	563686.696	1647329.194	5/13/2013	40.3	345.5	-	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-039	563798.562	1647404.273	5/14/2013	40.5	346.0	-	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-040	563979.770	1647521.822	5/13/2013	40.9	347.0	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
E360-B-041	564099.651	1647578.591	5/13/2013	40.5	348.0	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
E360-B-042	564146.303	1647717.714	5/16/2013	41.5	378.8	-	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-043	564308.762	1647661.627	5/14/2013	41.5	371.1	-	MR	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
E360-B-044	564367.997	1647808.012	5/16/2013	50.8	375.0	MW	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
E360-B-045	564470.125	1647754.811	5/14/2013	40.5	352.2	-	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-046	564663.750	1647894.764	4/04/2013	41.5	369.0	-	MR	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
E360-B-047	564826.359	1647935.341	5/09/2013	40.5	367.3	-	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-048	564964.217	1647897.795	5/15/2013	40.8	355.5	-	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-049	565129.465	1648008.139	5/09/2013	40.5	355.5	MW	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-050	565534.628	1648212.125	5/04/2013	20.8	351.7	-	HSA	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-055	565901.657	1648047.531	5/04/2013	46	354.8	MW	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-056	565981.588	1648068.301	5/05/2013	40.8	354.0	-	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-057	566135.621	1648059.161	5/04/2013	50.3	353.4	MW	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-058	566288.383	1648043.044	5/04/2013	50.5	352.7	MW	MR	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
E360-B-059	566237.797	1648200.436	5/04/2013	20.5	347.5	-	HSA	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
OTC-B-001	565835.910	1647665.295	1/04/2013	25.9	358.1	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
OTC-B-002	565665.667	1647670.154	1/04/2014	25.5	356.2	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
OTC-B-003	565661.865	1647903.486	9/17/2013	40.8	353.1	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
OTC-B-005	565405.525	1648366.412	8/14/2013	16.5	356.0	-	HSA	Holt Services Inc.	Contract E360 Final RFP Submittal GDR

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Table A.2-1. Summary of Existing Explorations (Continued)

Boring	Northing	Easting	Date Completed	Boring Depth (ft)	Ground Elev.[4] (ft)	GW Install[1]	Drilling Method[2]	Drilling Contractor	Source Document[3]
OVS-B-001	563295.889	1646714.498	9/16/2013	26	345.5	-	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
OVS-B-002	563227.557	1646835.100	9/16/2013	40.4	338.4	-	-	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
OVS-B-003	563093.056	1646897.314	9/08/2013	25.3	339.0	-	HSA	Holt Services Inc.	Contract E360 Final RFP Submittal GDR
B-D-ES-11p	561901.227	1645461.710	8/30/2010	100.5	333.4	MW	MR	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-ES-12p	562077.622	1645823.702	9/02/2010	126.5	375.0	MW	HSA/MR	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-ES-13p	562485.713	1646125.995	9/03/2010	71.5	324.9	MW	MR	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-ES-14p	561427.482	1644806.949	9/08/2010	90.9	288.6	MW	MR	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-ES-6	560430.723	1642944.959	12/11/2009	71.5	197.8	-	HSA/MR	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-ES-7	560752.254	1643771.850	2/09/2010	106.5	251.1	-	HSA/MR	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-OTCST-1	565299.308	1648037.739	1/04/2010	61.5	356.5	-	HSA	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-OTCST-2	565690.299	1648042.239	1/05/2010	61.5	355.0	-	HSA	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-OTCST-3p	566344.322	1648006.350	1/06/2010	76.5	365.2	MW	HSA	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-OVSSP-1p	563076.599	1646763.180	8/31/2010	40.5	338.1	MW	HSA	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-PK-1p	565211.749	1648199.646	1/04/2010	65.8	359.0	MW	HSA	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-PK-2p	565412.544	1648156.547	1/05/2010	60.8	353.0	MW	HSA	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-RW2-1p	560320.064	1642460.081	1/27/2010	30.8	199.0	MW	HSA	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-RW5-3	564678.922	1647819.144	2/04/2010	50.5	353.1	-	HSA	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-RW6-1p	566048.790	1648125.037	1/07/2010	61.5	352.6	MW	HSA	Gregory Drilling Inc.	Contract E360 Final RFP Submittal GDR
MW-1	562839.638	1646937.490	9/15/2009	52	335.1	MW	HSA	Geologic Drill, Inc.	Contract E360 Final RFP Submittal GDR
MW-PS-3	562658.525	1646396.969	10/30/2010	51.5	335.3	MW	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
MW-PS-7	562694.111	1646654.517	11/01/2011	80	336.9	MW	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-2	565645.076	1647601.955	4/29/2006	59	368[t]	MW	HSA	Subterranean Inc.	Contract E360 Final RFP Submittal GDR
B-3	565984.123	1647560.814	4/28/2006	58.5	368[t]	-	HSA	Subterranean Inc.	Contract E360 Final RFP Submittal GDR
UICW-PS-10	562929	1646692	9/14/2013	35	337.0	MW	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
MW-PS-11	562924.343	1646682.001	9/15/2013	60	337.0	MW	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
MW-PS-12	562679.563	1646502.354	9/15/2013	50	337.0	MW	HSA	Holocene Drilling Inc.	Contract E360 Final RFP Submittal GDR
B-D-ES-9	561198.205	1645466.300	12/28/2009	25.8	314.1	-	HSA	Gregory Drilling Inc.	E360-REC-00001-RFI001 Monitoring Wells
B-D-ES-10	561205.243	1645974.698	2/19/2010	71.0	311.0	MW	HSA	Gregory Drilling Inc.	E360-REC-00001-RFI001 Monitoring Wells
GEI-1	564434.548	1647215.785	4/05/2007	21.5	354.6*	-	HSA	Holocene Drilling Inc.	GeoEngineers, 2008 (SR 520 Bridge)
GEI-2	564290.204	1647342.368	4/05/2007	31.5	354*	-	HSA	Holocene Drilling Inc.	GeoEngineers, 2008 (SR 520 Bridge)
GEI-3	564323.305	1647470.471	4/05/2007	31.5	357.5*	-	HSA	Holocene Drilling Inc.	GeoEngineers, 2008 (SR 520 Bridge)
GEI-4	564189.222	1647397.839	4/06/2007	80	354*	MW	HSA	Holocene Drilling Inc.	GeoEngineers, 2008 (SR 520 Bridge)
GEI-5	564055.659	1647317.967	4/05/2007	31.5	351.2*	-	HSA	Holocene Drilling Inc.	GeoEngineers, 2008 (SR 520 Bridge)
GEI-6	563962.327	1647606.384	4/09/2007	21.5	372*	-	HSA	Holocene Drilling Inc.	GeoEngineers, 2008 (SR 520 Bridge)
GEI-7	563844.894	1647536.853	4/10/2007	61.5	369.7*	MW	HSA	Holocene Drilling Inc.	GeoEngineers, 2008 (SR 520 Bridge)
GEI-8	563640.889	1647396.149	4/09/2007	31.5	362*	-	HSA	Holocene Drilling Inc.	GeoEngineers, 2008 (SR 520 Bridge)

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Table A.2-1. Summary of Existing Explorations (Continued)

Boring	Northing	Easting	Date Completed	Boring Depth (ft)	Ground Elev.[4] (ft)	GW Install[1]	Drilling Method[2]	Drilling Contractor	Source Document[3]
GEI-9	563484.745	1647281.077	4/09/2007	26.5	350*	-	HSA	Holocene Drilling Inc.	GeoEngineers, 2008 (SR 520 Bridge)
GEI-10	563339.122	1647138.633	4/09/2007	26.5	338*	-	HSA	Holocene Drilling Inc.	GeoEngineers, 2008 (SR 520 Bridge)
GEI-11	563974.857	1647443.600	4/18/2007	90	341.1*	-	HSA	Holocene Drilling Inc.	GeoEngineers, 2008 (SR 520 Bridge)
TH-1-97	566305.520	1647989.790	9/29/1997	30.3	350[t]	-	HSA	-	WSDOT, 1997 (NE 40th Detention Vault)
TH-2-97	566100.440	1648014.430	9/30/1997	30.3	352[t]	-	HSA	-	WSDOT, 1997 (NE 40th Detention Vault)
BH-3	565747	1647649	7/16/1996	30.2	363[t]	-	MR	WSDOT	Hong West & Associates, 1997
TP-1	n/a	n/a	3/25/1999	8	344[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-2	n/a	n/a	3/25/1999	7.5	343[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-3	n/a	n/a	3/25/1999	8.5	347[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-4	n/a	n/a	3/25/1999	7.75	347[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-5	n/a	n/a	3/25/1999	8	346[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-6	n/a	n/a	3/25/1999	9	349[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-7	n/a	n/a	3/25/1999	8	349[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-8	n/a	n/a	3/25/1999	8.5	351[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-9	n/a	n/a	3/25/1999	8.25	347[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-10	n/a	n/a	3/25/1999	8.5	353[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-11	n/a	n/a	3/25/1999	8	350[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-12	n/a	n/a	1/25/2001	7.5	351[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-13	n/a	n/a	1/25/2001	6.5	345[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
TP-14	n/a	n/a	1/25/2001	6.0	348[t]	-	-	Deeny Construction	HWA Geosciences, 2002 (OTC)
Daytona B-1	563463.000	1646703.000	5/17/2000	10.0	348[t]	-	HSA	Holt Drilling	GeoEngineers, 2000 (Daytona Building)
Daytona B-3	563373.000	1646498.000	5/17/2000	39.0	348[t]	-	HSA	Holt Drilling	GeoEngineers, 2000 (Daytona Building)
B-D-ES-8	561212.700	1644587.800	12/14/2009	70.8	260.6	-	HSA	Gregory Drilling Inc.	E360-REC-00166-RFI00010

Notes:

1. MW = Monitoring Well, VWP = Vibrating Wire Piezometer
2. MR = Mud Rotary, HSA = Hollow Stem Auger
3. Northings, Eastings, and Elevations of borings from the Contract E360 RFP GDR were taken from Table 3-1 of that report and may not match the information shown on the boring logs.
4. Boring elevation datum is NAVD88, with the following exceptions: elevations marked with * are NGVD29, and elevations marked with [t] have an unknown datum.

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BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E340-B-037

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 13730 NE 20th Street

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 3/1/2013
DRILL RIG: BK-81 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 560,215.84 E: 1,642,260.60

ELEVATION: 199.51
INCLINATION: -90
WELL TAG#:BHR761

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS / GRAPHIC
0	0.0 - 0.2 Asphalt Pavement.	GP-GM	0.2 / 199.9						8-inch diameter flush mount monument cemented to 1 ft bgs.
	0.2 - 0.6 Very dense, brown, (GP-GM), moist, fine to coarse GRAVEL, some sand, little silt, crushed rock, [FILL, Hf].		0.6	S-1a	SS	25-33-37	>50	0.9 / 0.9	
	0.6 - 3.2 Compact to very dense, gray to very dark brown, (SM), moist, silty, fine to coarse SAND, little to some gravel and cobbles, [FILL, Hf].	SM		S-1b	SS			0.6 / 0.6	2-inch diameter PVC riser from 0.7 to 5.3 ft bgs.
	No recovery Samples S-2 at 2 ft bgs and S-2a at 2.5 ft bgs.		196.3	S-2a	SS	18-13-6	19	0.0 / 1.5	
	3.2 - 4.0 Very stiff, dark brown (MH/OH), moist, high plasticity, organic SILT, some organic fragments, horizontal laminations with fibrous organics, stratified with dark brown and greenish gray (OL/CL), organic SILT or silty CLAY, [PEAT DEPOSITS, Hp].	MH /OH	3.2 / 195.5	S-2b	HD			1.0 / 1.0	Backfilled with 3/4-inch bentonite chips from 3 to 5 ft bgs.
5	4.0 - 6.5 Very stiff, greenish gray, (CL), moist, low plasticity, silty CLAY and SAND, trace organics, [LACUSTRINE DEPOSITS, Hl].	CL	4.0	S-3a	SS	6-9-10	19	0.8 / 0.8	2-inch diameter size 0.010 inch slotted PVC screen from 5.3 to 15.3 ft bgs.
	1/2-inch thick very stiff, dark brown (OL), organic SILT at 5 ft bgs.		193.0	S-3b	SS			0.5 / 0.5	
	6.5 - 9.0 Very dense, greenish gray, (SM), wet, fine to coarse SAND and SILT, some fine to coarse gravel, [LACUSTRINE DEPOSITS, Hl].	SM	6.5						
	No recovery sample S-4 at 7.5 ft bgs, 3-inch sampler driven after SPT, blow counts not representative.		190.5	S-4	SS	18-28-34	>50	0.8 / 1.5	S-4@7.5ft %G-22.0 %S-45.1 %F-32.9
10	9.0 - 13.0 Soft to firm, gray, (CL), moist to wet, low plasticity, silty CLAY, trace fine to medium sand, few horizontal fine sand partings, [LACUSTRINE DEPOSITS, Hl].	CL	9.0	S-5	SS	0-2-2	4	1.5 / 1.5	
	Becomes very stiff, 6-inch layer of (SP-SM), wet, fine medium sand, little silt.		186.5						Backfilled with Colorado silica 10 x 20 sand filter from 5 to 16.5 ft bgs.
	13.0 - 16.5 Firm, gray, (SC), wet, fine to coarse SAND and low plasticity CLAY, [LACUSTRINE DEPOSITS, Hl].	SC	13.0	S-6	SS	8-14-8	22	1.5 / 1.5	
15				S-7	SS	2-2-5	7	1.5 / 1.5	S-7@15ft %G- %S- %F-44.3
			183.0						
	Boring completed at 16.5 ft.		16.5						
20									

PENETRATION RESISTANCE BLOWS / ft ◆: 10 20 30 40; PL MC LL: 20 40 60 80

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Kevin Doyle

LOGGED: Jeff Schwartz
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-003

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/13/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
0	0.0 - 4.0 Very dense, gray, (SM), damp, silty, fine to coarse SAND, some gravel, stratified, [FILL, Hf].	SM		S-1	SS	31-50/6"	>50	0.8 / 1.0	Smooth drilling at 2.5 ft bgs.
	4.0 - 9.5 Dense, gray, (SM), moist, fine to coarse SAND, some gravel, some silt, ribbons of brown, silty sand, [FILL, Hf].	SM	4.0	S-2	SS	29-40-26	>50	0.0 / 1.5	No recovery Sample S-2 at 5 ft bgs, gravel wedged in sampler shoe.
5				S-3	SS	13-20-18	38	1.0 / 1.5	S-3@7.5ft %G-20.7 %S-63.0 %F-16.3
10	9.5 - 21.0 Dense, gray, (SM), damp, silty, fine to coarse SAND, little to some gravel, [FILL, Hf].	SM	9.5	S-4	SS	13-19-21	40	0.9 / 1.5	Slight drilling chatter at 12 ft bgs.
	Pockets of brown silty sand.			S-5	SS	13-16-20	36	1.2 / 1.5	Smooth drilling chatter at 12.5 ft bgs.
15	Lenses of dark brown silty sand.			S-6	SS	10-14-19	33	1.3 / 1.5	S-6@15ft %G-10.4 %S-65.5 %F-24.1
	Ribbons of brown silty sand.								
20				S-7	SS	13-17-18	35	1.2 / 1.5	Slight drilling chatter at 21 ft bgs.
	21.0 - 38.0 Dense, gray, (SM), moist to wet, silty, fine to coarse SAND, [RECESSIONAL OUTWASH, Qvro].	SM	21.0						
25				S-8	SS	13-17-22	39	0.0 / 1.5	No recovery Sample S-8 at 25 ft bgs, gravel wedged in sampler shoe. Smooth drilling at 25 ft bgs.
30									

PENETRATION RESISTANCE BLOWS / ft ◆: 10 20 30 40; PL MC LL: 20 40 60 80

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED:
DATE:

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00890,
BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-003

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/13/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft (PL MC LL)	NOTES WATER LEVELS
30	21.0 - 38.0 Dense, gray, (SM), moist to wet, silty, fine to coarse SAND, [RECESSIONAL OUTWASH, Qvro]. Becomes stratified silt and sand.	SM			S-9	SS	14-22-28	50	1.0 / 1.5		S-9@30ft %G-1.1 %S-69.0 %F-29.9
35					S-10	SS	13-17-20	37	1.3 / 1.5		
	38.0 - 48.0 Very dense, gray, (SM), damp to moist, silty SAND, trace to some gravel, trace clay, [TILL, Qvt].			38.0							
40					S-11	SS	17-47-50/6"	>50	1.3 / 1.5	>>	
	Lenses of brown fine to medium sand with some silt.	SM									
45					S-12	SS	17-28-33	>50	1.1 / 1.5	>>	S-12@45ft %G-0.1 %S-84.5 %F-15.4
	48.0 - 58.0 Very dense, gray, (SP), damp to moist, fine to medium SAND, some silt, [ADVANCE OUTWASH, Qva].			48.0							
50					S-13	SS	38-50/6"	>50	1.0 / 1.0	>>	
		SP									
55					S-14	SS	40-50/5.5"	>50	0.9 / 0.9	>>	Smooth drilling at 55 ft bgs.
	58.0 - 63.0 Very dense, gray, (SM), damp to moist, fine to coarse SAND, some silt, little gravel, [ADVANCE OUTWASH, Qva].	SM		58.0							
60	Log continued on next page										

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED:
DATE:

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BLDG-2018-00982, BLDG-2018-00980, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-003

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder
DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/13/2013
DRILL RIG: B-59 Mobile Drill Truck
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (PL MC LL)	NOTES WATER LEVELS
60	58.0 - 63.0 Very dense, gray, (SM), damp to moist, fine to coarse SAND, some silt, little gravel, [ADVANCE OUTWASH, Qva].	SM			S-15	SS	47-50/5.5"	>50	0.9 / 0.9		>>◆ S-15@60ft %G-8.6 %S-77.0 %F-14.4
	63.0 - 73.0 Very dense, gray, (SM), damp, silty SAND, trace to some gravel, [PRE-VASHON TILL, Qpgt].	SM		63.0							
65					S-16	SS	50/4"	>50	0.3 / 0.3		>>◆ Slight drilling chatter at 65 ft bgs.
70					S-17	SS	50/3"	>50	0.3 / 0.3		>>◆
	73.0 - 78.0 Very dense, gray, (SP-SM), damp, fine SAND, little silt, lenses of finer siltier sand throughout, [PRE-VASHON OUTWASH, Qpgo].	SP-SM		73.0							
75					S-18	SS	50/3"	>50	0.3 / 0.3		>>◆
	78.0 - 93.0 Very dense, gray, (SM), damp, silty, fine to coarse SAND, some gravel, [PRE-VASHON OUTWASH, Qpgo].	SM		78.0							
80					S-19	SS	50/4"	>50	0.3 / 0.3		>>◆
85					S-20	SS	50/3"	>50	0.3 / 0.3		>>◆
	Lenses of olive-brown coarse sand.										
90	Log continued on next page										

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman
LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED:
DATE:

FINAL DESIGN PARTNERS.

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BLDG-2018-00982, BLDG-2018-00980, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-003

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/13/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL; 20 40 60 80)	NOTES WATER LEVELS
90	4.9-inch Bit, Mud Rotary	78.0 - 93.0 Very dense, gray, (SM), damp, silty, fine to coarse SAND, some gravel, [PRE-VASHON OUTWASH, Qpgo].	SM			S-21	SS	50/4"	>50	0.3 / 0.3	>>◆	
		93.0 - 101.5 Hard, gray, (CL), damp, CLAY, some sand, homogeneous, dropstones, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	CL		93.0							
95						S-22	SS	21-32-39	>50	1.0 / 1.5	>>◆	S-22@95ft %G- %S- %F-84.2
100						S-23	SS	14-25-33	>50	1.0 / 1.5	>>◆	
		Boring completed at 101.5 ft. Backfilled with 3/8-inch bentonite chips.			101.5							
105												
110												
115												
120												

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED:
DATE:

FINAL DESIGN PARTNERS.

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BLDG-2018-00887, BLDG-2018-00980, BLDG-2018-00982,
BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-007

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/12/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 560,548.85 E: 1,643,259.16

ELEVATION: 232.31
INCLINATION: -90

BORING METHOD: 4.24-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
0	0.0 - 9.5 Compact, brown, (SM), moist, silty SAND, some gravel, [FILL, Hf].								
				S-1	SS	7-8-7	15	0.5 / 1.5	
5		SM							
				S-2	SS	1-1-9	10	0.7 / 1.5	S-2@5ft %G-18.5 %S-59.3 %F-22.2
	Pockets of gray silty, fine sand.			S-3	SS	9-7-7	14	0.7 / 1.5	
			222.8 / 9.5						
10	9.5 - 14.5 Dense, brown, (SM), damp, silty SAND, some gravel, stratified layers of gray silty, fine sand, [FILL, Hf].			S-4	SS	9-17-17	34	0.8 / 1.5	
		SM		S-5	SS	8-18-15	33	0.8 / 1.5	S-5@12.5ft %G-15.2 %S-57.1 %F-27.7
			217.8 / 14.5						
15	14.5 - 33.0 Very dense, gray, (SM), damp to moist, gravelly, silty, fine to coarse SAND, reworked Till, [FILL, Hf].			S-6	SS	18-30-28	>50	0.5 / 1.5	>>
20				S-7	SS	18-30-28	>50	1.0 / 1.5	>>
		SM							
25				S-8	SS	20-26-46	>50	0.8 / 1.5	>>
30									

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PENETRATION RESISTANCE BLOWS / ft ◆ (10, 20, 30, 40); PL MC LL (20, 40, 60, 80)

1 in to 4 ft

DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Grahm

LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-007

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/12/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 560,548.85 E: 1,643,259.16

ELEVATION: 232.31
INCLINATION: -90

BORING METHOD: 4.24-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft	NOTES WATER LEVELS
30	14.5 - 33.0 Very dense, gray, (SM), damp to moist, gravelly, silty, fine to coarse SAND, reworked Till, [FILL, Hf].	SM	199.3 / 33.0	S-9	SS	26-30-26	>50	1.3 / 1.5	>>	S-9@30ft %G-18.4 %S-60.8 %F-20.8
35	33.0 - 43.0 Compact, gray to grayish brown, (SM), damp to moist, silty, fine to coarse SAND, trace to some gravel, reworked, [ALLUVIUM, Ha].	SM		S-10	SS	11-11-17	28	0.4 / 1.5		
40				S-11	SS	4-8-12	20	1.5 / 1.5		S-11@40ft %G-4.1 %S-78.1 %F-17.8
	43.0 - 46.0 Compact, grayish-brown, (SP), moist, fine to coarse SAND, layer of brown SAND, [ALLUVIUM, Ha].	SP	189.3 / 43.0							
45				S-12	SS	8-12-16	28	1.5 / 1.5		
	46.0 - 48.0 Compact, gray, (SM/ML/OL), moist, fine SAND and SILT, organic lenses, [LACUSTRINE DEPOSITS, Hl].	ML /SM /OL	186.3 / 46.0							
	48.0 - 63.0 Firm to stiff, gray, (CL), moist, CLAY, stratified pockets of gray fine sand, [LACUSTRINE DEPOSITS, Hl].	CL	184.3 / 48.0							
50				S-13	SS	3-4-4	8	1.5 / 1.5		S-13@50ft %G- %S- %F-95.5
55	Becomes very soft.			S-14	SS	0-0-1	1	1.5 / 1.5		
60										

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Grahm

LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-007

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/12/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted
DATUM: Sound Transit East Coordinate System
COORDINATES: N: 560,548.85 E: 1,643,259.16
ELEVATION: 232.31
INCLINATION: -90

BORING METHOD: 4.24-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
60	48.0 - 63.0 Firm to stiff, gray, (CL), moist, CLAY, stratified pockets of gray fine sand, [LACUSTRINE DEPOSITS, HI].	CL	169.3	S-15	SS	0-0-1	1	1.3 / 1.5		S-15@60ft %G- %S- %F-81.4
	63.0 - 68.0 Very dense, gray, (SP), moist, fine to coarse SAND, trace silt, homogeneous, rip up clasts?, [LACUSTRINE DEPOSITS, HI].	SP	164.3 / 63.0	S-16	SS	36-50/5"	>50	0.9 / 0.9	>>	
65										
	68.0 - 78.0 Very dense, gray, (SM), moist, fine to coarse SAND, some silt, some gravel, rip up clasts?, [LACUSTRINE DEPOSITS, HI].	SM	154.3 / 68.0	S-17	SS	28-50/5"	>50	0.9 / 0.9	>>	S-17@70ft %G-12.4 %S-71.5 %F-16.1
70										
75	Layer of gray silty, fine sand.			S-18	SS	50/3"	>50	0.3 / 0.3	>>	
	78.0 - 88.0 Compact, gray, (ML), moist, fine sandy SILT, stratified, [LACUSTRINE DEPOSITS, HI].	ML	144.3 / 78.0	S-19	SS	11-7-10	17	1.5 / 1.5		
80										
85				S-20	SS	5-7-8	15	1.5 / 1.5		
	88.0 - 93.0 Compact, gray, (SM), moist, fine SAND and SILT, little gravel, [LACUSTRINE DEPOSITS, HI].	SM	88.0							
90	Log continued on next page									

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Grahm
LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-007

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/12/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 560,548.85 E: 1,643,259.16

ELEVATION: 232.31
INCLINATION: -90

BORING METHOD: 4.24-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES / WATER LEVELS
90	88.0 - 93.0 Compact, gray, (SM), moist, fine SAND and SILT, little gravel, [LACUSTRINE DEPOSITS, Hl].	SM	139.3	S-21	SS	11-11-13	24	1.5 / 1.5	S-21@90ft %G-5.1 %S-50.6 %F-44.3
	93.0 - 98.0 Compact, gray, (ML), moist, low plasticity to non-plastic SILT, some sand, trace gravel, [LACUSTRINE DEPOSITS, Hl].	ML	93.0						
95				S-22	SS	5-7-9	16	1.5 / 1.5	S-22@95ft %G- %S- %F-80.4
	98.0 - 101.5 Compact, gray, (ML), moist, low plasticity to non-plastic SILT, some sand, trace gravel, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	ML	134.3 98.0						
100			130.8	S-23	SS	22-38-28	>50	1.5 / 1.5	S-23@100ft %G- %S- %F-76.9
	Boring completed at 101.5 ft. Backfilled with 3/8-inch bentonite chips.		101.5						
105									
110									
115									
120									

PENETRATION RESISTANCE BLOWS / ft ◆: 10, 20, 30, 40
PL, MC, LL: 20, 40, 60, 80

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Grahm

LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-011

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/14/2013
DRILL RIG: Landa L-10-T Track

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
0	0.0 - 2.0 Very loose, gray-brown, (SP-SM), moist, fine to coarse SAND, trace silt, [FILL, Hf].	SP-SM		S-1	SS	1-2-1	3	0.3 / 1.5	
	2.0 - 4.5 Compact, gray, (SP-SM), moist to wet, fine to coarse SAND, trace silt, interbedded with silty sand, [FILL, Hf].	SP-SM	2.0	S-2	SS	10-12-13	25	1.1 / 1.5	S-2@2.5ft %G-7.2 %S-66.2 %F-26.6
5	4.5 - 9.5 Very dense, gray, (SP), wet, fine to coarse SAND, trace silt, scattered gravel and organics, [FILL, Hf].	SP	4.5	S-3	SS	10-23-31	>50	0.6 / 1.5	
	No recovery Sample S-4 at 7.5 ft bgs, lithology inferred from blow counts.			S-4	SS	5-7-18	25	0.0 / 1.5	
10	9.5 - 18.0 Compact to very dense, gray-brown mottled with brown, (SM), wet, silty, fine to coarse SAND, trace to little gravel, scattered organics, [FILL, Hf]. Re-sampled at 11.5 ft with a 3-inch diameter over sized sampler due to no recovery Sample S-5 at 10 ft bgs. Becomes gray, crudely bedded with fine to coarse sand.	SM	9.5	S-5	SS	7-10-18	28	0.1 / 1.5	
				S-6	SS	17-38-50/6"	>50	1.0 / 1.5	S-6@12.5ft %G-12.4 %S-59.7 %F-27.9 Wood noted in drilling mud at 14 ft bgs.
15				S-7	SS	32-42-50/6"	>50	0.6 / 1.5	
20	18.0 - 23.0 Compact, brown, (SP), wet, fine to coarse SAND, trace silt, scattered gravel, subrounded to angular micaceous particles, [ALLUVIUM, Ha]. Re-sampled at 21.5 with a 3-inch diameter over sized sampler due to no recovery Sample S-8 at 20 ft bgs.	SP	18.0	S-8	SS	10-11-9	20	0.0 / 1.5	
25	23.0 - 28.0 Very dense, gray, (SP-SM), wet, fine to medium SAND, little silt, thinly bedded with silty sand and laminations of gray-brown silt, [ALLUVIUM, Ha].	SP-SM	23.0	S-9	SS	43-50/6"	>50	0.5 / 1.0	
30	28.0 - 33.0 Very dense, gray, (SM), wet, silty, fine to coarse SAND, fine thinly scattered laminations of sandy silt, [ALLUVIUM, Ha].	SM	28.0						

Log continued on next page

PENETRATION RESISTANCE BLOWS / ft ◆: 10, 20, 30, 40
PL — MC — LL: 20, 40, 60, 80

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschield

LOGGED: Dave Yonemitsu
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-011

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/14/2013
DRILL RIG: Landa L-10-T Track

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
30	28.0 - 33.0 Very dense, gray, (SM), wet, silty, fine to coarse SAND, fine thinly scattered laminations of sandy silt, [ALLUVIUM, Ha].	SM			S-10	SS	37-50/6"	>50	0.8 / 1.0	>>◆	S-10@30ft %G-0.2 %S-77.4 %F-22.4
	33.0 - 38.0 Stiff, dark gray, (CL-ML), wet, silty CLAY, low plasticity, thinly bedded, little sandy silt and silty sand layers, [LACUSTRINE DEPOSITS, Hl].	CL-ML		33.0							Change in drill action at 33 ft bgs.
35					S-11	SS	9-11-8	19	1.0 / 1.5		S-11@35ft %G- %S- %F-94.6
	38.0 - 59.0 Soft to very soft, dark gray, (CL), wet, low plasticity CLAY, 2-inches interbedded silty sand and sandy silt, [LACUSTRINE DEPOSITS, Hl].	CL		38.0							
40					S-12	SS	2-1-2	3	1.3 / 1.5	◆	S-12@40ft %G- %S- %F-80.8
	Becomes stiff, gravelly.										Change in drill action at 44 ft bgs.
45					S-13	SS	5-5-2	7	1.5 / 1.5	◆	
	Little sand.										
50					S-14	SS	1-1-1	2	1.5 / 1.5	◆	S-14@50ft %G- %S- %F-97.2
55					S-15	SS	0-0-0	0	1.5 / 1.5	◆	S-15@55ft %G- %S- %F-88.6
		SP		59.0							Change in drill action at 59 ft bgs.
60	Log continued on next page										

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschield

LOGGED: Dave Yonemitsu
CHECKED: David P. Findley
DATE: 12/23/2013

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FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-011

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/14/2013
DRILL RIG: Landa L-10-T Track

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
60	59.0 - 63.0 Very dense, yellow brown, (SP), wet, gravelly, fine to coarse SAND, fine gravel, trace silt, [PRE-VASHON OUTWASH, Qpgo].	SP			S-16	SS	24-34-43	>50	0.8 / 1.5	>>◆	Sample recovery not recorded for S-16 at 60 ft bgs.
	63.0 - 68.0 Very dense, gray-brown, (SM), wet, fine to coarse SAND, some silt, scattered laminations of silty sand, [PRE-VASHON OUTWASH, Qpgo].	SM		63.0							
65					S-17	SS	33-40-46	>50	1.5 / 1.5	● >>◆	S-17@65ft %G-0.4 %S-80.1 %F-19.5
	68.0 - 78.0 Very dense, gray-brown, (SP), wet, fine to coarse SAND, trace silt, [PRE-VASHON OUTWASH, Qpgo].	SP		68.0							
70					S-18	SS	38-50/6"	>50	1.0 / 1.0	>>◆	
	Scattered gravel.										
75					S-19	SS	50/6"	>50	0.5 / 0.5	>>◆	
	78.0 - 83.0 Very dense, gray-brown, (SP), wet, fine to coarse SAND, subangular gravel, with volcanic particles and scattered fine gravel, [PRE-VASHON OUTWASH, Qpgo].	SP		78.0							Change in drill action at 78 ft bgs.
80					S-20	SS	50/6"	>50	0.3 / 0.5	>>◆	
	83.0 - 103.0 Hard, dark gray, (CL), moist, low plasticity CLAY, trace sand, scattered dropstones, occasional lenses of fine to medium sand at 0° to 10° from horizontal, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	CL		83.0							Change in drill action at 83 ft bgs.
85					S-21	SS	12-21-31	>50	1.5 / 1.5	>>◆	
	Irregular layers to laminations of sandy silt at 40° to 60° from horizontal.										
90											

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschield

LOGGED: Dave Yonemitsu
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-011

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/14/2013
DRILL RIG: Landa L-10-T Track

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (PL, MC, LL)	NOTES WATER LEVELS
90	83.0 - 103.0 Hard, dark gray, (CL), moist, low plasticity CLAY, trace sand, scattered dropstones, occasional lenses of fine to medium sand at 0° to 10° from horizontal, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	CL			S-22	SS	12-28-24	>50	1.5/1.5	>>◆	S-22@90ft %G- %S- %F-85.1
	Trace sand, scattered dropstones and irregular laminations of sandy silt.										
95					S-23	SS	11-19-24	43	1.5/1.5	◆	
100	High angle fractures refilled with sand at 80° from horizontal.				S-24	SS	11-16-22	38	1.5/1.5	◆	
	103.0 - 111.5 Hard, gray, (CL), moist, clayey SILT to silty CLAY, low to high plasticity, scattered dropstones, 1/2-inch layer of fine to medium sand, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	CL		103.0							
105					S-25	SS	12-18-37	>50	1.5/1.5	>>◆	
110	Irregular lenses of sandy silt.				S-26	SS	14-16-30	46	1.5/1.5	◆	
	Boring completed at 111.5 ft. Backfilled with 3/8-inch bentonite chips.			111.5							
115											
120											

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschield

LOGGED: Dave Yonemitsu
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-012

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/15/2013
DRILL RIG: CME 850

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 560,698.69 E: 1,643,851.28

ELEVATION: 221.50
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
0	0.0 - 15.5 Compact to very dense, brown and gray, (SM), damp to moist, silty, fine to coarse SAND, trace to some gravel, [FILL, Hf].									
	Trace organics as roots.				S-1	SS	4-14-27	41	1.5 / 1.5	
5					S-2	SS	4-8-12	20	1.5 / 1.5	
		SM			S-3	SS	7-9-13	22	1.5 / 1.5	S-3@7.5ft %G-19.2 %S-55.8 %F-25.0
10					S-4	SS	9-21-25	46	1.5 / 1.5	
					S-5	SS	12-13-19	32	1.5 / 1.5	
15				206.0 / 15.5	S-6	SS	4-44-48	>50	1.5 / 1.5	>>
	15.5 - 23.0 Dense, gray, (SM), wet, silty, fine to coarse SAND, trace gravel, [FILL, Hf].	SM								
20					S-7	SS	12-19-19	38	1.5 / 1.5	S-7@20ft %G-4.0 %S-69.3 %F-26.7
				198.5 / 23.0						
	23.0 - 46.0 Loose to compact, gray, (SP-SM/SM), wet, fine to coarse SAND, little silt, trace gravel, to fine to coarse SAND and SILT, [ALLUVIUM, Ha].									
25		SP-SM /SM			S-8	SS	8-10-15	25	1.5 / 1.5	
30	Log continued on next page									

PENETRATION RESISTANCE BLOWS / ft ◆ (10, 20, 30, 40); PL MC LL (20, 40, 60, 80)

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth

LOGGED: J. Coleman
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-012

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/15/2013
DRILL RIG: CME 850
DATUM: Sound Transit East Coordinate System
COORDINATES: N: 560,698.69 E: 1,643,851.28
ELEVATION: 221.50
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
30	23.0 - 46.0 Loose to compact, gray, (SP-SM/SM), wet, fine to coarse SAND, little silt, trace gravel, to fine to coarse SAND and SILT, [ALLUVIUM, Ha].	SP-SM /SM			S-9	SH			0.0 / 0.5		
					S-10	SS	5-11-17	28	1.5 / 1.5	● ◆	S-10@32.5ft %G-11.1 %S-76.7 %F-12.2
35					S-11	SH			0.0 / 1.6		
					S-12	SH			0.0 / 1.0		
40					S-13	SS	4-10-18	28	1.5 / 1.5	◆	
45				175.5	S-14	SS	3-4-4	8	1.5 / 1.5	◆ ●	S-14@45ft %G-0.0 %S-51.2 %F-48.8 4 feet of heave encountered.
	46.0 - 49.0 Loose, gray, (ML), wet, sandy SILT to silty SAND, stratified, [ALLUVIUM, Ha].	ML		46.0	S-16	SH					
					S-15	SS	6-10-15	25	1.0 / 1.5	◆	
	49.0 - 63.0 Very soft to firm, gray, (CL/SC), wet, low plasticity CLAY and SAND, some gravel grading to silty CLAY, [LACUSTRINE, Hl].	CL /SC		172.5 49.0							
50					S-17	SS	2-1-1	2	0.1 / 1.5	◆	
					S-18	SH			2.0 / 2.0	⊢●⊣	S-18@52.5ft %G-0.0 %S-55.5 %F-44.5
55					S-19	SS	0-0-1	1	1.5 / 1.5	◆ ⊢●⊣	S-19@55ft %G- %S- %F-62.5
					S-21 S-20	SS SH	0-0-0	0	1.5 / 1.5 0.0 / 2.0	◆	
60	Log continued on next page										

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: J. Coleman
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-012

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/15/2013
DRILL RIG: CME 850

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 560,698.69 E: 1,643,851.28

ELEVATION: 221.50
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
60	49.0 - 63.0 Very soft to firm, gray, (CL/SC), wet, low plasticity CLAY and SAND, some gravel grading to silty CLAY, [LACUSTRINE, Hl].	CL /SC		S-22	SS	1-3-5	8	1.5 / 1.5		
			158.5 / 63.0							
	63.0 - 78.0 Very dense, brown, (SP-SM/SM), wet, fine to coarse SAND, trace to little silt, trace gravel grading to silty, fine to coarse SAND, trace gravel, micaceous particles, [PRE-VASHON OUTWASH, Qpgo].									
65				S-23	SS	11-21-29	50	1.5 / 1.5		
70		SP-SM /SM		S-24	SS	11-50/6"	>50	1.0 / 1.0	>>	S-24@70ft %G-4.0 %S-85.9 %F-10.1
75				S-25	SS	50/4"	>50	0.3 / 0.3	>>	
			143.5 / 78.0							
	78.0 - 83.0 Hard, gray, (CH), moist, high plasticity CLAY, trace to some sand, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].									
80		CH		S-26	SS	21-29-34	>50	1.5 / 1.5	>>	
	Trace whiteish volcanic ash in discontinuous zones from 80 to 90 ft bgs.									
			138.5 / 83.0							
	83.0 - 94.0 Very dense, gray, (SC), moist, clayey SAND, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].									
85		SC		S-27	SS	15-19-26	45	1.5 / 1.5	◆	
90										

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth

LOGGED: J. Coleman
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-012

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/15/2013
DRILL RIG: CME 850
DATUM: Sound Transit East Coordinate System
COORDINATES: N: 560,698.69 E: 1,643,851.28
ELEVATION: 221.50
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
90	4.25-inch Inner Diameter Hollow Stem Auger	83.0 - 94.0 Very dense, gray, (SC), moist, clayey SAND, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	SC		127.5	S-28	SS	12-18-27	45	1.5 / 1.5		S-28@90ft %G- %S- %F-19.7
95		94.0 - 100.5 Very dense, gray, (SM), wet, silty, fine SAND to sandy SILT, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	SM /ML		94.0	S-29	SS	18-50/6"	>50	1.0 / 1.0	>>	
100					121.0	S-30	SS	50/6"	>50	0.5 / 0.5	>>	
		Boring completed at 100.5 ft. Backfilled with 3/8-inch bentonite chips.			100.5							

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: J. Coleman
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-014

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/17/2013
DRILL RIG: Landa L-10-T Track

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
0	0.0 - 0.5 Compact, dark brown, (SM), moist, silty fine to medium SAND, trace organics, trace gravel, [TOPSOIL, Ha].	SM							
	0.5 - 2.0 Compact, gray-brown, (SM), moist, silty SAND, little fine to medium gravel, [FILL, Hf].	SM	0.5	S-1	SS	2-12-11	23	1.0 / 1.5	
	2.0 - 18.0 Dense to very dense, brown to gray, (SM), moist, silty, fine to coarse SAND, some fine gravel, [FILL, Hf].		2.0	S-2	SS	11-25-49	>50	1.0 / 1.5	S-2@2.5ft %G-9.7 %S-61.5 %F-28.8
5				S-3	SS	22-22-24	46	0.2 / 1.5	
	Mottled, scattered organics.			S-4	SS	7-10-24	34	0.6 / 1.0	
10		SM		S-5	SS	16-24-25	49	1.1 / 1.5	
	Numerous organics.			S-6	SS	18-24-30	>50	1.0 / 1.5	
15	Socketed gravels.			S-7	SS	13-16-23	39	1.0 / 1.5	S-7@15ft %G-11.5 %S-65.9 %F-22.6
	18.0 - 23.0 Loose, yellow-brown, (SM), wet, SAND, trace silt, lenses of organic silt, [ALLUVIUM, Ha].		18.0						
20		SM		S-8	SS	2-2-2	4	1.0 / 1.5	S-8@20ft %G-8.1 %S-73.6 %F-18.3 Gravelly drillin gfrom 20 to 23 ft bgs.
	23.0 - 28.0 Very dense, yellow-brown, (SP), wet, fine to medium SAND, little fine gravel, trace silt, [ALLUVIUM, Ha].		23.0						
25		SP		S-9	SS	30-50/6"	>50	0.7 / 1.0	
	28.0 - 33.0 Very dense, gray-brown, (SM), wet, gravelly, fine to medium SAND, some silt, [ALLUVIUM, Ha].	SM	28.0						
30									

PENETRATION RESISTANCE BLOWS / ft ◆ (10, 20, 30, 40); PL MC LL (20, 40, 60, 80)

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschield

LOGGED: Dave Yonemitsu
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-014

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/17/2013
DRILL RIG: Landa L-10-T Track

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (PL–MC–LL)	NOTES WATER LEVELS
30	28.0 - 33.0 Very dense, gray-brown, (SM), wet, gravelly, fine to medium SAND, some silt, [ALLUVIUM, Ha].	SM		S-10	SS	30-33-39	>50	1.4 / 1.5		S-10@30ft %G-28.4 %S-58.0 %F-13.6
	33.0 - 38.0 Very dense, gray-brown, (SP-SM), wet, fine to coarse SAND, little gravel, little silt, wood fragments, [ALLUVIUM, Ha].	SP-SM	33.0							
35				S-11	SS	19-27-26	>50	1.0 / 1.5		Wood in drilling mud at 36 ft bgs.
	38.0 - 43.0 Dense, gray-brown, (SM), wet, silty, fine SAND, interbedded sandy gravel, iron oxide staining, [PRE-VASHON TILL, Qpgt].	SM	38.0							
40				S-12	SS	18-23-26	49	0.7 / 1.5		
	43.0 - 63.0 Dense to very dense, gray-brown, (SM), moist, silty, fine to coarse SAND, some fine gravel, layers of silty sand, [PRE-VASHON TILL, Qpgt].	SM	43.0							
45				S-13	SS	32-55/6"	>50	0.8 / 1.0		Recovery not recorded for Sample S-13 at 45 ft bgs.
	Diamict texture, crudely bedded fine to medium sand layers.									
50				S-14	SS	39-50/4"	>50	0.8 / 0.8		S-14@50ft %G-8.6 %S-62.0 %F-29.4
	Thinly bedded.									
55				S-15	SS	50/5"	>50	0.4 / 0.4		
60										

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschield

LOGGED: Dave Yonemitsu
CHECKED: David P. Findley
DATE: 12/23/2013

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FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-014

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/17/2013
DRILL RIG: Landa L-10-T Track

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
60	43.0 - 63.0 Dense to very dense, gray-brown, (SM), moist, silty, fine to coarse SAND, some fine gravel, layers of silty sand, [PRE-VASHON TILL, Qpgt].	SM		S-16	SS	50/4"	>50	0.3 / 0.3	>>
	63.0 - 68.0 Very dense, gray, (SP), wet, SAND, trace silt, scattered layers of gravelly sand, (inferred by drill action), rounded clasts predominantly quartz, sand lens in [PRE-VASHON TILL, Qpgt].	SP	63.0						
65				S-17	SS	50/5"	>50	0.4 / 0.4	>>
	68.0 - 78.0 Very dense, gray-brown, (SM), wet, fine to medium SAND and SILT, little gravel, socketed gravels, thinly laminated sandy silt, [PRE-VASHON TILL, Qpgt].	SM	68.0						
70				S-18	SS	50/4"	>50	0.3 / 0.3	>> S-18@70ft %G-8.8 %S-61.1 %F-30.1
75				S-19	SS	50/4"	>50	0.3 / 0.3	>> Recovery not recorded for Sample S-19 at 75 ft bgs.
	78.0 - 83.0 Very dense, dark gray, (SM), moist, silty SAND, some gravel, diamict texture, [PRE-VASHON TILL, Qpgt].	SM	78.0						
80				S-20	SS	50/3"	>50	0.3 / 0.3	>>
	83.0 - 93.0 Very dense, dark gray, (SP), wet, fine to coarse SAND, trace silt, socketed coarse sand and fine gravel, [PRE-VASHON TILL, Qpgt].	SP	83.0						
85				S-21	SS	50/3"	>50	0.2 / 0.3	>> Very gravelly drilling from 85 to 87 ft bgs.
90									

PENETRATION RESISTANCE BLOWS / ft ◆ (10, 20, 30, 40); PL MC LL (20, 40, 60, 80)

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschield

LOGGED: Dave Yonemitsu
CHECKED: David P. Findley
DATE: 12/23/2013

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FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-014

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/17/2013
DRILL RIG: Landa L-10-T Track

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
90	4.9-inch Diameter Bit, Mud Rotary	83.0 - 93.0 Very dense, dark gray, (SP), wet, fine to coarse SAND, trace silt, socketed coarse sand and fine gravel, [PRE-VASHON TILL, Qpgt].	SP			S-22	SS	100/4"	>50	0.3 / 0.3	>>◆	Recovery not recorded for Sample S-22 at 90 ft bgs.
		93.0 - 98.0 Very dense, dark gray, (ML/SM), moist, sandy SILT to silty SAND, little gravel, [PRE-VASHON TILL, Qpgt].	ML /SM		93.0							Clayey silt in cuttings from 92-93 ft bgs, contact inferred.
95						S-23	SS	100/6"	>50	0.2 / 0.5	>>◆	
		98.0 - 100.8 Very dense, dark gray, (SM), moist, fine to medium SAND, some silt, [PRE-VASHON OUTWASH DEPOSITS, Qpgo].	SM		98.0							
100						S-24	SS	50/6"-50/3"	>50	0.7 / 0.8	● >>◆	S-24@100ft %G-0.4 %S-75.4 %F-24.2 Recovery not recorded for Sample S-24 at 100 ft bgs.
		Boring completed at 100.8 ft. Backfilled with 3/8-inch bentonite chips.			100.8							
105												
110												
115												
120												

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschield

LOGGED: Dave Yonemitsu
CHECKED: David P. Findley
DATE: 12/23/2013

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FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-017

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/16/2013
DRILL RIG: CME 850

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

SOIL PROFILE

DEPTH (Ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)
0	0.0 - 28.0 Loose to very dense, gray and brown to mottled brown, (SM), moist to wet, silty, fine to coarse SAND, trace gravel, trace to some organics, [FILL, Hf].	SM		
	28.0 - 34.0 Dense, brown, (SM), wet, fine to coarse SAND and GRAVEL, some silt, [ALLUVIUM, Ha].	SM		28.0

Log continued on next page

SAMPLES

NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
S-1	SS	9-7-10	17	1.0 / 1.5	
S-2	SS	5-5-5	10	1.5 / 1.5	S-2@5ft %G-13.8 %S-63.2 %F-23.0
S-3	SS	1-3-4	7	1.0 / 1.5	
S-4	SS	6-7-12	19	1.0 / 1.5	
S-5	SS	24-27-33	>50	0.0 / 1.5	No recovery Sample S-5 at 12.5 ft bgs, rock caught in sampler.
S-6	SS	15-33-29	>50	1.5 / 1.5	
S-7	SS	9-17-19	36	1.0 / 1.5	S-7@20ft %G-15.1 %S-62.3 %F-22.6
S-8	SS	5-4-6	10	– / 1.5	

PENETRATION RESISTANCE BLOWS / ft ◆
10 20 30 40
PL MC LL
20 40 60 80

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth

LOGGED: J. Coleman
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

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RECORD OF BOREHOLE E360-B-017

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/16/2013
DRILL RIG: CME 850
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
30	28.0 - 34.0 Dense, brown, (SM), wet, fine to coarse SAND and GRAVEL, some silt, [ALLUVIUM, Ha].	SM		S-9	SS	8-18-22	40	1.0 / 1.5		S-9@30ft %G-40.7 %S-44.4 %F-14.9
35	34.0 - 42.0 Very dense, gray, (SM), moist, silty, fine to coarse SAND, trace gravel [PRE-VASHON TILL, Qpgt] 2-inch thick layer of clayey SILT observed at 35.2 ft bgs.	SM	34.0	S-10	SS	50/5"	>50	0.4 / 0.4	>>	
40				S-11	SS	50/4"	>50	0.3 / 0.3	>>	
45	42.0 - 48.0 Hard, gray, (ML), moist to wet, sandy SILT interbedded with very dense, gray (SM), wet, silty, fine to coarse SAND, trace gravel, [PRE-VASHON TILL, Qpgt].	ML	42.0	S-12	SS	27-50/4"	>50	0.8 / 0.8	>>	S-12@45ft %G- %S- %F-53.4
50	48.0 - 59.0 Very dense, gray, (SM), moist, silty, fine to coarse SAND, trace to little gravel, [PRE-VASHON TILL, Qpgt].	SM	48.0	S-13	SS	15-50/2"	>50	0.7 / 0.7	>>	
55				S-14	SS	50/5"	>50	0.4 / 0.4	>>	
60		SP-SM /SM	59.0							

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: J. Coleman
CHECKED: David P. Findley
DATE: 12/23/2013

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FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-017

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/16/2013
DRILL RIG: CME 850

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
60	59.0 - 72.0 Very dense, gray, (SP-SM/SM), wet, fine to coarse SAND, little to some silt, some gravel, [PRE-VASHON TILL, Qpgt].	SP-SM /SM			S-15	SS	34-50/4"	>50	0.7 / 0.8	
65					S-16	SS	33-50/3"	>50	0.5 / 0.8	S-16@65ft %G-17.6 %S-59.9 %F-22.5
70	Inclusion of silty SAND (SM)				S-17	SS	50/6"	>50	0.5 / 0.5	
	72.0 - 101.5 Hard, gray, (CL/CH), moist, low to high plasticity CLAY, trace to little sand, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].			72.0						
75					S-18	SS	8-22-50/5"	>50	1.4 / 1.4	
80	Fine to coarse sand present in thin lenses.	CL /CH			S-19	SS	46-50/5"	>50	0.9 / 0.9	
85	Becoming clayey at approximately 85 ft bgs.				S-20	SS	11-21-38	>50	1.5 / 1.5	S-20@85ft %G- %S- %F-90.4
90										

PENETRATION RESISTANCE BLOWS / ft ◆: 10, 20, 30, 40; PL, MC, LL; 20, 40, 60, 80

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth

LOGGED: J. Coleman
CHECKED: David P. Findley
DATE: 12/23/2013

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FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-017

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/16/2013
DRILL RIG: CME 850
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
90	4.25-inch Inner Diameter Hollow Stem Auger	72.0 - 101.5 Hard, gray, (CL/CH), moist, low to high plasticity CLAY, trace to little sand, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	CL /CH			S-21	SS	11-18-27	45	1.5/1.5	◆	
		Approximate horizontal fractures observed in sample with slickensides at 91 ft bgs.										
95		Vertical fractures observed from 95.5 to 97 ft bgs infilled with fine sand.				S-22	SS	11-16-24	40	1.5/1.5	◆	
100						S-23	SS	12-22-26	48	1.5/1.5	◆	
		Boring completed at 101.5 ft. Backfilled with 3/8-inch bentonite chips.			101.5							
105												
110												
115												
120												

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: J. Coleman
CHECKED: David P. Findley
DATE: 12/23/2013

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FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-022

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/19/2013
DRILL RIG: CME 850
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	0.0 - 18.0 Very dense, grayish brown, (SM), damp, silty, fine SAND, some gravel, [FILL, Hf].										
					S-1	SS	19-50/6"	>50	0.7 / 1.0	>>◆	
5					S-2	SS	15-50/5"	>50	0.7 / 0.8	>>◆	
					S-3	SS	23-50/6"	>50	0.8 / 1.0	>>◆	
		SM									
10	Becomes moist.				S-4	SS	26-50/5"	>50	0.9 / 0.9	● >>◆	S-4@10ft %G-10.3 %S-72.5 %F-17.2
					S-5	SS	12-50/6"	>50	1.0 / 1.0	>>◆	
15					S-6	SS	50/6"	>50	0.5 / 0.5	>>◆	
											Very soft drilling at 17 ft bgs.
	18.0 - 23.0 Dense, gray, (SP-SM), wet, SAND, some gravel, layer of gray, silty, fine sand, [ADVANCE OUTWASH, Qva].			18.0							
20		SP-SM			S-7	SS	6-23-21	44	1.5 / 1.5	◆	
											Heaving sands encountered at 21.5 ft bgs.
	23.0 - 28.0 Very dense, gray, (SP), wet, SAND, some gravel, layer of gray silty, fine sand, [ADVANCE OUTWASH, Qva].			23.0							
25		SP			S-8	SS	12-50/6"	>50	1.0 / 1.0	● >>◆	S-8@25ft %G-12.4 %S-80.0 %F-7.6
	28.0 - 33.0 Very dense, gray, (SM), moist, silty, fine SAND to sandy SILT, stratified, clay-like layer, [ADVANCE OUTWASH, Qva].	SM		28.0							Harder drilling at 28 ft bgs.
30	Log continued on next page										

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

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FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-022

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/19/2013
DRILL RIG: CME 850
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
30	28.0 - 33.0 Very dense, gray, (SM), moist, silty, fine SAND to sandy SILT, stratified, clay-like layer, [ADVANCE OUTWASH, Qva].	SM		S-9	SS	12-33-50/2"	>50	1.2 / 1.2	>>	
	33.0 - 38.0 Very dense, gray, (SP-SM), moist, SAND, some gravel, layer of gray clay, [ADVANCE OUTWASH, Qva].	SP-SM	33.0							
35				S-10	SS	50/6"	>50	0.5 / 0.5	>>	
	38.0 - 43.0 Very dense, gray, (SP), moist, silty, fine SAND, layer of sand, volcanic particles, [ADVANCE OUTWASH, Qva].	SP	38.0							
40				S-11	SS	50/5"	>50	0.4 / 0.4	>>	
	43.0 - 46.0 Very dense, gray, (ML), moist to wet, SILT and SAND, layers of sand, [GLACIOLACUSTRINE DEPOSITS, Qvgl].	ML	43.0							
45				S-12	SS	12-50/5"	>50	0.9 / 0.9	>>	S-12@45ft %G-0.8 %S-34.5 %F-64.7
	46.0 - 55.0 Very dense, gray, (SM), moist, fine SAND, [PRE-VASHON TILL, Qpgt].	SM	46.0							
50				S-13	SS	50/4"	>50	0.3 / 0.3	>>	
55	55.0 - 58.0 Hard, gray, (CL), damp, CLAY, with layer of silty sand, [PRE-VASHON GLACIOLACUSTRINE, Qpgl].	CL	55.0	S-14	SS	15-17-25	42	1.5 / 1.5		
	58.0 - 63.0 Very dense, gray, (SM), moist, silty, fine SAND, stratified, volcanic particles, [PRE-VASHON FLUVIAL DEPOSITS, Qpnf].	SM	58.0							
60										

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

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FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-022

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/19/2013
DRILL RIG: CME 850
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
60	58.0 - 63.0 Very dense, gray, (SM), moist, silty, fine SAND, stratified, volcanic particles, [PRE-VASHON FLUVIAL DEPOSITS, Qpnf].	SM		S-15	SS	50/6"	>50	0.5 / 0.5	>>	
	63.0 - 83.0 Very dense, gray, (SM/ML), moist, silty SAND and sandy SILT, micaceous particles, [PRE-VASHON LACUSTRINE DEPOSITS, Qpnl].		63.0							
65				S-16	SS	50/6"	>50	0.5 / 0.5	>>	
70		SM /ML		S-17	SS	23-27-34	>50	1.3 / 1.5	>>	S-17@70ft %G-0.0 %S-42.6 %F-57.4
75				S-18	SS	31-50/5"	>50	0.9 / 0.9	>>	
80				S-19	SS	24-50/6"	>50	1.0 / 1.0	>>	
	83.0 - 88.0 Very dense, gray, (ML), damp, low-plasticity SILT, trace lenses of fine sand, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].		83.0							
85		ML		S-20	SS	32-50/5"	>50	0.9 / 0.9	>>	
	88.0 - 93.0 Very dense, gray, (ML), moist to wet, non-plastic, SILT, little sand, trace gravel, homogeneous, dilatant, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	ML	88.0							
90										

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-022

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/19/2013
DRILL RIG: CME 850
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (PL MC LL)	NOTES WATER LEVELS
90	88.0 - 93.0 Very dense, gray, (ML), moist to wet, non-plastic, SILT, little sand, trace gravel, homogeneous, dilatant, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	ML			S-21	SS	50/6"	>50	0.5 / 0.5		>>◆ S-21@90ft %G-2.0 %S-7.7 %F-90.3
	93.0 - 98.0 Very dense, gray, (ML/SM), moist to wet, SILT and SAND, interbedded, trace gravel, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	ML /SP		93.0							
95					S-22	SS	31-50/5"	>50	0.9 / 0.9		>>◆
	98.0 - 100.5 Very dense, gray, (ML), moist to wet, sandy SILT, homogeneous, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	ML		98.0							
100					S-23	SS	50/6"	>50	0.5 / 0.5		>>◆
	Boring completed at 100.5 ft. Backfilled with 3/8-inch bentonite chips.			100.5							
105											
110											
115											
120											

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-024

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/20/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
0	0.0 - 4.0 Dense, brown, (SM), damp, silty SAND, some gravel, layer of white gravel and layer of gray fine sand, [FILL, Hf].	SM		S-1	SS	4-12-34	46	0.7 / 1.5	
	4.0 - 14.5 Dense to very dense, gray-brown, (SM), damp, fine SAND and SILT, some gravel, layer of silty, fine sand, [FILL, Hf].	SM	4.0	S-2	SS	4-20-32	>50	1.0 / 1.5	
5				S-3	SS	4-12-50/6"	>50	1.0 / 1.5	S-3@7.5ft %G-8.7 %S-54.0 %F-37.3
10				S-4	SS	5-11-23	34	1.0 / 1.5	
				S-5	SS	6-9-25	34	1.3 / 1.5	
15	14.5 - 18.0 Dense, gray, (SM), damp, silty, fine SAND, trace gravel, [FILL, Hf].	SM	14.5	S-6	SS	3-16-22	38	1.2 / 1.5	
	18.0 - 28.0 Very dense, gray, (SM), damp to moist, SAND and SILT, little gravel, [ADVANCE OUTWASH, Qva].	SM	18.0						
20				S-7	SS	4-21-37	>50	1.2 / 1.5	S-7@20ft %G-7.4 %S-56.1 %F-36.5
25				S-8	SS	6-24-43	>50	1.3 / 1.5	
	28.0 - 33.0 Dense, gray, (SP-SM), wet, fine to coarse SAND, little silt, little gravel, layer of silty, fine sand, [ADVANCE OUTWASH, Qva].	SP-SM	28.0						
30									

PENETRATION RESISTANCE BLOWS / ft ◆: 10, 20, 30, 40
PL — MC — LL: 20, 40, 60, 80

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-024

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/20/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES / WATER LEVELS
30	28.0 - 33.0 Dense, gray, (SP-SM), wet, fine to coarse SAND, little silt, little gravel, layer of silty, fine sand, [ADVANCE OUTWASH, Qva].	SP-SM		S-9	SS	3-11-22	33	1.3 / 1.5	Heaving conditions likely based on sample condition.
	33.0 - 38.0 Very dense, gray, (SM), moist, silty fine SAND, stratified layers of coarse sand, trace silt, [ADVANCE OUTWASH, Qva].	SM	33.0	S-10	SS	13-24-36	>50	1.5 / 1.5	
35									
	38.0 - 43.0 Very dense, gray, (SM), moist, silty, fine SAND, [ADVANCE OUTWASH, Qva].	SM	38.0	S-11	SS	9-19-50/4"	>50	1.3 / 1.3	Harder drilling at 40 ft bgs.
40									
	43.0 - 53.0 Very dense, gray, (SM), wet, fine to coarse SAND and SILT, trace to some socketed gravel, [PRE-VASHON TILL, Qpgt].	SM	43.0	S-12	SS	50/6"	>50	0.5 / 0.5	S-12@45ft %G-9.2 %S-58.5 %F-32.3 Drilling chatter at 45 ft bgs.
45									
50				S-13	SS	50/6"	>50	0.5 / 0.5	
	53.0 - 68.0 Very dense, gray, (SP), moist, fine to coarse SAND, little to some gravel, trace silt, [PRE-VASHON FLUVIAL DEPOSITS, Qpnf].	SP	53.0	S-14	SS	2-33-50/3"	>50	1.3 / 1.3	3 feet of heaving sands, Sample S-14 at 55 ft bgs, likely disturbed.
55									
60									

PENETRATION RESISTANCE BLOWS / ft ◆: 10, 20, 30, 40

PL, MC, LL: 20, 40, 60, 80

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-024

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/20/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (PL, MC, LL)	NOTES WATER LEVELS
60	53.0 - 68.0 Very dense, gray, (SP), moist, fine to coarse SAND, little to some gravel, trace silt, [PRE-VASHON FLUVIAL DEPOSITS, Qpnf].	SP			S-15	SS	16-18-24	42	1.5 / 1.5		
65					S-16	SS	2-6-18	24	0.5 / 1.5		
	68.0 - 73.0 Very dense, gray, (SM), moist, fine to coarse SAND, some silt, trace gravel, organic fragments, [PRE-VASHON FLUVIAL DEPOSITS, Qpnf].	SM		68.0							
70					S-17	SS	6-18-37	>50	1.5 / 1.5		S-17@70ft %G-1.8 %S-80.6 %F-17.6
	73.0 - 83.0 Very dense, gray, (SP), moist, fine to coarse SAND, little gravel, pockets of silty, fine sand, [PRE-VASHON FLUVIAL DEPOSITS, Qpnf].	SP		73.0							
75					S-18	SS	3-16-41	>50	1.5 / 1.5		
80					S-19	SS	50/4"	>50	0.3 / 0.3		
	83.0 - 100.5 Very dense, gray, (SM/ML), moist to wet, SILT and SAND, stratified, some socketed gravels and pieces of diamict textured soil, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	SM /ML		83.0							
85					S-20	SS	31-50/6"	>50	1.0 / 1.0		S-20@85ft %G-1.7 %S-35.6 %F-62.7
90											

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-024

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/20/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
90	4.25-inch Inner Diameter Hollow Stem Auger	83.0 - 100.5 Very dense, gray, (SM/ML), moist to wet, SILT and SAND, stratified, some socketed gravels and pieces of diamict textured soil, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].				S-21	SS	4		0.4 / 0.4		Heaving conditions likely based on sample recovery.
95		Dilatant.	SM /ML			S-22	SS	.9-50/5"	>50	0.9 / 0.9	>>◆	
100						S-23	SS	50/5"	>50	0.5 / 0.4	>>◆	
		Boring completed at 100.5 ft. Backfilled with 3/8-inch bentonite chips.			100.5							
105												
110												
115												
120												

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-030

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/19/2013
DRILL RIG: B-59 Mobile Drill Truck
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
0	0.0 - 7.0 Dense to very dense, gray, (SM), moist to wet, fine to medium SAND, some silt, trace gravel, [TILL, Qvt].	SM		S-1	SS	14-22-30	>50	1.1 / 1.5	S-1@2.5ft %G-2.0 %S-80.8 %F-17.2
5				S-2	SS	27-50/6"	>50	1.0 / 1.0	
	7.0 - 12.0 Very dense, gray, (SP), moist to wet, fine to coarse SAND, trace silt, trace gravel, [TILL, Qvt].	SP	7.0	S-3	SS	14-23-32	>50	1.2 / 1.5	
10				S-4	SS	13-31-34	>50	1.2 / 1.5	
	12.0 - 14.5 Very dense, gray, (SM), damp, SAND and SILT, 1/8-inch lenses of silty fine sand, [TILL, Qvt].	SM	12.0	S-5	SS	14-24-28	>50	1.2 / 1.5	S-5@12.5ft %G-0.5 %S-60.2 %F-39.3
15	14.5 - 18.0 Very dense, gray, (SM), moist, fine SAND, some silt, trace gravel, [TILL, Qvt].	SM	14.5	S-6	SS	21-32-50/5"	>50	1.4 / 1.4	
	18.0 - 23.0 Very dense, gray, (SP), damp, fine to medium SAND, some gravel, trace silt, 2-inch lens of medium sand, [TILL, Qvt].	SP	18.0	S-7	SS	25-39-42	>50	1.1 / 1.5	
20									
	23.0 - 28.0 Very dense, gray, (SM), moist, silty fine to coarse SAND, trace gravel, lenses of silty fine sand 1/8-inch thick, lens of iron oxide stained sand, [TILL, Qvt].	SM	23.0	S-8	SS	31-47-50/5"	>50	1.3 / 1.4	
25									
	28.0 - 33.0 Very dense, gray, (SM), moist, fine to coarse SAND, some gravel, some silt, [TILL, Qvt].	SM	28.0						
30									

PENETRATION RESISTANCE BLOWS / ft ◆: 10, 20, 30, 40

PL — MC — LL: 20, 40, 60, 80

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschielde
LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00987, BLDG-2018-00989, BLDG-2018-00988,
BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-030

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/19/2013
DRILL RIG: B-59 Mobile Drill Truck
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (PL–MC–LL)	NOTES WATER LEVELS
30	28.0 - 33.0 Very dense, gray, (SM), moist, fine to coarse SAND, some gravel, some silt, [TILL, Qvt].	SM		S-9	SS	16-27-33	>50	1.2 / 1.5	>>	S-9@30ft %G-15.5 %S-70.6 %F-13.9
	33.0 - 38.0 Very dense, gray, (SM), moist, silty, fine to coarse SAND, trace gravel, pockets of medium sand, [TILL, Qvt].	SM	33.0	S-10	SS	40-50/4"	>50	0.8 / 0.8	>>	
35										
	38.0 - 49.0 Hard, gray, (CH), damp, high plasticity CLAY, some fine sand, 1/6-inch ribbons of fine sand throughout, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	CH	38.0	S-11	SS	16-24-22	46	0.8 / 1.5	◆	
40	Trace sand.									
45				S-12	SS	12-16-25	41	0.8 / 1.5	◆	S-12@45ft %G- %S- %F-87.3
	49.0 - 58.0 Very dense, gray, (SP), damp, fine SAND, micaceous particles, homogeneous, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	SP	49.0	S-13	SS	24-50/5.5"	>50	0.9 / 1.0	>>	Moderate drill chatter at 49 ft bgs.
50										
55				S-14	SS	50/6"	>50	0.5 / 0.5	>>	
	58.0 - 63.0 Very dense, gray, (SM/ML), damp, silty, fine SAND to sandy SILT, homogeneous, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	SM /ML	58.0							
60										

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschielde
LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00982, BLDG-2018-00983, BLDG-2018-00984, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-030

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/19/2013
DRILL RIG: B-59 Mobile Drill Truck
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆	NOTES WATER LEVELS
60	58.0 - 63.0 Very dense, gray, (SM/ML), damp, silty, fine SAND to sandy SILT, homogeneous, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	SM /ML		S-15	SS	38-50/5"	>50	0.8 / 0.9	>>	
	63.0 - 68.0 Very dense, gray, (ML), damp, SILT, some sand, homogeneous, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	ML	63.0							
65				S-16	SS	13-24-30	>50	0.8 / 1.5	>>	S-16@65ft %G-0.0 %S-12.0 %F-88.0
	68.0 - 101.5 Hard, gray, (CL/CH), damp, low to high plasticity CLAY, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	CL /CH	68.0							
70				S-17	SS	11-14-22	36	0.8 / 1.5		
	Trace gravel.									
75				S-18	SS	12-14-26	40	0.8 / 1.5		
80				S-19	SS	13-17-24	41	0.8 / 1.5		
85				S-20	SS	11-17-29	46	0.9 / 1.5		S-20@85ft %G- %S- %F-89.8
90										

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschielde
LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00890,
BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-030

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/19/2013
DRILL RIG: B-59 Mobile Drill Truck
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
90	4.9-inch Bit, Mud Rotary	68.0 - 101.5 Hard, gray, (CL/CH), damp, low to high plasticity CLAY, [PRE-VASHON GLACIOLACUSTRINE DEPOSITS, Qpgl].	CL /CH			S-21	SS	13-21-30	>50	0.8 / 1.5	>>◆	
95						S-22	SS	17-23-31	>50	0.8 / 1.5	>>◆	
100						S-23	SS	15-24-30	>50	0.8 / 1.5	>>◆	
		Boring completed at 101.5 ft. Backfilled with 3/8-inch bentonite chips.			101.5							
105												
110												
115												
120												

1 in to 4 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschielde
LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00987, BLDG-2018-00989, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-033

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/13/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	0.0 - 7.0 Very dense, light brown, (SM), damp, SAND, some gravel, some silt, [TILL, Qvt].	SM		S-1	SS	12-30-40	>50	1.2 / 1.5	>>◆	
5	Pockets of brown sand.			S-2	SS	15-28-33	>50	1.0 / 1.5	● >>◆	S-2@5ft %G-18.2 %S-68.6 %F-13.2
	7.0 - 9.0 Very dense, gray, (SP-SM), damp, fine SAND, little silt, little gravel, pockets of gray sand, sand lens in [TILL, Qvt].	SP-SM	7.0	S-3	SS	20-50/6"	>50	1.0 / 1.0	>>◆	
10	9.0 - 14.5 Very dense, gray-brown, (SM), damp to wet, silty SAND, some gravel, pockets of silty, fine sand, [Till, Qvt].	SM	9.0	S-4	SS	36-50/4"	>50	0.7 / 0.8	>>◆	
	Lens of iron oxidize stained fine sand.			S-5	SS	22-30-50/5"	>50	1.3 / 1.4	● >>◆	S-5@12.5ft %G-19.6 %S-54.0 %F-26.4
15	14.5 - 23.0 Very dense, gray, (SP), moist, SAND, trace silt, pockets of silty, fine sand, sand lens in [TILL, Qvt].	SP	14.5	S-6	SS	26-50/6"	>50	1.0 / 1.0	>>◆	
20				S-7	SS	50/6"	>50	0.5 / 0.5	>>◆	
	23.0 - 33.0 Very dense, gray, (SM/ML), wet, SILT and fine to coarse SAND, [TILL, Qvt].	SM /ML	23.0							
25										

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Grahm
LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-033

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 148th St. Exit
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/13/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (PL MC LL)	NOTES WATER LEVELS
25	4.25-inch Inner Diameter Hollow Stem Auger	23.0 - 33.0 Very dense, gray, (SM/ML), wet, SILT and fine to coarse SAND, [TILL, Qvt].	SM /ML			S-8	SS	50/6"	>50	0.5 / 0.5		>>◆ S-8@25ft %G-1.6 %S-42.8 %F-55.6
30		Layer of gray sand.				S-9	SS	50/3"	>50	0.3 / 0.3		>>◆
		33.0 - 41.3 Very dense, gray, (SP-SM), moist to wet, SAND, trace to little silt, [ADVANCE OUTWASH, Qva].			33.0							
35			SP-SM			S-10	SS	50/6"	>50	0.5 / 0.5		>>◆ S-10@35ft %G-5.0 %S-89.0 %F-6.0
40		Trace gravel				S-11	SS	12-25-50/3"	>50	1.3 / 1.3		>>◆
		Boring completed at 41.3 ft. Backfilled with 3/8-inch bentonite chips.			41.3							
45												
50												

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Grahm
LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-034

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 2801 152nd Ave. NE

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 9/7/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	0.0 - 0.3 Asphalt Pavement.		0.3							
	0.3 - 14.5 Very dense, orange grading to gray-brown, (SM), moist, silty, fine to coarse SAND, some gravel, weathered, [TILL, Qvt].									
				S-1	SS	18-32-44	>50	1.3 / 1.5	>>◆	
5	Diamict Structure, very friable.			S-2	SS	29-37-43	>50	1.5 / 1.5	● >>◆	S-2@5ft %G-18.8 %S-58.3 %F-22.9
		SM		S-3	SS	15-20-32	>50	1.5 / 1.5	>>◆	
10				S-4	SS	14-27-33	>50	1.5 / 1.5	>>◆	
	Some iron oxide staining,			S-5	SS	16-30-32	>50	1.5 / 1.5	>>◆	
	14.5 - 23.0 Compact, brown, (SP-SM/SM), moist, fine to coarse SAND, little to some silt, little to some gravel, pockets of gray-brown, fine sandy SILT, [TILL, Qvt].		14.5							
15				S-6	SS	6-12-15	27	1.3 / 1.5	● ◆	S-6@15ft %G-6.3 %S-71.4 %F-22.3
		SP-SM /SM								
20	Log continued on next page									

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Derek Patsey

LOGGED: Mike Woiczko
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-034

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 2801 152nd Ave. NE
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 9/7/2013
DRILL RIG: B-59 Mobile Drill Truck
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
20	14.5 - 23.0 Compact, brown, (SP-SM/SM), moist, fine to coarse SAND, little to some silt, little to some gravel, pockets of gray-brown, fine sandy SILT, [TILL, Qvt]. Becomes very dense and gravelly.	SP-SM /SM			S-7	SS	14-50/4"	>50	0.7 / 0.8	>>	
	23.0 - 38.3 Compact, tan, (SP-SM), moist, fine to coarse SAND and GRAVEL, little silt, [ADVANCE OUTWASH, Qva].			23.0							
25					S-8	SS	14-19-29	48	0.4 / 1.5		
30		SP-SM			S-9	SS	14-50/4"	>50	0.9 / 0.9	>>	S-9@30ft %G-38.5 %S-54.4 %F-7.1
											Gravelly drilling at 36 ft bgs.
35					S-10	SS	27-50/3"	>50	0.7 / 0.8	>>	
											Gravelly drilling at 32 ft bgs.
	Becomes wet.				S-11	SS	31-50/3"	>50	0.8 / 0.8	>>	
	Boring completed at 38.3 ft. Backfilled with 3/8-inch bentonite chips.			38.3							
40											

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Derek Patsey
LOGGED: Mike Wolczko
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-036

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 2801 152nd Ave. NE

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 9/7/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90
WELL TAG#:BIJ756

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS / GRAPHIC
0	0.0 - 0.2 Asphalt Pavement.		0.2							8-inch diameter flush mounted steel monument, cemented to 1 ft bgs.
	0.2 - 7.0 Compact to dense, gray-brown, (SM), moist, fine to coarse SAND and SILT, some gravel, diamict structure, very friable, [TILL FILL, Hf].	SM		S-1	SS	3-12-14	26	0.9 / 1.5	◆	2-inch diameter PVC riser from 0.3 to 40 ft bgs. Backfilled with 3/4-inch bentonite chips from 1 to 37 ft bgs.
5				S-2	SS	7-11-21	32	1.0 / 1.5	● ◆	S-2@5ft %G-19.7 %S-41.4 %F-38.9
	7.0 - 9.5 Dense, gray-brown, (SM), moist, gravelly, silty, fine to coarse SAND, diamict structure, very friable, [TILL, Qvt]. Becomes very dense, predominately fine sand.	SM	7.0	S-3	SS	12-50/3"	>50	0.8 / 0.8	>>◆	
10	9.5 - 14.5 Very dense, gray-brown, (SP-SM), moist, fine to coarse SAND, little silt, little gravel, [TILL, Qvt].	SP-SM	9.5	S-4	SS	50/6"	>50	0.3 / 0.5	>>◆	Gravelly drilling at 11 ft bgs.
	Becomes gravelly, diamict structure, very friable.			S-5	SS	50/6"	>50	0.5 / 0.5	>>◆	
15	14.5 - 23.0 Very dense, gray-brown, (SP-SM/SM), moist, fine to coarse SAND, little to some gravel, trace to some silt, [ADVANCE OUTWASH, Qva].	SP-SM /SM	14.5	S-6	SS	50/5"	>50	0.4 / 0.4	>>◆	
20										

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Derek Patsey

LOGGED: Mike Wolczko
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-036

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 2801 152nd Ave. NE

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 9/7/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90
WELL TAG#:BIJ756

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS / GRAPHIC
20	14.5 - 23.0 Very dense, gray-brown, (SP-SM/SM), moist, fine to coarse SAND, little to some gravel, trace to some silt, [ADVANCE OUTWASH, Qva]. Becomes gravelly.	SP-SM /SM		S-7	SS	31-50/4"	>50	0.6 / 0.8	>>	S-7@20ft %G-40.6 %S-46.7 %F-12.7
	23.0 - 28.0 Very dense, gray-brown, (SP-SM/SM), moist, fine to coarse SAND, little to some silt, little gravel, [ADVANCE OUTWASH, Qva].	SP-SM /SM	23.0	S-8	SS	27-31-39	>50	1.5 / 1.5	>>	
25				S-9	SS	26-43-50/5"	>50	1.5 / 1.5	>>	S-9@27.5ft %G-1.5 %S-91.1 %F-7.4
	28.0 - 33.0 Very dense, gray-brown, (SP-SM), moist to wet, fine to coarse SAND, little silt, trace fine gravel, [ADVANCE OUTWASH, Qva].	SP-SM	28.0	S-10	SS	17-39-48	>50	1.2 / 1.5	>>	
30				S-11	SS	30-50/3"	>50	0.5 / 0.8	>>	
	33.0 - 51.4 Very dense, gray-brown, (SP), moist, fine to coarse SAND, trace to some gravel, trace silt, [ADVANCE OUTWASH, Qva]. Little gravel.	SP	33.0	S-12	SS	11-39-50/6"	>50	1.2 / 1.5	>>	Backfilled with Colorado silica 10 x 20 sand filter from 37.5 to 50 ft bgs.
35										
40										

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Derek Patsey

LOGGED: Mike Woiczko
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-036

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 2801 152nd Ave. NE

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 9/7/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90
WELL TAG#:BIJ756

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS / GRAPHIC
40	4.25-inch Inner Diameter Hollow Stem Auger	33.0 - 51.4 Very dense, gray-brown, (SP), moist, fine to coarse SAND, trace to some gravel, trace silt, [ADVANCE OUTWASH, Qva]. Becomes wet.				S-13	SS	15-38-50/6"	>50	1.3 / 1.5	>>◆	2-inch diameter size 0.010 inch slotted PVC screen from 40 to 50 ft bgs.
45		Becomes gray, trace gravel.	SP			S-14	SS	8-21-39	>50	1.4 / 1.5	>>◆	S-14@45ft %G-3.4 %S-92.2 %F-4.4
50						S-15	SS	3-21-50/5"	>50	0.9 / 1.4	>>◆	Backfilled with slough from 50 to 51.4 ft bgs.
		Boring completed at 51.4 ft.			51.4							
55												
60												

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Derek Patsey

LOGGED: Mike Woiczko
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-037

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/16/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	Air Knife	0.0 - 0.3 Asphalt Pavement.			0.3							
		0.3 - 23.0 Compact, gray, (SM), damp, silty, fine SAND, some gravel, [FILL, Hf].										Air Knife excavation to 7 ft bgs.
5												
	4.9-inch Bit, Mud Rotary					S-1	SS	4-12-13	25	0.4 / 1.5	◆	
10		Trace wood fragments and laminations of brown, silty, fine sand.	SM			S-2	SS	6-6-7	13	0.7 / 1.5	◆	
		Ribbons of brown silty, fine sand.				S-3	SS	6-8-7	15	1.0 / 1.5	● ◆	S-3@12.5ft %G-20.8 %S-53.1 %F-26.1
15		Laminations of brown silty sand.				S-4	SS	7-6-6	12	0.7 / 1.5	◆	Smooth drilling from 12.5 to 17ft bgs.
		Ribbons of brown silty, fine sand.										
20		Log continued on next page										

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00890,
BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-037

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/16/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (PL MC LL)	NOTES WATER LEVELS
20	0.3 - 23.0 Compact, gray, (SM), damp, silty, fine SAND, some gravel, [FILL, Hf].	SM		S-5	SS	10-8-8	16	0.4 / 1.5	◆	
	23.0 - 32.0 Very dense, gray, (SM), moist, silty, fine SAND, some gravel, [TILL, Qvt].	SM	23.0							
25				S-6	SS	50/4"	>50	0.3 / 0.3	>>◆	
30				S-7	SS	50/4"	>50	0.3 / 0.3	>>◆	
	32.0 - 35.9 Very dense, gray, (SP-SM), moist to wet, gravelly, fine to coarse SAND, little silt, [ADVANCE OUTWASH, Qva].	SP-SM	32.0							Slight drilling chatter from 32 to 34 ft bgs.
35				S-8	SS	45-50/4.5	>50	0.8 / 0.9	● >>◆	S-8@35ft %G-29.1 %S-61.2 %F-9.7
	Boring completed at 35.9 ft. Backfilled with 3/8-inch bentonite chips.		35.9							
40										

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00987, BLDG-2018-00989, BLDG-2018-00990,
BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-038

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/13/2013
DRILL RIG: B-60 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES / WATER LEVELS
0	0.0 - 4.5 Dense, gray, (SM), moist to damp, silty, fine to medium SAND, some gravel and wood fragments, pockets of brown silty sand, [FILL, Hf].	SM		S-1	SS	10-15-22	37	0.9 / 1.5	
5	4.5 - 13.0 Dense to very dense, light brown, (SM), moist to wet, fine to medium SAND, some silt, little gravel, [RECESSIONAL OUTWASH, Qvro].	SM	4.5	S-2	SS	7-14-16	30	1.0 / 1.5	
				S-3	SS	14-20-22	42	1.2 / 1.5	S-3@7.5ft %G-6.3 %S-76.8 %F-16.9
10				S-4	SS	12-18-19	37	1.2 / 1.5	
	13.0 - 20.0 Very dense, light brown, (SP-SM), wet, fine to coarse SAND, some gravel, little silt, pockets of coarse sand, [ADVANCE OUTWASH, Qva].	SP-SM	13.0	S-5	SS	14-25-29	>50	1.2 / 1.5	>>
15				S-6	SS	18-45-41	>50	1.2 / 1.5	>>S-6@15ft %G-21.4 %S-69.1 %F-9.5 Slight drill chatter at 15 ft bgs.
20	20.0 - 33.0 Dense to Very dense, brown, (SM), wet, silty, fine to coarse SAND, some gravel, [ADVANCE OUTWASH, Qva].	SM	20.0	S-7	SS	28-35-50/6"	>50	1.0 / 1.5	>>Slight drill chatter at 20 ft bgs.
25									

Log continued on next page

PENETRATION RESISTANCE BLOWS / ft ◆: 10, 20, 30, 40
PL — MC — LL: 20, 40, 60, 80

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschield

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00890,
BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-038

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/13/2013
DRILL RIG: B-60 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
25	20.0 - 33.0 Dense to Very dense, brown, (SM), wet, silty, fine to coarse SAND, some gravel, [ADVANCE OUTWASH, Qva].	SM			S-8	SS	21-33-38	>50	1.1 / 1.5	>>◆	
30	Pockets of fine sand.				S-9	SS	50/5"	>50	0.3 / 0.4	>>◆	Moderate drill chatter at 30 ft bgs.
	33.0 - 40.3 Very dense, brown (SP-SM), wet, fine to coarse SAND, some gravel, little silt, [ADVANCE OUTWASH, Qva].	SP-SM		33.0							
35					S-10	SS	36-50/6"	>50	0.8 / 1.0	● >>◆	S-10@35ft %G-18.1 %S-73.4 %F-8.5
40					S-11	SS	50/4"	>50	0.3 / 0.3	>>◆	
	Boring completed at 40.3 ft. Backfilled with 3/8-inch bentonite chips.			40.3							
45											
50											

SITE COPY
BLDG-2018-00887, BLDG-2018-00980, BLDG-2018-00982,
BLDG-2018-00983, BLDG-2018-00985

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Todd Knipschield

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-039

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/13-14/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	0.0 - 12.0 Very dense to dense, brown, (SM), moist to damp, fine to coarse SAND, some gravel, some silt, [RECESSIONAL OUTWASH, Qvro].										
					S-1	SS	15-20-37	>50	0.8 / 1.5	>>	
5		SM			S-2	SS	13-23-27	50	1.3 / 1.5	●	S-2@5ft %G-14.3 %S-70.3 %F-15.4 Slight drill chatter at 5 ft bgs.
					S-3	SS	13-22-27	49	1.3 / 1.5		
10					S-4	SS	13-17-24	41	1.3 / 1.5		
	12.0 - 18.0 Dense to very dense, brown, (SM), moist, silty, fine to coarse SAND, trace gravel, [ADVANCE OUTWASH, Qva].	SM		12.0	S-5	SS	17-46-50/4"	>50	0.0 / 1.4	>>	No recovery sample S-5 at 12.5 ft bgs.
15					S-6	SS	18-32-37	>50	1.5 / 1.5	>>	
	18.0 - 28.0 Dense to very dense, brown, (SP-SM), wet, gravelly, fine to coarse SAND, little silt, [ADVANCE OUTWASH, Qva].	SP-SM		18.0							
20					S-7	SS	18-42-38	>50	1.4 / 1.5	● >>	S-7@20ft %G-25.8 %S-65.8 %F-8.4
25											

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00982, BLDG-2018-00983, BLDG-2018-00984, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-039

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/13-14/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40) / PL MC LL (20 40 60 80)	NOTES WATER LEVELS
25	18.0 - 28.0 Dense to very dense, brown, (SP-SM), wet, gravelly, fine to coarse SAND, little silt, [ADVANCE OUTWASH, Qva].	SP-SM			S-8	SS	50/6"	>50	0.5 / 0.5	>>	
	28.0 - 33.0 Very dense, brown, (SM), wet, silty, fine to coarse SAND, some gravel, [ADVANCE OUTWASH, Qva].	SM		28.0							
30					S-9	SS	26-50/4"	>50	0.7 / 0.8	>>	Slight drill chatter at 30 ft bgs.
	33.0 - 38.0 Very dense, brown, (SM), wet, fine to coarse SAND, some silt, little gravel, [ADVANCE OUTWASH, Qva].	SM		33.0							
35					S-10	SS	31-46-42	>50	1.2 / 1.5	>>	S-10@35ft %G-7.2 %S-80.1 %F-12.7
	38.0 - 40.5 Very dense, brown, (SM), wet, silty, fine to coarse SAND, some gravel, [ADVANCE OUTWASH, Qva].	SM		38.0							
40					S-11	SS	50/6"	>50	0.2 / 0.5	>>	
	Boring completed at 40.5 ft. Backfilled with 3/8-inch bentonite chips.			40.5							
45											
50											

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-040

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/13/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (PL MC LL)	NOTES WATER LEVELS
0	0.0 - 7.0 Compact to very dense, brown, (SM), moist to damp, silty SAND, some gravel, trace bark, [FILL, Hf].	SM		S-1	SS	7-8-11	19	0.8 / 1.5		
5				S-2	SS	12-26-36	>50	0.8 / 1.5	>>	
	7.0 - 9.5 Very dense, brown, (SM) moist, SAND, some silt, little gravel, layer of wet, silty, fine sand, [ADVANCE OUTWASH, Qva].	SM	7.0	S-3	SS	14-22-30	>50	1.3 / 1.5	>>	S-3@7.5ft %G-8.1 %S-74.8 %F-17.1 Drill chatter at 7.5 ft bgs.
10	9.5 - 12.0 Very dense, brown, (SP), moist, SAND, trace silt, [ADVANCE OUTWASH, Qva].	SP	9.5	S-4	SS	15-22-30	>50	1.3 / 1.5	>>	
	12.0 - 18.0 Very dense, brown, (SM) damp to moist, silty SAND, some gravel, layer of wet, silty, fine sand, [ADVANCE OUTWASH, Qva].	SM	12.0	S-5	SS	15-30-27	>50	1.2 / 1.5	>>	
15				S-6	SS	15-25-31	>50	1.4 / 1.5	>>	
	18.0 - 40.9 Dense, brown to yellow-brown, (SP-SM), moist, SAND and GRAVEL, little silt, micaceous, oxidized, [ADVANCE OUTWASH, Qva].	SP-SM	18.0							
20				S-7	SS	25-50/6"	>50	0.7 / 1.0	>>	S-7@20ft %G-30.6 %S-58.5 %F-10.9
25										

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Graham

LOGGED: Chris McMillen (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00987, BLDG-2018-00988, BLDG-2018-00989
BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-040

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/13/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
25	4.25-inch Inner Diameter Hollow Stem Auger	18.0 - 40.9 Dense, brown to yellow-brown, (SP-SM), moist, SAND and GRAVEL, little silt, micaceous, oxidized, [ADVANCE OUTWASH, Qva]. Lenses of iron stained sand and gray, gravelly, sand.	SP-SM			S-8	SS	26-50/5"	>50	0.5 / 0.9	>> ◆	
30		Pocket of white gravel.				S-9	SS	30-50/4"	>50	0.5 / 0.8	>> ◆	Slight drill chatter at 30 ft bgs.
35		Pocket of silty fine sand.				S-10	SS	50/6"	>50	0.4 / 0.5	>> ◆	
40		Trace gravel.				S-11	SS	28-50/5"	>50	0.7 / 0.9	>> ◆	S-11@40ft %G-18.9 %S-71.7 %F-9.4
		Boring completed at 40.9 ft. Backfilled with 3/8-inch bentonite chips.			40.9							
45												
50												

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Graham

LOGGED: Chris McMillen (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00987, BLDG-2018-00988, BLDG-2018-00989
BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-041

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/13/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	0.0 - 4.5 Dense, brown, (SM), damp, fine to coarse SAND, some silt, some gravel, [FILL, Hf].	SM									
					S-1	SS	17-13-30	43	0.5 / 1.5	◆	
	4.5 - 12.0 Very dense, brown, (SM), damp, fine to coarse SAND, some silt, some gravel, [ADVANCE OUTWASH, Qva].			4.5							
5					S-2	SS	26-37-50/6"	>50	1.3 / 1.5	● >>◆	S-2@5ft %G-19.9 %S-66.4 %F-13.7
		SM			S-3	SS	25-36-38	>50	1.3 / 1.5	>>◆	
10					S-4	SS	19-25-42	>50	1.5 / 1.5	>>◆	
	12.0 - 20.0 Very dense, brown, (SM/SP-SM), damp, fine to coarse SAND, some silt, trace to little gravel, stratified, [ADVANCE OUTWASH, Qva].			12.0							
					S-5	SS	15-30-35	>50	1.3 / 1.5	● >>◆	S-5@12.5ft %G-1.9 %S-83.1 %F-15.0
15					S-6	SS	50/6"	>50	0.2 / 0.5	>>◆	Very poor recovery Sample S-6 at 15 ft bgs.
		SM /SP-SM									
					S-7	SS	25-30-30	>50	1.2 / 1.5	>>◆	
20	20.0 - 40.5 Dense to very dense, yellow-brown to brown, (SP), damp to moist, fine to coarse SAND, little silt, little gravel to SAND and GRAVEL, little silt, [ADVANCE OUTWASH, Qva].			20.0							
					S-8	SS	23-34-48	>50	1.2 / 1.5	● >>◆	S-8@20ft %G-22.7 %S-66.6 %F-10.7
		SP-SM									
25											

Log continued on next page

SITE COPY
BLDG-2018-00987, BLDG-2018-00988, BLDG-2018-00989
BLDG-2018-00983, BLDG-2018-00985

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Graham

LOGGED: Chris McMillen (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-041

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/13/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL; 20 40 60 80)	NOTES WATER LEVELS
25	4.25-inch Inner Diameter Hollow Stem Auger	20.0 - 40.5 Dense to very dense, yellow-brown to brown, (SP), damp to moist, fine to coarse SAND, little silt, little gravel to SAND and GRAVEL, little silt, [ADVANCE OUTWASH, Qva].	SP-SM			S-9	SS	50/6"	>50	0.4 / 0.5	>>	Drill chatter at 25 ft bgs.
30						S-10	SS	50/6"	>50	0.5 / 0.5	>>	S-10@30ft %G-37.6 %S-54.6 %F-7.8 Slight drill chatter at 30 ft bgs.
35						S-11	SS	50/5"	>50	0.4 / 0.4	>>	
40						S-12	SS	50/6"	>50	0.0 / 0.5	>>	No recovery Sample S-12 at 40 ft bgs.
		Boring completed at 40.5 ft. Backfilled with 3/8-inch bentonite chips.			40.5							
45												
50												

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Graham

LOGGED: Chris McMillen (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00987, BLDG-2018-00988, BLDG-2018-00989
BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-042

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/16/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,146.30 E: 1,647,717.71

ELEVATION: 378.74
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	Air Knife Excavation	0.0 - 5.0 Dense, light brown to brown (SM), damp to moist, silty, fine to coarse SAND, some gravel, [FILL, Hf].	SM									
5		5.0 - 25.0 Dense to very dense, light brown, (SM), moist to wet, fine to coarse SAND, some gravel, some silt, [ADVANCE OUTWASH, Qva].			373.7 5.0							Slight drilling chatter at 6.5 bgs.
	4.9-inch Diameter Bit, Mud Rotary					3	SS	12-26-26	>50	1.0/1.5	>>	
10						4	SS	12-26-24	50	1.1/1.5	●	4@10ft %G-21.7 %S-57.4 %F-20.9
		Light brownish gray, damp.				5	SS	31-50/5.5"	>50	0.9/0.9	>>	Hammer bouncing.
15			SM			6	SS	34-50/6"	>50	1.0/1.0	● >>	6@15ft %G-24.9 %S-52.4 %F-22.7 Slight drilling chatter 15 to 24 ft bgs.
20						7	SS	23-45-43	>50	1.0/1.5	>>	
												Smooth drilling at 24 ft bgs.
25		Log continued on next page			353.7							

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-042

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/16/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,146.30 E: 1,647,717.71

ELEVATION: 378.74
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
25	4.9-inch Diameter Bit, Mud Rotary	25.0 - 30.0 Very dense, gray, (SM), moist, fine to coarse SAND, some silt, [ADVANCE OUTWASH, Qva].	SM		25.0	8	SS	17-26-30	>50	1.1 / 1.5	>>	8@25ft %G-0.6 %S-83.4 %F-16.0
30		30.0 - 41.5 Very dense, brown to gray (SM), moist, fine to coarse SAND, some silt, little gravel, [ADVANCE OUTWASH, Qva]. Lenses of orange stained brown sand.	SM		348.7 30.0	9	SS	24-36-28	>50	1.2 / 1.5	>>	
35						10	SS	27-38-50/4"	>50	1.2 / 1.2	>>	
40						11	SS	29-33-42	>50	1.1 / 1.5	>>	11@40ft %G-8.5 %S-75.7 %F-15.8
		Boring completed at 41.5 ft. Backfilled with 3/8-inch bentonite chips.			337.2 41.5							
45												
50												

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-043

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 40th St. Exit
DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/13-14/2013
DRILL RIG: B-46 Mobile Drill Truck Mounted
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.9-inch Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES / WATER LEVELS
0	0.0 - 4.5 Compact, brown, (SP-SM), damp, fine to coarse SAND, little silt, trace gravel, [FILL, Hf].	SP-SM		S-1	SS	7-8-9	17	1.0 / 1.5	S-1@2.5ft %G-4.4 %S-87.2 %F-8.4
	4.5 - 7.0 Compact, brown, (SP), damp, SAND, homogeneous, [RECESSIONAL OUTWASH, Qvro].	SP	4.5	S-2	SS	6-10-10	20	1.0 / 1.5	
	7.0 - 12.0 Compact to dense, brown, (SM), damp to moist, SAND, some silt, trace to some gravel, [RECESSIONAL OUTWASH, Qvro].	SM	7.0	S-3	SS	7-9-16	25	1.2 / 1.5	
10				S-4	SS	9-14-18	32	1.2 / 1.5	S-4@10ft %G-4.7 %S-82.0 %F-13.3
	12.0 - 14.5 Dense, brown, (SP), moist, SAND, some gravel, trace silt, [RECESSIONAL OUTWASH, Qvro].	SP	12.0	S-5	SS	11-19-24	43	1.0 / 1.5	
15	14.5 - 18.0 Very dense, brown, (SP), damp, fine to coarse SAND, some gravel, trace silt, [ADVANCE OUTWASH, Qva].	SP	14.5	S-6	SS	9-35-21	>50	1.2 / 1.5	Hose broke on drill rig at 2:22AM, 5/14/13, drilling done for night. Began drilling again on 5/14/13 at 8:15PM
	18.0 - 41.5 Very dense, brown, (SP-SM), damp, SAND, some gravel, little silt, [ADVANCE OUTWASH, Qva].	SP-SM	18.0	S-7	SS	20-40-50/6"	>50	0.5 / 1.5	
20									
25									

PENETRATION RESISTANCE BLOWS / ft ◆ (10, 20, 30, 40); PL MC LL (20, 40, 60, 80)

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Graham
LOGGED: Chris McMillen (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00987, BLDG-2018-00988, BLDG-2018-00989, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-043

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound, 40th St. Exit
DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/13-14/2013
DRILL RIG: B-46 Mobile Drill Truck Mounted
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
25	4.9-inch Bit, Mud Rotary	18.0 - 41.5 Very dense, brown, (SP-SM), damp, SAND, some gravel, little silt, [ADVANCE OUTWASH, Qva]. Layer of silty, fine sand.	SP-SM			S-8	SS	22-39-50/5"	>50	1.3 / 1.5	>>◆	S-8@25ft %G-34.8 %S-55.8 %F-9.4
30						S-9	SS	30-36-50/6"	>50	1.3 / 1.5	>>◆	
35						S-10	SS	36-50/5"	>50	0.8 / 0.9	>>◆	
40						S-11	SS	40-47-50/5"	>50	1.0 / 1.4	>>◆	S-11@40ft %G-31.1 %S-59.9 %F-9.0
		Boring completed at 41.5 ft. Backfilled with 3/8-inch bentonite chips.			41.5							
45												
50												

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Graham
LOGGED: Chris McMillen (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00987, BLDG-2018-00988, BLDG-2018-00989
BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-044

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/16/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,368.00 E: 1,647,808.01

ELEVATION: 375.03
INCLINATION: -90
WELL TAG#:BHU177

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS / GRAPHIC
0	0.0 - 4.0 Very loose, gray, (SP), moist, fine SAND, trace silt, [FILL, Hf].	SP								8-inch diameter flush mount steel monument, cemented to 1.0 ft bgs. 2-inch diameter PVC riser from 0.3 to 38 ft bgs. Backfilled with 3/8-inch bentonite chips from 1 to 38 ft bgs.
				S-1	SS	0-1-1	2	1.3 / 1.5	◆	
	4.0 - 9.5 Very loose to loose, brown, (SP-SM), damp, fine to coarse SAND, little silt, some pockets of black silty, fine sand, [FILL, Hf].		371.0 4.0							
5				S-2	SS	2-1-1	2	0.3 / 1.5	◆	
	Organic fragments.	SP-SM								
				S-3	SS	6-5-5	10	1.3 / 1.5	● ◆	S-3@7.5ft %G-3.1 %S-85.3 %F-11.6
	9.5 - 13.5 Compact, brown, (SM), damp, SAND, some silt, [FILL, Hf].		365.5 9.5							
10				S-4	SS	7-9-12	21	1.5 / 1.5	◆	
		SM								
				S-5	SS	13-21-22	43	1.2 / 1.5	◆	
	13.5 - 18.0 Dense to very dense, brown, (SP-SM), damp, SAND, little silt, [RECESSIONAL OUTWASH, Qvro].		361.5 13.5							
15				S-6	SS	11-17-25	42	1.2 / 1.5	● ◆	S-6@15ft %G-0.2 %S-81.5 %F-18.3
		SP-SM								
	18.0 - 38.0 Very dense, brown, (SM), damp, fine to coarse SAND, some silt, trace to some gravel, [ADVANCE OUTWASH, Qva].	SM	357.0 18.0							
20	Log continued on next page									

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Dave Puckett

LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-044

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/16/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,368.00 E: 1,647,808.01

ELEVATION: 375.03
INCLINATION: -90
WELL TAG#:BHU177

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS / GRAPHIC
20	18.0 - 38.0 Very dense, brown, (SM), damp, fine to coarse SAND, some silt, trace to some gravel, [ADVANCE OUTWASH, Qva]. Pockets of gravelly, silty, sand.	SM			S-7	SS	14-27-49	>50	1.0 / 1.5	>>◆	
25					S-8	SS	19-30-44	>50	1.2 / 1.5	>>◆	
30	Lens of white gravelly sand.				S-9	SS	25-33-39	>50	1.2 / 1.5	>>◆	
35	Pockets of brown, clay-like material.				S-10	SS	26-36-42	>50	1.3 / 1.5	● >>◆	S-10@35ft %G-14.7 %S-58.3 %F-27.0
				337.0 / 38.0							
	38.0 - 43.0 Very dense, brown, (SP), damp, fine to coarse SAND, some gravel, pocket of gray, gravelly, sand, [ADVANCE OUTWASH, Qva].	SP									Backfilled with 10x20 silica sand from 38 to 50.8 ft bgs. 2-inch diameter 0.010 slotted PVC from 39.1
40	Log continued on next page										

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Dave Puckett

LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-044

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

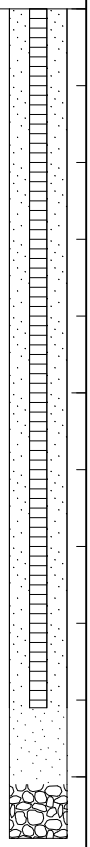
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/16/2013
DRILL RIG: B-61 Mobile Drill Truck Mounted

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,368.00 E: 1,647,808.01

ELEVATION: 375.03
INCLINATION: -90
WELL TAG#:BHU177

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS / GRAPHIC
40	38.0 - 43.0 Very dense, brown, (SP), damp, fine to coarse SAND, some gravel, pocket of gray, gravelly, sand, [ADVANCE OUTWASH, Qva].	SP		332.0	S-11	SS	25-32-50/5.5"	>50	1.2 / 1.4	>>◆	to 49.1 ft bgs.
	43.0 - 48.0 Very dense, brown, (SM), damp, fine SAND, some silt, pocket of dry brown sand, [ADVANCE OUTWASH, Qva].	SM		43.0							
45					S-12	SS	19-26-43	>50	1.2 / 1.5	>>◆	S-12@45ft %G-0.2 %S-84.3 %F-15.5 Slight drilling chatter.
	48.0 - 50.8 Very dense, brown, (SP), moist, SAND, some gravel, [ADVANCE OUTWASH, Qva].	SP		327.0 48.0							
50				324.2	S-13	SS	40-50/4"	>50	0.8 / 0.8	>>◆	Slough
	Boring completed at 50.8 ft.			50.8							
55											
60											



1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Dave Puckett

LOGGED: Chris McMillen
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-045

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/14/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,481.13 E: 1,647,788.43

ELEVATION: 352.20
INCLINATION: -90

BORING METHOD: 4.9-inch Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
0	0.0 - 0.3 Asphalt Pavement.		0.3						
	0.3 - 4.5 Dense, brown, (SM), damp, fine to coarse SAND, some silt, some gravel, [RECESSIONAL OUTWASH, Qvro].	SM		S-1	SS	11-16-14	30	1.2 / 1.5	S-1@2.5ft %G-16.0 %S-67.6 %F-16.4
			347.7 4.5						
5	4.5 - 9.5 Compact to dense, light brown, (SM), damp to moist, silty, fine to coarse SAND, some gravel, 1/4-inch thick layer of medium sand, [RECESSIONAL OUTWASH, Qvro].	SM		S-2	SS	11-12-7	19	0.8 / 1.5	
				S-3	SS	10-15-24	39	1.0 / 1.5	
			342.7 9.5						
10	9.5 - 23.0 Very dense, light brown, (SM), damp to moist, silty, fine to coarse SAND, some gravel, [ADVANCE OUTWASH, Qva].	SM		S-4	SS	15-26-34	>50	0.8 / 1.5	>>
				S-5	SS	15-28-32	>50	1.0 / 1.5	>> S-5@12.5ft %G-3.8 %S-81.0 %F-15.2
15				S-6	SS	34-34-36	>50	0.9 / 1.5	>>
20				S-7	SS	18-30-28	>50	1.0 / 1.5	>>
	23.0 - 40.5 Very dense, brown, (SP-SM), moist to wet, fine to coarse SAND and GRAVEL, little silt, [ADVANCE OUTWASH, Qva].	SP-SM	329.2 23.0						
25	Log continued on next page								

PENETRATION RESISTANCE BLOWS / ft ◆ (10, 20, 30, 40)
PL MC LL (20, 40, 60, 80)

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00890,
BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-045

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/14/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,481.13 E: 1,647,788.43

ELEVATION: 352.20
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL; 20 40 60 80)	NOTES WATER LEVELS
25	4.9-inch Bit, Mud Rotary	23.0 - 40.5 Very dense, brown, (SP-SM), moist to wet, fine to coarse SAND and GRAVEL, little silt, [ADVANCE OUTWASH, Qva].	SP-SM			S-8	SS	42-44-25	>50	0.0 / 1.5	>>	
30						S-9	SS	50/5"	>50	0.4 / 0.4	>>	Slight Drilling Chatter
35						S-10	SS	31-50/6"	>50	0.8 / 1.0	>>	S-10@35ft %G-31.7 %S-59.8 %F-8.5 Slight Drilling Chatter
40					311.7 / 40.5	S-11	SS	50/6"	>50	0.5 / 0.5	>>	
		Boring completed at 40.5 ft. Backfilled with 3/8-inch bentonite chips.										
45												
50												

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00890,
BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-046

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Mud Rotary
DRILLING DATE: 4/04/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,663.75 E: 1,647,894.76

ELEVATION: 369.06
INCLINATION: -90

BORING METHOD: 4.9-inch Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	0.0 - 4.0 Very loose, brown, (SP-SM), damp, fine SAND some gravel, little silt, trace asphalt at top of Sample S-1, [FILL, Hf].	SP-SM								
				S-1	SS	3-1-1	2	0.3 / 1.5	◆	
			365.1 / 4.0							
	4.0 - 12.5 Loose, dark brown, (SM), damp, silty, fine SAND, some gravel, pieces of asphalt, [FILL, Hf].									
5				S-2	SS	3-2-3	5	0.3 / 1.5	◆	
		SM		S-3	SS	3-2-2	4	0.3 / 1.5	◆	
10				S-4	SS	4-3-4	7	0.5 / 1.5	●◆	S-4@10ft %G-11.1 %S-60.2 %F-28.7
			356.6 / 12.5							
	12.5 - 18.0 Compact, brown-gray, (SP), damp, fine SAND, some gravel, pieces of asphalt and pea gravel, [RECESSIONAL OUTWASH, Qvro].									Slight drill chatter at 12.5 ft bgs.
				S-5	SS	4-4-7	11	0.7 / 1.5	◆	
15		SP		S-6	SS	8-9-14	23	1.0 / 1.5	◆	
			351.1 / 18.0							
	18.0 - 23.0 Very dense, brown, (SM), damp, SAND, some gravel, some silt, [ADVANCE OUTWASH, Qva].									
20		SM		S-7	SS	15-20-33	>50	1.3 / 1.5	● >>◆	S-7@20ft %G-8.2 %S-75.9 %F-15.9
			346.1 / 23.0							
	23.0 - 38.0 Very dense, brown, (SP/SP-SM), damp, SAND, trace to little silt, trace gravel, [ADVANCE OUTWASH, Qva].	SP /SP-SM								
25	Log continued on next page									

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Dave Puckett

LOGGED: Chris Smith
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-046

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Mud Rotary
DRILLING DATE: 4/04/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,663.75 E: 1,647,894.76

ELEVATION: 369.06
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
25	4.9-inch Bit, Mud Rotary	23.0 - 38.0 Very dense, brown, (SP/SP-SM), damp, SAND, trace to little silt, trace gravel, [ADVANCE OUTWASH, Qva].				S-8	SS	13-21-30	>50	1.2 / 1.5	>>	
30		Becomes gravelly.	SP /SP-SM			S-9	SS	8-15-31	46	1.0 / 1.5		
35						S-10	SS	19-27-37	>50	1.0 / 1.5	>>	S-10@35ft %G-3.5 %S-88.1 %F-8.4
					331.1 / 38.0							
		38.0 - 41.5 Very dense, brown, (SM), damp, gravelly SAND, some silt, [ADVANCE OUTWASH, Qva].	SM									
40						S-11	SS	25-45-44	>50	1.0 / 1.5	>>	
					327.6 / 41.5							
		Boring completed at 41.5 ft. Backfilled with 3/8-inch bentonite chips.										
45												
50												

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Dave Puckett

LOGGED: Chris Smith
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-047

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/9/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,826.36 E: 1,647,935.34

ELEVATION: 367.32
INCLINATION: -90

BORING METHOD: Core Barrel; 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
0	0.0 - 0.7 Asphalt Pavement.		366.6						
	0.7 - 2.5 Very dense, gray-brown wtih gray mottling, (SM), moist, gravelly, silty, fine to coarse SAND, [FILL, Hf].	SM	0.7 / 364.8	S-1	SS	24-30-26	>50	1.3 / 1.5	S-1@1ft %G-15.7 %S-54.4 %F-29.9
	2.5 - 4.5 Compact, orange-brown, (SP-SM), moist, gravelly, fine to coarse SAND, [FILL, Hf].	SP-SM	2.5 / 362.8	S-2	SS	9-10-10	20	1.2 / 1.5	
5	4.5 - 7.0 Compact, gray-brown, (SM), wet, gravelly, silty, fine to coarse SAND, dark brown with piece of wood and organics in shoe of sampler, [FILL, Hf].	SM	4.5 / 360.3	S-3	SS	6-7-6	13	1.1 / 1.5	
	7.0 - 9.5 Compact, orange-brown, (SM), wet, silty, fine to coarse SAND, little gravel, organics, iron oxide staining in shoe of sampler, [FILL, Hf].	SM	7.0 / 357.8	S-4	SS	4-8-11	19	0.7 / 1.5	ATD-05/09/2013 Based on wet soil conditions.
10	9.5 - 12.0 Dense, gray-brown, (SM), wet, fine to coarse SAND and SILT, little gravel, some bands of iron oxide staining, [RECESSIONAL LACUSTRINE DEPOSITS, Qvrl].	SM	9.5 / 355.3	S-5	SS	15-21-22	43	1.2 / 1.5	S-5@10ft %G-8.9 %S-46.4 %F-44.7
	12.0 - 18.0 Dense to very dense, gray-brown, (SM), moist, fine to coarse SAND and SILT, little gravel, diamict structure, very friable, few decomposing rock fragments, [TILL, Qvt].	SM	12.0 / 349.3	S-6	SS	13-19-20	39	1.1 / 1.5	
15				S-7	SS	19-29-35	>50	1.3 / 1.5	S-7@15ft %G-7.6 %S-46.1 %F-46.3
	18.0 - 23.0 Dense, orange-brown, (SP), moist, fine to coarse SAND, trace silt, trace fine gravel, [ADVANCE OUTWASH, Qva].	SP	18.0 / 344.3						
20				S-8	SS	16-19-23	42	1.1 / 1.5	
	23.0 - 28.0 Very dense, orange-brown, (SP-SM), moist, fine to coarse SAND, little silt, little fine gravel, [ADVANCE OUTWASH, Qva].	SP-SM	23.0						
25									

PENETRATION RESISTANCE BLOWS / ft ◆: 10, 20, 30, 40

PL — MC — LL: 20, 40, 60, 80

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Mike Woiczko (Yonemitsu Geological Services)
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00892, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-047

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/9/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,826.36 E: 1,647,935.34

ELEVATION: 367.32
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES / WATER LEVELS
25	23.0 - 28.0 Very dense, orange-brown, (SP-SM), moist, fine to coarse SAND, little silt, little fine gravel, [ADVANCE OUTWASH, Qva].	SP-SM	339.3	S-9	SS	32-35-39	>50	1.2 / 1.5	S-9@25ft %G-6.9 %S-81.8 %F-11.3
	28.0 - 33.0 Very dense, gray-brown, (SP), wet, fine to coarse SAND, little gravel, trace silt, [ADVANCE OUTWASH, Qva].	SP	28.0						
30				S-10	SS	50/6"	>50	0.5 / 0.5	ATD-05/09/2013 Based on wet soil conditions.
	33.0 - 38.0 Very dense, gray-brown, (SP-SM), wet, fine to coarse SAND, little silt, [ADVANCE OUTWASH, Qva].	SP-SM	334.3 / 33.0						
35				S-11	SS	33-50/6"	>50	1.0 / 1.0	S-11@35ft %G-0.0 %S-92.1 %F-7.9
	38.0 - 40.5 Very dense, gray-brown, (SP), wet, gravelly, fine to coarse SAND, [ADVANCE OUTWASH, Qva].	SP	329.3 / 38.0						
40				S-12	SS	50/6"	>50	0.5 / 0.5	
	Boring completed at 40.5 ft. Backfilled with 3/8-inch bentonite chips, surfaced with coldpatch asphalt.		326.8 / 40.5						
45									
50									

PENETRATION RESISTANCE BLOWS / ft ◆: 10 20 30 40; PL MC LL: 20 40 60 80

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Mike Wolczko (Yonemitsu Geological Services)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00892, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-048

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/15/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,962.62 E: 1,647,909.41

ELEVATION: 355.45
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	0.0 - 0.3 Asphalt Pavement.		0.3							
	0.3 - 4.5 Dense, gray, (SM), damp, silty, fine to coarse SAND, some gravel, [FILL, Hf].	SM		S-1	SS	14-25-18	43	1.0 / 1.5	◆	
			351.0 / 4.5							
5	4.5 - 12.0 Very dense, gray, (SM), damp, fine to coarse SAND and SILT, some gravel, [TILL, Qvt].			S-2	SS	17-24-28	>50	1.0 / 1.5	>>◆	
		SM		S-3	SS	23-34-47	>50	1.2 / 1.5	● >>◆	S-3@7.5ft %G-7.7 %S-44.6 %F-47.7
10				S-4	SS	24-50/5"	>50	0.8 / 0.9	>>◆	
			343.5 / 12.0							
	12.0 - 14.5 Dense, brown, (SP-SM), damp to moist, fine SAND, some silt, some gravel, [ADVANCE OUTWASH, Qva].	SP-SM		S-5	SS	15-20-29	49	1.0 / 1.5	◆	
			341.0 / 14.5							
15	14.5 - 38.0 Very dense, brown to light brown, (SM), moist to wet, fine to coarse SAND, some silt, trace to some gravel, [ADVANCE OUTWASH, Qva].			S-6	SS	22-31-33	>50	0.9 / 1.5	● >>◆	S-6@15ft %G-1.3 %S-80.8 %F-17.9
20		SM		S-7	SS	19-34-35	>50	1.2 / 1.5	>>◆	
25										

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-048

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/15/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 564,962.62 E: 1,647,909.41

ELEVATION: 355.45
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (PL MC LL)	NOTES WATER LEVELS
25	14.5 - 38.0 Very dense, brown to light brown, (SM), moist to wet, fine to coarse SAND, some silt, trace to some gravel, [ADVANCE OUTWASH, Qva].	SM			S-8	SS	19-32-50/6"	>50	1.1 / 1.5	>>	Slight Drilling Chatter
30					S-9	SS	43-50/5"	>50	0.7 / 0.9	>>	Slight Drilling Chatter
35					S-10	SS	50/6"	>50	0.5 / 0.5	>>	Moderate Drilling Chatter
				317.5							
	38.0 - 40.8 Very dense, brown, (SP-SM), wet, fine to coarse SAND, some gravel, some silt, [ADVANCE OUTWASH, Qva].	SP-SM		38.0							
40					S-11	SS	37-50/4"	>50	0.8 / 0.8	>>	S-11@40ft %G-28.6 %S-61.6 %F-9.8
				314.7							
	Boring completed at 40.8 ft. Backfilled with 3/8-inch bentonite chips.			40.8							
45											
50											

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00987, BLDG-2018-00989, BLDG-2018-00990,
BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-049

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/9/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 565,129.46 E: 1,648,008.14

ELEVATION: 355.53
INCLINATION: -90
WELL TAG#:BHU631

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS / GRAPHIC
0	0.0 - 0.3 Asphalt Pavement.		355.2 / 0.3							8-inch diameter flush mount steel monument, cemented in place to 1 ft bgs.
	0.3 - 2.0 Compact, mottled orange, brown, and gray (SM), moist, gravelly, silty, fine to medium SAND, some organics and a piece of wood, [FILL, Hf].	SM	353.5 / 2.0	S-1	SS	9-8-8	16	1.0 / 1.5		
	2.0 - 4.5 Stiff, gray-brown (ML), moist, low plasticity, clayey SILT and SAND, little gravel, heavy iron oxide staining, [LACUSTRINE DEPOSITS, Hl].	ML	351.0 / 4.5	S-2	SS	4-5-4	9	0.8 / 1.5		2-inch diameter PVC riser from 0.3 to 29 ft bgs. Backfilled with 3/8 inch HolePlug Bentonite Chips from 1 foot to 27 ft bgs.
5	4.5 - 7.0 Dense, brownish gray (SM), moist, silty, fine to coarse SAND, little gravel, diamict structure, very friable, [ABLATION TILL, Qvat].	SM	348.5 / 7.0	S-3	SS	9-15-16	31	0.5 / 1.5		S-2@2.5ft %G-5.7 %S-36.7 %F-57.6
	7.0 - 9.5 Dense, brownish gray (SM), moist, gravelly, fine to coarse SAND and SILT, diamict structure, very friable, [ABLATION TILL, Qvat].	SM	346.0 / 9.5	S-4	SS	16-20-24	44	0.8 / 1.5		S-4@7.5ft %G-25.8 %S-39.2 %F-35.0
10	9.5 - 14.5 Dense, brownish gray (SM), moist to wet, silty fine to medium SAND, little gravel, diamict structure, very friable, [ABLATION TILL, Qvat].	SM	341.0 / 14.5	S-5	SS	16-19-27	46	0.9 / 1.5		
				S-6	SS	13-20-28	48	0.8 / 1.5		
15	14.5 - 18.0 Dense, gray-brown (SM), wet, silty, fine to medium SAND, some gravel, 1-inch seam of silty fine sand, [ABLATION TILL, Qvat].	SM	337.5 / 18.0	S-7	SS	17-20-25	45	0.9 / 1.5		S-7@15ft %G-18.0 %S-56.0 %F-26.0
	18.0 - 40.5 Very dense, gray-brown (SP/SP-SM), wet, fine to coarse SAND, trace to little silt, trace to some gravel, [ADVANCE OUTWASH, Qva].	SP /SP-SM								
20				S-8	SS	19-50/6"	>50	0.8 / 1.0	>>◆	
25										

Log continued on next page

ATD-05/09/2013 Inferred based on samples.

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Mike Wolczko (Yonemitsu Geological Services)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00892, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-049

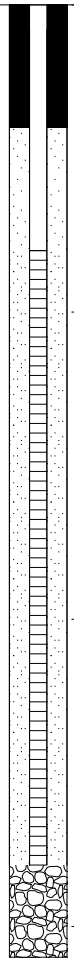
PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/9/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 565,129.46 E: 1,648,008.14

ELEVATION: 355.53
INCLINATION: -90
WELL TAG#:BHU631

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS / GRAPHIC
25	4.9-inch Diameter Bit, Mud Rotary	18.0 - 40.5 Very dense, gray-brown (SP/SP-SM), wet, fine to coarse SAND, trace to little silt, trace to some gravel, [ADVANCE OUTWASH, Qva].	SP /SP-SM			S-9	SS	27-50/6"	>50	0.8 / 1.0	>>	Backfilled with 10x20 Silica Sand from 27 to 39 ft bgs.
30		Becomes gravelly.				S-10	SS	19-25-27	>50	0.8 / 1.5	>>	2 inch diameter, 0.010 inch machine slotted PVC installed between 29 and 39 ft bgs, capped at 39 ft bgs. S-10@30ft %G-3.9 %S-86.3 %F-9.8
35						S-11	SS	50/6"	>50	0.3 / 0.5	>>	
40					315.0	S-12	SS	50/6"	>50	0.4 / 0.5	>>	Slough from 39 to 40.5 ft bgs.
		Boring completed at 40.5 ft.			40.5							
45												
50												



1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Mike Woiczko (Yonemitsu Geological Services)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00892, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-050

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Overlake Transit Center

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/4/2013
DRILL RIG: B-60 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 565,534.67 E: 1,648,212.15

ELEVATION: 351.66
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40) / PL MC LL (20 40 60 80)	NOTES WATER LEVELS
0	0.0 - 12.0 Compact to dense, brown to gray, (SM), damp, fine to coarse SAND and SILT, some gravel, trace lenses of clay, [RECESSIONAL OUTWASH, Qvro].	SM								
				S-1	SS	20-18-16	34	0.8 / 1.5	◆	
5				S-2	SS	2-18-20	38	0.8 / 1.5	● ◆	S-2@5ft %G-8.9 %S-42.7 %F-48.4
				S-3	SS	4-4-10	14	0.9 / 1.5	◆	
10				S-4	SS	7-11-14	25	1.0 / 1.5	● ◆	S-4@10ft %G-7.6 %S-45.6 %F-46.8
	12.0 - 18.0 Compact to very dense, gray to brown, (SM), damp, silty, SAND to SILT and SAND, trace to some socketed coarse sand and fine gravel, [TILL, Qvt].	SM	339.7 / 12.0	S-5	SS	18-32-45	>50	1.2 / 1.5	>>◆	
15				S-6	SS	22-35-14	49	1.1 / 1.5	◆	
	18.0 - 20.8 Very dense, brown, (SP-SM), fine to coarse SAND, little silt, some gravel, [ADVANCE OUTWASH, Qva].	SP-SM	333.7 / 18.0							
20				S-7	SS	27-50/4"	>50	0.8 / 0.8	● >>◆	S-7@20ft %G-38.0 %S-53.1 %F-8.9
	Boring completed at 20.8 ft. Backfilled with 3/8-inch bentonite chips.		330.9 / 20.8							
25										

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Abe Causland

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-055

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Overlake Transit Center

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/4/2013
DRILL RIG: B-60 Mobile Drill Truck

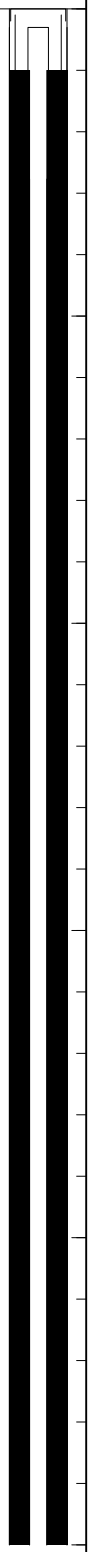
DATUM: Sound Transit East Coordinate System
COORDINATES: N: 565,901.55 E: 1,648,047.49

ELEVATION: 354.68
INCLINATION: -90
WELL TAG#:BHU628

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS GRAPHIC
0	0.0 - 7.0 Compact, brown, (SM), damp to moist, fine to coarse SAND and SILT, trace to little gravel, some clay, some pockets of clayey sand, [FILL, Hf].	SM							8-inch diameter flush mount steel monument, cemented to 1 ft bgs.
				S-1	SS	8-7-5	12	0.8 / 1.5	2-inch diameter PVC riser from 0.3 to 34 ft bgs. Backfilled with 3/8-inch bentonite chips from to 32 ft bgs.
5				S-2	SS	4-5-10	15	0.9 / 1.5	S-1@2.5ft %G-4.5 %S-48.7 %F-46.8
	7.0 - 12.0 Compact to dense, gray, (SM), damp, fine to coarse SAND and SILT, some gravel, trace clay, laminations of cleaner, coarser gray sand, [FILL, Hf].	SM	347.7 / 7.0	S-3	SS	10-12-13	25	0.7 / 1.5	
10				S-4	SS	10-10-20	30	0.8 / 1.5	S-4@10ft %G-16.0 %S-40.0 %F-44.0
	12.0 - 22.5 Very dense, gray, (SM), damp, silty, fine to coarse SAND, some gravel, [TILL, Qvt].	SM	342.7 / 12.0	S-5	SS	34-50/3"	>50	0.6 / 0.8	>> Fractured rocks in sampler Sample S-5 at 12.5 ft bgs.
15	Pockets of cleaner slightly coarser fine sand.			S-6	SS	34-50/3"	>50	0.8 / 0.8	>>
	Boulder encountered at 17 ft bgs.								
20	Lenses of silty clay.			S-7	SS	50/6"	>50	0.3 / 0.5	>> Slight drill chatter at 20 ft bgs.
	22.5 - 27.5 Very dense, gray, (ML), damp, sandy SILT, some gravel, trace clay, [TILL, Qvt].	ML	332.2 / 22.5						
25	Log continued on next page								

PENETRATION RESISTANCE BLOWS / ft ◆ (10, 20, 30, 40); PL MC LL (20, 40, 60, 80)



1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Abe Causland

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-055

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Overlake Transit Center

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/4/2013
DRILL RIG: B-60 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 565,901.55 E: 1,648,047.49

ELEVATION: 354.68
INCLINATION: -90
WELL TAG#:BHU628

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft	NOTES WATER LEVELS GRAPHIC
25	22.5 - 27.5 Very dense, gray, (ML), damp, sandy SILT, some gravel, trace clay, [TILL, Qvt].	ML		S-8	SS	41-50/3"	>50	0.7 / 0.8	>>	S-8@25ft %G-3.0 %S-29.3 %F-67.7
	27.5 - 30.5 Very dense, gray, (SM), damp, silty fine SAND, some gravel, [TILL, Qvt].	SM	327.2 / 27.5							
30				S-9	SS	50/4"	>50	0.3 / 0.3	>>	
	30.5 - 37.5 Very dense, gray, (SP-SM), damp, silty, fine to coarse SAND, some gravel, layer of light brown fine sand with some silt and damp to moist layer to red-brown medium sand with some silt, [TILL, Qvt].	SP-SM	324.2 / 30.5							Smooth drilling at 31 ft bgs. Backfilled with 10x20 Silica Sand from 32 to 45 ft bgs. 2-inch diameter slotted PVC from 34 to 44 ft bgs.
35				S-10	SS	31-50/4"	>50	0.8 / 0.8	>>	Some drill chatter at 35 ft bgs.
	37.5 - 46.0 Very dense, gray, (SM), moist to wet, gravelly, fine to coarse SAND, some silt, [ADVANCE OUTWASH, Qva].	SM	317.2 / 37.5							
40				S-11	SS	50/5.5"	>50	0.5 / 0.5	>>	
45				S-12	SS	37-50/5.5"	>50	0.8 / 1.0	>>	S-12@45ft %G-25.0 %S-62.4 %F-12.6 Moderate chatter at 45 ft bgs.
	Boring completed at 46.0 ft.		308.7 / 46.0							
50										

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Abe Causland

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-056

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Overlake Transit Center

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/5/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 565,981.41 E: 1,648,068.35

ELEVATION: 353.98
INCLINATION: -90

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (PL MC LL)	NOTES WATER LEVELS
0	0.0 - 0.3 Asphalt Pavement.		353.7 / 0.3							
	0.3 - 4.5 Loose, mottled gray-brown and gray, (SM), moist, SAND and SILT, little gravel, significant iron oxide staining, [FILL, Hf].	SM								
	SPT sample driving on rock (cobble) during last 6 inches.			S-1	SS	4-1-15	16	1.0 / 1.5	● ◆	S-1@2.5ft %G-23.4 %S-34.0 %F-42.6
	Cobble encountered at 4 ft bgs.		349.5 / 4.5							Drilling on granite cobble 4 ft bgs.
5	4.5 - 12.0 Dense to very dense, gray-brown, (ML), moist, sandy SILT, little gravel, diamict structure, friable, [ABLATION TILL, Qvat].			S-2	SS	50/6"	>50	0.0 / 0.5	>>◆	
	Flake of broken granite in tip of split-spoon sampler no recovery for 6-inches.									
		ML		S-3	SS	7-14-19	33	1.0 / 1.5	● ◆	S-3@7.5ft %G-9.0 %S-34.1 %F-56.9
10				S-4	SS	17-23-18	41	0.4 / 1.5	◆	
	12.0 - 22.5 Very dense, gray-brown, (ML), moist, sandy SILT, little gravel, diamict structure, friable, [TILL, Qvt].		342.0 / 12.0							
				S-5	SS	11-26-50	>50	1.1 / 1.5	>>◆	
15				S-6	SS	50/6"	>50	0.4 / 0.5	>>◆	
		ML								Harder drilling 18 ft bgs.
20				S-7	SS	50/5"	>50	0.4 / 0.4	● >>◆	S-7@20ft %G-3.8 %S-40.1 %F-56.1
	22.5 - 37.5 Very dense, gray-brown, (SM), moist, silty, fine to coarse SAND, little to some gravel, diamict structure, [TILL, Qvt].	SM	331.5 / 22.5							
25										

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Mike Woiczko (Yonemitsu Geological Services)
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00892, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-056

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Overlake Transit Center

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/5/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 565,981.41 E: 1,648,068.35

ELEVATION: 353.98
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
25	4.9-inch Diameter Bit, Mud Rotary	22.5 - 37.5 Very dense, gray-brown, (SM), moist, silty, fine to coarse SAND, little to some gravel, diamict structure, [TILL, Qvt].	SM			S-8	SS	50/4"	>50	0.3 / 0.3	>>◆	Boney drilling 26 ft bgs. Boney drilling 28 ft bgs.
30						S-9	SS	50/4"	>50	0.3 / 0.3	>>◆	
35						S-10	SS	50/4"	>50	0.3 / 0.3	>>◆	
					316.5							
		37.5 - 40.8 Very dense, gray-brown, (SP), wet, fine to coarse SAND, little gravel, trace silt, [ADVANCE OUTWASH, Qva].	SP		37.5							
40						S-11	SS	26-50/4"	>50	0.6 / 0.8	● >>◆	S-11@40ft %G-1.7 %S-86.5 %F-11.8
		Boring completed at 40.8 ft. Backfilled with 3/8-inch bentonite chips.			313.2 40.8							
45												
50												

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Mike Wolczko (Yonemitsu Geological Services)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00892, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-057

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 15590 NE 36th St. Redmond

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/4/2013
DRILL RIG: B-60 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 566,134.88 E: 1,648,059.17

ELEVATION: 353.38
INCLINATION: -90
WELL TAG#:BHU627

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft (PL MC LL)	NOTES WATER LEVELS / GRAPHIC
0	0.0 - 4.0 Compact, brown, (SM), wet, silty, sandy GRAVEL, some clay, [FILL, Hf].	SM								8-inch diameter flush mounted steel monument, cemented to 1 ft bgs. 2-inch diameter PVC riser from 0.3 to 39 ft bgs. Backfilled with 3/4-inch bentonite chips from 1 to 37 ft bgs.
				S-1	SS	10-14-9	23	0.2 / 1.5		
			349.4 / 4.0							
5	4.0 - 7.0 Dense, light brown, (SM), damp to moist, silty fine to coarse SAND, some gravel, some to abundant clay, lenses of gray, silty, clayey sand, lenses of brown-red silty, clayey, sand, [FILL, Hf].	SM								
				S-2	SS	4-10-28	38	1.5 / 1.5		
			346.4 / 7.0							
	7.0 - 9.5 Compact, gray, (SM), damp, fine to coarse SAND and SILT, little to gravel, some clay, lenses and pockets of brown-red, silty sand, [FILL, Hf].	SM								S-3@7.5ft %G-5.3 %S-44.9 %F-49.8
				S-3	SS	15-15-15	30	0.9 / 1.5		
			343.9 / 9.5							
10	9.5 - 14.5 Compact to dense, gray, (SM), damp, silty SAND, some gravel, trace clay, pockets of brown-red sand, [ABLATION TILL, Qvat].	SM								
				S-4	SS	13-11-10	21	0.8 / 1.5		
	Pockets of gray medium sand.			S-5	SS	15-16-24	40	0.1 / 1.5		Slight drilling chatter at 13 to 15 ft bgs.
			338.9 / 14.5							
15	14.5 - 17.5 Dense, gray, (SM), damp, fine to coarse SAND and SILT, some gravel, [ABLATION TILL, Qvat].	SM								S-6@15ft %G-14.6 %S-44.4 %F-41.0
				S-6	SS	14-21-26	47	0.8 / 1.5		
			335.9 / 17.5							
20	17.5 - 40.0 Dense, gray, (SM), damp, silty, fine to coarse SAND, some gravel, trace to some clay, [TILL, Qvt].	SM								

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Abe Causland

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00982, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-057

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 15590 NE 36th St. Redmond

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/4/2013
DRILL RIG: B-60 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 566,134.88 E: 1,648,059.17

ELEVATION: 353.38
INCLINATION: -90
WELL TAG#:BHU627

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS / GRAPHIC
20	17.5 - 40.0 Dense, gray, (SM), damp, silty, fine to coarse SAND, some gravel, trace to some clay, [TILL, Qvt].				S-7	SS	31-50/4.5"	>50	0.1 / 0.9	>>◆	Hammer bouncing at 20 ft bgs Slight drilling chatter at 21 to 26 ft bgs.
25	Ribbons of light brown-red silty sand.				S-8	SS	50/5.5"	>50	0.5 / 0.5	>>◆	Moderate drilling chatter at 29 ft bgs.
30	Ribbons of dark brown silty sand.	SM			S-9	SS	50/5.5"	>50	0.5 / 0.5	>>◆	
35					S-10	SS	50/4"	>50	0.3 / 0.3	>>◆	Backfilled with Colorado silica 10 x 20 sand filter from 37 to 50 ft bgs. 2 inch diameter size 0.010 inch slotted PVC
40	Log continued on next page			313.4							

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Abe Causland

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00982, BLDG-2018-00983, BLDG-2018-00984, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-057

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 15590 NE 36th St. Redmond

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/4/2013
DRILL RIG: B-60 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 566,134.88 E: 1,648,059.17

ELEVATION: 353.38
INCLINATION: -90
WELL TAG#:BHU627

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS / GRAPHIC
40	4.9-inch Diameter Bit, Mud Rotary	40.0 - 50.3 Dense, gray, (SM), damp, fine to coarse SAND and SILT, some gravel, [ADVANCE OUTWASH, Qva].			40.0	S-11	SS	50/5.5"	>50	0.6 / 0.6	●	screen from 39 to 49 ft bgs. S-11@40ft %G-0.8 %S-58.6 %F-40.6
45		Pockets of silty brown sand with some clay.	SM			S-12	SS	50/4.5"	>50	0.4 / 0.4		
50		Boring completed at 50.3 ft.			303.1 50.3	S-13	SS	50/3"	>50	0.3 / 0.3		
55												
60												

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Abe Causland

LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00890,
BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-058

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Overlake Transit Center

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/04/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 566,288.74 E: 1,648,043.22

ELEVATION: 352.50
INCLINATION: -90
WELL TAG#:BHU629

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS / GRAPHIC
0	0.0 - 2.5 Compact, gray to brown, (ML/SM), moist, sandy SILT and gravell, silty SAND, trace organics, piece of wood in tip of split spoon, filter fabric on top of sample, [FILL, Hf].	SM /ML	350.0	S-1	SS	13-12-10	22	0.8 / 1.5		8-inch diameter flush mount monument, cemented to 1 ft bgs. 2-inch diameter PVC riser from 0.3 to 35 ft bgs. Backfilled with 3/4-inch bentonite chips from 1 to 35 ft bgs.
	2.5 - 5.0 No recovery.		347.5	S-2	SS	19-6-5	11	0.0 / 1.5		
5	5.0 - 7.0 Compact, mottled gray and brown, (ML), moist, SILT and SAND, trace gravel, trace roots, locally trace clay, irregular pattern of iron oxide staining, [FILL, Hf].	ML	345.5	S-3	SS	12-8-10	18	0.8 / 1.5		S-3@5ft %G-3.3 %S-37.9 %F-58.8
	7.0 - 9.5 Very dense, gray-brown, (GM/SM), wet, silty, sandy GRAVEL and gravelly SAND, small sandy section has diamict texture, [ABLATION TILL, Qvat]. Weathered zone form 7.5 to 11.5 ft bgs.	GM /SM	343.0	S-4	SS	28-28-23	>50	0.5 / 1.5	>>	
10	9.5 - 12.0 Compact, gray-brown, (SM), very moist, SAND and SILT, some gravel diamict texture, very friable, [ABLATION TILL, Qvat].	SM	340.5	S-5	SS	14-12-13	25	1.1 / 1.5		S-5@10ft %G-16.4 %S-42.4 %F-41.2
	12.0 - 14.5 Dense, gray-brown, (ML), moist, sandy SILT, little gravel, diamict structure, wet seam from 13.5 to 14 ft bgs, [ABLATION TILL, Qvat].	ML	338.0	S-6	SS	14-18-21	39	1.2 / 1.5		
15	14.5 - 20.0 Very dense, gray-brown, (ML), moist, gravelly, sandy SILT, diamict structure, friable, [TILL, Qvt].	ML	332.5	S-7	SS	25-50/3"	>50	0.8 / 0.8	>>	Gravelly drilling 16.5 to 41 ft bgs.
20										

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Mike Wolczko
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-058

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Overlake Transit Center

DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/04/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 566,288.74 E: 1,648,043.22

ELEVATION: 352.50
INCLINATION: -90
WELL TAG#:BHU629

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS / GRAPHIC
20	4.9-inch Diameter Bit, Mud Rotary	20.0 - 23.0 Very dense, gray-brown, (ML), moist, SILT and SAND, little gravel, diamict structure, friable, [TILL, Qvt].	ML		20.0	S-8	SS	50/6"	>50	0.2 / 0.5		>>◆ S-8@20ft %G-6.4 %S-41.6 %F-52.0
					329.5							
		23.0 - 40.0 Very dense, gray-brown, (SM), moist, silty, fine to coarse SAND, little gravel, diamict texture, [TILL, Qvt].	SM		23.0							
25						S-9	SS	50/4"	>50	0.3 / 0.3		>>◆
30						S-10	SS	50/4"	>50	0.3 / 0.3		>>◆
35						S-11	SS	50/3"	>50	0.3 / 0.3		>>◆ Backfilled with Colorado silica 10 x 20 sand filter from 35 to 47.5 ft bgs. 2-inch diameter size 0.010 inch slotted PVC screen from 37.5 to 47.5 ft bgs.
40					312.5							

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Mike Woiczko
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE E360-B-058

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Overlake Transit Center

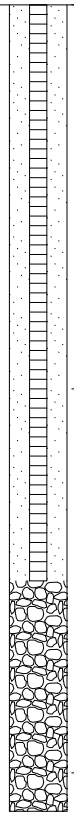
DRILLING METHOD: Mud Rotary
DRILLING DATE: 5/04/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: N: 566,288.74 E: 1,648,043.22

ELEVATION: 352.50
INCLINATION: -90
WELL TAG#:BHU629

BORING METHOD: 4.9-inch Diameter Bit, Mud Rotary

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (PL–MC–LL)	NOTES WATER LEVELS / GRAPHIC
40	40.0 - 43.0 Very dense, gray-brown, (SP), wet, fine to coarse SAND, trace silt, trace gravel, [ADVANCE OUTWASH, Qva].	SP	40.0	S-12	SS	43-50/3"	>50	0.5 / 0.8	>>◆	Zones of gravelly drilling 41 to 45 ft bgs.
			309.5							
	43.0 - 50.0 Very dense, gray-brown, (SP-SM), wet, gravelly, fine to coarse SAND, little silt, [ADVANCE OUTWASH, Qva].	SP-SM	43.0							
45				S-13	SS	35-50/2"	>50	0.5 / 0.7	>>◆	S-13@45ft %G-39.5 %S-50.4 %F-10.1
										Slough backfill
			302.5							
50	50.0 - 50.5 Very dense, gray-brown, (GP), wet, sandy GRAVEL, [ADVANCE OUTWASH, Qva].	GP	50.0 302.0	S-14	SS	50/6"	>50	0.3 / 0.5	>>◆	
	Boring completed at 50.5 ft.		50.5							
55										
60										



1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Larry Inselman

LOGGED: Mike Woiczko
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE E360-B-059

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 15590 NE 36th St. Redmond
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 5/4/2013
DRILL RIG: B-60 Mobile Drill Truck
DATUM: Sound Transit East Coordinate System
COORDINATES: N: 566,238.52 E: 164,201.17
ELEVATION: 347.54
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	0.0 - 4.5 Stiff, light brown, (SM), damp, SILT and SAND, little gravel, [FILL, Hf].	SM								
				1	SS	7-4-5	9	0.8 / 1.5	●	1@2.5ft %G-8.4 %S-43.3 %F-48.3
			343.0 / 4.5							▼
5	4.5 - 12.0 Compact, gray (SM), moist, fine to coarse SAND and SILT, some gravel, [TILL, Qvt].									
				2	SS	4-7-10	17	0.8 / 1.5	◆	
	Becomes dense.	SM		3	SS	9-16-18	34	0.3 / 1.5	◆	
10	Lens of brown medium sand.			4	SS	8-11-11	22	0.8 / 1.5	● ◆	4@10ft %G-14.9 %S-41.5 %F-43.6
			335.5 / 12.0							Increasing water in samples
	12.0 - 20.5 Very dense, gray, (SM), damp to moist, fine to coarse SAND and SILT, some gravel, [TILL, Qvt].									
				5	SS	14-23-28	>50	0.8 / 1.5	>>◆	
										Smooth Drilling at 14 ft bgs.
15				6	SS	50/5"	>50	0.0 / 0.4	>>◆	No recovery Sample S-6 at 15 ft bgs.
		SM								Gravel content decreasing based on drill action.
	Becomes dense, lenses of brown sand.									
20			327.0 / 20.5	7	SS	50/5.5"	>50	0.0 / 0.5	● >>◆	7@20ft %G-6.3 %S-46.4 %F-47.3
	Boring completed at 20.5 ft. Backfilled with 3/8-inch bentonite chips.									
25										

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Abe Causland
LOGGED: Chris Smith (Pacific Geo Engineering LLC)
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00987, BLDG-2018-00989, BLDG-2018-00988, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE OTC-B-001

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 1/4/2014
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	Air Knife Excavation	0.0 - 0.8 Asphalt Pavement.										
		0.8 - 7.0 Compact to dense, gray-brown, (SM), damp to moist, silty, fine to medium SAND, little to some gravel, trace iron oxide staining [FILL, Hf]. Cobble encountered at 4 ft bgs.	SM		0.8							
5	4.25-inch Inner Diameter Hollow Stem Auger					S-1	SS	2-8-17	25	0.7 / 1.5	◆	
		7.0 - 9.5 Dense, gray-brown, (SM/ML), moist, fine to coarse SAND and SILT, some fine to coarse gravel, gravel sockets in sand and silt matrix, decomposing gravel clasts, iron oxide staining, [FILL, Hf].	SM /ML		7.0	S-2	SS	9-16-16	32	1.4 / 1.5	◆	Hard, gravelly drilling at 7 ft bgs.
10		9.5 - 25.9 Very dense, gray-brown, (SM), damp, silty, fine to coarse SAND, little to some gravel, gravel sockets in sand and silt matrix, decomposing gravel clasts, trace iron oxide staining, [TILL, Qvt].	SM		9.5	S-3	SS	19-15-43	>50	1.5 / 1.5	>>◆	
						S-4	SS	28-50/3"	>50	0.8 / 0.8	>>◆	
15						S-5	SS	47-50/4"	>50	0.8 / 0.8	>>◆	
20												

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Dave Puckett

LOGGED: Jessica Herrera
CHECKED: David P. Findley
DATE: 1/8/2014

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE OTC-B-001

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 1/4/2014
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
20	4.25-inch Inner Diameter Hollow Stem Auger	9.5 - 25.9 Very dense, gray-brown, (SM), damp, silty, fine to coarse SAND, little to some gravel, gravel sockets in sand and silt matrix, decomposing gravel clasts, trace iron oxide staining, [TILL, Qvt].	SM			S-6	SS	50/5"	>50	0.4 / 0.4	>>◆	
25		Faceted gravels.				S-7	SS	17-50/5"	>50	0.9 / 0.9	>>◆	
		Boring completed at 25.9 ft. Backfilled with 3/8-inch bentonite chips.			25.9							
30												
35												
40												

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Dave Puckett

LOGGED: Jessica Herrera
CHECKED: David P. Findley
DATE: 1/8/2014

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE OTC-B-002

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 1/4/2014
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
0	Air Knife Excavation	0.0 - 1.3 Asphalt Pavement.								
		1.3 - 3.0 Loose to compact, gray-brown, (SM), damp to moist, silty, fine to coarse SAND, little gravel, [FILL, Hf].	SM	1.3						
		3.0 - 9.5 Compact, gray-brown, (SM), damp, silty, fine to coarse SAND, little to some gravel, gravel sockets in sand and silt matrix, trace iron oxide staining, [FILL, Hf].	SM	3.0						Large root encountered at 3.5 ft bgs.
5	4.25-inch Inner Diameter Hollow Stem Auger				S-1	SS	4-8-12	20	1.2 / 1.5	
		Faceted gravels, diamict structure, friable.			S-2	SS	8-15-22	37	1.2 / 1.5	
10		9.5 - 14.0 Dense, gray-brown, (SM), damp, silty, fine to coarse SAND, little to some gravel, gravel sockets in sand and silt matrix, trace iron oxide staining, [TILL, Qvt].	SM	9.5	S-3	SS	13-15-33	48	1.0 / 1.5	
					S-4	SS	10-17-30	47	1.5 / 1.5	
15		14.0 - 25.5 Very dense, gray-brown, (SM), moist, silty, fine to coarse SAND, some fine to coarse gravel, faceted gravels, have sockets in sand and silt matrix, discontinuous pockets of fine to medium sand, trace silt, diamict structure, friable, [TILL, Qvt].	SM	14.0	S-5	SS	17-33-50/3"	>50	1.3 / 1.3	Blowcounts may be over-stated, Sample S-5 at 15 ft bgs, coarse gravel stuck in tip of sampler.
20										

Log continued on next page

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Dave Puckett

LOGGED: Jessica Herrera
CHECKED: David P. Findley
DATE: 1/8/2014

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE OTC-B-002

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: Microsoft Campus

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 1/4/2014
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
20	4.25-inch Inner Diameter Hollow Stem Auger	14.0 - 25.5 Very dense, gray-brown, (SM), moist, silty, fine to coarse SAND, some fine to coarse gravel, faceted gravels, have sockets in sand and silt matrix, discontinuous pockets of fine to medium sand, trace silt, diamict structure, friable, [TILL, Qvt]. Trace iron oxide stainig.	SM			S-6	SS	40-50/3"	>50	0.8 / 0.8	>>◆	Gravelly drilling at 23 ft bgs.
25						S-7	SS	50/6"	>50	0.5 / 0.5	>>◆	
		Boring completed at 25.5 ft. Backfilled with 3/8-inch bentonite chips.			25.5							
30												
35												
40												

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Dave Puckett

LOGGED: Jessica Herrera
CHECKED: David P. Findley
DATE: 1/8/2014

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE OTC-B-003

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 9/17/13
DRILL RIG: Diedrich D120

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	0.0 - 0.8 Asphalt Pavement.									
	0.8 - 7.0 Dense, gray-brown, (SM), moist, gravelly, silty, fine to coarse SAND, [FILL, Hf].	SM	0.8							
				S-1	SS	23-25-20	45	0.8 / 1.5	◆	
5				S-2	SS	14-15-24	39	0.9 / 1.5	◆	
	7.0 - 30.3 Dense, gray-brown, (SM/ML), moist, SILT and fine to coarse SAND, little to some gravel, diamict structure, friable, [TILL, Qvt]. Becomes very dense.	SM /ML	7.0							
				S-3	SS	14-34-50/4"	>50	1.2 / 1.3	● >>◆	S-3@7.5ft %G-10.5 %S-37.5 %F-52.0
10				S-4	SS	23-50/6"	>50	1.0 / 1.0	>>◆	
				S-5	SS	23-50/2"	>50	0.5 / 0.7	>>◆	
15				S-6	SS	50/6"	>50	0.2 / 0.5	>>◆	
20				S-7	SS	19-50/5"	>50	0.9 / 0.9	>>◆	
25										

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth

LOGGED: Mike Wolczko
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE OTC-B-003

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 9/17/13
DRILL RIG: Diedrich D120

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
25	7.0 - 30.3 Dense, gray-brown, (SM/ML), moist, SILT and fine to coarse SAND, little to some gravel, diamict structure, friable, [TILL, Qvt]. 2-inch seam of fine sandy silt.	SM /ML		S-8	SS	40-50/6"	>50	1.0 / 1.0	>>◆	
30	30.3 - 35.0 Very dense, gray-brown, (SM), moist, fine to coarse SAND, some silt, some gravel, [ADVANCE OUTWASH, Qva].	SM	30.3	S-9	SS	18-37-50/4"	>50	1.3 / 1.3	● >>◆	S-9@30ft %G-15.9 %S-71.4 %F-12.7
35	35.0 - 40.0 Very dense, gray-brown, (SP), moist, fine to coarse SAND, trace silt, trace gravel [ADVANCE OUTWASH, Qva].	SP	35.0	S-10	SS	22-25-50/3"	>50	1.3 / 1.3	>>◆	
40	40.0 - 40.8 Very dense, brown, (GP), moist, sandy GRAVEL, trace silt, middle section of sample S-11 is wet, [ADVANCE OUTWASH, Qva].	GP	40.0	S-11	SS	23-50/4"	>50	0.3 / 0.8	>>◆	
	Boring completed at 40.8 ft. Backfilled with 3/8-inch bentonite chips.		40.8							
45										
50										

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth

LOGGED: Mike Wolczko
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE OTC-B-005

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 152nd Ave. NE

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 8/13-8/14/2013
DRILL RIG: CME 85

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	4.25-inch Inner Diameter Hollow Stem Auger	0.0 - 0.7 Asphalt Pavement.										
		0.7 - 8.0 Medium Dense to loose, (SM), moist, silty SAND, some gravel, [FILL, Hf].	SM		0.7	S-1	SS	6-16-21	37	1.5 / 1.5	◆	Encountered CDF duct bank at approximately 2 ft bgs, hole abandoned and off set 2 ft. Air knife excavation to approximately 8 ft bgs and drilling continued. Broken, older duct bank at 4 ft bgs.
5												
		8.0 - 16.5 Loose, brown, (SM), moist, fine to coarse SAND, some gravel, trace charcoal, [FILL, Hf].	SM		8.0							
10						S-2	SS	0-1-1	2	– / 1.5	◆	
						S-3	SS	3-2-5	7	0.8 / 1.5	◆	
15						S-4	SS	15-16-15	31	0.3 / 1.5	◆	
		Boring completed at 16.5 ft. Backfilled with 3/8-inch bentonite chips, surface restored with 1/2-inch HMA			16.5							
20												

1 in to 3 ft
DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: John Bennet

LOGGED: Dave Yonemitsu
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE OVS-B-001

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 9/16/13
DRILL RIG: Diedrich D120

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	0.0 - 0.8 Asphalt Pavement.									
	0.8 - 25.0 Very dense, gray-brown, (SM), moist, gravelly, silty, fine to coarse SAND, diamict structure, friable, [TILL, Qvt].		0.8							
				S-1	SS	29-50/5"	>50	0.9 / 0.9	>>◆	
5				S-2	SS	13-50/6"	>50	0.5 / 1.0	>>◆	
				S-3	SS	21-50/3"	>50	0.4 / 0.8	>>◆	
10				S-4	SS	29-50/1"	>50	0.3 / 0.6	>>◆	
		SM		S-5	SS	30-50/6"	>50	0.7 / 1.0	● >>◆	S-5@12.5ft %G-28.7 %S-49.2 %F-22.1
15				S-6	SS	22-50/2"	>50	0.7 / 0.7	>>◆	
20				S-7	SS	39-50/2"	>50	0.7 / 0.7	>>◆	
25	25.0 - 26.0 Very dense, gray-brown, (SP-SM), very moist, fine to coarse SAND, little silt, little gravel, [ADVANCE OUTWASH, Qva].	SP-SM	25.0	S-8	SS	19-50/6"	>50	0.9 / 1.0	● >>◆	S-8@25ft %G-11.6 %S-81.1 %F-7.3
	Boring completed at 26.0 ft.		26.0							
	Backfilled with 3/8-inch bentonite chips.									
30										

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth

LOGGED: Mike Woiczko
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE OVS-B-002

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder
DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 9/16/13
DRILL RIG: Diedrich D120
DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed
ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS
0	0.0 - 0.8 Asphalt Pavement.									
	0.8 - 5.0 Very dense, gray-brown, (SM), moist, gravelly, silty, fine to coarse SAND, [TILL, Qvt].	SM	0.8	S-1	SS	12-15-50/1"	>50	0.5 / 1.1	>>	Driving on rock 3 ft bgs.
5	5.0 - 7.5 Dense, gray-brown, (SM), moist, fine to coarse SAND and SILT, little gravel, diamict structure, friable, small amount of iron oxide staining, [TILL, Qvt].	SM	5.0	S-2	SS	12-17-19	36	0.9 / 1.5	● ◆	S-2@5ft %G-9.4 %S-51.4 %F-39.2
	7.5 - 20.0 Very dense, gray-brown, (SM), moist, fine to coarse SAND, some silt, little to some gravel, diamict structure, friable, [TILL, Qvt].	SM	7.5	S-3	SS	18-50/6"	>50	0.5 / 1.0	>>	
10				S-4	SS	11-50/5"	>50	0.4 / 0.9	>>	
	Becomes gravelly.			S-5	SS	15-50/3"	>50	0.5 / 0.8	>>	
15				S-6	SS	50/6"	>50	0.5 / 0.5	● >>	S-6@15ft %G-24.5 %S-52.7 %F-22.8
20	20.0 - 32.0 Very dense, gray-brown, (SM), moist, fine to coarse SAND, some silt, trace to some gravel, [TILL, Qvt].	SM	20.0	S-7	SS	50/6	>50	0.2 / 0.5	>>	
25										

Log continued on next page

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth
LOGGED: Mike Wolczko
CHECKED: David P. Findley
DATE: 12/23/2013

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

RECORD OF BOREHOLE OVS-B-002

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 520 Eastbound Shoulder

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 9/16/13
DRILL RIG: Diedrich D120

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	SOIL PROFILE: DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
25	20.0 - 32.0 Very dense, gray-brown, (SM), moist, fine to coarse SAND, some silt, trace to some gravel, [TILL, Qvt].	SM		S-8	SS	22-50/6"	>50	1.0 / 1.0	S-8@25ft %G-1.3 %S-86.1 %F-12.6
30				S-9	SS	50/6"	>50	0.2 / 0.5	
	32.0 - 40.0 Very dense, gray-brown, (SW-SM), moist, gravelly, fine to coarse SAND, little silt, [ADVANCE OUTWASH, Qva].		32.0						
35		SW-SM		S-10	SS	15-35-39	>50	1.2 / 1.5	S-10@35ft %G-20.2 %S-72.5 %F-7.3
40	40.0 - 40.4 Very dense, gray-brown, (SM), moist, gravelly, silty, fine to coarse SAND, [ADVANCE OUTWASH, Qva].	SM	40.0	S-11	SS	50/5"	>50	0.2 / 0.4	
	Boring completed at 40.4 ft.		40.4						
45	Backfilled with 3/8-inch bentonite chips.								
50									

PENETRATION RESISTANCE BLOWS / ft ◆: 10, 20, 30, 40 — PL, MC, LL — 20, 40, 60, 80

1 in to 3 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Roddy Gilseth

LOGGED: Mike Woiczko
CHECKED: David P. Findley
DATE: 12/23/2013

FINAL DESIGN PARTNERS.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

RECORD OF BOREHOLE OVS-B-003

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: 2801 152nd Ave. NE

DRILLING METHOD: Hollow Stem Auger
DRILLING DATE: 9/8/2013
DRILL RIG: B-59 Mobile Drill Truck

DATUM: Sound Transit East Coordinate System
COORDINATES: not surveyed

ELEVATION:
INCLINATION: -90

BORING METHOD: 4.25-inch Inner Diameter Hollow Stem Auger

DEPTH (Ft)	DESCRIPTION	USCS	ELEV. / DEPTH (Ft)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
0	0.0 - 0.3 Asphalt Pavement.		0.3						
	0.3 - 2.0 Very dense, orange-brown, (SM), silty, fine to coarse SAND, little gravel, [FILL, Hf].	SM							
	2.0 - 4.5 Very dense, gray-brown, (SM), moist, fine to coarse SAND and SILT, little gravel, predominantly fine sand, [TILL, Qvt].	SM	2.0	S-1	SS	11-22-38	>50	1.3 / 1.5	S-1@2.5ft %G-11.2 %S-53.8 %F-35.0
5	4.5 - 6.0 Very dense, gray-brown, (SM), moist, gravelly, silty, fine to coarse SAND, diamict structure, very friable, [TILL, Qvt].	SM	4.5	S-2	SS	25-39-43	>50	1.5 / 1.5	Gravelly drilling at 4.5 ft bgs.
	6.0 - 9.5 Very dense, gray-brown, (SP-SM), moist, fine to coarse SAND, predominately fine sand, little silt, little gravel, sand lens in [TILL, Qvt].	SP-SM	6.0	S-3	SS	18-50/5"	>50	0.8 / 0.9	Gravelly drilling at 6.5 ft bgs.
10	9.5 - 12.0 Very dense, gray-brown, (SM), moist, fine to coarse SAND and SILT, little gravel, diamict structure, friable, [TILL, Qvt].	SM	9.5	S-4	SS	50/5"	>50	0.4 / 0.4	S-4@10ft %G-11.9 %S-46.0 %F-42.1
	12.0 - 25.3 Very dense, gray-brown, (SP-SM/SM), moist, fine to coarse SAND, little to some silt, little to some gravel, [TILL, Qvt].	SP-SM /SM	12.0	S-5	SS	50/4"	>50	0.3 / 0.3	Gravelly drilling at 12 ft bgs.
	Little gravel, diamict structure, very friable.								Gravelly drilling at 14 ft bgs.
15				S-6	SS	50/6"	>50	0.3 / 0.5	
									Gravelly drilling from 16.5 to 20 ft bgs.
20				S-7	SS	50/6"	>50	0.5 / 0.5	S-7@20ft %G-8.5 %S-63.2 %F-28.3
									Gravelly drilling at 24 ft bgs.
25				S-8	SS	50/3"	>50	0.3 / 0.3	
	Boring completed at 25.3 ft. Backfilled with 3/8-inch bentonite chips.		25.3						
30									

PENETRATION RESISTANCE BLOWS / ft ◆ (10, 20, 30, 40); PL MC LL (20, 40, 60, 80)

1 in to 4 ft

DRILLING CONTRACTOR: Holt Services Inc.
DRILLER: Derek Patsey

LOGGED: Mike Wolczko
CHECKED: David P. Findley
DATE: 12/23/2013

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

FINAL DESIGN PARTNERS.

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BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-11p	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : SW of 148th Ave NE and SR520 East intersection, Bellevue. (233813.2 N, 1317347.3 E, South State Plane

ELEVATION : 334.2 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 32.9' bgs (12/9/2010). See graph for additional details.

START : 8/30/2010 END : 8/30/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is long grass and weeds.	Began drilling at 9:00am on 8/30/2010.
5	5.0					
	6.5	1.0	SS-1	13-12-14 (26)	**SILTY SAND WITH GRAVEL (SM),** dark brown, moist, medium dense, fine to medium sand, predominantly fine sand, estimated 30% nonplastic fines, estimated 15-20% fine subangular gravel, 2" seam of coal at 5.3'.	Driller notes gravels at 6'.
						Chattery drilling from 6' to 10'.
10	10.0					
	10.9	0.7	SS-2	36-50/5" (50/5")	**SILTY SAND (SM),** olive-gray, dry to slightly moist, very dense, fine to medium sand, estimated 25% nonplastic fines, estimated 10% fine subangular gravel.	3" of gravel slough on top of sample.
15	15.0					
	15.5	0.4	SS-3	50/6" (50/6")	**SILTY SAND (SM),** similar to above, except moist.	3" of gravel slough on top of sample.
						Drilling rate slows slightly from 15' to 20'.
20	20.0					
	21.0	1.0	SS-4	31-50/6" (50/6")	**SILTY SAND, SM,** light gray, moist, very dense, fine to medium sand, predominantly fine sand, nonplastic fines, fine to coarse angular to subangular gravel.	**See laboratory results for SS-4.** 3" of gravel slough on top of sample.
25	25.0					
	25.5	0.4	SS-5	50/6" (50/6")	**SILTY SAND, SM,** light olive-gray, moist, very dense, fine to medium sand, predominantly fine sand, nonplastic fines, trace fine subangular gravel.	**See laboratory results for SS-5.**
30						

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-11p	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : SW of 148th Ave NE and SR520 East intersection, Bellevue. (233813.2 N, 1317347.3 E, South State Plane

ELEVATION : 334.2 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 32.9' bgs (12/9/2010). See graph for additional details

START : 8/30/2010 END : 8/30/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0 – 31.5	1.2	SS-6	19-39-40 (79)	**SILTY SAND (SM),** gray, moist to wet, very dense, fine to medium sand, estimated 25-30% nonplastic fines, trace fine subrounded gravel, interbedded silt layers 1/8" to 1/4" thick from 30.5'-31'.	
35	35.0 – 36.0	0.8	SS-7	25-50/6" (50/6")	**POORLY GRADED SAND WITH SILT, SP-SM,** gray, wet, very dense, predominantly fine sand, nonplastic fines.	**See laboratory results for SS-7.**
40	40.0 – 41.0	1.0	SS-8	39-50/6" (50/6")	**SILTY SAND (SM),** gray, wet, very dense, fine to coarse sand, predominantly fine to medium sand, estimated 15-20% nonplastic fines, trace fine subangular gravel.	
45	45.0 – 45.9	0.7	SS-9	30-50/5" (50/5")	**POORLY GRADED SAND WITH SILT (SP-SM),** light gray, wet, very dense, fine to medium sand, predominantly fine sand, estimated 10% nonplastic fines, interbedded 1/4" silty sand lenses from 45' to 45.4'.	
50	50.0 – 50.5	0.4	SS-10	50/6" (50/6")	**SILTY SAND, SM,** gray, wet, very dense, fine to coarse sand, predominantly fine to medium sand, nonplastic fines, fine subangular gravel.	**See laboratory results for SS-10.** 4" of gravel slough on top of sample.
55	55.0 – 55.5	0.5	SS-11	50/6" (50/6")	**POORLY GRADED SAND WITH SILT (SP-SM),** olive-gray, wet, very dense, predominantly fine to medium sand, estimated 5% nonplastic fines.	Driller notes trace gravels at 57'.
60						

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-11p	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : SW of 148th Ave NE and SR520 East intersection, Bellevue. (233813.2 N, 1317347.3 E, South State Plane

ELEVATION : 334.2 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 32.9' bgs (12/9/2010). See graph for additional details.

START : 8/30/2010 END : 8/30/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0	0.2	SS-12	50/4" (50/4")	**SILTY SAND WITH GRAVEL (SM),** gray, moist, very dense, fine to medium sand, estimated 40-45% nonplastic fines, estimated 20% fine to coarse angular to rounded gravel.	4" of gravel slough on top of sample.
65	65.0 65.3	0.2	SS-13	50/4" (50/4")	**SILTY SAND (SM),** poor recovery, gray, moist, very dense, fine to medium sand, estimated 25-30% nonplastic fines, estimated 5% fine subangular gravel.	4" of gravel slough on top of sample.
						Drilling rate slows from 65' to 70'.
						Slightly chattery drilling at 69'.
70	70.0 70.1	0.1	SS-14	50/1" (50/1")	**SILTY SAND (SM),** poor recovery, similar to above, except dry to slightly moist.	
						Slight drill rate increase from 72' to 73.5'.
75	75.0 75.8	0.6	SS-15	45-50/4" (50/4")	**SILTY SAND, SM,** gray, wet, very dense, fine to medium sand, predominantly fine sand, nonplastic fines concentrated from 75' to 75.3', fine gravel.	**See laboratory results for SS-15.** 4" of gravel slough on top of sample.
80	80.0 80.5	0.4	SS-16	50/6" (50/6")	**SANDY SILT (ML),** dark olive-gray, moist, hard, nonplastic, estimated 30-35% very fine sand, homogeneous appearance.	
85	85.0 85.3	0.3	SS-17	50/4" (50/4")	**SANDY SILT, ML,** dark gray, dry to slightly moist, hard, nonplastic, fine to medium sand, 1" wet medium sand lens at 85.3'.	**See laboratory results for SS-17.**
90						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-11p	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : SW of 148th Ave NE and SR520 East intersection, Bellevue. (233813.2 N, 1317347.3 E, South State Plane

ELEVATION : 334.2 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 32.9' bgs (12/9/2010). See graph for additional details

START : 8/30/2010 END : 8/30/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	90.0	0.2	SS-18	50/4" (50/4")	**SILTY SAND, SM,** dark gray, moist to wet, very dense, predominantly fine sand, nonplastic fines.	**See laboratory results for SS-18.**
95	95.0 95.3	0.2	SS-19	50/4" (50/4")	**SILTY SAND, SM,** same as above.	**See laboratory results for SS-19.**
100	100.0 100.5	0.3	SS-20	50/6" (50/6")	**SILTY SAND (SM),** same as above.	Drilling completed at 13:55pm on 8/30/2010.
					Bottom of hole at 100.5 ft below ground surface.	**PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT 712.** Well is 2-inch diameter schedule 40 PVC with 0.01" slotted screen installed from 51' to 61'. 0' to 1' - Flush concrete monument. 1' to 48' - 3/8" Bentonite chips. 48' to 61' - Colorado silica sand. 61' to 64' - 3/8" Bentonite chips. 64' to 100.5' - Bentonite-cement grout.
105						
110						
115						
120						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-12p	SHEET 1 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Grass Hill SE of int. of 148th and SR520 E, Redmond. (233989.6 N, 1317709.3 E, South State Plane)

ELEVATION : 375.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 850 track-mounted rig

WATER LEVELS : High of 58.1' bgs (9/10/2010). See graph for additional details.

START : 9/1/2010 END : 9/2/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is long grass, moss, and weeds.	Began drilling at 9:40am on 9/1/2010 with hollow-stem auger.
5	5.0					
	6.5	0.7	SS-1	1-6-5 (11)	**SILTY SAND WITH GRAVEL (SM),** brown from 5'-5.5', gray from 5.5'-5.8', moist, medium dense, fine to medium sand, estimated 30% nonplastic fines, estimated 15% fine to coarse subangular to rounded gravel.	
10	10.0					
	11.5	0.6	SS-2	8-4-2 (6)	**SILTY SAND WITH GRAVEL AND ORGANICS (SM),** similar to above except loose and estimated 15-20% organics (coal).	
15	15.0					
	16.5	1.3	SS-3	0-0-0 (0)	**SILTY SAND WITH GRAVEL, SM,** bluish-gray, wet, very loose, fine to medium sand, nonplastic fines, fine to coarse subangular to subrounded gravel, trace organics at top 2" of sample.	**See laboratory results for SS-3.**
20	20.0					
	21.5	0.7	SS-4	3-20-20 (40)	**SANDY SILT WITH GRAVEL (ML),** bluish-gray, slightly moist to moist, hard, nonplastic, estimated 30% fine sand, estimated 15-20% fine to coarse angular to subrounded gravel concentrated from 20.5' to 20.8'.	SPT sampler was wet but sample was dry.
25	25.0					
	26.5	0.8	SS-5	3-2-6 (8)	**SILTY SAND WITH GRAVEL, SM,** bluish-gray, slightly wet, loose, fine to coarse sand, predominantly fine to medium sand, nonplastic fines, fine to coarse subangular to subrounded gravel.	**See laboratory results for SS-5.**
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-12p	SHEET 2 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Grass Hill SE of int. of 148th and SR520 E, Redmond. (233989.6 N, 1317709.3 E, South State Plane)

ELEVATION : 375.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 850 track-mounted rig

WATER LEVELS : High of 58.1' bgs (9/10/2010). See graph for additional details.

START : 9/1/2010 END : 9/2/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0 – 31.5	1.5	SS-6	11-15-16 (31)	**SILTY SAND WITH GRAVEL, SM,** dark gray, slightly moist, dense, fine to medium sand, predominantly fine sand, nonplastic fines, fine to coarse subangular to subrounded gravel.	**See laboratory results for SS-6.**
35	35.0 – 35.8	0.7	SS-7	45-50/4" (50/4")	**SILTY SAND WITH GRAVEL (SM),** similar to above, except very dense.	
40	40.0 – 41.5	1.2	SS-8	15-15-13 (28)	**SILTY SAND WITH GRAVEL (SM),** similar to above, except medium dense and estimated 30% nonplastic fines.	
45	45.0 – 46.5	1.3	SS-9	9-28-37 (65)	**SILTY SAND (SM),** dark brown from 45'-45.3', gray from 45.3-46.3' with scattered 1/8" thick orange iron-oxide stains, dry to slightly moist, very dense, fine to medium sand, estimated 25-30% nonplastic fines, estimated 10% fine to coarse angular to subrounded gravel.	
50	50.0 – 51.5	1.4	SS-10	17-25-25 (50)	**SILTY SAND, SM,** dark gray, dry to slightly moist, very dense, fine to medium sand, predominantly fine sand, nonplastic fines, fine subangular to subrounded gravel.	**See laboratory results for SS-10.** Switched to mud rotary drilling after SS-10.
55	55.0 – 56.5	1.4	SS-11	23-27-26 (53)	**SILTY SAND (SM),** light brownish-gray, dry to slightly moist, very dense, fine to medium sand, estimated 25-30% nonplastic fines, estimated 10% fine to coarse angular to subrounded gravel.	Chattery drilling at 57'.
60						Very chattery drilling from 59' to 60'.

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-12p	SHEET 3 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Grass Hill SE of int. of 148th and SR520 E, Redmond. (233989.6 N, 1317709.3 E, South State Plane)

ELEVATION : 375.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 850 track-mounted rig

WATER LEVELS : High of 58.1' bgs (9/10/2010). See graph for additional details.

START : 9/1/2010 END : 9/2/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0	0.0	SS-12	50/3" (50/3")	**NO RECOVERY.**	
						Very chattery drilling at 61.5'.
						Minor drill chatter off and on from 62' to 65'.
65	65.0 / 65.3	0.2	SS-13	50/4" (50/4")	**SILTY SAND (SM),** light brownish-gray, slightly moist, very dense, fine to medium sand, estimated 35% nonplastic fines, estimated 10% fine subrounded gravel.	
70	70.0 / 70.4	0.2	SS-14	50/5" (50/5")	**SILTY SAND (SM),** light brownish-gray, moist to slightly wet, very dense, fine to medium sand, estimated 25% nonplastic fines, estimated 5% fine subrounded gravel.	
75	75.0 / 75.8	0.4	SS-15	37-50/4" (50/4")	**SILTY SAND (SM),** olive-gray, wet, very dense, fine to medium sand, predominantly fine sand, estimated 30-35% nonplastic fines.	
80	80.0 / 81.0	0.7	SS-16	38-50/6" (50/6")	**SILTY SAND, SM,** brownish-gray, wet, very dense, fine to medium sand, predominantly fine sand, nonplastic fines, fine subangular gravel.	**See laboratory results for SS-16.**
85	85.0 / 85.4	0.4	SS-17	50/5" (50/5")	**SILTY SAND (SM),** same as above.	
90						

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-12p	SHEET 4 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Grass Hill SE of int. of 148th and SR520 E, Redmond. (233989.6 N, 1317709.3 E, South State Plane)

ELEVATION : 375.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 850 track-mounted rig

WATER LEVELS : High of 58.1' bgs (9/10/2010). See graph for additional details.

START : 9/1/2010 END : 9/2/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	90.6	0.2	SS-18	50/5" (50/5")	**POORLY GRADED SAND WITH SILT, SP-SM,** gray, wet, very dense, fine to coarse sand, predominantly fine to medium sand, nonplastic fines, trace fine subangular to subrounded gravel.	**See laboratory results for SS-18.**
95	95.0					
	96.0	0.3	SS-19	36-50/6" (50/6")	**SILTY SAND (SM),** light olive-gray, wet, very dense, fine to medium sand, predominantly fine sand, estimated 20% nonplastic fines.	
						Chattery drilling at 99' for 6".
100	100.0					
	100.8	0.7	SS-20	39-50/4" (50/4")	**SILTY SAND, SM,** brownish-gray, wet, very dense, predominantly fine sand, nonplastic fines, 1/8" silt seam at 100.3'.	**See laboratory results for SS-20.** Drilling stopped at 16:05pm on 9/1/2010. Drilling resumed at 7:32am on 9/2/2010.
						Slightly chattery drilling at 104'.
105	105.0					
	105.4	0.2	SS-21	50/5" (50/5")	**SILTY SAND (SM),** gray, wet, very dense, fine to medium sand, predominantly fine sand, estimated 15-25% nonplastic fines.	
						Very chattery drilling at 107.5' for 3".
110						Consistant drill rate from 105' to 113'.
						Drill rate decreases slightly from 113' to 115'.
115	115.0					
	116.5	1.7	SS-22	13-23-27 (50)	**FAT CLAY, CH,** dark gray, moist, hard, plastic, estimated 5-10% fine sand scattered in lenses 1/8" thick throughout sample, trace fine subrounded gravel.	**See laboratory results for SS-22.**
120						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-12p	SHEET 5 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Grass Hill SE of int. of 148th and SR520 E, Redmond. (233989.6 N, 1317709.3 E, South State Plane)

ELEVATION : 375.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 850 track-mounted rig

WATER LEVELS : High of 58.1' bgs (9/10/2010). See graph for additional details.

START : 9/1/2010 END : 9/2/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
						Chattery drilling, driller notes gravels at 123'.
125	125.0					
	126.5	1.7	SS-23	13-26-29 (55)	**FAT CLAY (CH),** similar to above, except no sand lenses, homogeneous appearance.	q_u>4.5 tsf.
					Bottom of hole at 126.5 ft below ground surface.	**PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT 140.** Well is 1-inch diameter schedule 40 PVC with 0.01" slotted screen installed from 90' to 100'. 0' to 1' - Flush concrete monument. 1' to 8' - 3/8" Bentonite chips. 8' to 83' - Bentonite-cement grout. 83' to 85' - 3/8" Bentonite chips. 85' to 100' - Colorado silica sand. 100' to 103' - 3/8" Bentonite chips. 103' to 126.5' - Bentonite-cement grout.
130						
135						
140						
145						
150						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-13p	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : In grass off SR520E, East of 148th Ave NE, Redmond. (234397.7 N, 1318011.6 E, South State Plane)

ELEVATION : 325.5 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 850 track-mounted rig

WATER LEVELS : High of 5.1' bgs (12/9/2010). See graph for additional details

START : 9/3/2010 END : 9/3/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is various grasses and weeds.	Began drilling at 7:35am on 9/5/2010.
5	5.0					
	6.5	1.3	SS-1	36-43-50 (93)	**SILTY SAND (SM),** olive-gray, dry to slightly moist, very dense, fine to medium sand, estimated 25% nonplastic fines, estimated 10% fine subangular to subrounded gravel.	
						Driller notes sand at 8'.
10	10.0					
	11.5	1.3	SS-2	20-33-38 (71)	**POORLY GRADED SAND WITH SILT, SP-SM,** grayish-brown, wet, very dense, fine to medium sand, predominantly fine sand, nonplastic fines, trace fine subangular gravel.	**See laboratory results for SS-2.**
15	15.0					
	16.5	1.2	SS-3	18-34-33 (67)	**SILTY SAND (SM),** grayish-brown, wet, very dense, fine to coarse sand, predominantly fine sand, estimated 35% nonplastic fines, estimated 10% fine subangular to subrounded gravel.	
20	20.0					
	21.5	1.1	SS-4	13-22-24 (46)	**SILTY SAND (SM),** grayish-brown, wet, dense, predominantly fine sand, estimated 35% nonplastic fines, trace coarse sand from 20.1' to 20.3'.	3" of gravel slough on top of sample.
						Chattery drilling from 23.5' to 25'.
25	25.0					
	26.5	1.4	SS-5	30-43-50 (93)	**SILTY SAND, SM,** grayish-brown, wet, very dense, fine to medium sand, predominantly fine sand, nonplastic fines, scattered fine subrounded gravel.	**See laboratory results for SS-5.**
						Slightly chattery drilling from 26' to 27.5'.
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-13p	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : In grass off SR520E, East of 148th Ave NE, Redmond. (234397.7 N, 1318011.6 E, South State Plane)

ELEVATION : 325.5 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 850 track-mounted rig

WATER LEVELS : High of 5.1' bgs (12/9/2010). See graph for additional details.

START : 9/3/2010 END : 9/3/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0 31.0	1.0	SS-6	36-50/6" (50/6")	**30'-30.5' - A: SILT WITH SAND (ML),** brownish-gray, dry to slightly moist, hard, nonplastic, estimated 15-20% fine to medium sand, trace fine subangular gravel. **30.5'-31' - B: WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM),** brownish-gray, wet, very dense, fine to coarse sand, estimated 10% nonplastic fines, estimated 15% fine subrounded gravel.	
35	35.0 35.3	0.2	SS-7	50/4" (50/4")	**SILTY SAND (SM),** gray, wet, very dense, fine to medium sand, estimated 25-35% nonplastic fines, dry at bottom.	Very chattery drilling at 36'. Drilling rate slows significantly at 37'.
40	40.0 41.5	1.7	SS-8	13-16-21 (37)	**FAT CLAY, CH,** dark gray, slightly moist to moist, hard, plastic, trace fine sand, homogeneous appearance.	**See laboratory results for SS-8.** q_u>4.5 tsf.
45	45.0 46.5	1.7	SS-9	13-20-25 (45)	**FAT CLAY (CH),** similar to above, except trace fine gravel scattered throughout sample.	Driller notes interbedded clay, gravels, and sand from 46.5' to 50'.
50	50.0 51.5	1.7	SS-10	15-18-24 (42)	**FAT CLAY (CH),** same as above.	q_u>4.5 tsf.
55						Chattery drilling from 55' to 57'. Driller notes sand at 57'. Driller notes back in clay at 57.5'.
60						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-13p	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : In grass off SR520E, East of 148th Ave NE, Redmond. (234397.7 N, 1318011.6 E, South State Plane)

ELEVATION : 325.5 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 850 track-mounted rig

WATER LEVELS : High of 5.1' bgs (12/9/2010). See graph for additional details.

START : 9/3/2010 END : 9/3/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 – 61.5	1.7	SS-11	14-19-24 (43)	**FAT CLAY (CH),** dark gray, moist, hard, plastic, trace fine sand, scattered trace fine subangular gravel, homogeneous appearance.	q_u>4.5 tsf.
65						Consistant, slow drilling rate from 60' to 70'.
70	70.0 – 71.5	1.7	SS-12	7-11-15 (26)	**FAT CLAY, CH,** dark gray, moist, very stiff, plastic, trace fine sand, homogeneous appearance.	**See laboratory results for SS-12.** q_u=4.0-4.5 tsf. Drilling completed at 10:51am on 9/5/2010.
					Bottom of hole at 71.5 ft below ground surface.	**PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT 141.** Well is 2-inch diameter schedule 40 PVC with 0.01" slotted screen installed from 19' to 29'. 0' to 1' - Concrete monument. 1' to 16' - 3/8" Bentonite chips. 16' to 29' - Colorado silica sand. 29' to 32' - 3/8" Bentonite chips. 32' to 71.5' - Bentonite-cement grout.
75						
80						
85						
90						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-14p	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Shoulder of 148th Ave NE SB offramp, Bellevue. (233338.7 N, 1316692.7 E, South State Plane)

ELEVATION : 288.8 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 12.5' bgs (12/9/2010). See graph for additional details.

START : 9/7/2010 END : 9/8/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is long grass and weeds.	Began drilling at 9:50am on 9/7/2010.
5	5.0					
	6.5	1.3	SS-1	18-21-26 (47)	**SILTY SAND and SILT (SM/ML),** interbedded in layers 3" to 6" thick, SM is gray, moist, dense, fine to medium sand, estimated 15% nonplastic fines, ML is gray, dry to moist, hard, nonplastic, trace fine sand.	
10	10.0					
	11.5	1.0	SS-2	15-26-30 (56)	**SILTY SAND (SM),** light olive-gray, wet, very dense, fine to medium sand, predominantly fine sand, estimated 15-25% nonplastic fines.	
15	15.0					
	16.5	1.5	SS-3	29-39-50 (89)	**SILTY SAND, SM,** light gray, dry to slightly moist, very dense, fine to medium sand, predominantly fine sand, nonplastic fines, fine to coarse angular to subrounded gravel.	**See laboratory results for SS-3.**
						Driller notes hard and soft interbedded layers from 17' to 20'.
20	20.0					Slightly chattery drilling at 19.5'.
	21.5	1.0	SS-4	18-38-40 (78)	**SILTY SAND (SM),** gray, wet, very dense, fine to medium sand, estimated 30-40% nonplastic fines, silt lenses 1/8" to 1/4" thick throughout sample.	
25	25.0					
	26.5	1.2	SS-5	21-40-50 (90)	**25'-25.3' - A: SILT WITH SAND (ML),** olive-gray, moist to wet, hard, nonplastic, estimated 15-20% fine sand.	
					25.3'-26.2' - B: POORLY GRADED SAND WITH SILT (SP-SM), gray, wet, very dense, fine to coarse sand, predominantly fine to medium sand, estimated 5% nonplastic fines, estimated 10% fine subrounded gravel.	
30						Chattery drilling from 29' to 30'.

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PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-14p	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Shoulder of 148th Ave NE SB offramp, Bellevue. (233338.7 N, 1316692.7 E, South State Plane)

ELEVATION : 288.8 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 12.5' bgs (12/9/2010). See graph for additional details.

START : 9/7/2010 END : 9/8/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0 30.8	0.5	SS-6	40-50/3" (50/3")	**SILT (ML),** brownish-gray, dry to moist, hard, nonplastic, estimated 10-15% fine sand with trace medium sand.	6" of gravel slough on top of sample.
35	35.0 35.5	0.4	SS-7	50/6" (50/6")	**SILTY CLAY, CL-ML,** dark gray, moist, hard, low plasticity, estimated 5% fine sand, homogeneous appearance.	**See laboratory results for SS-7.**
						Driller notes gravel at 38.5'.
40	40.0 40.3	0.2	SS-8	50/3" (50/3")	**SILTY SAND (SM),** dark gray, dry to moist, very dense, fine to medium sand, estimated 35% nonplastic fines, estimated 5-10% fine subangular to subrounded gravel.	
45	45.0 45.4	0.4	SS-9	50/5" (50/5")	**SILTY SAND, SM,** dark gray, wet, very dense, fine to coarse sand, nonplastic fines, fine subangular to subrounded gravel.	**See laboratory results for SS-9.**
						Driller notes sand at 47'.
50	50.0 50.4	0.4	SS-10	50/5" (50/5")	**SILTY SAND, SM,** same as above, top 1/4" is sandy silt (ML).	**See laboratory results for SS-10.**
						Slightly chattery drilling from 53' to 55'.
55	55.0 55.3	0.2	SS-11	50/4" (50/4")	**POORLY GRADED SAND WITH SILT (SP-SM),** gray, wet, very dense, fine to coarse sand, predominantly fine sand, estimated 10% nonplastic fines, trace fine subangular gravel.	
60						

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PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-14p	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Shoulder of 148th Ave NE SB offramp, Bellevue. (233338.7 N, 1316692.7 E, South State Plane)

ELEVATION : 288.8 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 12.5' bgs (12/9/2010). See graph for additional details.

START : 9/7/2010 END : 9/8/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0	0.4	SS-12	50/5" (50/5")	**SILT WITH SAND (ML),** dark gray, dry to slightly moist, hard, nonplastic, estimated 15-25% fine sand with trace coarse sand, homogeneous appearance.	Driller notes silt, slower drilling at 62'.
65	65.0					Driller notes interbedded gravels from 63.5' to 65.
	65.9	1.0	SS-13	24-50/5" (50/5")	**LEAN CLAY, CL,** dark gray, dry to moist, hard, plastic, estimated 5-10% fine sand, trace fine subrounded gravel.	**See laboratory results for SS-13.** Driller notes trace gravels at 66'.
70	70.0					
	71.5	1.5	SS-14	27-42-50 (92)	**LEAN CLAY (CL),** similar to above, except trace sand and no gravel.	
75						
80	80.0					
	80.5	0.5	SS-15	50/6" (50/6")	**SILT WITH SAND (ML),** dark gray, wet, hard, nonplastic, estimated 15-25% fine sand.	
85						
90						

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PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-14p	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Shoulder of 148th Ave NE SB offramp, Bellevue. (233338.7 N, 1316692.7 E, South State Plane)

ELEVATION : 288.8 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 12.5' bgs (12/9/2010). See graph for additional details.

START : 9/7/2010 END : 9/8/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	90.0 90.9	0.9	SS-16	39-50/5" (50/5")	**SILT WITH SAND, ML,** dark gray, moist, hard, nonplastic, fine sand.	**See laboratory results for SS-16.** Drilling completed at 14:22pm on 9/7/2010. Continued with piezometer installation on 9/8/2010.
					Bottom of hole at 90.9 ft below ground surface.	
95						**PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT 714.** Well is 2-inch diameter schedule 40 PVC with 0.01" slotted screen installed from 50' to 60'. 0' to 1' - Flush concrete monument. 1' to 47' - 3/8" Bentonite chips. 47' to 60' - Colorado silica sand. 60' to 64' - 3/8" Bentonite chips. 64' to 90.9' - Bentonite-cement grout.
100						
105						
110						
115						
120						

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PROJECT NUMBER:	BORING NUMBER:
393372.H3.03.04.04.01	B-D-ES-6 SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : 104th Ave NE, ~150' S of 520 overpass, Bellevue. (232342.5 N, 1314830.9 E, South State Plane)

ELEVATION : 197.4 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 12/11/2009 END : 12/11/2009 LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is asphalt.	Began drilling at 9:15am on 12/11/2009 with hollow-stem auger.
5	5.0					
	6.5	0.8	SS-1	0-1-2 (3)	**PEAT (PT),** dark brown, moist to wet, decayed and fresh organic matter, gray clay at very bottom of sample.	
10	10.0					
	11.5	0.3	SS-2	1-5-3 (8)	**SILT (ML),** light brownish-gray, dry to moist, soft, nonplastic, estimated less than 10% fine sand.	
15	15.0					
	16.5	0.9	SS-3	5-13-17 (30)	**SILT (ML),** similar to above, except hard.	Switched to mud rotary drilling after SS-3.
20	20.0					
	21.5	0.8	SS-4	20-22-28 (50)	**SILTY SAND, SM,** light brown, moist, very dense, fine to medium sand, nonplastic fines.	**See laboratory results for SS-4.**
25	25.0					
	25.5	0.7	SS-5	15-14-18 (32)	**SILTY SAND (SM),** light brown, moist, dense, fine to coarse sand, estimated 10-20% nonplastic fines, trace fine gravel at bottom of sample.	Rig chatter at 27.5'.
30						

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PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-6	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : 104th Ave NE, ~150' S of 520 overpass, Bellevue. (232342.5 N, 1314830.9 E, South State Plane)

ELEVATION : 197.4 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 12/11/2009 END : 12/11/2009 LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0 – 31.5	0.7	SS-6	17-15-22 (37)	**SILTY SAND, SM,** light brown to brown, moist, dense, fine to coarse sand, predominantly fine to medium sand, nonplastic fines, fine gravel.	**See laboratory results for SS-6.**
35	35.0 – 36.5	0.5	SS-7	17-22-27 (49)	**POORLY GRADED SAND WITH SILT (SP-SM),** light brown to brown, moist, dense, fine to coarse sand, estimated less than 10% fines.	
40	40.0 – 41.5	0.7	SS-8	15-31-53 (84)	**POORLY GRADED SAND WITH SILT (SP-SM),** light brown, moist, very dense, fine to medium sand, nonplastic fines vary from 5% to 10% throughout sample, trace fine gravel, 2" silt seam near top of sample.	
45						Blind drilling from 45' to 55'.
						Driller notes gravels at 46'.
						Driller notes hard drilling at 48'.
50						
						Driller notes trace gravels at 52'.
55	55.0 – 55.3	0.3	SS-9	50/4" (50/4")	**SILTY SAND, SM,** light gray, moist to wet, very dense, fine to medium sand, nonplastic fines.	**See laboratory results for SS-9.**
60						

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PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-6	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : 104th Ave NE, ~150' S of 520 overpass, Bellevue. (232342.5 N, 1314830.9 E, South State Plane)

ELEVATION : 197.4 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 12/11/2009 END : 12/11/2009 LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
						Consistent drill rate from 55' to 62'.
65	65.0					Driller notes clay at 64'.
	66.5	1.5	SS-10	31-21-26 (47)	**POORLY GRADED SAND WITH SILT (SP-SM),** similar to above, except medium gray, wet, dense, fine to medium sand, estimated 5-15% fines.	
70	70.0					
	71.5	1.2	SS-11	15-31-50 (81)	**SILTY SAND, SM,** dark gray, wet, very dense, fine sand, nonplastic fines.	**See laboratory results for SS-11.** Drilling completed at 13:04pm on 12/11/2009.
					Bottom of hole at 71.5 ft below ground surface.	**Borehole Abandonment Log:** 0' to 1' - Flush concrete patch. 1' to 71.5' - 3/8" bentonite chips.
75						
80						
85						
90						

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PROJECT NUMBER:	BORING NUMBER:
393372.H3.03.04.04.01	B-D-ES-7 SHEET 1 OF 4

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : SR520E, west of 148th Ave NE, Bellevue. (232664.2 N, 1315657.4 E, South State Plane)

ELEVATION : 251.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 2/9/2010 END : 2/9/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is long grass and weeds.	Began drilling at 10:21am on 2/9/2010 with hollow-stem auger.
5	5.0					
	6.5	1.0	SS-1	9-10-10 (20)	**SILTY SAND WITH GRAVEL (SM),** changes from brown to gray to brown, slightly moist, medium dense, predominantly fine to medium sand, estimated 15-20% nonplastic fines, estimated 15-20% fine to coarse subrounded gravel.	
10	10.0					
	11.5	1.5	SS-2	33-33-25 (58)	**SILTY SAND, SM,** similar to above, except brownish-gray and very dense, less gravel.	**See laboratory results for SS-2.**
15	15.0					
	16.0	1.0	SS-3	12-50/6" (50/6")	**SILTY SAND (SM),** similar to above, except moist, brown from 15' to 15.5', gray from 15.5' to 16'.	
20	20.0					
	20.9	0.7	SS-4	39-50/5" (50/5")	**SILTY SAND, SM,** gray, moist, very dense, fine to medium sand, predominantly fine sand, nonplastic fines, fine to coarse subrounded gravel.	**See laboratory results for SS-4.** Switched to mud rotary drilling after SS-4.
25	25.0					
	26.5	0.7	SS-5	38-40-38 (78)	**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM),** brownish-gray, moist, very dense, fine to coarse sand, estimated less than 10% nonplastic fines, estimated 20% fine to coarse subrounded gravel up to 1".	
30						

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PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-7	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : SR520E, west of 148th Ave NE, Bellevue. (232664.2 N, 1315657.4 E, South State Plane)

ELEVATION : 251.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 2/9/2010 END : 2/9/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0–31.5	0.7	SS-6	14-25-36 (61)	**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM),** gray, moist to slightly wet, very dense, predominantly fine to medium sand, estimated 10-15% nonplastic fines, estimated 15-20% fine to coarse subangular to subrounded gravel.	
35	35.0–35.8	0.4	SS-7	36-50/4" (50/4")	**SILTY SAND WITH GRAVEL, SM,** brownish-gray with several small orange iron-oxide stains, moist, very dense, fine to coarse sand, nonplastic fines, fine subangular to subrounded gravel.	**See laboratory results for SS-7.**
40	40.0–41.5	1.0	SS-8	20-20-22 (42)	**POORLY GRADED SAND WITH SILT AND GRAVEL and SILTY SAND WITH GRAVEL (SP-SM/SM),** interbedded in layers 1" to 4" thick, moist to wet, dense, SP-SM is gray, fine to medium sand with trace coarse sand, estimated 10% nonplastic fines, estimated 15% fine subrounded gravel. SM is dark reddish-brown, estimated 20-25% nonplastic fines, estimated 20% fine to coarse gravel, trace organics.	
45	45.0–46.5	0.0	SS-9	13-16-24 (40)	**NO RECOVERY,** some organics in split spoon shoe consisting of damp soil and roots.	
50	50.0–50.4	0.2	SS-10	50/5" (50/5")	**SILTY SAND WITH GRAVEL (SM),** dark gray, some orange iron-oxide staining, moist, very dense, fine to medium sand, estimated 25% nonplastic fines, estimated 15-20% fine to coarse subangular to subrounded gravel up to 1".	
55	55.0–56.5	0.6	SS-11	13-11-10 (21)	**SILTY SAND, SM,** grayish-brown, wet, medium dense, fine to medium sand, nonplastic fines, fine subrounded gravel.	**See laboratory results for SS-11.**
60						

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PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-7	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : SR520E, west of 148th Ave NE, Bellevue. (232664.2 N, 1315657.4 E, South State Plane)

ELEVATION : 251.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 2/9/2010 END : 2/9/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 61.0	0.6	SS-12	38-50/6" (50/6")	**POORLY GRADED SAND (SP),** gray with some faint brown color, wet, very dense, predominantly fine to medium sand with coarse sand, trace nonplastic fines, trace gravel, more coarse sand from 60' to 60.2'.	
65	65.0 66.0	0.8	SS-13	42-50/6" (50/6")	**SILTY SAND, SM,** gray, wet, very dense, fine to medium sand, predominantly fine sand, nonplastic fines, fine gravel, silt seams 1/8" thick throughout.	**See laboratory results for SS-13.**
70	70.0 71.5	1.0	SS-14	11-6-7 (13)	**70'-70.4' - A: LEAN CLAY WITH SAND (CL),** gray, moist, stiff, plastic, estimated 15% fine sand. **70.4'-71' - B: LEAN CLAY, CL,** similar to above, except trace sand.	**See laboratory results for SS-14B.**
75	75.0 77.0	1.8	ST-15	PUSH	**LEAN CLAY, CL,** dark gray, moist, plastic.	**See laboratory results for ST-15.**
	78.5	1.5	SS-16	6-5-7 (12)	**SANDY SILT (ML),** dark gray, moist, stiff, nonplastic to low plasticity, estimated 45% fine sand.	
80						Driller notes gravels at 81'.
85	85.0 86.5	1.1	SS-17	13-17-18 (35)	**SILTY SAND (SM),** dark gray, moist to wet, dense, fine to medium sand, estimated 35-40% nonplastic fines, trace fine subrounded gravel.	
90						

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BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-7	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : SR520E, west of 148th Ave NE, Bellevue. (232664.2 N, 1315657.4 E, South State Plane)

ELEVATION : 251.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 2/9/2010 END : 2/9/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	90.0 – 91.5	1.0	SS-18	0-0-0 (0)	**SILT (ML),** dark gray, moist to wet, very soft, low plasticity, trace fine sand, trace gravel.	
95	95.0					
	95.0 – 97.0	1.8	ST-19	PUSH	**LEAN CLAY, CL,** dark gray, moist, plastic.	**See laboratory results for ST-19.**
	97.0 – 98.5	1.2	SS-20	11-31-28 (59)	**97'-97.8' - A: SILT WITH SAND (ML),** dark gray, moist to wet, hard, low plasticity, estimated 20% fine sand. **97.8'-98.2' - B: SILT, ML,** dark gray, moist, hard, nonplastic to low plasticity, trace fine sand.	**See laboratory results for SS-20B.**
100						Driller notes gravel at 102'.
105	105.0 – 106.5	1.5	SS-21	11-17-10 (27)	**SANDY SILT (ML),** dark gray, moist, very stiff, nonplastic to low plasticity, estimated 30-35% fine to medium sand with interbedded 2" sand lenses throughout sample, trace gravel.	Drilling completed at 14:53pm on 2/9/2010.
					Bottom of hole at 106.5 ft below ground surface.	**Borehole Abandonment Log:** 0' to 1' - Grass patch. 1' to 20' - 3/8" Bentonite chips. 20' to 106.5' - Bentonite-cement grout.
110						
115						
120						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER:	BORING NUMBER:
393372.H3.03.04.04.01	B-D-OTCST-1 SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237211.2 N, 1319923.8 E, South State Plane)

ELEVATION : 356.4 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : See comments.

START : 1/4/2010 END : 1/4/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is asphalt.	Began drilling at 8:47am on 1/04/2010.
5	5.0					Slight rig chatter at 4".
	6.5	1.2	SS-1	2-4-5 (9)	**SANDY SILT, ML,** light to dark brown, moist to wet, stiff, nonplastic, fine to medium sand.	**See laboratory results for SS-1.**
10	10.0					
	11.5	1.1	SS-2	5-8-11 (19)	**SANDY SILT (ML),** similar to above, except moist and very stiff.	Water observed seeping into hole.
15	15.0					
	16.5	1.2	SS-3	11-17-26 (43)	**SILTY SAND (SM),** light grayish-brown, moist, dense, fine to coarse sand, predominantly fine to medium sand, estimated 25-35% nonplastic fines, estimated less than 10% fine gravel up to 1/2".	
20	20.0					
	21.0	1.0	SS-4	23-50/6" (50/6")	**SILTY SAND, SM,** light gray, moist, very dense, fine to coarse sand, nonplastic fines, estimated less than 10% fine gravel.	**See laboratory results for SS-4.** 2" of sand heave on top of sample.
						Water seeping into hole abundantly at 23'.
25	25.0					
	25.4	0.4	SS-5	50/5" (50/5")	**SILTY SAND WITH GRAVEL (SM),** similar to above, except estimated 15-20% fine to coarse gravel.	
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-OTCST-1	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237211.2 N, 1319923.8 E, South State Plane)

ELEVATION : 356.4 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : See comments.

START : 1/4/2010 END : 1/4/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0 31.0	1.0	SS-6	35-50/6" (50/6")	**POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM,** brownish-gray, moist to wet, very dense, fine to coarse sand, nonplastic fines, fine to coarse gravel.	**See laboratory results for SS-6.**
35	35.0 35.9	0.5	SS-7	30-50/5" (50/5")	**SILTY SAND WITH GRAVEL (SM),** brownish-gray, moist to wet, very dense, fine to coarse sand, estimated 15-20% nonplastic fines, estimated 15-20% fine to coarse subangular to subrounded gravel.	
40	40.0 40.8	0.8	SS-8	42-50/3" (50/3")	**POORLY GRADED SAND WITH GRAVEL (SP),** light brownish-gray, wet, very dense, medium to coarse sand, estimated 20-30% fine to coarse subrounded gravel, estimated less than 5% nonplastic fines.	Slight rig chatter at 39'. Slight rig chatter at 43'.
45	45.0 45.5	0.5	SS-9	50/6" (50/6")	**POORLY GRADED SAND WITH GRAVEL (SP),** same as above, gravel lodged in split spoon shoe.	
50	50.0 50.5	0.4	SS-10	50/6" (50/6")	**POORLY GRADED SAND WITH GRAVEL (SP),** same as above.	
55	55.0 56.5	1.2	SS-11	13-19-29 (48)	**POORLY GRADED SAND WITH SILT, SP-SM,** brown, moist to wet, dense, predominantly fine to medium sand, nonplastic fines, trace gravel, increased silt content from 55.8' to 55.9'.	**See laboratory results for SS-11.**
60						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-OTCST-1	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237211.2 N, 1319923.8 E, South State Plane)

ELEVATION : 356.4 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : See comments.

START : 1/4/2010 END : 1/4/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 – 61.5	1.7	SS-12	19-34-37 (71)	**POORLY GRADED SAND WITH SILT (SP-SM),** same as above.	Drilling completed at 11:26am on 1/04/2010.
					Bottom of hole at 61.5 ft below ground surface.	Water filling up hole to approximately 15' below ground surface. Heavy percolation from soil layer at about 3' below surface, possibly from nearby ditch. **Borehole Abandonment Log:** 0' to 0.2' - Fast Patch asphalt. 0.2' to 3' - Concrete mix. 3' to 4' - Colorado silica sand. 4' to 40' - 3/8" Bentonite chips. 40' to 60' - Collapsed native material.
65						
70						
75						
80						
85						
90						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER:	BORING NUMBER:
393372.H3.03.04.04.01	B-D-OTCST-2 SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237602.2 N, 1319928.3 E, South State Plane)

ELEVATION : 355.1 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 1/5/2010 END : 1/5/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is 2"-thick asphalt.	Began drilling at 8:42am on 1/05/2010.
						Slightly chattery drilling from 1' to 2'.
5	5.0					
	6.5	1.1	SS-1	7-13-17 (30)	**SILTY SAND (SM),** light gray, dry to slightly moist, medium dense, fine sand, estimated 35-45% nonplastic fines, trace fine subangular gravel.	
10	10.0					
	11.5	1.7	SS-2	19-22-24 (46)	**SILTY SAND, SM,** similar to above, except dense and slightly more gravel.	**See laboratory results for SS-2.**
15	15.0					
	15.8	0.7	SS-3	26-50/4" (50/4")	**SILTY SAND (SM),** similar to above, except very dense and broken gravel and medium sand from 15.6' to 15.8'.	
20	20.0					
	21.0	1.1	SS-4	28-50/6" (50/6")	**SILTY SAND, SM,** light gray, moist, very dense, fine to medium sand, nonplastic fines, fine to medium subrounded to rounded gravel.	**See laboratory results for SS-4.**
25	25.0					
	25.8	0.9	SS-5	40-50/3" (50/3")	**SILTY SAND (SM),** light brownish-gray, moist, very dense, predominantly fine sand, estimated 15-20% nonplastic fines, estimated less than 10% fine to coarse subrounded gravel.	
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER:	BORING NUMBER:
393372.H3.03.04.04.01	B-D-OTCST-2 SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link
LOCATION : Overlake Transit Center, Redmond. (237602.2 N, 1319928.3 E, South State Plane)
ELEVATION : 355.1 feet (NAVD88)
DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington
DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig
WATER LEVELS : Not noted.
START : 1/5/2010 END : 1/5/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.6	0.5	SS-6	50/6" (50/6")	**SILTY SAND (SM),** same as above.	
						Driller notes gravel from 32' to 33'.
35	35.0					
	36.0	1.0	SS-7	21-50/6" (50/6")	**POORLY GRADED SAND WITH SILT, SP-SM,** brown, moist to wet, very dense, fine to medium sand, predominantly medium sand, nonplastic fines, fine subangular to subrounded gravel.	**See laboratory results for SS-7.**
40	40.0					
	40.8	1.0	SS-8	14-50/4" (50/4")	**POORLY GRADED SAND WITH SILT (SP-SM),** similar to above, except wet from 40.8' to 41.0'.	
45	45.0					
	45.9	0.2	SS-9	39-50/5" (50/5")	**POORLY GRADED SAND WITH GRAVEL (SP),** poor recovery, sand with some gravel, gravel in split spoon shoe.	
50	50.0					
	50.5	0.2	SS-10	50/6" (50/6")	**POORLY GRADED SAND WITH GRAVEL (SP),** poor recovery, same as above.	
						Slight rig chatter from 52' to 54'.
55	55.0					
	56.5	1.3	SS-11	15-33-30 (63)	**POORLY GRADED SAND WITH SILT, SP-SM,** brown, moist to wet, very dense, predominantly fine to medium sand with coarse sand, nonplastic fines.	**See laboratory results for SS-11.**
60						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER:	BORING NUMBER:
393372.H3.03.04.04.01	B-D-OTCST-2 SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237602.2 N, 1319928.3 E, South State Plane)

ELEVATION : 355.1 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 1/5/2010 END : 1/5/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 61.5	1.6	SS-12	18-35-44 (79)	**POORLY GRADED SAND, SP,** dark brown, wet, very dense, predominantly medium sand, nonplastic fines, fine subrounded gravel.	**See laboratory results for SS-12.** Drilling completed at 10:44am on 1/05/2010.
					Bottom of hole at 61.5 ft below ground surface.	**Borehole Abandonment Log:** 0' to 0.2' - Fast patch asphalt. 0.2' to 1' - Concrete mix. 1' to 61' - 3/8" Bentonite chips.
65						
70						
75						
80						
85						
90						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-OTCST-3p	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (238256.4 N, 1319892.0 E, South State Plane)

ELEVATION : 365.6 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : High of 68.6' bgs (11/3/2010). See graph for additional details

START : 1/6/2010 END : 1/6/2010 LOGGER : M. Bouchedid

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is grass.	Began drilling at 8:30am on 1/6/2010.
5	5.0					
	6.5	1.1	SS-1	9-8-4 (12)	**SILTY SAND, SM,** brown with some light orange iron-oxide staining, moist, medium dense, fine to medium sand, predominantly fine sand, nonplastic fines, scattered fine subrounded gravel with 1" diameter gravel lodged in split spoon shoe.	**See laboratory results for SS-1.**
10	10.0					
	11.5	0.9	SS-2	1-5-3 (8)	**SILTY SAND WITH GRAVEL (SM),** similar to above, except loose, predominantly fine to medium sand.	
15	15.0					
	16.5	1.5	SS-3	2-5-16 (21)	**SANDY SILT, ML,** brown, moist, very stiff, nonplastic fines, fine to medium sand, fine subrounded gravel.	**See laboratory results for SS-3.**
20	20.0					
	21.5	1.0	SS-4	7-18-36 (54)	**SANDY SILT (ML),** similar to above, except hard.	
25	25.0					
	26.5	1.2	SS-5	17-23-28 (51)	**SANDY SILT, ML,** same as above.	**See laboratory results for SS-5.**
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-OTCST-3p	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (238256.4 N, 1319892.0 E, South State Plane)

ELEVATION : 365.6 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : High of 68.6' bgs (11/3/2010). See graph for additional details

START : 1/6/2010 END : 1/6/2010 LOGGER : M. Bouchedid

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0	0.2	SS-6	50/3" (50/3")	**SILTY SAND WITH GRAVEL (SM),** brown, moist, very dense, fine to medium sand, estimated 25-35% nonplastic fines, estimated 15% fine subrounded gravel.	Slight rig chatter at 32'.
35	35.0 35.3	0.2	SS-7	50/4" (50/4")	**SILTY SAND WITH GRAVEL (SM),** same as above.	
40	40.0 40.4	0.2	SS-8	50/5" (50/5")	**SILTY SAND WITH GRAVEL (SM),** same as above.	
45	45.0 45.4	0.3	SS-9	50/5" (50/5")	**SILTY SAND WITH GRAVEL (SM),** same as above.	
50	50.0 50.3	0.3	SS-10	50/4" (50/4")	**SILTY SAND WITH GRAVEL (SM),** same as above.	Slight rig chatter at 53'.
55	55.0 55.4	0.2	SS-11	50/5" (50/5")	**POORLY GRADED SAND WITH SILT (SP-SM),** poor recovery, gray, moist, very dense, fine to coarse sand, predominantly medium sand, estimated 10-15% nonplastic fines, trace fine to coarse subrounded gravel.	
60						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-OTCST-3p	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (238256.4 N, 1319892.0 E, South State Plane)

ELEVATION : 365.6 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : High of 68.6' bgs (11/3/2010). See graph for additional details.

START : 1/6/2010 END : 1/6/2010 LOGGER : M. Bouchedid

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 61.0	1.0	SS-12	14-50/6" (50/6")	**POORLY GRADED SAND WITH SILT, SP-SM,** same as above.	**See laboratory results for SS-12.**
						Slight rig chatter at 64'.
65	65.0					
	66.5	1.2	SS-13	19-22-17 (39)	**POORLY GRADED SAND WITH GRAVEL, SP,** gray, some light orange iron-oxide staining at 66', moist, dense, fine to coarse sand, nonplastic fines, fine to coarse subrounded gravel.	**See laboratory results for SS-13.**
70	70.0					
	71.0	1.0	SS-14	16-50/6" (50/6")	**POORLY GRADED SAND WITH SILT (SP-SM),** gray, wet, very dense, fine to coarse sand, predominantly medium sand, estimated 5-10% nonplastic fines, trace subrounded gravel.	
						Driller notes abundance of water.
75	75.0					
	76.5	1.1	SS-15	42-31-37 (68)	**POORLY GRADED SAND WITH SILT (SP-SM),** similar to above, except 2" seam with estimated 20% gravel.	6 to 8" of heave at 75'. Drilling completed at 12:07pm on 1/6/2010.
					Bottom of hole at 76.5 ft below ground surface.	**PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT 354** Well is 2-inch diameter schedule 40 PVC with 0.01" slotted screen installed from 65' to 75'.
80						0' to 1' - Flush concrete monument. 1' to 15' - 3/8" Bentonite chips. 15' to 57.5' - Bentonite-cement grout. 57.5' to 60' - 3/8" Bentonite chips. 60' to 76.5' - Colorado silica Sand.
85						
90						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-OVSSP-1p	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Shoulder of 148th Ave offramp to SR520E, Redmond. (234988.6 N, 1318648.8 E, South State Plane)

ELEVATION : 338.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Dry well. Water not noted in log.

START : 8/31/2010 END : 8/31/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is grasses and weeds.	Began drilling at 10:00am on 8/31/2010. Drilled slowly to 10' due to potential utility conflict.
5						
10	10.0 10.8	0.8	SS-1	37-50/4" (50/4")	**SILTY SAND, SM,** light brownish-gray, dry, very dense, fine to medium sand with trace coarse sand, nonplastic fines, fine subangular gravel.	**See laboratory results for SS-1.**
15	15.0 15.4	0.4	SS-2	50/5" (50/5")	**SILTY SAND (SM),** similar to above, except estimated 10% fine to coarse angular to subrounded gravel.	
20	20.0 20.5	0.5	SS-3	50/6" (50/6")	**SILTY SAND (SM),** similar to above, except slightly moist.	
25	25.0 25.4	0.4	SS-4	50/5" (50/5")	**SILTY SAND WITH GRAVEL (SM),** light yellowish-gray, dry to slightly moist, very dense, fine to coarse sand, estimated 25% nonplastic fines, estimated 15-20% fine to coarse angular to subangular gravel.	
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER:	BORING NUMBER:
393372.H3.03.04.04.01	B-D-OVSSP-1p SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Shoulder of 148th Ave offramp to SR520E, Redmond. (234988.6 N, 1318648.8 E, South State Plane)

ELEVATION : 338.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Dry well. Water not noted in log.

START : 8/31/2010 END : 8/31/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.6	0.5	SS-5	50/6" (50/6")	**SILTY SAND WITH GRAVEL, SM,** light yellowish-gray, moist, very dense, fine to coarse sand, predominantly fine to medium sand, nonplastic fines, fine subangular to subrounded gravel.	**See laboratory results for SS-5.**
35	35.0					
	35.9	0.7	SS-6	35-50/5" (50/5")	**WELL GRADED SAND WITH SILT, SW-SM,** brownish-gray, moist, very dense, fine to coarse sand, predominantly medium sand, nonplastic fines, fine to coarse subangular to subrounded gravel.	**See laboratory results for SS-6.**
40	40.0					
	40.5	0.5	SS-7	50/6" (50/6")	**SILTY SAND WITH GRAVEL (SM),** yellowish-gray, moist, very dense, fine to coarse sand, predominantly medium to coarse sand, estimated 15-20% nonplastic fines, estimated 30-35% fine to coarse angular to subrounded gravel. Bottom of hole at 40.5 ft below ground surface.	Drilling completed at 11:53am on 8/31/2010. **PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT 713.** Well is 2-inch diameter schedule 40 PVC with 0.01" slotted screen installed from 29' to 39'. 0' to 1' - Flush concrete monument. 1' to 25' - 3/8" Bentonite chips. 25' to 39' - Colorado silica sand.
45						
50						
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SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-PK-1p	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237123.8 N, 1320085.3 E, South State Plane)

ELEVATION : 359.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : High of 61.3' bgs (2/15/2010). See graph for additional details.

START : 1/4/2010 END : 1/4/2010 LOGGER : M. Bouchedid

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is grass.	Began drilling at 10:11am on 1/4/2010.
5	5.0					
	6.5	1.5	SS-1	3-3-8 (11)	**5.0'-6.0' - A: SANDY SILT (ML),** gray with orange iron-oxide mottling, moist, firm, nonplastic, estimated 30% sand, interbedded. **6.0'-6.5' - B: SILTY SAND WITH GRAVEL (SM),** brown, moist, medium dense, fine to coarse sand, estimated 20% nonplastic fines, estimated 20% fine subrounded gravel.	
10	10.0					
	11.5	1.8	SS-2	5-25-22 (47)	**SILTY SAND, SM,** brown, moist, dense, fine to coarse sand, predominantly fine sand, nonplastic fines, fine subrounded gravel.	**See laboratory results for SS-2.**
15	15.0					
	15.9	0.8	SS-3	18-50/5" (50/5")	**SILTY SAND (SM),** similar to above, except very dense.	
						Driller notes softer soils at 18.5'
20	20.0					
	21.4	1.0	SS-4	10-29-50/5" (79/11")	**SILTY SAND (SM),** brown, moist, very dense, fine to coarse sand, predominantly fine to medium sand, estimated 15% nonplastic fines, trace subrounded gravel.	
25	25.0					
	26.5	1.5	SS-5	16-28-27 (55)	**POORLY GRADED SAND WITH SILT, SP-SM,** brown, moist, very dense, fine to medium sand, predominantly fine sand, nonplastic fines, trace fine gravel.	**See laboratory results for SS-5.**
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-PK-1p	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237123.8 N, 1320085.3 E, South State Plane)

ELEVATION : 359.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : High of 61.3' bgs (2/15/2010). See graph for additional details START : 1/4/2010 END : 1/4/2010 LOGGER : M. Bouchedid

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0–31.5	1.5	SS-6	16-24-36 (60)	**POORLY GRADED SAND WITH SILT (SP-SM),** same as above.	
35	35.0–35.9	1.0	SS-7	31-50/5" (50/5")	**SILTY SAND WITH GRAVEL, SM,** brown, moist to slightly wet, very dense, predominantly medium to coarse sand, nonplastic fines, fine to coarse subrounded gravel.	**See laboratory results for SS-7.**
40	40.0–40.8	0.8	SS-8	34-50/4" (50/4")	**SILTY SAND WITH GRAVEL (SM),** same as above, 1" gravel lodged in split spoon shoe.	
45	45.0–45.8	0.7	SS-9	40-50/4" (50/4")	**POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM,** grayish-brown, moist, very dense, fine to coarse sand, nonplastic fines, fine to coarse subrounded gravel with three 1-inch gravel pieces.	**See laboratory results for SS-9.** Driller notes less gravels at 48'.
50	50.0–51.4	1.5	SS-10	32-34-50/5" (84/11")	**POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM,** brown, moist, very dense, fine to coarse sand, nonplastic fines, fine subrounded gravel.	**See laboratory results for SS-10.** Driller notes back in gravel at 53'.
55	55.0–56.5	1.0	SS-11	17-42-50 (92)	**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM),** same as above.	
60						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-PK-1p	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237123.8 N, 1320085.3 E, South State Plane)

ELEVATION : 359.3 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : High of 61.3' bgs (2/15/2010). See graph for additional details.

START : 1/4/2010 END : 1/4/2010 LOGGER : M. Bouchedid

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 – 61.5	1.5	SS-12	17-32-41 (73)	**POORLY GRADED SAND WITH SILT, SP-SM,** brown, moist, very dense, predominantly fine to medium sand, nonplastic fines, trace fine subrounded gravel.	**See laboratory results for SS-12.**
65	65.0 – 65.8	1.0	SS-13	27-50/4" (50/4")	**POORLY GRADED SAND WITH SILT (SP-SM),** similar to above, except wet, estimated 10% fine subrounded gravel.	Drilling completed at 12:25pm on 1/4/2010.
					Bottom of hole at 65.8 ft below ground surface.	**PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT 352** Well is 2-inch diameter schedule 40 PVC with 0.01" slotted screen installed from 54' to 64'. 0' to 2' - Flush concrete monument. 2' to 49' - 3/8" Bentonite chips. 49' to 65' - Colorado silica sand.
70						
75						
80						
85						
90						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER:	BORING NUMBER:
393372.H3.03.04.04.01	B-D-PK-2p

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237324.6 N, 1320042.2 E, South State Plane)

ELEVATION : 353.1 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : Dry well. Water not noted on log.

START : 1/5/2010 END : 1/5/2010 LOGGER : M. Bouchedid

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is grass.	Began drilling at 9:05am on 1/5/2010.
5	5.0					
	6.5	1.5	SS-1	5-12-14 (26)	**SILTY SAND (SM),** brown, moist, medium dense, fine to coarse sand, predominantly fine to medium sand, estimated 30-40% nonplastic fines, trace gravel scattered throughout.	
10	10.0					
	11.5	1.3	SS-2	6-8-10 (18)	**SANDY SILT, ML,** brown, moist, very stiff, nonplastic, fine to medium sand, 3/4" subangular gravel at 11.2'.	**See laboratory results for SS-2.**
15	15.0					
	16.5	1.2	SS-3	15-32-41 (73)	**SILTY SAND, SM,** brown, moist, very dense, fine to coarse sand, predominantly fine sand, nonplastic fines, scattered fine subrounded gravel.	**See laboratory results for SS-3.**
20	20.0					
	20.4	0.3	SS-4	50/5" (50/5")	**SILTY SAND (SM),** same as above.	
25	25.0					
	25.8	0.5	SS-5	40-50/4" (50/4")	**SILTY SAND WITH GRAVEL (SM),** similar to above, except estimated 25% gravel, estimated 20% nonplastic fines.	
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-PK-2p	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237324.6 N, 1320042.2 E, South State Plane)

ELEVATION : 353.1 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : Dry well. Water not noted on log.

START : 1/5/2010

END : 1/5/2010

LOGGER : M. Bouchedid

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0–31.5	0.4	SS-6	42-1-1 (2)	**SILTY SAND WITH GRAVEL (SM),** similar to above, except estimated 35% gravel, estimated 15% nonplastic fines.	Driller hits void from 30.5 to 32.5' while sampling SS-6. Blow counts are 42 for 4", 1 for 8" then 1 for 6".
35	35.0–35.8	0.5	SS-7	33-50/4" (50/4")	**WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM),** brown, moist, very dense, fine to coarse subrounded gravel, predominantly fine gravel, nonplastic fines, fine to coarse sand, 1" gravel piece lodged in split spoon shoe.	
40	40.0–41.3	1.0	SS-8	32-45-50/3" (95/9")	**WELL GRADED GRAVEL WITH SILT AND SAND, GW-GM,** similar to above, except wet from 40' to 40.8', moist from 40.8' to 41'.	**See laboratory results for SS-8.**
45	45.0–45.3	1.3	SS-9	18-34-50/4" (84/10")	**POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM,** brown, moist to wet, very dense, predominantly fine to medium sand, nonplastic fines, fine to coarse subrounded gravel.	Driller notes sand at 44.5'. **See laboratory results for SS-9.** Driller notes back in gravel at 46.5'.
50	50.0–51.5	1.4	SS-10	15-7-3 (10)	**POORLY GRADED SAND, SP,** brown, moist to wet, loose, predominantly medium sand, nonplastic fines.	**See laboratory results for SS-10.**
55	55.0–56.5	1.5	SS-11	30-42-38 (80)	**POORLY GRADED SAND (SP),** similar to above, except wet.	
60						Driller notes gravel at 59'.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER:	BORING NUMBER:
393372.H3.03.04.04.01	B-D-PK-2p SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237324.6 N, 1320042.2 E, South State Plane)

ELEVATION : 353.1 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : Dry well. Water not noted on log.

START : 1/5/2010 END : 1/5/2010 LOGGER : M. Bouchedid

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 60.8	1.1	SS-12	43-50/3" (50/3")	**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM),** grayish-brown, wet, very dense, fine to coarse sand, predominantly fine to medium sand, estimated 10% nonplastic fines, estimated 15% scattered fine subrounded gravel. Bottom of hole at 60.8 ft below ground surface.	Driller notes 6" of heave after SS-12. Drilling completed at 11:33am on 1/5/2010. **PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT 353** Well is 2-inch diameter schedule 40 PVC with 0.01" slotted screen installed from 40' to 50'. 0' to 2' - Flush concrete monument. 2' to 37' - 3/8" Bentonite chips. 37' to 51' - Colorado silica sand. 51' to 60' - 3/8" Bentonite chips.
65						
70						
75						
80						
85						
90						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-RW2-1p	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : P&P Auto Salon, NE 20th St, Bellevue. (232232.0 N, 1314345.6 E, South State Plane)

ELEVATION : 198.8 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 2.8' bgs (2/9/2010). See graph for additional details.

START : 1/27/2010 END : 1/27/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is 2"-thick asphalt.	Began drilling at 18:63pm on 1/27/2010. Cuttings are wet and gravelly.
5	5.0–6.5	0.5	SS-1	7-9-8 (17)	**POORLY GRADED SAND WITH SILT (SP-SM),** gray, moist to wet, medium dense, fine to medium sand, predominantly fine sand, estimated 5-10% nonplastic fines.	
10	10.0–11.5	1.0	SS-2	6-7-4 (11)	**SILTY SAND, SM,** dark gray, moist to wet, medium dense, fine sand, nonplastic fines.	**See laboratory results for SS-2.**
15	15.0–16.5	1.2	SS-3	5-6-5 (11)	**SANDY SILT, ML,** gray, moist, stiff, nonplastic to low plasticity, fine sand.	**See laboratory results for SS-3.**
20	20.0–20.5	0.7	SS-4	50/6" (50/6")	**SILT (ML),** gray, moist, hard, low plasticity, homogeneous appearance.	Drill rig chatter at 23'.
25	25.0–26.0	1.3	SS-5	25-50/6" (50/6")	**SILTY SAND WITH GRAVEL, SM,** gray, wet, very dense, fine to coarse sand, predominantly fine to medium sand, nonplastic fines, fine to coarse subangular to subrounded gravel, increased gravel percentage at 26.1'.	**See laboratory results for SS-5.** Drill rig chatter from 27' to 28'.
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SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-RW2-1p	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : P&P Auto Salon, NE 20th St, Bellevue. (232232.0 N, 1314345.6 E, South State Plane)

ELEVATION : 198.8 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 2.8' bgs (2/9/2010). See graph for additional details.

START : 1/27/2010 END : 1/27/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0 30.8	1.0	SS-6	40-50/3" (50/3")	**SILTY SAND, SM,** gray, wet, very dense, predominantly fine sand, nonplastic fines.	**See laboratory results for SS-6.** Drilling completed at 19:30pm on 1/27/2010.
					Bottom of hole at 30.8 ft below ground surface.	**PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT 224.** Well is 2-inch diameter schedule 40 PVC with 0.01" slotted screen installed from 19' to 29'. 0' to 1' - Flush concrete monument. 1' to 16' - 3/8" Bentonite chips. 16' to 29' - Colorado silica sand. 29' to 30.8' - Collapsed native material.

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SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-RW5-3	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Ramp from SR520E to NE 40th St, Redmond. (236590.8 N, 1319705.2 E, South State Plane)

ELEVATION : 353.8 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : Not noted.

START : 2/3/2010 END : 2/4/2010 LOGGER : M. Bouchedid

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is 13"-thick asphalt.	Began drilling at 22:35pm on 2/3/2010.
5	5.0					
	6.5	1.2	SS-1	8-18-22 (40)	**POORLY GRADED SAND WITH SILT, SP-SM,** brown, slightly moist, dense, fine to coarse sand, predominantly fine to medium sand, nonplastic fines.	**See laboratory results for SS-1.**
						Driller notes gravel from 6.5' to 7.5' then back in sand.
						Driller notes gravel at 9'.
10	10.0					
	11.5	1.1	SS-2	5-20-28 (48)	**POORLY GRADED SAND WITH SILT (SP-SM),** similar to above, trace gravel with 1" gravel piece lodged in split spoon shoe.	
15	15.0					
	16.5	1.3	SS-3	8-15-40 (55)	**POORLY GRADED SAND WITH SILT, SP-SM,** similar to above, except very dense and no gravel lodged in split spoon shoe.	**See laboratory results for SS-3.**
						Driller notes felt like clean sand between 15' and 20'.
20	20.0					
	21.5	1.3	SS-4	15-27-48 (75)	**POORLY GRADED SAND WITH SILT (SP-SM),** similar to above except trace gravel only from 21.1'-21.3'.	
						Driller notes gravel at 24'.
25	25.0					
	26.5	1.1	SS-5	19-48-50 (98)	**WELL GRADED SAND WITH SILT AND GRAVEL, SW-SM,** brown, moist to wet from 25'-25.3', moist from 25.3'-26.1', very dense, fine to coarse sand, predominantly medium to coarse sand, nonplastic fines, fine to coarse subangular to subrounded gravel.	**See laboratory results for SS-5.**
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER:	BORING NUMBER:
393372.H3.03.04.04.01	B-D-RW5-3 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Ramp from SR520E to NE 40th St, Redmond. (236590.8 N, 1319705.2 E, South State Plane)

ELEVATION : 353.8 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : Not noted.

START : 2/3/2010 END : 2/4/2010 LOGGER : M. Bouchedid

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0 30.9	0.7	SS-6	36-50/5" (50/5")	**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM),** similar to above, except wet, 1/8" thick lens of orange iron-oxide stains at 30.7'.	
						Driller notes gravel at 34'.
35	35.0 35.9	1.1	SS-7	21-50/5" (50/5")	**POORLY GRADED SAND WITH SILT, SP-SM,** brown, moist to slightly wet, very dense, fine to coarse sand, predominantly medium sand, nonplastic fines, fine subrounded gravel.	**See laboratory results for SS-7.**
40	40.0 40.8	1.0	SS-8	30-50/4" (50/4")	**SILTY SAND WITH GRAVEL (SM),** brown, moist to slightly wet, very dense, fine to coarse sand, predominantly fine to medium sand, estimated 15% nonplastic fines, estimated 30-40% fine subrounded gravel.	
45	45.0 45.5	0.4	SS-9	50/6" (50/6")	**WELL GRADED SAND WITH SILT AND GRAVEL, SW-SM,** brown, wet, very dense, fine to coarse sand, predominantly fine to medium sand, nonplastic fines, fine gravel, 1" gravel piece lodged in split spoon shoe.	**See laboratory results for SS-9.**
50	50.0 50.5	0.5	SS-10	50/6" (50/6")	**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM),** similar to above, except no gravel lodged in split spoon shoe.	Drilling completed at 00:15am on 2/4/2010.
					Bottom of hole at 50.5 ft below ground surface.	**Borehole Abandonment Log:** 0' to 1' - Flush concrete patch. 1' to 50' - 3/8" Bentonite chips.
55						
60						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-RW6-1p	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237960.7 N, 1320011.1 E, South State Plane)

ELEVATION : 352.5 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : High of 55.3' bgs (7/8/2010). See graph for additional details.

START : 1/6/2010 END : 1/7/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is asphalt.	Began drilling at 8:04am on 1/6/2010.
						Chattery drilling 1' to 3'.
5	5.0					
	6.5	1.5	SS-1	13-24-20 (44)	**SILTY SAND (SM),** light gray, dry, dense, predominantly fine sand, estimated 30-40% nonplastic fines, estimated 10-15% fine to coarse subrounded gravel.	
						Chattery drilling 5' to 10'.
10	10.0					
	11.5	1.3	SS-2	14-16-17 (33)	**SILTY SAND, SM,** same as above.	**See laboratory results for SS-2.**
15	15.0					
	16.5	1.3	SS-3	23-43-44 (87)	**SILTY SAND (SM),** gray, slightly moist, very dense, fine sand, estimated 30-40% nonplastic fines, estimated 5-10% subrounded to rounded gravel.	Chattery drilling at 16'.
20	20.0					
	20.5	0.5	SS-4	50/6" (50/6")	**SILTY SAND (SM),** same as above.	
						Slight rig chatter at 24'.
25	25.0					
	25.3	0.5	SS-5	50/4" (50/4")	**SANDY SILT, ML,** gray, some orange iron-oxide staining, moist, hard, nonplastic fines, fine sand, estimated 5-10% fine subangular to subrounded gravel.	**See laboratory results for SS-5.**
						Drilling stopped at 9:38am on 1/6/2010 at 28' due to faulty transmission on drill rig. Drilling resumed with CME 75 rig at 7:45am on 1/7/2010.
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-RW6-1p	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237960.7 N, 1320011.1 E, South State Plane)

ELEVATION : 352.5 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : High of 55.3' bgs (7/8/2010). See graph for additional details

START : 1/6/2010 END : 1/7/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0 30.7	0.7	SS-6	45-50/2" (50/2")	**SANDY SILT WITH GRAVEL (ML),** similar to above, except estimated 15% gravel.	
35	35.0 35.8	0.3	SS-7	50/4" (50/4")	**SILTY SAND (SM),** dark gray, moist, very dense, fine sand, estimated 25-35% nonplastic fines, estimated 5-10% fine subangular to subrounded gravel.	
40	40.0 40.8	0.6	SS-8	19-50/4" (50/4")	**WELL GRADED SAND WITH SILT AND GRAVEL, SW-SM,** light brownish-gray, moist, very dense, fine to coarse sand, nonplastic fines, fine to coarse subangular to subrounded gravel, gravel lodged in split spoon shoe.	**See laboratory results for SS-8.** Driller notes softer soils at 43'.
45	45.0 45.5	0.1	SS-9	50/6" (50/6")	**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM),** poor recovery, same as above, gravel lodged in split spoon shoe.	Gravels up to 3" in diameter observed in cuttings.
50	50.0 50.8	0.7	SS-10	19-50/4" (50/4")	**WELL GRADED SAND WITH SILT AND GRAVEL, SW-SM,** similar to SS-9 except wet.	**See laboratory results for SS-10.**
55	55.0 55.8	0.7	SS-11	44-50/3" (50/3")	**POORLY GRADED SAND WITH SILT (SP-SM),** light brownish-gray, wet, very dense, fine to coarse sand, predominantly medium to coarse sand, estimated 10-15% nonplastic fines, estimated 20-30% fine to coarse subrounded to rounded gravel.	
60						Driller notes very wet at 59'.

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-RW6-1p	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Overlake Transit Center, Redmond. (237960.7 N, 1320011.1 E, South State Plane)

ELEVATION : 352.5 feet (NAVD88)

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : High of 55.3' bgs (7/8/2010). See graph for additional details.

START : 1/6/2010 END : 1/7/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 61.5	1.1	SS-12	7-27-37 (64)	**POORLY GRADED SAND WITH SILT, SP-SM,** gray, wet, very dense, fine to coarse sand, predominantly medium sand, nonplastic fines, trace fine to coarse subrounded to rounded gravel. Bottom of hole at 61.5 ft below ground surface.	**See laboratory results for SS-12.** Drilling completed at 9:42am on 1/7/2010. **PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT 355.** Well is 2-inch diameter schedule 40 PVC with 0.01" slotted screen installed from 50' to 60'. 0' to 1' - Flush concrete monument. 1' to 22' - 3/8" Bentonite chips. 22' to 46' - Bentonite-cement grout. 46' to 48' - 3/8" Bentonite chips. 48' to 61.5' - Colorado silica sand.
65						
70						
75						
80						
85						
90						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Drilled	Start 9/15/2009	End 9/15/2009	Total Depth (ft)	52	Logged By RBM / Checked By CMK	Driller Geologic Drill, Inc.	Drilling Method Hollow Stem Auger

Hammer Data	Rope & Cathead 140 (lbs) / 30 (in) Drop	Drilling Equipment	Trailer-mounted Deep Rock XL
Surface Elevation (ft) / Vertical Datum	335.07 NAVD88	Top of Casing Elevation (ft)	334.62
Easting (X) / Northing (Y)	1318830.790 / 234728.333	Horizontal Datum	NAD83/91

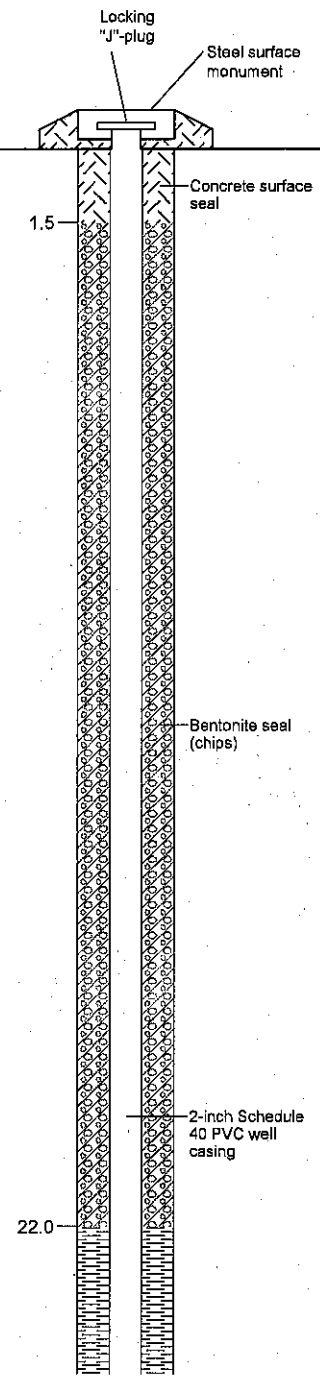
A 2 (in) well was installed on 9/15/2009 to a depth of 48.8 (ft).

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
9/16/2009	38.68	296.39

Notes: Auger Data: 4 ¼-inch I.D.; 8 ½-inch O.D.

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
	0								AC	8.5 inches asphalt concrete		
									GM / SM	4 inches gray silty gravel with sand and trace organic matter (medium dense, moist) (base course)		
			16	26		1				Grayish brown silty fine sand with occasional gravel and occasional cobbles (medium dense, moist) (fill)		
330	5		18	15		2						
			18	30		3						
325	10		13	29		4						
			12	65/9"		5 SA			SM	Grayish brown silty fine to medium sand with occasional fine gravel (very dense, moist) (till) %F = 36	9	
320	15		5	50/5"		6						
									SP-SM	Brown and gray medium to coarse sand with silt and fine gravel (very dense, moist) (advance outwash)		
315	20		12	50/6"		7						
									GP-GM	Brown and gray fine gravel with silt and medium to coarse sand (very dense, moist) %F = 10		
	25											

WELL LOG



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

SITE COPY
BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

Log of Monitoring Well MW-1

GEOENGINEERS

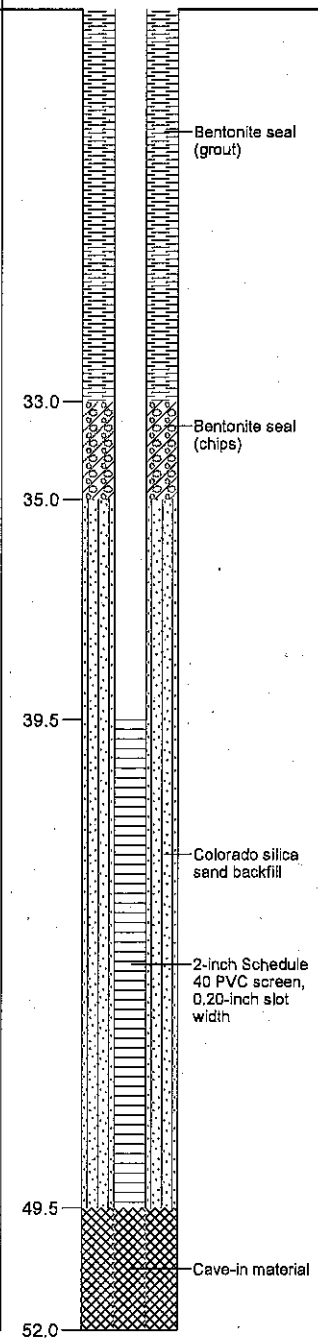
Project: Overlake Village Stormwater Facility
Project Location: Redmond, Washington
Project Number: 0500-161-00

Figure A-2
Sheet 1 of 2

Redmond: Date:2/22/11 Path:C:\DOCUMENTS AND SETTINGS\CVOSS\DESKTOP\GINT\0500161\0100\0500161\0100.GPJ DBTemplate\LibTemplate\GEOENGINEERS8.GDT\GEI8_GEOTECH_WELL

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
	25		4	50/4"		8 SA					7	
									SW-SM	Brown and gray medium to coarse sand with silt and fine gravel (very dense, moist)		
305	30		5	50/5"		9						
300	35		9	50/5"		10 SA				%F = 8	9	
295	40		5	50/5"		11				(Rock fragments in sampler shoe)		
									SP	Grayish brown medium to coarse sand with trace silt and occasional gravel (very dense, wet)		
290	45		18	90		12				(6 inches of heave)		
										(12 inches of heave)		
285	50		10	92/10"		13 14				(Sample 14 from 2.4-inch I.D. split barrel sampler used to remove heave prior to well installation)		

WELL LOG



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

SITE COPY
BLDG-2018-00881, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

Log of Monitoring Well MW-1 (continued)

GEOENGINEERS

Project: Overlake Village Stormwater Facility
Project Location: Redmond, Washington
Project Number: 0500-161-00

Figure A-2
Sheet 2 of 2

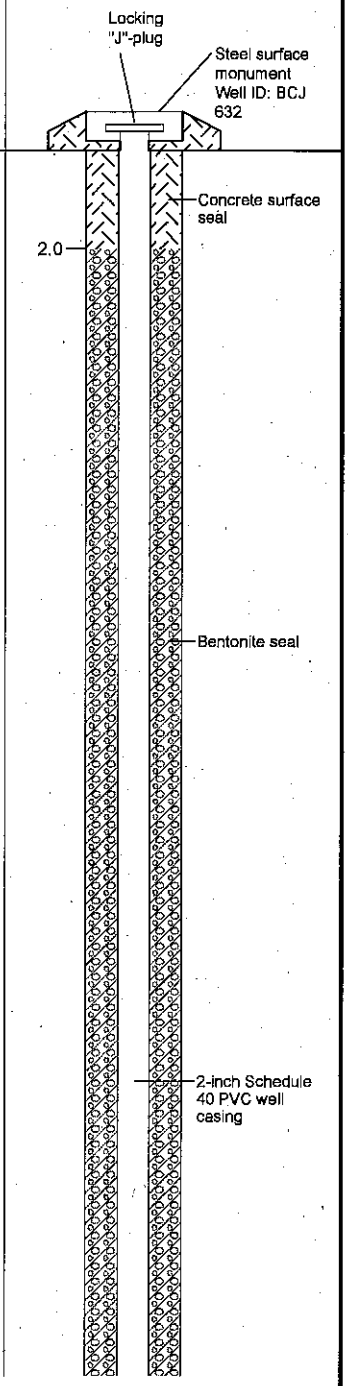
Redmond: Date:2/23/11 Path:C:\DOCUMENTS AND SETTINGS\CVOSS\DESKTOP\GINT\0500161000\0500161000.GPJ DBTemplate\LibTemplate\GEOENGINEERS8.GDT\GEI8_GEOTECH_WELL

Drilled Start 10/30/2010	End 10/30/2010	Total Depth (ft) 51.5	Logged By JCK / Checked By CMK	Driller Holocene Drilling	Drilling Method Hollow Stem Auger/SPT
Hammer Data	Automatic 140 (lbs) / 30 (in) Drop		Drilling Equipment	Truck-mounted Brainard-Kilman 81	A 2 (in) well was installed on 10/30/2010 to a depth of 48 (ft).
Surface Elevation (ft) / Vertical Datum	335.35 NAVD88		Top of Casing Elevation (ft)	334.95	Groundwater: Date Measured 11/7/2010; Depth to Water (ft) 38.12; Elevation (ft) 297.23
Easting (X) / Northing (Y)	1318271.909 / 234537.227		Horizontal Datum	NAD83/91	

Notes: Auger Data: 4-inch I.D.; 9-inch O.D.

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
335	0								AC	2 inches asphalt concrete		
									SM	Brown/gray silty sand with gravel (medium dense to dense, moist) (fill/weathered till)		
			18	30		1						
330	5		18	37		2						
			11	50/5"		3			SM	Gray silty fine to medium sand with gravel (very dense, moist) (till)		
325	10		14	61		4 SA				%F = 26	11	
320	15		4	50/4"		5						
315	20		4	50/4"		6						
	25											

WELL LOG



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

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

Log of Monitoring Well MW-PS-3

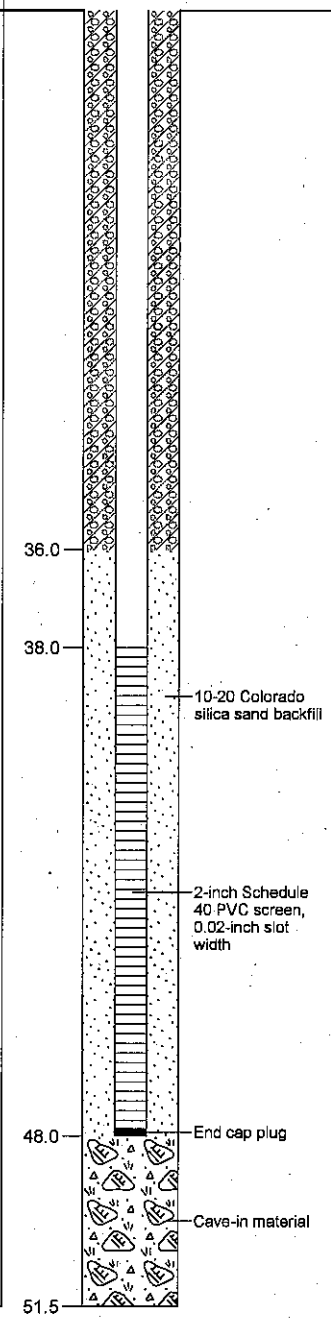
GEOENGINEERS

Project: Overlake Village Stormwater Facility
Project Location: Redmond, Washington
Project Number: 0500-161-02

Figure A-9
Sheet 1 of 2

Redmond: Date:2/22/11 Path:C:\DOCUMENTS AND SETTINGS\CVOSS\DESKTOP\GINT\0500161000500016102.GPJ D3\Template\Lib\Template:GEOENGINEERS8.GDT/GEI8_GEOTECH_WELL

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
310	25		6	50/6"		7						
									SP-SM	Brown fine to coarse sand with silt and gravel (very dense, moist) (advance outwash)		
305	30		10	50/4"		8 SA				%F = 8	11	
									GM	Brown silty gravel with sand (very dense, wet)		
300	35		6	50/6"		9						
									CH	Gray clay with fine sand (hard, moist)		
295	40		18	56		10 AL					24	
									SP-SM	Brown fine to medium sand with silt (very dense, wet)		
290	45		12	50/6"		11 SA				%F = 6	24	
									SP-SM	Brown fine to coarse sand with silt and gravel (very dense, wet)		
285	50		18	50/5"		12						



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

SITE COPY
BLDG-2018-00887, BLDG-2018-00885, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Log of Monitoring Well MW-PS-3 (continued)

GEOENGINEERS

Project: Overlake Village Stormwater Facility
Project Location: Redmond, Washington
Project Number: 0500-161-02

Figure A-9
Sheet 2 of 2

Redmond Date:2/22/11 Path:C:\DOCUMENTS AND SETTINGS\CVOSS\DESKTOP\GINT\0500161\0500161\02.GPJ DBTemplate1.libTemplate:GEOENGINEERS8.GDT\GEI8_GEOTECH_WELL

Drilled	Start 10/31/2011	End 11/1/2011	Total Depth (ft) 80	Logged By SMJ / Checked By CMK	Driller Holocene Drilling, Inc.	Drilling Method Hollow-stem Auger

Hammer Data	Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment	Truck-mounted Brainard-Kilman 81
Surface Elevation (ft) Vertical Datum	336.9 NAVD88	Top of Casing Elevation (ft)	336.65
Easting (X) Northing (Y)	234607.65 1318541.98	Horizontal Datum	NAD83/91

DOE Well I.D.: BHH 734
A 2 (in) well was installed on 10/31/2011 to a depth of 49.5 (ft).

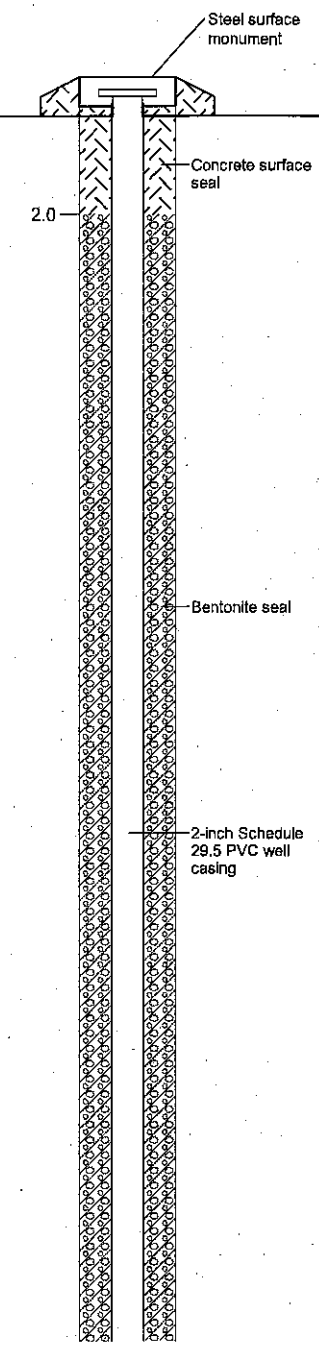
Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
10/31/2011	40.0	296.9

Notes: Auger Data: 4-inch I.D.; 9-inch O.D.

FIELD DATA

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
	0								AC	6 inches asphalt concrete		
335									SM	Light brown silty fine sand with occasional gravel (medium dense, moist) (fill)		
			12	12		1						
	5		18	31		2			SM	Brown silty fine to medium sand with gravel (trace organics) (dense, moist) (weathered till)		
330												
									SM	Grayish-brown silty fine to medium sand with gravel (very dense, moist) (till)		
	10		9	71		3				Rough drilling		
325												
	15		2	50/2"		4				Driller noted drilled through rock		
320												
	20		13	71/9"		5				Rough drilling		
315										Water added at 22 feet		
	25											

WELL LOG



Note: Please see Figure A-1 for explanation of symbols

SITE COPY
BLDG-2018-00888, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Log of Monitoring Well MW-PS-7

GeoEngineers

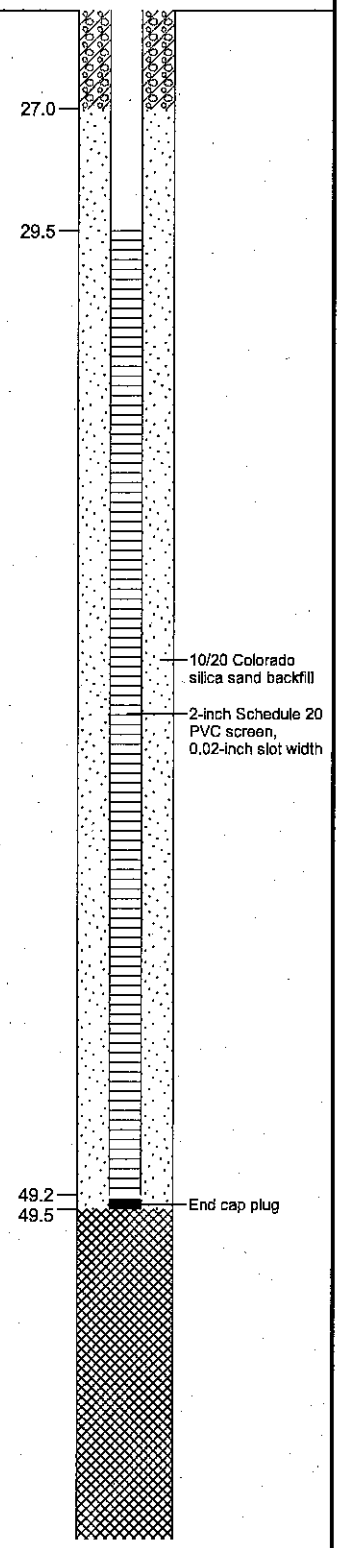
Project: Overlake Village Stormwater Facility
Project Location: Redmond, Washington
Project Number: 0500-161-04

Figure A-13
Sheet 1 of 3

Redmond Date:7/30/13 Path:\\REDPROJECTS\0050016\1\GINT\0500161\0X.GPJ DBTemplate\LibTemplate.GEOENGINEERS8.GDT/GEI8_GEOTECH_WELL

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
	25		9	50/5"		6						
310												
									SM	Gray silty fine to medium sand (very dense, moist to wet) (outwash)		
	30		12	50/6"		7 SA				%F = 14	14	
305												
	35		9	56/11"		8						
300												
									SP-SM	Gray fine to medium sand with silt and occasional gravel (very dense, wet)		
	40		17	66/11"		9 SA	▽			%F = 6		
295												
	45		12	50/6"		10						
290												
	50		12	50/6"		11				Water pumped into hole at 50 feet		
285												
										(grades to medium dense)		
	55		18	38		12						

WELL LOG



Note: Please see Figure A-1 for explanation of symbols

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00988

Log of Monitoring Well MW-PS-7 (continued)

GeoEngineers

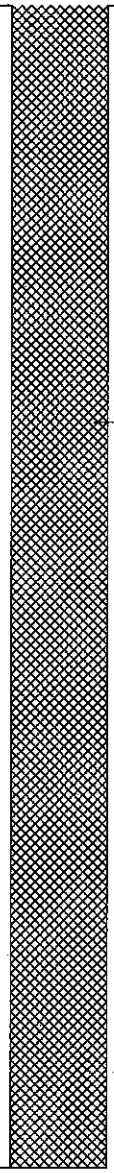
Project: Overlake Village Stormwater Facility
Project Location: Redmond, Washington
Project Number: 0500-161-04

Figure A-13
Sheet 2 of 3

Redmond: Date:7/30/13 Path:\\RED\PROJECTS\0\0500161\GINT\050016104.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_WELL

Elevation (feet)	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density, (pcf)
280											
	60	18	39		13						
275											
	65	18	35		14				6 inches of heave		
270											
	70	18	29		15				(gravel) 5 inches of heave		
265											
	75	18	28		16				6 inches heave		
260											
	80								15 feet of heave; excessive heave-unable to sample		

WELL LOG



Note: Please see Figure A-1 for explanation of symbols

SITE COPY
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BLDG-2013-00983, BLDG-2013-00985

Log of Monitoring Well MW-PS-7 (continued)

GEOENGINEERS

Project: Overlake Village Stormwater Facility
Project Location: Redmond, Washington
Project Number: 0500-161-04

Figure A-13
Sheet 3 of 3

Redmond: Date:7/30/13 Path:\\RED\PROJECTS\0\0500161\GINT\050016104.GPJ DBTemplate\.lib\Template:GEOENGINEERS8.GDT/GEI8_GEOTECH_WELL

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

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

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod

Measured groundwater level in exploration, well, or piezometer

Groundwater observed at time of exploration

Perched water observed at time of exploration

Measured free product in well or piezometer

Stratigraphic Contact

Distinct contact between soil strata or geologic units

Gradual change between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

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.

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

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985

GEOENGINEERS

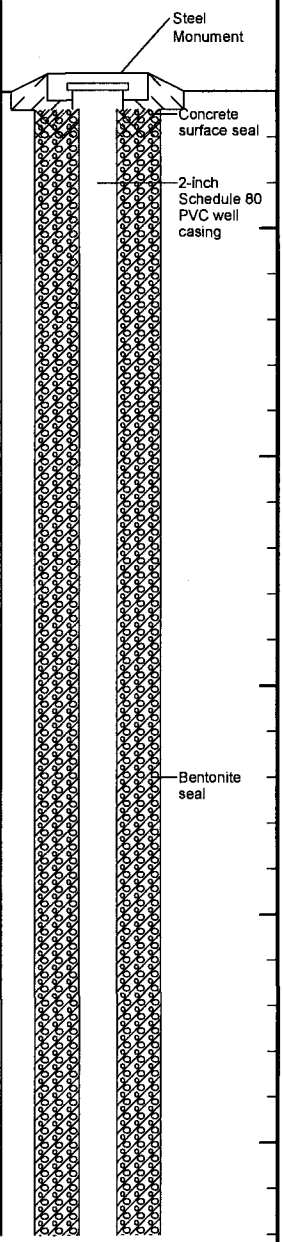
FIGURE A-1

Date(s) Drilled	04/29/06	Logged By	BJ2	Checked By	SRR
Drilling Contractor	Subterranean Inc	Drilling Method	HSA	Sampling Methods	Dames & Moore
Auger Data	4-inch I.D.	Hammer Data	300 (lb) hammer/ 30 (in) drop	Drilling Equipment	B-61 Truck Rig
Total Depth (ft)	59	Ground Surface Elevation (ft)	368	Groundwater Elevation (ft. bgs)	328
Vertical Datum		Datum/ System		Easting(x): Northing(y):	

Depth feet	SAMPLES Interval Recovered (in)	Blows/foot	Sub-Sample Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³
0					AC	5 inches asphalt concrete pavement		
					GP	6 inches gravel base course		
					SM	Brown silty sand with gravel (loose, moist) (fill)		
	18	9	1				25	96
5					SM	Gray silty fine to medium sand with gravel (medium dense, moist) (glacial till)		
	18	18						
10						Grades to very dense		
	18	47	3				11	123
15								
	9	50/3"	4			%F=46	12	
20					SP-SM	Gray fine to medium sand with silt and gravel (very dense, moist) (advance outwash)		
	6	50/6"						
25								

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

WELL CONSTRUCTION



LOG OF BORING B-2

GEOENGINEERS

Project: Microsoft Block C Development
Project Location: Redmond, Washington
Project Number: 0694-015-00

Figure A-3
Sheet 1 of 3

SITE COPY
BLDG-2018-00887, BLDG-2018-00886, BLDG-2018-00883, BLDG-2018-00884, BLDG-2018-00885

V6_GTWELL P:\0\0694015\00\FINALS\069401500.GPJ GEIV6_1.GDT 1/24/07

Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	WELL CONSTRUCTION
25										
		6	50/6"							
30						SP	Brown to gray fine to coarse sand with occasional gravel (very dense, moist) (advance outwash)			
		5	50/5"							
35										
		6	50/6"							
40						SP-SM	Gray to brown fine to medium sand with silt and gravel (very dense, wet) (advance outwash)			10/20 sand backfill
		18	74							
45										
		18	76	10		SP	Brown fine to medium sand (very dense, wet) (advance outwash)	11	113	2-inch Schedule 80 PVC screen, 0.010-inch slot width
50										
		17	87/11"							
55										

LOG OF BORING B-2 (continued)

GEOENGINEERS

Project: Microsoft Block C Development
Project Location: Redmond, Washington
Project Number: 0694-015-00

Figure A-3
Sheet 2 of 3

SITE COPY
BLDG-2018-00887, BLDG-2018-00886, BLDG-2018-00893, BLDG-2018-00884, BLDG-2018-00885

V6_GTWELL P:\0\0694015\00\FINALS\069401500.GPJ GEIV6_1.GDT 1/24/07

Depth feet	SAMPLES: Interval Recovered (in)	SAMPLES: Blows/foot	SAMPLES: Sub-Sample Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	WELL CONSTRUCTION
	18	88							
						Bottom of hole at 59 feet Perched groundwater was encountered at 40 feet during drilling			
60									
65									
70									
75									
80									
85									

V6_GTWELL P:\0\0694015\00\FINALS\069401500.GPJ GEIV6_1.GDT 1/24/07

LOG OF BORING B-2 (continued)

GEOENGINEERS

Project: Microsoft Block C Development
Project Location: Redmond, Washington
Project Number: 0694-015-00

SITE COPY
BLDG-2018-00887, BLDG-2018-00890, BLDG-2018-00893, BLDG-2018-00894, BLDG-2018-00895

Figure A-3
Sheet 3 of 3

Date(s) Drilled	04/28/06	Logged By	BJ2	Checked By	SRR
Drilling Contractor	Subterranean Inc	Drilling Method	HSA	Sampling Methods	Dames & Moore
Auger/Bit Data	4-inch I.D.	Hammer Data	300 (lb) hammer/ 30 (in) drop	Drilling Equipment	B-61 Truck Rig
Total Depth (ft)	58.5	Surface Elevation (ft)	368	Groundwater Elevation	333
Vertical Datum		Datum/ System		Easting(x): Northing(y):	

Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample	Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
0								AC	5 inches asphalt concrete pavement			
								GP	4 inches gravel base course			
								SM	Brown silty sand with occasional gravel and organics (medium dense, moist) (fill)			
		18	11		1					20	104	
5												
		18	27		2			SM	Gray silty fine to medium sand with gravel (medium dense, moist) (glacial till)			
10												
		17	87/11"		3				Grades to very dense			
15												
		6	50/6"		4							
20												
		6	50/4'		5							
25												

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

V6_GTBORING P:\0\0694015\00\FINALS\0694015\00.GPJ GEIV6_1.GDT 1/24/07

LOG OF BORING B-3

GEOENGINEERS

Project: Microsoft Block C Development
Project Location: Redmond, Washington
Project Number: 0694-015-00

SITE COPY
BLDG-2010-00885

Figure A-4
Sheet 1 of 3

Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample	Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
25												
	■	3	50/5"	I	6					10	135	
30								SM	Gray fine to coarse silty sand with gravel (very dense, moist) (advance outwash)			
		3	50/5"	I	7							%F=38
35						▽						
		5.5	50/5.5"	I	8				Becomes wet			
40								SP-SM	Brown fine to medium sand with silt and gravel (very dense, wet) (advance outwash)			
	■	4	50/4"	I	9							Heavy shoe damaged
45									Grades to fine to coarse sand with occasional gravel			
	■	6	50/4"	I	10					8		SA, %F=6
50												
	■	6	50/4"	I	11					10	134	
55												

LOG OF BORING B-3 (continued)

GEOENGINEERS

Project: Microsoft Block C Development
Project Location: Redmond, Washington
Project Number: 0694-015-00

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BLDG-2018-00887, BLDG-2018-00886, BLDG-2018-00883, BLDG-2018-00884, BLDG-2018-00885

Figure A-4
Sheet 2 of 3

V6_GTBORING P:\0\0694015\00\FINALS\0694015\00.GPJ GEIV6_1.GDT 1/24/07

Depth feet	SAMPLES: Interval Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	6	50/3"	12							
60							Bottom of hole at 59 feet Perched groundwater was encountered at 35 feet during drilling			
65										
70										
75										
80										
85										

LOG OF BORING B-3 (continued)

GEOENGINEERS

Project: Microsoft Block C Development
Project Location: Redmond, Washington
Project Number: 0694-015-00

Figure A-4
Sheet 3 of 3

SITE COPY
BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893, BLDG-2018-00895, BLDG-2018-00895

V6_GTBORING P:\0\0694015\00\FINALS\069401500.GPJ GEIV6_1.GDT 1/24/07

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LESS THAN 5% FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(GREATER THAN 12% FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		(LESS THAN 5% FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50 OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(GREATER THAN 12% FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	INORGANIC		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
	LIQUID LIMIT LESS THAN 50	ORGANIC		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	INORGANIC		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
	LIQUID LIMIT GREATER THAN 50	ORGANIC		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
FILL SOILS				FILL (AF)	HUMAN ALTERED SOIL OR MODIFIED LAND

NOTES:

1. SOIL DESCRIPTIONS ARE BASED ON THE GENERAL APPROACH PRESENTED IN THE STANDARD PRACTICE FOR DESCRIPTION AND IDENTIFICATION OF SOILS (VISUAL-MANUAL PROCEDURE), AS OUTLINED IN ASTM D 2488. WHERE LABORATORY INDEX TESTING HAS BEEN CONDUCTED, SOIL CLASSIFICATIONS ARE BASED ON THE STANDARD TEST METHOD FOR CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES, AS OUTLINED IN ASTM D 2487.

2. SOIL DESCRIPTION TERMINOLOGY IS BASED ON VISUAL ESTIMATES (IN THE ABSENCE OF LABORATORY TEST DATA) OF THE PERCENTAGES OF EACH SOIL TYPE AND IS DEFINED AS DESCRIBED BELOW:

3. DUAL SYMBOLS (E.G. SP-SM, OR GP-GM) ARE USED TO INDICATE A SOIL WITH AN ESTIMATED 5-12% FINES.

   PRIMARY CONSTITUENT: >50% - "GRAVEL", "SAND", "SILT", "CLAY", etc.
   SECONDARY CONSTITUENTS: >12% and ≤50% - "gravelly", "sandy", "silty", etc.
   ADDITIONAL CONSTITUENTS: >5% and ≤12% - "some gravel", "some sand", "some silt", etc.
   ≤5% - "trace gravel", "trace sand", "trace silt" etc. or not noted.

4. RELATIVE DENSITY OF SOIL IS BASED ON STANDARD TEST METHOD FOR PENETRATION TEST (SPT) AND SPLIT-BARREL SAMPLING OF SOILS ASTM D 1586 OR CORRELATIONS FOR OTHER SIMPLER TYPES AND METHODS FOR SPT SAMPLING, THE FOLLOWING BLOW COUNT CORRELATION APPLIES.

   A. RELATIVE DENSITY OF COARSE GRAINED SOILS (N = BLOWS/FOOT SPT METHOD)
   - VERY LOOSE: N = ≤4
   - LOOSE: N = >4 AND ≤10
   - MEDIUM DENSE: N = >10 AND ≤30
   - DENSE: N = >30 AND ≤50
   - VERY DENSE: N = >50

   B. RELATIVE CONSISTENCY OF FINE GRAINED SOILS (N = BLOWS/FOOT SPT METHOD)
   - VERY SOFT: N = <2
   - SOFT: N = ≥2 AND ≤4
   - MEDIUM STIFF: N = >4 AND ≤8
   - STIFF: N = >8 AND ≤15
   - VERY STIFF: N = >15 AND ≤30
   - HARD: N = >30

AMEC Environment & Infrastructure
11810 North Creek Parkway North
Bothell, WA, U.S.A. 98011-8201

CLIENT LOGO

CLIENT

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00893, BLDG-2018-00895

PROJECT	DWN BY: JRS	DATUM:	DATE: JULY 2010
TITLE	CHK'D BY: JD	REV. NO.:	PROJECT NO:
SOIL CLASSIFICATION CHART / KEY	PROJECTION:	SCALE: NOT TO SCALE	FIGURE No. A-1

G:_Amec_Library\Standard Details\SOIL CLASS CHART.dwg – Layout1 (2) – Dec. 06, 2011 11:36am – jeffrey.sanders

PROJECT: *Overlake Village Regional Stormwater Facility* JOB No. *3-917-17625-0* BORING No. *UICW-PS-10*

Page 1 of 2

Location: West of Building 13

Approximate ground surface elevation: 337 feet

DEPTH (feet)	Soil Description	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Blows per foot)	TESTING
0	2.5-inches asphalt over 3-inches crushed rock base course over moist, gray, silty, fine to medium SAND (Fill) SM			N/E		
	Very dense, damp, gray, silty fine to medium SAND with trace to some gravel (Glacial Till) SM					
5			S-1		76	
10			S-2		50/4"	
15			S-3		50/5"	
20			S-4		50/5"	
	Very dense, moist, gray, gravelly SAND with some silt (Glacial Till/Advance Outwash) SP-SM					
25			S-5		50/3"	
	Very dense, wet, gray, gravelly SAND with trace to some silt (Advanced Outwash) SP-SM		S-6		50/4"	
30	Drilling becomes gravelly					

PENETRATION RESISTANCE: ▲ Standard; ##/# Blows over inches; △ Other

Blows per foot: 0 10 20 30 40 50

MOISTURE CONTENT: 0 20 40 60 80 100 — Plastic Limit — Liquid Limit

LEGEND

- 2.00-inch OD split-spoon sampler
- N/E No groundwater encountered
- Organic Content (% shown)
- Permeability test
- Grain Size Analysis (% fines shown)

Observation well:

- Monument
- Bentonite Fill with PVC Pipe
- Groundwater Level
- Sand Fill with Slotted PVC Pipe
- Pipe Cap
- Slough at Bottom of Hole

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00898, BLDG-2018-00985

amec

11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Automatic Date drilled: *September 14, 2013* Logged By: *TDW*

Drilled by: *Holocene Drilling*

BOTHELL_LOG FORMAT 2012 W/O PS10-12.GPJ BOTHELL GEO 2010 B&TP.GDT 11/7/13

PROJECT: *Overlake Village Regional Stormwater Facility* JOB No. *3-917-17625-0* BORING No. *UICW-PS-10*

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Standard / Blows over inches / Other; Blows per foot)	TESTING
	Location: West of Building 13 Approximate ground surface elevation: 337 feet						Page 2 of 2
30	Very dense, damp to moist, gray, fine to medium SAND with some silt and trace gravel (Advance Outwash) SP-SM			S-7		63	1, CEC=6
				S-8		78	11
35	Knocked out 10-inch diameter plate and left in bottom of well 34.5' to 35' bgs Unique DOE Well #BHV-268 Boring terminated at approximately 35 feet						
40							
45							
50							
55							
60							

Scale: 0, 10, 20, 30, 40, 50

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100 (Plastic Limit – Liquid Limit)

LEGEND

- 2.00-inch OD split-spoon sampler
- N/E No groundwater encountered
- Organic Content (% shown)
- Permeability test
- Grain Size Analysis (% fines shown)

Observation well:
- Monument
- Bentonite Fill with PVC Pipe
- Groundwater Level
- Sand Fill with Slotted PVC Pipe
- Pipe Cap
- Slough at Bottom of Hole

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11810 North Creek Parkway N
Bothell, Washington 98011

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Drilling Method: HSA Hammer Type: Automatic Date drilled: *September 14, 2013* Logged By: *TDW*

Drilled by: *Holocene Drilling*

BOTHELL_LOG FORMAT 2012 W/O PS10-12.GPJ BOTHELL GEO 2010 B&TP.GDT 11/7/13

PROJECT: *Overlake Village Regional Stormwater Facility* JOB No. *3-917-17625-0* BORING No. *MW-PS-11*

Page 1 of 2

Location: West of NWC Building 13

Approximate ground surface elevation: 337 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Blows per foot)	TESTING
0	2.5-inches asphalt over 3-inches crushed rock base course (Fill)						
	Very dense, damp, gray, silty SAND with some gravel (Glacial Till) SM						
5				S-1		71	
10				S-2		50/4"	
15				S-3		50/2"	
20				S-4		50/4"	
25				S-5		50/5"	
	Very dense, moist, gray, fine to medium SAND with some silt and trace to some gravel (Advance Outwash) SP-SM			S-6		62	1 CEC=5
30							

PENETRATION RESISTANCE: ▲ Standard; #/# Blows over inches; △ Other. Blows per foot: 0, 10, 20, 30, 40, 50

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100 — Plastic Limit, Liquid Limit

LEGEND

- 2.00-inch OD split-spoon sampler
- Observed groundwater level
- Groundwater level at time of drilling (ATD)
- Organic Content (% shown)
- Grain Size Analysis (% fines shown)
- Permeability test

Observation well:

- Monument
- Bentonite Fill with PVC Pipe
- Groundwater Level
- Sand Fill with Slotted PVC Pipe
- Pipe Cap
- Slough at Bottom of Hole

amec

11810 North Creek Parkway N
Bothell, Washington 98011

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00898, BLDG-2018-00985

Drilling Method: HSA Hammer Type: Automatic Date drilled: *September 15, 2013* Logged By: *TDW*

Drilled by: *Holocene Drilling*

BOTHELL_LOG FORMAT 2012 W/O PS10-12.GPJ BOTHELL GEO 2010 B&TP.GDT 11/7/13

PROJECT: *Overlake Village Regional Stormwater Facility* JOB No. *3-917-17625-0* BORING No. *MW-PS-11*

Location: West of NWC Building 13
Approximate ground surface elevation: 337 feet

DEPTH (feet)	Soil Description	SAMPLE NUMBER	PENETRATION RESISTANCE (Blows per foot)	TESTING
30	Fine to medium SAND as above	S-7	64	11
		S-8	88	
35		S-9	76	10
	Becomes wet	S-10	50/5"	12
40	Becomes saturated	S-11	50/5"	
45		S-12	39	
50		S-13	43	
55		S-14	43	
60	Unique DOE Well #BHV-269 Boring terminated at approximately 60 feet			

USCS/USGS GRAPHICS — SAMPLE TYPE — GROUND WATER (ATD)

Page 2 of 2

PENETRATION RESISTANCE: ▲ Standard; ##/## Blows over inches; △ Other; Blows per foot 0, 10, 20, 30, 40, 50

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100 — Plastic Limit — Liquid Limit

LEGEND

- 2.00-inch OD split-spoon sampler
- Observed groundwater level
- ATD Groundwater level at time of drilling
- Organic Content (% shown)
- Grain Size Analysis (% fines shown)
- Permeability test

Observation well:
- Monument
- Bentonite Fill with PVC Pipe
- Groundwater Level
- Sand Fill with Slotted PVC Pipe
- Pipe Cap
- Slough at Bottom of Hole

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11810 North Creek Parkway N
Bothell, Washington 98011

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Drilling Method: HSA Hammer Type: Automatic Date drilled: *September 15, 2013* Logged By: *TDW*

Drilled by: *Holocene Drilling*

BOTHELL_LOG FORMAT 2012 W/O PS10-12.GPJ BOTHELL GEO 2010 B&TP.GDT 11/7/13

PROJECT: *Overlake Village Regional Stormwater Facility* JOB No. *3-917-17625-0* BORING No. *MW-PS-12*

Location: South of SWC Building 13
Approximate ground surface elevation: 337 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Standard / Blows over inches / Other; Blows per foot)	TESTING
0	2.5-inches asphalt over 3-inches crushed rock base course over moist, grayish brown, silty SAND with some gravel (Fill) SM						
	Very dense, damp, gray, silty fine to medium SAND with some gravel (Glacial Till) SM						
5				S-1		50/6"	
10				S-2		53	
15	Becomes moist			S-3		50/4"	
20	Drilling becomes gravelly			S-4		50/4"	
				S-5		50/5"	
25	Becomes some silt			S-6		50/6"	
	Very dense, moist, gray, gravelly, medium to coarse SAND with trace to some silt (Advance Outwash) SP-SM			S-7		50/6"	
30							

Plastic Limit — MOISTURE CONTENT — Liquid Limit (0 20 40 60 80 100)

LEGEND

- 2.00-inch OD split-spoon sampler
- No Recovery
- Observed groundwater level
- ATD Groundwater level at time of drilling
- Grain Size Analysis (% fines shown)

Observation well:
- Monument
- Bentonite Fill with PVC Pipe
- Groundwater Level
- Sand Fill with Slotted PVC Pipe
- Pipe Cap
- Slough at Bottom of Hole

amec

11810 North Creek Parkway N
Bothell, Washington 98011

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Drilling Method: HSA Hammer Type: Automatic Date drilled: *September 15, 2013* Logged By: *TDW*

Drilled by: *Holocene Drilling*

BOTHELL_LOG FORMAT 2012 W/O PS10-12.GPJ BOTHELL GEO 2010 B&TP.GDT 11/7/13

PROJECT: *Overlake Village Regional Stormwater Facility* JOB No. *3-917-17625-0* BORING No. *MW-PS-12*

Location: South of SWC Building 13
Approximate ground surface elevation: 337 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Standard / Blows over inches / Other; Blows per foot)	TESTING
30	Gravelly, medium to coarse SAND as above						
				S-8		50/6"	4
35				S-9		50/4"	
	Very dense, wet to saturated, gray, medium to coarse SAND with some silt and gravel (Advance Outwash) SW-SM			S-10		50/5"	7
40				S-11	ATD	50/4"	
45				S-12		50/3"	
50	Unique DOE Well #BVD-270 Boring terminated at approximately 50 feet						
55							
60							

Plastic Limit — MOISTURE CONTENT (0, 20, 40, 60, 80, 100) — Liquid Limit

LEGEND

- 2.00-inch OD split-spoon sampler
- No Recovery
- Observed groundwater level
- ATD Groundwater level at time of drilling
- Grain Size Analysis (% fines shown)

Observation well: Monument; Bentonite Fill with PVC Pipe; Groundwater Level; Sand Fill with Slotted PVC Pipe; Pipe Cap; Slough at Bottom of Hole

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00923, BLDG-2018-00985

amec

11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Automatic Date drilled: *September 15, 2013* Logged By: *TDW*

Drilled by: *Holocene Drilling*

BOTHELL_LOG FORMAT 2012 W/O PS10-12.GPJ BOTHELL GEO 2010 B&TP.GDT 11/7/13

PROJECT NUMBER:	BORING NUMBER:
393372.H3.03.04.04.01	B-D-ES-9 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : NE 24th St at 145th Ave NE, Bellevue. (233110.0 N, 1317352.3 E)

ELEVATION : 314.8

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 75 truck-mounted rig

WATER LEVELS : Not noted.

START : 12/28/2009 END : 12/28/2009 LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is asphalt.	Began drilling at 8:45am on 12/28/2009.
						Cuttings between ground surface and 5' are light to medium brown silty sand (SM).
5	5.0					
	6.5	0.2	SS-1	20-26-25 (51)	**POORLY GRADED SAND WITH SILT (SP-SM),** brown, moist, very dense, fine to coarse sand, estimated 5-15% nonplastic fines, trace fine gravel.	
10	10.0					
	11.5	0.2	SS-2	29-19-40 (59)	**SILTY SAND, SM,** grayish-brown, moist, very dense, fine to coarse sand, nonplastic fines, trace fine gravel.	**See laboratory results for SS-2.**
						Fine to coarse gravel observed in cuttings from 10' to 15'.
15	15.0					
	15.4	0.1	SS-3	50/5" (50/5")	**SILTY SAND (SM),** poor recovery, similar to above, gravel lodged in split spoon shoe.	
20	20.0					
	20.7	0.7	SS-4	39-50/2" (50/2")	**SILTY SAND, SM,** brownish-gray, moist, very dense, fine to medium sand, predominantly fine sand, nonplastic fines, fine gravel.	**See laboratory results for SS-4.**
25	25.0					
	25.8	1.1	SS-5	27-50/4" (50/4")	**SILTY SAND, SM,** light gray to gray, moist to wet, very dense, fine to coarse sand, nonplastic fines, estimated less than 10% fine gravel.	**See laboratory results for SS-5.** Drilling stopped at 9:21am on 12/28/2009.
					Bottom of hole at 25.8 ft below ground surface.	Hole abandoned at 25.8' after SS-5 due to strong gas odor from sample. Gas station nearby so soil contamination assumed. Borehole abandoned with bentonite chips and concrete cap at surface.
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER:	BORING NUMBER:
393372.H3.03.04.04.01	B-D-ES-10p SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : NE 24th St, East of 148th Ave NE, Redmond. (233117.2 N, 1317860.3 E)

ELEVATION : 310.6

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 14.6' bgs (3/19/2010). See graph for additional details. START : 2/19/2010 END : 2/19/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is asphalt.	Began drilling at 9:20am on 2/19/2010 with hollow-stem auger.
						Drilled through large cobble at 3'.
5	5.0					
	6.5	1.2	SS-1	12-15-12 (27)	**SILTY SAND WITH GRAVEL (SM),** grayish-brown with some orange iron-oxide stains, dry to slightly moist, medium dense, fine to medium sand, estimated 15-20% nonplastic fines, estimated 20-25% fine to coarse subangular to subrounded gravel up to 1".	Switched to mud rotary drilling after SS-1.
						Chattery drilling from 7' to 10'.
10	10.0					
		0.0	SS-2	50/2" (50/2")	**NO RECOVERY.**	
15	15.0					
	15.5	0.3	SS-3	50/6" (50/6")	**SILTY SAND WITH GRAVEL, SM,** grayish-brown, moist, very dense, fine to coarse sand, predominantly fine to medium sand, nonplastic fines, fine subrounded gravel.	**See laboratory results for SS-3.**
						Driller notes sand at 17'.
20	20.0					
	21.5	1.0	SS-4	17-16-24 (40)	**20.0'-20.6' - A: POORLY GRADED SAND WITH SILT (SP-SM),** gray, wet, dense, predominantly fine to medium sand, estimated 5-10% nonplastic fines. **20.6'-21.0' - B: SILTY SAND (SM),** olive-gray, moist to wet, dense, fine sand, estimated 35-40% nonplastic fines.	
25	25.0					
	26.4	1.0	SS-5	34-43-50/5" (93/11")	**POORLY GRADED SAND WITH SILT (SP-SM),** similar to above, except very dense.	
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-D-ES-10p	SHEET 2 OF 3

CH2MHILL

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : NE 24th St, East of 148th Ave NE, Redmond. (233117.2 N, 1317860.3 E)

ELEVATION : 310.6

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 14.6' bgs (3/19/2010). See graph for additional details. START : 2/19/2010 END : 2/19/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0 31.0	0.8	SS-6	24-50/6" (50/6")	**POORLY GRADED SAND WITH SILT, SP-SM,** gray, wet, very dense, fine to medium sand, predominantly fine sand, nonplastic fines.	**See laboratory results for SS-6.**
35	35.0					
	36.5	1.0	SS-7	21-34-41 (75)	**POORLY GRADED SAND WITH SILT (SP-SM),** same as above.	
40	40.0					
	41.5	1.2	SS-8	20-36-43 (79)	**SANDY SILT, ML,** light gray, wet, hard, nonplastic, fine to medium sand, more sand towards bottom of sample.	**See laboratory results for SS-8.**
45	45.0					
	45.9	0.7	SS-9	42-50/5" (50/5")	**45.0'-45.3' - A: SANDY SILT (ML),** gray, moist to wet, hard, nonplastic, estimated 40% fine sand. **45.3'-45.7' - B: SILTY SAND WITH GRAVEL, SM,** gray, wet, very dense, fine to coarse sand, predominantly medium sand, nonplastic fines, fine to coarse subrounded gravel.	**See laboratory results for SS-9B.**
50	50.0					
	51.5	1.1	SS-10	28-39-43 (82)	**POORLY GRADED SAND WITH SILT (SP-SM),** gray, wet, very dense, predominantly fine to medium sand, estimated 10% nonplastic fines, trace fine subrounded gravel up to 1/2".	Driller notes silt at 52'.
55	55.0					
	56.5	1.5	SS-11	17-32-42 (74)	**55.0'-55.8' - A: SILT (ML),** gray, dry, hard, nonplastic, trace fine sand. **55.8'-56.5' - B: SILT WITH ORGANICS (ML),** dark brown, dry, hard, nonplastic, organics consisting of wood and small roots, trace sand.	
60						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-D-ES-10p	SHEET 3 OF 3

CH2MHILL

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : NE 24th St, East of 148th Ave NE, Redmond. (233117.2 N, 1317860.3 E)

ELEVATION : 310.6

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 14.6' bgs (3/19/2010). See graph for additional details. START : 2/19/2010 END : 2/19/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 – 61.5	1.4	SS-12	12-24-29 (53)	**SILT WITH SAND (ML),** gray, dry to slightly moist, hard, nonplastic, estimated 25-30% fine to medium sand, trace gravel.	
65	65.0 – 66.5	1.2	SS-13	26-40-47 (87)	**SILT WITH SAND, ML,** olive-gray, moist, hard, nonplastic, fine sand.	**See laboratory results for SS-13.**
70	70.0 – 71.0	0.8	SS-14	31-50/6" (50/6")	**SILTY SAND, SM,** dark gray, moist, very dense, fine sand, nonplastic fines.	**See laboratory results for SS-14.** Drilling completed at 12:37pm on 2/19/2010.
					Bottom of hole at 71.0 ft below ground surface.	**PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT 229.** Well is 2-inch diameter schedule 40 PVC with 0.01" slotted screen installed from 40' to 50'. 0' to 1' - Flush concrete monument. 1' to 37' - 3/8" Bentonite chips. 37' to 50' - Colorado silica sand. 50' to 71' - 3/8" Bentonite chips.
75						
80						
85						
90						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Date(s) Drilled	04/05/07	Logged By	SH	Checked By	BJM
Drilling Contractor	Holocene Drilling	Drilling Method	Hollow-stem Auger	Sampling Methods	SPT
Auger Data	4¼-inch I.D.	Hammer Data	140 lb hammer/30 in drop automatic	Drilling Equipment	Mobile B-61
Total Depth (ft)	21.5	Surface Elevation (ft)	354.6 (Approximate)	Groundwater Level (ft. bgs)	Not Encountered
Vertical Datum	NGVD 1929	Datum/ System	NAD 83/91 (City of Redmond) (Approximate)	Easting(x): Northing(y):	1319101.34 236345.64

Elevation feet	Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0							AC	10 inches asphalt concrete			
					1			SM	Brown silty fine to medium sand with gravel (loose, moist) (fill)			Composite CBR
	5											
			17	14	2			SM	Gray silty fine to medium sand (medium dense, moist) (weathered till)			Air-knife to 7 feet
	10		15	18	3					13		%F = 47
								SM	Gray silty fine to medium sand with gravel (very dense, moist) (glacial till)			
	15		18	50/5"	4							
	20		9	50/6"	5					10		Hard drilling %F = 47
	25											
	30											
	35											

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

LOG OF BORING GEI-1

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

Figure A-2
Sheet 1 of 1

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00895, BLDG-2018-00895

V6_GTBORING P:\0\0500142\00\FINALS\0500142\00.GPJ GEIV6_1.GDT 6/11/08

Date(s) Drilled	04/05/07	Logged By	SH	Checked By	BJM
Drilling Contractor	Holocene Drilling	Drilling Method	Hollow-stem Auger	Sampling Methods	SPT
Auger Data	4¼-inch I.D.	Hammer Data	140 lb hammer/30 in drop automatic	Drilling Equipment	Mobile B-61
Total Depth (ft)	31.5	Surface Elevation (ft)	354.0 (Approximate)	Groundwater Level (ft. bgs)	Not Encountered
Vertical Datum	NGVD 1929	Datum/ System	NAD 83/91 (City of Redmond) (Approximate)	Easting(x): Northing(y):	1319227.92 236201.3

Elevation feet	Depth feet	SAMPLES Interval Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0						AC	3 inches asphalt concrete			
							GP	3 inches gravel base course			
				1			SM	Brown silty fine to medium sand with gravel (loose, moist) (fill)			
	5										
		7	16	2			SM	Brownish gray silty fine to medium sand (medium dense, moist) (weathered till)	12		Air-knife to 6.5 feet
							SM	Gray silty fine to medium sand with occasional gravel (medium dense to dense, moist) (glacial till)			
	10	14	26	3							
	15	17	45	4					12		SA; %F = 39
	20	18	37	5							
							SP	Brownish gray fine to coarse sand with silt and gravel (very dense, moist) (advance outwash)			
	25	17	90	6							
	30	18	71	7					9		%F = 12
	35										

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

LOG OF BORING GEI-2

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

Figure A-3
Sheet 1 of 1

V6 GTBORING P:\0\0500142\00\FINALS\050014200.GPJ GEIV6_1.GDT 6/11/08

Date(s) Drilled	04/05/07	Logged By	SH	Checked By	BJM
Drilling Contractor	Holocene Drilling	Drilling Method	Hollow-stem Auger	Sampling Methods	SPT
Auger Data	4¼-inch I.D.	Hammer Data	140 lb hammer/30 in drop automatic	Drilling Equipment	Mobile B-61
Total Depth (ft)	31.5	Surface Elevation (ft)	357.5 (Approximate)	Groundwater Level (ft. bgs)	Not Encountered
Vertical Datum	NGVD 1929	Datum/ System	NAD 83/91 (City of Redmond) (Approximate)	Easting(x): Northing(y):	1319356.02 236234.4

Elevation feet	Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0							TS	12 inches topsoil			
					1			SM	Brown silty fine to medium sand with gravel (loose, moist) (fill)			Composite CBR
	5		3	1	2							Air-knife to 5.5 feet
			15	7	3							
	10		14	6	4					11		%F = 30
	15		4	1	5							
								SM	Gray silty fine to medium sand with occasional gravel (very dense, moist) (glacial till)			
	20		18	49	6					8		%F = 16
								SM	Brownish gray silty fine to medium sand (very dense, moist) (advance outwash)			
	25		14	50/5"	7							
	30		14	50/6"	8					10		SA; %F = 41
	35											

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

LOG OF BORING GEI-3

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

SITE COPY
BLDG-2018-00887; BLDG-2018-00889; BLDG-2018-00893,
BLDG-2018-00895; BLDG-2018-00895

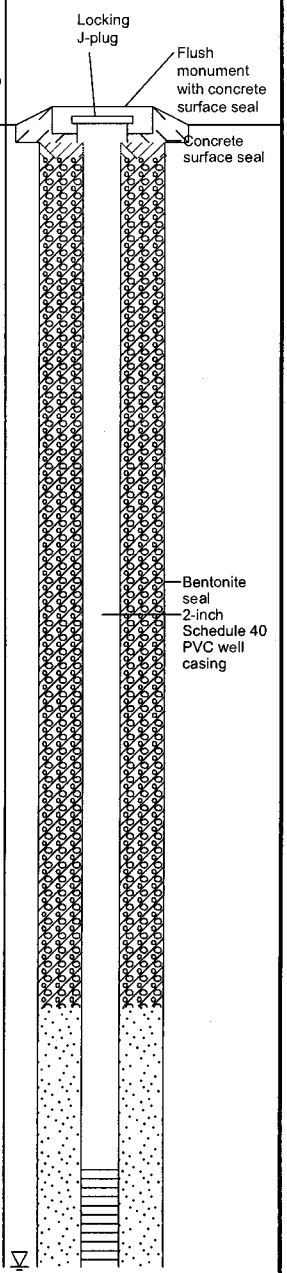
Figure A-4
Sheet 1 of 1

V6 GTBORING P:\0\0500142\00\FINALS\0500142.00.GPJ GEIV6 1.GDT 6/11/08

Date(s) Drilled	04/06/07	Logged By	SH	Checked By	BJM
Drilling Contractor	Holocene Drilling	Drilling Method	Hollow-stem Auger	Sampling Methods	SPT
Auger Data	4¼-inch I.D.	Hammer Data	140 lb hammer/30 in drop automatic	Drilling Equipment	Mobile B-61
Total Well Depth (ft)	80	Ground Surface Elevation (ft)	354.0 (Approximate)	Groundwater Level (ft. bgs)	35
Vertical Datum	NGVD 1929	Datum/ System	NAD 83/91 (City of Redmond) (Approximate)	Easting(x): Northing(y):	1319283.39 236100.32

Elevation feet	Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³
	0						TS	12 inches topsoil		
					1		SM	Brown silty fine to medium sand with gravel (loose, moist) (fill)		
	5		10	7	2			(Air-knife to 5 feet)		
			18	28	3		SM	Gray silty fine to medium sand with occasional gravel (medium dense, moist) (weathered till)		
	10		18	15	4			(%F = 39)	12	
							SM	Gray silty fine to medium sand with occasional gravel (dense, moist) (glacial till)		
	15		18	72	5					
							SP-SM	Brownish gray fine to coarse sand with silt and gravel (very dense, moist to wet) (advance outwash) (%F = 8)		
	20		18	63	6				7	
	25		18	49	7				10	
	30		18	45	8					
	35									

WELL CONSTRUCTION



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

LOG OF BORING GEI-4

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

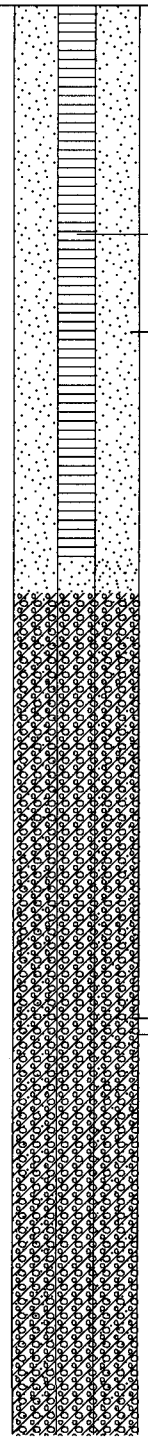
SITE COPY
BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

Figure A-5
Sheet 1 of 3

V6_GTWELL P:\0\0500142\00\FINALS\0500142\00.GPJ GEIV6_1.GDT 6/11/08

Elevation feet / Depth feet	SAMPLES: Interval	Recovered (in)	Blows/foot	Sub-Sample Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³
35		18	50/6"	9			(SA; %F = 6)		
40		18	72	10					
						SP-SM	Gray fine to medium sand with silt (very dense, wet)		
45		18	58	11					
50		18	52	12					
55		18	52	13			(%F = 10)	11	
60		18	65	14					
65		18	50/6"	15					
70		18	57	16					
						GP-GM	Brownish gray fine to coarse gravel with silt and sand (very dense, wet)		
75		12	50/6"	17			(SA; %F = 7)	8	

WELL CONSTRUCTION



LOG OF BORING GEI-4 (continued)

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

SITE COPY
BLDG 2018-00887, BLDG 2018-00889, BLDG 2018-00893, BLDG 2018-00883, BLDG 2018-00885

Figure A-5
Sheet 2 of 3

V6_GTWELL P:\0\0500142\00\FINALS\0500142\00.GPJ GEIV6_1.GDT 6/11/08

Elevation feet / Depth feet	SAMPLES: Interval Recovered (in)	Blows/foot	Sub-Sample Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	WELL CONSTRUCTION
80	15	50/6"	18						

Groundwater measured at 35 feet during drilling
Well dry on 04/23/07

85
90
95
100
105
110
115
120

V6_GTWELL P:\0\0500142\00\FINALS\050014200.GPJ GEIV6_1.GDT 6/11/08

LOG OF BORING GEI-4 (continued)

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00883, BLDG-2018-00885

Figure A-5
Sheet 3 of 3

Date(s) Drilled	04/05/07	Logged By	SH	Checked By	BJM
Drilling Contractor	Holocene Drilling	Drilling Method	Hollow-stem Auger	Sampling Methods	SPT
Auger Data	4¼-inch I.D.	Hammer Data	140 lb hammer/30 in drop automatic	Drilling Equipment	Mobile B-61
Total Depth (ft)	31.5	Surface Elevation (ft)	351.2 (Approximate)	Groundwater Level (ft. bgs)	Not Encountered
Vertical Datum	NGVD 1929	Datum/ System	NAD 83/91 (City of Redmond) (Approximate)	Easting(x): Northing(y):	1319203.52 235966.76

Elevation feet	Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0							TS	12 inches topsoil			
					1			SM	Brown silty fine to medium sand with gravel (loose, moist) (fill)			
	5		8	7	2							Air-knife to 5 feet
			4	50/3"	3							Pounding on rock
	10		18	5	4							
	15		13	4	5					18		SA; %F = 40
								SM	Gray silty fine to medium sand (very dense, moist) (glacial till)			
	20		18	50/6"	6					8		%F = 27
	25		13	50/6"	7							
								SP-SM	Gray fine to coarse sand with silt and gravel (very dense, wet) (advance outwash)			
	30		15	50/6"	8					9		
	35											

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

LOG OF BORING GEI-5

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

Figure A-6
Sheet 1 of 1

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00883, BLDG-2018-00885

V6_GTBORING P:\0\0500142\00\FINALS\050014200.GPJ GEIV6_1.GDT 6/11/08

Date(s) Drilled	04/09/07	Logged By	SH	Checked By	BJM
Drilling Contractor	Holocene Drilling	Drilling Method	Hollow-stem Auger	Sampling Methods	SPT
Auger Data	4¼-inch I.D.	Hammer Data	140 lb hammer/30 in drop automatic	Drilling Equipment	Mobile B-61
Total Depth (ft)	21.5	Surface Elevation (ft)	372.0 (Approximate)	Groundwater Level (ft. bgs)	Not Encountered
Vertical Datum	NGVD 1929	Datum/ System	NAD 83/91 (City of Redmond) (Approximate)	Easting(x): Northing(y):	1319491.93 235873.43

Elevation feet	Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0							AC	9 inches asphalt concrete			
					1			SM	Brown silty fine to medium sand with gravel (loose, moist) (fill)			
	5		6	42	2			SM	Brownish gray silty fine to medium sand with gravel (glacial till)	7		Air-knife to 5 feet %F = 23
			18	66	3							
	10		18	60	4							
	15		18	50/6"	5					6		%F = 30
												Hard drilling
	20		18	50/6"	6							
	25											
	30											
	35											

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

LOG OF BORING GEI-6

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00883, BLDG-2018-00885

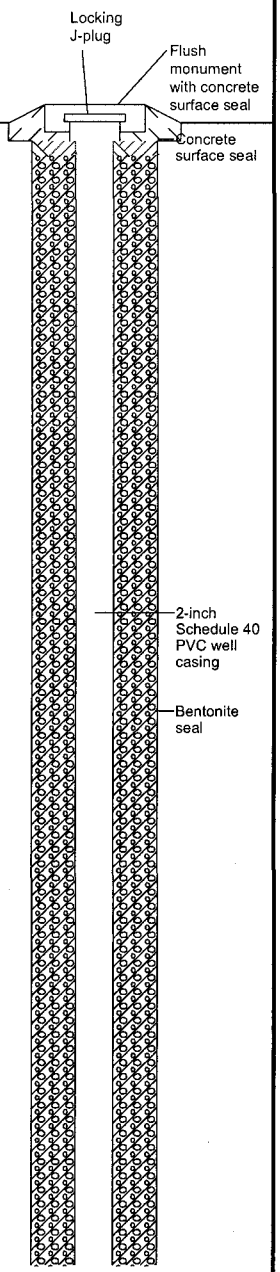
Figure A-7
Sheet 1 of 1

Date(s) Drilled	04/10/07	Logged By	SH	Checked By	BJM
Drilling Contractor	Holocene Drilling	Drilling Method	Hollow-stem Auger	Sampling Methods	SPT
Auger Data	4¼-inch I.D.	Hammer Data	140 lb hammer/30 in drop automatic	Drilling Equipment	Mobile B-61
Total Well Depth (ft)	61.5	Ground Surface Elevation (ft)	369.7 (Approximate)	Groundwater Level (ft. bgs)	53.3
Vertical Datum	NGVD 1929	Datum/ System	NAD 83/91 (City of Redmond) (Approximate)	Easting(x): Northing(y):	1319422.4 235756

Elevation feet	Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³
	0						AC	9 inches asphalt concrete		
					1		SM	Brownish silty fine to medium sand with gravel (loose, moist) (fill)		
	5		18	18	2		SM	Brown to gray silty fine to medium sand with occasional gravel (medium dense to very dense, moist) (glacial till) (Air-knife to 5 feet)		
			18	52	3				7	
	10		17	52	4					
	15		18	82	5			(%F = 22)	6	
	20		17	50/6"	6					
	25		17	68	7			(SA; %F = 46)		
	30		18	72	8		SP	Gray fine to medium sand with silt and occasional gravel (very dense, moist to wet) (advance outwash)		
	35									

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

WELL CONSTRUCTION



LOG OF BORING GEI-7

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

Figure A-8
Sheet 1 of 3

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00883, BLDG-2018-00885

V6_GTWELL P:\0\0500142\00\FINALS\0500014200.GPJ GEIV6_1.GDT 6/11/08

Elevation feet	Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	WELL CONSTRUCTION
	35		18	70		9			(F% = 13)	9		
	40		16	50/6"		10						
	45		18	48		11						Colorado silica sand backfill
	50		11	50/5"		12			(%F = 9)	11		2-inch Schedule 40 PVC screen, 0.20-inch slot width
	55		18	50/6"		13						
	60		18	50/6"		14						
	65		13	50/6"		15						
	70		18	60		16			(SA; %F = 6)	16		Bentonite seal
	75		18	50/6"		17						

LOG OF BORING GEI-7 (continued)

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

SITE COPY
BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

Figure A-8
Sheet 2 of 3

V6 GTWELL P:\0\0500142\00\FINALS\050014200.GPJ GEIV6_1.GDT 6/11/08

Elevation feet / Depth feet	SAMPLES: Interval Recovered (in)	Blows/foot	Sub-Sample Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	WELL CONSTRUCTION
80	18	50/6"	18			(%F = 2)	11		

Groundwater measured at 50 feet during drilling
Groundwater measured at 53.3 feet on 04/23/07

85
90
95
100
105
110
115
120

V6 GTWELL P:\0\0500142\00\FINALS\050014200.GPJ GEIV6_1.GDT 6/11/08

LOG OF BORING GEI-7 (continued)

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

Figure A-8
Sheet 3 of 3

SITE COPY
BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893,
BLDG-2018-00883, BLDG-2018-00885

Date(s) Drilled	04/09/07	Logged By	SH	Checked By	BJM
Drilling Contractor	Holocene Drilling	Drilling Method	Hollow-stem Auger	Sampling Methods	SPT
Auger Data	4¼-inch I.D.	Hammer Data	140 lb hammer/30 in drop automatic	Drilling Equipment	Mobile B-61
Total Depth (ft)	31.5	Surface Elevation (ft)	362.0 (Approximate)	Groundwater Level (ft. bgs)	Not Encountered
Vertical Datum	NGVD 1929	Datum/ System	NAD 83/91 (City of Redmond) (Approximate)	Easting(x): Northing(y):	1319281.7 235552

Elevation feet	Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0							AC	9 inches asphalt concrete			
					1			SM	Brown silty fine to medium sand with gravel (loose, moist) (fill)			Composite GBR
	5		18	58	2			SM	Gray fine to medium sand with gravel (dense to very dense, moist) (glacial till)			Air-knife to 5 feet
			18	33	3					9		
	10		18	48	4							
	15		18	69	5					8		SA; %F = 21
								SP-SM	Brownish gray fine to medium sand with silt and occasional gravel (very dense, moist) (advance outwash)			Hard drilling
	20		17	48	6					9		
	25		17	45	7							
	30		18	48	8					10		%F = 11
	35											

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

V6_GTBORING P:\0\0500142\00\FINALS\050014200.GPJ GEIV6_1.GDT 6/11/08

LOG OF BORING GEI-8

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

SITE COPY
BLDG-2018-00887; BLDG-2018-00889; BLDG-2018-00893, BLDG-2018-00883; BLDG-2018-00885

Figure A-9
Sheet 1 of 1

Date(s) Drilled	04/09/07	Logged By	SH	Checked By	BJM
Drilling Contractor	Holocene Drilling	Drilling Method	Hollow-stem Auger	Sampling Methods	SPT
Auger Data	4¼-inch I.D.	Hammer Data	140 lb hammer/30 in drop automatic	Drilling Equipment	Mobile B-61
Total Depth (ft)	26.5	Surface Elevation (ft)	350.0 (Approximate)	Groundwater Level (ft. bgs)	Not Encountered
Vertical Datum	NGVD 1929	Datum/ System	NAD 83/91 (City of Redmond) (Approximate)	Easting(x): Northing(y):	1319166.63 235395.86

Elevation feet	Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0				1			AC	8 inches asphalt concrete			
								SM	Brown to gray silty fine to medium sand with occasional gravel (very loose, moist) (fill)			
	5		10	2	2							
								SM	Gray silty fine to medium sand with gravel (medium dense, moist) (weathered till)			Air-knife to 6 feet
			10	16	3					8		%F = 15
	10		17	15	4							
	15		16	25	5					15		%F = 22
								SP-SM	Gray fine to medium sand with silt (dense to very dense, moist) (advance outwash)			
	20		16	38	6							
	25		8	50/6"	7					8		%F = 9
	30											
	35											

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

LOG OF BORING GEI-9

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

Figure A-10
Sheet 1 of 1

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00883, BLDG-2018-00885

V6_GTBORING P:\0\0500142\00\FINALS\050014200.GPJ GEIV6_1.GDT 6/11/08

Date(s) Drilled	04/09/07	Logged By	SH	Checked By	BJM
Drilling Contractor	Holocene Drilling	Drilling Method	Hollow-stem Auger	Sampling Methods	SPT
Auger Data	4¼-inch I.D.	Hammer Data	140 lb hammer/30 in drop automatic	Drilling Equipment	Mobile B-61
Total Depth (ft)	26.5	Surface Elevation (ft)	338.0 (Approximate)	Groundwater Level (ft. bgs)	Not Encountered
Vertical Datum	NGVD 1929	Datum/ System	NAD 83/91 (City of Redmond) (Approximate)	Easting(x): Northing(y):	1319024.19 235250.24

Elevation feet	Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0							AC	7 inches asphalt concrete			
					1			SM	Brown silty fine to medium sand with occasional gravel (loose to medium dense, moist) (fill)			
	5			11	2							Air-knife to 5 feet
			18	15	3			SM	Gray silty fine to medium sand with occasional gravel (medium dense, moist) (weathered till)	10		
	10		14	17	4							
	15		18	19	5					10		%F = 29
								SP-SM	Brownish gray fine to medium sand with silt and gravel (very dense, moist) (advance outwash)			
	20		13	50/5"	6							
	25		15	50/6"	7							
	30											
	35											

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

V6_GTBORING P:\0\0500142\00\FINALS\050014200.GPJ GEIV6_1.GDT 6/11/08

LOG OF BORING GEI-10

GEOENGINEERS

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

Figure A-11
Sheet 1 of 1

Date(s) Drilled	04/16/07 - 04/18/07	Logged By	AKL	Checked By	ASB
Drilling Contractor	WSDOT	Drilling Method	Mud Rotary	Sampling Methods	SPT
Auger Data	HQ 4 inches	Hammer Data	140 lb hammer/30 in drop automatic	Drilling Equipment	CME 55 LC
Total Depth (ft)	90	Surface Elevation (ft)	341.1 (Approximate)	Groundwater Level (ft. bgs)	15
Vertical Datum	NGVD 1929	Datum/ System	NAD 83/91 (City of Redmond) (Approximate)	Easting(x): Northing(y):	1319329.15 235885.96

Elevation feet	Depth feet	SAMPLES Interval	Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0							CC	9 inches concrete			
			18	48	1			GP-GM	Brown fine gravel with silt and sand (dense, moist) (base course)			
			18	39	2			SP-SM	Brownish gray fine to medium sand with silt and gravel (dense to very dense, moist to wet) (advance outwash)			
	5		18	41	3					12		%F = 11
			6	79	4							
	10											
			18	81	5	▼						
	15							GP-GM	Brownish gray fine to coarse gravel with silt and sand (very dense, wet)			
			18	69	6			SW-SM	Gray medium to coarse sand with silt and gravel (very dense, wet)			
	20											
			12	50/5½"	7					41		SA; %F = 9
	25											
			6	50/3"	8							
	30											
			6	52/6"	9			GP-GM	Gray fine to coarse gravel with sand and silt (very dense, wet)			
	35											

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

LOG OF BORING GEI-11

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

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Figure A-12
Sheet 1 of 3

V6_GTBORING P:\0\0500142\00\FINALS\050014200.GPJ GEIV6_1.GDT 6/11/08

Elevation feet / Depth feet	SAMPLES: Interval Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
35										
40	6	50/4"	10					11		
45	3	50/5"	11					6		%F = 1
						SM	Gray silty fine to medium sand with gravel (very dense, wet)			
50	12	60	12							
55	12	80	13					33		SA; %F = 18
						SP-SM	Gray fine to medium sand with silt and gravel (very dense, wet)			
60	18	77	14							
						SM	Brownish gray silty fine to coarse sand with gravel (very dense, wet)			
65	12	88	15					13		%F = 7
70	6	93	16							
75	12	92	17							

LOG OF BORING GEI-11 (continued)

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

Figure A-12
Sheet 2 of 3

SITE COPY
BLDG-2018-00887, BLDG-2018-00880, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

Elevation feet / Depth feet	SAMPLES: Interval Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
80	18	88	18							No recovery: switch to 6 inch casing
85	18	59	19			SM	Brownish gray silty fine to medium sand (very dense, wet)	37		SA; %F = 14
90	18	40	20							
95										
100										
105										
110										
115										
120										

V6_GTBORING P:\0\0500142\00\FINALS\050014200.GPJ GEIV6_1.GDT 6/11/08

LOG OF BORING GEI-11 (continued)

GEOENGINEERS

Project: SR-520 31st/36th Overpass
Project Location: Redmond, Washington
Project Number: 0500-142-00

SITE COPY
BLDG-2018-00887, BLDG-2018-00886, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure A-12
Sheet 3 of 3

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. TH-1-97

PROJECT NE 40th Street Intercange — Job No. OL-2663

Detention Pond — S.R. 520

Station L 525+00 — Offset 250' Rt — C.S.

Equipment CME 850 — Casing — Ground El *350.0 (106.68 m)

Method of Boring Augers

Start Date September 29, 1997 — Completion Date September 29, 1997 — Sheet 1 of 2

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
								1 ft. = 0.3048 m.		
5	1			3 9 9 (18)		D-1		Silty SAND with gravel, medium dense, gray, moist. Recovered 1.5 ft.		
	2									
10	3			8 18 24 (42)		D-2		Silty SAND with gravel, dense, gray, moist. Recovered 1.5 ft.		
	4									
15			>>	50/5" (50/5")		D-3		Silty SAND with gravel, very dense, gray, moist. Recovered 0.2 ft.		
	5									
20	6									

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. TH-1-97

Sheet 2 of 2

PROJECT NE 40th Street Intercange

Job No. OL-2663

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				50/2" (50/2")		D-4		~~Silty SAND with gravel, very dense, gray, moist.~~ No recovery.		
	7									
25				50/5" (50/5")		D-5		Silty SAND with gravel, very dense, gray, moist. Recovered 0.3 ft.		
	8									
	9							Silty SAND with gravel, very dense, gray, moist. Recovered 0.3 ft.		
30				50/3" (50/3")		D-6				
								End of test hole boring at 30.3 ft (9.2 m) below ground elevation.		
								Water table elevation not determined.		
	10							*Ground elevation is approximate.		
35								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	11									
	12									
40										
	13									
45										

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. TH-2-97

PROJECT NE 40th Street Intercange — Job No. OL-2663

Detention Pond — S.R. 520

Station L 523+00 — Offset 230' Rt — C.S.

Equipment CME 850 — Casing — Ground El *352.0 (107.29 m)

Method of Boring Augers

Start Date September 30, 1997 — Completion Date September 30, 1997 — Sheet 1 of 2

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
								1 ft. = 0.3048 m.		
5	1			14 28 15 (53)		D-1		Silty SAND with gravel, very dense, gray, moist. Recovered 1.5 ft.		
	2									
10	3			8 13 17 (30)		D-2		Silty SAND with gravel, dense, gray, moist. Recovered 1.5 ft.		
	4									
15	5			50/6" (50/6")		D-3		Silty SAND with gravel, very dense, gray, moist. Recovered 0.5 ft.		
	6									
20										

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. TH-2-97

Sheet 2 of 2

PROJECT NE 40th Street Intercange

Job No. OL-2663

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				50/3" (50/3")		D-4		Silty SAND with gravel, very dense, gray, moist. Recovered 0.3 ft.		
	7									
25				50/3" (50/3")		D-5		Silty SAND with gravel, very dense, gray, moist. Recovered 0.3 ft.		
	8									
	9							Silty SAND with gravel, very dense, gray, moist. Recovered 0.3 ft.		
30				50/3" (50/3")		D-6				
								End of test hole boring at 30.3 ft (9.2 m) below ground elevation.		
								Water table elevation not determined.		
	10							*Ground elevation is approximate.		
35								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	11									
	12									
40										
	13									
45										

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

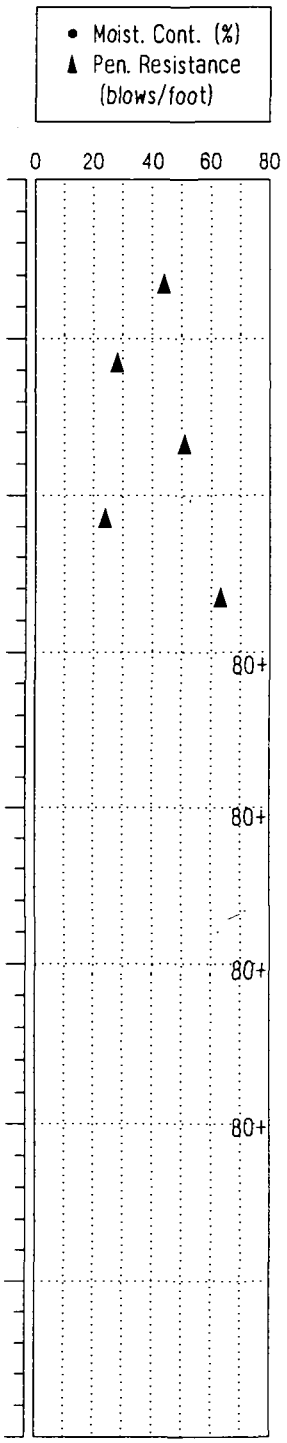
HONG WEST & ASSOCIATES, INC.

BORING LOG

DRILLING COMPANY: WSDOT
DRILLING METHOD: CME-45, Mud Rotary HQ Rods
SAMPLING METHOD: SPT

TOTAL DEPTH: 30.2 Feet
SURFACE ELEVATION: 363 Feet
MEASURING POINT EL.: Feet

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	N-VALUE (blows/ft)	MOIST. CONT. (%)	OTHER TESTS	SYMBOL	SOIL CLASS. (ASTM D-2487 or 2488)	DESCRIPTION
0								ML SM	Hard/dense, gray, sandy SILT/silty SAND with gravel, moist. Fine to medium grained sand. (GLACIAL TILL)
		S-1	8-21-23	44		GS			
5		S-2	10-14-14	28		%F		SM	Medium dense to very dense, grayish brown, silty SAND with gravel, moist. Fine to medium grained sand.
		S-3	24-27-24	51					
10		S-4	11-11-13	24		%F			
		S-5	17-24-39	63					
15		S-6	26-50-5"						
20		S-7	50-6"						
25		S-8	50-4"						
30		S-9	50-2"					SM	Very dense, olive, silty SAND with gravel, moist to very moist. Fine to corase grained sand. (ADVANCE OUTWASH ?)
35									End of boring BH-3 at 30.2 Feet. No groundwater observed during drilling.
40									



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated, and therefore, may not necessarily be indicative of other times and/or locations.

PROJECT: SR 520 / NE 40th Street

BORING: BH-3

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BLDG-2018-00983, BLDG-2018-00985

LOCATION: EW-S Line: STA 17+00, offset 56' Rt.
DATE COMPLETED: 7-16-96
LOGGED BY: C. Behrens

PROJECT NUMBER: 96115

PAGE: 1 OF 1

Figure A-6

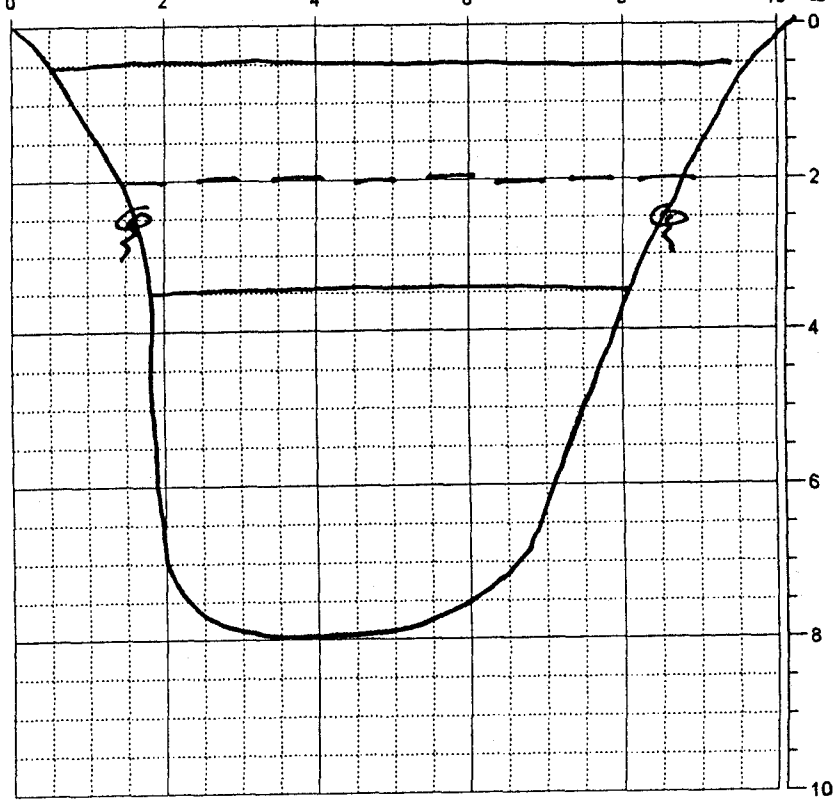
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Kubota Track-Hoe
SURFACE ELEVATION: 344 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 3/25/99
LOGGED BY: Erik Andersen

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		ML	Very loose to loose, dark grayish brown, slightly sandy to sandy, gravelly, SILT, moist. Numerous organics. (TOPSOIL)					
		SM	Loose to medium dense, dark grayish brown, silty to slightly silty, fine to medium SAND, moist. (FILL)					
2		SP SM	Loose to medium dense, dark yellowish brown, silty, gravelly, fine to coarse SAND, moist to wet. Trace organic fibers.	○	S-1	21	GS	▽
4		SM	Medium dense to very dense, olive gray, gravelly, very silty, fine to medium SAND, moist. (GLACIAL TILL) Becomes very dense, unweathered till below about 4-1/2 feet.	○	S-2	12	GS	
8								
10								

Total depth = 8 feet. Slight groundwater seepage observed at about 2-1/2 feet during excavation. No caving.

SKETCH OF NW SIDE OF PIT



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LOG OF TEST PIT
TP- 1

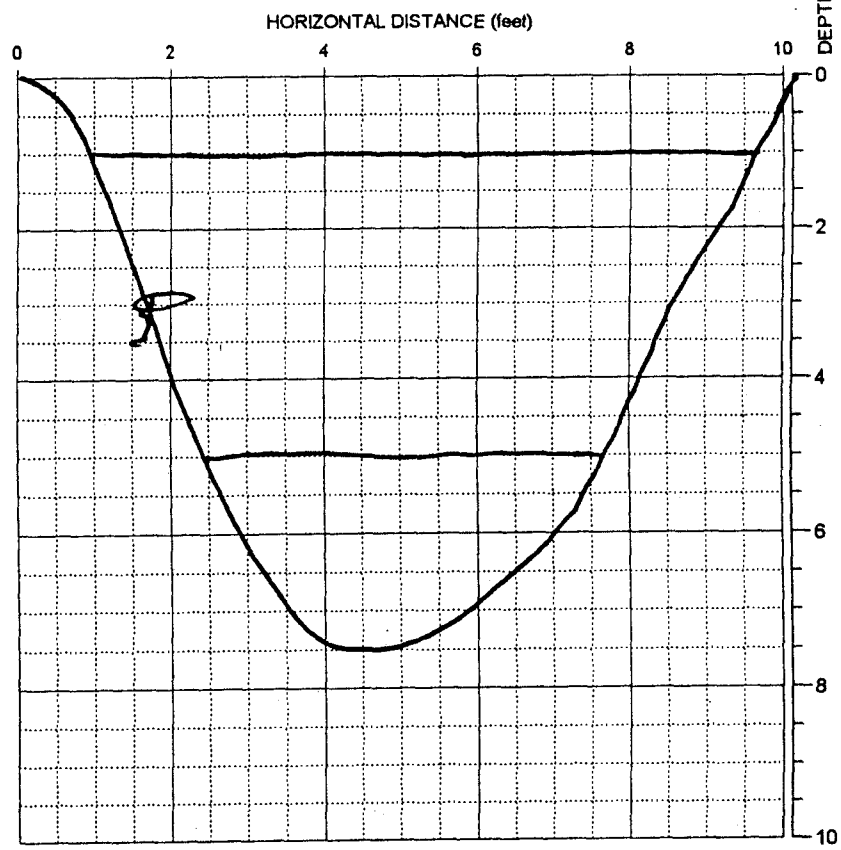
PROJECT NO.: 98108 FIGURE: A-2

EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Kubota Track-Hoe
SURFACE ELEVATION: 343 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 3/25/99
LOGGED BY: Erik Andersen

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		ML	Loose, very dark grayish brown, slightly sandy SILT, moist. Numerous organics. (TOPSOIL)					
2		SM	Loose to medium dense, dark olive brown, very silty to silty, fine to medium SAND, moist to wet. Numerous organic fibers. (FILL) Fines content of S-1: 39 percent.	○	S-1	40	%F	
4				◐	S-2	17	MD CBR GS	▽
6		SM	Medium dense, grayish brown, slightly fine grevelly, silty, fine to medium SAND, wet. (RECESSIONAL OUTWASH)					
				○	S-3	14		
				○	S-4	12		
8			Total depth = 7-1/2 feet. Slight groundwater seepage observed at about 3 feet during excavation. No caving.					
10								

SKETCH OF EAST SIDE OF PIT



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LOG OF TEST PIT
TP- 2

PAGE: 1 of 1

PROJECT NO.: 98108 FIGURE: A-3

TPT10 98108 GPJ 2/13/01

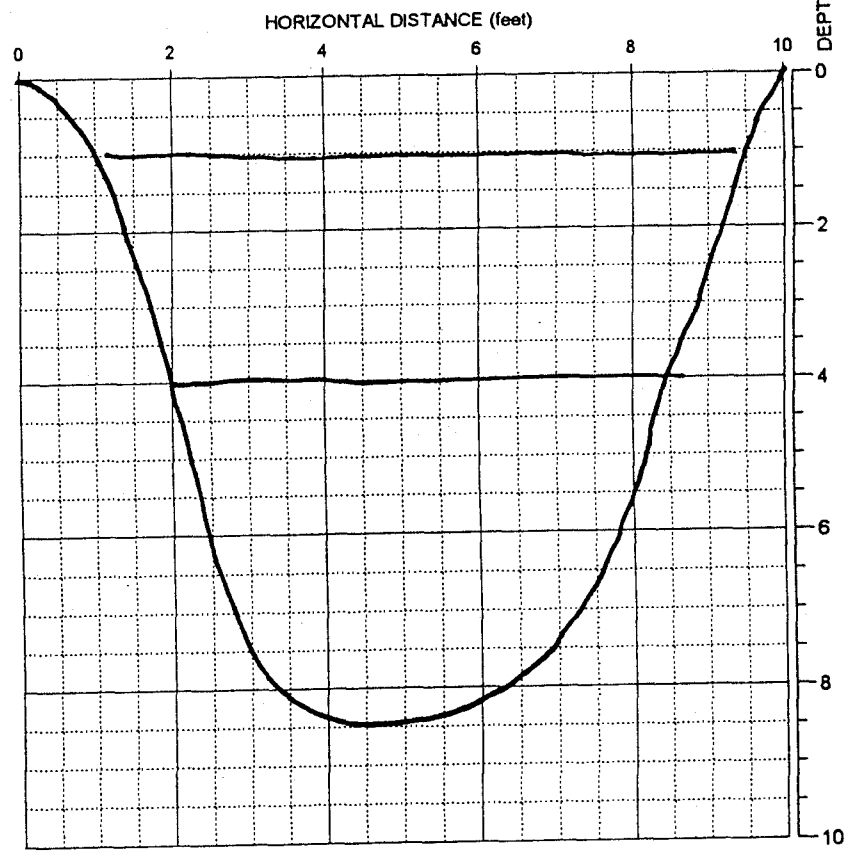
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Kubota Track-Hoe
SURFACE ELEVATION: 347 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 3/25/99
LOGGED BY: Erik Andersen

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		ML	Loose, very dark brown, slightly sandy, SILT, moist. Numerous organics. (TOPSOIL)					
2		SM	Loose to medium dense, reddish brown to dark yellowish brown, very silty, fine to medium SAND, moist. Old tree limb at about 1-1/2 feet. (FILL) Fines content of S-1: 35 percent.	○	S-1	23	%F	
4		SM	Dense to very dense, gray, very silty to silty, fine to medium SAND, moist. Occasional gravels and cobbles. (GLACIAL TILL)	○	S-2	11	GS	
6								
8				○	S-3	17		
10								

Total depth = 8-1/2 feet.
No groundwater seepage observed during excavation. No caving.

SKETCH OF EAST SIDE OF PIT



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OVERLAKE TRANSIT FACILITY
REDMOND, WASHINGTON

LOG OF TEST PIT
TP- 3
PAGE: 1 of 1

PROJECT NO.: 98108 FIGURE: A-4

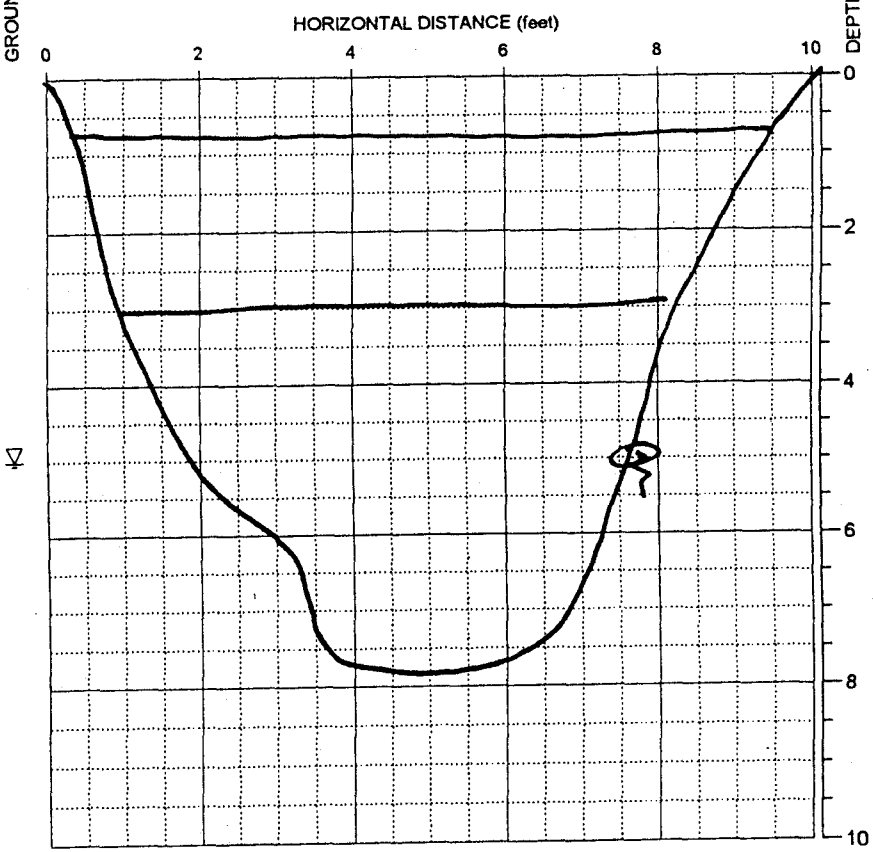
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Kubota Track-Hoe
SURFACE ELEVATION: 347 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 3/25/99
LOGGED BY: Erik Andersen

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		ML	Loose, very dark brown, slightly gravelly, sandy, SILT, moist. Numerous organics. (TOPSOIL)					
		SM	Loose, dark yellowish brown, slightly gravelly, silty, fine to medium SAND, moist. Occasional cobbles, and occasional organic fibers. (FILL)		S-1	28		
2								
		SM	Dense, dark yellowish brown to gray, slightly silty to silty, fine to medium SAND, moist. Occasional gravels and cobbles. (GLACIAL TILL)					
4					S-2	20	GS	∇
			Becomes very dense unweathered till below about 5 feet.					
6								
					S-3	14		
8								
10								

Total depth = 7-3/4 feet.
Slight groundwater seepage observed at about 5 feet during excavation. No caving.

SKETCH OF EAST SIDE OF PIT



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REDMOND, WASHINGTON

LOG OF TEST PIT
TP-4

PROJECT NO.: 98108 FIGURE: A-5

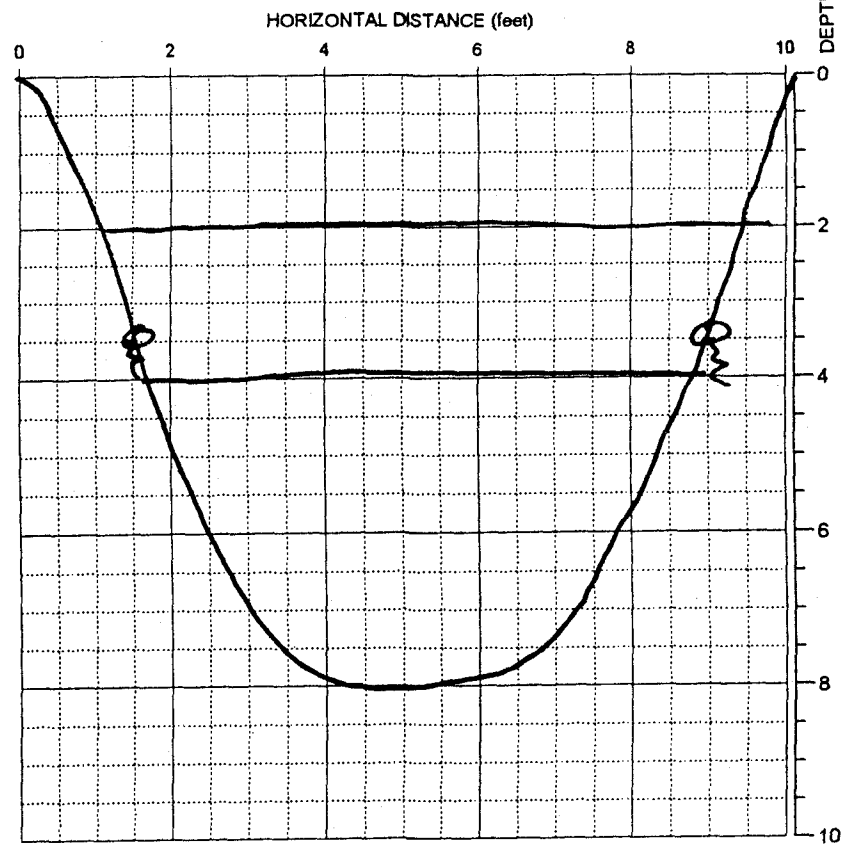
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Kubota Track-Hoe
SURFACE ELEVATION: 346 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 3/25/99
LOGGED BY: Erik Andersen

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		ML	Very loose, very dark brown to dark yellowish brown, slightly sendy, SILT, moist. Numerous organics. (TOPSOIL)					
2		SM	Loose, mottled dark yellowish brown to strong brown, very silty, fine to medium SAND, moist to wet. (FILL) Fines content of S-2: 40 percent.		S-1	25		
					S-2	22	%F	▽
4		SM	Medium dense to dense, gray, slightly gravelly, silty, fine to medium SAND, moist. (GLACIAL TILL)					
					S-3	13		
6			Becomes dense unweathered till below about 7 feet.					
8					S-4	16		
10								

Total depth = 8 feet.
Very slight groundwater seepage observed at about 3-1/2 feet during excavation. No caving.

SKETCH OF EAST SIDE OF PIT



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LOG OF TEST PIT
TP-5

PROJECT NO.: 98108 FIGURE: A-6

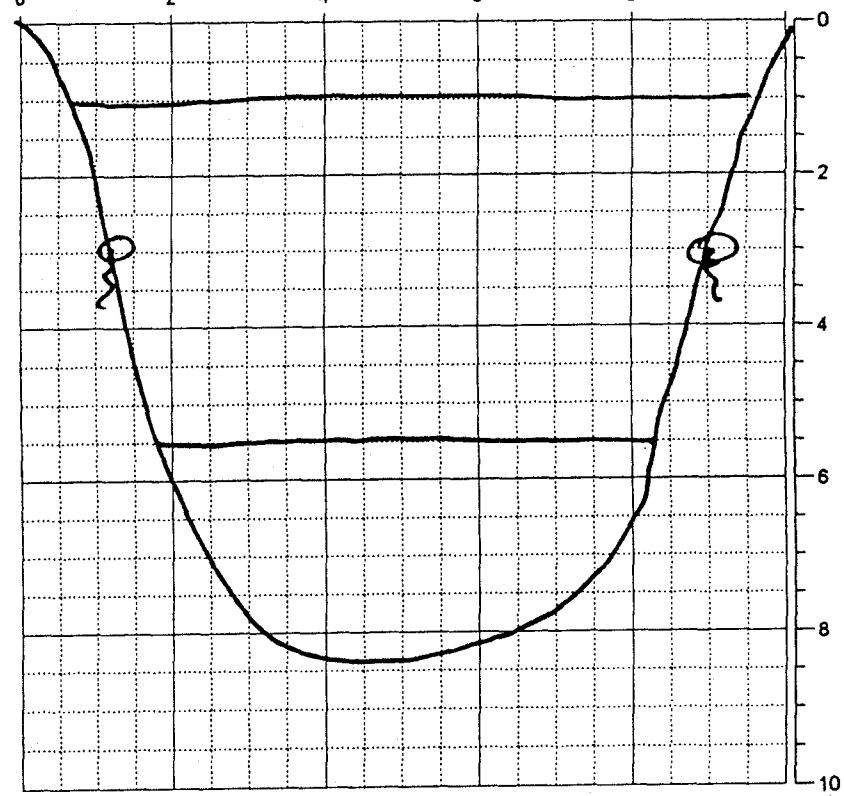
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Kubota Track-Hoe
SURFACE ELEVATION: 349 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 3/26/99
LOGGED BY: Erik Andersen

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		SM	Loose, very silty, fine to medium SAND, moist. Numerous organics. **(TOPSOIL)**					
		SM	Loose, mottled gray and reddish brown, silty, very gravelly, fine to coarse SAND, moist to wet. Occasional 6-inch cobbles. **(FILL)**					
2				○	S-1	17	GS	▽
4								
6		ML	Medium dense to dense, gray, slightly gravelly, very sandy SILT, moist. Occasional fine rounded gravels. **(GLACIAL TILL)**	○	S-2	12	GS	
8				○	S-3	11		
10								

Total depth = 9 feet.
Slight groundwater seepage observed at about 3 feet during excavation. No caving.

SKETCH OF SOUTH SIDE OF PIT



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LOG OF TEST PIT
TP- 6
PAGE: 1 of 1

PROJECT NO.: 98108 FIGURE: A-7

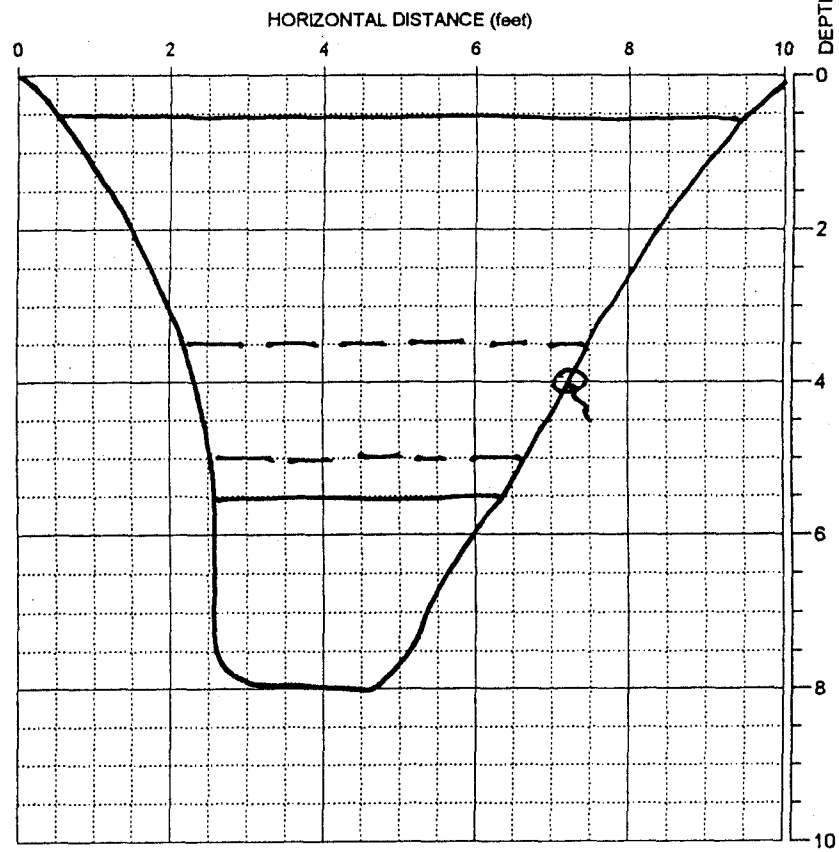
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Kubota Track-Hoe
SURFACE ELEVATION: 349 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 3/25/99
LOGGED BY: Erik Andersen

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		ML	Very loose to loose, very dark brown, sandy SILT, moist. Numerous organics.					
		SM	Loose, dark yellowish brown, slightly gravelly, silty, fine to coarse SAND, moist. Occasional organic fibers. (FILL)					
2					S-1	17		
4		SM	Medium dense, grayish brown to gray, silty to very silty, slightly gravelly, fine to coarse SAND, moist.					
		SM	Medium dense, gray and mottled reddish brown, very silty, fine to medium SAND, moist. Occasional organic fibers. Fines content of S-2: 40 percent.		S-2	22	%F	
6		SM	Dense, gray, slightly gravelly, silty to very silty, fine SAND, moist. (GLACIAL TILL)					
					S-3	11		
8								
10								

Total depth = 8 feet.
Very slight groundwater seepage observed at about 4 feet during excavation. No caving.

SKETCH OF EAST SIDE OF PIT



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LOG OF TEST PIT
TP- 7

PROJECT NO.: 98108 FIGURE: A-8

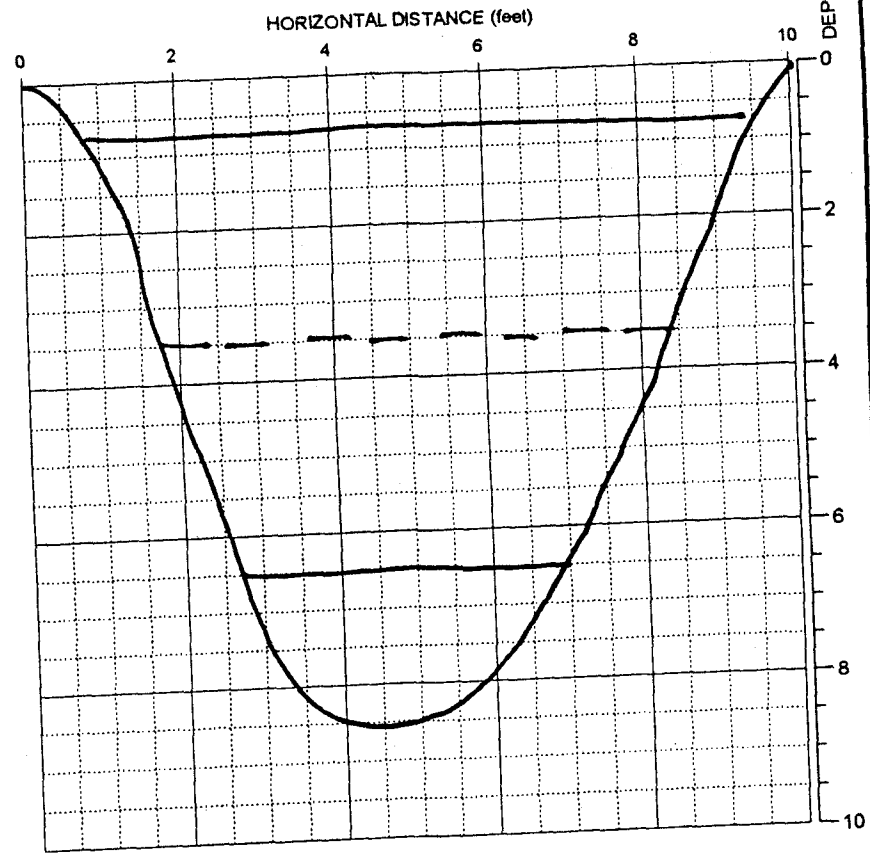
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Kubota Track-Hoe
SURFACE ELEVATION: 351 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 3/25/99
LOGGED BY: Erik Andersen

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		ML	Loose, very dark brown, slightly sandy, SILT, moist. (TOPSOIL)					
2		SM	Loose to medium dense, dark yellowish brown, silty, gravelly, fine to coarse SAND, moist. Occasional cobbles. (FILL)					
4		SM	Medium dense, grayish brown, slightly gravelly, silty, fine to coarse SAND, moist. Occasional roots.	○	S-1			
6		SM	Medium dense to dense, gray, slightly gravelly, silty to very silty, fine SAND, moist. (GLACIAL TILL)	○	S-2	13		
8								
10								

Total depth = 8-1/2 feet.
No groundwater seepage observed during excavation. No caving.

SKETCH OF WEST SIDE OF PIT



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BLDG-2018-00896, BLDG-2018-00985

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LOG OF TEST PIT
TP- 8

PROJECT NO.: 98108

FIGURE: A-9

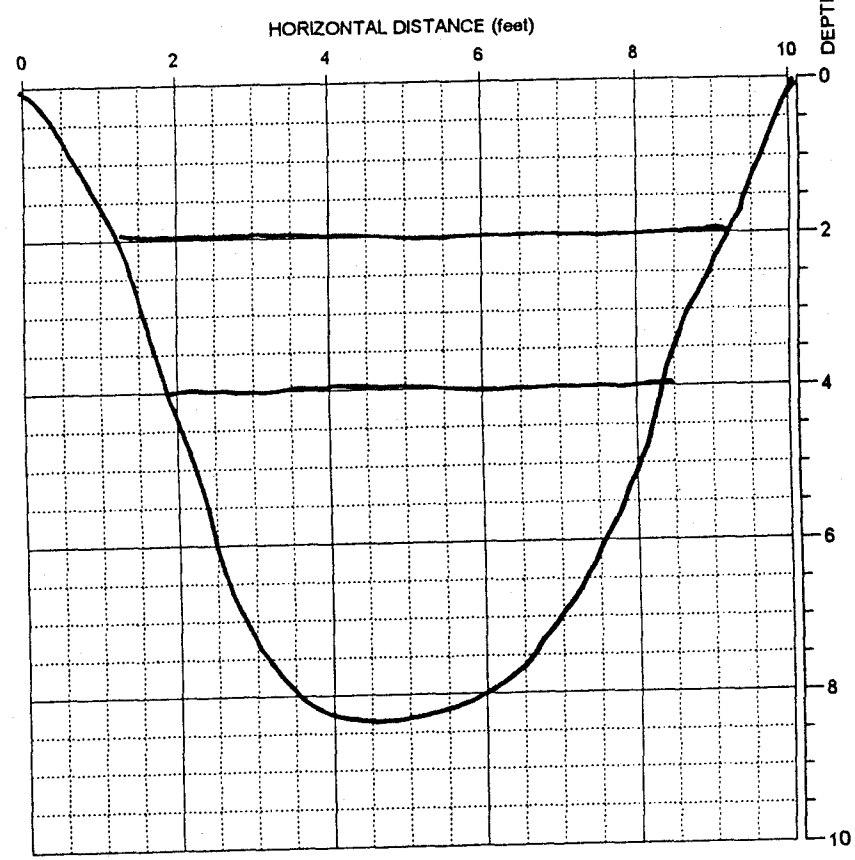
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Kubota Track-Hoe
SURFACE ELEVATION: 347 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 3/26/99
LOGGED BY: Erik Andersen

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		SM	Very loose, brown to very dark brown, very silty, SAND, moist. Numerous organics. (TOPSOIL)					
2		SM	Medium dense, mottled dark grayish brown, gravelly, very silty, fine to medium SAND, moist. Numerous organics. (FILL)		S-1	17	MD CBR GS	
4		SM	Medium dense to dense, gray, silty, gravelly, fine SAND, moist. Fine to coarse subrounded to rounded gravel. Occasional rounded cobbles. (GLACIAL TILL)		S-2	18		
6			Becomes dense to very dense below about 7 feet.		S-3	16		
8					S-4	13		
10								

Total depth = 8-1/4 feet.
No groundwater seepage observed during excavation. No caving.

SKETCH OF NORTH SIDE OF PIT



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LOG OF TEST PIT
TP- 9

PROJECT NO.: 98108

FIGURE: A-10

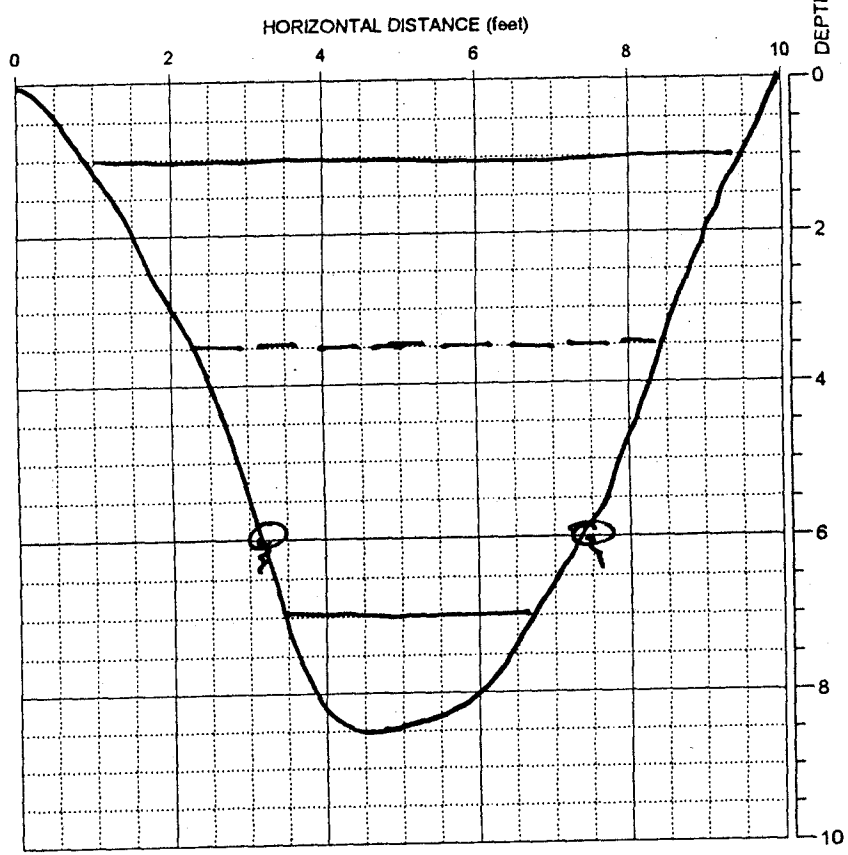
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Kubota Track-Hoe
SURFACE ELEVATION: 353 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 3/26/99
LOGGED BY: Erik Andersen

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		SM	Loose, dark grayish brown, slightly gravelly, silty, fine to medium SAND, moist. Numerous organics. (TOPSOIL)					
2		SM	Loose to medium dense, dark yellowish brown, silty, fine to medium SAND, moist. Occasional organics. (FILL)		S-1	17	MD	
4		SM	Medium dense, olive brown to gray, slightly gravelly, slightly silty, fine to medium SAND, moist to wet.		S-2	21		▽
6			Old roots at 6 to 6-1/2 feet.					
8		SM	Medium dense to dense, gray, slightly gravelly, silty, fine to medium SAND, moist. (GLACIAL TILL)		S-3	13		
10								

Total depth = 8-1/2 feet.
Groundwater seepage observed above glacial till at about 6 feet during excavation. No caving.

SKETCH OF WEST SIDE OF PIT



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LOG OF TEST PIT
TP-10

PAGE: 1 of 1

PROJECT NO.: 98108

FIGURE: A-11

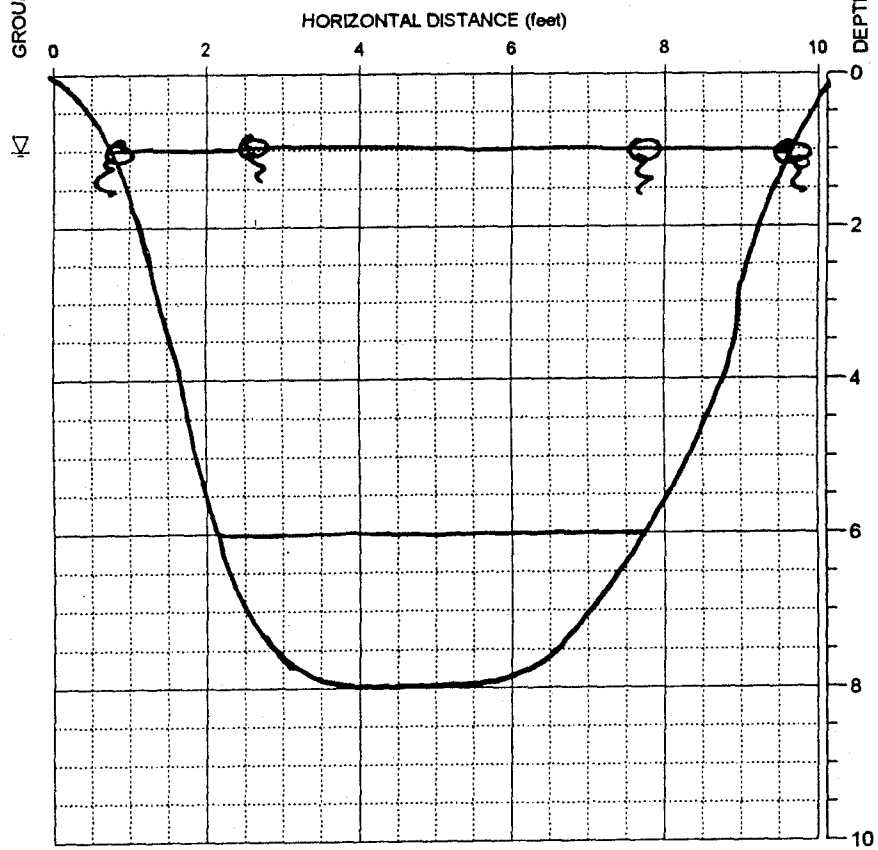
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Kubota Track-Hoe
SURFACE ELEVATION: 350 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 3/26/99
LOGGED BY: Erik Andersen

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		ML	Standing surface water within 20 feet of this test pit. Loose, very dark brown, sandy SILT, very most to wet. Numerous organics. (TOPSOIL)					
2		SM	Loose to medium dense, mottled reddish brown and dark yellowish brown, slightly gravelly, silty, fine to medium SAND, moist to wet. Occasional 6- to 10-inch cobbles. (FILL)					
				○	S-1	23		
4								
6		SM	Dense, mottled strong brown to gray, slightly gravelly to gravelly, very silty, fine to medium SAND, moist. (GLACIAL TILL)	○	S-2	22	GS	
8				○	S-3	7		
10								

Total depth = 8 feet.
Groundwater seepage observed at 1 foot during excavation.
Slight caving of test pit walls above 6 feet.

SKETCH OF EAST SIDE OF PIT



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OVERLAKE TRANSIT FACILITY
REDMOND, WASHINGTON

LOG OF TEST PIT
TP-11
PAGE: 1 of 1

PROJECT NO.: 98108 FIGURE: A-12

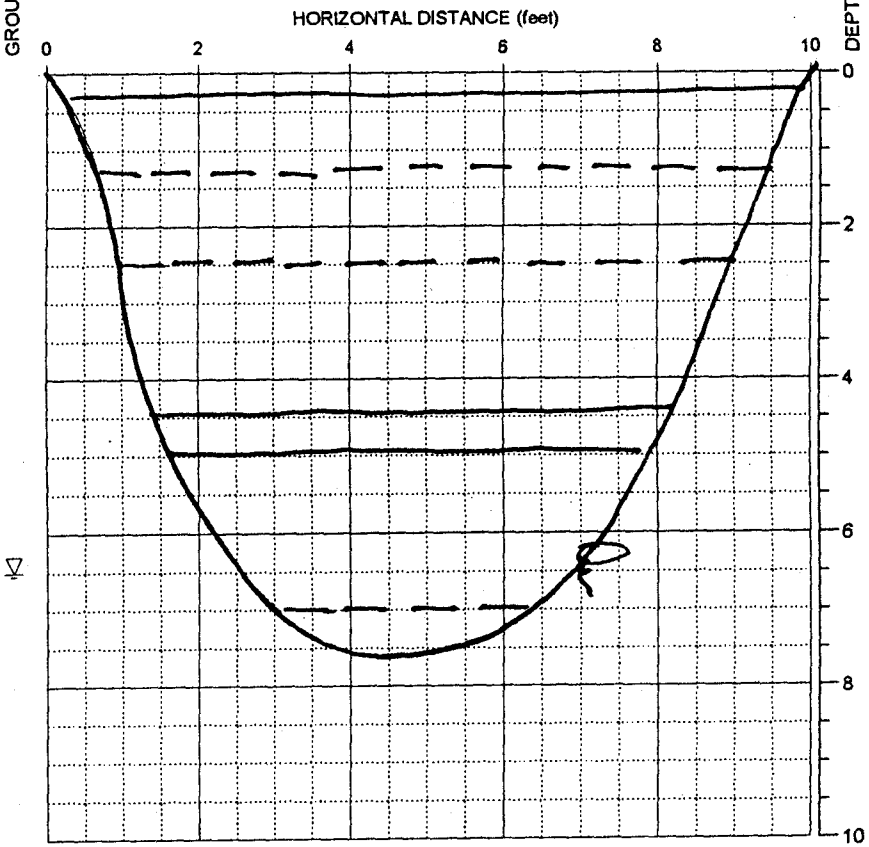
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Case 580 Super L Backhoe
SURFACE ELEVATION: 351 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 1/25/01
LOGGED BY: Bryan Hawkins

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		ML	Loose, dark brown, sandy SILT, moist. Abundant organics.					
		SM	(TOPSOIL)		S-1	9		
			Medium dense, brown, fine to coarse gravelly, silty SAND, moist. Occasional to numerous organics/root fragments.					
		GP GM	(FILL)		S-2	6		
2			Medium dense, olive gray, slightly silty, sandy, fine to coarse GRAVEL, moist. Fine to coarse sand.					
		SM	Medium dense, olive gray, fine to coarse gravelly, silty, fine to medium SAND, moist. Very dark brown, organic SILT (old topsoil) at approximately 3 feet. Abundant organics.		S-3	14		
4		OL	Medium stiff, black, sandy, organic SILT, moist. Abundant organics/wood fibers.		S-4	46		
		SM	(OLD TOPSOIL)		S-5	20	MD	
6			Medium dense to dense, mottled brown and gray, gravelly, silty, fine to coarse SAND, moist to wet. Some organics/rootlets. Abundant cobbles and boulders.					▽
			(GLACIAL TILL)					
			Approximate 3-foot granite boulder at 7 feet.					
		GW GM	Very dense, yellowish brown, slightly silty, very sandy, fine to coarse GRAVEL, moist. Abundant cobbles and occasional boulders.		S-6	10	GS	
8								
10								

Total depth = 7.5 feet.
Groundwater seepage observed at 6.5 feet.
No caving of hole.

SKETCH OF NORTH SIDE OF PIT



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

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SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

OVERLAKE TRANSIT FACILITY
REDMOND, WASHINGTON

LOG OF TEST PIT
TP-12

PROJECT NO.: 98108 FIGURE: A-13

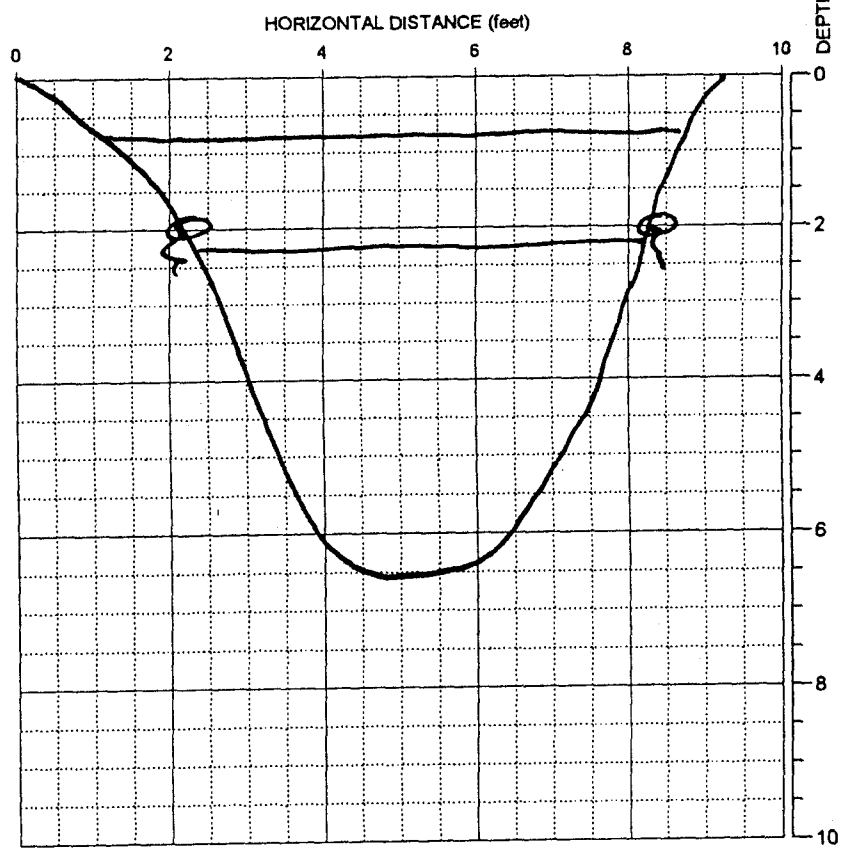
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Case 580 Super L Backhoe
SURFACE ELEVATION: 345 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 1/25/01
LOGGED BY: Bryan Hawkins

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		OL	Soft, black, fine sandy, organic SILT, moist. Abundant organics, rotted leaves, roots, etc. (TOPSOIL)					
		SM	Loose, brown, slightly fine gravelly, silty, fine to medium SAND, moist to wet. (FILL)		S-1	31		
2		SM	Medium dense, mottled brown and gray, fine to coarse gravelly, very silty SAND, moist to wet. Abundant cobbles and occasional boulders. (GLACIAL TILL)		S-2	24		▽
4			Becomes very dense, olive gray, unweathered glacial till below 4.5 feet.		S-3	10	GS	
6					S-4	12	MD	
8								
10								

Total depth = 6.5 feet.
Groundwater seepage at 2 feet.
No caving of hole.

SKETCH OF EAST SIDE OF PIT



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

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BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC.

OVERLAKE TRANSIT FACILITY
REDMOND, WASHINGTON

LOG OF TEST PIT
TP-13

PAGE: 1 of 1

PROJECT NO.: 98108

FIGURE: A-14

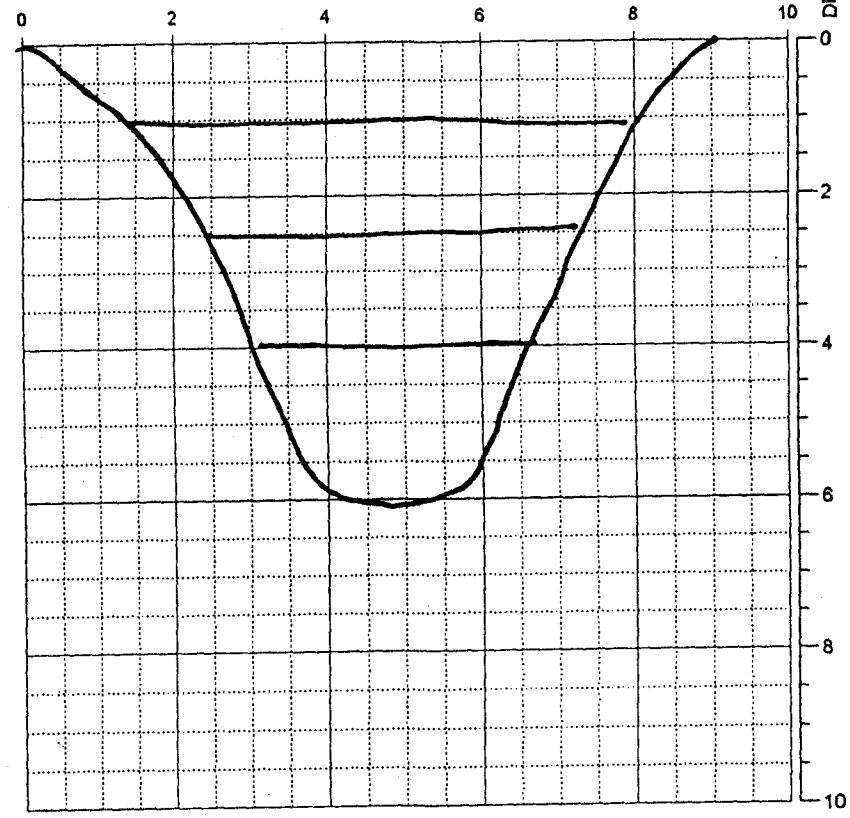
EXCAVATION COMPANY: Deeny Construction
EXCAVATING EQUIPMENT: Case 580 Super L Backhoe
SURFACE ELEVATION: 348 ± Feet

LOCATION: See Figure 2
DATE COMPLETED: 1/25/01
LOGGED BY: Bryan Hawkins

DEPTH (feet)	SYMBOL	USCS SOIL CLASS.	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT (%)	OTHER TESTS	GROUNDWATER
0		SP SM	Medium dense, olive gray, slightly silty, gravelly, fine to medium SAND, moist. Abundant cobbles. (FILL)		S-1	11		
		ML	Soft to medium stiff, dark brown, slightly fine gravelly, sandy SILT, moist. Abundant presence of organics and roots. (OLD TOPSOIL)		S-2	28		
2		SM	Medium dense, reddish brown to dark yellowish brown, slightly fine to coarse gravelly, silty to very silty SAND. Some organics. (FILL)		S-3	27		
4		SM	Medium dense to dense, mottled brown and gray, fine to coarse gravelly, silty to very silty SAND, moist. Abundant cobbles. (GLACIAL TILL)		S-4	23	MD	
6			Becomes very dense, olive brown, unweathered glacial till below 5-1/2 feet.		S-5	10	GS	
8								
10								

Total depth = 6 feet.
No groundwater seepage observed.
No caving of hole.

SKETCH OF EAST SIDE OF PIT



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

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OVERLAKE TRANSIT FACILITY
REDMOND, WASHINGTON

LOG OF TEST PIT
TP-14

PROJECT NO.: 98108 FIGURE: A-15

Project	Job Number	Location
Daytona Building	4260-008-00	Redmond, Washington

Date Drilled	05/17/00	Logged By	AES	Contractor	Holt Drilling
Drill Method	4-1/4 inch ID HSA	Equipment	Mobile B-59	Drill Bit	
Sample Method	2.4 inch ID Split Barrel Sampler	Hammer Data	300 lb Winch release	X-coordinate: Y-coordinate:	Not Determined Not Determined
Total Depth (ft)	10	Elevation (ft)	348	Datum: System:	Not Determined Not Determined

DEPTH IN FEET	% Recovery	Sample No.	Blow Count	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Dry Unit Weight (pcf)	Other Tests And Notes	DEPTH IN FEET
0						AC	3 inches asphalt concrete				0
						SP-SM	Brown fine to medium sand with silt and gravel (medium dense, moist) (fill)				
						SM	Gray silty fine to medium sand with gravel and occasional wood debris (medium dense, moist) (fill)				
	83	1	25	■		SM	Brown and gray silty fine to medium sand with gravel (medium dense, moist) (weathered glacial till)	13	108		
5						SM	Gray silty fine to medium sand with gravel and occasional cobbles (very dense, moist) (glacial till)				5
	83	2	77	■							
	89	3	76	■							
10							Boring completed at a depth of 10 feet on 05/17/00 No ground water encountered during drilling				10
15											15
20											20
25											25
30											30
35											35

Note: See Figure A-2 for explanation of symbols

GEI GENERAL BORING LOG 4260008.GPJ GEI_CORP.GDT 6/16/00 4260-008-00

Geo Engineers

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

LOG OF BORING B-1

FIGURE A-3

Project	Job Number	Location
Daytona Building	4260-008-00	Redmond, Washington

Date Drilled	05/17/00	Logged By	AES	Contractor	Holt Drilling
Drill Method	4-1/4 inch ID HSA	Equipment	Mobile B-59	Drill Bit	
Sample Method	2.4 inch ID Split Barrel Sampler	Hammer Data	300 lb Winch release	X-coordinate: Y-coordinate:	Not Determined Not Determined
Total Depth (ft)	39	Elevation (ft)	349	Datum: System:	Not Determined Not Determined

DEPTH IN FEET	% Recovery	Sample No.	Blow Count	USCS Group Symbol	Material Description	Moisture Content (%)	Dry Unit Weight (pcf)	Other Tests And Notes
0				SM	3 inches bark Gray and brown silty fine to medium sand with gravel (medium dense, moist) (fill)			
	83	1	22					
5								
	89	2	20	SM	Brown silty fine to medium sand with gravel (medium dense, moist) (weathered glacial till)	6	118	
				SM	Gray silty fine to medium sand with gravel and occasional cobbles (dense, moist) (glacial till)			
	89	3	42					GS
10								
	89	4	43			7	121	
	89	5	39					
15								
	89	6	56	ML	Gray fine sandy silt and occasional gravel (hard, moist) (advance outwash)			GS
20								
				SP	Gray fine to medium sand with gravel (very dense, moist) (advance outwash)			
	94	7	91/11			4	107	
25								
				SM	Gray silty fine to medium sand; minor cementation (very dense, moist to wet) (advance outwash)			
	107	8	85/10					
30								
	67	9	50/3			10	127	
35								

Note: See Figure A-2 for explanation of symbols

GEI GENERAL BORING LOG 4260008.GPJ GEI_CORP.GDT 6/16/00 4260-008-00

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

LOG OF BORING B-3

FIGURE A-5

Project	Job Number	Location
Daytona Building	4260-008-00	Redmond, Washington

DEPTH IN FEET	% Recovery	Sample No.	Blow Count	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Dry Unit Weight (pcf)	Other Tests And Notes	DEPTH IN FEET
35											35
	91	10	50/6	■		SP	Gray fine to medium sand (very dense, wet) (advance outwash)				
							Boring completed at a depth of 39 feet on 05/17/00 Perched ground water encountered at a depth of 30 feet and 39 feet during drilling				
40											40
45											45
50											50
55											55
60											60
65											65
70											70
75											75

Note: See Figure A-2 for explanation of symbols

GEI GENERAL BORING LOG 4260008.GPJ GEI CORP.GDT 6/16/00 4260-008-00

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00892
BLDG-2018-00983, BLDG-2018-00985

LOG OF BORING B-3
(Continued)

FIGURE A-5

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-8	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : NE 24th St, next to SR520E overpass, Bellevue. (233123.9 N, 1316473.4 E)

ELEVATION : 260.6

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Artesian conditions. See comments.

START : 12/14/2009 END : 12/14/2009 LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is asphalt.	Began drilling at 8:30am on 12/14/2009.
						Cuttings between ground surface and 5' are light brownish-gray sandy silt (ML).
5	5.0					
	6.5	1.5	SS-1	11-34-44 (78)	**SILT WITH SAND (ML),** light brownish-gray, hard, nonplastic, interbedded layers of silty sand less than 2" thick.	Driller notes hard drilling from 5'.
						Trace gravel at 8', followed by soft drilling, then hard again.
10	10.0					
	11.0	0.8	SS-2	21-50/6" (50/6")	**SILT (ML),** light brownish-gray, moist, hard, nonplastic, estimated less than 15% fine sand.	
15	15.0					
	15.8	0.3	SS-3	50/4" (50/4")	**SILT (ML),** light brownish-gray, dry to moist, hard, nonplastic, trace fine sand.	
						Driller notes very hard at 18'.
20	20.0					
		0.2	SS-4	50/3" (50/3")	**SANDY SILT (ML),** gray, moist, hard, nonplastic, estimated 35-45% fine sand.	
25	25.0					
		0.2	SS-5	50/3" (50/3")	**SILTY SAND (SM),** gray, moist, very dense, fine to coarse sand, estimated 25-35% nonplastic fines, trace fine gravel.	
30						

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-D-ES-8	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : NE 24th St, next to SR520E overpass, Bellevue. (233123.9 N, 1316473.4 E)

ELEVATION : 260.6

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Artesian conditions. See comments.

START : 12/14/2009 END : 12/14/2009 LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0 30.8	0.6	SS-6	34-50/4" (50/4")	**SILTY SAND, SM,** gray, moist, very dense, fine to coarse sand, nonplastic fines, trace gravel.	**See laboratory results for SS-6.**
35	35.0	0.2	SS-7	50/3" (50/3")	**SILTY SAND (SM),** same as above.	
40	40.0	0.2	SS-8	50/3" (50/3")	**SILT WITH SAND (ML),** gray, dry to moist, hard, nonplastic, estimated 10-20% very fine sand, trace fine gravel.	
45						Driller notes still hard drilling at 46'. Driller notes slightly softer at 48', then hard at 49' in clay.
50	50.0 51.5	1.5	SS-9	22-28-48 (76)	**SANDY LEAN CLAY, CL,** greenish-gray, dry to moist, hard, plastic, fine sand, trace fresh and decayed organics in shoe and bottom of sample.	**See laboratory results for SS-9.**
55						Driller notes pressure drop, in sand, at 53.5' to 54'. Back in clay at 54'. Driller notes sand at 57'. Driller notes trace gravels at 58'.
60						

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PROJECT NUMBER: 393372.H3.03.04.04.01	BORING NUMBER: B-D-ES-8	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : NE 24th St, next to SR520E overpass, Bellevue. (233123.9 N, 1316473.4 E)

ELEVATION : 260.6

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Artesian conditions. See comments.

START : 12/14/2009 END : 12/14/2009 LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 – 61.5	1.5	SS-10	18-22-35 (57)	**FAT CLAY, CH,** dark gray, moist, hard, plastic, homogeneous appearance.	**See laboratory results for SS-10.**
65						Slow and hard drilling at 66'.
						Rig chatter at 69'.
70	70.0 – 70.8	1.0	SS-11	31-50/4" (50/4")	**70.0'-70.3' - A: FAT CLAY (CH),** same as above. **70.3'-71.0' - B: SILT WITH SAND, ML,** dark gray, dry to moist, hard, nonplastic, estimated 15-25% fine sand. Bottom of hole at 70.8 ft below ground surface.	**See laboratory results for SS-11B.** Drilling completed at 12:14pm on 12/14/2009. **Piezometer Installation Log:** Artesian conditions observed before setting monument. Head reached 19" above pavement surface. Inside of piezometer abandoned from bottom to top with bentonite chips, concrete patch at surface. Subsurface profile of abandoned well: 1' to 22' - 3/8" Bentonite chips. 22' to 34.5' - Colorado silica sand. 34.5' to 70' - 3/8" Bentonite chips.
75						
80						
85						
90						

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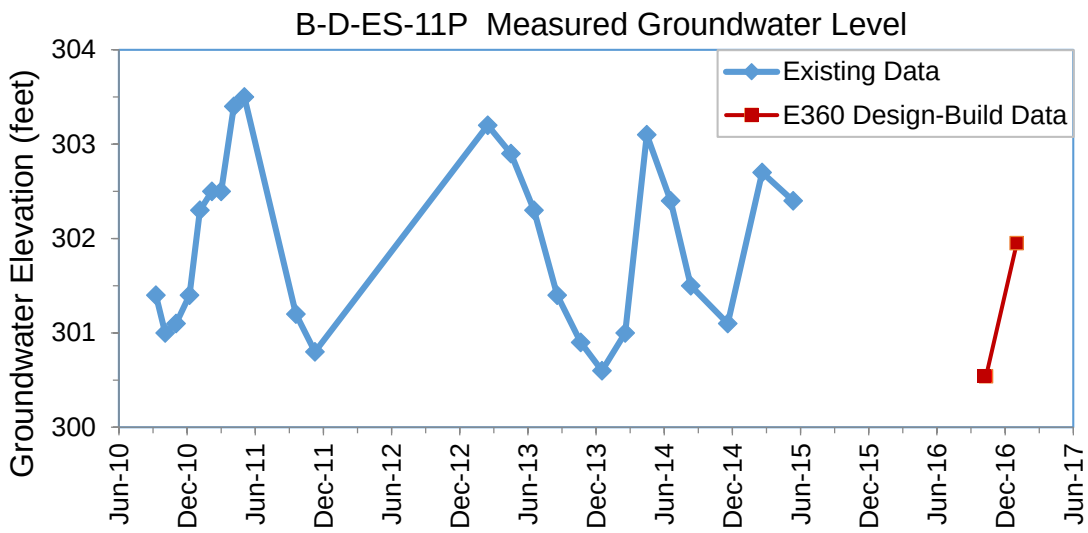
BLDG-2018-00983, BLDG-2018-00985

Appendix B

Groundwater Data

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



B-D-ES-11P	Ground Surface Elevation: 334.2 ft, Screen Elevation: 283.2 ft to 273.2 ft			
	Existing Data		E360 Design-Build Data	
Date	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
9/10/2010	32.9	301.4		
10/5/2010	33.2	301.0		
11/3/2010	33.1	301.1		
12/9/2010	32.9	301.4		
1/6/2011	31.9	302.3		
2/7/2011	31.8	302.5		
3/4/2011	31.8	302.5		
4/7/2011	30.8	303.4		
5/5/2011	30.7	303.5		
9/20/2011	33.0	301.2		
11/10/2011	33.4	300.8		
2/15/2013	31.0	303.2		
4/18/2013	31.4	302.9		
6/19/2013	32.0	302.3		
8/20/2013	32.8	301.4		
10/22/2013	33.4	300.9		
12/18/2013	33.7	300.6		
2/18/2014	33.2	301.0		
4/17/2014	31.2	303.1		
6/20/2014	31.8	302.4		
8/13/2014	32.8	301.5		
11/20/2014	33.1	301.1		
2/20/2015	31.5	302.7		
5/14/2015	31.8	302.4		
10/12/2016			33.7	300.5
1/2/2017			32.2	302.0

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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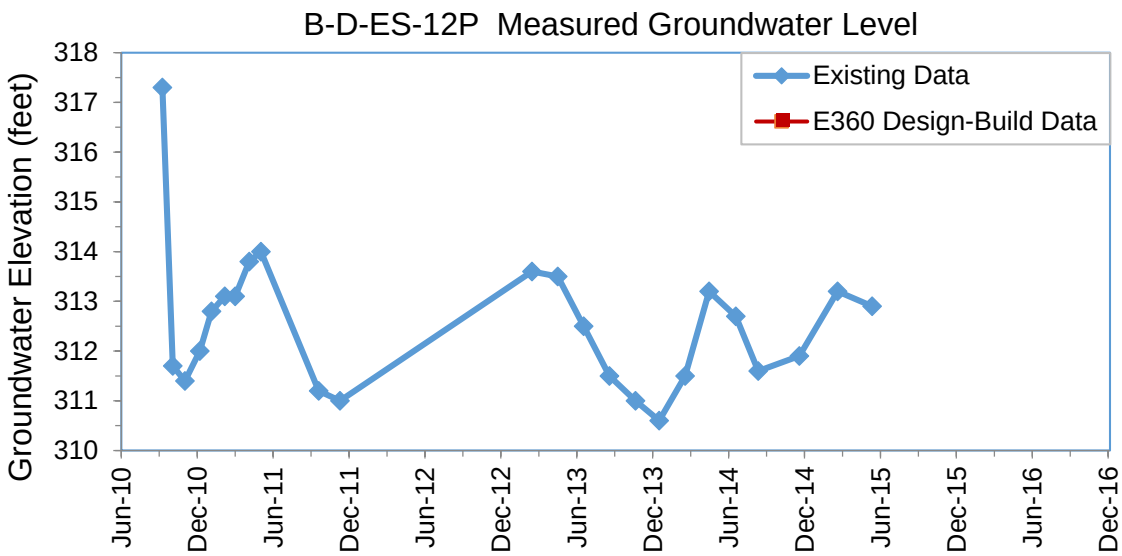
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



B-D-ES-12P	Ground Surface Elevation: 375.3 ft, Screen Elevation: 285.3 ft to 275.3			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
9/10/2010	58.1	317.2		
10/5/2010	63.6	311.7		
11/3/2010	63.9	311.4		
12/9/2010	63.4	311.9		
1/6/2011	62.5	312.8		
2/7/2011	62.2	313.1		
3/4/2011	62.2	313.1		
4/7/2011	61.6	313.7		
5/5/2011	61.4	313.9		
9/21/2011	64.1	311.2		
11/11/2011	64.4	310.9		
2/15/2013	61.8	313.5		
4/18/2013	61.8	313.5		
6/19/2013	62.8	312.5		
8/20/2013	63.9	311.4		
10/22/2013	64.3	311.0		
12/18/2013	64.7	310.6		
2/18/2014	63.8	311.5		
4/17/2014	62.1	313.2		
6/20/2014	62.7	312.6		
8/13/2014	63.7	311.6		
11/20/2014	63.4	311.9		
2/20/2015	62.1	313.2		
5/14/2015	62.5	312.8		
10/12/2016			Instrument inaccessible or not found.	
1/2/2017			Instrument inaccessible or not found.	

Note: Elevations are taken from Boring Logs in Appendix A.2 and may not match elevations in Table A.2

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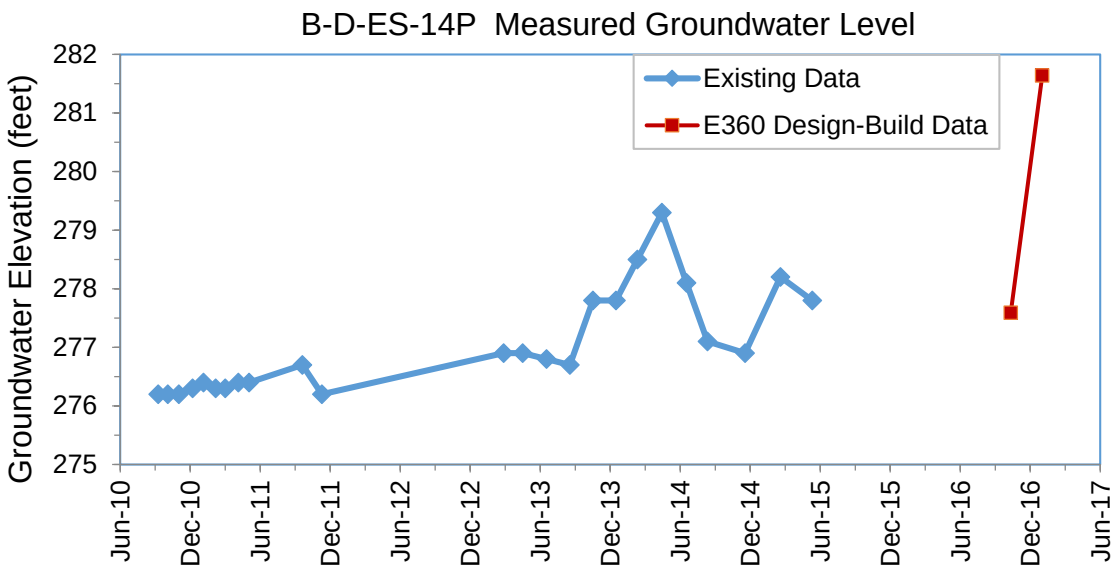
BLDG-2018-00980, BLDG-2018-00982, BLDG-2018-00983,
BLDG-2018-00983, BLDG-2018-00985



B-D-ES-14P	Ground Surface Elevation: 288.8 ft, Screen Elevation: 238.8 ft to 228.8 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
9/10/2010	12.6	276.2		
10/5/2010	12.6	276.2		
11/3/2010	12.6	276.2		
12/9/2010	12.5	276.3		
1/6/2011	12.5	276.4		
2/7/2011	12.5	276.3		
3/4/2011	12.5	276.3		
4/7/2011	12.4	276.4		
5/5/2011	12.4	276.4		
9/21/2011	12.1	276.7		
11/11/2011	12.6	276.2		
2/27/2013	11.9	276.9		
4/18/2013	12.0	276.9		
6/19/2013	12.0	276.8		
8/19/2013	12.2	276.7		
10/18/2013	11.0	277.8		
12/17/2013	11.1	277.8		
2/11/2014	10.3	278.5		
4/16/2014	9.6	279.3		
6/19/2014	10.7	278.1		
8/13/2014	11.8	277.1		
11/19/2014	11.9	276.9		
2/19/2015	10.6	278.2		
5/13/2015	11.0	277.8		
10/12/2016			11.2	277.6
1/2/2017			7.2	281.6

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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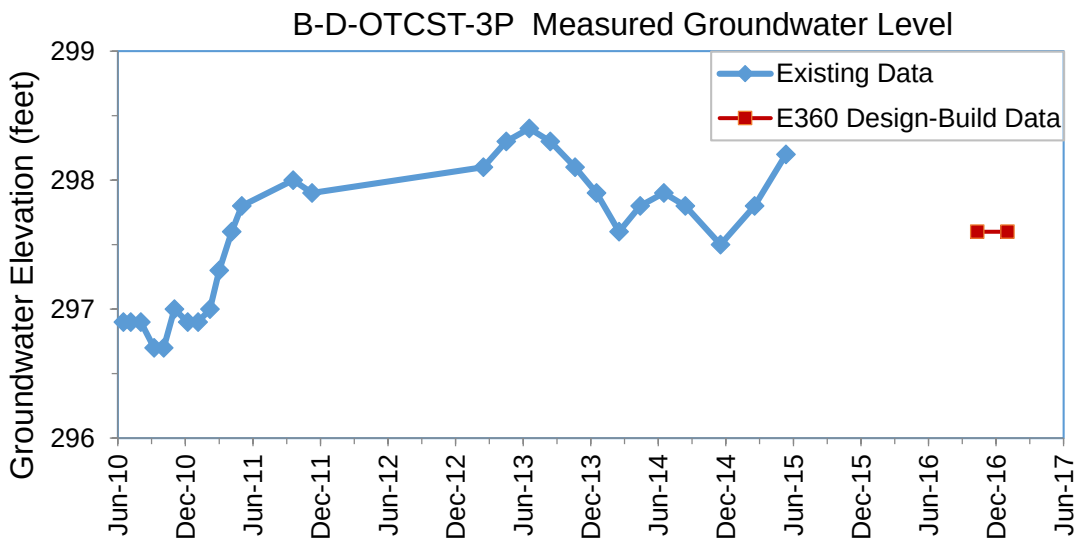
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



B-D-OTCST-3P	Ground Surface Elevation: 365.6 ft, Screen Elevation: 300.6 ft to 290.6 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
2/15/2010	69.2	296.4		
3/18/2010	69.0	296.6		
4/16/2010	68.9	296.7		
5/5/2010	68.7	296.9		
6/18/2010	68.7	296.9		
7/8/2010	68.7	296.9		
8/4/2010	68.7	296.9		
9/9/2010	68.9	296.7		
10/5/2010	68.9	296.7		
11/3/2010	68.6	297.0		
12/9/2010	68.7	296.9		
1/6/2011	68.7	296.9		
2/7/2011	68.6	297.0		
3/4/2011	68.3	297.3		
4/7/2011	68.0	297.6		
5/4/2011	67.8	297.8		
9/20/2011	67.6	298.0		
11/10/2011	67.7	297.9		
2/15/2013	67.5	298.1		
4/18/2013	67.3	298.3		
6/19/2013	67.2	298.4		
8/15/2013	67.3	298.3		
10/21/2013	67.5	298.1		
12/18/2013	67.7	297.9		
2/17/2014	68.0	297.6		
4/15/2014	67.8	297.8		
6/18/2014	67.7	297.9		
8/15/2014	67.8	297.8		
11/18/2014	68.1	297.5		
2/18/2015	67.8	297.8		
5/14/2015	67.4	298.2		
10/12/2016			68.0	297.6
1/2/2017			68.0	297.6

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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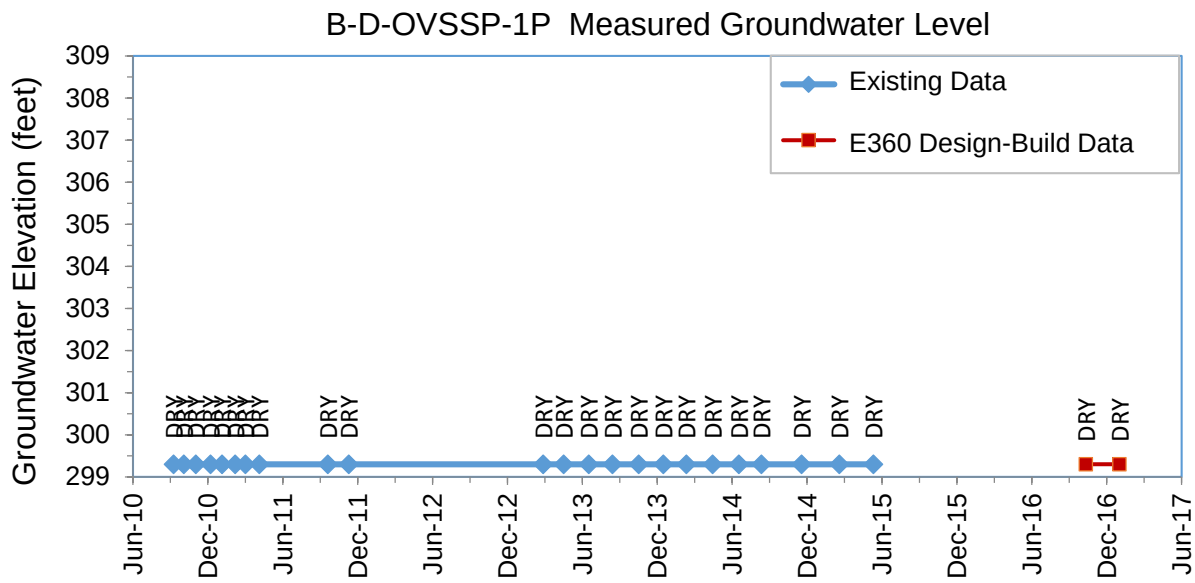
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985



B-D-OVSSP-1P	Ground Surface Elevation: 338.3 ft, Screen Elevation: 309.3 ft to 299.3 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
9/10/2010	DRY			
10/5/2010	DRY			
11/3/2010	DRY			
12/9/2010	DRY			
1/6/2011	DRY			
2/7/2011	DRY			
3/4/2011	DRY			
4/7/2011	DRY			
9/21/2011	DRY			
11/11/2011	DRY			
2/27/2013	DRY			
4/18/2013	DRY			
6/18/2013	DRY			
8/15/2013	DRY			
10/18/2013	DRY			
12/17/2013	DRY			
2/11/2014	DRY			
4/16/2014	DRY			
6/19/2014	DRY			
8/13/2014	DRY			
11/19/2014	DRY			
2/19/2015	DRY			
5/13/2015	DRY			
10/12/2016			DRY	
1/2/2017			DRY	

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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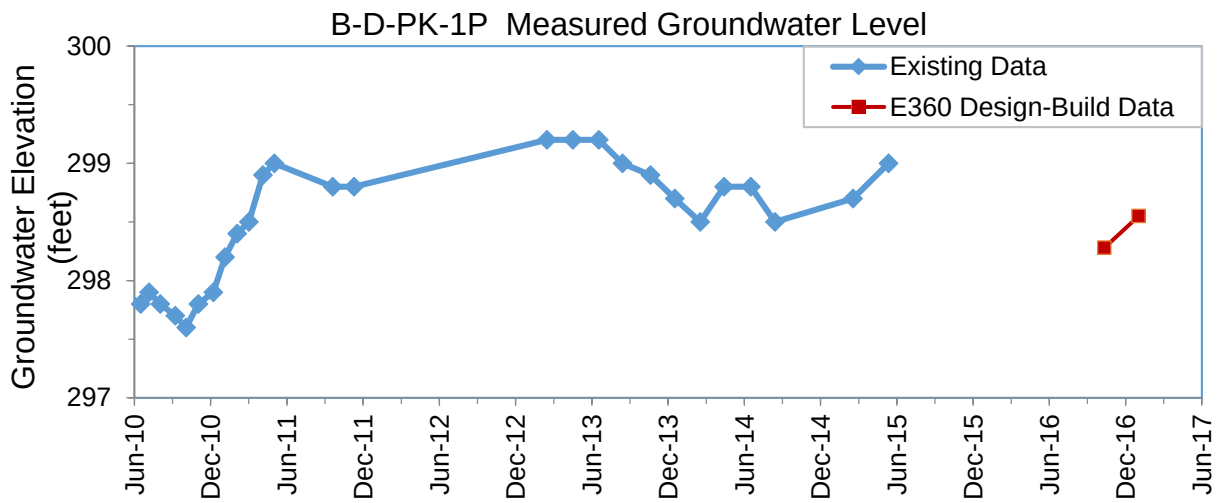
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



B-D-PK-1P	Ground Surface Elevation: 359.3 ft, Screen Elevation: 305.3 ft to 295.3 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
2/15/2010	61.3	298.0		
3/18/2010	61.5	297.8		
4/16/2010	61.7	297.6		
5/5/2010	61.4	297.9		
6/18/2010	61.6	297.7		
7/8/2010	61.4	297.9		
8/4/2010	61.5	297.8		
9/9/2010	61.6	297.7		
10/5/2010	61.7	297.6		
11/3/2010	61.5	297.8		
12/9/2010	61.4	297.9		
1/6/2011	61.2	298.1		
2/4/2011	60.9	298.4		
3/4/2011	60.8	298.5		
4/7/2011	60.4	298.9		
5/4/2011	60.4	298.9		
9/21/2011	60.5	298.8		
11/11/2011	60.6	298.7		
2/15/2013	60.1	299.2		
4/18/2013	60.2	299.1		
6/19/2013	60.1	299.2		
8/15/2013	60.3	299.0		
10/21/2013	60.4	298.9		
12/18/2013	60.7	298.6		
2/17/2014	60.8	298.5		
4/15/2014	60.5	298.8		
6/18/2014	60.5	298.8		
8/15/2014	60.8	298.5		
2/18/2015	60.7	298.6		
5/14/2015	60.3	299.0		
10/12/2016			61.0	298.3
1/2/2017			60.8	298.5

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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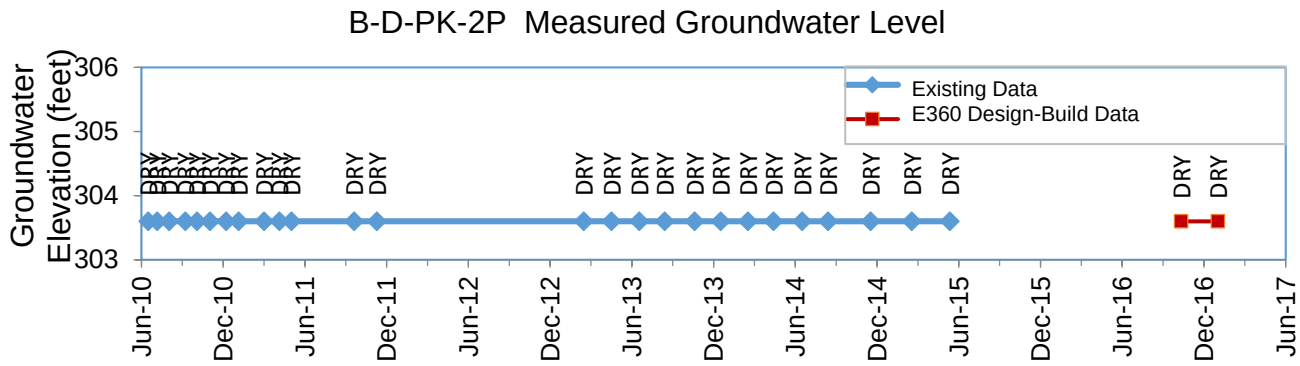
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



B-D-PK-2P	Ground Surface Elevation: 353.1 ft, Screen Elevation: 313.1 ft to 303.1 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
2/15/2010	DRY			
3/18/2010	DRY			
4/16/2010	DRY			
5/5/2010	DRY			
6/18/2010	DRY			
7/8/2010	DRY			
8/4/2010	DRY			
9/9/2010	DRY			
10/5/2010	DRY			
11/3/2010	DRY			
12/9/2010	DRY			
1/6/2011	DRY			
3/4/2011	DRY			
4/7/2011	DRY			
5/4/2011	DRY			
9/21/2011	DRY			
11/11/2011	DRY			
2/15/2013	DRY			
4/18/2013	DRY			
6/19/2013	DRY			
8/15/2013	DRY			
10/21/2013	DRY			
12/18/2013	DRY			
2/17/2014	DRY			
4/15/2014	DRY			
6/18/2014	DRY			
8/15/2014	DRY			
11/18/2014	DRY			
2/18/2015	DRY			
5/14/2015	DRY			
10/12/2016			DRY	
1/2/2017			DRY	

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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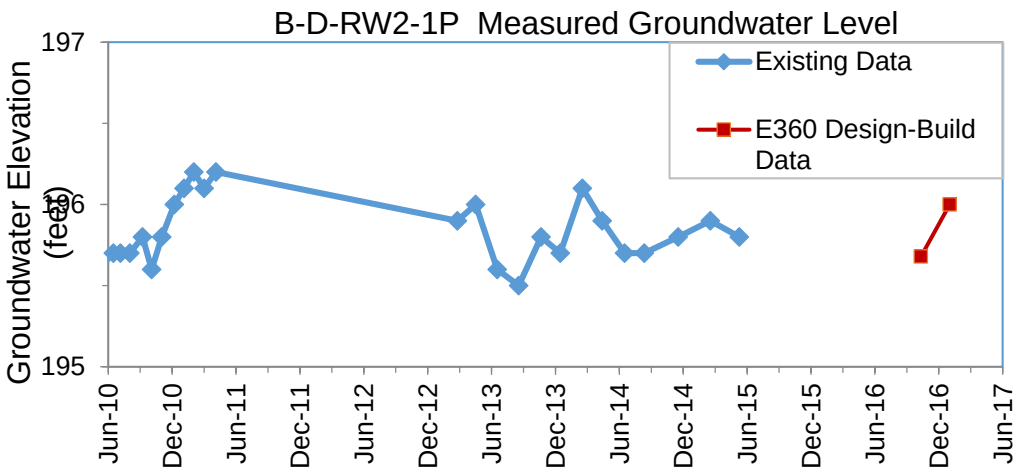
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



B-D-RW2-1P	Ground Surface Elevation: 198.8 ft, Screen Elevation: 179.8 ft to 169.8 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
2/15/2010	3.0	195.8		
3/19/2010	3.0	195.8		
4/16/2010	3.0	195.8		
5/5/2010	3.2	195.6		
6/18/2010	3.1	195.7		
7/8/2010	3.1	195.7		
8/4/2010	3.2	195.7		
9/9/2010	3.0	195.8		
10/5/2010	3.2	195.6		
11/3/2010	3.0	195.8		
12/9/2010	2.8	196.0		
1/6/2011	2.7	196.1		
2/3/2011	2.6	196.2		
3/4/2011	2.7	196.1		
4/7/2011	2.6	196.2		
2/25/2013	2.9	195.9		
4/18/2013	2.8	196.0		
6/19/2013	3.2	195.6		
8/19/2013	3.3	195.5		
10/22/2013	3.1	195.8		
12/16/2013	3.1	195.7		
2/17/2014	2.7	196.1		
4/15/2014	2.9	195.9		
6/18/2014	3.1	195.7		
8/13/2014	3.1	195.7		
11/18/2014	3.0	195.8		
2/18/2015	2.9	195.9		
5/12/2015	3.0	195.8		
10/12/2016			3.1	195.7
1/2/2017			2.8	196.0

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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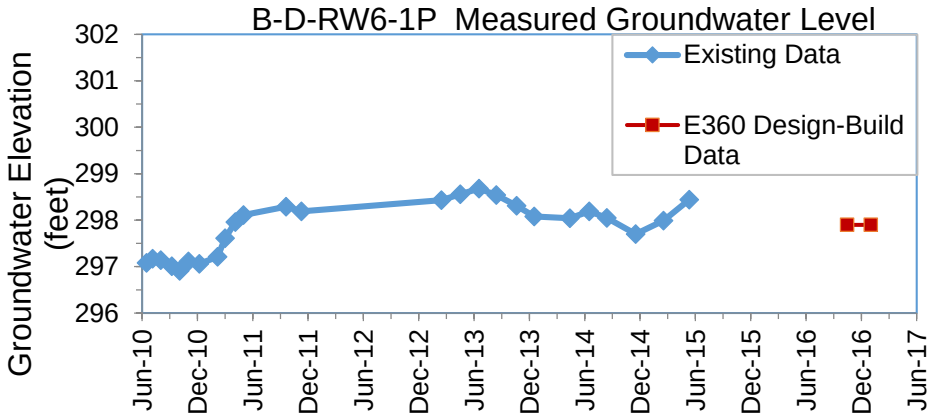
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00985, BLDG-2018-00985



B-D-RW6-1P	Ground Surface Elevation: 352.5 ft, Screen Elevation: 302.5 ft to 292.5 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
2/15/2010	55.6	296.9		
3/18/2010	55.5	297.0		
4/16/2010	55.5	297.0		
5/5/2010	55.4	297.1		
6/18/2010	55.4	297.1		
7/8/2010	55.3	297.2		
8/4/2010	55.4	297.1		
9/9/2010	55.5	297.0		
10/5/2010	55.6	296.9		
11/3/2010	55.4	297.1		
12/9/2010	55.5	297.1		
2/7/2011	55.3	297.2		
3/4/2011	54.9	297.6		
4/7/2011	54.6	298.0		
5/4/2011	54.4	298.1		
9/21/2011	54.2	298.3		
11/11/2011	54.3	298.2		
2/15/2013	54.1	298.4		
4/18/2013	54.0	298.6		
6/19/2013	53.8	298.7		
8/15/2013	54.0	298.5		
10/21/2013	54.2	298.3		
12/18/2013	54.4	298.1		
4/15/2014	54.5	298.0		
6/18/2014	54.3	298.2		
8/15/2014	54.5	298.1		
11/18/2014	54.8	297.7		
2/18/2015	54.5	298.0		
5/14/2015	54.1	298.4		
10/16/2016			54.6	297.9
1/2/2017			54.6	297.9

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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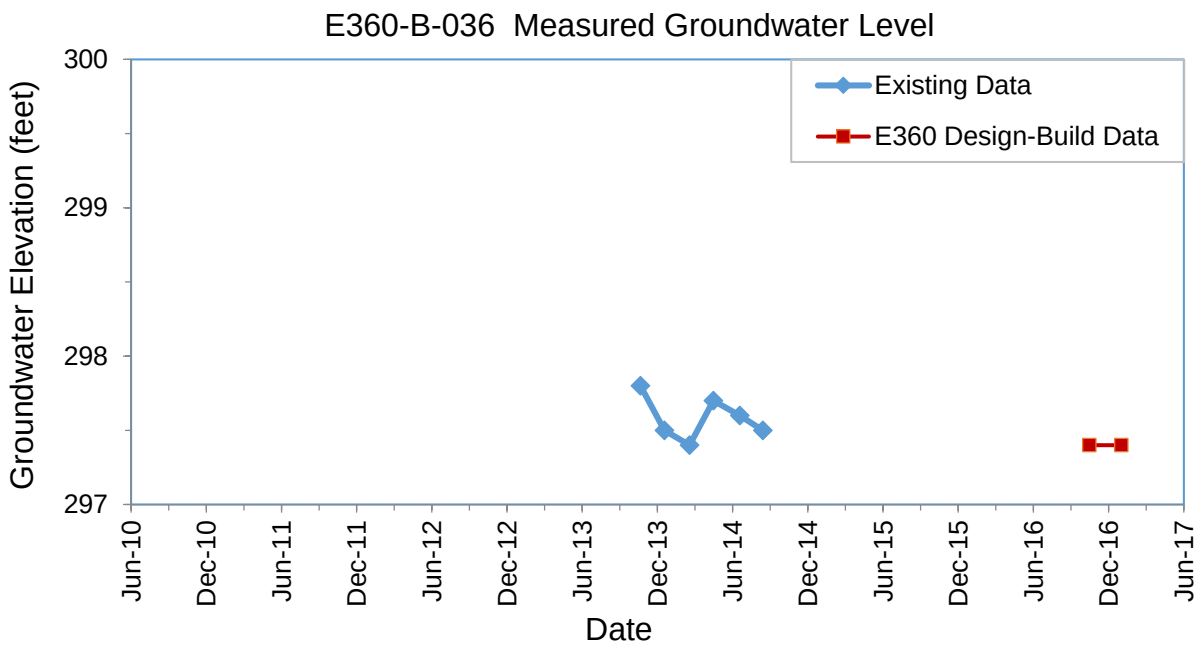
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985



E360-B-036	Ground Surface Elevation: 338 ft, Screen Elevation: 298 ft to 288 ft			
Elevations estimated; no survey data found.				
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
10/22/2013	40.2	297.8		
12/19/2013	40.5	297.5		
2/18/2014	40.6	297.4		
4/17/2014	40.3	297.7		
6/20/2014	40.4	297.6		
8/15/2014	40.5	297.5		
10/16/2016			40.6	297.4
1/2/2017			40.6	297.4

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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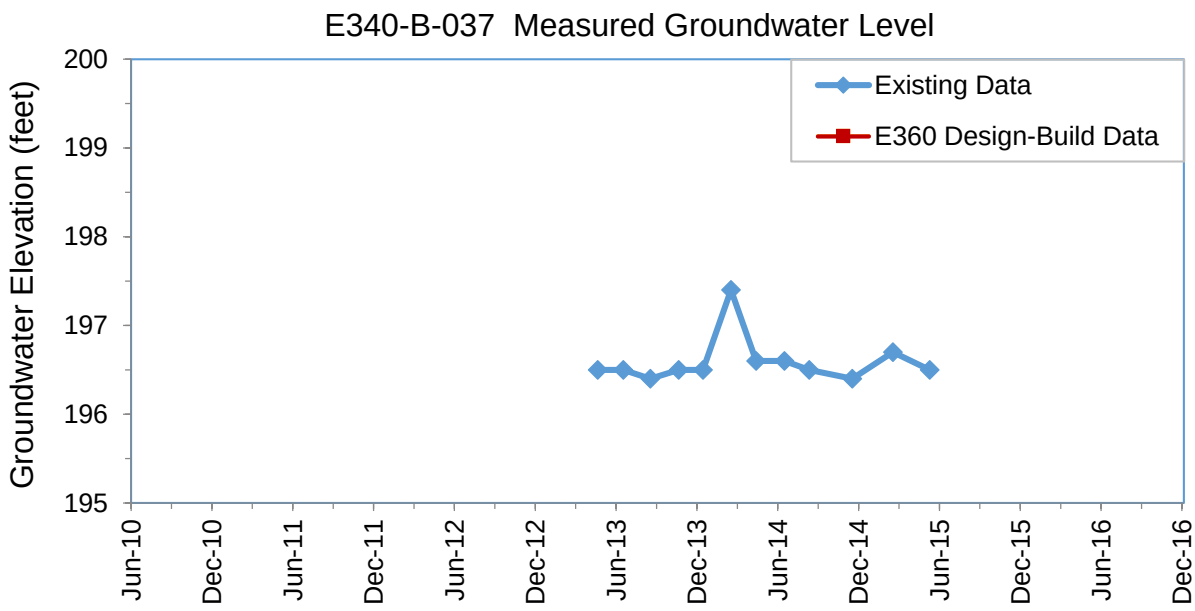
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



E340-B-037	Ground Surface Elevation: 199.5 ft, Screen Elevation: 194.2 ft to 184.2 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
4/22/2013	3.0	196.5		
6/19/2013	3.0	196.5		
8/19/2013	3.1	196.4		
10/22/2013	3.1	196.5		
12/16/2013	3.0	196.5		
2/17/2014	2.2	197.4		
4/15/2014	2.9	196.6		
6/18/2014	2.9	196.6		
8/13/2014	3.0	196.5		
11/18/2014	3.1	196.4		
2/18/2015	2.8	196.7		
5/12/2015	3.0	196.5		
10/16/2016			Instrument inaccessible or not found.	
1/2/2017			Instrument inaccessible or not found.	

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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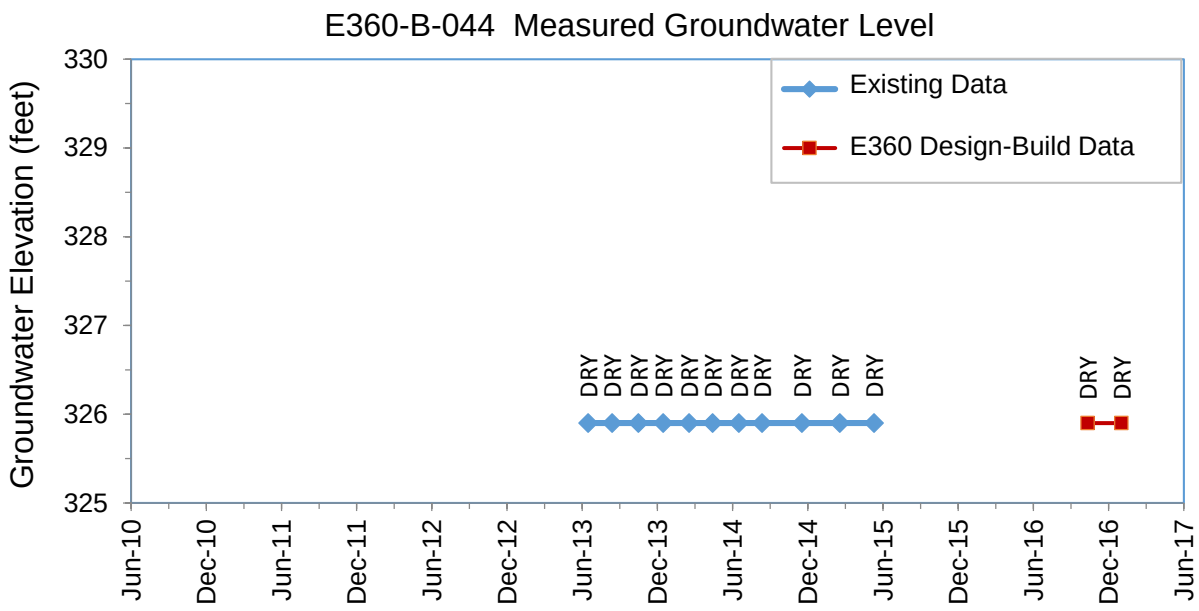
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



E360-B-044	Ground Surface Elevation: 375.0 ft, Screen Elevation: 335.9 ft to 325.9 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
6/17/2013	DRY			
8/14/2013	DRY			
10/17/2013	DRY			
12/16/2013	DRY			
2/17/2014	DRY			
4/15/2014	DRY			
6/18/2014	DRY			
8/13/2014	DRY			
11/18/2014	DRY			
2/18/2015	DRY			
5/12/2015	DRY			
10/12/2016			DRY	
1/2/2017			DRY	

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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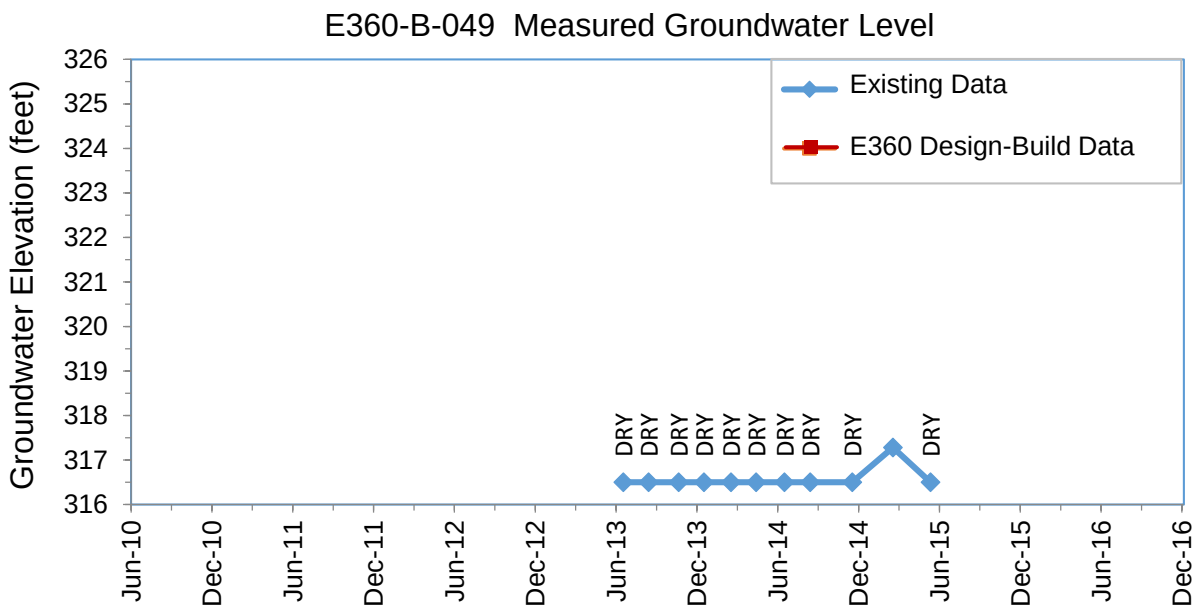
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



E360-B-049	Ground Surface Elevation: 355.5 ft, Screen Elevation: 326.5 ft to 316.5 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
6/19/2013	DRY			
8/15/2013	DRY			
10/22/2013	DRY			
12/18/2013	DRY			
2/17/2014	DRY			
4/15/2014	DRY			
6/18/2014	DRY			
8/15/2014	DRY			
11/18/2014	DRY			
2/18/2015	38.3	317.3		
5/14/2015	DRY			
10/16/2016			Instrument inaccessible or not found.	
1/2/2017			Instrument inaccessible or not found.	

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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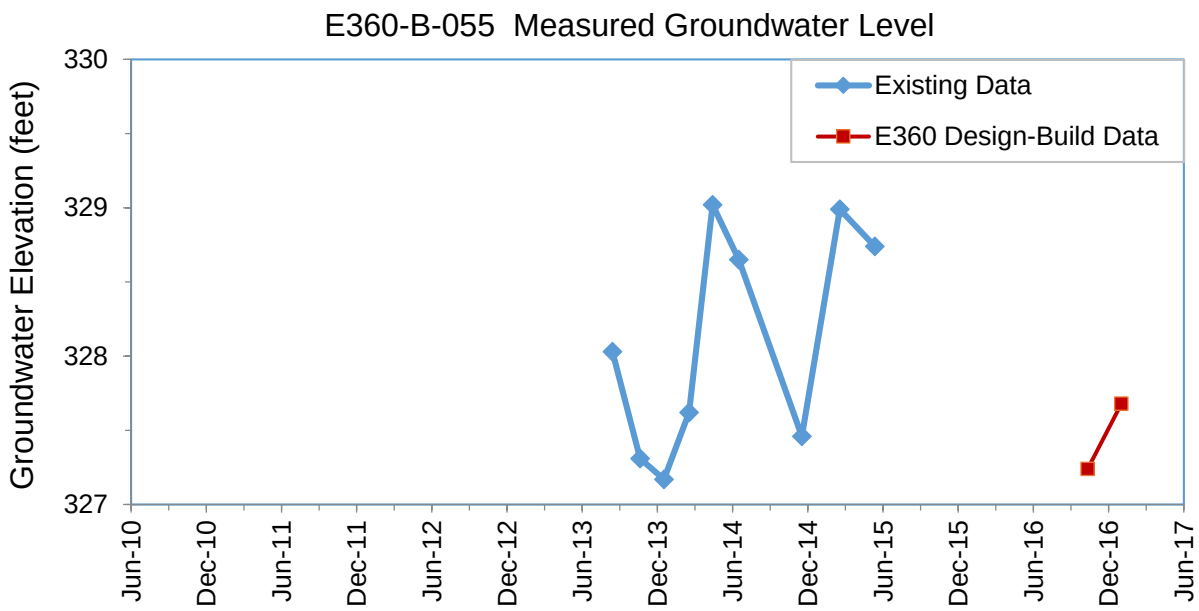
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



E360-B-055	Ground Surface Elevation: 354.7 ft, Screen Elevation: 320.7 ft to 310.7 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
8/15/2013	26.7	328.0		
10/21/2013	27.4	327.3		
12/18/2013	27.5	327.2		
2/17/2014	27.1	327.6		
4/15/2014	25.7	329.0		
6/18/2014	26.0	328.7		
11/18/2014	27.2	327.5		
2/18/2015	25.7	329.0		
5/14/2015	25.9	328.7		
10/12/2016			27.4	327.2
1/2/2017			27.0	327.7

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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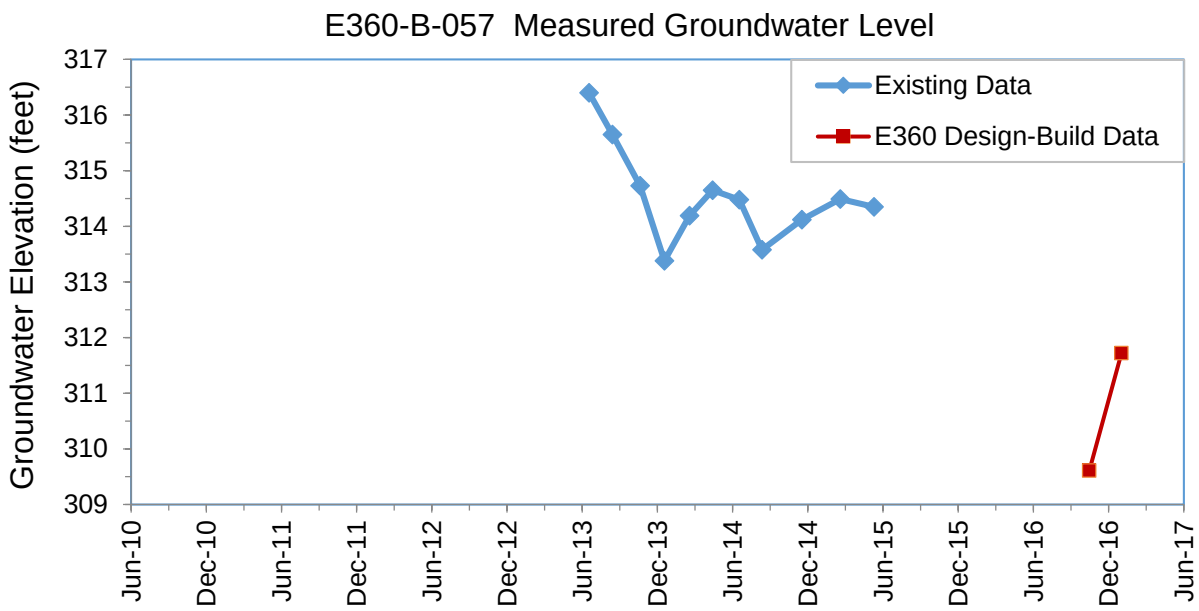
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



E360-B-057	Ground Surface Elevation: 353.4 ft, Screen Elevation: 316.4 ft to 303.4 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
6/19/2013	37.0	316.4		
8/15/2013	37.7	315.7		
10/21/2013	38.7	314.7		
12/19/2013	40.0	313.4		
2/18/2014	39.2	314.2		
4/15/2014	38.7	314.7		
6/19/2014	38.9	314.5		
8/13/2014	39.8	313.6		
11/18/2014	39.3	314.1		
2/19/2015	38.9	314.5		
5/12/2015	39.0	314.4		
10/16/2016			43.8	309.6
1/2/2017			41.7	311.7

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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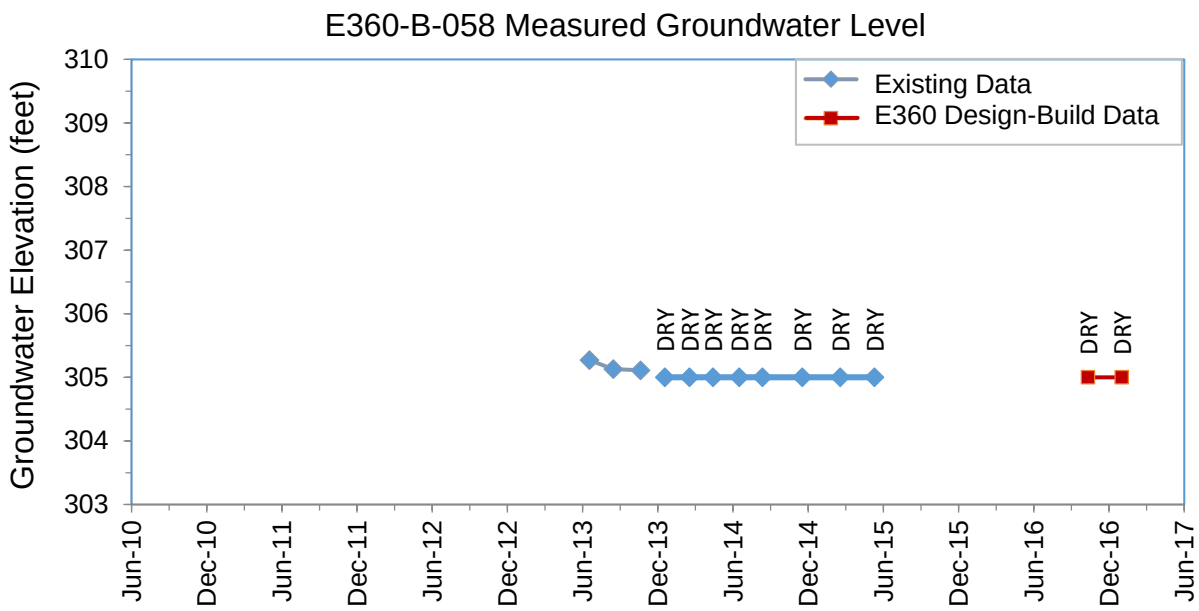
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



E360-B-058	Ground Surface Elevation: 352.5 ft, Screen Elevation: 315.0 ft to 305.0 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
6/19/2013	47.2	305.3		
8/16/2013	47.4	305.1		
10/21/2013	47.4	305.1		
12/19/2013	DRY			
2/17/2014	DRY			
4/15/2014	DRY			
6/18/2014	DRY			
8/13/2014	DRY			
11/18/2014	DRY			
2/18/2015	DRY			
5/12/2015	DRY			
10/16/2016			DRY	
1/2/2017			DRY	

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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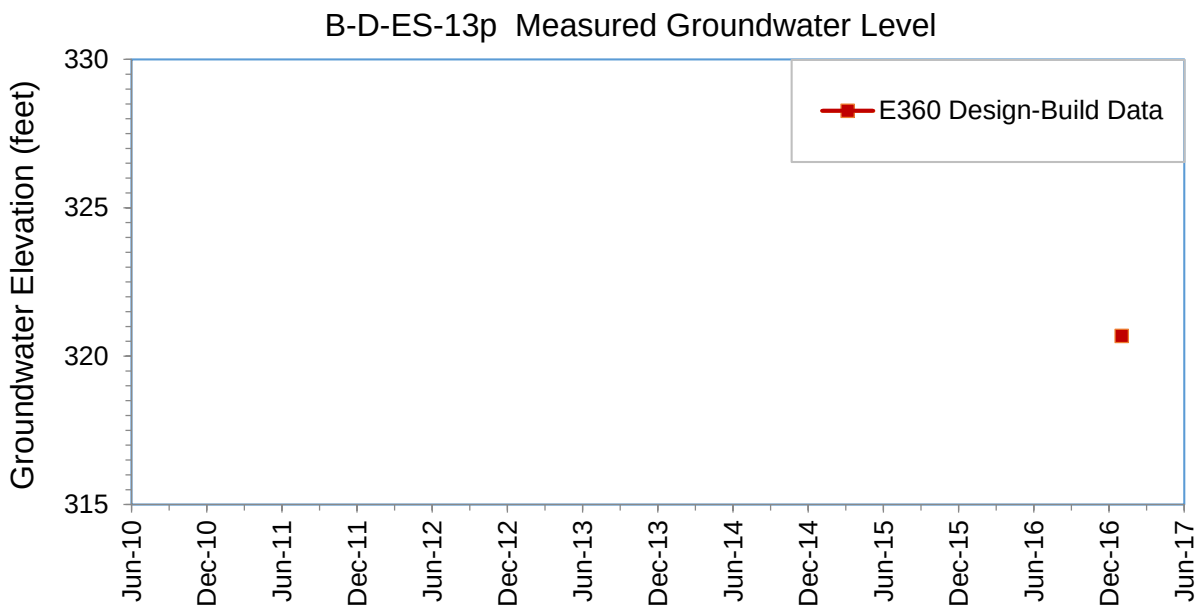
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



B-D-ES-13p	Ground Surface Elevation: 325.5 ft, Screen Elevation: 306.5 ft to 296.5 ft			
Date	Existing Data		E360 Design-Build Data	
	Groundwater Depth (feet)	Groundwater Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
1/2/2017			4.8	320.7

Note: Elevations are taken from Boring Logs in Appendix A.2, and may not match elevations in Table A.2

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SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Appendix C

Laboratory Testing

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Appendix C.1

E360 Design-Build Index and Property Testing

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Table C.1-1. Summary of E360 Design-Build Index and Property Testing

Boring ID	Sample Number	Top Depth (feet)	Bottom Depth (feet)	Natural Water Content (%)	Grain Size			Atterberg Limits			1-D Consol Test	CU Triax Test
					% Gravel	% Sand	% Fines	Plastic Limit (PL)	Liquid Limit (LL)	Plasticity Index (PI)		
E360-K-002	S1	10.0	11.5	16.3	0.3	83.8	15.9	-	-	-	☐	☐
E360-K-002	S4	17.5	19.0	10.3	20	56.6	23.3	-	-	-	☐	☐
E360-K-003	S3	15.0	16.5	17.9	-	65.2	34.8	NP	NP	NP	☐	☐
E360-K-003	S5	20.0	21.5	23.3	-	-	69.5	NP	NP	NP	☐	☐
E360-K-003	S14	65.0	66.5	26.5	-	-	78.7	23	60	37	☐	☐
E360-K-003	S16	75.0	76.5	28.1	-	-	95.8	26	73	47	☐	☐
E360-K-004	S1	10.0	11.5	30.9	-	-	-	23	29	6	☐	☐
E360-K-004	S4	17.5	19.0	15.1	1.9	72.6	25.5	-	-	-	☐	☐
E360-K-004	S6	25.0	26.5	17.4	6.4	84.6	8.9	-	-	-	☐	☐
E360-K-004	S14	65.0	66.5	13.3	-	-	60.9	12	16	4	☐	☐
E360-K-004	S16	75.0	76.5	30.7	-	-	-	28	76	48	☐	☐
E360-K-005	S1	10.0	11.5	17.2	2.7	86.4	10.9	-	-	-	☐	☐
E360-K-005	S5	20.0	21.5	13.3	0.3	85.9	13.8	-	-	-	☐	☐
E360-K-005	S8	35.0	36.5	13.9	8.8	74.6	16.7	-	-	-	☐	☐
E360-K-005	S16	75.0	76.5	24.8	-	-	87.3	27	65	38	☐	☐
E360-K-005	S17	80.0	81.5	31.5	-	-	87.7	29	75	46	☐	☐
E360-K-007	S2	7.5	9.0	24.0	-	-	-	18	21	3	☐	☐
E360-K-007	ST-1	12.5	14.5	59.8	-	-	-	25	47	22	■	■
E360-K-007	S4	15.0	16.5	24.2	-	-	92.8	24	25	1	☐	☐
E360-K-007	ST2	17.0	18.5	37.5	-	-	-	28	54	26	■	☐
E360-K-007	S6	25.0	26.5	13.8	0.2	83.7	16.1	-	-	-	☐	☐
E360-K-007	S10	45.0	46.5	17.1	2.0	83.8	14.2	-	-	-	☐	☐
E360-K-007	S15	80.0	81.5	20.8	-	77	23.0	-	-	-	☐	☐
E360-K-008	S9	30.0	31.5	50.4	-	-	-	23	45	22	☐	☐
E360-K-008	T10	31.5	33.5	31.0	-	-	-	23	32	9	■	☐
E360-K-008	T12	37.0	38.5	45.3	-	-	-	25	57	32	■	☐
E360-K-008	S15	50.0	51.5	10.7	14	54.1	31.9	-	-	-	☐	☐
E360-K-009	S2	7.5	9.0	7.7	19.4	66.3	14.2	-	-	-	☐	☐
E360-K-009	S5	15.0	16.5	11.3	11.7	61.2	27.1	-	-	-	☐	☐
E360-K-009	S11	40.0	41.5	49.3	-	-	-	24	53	29	☐	☐
E360-K-009	S12	42.0	44.0	44.9	-	-	-	23	52	29	■	■
E360-K-009	S13A	45.0	46.0	32.8	-	-	-	20	41	21	☐	☐
E360-K-009	S17	65.0	66.5	18.2	-	-	37.2	NP	NP	NP	☐	☐
E360-K-009	S19	75.0	76.5	31	-	-	-	23	32	9	☐	☐
E360-K-009	S25	105.0	106.5	17.5	-	81.2	18.8	-	-	-	☐	☐
E360-K-010	S12	47.5	49.0	45.3	-	-	-	25	50	25	☐	☐
E360-K-010	S14	55.0	56.5	14.4	-	81.4	18.6	-	-	-	☐	☐
E360-K-010	S16	65.0	66.5	22.0	-	-	96.9	22	24	2	☐	☐
E360-K-011	S2	10	11.5	8.7	12.3	62.9	24.8	-	-	-	☐	☐
E360-K-011	S9	32.5	34	17.9	0.5	54.5	45	-	-	-	☐	☐
E360-K-011	S13	45	46.5	31.6	-	-	-	23	41	18	☐	☐
E360-K-011	S14	50	51.5	22.6	-	-	-	17	17	NP	☐	☐
E360-K-011	S16	60	61.5	46.7	-	-	-	22	35	13	☐	☐
E360-K-011	S19	75	76.5	18	-	-	32.4	-	-	-	☐	☐

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Table C.1-1. Summary of E360 Design-Build Index and Property Testing (Continued)

Boring ID	Sample Number	Top Depth (feet)	Bottom Depth (feet)	Natural Water Content (%)	Grain Size			Atterberg Limits			1-D Consol Test	CU Triax Test
					% Gravel	% Sand	% Fines	Plastic Limit (PL)	Liquid Limit (LL)	Plasticity Index (PI)		
E360-K-011	S24	100	101.5	31	-	-	-	25	56	31	☐	☐
E360-K-012	S2	7.5	9	11.5	9.7	64.2	26.2	-	-	-	☐	☐
E360-K-013	S4	12.5	14	11.2	8.6	64.7	26.7	-	-	-	☐	☐
E360-K-013	S23	100	101.5	20.6	-	-	-	22	39	17	☐	☐
E360-K-014	S3	10	11.5	10.5	10.9	54	35.1	-	-	-	☐	☐
E360-K-015	S3	10	11.5	11.5	10	56.6	33.4	-	-	-	☐	☐
E360-K-015	S18	75	76.5	21	-	-	76.2	21	51	30	☐	☐
E360-K-015	S20	85	86.5	24.1	-	-	-	21	48	27	☐	☐
E360-K-017	S1B	2.8	3.5	16.5	-	-	73.9	NP	NP	NP	☐	☐
E360-K-017	S2	5	6.5	19.7	-	-	68.7	NP	NP	NP	☐	☐
E360-K-017	S7	20	21.5	20.2	-	-	86.8	21	25	4	☐	☐
E360-K-017	S14	55	56.5	19.5	0.1	14.1	85.8	26	43	17	☐	☐
E360-K-017	S17	80	81.5	20.4	-	-	86.4	21	55	34	☐	☐
E360-K-018	S3	7.5	9	20.3	0.4	16.6	83	NP	NP	NP	☐	☐
E360-K-018	S5A	12.5	13.8	19.8	-	-	82	NP	NP	NP	☐	☐
E360-K-018	S6	15	16.5	15.2	2.3	75.8	21.9	-	-	-	☐	☐
E360-K-018	S8	25	26.5	17.2	-	-	-	21	25	4	☐	☐
E360-K-019	S7	25	26.5	16.6	0.2	76.3	23.4	-	-	-	☐	☐
E360-K-019	S8	30	31.5	18.9	-	-	58.1	-	-	-	☐	☐
E360-K-019	S9	35	36.5	19.1	-	-	77.8	NP	NP	NP	☐	☐
E360-K-019	S16	70	71.5	20.6	-	-	94.2	NP	NP	NP	☐	☐
E360-K-021	S5	20	21.5	19.7	-	-	-	NP	NP	NP	☐	☐
E360-K-021	S15	70	71.5	19.3	-	70.2	29.8	-	-	-	☐	☐
E360-K-022	S1	5	6.5	10.3	13	56.5	30.5	-	-	-	☐	☐
E360-K-022	S5	20	21.5	13.7	1.4	68	30.6	-	-	-	☐	☐
E360-K-023	S1	5	6.5	10	23.2	49.7	27.1	-	-	-	☐	☐
E360-K-023	S2	7.5	9	8.1	12.6	58.6	28.8	-	-	-	☐	☐
E360-K-023	S17	80	81.5	17.6	1.6	79.2	19.2	-	-	-	☐	☐
E360-K-025	S1	5	6.5	11.4	15.7	64	20.3	-	-	-	☐	☐
E360-K-026	S15	80	81.5	21.8	-	-	-	23	50	27	☐	☐
E360-K-027	S3	10	11.5	9.9	10.7	64.9	24.5	-	-	-	☐	☐
E360-K-027	S8	50	51.5	25.5	-	-	-	24	61	37	☐	☐
E360-K-027	S10	70	71.5	20.3	1.1	12.2	86.7	23	53	30	☐	☐
E360-K-028	S8	40	41.5	23.8	-	-	81.7	25	51	26	☐	☐
E360-K-028	S11	70	71.5	22.1	-	-	78.9	20	34	14	☐	☐
E360-K-029	S4	12.5	14	11.9	5.4	54.6	39.9	-	-	-	☐	☐
E360-K-029	S7	25	26.5	12.5	3.6	70.6	25.8	-	-	-	☐	☐
E360-K-029	S10	50	51.5	22.3	-	-	-	22	56	34	☐	☐
E360-K-029	S12	70	71.5	20.2	-	89.3	10.7	-	-	-	☐	☐
E360-K-030	S1	5	6.5	11.8	3	65.3	31.7	-	-	-	☐	☐
E360-K-030	S10A	50	51	17.4	-	-	74	17	37	20	☐	☐
E360-K-030	S11	55	56.5	19.6	-	87.3	12.7	-	-	-	☐	☐
E360-TP-1	S2	2	4.5	9.2	15.5	62.9	21.5	NP	NP	NP	☐	☐
E360-TP-1	S3	4.5	6.5	4.9	25.4	66	8.6	-	-	-	☐	☐

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Table C.1-1. Summary of E360 Design-Build Index and Property Testing (Continued)

Boring ID	Sample Number	Top Depth (feet)	Bottom Depth (feet)	Natural Water Content (%)	Grain Size			Atterberg Limits			1-D Consol Test	CU Triax Test
					% Gravel	% Sand	% Fines	Plastic Limit (PL)	Liquid Limit (LL)	Plasticity Index (PI)		
E360-TP-2	S2	5	8	6.6	27.3	54	18.7	-	-	-	☐	☐
E360-TP-5	S3	4	6	3.4	19	65.7	15.3	NP	NP	NP	☐	☐
E360-TP-5	S4	6	7	5.1	25	62.8	12.2	-	-	-	☐	☐

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HWA GEOSCIENCES INC.
Geotechnical & Pavement Engineering • Hydrogeology • Geoenvironmental • Inspection & Testing

October 25, 2016
HWA Project No. 2016-112-23 Task 100

McMillen Jacobs Associates
1109 First Avenue, Suite 501
Seattle, Washington 98101

Attention: Mr. Daniel Dreyfus P.E.

Subject: **Materials Laboratory Report**
Soil Index and Consolidation Testing
Eastlink E360
Client Project No. 5480.0
Final Laboratory Report

Dear Mr. Dreyfus;

In accordance with your request, HWA GeoSciences Inc. (HWA) performed laboratory testing for the above referenced project. Herein we present the results of our laboratory analyses, which are summarized on the attached reports. The laboratory testing program was performed in general accordance with your instructions and appropriate ASTM Standards as outlined below.

SAMPLE DESCRIPTION: The subject samples were delivered to our laboratory on September 30, October 3, and October 10, 2016 by McMillen Jacobs personnel. The samples were delivered in re-sealable plastic bags and 2.8-inch diameter thin walled (Shelby) tubes. The samples were classified for engineering purposes, the descriptions of the samples can be found on the Summary of Material Properties Sheets, Figures 1 through 5.

MOISTURE CONTENT OF SOIL: The moisture content of all soil samples (percent by dry mass) was determined in general accordance with ASTM D 2216. The results are shown on the attached Figures, 1 through 5.

PARTICLE SIZE ANALYSIS OF SOILS: Specified samples were tested to determine the particle size distribution in general accordance with ASTM D422, using sieve analysis only. The results are plotted on the attached Particle Size Analysis of Soil Reports, Figures 6 through 28, which also indicate the moisture content of the soil samples at the time of testing.

PERCENTAGE FINER THAN #200 SIEVE: The percentage of material finer than the #200 sieve was determined for select samples in general accordance with ASTM D1140. The soil was oven dried, and washed over a #200 sieve to determine the percentage of fines. The results are shown on Figures 6 through 28.

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LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ATTERBERG LIMITS): Selected samples were tested using method ASTM D 4318, multi-point method. The results are reported on the attached Liquid Limit, Plastic Limit, and Plasticity Index reports, Figures 29 through 37.

ONE DIMENSIONAL CONSOLIDATION PROPERTIES OF SOIL: The consolidation properties of selected soil samples were measured in general accordance with ASTM D 2435. Saturation was maintained by inundation of the sample throughout the test. The samples were subjected to increasing increments of total stress, the duration of which was selected to exceed the time required for completion of primary consolidation as defined in the Standard, Method B. For samples E360-K-007 at 17 ft. and E360-K008 at 37 ft. additional time was added to each load to provide estimates of secondary compression. Unloading of the sample was carried out incrementally. The test results are presented on the attached Figures 38 through 47. Secondary compression graphs are presented in Figures 50a through 51i.

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION OF SOILS: Two specimens were tested in general accordance with method ASTM D 4767 to determine the shear strength characteristics of the soil. Prior to testing each extruded sample was trimmed to obtain cylindrical test specimens with a length to diameter ratio between 2:1 and 2.5:1. The bulk density of each specimen was determined by careful weighing and dimensional measurement of the trimmed sections. Each specimen was back-pressure saturated to dissolve entrapped air. After saturation was attained, but prior to vertical loading, the specimens were consolidated incrementally under effective consolidation pressures specified by the client. Loading was conducted until measured change in deviator stress over strain leveled off or decreased. The test results are presented on the attached Consolidated Undrained Triaxial Compression of Soil reports, Figures 48 and 49.

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CLOSURE: Experience has shown that test values on soil and other natural materials vary with each representative sample. As such, HWA has no knowledge as to the extent and quantity of material the tested samples may represent. HWA also makes no warranty as to how representative either the samples tested or the test results obtained are to actual field conditions. It is a well-established fact that sampling methods present varying degrees of disturbance that affect sample representativeness.

No copy should be made of this report except in its entirety.

We appreciate the opportunity to provide laboratory testing services on this project. Should you have any questions or comments, or if we may be of further service, please call.

HWA GEOSCIENCES INC.

Jessica Herrera
Materials Laboratory Manager

Steven E. Greene L.E.G.
Principal Engineering Geologist
Vice President

Attachments:

Figures 1-5	Summary of Material Properties
Figures 6-28	Particle Size Analysis of Soils
Figures 29-37	Liquid Limit, Plastic Limit and Plasticity Index of Soils
Figures 38-47	One Dimensional Consolidation of Soils
Figures 48-49	Consolidated Undrained Triaxial Compression of Soil
Figures 50a-51i	One Dimensional Consolidation of Soils - Secondary Compression

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EXPLORATION DESIGNATION	TOP DEPTH (feet)	BOTTOM DEPTH (feet)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)	SPECIFIC GRAVITY	ATTERBERG LIMITS (%)			% GRAVEL	% SAND	% FINES	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
						LL	PL	PI					
E360-K-002,S1	10.0	11.5	16.3						0.3	83.8	15.9	SM	Olive brown, silty SAND
E360-K-002,S4	17.5	19.0	10.3						20.0	56.6	23.3	SM	Olive brown, silty SAND with gravel
E360-K-003,S3	15.0	16.5	17.9			NP	NP	NP		65.2	34.8	SM	Gray, silty SAND
E360-K-003,S5	20.0	21.5	23.3			NP	NP	NP			69.5	ML	Gray, sandy SILT
E360-K-003,S14	65.0	66.5	26.5			60	23	37			78.7	CH	Gray, fat CLAY with sand
E360-K-003,S16	75.0	76.5	28.1			73	26	47			95.8	CH	Gray, fat CLAY
E360-K-004,S1	10.0	11.5	30.9			29	23	6				ML	Dark gray, SILT
E360-K-004,S4	17.5	19.0	15.1						1.9	72.6	25.5	SM	Dark grayish brown, silty SAND
E360-K-004,S6	25.0	26.5	17.4						6.4	84.6	8.9	SP-SM	Olive brown, poorly graded SAND with silt
E360-K-004,S14	65.0	66.5	13.3			16	12	4			60.9	CL-ML	Gray, sandy silty CLAY
E360-K-004,S16	75.0	76.5	30.7			76	28	48				CH	Dark gray, fat CLAY with sand
E360-K-005,S1	10.0	11.5	17.2						2.7	86.4	10.9	SP-SM	Light olive brown, poorly graded SAND with silt
E360-K-005,S5	20.0	21.5	13.3						0.3	85.9	13.8	SM	Olive brown, silty SAND
E360-K-005,S8	35.0	36.5	13.9						8.8	74.6	16.7	SM	Grayish brown, silty SAND
E360-K-005,S16	75.0	76.5	24.8			65	27	38			87.3	CH	Gray, fat CLAY
E360-K-005,S17	80.0	81.5	31.5			75	29	46			87.7	CH	Gray, fat CLAY
E360-K-007,S2	7.5	9.0	24.0			21	18	3				ML	Dark olive brown, sandy SILT
E360-K-007,ST-1	12.5	14.5	59.8			47	25	22				CL	Gray, lean CLAY
E360-K-007,S4	15.0	16.5	24.2			25	24	1			92.8	ML	Light olive brown, SILT
E360-K-007,ST2	17.0	18.5	37.5			54	28	26				CH	Olive brown, fat CLAY

Notes: 1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report test, other graphs and tables, and the exploration logs.
2. The soil classifications in this table are based on ASTM D2487 and D2488 as applicable.

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Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

SUMMARY OF MATERIAL PROPERTIES

PROJECT NO.: 2016-112-23 FIGURE: 1

EXPLORATION DESIGNATION	TOP DEPTH (feet)	BOTTOM DEPTH (feet)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)	SPECIFIC GRAVITY	ATTERBERG LIMITS (%)			% GRAVEL	% SAND	% FINES	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
						LL	PL	PI					
E360-K-007,S6	25.0	26.5	13.8						0.2	83.7	16.1	SM	Dark olive brown, silty SAND
E360-K-007,S10	45.0	46.5	17.1						2.0	83.8	14.2	SM	Dark olive brown, silty SAND
E360-K-007,S15	80.0	81.5	20.8							77.0	23.0	SM	Very dark olive brown, silty SAND
E360-K-008,S9	30.0	31.5	50.4			45	23	22				CL	Grayish brown, lean CLAY
E360-K-008,T10	31.5	33.5	31.0			32	23	9				CL	Gray, lean CLAY with sand
E360-K-008,T12	37.0	38.5	45.3			57	25	32				CH	Dark grayish brown, fat CLAY
E360-K-008,S15	50.0	51.5	10.7						14.0	54.1	31.9	SM	Grayish brown, silty SAND
E360-K-009,S2	7.5	9.0	7.7						19.4	66.3	14.2	SM	Light olive brown, silty SAND with gravel
E360-K-009,S5	15.0	16.5	11.3						11.7	61.2	27.1	SM	Olive brown, silty SAND
E360-K-009,S11	40.0	41.5	49.3			53	24	29				CH	Grayish brown, fat CLAY
E360-K-009,S12	42.0	44.0	44.9			52	23	29				CH	Gray, fat CLAY
E360-K-009,S13A	45.0	46.0	32.8			41	20	21				CL	Dark grayish brown, lean CLAY
E360-K-009,S17	65.0	66.5	18.2			NP	NP	NP			37.2	SM	Grayish brown, silty SAND
E360-K-009,S19	75.0	76.5	31.0			32	23	9				ML	Dark grayish brown, SILT with sand
E360-K-009,S25	105.0	106.5	17.5							81.2	18.8	SM	Dark grayish brown, silty SAND
E360-K-010,S12	47.5	49.0	45.3			50	25	25				CH	Dark grayish brown, fat CLAY
E360-K-010,S14	55.0	56.5	14.4							81.4	18.6	SM	Dark olive brown, silty SAND
E360-K-010,S16	65.0	66.5	22.0			24	22	2			96.9	ML	Light olive brown, SILT
E360-K-011,S2	10.0	11.5	8.7						12.3	62.9	24.8	SM	Dark olive brown, silty SAND
E360-K-011,S9	32.5	34.0	17.9						0.5	54.5	45.0	SM	Dark grayish brown, silty SAND

Notes: 1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report test, other graphs and tables, and the exploration logs.
2. The soil classifications in this table are based on ASTM D2487 and D2488 as applicable.

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HWA GEOSCIENCES INC.

Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

SUMMARY OF MATERIAL PROPERTIES

PROJECT NO.: 2016-112-23 FIGURE: 2

EXPLORATION DESIGNATION	TOP DEPTH (feet)	BOTTOM DEPTH (feet)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)	SPECIFIC GRAVITY	ATTERBERG LIMITS (%)			% GRAVEL	% SAND	% FINES	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
						LL	PL	PI					
E360-K-011,S13	45.0	46.5	31.6			41	23	18				CL	Gray, lean CLAY
E360-K-011,S14	50.0	51.5	22.6			17	17	NP				ML	Dark gray, sandy SILT
E360-K-011,S16	60.0	61.5	46.7			35	22	13				CL	Gray, lean CLAY
E360-K-011,S19	75.0	76.5	18.0								32.4	SM	Dark grayish brown, silty SAND
E360-K-011,S24	100.0	101.5	31.0			56	25	31				CH	Gray, fat CLAY
E360-K-012,S2	7.5	9.0	11.5						9.7	64.2	26.2	SM	Dark olive brown, silty SAND
E360-K-013,S4	12.5	14.0	11.2						8.6	64.7	26.7	SM	Dark grayish brown, silty SAND
E360-K-013,S23	100.0	101.5	20.6			39	22	17				CL	Grayish brown, lean CLAY
E360-K-014,S3	10.0	11.5	10.5						10.9	54.0	35.1	SM	Light olive brown, silty SAND
E360-K-015,S3	10.0	11.5	11.5						10.0	56.6	33.4	SM	Light olive brown, silty SAND
E360-K-015,S18	75.0	76.5	21.0			51	21	30			76.2	CH	Dark grayish brown, fat CLAY with sand
E360-K-015,S20	85.0	86.5	24.1			48	21	27				CL	Gray, lean CLAY
E360-K-017,S1B	2.8	3.5	16.5			NP	NP	NP			73.9	ML	Grayish brown, SILT with sand
E360-K-017,S2	5.0	6.5	19.7			NP	NP	NP			68.7	ML	Grayish brown, sandy SILT
E360-K-017,S7	20.0	21.5	20.2			25	21	4			86.8	CL-ML	Grayish brown, silty CLAY
E360-K-017,S14	55.0	56.5	19.5			43	26	17	0.1	14.1	85.8	CL	Grayish brown, lean CLAY
E360-K-017,S17	80.0	81.5	20.4			55	21	34			86.4	CH	Dark grayish brown, fat CLAY
E360-K-018,S3	7.5	9.0	20.3			NP	NP	NP	0.4	16.6	83.0	ML	Light olive brown, SILT with sand
E360-K-018,S5A	12.5	13.8	19.8			NP	NP	NP			82.0	ML	Light gray, SILT with sand
E360-K-018,S6	15.0	16.5	15.2						2.3	75.8	21.9	SM	Light grayish brown, silty SAND

Notes: 1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report test, other graphs and tables, and the exploration logs.
2. The soil classifications in this table are based on ASTM D2487 and D2488 as applicable.

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Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

SUMMARY OF MATERIAL PROPERTIES

PROJECT NO.: 2016-112-23 FIGURE: 3

EXPLORATION DESIGNATION	TOP DEPTH (feet)	BOTTOM DEPTH (feet)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)	SPECIFIC GRAVITY	ATTERBERG LIMITS (%)			% GRAVEL	% SAND	% FINES	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
						LL	PL	PI					
E360-K-018,S8	25.0	26.5	17.2			25	21	4				CL-ML	Grayish brown, silty CLAY
E360-K-019,S7	25.0	26.5	16.6						0.2	76.3	23.4	SM	Olive brown, silty SAND
E360-K-019,S8	30.0	31.5	18.9								58.1	ML	Grayish brown, sandy SILT
E360-K-019,S9	35.0	36.5	19.1			NP	NP	NP			77.8	ML	Gray, SILT with sand
E360-K-019,S16	70.0	71.5	20.6			NP	NP	NP			94.2	ML	Gray, SILT
E360-K-021,S5	20.0	21.5	19.7			NP	NP	NP				ML	Grayish brown, sandy SILT
E360-K-021,S15	70.0	71.5	19.3							70.2	29.8	SM	Grayish brown, silty SAND
E360-K-022,S1	5.0	6.5	10.3						13.0	56.5	30.5	SM	Olive brown, silty SAND
E360-K-022,S5	20.0	21.5	13.7						1.4	68.0	30.6	SM	Grayish brown, silty SAND
E360-K-023,S1	5.0	6.5	10.0						23.2	49.7	27.1	SM	Olive brown, silty SAND with gravel
E360-K-023,S2	7.5	9.0	8.1						12.6	58.6	28.8	SM	Grayish brown, silty SAND
E360-K-023,S17	80.0	81.5	17.6						1.6	79.2	19.2	SM	Grayish brown, silty SAND
E360-K-025,S1	5.0	6.5	11.4						15.7	64.0	20.3	SM	Light olive brown, silty SAND with gravel
E360-K-026,S15	80.0	81.5	21.8			50	23	27				CH	Dark gray, fat CLAY
E360-K-027,S3	10.0	11.5	9.9						10.7	64.9	24.5	SM	Olive brown, silty SAND
E360-K-027,S8	50.0	51.5	25.5			61	24	37				CH	Gray, fat CLAY
E360-K-027,S10	70.0	71.5	20.3			53	23	30	1.1	12.2	86.7	CH	Dark gray, fat CLAY
E360-K-028,S8	40.0	41.5	23.8			51	25	26			81.7	CH	Dark gray, fat CLAY with sand
E360-K-028,S11	70.0	71.5	22.1			34	20	14			78.9	CL	Dark gray, lean CLAY with sand
E360-K-029,S4	12.5	14.0	11.9						5.4	54.6	39.9	SM	Light olive brown, silty SAND

Notes: 1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report test, other graphs and tables, and the exploration logs.
2. The soil classifications in this table are based on ASTM D2487 and D2488 as applicable.

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SUMMARY OF MATERIAL PROPERTIES

PROJECT NO.: 2016-112-23 FIGURE: 4

EXPLORATION DESIGNATION	TOP DEPTH (feet)	BOTTOM DEPTH (feet)	MOISTURE CONTENT (%)	ORGANIC CONTENT (%)	SPECIFIC GRAVITY	ATTERBERG LIMITS (%)			% GRAVEL	% SAND	% FINES	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
						LL	PL	PI					
E360-K-029,S7	25.0	26.5	12.5						3.6	70.6	25.8	SM	Grayish brown, silty SAND
E360-K-029,S10	50.0	51.5	22.3			56	22	34				CH	Gray, fat CLAY
E360-K-029,S12	70.0	71.5	20.2							89.3	10.7	SP-SM	Olive brown, poorly graded SAND with silt
E360-K-030,S1	5.0	6.5	11.8						3.0	65.3	31.7	SM	Grayish brown, silty SAND
E360-K-030,S10A	50.0	51.0	17.4			37	17	20			74.0	CL	Light olive brown, lean CLAY with sand
E360-K-030,S11	55.0	56.5	19.6							87.3	12.7	SM	Dark grayish brown, silty SAND
E360-TP-1,S2	2.0	4.5	9.2			NP	NP	NP	15.5	62.9	21.5	SM	Light olive brown, silty SAND with gravel
E360-TP-1,S3	4.5	6.5	4.9						25.4	66.0	8.6	SW-SM	Olive brown, well graded SAND with silt and gravel
E360-TP-2,S2	5.0	8.0	6.6						27.3	54.0	18.7	SM	Light brown, silty SAND with gravel
E360-TP-5,S3	4.0	6.0	3.4			NP	NP	NP	19.0	65.7	15.3	SM	Very light brown, silty SAND with gravel
E360-TP-5,S4	6.0	7.0	5.1						25.0	62.8	12.2	SM	Very light brown, silty SAND with gravel

Notes:
1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report test, other graphs and tables, and the exploration logs.
2. The soil classifications in this table are based on ASTM D2487 and D2488 as applicable.

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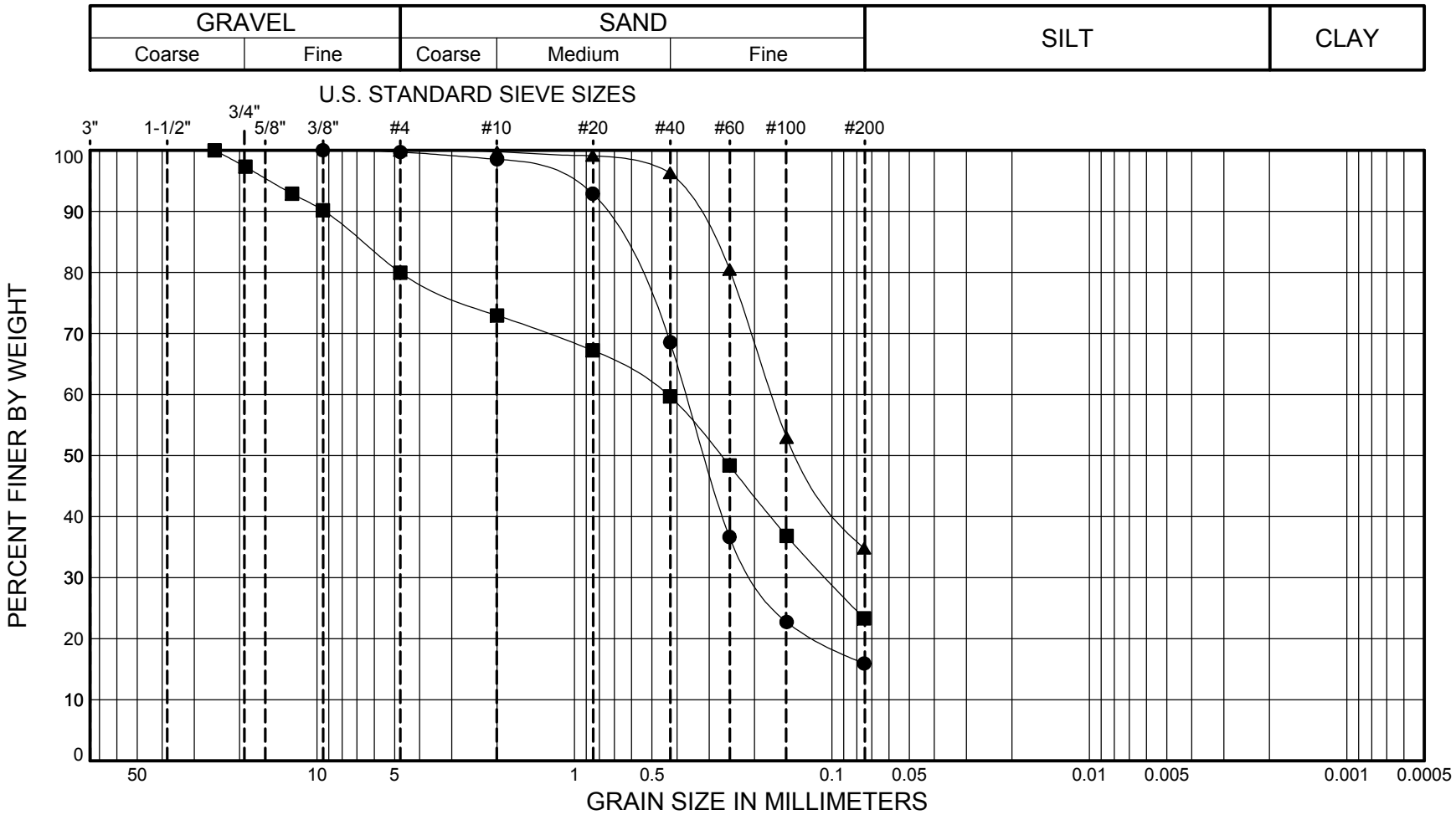
SUMMARY OF MATERIAL PROPERTIES

PROJECT NO.: 2016-112-23 FIGURE: 5



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-002	S1	10.0 - 11.5	(SM) Olive brown, silty SAND	16				0.3	83.8	15.9
■	E360-K-002	S4	17.5 - 19.0	(SM) Olive brown, silty SAND with gravel	10				20.0	56.6	23.3
▲	E360-K-003	S3	15.0 - 16.5	(SM) Gray, silty SAND	18	NP	NP	NP		65.2	34.8

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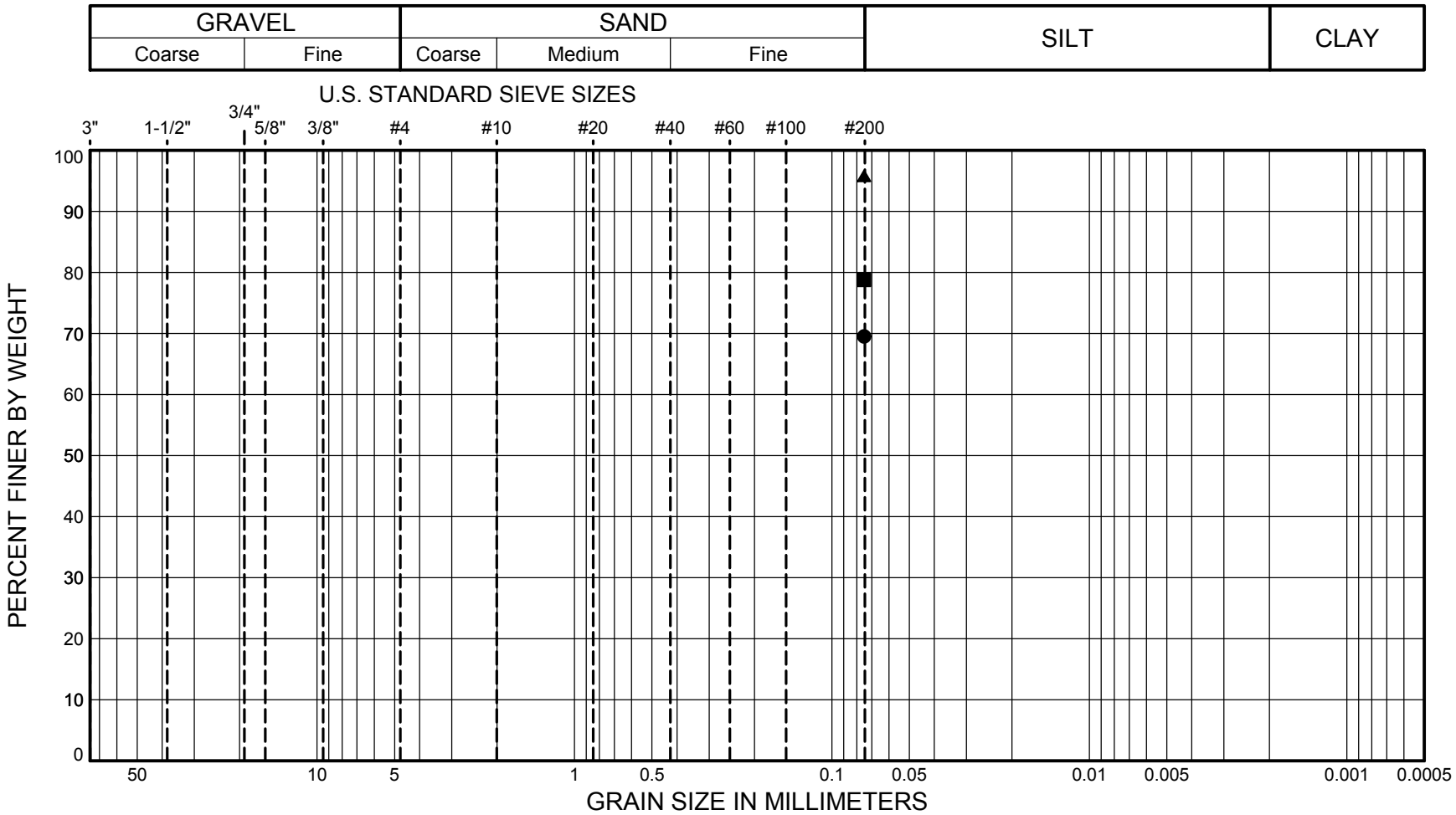
PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 6



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-003	S5	20.0 - 21.5	(ML) Gray, sandy SILT	23	NP	NP	NP			69.5
■	E360-K-003	S14	65.0 - 66.5	(CH) Gray, fat CLAY with sand	27	60	23	37			78.7
▲	E360-K-003	S16	75.0 - 76.5	(CH) Gray, fat CLAY	28	73	26	47			95.8

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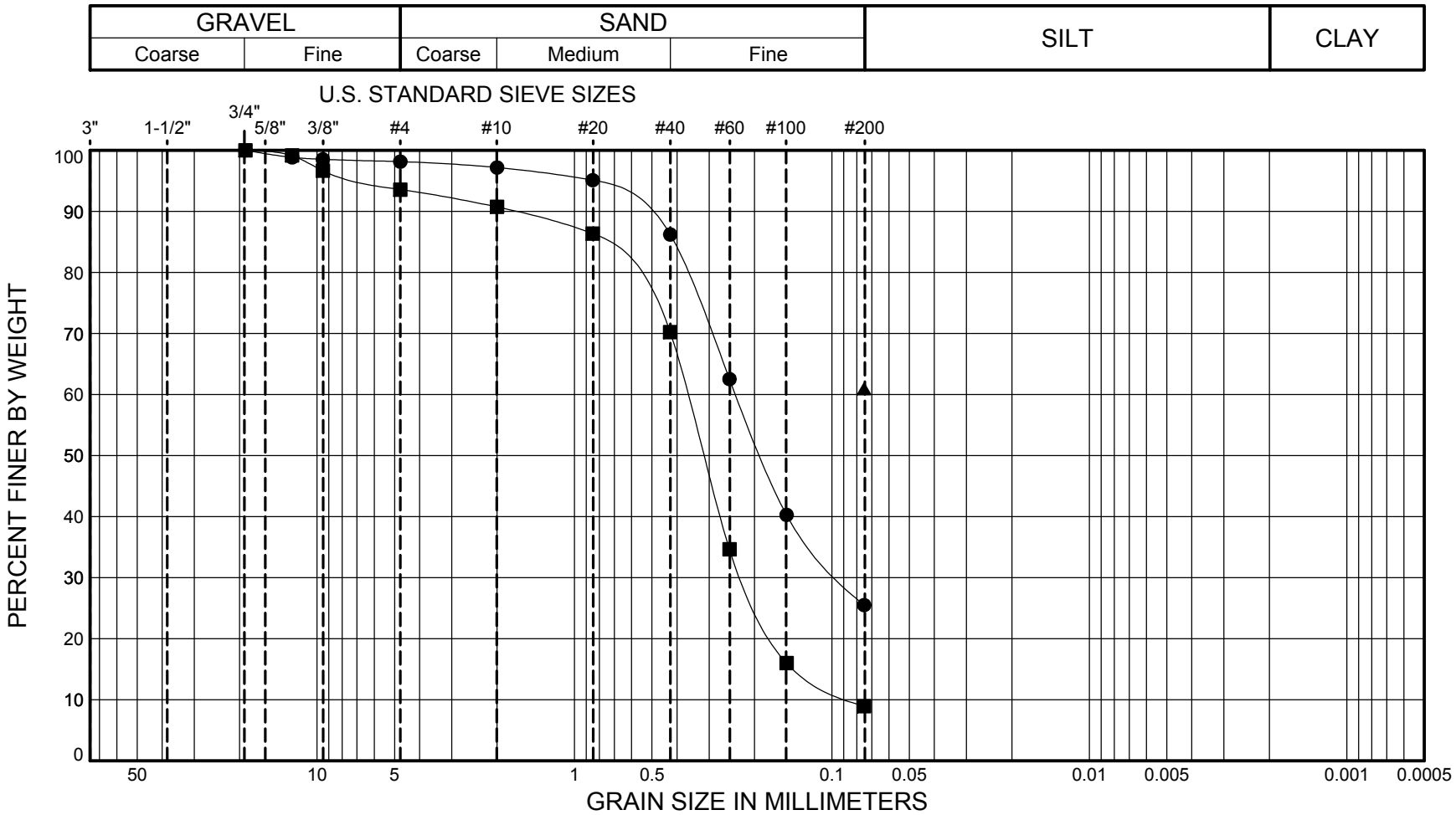
PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 7



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-004	S4	17.5 - 19.0	(SM) Dark grayish brown, silty SAND	15				1.9	72.6	25.5
■	E360-K-004	S6	25.0 - 26.5	(SP-SM) Olive brown, poorly graded SAND with silt	17				6.4	84.6	8.9
▲	E360-K-004	S14	65.0 - 66.5	(CL-ML) Gray, sandy silty CLAY	13	16	12	4			60.9

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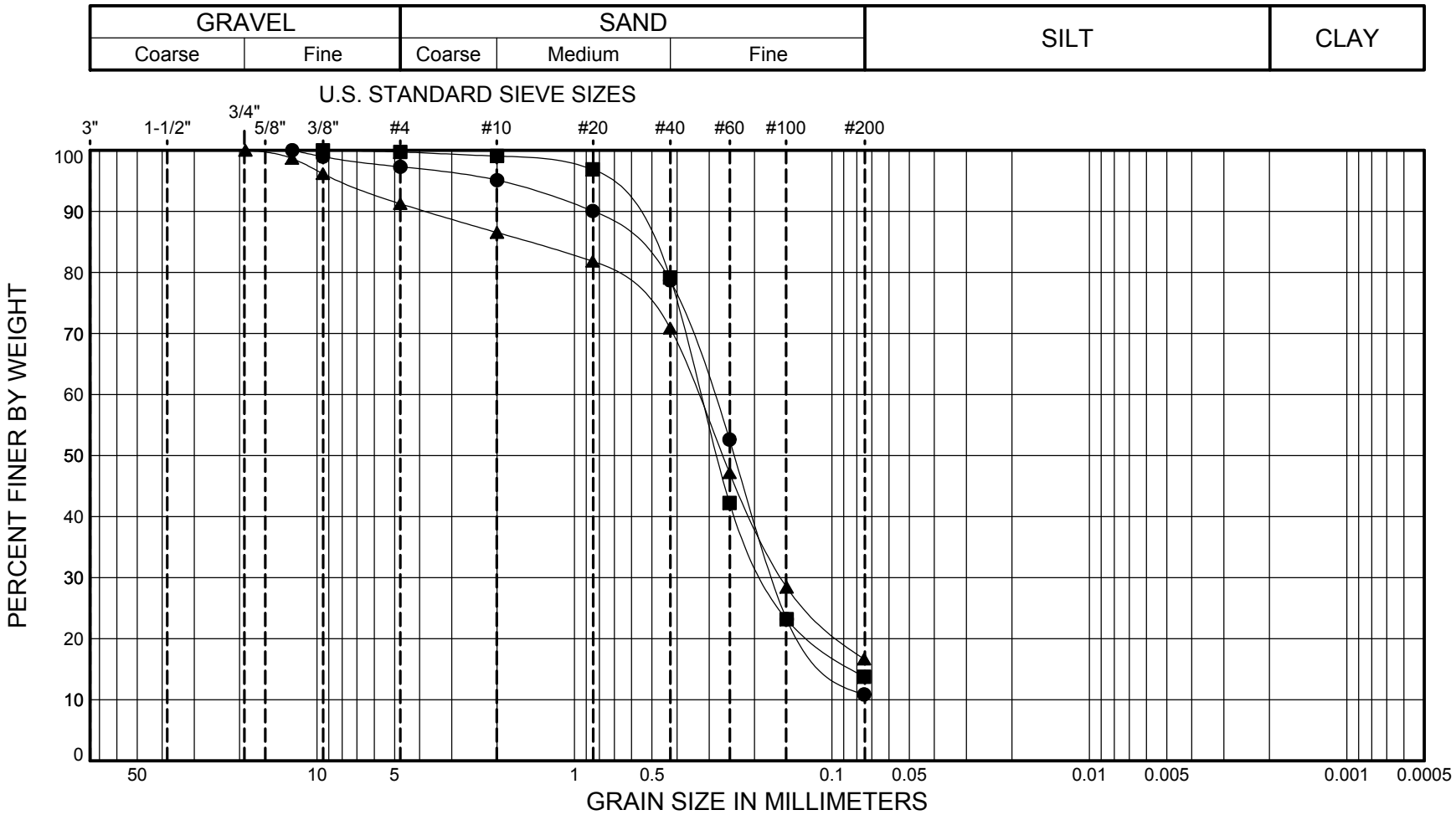
PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 8



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-005	S1	10.0 - 11.5	(SP-SM) Light olive brown, poorly graded SAND with silt	17				2.7	86.4	10.9
■	E360-K-005	S5	20.0 - 21.5	(SM) Olive brown, silty SAND	13				0.3	85.9	13.8
▲	E360-K-005	S8	35.0 - 36.5	(SM) Grayish brown, silty SAND	14				8.8	74.6	16.7

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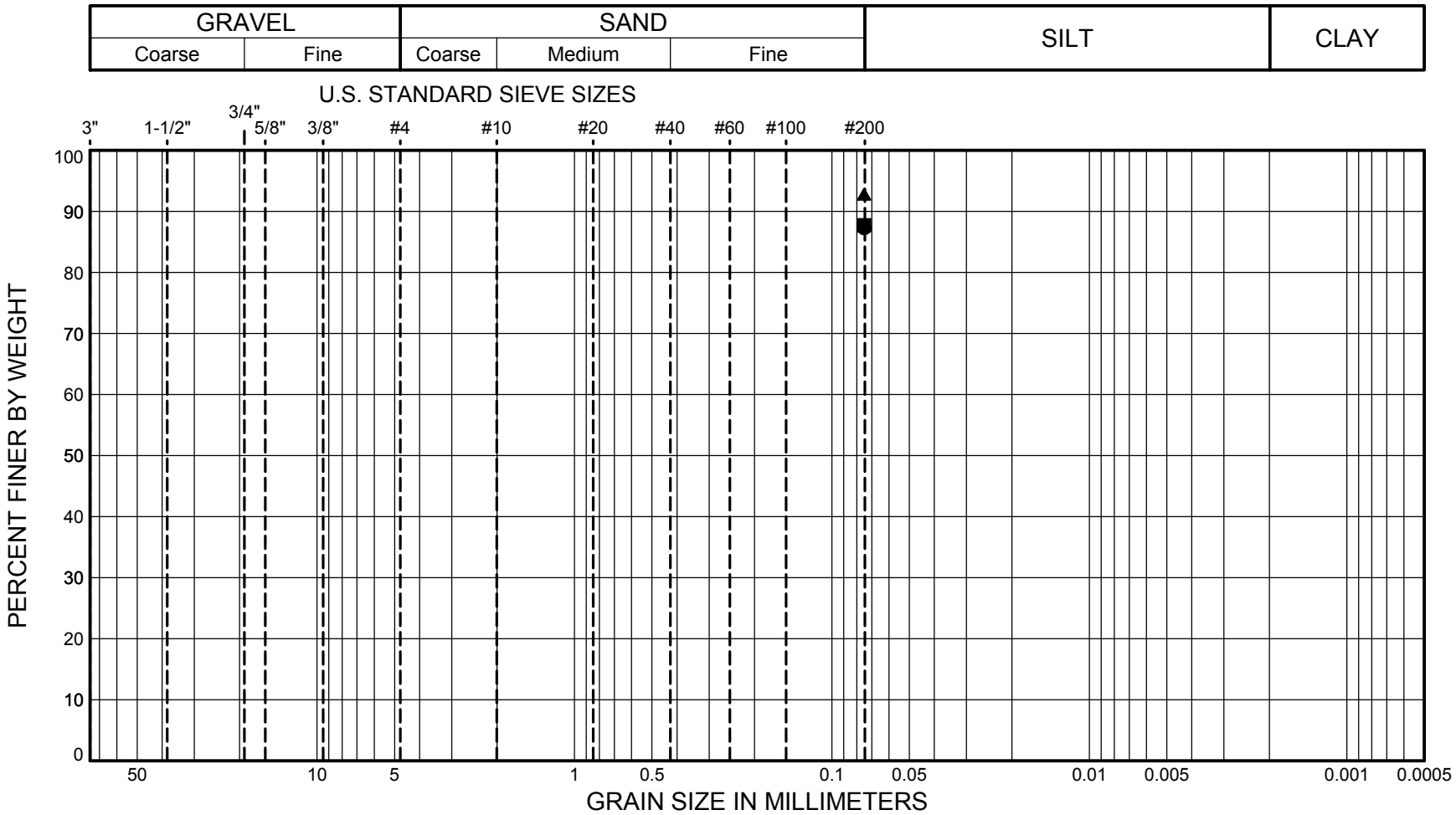
PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 9



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-005	S16	75.0 - 76.5	(CH) Gray, fat CLAY	25	65	27	38			87.3
■	E360-K-005	S17	80.0 - 81.5	(CH) Gray, fat CLAY	32	75	29	46			87.7
▲	E360-K-007	S4	15.0 - 16.5	(ML) Light olive brown, SILT	24	25	24	1			92.8

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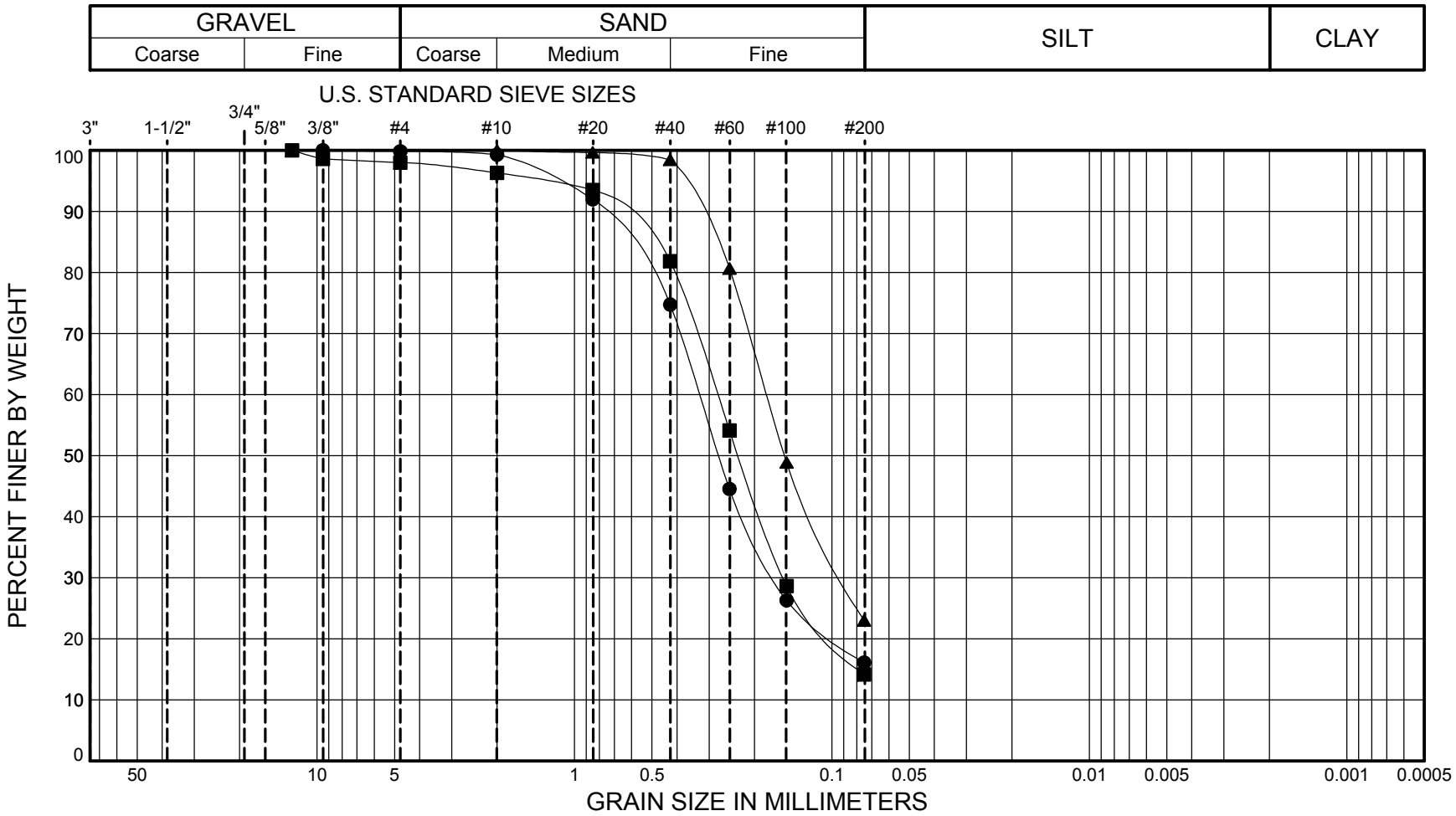
PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 10



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-007	S6	25.0 - 26.5	(SM) Dark olive brown, silty SAND	14				0.2	83.7	16.1
■	E360-K-007	S10	45.0 - 46.5	(SM) Dark olive brown, silty SAND	17				2.0	83.8	14.2
▲	E360-K-007	S15	80.0 - 81.5	(SM) Very dark olive brown, silty SAND	21					77.0	23.0

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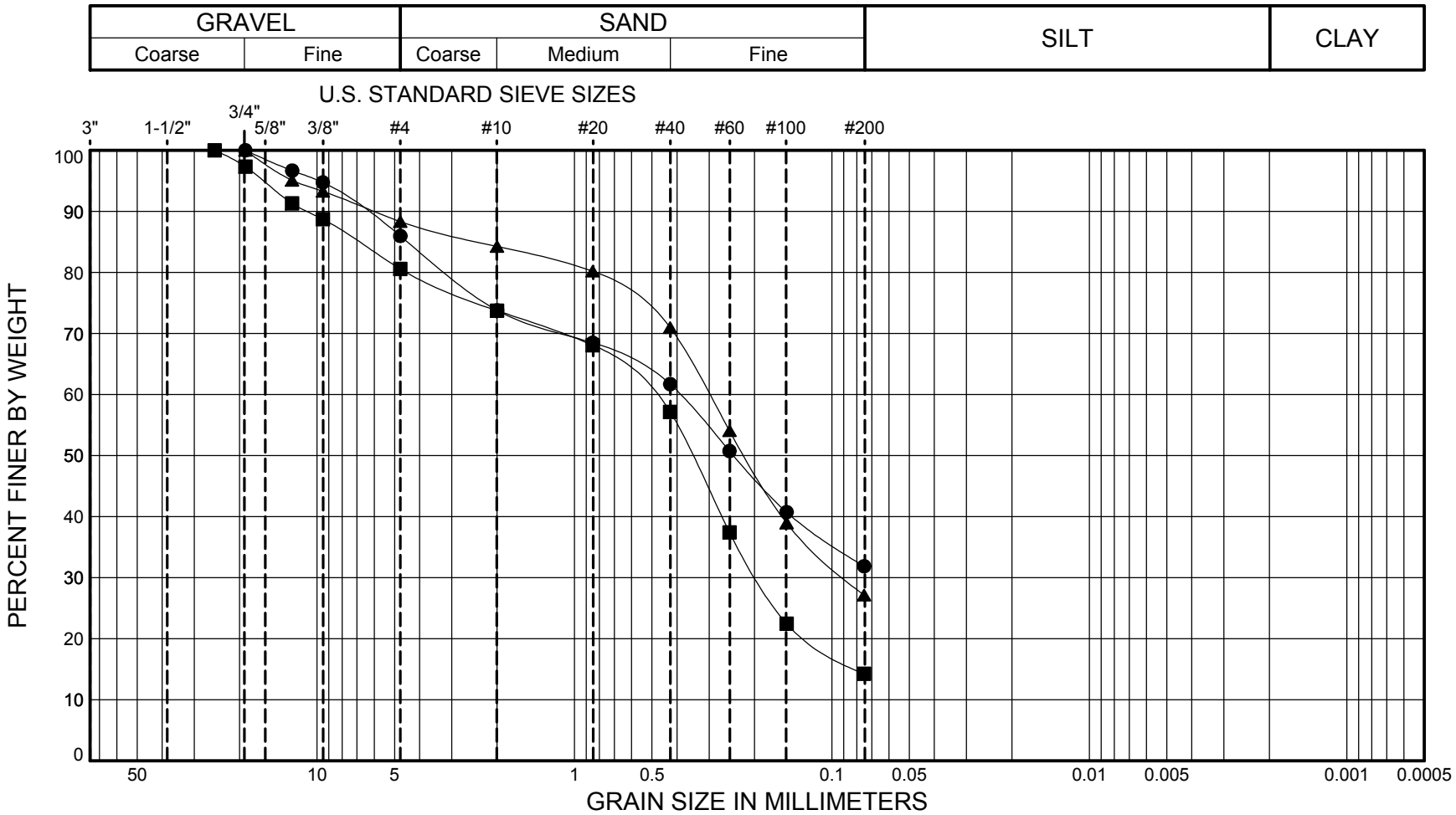
PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 11



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-008	S15	50.0 - 51.5	(SM) Grayish brown, silty SAND	11				14.0	54.1	31.9
■	E360-K-009	S2	7.5 - 9.0	(SM) Light olive brown, silty SAND with gravel	8				19.4	66.3	14.2
▲	E360-K-009	S5	15.0 - 16.5	(SM) Olive brown, silty SAND	11				11.7	61.2	27.1

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PARTICLE-SIZE ANALYSIS
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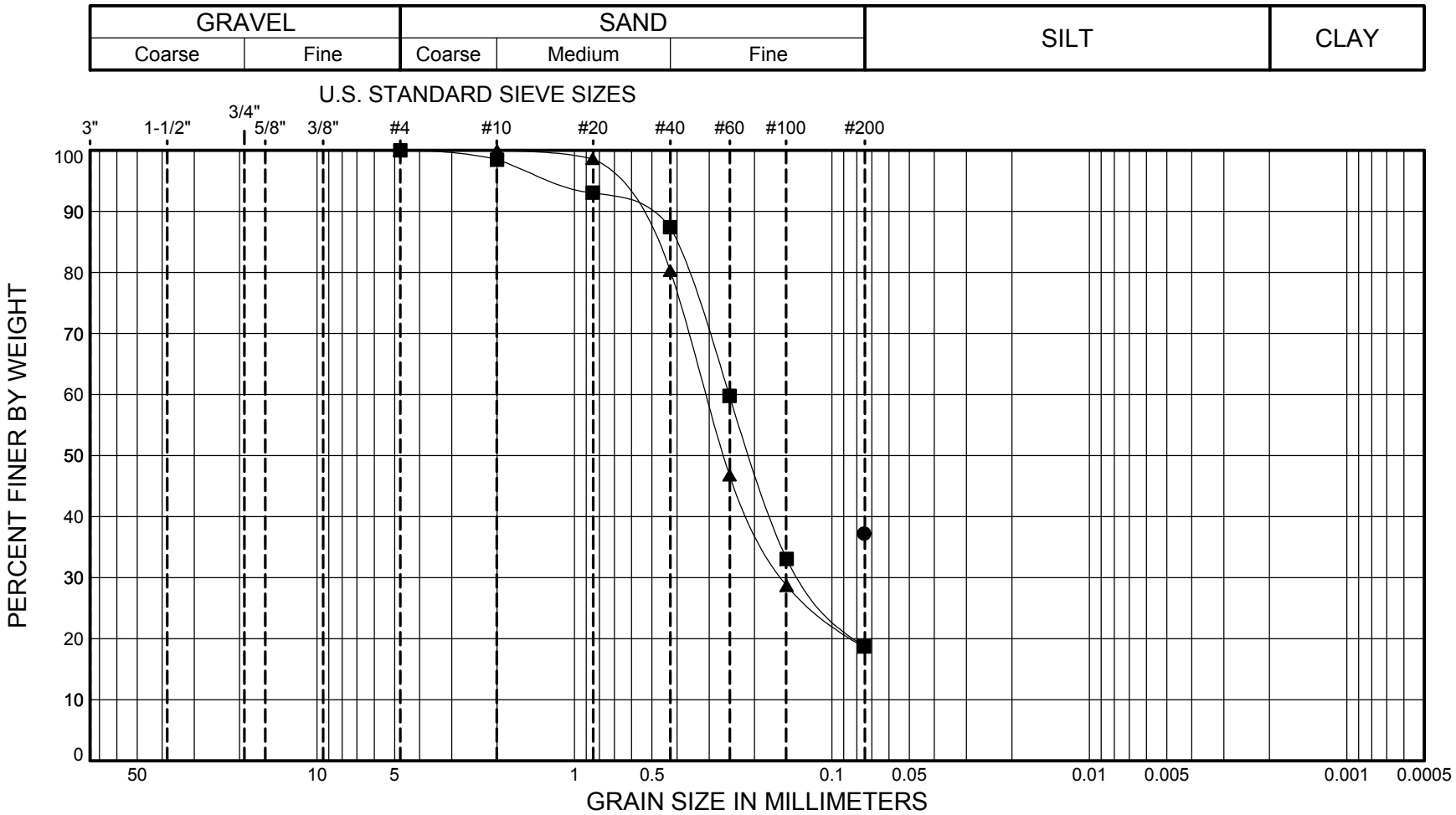
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 12



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-009	S17	65.0 - 66.5	(SM) Grayish brown, silty SAND	18	NP	NP	NP			37.2
■	E360-K-009	S25	105.0 - 106.5	(SM) Dark grayish brown, silty SAND	17					81.2	18.8
▲	E360-K-010	S14	55.0 - 56.5	(SM) Dark olive brown, silty SAND	14					81.4	18.6

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PARTICLE-SIZE ANALYSIS
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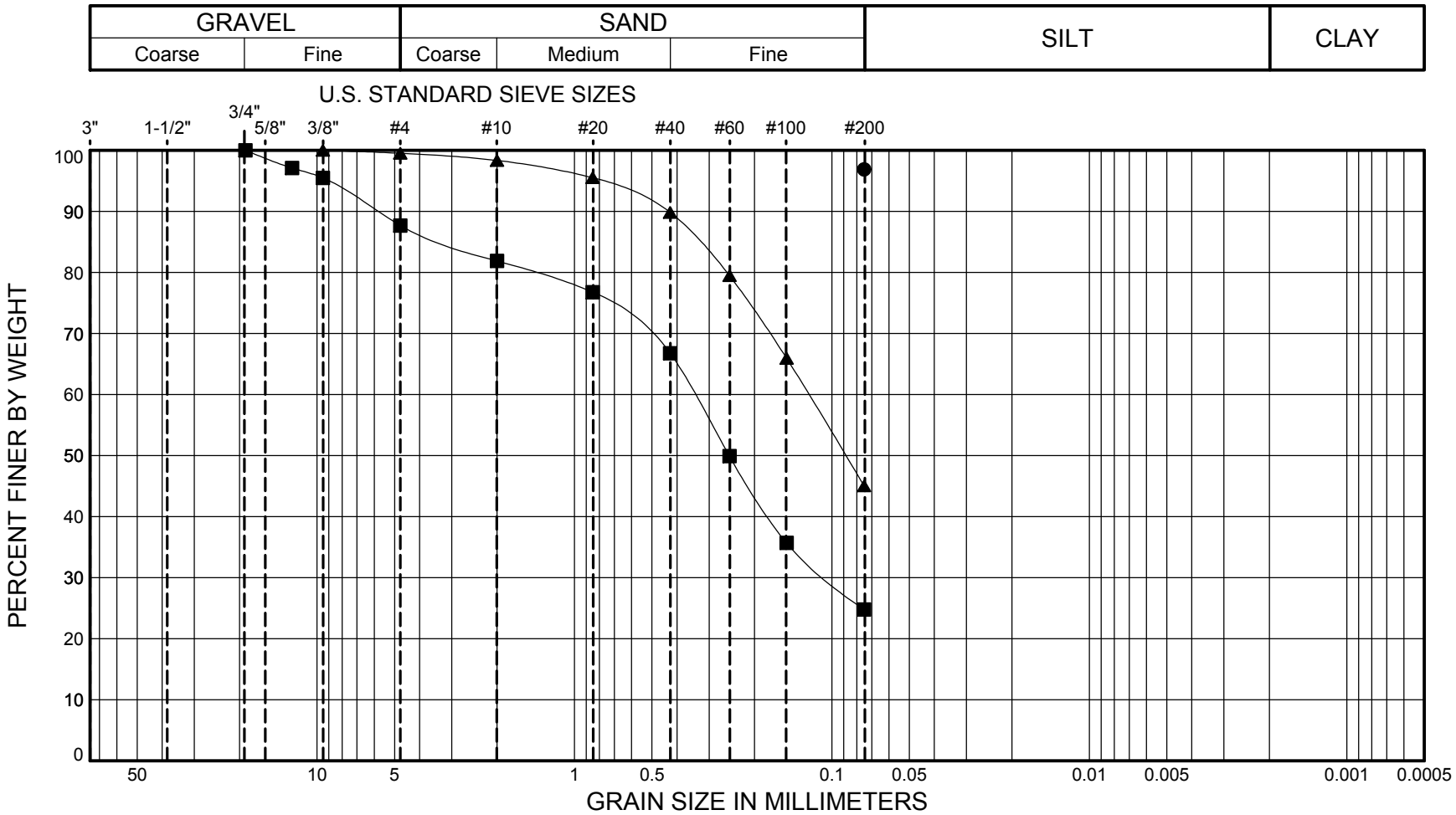
PROJECT NO.: 2016-112-23 FIGURE: 13



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-010	S16	65.0 - 66.5	(ML) Light olive brown, SILT	22	24	22	2			96.9
■	E360-K-011	S2	10.0 - 11.5	(SM) Dark olive brown, silty SAND	9				12.3	62.9	24.8
▲	E360-K-011	S9	32.5 - 34.0	(SM) Dark grayish brown, silty SAND	18				0.5	54.5	45.0

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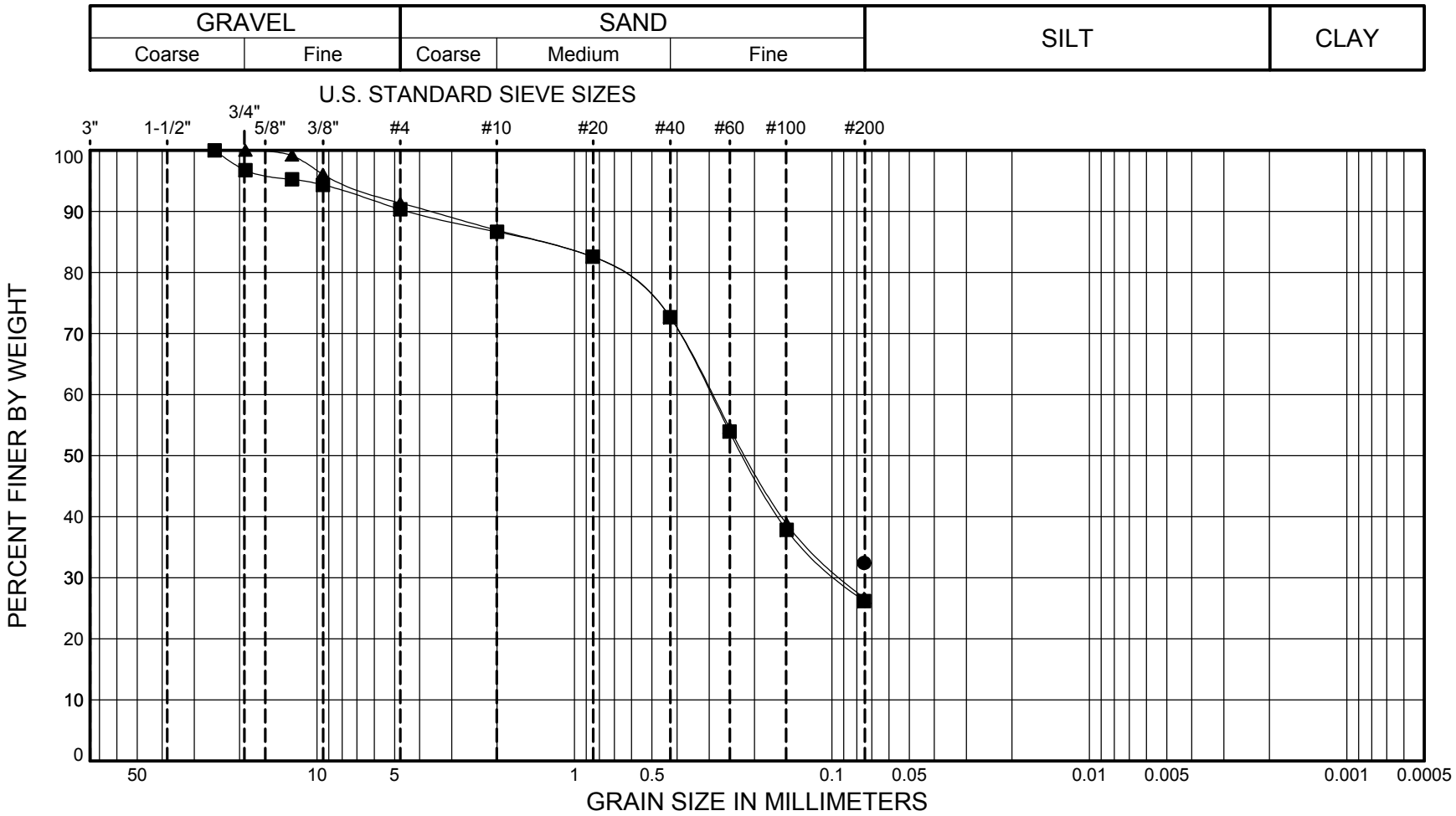
PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 14



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-011	S19	75.0 - 76.5	(SM) Dark grayish brown, silty SAND	18						32.4
■	E360-K-012	S2	7.5 - 9.0	(SM) Dark olive brown, silty SAND	12				9.7	64.2	26.2
▲	E360-K-013	S4	12.5 - 14.0	(SM) Dark grayish brown, silty SAND	11				8.6	64.7	26.7

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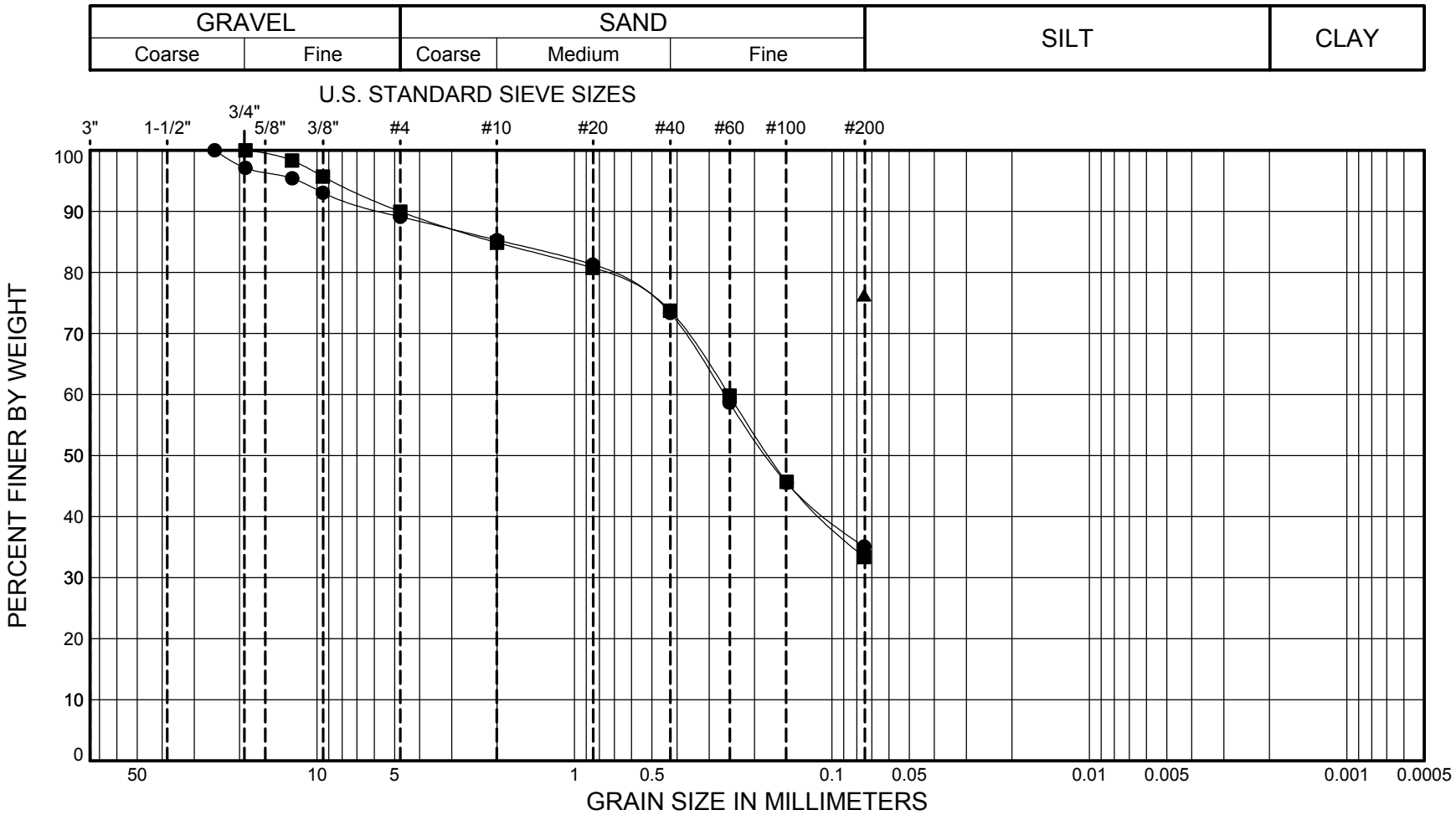
PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 15



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-014	S3	10.0 - 11.5	(SM) Light olive brown, silty SAND	11				10.9	54.0	35.1
■	E360-K-015	S3	10.0 - 11.5	(SM) Light olive brown, silty SAND	12				10.0	56.6	33.4
▲	E360-K-015	S18	75.0 - 76.5	(CH) Dark grayish brown, fat CLAY with sand	21	51	21	30			76.2

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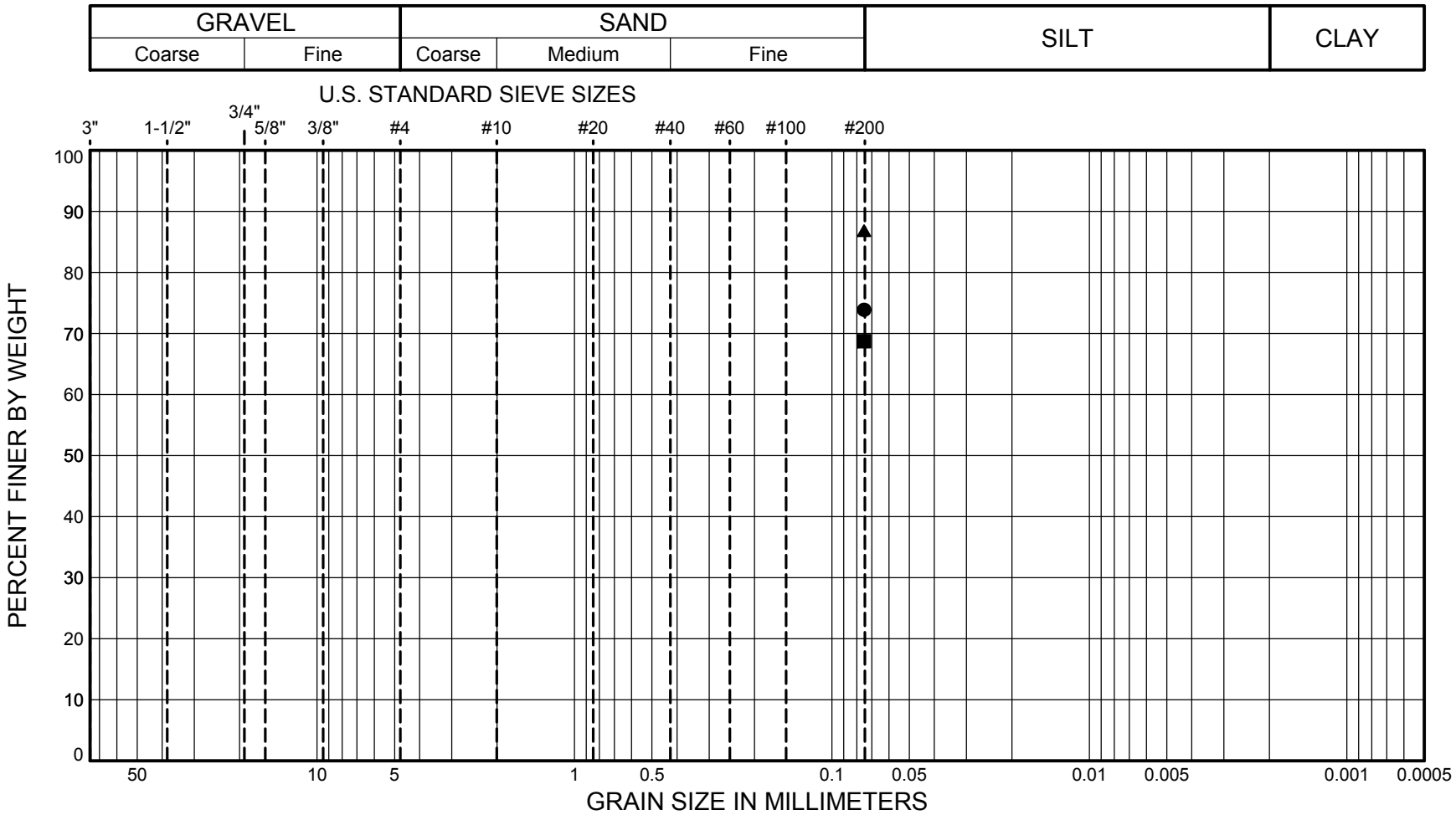
PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 16



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-017	S1B	2.8 - 3.5	(ML) Grayish brown, SILT with sand	16	NP	NP	NP			73.9
■	E360-K-017	S2	5.0 - 6.5	(ML) Grayish brown, sandy SILT	20	NP	NP	NP			68.7
▲	E360-K-017	S7	20.0 - 21.5	(CL-ML) Grayish brown, silty CLAY	20	25	21	4			86.8

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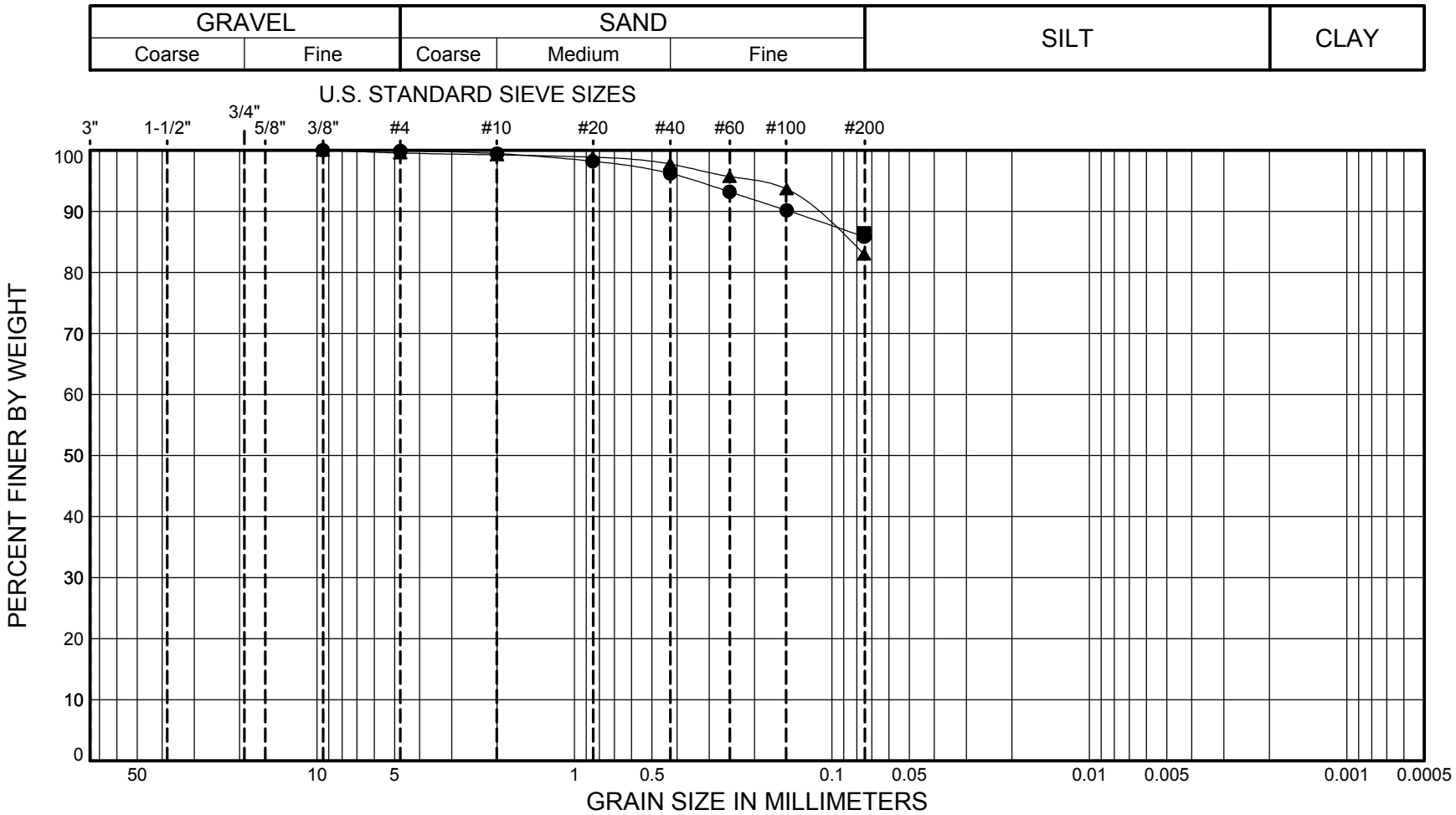
Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 17



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-017	S14	55.0 - 56.5	(CL) Grayish brown, lean CLAY	20	43	26	17	0.1	14.1	85.8
■	E360-K-017	S17	80.0 - 81.5	(CH) Dark grayish brown, fat CLAY	20	55	21	34			86.4
▲	E360-K-018	S3	7.5 - 9.0	(ML) Light olive brown, SILT with sand	20	NP	NP	NP	0.4	16.6	83.0

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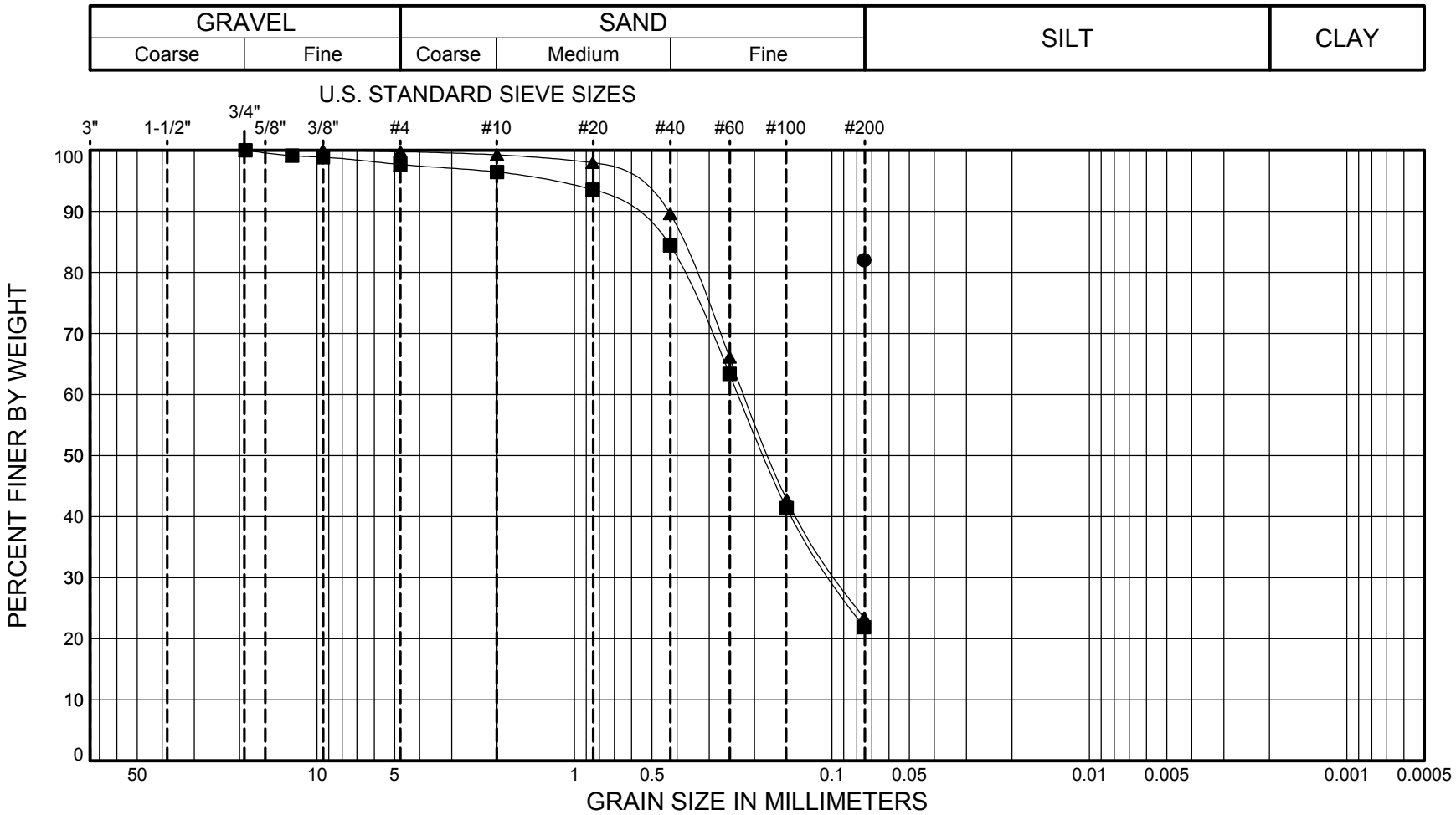
Sound Transit Eastlink E360
Client Project No.: 5480.0

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 18



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-018	S5A	12.5 - 13.8	(ML) Light gray, SILT with sand	20	NP	NP	NP			82.0
■	E360-K-018	S6	15.0 - 16.5	(SM) Light grayish brown, silty SAND	15				2.3	75.8	21.9
▲	E360-K-019	S7	25.0 - 26.5	(SM) Olive brown, silty SAND	17				0.2	76.3	23.4

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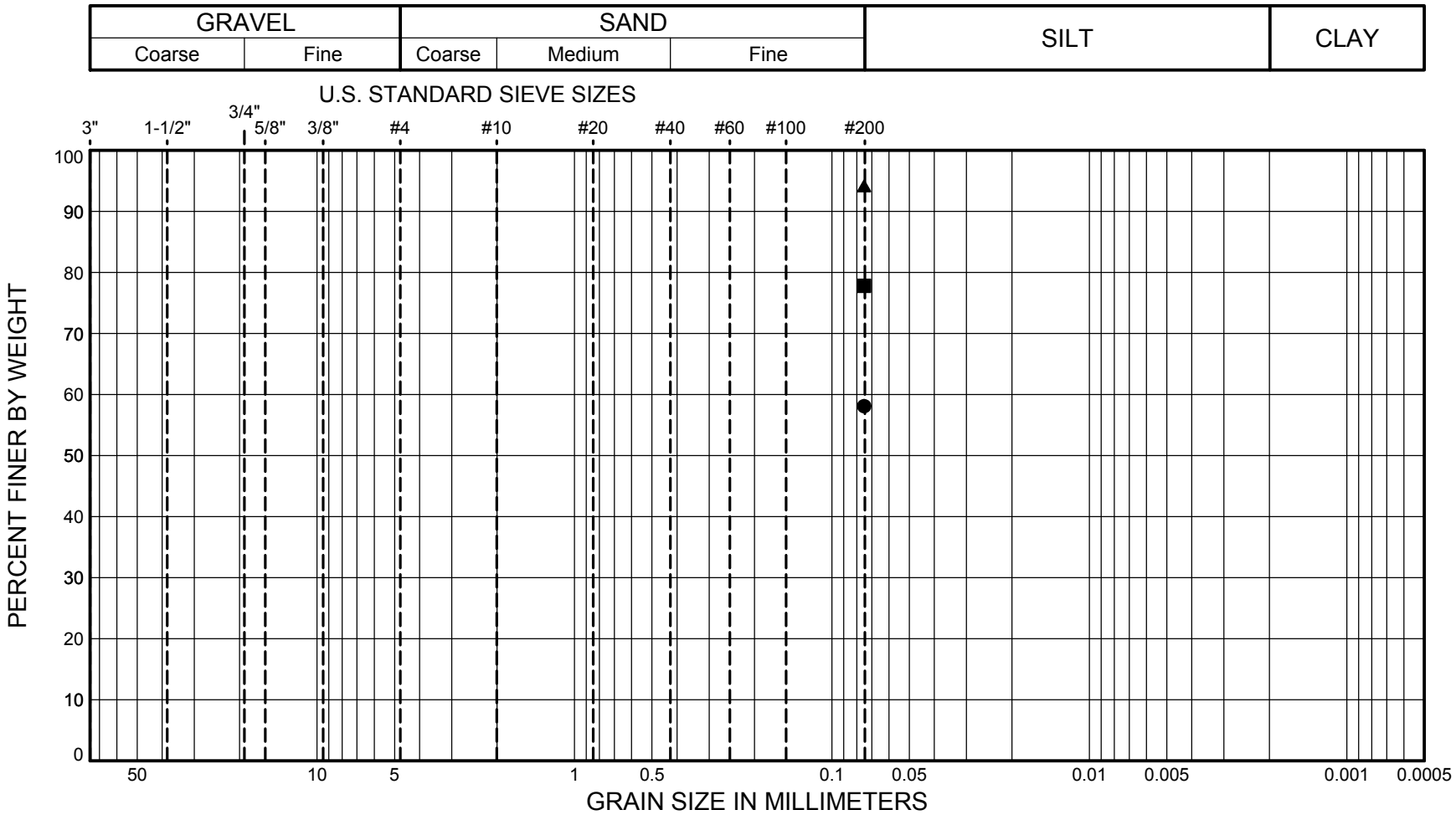
Sound Transit Eastlink E360
Client Project No.: 5480.0

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 19



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-019	S8	30.0 - 31.5	(ML) Grayish brown, sandy SILT	19						58.1
■	E360-K-019	S9	35.0 - 36.5	(ML) Gray, SILT with sand	19	NP	NP	NP			77.8
▲	E360-K-019	S16	70.0 - 71.5	(ML) Gray, SILT	21	NP	NP	NP			94.2

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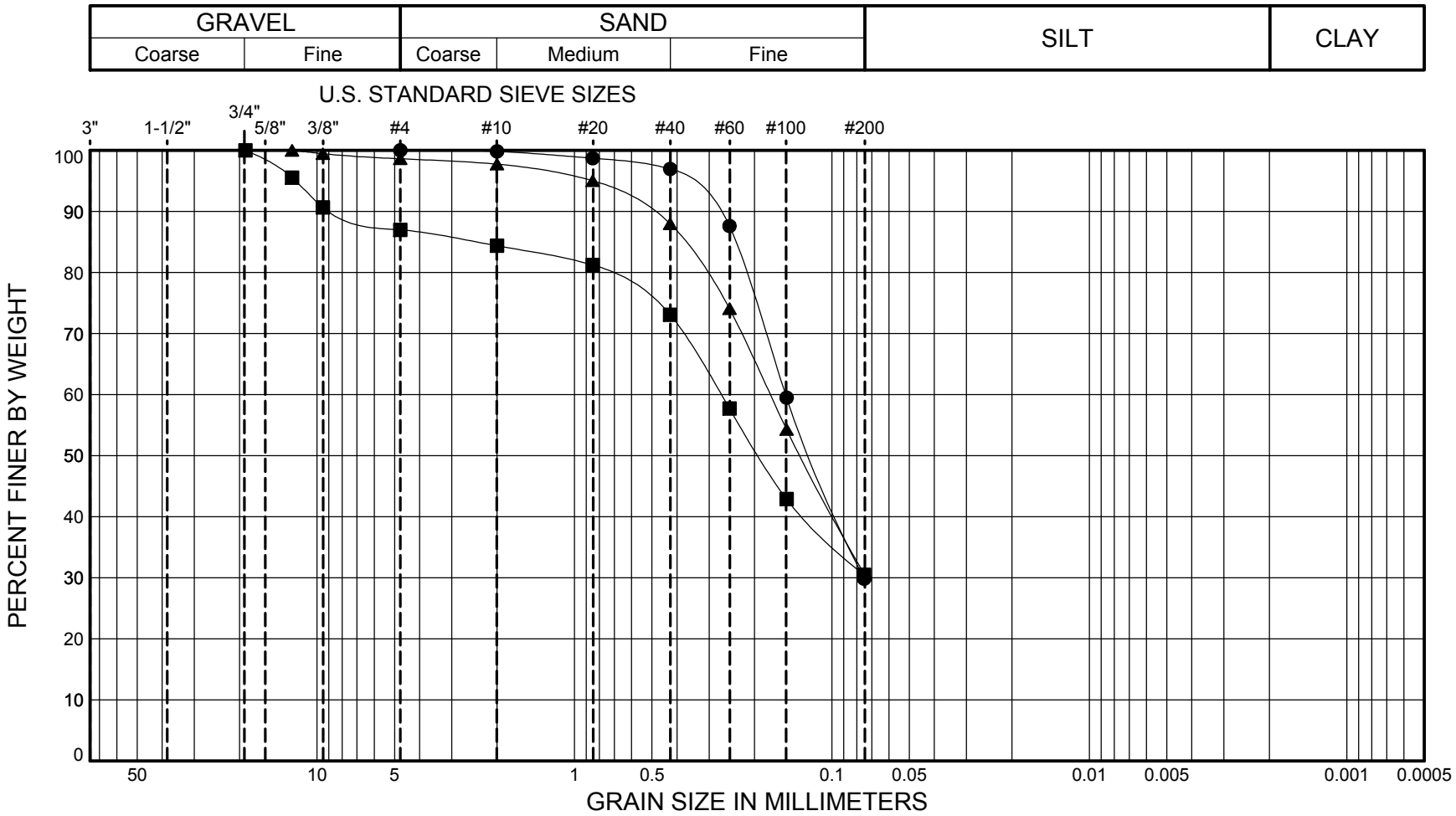
Sound Transit Eastlink E360
Client Project No.: 5480.0

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 20



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-021	S15	70.0 - 71.5	(SM) Grayish brown, silty SAND	19					70.2	29.8
■	E360-K-022	S1	5.0 - 6.5	(SM) Olive brown, silty SAND	10				13.0	56.5	30.5
▲	E360-K-022	S5	20.0 - 21.5	(SM) Grayish brown, silty SAND	14				1.4	68.0	30.6

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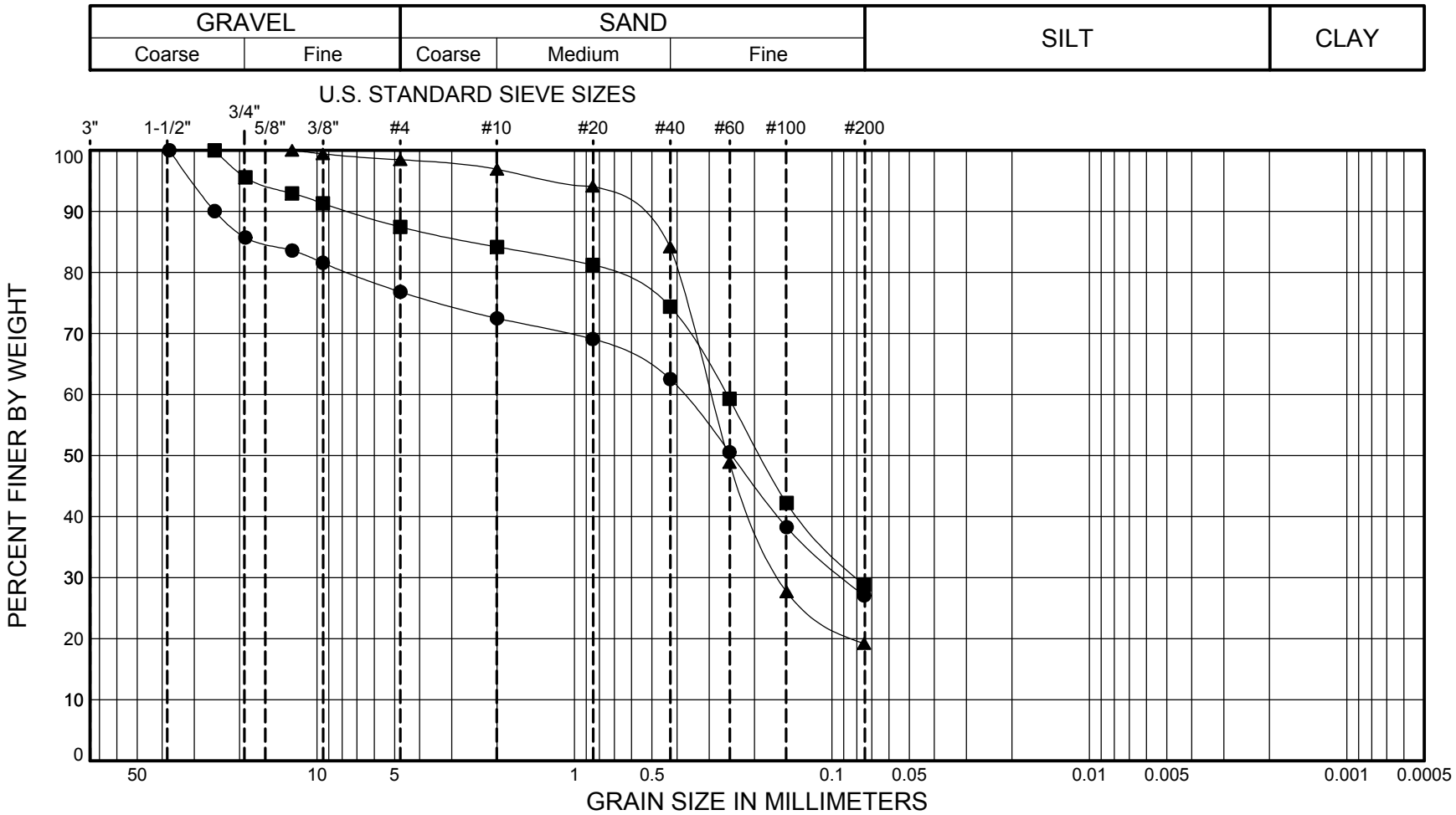
Sound Transit Eastlink E360
Client Project No.: 5480.0

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 21



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-023	S1	5.0 - 6.5	(SM) Olive brown, silty SAND with gravel	10				23.2	49.7	27.1
■	E360-K-023	S2	7.5 - 9.0	(SM) Grayish brown, silty SAND	8				12.6	58.6	28.8
▲	E360-K-023	S17	80.0 - 81.5	(SM) Grayish brown, silty SAND	18				1.6	79.2	19.2

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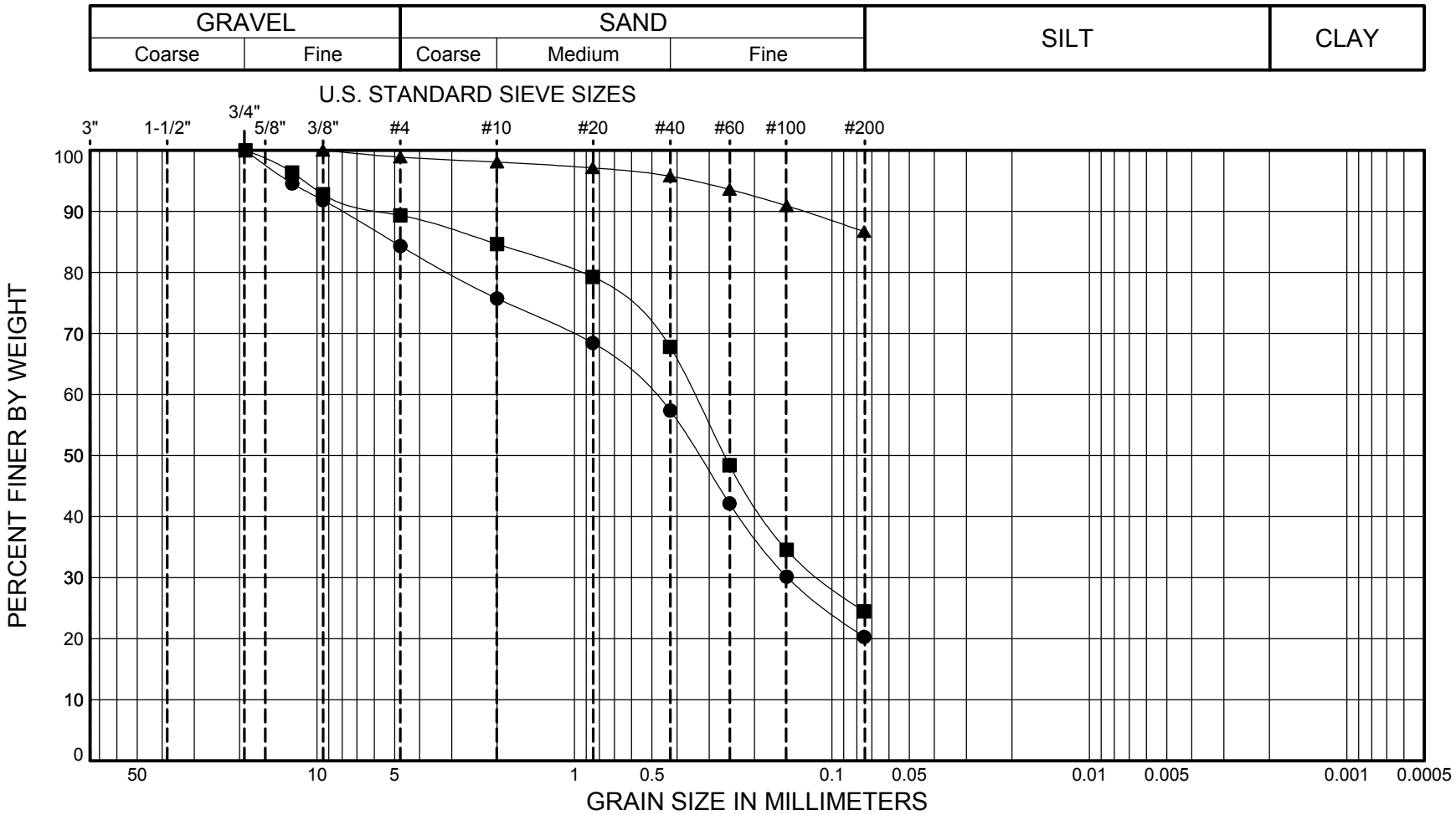
Sound Transit Eastlink E360
Client Project No.: 5480.0

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 22



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-025	S1	5.0 - 6.5	(SM) Light olive brown, silty SAND with gravel	11				15.7	64.0	20.3
■	E360-K-027	S3	10.0 - 11.5	(SM) Olive brown, silty SAND	10				10.7	64.9	24.5
▲	E360-K-027	S10	70.0 - 71.5	(CH) Dark gray, fat CLAY	20	53	23	30	1.1	12.2	86.7

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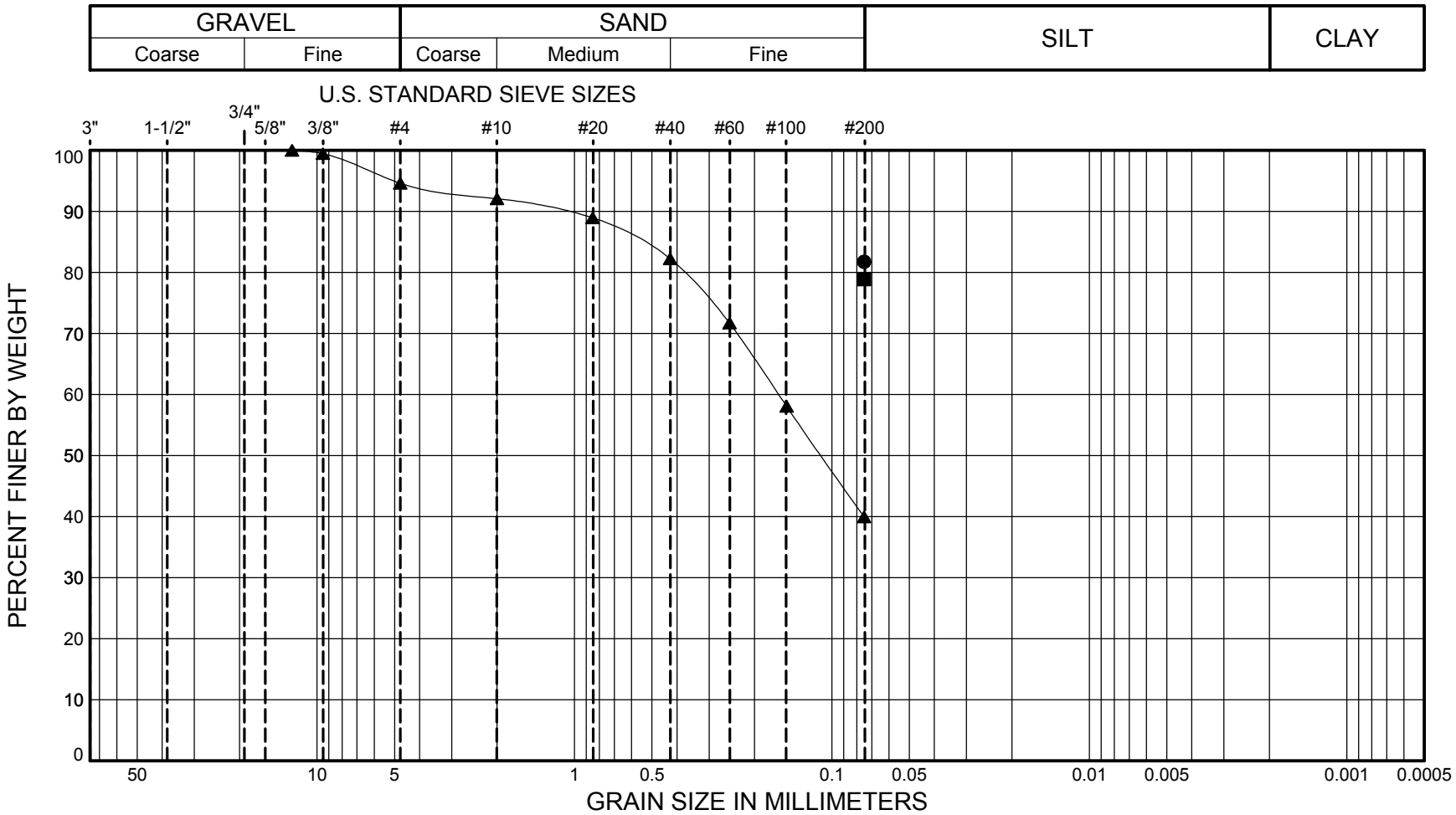
Sound Transit Eastlink E360
Client Project No.: 5480.0

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 23



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-028	S8	40.0 - 41.5	(CH) Dark gray, fat CLAY with sand	24	51	25	26			81.7
■	E360-K-028	S11	70.0 - 71.5	(CL) Dark gray, lean CLAY with sand	22	34	20	14			78.9
▲	E360-K-029	S4	12.5 - 14.0	(SM) Light olive brown, silty SAND	12				5.4	54.6	39.9

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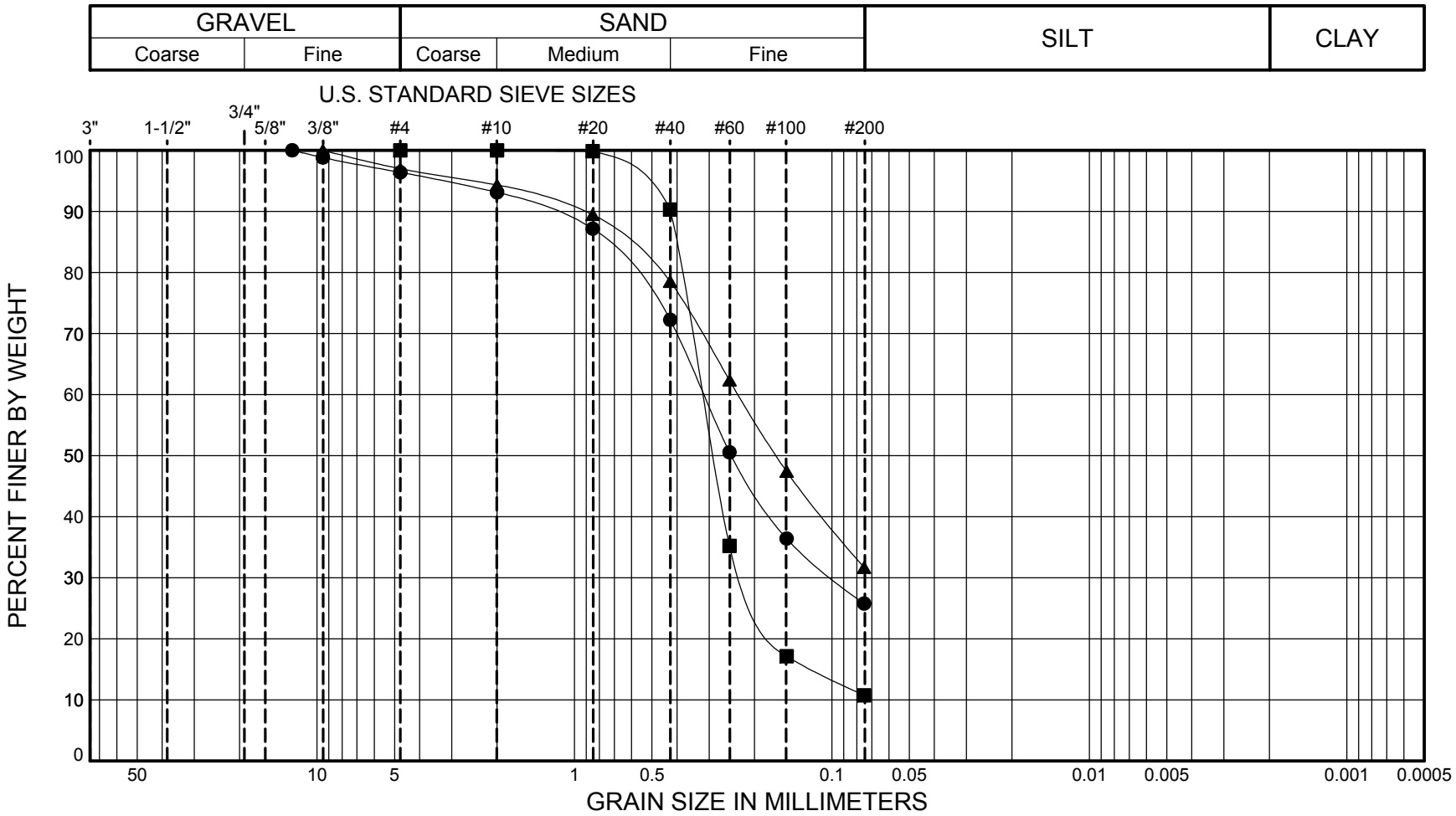
Sound Transit Eastlink E360
Client Project No.: 5480.0

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 24



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-029	S7	25.0 - 26.5	(SM) Grayish brown, silty SAND	12				3.6	70.6	25.8
■	E360-K-029	S12	70.0 - 71.5	(SP-SM) Olive brown, poorly graded SAND with silt	20					89.3	10.7
▲	E360-K-030	S1	5.0 - 6.5	(SM) Grayish brown, silty SAND	12				3.0	65.3	31.7

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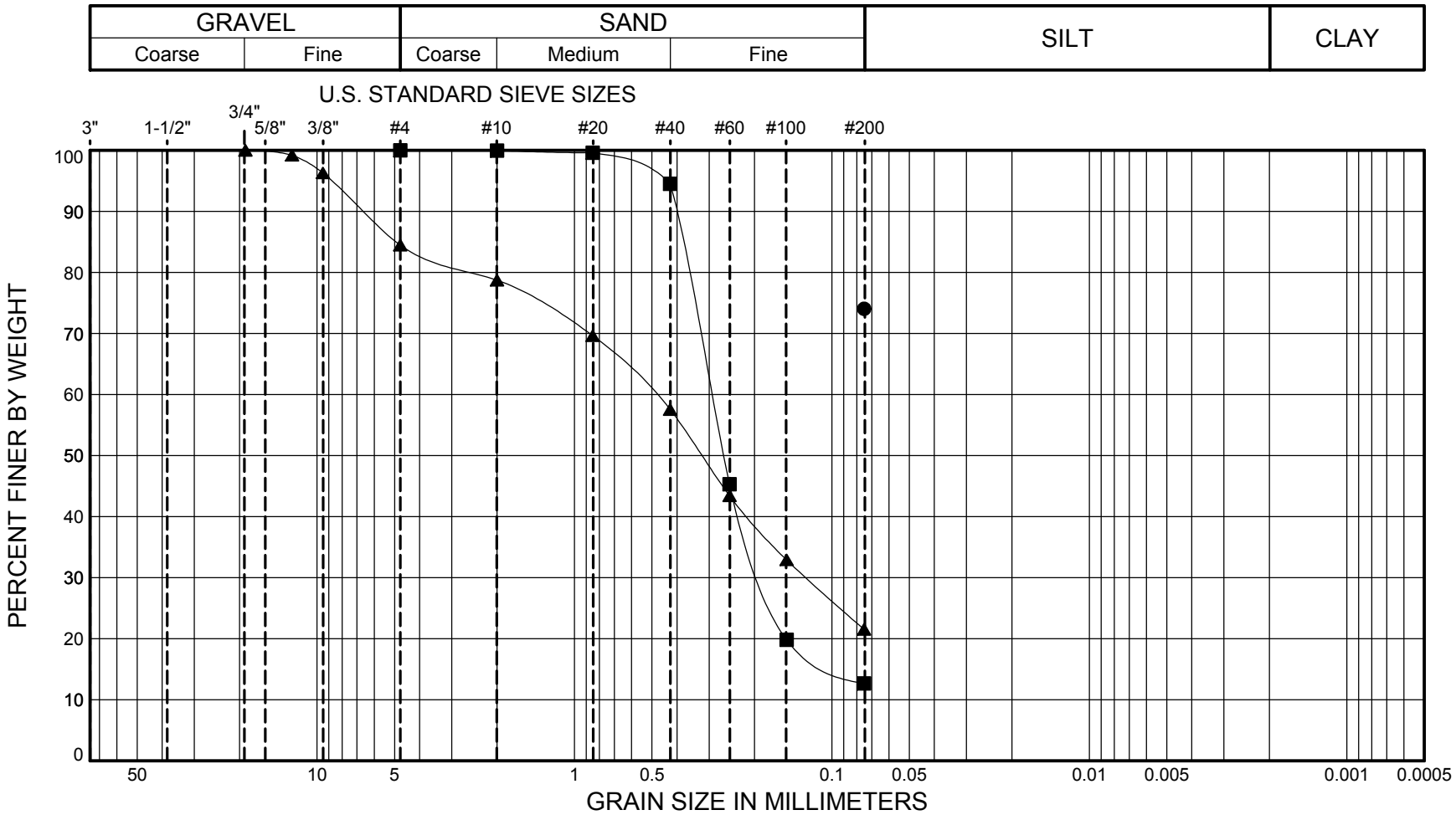
Sound Transit Eastlink E360
Client Project No.: 5480.0

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 25



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-K-030	S10A	50.0 - 51.0	(CL) Light olive brown, lean CLAY with sand	17	37	17	20			74.0
■	E360-K-030	S11	55.0 - 56.5	(SM) Dark grayish brown, silty SAND	20					87.3	12.7
▲	E360-TP-1	S2	2.0 - 4.5	(SM) Light olive brown, silty SAND with gravel	9	NP	NP	NP	15.5	62.9	21.5

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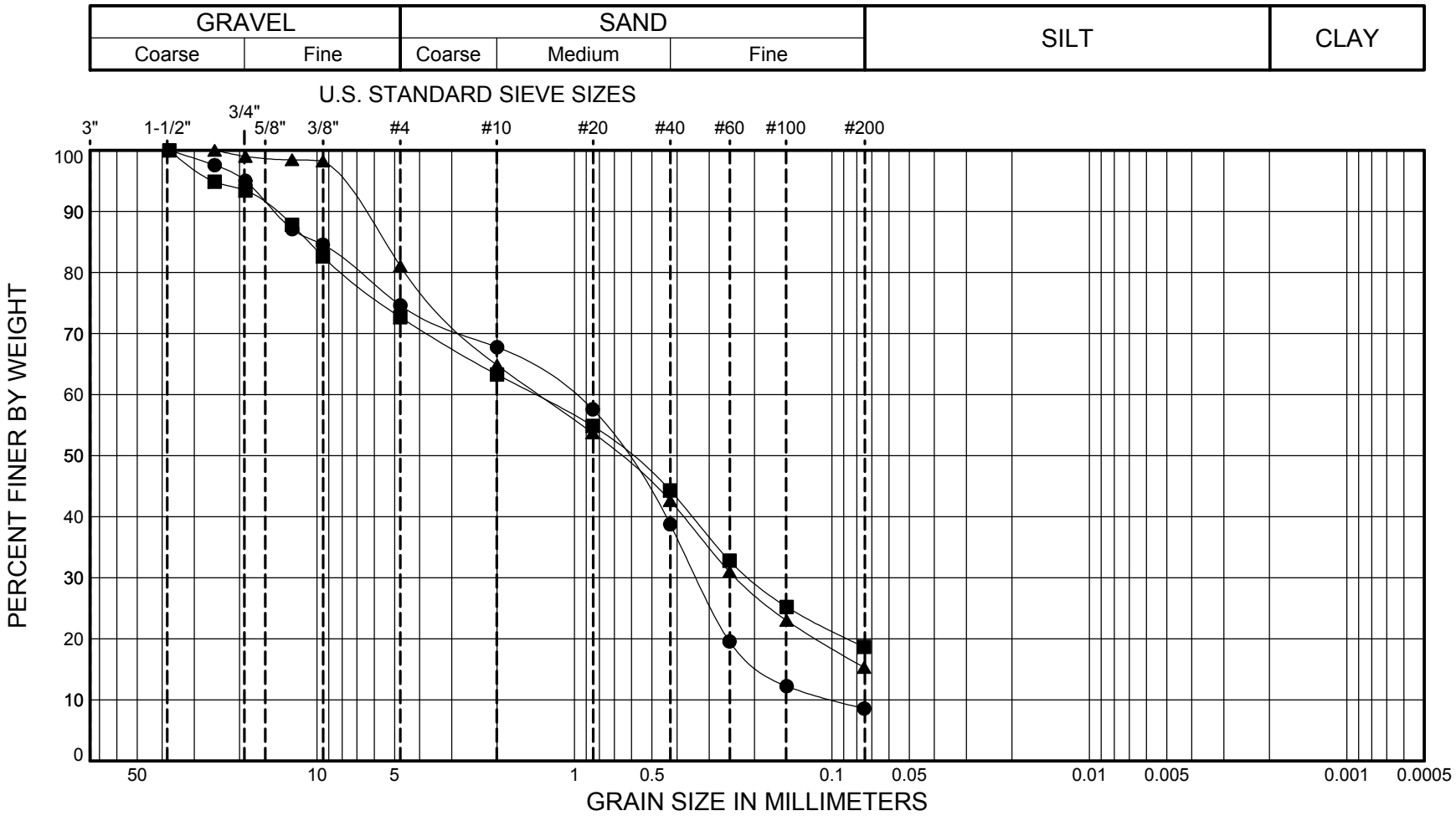
Sound Transit Eastlink E360
Client Project No.: 5480.0

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 26



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-TP-1	S3	4.5 - 6.5	(SW-SM) Olive brown, well graded SAND with silt and gravel	5				25.4	66.0	8.6
■	E360-TP-2	S2	5.0 - 8.0	(SM) Light brown, silty SAND with gravel	7				27.3	54.0	18.7
▲	E360-TP-5	S3	4.0 - 6.0	(SM) Very light brown, silty SAND with gravel	3	NP	NP	NP	19.0	65.7	15.3

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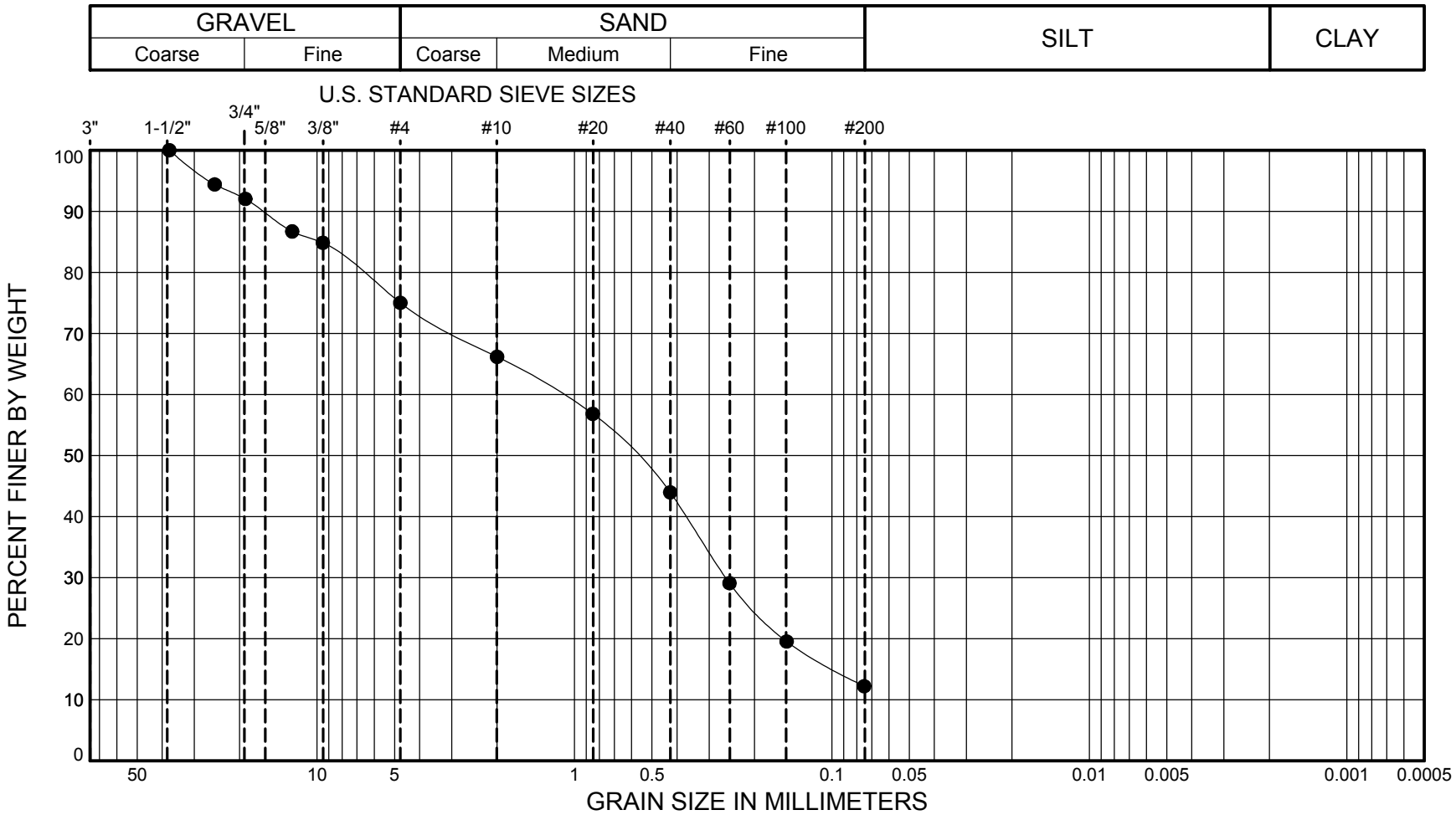
Sound Transit Eastlink E360
Client Project No.: 5480.0

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 27



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	E360-TP-5	S4	6.0 - 7.0	(SM) Very light brown, silty SAND with gravel	5				25.0	62.8	12.2

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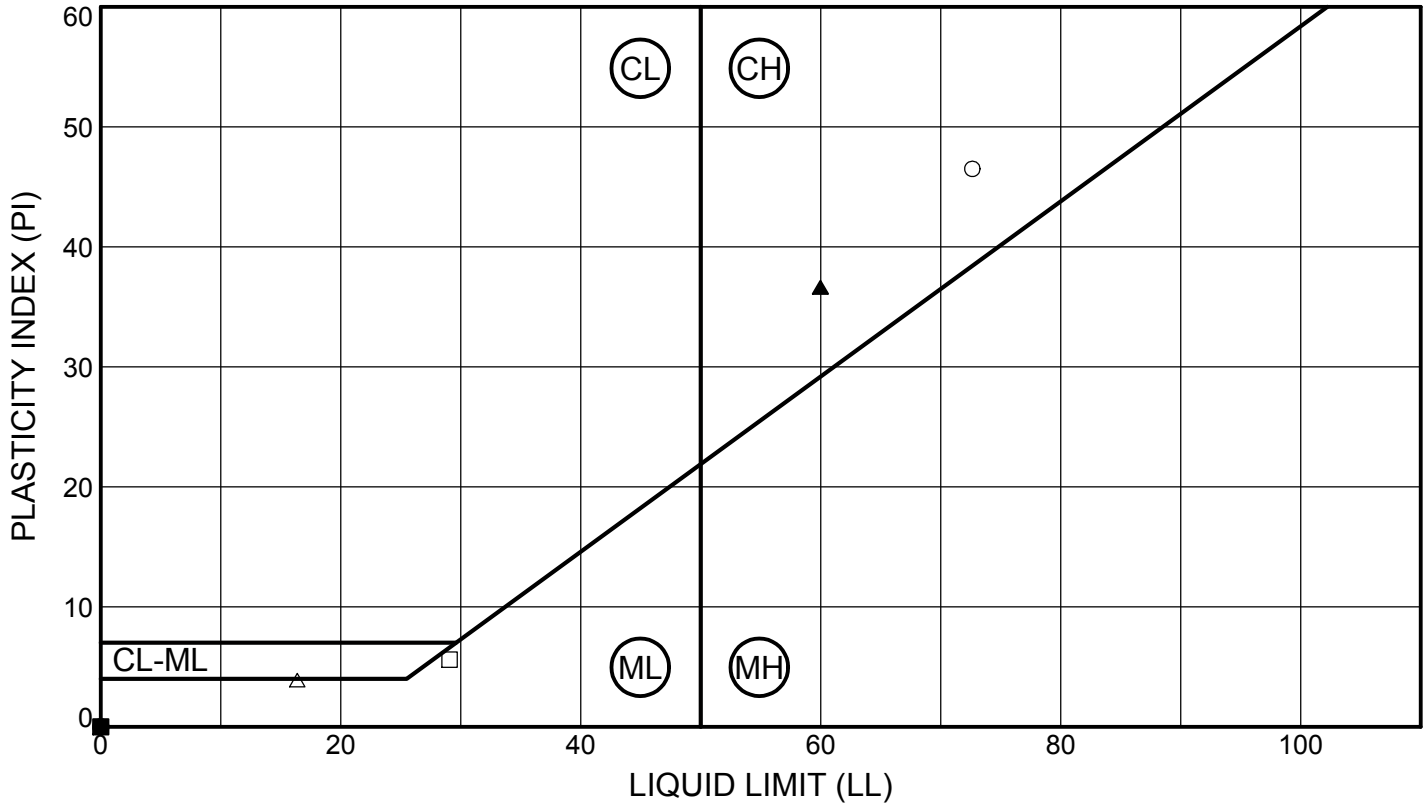
Sound Transit Eastlink E360
Client Project No.: 5480.0

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2016-112-23 FIGURE: 28



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	E360-K-003	S3	15.0 - 16.5	(SM) Gray, silty SAND	18	NP	NP	NP	34.8
■	E360-K-003	S5	20.0 - 21.5	(ML) Gray, sandy SILT	23	NP	NP	NP	69.5
▲	E360-K-003	S14	65.0 - 66.5	(CH) Gray, fat CLAY with sand	27	60	23	37	78.7
○	E360-K-003	S16	75.0 - 76.5	(CH) Gray, fat CLAY	28	73	26	47	95.8
□	E360-K-004	S1	10.0 - 11.5	(ML) Dark gray, SILT	31	29	23	6	
△	E360-K-004	S14	65.0 - 66.5	(CL-ML) Gray, sandy silty CLAY	13	16	12	4	60.9

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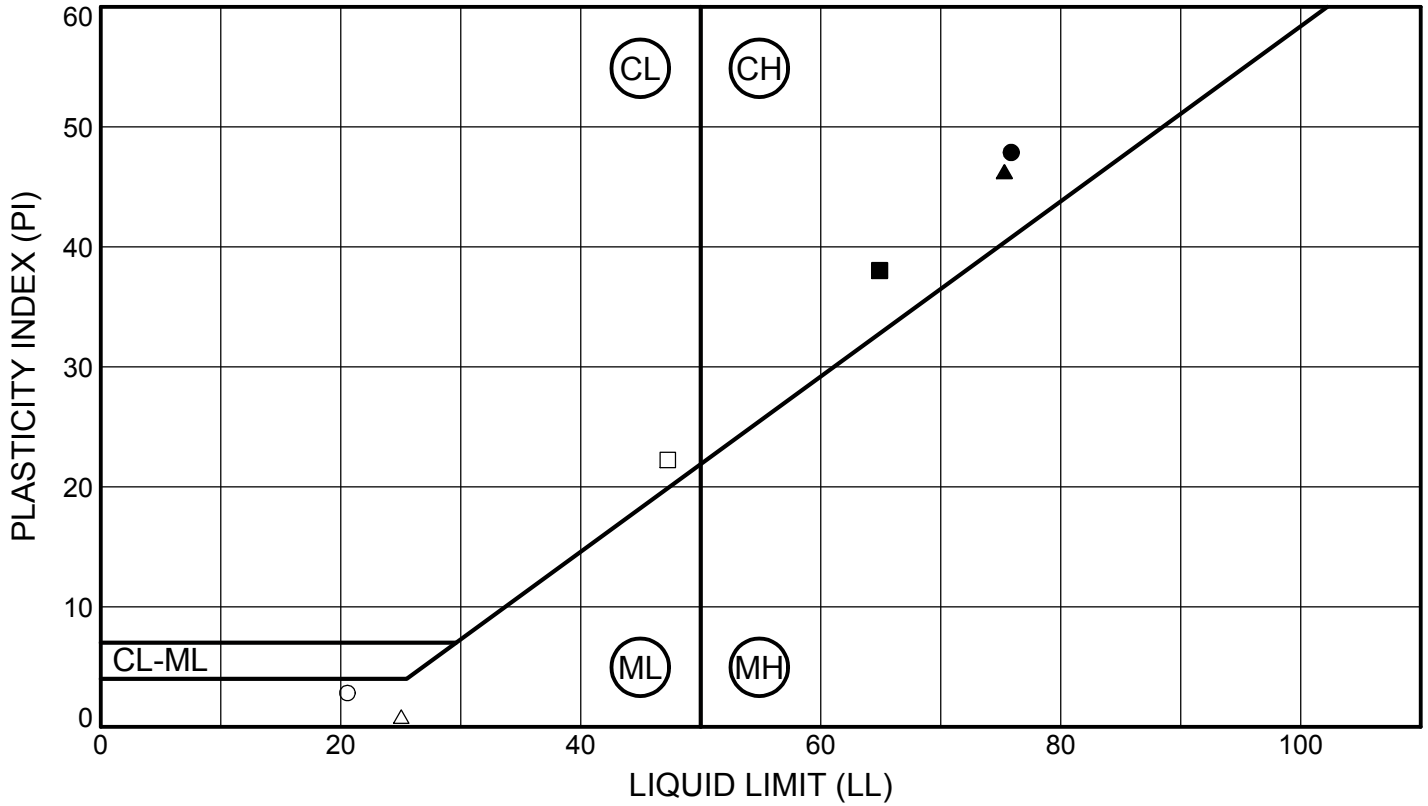
Sound Transit Eastlink E360
Client Project No.: 5480.0

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2016-112-23 FIGURE: 29



SYMBOL	SAMPLE	DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	E360-K-004 S16	75.0 - 76.5	(CH) Dark gray, fat CLAY with sand	31	76	28	48	
■	E360-K-005 S16	75.0 - 76.5	(CH) Gray, fat CLAY	25	65	27	38	87.3
▲	E360-K-005 S17	80.0 - 81.5	(CH) Gray, fat CLAY	32	75	29	46	87.7
○	E360-K-007 S2	7.5 - 9.0	(ML) Dark olive brown, sandy SILT	24	21	18	3	
□	E360-K-007 ST-1	12.5 - 14.5	(CL) Gray, lean CLAY	60	47	25	22	
△	E360-K-007 S4	15.0 - 16.5	(ML) Light olive brown, SILT	24	25	24	1	92.8

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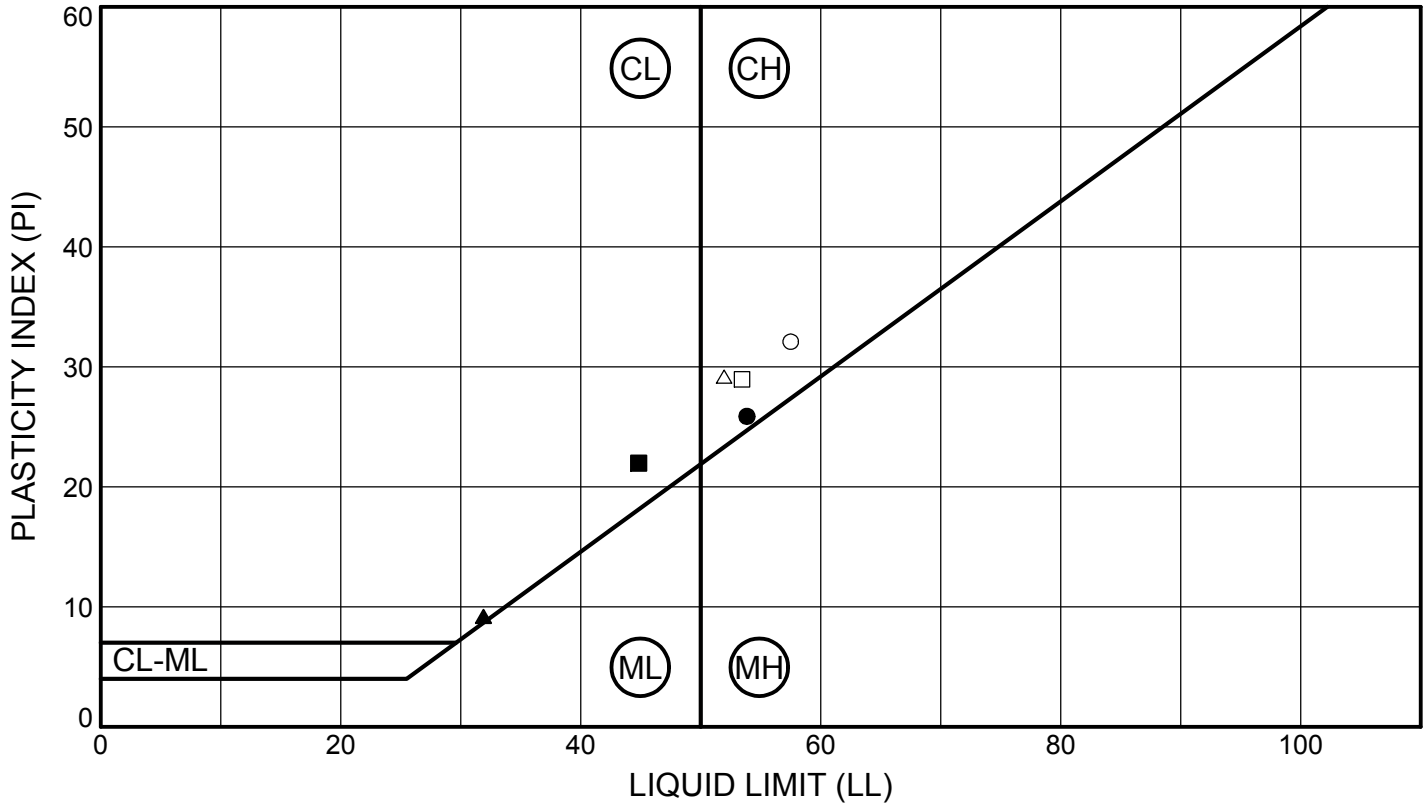
Sound Transit Eastlink E360
Client Project No.: 5480.0

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2016-112-23 FIGURE: 30



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	E360-K-007	ST2	17.0 - 18.5	(CH) Olive brown, fat CLAY	37	54	28	26	
■	E360-K-008	S9	30.0 - 31.5	(CL) Grayish brown, lean CLAY	50	45	23	22	
▲	E360-K-008	T10	31.5 - 33.5	(CL) Gray, lean CLAY with sand	31	32	23	9	
○	E360-K-008	T12	37.0 - 38.5	(CH) Dark grayish brown, fat CLAY	45	57	25	32	
□	E360-K-009	S11	40.0 - 41.5	(CH) Grayish brown, fat CLAY	49	53	24	29	
△	E360-K-009	S12	42.0 - 44.0	(CH) Gray, fat CLAY	45	52	23	29	

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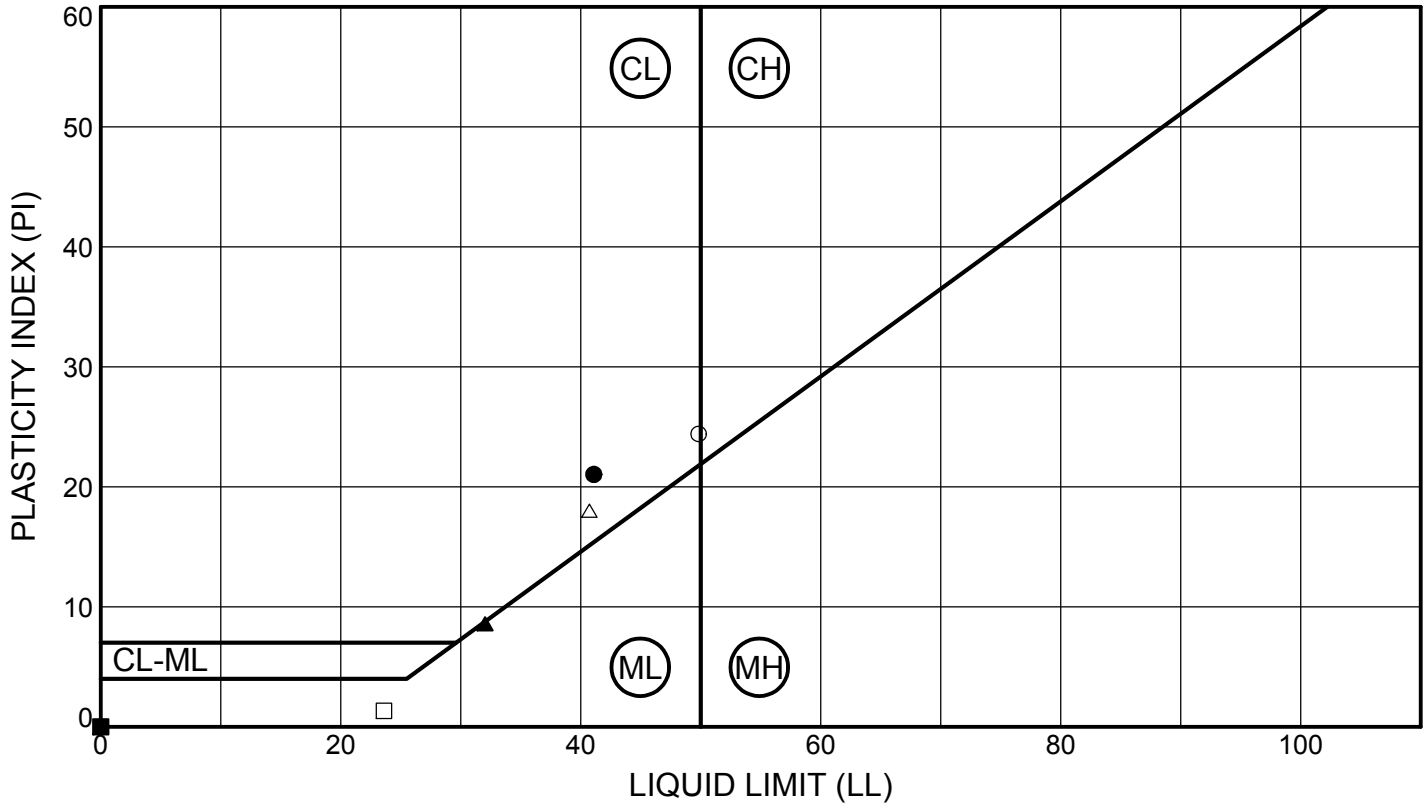
Client Project No.: 5480.0

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2016-112-23 FIGURE: 31



SYMBOL	SAMPLE	DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	E360-K-009 S13A	45.0 - 46.0	(CL) Dark grayish brown, lean CLAY	33	41	20	21	
■	E360-K-009 S17	65.0 - 66.5	(SM) Grayish brown, silty SAND	18	NP	NP	NP	37.2
▲	E360-K-009 S19	75.0 - 76.5	(ML) Dark grayish brown, SILT with sand	31	32	23	9	
○	E360-K-010 S12	47.5 - 49.0	(CH) Dark grayish brown, fat CLAY	45	50	25	25	
□	E360-K-010 S16	65.0 - 66.5	(ML) Light olive brown, SILT	22	24	22	2	96.9
△	E360-K-011 S13	45.0 - 46.5	(CL) Gray, lean CLAY	32	41	23	18	

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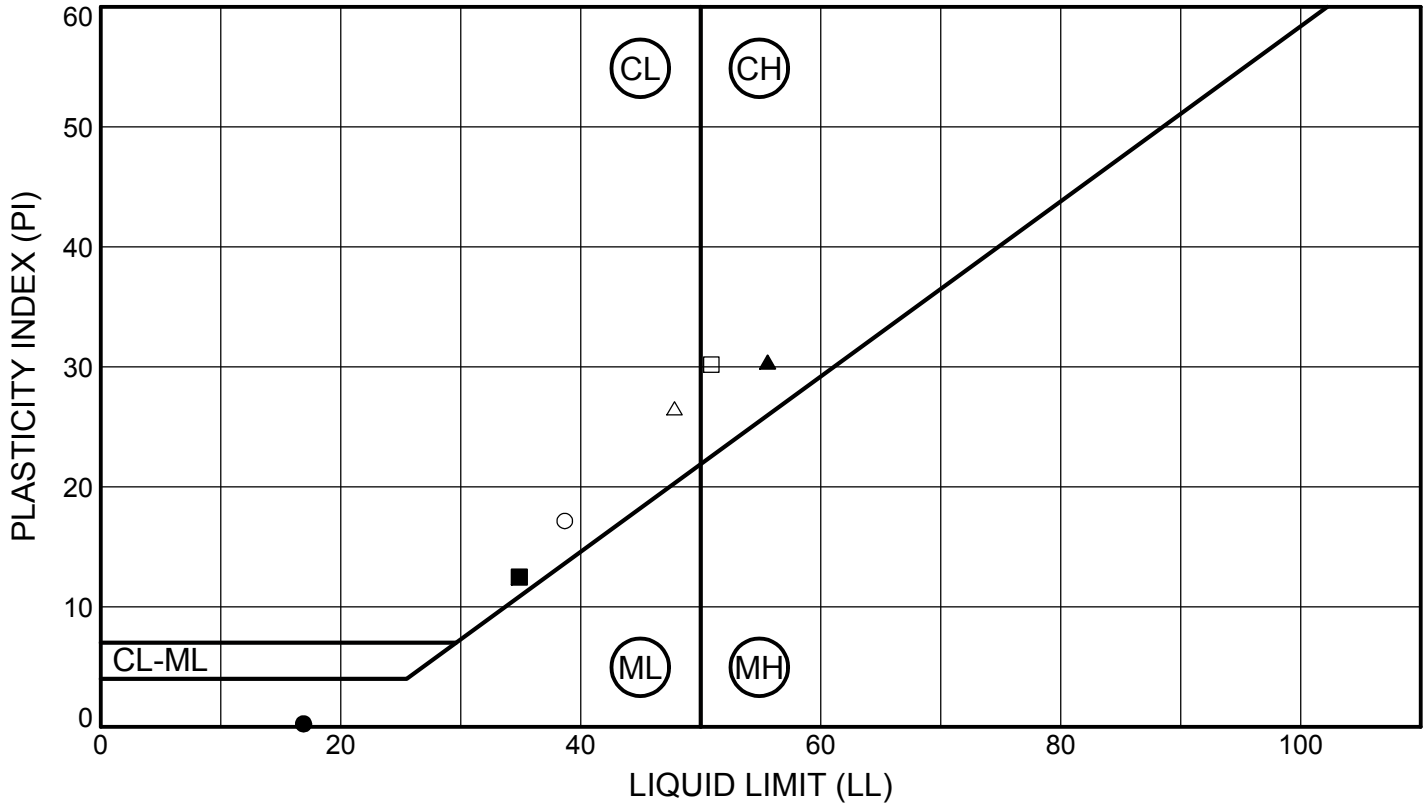
Sound Transit Eastlink E360
Client Project No.: 5480.0

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2016-112-23 FIGURE: 32



SYMBOL	SAMPLE	DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	E360-K-011 S14	50.0 - 51.5	(ML) Dark gray, sandy SILT	23	17	17	NP	
■	E360-K-011 S16	60.0 - 61.5	(CL) Gray, lean CLAY	47	35	22	13	
▲	E360-K-011 S24	100.0 - 101.5	(CH) Gray, fat CLAY	31	56	25	31	
○	E360-K-013 S23	100.0 - 101.5	(CL) Grayish brown, lean CLAY	21	39	22	17	
□	E360-K-015 S18	75.0 - 76.5	(CH) Dark grayish brown, fat CLAY with sand	21	51	21	30	76.2
△	E360-K-015 S20	85.0 - 86.5	(CL) Gray, lean CLAY	24	48	21	27	

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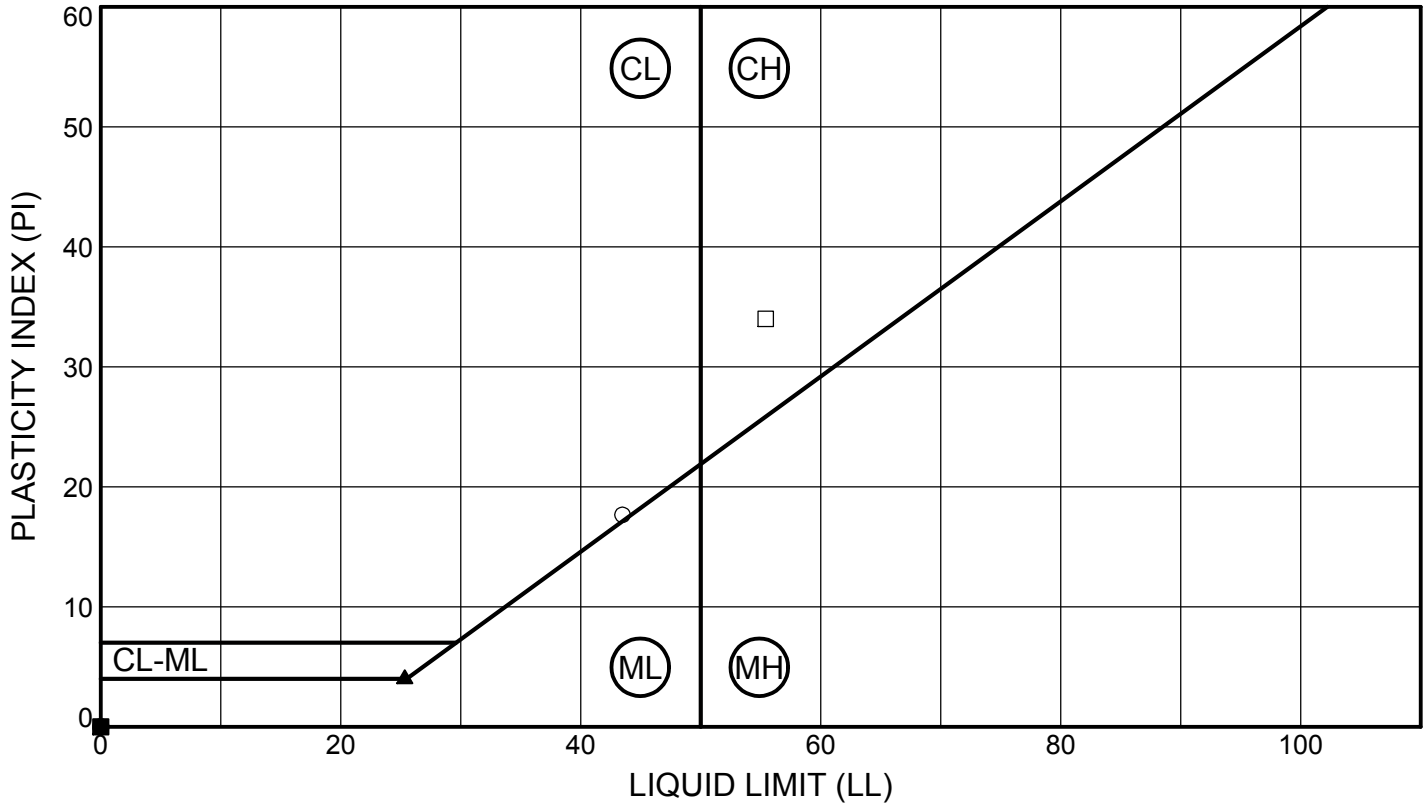
Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2016-112-23 FIGURE: 33



SYMBOL	SAMPLE	DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	E360-K-017 S1B	2.8 - 3.5	(ML) Grayish brown, SILT with sand	16	NP	NP	NP	73.9
■	E360-K-017 S2	5.0 - 6.5	(ML) Grayish brown, sandy SILT	20	NP	NP	NP	68.7
▲	E360-K-017 S7	20.0 - 21.5	(CL-ML) Grayish brown, silty CLAY	20	25	21	4	86.8
○	E360-K-017 S14	55.0 - 56.5	(CL) Grayish brown, lean CLAY	20	43	26	17	85.8
□	E360-K-017 S17	80.0 - 81.5	(CH) Dark grayish brown, fat CLAY	20	55	21	34	86.4
△	E360-K-018 S3	7.5 - 9.0	(ML) Light olive brown, SILT with sand	20	NP	NP	NP	83.0

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BLDG-2018-00963, BLDG-2018-00985

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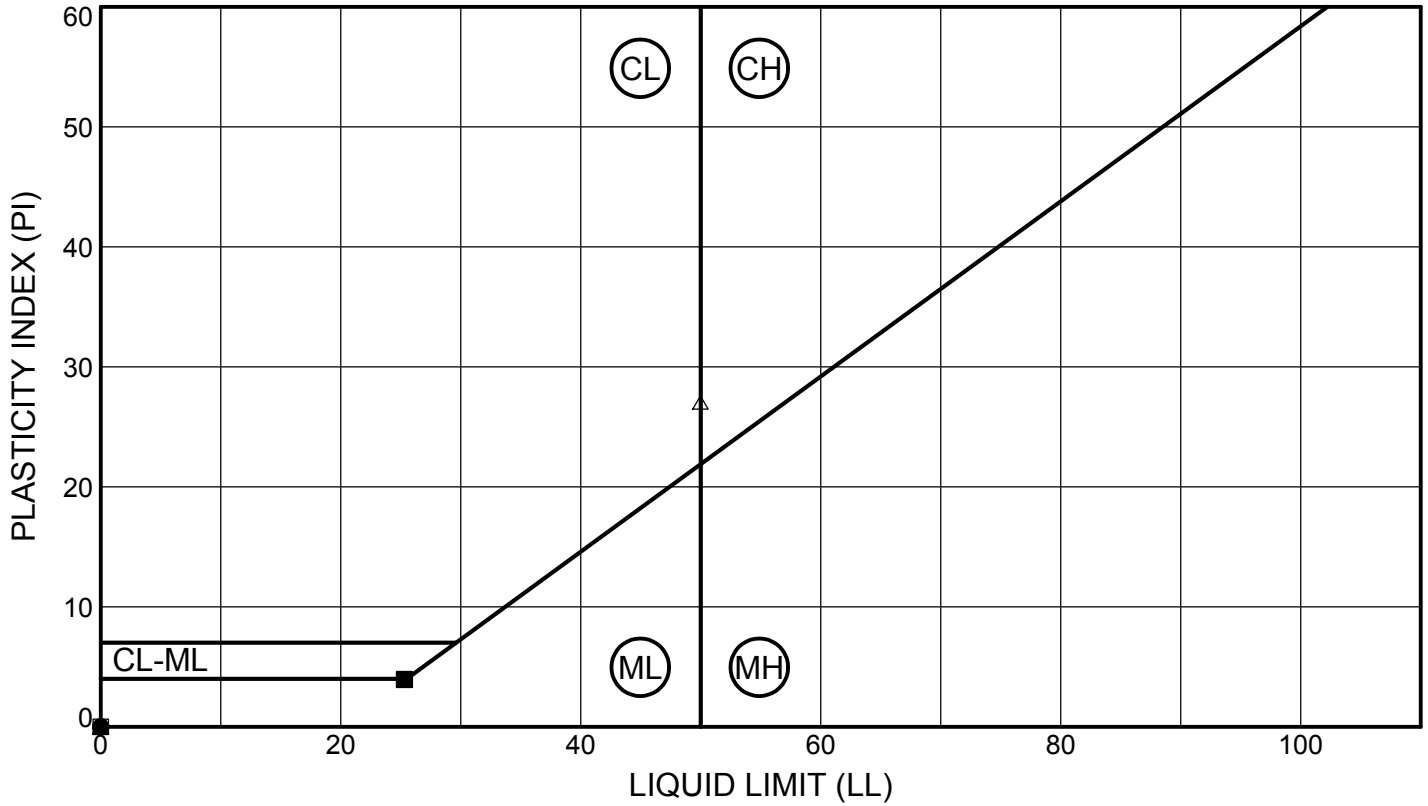
Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2016-112-23 FIGURE: 34



SYMBOL	SAMPLE	DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	E360-K-018 S5A	12.5 - 13.8	(ML) Light gray, SILT with sand	20	NP	NP	NP	82.0
■	E360-K-018 S8	25.0 - 26.5	(CL-ML) Grayish brown, silty CLAY	17	25	21	4	
▲	E360-K-019 S9	35.0 - 36.5	(ML) Gray, SILT with sand	19	NP	NP	NP	77.8
○	E360-K-019 S16	70.0 - 71.5	(ML) Gray, SILT	21	NP	NP	NP	94.2
□	E360-K-021 S5	20.0 - 21.5	(ML) Grayish brown, sandy SILT	20	NP	NP	NP	
△	E360-K-026 S15	80.0 - 81.5	(CH) Dark gray, fat CLAY	22	50	23	27	

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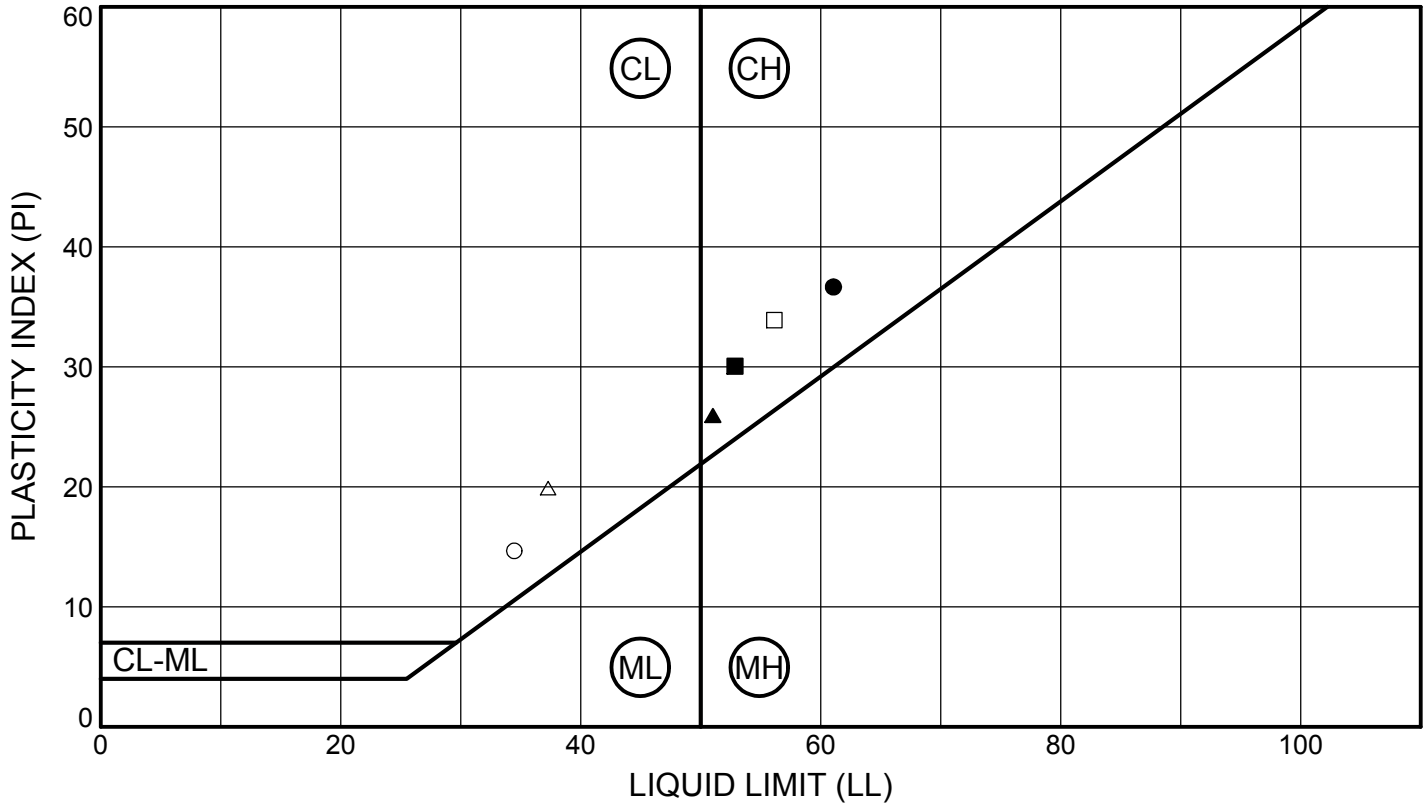
Sound Transit Eastlink E360
Client Project No.: 5480.0

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2016-112-23 FIGURE: 35



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	E360-K-027	S8	50.0 - 51.5	(CH) Gray, fat CLAY	26	61	24	37	
■	E360-K-027	S10	70.0 - 71.5	(CH) Dark gray, fat CLAY	20	53	23	30	86.7
▲	E360-K-028	S8	40.0 - 41.5	(CH) Dark gray, fat CLAY with sand	24	51	25	26	81.7
○	E360-K-028	S11	70.0 - 71.5	(CL) Dark gray, lean CLAY with sand	22	34	20	14	78.9
□	E360-K-029	S10	50.0 - 51.5	(CH) Gray, fat CLAY	22	56	22	34	
△	E360-K-030	S10A	50.0 - 51.0	(CL) Light olive brown, lean CLAY with sand	17	37	17	20	74.0

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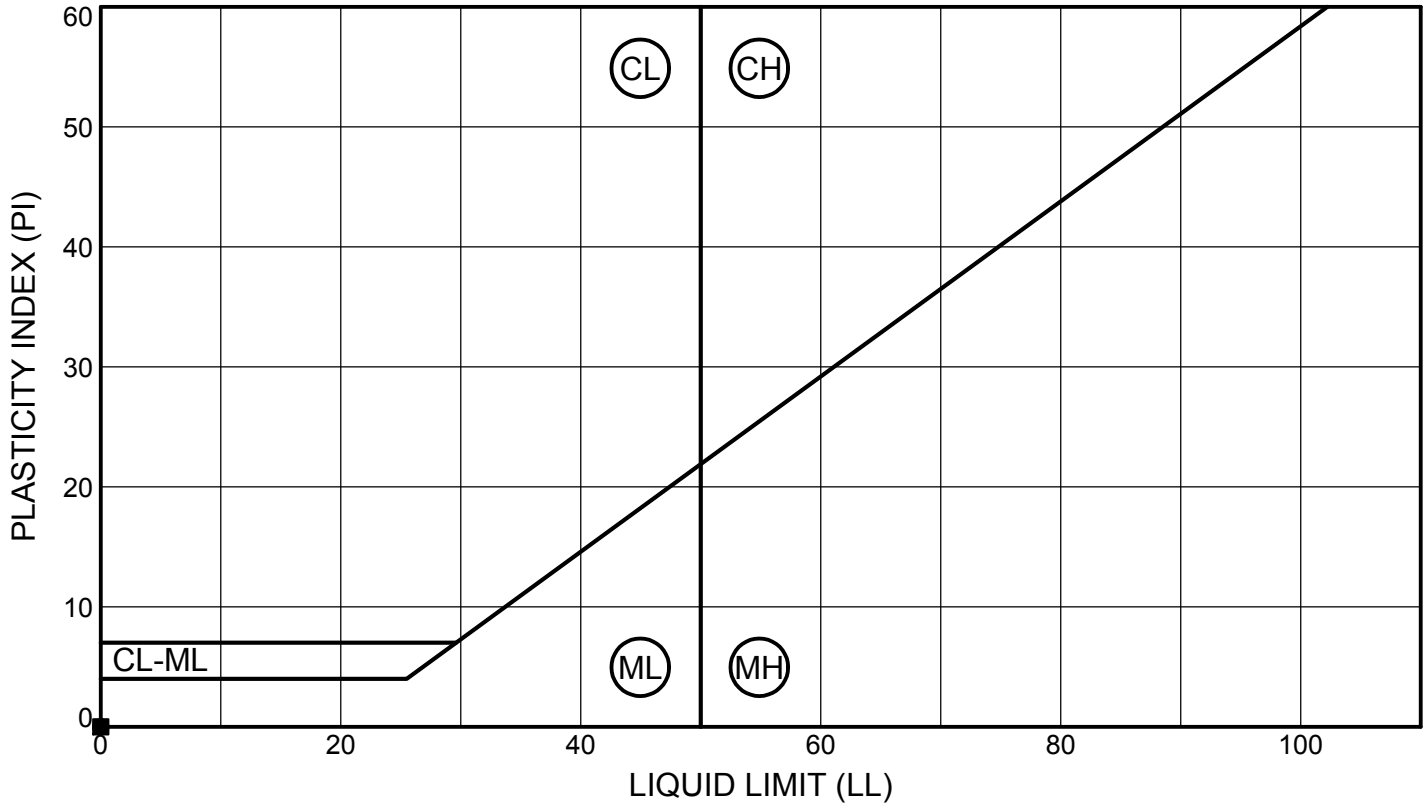
Sound Transit Eastlink E360
Client Project No.: 5480.0

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2016-112-23 FIGURE: 36



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	E360-TP-1	S2	2.0 - 4.5	(SM) Light olive brown, silty SAND with gravel	9	NP	NP	NP	21.5
■	E360-TP-5	S3	4.0 - 6.0	(SM) Very light brown, silty SAND with gravel	3	NP	NP	NP	15.3

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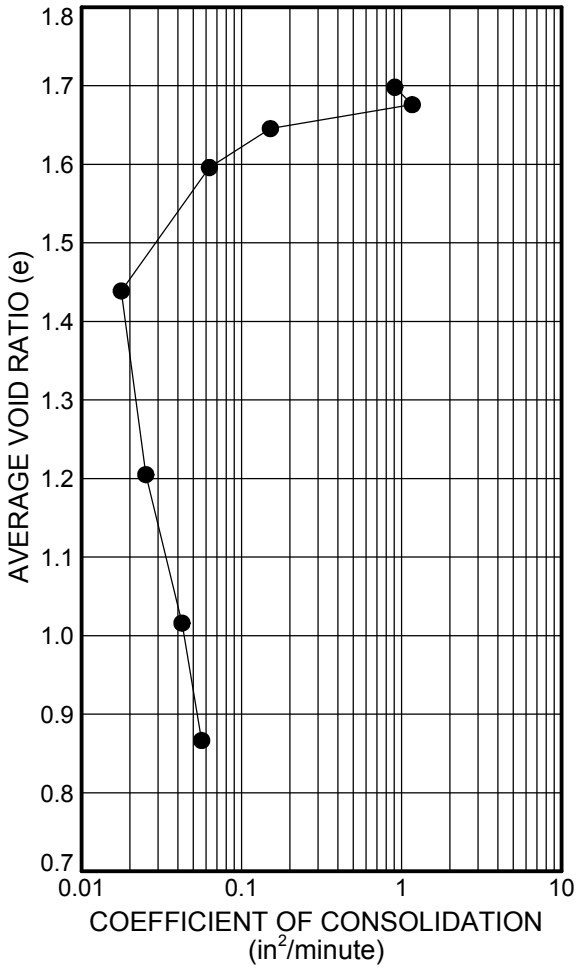
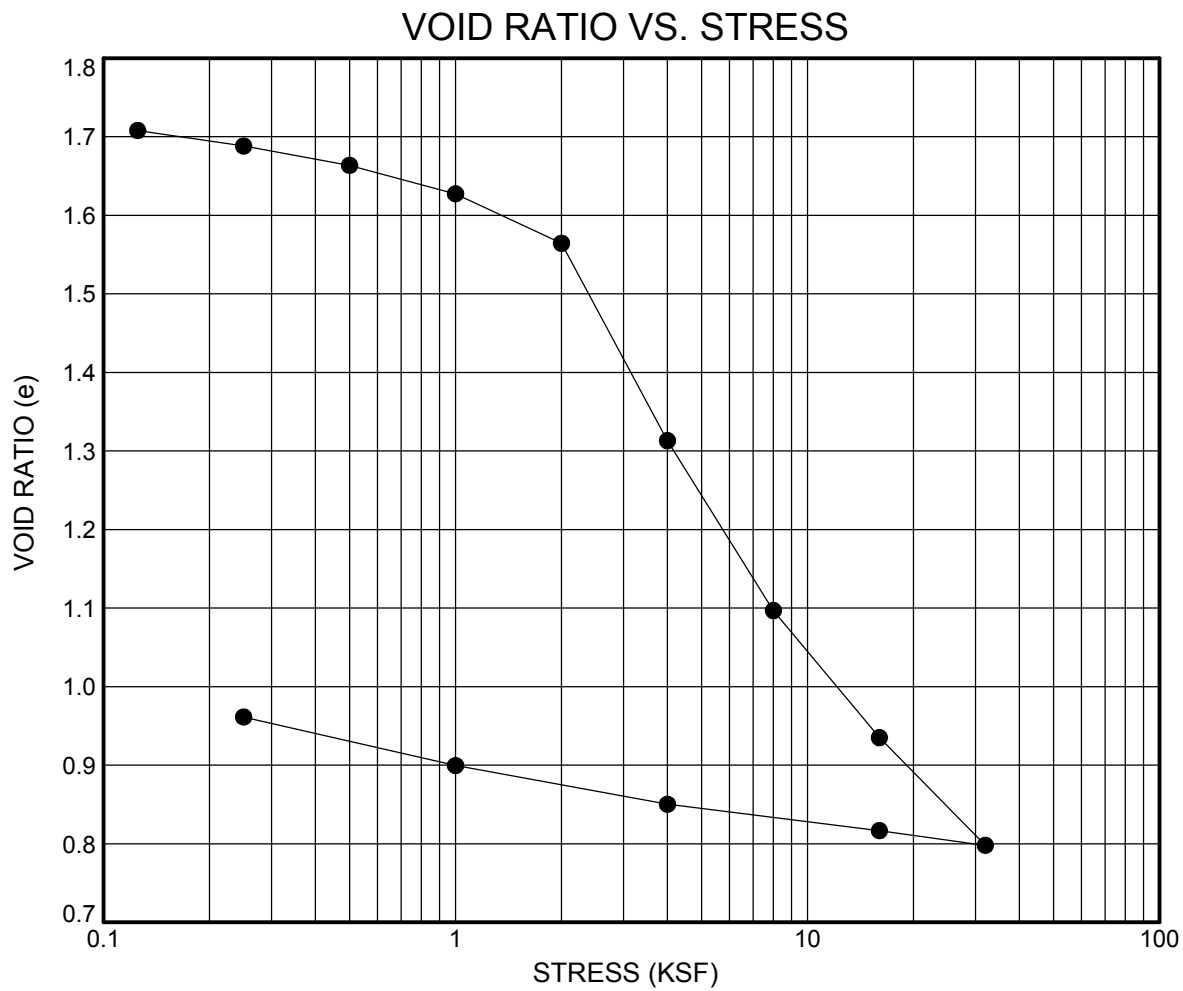
Sound Transit Eastlink E360
Client Project No.: 5480.0

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2016-112-23 FIGURE: 37





SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487	% MC		% Saturation		Dry Density (pcf)		Void Ratio (e)	
					Initial	Final	Initial	Final	Initial	Final	Initial	Final
●	E360-K-007	ST-1	12.5 - 14.5	(CL) Gray, lean CLAY	59.8	37.5	100.4	105.4	62.1	85.9	1.713	0.9613

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Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

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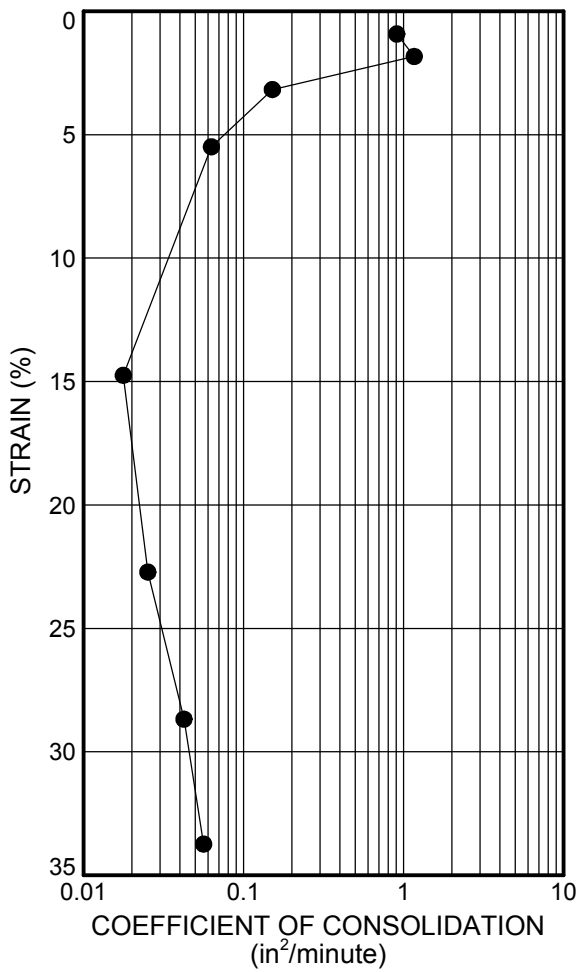
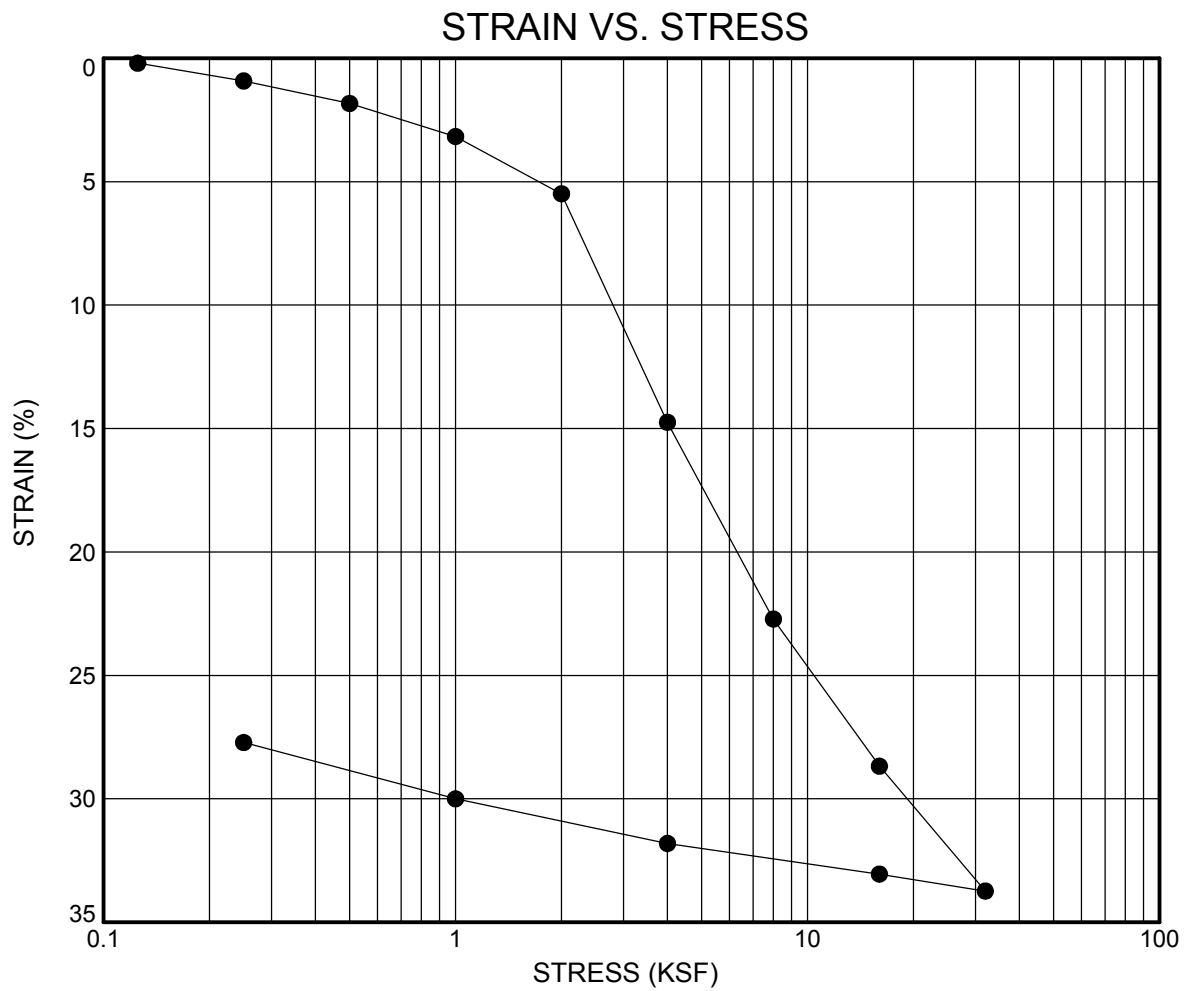
BLDG-2018-00985, BLDG-2018-00985

ONE DIMENSIONAL CONSOLIDATION OF SOILS ASTM D2435

PROJECT NO.: 2016-112-23 FIGURE: 38





SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487	% MC		% Saturation		Dry Density (pcf)		Void Ratio (e)	
					Initial	Final	Initial	Final	Initial	Final	Initial	Final
●	E360-K-007	ST-1	12.5 - 14.5	(CL) Gray, lean CLAY	59.8	37.5	100.4	105.4	62.1	85.9	1.713	0.9613

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Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

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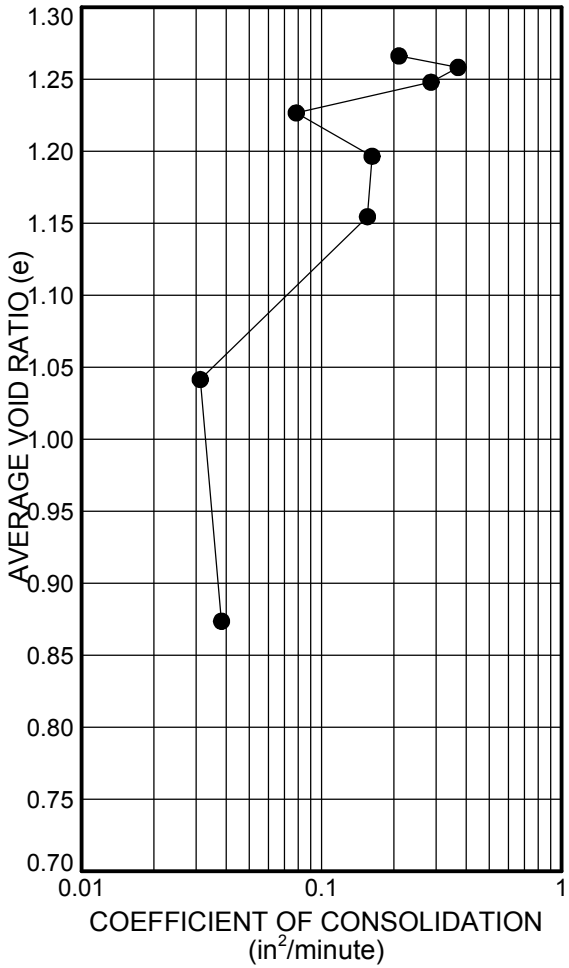
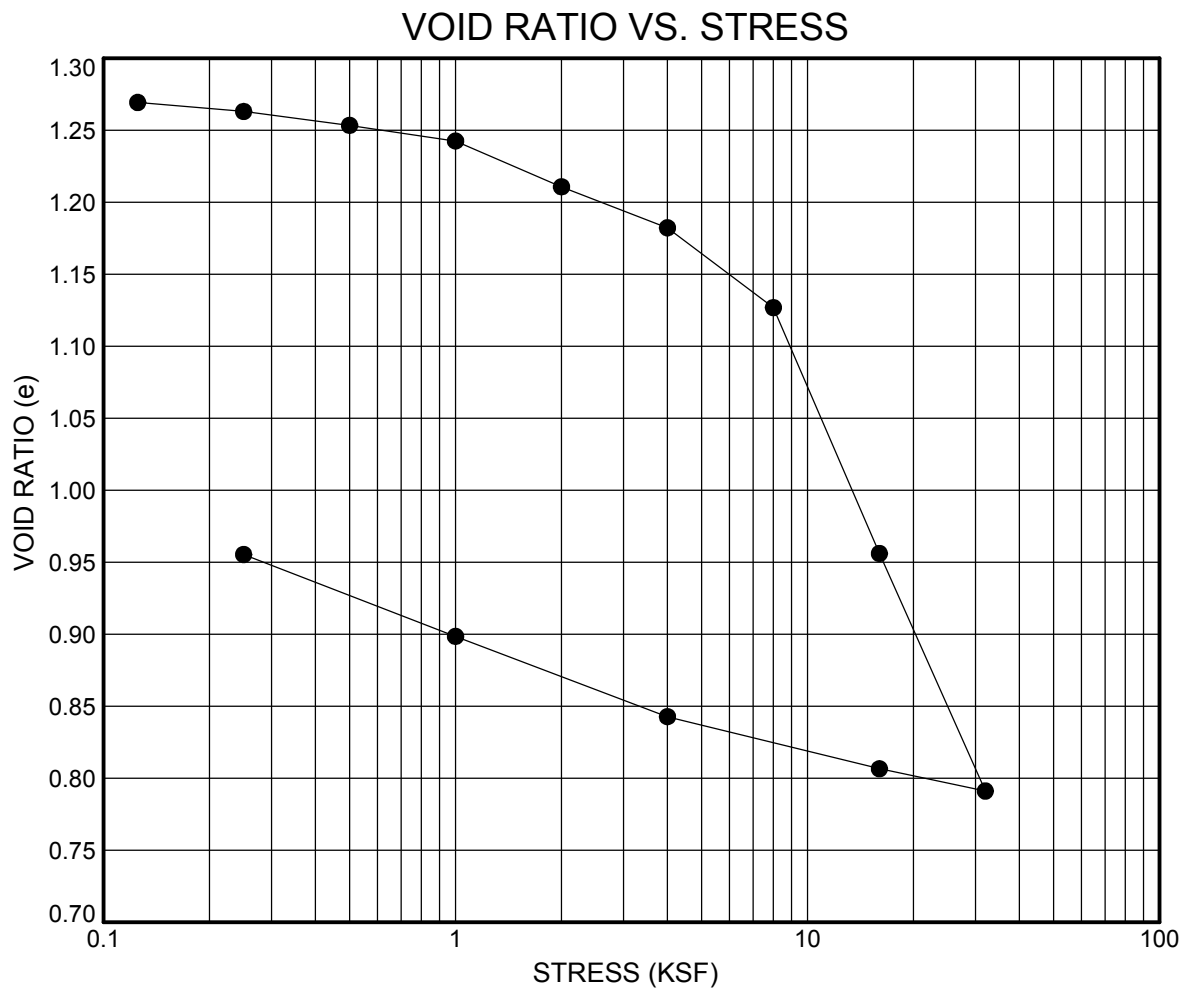
BLDG-2018-00983, BLDG-2018-00985

ONE DIMENSIONAL CONSOLIDATION OF SOILS ASTM D2435

PROJECT NO.: 2016-112-23 FIGURE: 39





SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487	% MC		% Saturation		Dry Density (pcf)		Void Ratio (e)	
					Initial	Final	Initial	Final	Initial	Final	Initial	Final
●	E360-K-007	ST2	17.0 - 18.5	(CH) Olive brown, fat CLAY	37.5	37.8	103.5	104.9	79.2	84.6	1.2741	0.9554

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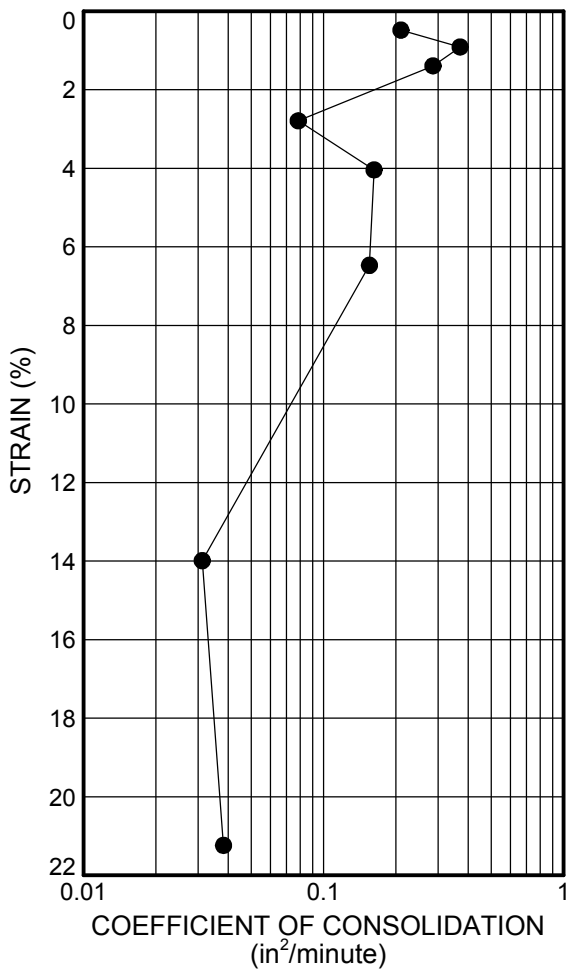
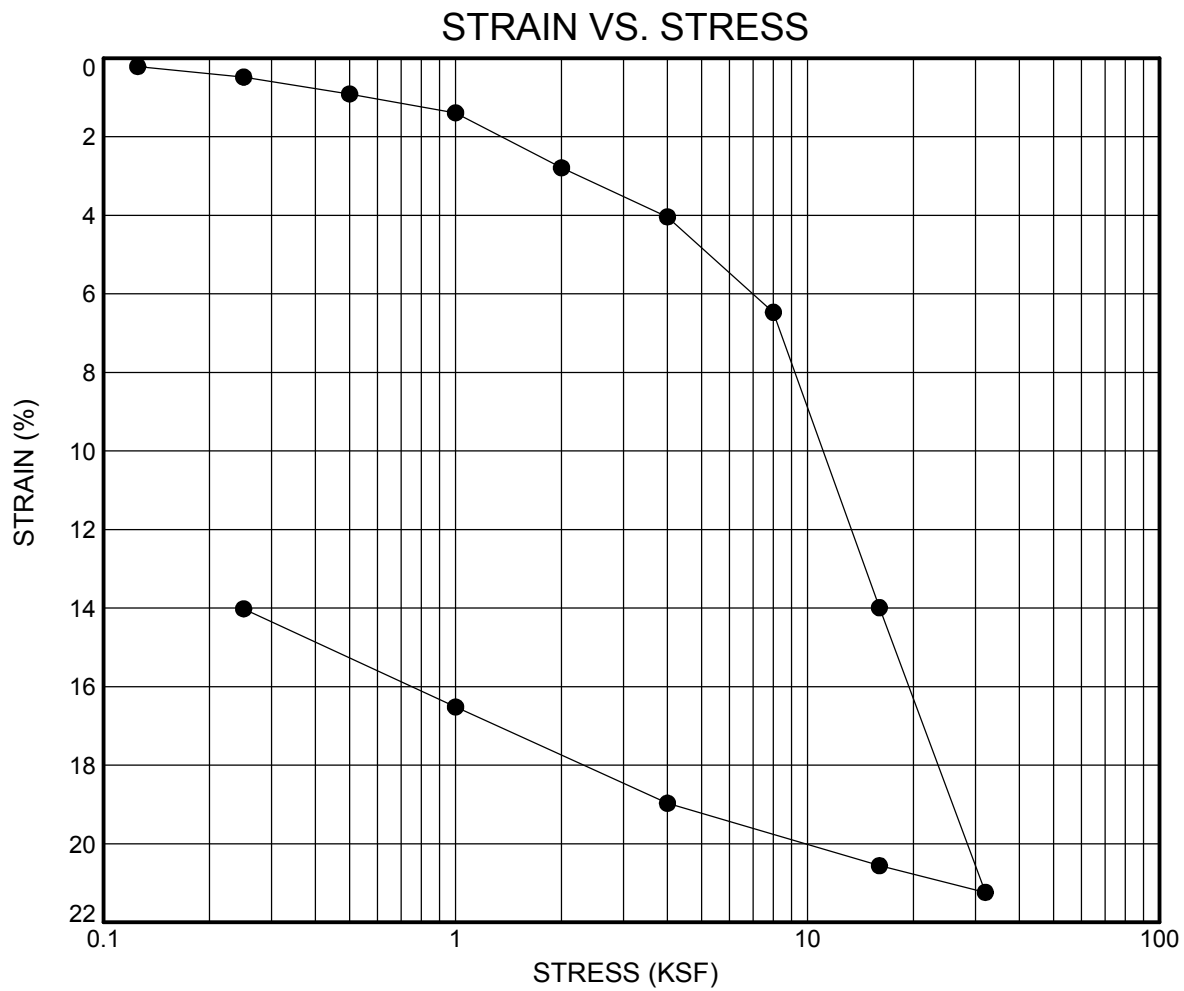
Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

ONE DIMENSIONAL CONSOLIDATION OF SOILS ASTM D2435

PROJECT NO.: 2016-112-23 FIGURE: 40





SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487	% MC		% Saturation		Dry Density (pcf)		Void Ratio (e)	
					Initial	Final	Initial	Final	Initial	Final	Initial	Final
●	E360-K-007	ST2	17.0 - 18.5	(CH) Olive brown, fat CLAY	37.5	37.8	103.5	104.9	79.2	84.6	1.2741	0.9554

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Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

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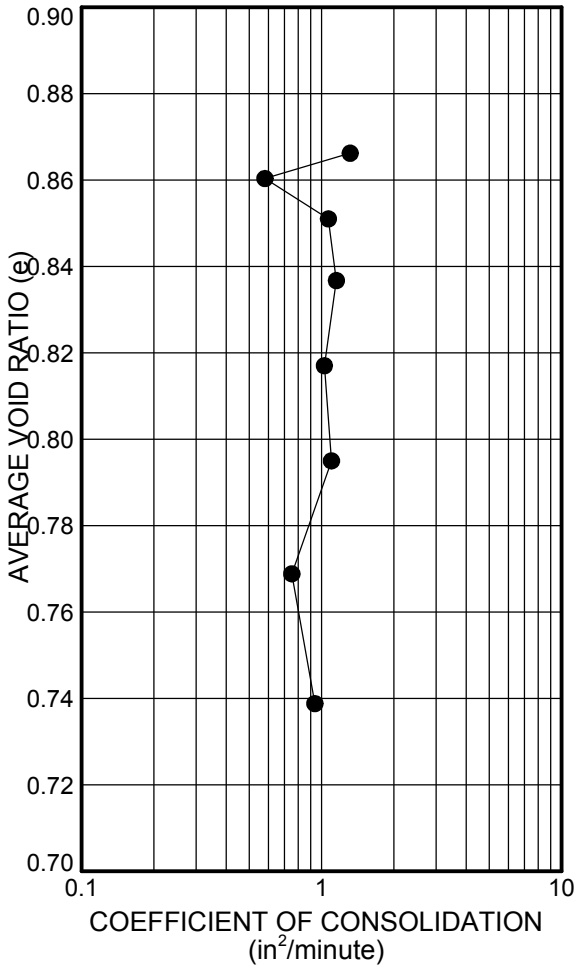
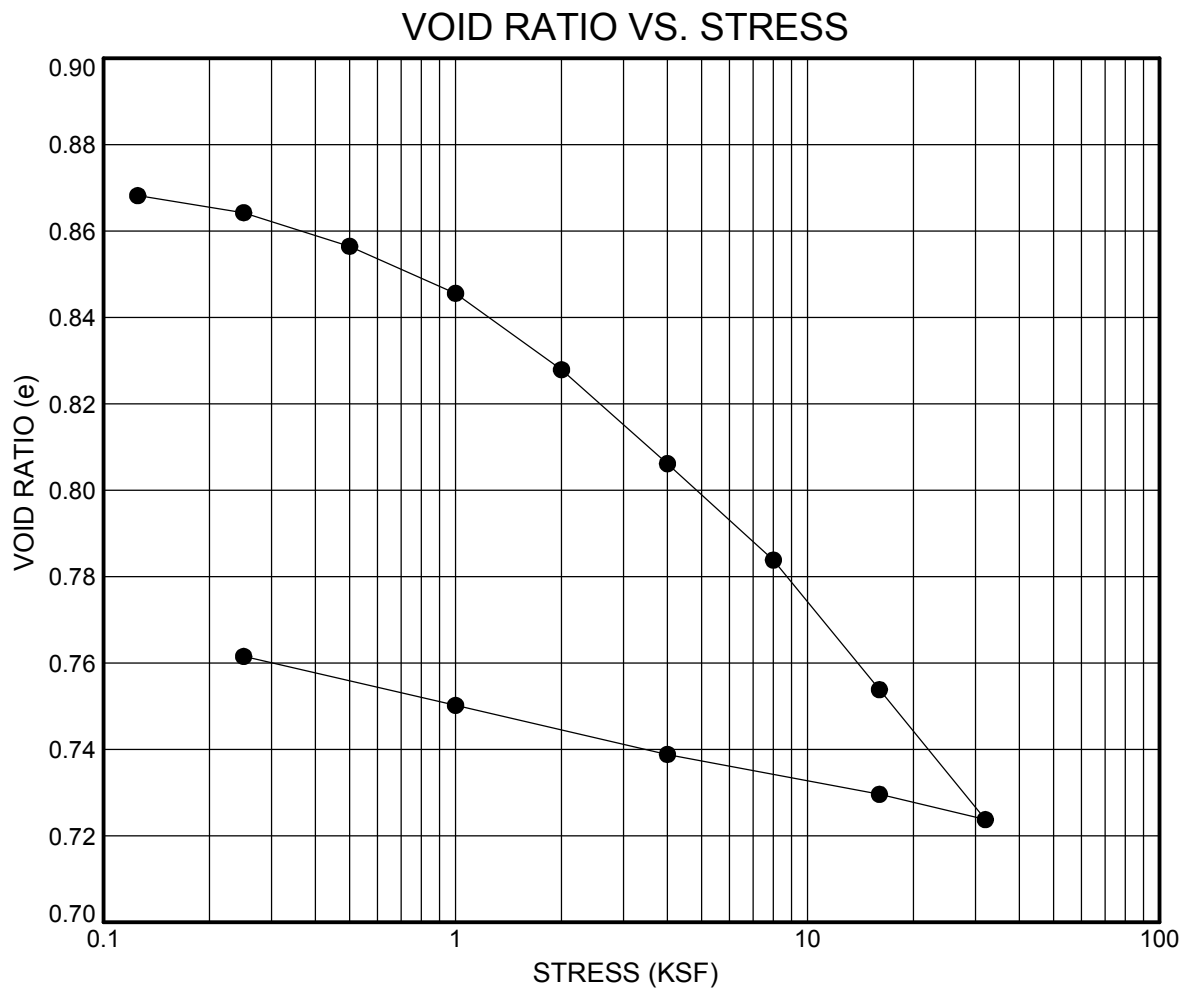
BLDG-2018-00983, BLDG-2018-00985

ONE DIMENSIONAL CONSOLIDATION OF SOILS ASTM D2435

PROJECT NO.: 2016-112-23 FIGURE: 41





SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487	% MC		% Saturation		Dry Density (pcf)		Void Ratio (e)	
					Initial	Final	Initial	Final	Initial	Final	Initial	Final
●	E360-K-008	T10	31.5 - 33.5	(CL) Gray, lean CLAY with sand	31.0	28.4	98.9	100.7	90.1	95.7	0.8712	0.7615

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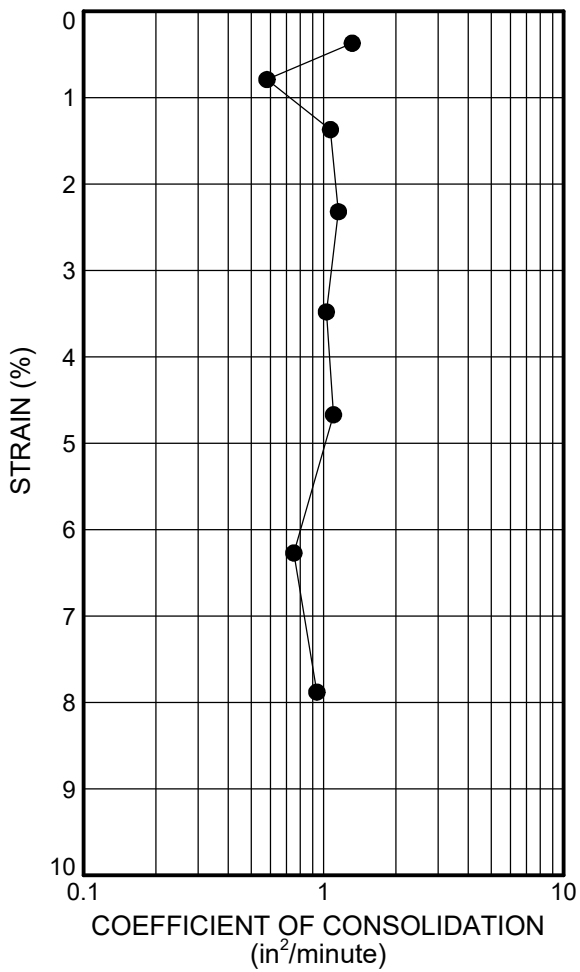
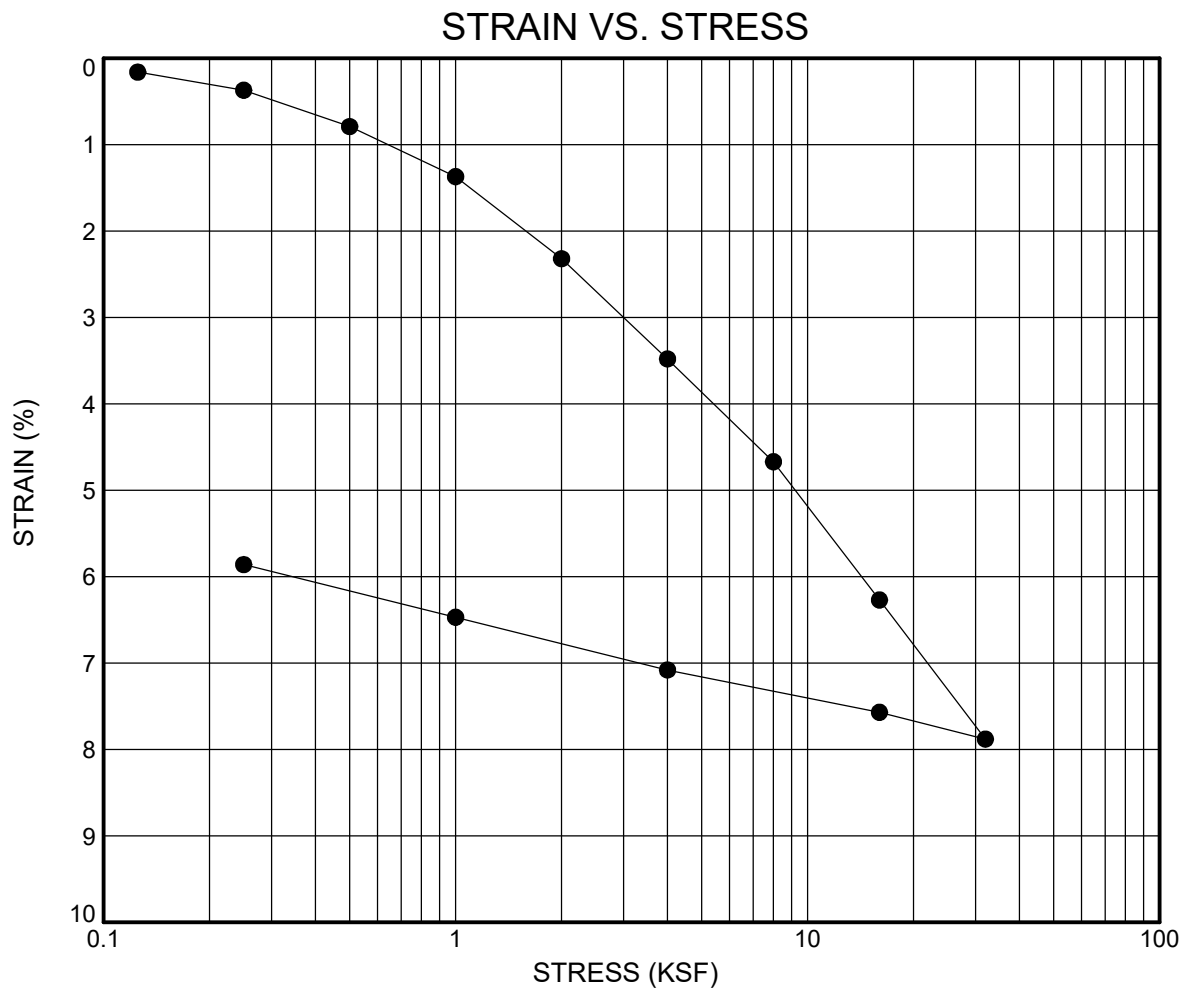
Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

SITE COPY
BLDG-2018-00887, BLDG-2018-00891, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

ONE DIMENSIONAL CONSOLIDATION OF SOILS ASTM D2435

PROJECT NO.: 2016-112-23 FIGURE: 42





SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487	% MC		% Saturation		Dry Density (pcf)		Void Ratio (e)	
					Initial	Final	Initial	Final	Initial	Final	Initial	Final
●	E360-K-008	T10	31.5 - 33.5	(CL) Gray, lean CLAY with sand	31.0	28.4	98.9	100.7	90.1	95.7	0.8712	0.7615

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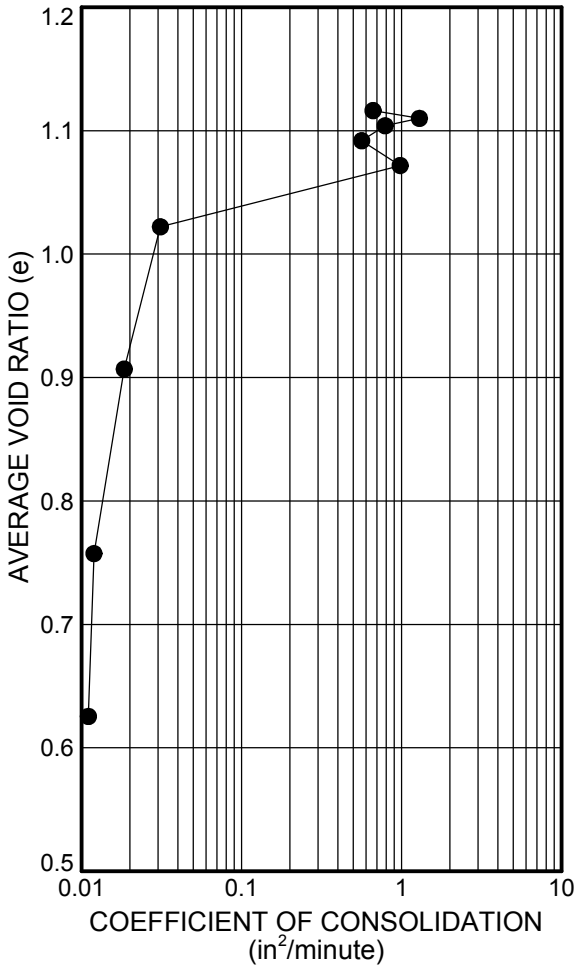
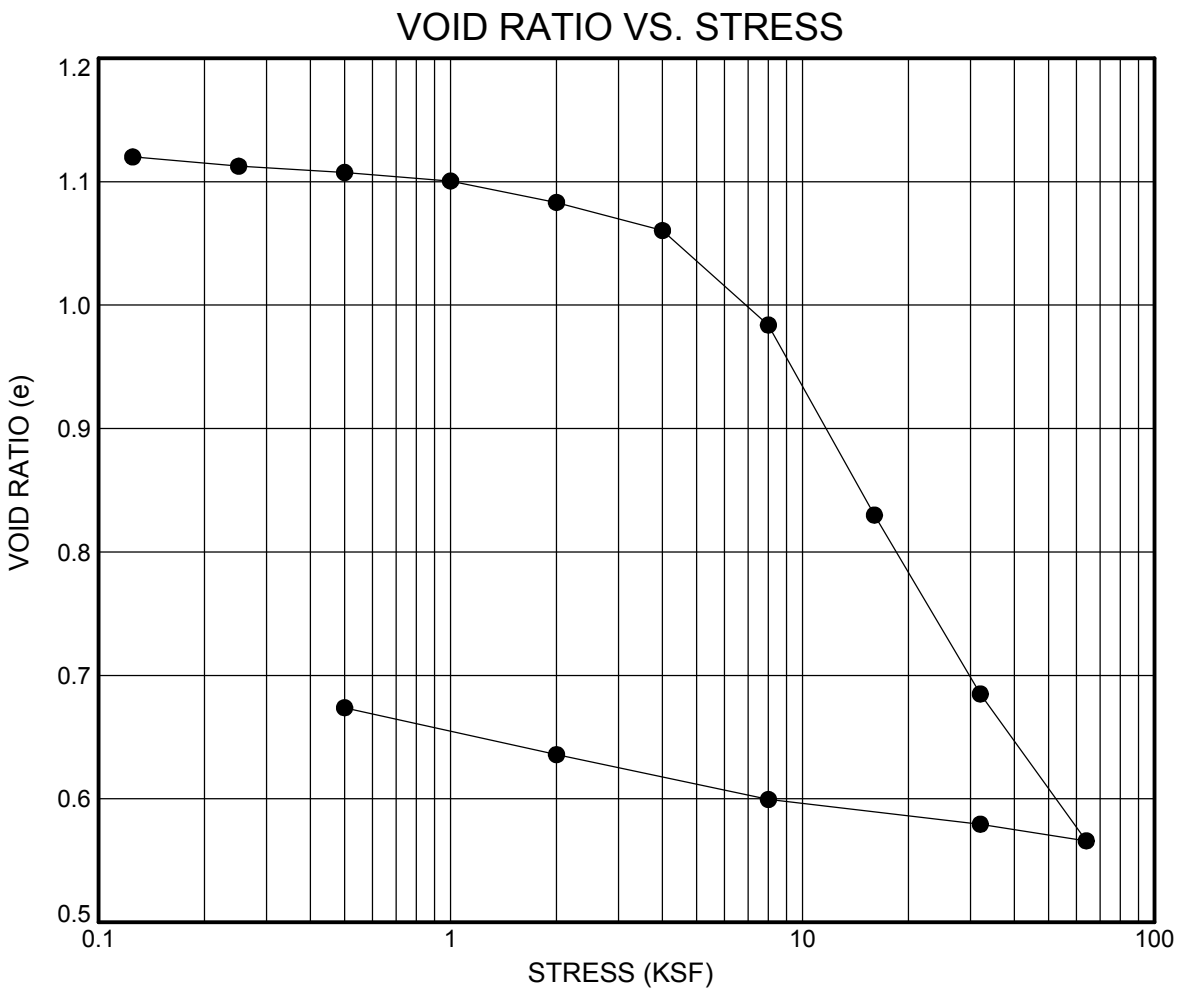
Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

SITE COPY
BLDG-2018-00837, BLDG-2018-00839, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

ONE DIMENSIONAL CONSOLIDATION OF SOILS ASTM D2435

PROJECT NO.: 2016-112-23 FIGURE: 43





SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487	% MC		% Saturation		Dry Density (pcf)		Void Ratio (e)	
					Initial	Final	Initial	Final	Initial	Final	Initial	Final
●	E360-K-008	T12	37.0 - 38.5	(CH) Dark grayish brown, fat CLAY	45.3	28.3	97.1	117.8	75.5	101.1	1.1355	0.6358

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Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

SITE COPY
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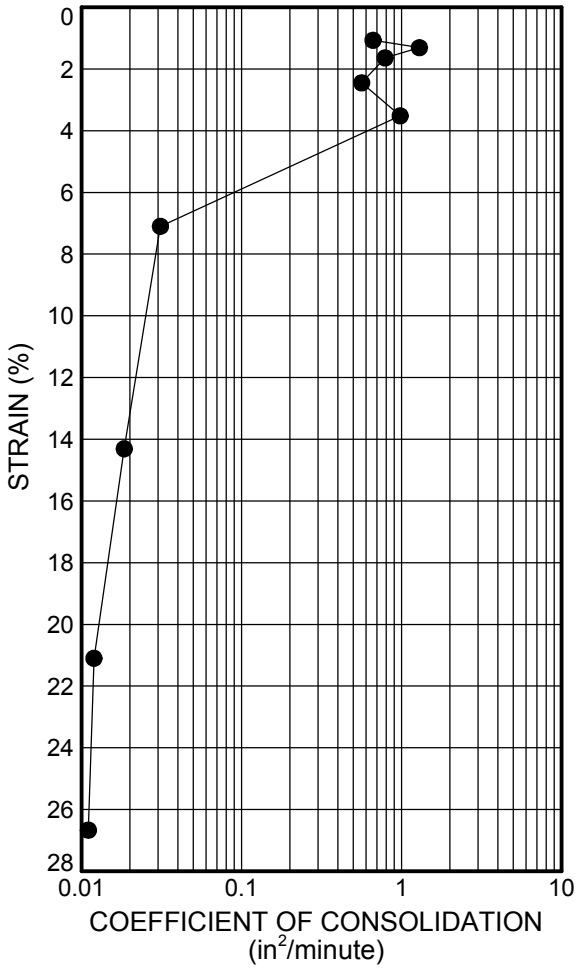
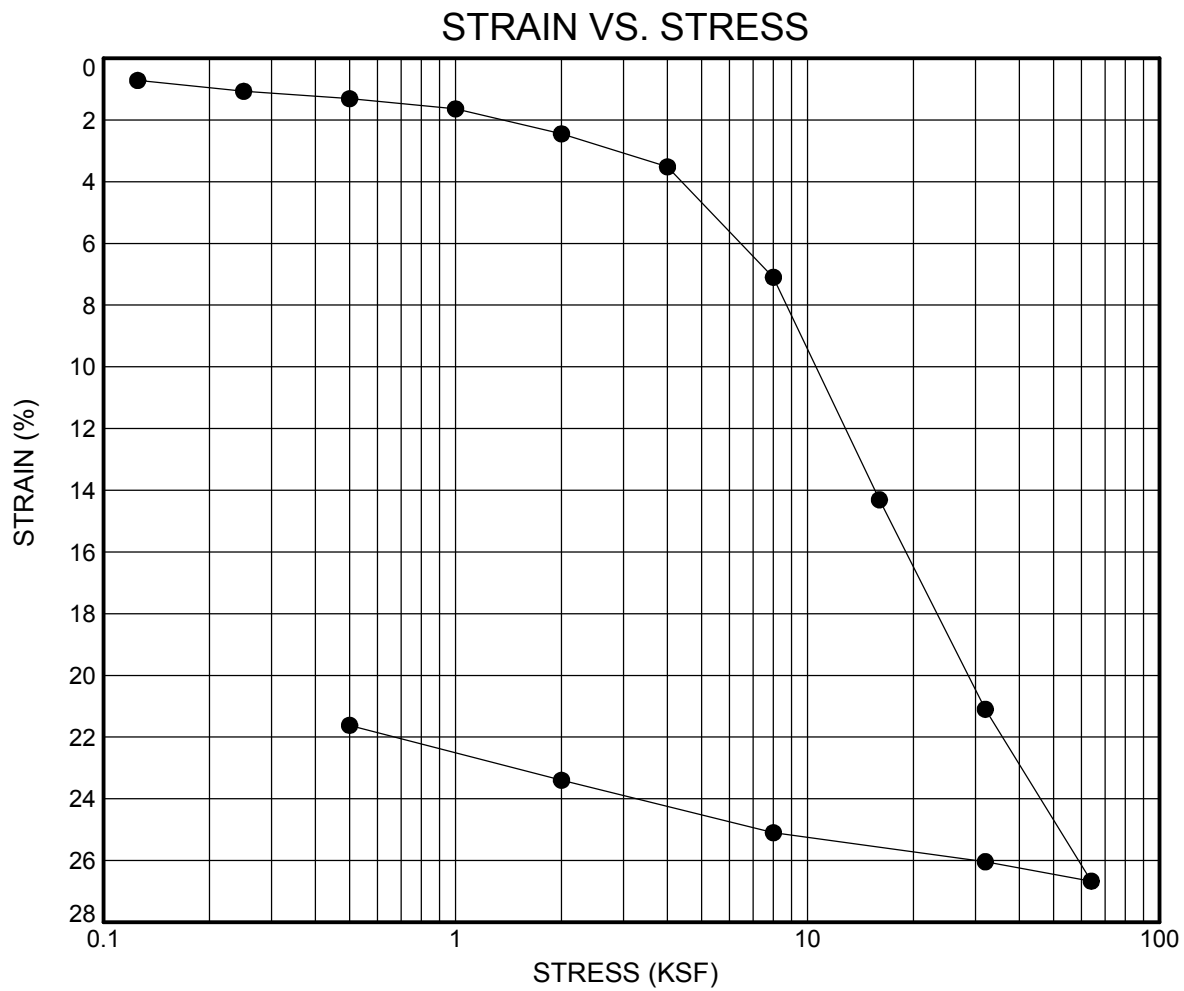
BLDG-2018-00983, BLDG-2018-00985

ONE DIMENSIONAL CONSOLIDATION OF SOILS ASTM D2435

PROJECT NO.: 2016-112-23 FIGURE: 44





SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487	% MC		% Saturation		Dry Density (pcf)		Void Ratio (e)	
					Initial	Final	Initial	Final	Initial	Final	Initial	Final
●	E360-K-008	T12	37.0 - 38.5	(CH) Dark grayish brown, fat CLAY	45.3	28.3	97.1	117.8	75.5	101.1	1.1355	0.6358

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Sound Transit Eastlink E360
Client Project No.: 5480.0

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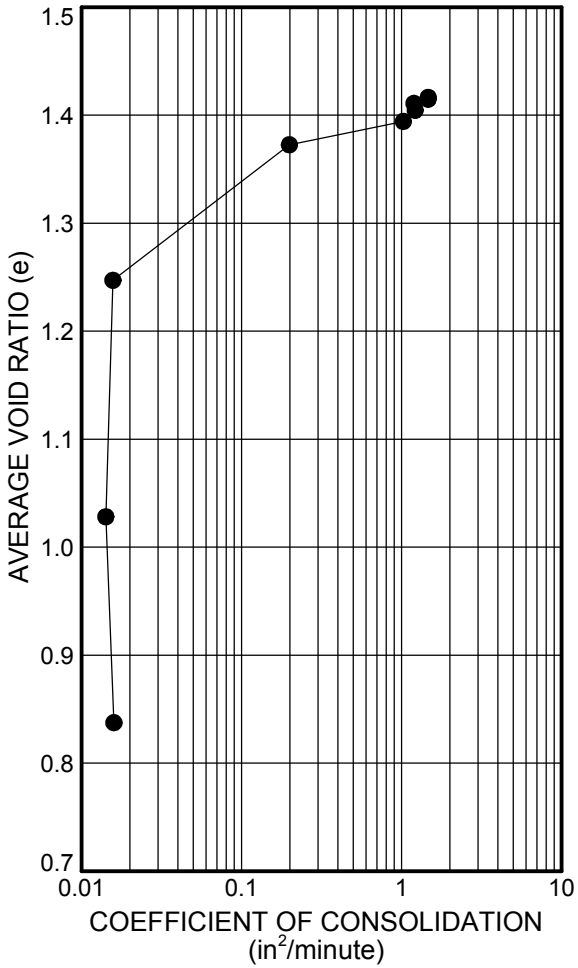
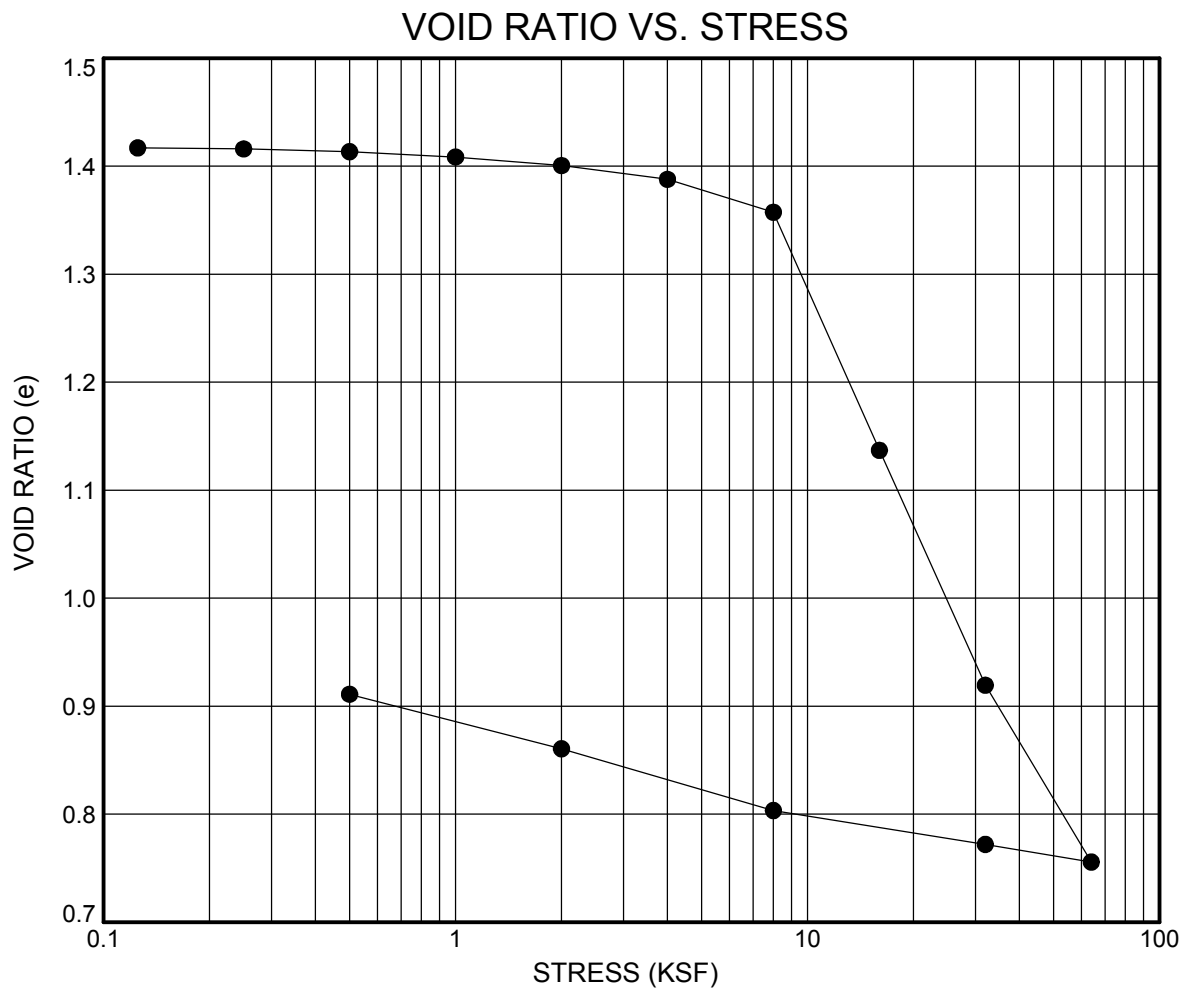
BLDG-2018-00837, BLDG-2018-00838, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

ONE DIMENSIONAL CONSOLIDATION OF SOILS ASTM D2435

PROJECT NO.: 2016-112-23 FIGURE: 45





SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487	% MC		% Saturation		Dry Density (pcf)		Void Ratio (e)	
					Initial	Final	Initial	Final	Initial	Final	Initial	Final
●	E360-K-009	S12	42.0 - 44.0	(CH) Gray, fat CLAY	44.9	34.5	100.0	104.11	71.0	89.8	1.4175	0.9110

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Client Project No.: 5480.0

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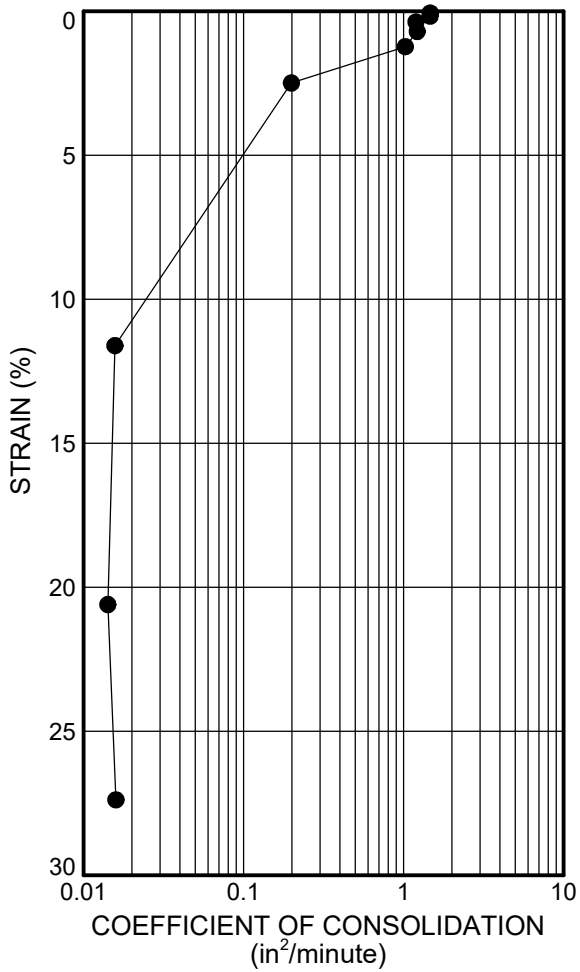
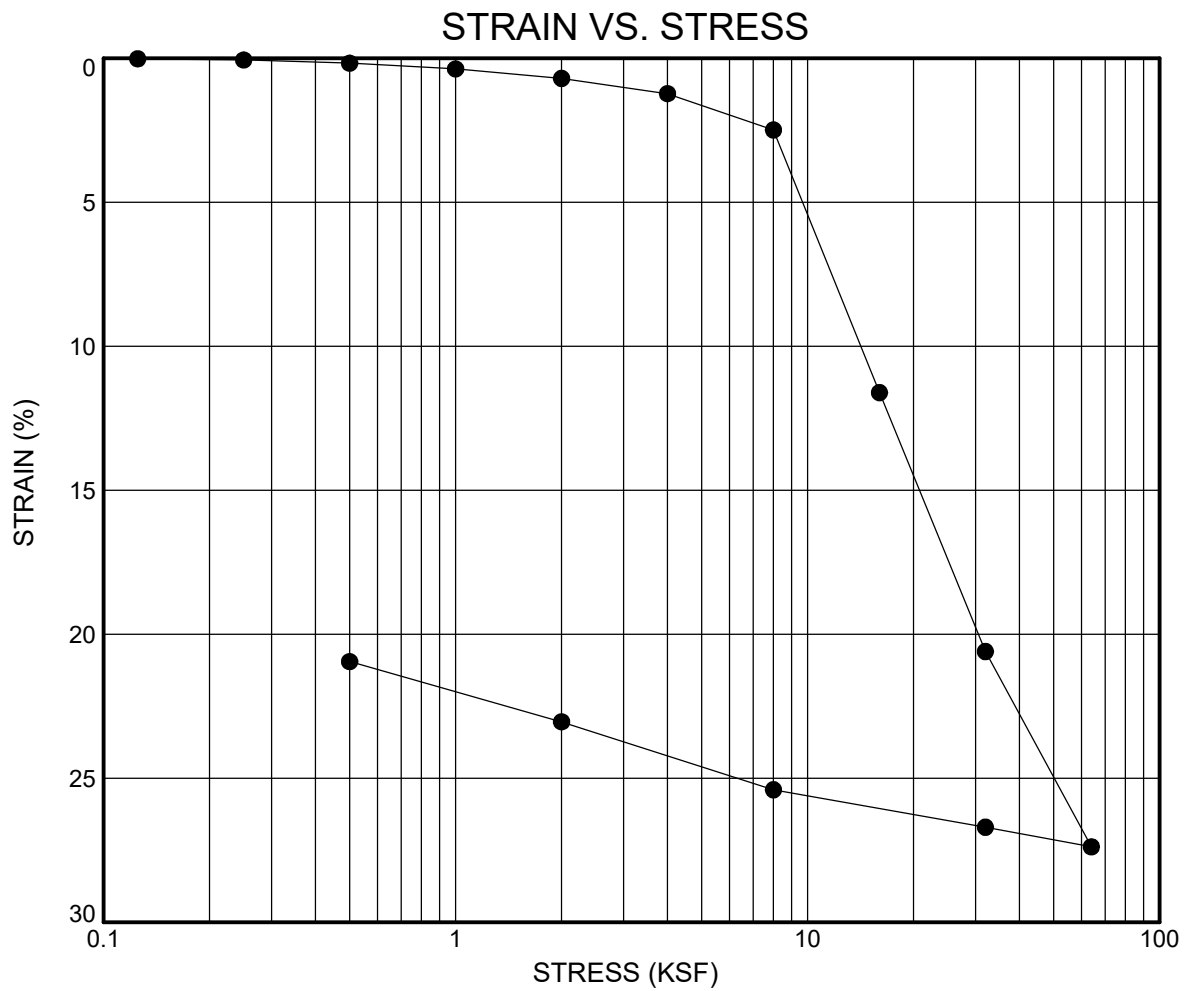
BLDG-2018-00983, BLDG-2018-00985

ONE DIMENSIONAL CONSOLIDATION OF SOILS ASTM D2435

PROJECT NO.: 2016-112-23 FIGURE: 46





SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487	% MC		% Saturation		Dry Density (pcf)		Void Ratio (e)	
					Initial	Final	Initial	Final	Initial	Final	Initial	Final
●	E360-K-009	S12	42.0 - 44.0	(CH) Gray, fat CLAY	44.9	34.5	100.0	104.11	71.0	89.8	1.4175	0.9110

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Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

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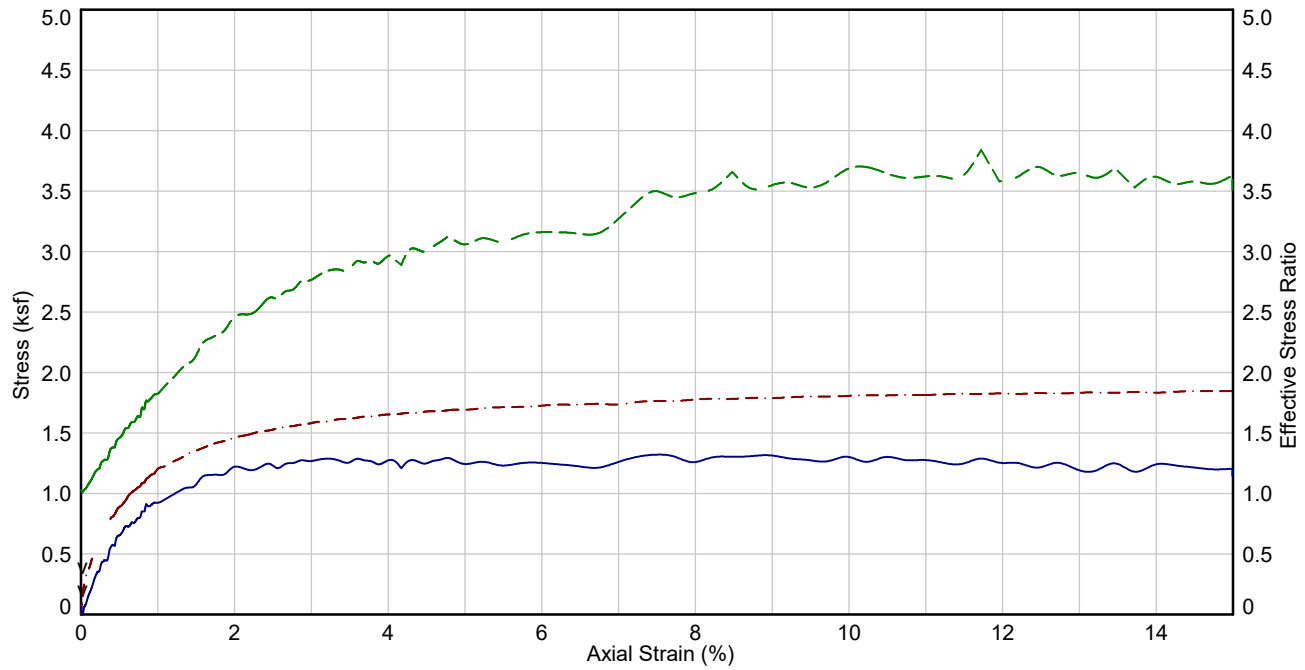
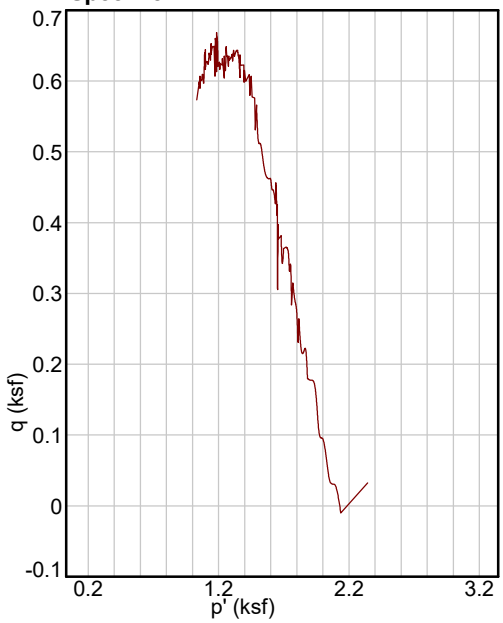
BLDG-2018-00983, BLDG-2018-00985

ONE DIMENSIONAL CONSOLIDATION OF SOILS ASTM D2435

PROJECT NO.: 2016-112-23 FIGURE: 47



Specimen A



Type of Test:	Consolidated-Undrained
Boring No.:	E360-K-007
Depth:	12.5 ft.
Sample No.:	ST-1
Description:	(CL) Gray, lean CLAY
Sample Type:	Cohesive
Liquid Limit, LL (%):	47
Plastic Limit, PL (%):	25
Plasticity Index (Calculated), PI (%):	22
Specific Gravity, Gs: (Assumed)	2.72

	Specimen	A
	Specimen Interval (ft)	12.5
Initial	Water Content, (%)	59.8
	Dry Density, (pcf)	67.3
	Saturation, (%)	106.8
	Void Ratio, e	1.524
	Diameter, (in.)	2.82
	Height, (in.)	5.82
At Test	B-Value	1.0
	Cross-Sectional Area Determination	Method A
	Water Content, (%)	56.7
	Dry Density, (pcf)	76.0
	Saturation, (%)	104.8
	Void Ratio, e	1.233
	Diameter, (in.)	2.68
	Height, (in.)	5.06
	Saturation Method (Wet/Dry)	Wet
	t_{50}, (min.)	55.0
	Strain rate, (%/min.)	2.6E-4
	Back Pressure, (psi)	13.9
	Confining Pressure σ_3, (ksf)	2.3
	Shear Stress (q) at Max Shear Stress, (ksf)	0.66
	Strain, (%)	7.5
	Shear Stress (q) at Max Obliquity, (ksf)	0.64
	Strain, (%)	11.7
	σ_1' Failure, (ksf)	1.8
	σ_3' Failure, (ksf)	0.5

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Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION OF SOIL ASTM D4767

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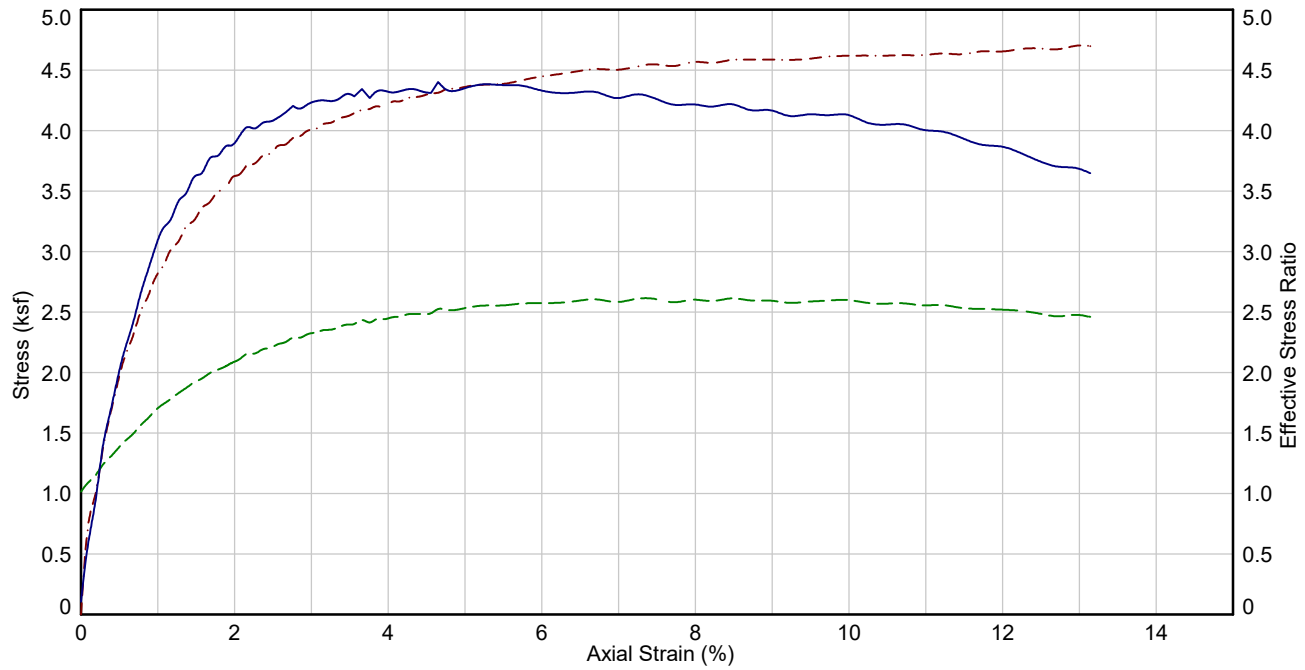
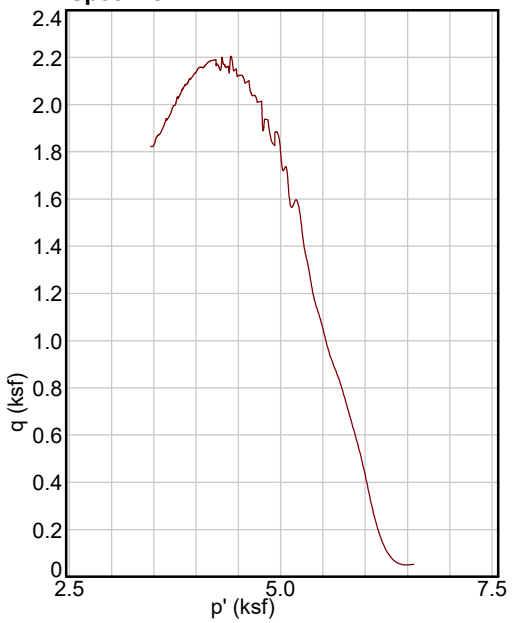
PROJECT NO.: 2016-112-23 FIGURE: 48



Specimen A



Specimen		A
Specimen Interval (ft)		42.0
Initial	Water Content, (%)	44.9
	Dry Density, (pcf)	75.7
	Saturation, (%)	97.4
	Void Ratio, e	1.268
	Diameter, (in.)	2.86
	Height, (in.)	5.85
At Test	B-Value	1.0
	Cross-Sectional Area Determination	Method A
	Water Content, (%)	44.1
	Dry Density, (pcf)	79.7
	Saturation, (%)	105.3
	Void Ratio, e	1.153
	Diameter, (in.)	2.75
	Height, (in.)	5.19
Saturation Method (Wet/Dry)		Wet
t_{50}, (min.)		102.0
Strain rate, (%/min.)		4.3E-3
Back Pressure, (psi)		28.9
Confining Pressure σ_3, (ksf)		7.2
Shear Stress (q) at Max Shear Stress, (ksf)		2.2
Strain, (%)		4.7
Shear Stress (q) at Max Obliquity, (ksf)		2.1
Strain, (%)		8.7
σ_1' Failure, (ksf)		6.5
σ_3' Failure, (ksf)		2.1

Type of Test:	Consolidated-Undrained	
Boring No.:	E360-K-009	
Depth:	42 ft.	
Sample No.:	S12	
Description:	(CH) Gray, fat CLAY	
Sample Type:	Cohesive	
Liquid Limit, LL (%):	52	
Plastic Limit, PL (%):	23	
Plasticity Index (Calculated), PI (%):	29	
Specific Gravity, Gs:	(Assumed)	2.75

HWA GEOSCIENCES INC.

Laboratory Testing for McMillen Jacobs Associates
Sound Transit Eastlink E360
Client Project No.: 5480.0

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BLDG-2018-00983, BLDG-2018-00985

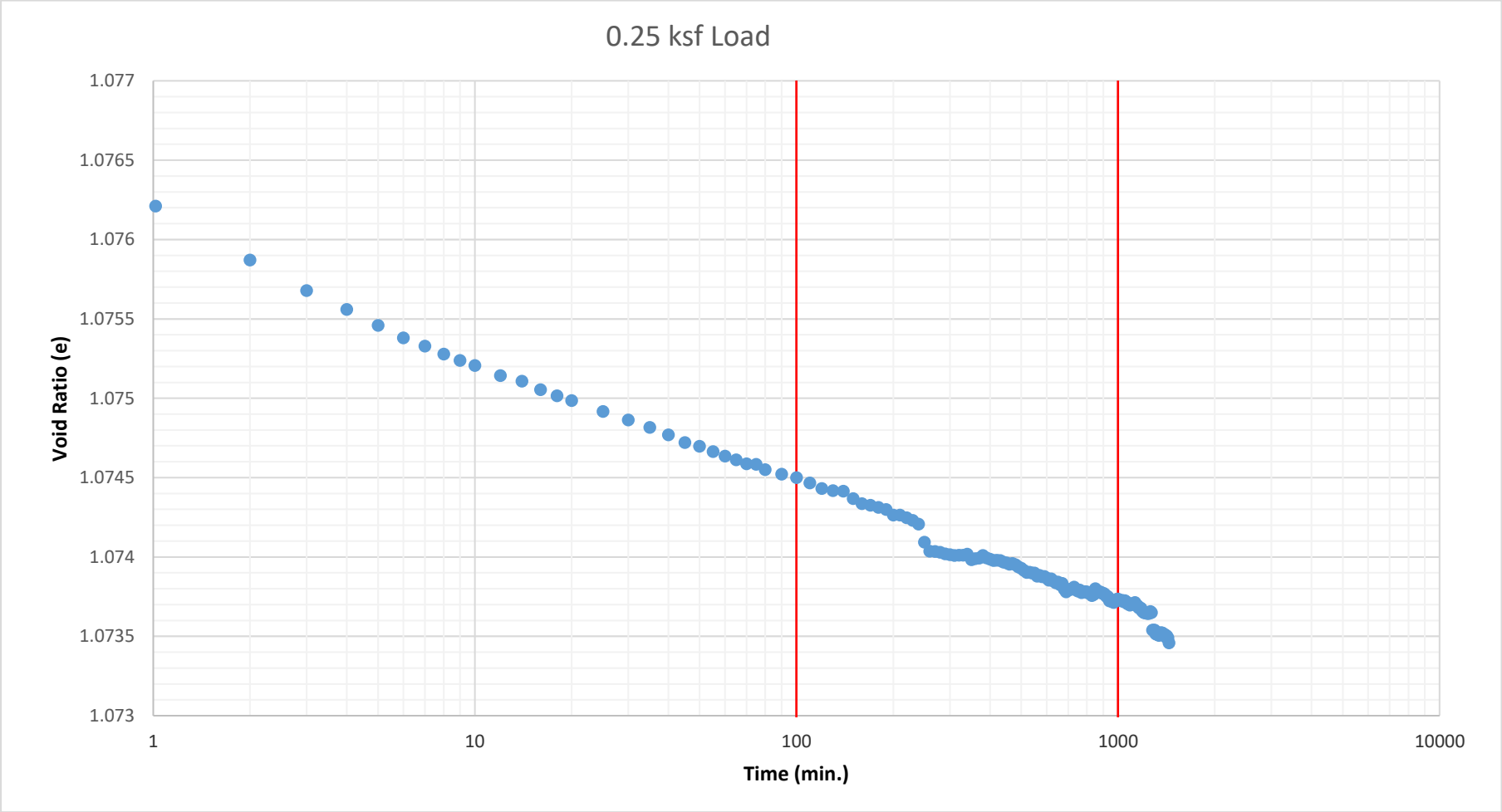
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION OF SOIL ASTM D4767

PROJECT NO.: 2016-112-23 FIGURE: 49

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number		Moisture Content	37.5	37.8	%
Project Number:	2016-112-23	Sample Depth	17-18.5 feet	Saturation	103.5	104.9	%
Exploration Number:	E360-K-007	Soil Description	Olive brown, fat CLAY (CH)	Dry Density	79.3	84.6	pcf



C_α=	1.0745	-	1.0737	=	0.0008

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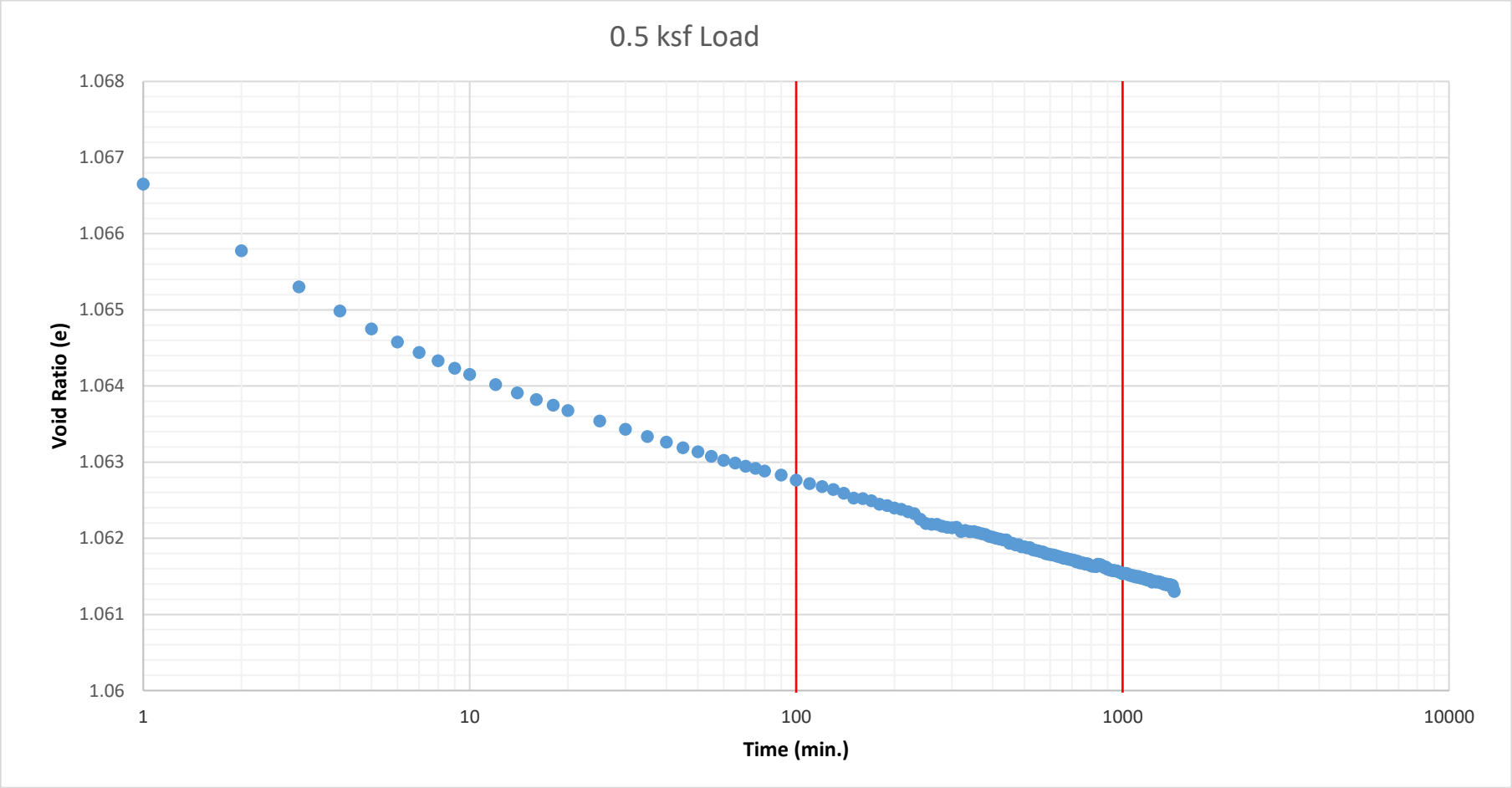
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 50a

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number		Moisture Content	37.5	37.8	%
Project Number:	2016-112-23	Sample Depth	17-18.5 feet	Saturation	103.5	104.9	%
Exploration Number:	E360-K-007	Soil Description	Olive brown, fat CLAY (CH)	Dry Density	79.3	84.6	pcf



C_α=	1.0628	-	1.0615	=	0.0012

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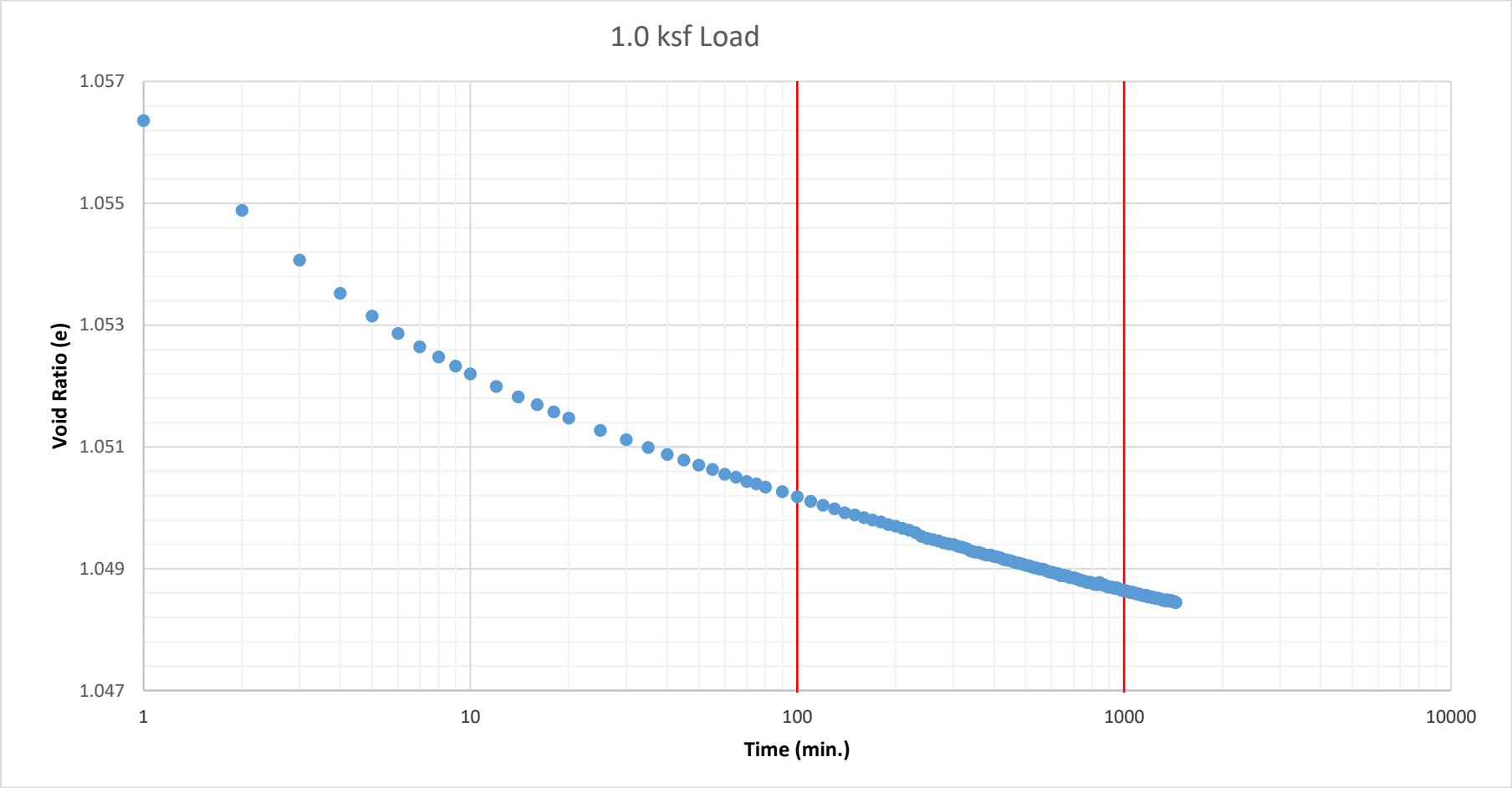
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 50b

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number		Moisture Content	37.5	37.8	%
Project Number:	2016-112-23	Sample Depth	17-18.5 feet	Saturation	103.5	104.9	%
Exploration Number:	E360-K-007	Soil Description	Olive brown, fat CLAY (CH)	Dry Density	79.3	84.6	pcf



C_α=	1.0502	-	1.0486	=	0.0015

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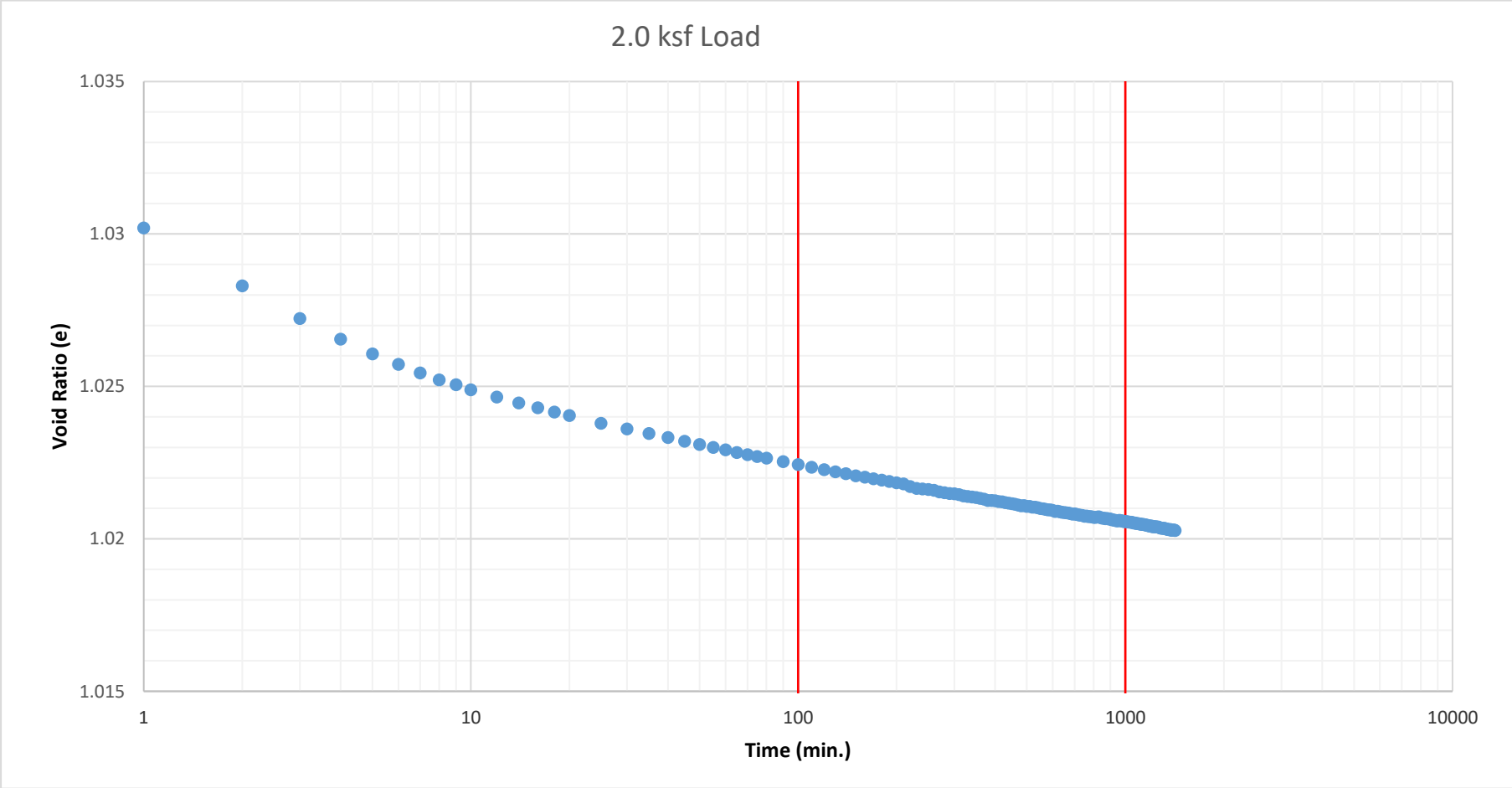
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 50c

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number		Moisture Content	37.5	37.8	%
Project Number:	2016-112-23	Sample Depth	17-18.5 feet	Saturation	103.5	104.9	%
Exploration Number:	E360-K-007	Soil Description	Olive brown, fat CLAY (CH)	Dry Density	79.3	84.6	pcf



C_α=	1.0224	-	1.0206	=	0.0019

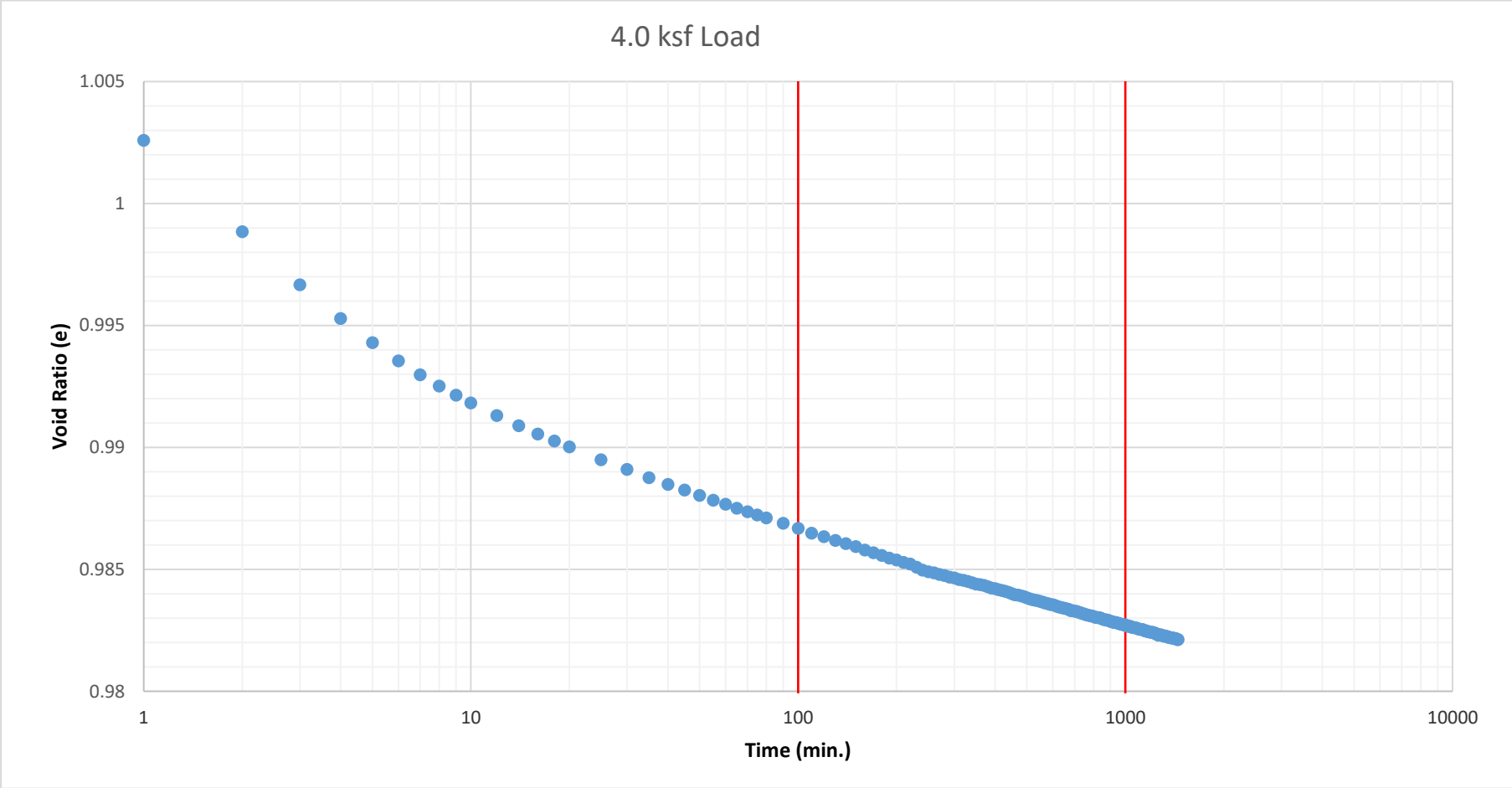
SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 50d

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number		Moisture Content	37.5	37.8	%
Project Number:	2016-112-23	Sample Depth	17-18.5 feet	Saturation	103.5	104.9	%
Exploration Number:	E360-K-007	Soil Description	Olive brown, fat CLAY (CH)	Dry Density	79.3	84.6	pcf



C_α=	0.9867	-	0.9827	=	0.0040

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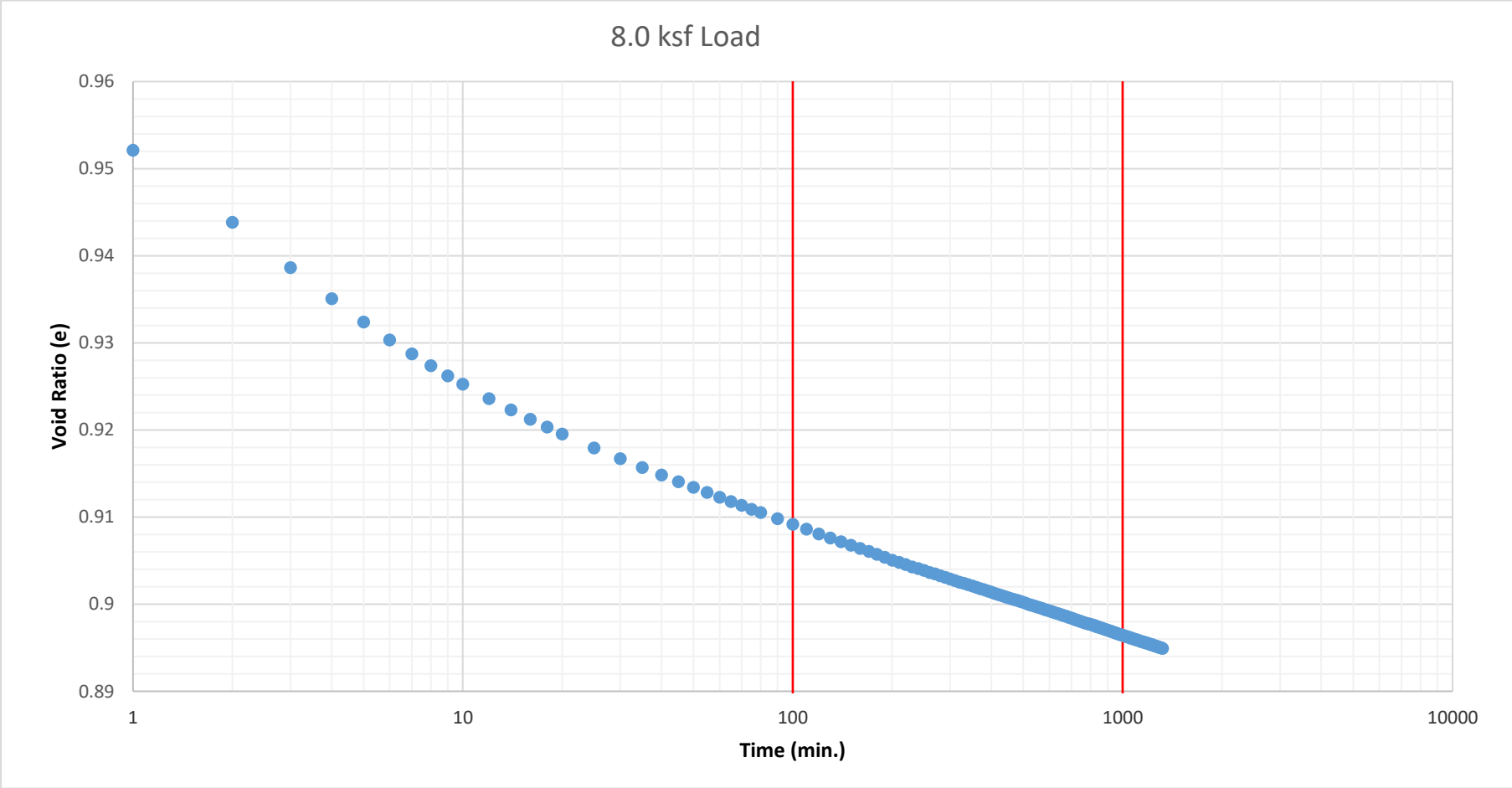
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 50e

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number		Moisture Content	37.5	37.8	%
Project Number:	2016-112-23	Sample Depth	17-18.5 feet	Saturation	103.5	104.9	%
Exploration Number:	E360-K-007	Soil Description	Olive brown, fat CLAY (CH)	Dry Density	79.3	84.6	pcf



C_α=	0.9092	-	0.8964	=	0.0127

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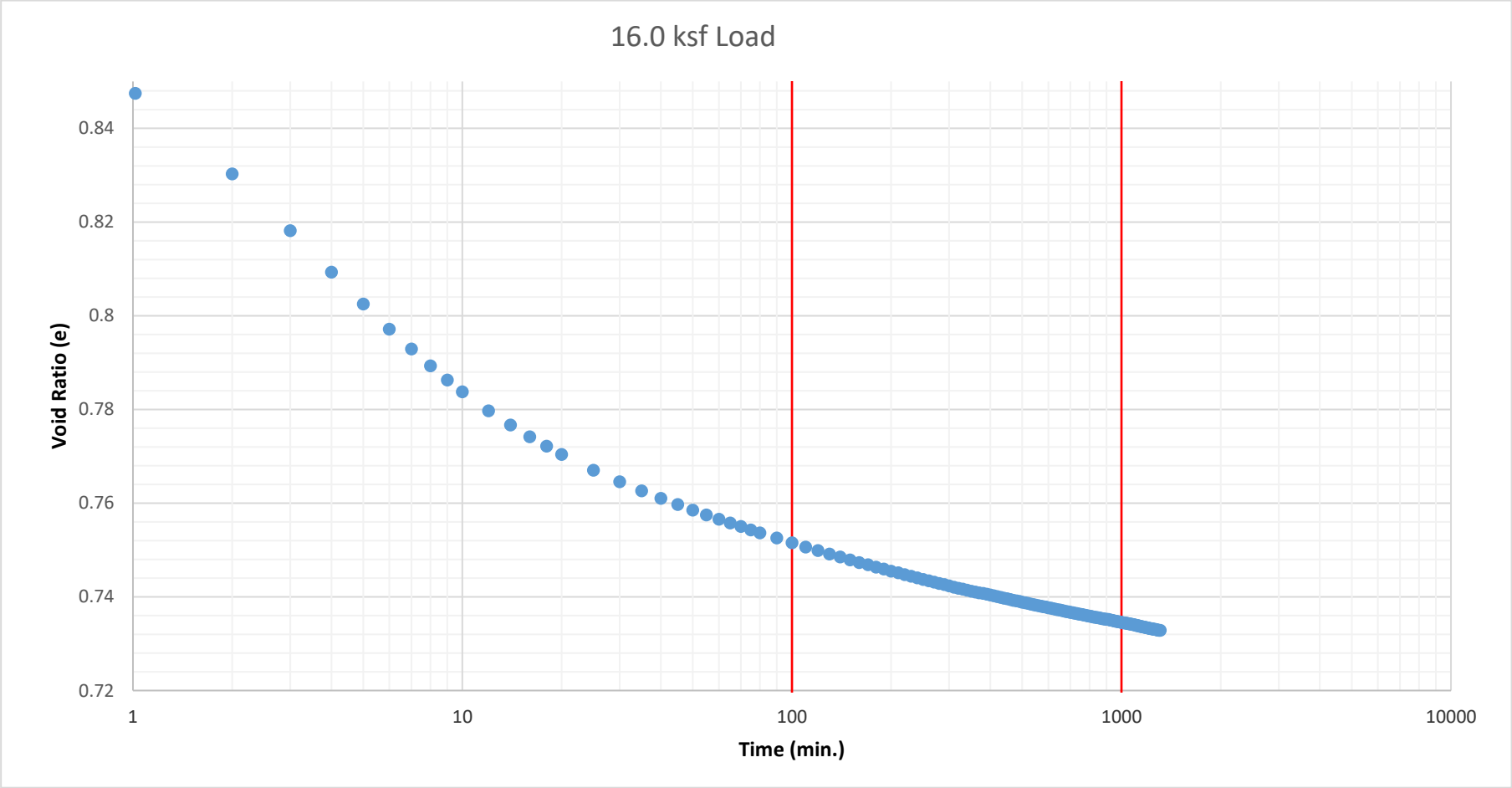
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 50f

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number		Moisture Content	37.5	37.8	%
Project Number:	2016-112-23	Sample Depth	17-18.5 feet	Saturation	103.5	104.9	%
Exploration Number:	E360-K-007	Soil Description	Olive brown, fat CLAY (CH)	Dry Density	79.3	84.6	pcf



C_α=	0.7515	-	0.7345	=	0.0170

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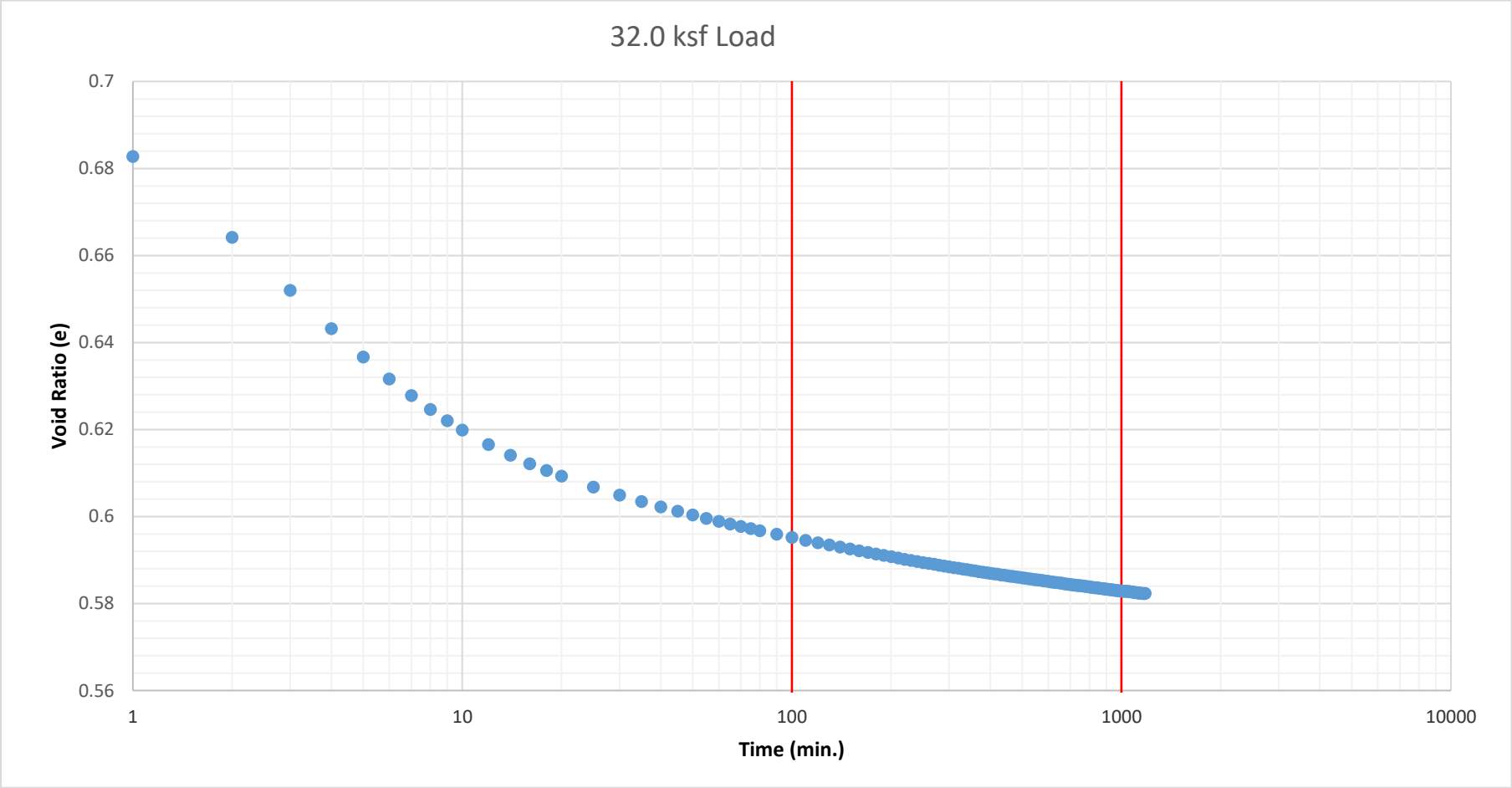
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 50g

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number		Moisture Content	37.5	37.8	%
Project Number:	2016-112-23	Sample Depth	17-18.5 feet	Saturation	103.5	104.9	%
Exploration Number:	E360-K-007	Soil Description	Olive brown, fat CLAY (CH)	Dry Density	79.3	84.6	pcf



C_α=	0.5952	-	0.5829	=	0.0123

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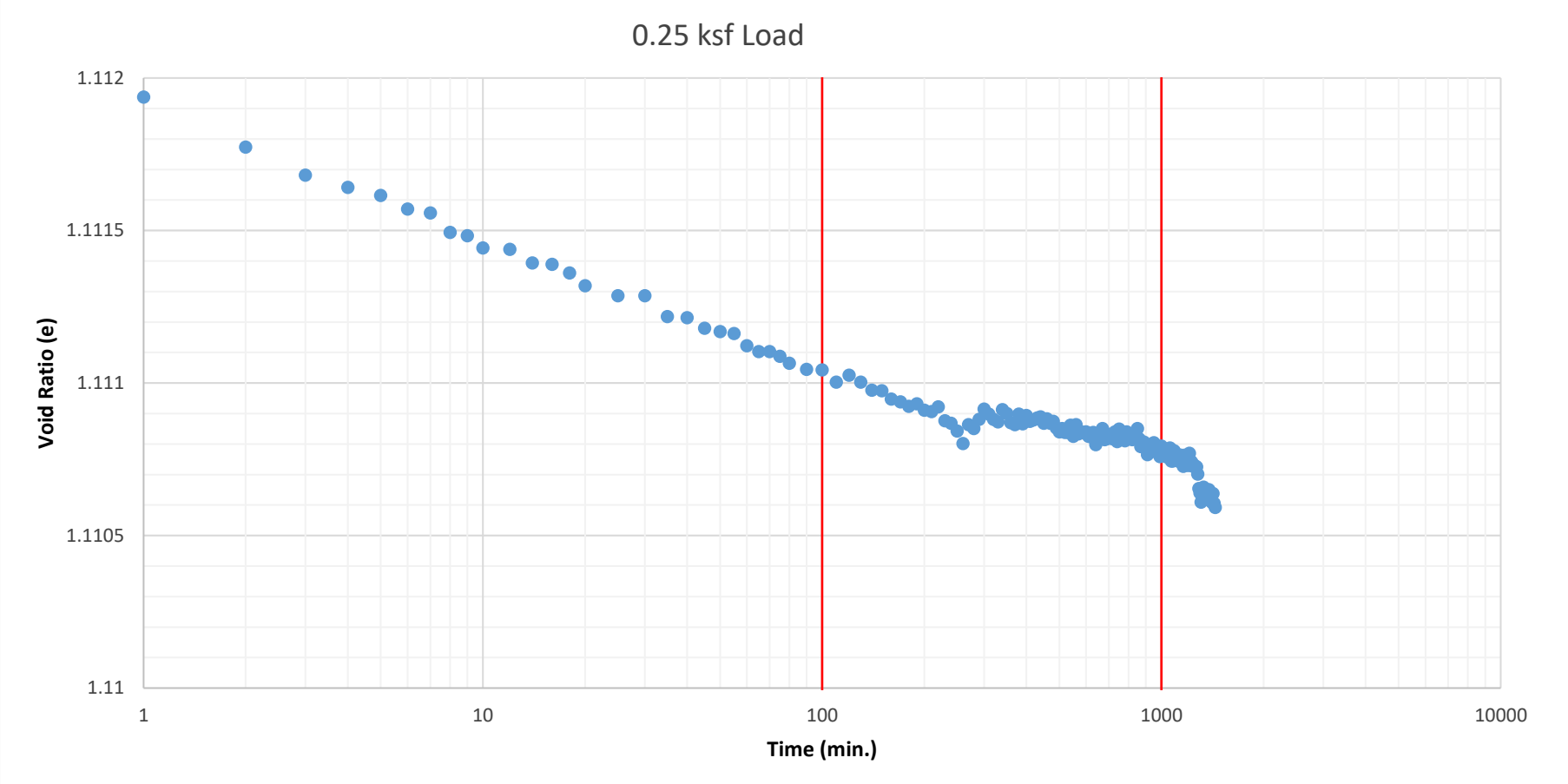
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 50h

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number	T12	Moisture Content	45.3	28.3	%
Project Number:	2016-112-23	Sample Depth	37-39 feet	Saturation	97.1	117.8	%
Exploration Number:	E360-K-008	Soil Description	Dark grayish brown, fat CLAY (CH)	Dry Density	75.5	101.1	pcf



C_α=	1.1110	-	1.1108	=	0.0002

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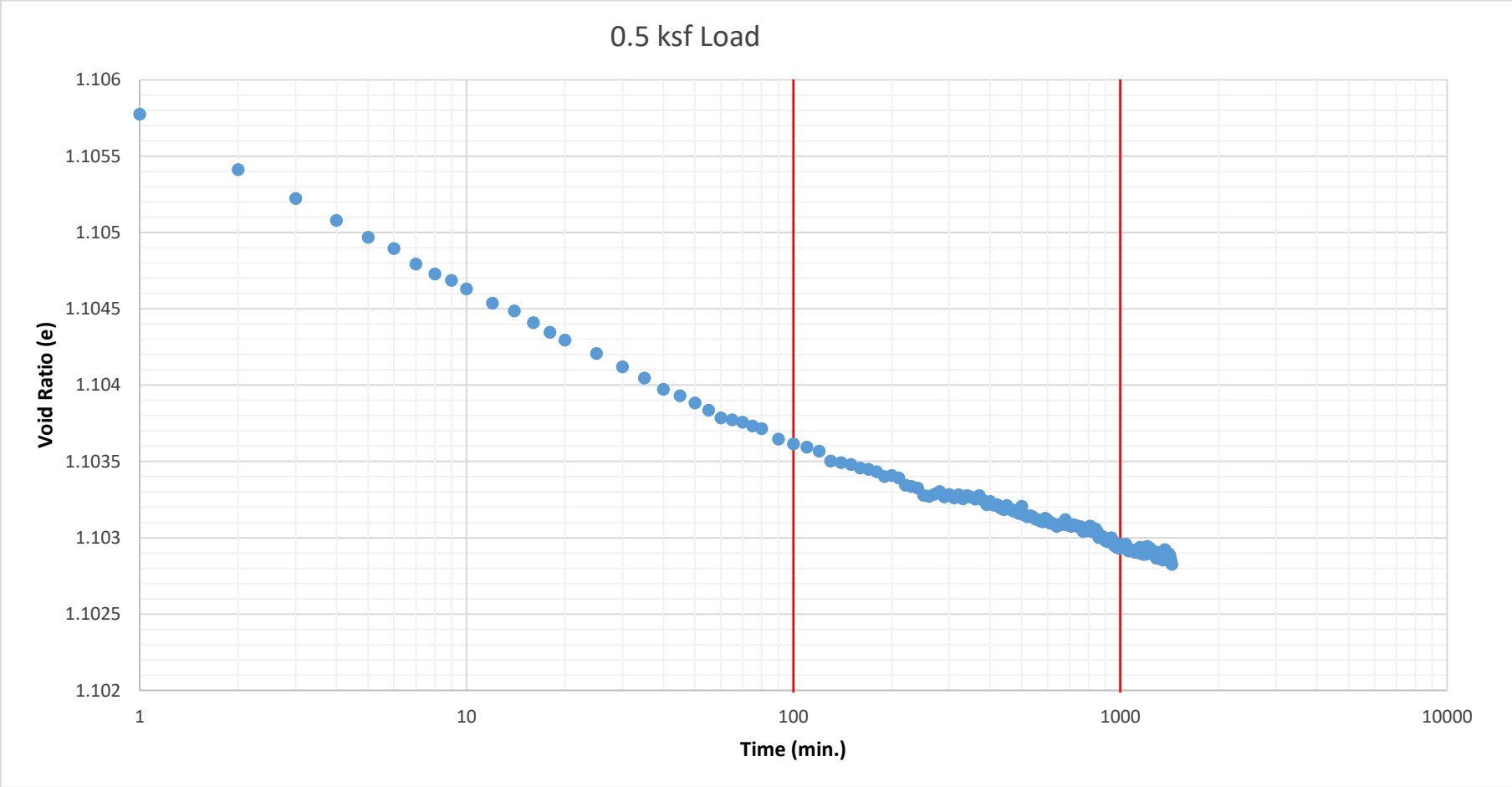
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 51a

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number	T12	Moisture Content	45.3	28.3	%
Project Number:	2016-112-23	Sample Depth	37-39 feet	Saturation	97.1	117.8	%
Exploration Number:	E360-K-008	Soil Description	Dark grayish brown, fat CLAY (CH)	Dry Density	75.5	101.1	pcf



C_α=	1.1036	-	1.1029	=	0.0007

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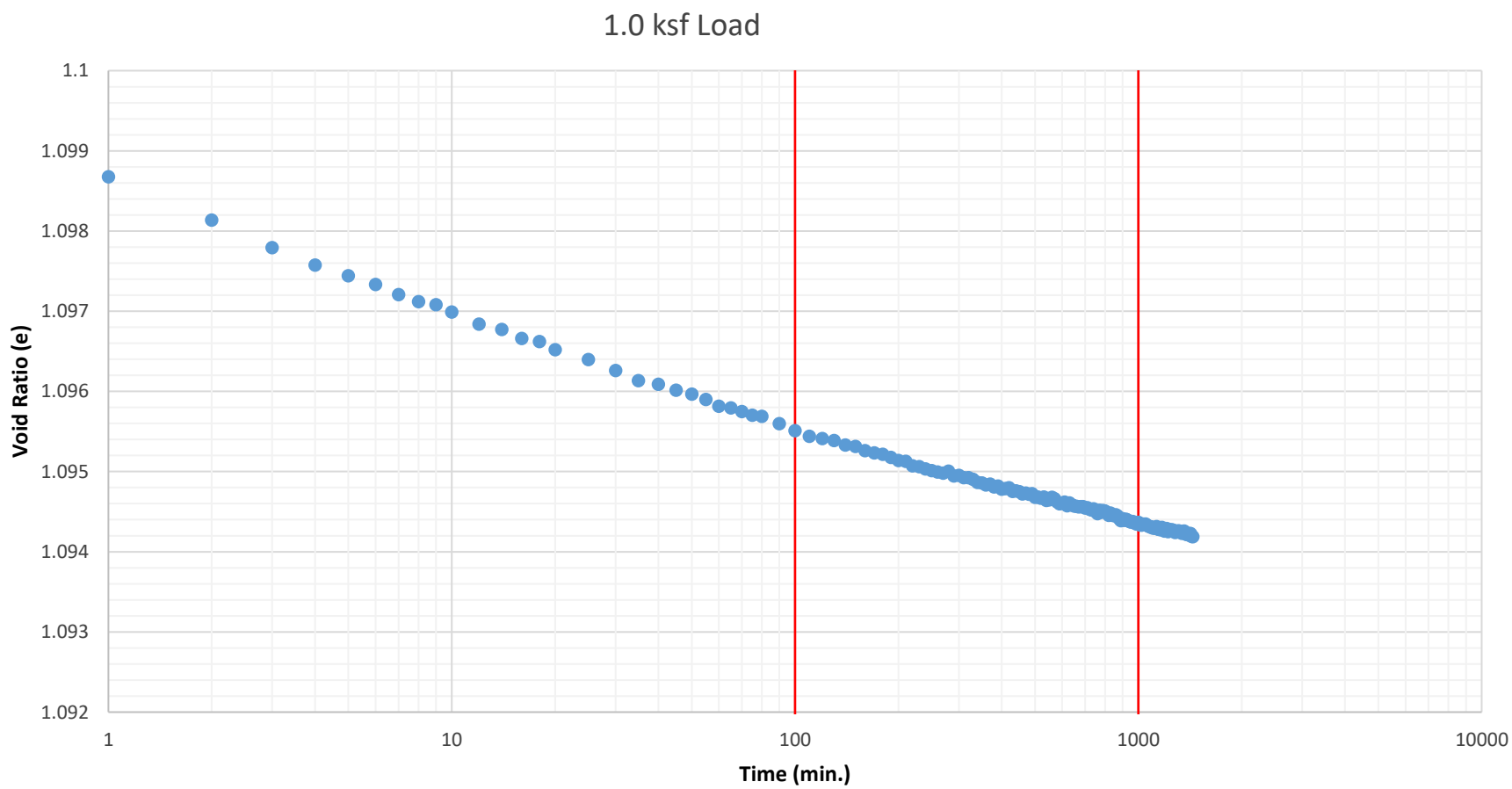
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 51b

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number	T12	Moisture Content	45.3	28.3	%
Project Number:	2016-112-23	Sample Depth	37-39 feet	Saturation	97.1	117.8	%
Exploration Number:	E360-K-008	Soil Description	Dark grayish brown, fat CLAY (CH)	Dry Density	75.5	101.1	pcf



C_α=	1.0955	-	1.0944	=	0.0011

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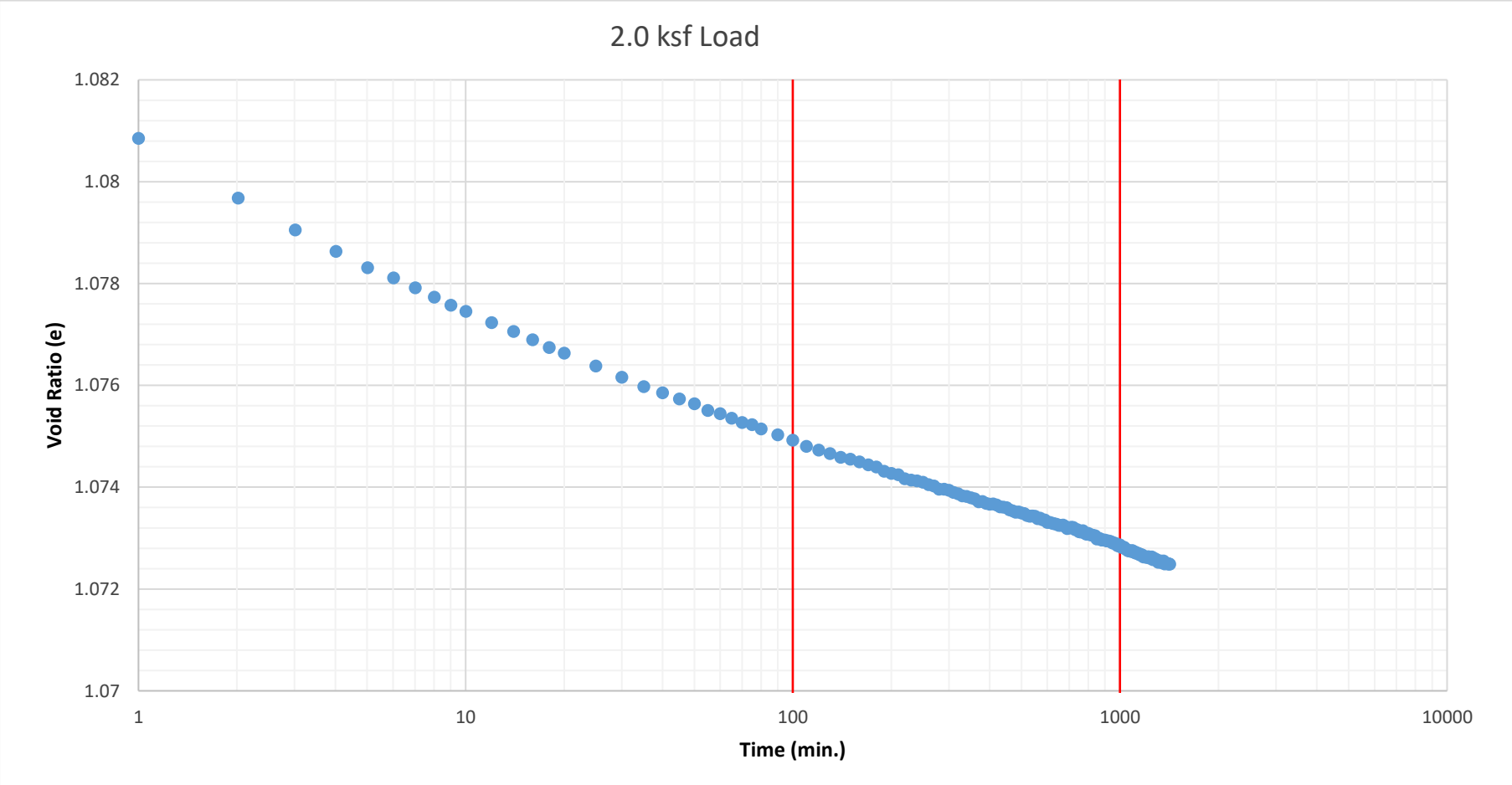
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 51c

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number	T12	Moisture Content	45.3	28.3	%
Project Number:	2016-112-23	Sample Depth	37-39 feet	Saturation	97.1	117.8	%
Exploration Number:	E360-K-008	Soil Description	Dark grayish brown, fat CLAY (CH)	Dry Density	75.5	101.1	pcf



C_α=	1.0749	-	1.0729	=	0.0021

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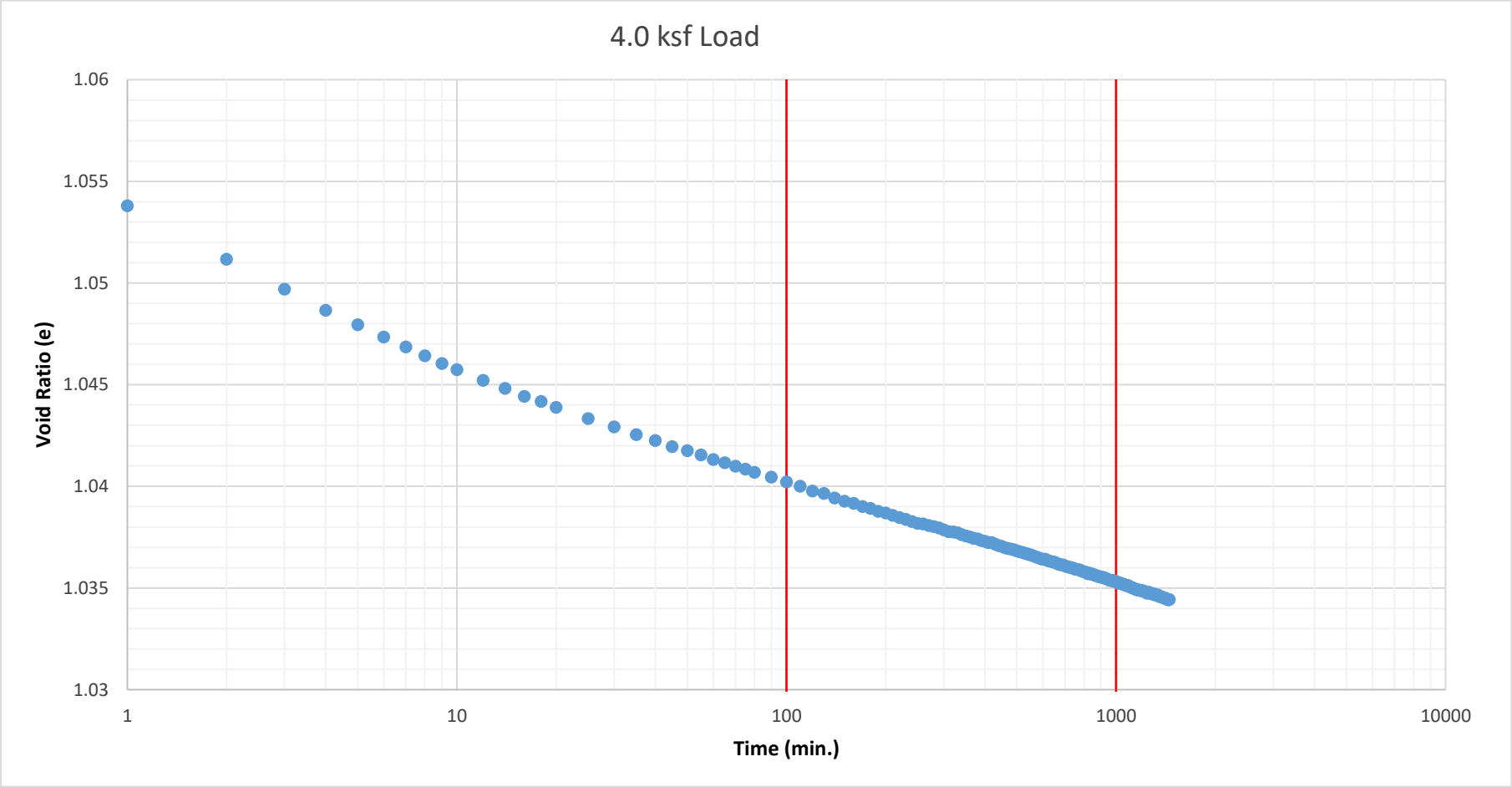
BLDG-2018-00983, BLDG-2018-00985

Figure 51d

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number	T12	Moisture Content	45.3	28.3	%
Project Number:	2016-112-23	Sample Depth	37-39 feet	Saturation	97.1	117.8	%
Exploration Number:	E360-K-008	Soil Description	Dark grayish brown, fat CLAY (CH)	Dry Density	75.5	101.1	pcf



C_α=	1.0402	-	1.0353	=	0.0049

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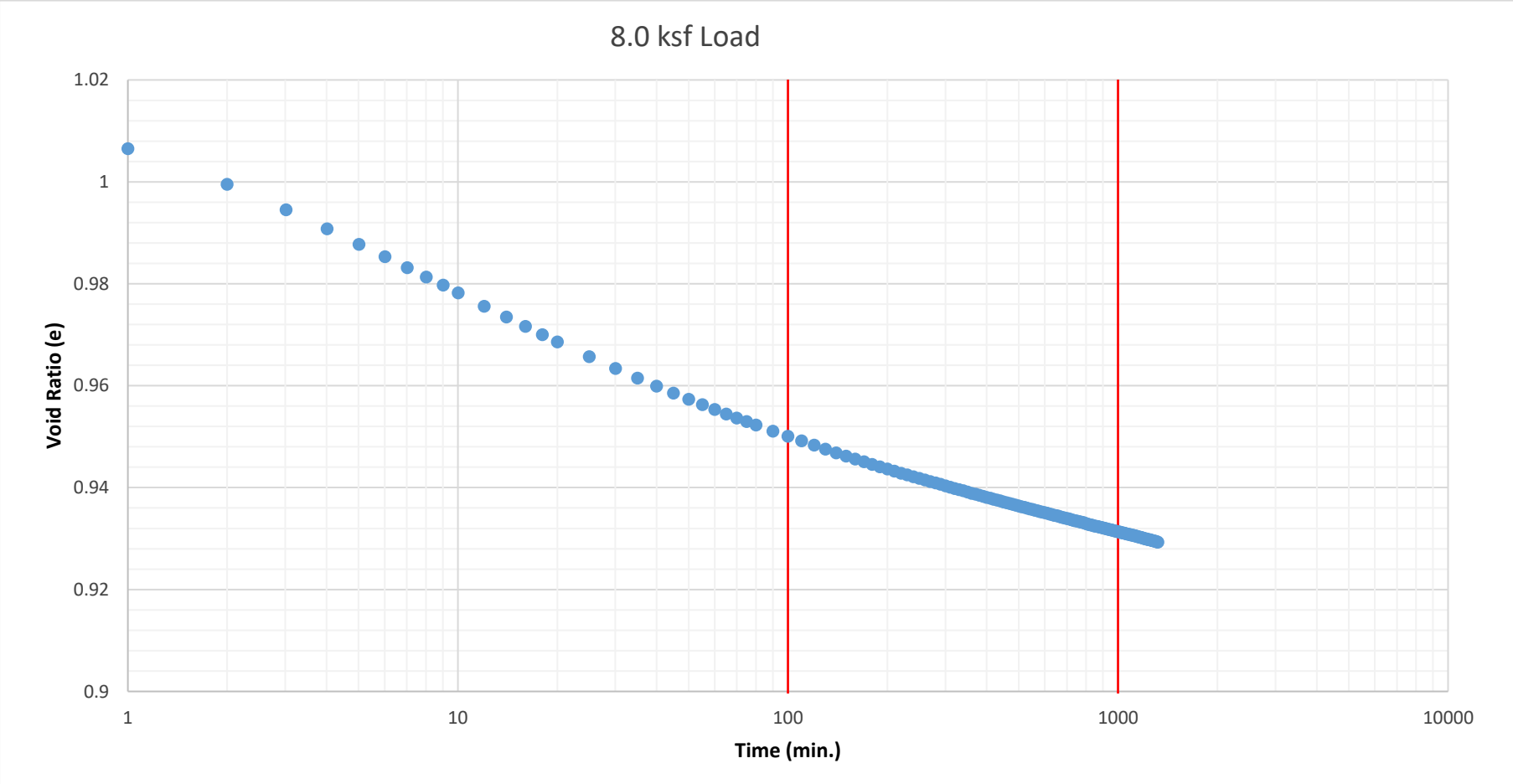
BLDG-2018-00983, BLDG-2018-00985

Figure 51e

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number	T12	Moisture Content	45.3	28.3	%
Project Number:	2016-112-23	Sample Depth	37-39 feet	Saturation	97.1	117.8	%
Exploration Number:	E360-K-008	Soil Description	Dark grayish brown, fat CLAY (CH)	Dry Density	75.5	101.1	pcf



C_α=	0.9501	-	0.9313	=	0.0187

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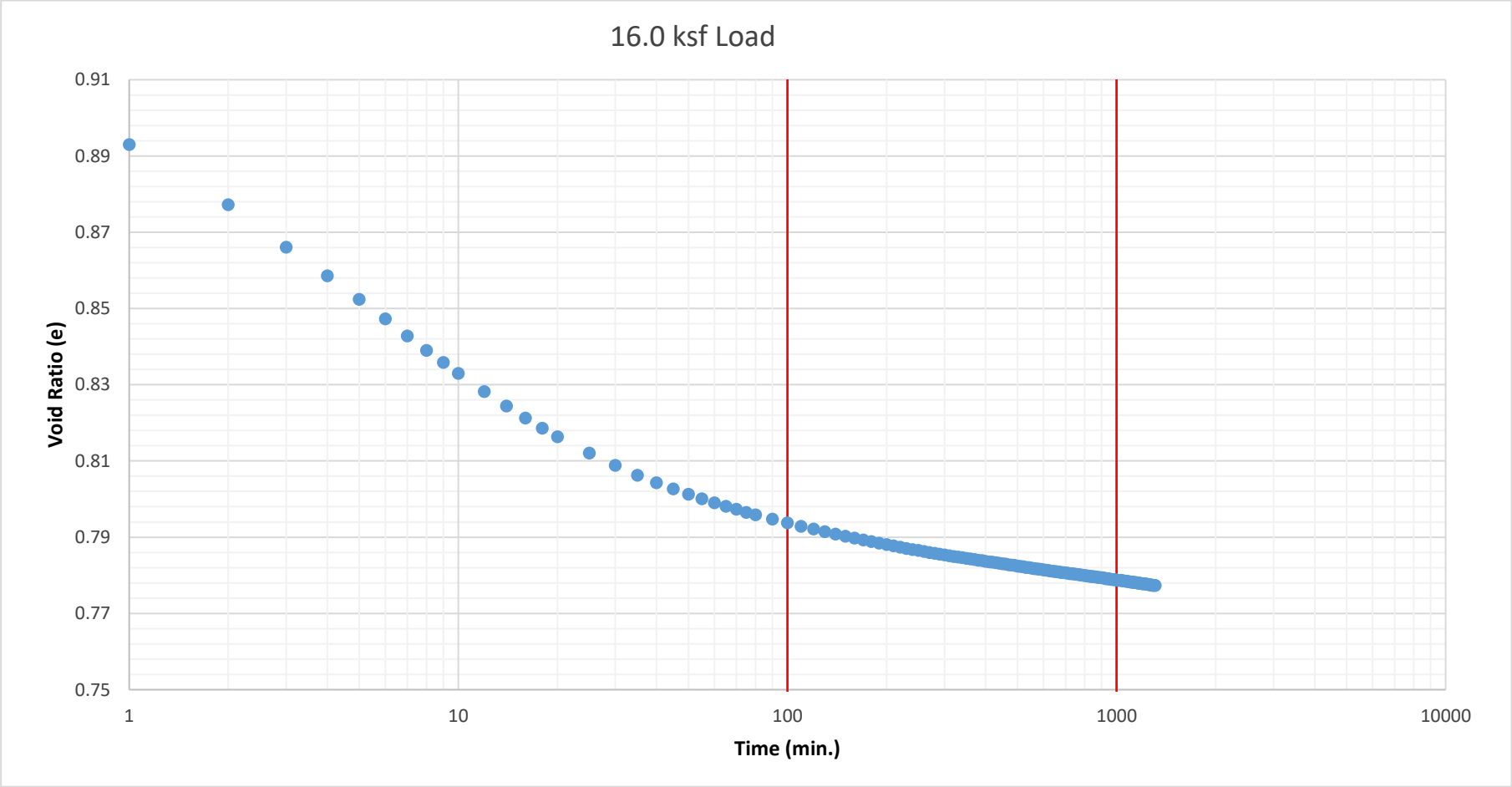
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 51f

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number	T12	Moisture Content	45.3	28.3	%
Project Number:	2016-112-23	Sample Depth	37-39 feet	Saturation	97.1	117.8	%
Exploration Number:	E360-K-008	Soil Description	Dark grayish brown, fat CLAY (CH)	Dry Density	75.5	101.1	pcf



C_α=	0.7938	-	0.7788	=	0.0150

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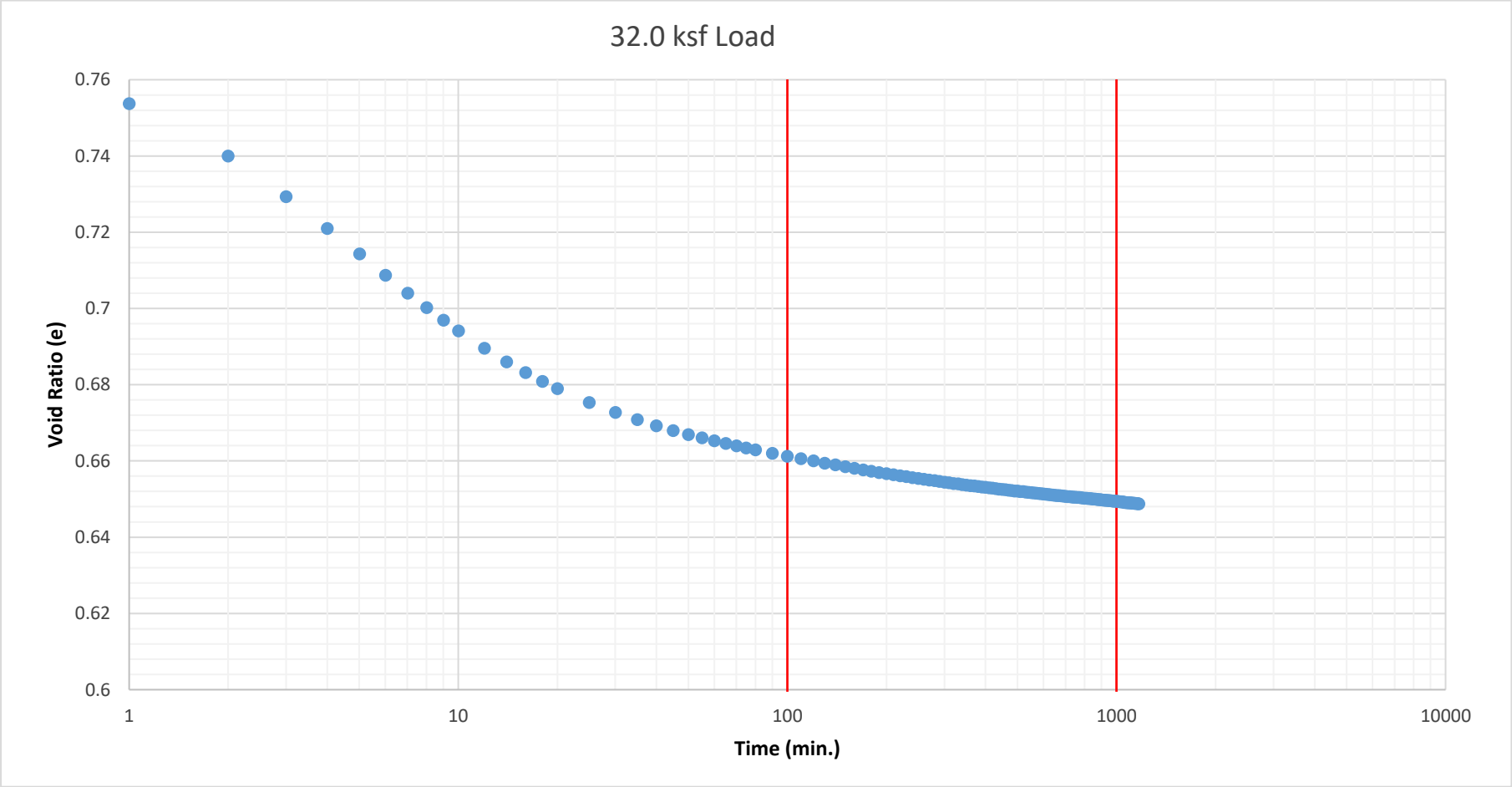
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 51g

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number	T12	Moisture Content	45.3	28.3	%
Project Number:	2016-112-23	Sample Depth	37-39 feet	Saturation	97.1	117.8	%
Exploration Number:	E360-K-008	Soil Description	Dark grayish brown, fat CLAY (CH)	Dry Density	75.5	101.1	pcf



C_α=	0.6612	-	0.6495	=	0.0118

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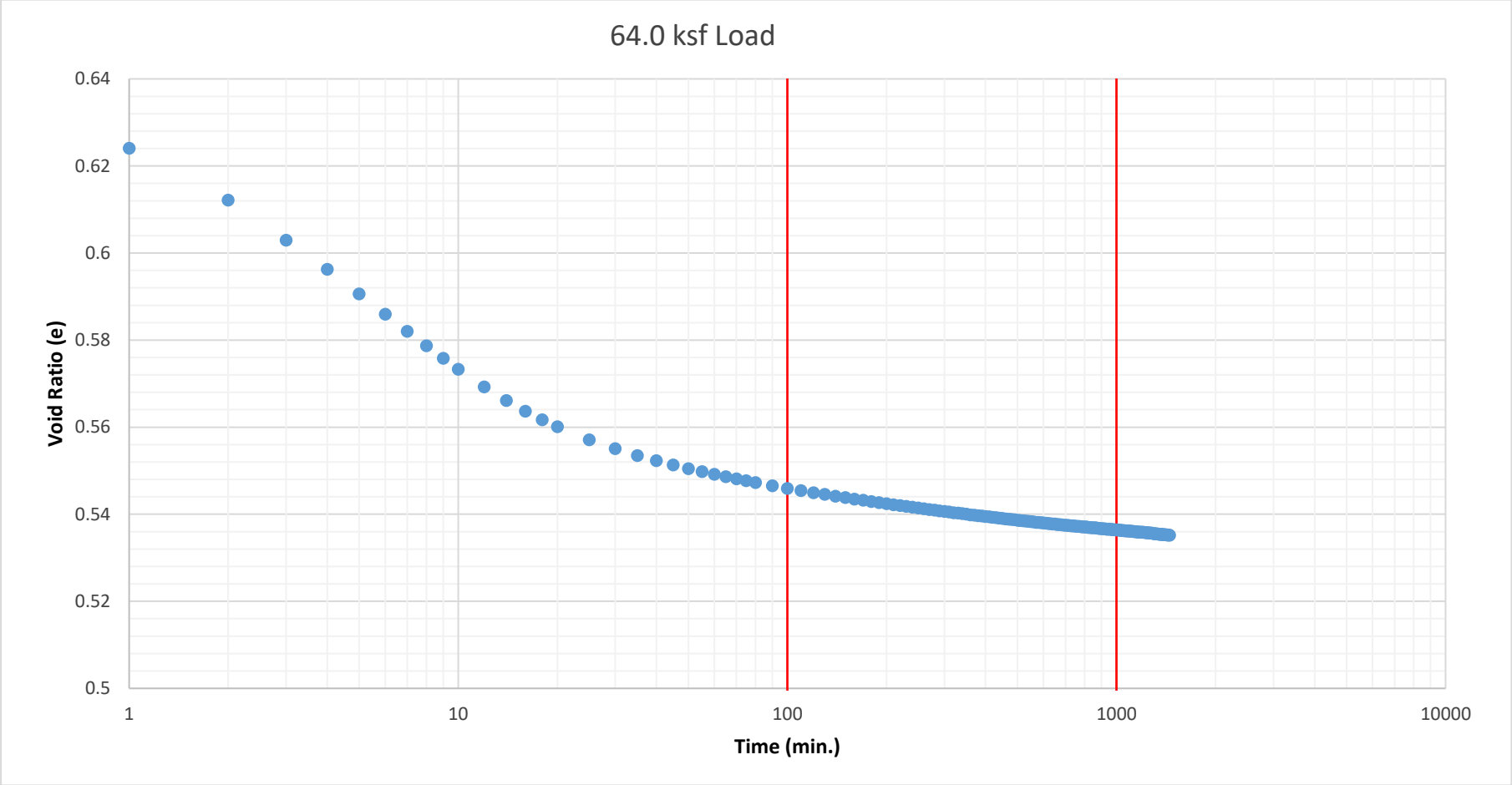
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 51h

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION OF SOIL ASTM D2435
SECONDARY COMPRESSION

					Start	Finish	
Project Name:	Eastlink E360	Sample Number	T12	Moisture Content	45.3	28.3	%
Project Number:	2016-112-23	Sample Depth	37-39 feet	Saturation	97.1	117.8	%
Exploration Number:	E360-K-008	Soil Description	Dark grayish brown, fat CLAY (CH)	Dry Density	75.5	101.1	pcf



C_α=	0.5459	-	0.5364	=	0.0096

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Figure 51i

Appendix C.2

E360 Design-Build Corrosion Testing

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BLDG-2018-00983, BLDG-2018-00985

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com

AMTEST LABORATORIES

Professional Analytical Services

ANALYSIS REPORT

MCMILLEN JACOBS ASSOCIATES
1109 1ST AVE
SEATTLE, WA 98101
Attention: DANIEL DREYFUS
Project Name: E360
Project #: 5480.0
All results reported on an as received basis.

Date Received: 10/24/16
Date Reported: 11/ 2/16

AMTEST Identification Number **16-A027532**
Client Identification **K-014 S1 S2B**
Sampling Date

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
pH	6.2	unit			AASHTO T 289-91	AS	10/25/16
Resistivity	40000	ohms cm		100	ASTM G-187	KF	10/27/16
Redox Potential	366.	unit		200	ASTM D1498-76	AS	10/25/16

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	< 10	ug/g		10	EPA 300.0	MJ	10/31/16
Chloride	< 10	ug/g		10	EPA 300.0	MH	10/31/16

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

MCMILLEN JACOBS ASSOCIATES
Project Name: E360
AmTest ID: 16-A027533

AMTEST Identification Number **16-A027533**
Client Identification **K-014 S4 S5**
Sampling Date

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
pH	6.6	unit			AASHTO T 289-91	AS	10/25/16
Resistivity	30000	ohms cm		100	ASTM G-187	KF	10/27/16
Redox Potential	389.	unit		200	ASTM D1498-76	AS	10/25/16

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	14.	ug/g		10	EPA 300.0	MJ	10/31/16
Chloride	< 10	ug/g		10	EPA 300.0	MH	10/31/16

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

MCMILLEN JACOBS ASSOCIATES
Project Name: E360
AmTest ID: 16-A027534

AMTEST Identification Number **16-A027534**
Client Identification **K-015 S1 S2**
Sampling Date

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
pH	6.3	unit			AASHTO T 289-91	AS	10/25/16
Resistivity	31000	ohms cm		100	ASTM G-187	KF	10/27/16
Redox Potential	388.	unit		200	ASTM D1498-76	AS	10/25/16

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	< 10	ug/g		10	EPA 300.0	MJ	10/31/16
Chloride	< 10	ug/g		10	EPA 300.0	MH	10/31/16

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BLDG-2018-00983, BLDG-2018-00985

MCMILLEN JACOBS ASSOCIATES
Project Name: E360
AmTest ID: 16-A027535

AMTEST Identification Number **16-A027535**
Client Identification **K-015 S4 S5**
Sampling Date

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
pH	6.8	unit			AASHTO T 289-91	AS	10/25/16
Resistivity	30000	ohms cm		100	ASTM G-187	KF	10/27/16
Redox Potential	391.	unit		200	ASTM D1498-76	AS	10/25/16

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	52.	ug/g		10	EPA 300.0	MJ	10/31/16
Chloride	11.	ug/g		10	EPA 300.0	MH	10/31/16

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BLDG-2018-00983, BLDG-2018-00985

MCMILLEN JACOBS ASSOCIATES
Project Name: E360
AmTest ID: 16-A027536

AMTEST Identification Number **16-A027536**
Client Identification **TP-6 S5**
Sampling Date

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
pH	5.9	unit			AASHTO T 289-91	AS	10/25/16
Resistivity	20000	ohms cm		100	ASTM G-187	KF	10/27/16
Redox Potential	457.	unit		200	ASTM D1498-76	AS	10/25/16

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	< 10	ug/g		10	EPA 300.0	MJ	10/31/16
Chloride	< 10	ug/g		10	EPA 300.0	MH	10/31/16

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President

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Appendix C.3

Existing Laboratory Testing

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Table C.3-1. Summary of Existing Lab Testing Data

Boring ID	Sample Number	Top Depth (feet)	Bottom Depth (feet)	Natural Water Content (%)	Grain Size			Atterberg Limits			1-D Consol Test	CU Triax Test
					% Gravel	% Sand	% Fines	Plastic Limit (PL)	Liquid Limit (LL)	Plasticity Index (PI)		
E340-B-037	S-4	7.5	9.0	-	22.0	45.1	32.9	-	-	-	☐	☐
E340-B-037	S-7	15.0	16.5	111.1	-	-	44.3	16	24	8	☐	☐
E340-B-037	S-2B	3.2	4.0	39.0	-	-	-	37	56	19	☐	☐
E340-B-037	S-3B	5.2	6.0	14.4	-	-	-	13	21	8	☐	☐
E340-B-037	S-5	10.0	11.5	31.8	-	-	-	13	27	14	☐	☐
E360-B-003	S-3	7.5	9.0	10.1	20.7	63	16.3	-	-	-	☐	☐
E360-B-003	S-6	15.0	16.5	12.4	10.4	65.5	24.1	-	-	-	☐	☐
E360-B-003	S-9	30.0	31.5	16.3	1.1	6.9	29.9	-	-	-	☐	☐
E360-B-003	S-12	45.0	46.5	18.2	0.1	84.5	15.4	-	-	-	☐	☐
E360-B-003	S-15	60.0	61.0	13.6	8.6	77	14.4	-	-	-	☐	☐
E360-B-003	S-22	95.0	96.5	20.2	-	-	84.2	24	49	25	☐	☐
E360-B-007	S-2	5.0	7.5	-	18.5	59.3	22.2	-	-	-	☐	☐
E360-B-007	S-5	12.5	14.0	12.0	15.2	57.1	27.7	-	-	-	☐	☐
E360-B-007	S-9A	30.0	31.5	7.1	18.4	60.8	20.8	-	-	-	☐	☐
E360-B-007	S-11A	40.0	41.5	15.0	4.1	78.1	17.8	-	-	-	☐	☐
E360-B-007	S-13A	50.0	51.5	33.9	-	-	95.5	21	37	16	☐	☐
E360-B-007	S-14A	60.0	61.5	28.4	-	-	81.4	23	34	11	☐	☐
E360-B-007	S-17A	70.0	71.5	9.6	12.4	71.5	16.1	-	-	-	☐	☐
E360-B-007	S-21A	90.0	91.5	16.7	5.1	50.6	44.3	-	-	-	☐	☐
E360-B-007	S-22B	95.0	96.5	23.6	-	-	-	21	21	NP	☐	☐
E360-B-007	S-23B	100.0	101.5	23.8	-	-	76.9	NP	NP	NP	☐	☐
E360-B-011	S-2	2.5	4.0	-	7.2	66.2	26.6	-	-	-	☐	☐
E360-B-011	S-6	12.5	14.0	-	12.4	59.7	27.9	-	-	-	☐	☐
E360-B-011	S-10	30.0	31.0	-	0.2	77.4	22.4	-	-	-	☐	☐
E360-B-011	S-11	35.0	36.5	35.4	-	-	94.6	18	22	4	☐	☐
E360-B-011	S-12	40.0	41.5	38.0	-	-	80.8	18	41	23	☐	☐
E360-B-011	S-14	50.0	51.5	41.0	-	-	97.2	26	45	19	☐	☐
E360-B-011	S-15	55.0	56.0	34.4	-	-	88.6	17	37	20	☐	☐
E360-B-011	S-17	65.0	66.5	-	0.4	80.1	19.5	-	-	-	☐	☐
E360-B-011	S-22	90.0	91.5	20.9	-	-	85.1	21	47	26	☐	☐
E360-B-012	S-3	7.5	9.0	-	19.2	55.8	25.0	-	-	-	☐	☐
E360-B-012	S-7	20.0	21.5	-	4.0	69.3	26.7	-	-	-	☐	☐
E360-B-012	S-10	32.5	34.0	-	11.1	76.7	12.2	-	-	-	☐	☐
E360-B-012	S-14	45.0	46.5	-	-	51.2	48.8	-	-	-	☐	☐
E360-B-012	S-18	53.9	-	17.6	-	56	44.5	14	22	8	☐	☐
E360-B-012	S-19	55.0	56.5	22.4	-	-	62.5	17	29	12	☐	☐
E360-B-012	S-24	70.0	71.0	-	4.0	85.9	10.1	-	-	-	☐	☐
E360-B-012	S-28	90.0	91.5	24.5	-	-	19.7	21	50	29	☐	☐
E360-B-014	S-2	2.5	4	-	9.7	61.5	28.8	-	-	-	☐	☐
E360-B-014	S-7	15	16.5	-	11.5	65.9	22.6	-	-	-	☐	☐
E360-B-014	S-8	20	21.5	-	8.1	73.6	18.3	-	-	-	☐	☐
E360-B-014	S-10	30	31.5	-	28.4	58	13.6	-	-	-	☐	☐
E360-B-014	S-14	50	50.8	-	8.6	62	29.4	-	-	-	☐	☐
E360-B-014	S-18	70	70.4	-	8.8	61.1	30.1	-	-	-	☐	☐

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BLDG-2018-00983, BLDG-2018-00985

Table C.3-1. Summary of Existing Explorations (Continued)

Boring ID	Sample Number	Top Depth (feet)	Bottom Depth (feet)	Natural Water Content (%)	Grain Size			Atterberg Limits			1-D Consol Test	CU Triax Test
					% Gravel	% Sand	% Fines	Plastic Limit (PL)	Liquid Limit (LL)	Plasticity Index (PI)		
E360-B-014	S-24	100	100.9	-	0.4	75.4	24.2	-	-	-	☐	☐
E360-B-017	S-2	5	6.5	-	13.8	63.2	23	-	-	-	☐	☐
E360-B-017	S-7	20	21.5	-	15.1	62.3	22.6	-	-	-	☐	☐
E360-B-017	S-9	30	31.5	-	40.7	44.4	14.9	-	-	-	☐	☐
E360-B-017	S-12	45	45.8	14	-	-	53.4	NP	NP	NP	☐	☐
E360-B-017	S-16	65	65.7	-	17.6	59.9	22.5	-	-	-	☐	☐
E360-B-017	S-20	85	86.5	23.3	-	-	90.4	26	58	32	☐	☐
E360-B-022	S-4	10	10.11	-	10.3	72.5	17.2	-	-	-	☐	☐
E360-B-022	S-8	25	26	-	12.4	80	7.6	-	-	-	☐	☐
E360-B-022	S-12	45	45.11	-	0.8	34.5	64.7	-	-	-	☐	☐
E360-B-022	S-17	70	71.5	-	0	42.6	57.4	-	-	-	☐	☐
E360-B-022	S-21	90	90.5	-	2	7.7	90.3	-	-	-	☐	☐
E360-B-024	S-3	7.5	9	-	8.7	54	37.3	-	-	-	☐	☐
E360-B-024	7538-34	20	21.5	-	7.4	56.1	36.5	-	-	-	☐	☐
E360-B-024	S-12	45	45.5	-	9.2	58.5	32.3	-	-	-	☐	☐
E360-B-024	S-17	70	71.5	-	1.8	80.6	17.6	-	-	-	☐	☐
E360-B-024	S-20	85	85.4	-	1.7	35.6	62.7	-	-	-	☐	☐
E360-B-030	S-1	2.5	4	-	2	80.8	17.2	-	-	-	☐	☐
E360-B-030	S-5	12.5	14	-	0.5	60.2	39.3	-	-	-	☐	☐
E360-B-030	S-9	30	31.5	-	15.5	70.6	13.9	-	-	-	☐	☐
E360-B-030	S-12	45	46.5	20.4	-	-	87.3	23	52	29	☐	☐
E360-B-030	S-16	65	66.5	-	0	12	88	-	-	-	☐	☐
E360-B-030	S-20	85	86.5	21.1	-	-	89.8	21	51	30	☐	☐
E360-B-033	S-2	5	6.5	-	18.2	68.6	13.2	-	-	-	☐	☐
E360-B-033	S-5	12.5	13.11	-	19.6	54	26.4	-	-	-	☐	☐
E360-B-033	S-8	25	25.5	-	1.6	42.8	55.6	-	-	-	☐	☐
E360-B-033	S-10	35	35.5	-	5	89	6	-	-	-	☐	☐
E360-B-034	S-2	5	6.5	5.1	18.8	58.3	22.9	-	-	-	☐	☐
E360-B-034	S-6	15	16.5	13.9	6.3	71.4	22.3	-	-	-	☐	☐
E360-B-034	S-9	30	30.9	6.4	38.5	54.4	7.1	-	-	-	☐	☐
E360-B-036	S-2	5	6.5	6.8	19.7	41.4	38.9	-	-	-	☐	☐
E360-B-036	S-7	20	20.8	3.3	40.6	46.7	12.7	-	-	-	☐	☐
E360-B-036	S-9	27.5	28.9	9.6	1.5	91.1	7.4	-	-	-	☐	☐
E360-B-036	S-14	45	46.5	16.2	3.4	92.2	4.4	-	-	-	☐	☐
E360-B-037	S-3	12.5	14	11.2	20.8	53.1	26.1	-	-	-	☐	☐
E360-B-037	S-8	35	35.5	11.7	29.1	61.2	9.7	-	-	-	☐	☐
E360-B-038	S-3	7.5	9	17.8	6.3	76.8	16.9	-	-	-	☐	☐
E360-B-038	S-6	15	16.5	14	21.4	69.1	9.5	-	-	-	☐	☐
E360-B-038	S-10	35	36	14.2	18.1	73.4	8.5	-	-	-	☐	☐
E360-B-039	S-2	5	6.5	13.8	14.3	70.3	15.4	-	-	-	☐	☐
E360-B-039	S-7	20	21.5	13.1	25.8	65.8	8.4	-	-	-	☐	☐
E360-B-039	S-10	35	36.5	15.1	7.2	80.1	12.7	-	-	-	☐	☐
E360-B-040	S-3	7.5	9	12.9	8.1	74.8	17.1	-	-	-	☐	☐
E360-B-040	S-7	20	21	7.9	30.6	58.5	10.9	-	-	-	☐	☐

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BLDG-2018-00983, BLDG-2018-00985

Table C.3-1. Summary of Existing Explorations (Continued)

Boring ID	Sample Number	Top Depth (feet)	Bottom Depth (feet)	Natural Water Content (%)	Grain Size			Atterberg Limits			1-D Consol Test	CU Triax Test
					% Gravel	% Sand	% Fines	Plastic Limit (PL)	Liquid Limit (LL)	Plasticity Index (PI)		
E360-B-040	S-11	40	40.11	9.9	18.9	71.7	9.4	-	-	-	☐	☐
E360-B-041	S-2	5	6.5	8.3	19.9	66.4	13.7	-	-	-	☐	☐
E360-B-041	S-5	12.5	14	10.2	1.9	83.1	15	-	-	-	☐	☐
E360-B-041	S-8	20	21.5	9.2	22.7	66.6	10.7	-	-	-	☐	☐
E360-B-041	S-10	30	31.5	7.1	37.6	54.6	7.8	-	-	-	☐	☐
E360-B-042	S-4	10	11.5	11.1	21.7	57.4	20.9	-	-	-	☐	☐
E360-B-042	S-6	15	16	10.9	24.9	52.4	22.7	-	-	-	☐	☐
E360-B-042	S-8	25	26.5	17.7	0.6	83.4	16	-	-	-	☐	☐
E360-B-042	S-11	40	41.5	15.1	8.5	75.7	15.8	-	-	-	☐	☐
E360-B-043	S-1	2.5	4	13.5	4.4	87.2	8.4	-	-	-	☐	☐
E360-B-043	S-4	10	11.5	16.9	4.7	82	13.3	-	-	-	☐	☐
E360-B-043	S-8	25	26.5	6.6	34.8	55.8	9.4	-	-	-	☐	☐
E360-B-043	S-11	40	41.5	8.8	31.1	59.9	9	-	-	-	☐	☐
E360-B-044	S-3	7.5	9	9.2	3.1	85.3	11.6	-	-	-	☐	☐
E360-B-044	S-6	15	16.5	12.9	0.2	81.5	18.3	-	-	-	☐	☐
E360-B-044	S-10	35	36.5	11.2	14.7	58.3	27	-	-	-	☐	☐
E360-B-044	S-12	45	46.5	5	0.2	84.3	15.5	-	-	-	☐	☐
E360-B-045	S-1	2.5	4	11.4	16	67.6	16.4	-	-	-	☐	☐
E360-B-045	S-5	12.5	14	17	3.8	81	15.2	-	-	-	☐	☐
E360-B-045	S-10	35	36	11.5	31.7	59.8	8.5	-	-	-	☐	☐
E360-B-046	S-4	10	11.5	7.9	11.1	60.2	28.7	-	-	-	☐	☐
E360-B-046	S-7	20	21.5	10	8.2	75.9	15.9	-	-	-	☐	☐
E360-B-046	S-10	35	36.5	6.7	3.5	88.1	8.4	-	-	-	☐	☐
E360-B-047	S-1	1	2.5	9.1	15.7	54.4	29.9	-	-	-	☐	☐
E360-B-047	S-5	10	11.5	13.8	8.9	46.4	44.7	-	-	-	☐	☐
E360-B-047	S-7	15	16.5	10.5	7.6	46.1	46.3	-	-	-	☐	☐
E360-B-047	S-9	25	26.5	12.5	6.9	81.8	11.3	-	-	-	☐	☐
E360-B-047	S-11	35	36	11.7	0	92.1	7.9	-	-	-	☐	☐
E360-B-048	S-3	7.5	9	12	7.7	44.6	47.7	-	-	-	☐	☐
E360-B-048	S-6	15	16.5	15.8	1.3	80.8	17.9	-	-	-	☐	☐
E360-B-048	S-11	40	40.9	9.8	28.6	61.6	9.8	-	-	-	☐	☐
E360-B-049	S-2	2.5	4	20.3	5.7	36.7	57.6	-	-	-	☐	☐
E360-B-049	S-4	7.5	9	8.8	25.8	39.2	35	-	-	-	☐	☐
E360-B-049	S-7	15	16.5	9.6	18	56	26	-	-	-	☐	☐
E360-B-049	S-10	30	31.5	11	3.9	86.3	9.8	-	-	-	☐	☐
E360-B-050	S-2	5	6.5	10.5	8.9	42.7	48.4	-	-	-	☐	☐
E360-B-050	S-4	10	11.5	9.4	7.6	45.6	46.8	-	-	-	☐	☐
E360-B-050	S-7	20	20.9	5.6	38	53.1	8.9	-	-	-	☐	☐
E360-B-055	S-1	2.5	4	19	4.5	48.7	46.8	-	-	-	☐	☐
E360-B-055	S-4	10	11.5	11.4	16	40	44	-	-	-	☐	☐
E360-B-055	S-8	25	25.9	14.8	3	29.3	67.7	-	-	-	☐	☐
E360-B-055	S-12	45	46	6.5	25	62.4	12.6	-	-	-	☐	☐
E360-B-056	S-1	2.5	4	17.6	23.4	34	42.6	-	-	-	☐	☐
E360-B-056	S-3	7.5	9	12.3	9	34.1	56.9	-	-	-	☐	☐

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BLDG-2018-00983, BLDG-2018-00985

Table C.3-1. Summary of Existing Explorations (Continued)

Boring ID	Sample Number	Top Depth (feet)	Bottom Depth (feet)	Natural Water Content (%)	Grain Size			Atterberg Limits			1-D Consol Test	CU Triax Test
					% Gravel	% Sand	% Fines	Plastic Limit (PL)	Liquid Limit (LL)	Plasticity Index (PI)		
E360-B-056	S-7	20	20.4	10.2	3.8	40.1	56.1	-	-	-	☐	☐
E360-B-056	S-11	40	40.8	14.7	1.7	86.5	11.8	-	-	-	☐	☐
E360-B-057	S-3	7.5	9	11.3	5.3	44.9	49.8	-	-	-	☐	☐
E360-B-057	S-6	15	16.5	11.1	14.6	44.4	41	-	-	-	☐	☐
E360-B-057	S-11	40	40.5	13.6	0.8	58.6	40.6	-	-	-	☐	☐
E360-B-058	S-3	5	6.5	17.9	3.3	37.9	58.8	-	-	-	☐	☐
E360-B-058	S-5	10	11.5	10.9	16.4	42.4	41.2	-	-	-	☐	☐
E360-B-058	S-8	20	20.5	11.3	6.4	41.6	52	-	-	-	☐	☐
E360-B-058	S-13	45	45.7	7.1	39.5	50.4	10.1	-	-	-	☐	☐
E360-B-059	S-1	2.5	4	17.1	8.4	43.3	48.3	-	-	-	☐	☐
E360-B-059	S-4	10	11.5	13.3	14.9	41.5	43.6	-	-	-	☐	☐
E360-B-059	S-7	20	20.5	7.7	6.3	46.4	47.3	-	-	-	☐	☐
OTC-B-003	S-3	7.5	8.8	10.1	10.5	37.5	52	-	-	-	☐	☐
OTC-B-003	S-9	30	31.3	9.3	15.9	71.4	12.7	-	-	-	☐	☐
OVS-B-001	S-5	12.5	13.5	5.2	28.7	49.2	22.1	-	-	-	☐	☐
OVS-B-001	S-8	25	26	11.2	11.6	81.1	7.3	-	-	-	☐	☐
OVS-B-002	S-2	5	6.5	8.7	9.4	51.4	39.2	-	-	-	☐	☐
OVS-B-002	S-6	15	15.5	5.1	24.5	52.7	22.8	-	-	-	☐	☐
OVS-B-002	S-8	25	26	12.7	1.3	86.1	12.6	-	-	-	☐	☐
OVS-B-002	S-10	35	36.5	8.1	20.2	72.5	7.3	-	-	-	☐	☐
OVS-B-003	S-1	2.5	4	6.7	11.2	53.8	35	-	-	-	☐	☐
OVS-B-003	S-4	10	10.4	6.5	11.9	46	42.1	-	-	-	☐	☐
OVS-B-003	S-7	20	20.5	5.7	8.5	63.2	28.3	-	-	-	☐	☐
B-D-ES-6p	SS-4	20	21.5	16	-	-	16.2	-	-	-	☐	☐
B-D-ES-6p	SS-6	30	31.5	14	8.7	79.1	12.2	-	-	-	☐	☐
B-D-ES-6p	SS-9	55	56.5	13	-	-	17.4	-	-	-	☐	☐
B-D-ES-6p	SS-11	70	71.5	23	-	-	21.1	-	-	-	☐	☐
B-D-ES-7	SS-2	10	11.5	7	13.6	57.8	28.7	-	-	-	☐	☐
B-D-ES-7	SS-4	20	21.5	8	10	63.2	26.8	-	-	-	☐	☐
B-D-ES-7	SS-7	35	36.5	15	25.7	47.4	27	-	-	-	☐	☐
B-D-ES-7	SS-11	55	56.5	19	9.9	74	16.1	-	-	-	☐	☐
B-D-ES-7	SS-13	65	66.5	16	4.2	76.5	19.2	-	-	-	☐	☐
B-D-ES-7	SS-14B	70	71.5	35	-	-	-	20	43	23	☐	☐
B-D-ES-7	SS-20B	97.5	99	23	-	-	97.2	-	-	-	☐	☐
B-D-ES-7	ST-15	75	77	36	-	-	96	21	42	21	■	☐
B-D-ES-7	ST-19	95	97	30	-	-	82	18	43	25	☐	■
B-D-ES-8p	SS-6	30	31.5	13	-	-	15.7	-	-	-	☐	☐
B-D-ES-8p	SS-9	50	51.5	15	3.2	32.6	64.2	17	32	15	☐	☐
B-D-ES-8p	SS-10	60	61.5	24	-	-	-	23	54	31	☐	☐
B-D-ES-8p	SS-11B	70	71.5	21	-	-	80.7	-	-	-	☐	☐
B-D-ES-9	SS-2	10	11.5	9	-	-	34.5	-	-	-	☐	☐
B-D-ES-9	SS-4	20	21.5	8	4.2	61.2	34.6	-	-	-	☐	☐
B-D-ES-9	SS-5	25	26.5	11	-	-	31.9	-	-	-	☐	☐
B-D-ES-10p	SS-3	15	16.5	11	18.3	60.3	21.4	-	-	-	☐	☐

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BLDG-2018-00983, BLDG-2018-00985

Table C.3-1. Summary of Existing Explorations (Continued)

Boring ID	Sample Number	Top Depth (feet)	Bottom Depth (feet)	Natural Water Content (%)	Grain Size			Atterberg Limits			1-D Consol Test	CU Triax Test
					% Gravel	% Sand	% Fines	Plastic Limit (PL)	Liquid Limit (LL)	Plasticity Index (PI)		
B-D-ES-10p	SS-6	30	31.5	20	0	91.8	8.2	-	-	-	☐	☐
B-D-ES-10p	SS-8	40	41.5	21	-	-	67.9	-	-	-	☐	☐
B-D-ES-10p	SS-9B	45	46.5	10	19.5	67.3	13.2	-	-	-	☐	☐
B-D-ES-10p	SS-13	65	66.5	26	-	-	73.2	-	-	-	☐	☐
B-D-ES-10p	SS-14	70	71.5	24	-	-	49.1	-	-	-	☐	☐
B-D-ES-11p	SS-4	20	21.5	14	12.9	53.3	33.8	-	-	-	☐	☐
B-D-ES-11p	SS-5	25	26.5	15	-	-	49.2	-	-	-	☐	☐
B-D-ES-11p	SS-7	35	36.5	21	0.6	87.5	11.9	-	-	-	☐	☐
B-D-ES-11p	SS-10	50	51.5	16	8.2	78.1	13.7	-	-	-	☐	☐
B-D-ES-11p	SS-15	75	76.5	17	6.9	73.1	19.9	-	-	-	☐	☐
B-D-ES-11p	SS-17	85	86.5	19	-	-	56.2	-	-	-	☐	☐
B-D-ES-11p	SS-18/19	90	96.5	20	0.2	54.5	45.3	-	-	-	☐	☐
B-D-ES-12p	SS-3	15	16.5	15	17.9	44.6	37.5	-	-	-	☐	☐
B-D-ES-12p	SS-5	25	26.5	10	19.4	59.4	21.2	-	-	-	☐	☐
B-D-ES-12p	SS-6	30	31.5	7	16	60.6	23.4	-	-	-	☐	☐
B-D-ES-12p	SS-10	50	51.5	7	14.2	57.6	28.1	-	-	-	☐	☐
B-D-ES-12p	SS-16	80	81.5	15	5.6	69.8	24.6	-	-	-	☐	☐
B-D-ES-12p	SS-18	90	91.5	15	3.6	88.8	7.6	-	-	-	☐	☐
B-D-ES-12p	SS-20	100	101.5	22	0.5	86.1	13.4	-	-	-	☐	☐
B-D-ES-12p	SS-22	115	116.5	25	-	-	-	20	67	47	☐	☐
B-D-ES-13p	SS-2	10	11.5	20	1.6	90	8.4	-	-	-	☐	☐
B-D-ES-13p	SS-5	25	26.5	12	5.9	68.6	25.5	-	-	-	☐	☐
B-D-ES-13p	SS-8	40	41.5	29	-	-	-	28	70	42	☐	☐
B-D-ES-13p	SS-12	70	71.5	33	-	-	-	21	73	52	☐	☐
B-D-ES-14p	SS-3	15	16.5	11	10.9	59.8	29.4	-	-	-	☐	☐
B-D-ES-14p	SS-7	35	36.5	22	-	-	-	18	24	6	☐	☐
B-D-ES-14p	SS-9/10	45	51.5	15	11.2	73	15.7	-	-	-	☐	☐
B-D-ES-14p	SS-13	65	66.5	22	-	-	-	17	32	15	☐	☐
B-D-ES-14p	SS-16	90	91.5	23	0.3	16.2	83.5	-	-	-	☐	☐
B-D-PK-1p	SS-2	10	11.5	12	7.5	43.8	48.7	-	-	-	☐	☐
B-D-PK-1p	SS-5	25	26.5	8	1.3	90.4	8.3	-	-	-	☐	☐
B-D-PK-1p	SS-7	35	36.5	9	32.5	52.5	15	-	-	-	☐	☐
B-D-PK-1p	SS-9	45	46.5	7	42.3	51.3	6.4	-	-	-	☐	☐
B-D-PK-1p	SS-10	50	51.5	8	15.1	77.6	7.3	-	-	-	☐	☐
B-D-PK-1p	SS-12	60	61.5	14	-	-	7	-	-	-	☐	☐
B-D-PK-2p	SS-2	10	11.5	13	3.1	45.7	51.2	-	-	-	☐	☐
B-D-PK-2p	SS-3	15	16.5	10	12.4	49.4	38.1	-	-	-	☐	☐
B-D-PK-2p	SS-8	40	41.5	7	49.1	45.3	5.6	-	-	-	☐	☐
B-D-PK-2p	SS-9	45	46.5	12	21.5	73.4	5.1	-	-	-	☐	☐
B-D-PK-2p	SS-10	50	51.5	13	4.4	91.4	4.2	-	-	-	☐	☐
B-D-OTCST-1	SS-1	5	6.5	25	-	-	52.7	-	-	-	☐	☐
B-D-OTCST-1	SS-4	20	21.5	9	-	-	23.8	-	-	-	☐	☐
B-D-OTCST-1	SS-6	30	31.5	7	46.1	48.3	5.6	-	-	-	☐	☐
B-D-OTCST-1	SS-11	55	56.5	12	-	-	8.4	-	-	-	☐	☐

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BLDG-2018-00983, BLDG-2018-00985

Table C.3-1. Summary of Existing Explorations (Continued)

Boring ID	Sample Number	Top Depth (feet)	Bottom Depth (feet)	Natural Water Content (%)	Grain Size			Atterberg Limits			1-D Consol Test	CU Triax Test
					% Gravel	% Sand	% Fines	Plastic Limit (PL)	Liquid Limit (LL)	Plasticity Index (PI)		
B-D-OTCST-2	SS-2	10	11.5	8	-	-	40.2	-	-	-	☐	☐
B-D-OTCST-2	SS-4	20	21.5	10	-	-	41.8	-	-	-	☐	☐
B-D-OTCST-2	SS-7	35	36.5	13	6.2	82.2	11.6	-	-	-	☐	☐
B-D-OTCST-2	SS-11	55	56.5	14	-	-	6.6	-	-	-	☐	☐
B-D-OTCST-2	SS-12	60	61.5	15	7.6	87.7	4.7	-	-	-	☐	☐
B-D-OTCST-3p	SS-1	5	6.5	13	4.9	47.2	47.9	-	-	-	☐	☐
B-D-OTCST-3p	SS-3	15	16.5	20	6.1	34.4	59.6	-	-	-	☐	☐
B-D-OTCST-3p	SS-5	25	26.5	13	8.3	41.4	50.3	-	-	-	☐	☐
B-D-OTCST-3p	SS-12	60	61.5	9	-	-	6.8	-	-	-	☐	☐
B-D-OTCST-3p	SS-13	65	66.5	5	28	67.7	4.4	-	-	-	☐	☐
B-D-OVSSP-1p	SS-1	10	11.5	9	5	53.6	41.4	-	-	-	☐	☐
B-D-OVSSP-1p	SS-5	30	31.5	11	15.5	68.1	16.4	-	-	-	☐	☐
B-D-OVSSP-1p	SS-6	35	36.5	7	21.6	69.8	8.5	-	-	-	☐	☐
B-D-RW2-1p	SS-2	10	11.5	16	-	-	30.4	-	-	-	☐	☐
B-D-RW2-1p	SS-3	15	16.5	22	-	-	60.2	-	-	-	☐	☐
B-D-RW2-1p	SS-5	25	26.5	14	32.6	54.8	12.6	-	-	-	☐	☐
B-D-RW2-1p	SS-6	30	31.5	18	0.8	80.2	19	-	-	-	☐	☐
B-D-RW5-3	SS-1	5	6.5	11	1.5	86.5	11.9	-	-	-	☐	☐
B-D-RW5-3	SS-3	15	16.5	11	7.7	82.7	9.7	-	-	-	☐	☐
B-D-RW5-3	SS-5	25	26.5	7	41	53.4	5.5	-	-	-	☐	☐
B-D-RW5-3	SS-7	35	36.5	12	10.9	82.9	6.2	-	-	-	☐	☐
B-D-RW5-3	SS-9	45	46.5	11	15.8	75.8	8.4	-	-	-	☐	☐
B-D-RW6-1p	SS-2	10	11.5	8	14.4	44.7	40.9	-	-	-	☐	☐
B-D-RW6-1p	SS-5	25	26.5	10	-	-	52.5	-	-	-	☐	☐
B-D-RW6-1p	SS-8	40	41.5	7	43.7	49.1	7.2	-	-	-	☐	☐
B-D-RW6-1p	SS-10	50	51.5	7	39.5	55.3	5.3	-	-	-	☐	☐
B-D-RW6-1p	SS-12	60	61.5	14	-	-	5.2	-	-	-	☐	☐
MW-PS-10	S-8	32.5	34	7.19	1.1	88.1	10.8	NP	NP	NP	☐	☐
MW-PS-11	S-7	30	31.5	7.78	1.7	86.8	11.5	NP	NP	NP	☐	☐
MW-PS-11	S-9	35	36.5	7.46	0.7	88.9	10.4	NP	NP	NP	☐	☐
MW-PS-11	S-10	37.5	38.5	12.52	7.6	80.3	12.1	NP	NP	NP	☐	☐
MW-PS-12	S-8	32.5	33	8.84	33	62.8	4.2	NP	NP	NP	☐	☐
MW-PS-12	S-10	37.5	38.5	14.14	18.8	74.5	6.7	NP	NP	NP	☐	☐
MW-PS-10	-	-	-	-	40.8	59	0.2	NP	NP	NP	☐	☐

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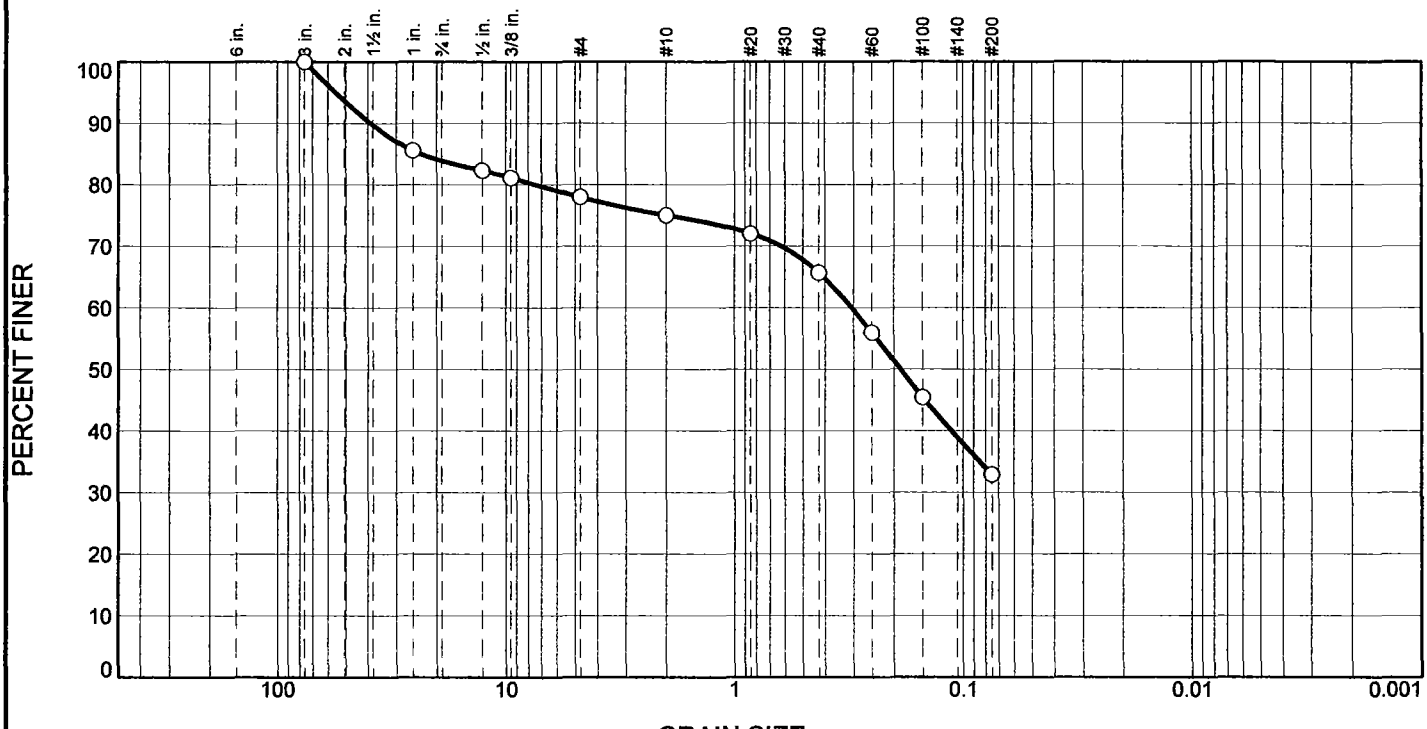
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.1	5.9	3.0	9.3	32.8	32.9	

Test Results (ASTM C136 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1"	85.6		
1/2"	82.3		
3/8"	81.1		
#4	78.0		
#10	75.0		
#20	72.1		
#40	65.7		
#60	56.0		
#100	45.4		
#200	32.9		

* (no specification provided)

Material Description

Gray Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 38.7811 D_{85}= 23.4065 D_{60}= 0.3055
D_{50}= 0.1878 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 05/3/13 **Date Tested:** 05/07/13

Tested By: JF

Checked By: JAM

Title:

Source of Sample: Boring E340-B-037 **Depth:** 7.5'-9.0' **Date Sampled:**
Sample Number: HMA#7510-4/S-4

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00895, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

5/15/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E340-B-037
Depth: 7.5'-9.0'
Sample Number: HMA#7510-4/S-4
Material Description: Gray Silty Sand W/Gravel
Date Received: 05/3/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D 1140
Tested By: JF
Test Date: 05/07/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare** = 622.40
Tare Wt. = 118.80
Minus #200 from wash = 31.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
849.90	118.80	3"	0.00	0.00	100.0
		1"	1575.00	1469.60	85.6
		1/2"	1443.50	1419.70	82.3
		3/8"	1492.90	1484.10	81.1
		#4	1380.50	1357.40	78.0
		#10	1536.40	1515.00	75.0
		#20	1089.70	1068.00	72.1
		#40	991.70	945.20	65.7
		#60	949.90	878.60	56.0
		#100	920.50	843.60	45.4
		#200	1112.00	1020.10	32.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	16.1	5.9	22.0	3.0	9.3	32.8	45.1			32.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1878	0.3055	7.4592	23.4065	38.7811	55.3015

Fineness Modulus
2.44

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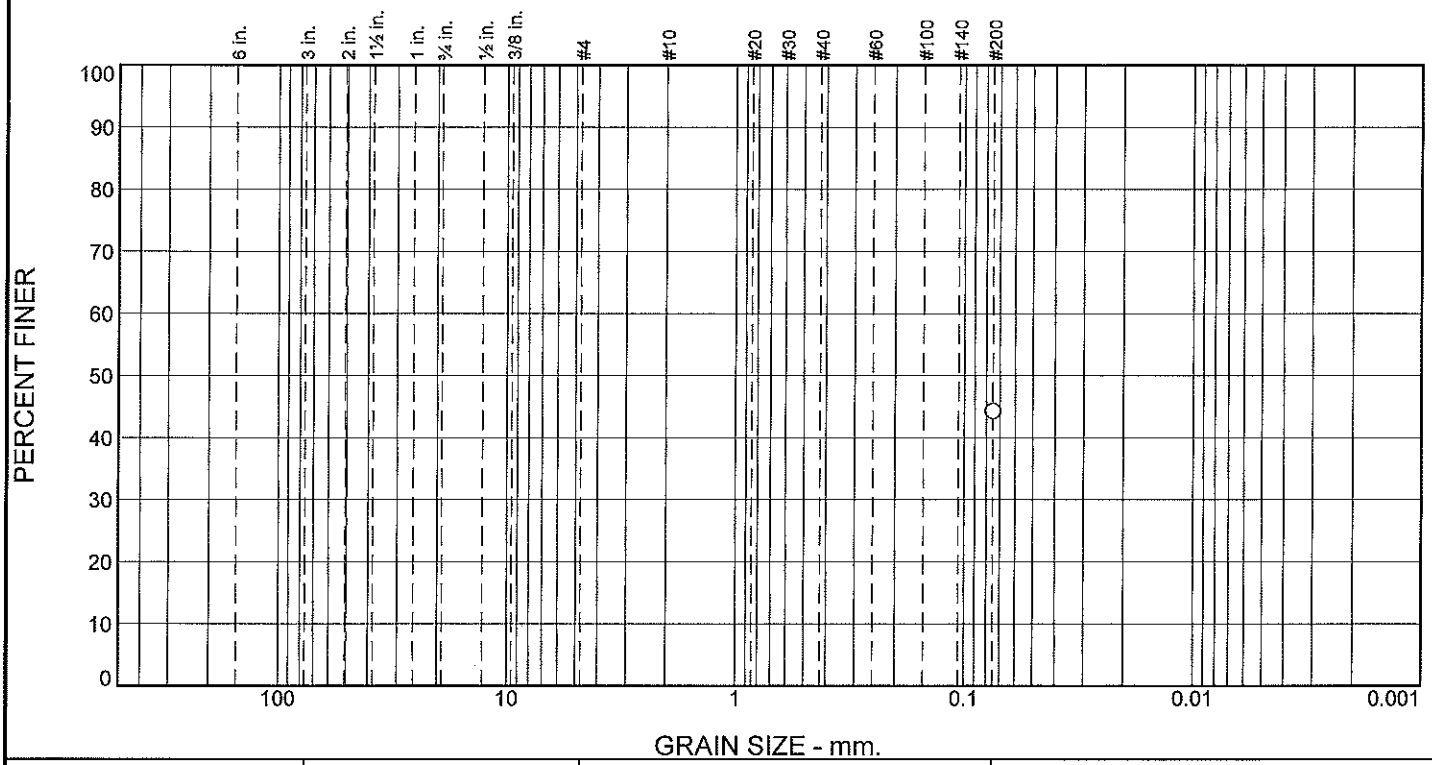
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						44.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	44.3		

* (no specification provided)

Material Description

Gray Clayey Sand

Atterberg Limits (ASTM D 4318)

PL= 16 LL= 24 PI= 8

Classification

USCS (D 2487)= SC AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 05/03/13 **Date Tested:** 05/07/13

Tested By: JF

Checked By: JAM

Title:

Source of Sample: Boring E340-B-037 **Depth:** 15'-16.5' **Date Sampled:**

Sample Number: HMA#7510-6/S-7

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Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/24/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E340-B-037
Depth: 15'-16.5' **Sample Number:** HMA#7510-6/S-7
Material Description: Gray Clayey Sand
Date Received: 05/03/13 **PL:** 16 **LL:** 24 **PI:** 8
USCS Classification: SC
#200 Wash Method: ASTM D 1140
Tested By: JF **Test Date:** 05/07/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 197.60
Tare Wt. = 114.10
Minus #200 from wash = 44.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
264.00	114.10	#200			44.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										44.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

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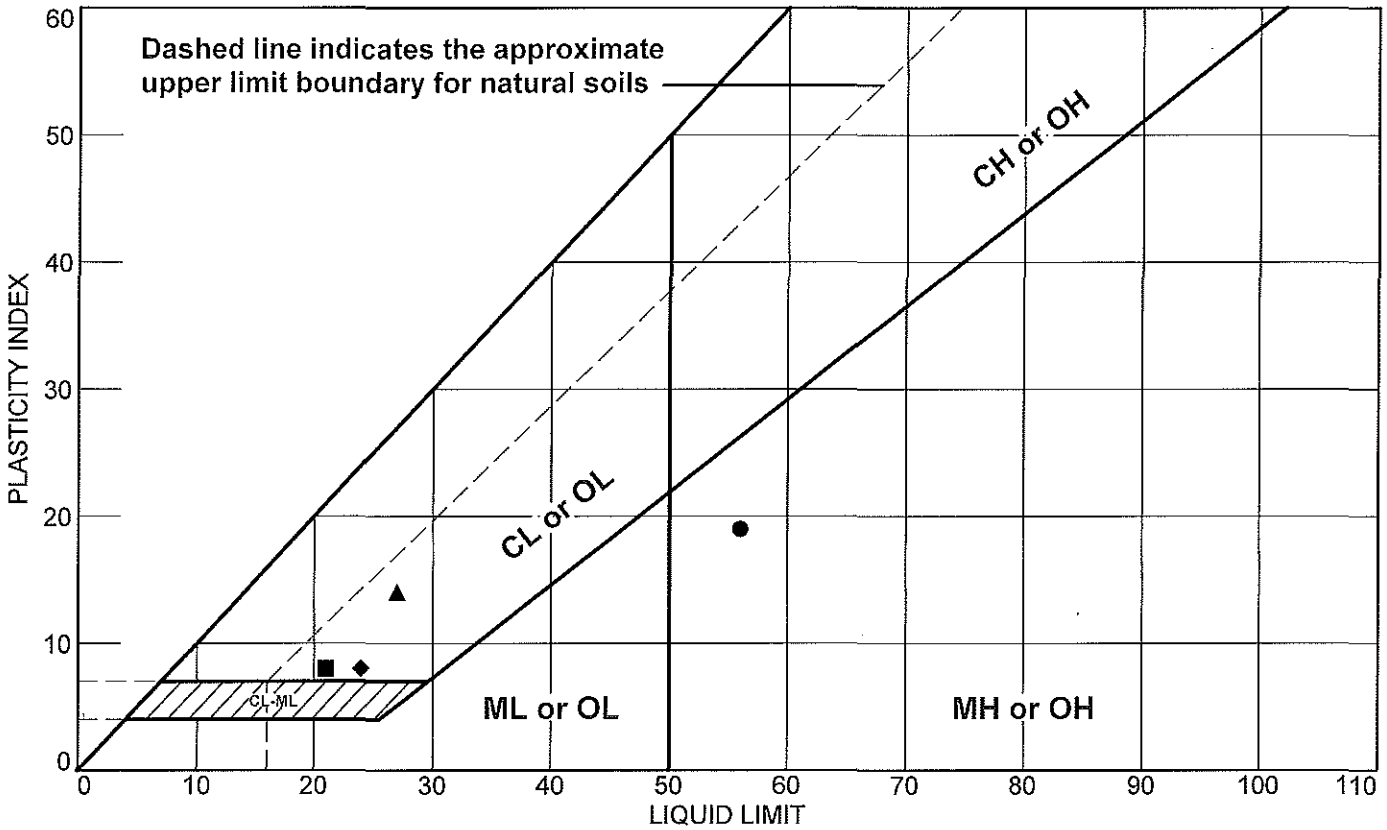
BLDG-2018-00983, BLDG-2018-00985

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring E340-B-037	HMA#7510-2/ S-2B	3.2'-4.0'	39.0	37	56	19	MH or OH
■	Boring E340-B-037	HMA#7510-3/ S-3B	5.2-6'	14.4	13	21	8	CL or OL
▲	Boring E340-B-037	HMA#7510-5/ S-5	10'-11.5'	31.8	13	27	14	CL or OL
◆	Boring E340-B-037	HMA#7510-6/ S-7	15'-16.5'	111.1	16	24	8	SC

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Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

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Project No.: 12-450

Figure

Tested By: JF **Checked By:** JAM

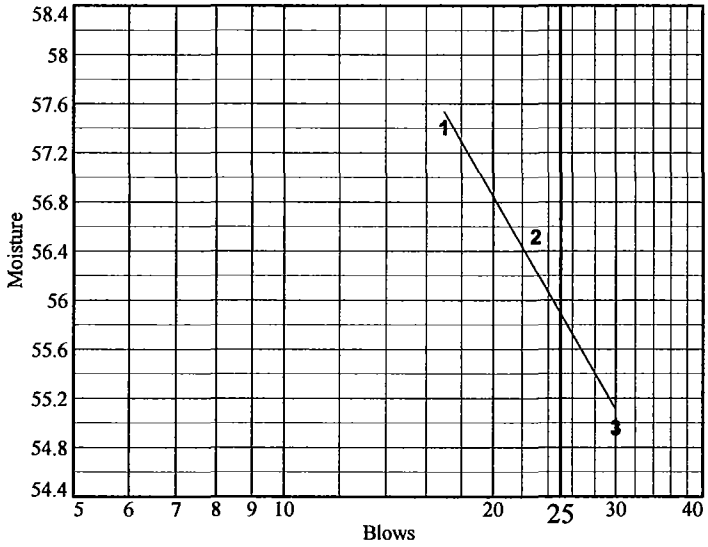
LIQUID AND PLASTIC LIMIT TEST DATA

5/15/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E340-B-037
Depth: 3.2'-4.0'
Sample Number: HMA#7510-2/S-2B
Material Description: Dark Brown/Olive Gray Silt
USCS: MH or OH
Tested by: JF
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	30.5	38.8	33.9			
Dry+Tare	24.3	29.7	26.7			
Tare	13.5	13.6	13.6			
# Blows	17	23	30			
Moisture	57.4	56.5	55.0			



Liquid Limit= 56
Plastic Limit= 37
Plasticity Index= 19
Natural Moisture= 39.0
Liquidity Index= 0.1

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	25.5	24.5	26.4		
Dry+Tare	22.3	21.5	22.9		
Tare	13.6	13.6	13.5		
Moisture	36.8	38.0	37.2		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
87.5	66.8	13.7	39.0

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

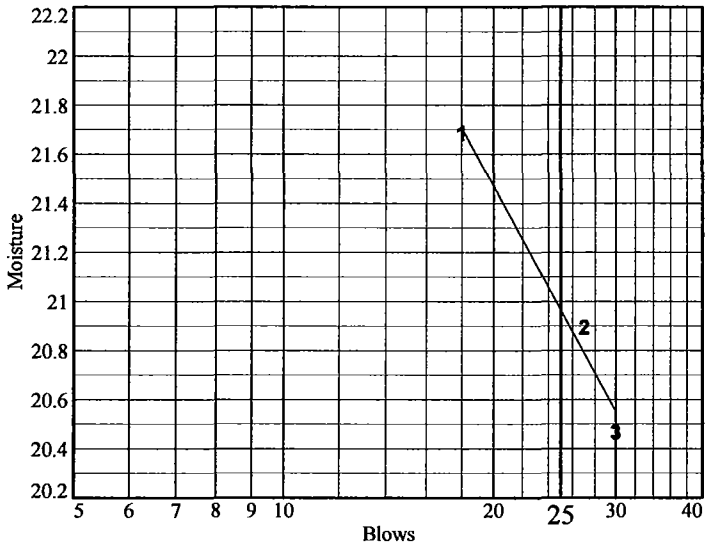
LIQUID AND PLASTIC LIMIT TEST DATA

5/15/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E340-B-037
Depth: 5.2-6'
Sample Number: HMA#7510-3/S-3B
Material Description: Olive Gray Clay
USCS: CL or OL
Tested by: JF
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	33.8	29.9	34.3			
Dry+Tare	30.2	27.1	30.8			
Tare	13.6	13.7	13.7			
# Blows	18	27	30			
Moisture	21.7	20.9	20.5			



Liquid Limit= 21
Plastic Limit= 13
Plasticity Index= 8
Natural Moisture= 14.4
Liquidity Index= 0.2

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	21	19.9	21.8		
Dry+Tare	20	18.9	20.5		
Tare	11.2	11.2	11.2		
Moisture	11.4	13.0	14.0		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
67.9	61.1	13.8	14.4

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BLDG-2018-00983, BLDG-2018-00985

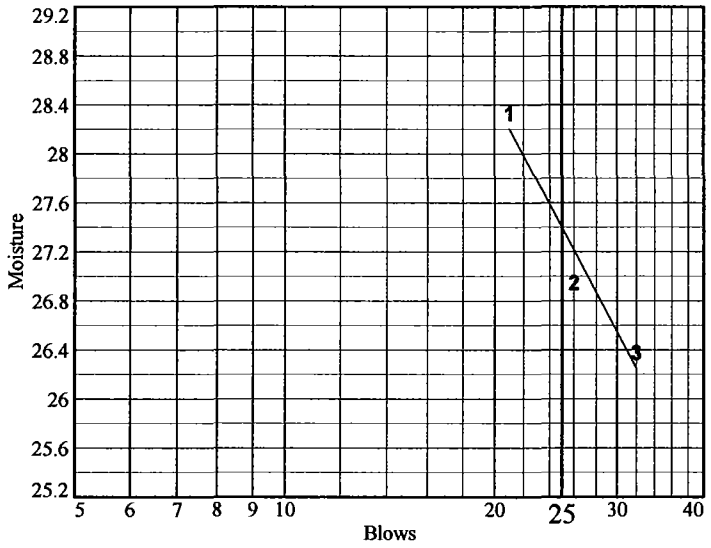
LIQUID AND PLASTIC LIMIT TEST DATA

5/15/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E340-B-037
Depth: 10'-11.5'
Sample Number: HMA#7510-5/S-5
Material Description: Gray Clay
USCS: CL or OL
Tested by: JF
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	29.2	31.6	34.1			
Dry+Tare	25.8	27.8	29.8			
Tare	13.8	13.7	13.5			
# Blows	21	26	32			
Moisture	28.3	27.0	26.4			



Liquid Limit= 27
Plastic Limit= 13
Plasticity Index= 14
Natural Moisture= 31.8
Liquidity Index= 1.3

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	24.7	22.7	25.4		
Dry+Tare	23.3	21.8	24		
Tare	13.6	13.6	13.6		
Moisture	14.4	11.0	13.5		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
72.4	58.2	13.6	31.8

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BLDG-2018-00983, BLDG-2018-00985

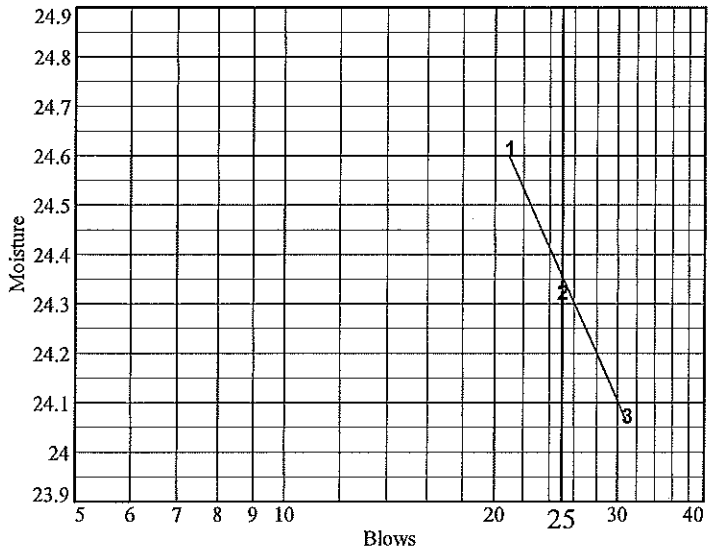
LIQUID AND PLASTIC LIMIT TEST DATA

10/24/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E340-B-037
Depth: 15'-16.5'
Sample Number: HMA#7510-6/S-7
Material Description: Gray Clayey Sand
USCS: SC
Tested by: JF
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	37.9	31.9	33.7			
Dry+Tare	33.1	28.3	29.8			
Tare	13.6	13.5	13.6			
# Blows	21	25	31			
Moisture	24.6	24.3	24.1			



Liquid Limit= 24
Plastic Limit= 16
Plasticity Index= 8
Natural Moisture= 111.1
Liquidity Index= 11.9

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	21.7	20.8	18.8		
Dry+Tare	20.3	19.5	17.7		
Tare	11	11.1	11.1		
Moisture	15.1	15.5	16.7		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
290.4	197.6	114.1	111.1

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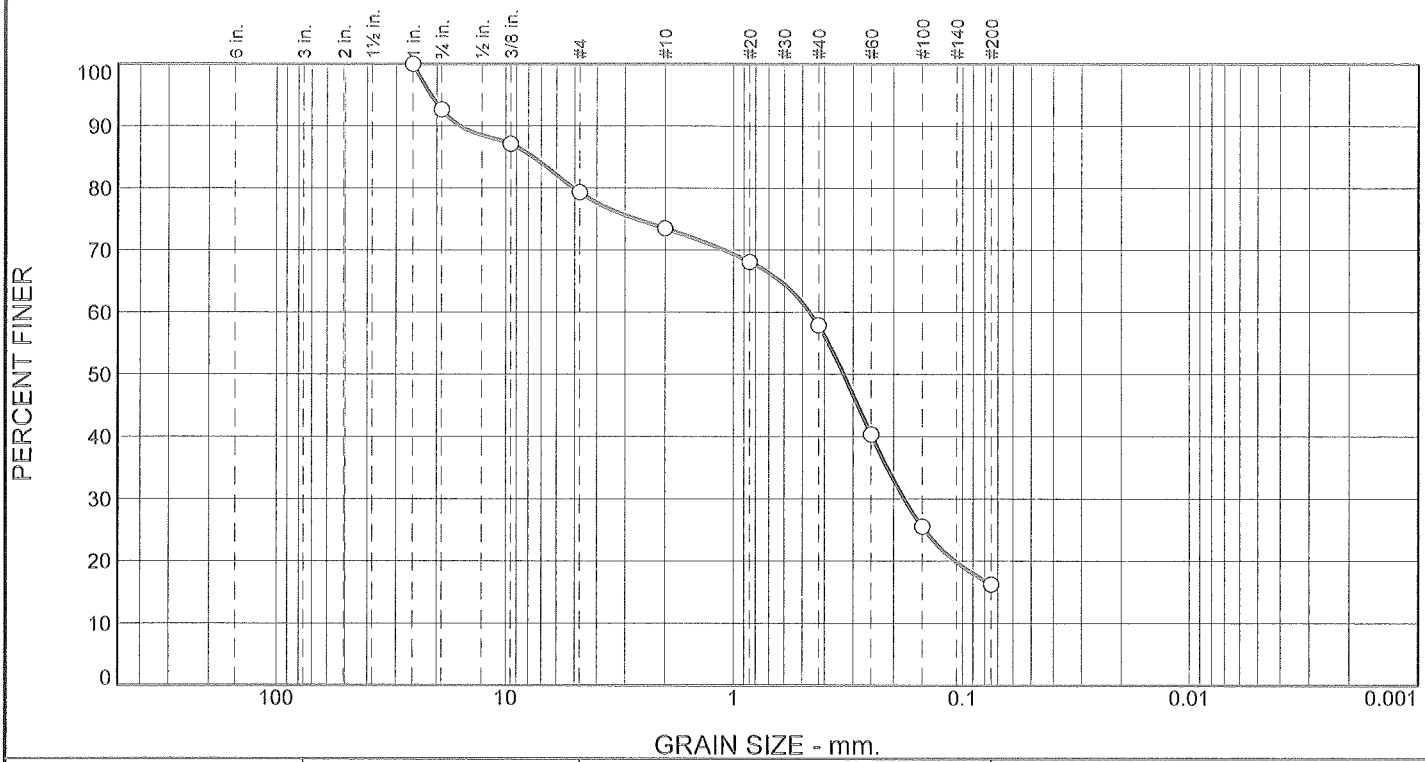
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.3	13.4	5.8	15.6	41.6	16.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	92.7		
3/8"	87.1		
#4	79.3		
#10	73.5		
#20	68.1		
#40	57.9		
#60	40.3		
#100	25.6		
#200	16.3		

* (no specification provided)

Material Description

Gray Brown Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 15.8425 D_{85}= 7.5893 D_{60}= 0.4638
D_{50}= 0.3291 D_{30}= 0.1797 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/18/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-003 **Depth:** 7.5'-9' **Date Sampled:**
Sample Number: HMA#7529-3/S-3

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-003
Depth: 7.5'-9'
Sample Number: HMA#7529-3/S-3
Material Description: Gray Brown Silty Sand W/Gravel
Date Received: 7/15/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/18/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 582.40
Tare Wt. = 217.30
Minus #200 from wash = 15.7%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
650.40	217.30	1"	0.00	0.00	100.0
		3/4"	1536.60	1504.80	92.7
		3/8"	1507.60	1483.60	87.1
		#4	1390.70	1356.90	79.3
		#10	1539.20	1514.00	73.5
		#20	1090.00	1066.70	68.1
		#40	988.50	944.20	57.9
		#60	954.10	878.10	40.3
		#100	907.20	843.20	25.6
		#200	1059.70	1019.50	16.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	7.3	13.4	20.7	5.8	15.6	41.6	63.0			16.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1073	0.1797	0.3291	0.4638	5.0501	7.5893	15.8425	21.1519

Fineness Modulus
2.59

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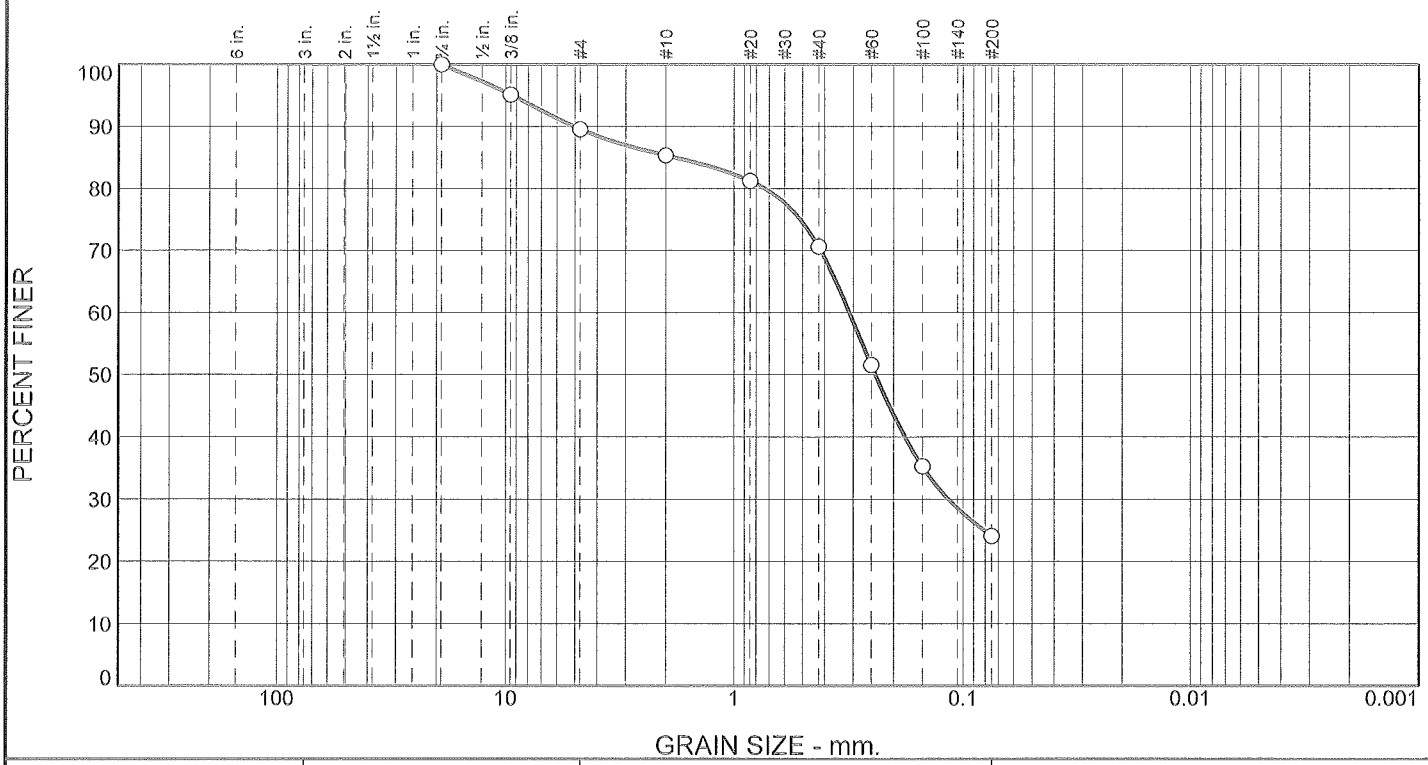
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00882, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.4	4.3	14.7	46.5	24.1	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
3/8"	95.2		
#4	89.6		
#10	85.3		
#20	81.2		
#40	70.6		
#60	51.5		
#100	35.3		
#200	24.1		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 5.0498 D_{85}= 1.8260 D_{60}= 0.3115
D_{50}= 0.2399 D_{30}= 0.1158 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/18/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-003 **Depth:** 15'-16.5' **Date Sampled:**
Sample Number: HMA#7529-4/S-6

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-003
Depth: 15'-16.5'
Sample Number: HMA#7529-4/S-6
Material Description: Olive Gray Silty Sand
Date Received: 7/15/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/18/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 597.60
Tare Wt. = 199.00
Minus #200 from wash = 23.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
717.40	199.00	3/4"	0.00	0.00	100.0
		3/8"	1508.60	1483.50	95.2
		#4	1385.70	1356.70	89.6
		#10	1535.90	1514.00	85.3
		#20	1088.20	1066.80	81.2
		#40	999.00	944.20	70.6
		#60	977.10	878.10	51.5
		#100	927.50	843.10	35.3
		#200	1077.30	1019.40	24.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	10.4	10.4	4.3	14.7	46.5	65.5			24.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1158	0.2399	0.3115	0.7322	1.8260	5.0498	9.3372

Fineness Modulus
1.75

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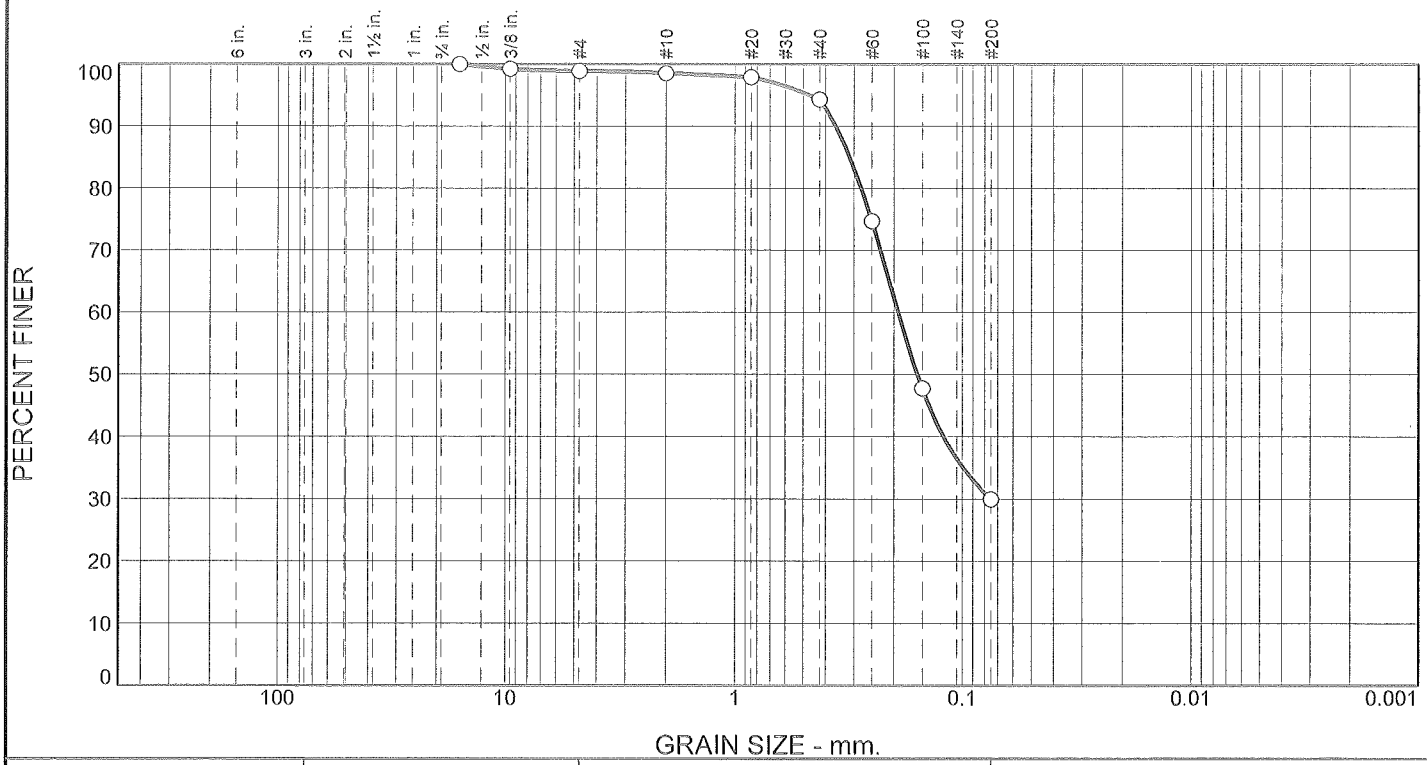
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.1	0.4	4.2	64.4	29.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
3/8"	99.3		
#4	98.9		
#10	98.5		
#20	97.9		
#40	94.3		
#60	74.7		
#100	47.8		
#200	29.9		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.3600 D_{85}= 0.3130 D_{60}= 0.1911
D_{50}= 0.1576 D_{30}= 0.0754 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/18/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-003 **Depth:** 30'-31.5' **Date Sampled:**
Sample Number: HMA#7529-5/S-9

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-003
Depth: 30'-31.5'
Sample Number: HMA#7529-5/S-9
Material Description: Olive Gray Silty Sand
Date Received: 7/15/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/18/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 537.40
Tare Wt. = 213.70
Minus #200 from wash = 29.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
670.60	213.70	5/8"	0.00	0.00	100.0
		3/8"	1487.00	1483.60	99.3
		#4	1358.20	1356.60	98.9
		#10	1515.80	1514.10	98.5
		#20	1069.40	1066.70	97.9
		#40	960.60	944.10	94.3
		#60	967.70	878.00	74.7
		#100	966.40	843.30	47.8
		#200	1100.90	1019.40	29.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.1	1.1	0.4	4.2	64.4	69.0			29.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0754	0.1576	0.1911	0.2787	0.3130	0.3600	0.4679

Fineness Modulus
0.77

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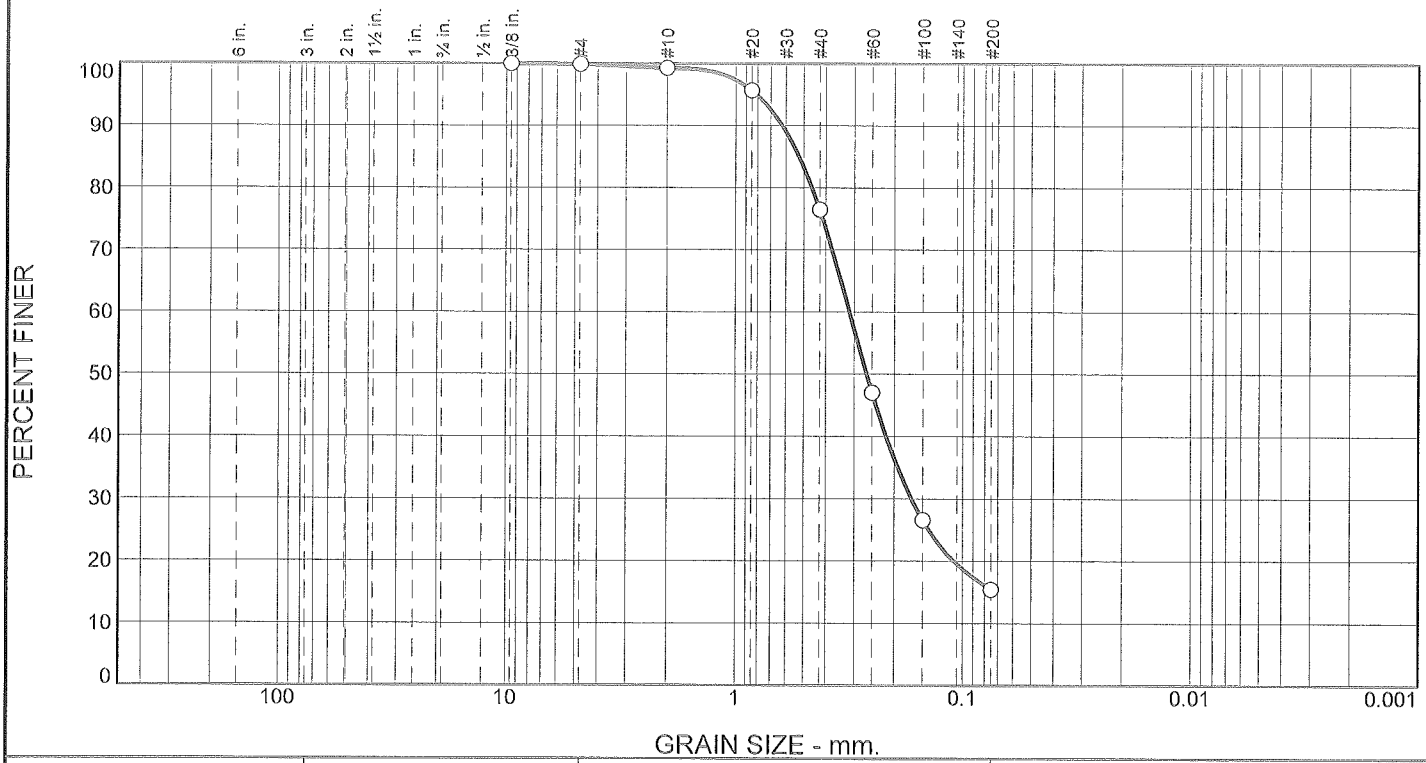
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.6	22.8	61.1	15.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	99.9		
#10	99.3		
#20	95.7		
#40	76.5		
#60	47.1		
#100	26.6		
#200	15.4		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.6223 D_{85}= 0.5245 D_{60}= 0.3143
D_{50}= 0.2640 D_{30}= 0.1678 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/18/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-003 **Depth:** 45'-46.5' **Date Sampled:**
Sample Number: HMA#7529-6/S-12

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-003
Depth: 45'-46.5'
Sample Number: HMA#7529-6/S-12
Material Description: Gray Brown Silty Sand
Date Received: 7/15/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/18/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 669.80
Tare Wt. = 214.20
Minus #200 from wash = 15.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
751.20	214.20	3/8"	0.00	0.00	100.0
		#4	1357.00	1356.60	99.9
		#10	1517.20	1514.00	99.3
		#20	1086.20	1066.70	95.7
		#40	1047.20	944.00	76.5
		#60	1035.90	877.90	47.1
		#100	953.00	843.20	26.6
		#200	1079.40	1019.40	15.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.1	0.1	0.6	22.8	61.1	84.5			15.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1092	0.1678	0.2640	0.3143	0.4598	0.5245	0.6223	0.8069

Fineness Modulus
1.29

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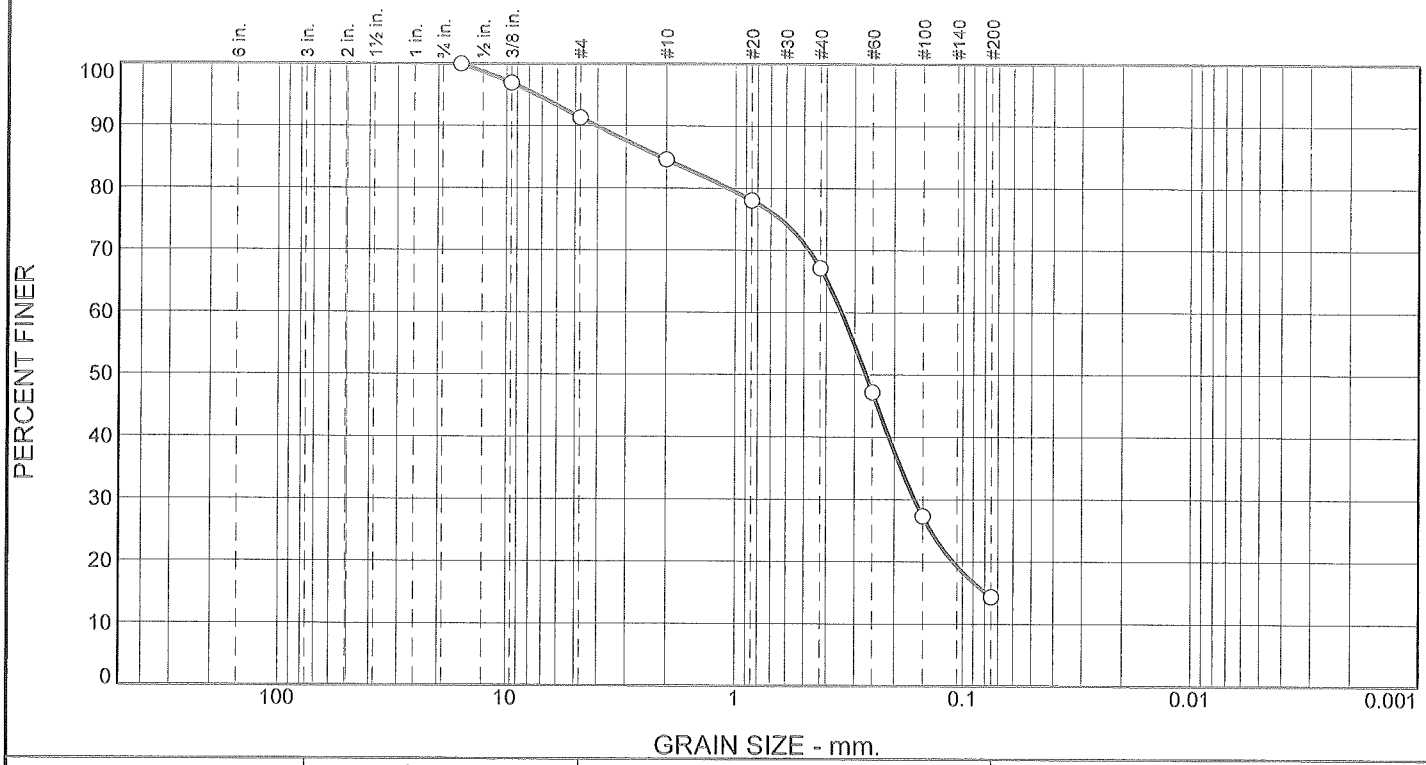
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.6	6.8	17.4	52.8	14.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
3/8"	96.9		
#4	91.4		
#10	84.6		
#20	78.0		
#40	67.2		
#60	47.2		
#100	27.3		
#200	14.4		

* (no specification provided)

Material Description

Gray Brwon Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 4.0273 D_{85}= 2.1117 D_{60}= 0.3423
D_{50}= 0.2670 D_{30}= 0.1630 D_{15}= 0.0788
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/18/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-003 **Depth:** 60'-61' **Date Sampled:**
Sample Number: HMA#7529-7/S-15

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-003
Depth: 60'-61'
Sample Number: HMA#7529-7/S-15
Material Description: Gray Brwon Silty Sand
Date Received: 7/15/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/18/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 606.10
Tare Wt. = 212.50
Minus #200 from wash = 13.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
668.30	212.50	5/8"	0.00	0.00	100.0
		3/8"	1497.50	1483.50	96.9
		#4	1382.00	1356.60	91.4
		#10	1544.80	1514.00	84.6
		#20	1096.70	1066.70	78.0
		#40	993.50	944.00	67.2
		#60	969.00	878.00	47.2
		#100	934.00	843.30	27.3
		#200	1078.20	1019.30	14.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	8.6	8.6	6.8	17.4	52.8	77.0			14.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0788	0.1104	0.1630	0.2670	0.3423	1.0796	2.1117	4.0273	7.3665

Fineness Modulus
1.89

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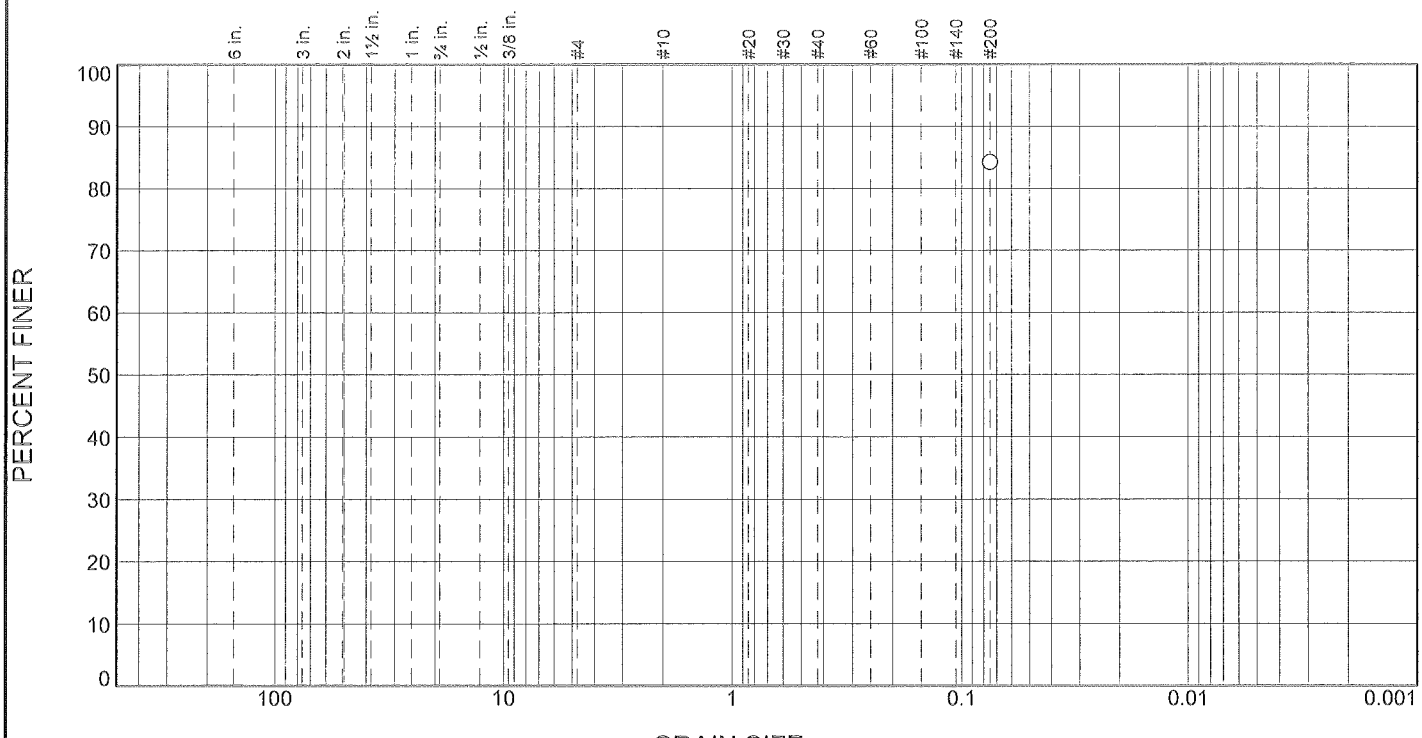
Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						84.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	84.2		

* (no specification provided)

Material Description

Gray Clay

Atterberg Limits (ASTM D 4318)

PL= 24 LL= 49 PI= 25

Classification

USCS (D 2487)= CL or OL AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/19/13

Tested By: JF/TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-003 **Depth:** 95'-96.5' **Date Sampled:**

Sample Number: HMA#7529-8/S-22

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450

Figure

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-003
Depth: 95'-96.5'
Sample Number: HMA#7529-8/S-22
Material Description: Gray Clay
Date Received: 7/15/13 **PL:** 24 **LL:** 49 **PI:** 25
USCS Classification: CL or OL
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/19/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 237.70
Tare Wt. = 213.00
Minus #200 from wash = 84.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
369.70	213.00	#200			84.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										84.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

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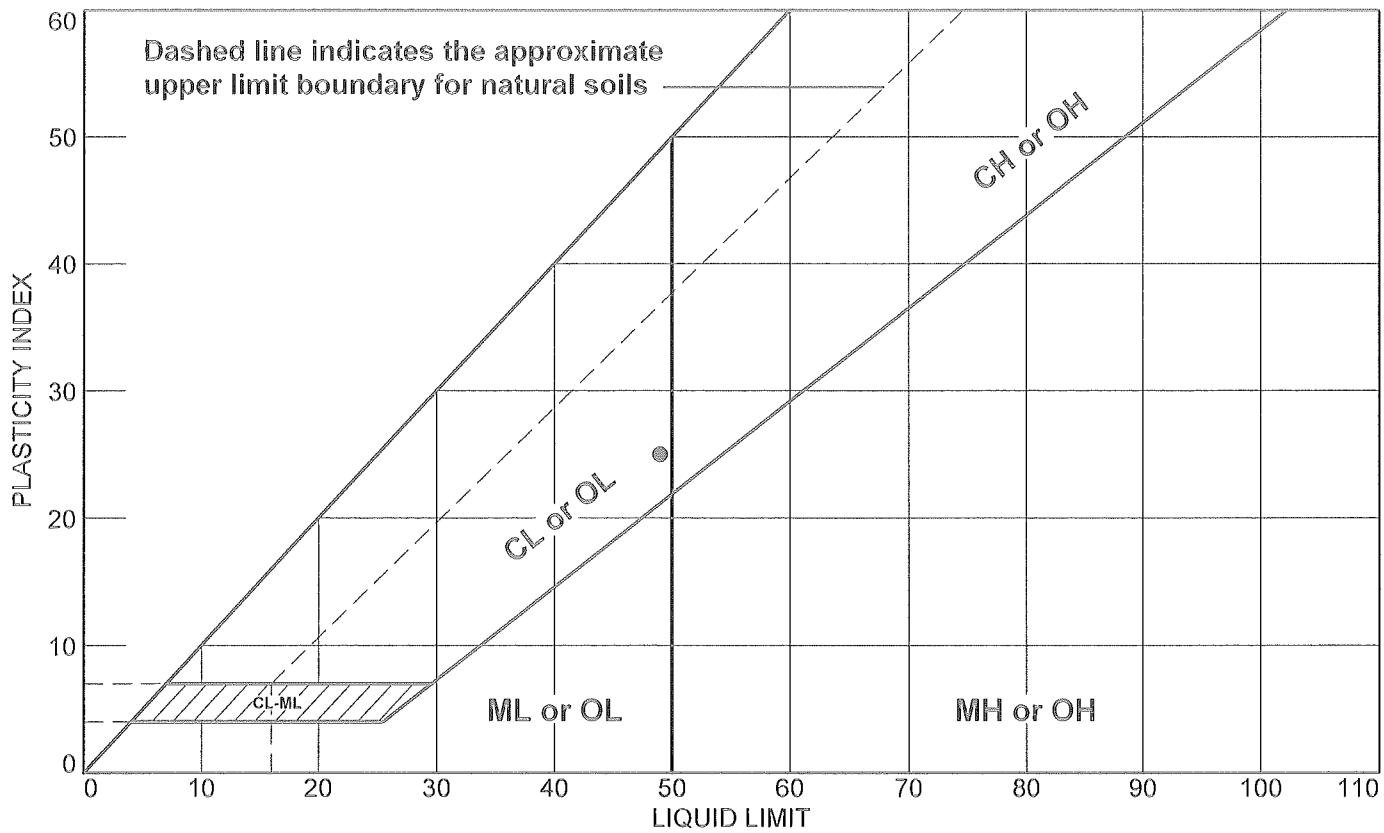
BLDG-2018-00883, BLDG-2018-00985

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring E360-B-003	HMA#7529-8/ S-22	95'-96.5'	20.2	24	49	25	CL or OL

Hayre McElroy & Associates, LLC Redmond, WA	**Client:** Golder Associates **Project:** Sound Transit East Link **Project No.:** 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

Tested By: JF/TP **Checked By:** JAM

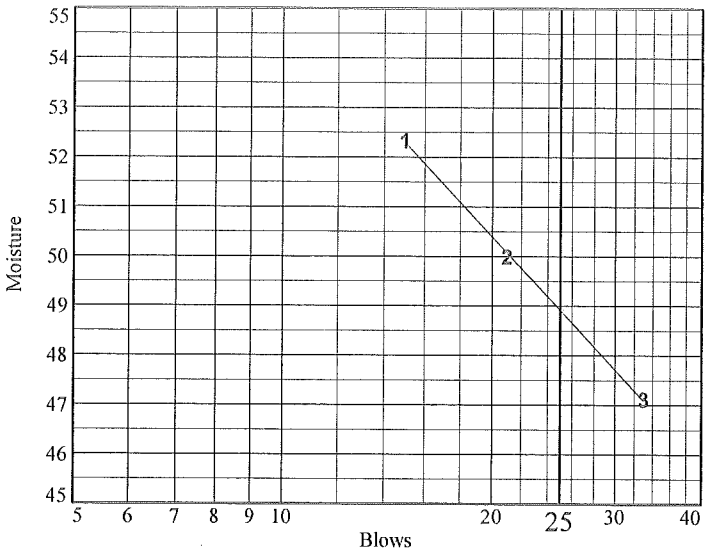
LIQUID AND PLASTIC LIMIT TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-003
Depth: 95'-96.5'
Sample Number: HMA#7529-8/S-22
Material Description: Gray Clay
USCS: CL or OL
Tested by: JF/TP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	29.8	31	28.8			
Dry+Tare	24.2	25.2	23.9			
Tare	13.5	13.6	13.5			
# Blows	15	21	33			
Moisture	52.3	50.0	47.1			



Liquid Limit= 49
Plastic Limit= 24
Plasticity Index= 25
Natural Moisture= 20.2
Liquidity Index= -0.2

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	17.8	17.7	18.3		
Dry+Tare	16.5	16.4	16.9		
Tare	11.2	11.1	11.1		
Moisture	24.5	24.5	24.1		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
401.3	369.7	213	20.2

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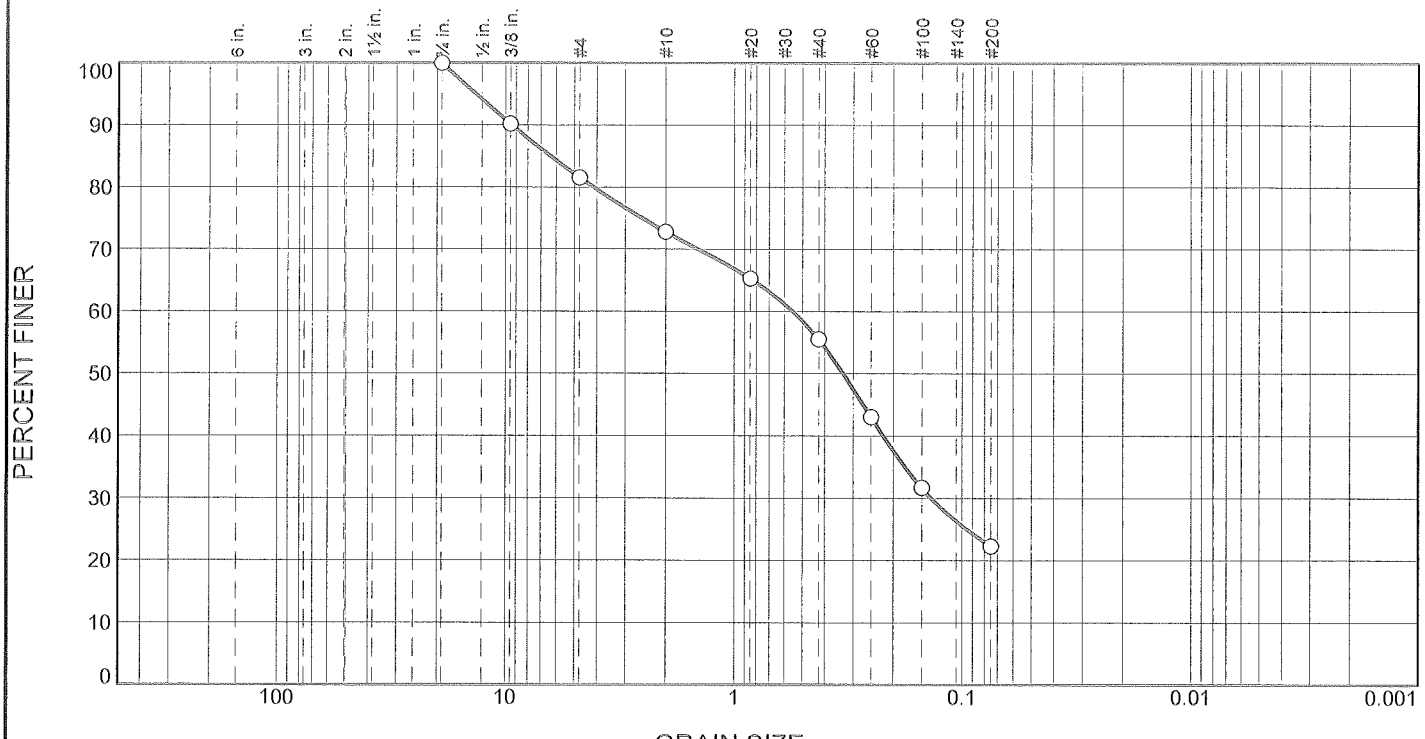
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.5	8.7	17.3	33.3	22.2	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
3/8"	90.2		
#4	81.5		
#10	72.8		
#20	65.3		
#40	55.5		
#60	43.0		
#100	31.7		
#200	22.2		

* (no specification provided)

Material Description

Dark Brown Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 9.3769 D_{85}= 6.3553 D_{60}= 0.5511
D_{50}= 0.3318 D_{30}= 0.1364 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/19/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-007 **Depth:** 5'-7.5' **Date Sampled:**
Sample Number: HMA#7529-9/S-2

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 5'-7.5'
Sample Number: HMA#7529-9/S-2
Material Description: Dark Brown Silty Sand W/Gravel
Date Received: 7/15/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/19/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 481.00
Tare Wt. = 214.10
Minus #200 from wash = 20.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
551.20	214.10	3/4"	0.00	0.00	100.0
		3/8"	1516.60	1483.60	90.2
		#4	1385.90	1356.70	81.5
		#10	1543.50	1514.00	72.8
		#20	1092.10	1066.70	65.3
		#40	977.10	944.20	55.5
		#60	920.20	878.10	43.0
		#100	881.40	843.10	31.7
		#200	1051.00	1019.30	22.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	18.5	18.5	8.7	17.3	33.3	59.3			22.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1364	0.3318	0.5511	4.1373	6.3553	9.3769	13.4520

Fineness Modulus
2.45

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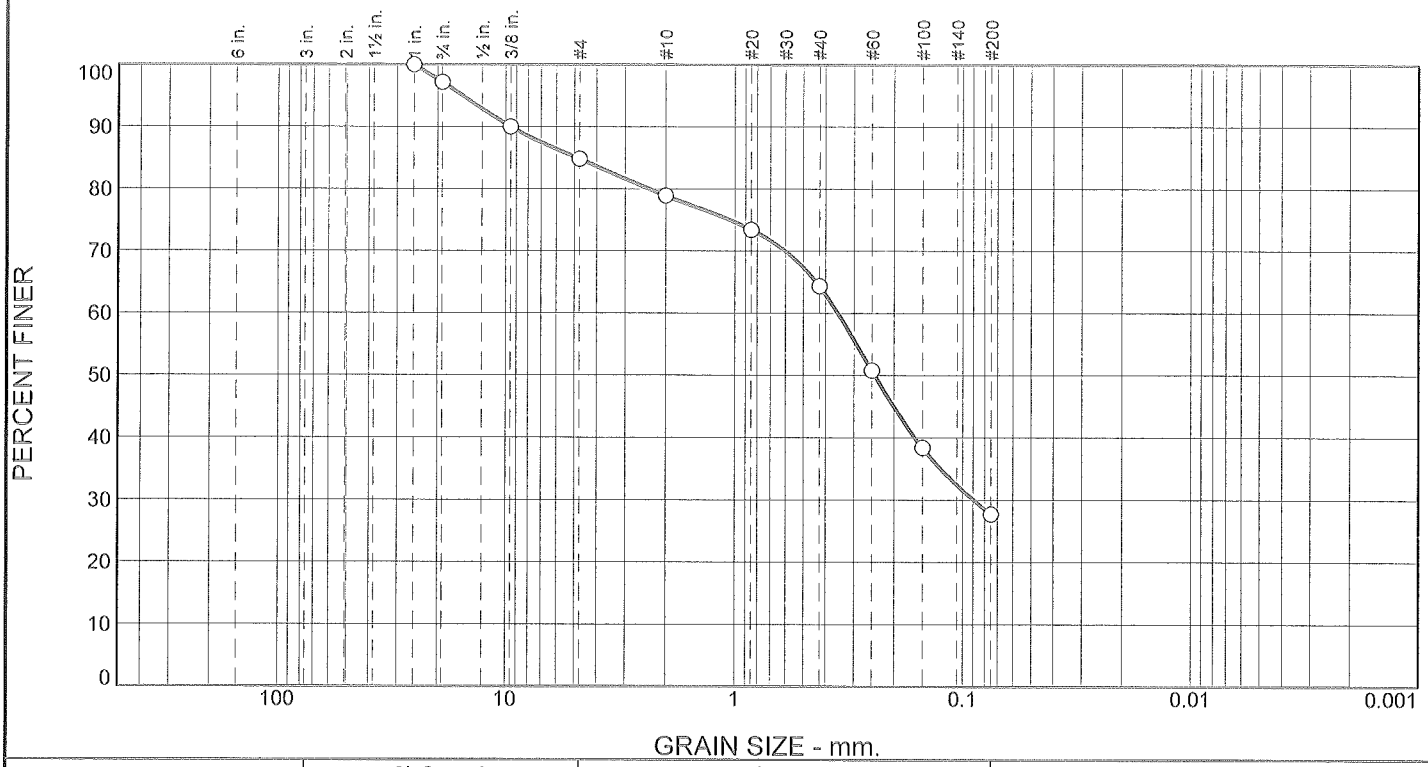
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.8	12.4	5.9	14.6	36.6	27.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	97.2		
3/8"	90.0		
#4	84.8		
#10	78.9		
#20	73.4		
#40	64.3		
#60	50.8		
#100	38.4		
#200	27.7		

* (no specification provided)

Material Description

Olive Gray Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 9.5361 D_{85}= 4.8931 D_{60}= 0.3524
D_{50}= 0.2429 D_{30}= 0.0893 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/19/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-007 **Depth:** 12.5'-14' **Date Sampled:**
Sample Number: HMA#7529-10/S-5

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Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 12.5'-14'
Sample Number: HMA#7529-10/S-5
Material Description: Olive Gray Silty Sand W/Gravel
Date Received: 7/15/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/19/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 609.80
Tare Wt. = 198.30
Minus #200 from wash = 26.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
760.70	198.30	1"	0.00	0.00	100.0
		3/4"	1520.60	1504.90	97.2
		3/8"	1524.00	1483.40	90.0
		#4	1385.90	1356.70	84.8
		#10	1547.40	1514.20	78.9
		#20	1097.50	1066.70	73.4
		#40	995.20	944.20	64.3
		#60	954.20	877.90	50.8
		#100	912.90	843.20	38.4
		#200	1079.50	1019.40	27.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.8	12.4	15.2	5.9	14.6	36.6	57.1			27.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0893	0.2429	0.3524	2.3758	4.8931	9.5361	15.4572

Fineness Modulus
2.08

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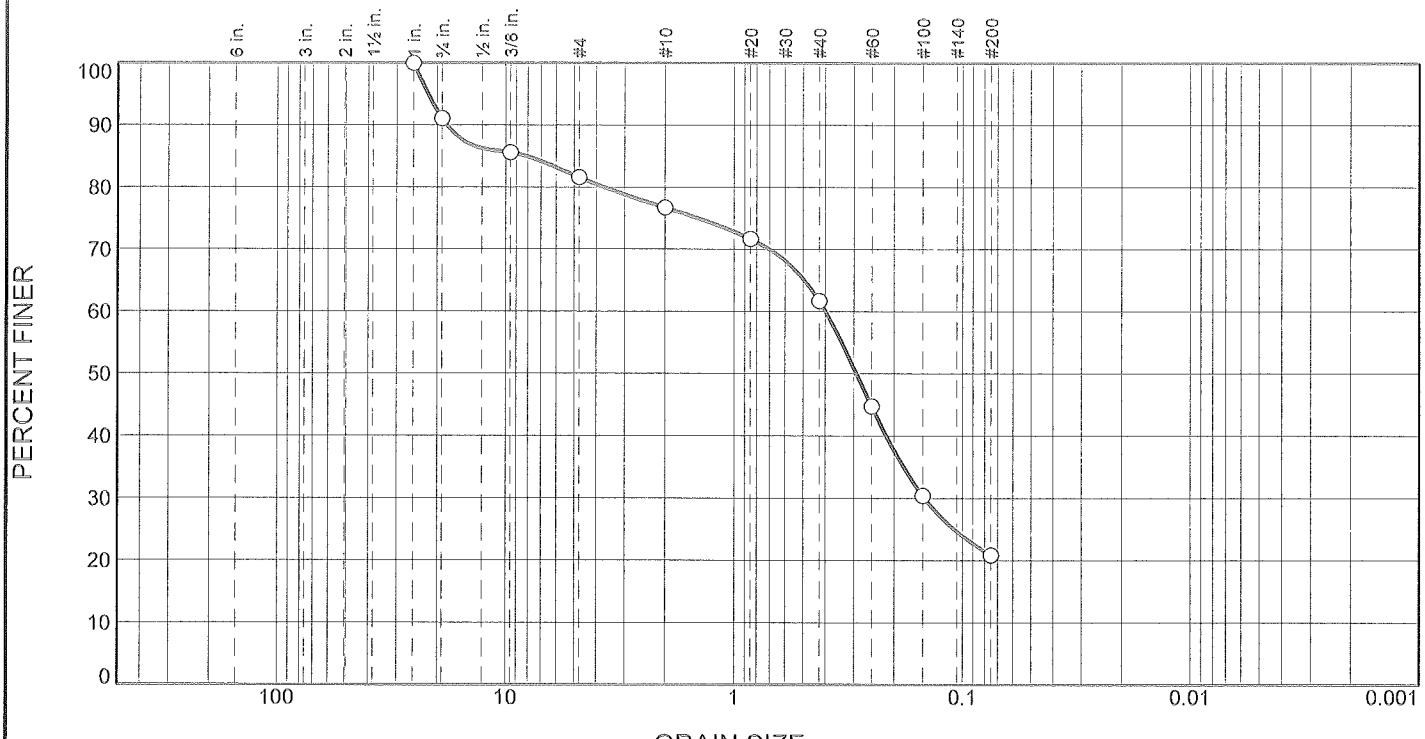
BLDG-2018-00883, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.9	9.5	4.9	15.0	40.9	20.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	91.1		
3/8"	85.6		
#4	81.6		
#10	76.7		
#20	71.6		
#40	61.7		
#60	44.7		
#100	30.4		
#200	20.8		

* (no specification provided)

Material Description

Gray Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 18.1326 D_{85}= 8.1337 D_{60}= 0.3990
D_{50}= 0.2921 D_{30}= 0.1472 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/22/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-007 **Depth:** 30'-31.5' **Date Sampled:**
Sample Number: HMA#7529-11/S-9A

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Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 30'-31.5'
Sample Number: HMA#7529-11/S-9A
Material Description: Gray Silty Sand W/Gravel
Date Received: 7/15/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/22/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 548.10
Tare Wt. = 117.90
Minus #200 from wash = 19.7%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
653.80	117.90	1"	0.00	0.00	100.0
		3/4"	1552.70	1504.90	91.1
		3/8"	1512.80	1483.40	85.6
		#4	1378.20	1356.60	81.6
		#10	1540.20	1514.10	76.7
		#20	1093.80	1066.70	71.6
		#40	997.60	944.30	61.7
		#60	969.10	878.10	44.7
		#100	920.40	843.70	30.4
		#200	1070.60	1019.30	20.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	8.9	9.5	18.4	4.9	15.0	40.9	60.8			20.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1472	0.2921	0.3990	3.7061	8.1337	18.1326	21.8957

Fineness Modulus
2.41

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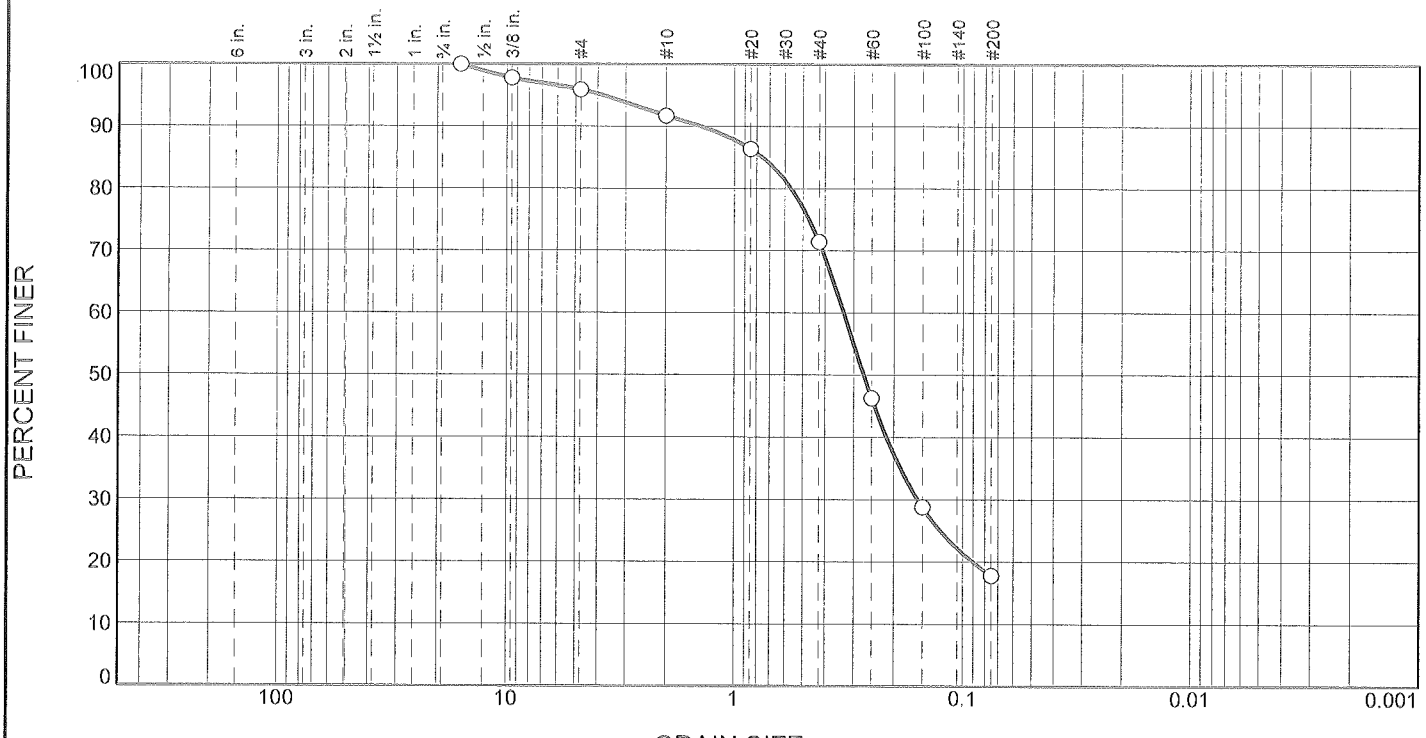
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.1	4.2	20.3	53.6	17.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
3/8"	97.8		
#4	95.9		
#10	91.7		
#20	86.3		
#40	71.4		
#60	46.3		
#100	28.8		
#200	17.8		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 1.4063 D_{85}= 0.7538 D_{60}= 0.3310
D_{50}= 0.2707 D_{30}= 0.1574 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/22/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-007 **Depth:** 40'-41.5' **Date Sampled:**
Sample Number: HMA#7529-12/S-11A

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 40'-41.5'
Sample Number: HMA#7529-12/S-11A
Material Description: Gray Brown Silty Sand
Date Received: 7/15/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/22/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 524.50
Tare Wt. = 114.10
Minus #200 from wash = 17.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
611.00	114.40	5/8"	0.00	0.00	100.0
		3/8"	1494.20	1483.30	97.8
		#4	1366.10	1356.80	95.9
		#10	1534.90	1514.00	91.7
		#20	1093.50	1066.80	86.3
		#40	1018.40	944.20	71.4
		#60	1002.80	878.00	46.3
		#100	930.20	843.40	28.8
		#200	1074.00	1019.50	17.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.1	4.1	4.2	20.3	53.6	78.1			17.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0900	0.1574	0.2707	0.3310	0.5630	0.7538	1.4063	3.7816

Fineness Modulus
1.59

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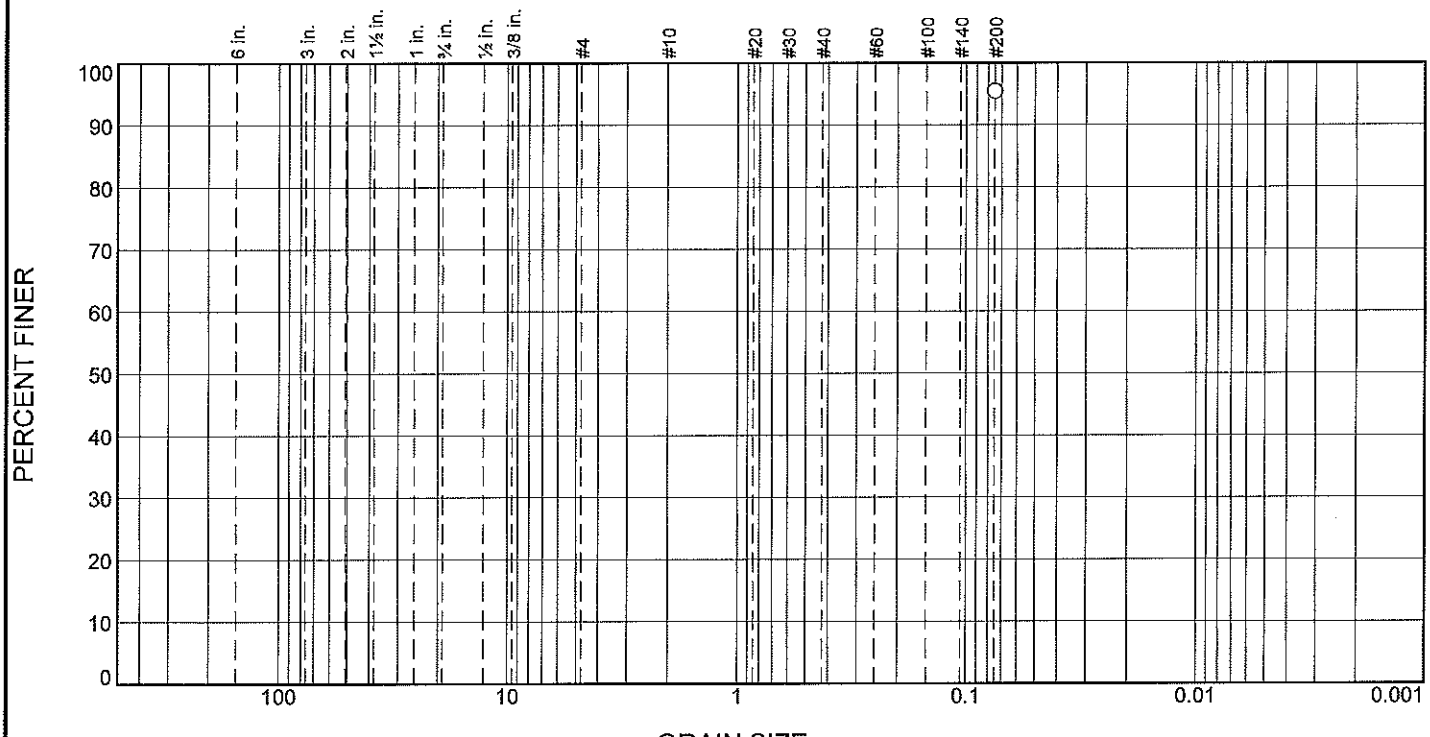
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						95.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	95.5		

* (no specification provided)

Material Description

Gray Clay

Atterberg Limits (ASTM D 4318)

PL= 21 LL= 37 PI= 16

Classification

USCS (D 2487)= CL AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/11/13

Tested By: TEP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-007 **Depth:** 50'-51.5' **Date Sampled:**

Sample Number: HMA#7555-1/S-13A

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/18/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 50'-51.5'
Sample Number: HMA#7555-1/S-13A
Material Description: Gray Clay
Date Received: 10/4/13 **PL:** 21 **LL:** 37 **PI:** 16
USCS Classification: CL
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 10/11/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 35.40
Tare Wt. = 31.50
Minus #200 from wash = 95.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
117.90	31.50	#200			95.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										95.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

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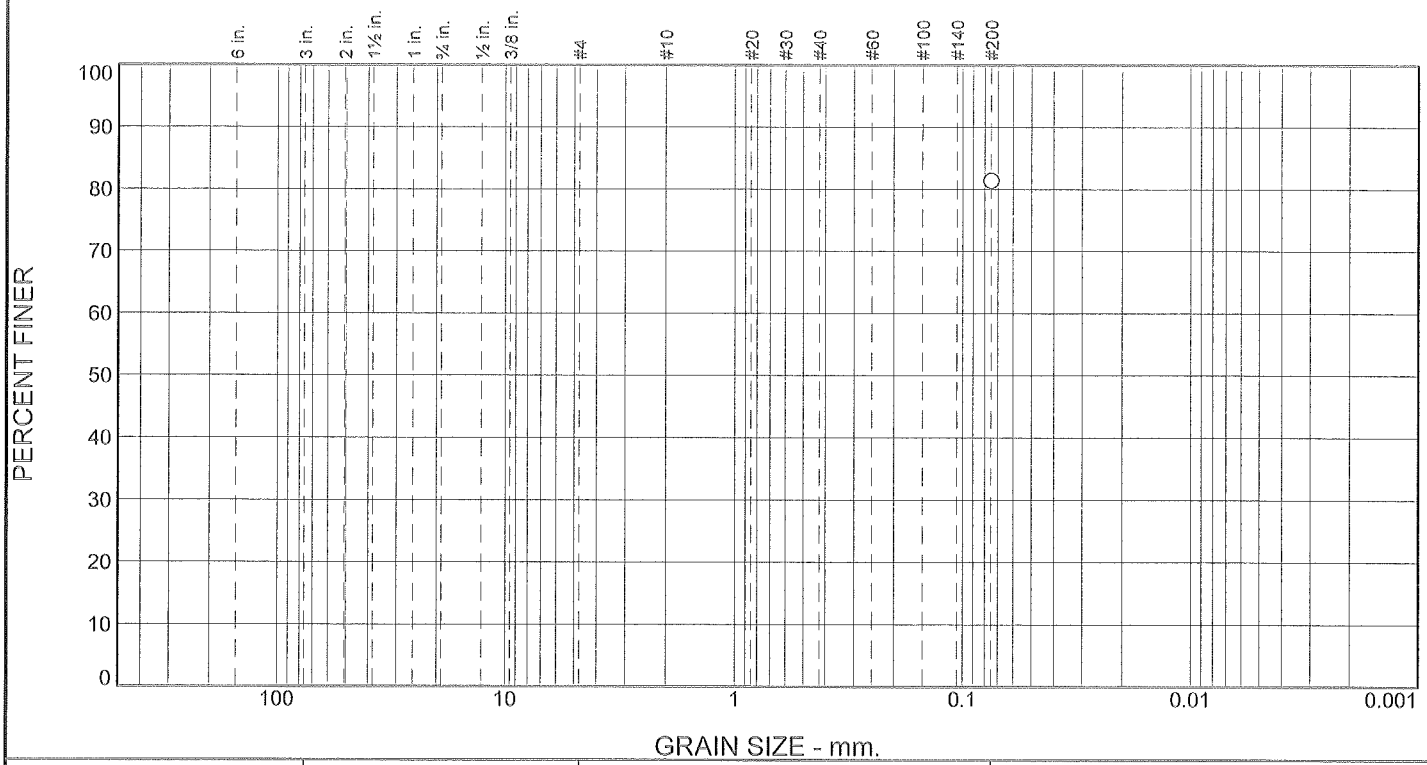
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						81.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	81.4		

* (no specification provided)

Material Description

Gray Clay

Atterberg Limits (ASTM D 4318)

PL= 23 LL= 34 PI= 11

Classification

USCS (D 2487)= CL or OL AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/22/13

Tested By: JF/TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-007 **Depth:** 60'-61.5' **Date Sampled:**

Sample Number: HMA#7529-13/S-14A

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450

Figure

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BLDG-2018-00887, BLDG-2018-00891, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 60'-61.5'
Sample Number: HMA#7529-13/S-14A
Material Description: Gray Clay
Date Received: 7/15/13 **PL:** 23 **LL:** 34 **PI:** 11
USCS Classification: CL or OL
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/22/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 152.50
Tare Wt. = 114.00
Minus #200 from wash = 81.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
321.00	114.00	#200			81.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										81.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

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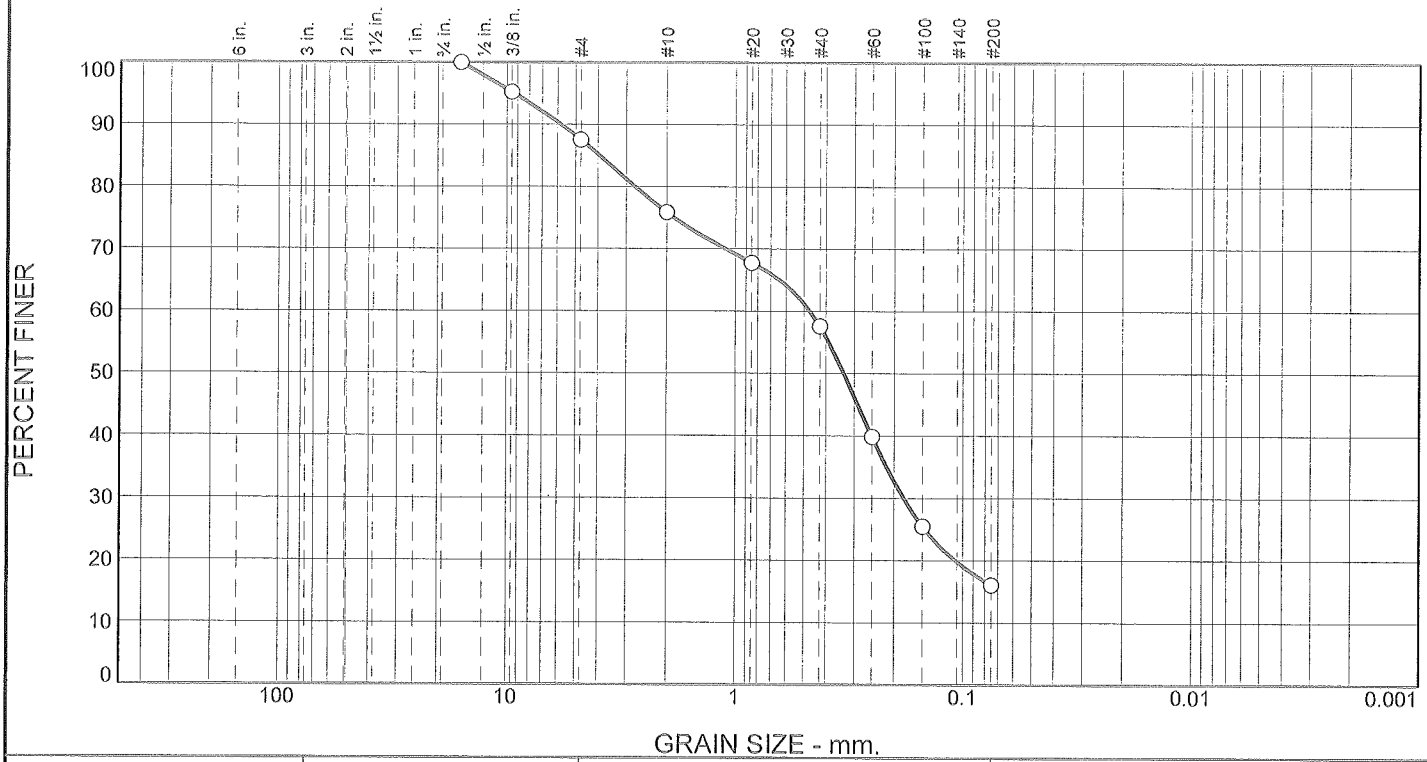
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	12.4	11.7	18.3	41.5	16.1	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
3/8"	95.2		
#4	87.6		
#10	75.9		
#20	67.8		
#40	57.6		
#60	39.8		
#100	25.5		
#200	16.1		

* (no specification provided)

Material Description

Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 5.7995 D_{85}= 3.9282 D_{60}= 0.4705
D_{50}= 0.3334 D_{30}= 0.1813 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/22/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-007 **Depth:** 70'-71.5' **Date Sampled:**
Sample Number: HMA#7529-14/S-17A

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 70'-71.5'
Sample Number: HMA#7529-14/S-17A
Material Description: Gray Silty Sand
Date Received: 7/15/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/22/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 746.20
Tare Wt. = 120.10
Minus #200 from wash = 15.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
858.30	120.10	5/8"	0.00	0.00	100.0
		3/8"	1518.60	1483.50	95.2
		#4	1413.50	1356.70	87.6
		#10	1600.30	1514.00	75.9
		#20	1126.50	1066.80	67.8
		#40	1019.70	944.30	57.6
		#60	1008.80	878.00	39.8
		#100	949.40	843.40	25.5
		#200	1089.10	1019.50	16.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	12.4	12.4	11.7	18.3	41.5	71.5			16.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1077	0.1813	0.3334	0.4705	2.7508	3.9282	5.7995	9.2884

Fineness Modulus
2.33

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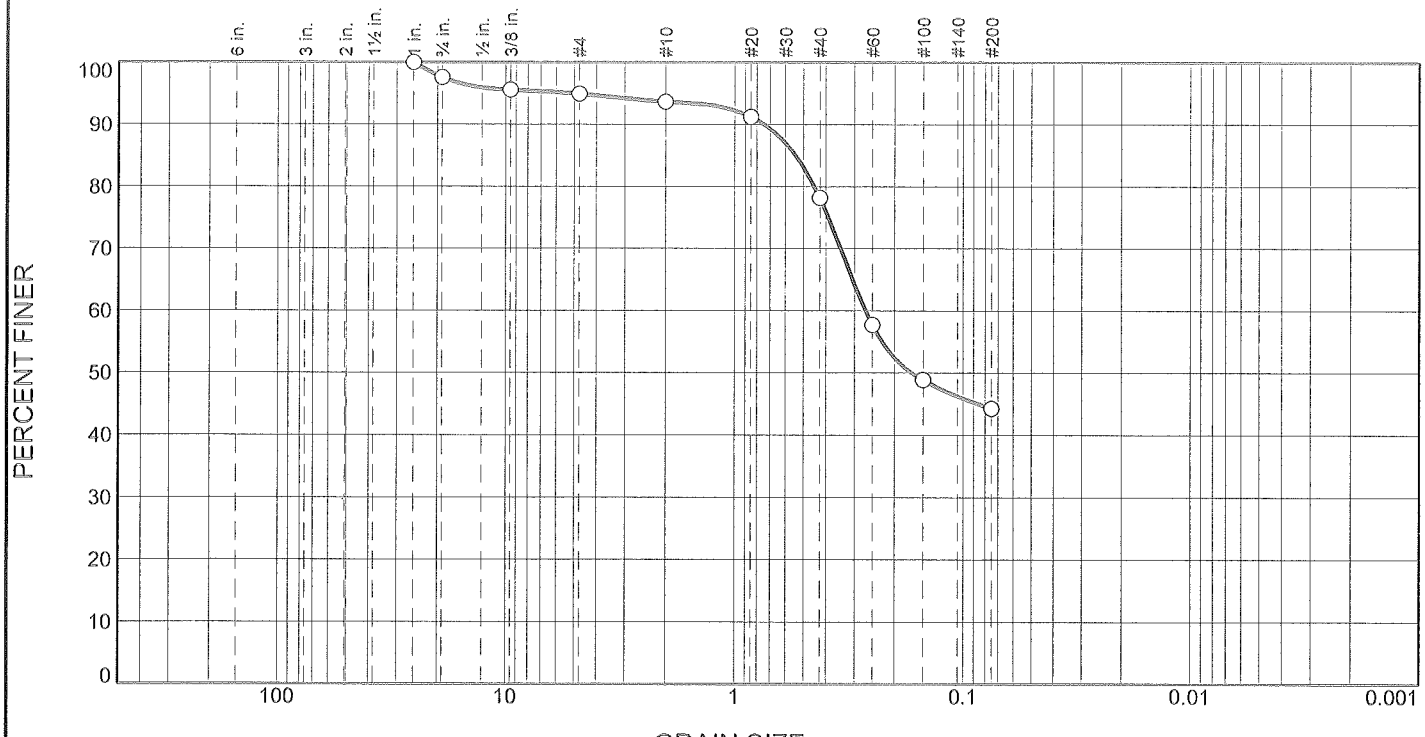
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.4	2.7	1.3	15.4	33.9	44.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	97.6		
3/8"	95.6		
#4	94.9		
#10	93.6		
#20	91.2		
#40	78.2		
#60	57.7		
#100	48.9		
#200	44.3		

* (no specification provided)

Material Description

Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.7419 D_{85}= 0.5416 D_{60}= 0.2679
D_{50}= 0.1680 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/22/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-007 **Depth:** 90'-91.5' **Date Sampled:**
Sample Number: HMA#7529-15/S-21A

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

7/25/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 90'-91.5'
Sample Number: HMA#7529-15/S-21A
Material Description: Gray Silty Sand
Date Received: 7/15/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 7/22/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 401.90
Tare Wt. = 118.70
Minus #200 from wash = 44.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
625.60	118.70	1"	0.00	0.00	100.0
		3/4"	1517.00	1504.90	97.6
		3/8"	1493.70	1483.40	95.6
		#4	1359.90	1356.60	94.9
		#10	1520.60	1514.10	93.6
		#20	1078.90	1066.70	91.2
		#40	1010.20	944.10	78.2
		#60	982.00	878.10	57.7
		#100	888.10	843.30	48.9
		#200	1042.60	1019.40	44.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.4	2.7	5.1	1.3	15.4	33.9	50.6			44.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1680	0.2679	0.4488	0.5416	0.7419	5.0229

Fineness Modulus
1.25

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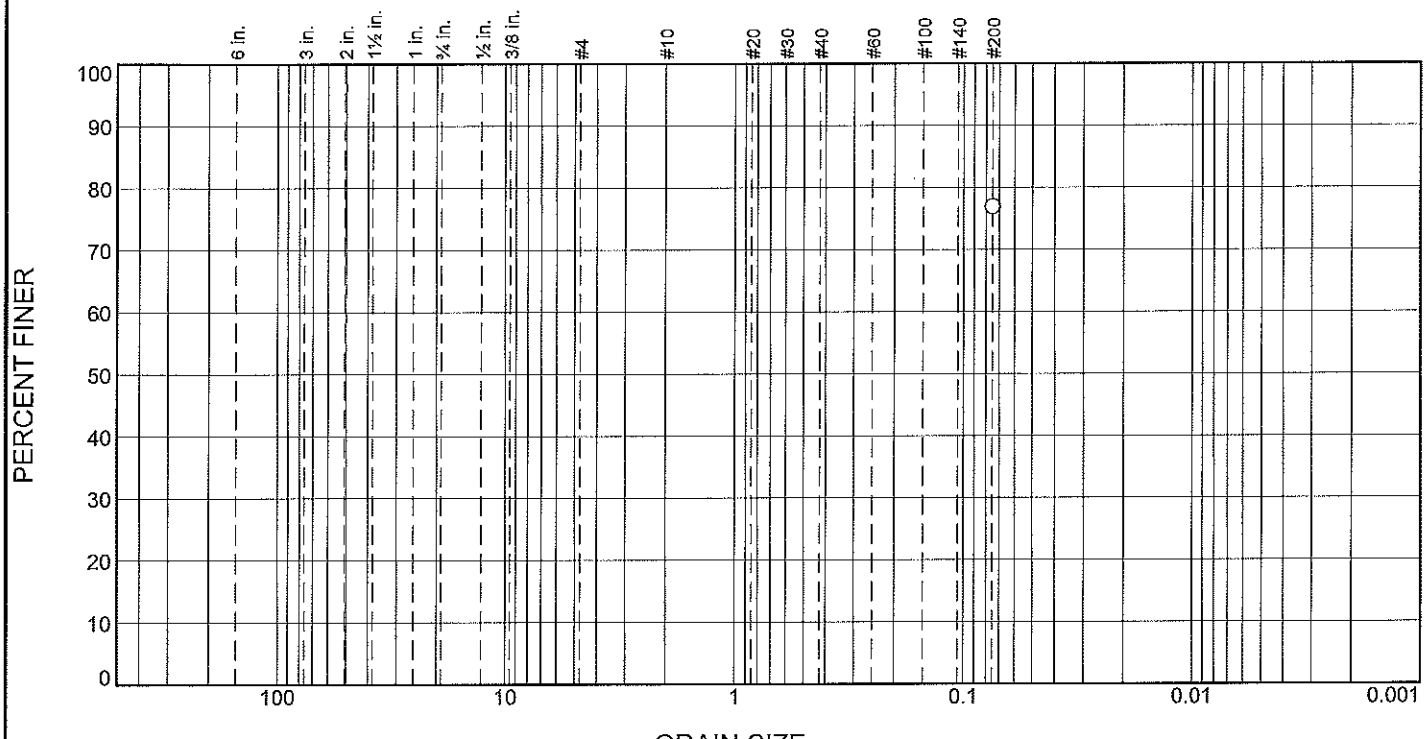
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						76.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	76.9		

* (no specification provided)

Material Description

Gray Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 7/15/13 **Date Tested:** 7/22/13

Tested By: JF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-007 **Depth:** 100'-101.5' **Date Sampled:**

Sample Number: HMA#7529-16/S-23B

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Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

11/26/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 100'-101.5'
Sample Number: HMA#7529-16/S-23B
Material Description: Gray Silt
Date Received: 7/15/13
USCS Classification: ML
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF
Test Date: 7/22/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 149.50
Tare Wt. = 116.10
Minus #200 from wash = 76.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
260.90	116.10	#200			76.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										76.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

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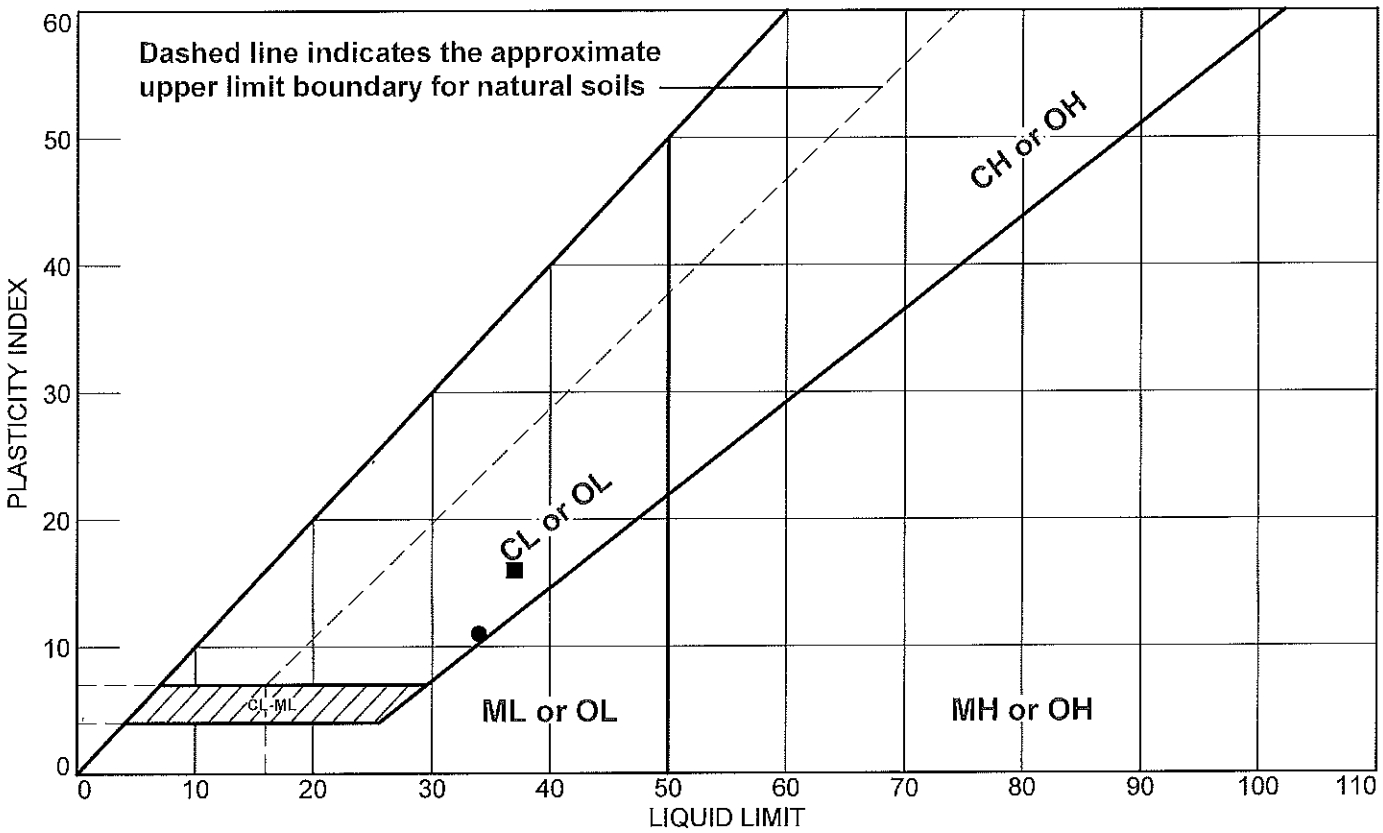
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring E360-B-007	HMA#7529-13/S-14A	60'-61.5'	28.4	23	34	11	CL or OL
■	Boring E360-B-007	HMA#7555-1/S-13A	50'-51.5'	33.9	21	37	16	CL
▲	Boring E360-B-007	HMA#7529-16/S-23B	100'-101.5'	23.8	NP	NP	NP	ML
◆	Boring E360-B-007	HMA#7529-16/S-23B	100'-101.5'	23.8	NP	NP	NP	ML
▼	Boring E360-B-007	HMA#7555-2/S-22B	95'-96.5'	23.6	21	21	NP	ML

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Project No.: 12-450

Figure

Tested By: ● JF/TP ■ TEP ▲ JF/TP ◆ JF ▼ TEP **Checked By:** JAM

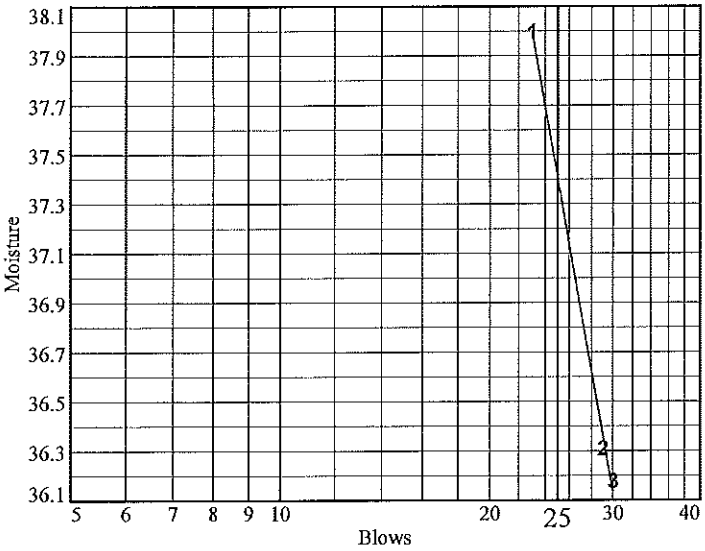
LIQUID AND PLASTIC LIMIT TEST DATA

11/26/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 50'-51.5'
Sample Number: HMA#7555-1/S-13A
Material Description: Gray Clay
USCS: CL
Tested by: TEP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	38.6	35.7	38.3			
Dry+Tare	31.0	29.2	31.1			
Tare	11.0	11.3	11.2			
# Blows	23	29	30			
Moisture	38.0	36.3	36.2			



Liquid Limit= 37
Plastic Limit= 21
Plasticity Index= 16
Natural Moisture= 33.9
Liquidity Index= 0.8

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	20.2	20.4	20.8		
Dry+Tare	19.0	19.1	19.7		
Tare	13.5	13.5	13.7		
Moisture	21.8	23.2	18.3		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
147.2	117.9	31.5	33.9

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

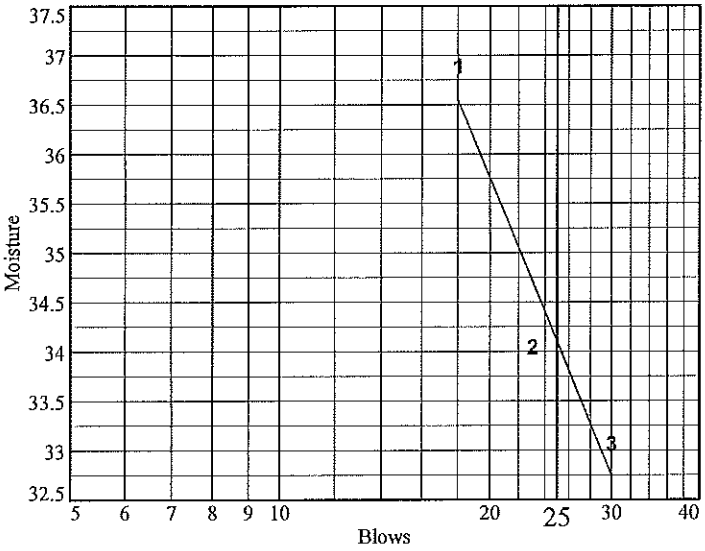
LIQUID AND PLASTIC LIMIT TEST DATA

11/26/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 60'-61.5'
Sample Number: HMA#7529-13/S-14A
Material Description: Gray Clay
USCS: CL or OL
Tested by: JF/TP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	27.7	27.94	30.5			
Dry+Tare	23.9	24.3	26.3			
Tare	13.6	13.61	13.6			
# Blows	18	23	30			
Moisture	36.9	34.1	33.1			



Liquid Limit= 34
Plastic Limit= 23
Plasticity Index= 11
Natural Moisture= 28.4
Liquidity Index= 0.5

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	17.93	18.80	18.6		
Dry+Tare	16.7	17.4	17.2		
Tare	11.20	11.22	11.22		
Moisture	22.4	22.7	23.4		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
379.7	321.0	114.0	28.4

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

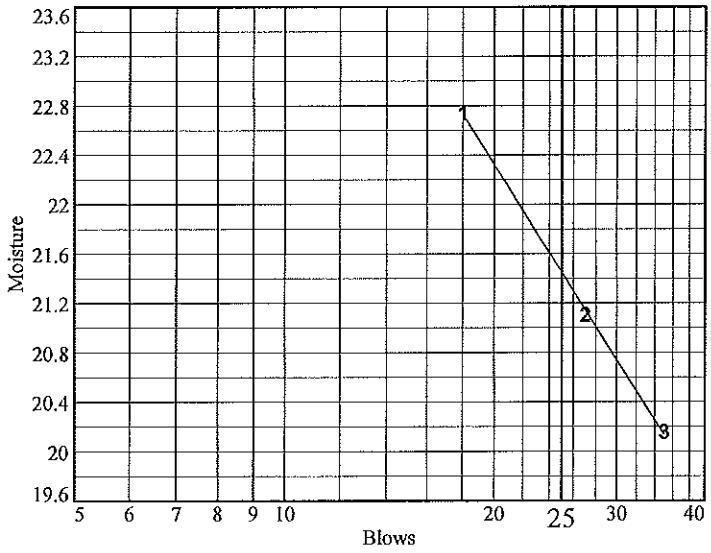
LIQUID AND PLASTIC LIMIT TEST DATA

11/26/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 95'-96.5'
Sample Number: HMA#7555-2/S-22B
Material Description: Olive Gray Silt
USCS: ML
Tested by: TEP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	39.8	33.0	40.9			
Dry+Tare	34.5	29.2	35.9			
Tare	11.2	11.2	11.1			
# Blows	18	27	35			
Moisture	22.7	21.1	20.2			



Liquid Limit= 21
Plastic Limit= 21
Plasticity Index= NP
Natural Moisture= 23.6

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	39.8	33.0	40.9		
Dry+Tare	34.5	29.2	35.9		
Tare	11.2	11.2	11.1		
Moisture	22.7	21.1	20.2		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
171.2	145.5	36.6	23.6

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

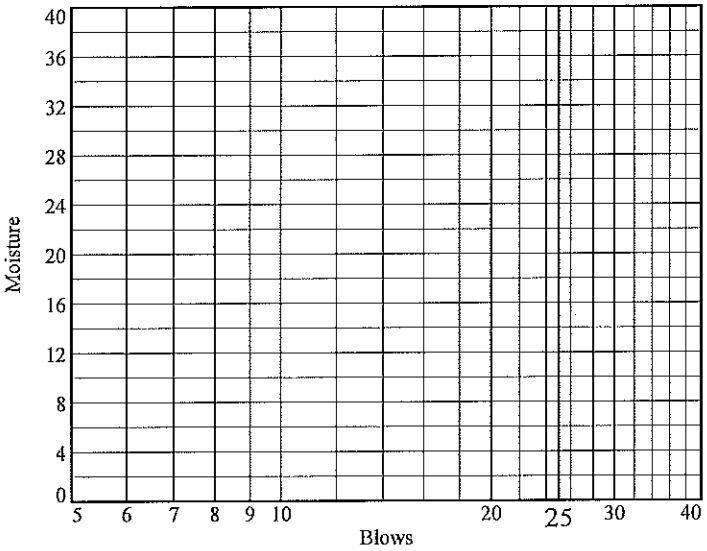
LIQUID AND PLASTIC LIMIT TEST DATA

11/26/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-007
Depth: 100'-101.5'
Sample Number: HMA#7529-16/S-23B
Material Description: Gray Clay
USCS: ML
Tested by: JF/TP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare						
Dry+Tare						
Tare						
# Blows						
Moisture						



Liquid Limit= NP
Plastic Limit= NP
Plasticity Index= NP
Natural Moisture= 23.8

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare					
Dry+Tare					
Tare					
Moisture					

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
295.3	260.9	116.1	23.8

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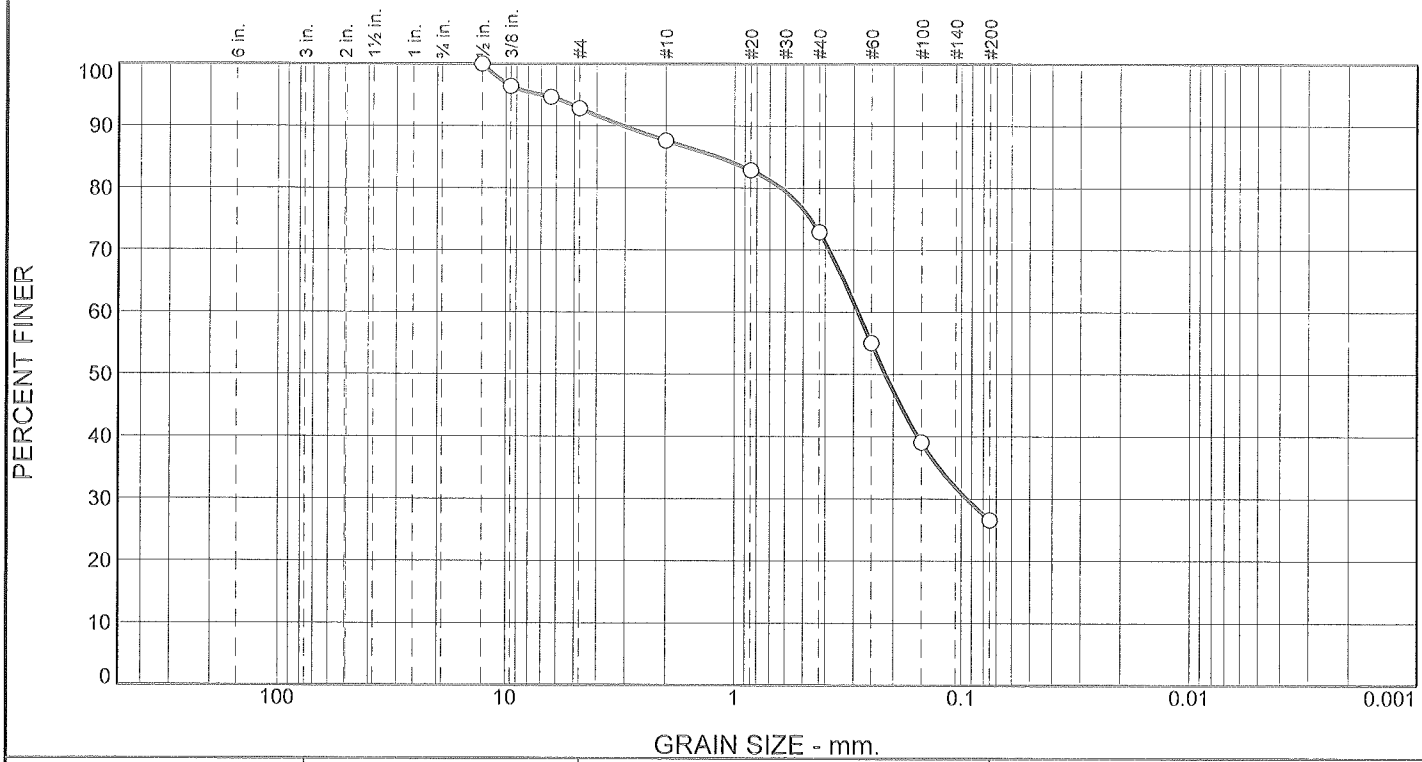
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.2	5.1	14.8	46.3	26.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	96.4		
1/4"	94.7		
#4	92.8		
#10	87.7		
#20	82.8		
#40	72.9		
#60	55.0		
#100	39.1		
#200	26.6		

* (no specification provided)

Material Description

Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 3.0643 D_{85}= 1.1923 D_{60}= 0.2866
D_{50}= 0.2164 D_{30}= 0.0944 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/2013 **Date Tested:** 8/8/2013
Tested By: JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-011 **Depth:** 2.5'-4.0' **Date Sampled:**
Sample Number: HMA#7538-1/S-2

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00891, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/20/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 2.5'-4.0'
Sample Number: HMA#7538-1/S-2
Material Description: Brown Silty Sand
Date Received: 8/5/2013
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF
Test Date: 8/8/2013
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 444.60
Tare Wt. = 214.40
Minus #200 from wash = 25.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
524.00	214.40	1/2"	0.00	0.00	100.0
		3/8"	1494.50	1483.50	96.4
		1/4"	1388.30	1382.80	94.7
		#4	1362.20	1356.50	92.8
		#10	1529.90	1513.90	87.7
		#20	1081.30	1066.40	82.8
		#40	975.00	944.20	72.9
		#60	933.40	878.10	55.0
		#100	892.90	843.40	39.1
		#200	1057.90	1019.30	26.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	7.2	7.2	5.1	14.8	46.3	66.2			26.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0944	0.2164	0.2866	0.6247	1.1923	3.0643	6.9349

Fineness Modulus
1.57

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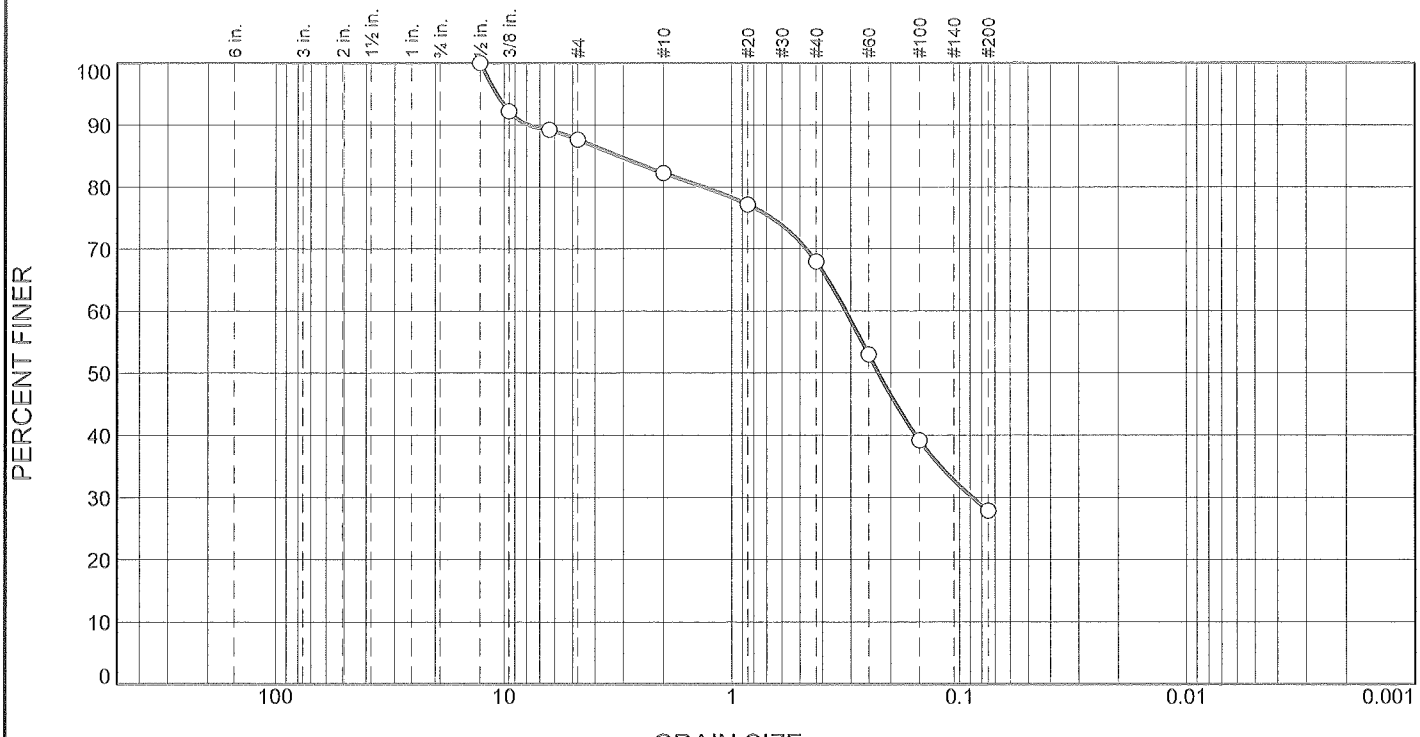
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	12.4	5.4	14.3	40.0	27.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	92.2		
1/4"	89.2		
#4	87.6		
#10	82.2		
#20	77.1		
#40	67.9		
#60	53.0		
#100	39.2		
#200	27.9		

* (no specification provided)

Material Description

Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 7.8274 D_{85}= 3.1442 D_{60}= 0.3152
D_{50}= 0.2262 D_{30}= 0.0877 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/2013 **Date Tested:** 8/8/2013

Tested By: JF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-011 **Depth:** 12.5'-14' **Date Sampled:**
Sample Number: HMA#7538-2/S-6

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/20/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 12.5'-14'
Sample Number: HMA#7538-2/S-6
Material Description: Brown Silty Sand
Date Received: 8/5/2013
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF
Test Date: 8/8/2013
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 551.80
Tare Wt. = 199.10
Minus #200 from wash = 27.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
683.00	199.10	1/2"	0.00	0.00	100.0
		3/8"	1521.10	1483.40	92.2
		1/4"	1397.40	1382.90	89.2
		#4	1364.30	1356.70	87.6
		#10	1540.00	1513.90	82.2
		#20	1091.30	1066.60	77.1
		#40	988.70	944.20	67.9
		#60	950.50	878.10	53.0
		#100	910.10	843.40	39.2
		#200	1074.30	1019.50	27.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	12.4	12.4	5.4	14.3	40.0	59.7			27.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0877	0.2262	0.3152	1.3282	3.1442	7.8274	10.7477

Fineness Modulus
1.86

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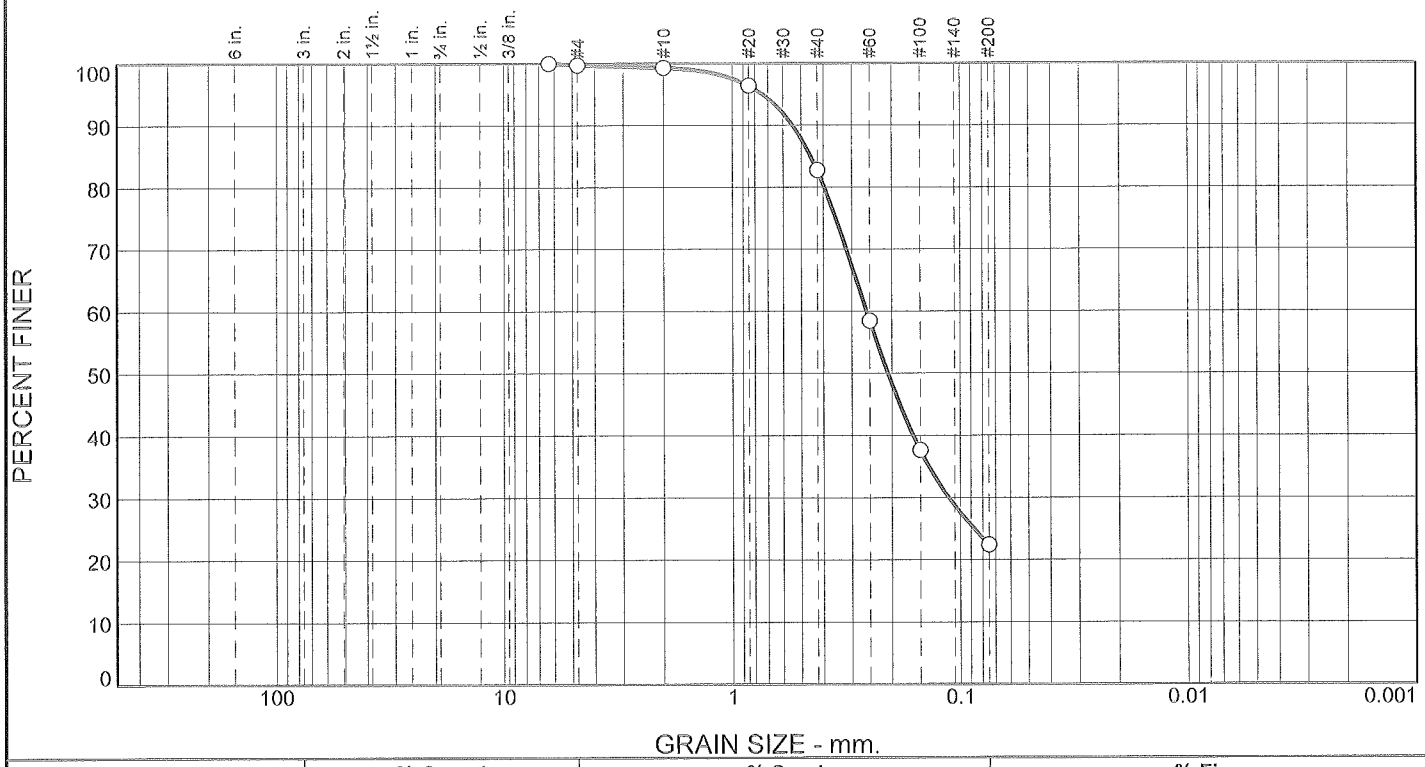
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.5	16.5	60.4	22.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/4"	100.0		
#4	99.8		
#10	99.3		
#20	96.4		
#40	82.8		
#60	58.5		
#100	37.6		
#200	22.4		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.5450 D_{85}= 0.4537 D_{60}= 0.2581
D_{50}= 0.2078 D_{30}= 0.1126 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/2013 **Date Tested:** 8/9/2013

Tested By: JF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-011 **Depth:** 30'-31' **Date Sampled:**

Sample Number: HMA#7538-3/S-10

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/20/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 30'-31'
Sample Number: HMA#7538-3/S-10
Material Description: Gray Brown Silty Sand
Date Received: 8/5/2013
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF
Test Date: 8/9/2013
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 483.10
Tare Wt. = 198.30
Minus #200 from wash = 21.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
559.60	198.30	1/4"	0.00	0.00	100.0
		#4	1357.50	1356.70	99.8
		#10	1515.80	1514.10	99.3
		#20	1077.00	1066.50	96.4
		#40	993.50	944.20	82.8
		#60	965.80	878.00	58.5
		#100	918.70	843.40	37.6
		#200	1074.30	1019.40	22.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	0.5	16.5	60.4	77.4			22.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1126	0.2078	0.2581	0.3956	0.4537	0.5450	0.7372

Fineness Modulus
1.06

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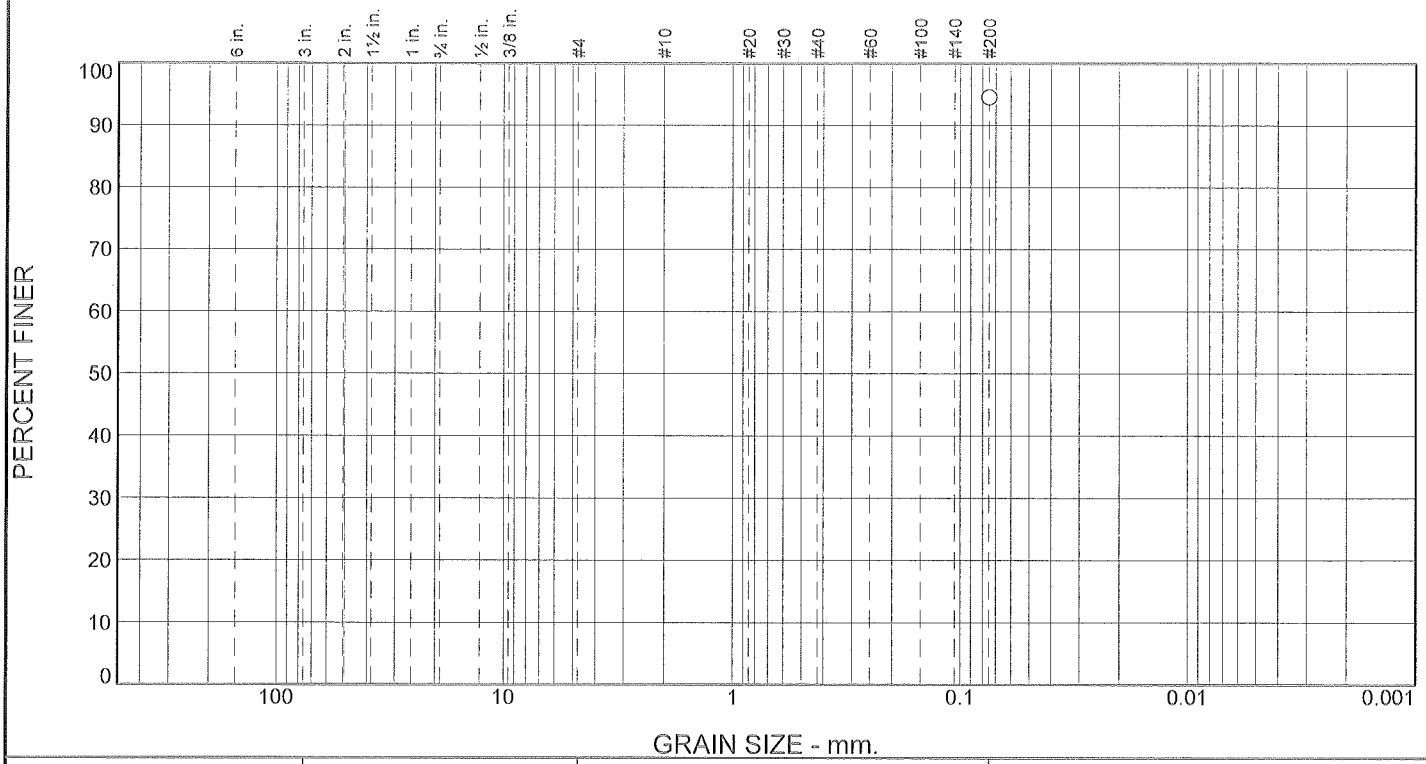
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						94.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	94.6		

* (no specification provided)

Material Description

Gray Silty Clay

Atterberg Limits (ASTM D 4318)

PL= 18 LL= 22 PI= 4

Classification

USCS (D 2487)= CL-ML AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/2013 **Date Tested:** 8/9/2013

Tested By: JF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-011 **Depth:** 35'-36.5' **Date Sampled:**

Sample Number: HMA#7538-4/S-11

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450

Figure

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/20/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 35'-36.5'
Sample Number: HMA#7538-4/S-11
Material Description: Gray Silty Clay
Date Received: 8/5/2013 **PL:** 18 **LL:** 22 **PI:** 4
USCS Classification: CL-ML
#200 Wash Method: ASTM D1140
Tested By: JF
Test Date: 8/9/2013
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 37.30
Tare Wt. = 31.30
Minus #200 from wash = 94.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
141.90	31.30	#200			94.6

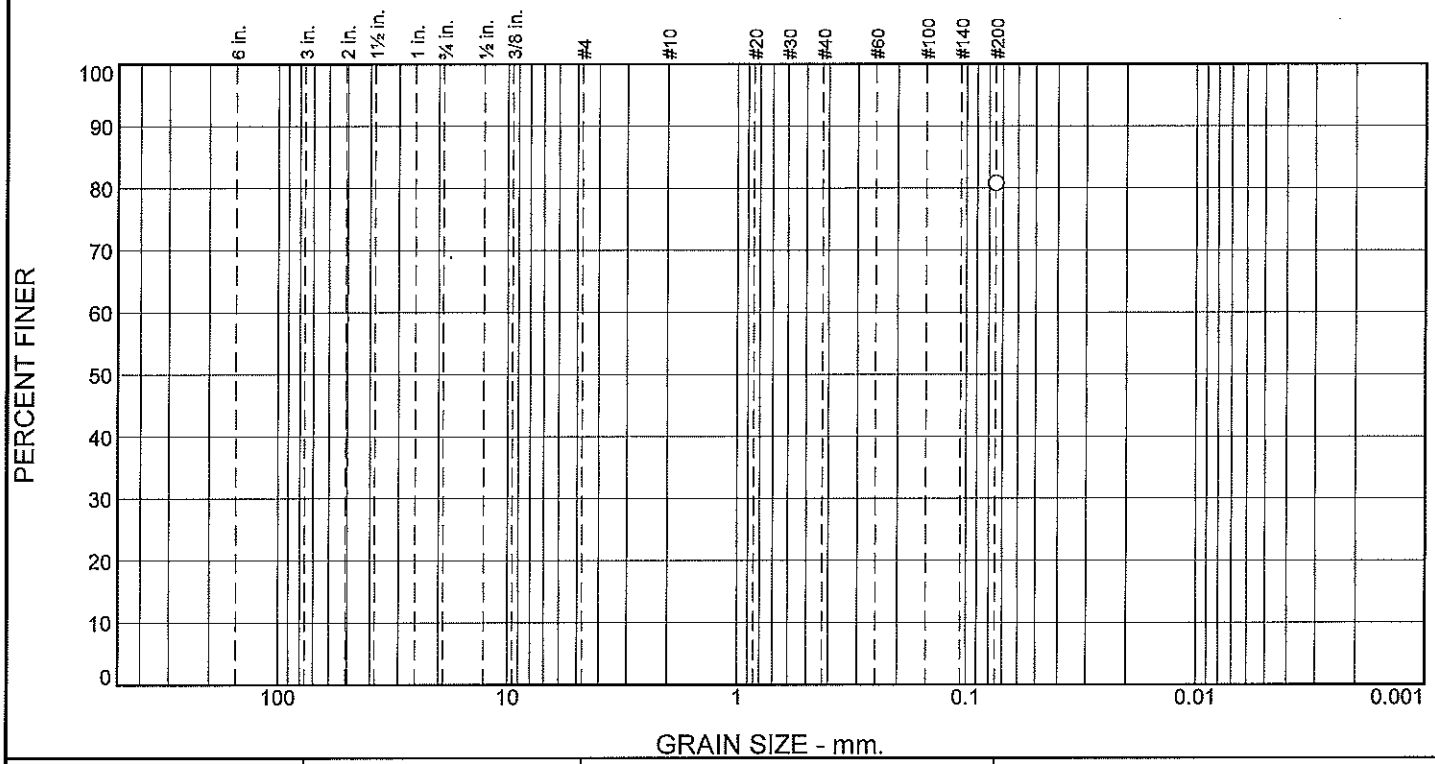
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										94.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						80.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	80.8		

* (no specification provided)

Material Description

Gray Clay

Atterberg Limits (ASTM D 4318)

PL= 18 LL= 41 PI= 23

Classification

USCS (D 2487)= CL AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/11/13

Tested By: TEP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-011 **Depth:** 40'-41.5' **Date Sampled:**

Sample Number: HMA#7555-3/S-12

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/18/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 40'-41.5'
Sample Number: HMA#7555-3/S-12
Material Description: Gray Clay
Date Received: 10/4/13 **PL:** 18 **LL:** 41 **PI:** 23
USCS Classification: CL
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 10/11/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 50.30
Tare Wt. = 35.40
Minus #200 from wash = 80.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
113.10	35.40	#200			80.8

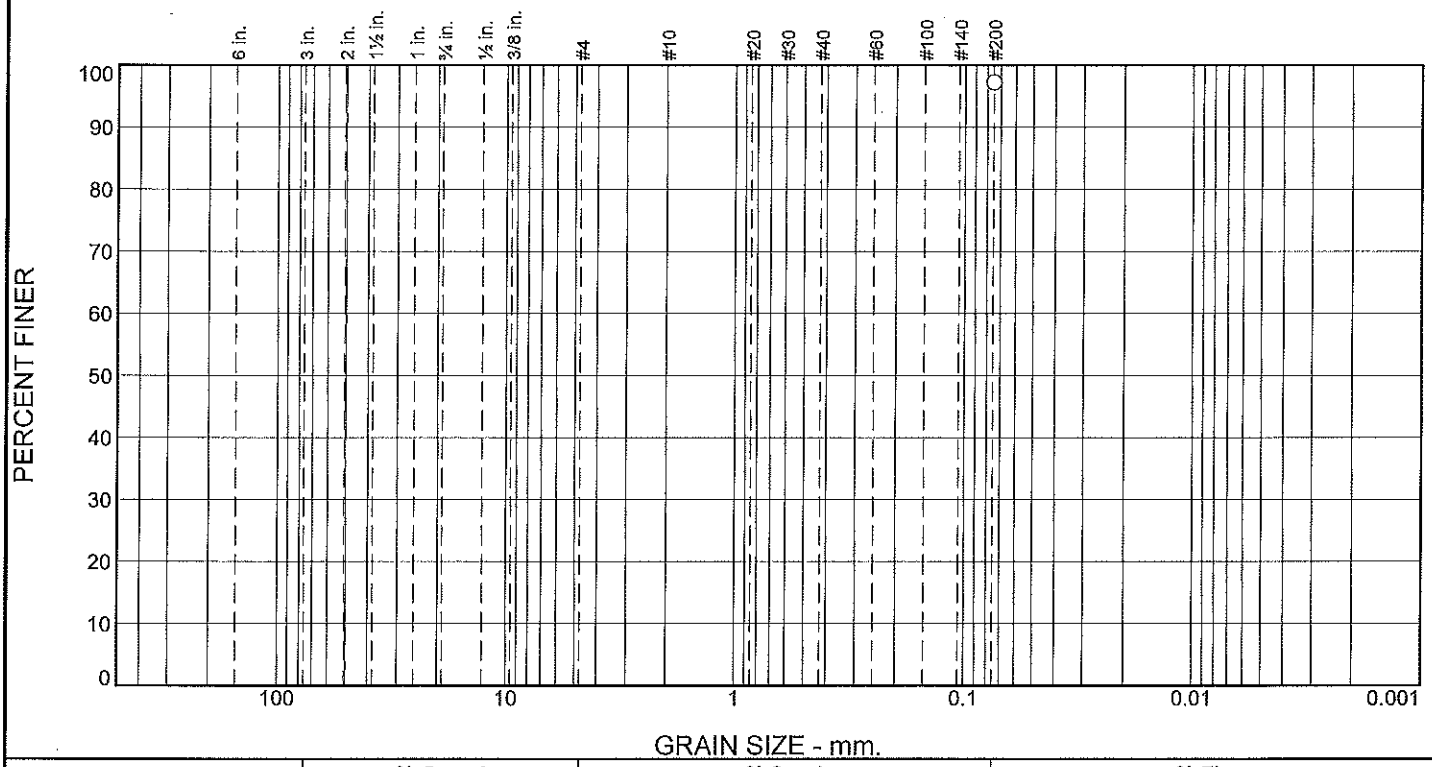
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										80.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						97.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	97.2		

* (no specification provided)

Material Description

Gray Clay

Atterberg Limits (ASTM D 4318)

PL= 26 LL= 45 PI= 19

Classification

USCS (D 2487)= CL AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/2013 **Date Tested:** 8/9/2013

Tested By: JF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-011 **Depth:** 50'-51.5' **Date Sampled:**

Sample Number: HMA#7538-5/S-14

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

11/26/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 50'-51.5' **Sample Number:** HMA#7538-5/S-14
Material Description: Gray Clay
Date Received: 8/5/2013 **PL:** 26 **LL:** 45 **PI:** 19
USCS Classification: CL
#200 Wash Method: ASTM D1140
Tested By: JF **Test Date:** 8/9/2013
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 34.00
Tare Wt. = 31.20
Minus #200 from wash = 97.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
132.70	31.20	#200			97.2

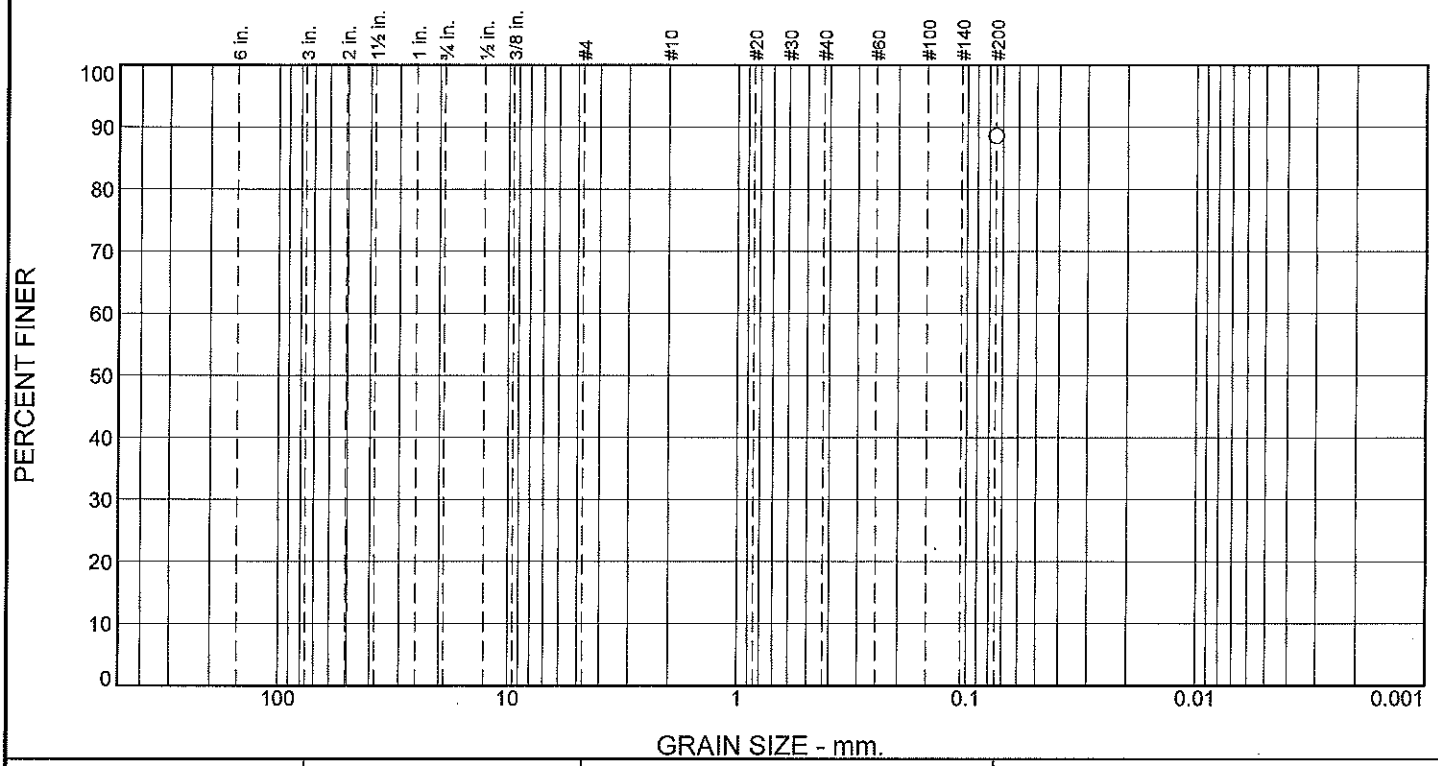
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										97.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						88.6	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	88.6		

* (no specification provided)

Material Description

Gray Clay

Atterberg Limits (ASTM D 4318)

PL= 17 LL= 37 PI= 20

Classification

USCS (D 2487)= CL AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/14/13

Tested By: TEP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-011 **Depth:** 55'-56' **Date Sampled:**

Sample Number: HMA#7555-4/S-15

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/18/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 55'-56'
Sample Number: HMA#7555-4/S-15
Material Description: Gray Clay
Date Received: 10/4/13 **PL:** 17 **LL:** 37 **PI:** 20
USCS Classification: CL
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 10/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 45.50
Tare Wt. = 37.00
Minus #200 from wash = 88.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
111.50	37.00	#200			88.6

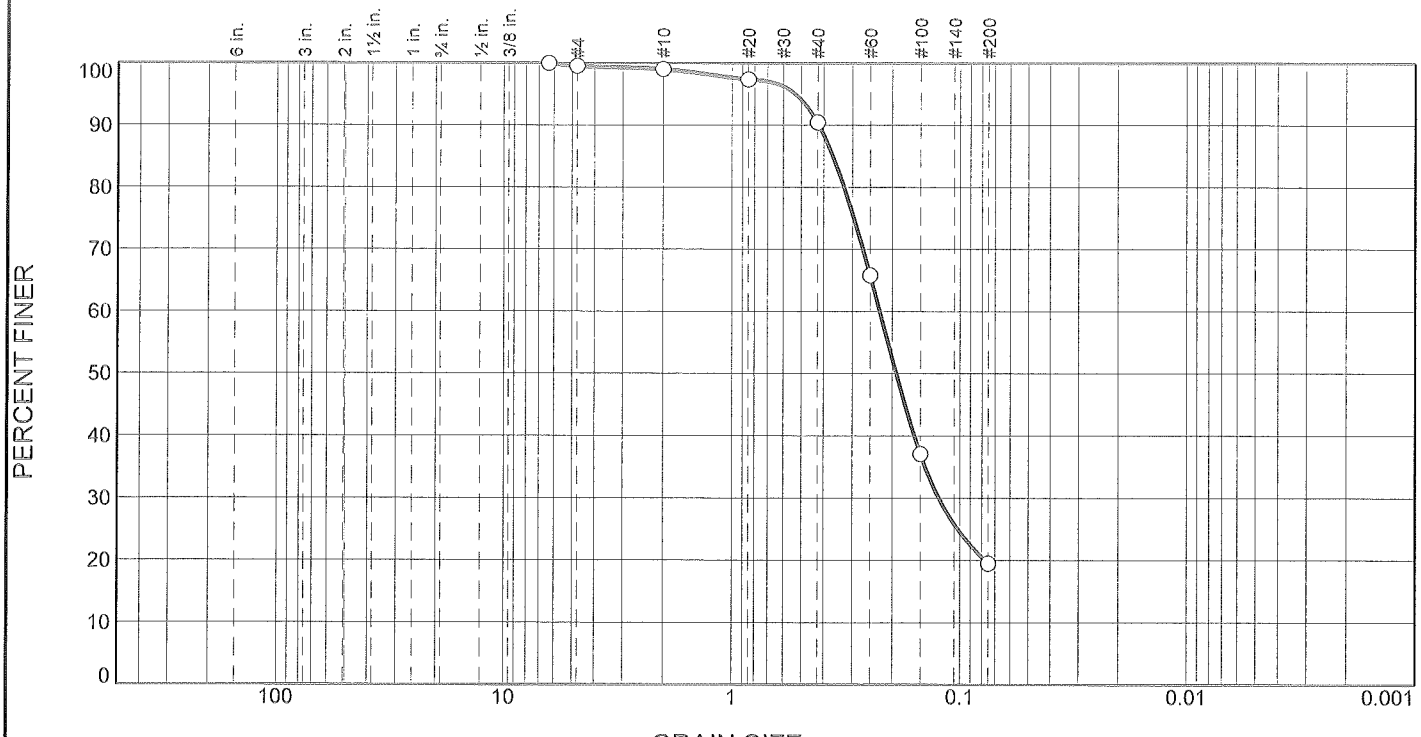
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										88.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	0.5	8.7	70.9	19.5	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/4"	100.0		
#4	99.6		
#10	99.1		
#20	97.4		
#40	90.4		
#60	65.8		
#100	37.1		
#200	19.5		

* (no specification provided)

Material Description

Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.4187 D_{85}= 0.3641 D_{60}= 0.2268
D_{50}= 0.1919 D_{30}= 0.1241 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/2013 **Date Tested:** 8/9/2013
Tested By: JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-011 **Depth:** 65'-66.5' **Date Sampled:**
Sample Number: HMA#7538-6/S-17

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/20/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 65'-66.5'
Sample Number: HMA#7538-6/S-17
Material Description: Brown Silty Sand
Date Received: 8/5/2013
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF
Test Date: 8/9/2013
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 489.20
Tare Wt. = 118.20
Minus #200 from wash = 18.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
572.40	118.20	1/4"	0.00	0.00	100.0
		#4	1358.60	1356.60	99.6
		#10	1516.30	1514.00	99.1
		#20	1074.00	1066.60	97.4
		#40	975.80	944.10	90.4
		#60	989.90	878.00	65.8
		#100	973.70	843.20	37.1
		#200	1099.10	1019.30	19.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.4	0.4	0.5	8.7	70.9	80.1			19.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0774	0.1241	0.1919	0.2268	0.3254	0.3641	0.4187	0.5285

Fineness Modulus
0.94

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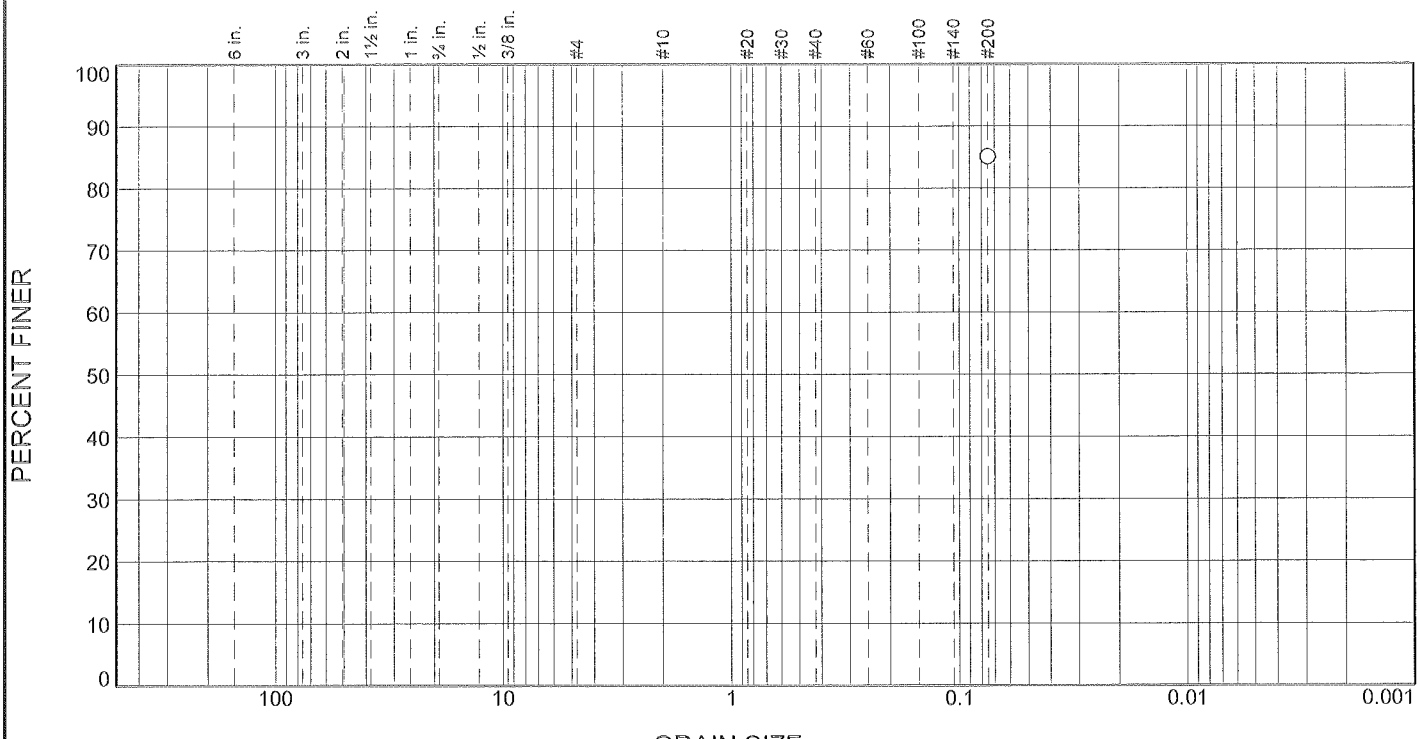
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						85.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	85.1		

* (no specification provided)

Material Description

Gray Clay

Atterberg Limits (ASTM D 4318)

PL= 21 LL= 47 PI= 26

Classification

USCS (D 2487)= CL or OL AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/12/13

Tested By: JF/TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-011 **Depth:** 90'-91.5' **Date Sampled:**

Sample Number: HMA#7538-7/S-22

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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GRAIN SIZE DISTRIBUTION TEST DATA

8/20/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 90'-91.5'
Sample Number: HMA#7538-7/S-22
Material Description: Gray Clay
Date Received: 8/5/13 **PL:** 21 **LL:** 47 **PI:** 26
USCS Classification: CL or OL
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/12/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 49.50
Tare Wt. = 31.30
Minus #200 from wash = 85.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
153.60	31.30	#200			85.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										85.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

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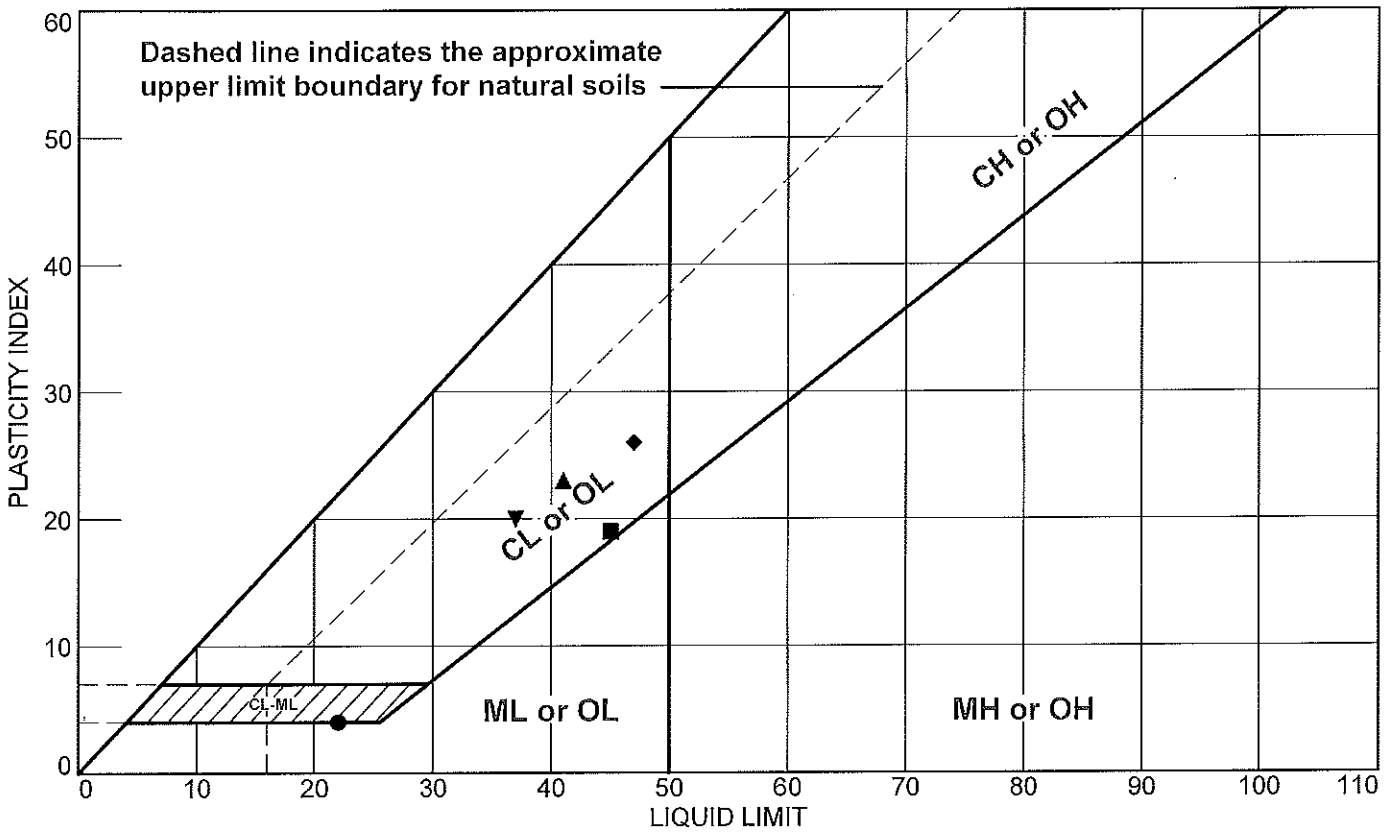
BLDG-2018-00983, BLDG-2018-00985

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring E360-B-011	HMA#7538-4/ S-11	35'-36.5'	35.4	18	22	4	CL-ML
■	Boring E360-B-011	HMA#7538-5/ S-14	50'-51.5'	41.0	26	45	19	CL
▲	Boring E360-B-011	HMA#7555-3/ S-12	40'-41.5'	38.0	18	41	23	CL
◆	Boring E360-B-011	HMA#7538-7/ S-22	90'-91.5'	20.9	21	47	26	CL
▼	Boring E360-B-011	HMA#7555-4/ S-15	55'-56'	34.4	17	37	20	CL

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Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

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Project No.: 12-450

Figure

Tested By: ● JF/TP ■ JF/TP ▲ TEP ◆ JF/TP ▼ TEP/SR **Checked By:** JAM

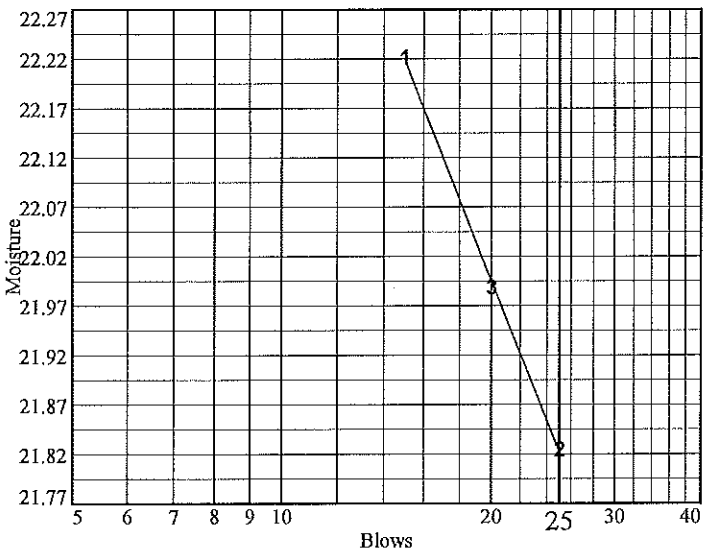
LIQUID AND PLASTIC LIMIT TEST DATA

11/26/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 35'-36.5'
Sample Number: HMA#7538-4/S-11
Material Description: Gray Silty Clay
USCS: CL-ML
Tested by: JF/TP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	37.5	41.8	34.4			
Dry+Tare	32.7	36.3	30.2			
Tare	11.1	11.1	11.1			
# Blows	15	25	20			
Moisture	22.2	21.8	22.0			



Liquid Limit= 22
Plastic Limit= 18
Plasticity Index= 4
Natural Moisture= 35.4
Liquidity Index= 4.3

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	25.9	22.6	22.3		
Dry+Tare	24.1	20.8	20.5		
Tare	13.6	11.0	11.1		
Moisture	17.1	18.4	19.1		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
181.1	141.9	31.1	35.4

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BLDG-2018-00983, BLDG-2018-00985

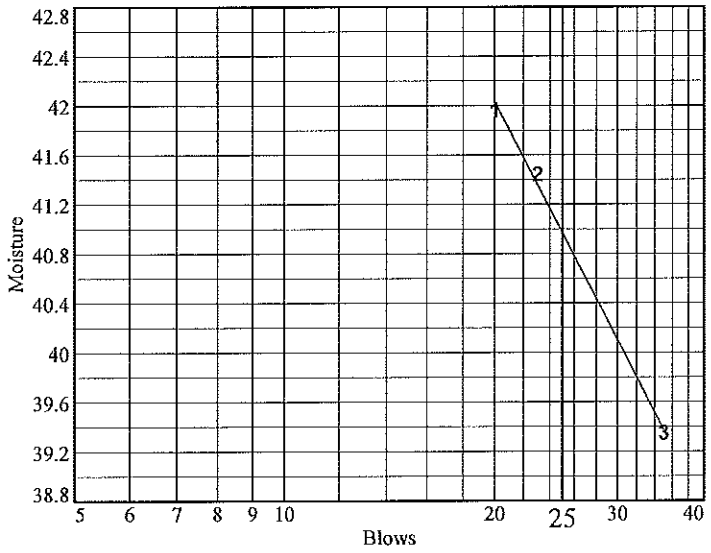
LIQUID AND PLASTIC LIMIT TEST DATA

11/26/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 40'-41.5'
Sample Number: HMA#7555-3/S-12
Material Description: Gray Clay
USCS: CL
Tested by: TEP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	38.6	38.5	32.8			
Dry+Tare	30.5	30.5	26.7			
Tare	11.2	11.2	11.2			
# Blows	20	23	35			
Moisture	42.0	41.5	39.4			



Liquid Limit= 41
Plastic Limit= 18
Plasticity Index= 23
Natural Moisture= 38.0
Liquidity Index= 0.9

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	20.8	21.6	21.7		
Dry+Tare	19.7	20.5	20.4		
Tare	13.6	13.6	13.7		
Moisture	18.0	15.9	19.4		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
142.6	113.1	35.4	38.0

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BLDG-2018-00983, BLDG-2018-00985

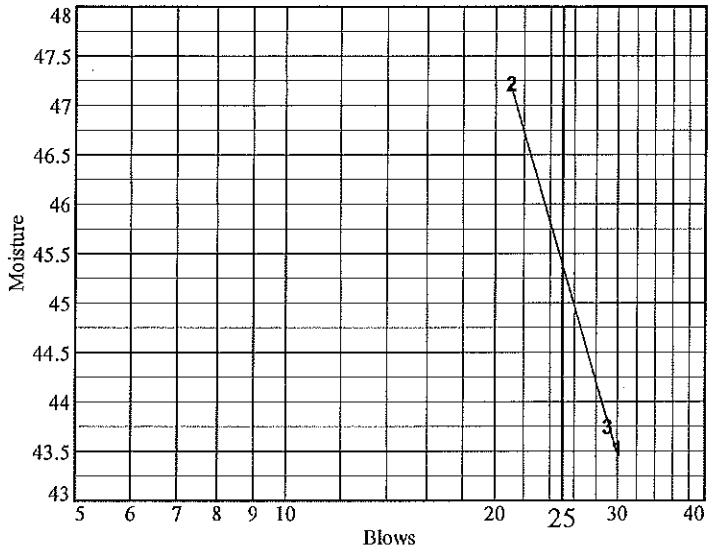
LIQUID AND PLASTIC LIMIT TEST DATA

11/26/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 50'-51.5'
Sample Number: HMA#7538-5/S-14
Material Description: Gray Clay
USCS: CL
Tested by: JF/TP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	25.7	29.5	27.3			
Dry+Tare	22.0	24.4	23.1			
Tare	13.5	13.6	13.5			
# Blows	30	21	29			
Moisture	43.5	47.2	43.7			



Liquid Limit= 45
Plastic Limit= 26
Plasticity Index= 19
Natural Moisture= 41.0
Liquidity Index= 0.8

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	17.2	18.1	17.6		
Dry+Tare	15.9	16.8	16.3		
Tare	11.2	11.3	11.2		
Moisture	27.7	23.6	25.5		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
174.3	132.7	31.2	41.0

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BLDG-2018-00983, BLDG-2018-00985

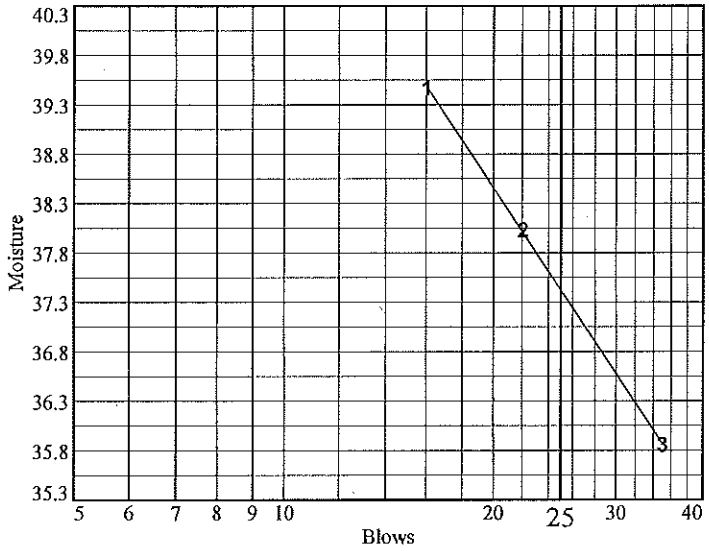
LIQUID AND PLASTIC LIMIT TEST DATA

11/26/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 55'-56'
Sample Number: HMA#7555-4/S-15
Material Description: Gray Clay
USCS: CL
Tested by: TEP/SR
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	27.2	33.7	30.8			
Dry+Tare	22.7	27.5	25.6			
Tare	11.3	11.2	11.1			
# Blows	16	22	35			
Moisture	39.5	38.0	35.9			



Liquid Limit= 37
Plastic Limit= 17
Plasticity Index= 20
Natural Moisture= 34.4
Liquidity Index= 0.9

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	20.3	20.3	20.0		
Dry+Tare	19.3	19.4	19.0		
Tare	13.5	13.7	13.6		
Moisture	17.2	15.8	18.5		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
137.1	111.5	37.0	34.4

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BLDG-2018-00983, BLDG-2018-00985

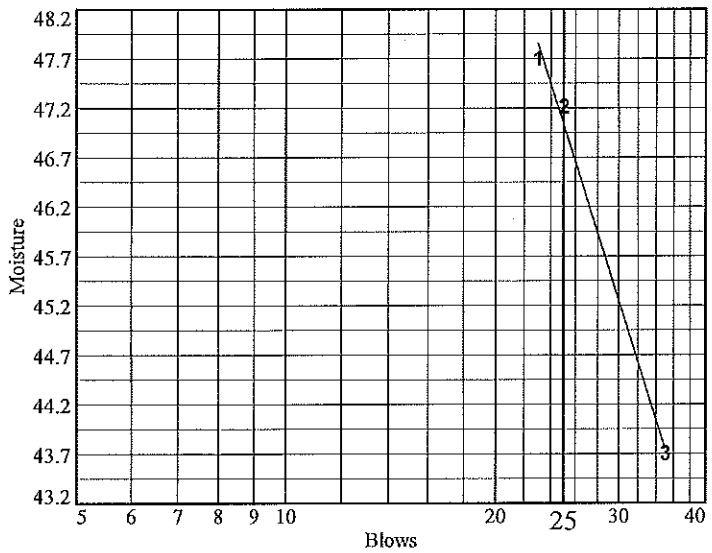
LIQUID AND PLASTIC LIMIT TEST DATA

11/26/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-011
Depth: 90'-91.5'
Sample Number: HMA#7538-7/S-22
Material Description: Gray Clay
USCS: CL
Tested by: JF/TP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	27.3	32.4	35.2			
Dry+Tare	22.1	25.6	27.9			
Tare	11.2	11.2	11.2			
# Blows	23	25	35			
Moisture	47.7	47.2	43.7			



Liquid Limit= 47
Plastic Limit= 21
Plasticity Index= 26
Natural Moisture= 20.9
Liquidity Index= 0.0

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	18.9	18.2	18.9		
Dry+Tare	17.5	17.1	17.6		
Tare	11.2	11.3	11.3		
Moisture	22.2	19.0	20.6		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
179.1	153.6	31.3	20.9

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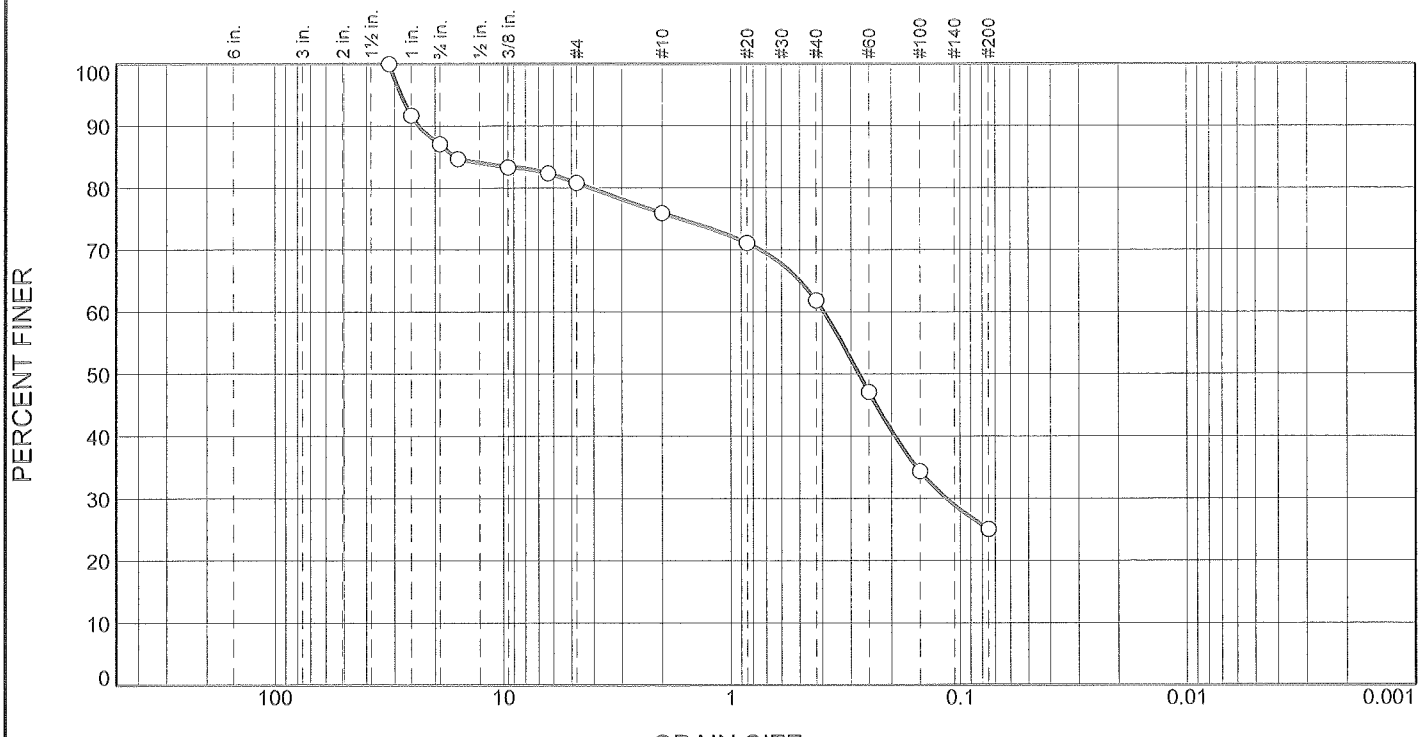
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.9	6.3	4.9	14.1	36.8	25.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/4"	100.0		
1"	91.7		
3/4"	87.1		
5/8"	84.6		
3/8"	83.3		
1/4"	82.3		
#4	80.8		
#10	75.9		
#20	71.1		
#40	61.8		
#60	47.1		
#100	34.4		
#200	25.0		

* (no specification provided)

Material Description

Brown Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 23.5903 D_{85}= 16.3733 D_{60}= 0.3932
D_{50}= 0.2759 D_{30}= 0.1151 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/12/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-012 **Depth:** 7.5'-9' **Date Sampled:**
Sample Number: HMA#7538-8/S-3

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/20/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-012
Depth: 7.5'-9'
Sample Number: HMA#7538-8/S-3
Material Description: Brown Silty Sand W/Gravel
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/12/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 460.50
Tare Wt. = 113.20
Minus #200 from wash = 24.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
572.70	113.20	1 1/4"	0.00	0.00	100.0
		1"	1507.70	1469.50	91.7
		3/4"	1526.00	1504.80	87.1
		5/8"	1483.90	1472.70	84.6
		3/8"	1489.50	1483.50	83.3
		1/4"	1387.60	1383.00	82.3
		#4	1363.70	1356.70	80.8
		#10	1536.40	1514.00	75.9
		#20	1088.90	1066.70	71.1
		#40	986.60	944.10	61.8
		#60	945.70	877.90	47.1
		#100	901.70	843.20	34.4
		#200	1062.30	1019.50	25.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	12.9	6.3	19.2	4.9	14.1	36.8	55.8			25.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1151	0.2759	0.3932	4.1290	16.3733	23.5903	28.0834

Fineness Modulus
2.44

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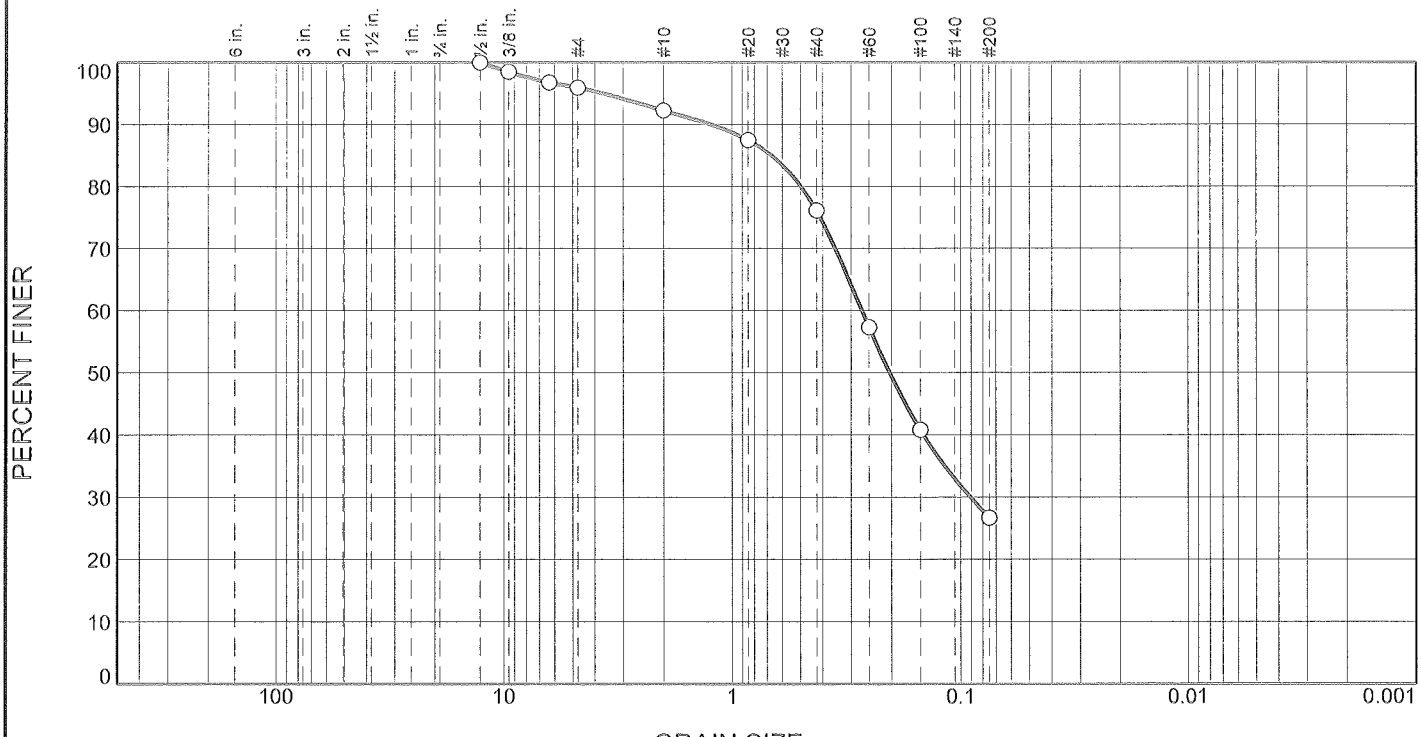
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.0	3.7	16.2	49.4	26.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	98.5		
1/4"	96.8		
#4	96.0		
#10	92.3		
#20	87.5		
#40	76.1		
#60	57.3		
#100	40.8		
#200	26.7		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 1.2351 D_{85}= 0.6689 D_{60}= 0.2685
D_{50}= 0.2032 D_{30}= 0.0905 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/12/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-012 **Depth:** 20'-21.5' **Date Sampled:**
Sample Number: HMA#7538-9/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/20/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-012
Depth: 20'-21.5'
Sample Number: HMA#7538-9/S-7
Material Description: Gray Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/12/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 544.40
Tare Wt. = 213.70
Minus #200 from wash = 25.7%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
658.70	213.70	1/2"	0.00	0.00	100.0
		3/8"	1490.20	1483.60	98.5
		1/4"	1390.70	1383.00	96.8
		#4	1360.50	1356.80	96.0
		#10	1530.50	1514.10	92.3
		#20	1088.00	1066.60	87.5
		#40	994.80	944.30	76.1
		#60	961.80	878.20	57.3
		#100	916.80	843.40	40.8
		#200	1082.40	1019.50	26.7

Fractional Components

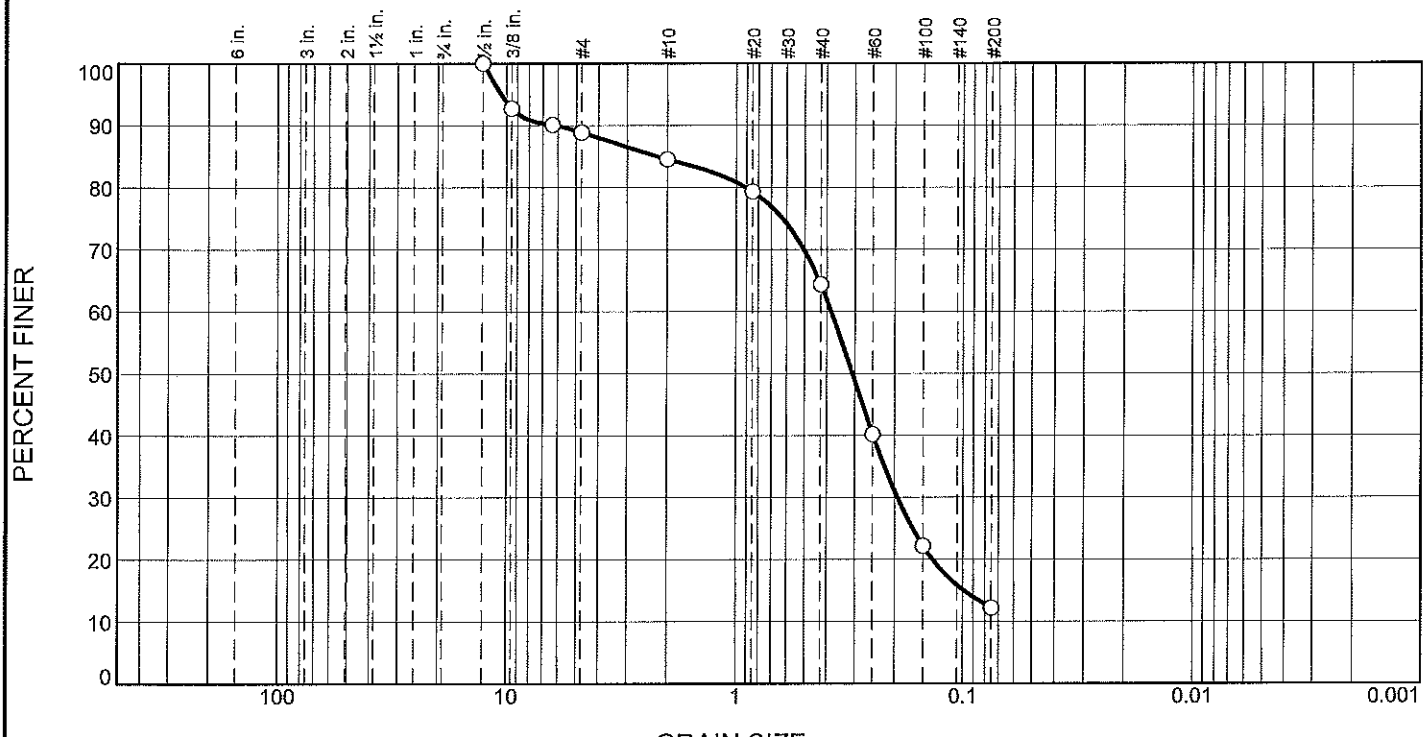
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.0	4.0	3.7	16.2	49.4	69.3			26.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0905	0.2032	0.2685	0.4965	0.6689	1.2351	3.6465

Fineness Modulus
1.34

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.1	4.4	20.2	52.1	12.2	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	92.7		
1/4"	90.1		
#4	88.9		
#10	84.5		
#20	79.3		
#40	64.3		
#60	40.2		
#100	22.2		
#200	12.2		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 6.1345 D_{85}= 2.2123 D_{60}= 0.3820
D_{50}= 0.3079 D_{30}= 0.1943 D_{15}= 0.0990
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/12/13

Tested By: JF/TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-012 **Depth:** 32.5'-34' **Date Sampled:**

Sample Number: HMA#7538-10/S-10

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

11/26/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-012
Depth: 32.5'-34'
Sample Number: HMA#7538-10/S-10
Material Description: Gray Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/12/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 565.90
Tare Wt. = 214.20
Minus #200 from wash = 11.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
613.30	214.20	1/2"	0.00	0.00	100.0
		3/8"	1512.40	1483.40	92.7
		1/4"	1393.20	1382.70	90.1
		#4	1361.60	1356.70	88.9
		#10	1531.20	1513.90	84.5
		#20	1087.40	1066.50	79.3
		#40	1003.80	944.10	64.3
		#60	974.50	878.00	40.2
		#100	915.00	843.20	22.2
		#200	1059.10	1019.30	12.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	11.1	11.1	4.4	20.2	52.1	76.7			12.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0990	0.1363	0.1943	0.3079	0.3820	0.9113	2.2123	6.1345	10.6063

Fineness Modulus
2.06

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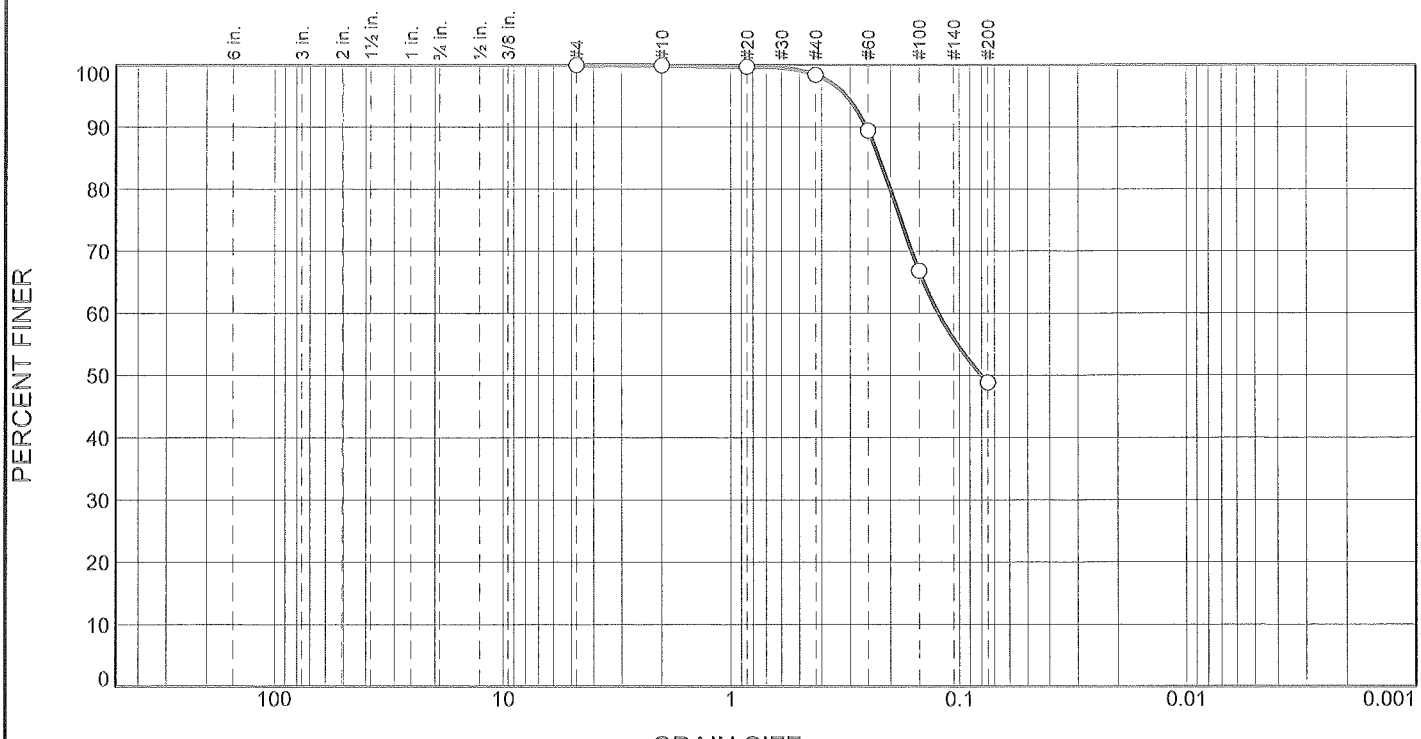
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.6	49.6	48.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	100.0		
#20	99.7		
#40	98.4		
#60	89.4		
#100	66.8		
#200	48.8		

* (no specification provided)

Material Description

Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 0.2543 D_{85}= 0.2231 D_{60}= 0.1236
D_{50}= 0.0799 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/12/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-012 **Depth:** 45'-46.5' **Date Sampled:**
Sample Number: HMA#7538-11/S-14

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/20/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-012
Depth: 45'-46.5'
Sample Number: HMA#7538-11/S-14
Material Description: Gray Silty Sand
Date Received: 8/5/13
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/12/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 339.40
Tare Wt. = 114.20
Minus #200 from wash = 47.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
540.80	114.20	#4	0.00	0.00	100.0
		#10	1514.20	1514.00	100.0
		#20	1067.40	1066.50	99.7
		#40	949.50	943.90	98.4
		#60	916.30	877.90	89.4
		#100	939.70	843.20	66.8
		#200	1096.00	1019.30	48.8

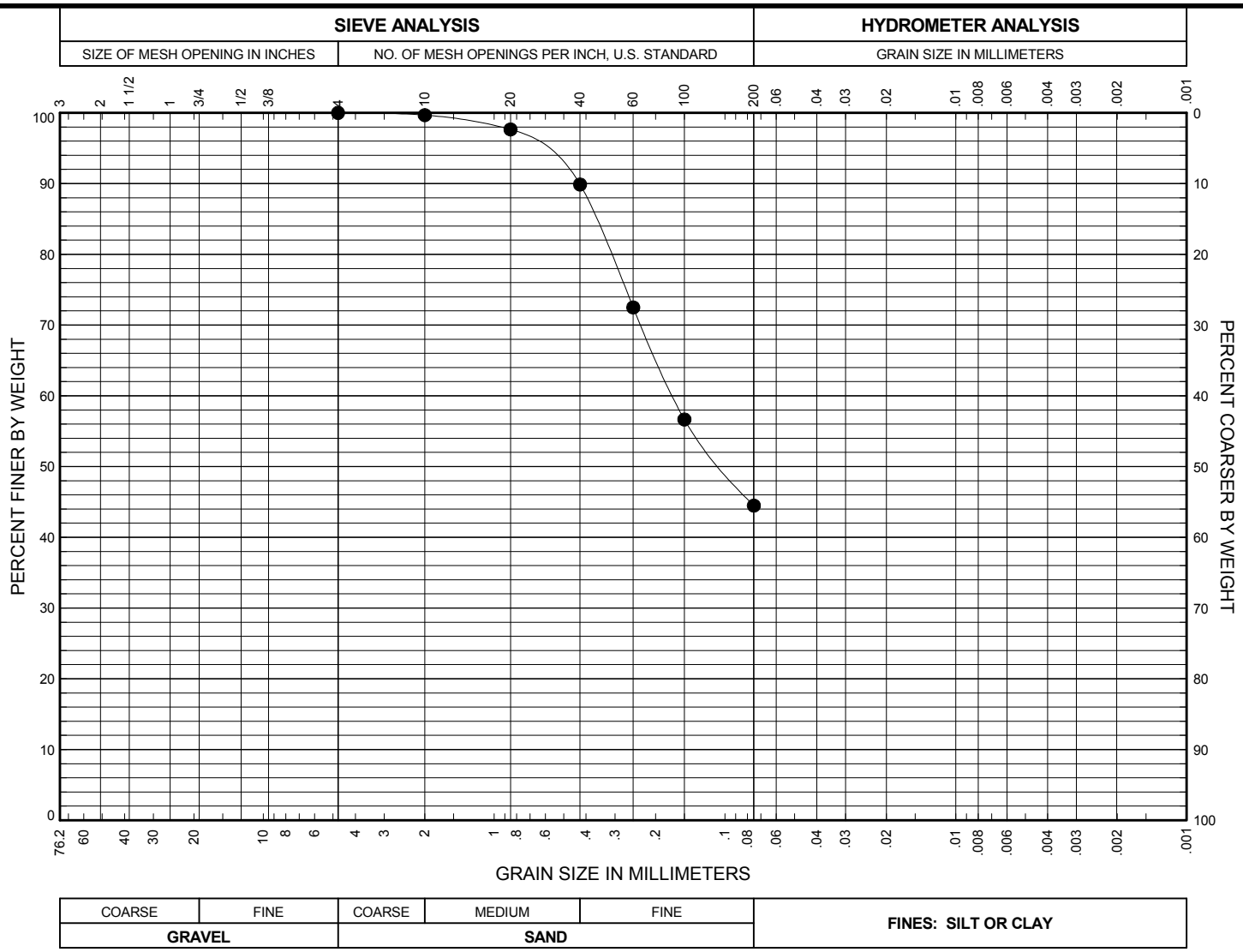
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	1.6	49.6	51.2			48.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0799	0.1236	0.1998	0.2231	0.2543	0.3103

Fineness Modulus
0.39

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



LEGEND

USCS: Unified Soil Classification System

COBBLE REM %: Percentage of cobbles removed from specimen; based on pre-removal total dry mass

SG: Specific gravity of soil solids < No. 4 sieve per ASTM D854

NAT WC %: Natural water content

Cu: Coefficient of uniformity

Cc: Coefficient of curvature

ASTM DES: ASTM International test standard designation

BORING AND SAMPLE NO.	DEPTH (feet)	U.S.C.S. SYMBOL	SOIL CLASSIFICATION	GRAVEL %	SAND %	FINES %	COBBLE REM %	SG	NAT WC %	Cu	Cc	TEST BY	REVIEW BY	ASTM DES
● E360-B-12, S-18	53.9	SC	Gray, Clayey Sand		56	44.5			17.6			AKV	JFL	D422

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BLDG-2018-00983, BLDG-2018-00985

Sound Transit Eastlink
Bellevue, Washington

GRAIN SIZE DISTRIBUTION

October 2013 21-1-08824-056

SHANNON & WILSON, INC.
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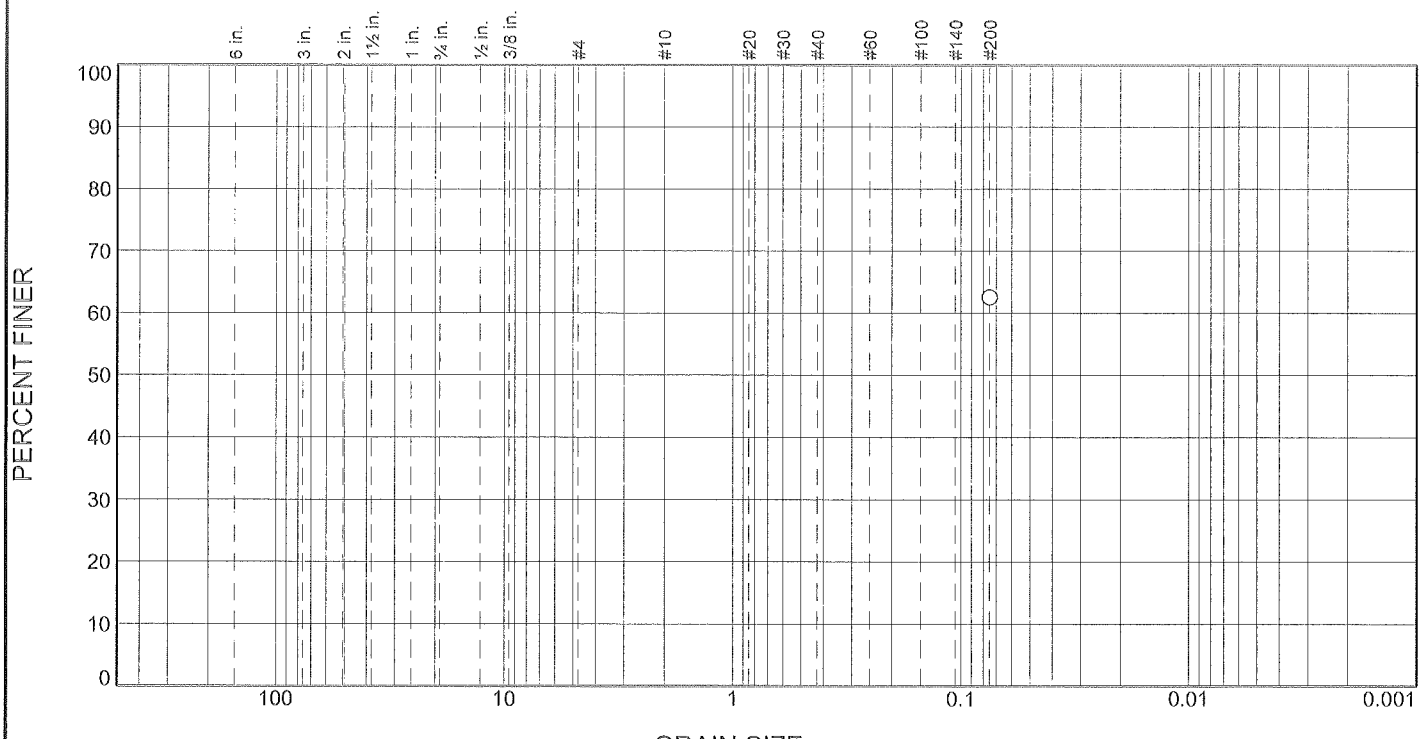
FIG. FINAL
Sheet 1 of 1

Golder Associates

FIG. FINAL

AASHTO GSA MAIN 3INCHMINUS 21-08824-056.GPJ 10/17/13

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						62.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	62.5		

* (no speeification provided)

Material Description

Gray Clay

Atterberg Limits (ASTM D 4318)

PL= 17 LL= 29 PI= 12

Classification

USCS (D 2487)= CL or OL AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/12/13

Tested By: JF/TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-012 **Depth:** 55'-56.5' **Date Sampled:**

Sample Number: HMA#7538-12/S-19

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-012
Depth: 55'-56.5'
Sample Number: HMA#7538-12/S-19
Material Description: Gray Clay
Date Received: 8/5/13 **PL:** 17 **LL:** 29 **PI:** 12
USCS Classification: CL or OL
#200 Wash Method: astm d1140
Tested By: JF/TP
Test Date: 8/12/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 100.80
Tare Wt. = 31.20
Minus #200 from wash = 62.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
217.00	31.20	#200			62.5

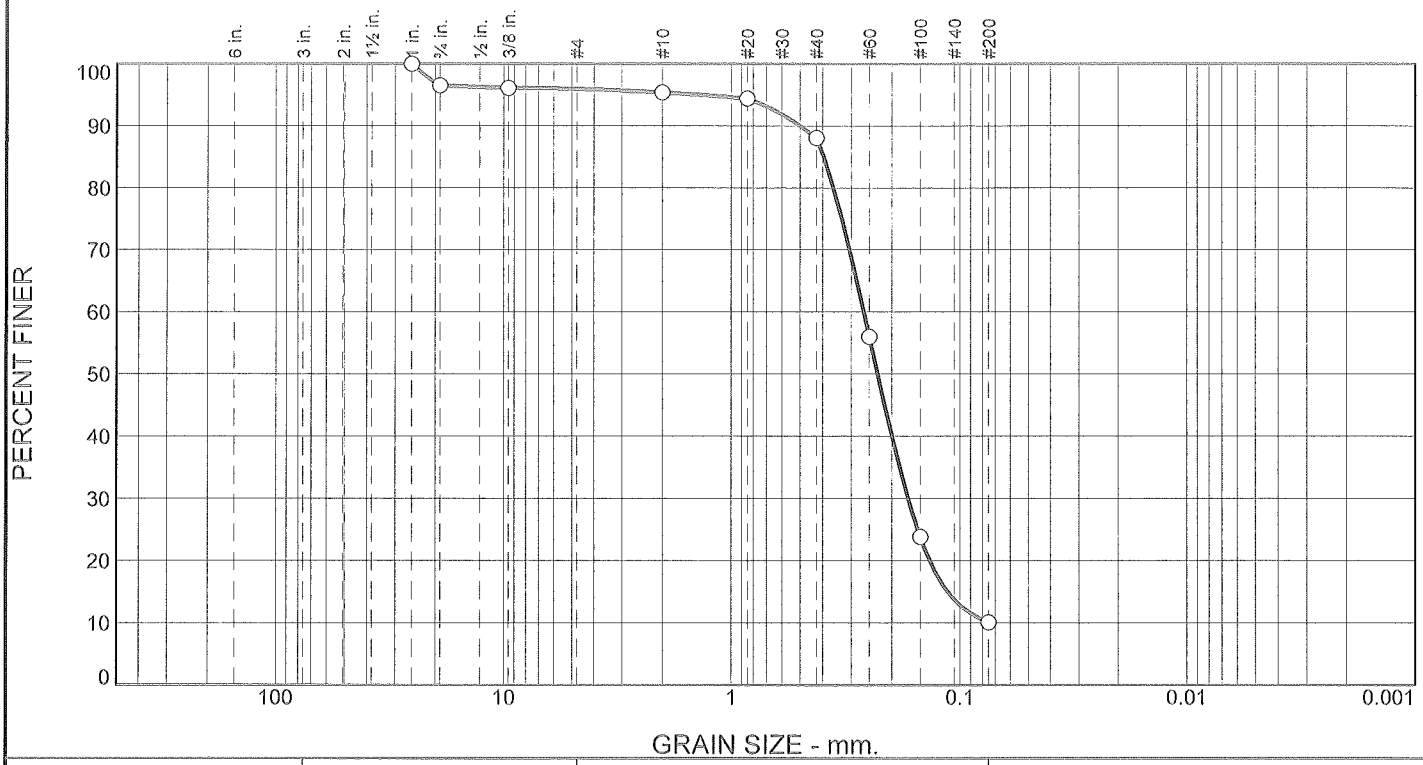
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										62.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.5	0.5	0.6	7.3	78.0	10.1	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	96.5		
3/8"	96.1		
#10	95.4		
#20	94.4		
#40	88.1		
#60	56.0		
#100	23.8		
#200	10.1		

* (no specification provided)

Material Description

Gray-Brown Poorly Graded Sand W/Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-3

Coefficients

D_{90}= 0.4999 D_{85}= 0.3951 D_{60}= 0.2643
D_{50}= 0.2300 D_{30}= 0.1694 D_{15}= 0.1136
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/12/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-012 **Depth:** 70'-71' **Date Sampled:**
Sample Number: HMA#7538-13/S-24

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-012
Depth: 70'-71'
Sample Number: HMA#7538-13/S-24
Material Description: Gray-Brown Poorly Graded Sand W/Silt
Date Received: 8/5/13
USCS Classification: SP-SM
AASHTO Classification: A-3
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/12/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 524.90
Tare Wt. = 114.60
Minus #200 from wash = 9.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
567.90	114.60	1"	0.00	0.00	100.0
		3/4"	1520.60	1504.90	96.5
		3/8"	1485.30	1483.40	96.1
		#10	1517.20	1513.90	95.4
		#20	1070.80	1066.40	94.4
		#40	972.80	944.00	88.1
		#60	1023.50	878.10	56.0
		#100	989.10	843.30	23.8
		#200	1081.50	1019.20	10.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	3.5	0.5	4.0	0.6	7.3	78.0	85.9			10.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1136	0.1362	0.1694	0.2300	0.2643	0.3584	0.3951	0.4999	1.3576

Fineness Modulus
1.36

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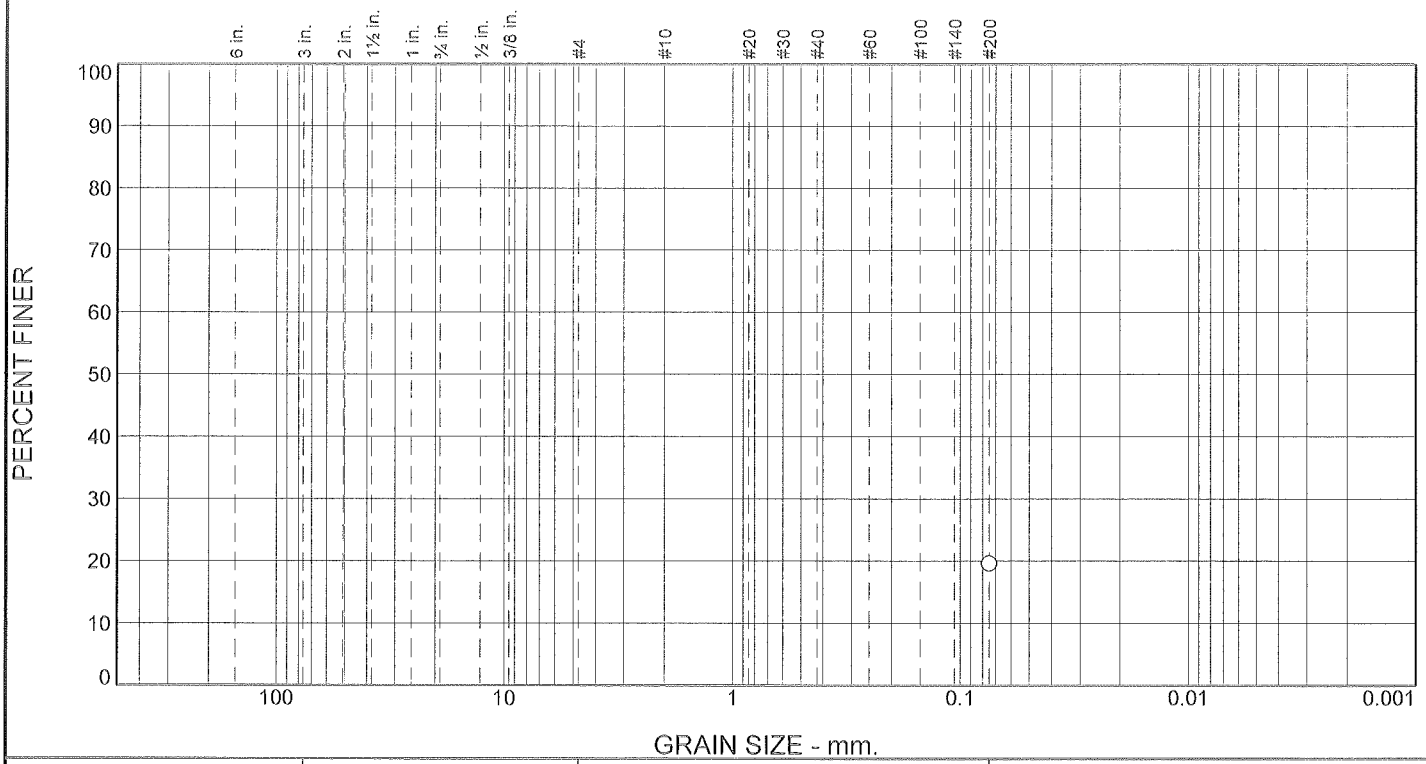
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						19.7	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	19.7		

* (no specification provided)

Material Description

Gray Clay

Atterberg Limits (ASTM D 4318)

PL= 21 LL= 50 PI= 29

Classification

USCS (D 2487)= CL or OL AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: **Date Tested:** 8/12/13

Tested By: JF/TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-012 **Depth:** 90'-91.5' **Date Sampled:**

Sample Number: HMA#7538-14/S-28

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-012
Depth: 90'-91.5'
Sample Number: HMA#7538-14/S-28
Material Description: Gray Clay
PL: 21 **LL:** 50 **PI:** 29
USCS Classification: CL or OL
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/12/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 105.80
Tare Wt. = 31.40
Minus #200 from wash = 19.7%

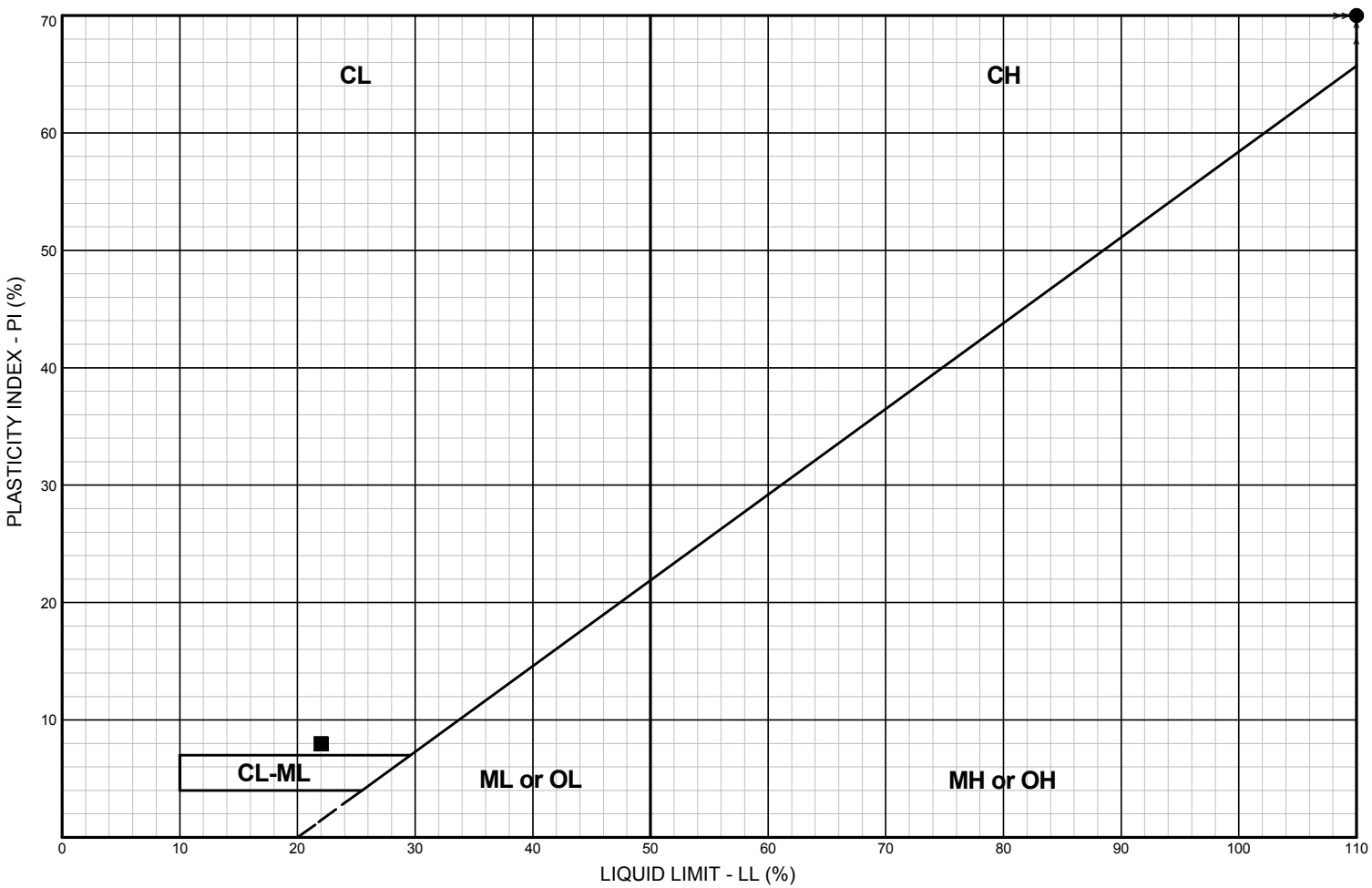
Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
124.00	31.40	#200			19.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										19.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985



LEGEND

CL: Low plasticity inorganic clays; sandy and silty clays

CH: High plasticity inorganic clays

ML: Inorganic silts and clayey silts of low plasticity

MH: Inorganic silts and clayey silts of high plasticity

CL-ML: Silty clays and clayey silts

OL: Organic silts and clays of low plasticity

OH: Organic silts and clays of high plasticity

LL: Liquid limit

PL: Plastic limit

PI: Plasticity index; PI=LL-PL

NP: Nonplastic

⌄ : Nonplastic

FINES %: Percentage of specimen mass passing the No. 200 sieve

NAT WC%: Natural water content

^,>>: Test value exceeds limit of graph

ASTM DES: ASTM International test standard designation

BORING AND SAMPLE NO.	DEPTH (feet)	U.S.C.S. SYMBOL	SOIL CLASSIFICATION	LL %	PL %	PI %	NAT WC %	FINES %	TEST BY	REVIEW BY	ASTM DES
● E330-B-29B, S-3	9.3	PT	Brown Peat; organic content = 89.0% by mass	891	430	461	769.2		AKV	JFL	D4318
■ E360-B-12, S-18	53.9	SC	Gray, Clayey Sand	22	14	8	17.6	44.5	AKV	JFL	D4318

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Sound Transit Eastlink
Bellevue, Washington

PLASTICITY CHART

October 2013 | 21-1-08824-056

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

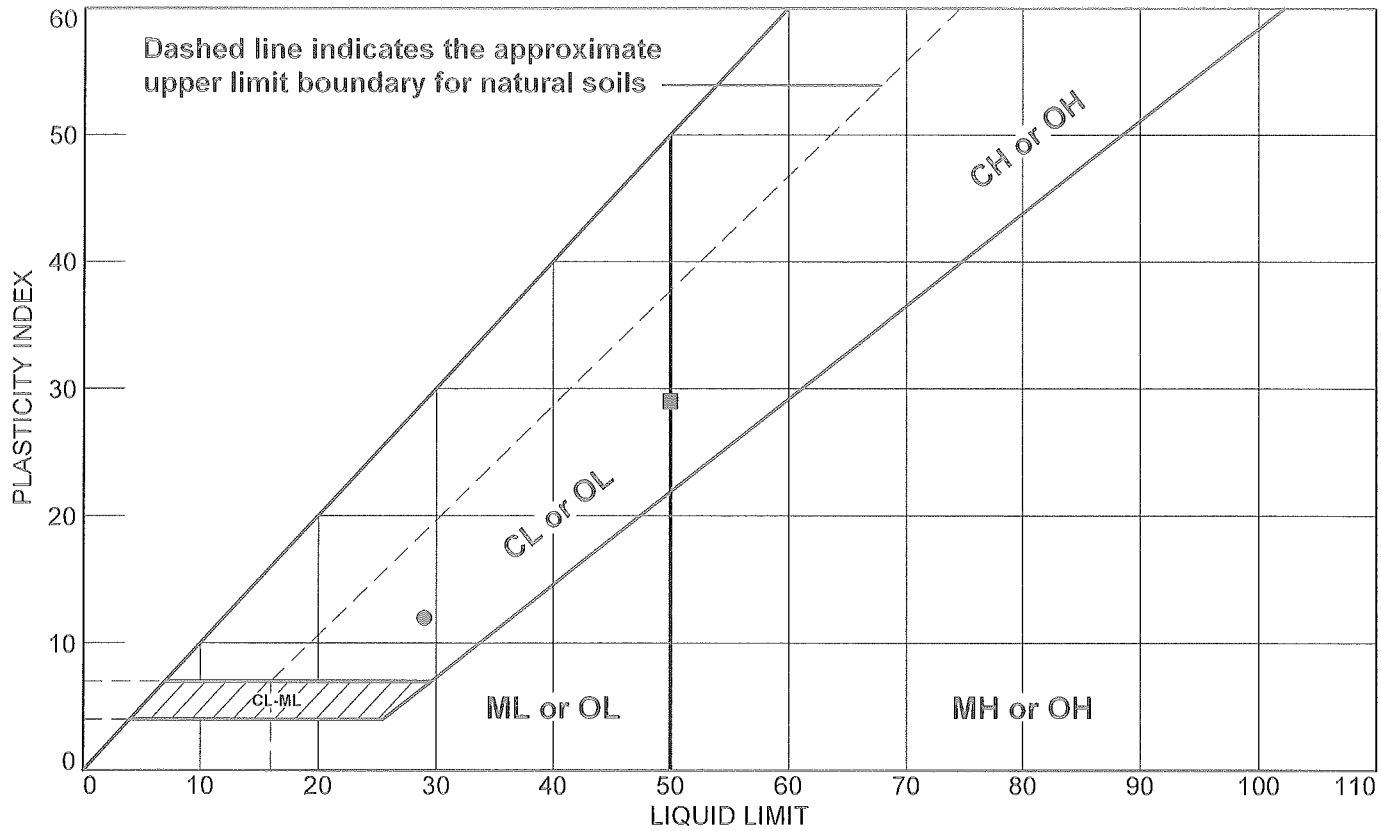
FIG. FINAL
Sheet 1 of 1

Golder Associates

FIG. FINAL

AASHTO_ATT_MAIN 21-08824-056.GPJ 10/17/13

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring E360-B-012	HMA#7538-12/S-19	55'-56.5'	22.4	17	29	12	CL or OL
■	Boring E360-B-012	HMA#7538-14/S-28	90'-91.5'	24.5	21	50	29	CL or OL

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Project No.: 12-450 **Figure**

Tested By: JF/TP **Checked By:** JAM

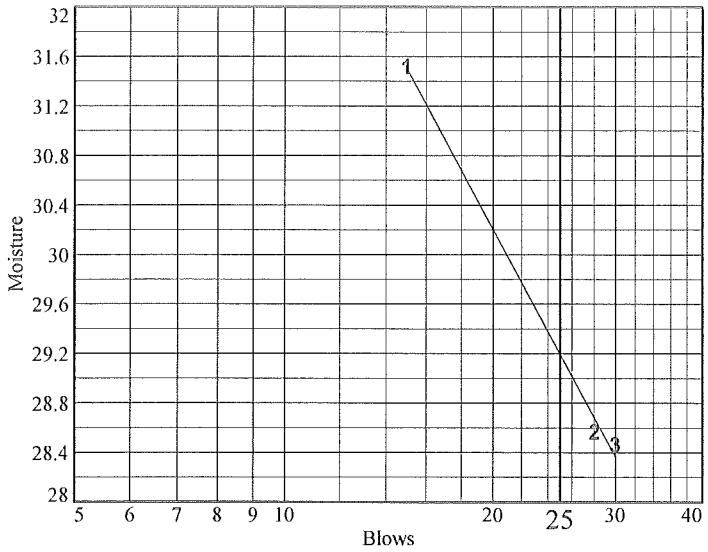
LIQUID AND PLASTIC LIMIT TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-012
Depth: 55'-56.5'
Sample Number: HMA#7538-12/S-19
Material Description: Gray Clay
USCS: CL or OL
Tested by: JF/TP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	37.7	26.1	31.1			
Dry+Tare	31.9	23.3	27.2			
Tare	13.5	13.5	13.5			
# Blows	15	28	30			
Moisture	31.5	28.6	28.5			



Liquid Limit= 29
Plastic Limit= 17
Plasticity Index= 12
Natural Moisture= 22.4
Liquidity Index= 0.4

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	21.5	20.1	20.3		
Dry+Tare	20.4	19.2	19.2		
Tare	13.7	13.6	13.7		
Moisture	16.4	16.1	20.0		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
258.6	217	31.2	22.4

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

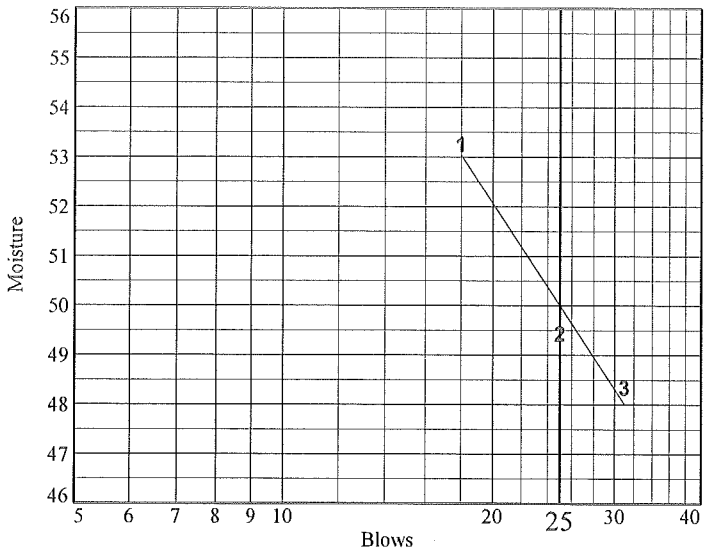
LIQUID AND PLASTIC LIMIT TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-012
Depth: 90'-91.5'
Sample Number: HMA#7538-14/S-28
Material Description: Gray Clay
USCS: CL or OL
Tested by: JF/TP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	27.6	26.9	27.1			
Dry+Tare	22.7	22.5	22.7			
Tare	13.5	13.6	13.6			
# Blows	18	25	31			
Moisture	53.3	49.4	48.4			



Liquid Limit= 50
Plastic Limit= 21
Plasticity Index= 29
Natural Moisture= 24.5
Liquidity Index= 0.1

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	17.6	17	17.1		
Dry+Tare	16.5	16	16		
Tare	11.2	11.2	11.1		
Moisture	20.8	20.8	22.4		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
124	105.8	31.4	24.5

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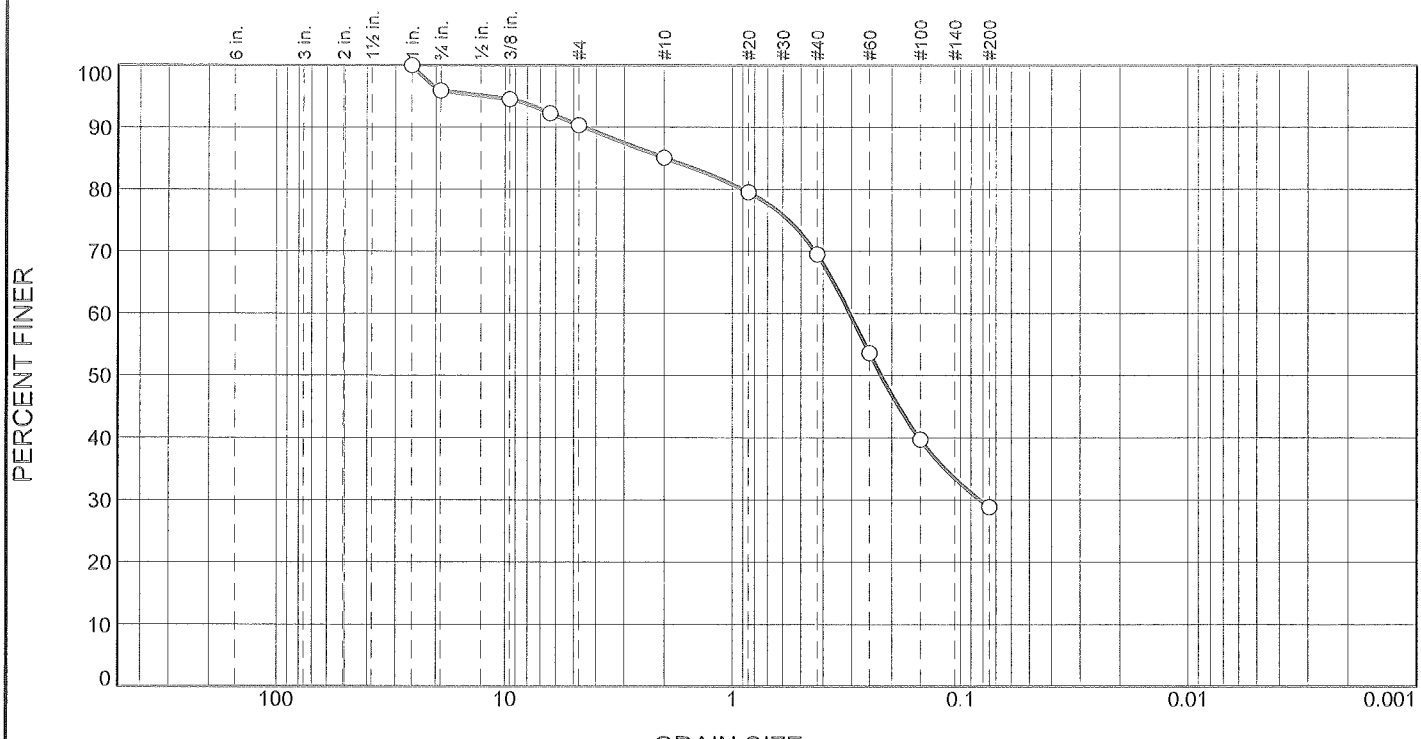
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.1	5.6	5.2	15.6	40.7	28.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	95.9		
3/8"	94.5		
1/4"	92.3		
#4	90.3		
#10	85.1		
#20	79.5		
#40	69.5		
#60	53.6		
#100	39.7		
#200	28.8		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 4.5127 D_{85}= 1.9718 D_{60}= 0.3055
D_{50}= 0.2222 D_{30}= 0.0822 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/13/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-014 **Depth:** 2.5'-4' **Date Sampled:**
Sample Number: HMA#7538-15/S-2

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-014
Depth: 2.5'-4'
Sample Number: HMA#7538-15/S-2
Material Description: Gray Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/13/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 392.70
Tare Wt. = 120.10
Minus #200 from wash = 28.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
499.50	120.10	1"	0.00	0.00	100.0
		3/4"	1520.80	1505.20	95.9
		3/8"	1488.50	1483.40	94.5
		1/4"	1391.50	1382.80	92.3
		#4	1363.90	1356.60	90.3
		#10	1533.80	1513.90	85.1
		#20	1087.70	1066.50	79.5
		#40	981.80	943.90	69.5
		#60	938.30	878.00	53.6
		#100	895.90	843.10	39.7
		#200	1060.50	1019.30	28.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	4.1	5.6	9.7	5.2	15.6	40.7	61.5			28.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0822	0.2222	0.3055	0.9043	1.9718	4.5127	12.0498

Fineness Modulus
1.76

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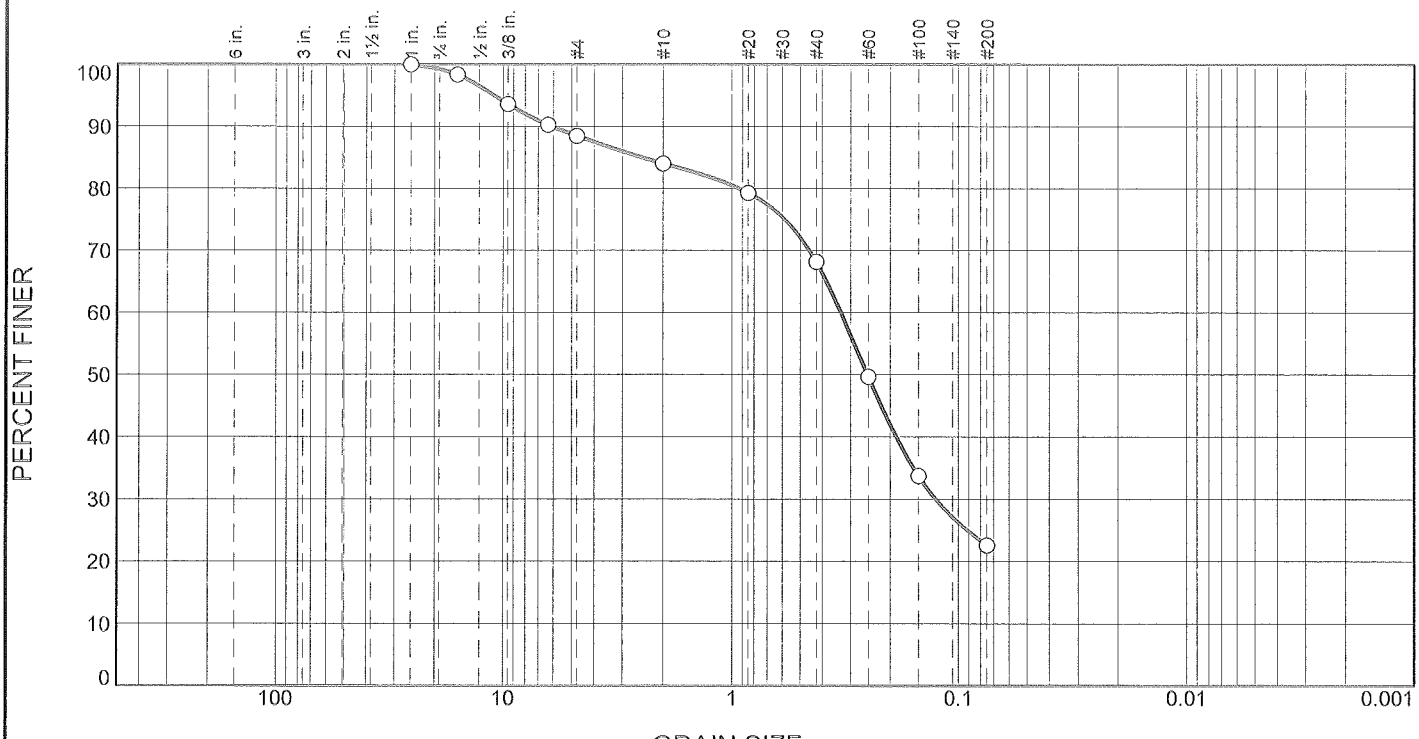
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.7	10.8	4.5	15.8	45.6	22.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
5/8"	98.4		
3/8"	93.6		
1/4"	90.3		
#4	88.5		
#10	84.0		
#20	79.3		
#40	68.2		
#60	49.7		
#100	33.7		
#200	22.6		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 6.1123 D_{85}= 2.4702 D_{60}= 0.3307
D_{50}= 0.2524 D_{30}= 0.1258 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/13/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-014 **Depth:** 15'-16.5' **Date Sampled:**
Sample Number: HMA#7530-16/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-014
Depth: 15'-16.5'
Sample Number: HMA#7530-16/S-7
Material Description: Gray Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/13/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 519.20
Tare Wt. = 117.20
Minus #200 from wash = 21.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
626.30	117.20	1"	0.00	0.00	100.0
		5/8"	1481.00	1472.70	98.4
		3/8"	1507.60	1483.40	93.6
		1/4"	1399.90	1382.80	90.3
		#4	1365.70	1356.60	88.5
		#10	1536.50	1513.80	84.0
		#20	1090.80	1066.70	79.3
		#40	1000.50	943.90	68.2
		#60	972.20	878.00	49.7
		#100	924.20	843.20	33.7
		#200	1076.10	1019.30	22.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.7	10.8	11.5	4.5	15.8	45.6	65.9			22.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1258	0.2524	0.3307	0.9324	2.4702	6.1123	10.9274

Fineness Modulus
1.87

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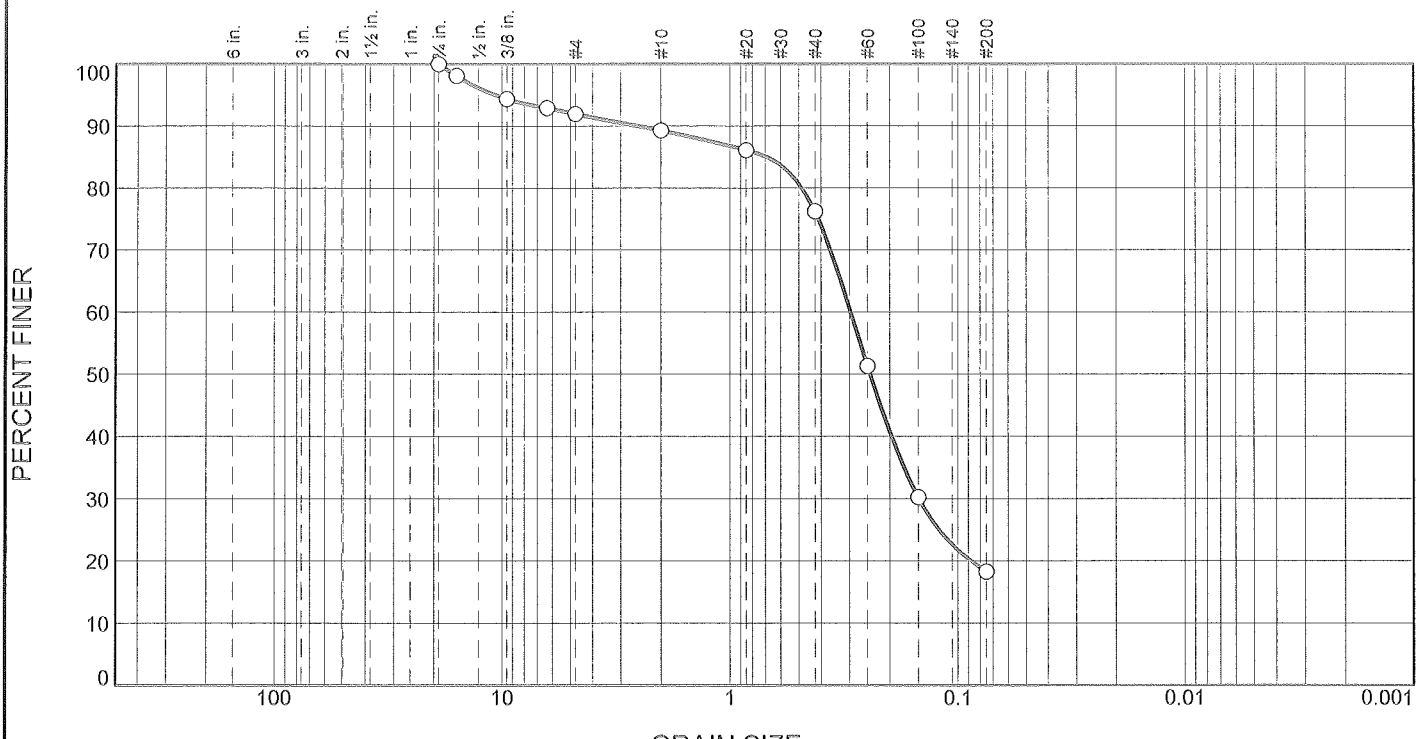
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.1	2.6	13.1	57.9	18.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
5/8"	98.1		
3/8"	94.4		
1/4"	92.9		
#4	91.9		
#10	89.3		
#20	86.1		
#40	76.2		
#60	51.3		
#100	30.2		
#200	18.3		

* (no specification provided)

Material Description

Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 2.5207 D_{85}= 0.6878 D_{60}= 0.2962
D_{50}= 0.2434 D_{30}= 0.1489 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/13/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-014 **Depth:** 20'-21.5' **Date Sampled:**
Sample Number: HMA#7538-17/S-8

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Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-014
Depth: 20'-21.5'
Sample Number: HMA#7538-17/S-8
Material Description: Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/13/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 421.10
Tare Wt. = 118.70
Minus #200 from wash = 18.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
487.30	118.70	3/4"	0.00	0.00	100.0
		5/8"	1479.70	1472.70	98.1
		3/8"	1497.20	1483.50	94.4
		1/4"	1388.20	1382.80	92.9
		#4	1360.00	1356.40	91.9
		#10	1523.60	1513.80	89.3
		#20	1078.20	1066.50	86.1
		#40	980.40	943.90	76.2
		#60	969.50	877.80	51.3
		#100	920.90	843.10	30.2
		#200	1063.30	1019.30	18.3

Fractional Components

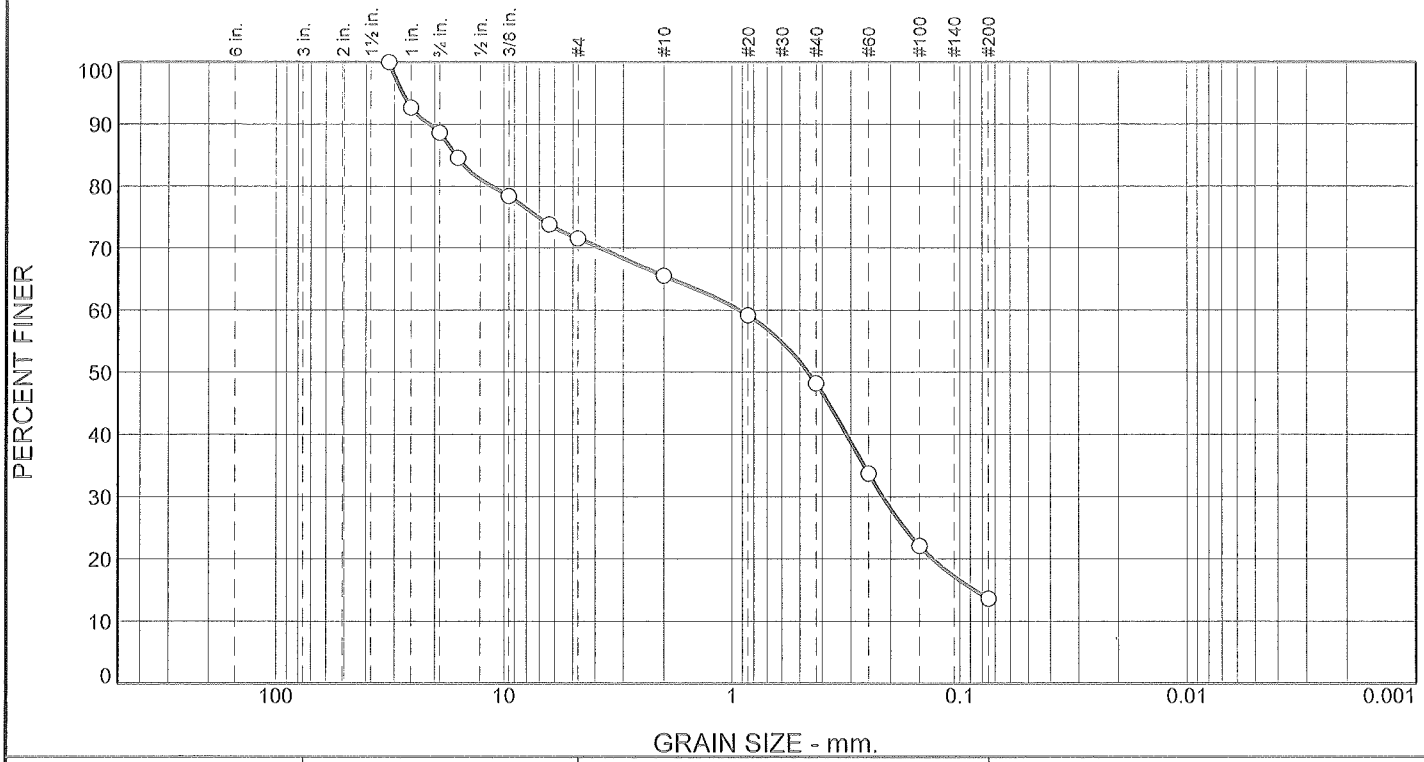
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	8.1	8.1	2.6	13.1	57.9	73.6			18.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0874	0.1489	0.2434	0.2962	0.4849	0.6878	2.5207	10.6900

Fineness Modulus
1.62

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	11.4	17.0	6.1	17.3	34.6	13.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/4"	100.0		
1"	92.7		
3/4"	88.6		
5/8"	84.6		
3/8"	78.4		
1/4"	73.8		
#4	71.6		
#10	65.5		
#20	59.2		
#40	48.2		
#60	33.7		
#100	22.1		
#200	13.6		

* (no specification provided)

Material Description

Gray Brown Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 21.0904 D_{85}= 16.1962 D_{60}= 0.9257
D_{50}= 0.4596 D_{30}= 0.2167 D_{15}= 0.0863
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/13/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-014 **Depth:** 30'-31.5' **Date Sampled:**
Sample Number: HMA#7538-18/S-10

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-014
Depth: 30'-31.5'
Sample Number: HMA#7538-18/S-10
Material Description: Gray Brown Silty Sand W/Gravel
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/13/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 513.50
Tare Wt. = 114.10
Minus #200 from wash = 13.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
573.90	114.10	1 1/4"	0.00	0.00	100.0
		1"	1503.20	1469.50	92.7
		3/4"	1523.50	1504.80	88.6
		5/8"	1491.40	1472.80	84.6
		3/8"	1511.80	1483.50	78.4
		1/4"	1404.10	1382.90	73.8
		#4	1366.90	1356.70	71.6
		#10	1541.90	1514.10	65.5
		#20	1096.00	1066.80	59.2
		#40	994.30	944.00	48.2
		#60	944.60	877.90	33.7
		#100	896.70	843.40	22.1
		#200	1058.50	1019.40	13.6

Fractional Components

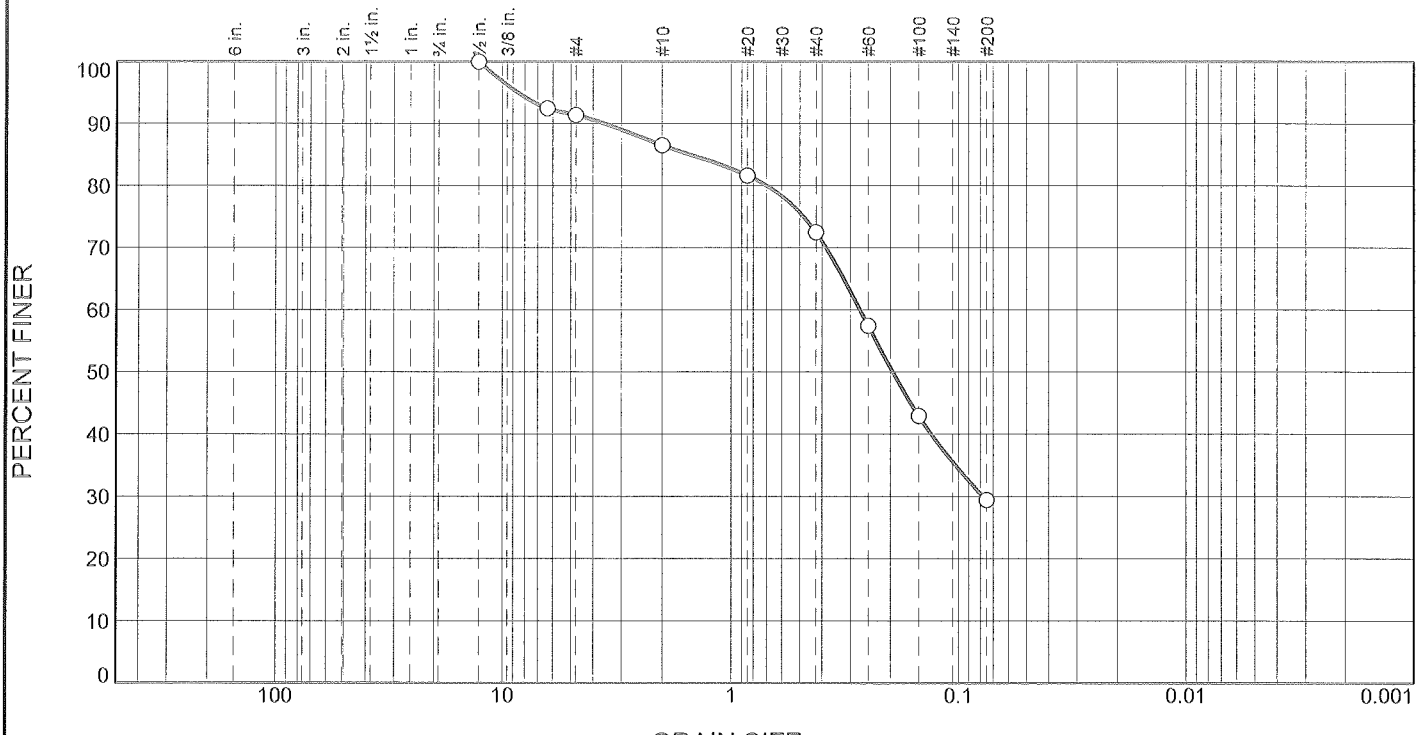
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	11.4	17.0	28.4	6.1	17.3	34.6	58.0			13.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0863	0.1313	0.2167	0.4596	0.9257	11.3585	16.1962	21.0904	27.6370

Fineness Modulus
3.17

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.6	4.9	14.0	43.1	29.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
1/4"	92.5		
#4	91.4		
#10	86.5		
#20	81.6		
#40	72.5		
#60	57.4		
#100	42.9		
#200	29.4		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 3.5449 D_{85}= 1.5082 D_{60}= 0.2718
D_{50}= 0.1952 D_{30}= 0.0776 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/14/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-014 **Depth:** 50'-50.8' **Date Sampled:**
Sample Number: HMA#7538-19/S-14

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-014
Depth: 50'-50.8'
Sample Number: HMA#7538-19/S-14
Material Description: Gray Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 396.50
Tare Wt. = 117.90
Minus #200 from wash = 27.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
504.20	117.90	1/2"	0.00	0.00	100.0
		1/4"	1411.90	1382.90	92.5
		#4	1361.00	1356.70	91.4
		#10	1532.70	1513.90	86.5
		#20	1085.30	1066.50	81.6
		#40	979.30	943.90	72.5
		#60	936.10	877.90	57.4
		#100	899.20	843.30	42.9
		#200	1071.80	1019.50	29.4

Fractional Components

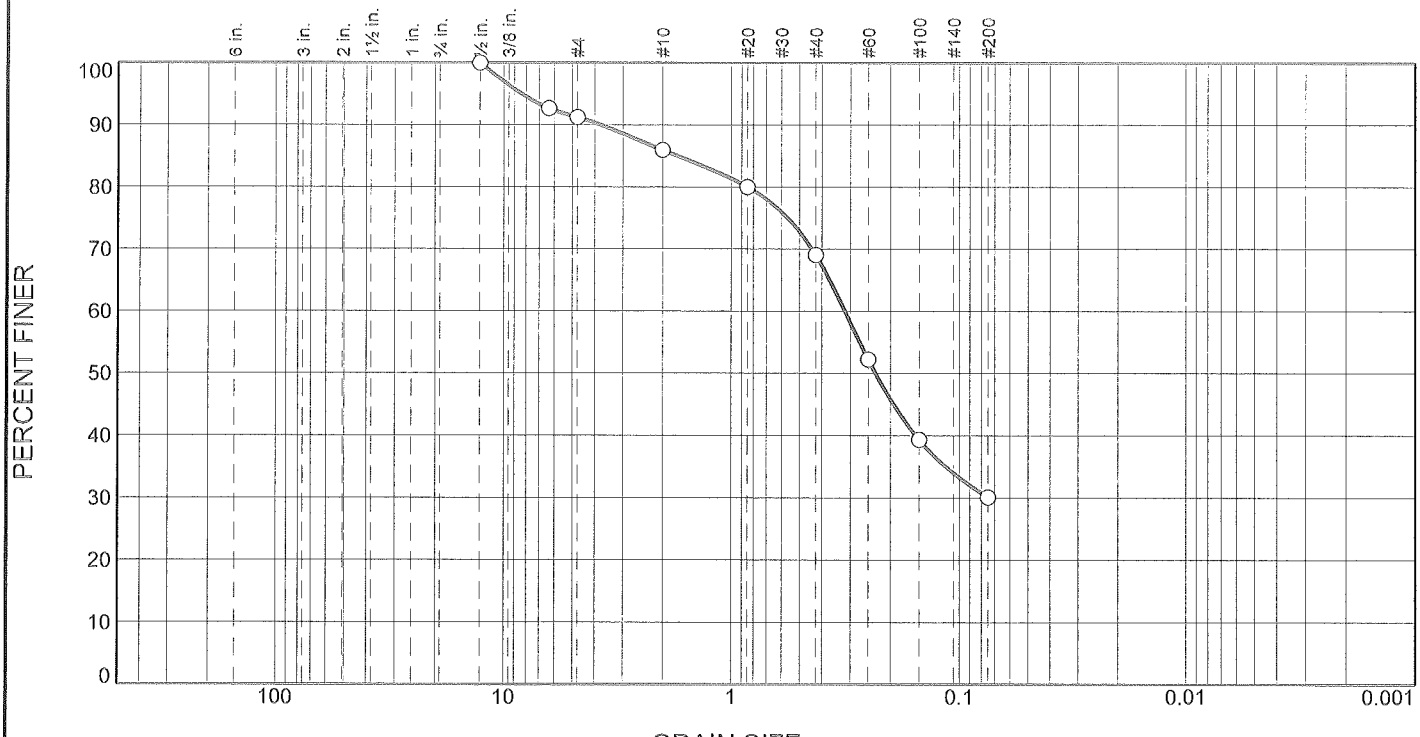
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	8.6	8.6	4.9	14.0	43.1	62.0			29.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0776	0.1952	0.2718	0.6974	1.5082	3.5449	8.5374

Fineness Modulus
1.57

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.8	5.3	16.9	38.9	30.1	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
1/4"	92.7		
#4	91.2		
#10	85.9		
#20	80.0		
#40	69.0		
#60	52.2		
#100	39.3		
#200	30.1		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 3.7592 D_{85}= 1.7244 D_{60}= 0.3167
D_{50}= 0.2324 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/14/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-014 **Depth:** 70'-70.4' **Date Sampled:**
Sample Number: HMA#7538-20/S-18

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-014
Depth: 70'-70.4'
Sample Number: HMA#7538-20/S-18
Material Description: Gray Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 143.60
Tare Wt. = 31.10
Minus #200 from wash = 29.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
191.00	31.10	1/2"	0.00	0.00	100.0
		1/4"	1394.50	1382.80	92.7
		#4	1358.90	1356.60	91.2
		#10	1522.40	1513.90	85.9
		#20	1076.00	1066.50	80.0
		#40	961.60	944.10	69.0
		#60	904.80	877.90	52.2
		#100	863.80	843.20	39.3
		#200	1034.20	1019.40	30.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	8.8	8.8	5.3	16.9	38.9	61.1			30.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.2324	0.3167	0.8512	1.7244	3.7592	8.3336

Fineness Modulus
1.69

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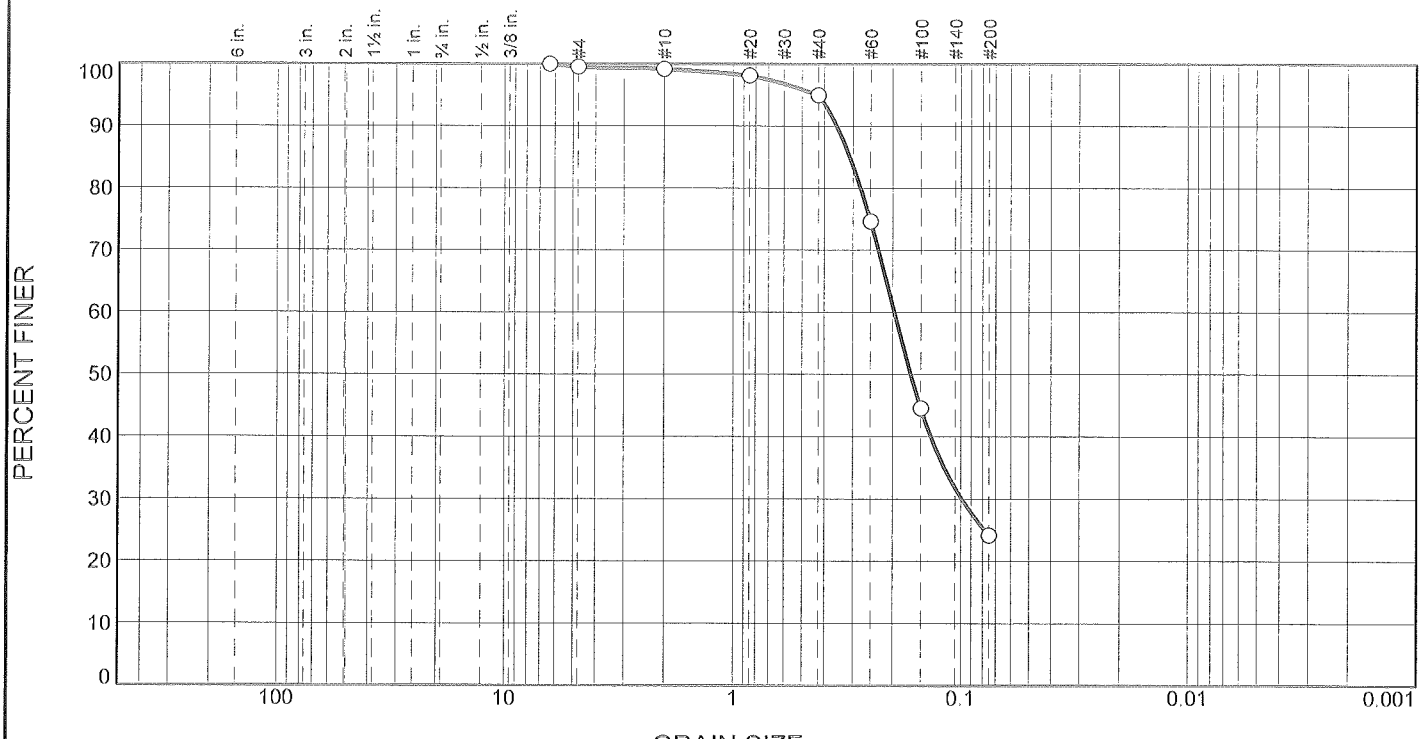
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	0.4	4.2	70.8	24.2	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/4"	100.0		
#4	99.6		
#10	99.2		
#20	98.2		
#40	95.0		
#60	74.6		
#100	44.6		
#200	24.2		

* (no specification provided)

Material Description

Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)=

Coefficients

D_{90}= 0.3525 D_{85}= 0.3088 D_{60}= 0.1961
D_{50}= 0.1660 D_{30}= 0.0989 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/14/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-014 **Depth:** 100'-100.9' **Date Sampled:**
Sample Number: HMA#7538-21/S-24

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-014
Depth: 100'-100.9'
Sample Number: HMA#7538-21/S-24
Material Description: Gray Silty Sand
Date Received: 8/5/13
USCS Classification: SM
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 140.40
Tare Wt. = 35.30
Minus #200 from wash = 22.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
171.00	35.30	1/4"	0.00	0.00	100.0
		#4	1357.10	1356.50	99.6
		#10	1514.40	1513.90	99.2
		#20	1067.90	1066.50	98.2
		#40	948.30	944.00	95.0
		#60	905.60	878.00	74.6
		#100	884.10	843.30	44.6
		#200	1047.00	1019.30	24.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.4	0.4	0.4	4.2	70.8	75.4			24.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0989	0.1660	0.1961	0.2768	0.3088	0.3525	0.4258

Fineness Modulus
0.77

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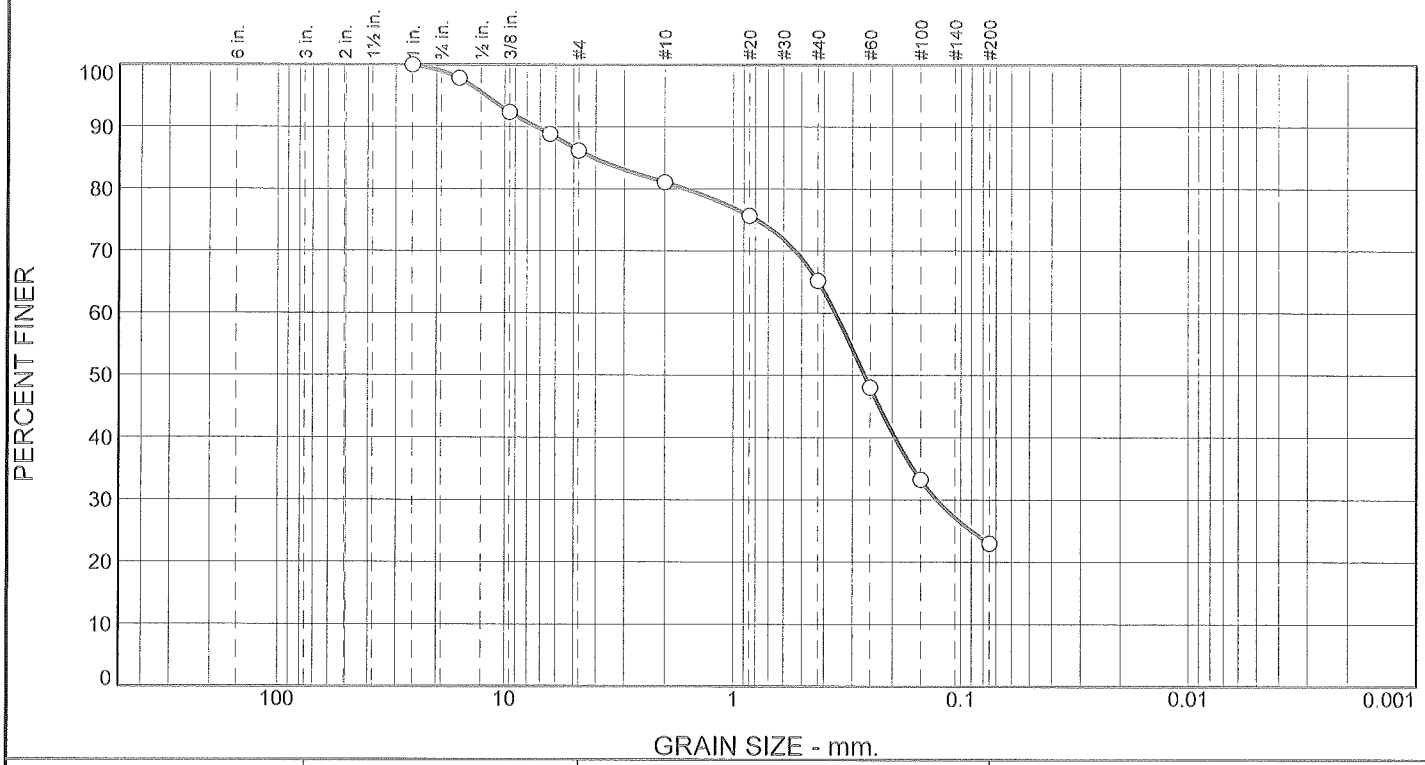
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.0	12.8	5.1	15.9	42.2	23.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
5/8"	97.9		
3/8"	92.4		
1/4"	88.8		
#4	86.2		
#10	81.1		
#20	75.6		
#40	65.2		
#60	48.1		
#100	33.3		
#200	23.0		

* (no specification provided)

Material Description

Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 7.2908 D_{85}= 4.0964 D_{60}= 0.3553
D_{50}= 0.2645 D_{30}= 0.1273 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/14/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-017 **Depth:** 5'-6.5' **Date Sampled:**
Sample Number: HMA#7538-22/S-2

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-017
Depth: 5'-6.5'
Sample Number: HMA#7538-22/S-2
Material Description: Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 400.40
Tare Wt. = 115.30
Minus #200 from wash = 22.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
482.70	115.30	1"	0.00	0.00	100.0
		5/8"	1480.50	1472.70	97.9
		3/8"	1503.60	1483.30	92.4
		1/4"	1395.80	1382.90	88.8
		#4	1366.40	1356.60	86.2
		#10	1532.70	1513.90	81.1
		#20	1086.40	1066.50	75.6
		#40	982.30	944.00	65.2
		#60	941.10	878.10	48.1
		#100	897.60	843.20	33.3
		#200	1057.10	1019.30	23.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	1.0	12.8	13.8	5.1	15.9	42.2	63.2			23.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1273	0.2645	0.3553	1.6269	4.0964	7.2908	12.0454

Fineness Modulus
2.03

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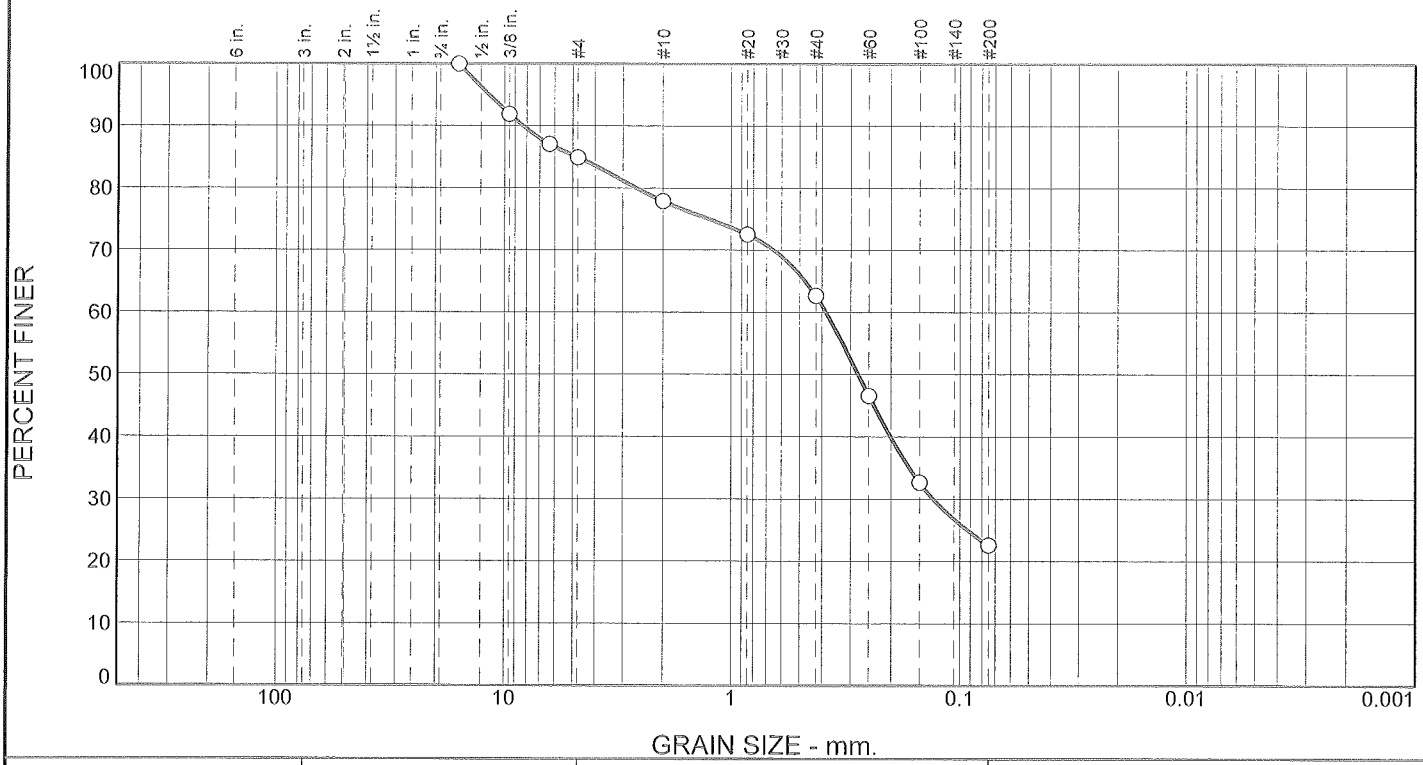
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	15.1	7.0	15.2	40.1	22.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
3/8"	91.9		
1/4"	87.1		
#4	84.9		
#10	77.9		
#20	72.5		
#40	62.7		
#60	46.6		
#100	32.7		
#200	22.6		

* (no specification provided)

Material Description

Brown Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 8.2812 D_{85}= 4.7982 D_{60}= 0.3839
D_{50}= 0.2780 D_{30}= 0.1307 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/14/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-017 **Depth:** 20'-21.5' **Date Sampled:**
Sample Number: HMA#7538-23/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-017
Depth: 20'-21.5'
Sample Number: HMA#7538-23/S-7
Material Description: Brown Silty Sand W/Gravel
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 510.30
Tare Wt. = 198.10
Minus #200 from wash = 22.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
598.20	198.10	5/8"	0.00	0.00	100.0
		3/8"	1515.70	1483.40	91.9
		1/4"	1402.30	1382.80	87.1
		#4	1365.10	1356.60	84.9
		#10	1542.10	1513.80	77.9
		#20	1087.90	1066.50	72.5
		#40	983.40	944.00	62.7
		#60	942.30	878.00	46.6
		#100	898.90	843.20	32.7
		#200	1059.70	1019.40	22.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	15.1	15.1	7.0	15.2	40.1	62.3			22.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1307	0.2780	0.3839	2.6225	4.7982	8.2812	11.6686

Fineness Modulus
2.15

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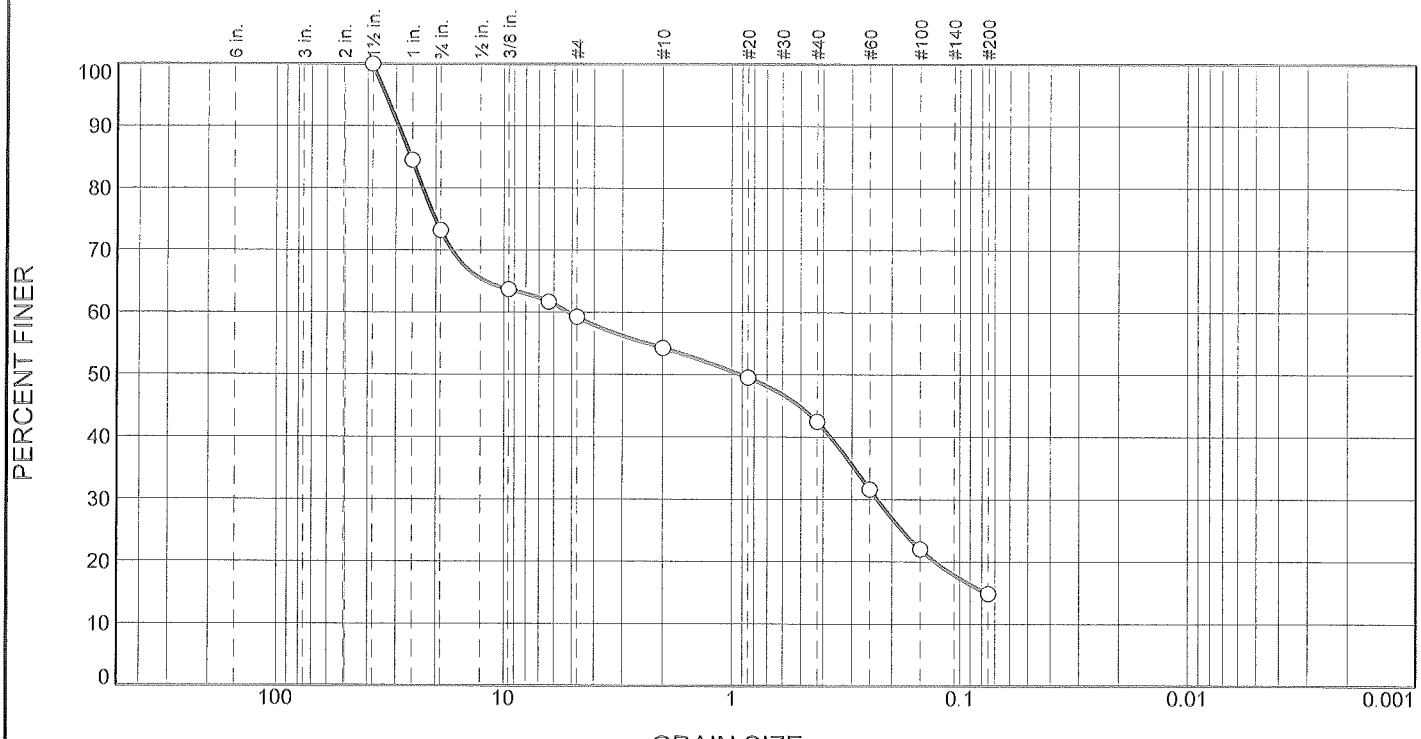
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	26.8	13.9	5.0	11.9	27.5	14.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/2"	100.0		
1"	84.5		
3/4"	73.2		
3/8"	63.7		
1/4"	61.7		
#4	59.3		
#10	54.3		
#20	49.5		
#40	42.4		
#60	31.6		
#100	22.0		
#200	14.9		

* (no specification provided)

Material Description

Olive Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 29.1785 D_{85}= 25.7222 D_{60}= 5.1741
D_{50}= 0.9107 D_{30}= 0.2315 D_{15}= 0.0763
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/14/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-017 **Depth:** 30'-31.5' **Date Sampled:**
Sample Number: HMA#7538-24/S-9

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-017
Depth: 30'-31.5'
Sample Number: HMA#7538-24/S-9
Material Description: Olive Silty Sand W/Gravel
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 207.10
Tare Wt. = 36.30
Minus #200 from wash = 14.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
236.10	36.30	1 1/2"	0.00	0.00	100.0
		1"	1500.70	1469.70	84.5
		3/4"	1527.60	1505.10	73.2
		3/8"	1502.40	1483.40	63.7
		1/4"	1386.80	1382.80	61.7
		#4	1361.50	1356.60	59.3
		#10	1523.80	1513.90	54.3
		#20	1076.00	1066.50	49.5
		#40	958.00	943.80	42.4
		#60	899.60	878.00	31.6
		#100	862.40	843.20	22.0
		#200	1033.50	1019.20	14.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	26.8	13.9	40.7	5.0	11.9	27.5	44.4			14.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0763	0.1292	0.2315	0.9107	5.1741	22.7953	25.7222	29.1785	33.2888

Fineness Modulus
3.93

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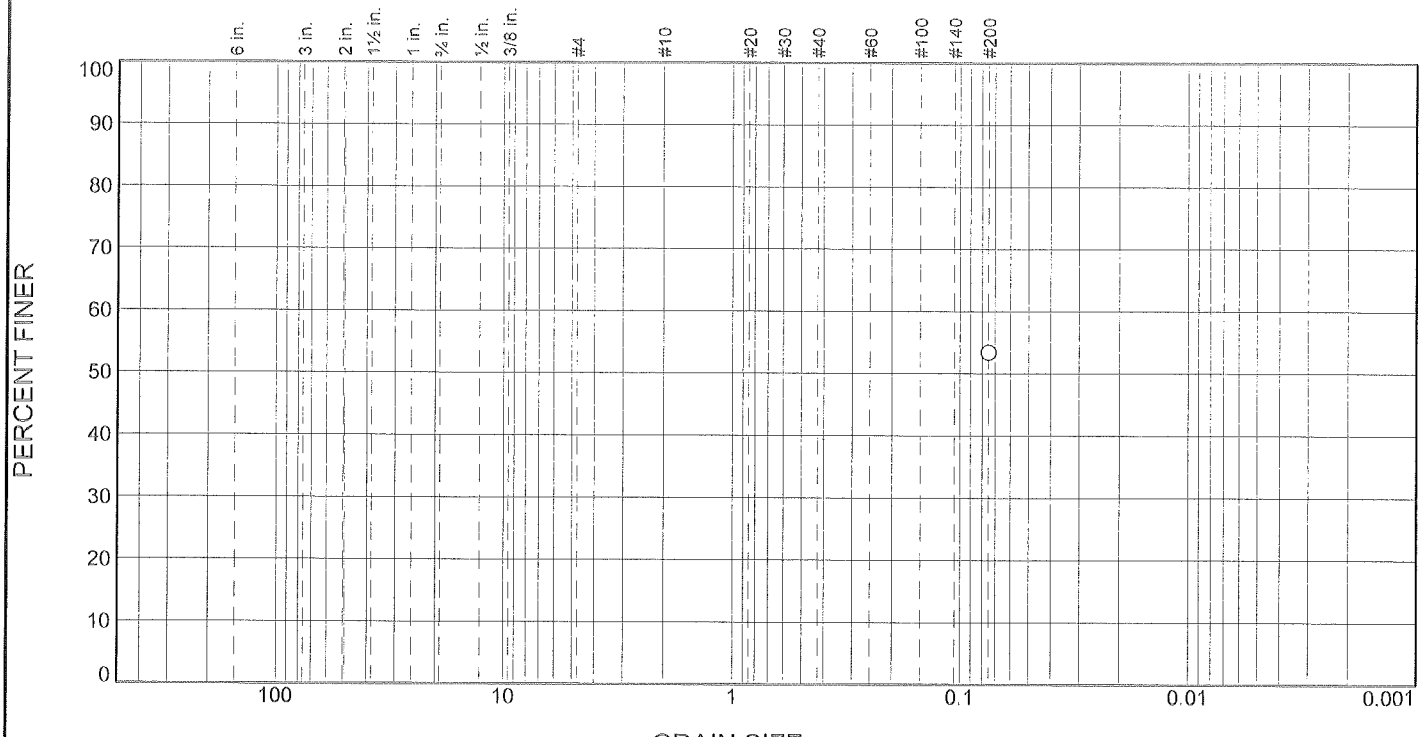
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						53.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	53.4		

* (no specification provided)

Material Description

Gray Silt

Atterberg Limits (ASTM D 4318)

PL= NP LL= NP PI= NP

Classification

USCS (D 2487)= ML AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/14/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-017 **Depth:** 45'-45.8' **Date Sampled:**
Sample Number: HMA#7538-25/S-12

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-017
Depth: 45'-45.8'
Sample Number: HMA#7538-25/S-12
Material Description: Gray Silt
Date Received: 8/5/13 **PL:** NP **LL:** NP **PI:** NP
USCS Classification: ML
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 132.00
Tare Wt. = 37.10
Minus #200 from wash = 53.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
240.80	37.10	#200			53.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										53.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

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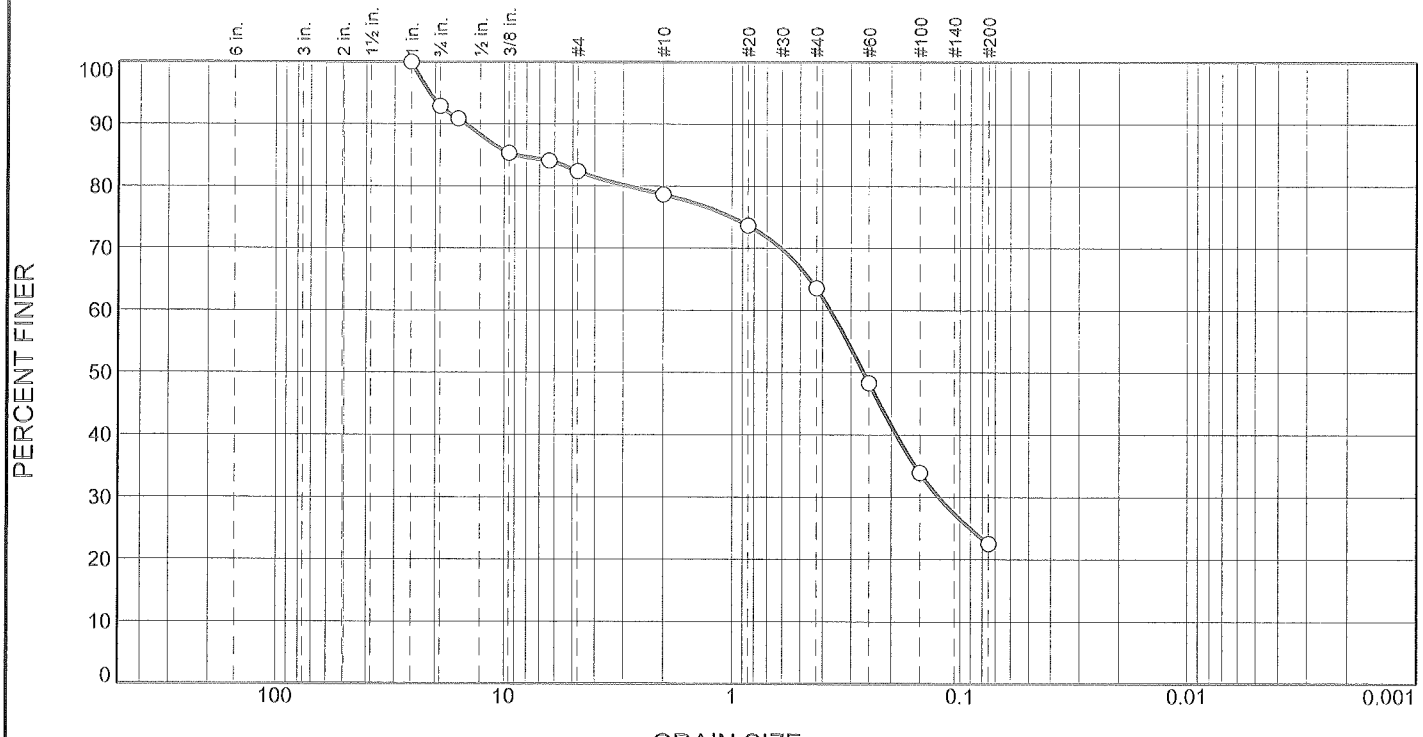
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.1	10.5	3.7	15.1	41.1	22.5	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	92.9		
5/8"	90.9		
3/8"	85.3		
1/4"	84.1		
#4	82.4		
#10	78.7		
#20	73.7		
#40	63.6		
#60	48.3		
#100	33.9		
#200	22.5		

* (no specification provided)

Material Description

Gray Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 14.6514 D_{85}= 8.9282 D_{60}= 0.3689
D_{50}= 0.2637 D_{30}= 0.1240 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/15/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-017 **Depth:** 65'-65.7' **Date Sampled:**
Sample Number: HMA#7538-26/S-16

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-017
Depth: 65'-65.7'
Sample Number: HMA#7538-26/S-16
Material Description: Gray Silty Sand W/Gravel
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/15/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 455.50
Tare Wt. = 165.00
Minus #200 from wash = 21.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
537.00	165.00	1"	0.00	0.00	100.0
		3/4"	1531.30	1504.90	92.9
		5/8"	1480.30	1472.70	90.9
		3/8"	1503.90	1483.40	85.3
		1/4"	1387.40	1382.70	84.1
		#4	1362.80	1356.50	82.4
		#10	1527.80	1513.90	78.7
		#20	1085.10	1066.50	73.7
		#40	981.40	943.90	63.6
		#60	934.50	877.80	48.3
		#100	896.70	843.10	33.9
		#200	1061.70	1019.30	22.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	7.1	10.5	17.6	3.7	15.1	41.1	59.9			22.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1240	0.2637	0.3689	2.8742	8.9282	14.6514	21.1411

Fineness Modulus
2.26

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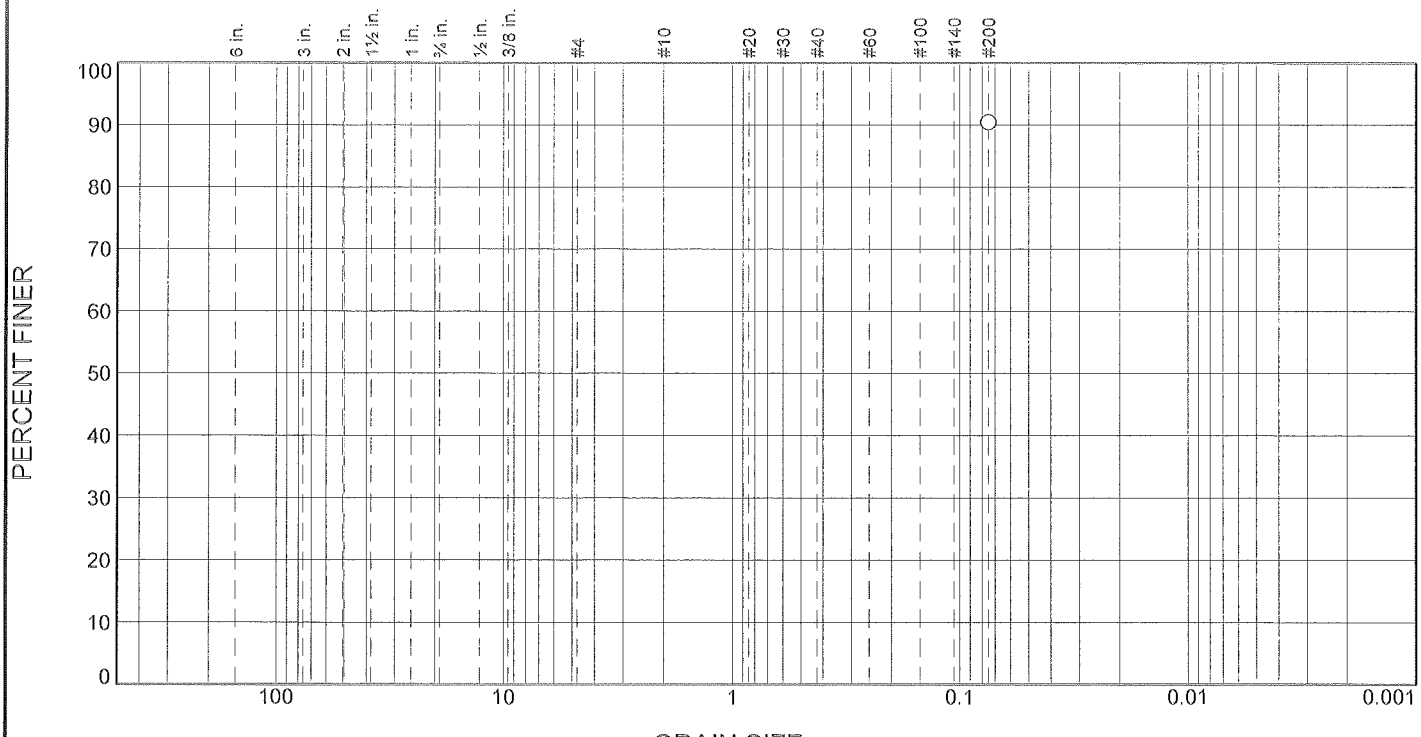
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						90.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	90.4		

* (no specification provided)

Material Description

Gray Clay

Atterberg Limits (ASTM D 4318)

PL= 26 LL= 58 PI= 32

Classification

USCS (D 2487)= CH AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/15/13

Tested By: JF/TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-017 **Depth:** 85'-86.5' **Date Sampled:**

Sample Number: MA#7538-27/S-20

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Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-017
Depth: 85'-86.5'
Sample Number: MA#7538-27/S-20
Material Description: Gray Clay
Date Received: 8/5/13 **PL:** 26 **LL:** 58 **PI:** 32
USCS Classification: CH
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/15/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 47.30
Tare Wt. = 36.70
Minus #200 from wash = 90.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
147.60	36.70	#200			90.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										90.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

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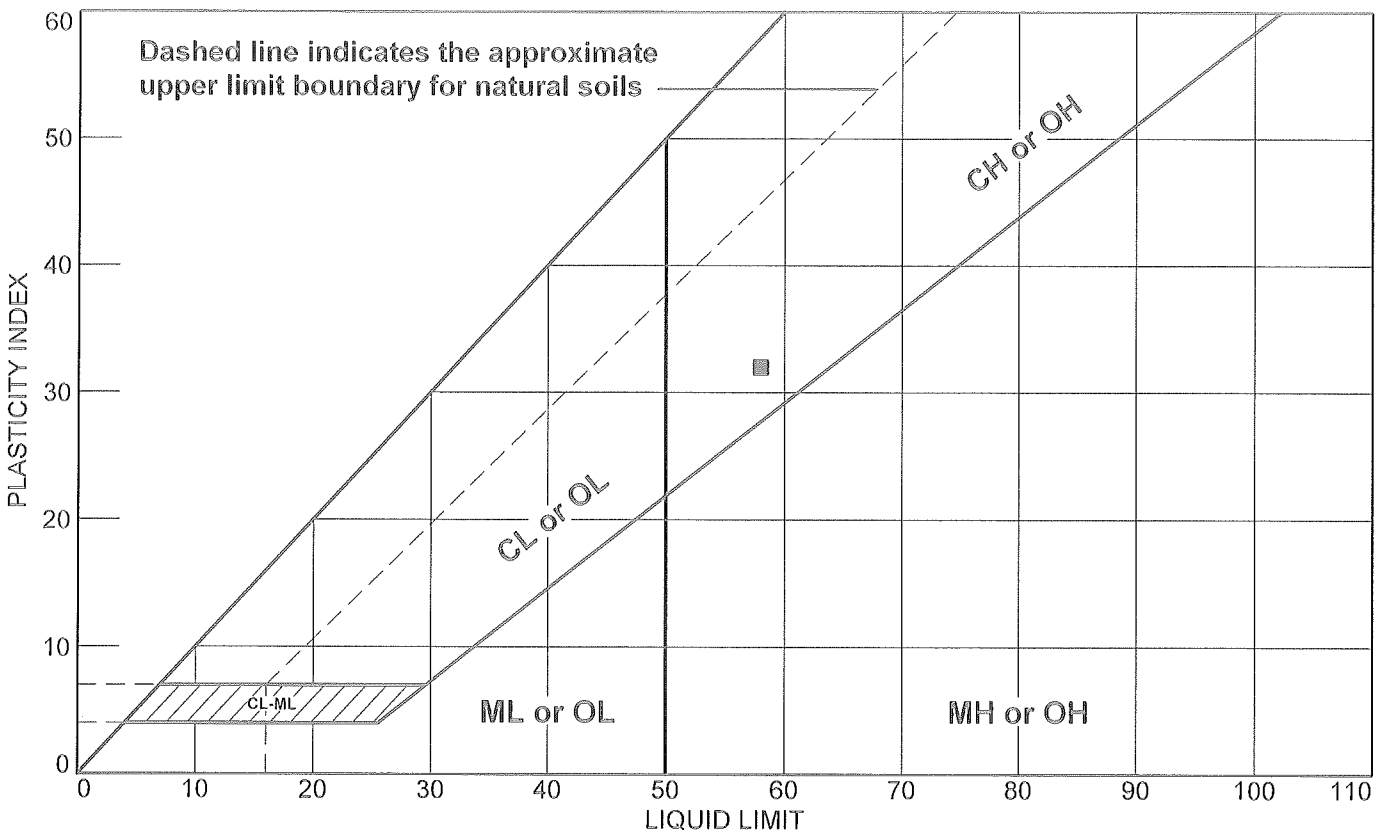
LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring E360-B-017	HMA#7538-25/S-12	45'-45.8'	14.0	NP	NP	NP	ML
■	Boring E360-B-017	MA#7538-27/S-20	85'-86.5'	23.3	26	58	32	CH

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Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

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BLDG-2018-00983, BLDG-2018-00985

Project No.: 12-450

Figure

Tested By: JF/TP **Checked By:** JAM

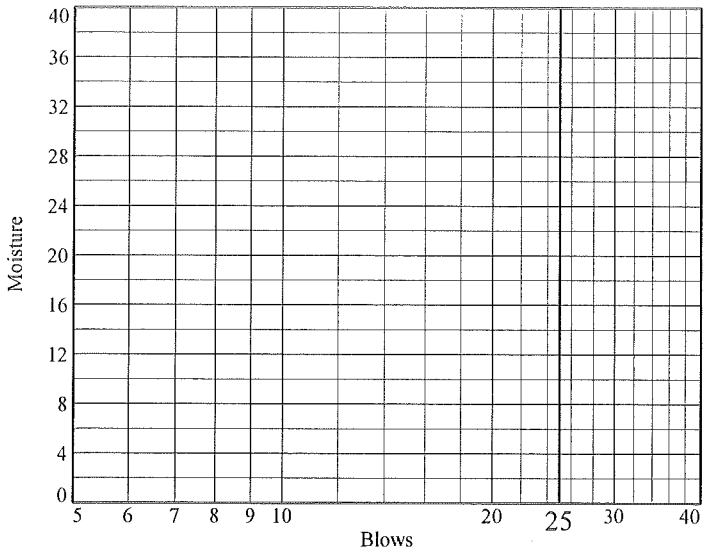
LIQUID AND PLASTIC LIMIT TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-017
Depth: 45'-45.8'
Sample Number: HMA#7538-25/S-12
Material Description: Gray Silt
USCS: ML
Tested by: JF/TP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare						
Dry+Tare						
Tare						
# Blows						
Moisture						



Liquid Limit= NP
Plastic Limit= NP
Plasticity Index= NP
Natural Moisture= 14.0

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare					
Dry+Tare					
Tare					
Moisture					

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
269.4	240.8	37.1	14.0

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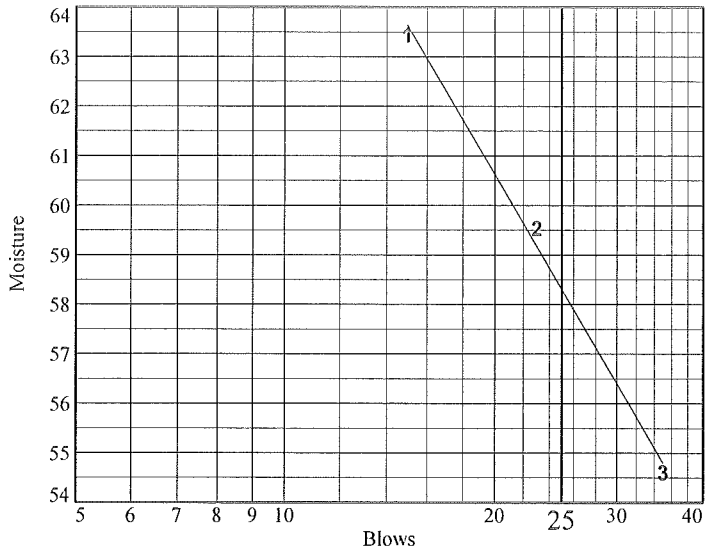
LIQUID AND PLASTIC LIMIT TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-017
Depth: 85'-86.5'
Sample Number: MA#7538-27/S-20
Material Description: Gray Clay
USCS: CH
Tested by: JF/TP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	37.3	34.6	33.7			
Dry+Tare	28.1	26.8	26.6			
Tare	13.6	13.7	13.6			
# Blows	15	23	35			
Moisture	63.4	59.5	54.6			



Liquid Limit= 58
Plastic Limit= 26
Plasticity Index= 32
Natural Moisture= 23.3
Liquidity Index= -0.1

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	20.1	19	20.2		
Dry+Tare	18.8	17.8	18.9		
Tare	13.6	13.4	13.7		
Moisture	25.0	27.3	25.0		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
173.4	147.6	36.7	23.3

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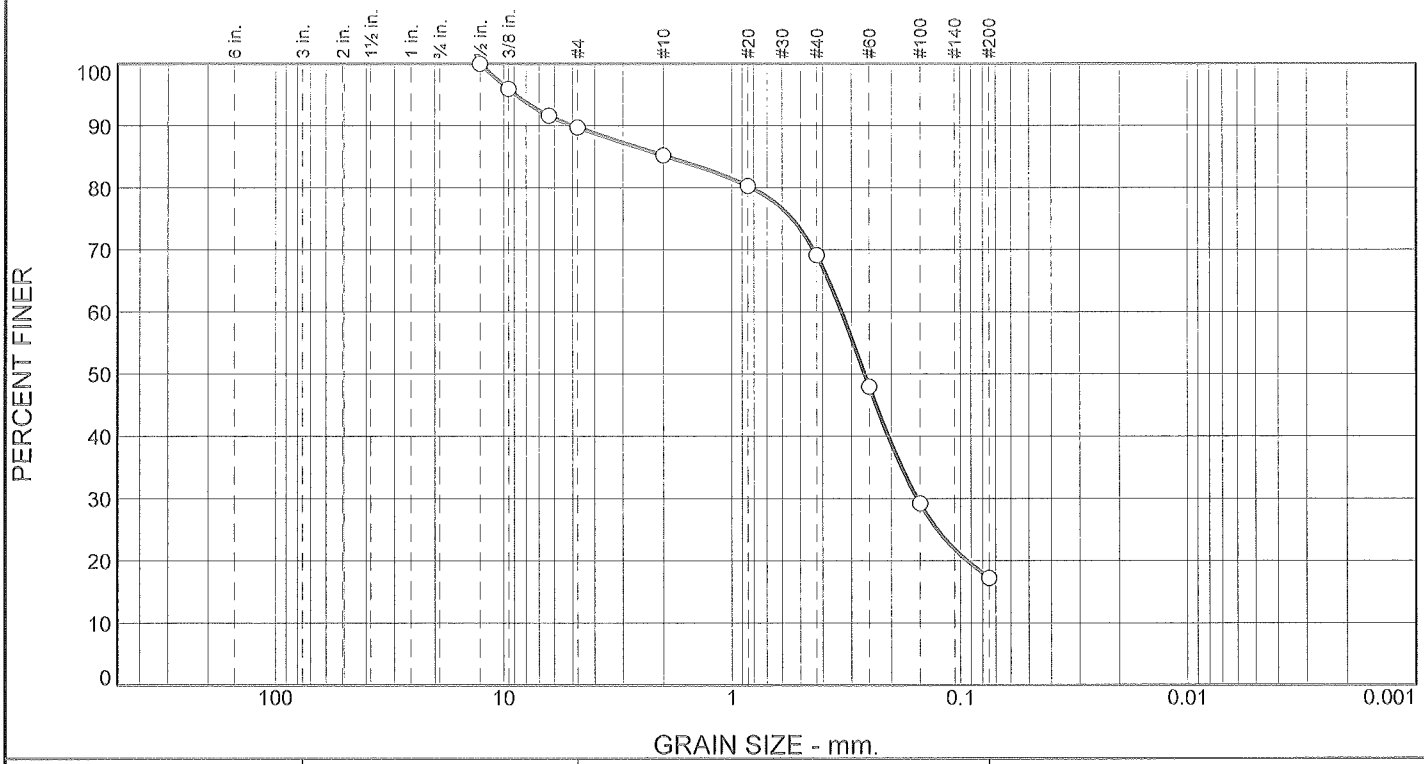
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.3	4.5	16.0	52.0	17.2	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	96.0		
1/4"	91.6		
#4	89.7		
#10	85.2		
#20	80.3		
#40	69.2		
#60	48.0		
#100	29.2		
#200	17.2		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 4.9640 D_{85}= 1.9055 D_{60}= 0.3309
D_{50}= 0.2621 D_{30}= 0.1543 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/15/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-022 **Depth:** 10'-10.11' **Date Sampled:**
Sample Number: HMA#7538-28/S-4

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-022
Depth: 10'-10.11'
Sample Number: HMA#7538-28/S-4
Material Description: Gray Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/15/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 746.80
Tare Wt. = 196.10
Minus #200 from wash = 16.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
854.60	196.10	1/2"	0.00	0.00	100.0
		3/8"	1509.90	1483.30	96.0
		1/4"	1411.30	1382.80	91.6
		#4	1368.90	1356.50	89.7
		#10	1543.60	1513.90	85.2
		#20	1099.20	1066.50	80.3
		#40	1017.20	944.00	69.2
		#60	1017.50	877.90	48.0
		#100	966.70	843.20	29.2
		#200	1098.10	1019.30	17.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	10.3	10.3	4.5	16.0	52.0	72.5			17.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0935	0.1543	0.2621	0.3309	0.8206	1.9055	4.9640	8.8290

Fineness Modulus
1.84

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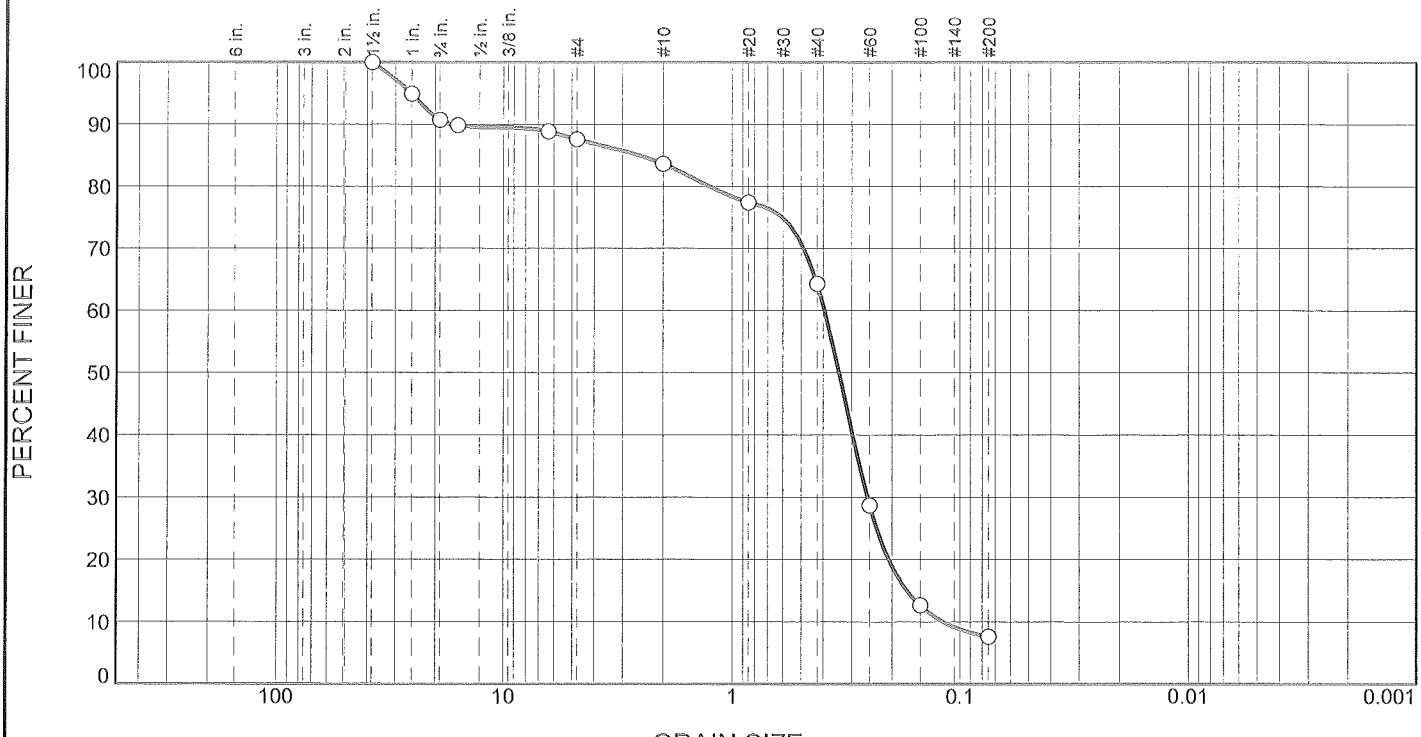
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.3	3.1	4.0	19.3	56.7	7.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/2"	100.0		
1"	94.9		
3/4"	90.7		
5/8"	89.9		
1/4"	88.8		
#4	87.6		
#10	83.6		
#20	77.4		
#40	64.3		
#60	28.7		
#100	12.6		
#200	7.6		

* (no specification provided)

Material Description

Gray Brown Poorly Graded Sand W/Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-3

Coefficients

D_{90}= 16.8194 D_{85}= 2.5440 D_{60}= 0.3943
D_{50}= 0.3405 D_{30}= 0.2556 D_{15}= 0.1717
D_{10}= 0.1188 C_u= 3.32 C_c= 1.39

Remarks

Date Received: 8/5/13 **Date Tested:** 8/16/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-022 **Depth:** 25'-26' **Date Sampled:**
Sample Number: HMA#7538-29/S-8

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-022
Depth: 25'-26'
Sample Number: HMA#7538-29/S-8
Material Description: Gray Brown Poorly Graded Sand W/Silt
Date Received: 8/5/13
USCS Classification: SP-SM
AASHTO Classification: A-3
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 864.30
Tare Wt. = 194.20
Minus #200 from wash = 7.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
917.80	194.20	1 1/2"	0.00	0.00	100.0
		1"	1506.10	1469.50	94.9
		3/4"	1535.40	1504.80	90.7
		5/8"	1478.90	1472.70	89.9
		1/4"	1390.00	1382.70	88.8
		#4	1365.50	1356.50	87.6
		#10	1542.60	1513.90	83.6
		#20	1111.40	1066.50	77.4
		#40	1039.00	944.00	64.3
		#60	1135.60	878.00	28.7
		#100	959.40	843.20	12.6
		#200	1055.80	1019.30	7.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	9.3	3.1	12.4	4.0	19.3	56.7	80.0			7.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1188	0.1717	0.2063	0.2556	0.3405	0.3943	1.2517	2.5440	16.8194	25.4942

Fineness Modulus	C_u	C_c
2.40	3.32	1.39

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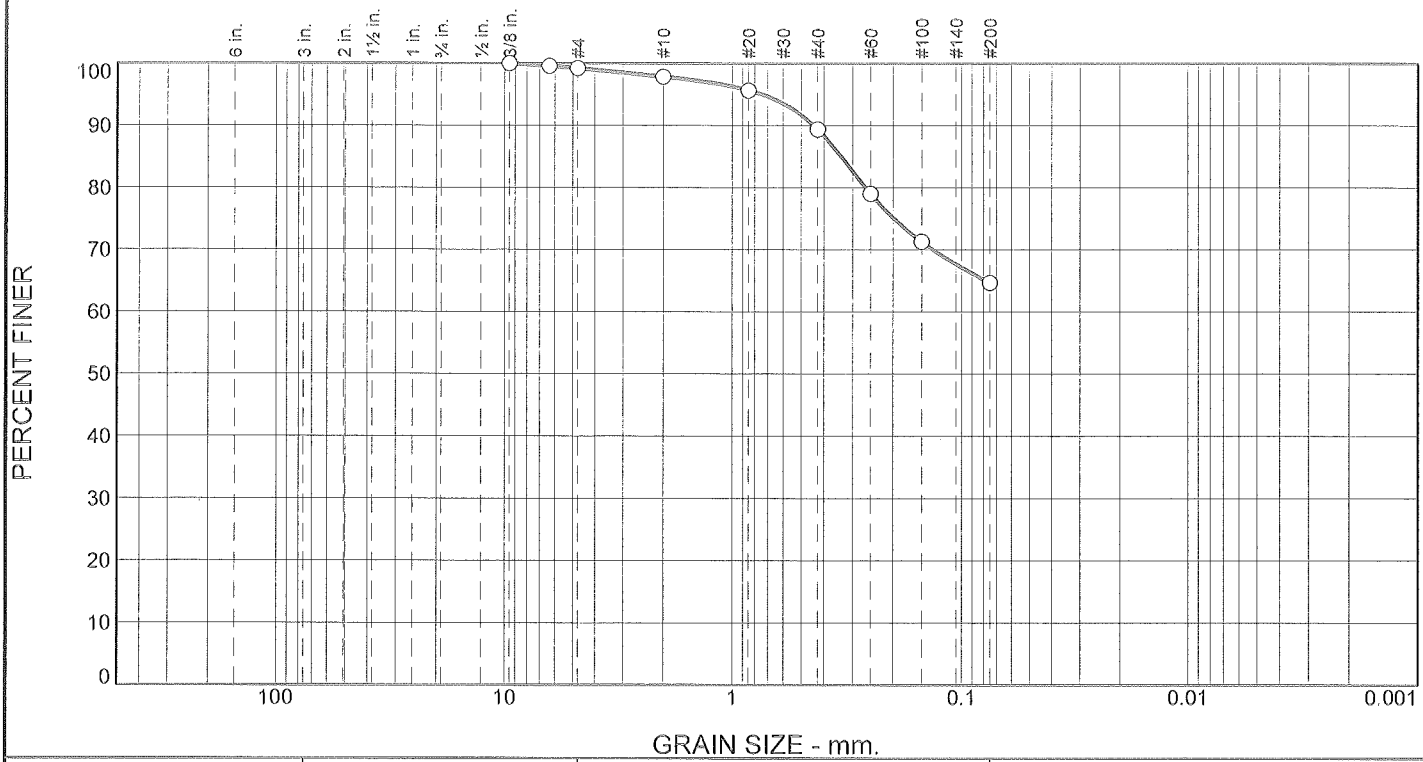
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.8	1.4	8.4	24.7	64.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
1/4"	99.6		
#4	99.2		
#10	97.8		
#20	95.7		
#40	89.4		
#60	79.0		
#100	71.3		
#200	64.7		

* (no specification provided)

Material Description

Gray Sandy Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.4416 D_{85}= 0.3358 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/15/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-022 **Depth:** 45'-45.11' **Date Sampled:**
Sample Number: HMA#7538-30/S-12

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-022
Depth: 45'-45.11'
Sample Number: HMA#7538-30/S-12
Material Description: Gray Sandy Silt
Date Received: 8/5/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/15/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 436.70
Tare Wt. = 192.90
Minus #200 from wash = 64.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
871.20	192.90	3/8"	0.00	0.00	100.0
		1/4"	1385.60	1382.90	99.6
		#4	1359.20	1356.70	99.2
		#10	1523.40	1514.00	97.8
		#20	1081.50	1066.80	95.7
		#40	986.70	944.10	89.4
		#60	948.40	878.00	79.0
		#100	895.70	843.20	71.3
		#200	1064.10	1019.40	64.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.8	0.8	1.4	8.4	24.7	34.5			64.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.2630	0.3358	0.4416	0.7401

Fineness Modulus
0.58

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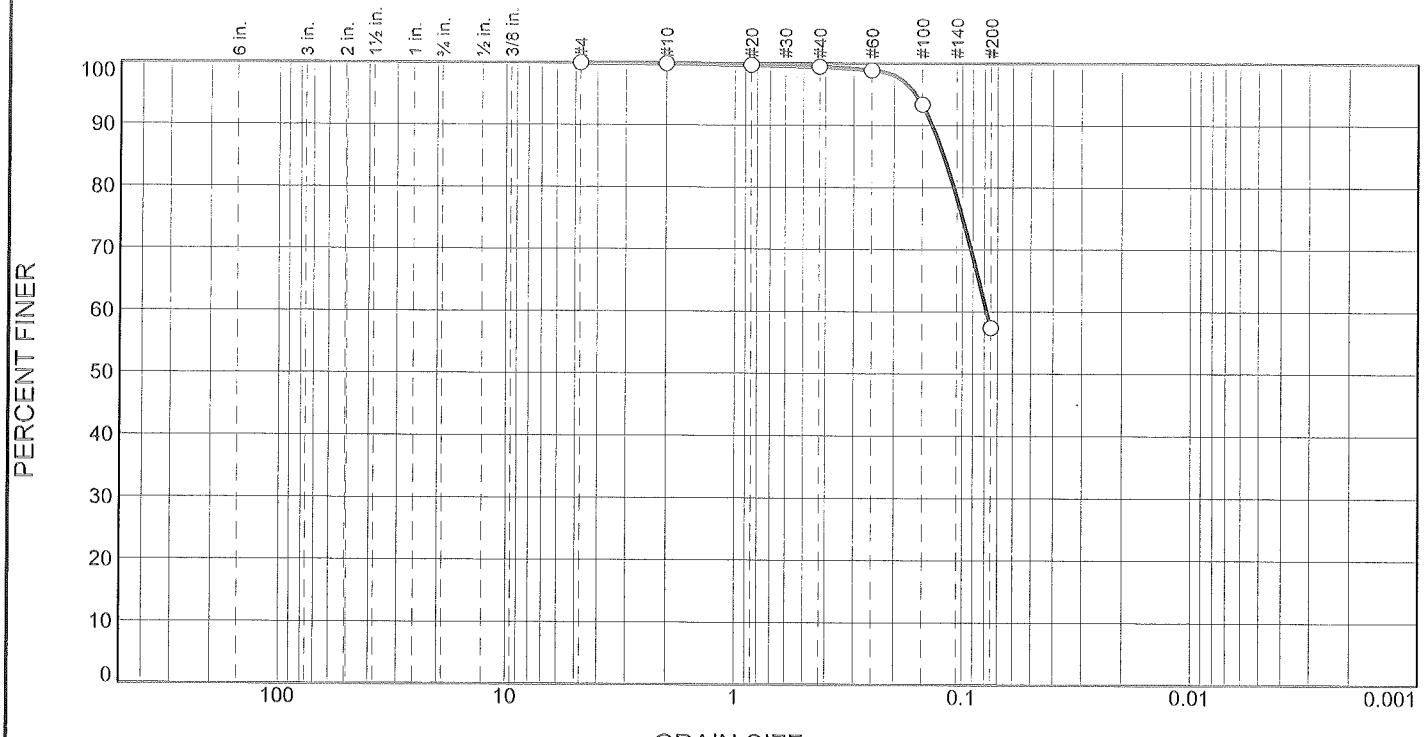
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.5	42.0	57.4	

Test Results (ASTM C136 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	99.7		
#40	99.4		
#60	98.9		
#100	93.4		
#200	57.4		

* (no specification provided)

Material Description

Gray Sandy Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.1354 D_{85}= 0.1204 D_{60}= 0.0781
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/15/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-022 **Depth:** 70'-71.5' **Date Sampled:**
Sample Number: HMA#7538-31/S-17

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-022
Depth: 70'-71.5'
Sample Number: HMA#7538-31/S-17
Material Description: Gray Sandy Silt
Date Received: 8/5/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D 1140
Tested By: JF/TP
Test Date: 8/15/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 557.70
Tare Wt. = 161.90
Minus #200 from wash = 33.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
752.40	161.90	#4	0.00	0.00	100.0
		#10	1514.50	1514.00	99.9
		#20	1068.00	1066.70	99.7
		#40	945.60	944.10	99.4
		#60	881.10	877.90	98.9
		#100	875.80	843.40	93.4
		#200	1232.00	1019.60	57.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	0.5	42.0	42.6			57.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.0781	0.1091	0.1204	0.1354	0.1597

Fineness Modulus
0.08

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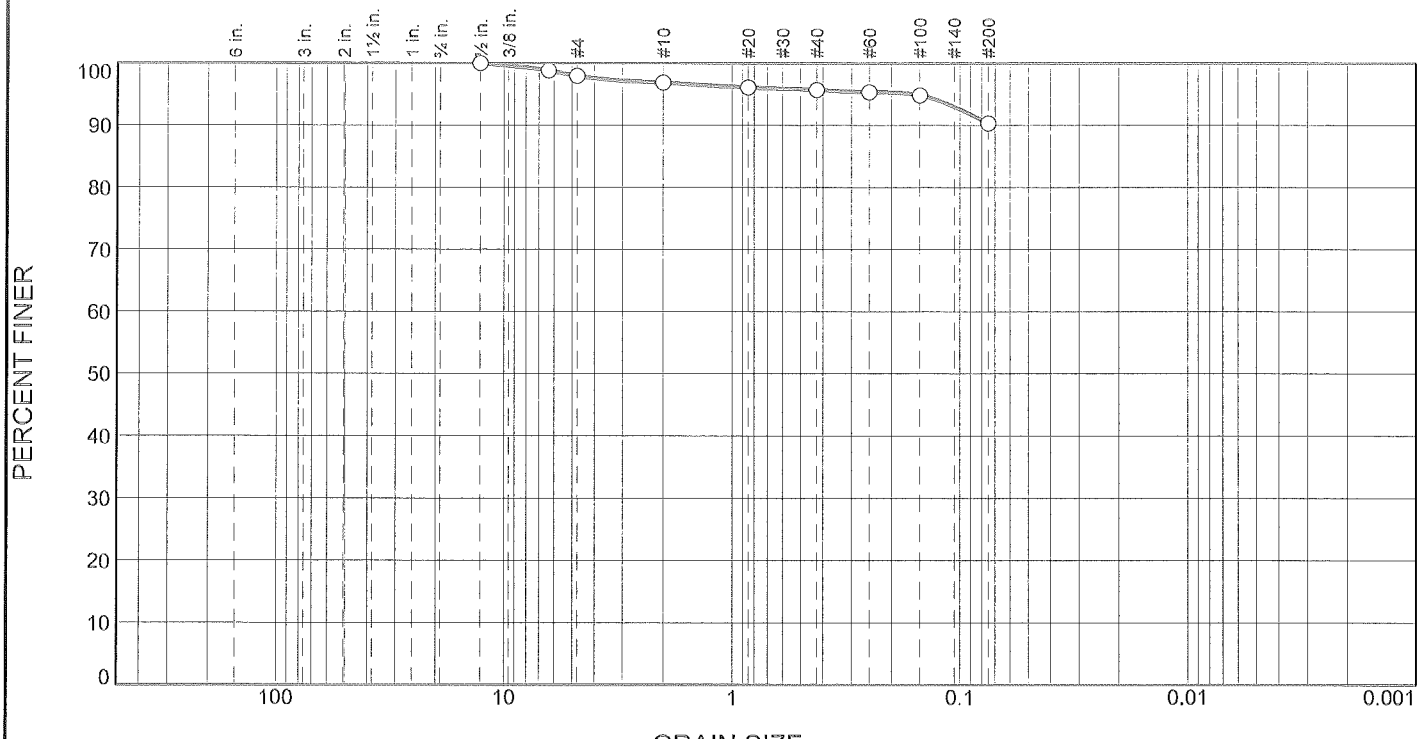
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.0	1.1	1.2	5.4	90.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
1/4"	98.8		
#4	98.0		
#10	96.9		
#20	96.1		
#40	95.7		
#60	95.4		
#100	94.9		
#200	90.3		

* (no specification provided)

Material Description

Gray Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/15/13

Tested By: JF/TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-022 **Depth:** 90'-90.5' **Date Sampled:**

Sample Number: 7538-32/S-21

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-022
Depth: 90'-90.5'
Sample Number: 7538-32/S-21
Material Description: Gray Silt
Date Received: 8/5/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/15/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 213.00
Tare Wt. = 157.40
Minus #200 from wash = 88.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
658.70	157.40	1/2"	0.00	0.00	100.0
		1/4"	1388.70	1382.80	98.8
		#4	1360.80	1356.60	98.0
		#10	1519.50	1513.90	96.9
		#20	1070.30	1066.50	96.1
		#40	945.90	944.00	95.7
		#60	879.80	877.90	95.4
		#100	845.60	843.10	94.9
		#200	1042.20	1019.40	90.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.0	2.0	1.1	1.2	5.4	7.7			90.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
									0.1580

Fineness Modulus
0.23

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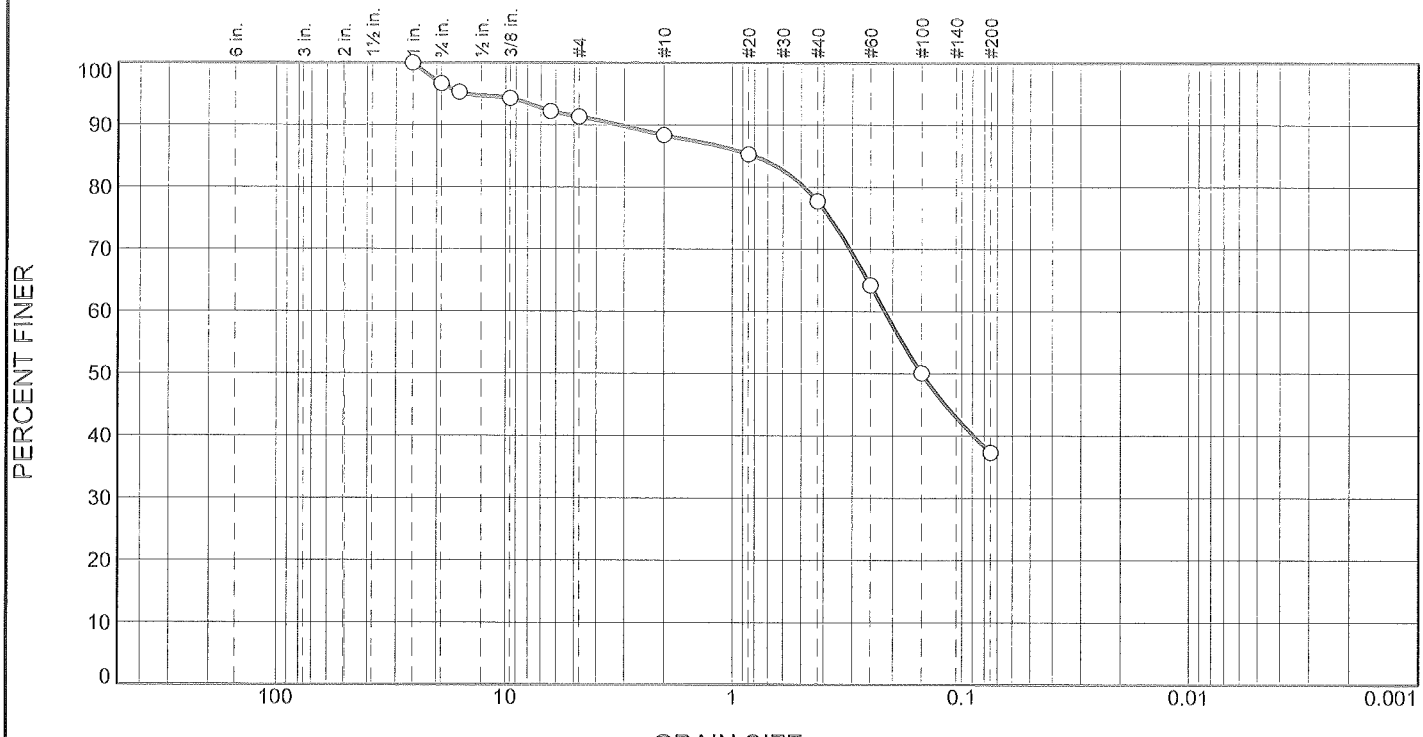
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.3	5.4	2.9	10.7	40.4	37.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	96.7		
5/8"	95.3		
3/8"	94.3		
1/4"	92.2		
#4	91.3		
#10	88.4		
#20	85.3		
#40	77.7		
#60	64.2		
#100	50.1		
#200	37.3		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 3.1624 D_{85}= 0.8061 D_{60}= 0.2165
D_{50}= 0.1496 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/16/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-024 **Depth:** 7.5'-9' **Date Sampled:**
Sample Number: HMA#7538-33/S-3

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-024
Depth: 7.5'-9'
Sample Number: HMA#7538-33/S-3
Material Description: Gray Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 558.90
Tare Wt. = 190.10
Minus #200 from wash = 36.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
769.50	190.10	1"	0.00	0.00	100.0
		3/4"	1524.00	1504.90	96.7
		5/8"	1481.00	1472.70	95.3
		3/8"	1489.00	1483.50	94.3
		1/4"	1394.90	1382.80	92.2
		#4	1361.90	1356.70	91.3
		#10	1531.30	1514.00	88.4
		#20	1084.20	1066.50	85.3
		#40	987.80	944.00	77.7
		#60	956.40	877.90	64.2
		#100	924.90	843.10	50.1
		#200	1093.10	1019.30	37.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	3.3	5.4	8.7	2.9	10.7	40.4	54.0			37.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1496	0.2165	0.4843	0.8061	3.1624	14.9397

Fineness Modulus
1.40

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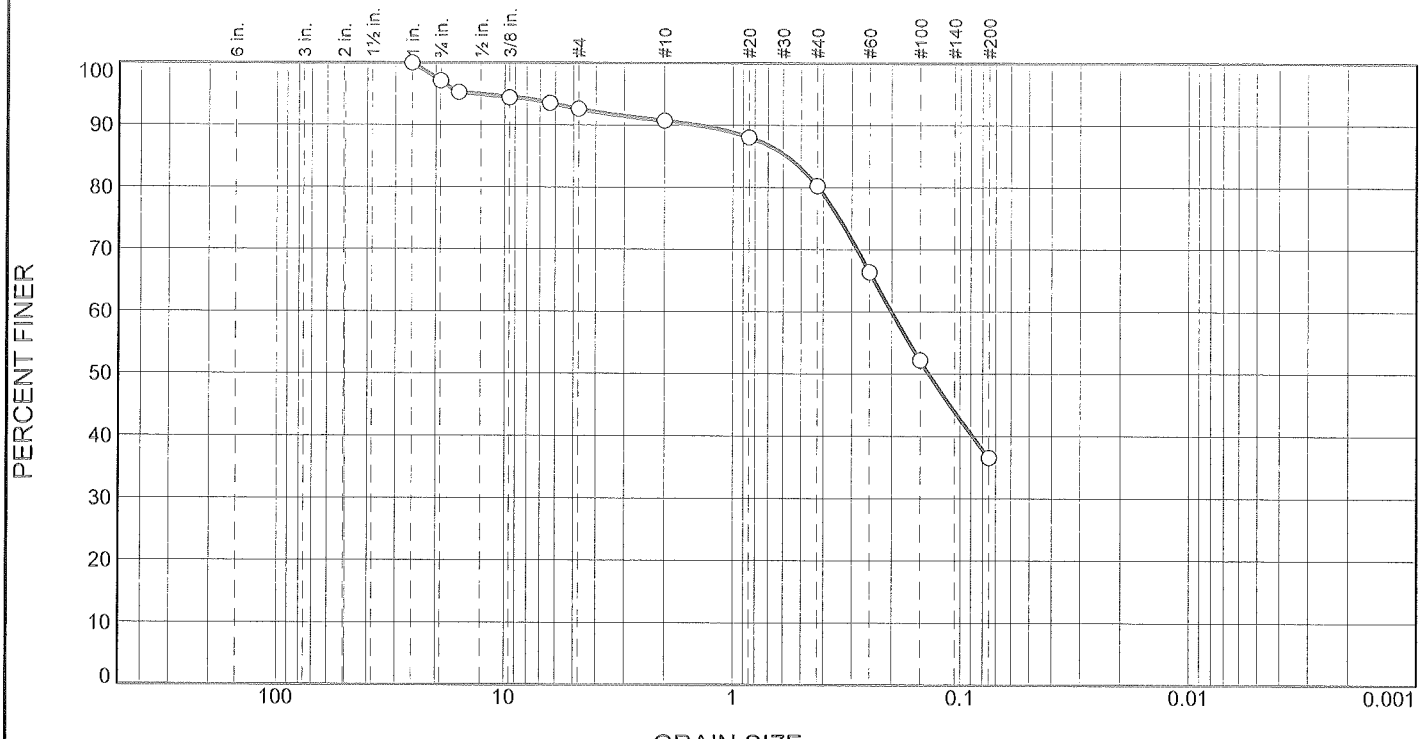
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.9	4.5	1.9	10.5	43.7	36.5	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	97.1		
5/8"	95.3		
3/8"	94.4		
1/4"	93.6		
#4	92.6		
#10	90.7		
#20	88.1		
#40	80.2		
#60	66.4		
#100	52.2		
#200	36.5		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 1.4261 D_{85}= 0.5791 D_{60}= 0.2001
D_{50}= 0.1372 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/16/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-024 **Depth:** 20'-21.5' **Date Sampled:**
Sample Number: HMA#7538-34

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-024
Depth: 20'-21.5'
Sample Number: HMA#7538-34
Material Description: Gray Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 649.30
Tare Wt. = 231.00
Minus #200 from wash = 34.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
870.60	231.00	1"	0.00	0.00	100.0
		3/4"	1523.10	1504.80	97.1
		5/8"	1484.60	1472.70	95.3
		3/8"	1488.80	1483.40	94.4
		1/4"	1388.40	1382.80	93.6
		#4	1362.70	1356.60	92.6
		#10	1526.10	1513.90	90.7
		#20	1083.40	1066.50	88.1
		#40	994.10	944.00	80.2
		#60	966.40	877.90	66.4
		#100	933.80	843.20	52.2
		#200	1119.60	1019.30	36.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.9	4.5	7.4	1.9	10.5	43.7	56.1			36.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1372	0.2001	0.4204	0.5791	1.4261	13.1448

Fineness Modulus
1.26

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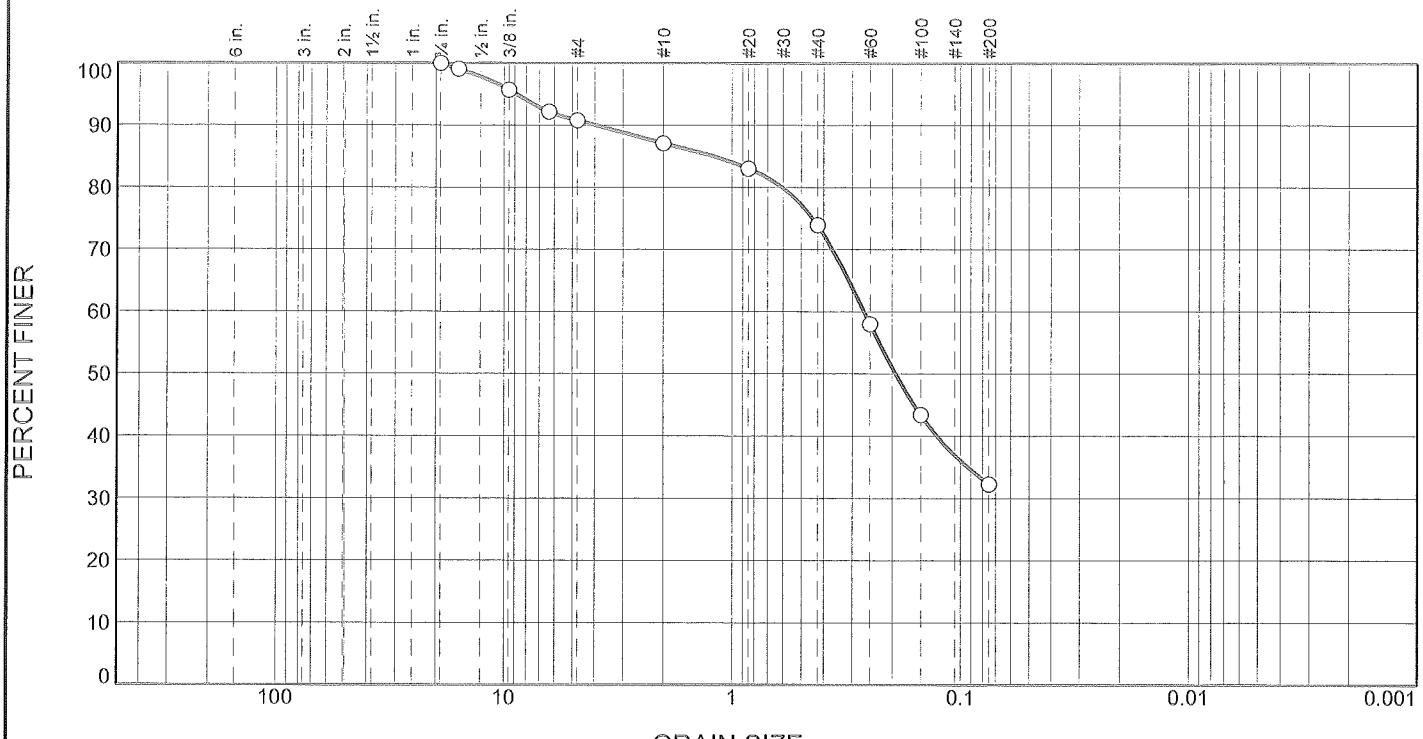
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.2	3.7	13.2	41.6	32.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
5/8"	99.1		
3/8"	95.7		
1/4"	92.2		
#4	90.8		
#10	87.1		
#20	83.0		
#40	73.9		
#60	58.0		
#100	43.4		
#200	32.3		

* (no specification provided)

Material Description

Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 3.9428 D_{85}= 1.2101 D_{60}= 0.2661
D_{50}= 0.1931 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/16/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-024 **Depth:** 45'-45.5' **Date Sampled:**
Sample Number: HMA#7538-35/S-12

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-024
Depth: 45'-45.5'
Sample Number: HMA#7538-35/S-12
Material Description: Gray Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 786.00
Tare Wt. = 234.90
Minus #200 from wash = 30.7%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
1029.70	234.90	3/4"	0.00	0.00	100.0
		5/8"	1479.90	1472.70	99.1
		3/8"	1510.20	1483.40	95.7
		1/4"	1411.00	1382.70	92.2
		#4	1367.60	1356.50	90.8
		#10	1543.10	1513.90	87.1
		#20	1098.80	1066.50	83.0
		#40	1016.50	944.00	73.9
		#60	1004.60	878.00	58.0
		#100	959.10	843.20	43.4
		#200	1107.80	1019.30	32.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	9.2	9.2	3.7	13.2	41.6	58.5			32.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1931	0.2661	0.6051	1.2101	3.9428	8.7952

Fineness Modulus
1.54

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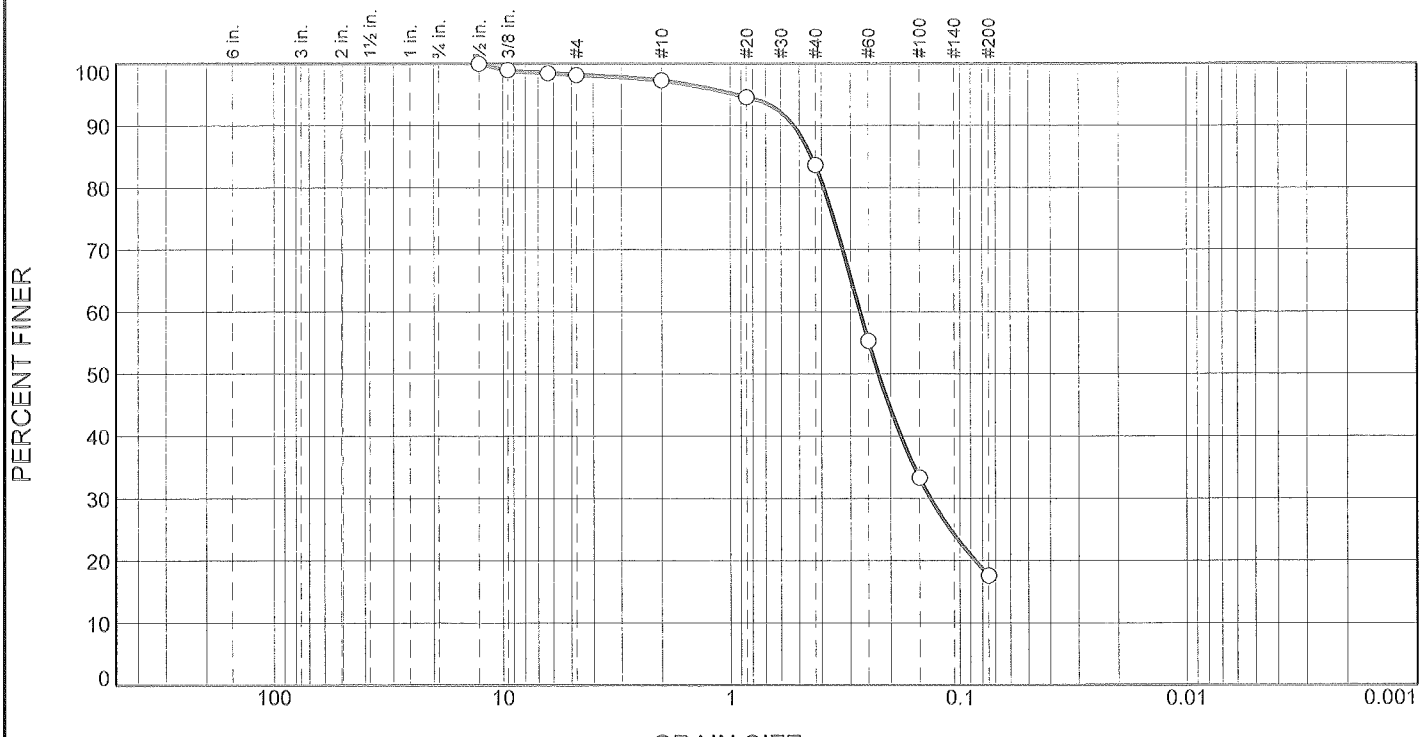
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.8	0.9	13.7	66.0	17.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	99.0		
1/4"	98.5		
#4	98.2		
#10	97.3		
#20	94.6		
#40	83.6		
#60	55.3		
#100	33.3		
#200	17.6		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.5269 D_{85}= 0.4406 D_{60}= 0.2718
D_{50}= 0.2257 D_{30}= 0.1344 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/16/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-024 **Depth:** 70'-71.5' **Date Sampled:**
Sample Number: HMA#7538-36/S-17

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-024
Depth: 70'-71.5'
Sample Number: HMA#7538-36/S-17
Material Description: Gray Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 713.50
Tare Wt. = 118.50
Minus #200 from wash = 16.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
827.00	118.50	1/2"	0.00	0.00	100.0
		3/8"	1490.40	1483.30	99.0
		1/4"	1386.30	1382.70	98.5
		#4	1358.70	1356.60	98.2
		#10	1520.30	1513.80	97.3
		#20	1085.50	1066.50	94.6
		#40	1021.60	944.00	83.6
		#60	1078.60	877.90	55.3
		#100	999.30	843.30	33.3
		#200	1130.70	1019.30	17.6

Fractional Components

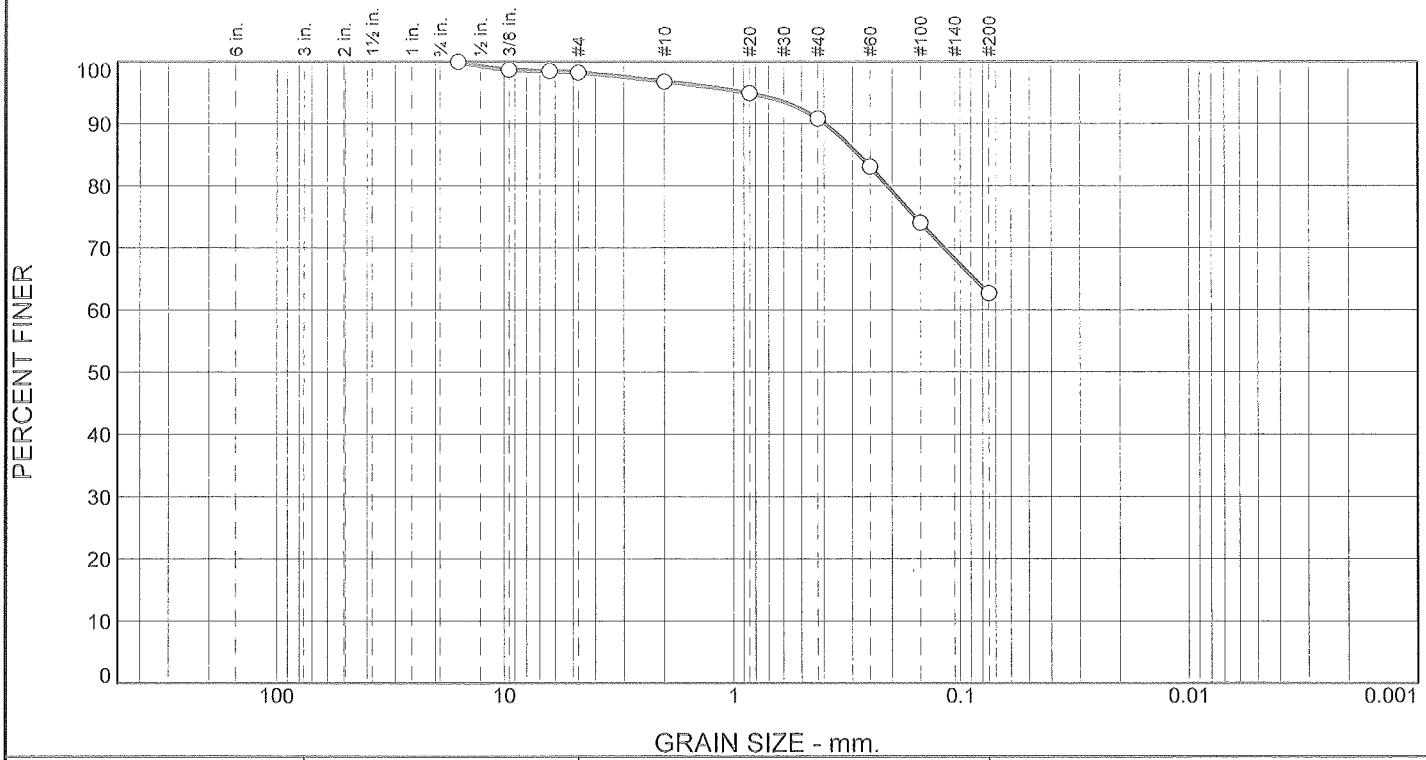
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.8	1.8	0.9	13.7	66.0	80.6			17.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0858	0.1344	0.2257	0.2718	0.3908	0.4406	0.5269	0.9448

Fineness Modulus
1.18

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.7	1.5	6.0	28.1	62.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
3/8"	98.7		
1/4"	98.5		
#4	98.3		
#10	96.8		
#20	94.9		
#40	90.8		
#60	83.1		
#100	74.0		
#200	62.7		

* (no specification provided)

Material Description

Gray Sandy Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.3953 D_{85}= 0.2803 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/16/13

Tested By: JF/TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-024 **Depth:** 85'-85.4' **Date Sampled:**
Sample Number: HMA#7538-37/S-20

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-024
Depth: 85'-85.4'
Sample Number: HMA#7538-37/S-20
Material Description: Gray Sandy Silt
Date Received: 8/5/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 355.80
Tare Wt. = 118.30
Minus #200 from wash = 60.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
725.50	118.30	5/8"	0.00	0.00	100.0
		3/8"	1491.10	1483.40	98.7
		1/4"	1384.10	1382.80	98.5
		#4	1358.20	1356.60	98.3
		#10	1522.80	1514.00	96.8
		#20	1078.00	1066.50	94.9
		#40	968.80	944.00	90.8
		#60	925.10	878.00	83.1
		#100	898.10	843.30	74.0
		#200	1088.40	1019.40	62.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.7	1.7	1.5	6.0	28.1	35.6			62.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.2098	0.2803	0.3953	0.8761

Fineness Modulus
0.56

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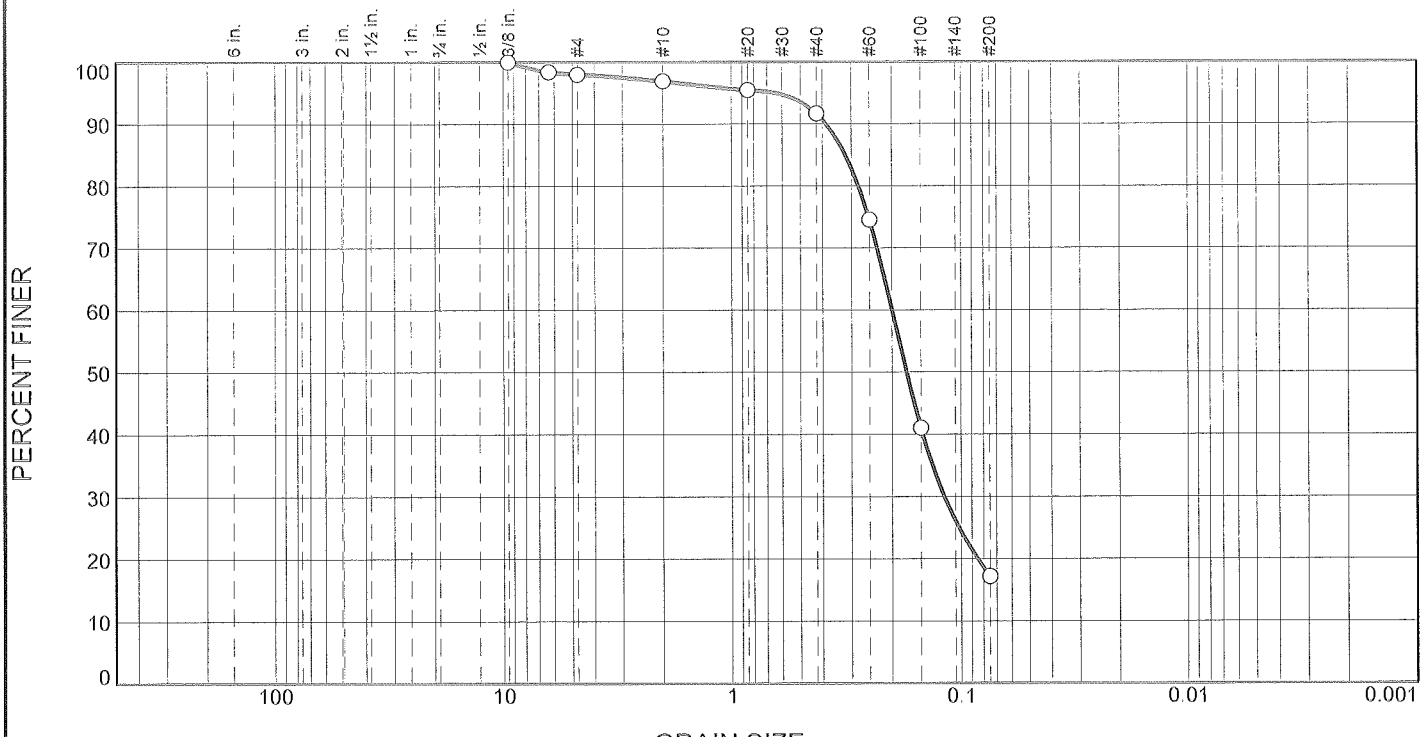
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.0	1.1	5.2	74.5	17.2	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
1/4"	98.4		
#4	98.0		
#10	96.9		
#20	95.5		
#40	91.7		
#60	74.5		
#100	41.1		
#200	17.2		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.3856 D_{85}= 0.3179 D_{60}= 0.1994
D_{50}= 0.1727 D_{30}= 0.1187 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/16/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-030 **Depth:** 2.5'-4' **Date Sampled:**
Sample Number: HMA#7538-38/S-1

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-030
Depth: 2.5'-4'
Sample Number: HMA#7538-38/S-1
Material Description: Gray Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 500.60
Tare Wt. = 116.10
Minus #200 from wash = 14.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
563.60	116.10	3/8"	0.00	0.00	100.0
		1/4"	1389.80	1382.80	98.4
		#4	1358.40	1356.60	98.0
		#10	1518.90	1513.90	96.9
		#20	1072.90	1066.50	95.5
		#40	960.90	943.90	91.7
		#60	954.60	877.90	74.5
		#100	993.10	843.20	41.1
		#200	1126.10	1019.30	17.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.0	2.0	1.1	5.2	74.5	80.8			17.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0847	0.1187	0.1727	0.1994	0.2790	0.3179	0.3856	0.6361

Fineness Modulus
0.90

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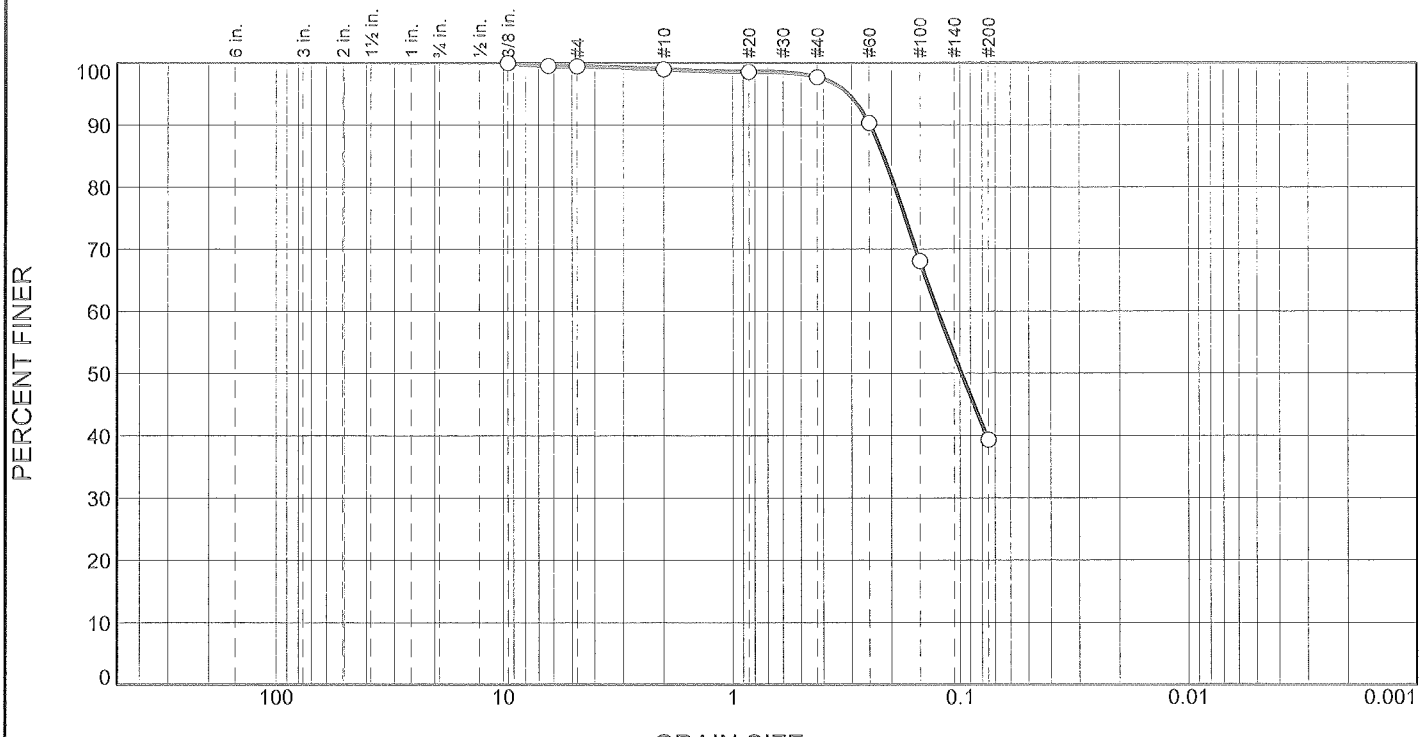
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.5	0.5	1.3	58.4	39.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
1/4"	99.5		
#4	99.5		
#10	99.0		
#20	98.6		
#40	97.7		
#60	90.3		
#100	68.1		
#200	39.3		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.2477 D_{85}= 0.2160 D_{60}= 0.1254
D_{50}= 0.0985 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/19/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-030 **Depth:** 12.5'-14' **Date Sampled:**
Sample Number: HMA#7538-39/S-5

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-030
Depth: 12.5'-14'
Sample Number: HMA#7538-39/S-5
Material Description: Gray Brown Silty Sand
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/19/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 394.10
Tare Wt. = 114.00
Minus #200 from wash = 32.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
529.00	114.00	3/8"	0.00	0.00	100.0
		1/4"	1384.70	1382.80	99.5
		#4	1356.80	1356.60	99.5
		#10	1515.90	1513.90	99.0
		#20	1068.10	1066.40	98.6
		#40	947.50	943.90	97.7
		#60	908.80	877.90	90.3
		#100	935.40	843.20	68.1
		#200	1138.50	1019.30	39.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.5	0.5	0.5	1.3	58.4	60.2			39.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0985	0.1254	0.1927	0.2160	0.2477	0.3082

Fineness Modulus
0.42

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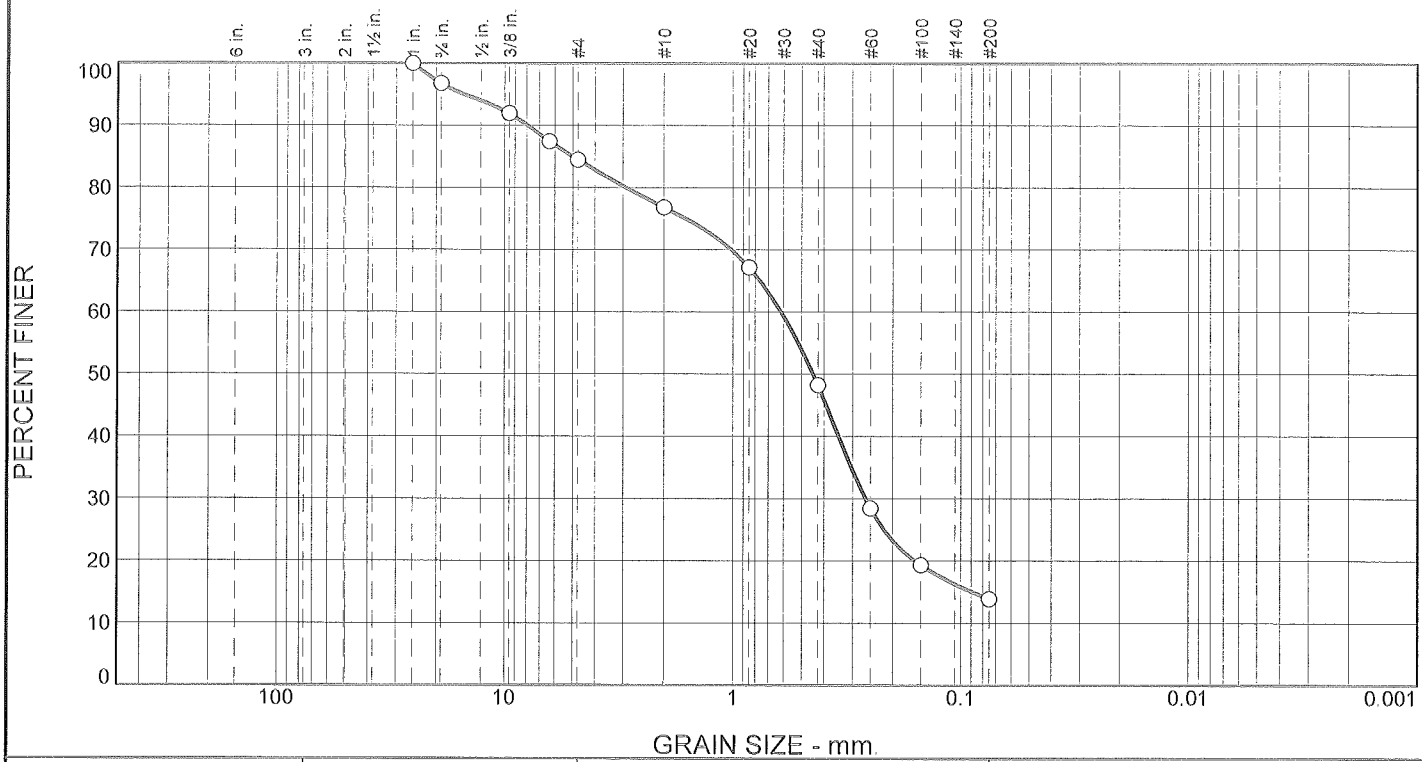
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.2	12.3	7.7	28.6	34.3	13.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	96.8		
3/8"	91.9		
1/4"	87.4		
#4	84.5		
#10	76.8		
#20	67.1		
#40	48.2		
#60	28.4		
#100	19.4		
#200	13.9		

* (no specification provided)

Material Description

Gray Brown Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 7.9138 D_{85}= 5.0182 D_{60}= 0.6166
D_{50}= 0.4464 D_{30}= 0.2630 D_{15}= 0.0887
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/19/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-030 **Depth:** 30'-31.5' **Date Sampled:**
Sample Number: HMA#7538-40/S-9

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Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-030
Depth: 30'-31.5'
Sample Number: HMA#7538-40/S-9
Material Description: Gray Brown Silty Sand W/Gravel
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/19/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 532.90
Tare Wt. = 123.20
Minus #200 from wash = 13.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
595.70	123.20	1"	0.00	0.00	100.0
		3/4"	1520.00	1504.80	96.8
		3/8"	1506.30	1483.40	91.9
		1/4"	1403.90	1382.70	87.4
		#4	1370.70	1356.60	84.5
		#10	1550.00	1513.80	76.8
		#20	1112.30	1066.50	67.1
		#40	1033.30	944.00	48.2
		#60	971.40	878.00	28.4
		#100	886.10	843.20	19.4
		#200	1045.30	1019.40	13.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	3.2	12.3	15.5	7.7	28.6	34.3	70.6			13.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0887	0.1589	0.2630	0.4464	0.6166	2.9191	5.0182	7.9138	15.0317

Fineness Modulus
2.63

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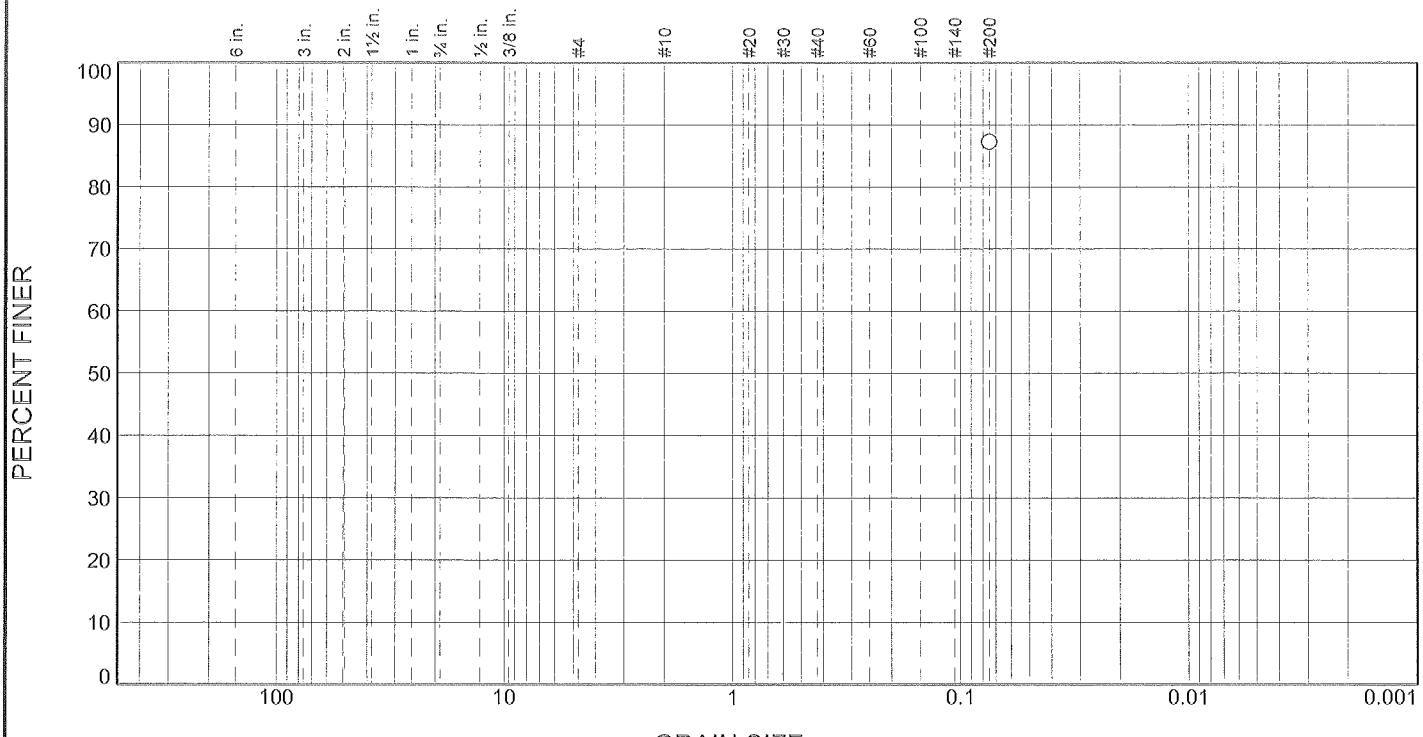
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						87.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	87.3		

* (no specification provided)

Material Description

Gray Clay

Atterberg Limits (ASTM D 4318)

PL= 23 LL= 52 PI= 29

Classification

USCS (D 2487)= CH or OH AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/19/13

Tested By: JF/TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-030 **Depth:** 45'-46.5 **Date Sampled:**

Sample Number: HMA#7538-41/S-12

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-030
Depth: 45'-46.5 **Sample Number:** HMA#7538-41/S-12
Material Description: Gray Clay
Date Received: 8/5/13 **PL:** 23 **LL:** 52 **PI:** 29
USCS Classification: CH or OH
#200 Wash Method: ASTM D1140
Tested By: JF/TP **Test Date:** 8/19/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 46.90
Tare Wt. = 31.00
Minus #200 from wash = 87.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
156.00	31.00	#200			87.3

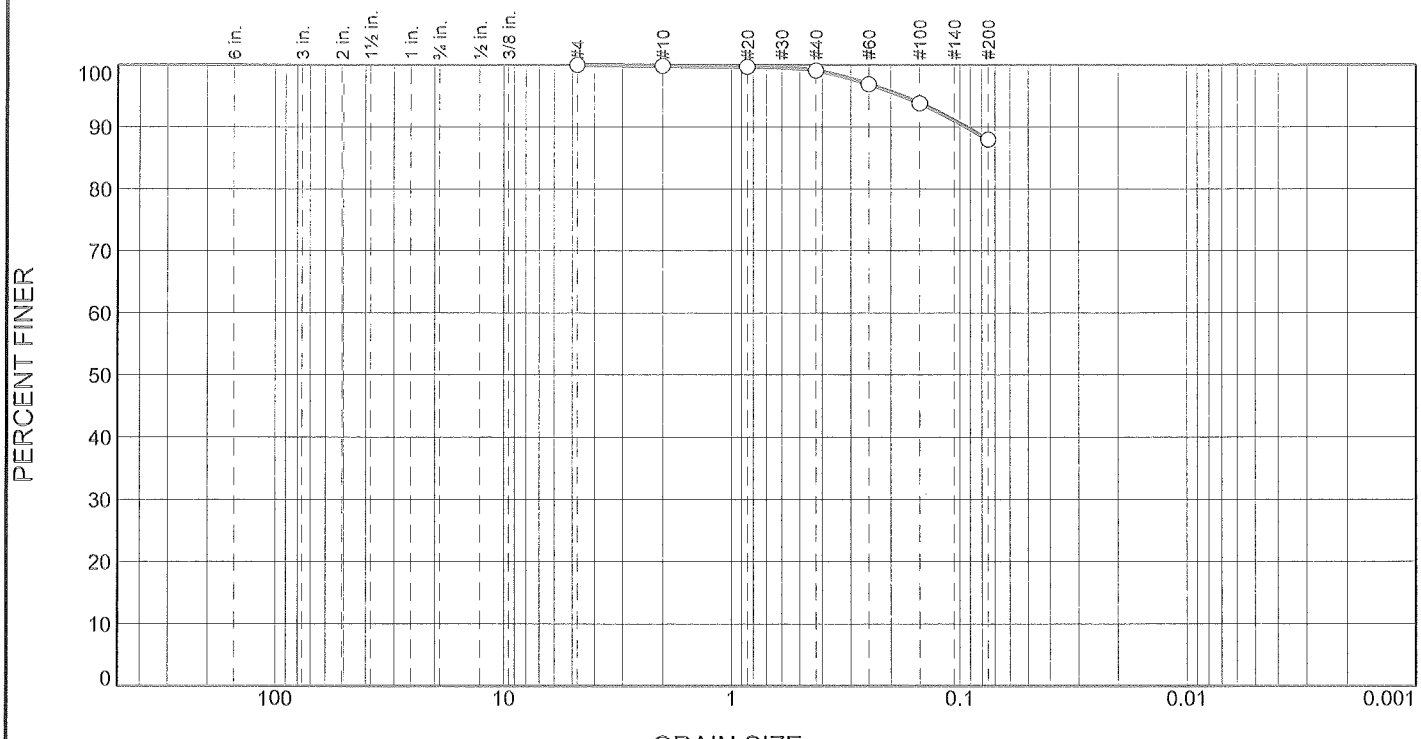
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										87.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.8	11.1	88.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	99.7		
#40	99.1		
#60	96.9		
#100	93.8		
#200	88.0		

* (no specification provided)

Material Description

Gray Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.0940 D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/19/13

Tested By: JF/TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-030 **Depth:** 65'-66.5' **Date Sampled:**

Sample Number: HMA#7538-42/S-16

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Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/22/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-030
Depth: 65'-66.5'
Sample Number: HMA#7538-42/S-16
Material Description: Gray Silt
Date Received: 8/5/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/19/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 188.80
Tare Wt. = 136.20
Minus #200 from wash = 87.7%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
563.90	136.20	#4	0.00	0.00	100.0
		#10	1514.40	1513.90	99.9
		#20	1067.20	1066.50	99.7
		#40	946.70	944.00	99.1
		#60	887.30	878.00	96.9
		#100	856.60	843.40	93.8
		#200	1044.50	1019.40	88.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	0.8	11.1	12.0			88.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.0940	0.1785

Fineness Modulus
0.09

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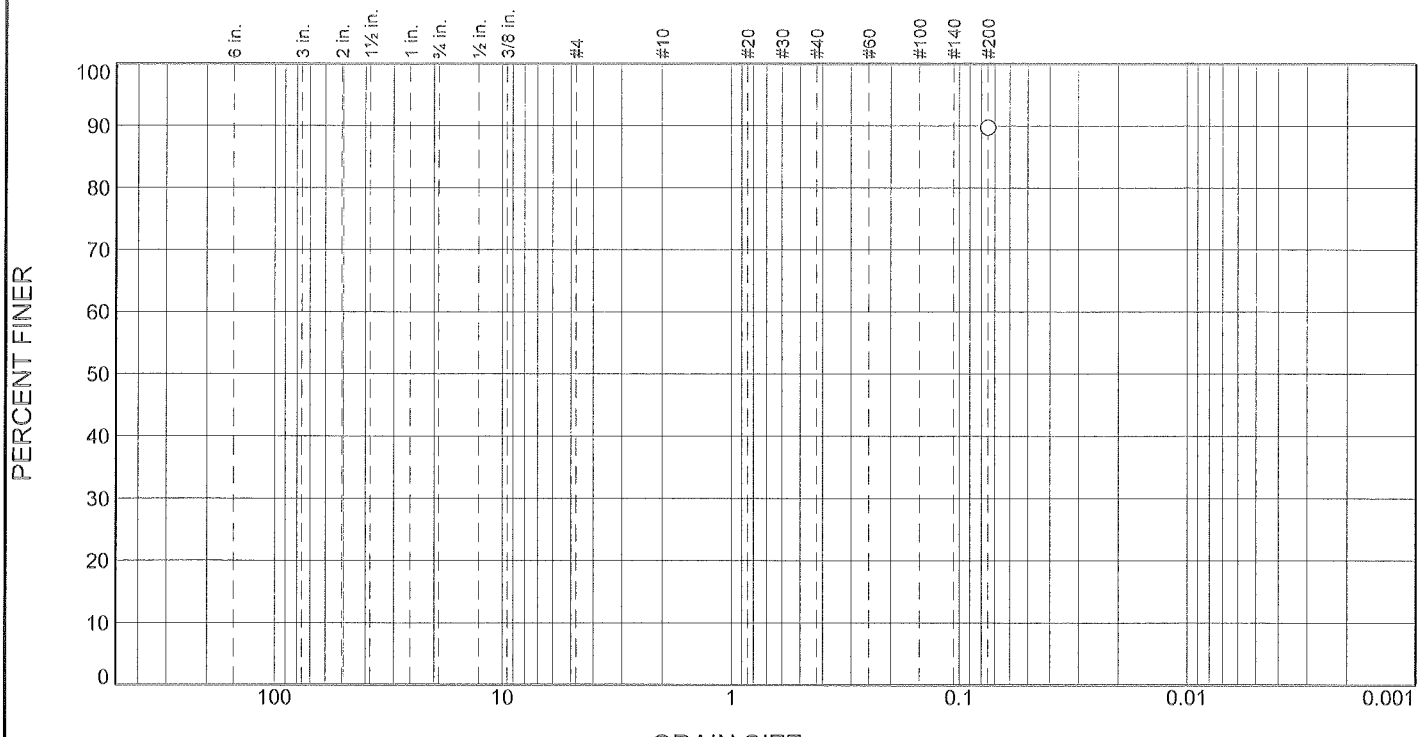
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						89.8	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	89.8		

* (no specification provided)

Material Description

Gray Clay

Atterberg Limits (ASTM D 4318)

PL= 21 LL= 51 PI= 30

Classification

USCS (D 2487)= CH or OH AASHTO (M 145)=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/20/13

Tested By: JF/TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-030 **Depth:** 85'-86.5' **Date Sampled:**

Sample Number: HMA#7538/S-20

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/22/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-030
Depth: 85'-86.5'
Sample Number: HMA#7538/S-20
Material Description: Gray Clay
Date Received: 8/5/13 **PL:** 21 **LL:** 51 **PI:** 30
USCS Classification: CH or OH
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/20/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 42.70
Tare Wt. = 31.10
Minus #200 from wash = 89.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
144.40	31.10	#200			89.8

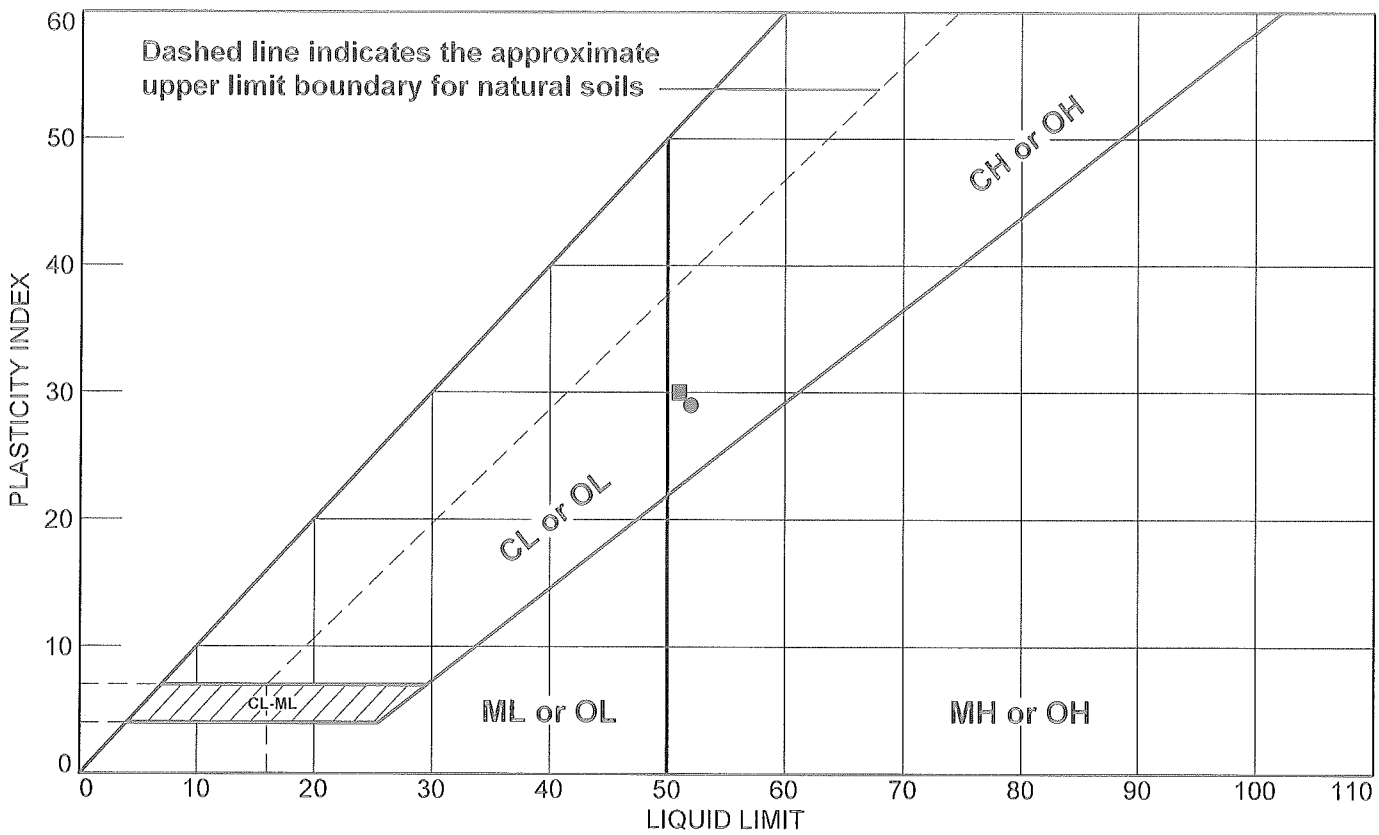
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
										89.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring E360-B-030	HMA#7538-41/S-12	45'-46.5	20.4	23	52	29	CH or OH
■	Boring E360-B-030	HMA#7538/S-20	85'-86.5'	21.1	21	51	30	CH or OH

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Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No.: 12-450

Figure

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Tested By: JF/TP **Checked By:** JAM

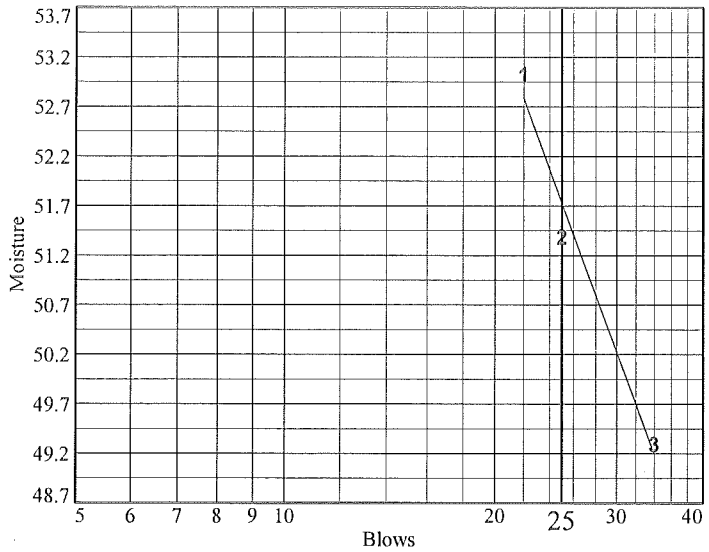
LIQUID AND PLASTIC LIMIT TEST DATA

8/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-030
Depth: 45'-46.5
Sample Number: HMA#7538-41/S-12
Material Description: Gray Clay
USCS: CH or OH
Tested by: JF/TP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	33.8	35.5	34.9			
Dry+Tare	26.8	28.1	27.9			
Tare	13.6	13.7	13.7			
# Blows	22	25	34			
Moisture	53.0	51.4	49.3			



Liquid Limit= 52
Plastic Limit= 23
Plasticity Index= 29
Natural Moisture= 20.4
Liquidity Index= -0.1

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	22.2	19.4	22.2		
Dry+Tare	20.5	18	20.6		
Tare	13.7	11.2	13.6		
Moisture	25.0	20.6	22.9		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
181.5	156	31	20.4

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

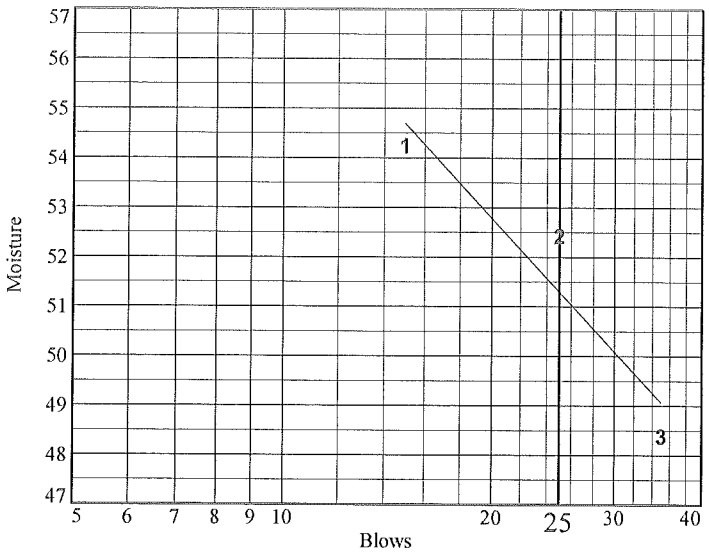
LIQUID AND PLASTIC LIMIT TEST DATA

8/22/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-030
Depth: 85'-86.5'
Sample Number: HMA#7538/S-20
Material Description: Gray Clay
USCS: CH or OH
Tested by: JF/TP
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	37.2	29.3	36.6			
Dry+Tare	28.9	23.9	29.1			
Tare	13.6	13.6	13.6			
# Blows	15	25	35			
Moisture	54.2	52.4	48.4			



Liquid Limit= 51
Plastic Limit= 21
Plasticity Index= 30
Natural Moisture= 21.1
Liquidity Index= 0.0

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	22.4	21.4	21.9		
Dry+Tare	20.9	20.1	20.4		
Tare	13.8	13.6	13.5		
Moisture	21.1	20.0	21.7		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
168.3	144.4	31.1	21.1

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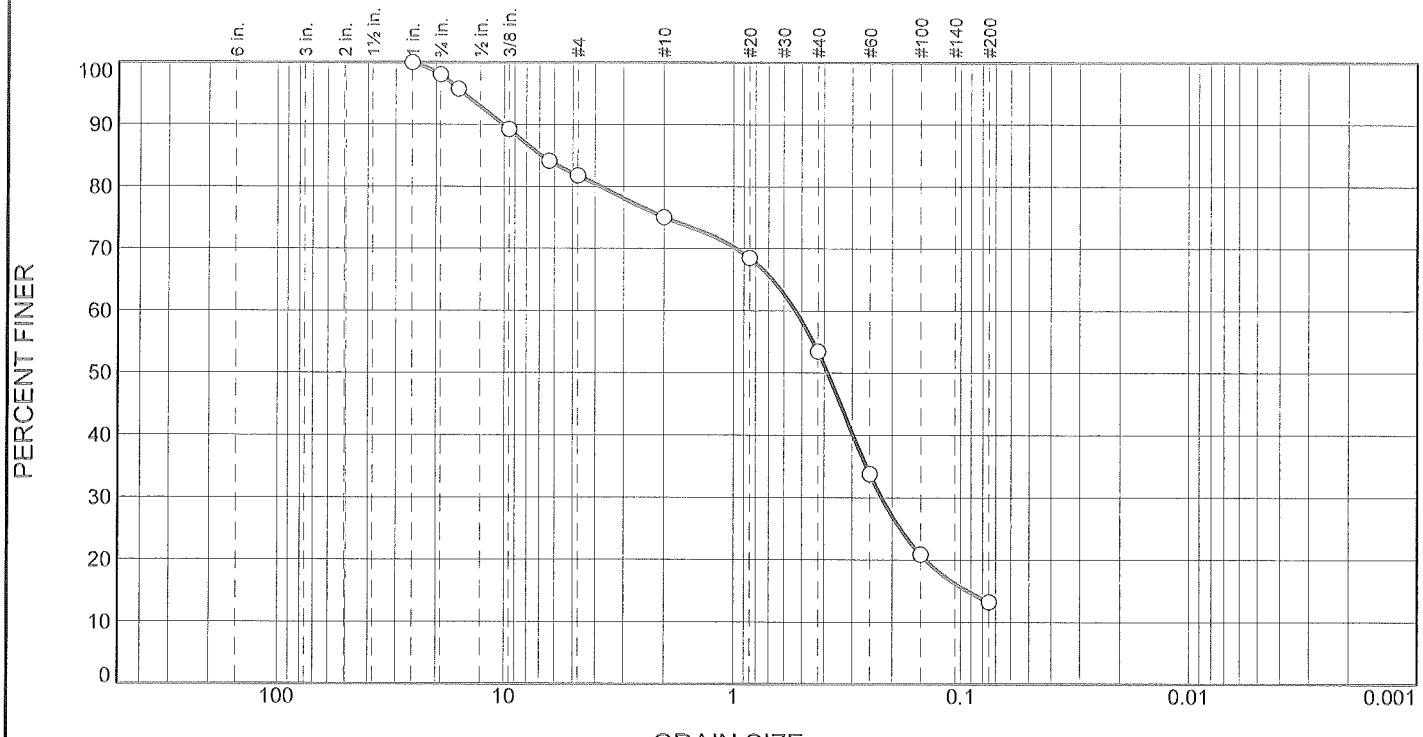
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.9	16.3	6.7	21.6	40.3	13.2	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	98.1		
5/8"	95.8		
3/8"	89.2		
1/4"	84.2		
#4	81.8		
#10	75.1		
#20	68.5		
#40	53.5		
#60	33.8		
#100	20.9		
#200	13.2		

* (no specification provided)

Material Description

Gray Brown Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 10.0991 D_{85}= 6.8583 D_{60}= 0.5326
D_{50}= 0.3850 D_{30}= 0.2219 D_{15}= 0.0933
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/20/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-033 **Depth:** 5'-6.5' **Date Sampled:**
Sample Number: HMA#7538-44/S-2

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/22/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-033
Depth: 5'-6.5'
Sample Number: HMA#7538-44/S-2
Material Description: Gray Brown Silty Sand W/Gravel
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/20/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 822.50
Tare Wt. = 217.40
Minus #200 from wash = 12.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
909.70	217.40	1"	0.00	0.00	100.0
		3/4"	1518.20	1504.90	98.1
		5/8"	1488.60	1472.60	95.8
		3/8"	1528.60	1483.40	89.2
		1/4"	1417.90	1382.80	84.2
		#4	1373.10	1356.60	81.8
		#10	1560.30	1513.80	75.1
		#20	1111.90	1066.50	68.5
		#40	1048.20	944.00	53.5
		#60	1014.10	878.00	33.8
		#100	932.80	843.20	20.9
		#200	1072.10	1019.30	13.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	1.9	16.3	18.2	6.7	21.6	40.3	68.6			13.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0933	0.1425	0.2219	0.3850	0.5326	3.7878	6.8583	10.0991	14.9833

Fineness Modulus
2.59

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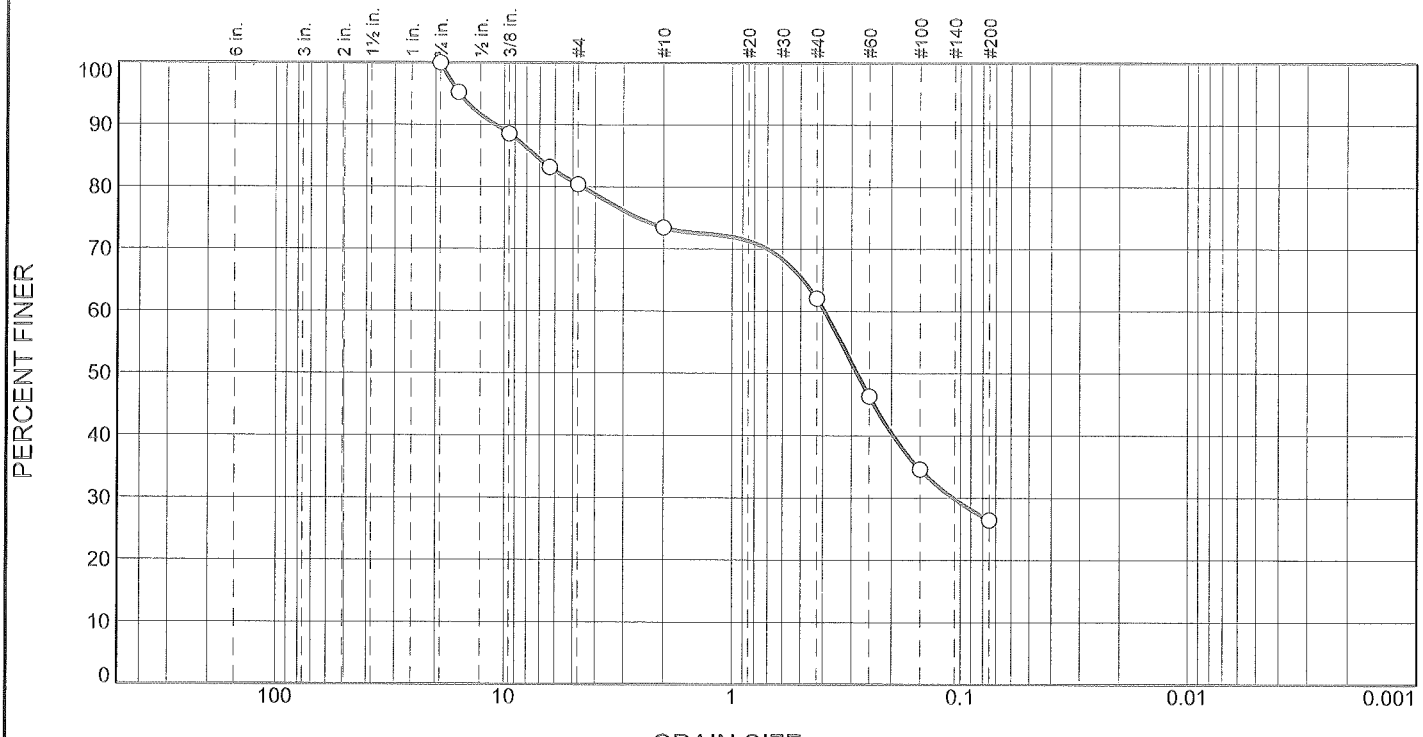
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	19.6	7.0	11.3	35.7	26.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
5/8"	95.2		
3/8"	88.6		
1/4"	83.2		
#4	80.4		
#10	73.4		
#40	62.1		
#60	46.3		
#100	34.6		
#200	26.4		

* (no specification provided)

Material Description

Brown Silty Sand W/Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 10.9093 D_{85}= 7.2979 D_{60}= 0.3929
D_{50}= 0.2826 D_{30}= 0.1075 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/20/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-033 **Depth:** 12.5'-13.11' **Date Sampled:**
Sample Number: HMA#7538-45/S-5

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/22/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-033
Depth: 12.5'-13.11'
Sample Number: HMA#7538-45/S-5
Material Description: Brown Silty Sand W/Gravel
Date Received: 8/5/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/20/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 826.50
Tare Wt. = 212.50
Minus #200 from wash = 19.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
978.60	212.50	3/4"	0.00	0.00	100.0
		5/8"	1509.10	1472.60	95.2
		3/8"	1534.20	1483.20	88.6
		1/4"	1423.90	1382.60	83.2
		#4	1378.60	1357.00	80.4
		#10	1567.00	1513.90	73.4
		#40	1031.20	944.00	62.1
		#60	998.60	877.90	46.3
		#100	932.70	843.20	34.6
		#200	1082.10	1019.30	26.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	19.6	19.6	7.0	11.3	35.7	54.0			26.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1075	0.2826	0.3929	4.5606	7.2979	10.9093	15.7043

Fineness Modulus
2.30

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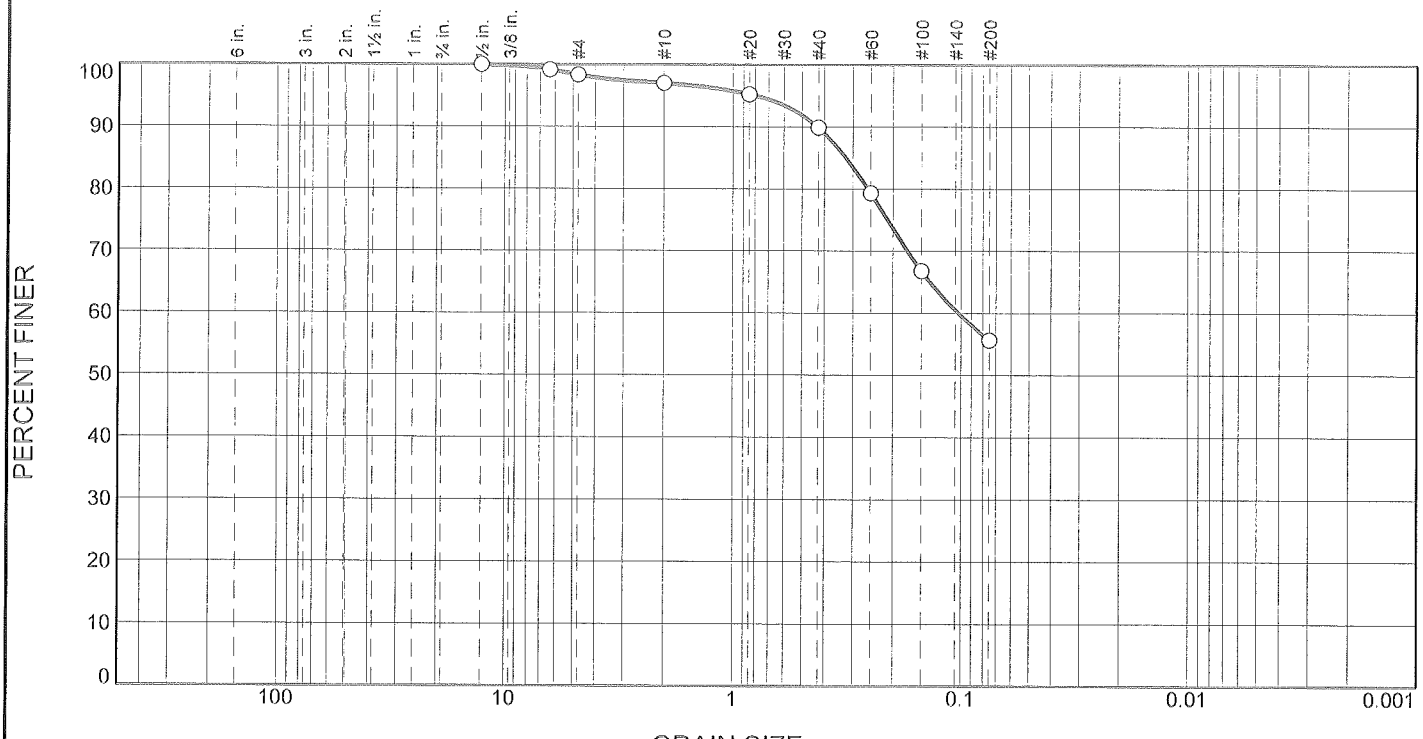
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.6	1.4	7.1	34.3	55.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
1/4"	99.2		
#4	98.4		
#10	97.0		
#20	95.2		
#40	89.9		
#60	79.3		
#100	66.8		
#200	55.6		

* (no specification provided)

Material Description

Brown Sandy Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.4282 D_{85}= 0.3217 D_{60}= 0.1026
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/5/13 **Date Tested:** 8/20/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-033 **Depth:** 25'-25.5' **Date Sampled:**
Sample Number: HMA#7538-46/S-8

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/22/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-033
Depth: 25'-25.5'
Sample Number: HMA#7538-46/S-8
Material Description: Brown Sandy Silt
Date Received: 8/5/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 8/20/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 312.80
Tare Wt. = 87.20
Minus #200 from wash = 52.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
562.10	87.20	1/2"	0.00	0.00	100.0
		1/4"	1386.30	1382.60	99.2
		#4	1360.60	1356.50	98.4
		#10	1520.20	1513.90	97.0
		#20	1074.90	1066.40	95.2
		#40	969.40	944.00	89.9
		#60	928.30	878.00	79.3
		#100	902.70	843.30	66.8
		#200	1072.30	1019.30	55.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.6	1.6	1.4	7.1	34.3	42.8			55.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.1026	0.2573	0.3217	0.4282	0.7974

Fineness Modulus
0.65

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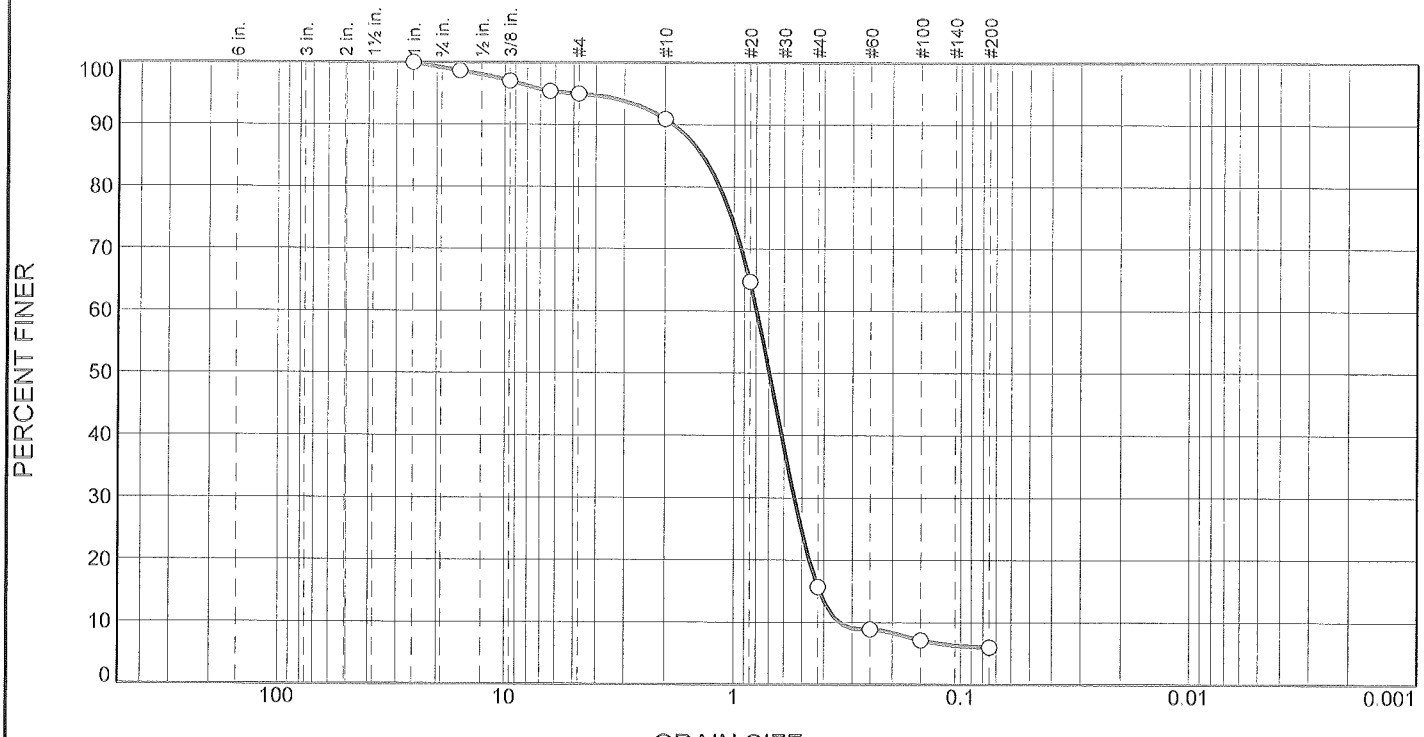
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.8	4.2	4.1	75.2	9.7	6.0	

Test Results (ASTM C136 & ASTM D1440)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
5/8"	98.7		
3/8"	97.1		
1/4"	95.4		
#4	95.0		
#10	90.9		
#20	64.7		
#40	15.7		
#60	8.9		
#100	7.2		
#200	6.0		

* (no specification provided)

Material Description

Gray Brown Poorly Graded Sand W/Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 1.8323 D_{85}= 1.3700 D_{60}= 0.7938
D_{50}= 0.6962 D_{30}= 0.5396 D_{15}= 0.4177
D_{10}= 0.3410 C_u= 2.33 C_c= 1.08

Remarks

Date Received: 8/5/13 **Date Tested:** 8/20/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-033 **Depth:** 35'-35.5' **Date Sampled:**
Sample Number: HMA#7538-47/S-10

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

8/22/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-033
Depth: 35'-35.5'
Sample Number: HMA#7538-47/S-10
Material Description: Gray Brown Poorly Graded Sand W/Silt
Date Received: 8/5/13
USCS Classification: SP-SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1440
Tested By: JF/TP
Test Date: 8/20/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 860.90
Tare Wt. = 213.10
Minus #200 from wash = 6.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
902.30	213.10	1"	0.00	0.00	100.0
		5/8"	1481.80	1472.80	98.7
		3/8"	1494.60	1483.30	97.1
		1/4"	1394.10	1382.60	95.4
		#4	1359.40	1356.60	95.0
		#10	1541.60	1513.80	90.9
		#20	1247.40	1066.50	64.7
		#40	1281.50	943.90	15.7
		#60	925.30	878.40	8.9
		#100	855.70	843.70	7.2
		#200	1027.20	1019.30	6.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.8	4.2	5.0	4.1	75.2	9.7	89.0			6.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3410	0.4177	0.4633	0.5396	0.6962	0.7938	1.1576	1.3700	1.8323	4.8407

Fineness Modulus	C_u	C_c
2.81	2.33	1.08

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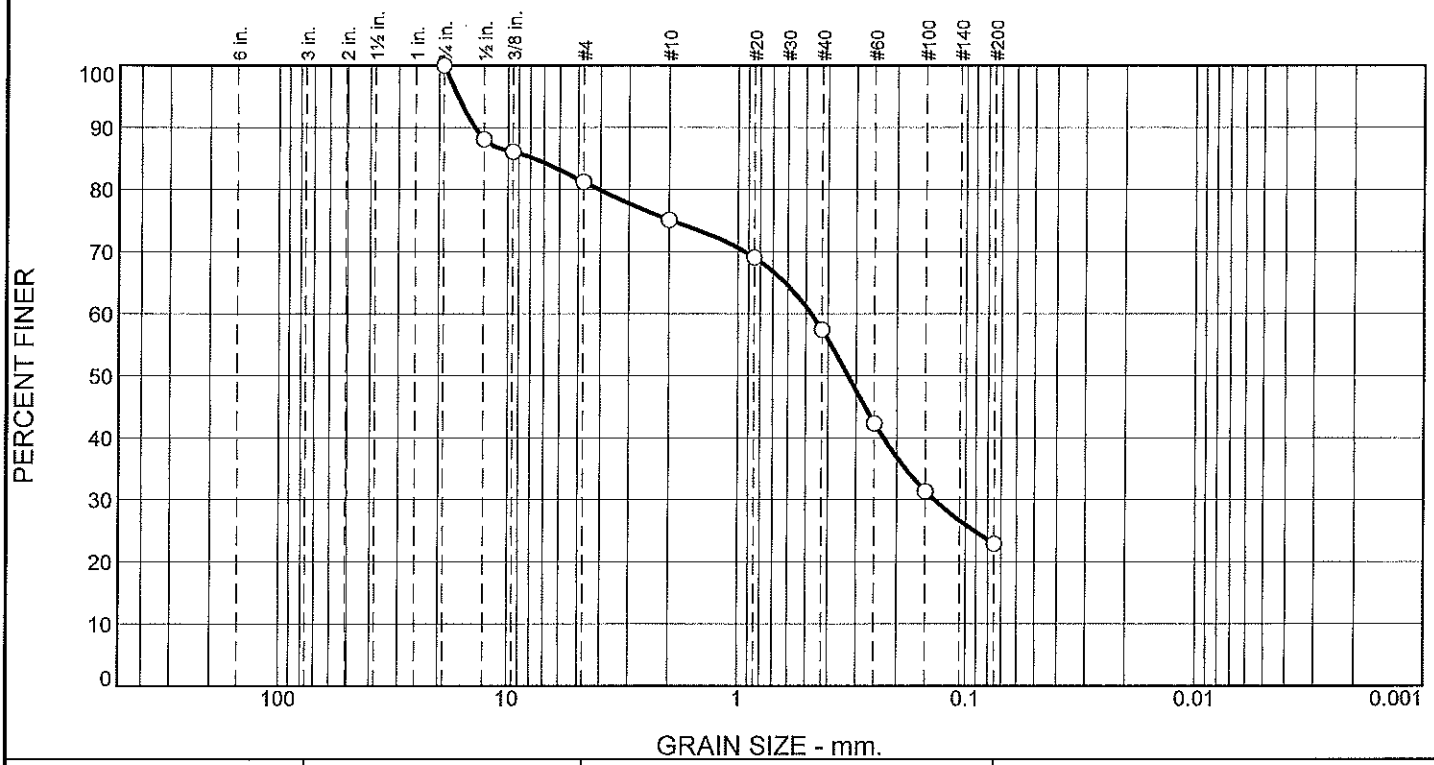
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00883, BLDG-2018-00895

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.8	6.1	17.7	34.5	22.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	88.1		
3/8"	86.1		
#4	81.2		
#10	75.1		
#20	69.0		
#40	57.4		
#60	42.3		
#100	31.4		
#200	22.9		

* (no specification provided)

Material Description

Gray Brown Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 13.9614 D_{85}= 7.7395 D_{60}= 0.4746
D_{50}= 0.3263 D_{30}= 0.1373 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 12/4/13

Tested By: TEP/RJF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-034 **Depth:** 5'-6.5' **Date Sampled:**

Sample Number: HMA#7567-12/S-2

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-034
Depth: 5'-6.5'
Sample Number: HMA#7567-12/S-2
Material Description: Gray Brown Silty Sand with Gravel
Date Received: 11/19/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 12/4/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 491.30
Tare Wt. = 117.10
Minus #200 from wash = 22.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
597.10	117.10	3/4"	0.00	0.00	100.0
		1/2"	1476.40	1419.20	88.1
		3/8"	1492.80	1483.10	86.1
		#4	1379.50	1356.20	81.2
		#10	1542.80	1513.50	75.1
		#20	1095.10	1066.00	69.0
		#40	999.40	943.50	57.4
		#60	950.00	877.60	42.3
		#100	895.20	842.70	31.4
		#200	1059.60	1019.00	22.9

Fractional Components

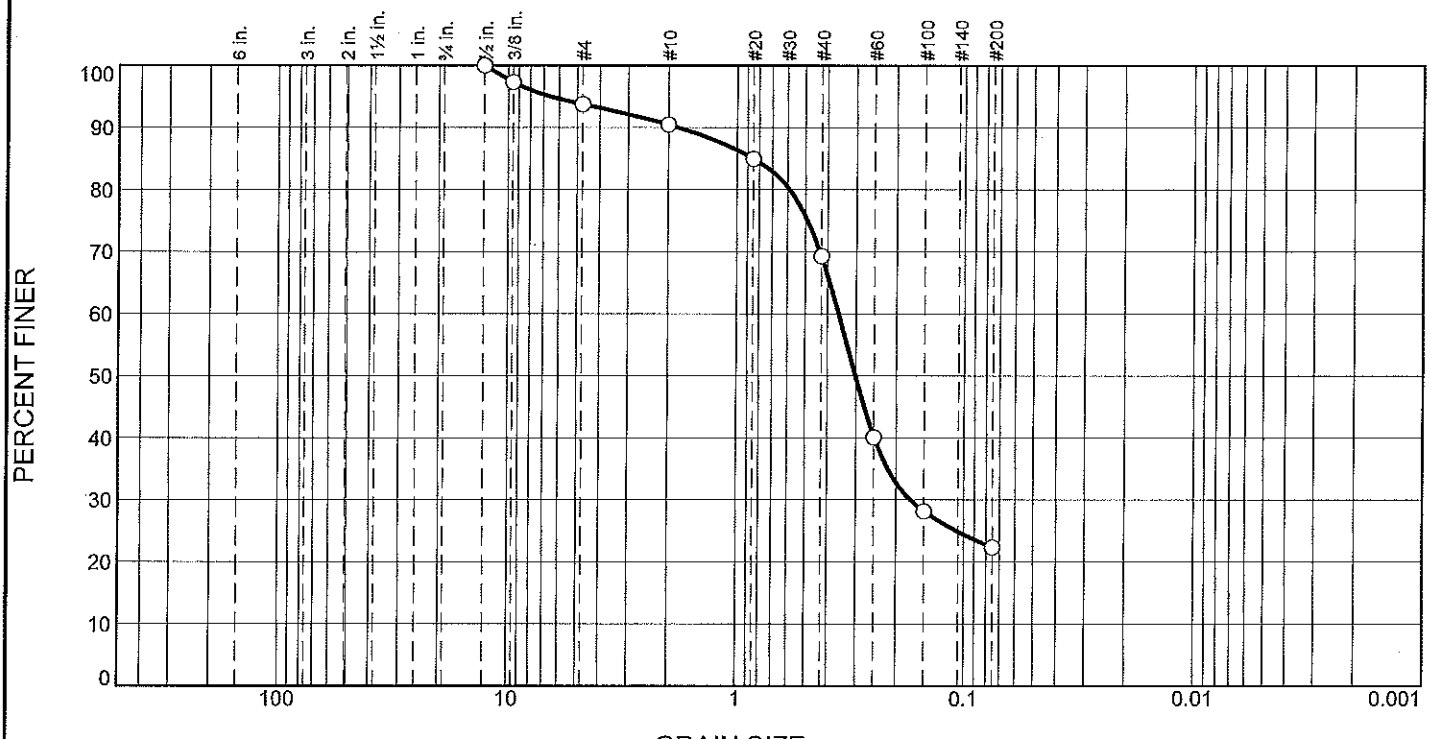
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	18.8	18.8	6.1	17.7	34.5	58.3			22.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1373	0.3263	0.4746	4.0814	7.7395	13.9614	16.5357

Fineness Modulus
2.41

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.3	3.3	21.1	47.0	22.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	97.3		
#4	93.7		
#10	90.4		
#20	85.0		
#40	69.3		
#60	40.1		
#100	28.2		
#200	22.3		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 1.8182 D_{85}= 0.8536 D_{60}= 0.3578
D_{50}= 0.3024 D_{30}= 0.1727 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 12/4/13

Tested By: TEP/RJF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-034 **Depth:** 15'-16.5' **Date Sampled:**

Sample Number: HMA#7567-13/S-6

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-034
Depth: 15'-16.5'
Sample Number: HMA#7567-13/S-6
Material Description: Olive Gray Silty Sand
Date Received: 11/19/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 12/4/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 434.10
Tare Wt. = 113.40
Minus #200 from wash = 23.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
531.00	113.40	1/2"	0.00	0.00	100.0
		3/8"	1494.40	1483.10	97.3
		#4	1371.00	1356.20	93.7
		#10	1527.30	1513.50	90.4
		#20	1088.90	1066.00	85.0
		#40	1009.00	943.50	69.3
		#60	999.60	877.60	40.1
		#100	892.30	842.70	28.2
		#200	1043.40	1019.00	22.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	6.3	6.3	3.3	21.1	47.0	71.4			22.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1727	0.3024	0.3578	0.5888	0.8536	1.8182	6.5562

Fineness Modulus
1.72

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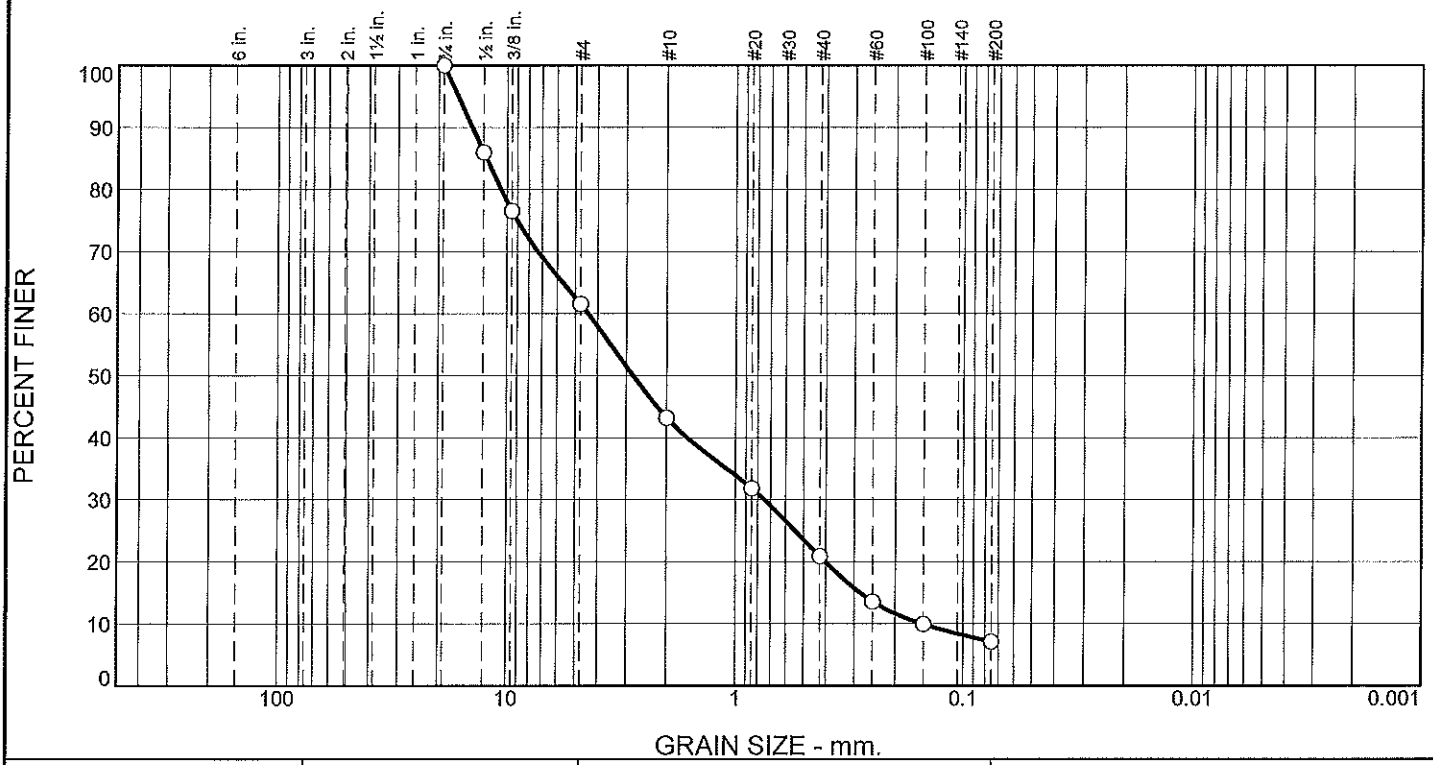
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	38.5	18.3	22.3	13.8	7.1	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	86.0		
3/8"	76.6		
#4	61.5		
#10	43.2		
#20	31.8		
#40	20.9		
#60	13.6		
#100	9.9		
#200	7.1		

* (no specification provided)

Material Description

Olive Gray Poorly Graded Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-1-a

Coefficients

D_{90}= 14.2609 D_{85}= 12.3421 D_{60}= 4.4108
D_{50}= 2.8100 D_{30}= 0.7485 D_{15}= 0.2834
D_{10}= 0.1517 C_u= 29.07 C_c= 0.84

Remarks

Date Received: 12/4/13 **Date Tested:** 12/4/13

Tested By: TEP/RJF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-034 **Depth:** 30'-30.9' **Date Sampled:**

Sample Number: HMA#7567-14/S-9

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-034
Depth: 30'-30.9' **Sample Number:** HMA#7567-14/S-9
Material Description: Olive Gray Poorly Graded Sand with Silt and Gravel
Date Received: 12/4/13
USCS Classification: SP-SM **AASHTO Classification:** A-1-a
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF **Test Date:** 12/4/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 503.90
Tare Wt. = 120.20
Minus #200 from wash = 7.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
535.60	120.20	3/4"	0.00	0.00	100.0
		1/2"	1477.40	1419.20	86.0
		3/8"	1522.30	1483.10	76.6
		#4	1418.60	1356.20	61.5
		#10	1589.70	1513.50	43.2
		#20	1113.20	1066.00	31.8
		#40	989.00	943.50	20.9
		#60	907.90	877.60	13.6
		#100	857.80	842.70	9.9
		#200	1030.70	1019.00	7.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	38.5	38.5	18.3	22.3	13.8	54.4			7.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1517	0.2834	0.4024	0.7485	2.8100	4.4108	10.6464	12.3421	14.2609	16.4815

Fineness Modulus	C_u	C_c
4.28	29.07	0.84

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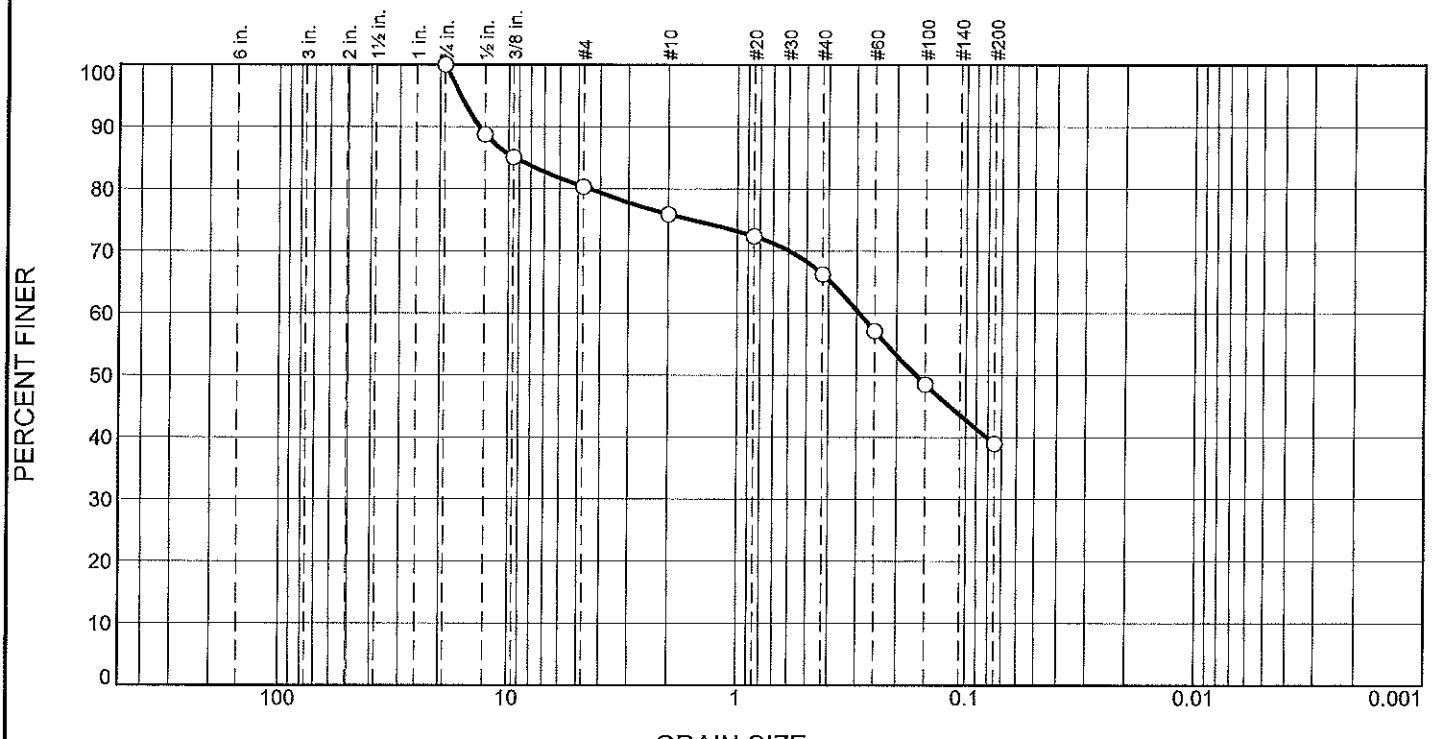
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	19.7	4.4	9.7	27.3	38.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	88.8		
3/8"	85.1		
#4	80.3		
#10	75.9		
#20	72.4		
#40	66.2		
#60	57.1		
#100	48.5		
#200	38.9		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 13.4607 D_{85}= 9.4027 D_{60}= 0.2930
D_{50}= 0.1651 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 12/4/13
Tested By: TEP/RJF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-036 **Depth:** 5'-6.5' **Date Sampled:**
Sample Number: HMA#7567-15/S-2

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-036
Depth: 5'-6.5'
Sample Number: HMA#7567-15/S-2
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 11/19/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 12/4/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 318.80
Tare Wt. = 87.40
Minus #200 from wash = 38.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
466.30	87.40	3/4"	0.00	0.00	100.0
		1/2"	1461.70	1419.20	88.8
		3/8"	1497.00	1483.10	85.1
		#4	1374.40	1356.20	80.3
		#10	1530.30	1513.50	75.9
		#20	1079.30	1066.00	72.4
		#40	966.70	943.50	66.2
		#60	912.30	877.60	57.1
		#100	875.20	842.70	48.5
		#200	1055.30	1019.00	38.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	19.7	19.7	4.4	9.7	27.3	41.4			38.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1651	0.2930	4.4992	9.4027	13.4607	16.2330

Fineness Modulus
2.05

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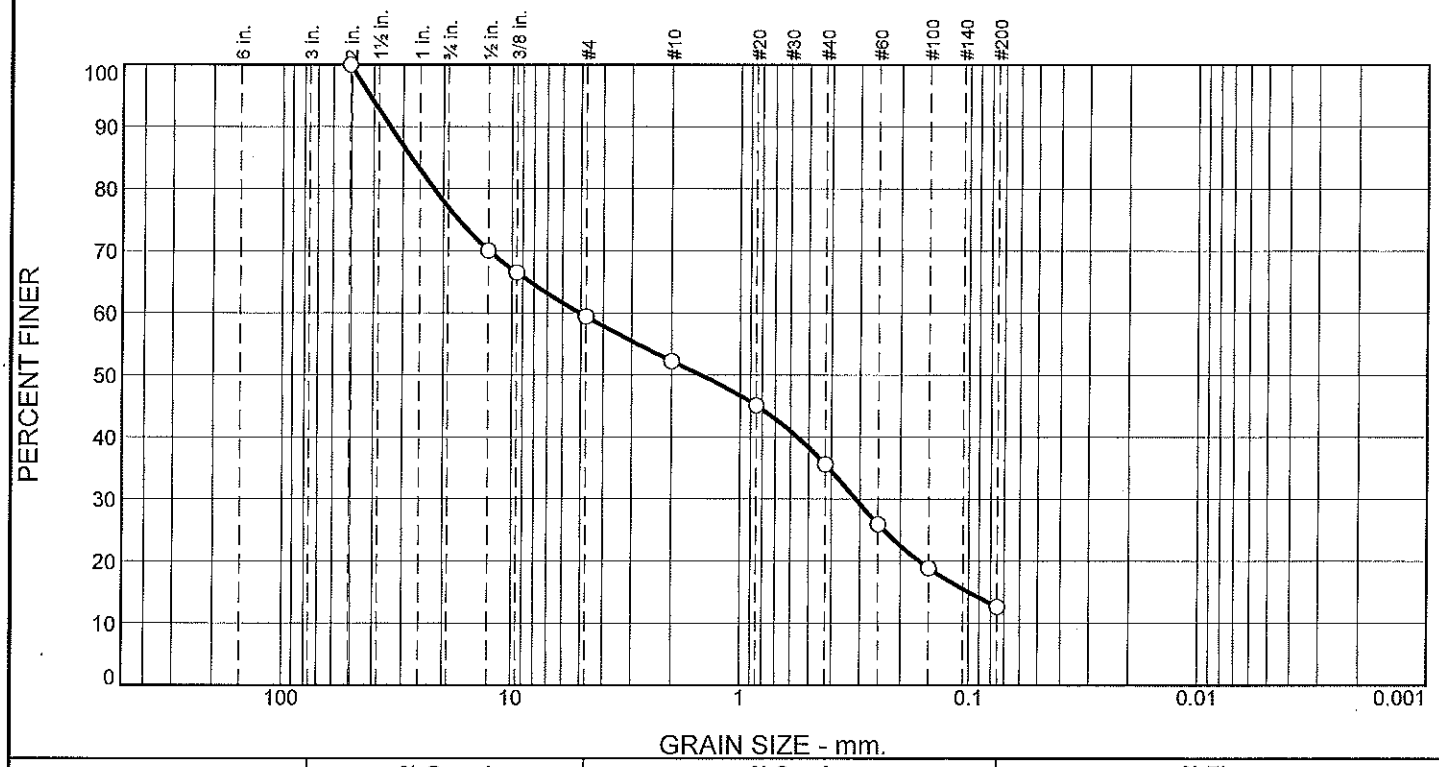
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	23.0	17.6	7.2	16.6	22.9	12.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2"	100.0		
1/2"	70.1		
3/8"	66.5		
#4	59.4		
#10	52.2		
#20	45.1		
#40	35.6		
#60	25.9		
#100	18.9		
#200	12.7		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 34.0508 D_{85}= 27.6012 D_{60}= 5.0735
D_{50}= 1.4921 D_{30}= 0.3135 D_{15}= 0.1001
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 12/4/13
Tested By: TEP/RJF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-036 **Depth:** 20'-20.8' **Date Sampled:**
Sample Number: HMA#7567-16/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-036
Depth: 20'-20.8'
Sample Number: HMA#7567-16/S-7
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 11/19/13
USCS Classification: SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 12/4/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 438.30
Tare Wt. = 198.90
Minus #200 from wash = 13.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
474.70	198.90	2"	0.00	0.00	100.0
		1/2"	1501.80	1419.20	70.1
		3/8"	1493.00	1483.10	66.5
		#4	1375.70	1356.20	59.4
		#10	1533.30	1513.50	52.2
		#20	1085.70	1066.00	45.1
		#40	969.60	943.50	35.6
		#60	904.30	877.60	25.9
		#100	862.10	842.70	18.9
		#200	1036.20	1019.00	12.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	23.0	17.6	40.6	7.2	16.6	22.9	46.7			12.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1001	0.1652	0.3135	1.4921	5.0735	22.0499	27.6012	34.0508	41.6674

Fineness Modulus
4.14

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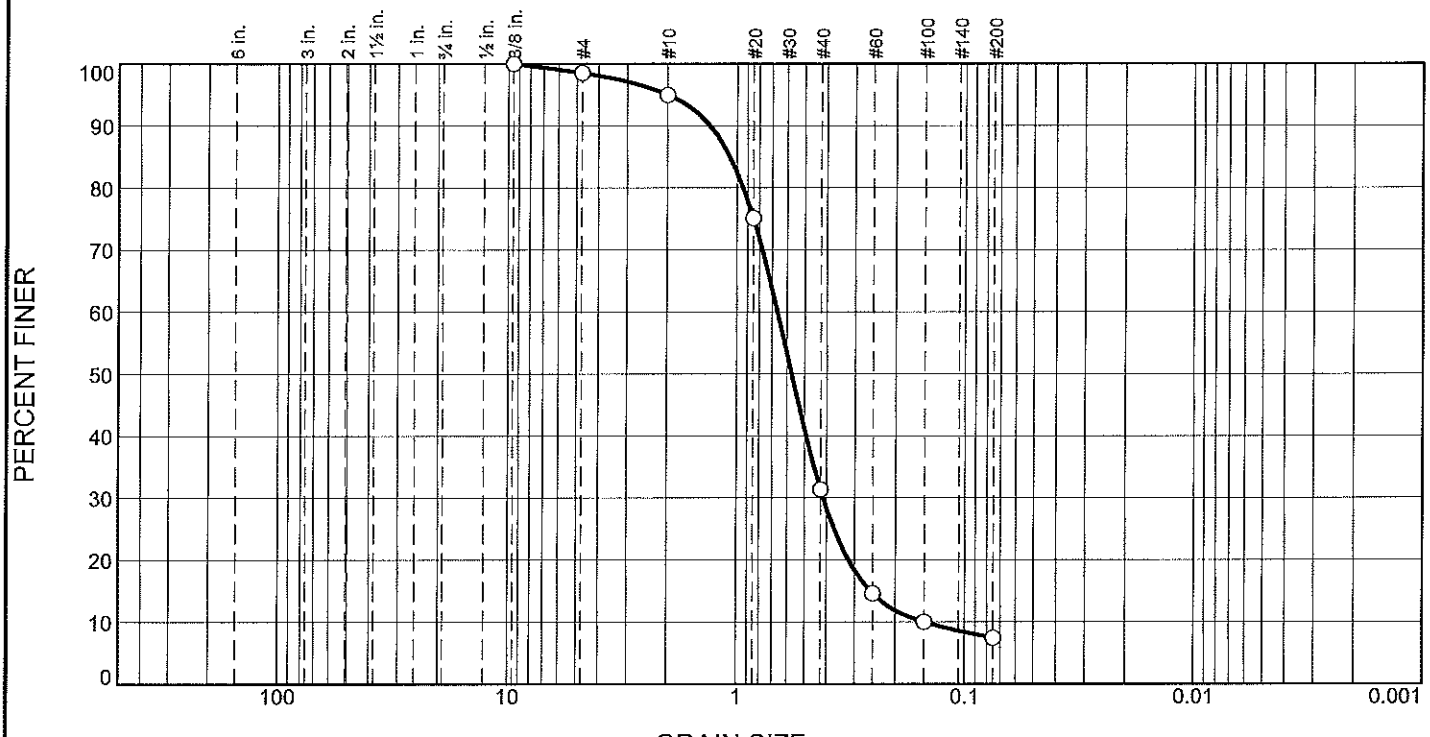
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.5	3.5	63.6	24.0	7.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	98.5		
#10	95.0		
#20	75.1		
#40	31.4		
#60	14.6		
#100	10.0		
#200	7.4		

* (no specification provided)

Material Description

Olive Gray Poorly Graded Sand with Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 1.3138 D_{85}= 1.0797 D_{60}= 0.6637
D_{50}= 0.5733 D_{30}= 0.4137 D_{15}= 0.2563
D_{10}= 0.1500 C_u= 4.42 C_c= 1.72

Remarks

Date Received: 11/19/13 **Date Tested:** 12/4/13

Tested By: TEP/RJF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-036 **Depth:** 27.5'-28.9' **Date Sampled:**

Sample Number: HMA#7567-17/S-9

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-036
Depth: 27.5'-28.9'
Sample Number: HMA#7567-17/S-9
Material Description: Olive Gray Poorly Graded Sand with Silt
Date Received: 11/19/13
USCS Classification: SP-SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 12/4/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 526.80
Tare Wt. = 217.40
Minus #200 from wash = 7.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
553.40	217.40	3/8"	0.00	0.00	100.0
		#4	1361.30	1356.20	98.5
		#10	1525.30	1513.50	95.0
		#20	1132.80	1066.00	75.1
		#40	1090.40	943.50	31.4
		#60	934.00	877.60	14.6
		#100	858.10	842.70	10.0
		#200	1027.60	1019.00	7.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.5	1.5	3.5	63.6	24.0	91.1			7.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1500	0.2563	0.3195	0.4137	0.5733	0.6637	0.9434	1.0797	1.3138	2.0087

Fineness Modulus	C_u	C_c
2.37	4.42	1.72

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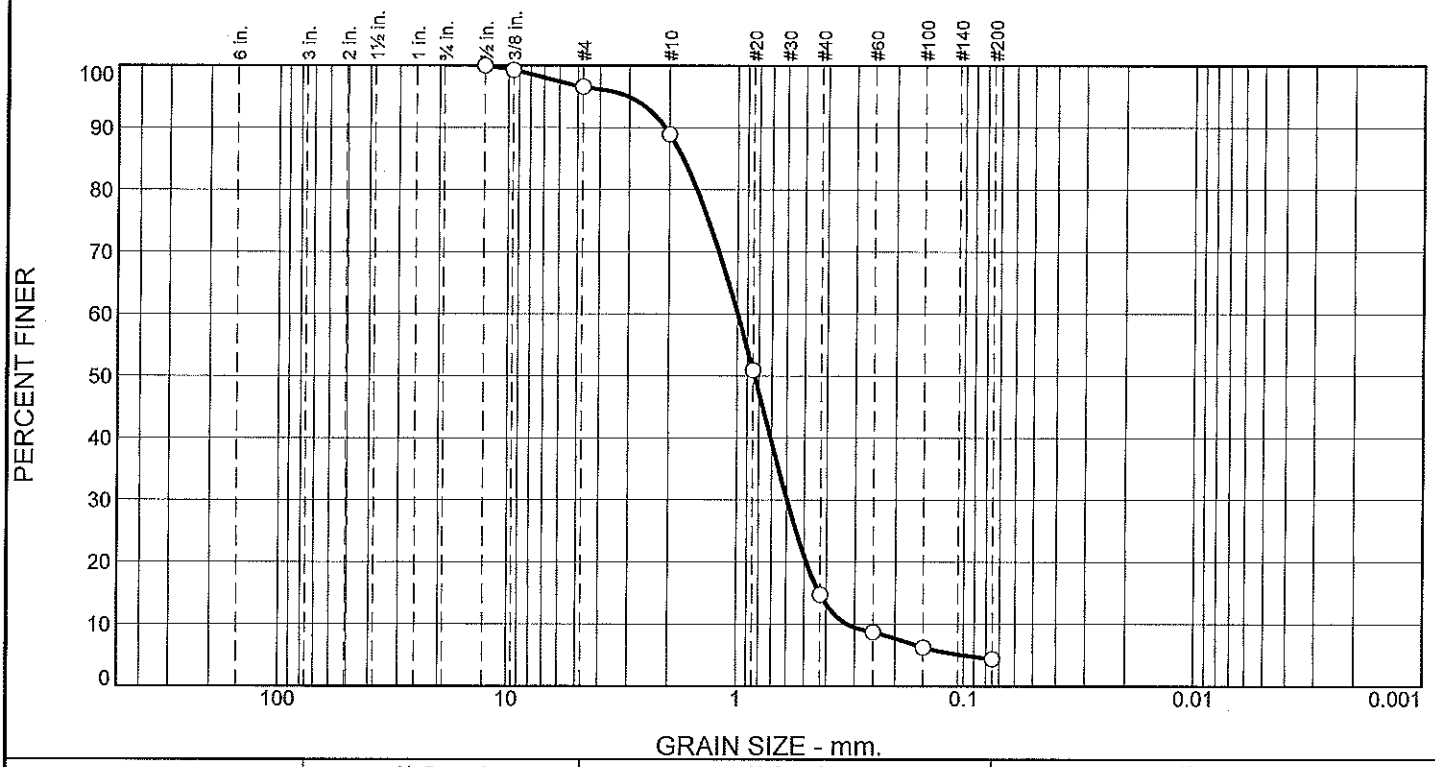
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.4	7.7	74.1	10.4	4.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	99.3		
#4	96.6		
#10	88.9		
#20	50.9		
#40	14.8		
#60	8.7		
#100	6.3		
#200	4.4		

* (no specification provided)

Material Description

Olive Gray Poorly Graded Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 2.0962 D_{85}= 1.7427 D_{60}= 0.9963
D_{50}= 0.8372 D_{30}= 0.5981 D_{15}= 0.4281
D_{10}= 0.3250 C_u= 3.07 C_c= 1.10

Remarks

Date Received: 11/19/13 **Date Tested:** 12/4/13

Tested By: TEP/RJF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-036 **Depth:** 45'-46.5' **Date Sampled:**
Sample Number: HMA#7567-18/S-14

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-036
Depth: 45'-46.5'
Sample Number: HMA#7567-18/S-14
Material Description: Olive Gray Poorly Graded Sand
Date Received: 11/19/13
USCS Classification: SP
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 12/4/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare** = 736.10
Tare Wt. = 212.50
Minus #200 from wash = 4.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
762.60	212.50	1/2"	0.00	0.00	100.0
		3/8"	1487.20	1483.10	99.3
		#4	1370.90	1356.20	96.6
		#10	1555.70	1513.50	88.9
		#20	1275.10	1066.00	50.9
		#40	1142.20	943.50	14.8
		#60	910.90	877.60	8.7
		#100	856.20	842.70	6.3
		#200	1029.30	1019.00	4.4

Fractional Components

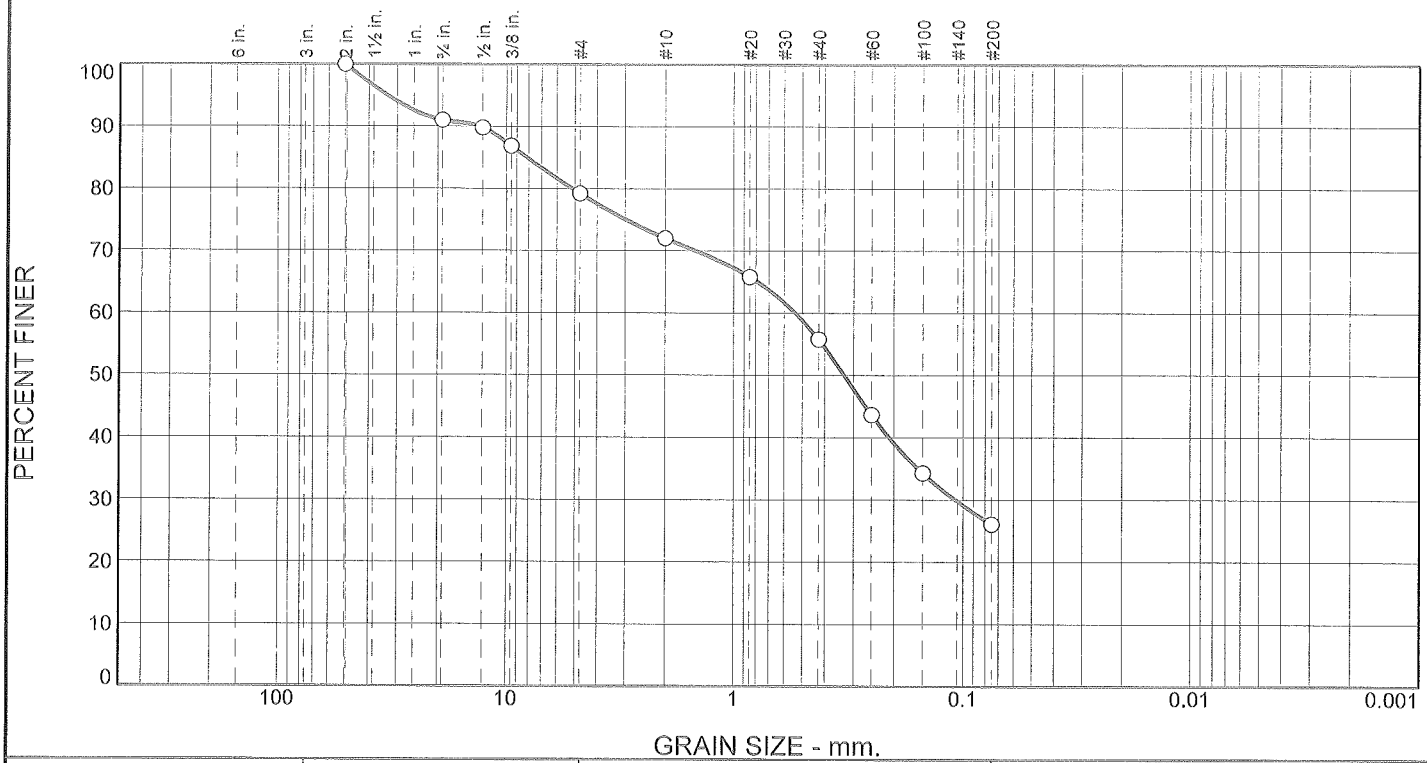
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.4	3.4	7.7	74.1	10.4	92.2			4.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.3250	0.4281	0.4899	0.5981	0.8372	0.9963	1.5149	1.7427	2.0962	3.0370

Fineness Modulus	C_u	C_c
2.97	3.07	1.10

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.0	11.8	7.2	16.2	29.7	26.1	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2"	100.0		
3/4"	91.0		
1/2"	89.8		
3/8"	86.9		
#4	79.2		
#10	72.0		
#20	65.8		
#40	55.8		
#60	43.6		
#100	34.3		
#200	26.1		

* (no specification provided)

Material Description

Brown Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 13.0871 D_{85}= 8.1184 D_{60}= 0.5355
D_{50}= 0.3284 D_{30}= 0.1079 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/22/13 **Date Tested:** 9/12/13
Tested By: TP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-37 **Depth:** 12.5'-14' **Date Sampled:**
Sample Number: HMA#7543-32/S-3

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

9/16/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-37
Depth: 12.5'-14'
Sample Number: HMA#7543-32/S-3
Material Description: Brown Silty Sand with Gravel
Date Received: 8/22/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/JF
Test Date: 9/12/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 598.80
Tare Wt. = 199.00
Minus #200 from wash = 25.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
736.00	199.00	2"	0.00	0.00	100.0
		3/4"	1553.10	1504.90	91.0
		1/2"	1425.80	1419.30	89.8
		3/8"	1499.30	1483.50	86.9
		#4	1397.70	1356.50	79.2
		#10	1552.40	1513.80	72.0
		#20	1099.70	1066.40	65.8
		#40	997.60	943.80	55.8
		#60	942.90	877.70	43.6
		#100	893.20	843.00	34.3
		#200	1063.30	1019.10	26.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	9.0	11.8	20.8	7.2	16.2	29.7	53.1			26.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1079	0.3284	0.5355	5.1426	8.1184	13.0871	33.0502

Fineness Modulus
2.61

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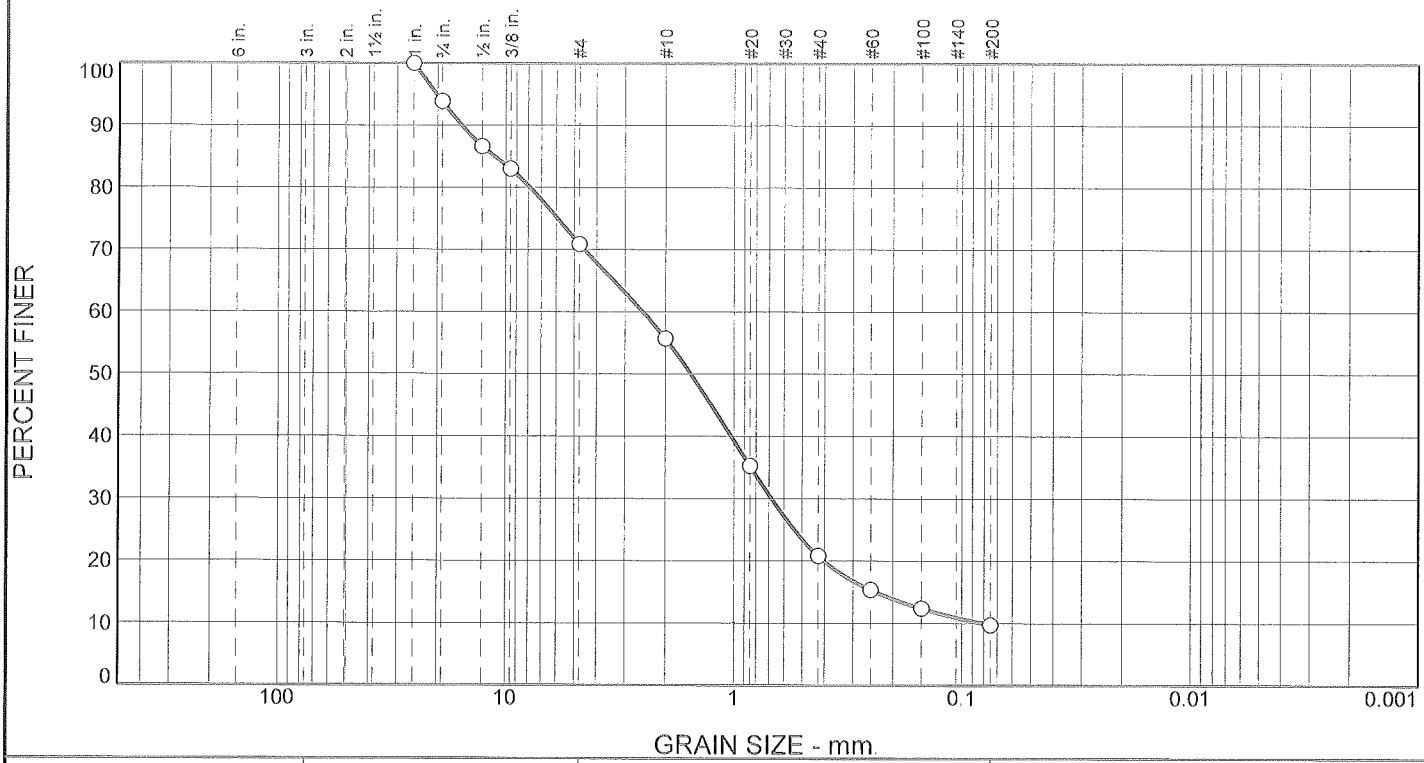
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.1	23.0	15.2	34.9	11.1	9.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	93.9		
1/2"	86.6		
3/8"	83.0		
#4	70.9		
#10	55.7		
#20	35.3		
#40	20.8		
#60	15.4		
#100	12.4		
#200	9.7		

* (no specification provided)

Material Description

Brown Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SW-SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 15.6080 D_{85}= 11.1886 D_{60}= 2.5035
D_{50}= 1.5437 D_{30}= 0.6815 D_{15}= 0.2373
D_{10}= 0.0812 C_u= 30.85 C_c= 2.29

Remarks

Date Received: 8/22/13 **Date Tested:** 9/12/13
Tested By: TP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-37 **Depth:** 35'-35.5' **Date Sampled:**
Sample Number: HMA#7543-33/S-8

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

9/16/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-37
Depth: 35'-35.5'
Sample Number: HMA#7543-33/S-8
Material Description: Brown Sand with Silt and Gravel
Date Received: 8/22/13
USCS Classification: SW-SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/JF
Test Date: 9/12/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 637.00
Tare Wt. = 190.10
Minus #200 from wash = 9.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
685.30	190.10	1"	0.00	0.00	100.0
		3/4"	1535.10	1504.90	93.9
		1/2"	1455.30	1419.30	86.6
		3/8"	1501.40	1483.40	83.0
		#4	1416.40	1356.50	70.9
		#10	1589.00	1513.80	55.7
		#20	1167.60	1066.40	35.3
		#40	1015.30	943.70	20.8
		#60	904.70	877.70	15.4
		#100	857.90	843.10	12.4
		#200	1032.30	1019.20	9.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	6.1	23.0	29.1	15.2	34.9	11.1	61.2			9.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0812	0.2373	0.4013	0.6815	1.5437	2.5035	7.8259	11.1886	15.6080	20.0873

Fineness Modulus	C_u	C_c
3.93	30.85	2.29

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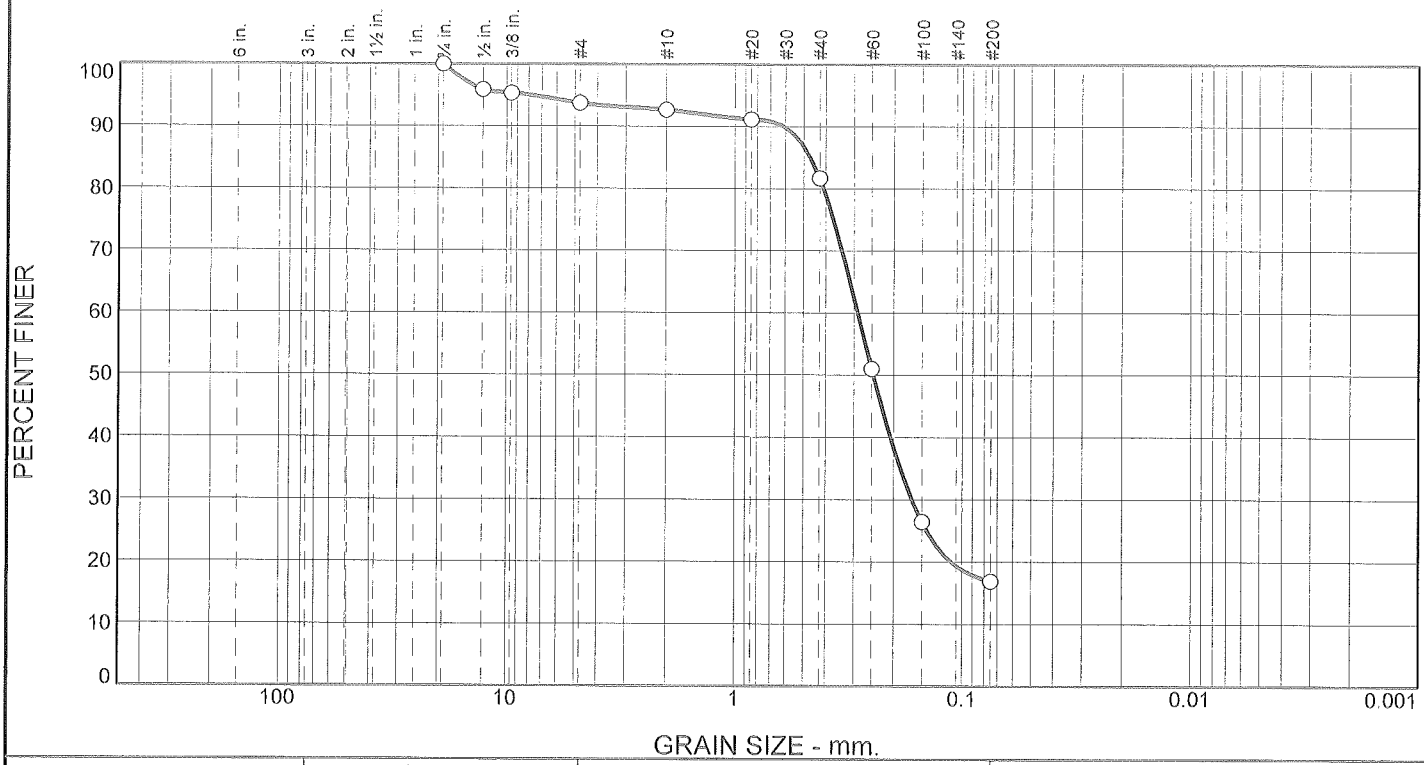
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.3	1.0	11.0	64.8	16.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	95.9		
3/8"	95.4		
#4	93.7		
#10	92.7		
#20	91.1		
#40	81.7		
#60	51.0		
#100	26.4		
#200	16.9		

* (no specification provided)

Material Description

Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.6109 D_{85}= 0.4668 D_{60}= 0.2883
D_{50}= 0.2460 D_{30}= 0.1659 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/22/13 **Date Tested:** 9/13/13
Tested By: TP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-38 **Depth:** 7.5'-9' **Date Sampled:**
Sample Number: HMA#7543-34/S-3

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

9/16/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-38
Depth: 7.5'-9'
Sample Number: HMA#7543-34/S-3
Material Description: Brown Silty Sand
Date Received: 8/22/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/JF
Test Date: 9/13/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 672.60
Tare Wt. = 230.80
Minus #200 from wash = 16.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
759.30	230.80	3/4"	0.00	0.00	100.0
		1/2"	1440.80	1419.30	95.9
		3/8"	1486.40	1483.40	95.4
		#4	1365.10	1356.50	93.7
		#10	1519.40	1513.70	92.7
		#20	1074.20	1066.20	91.1
		#40	993.60	943.70	81.7
		#60	1040.10	877.80	51.0
		#100	973.10	843.30	26.4
		#200	1069.60	1019.20	16.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	6.3	6.3	1.0	11.0	64.8	76.8			16.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1117	0.1659	0.2460	0.2883	0.4084	0.4668	0.6109	7.7126

Fineness Modulus
1.48

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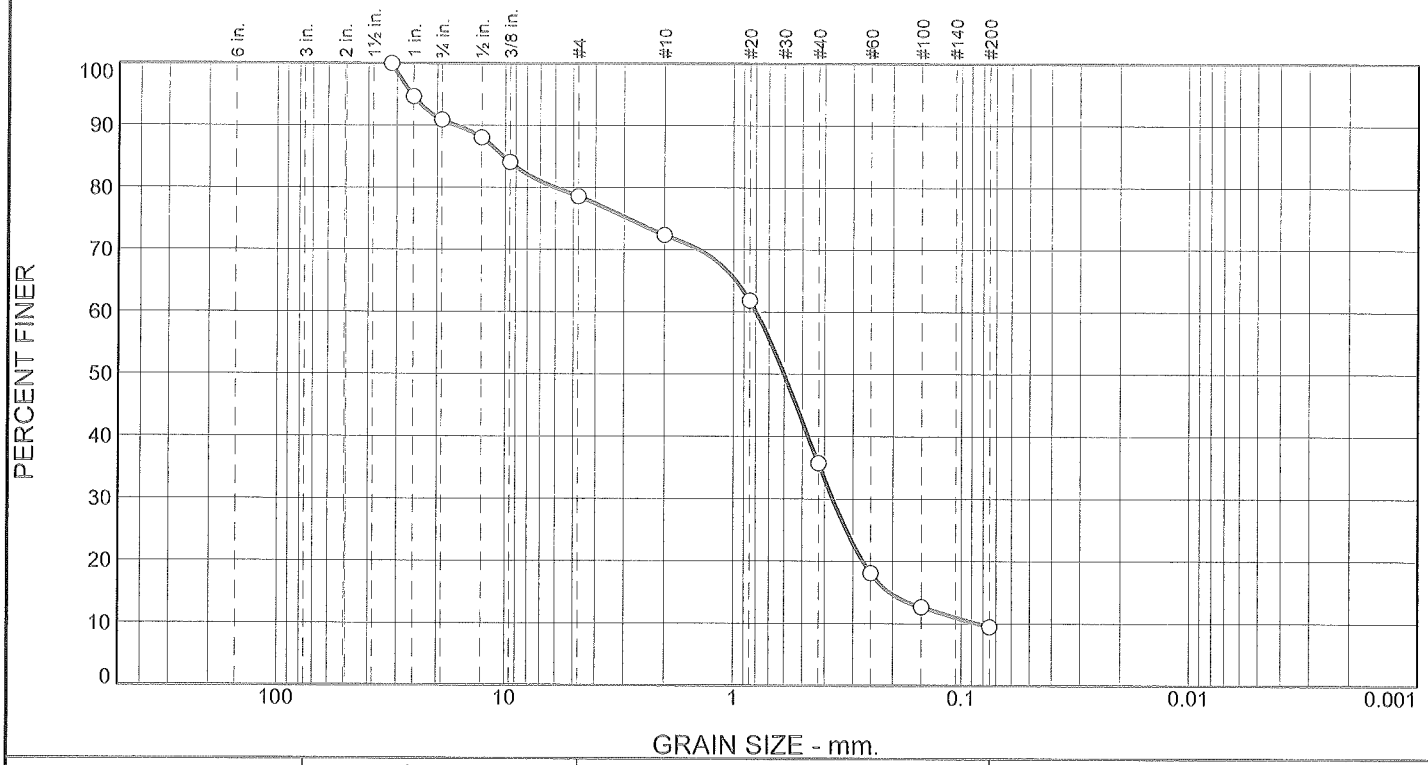
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.1	12.3	6.2	36.7	26.2	9.5	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/4"	100.0		
1"	94.7		
3/4"	90.9		
1/2"	88.0		
3/8"	84.1		
#4	78.6		
#10	72.4		
#20	61.9		
#40	35.7		
#60	18.1		
#100	12.7		
#200	9.5		

* (no specification provided)

Material Description

Brown Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SW-SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 16.5352 D_{85}= 10.1791 D_{60}= 0.7963
D_{50}= 0.6009 D_{30}= 0.3680 D_{15}= 0.2061
D_{10}= 0.0848 C_u= 9.40 C_c= 2.01

Remarks

Date Received: 8/22/13 **Date Tested:** 9/13/13
Tested By: TP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-38 **Depth:** 15'-16.5' **Date Sampled:**
Sample Number: HMA#7543-35/S-6

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

9/16/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-38
Depth: 15'-16.5'
Sample Number: HMA#7543-35/S-6
Material Description: Brown Sand with Silt and Gravel
Date Received: 8/22/13
USCS Classification: SW-SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/JF
Test Date: 9/13/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 722.00
Tare Wt. = 234.60
Minus #200 from wash = 9.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
773.40	234.60	1 1/4"	0.00	0.00	100.0
		1"	1498.50	1469.70	94.7
		3/4"	1525.10	1505.00	90.9
		1/2"	1434.90	1419.30	88.0
		3/8"	1504.70	1483.40	84.1
		#4	1386.00	1356.50	78.6
		#10	1547.30	1513.80	72.4
		#20	1123.10	1066.40	61.9
		#40	1084.70	943.80	35.7
		#60	972.70	877.80	18.1
		#100	872.40	843.10	12.7
		#200	1036.30	1019.10	9.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	9.1	12.3	21.4	6.2	36.7	26.2	69.1			9.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0848	0.2061	0.2710	0.3680	0.6009	0.7963	6.0044	10.1791	16.5352	25.8386

Fineness Modulus	C_u	C_c
3.19	9.40	2.01

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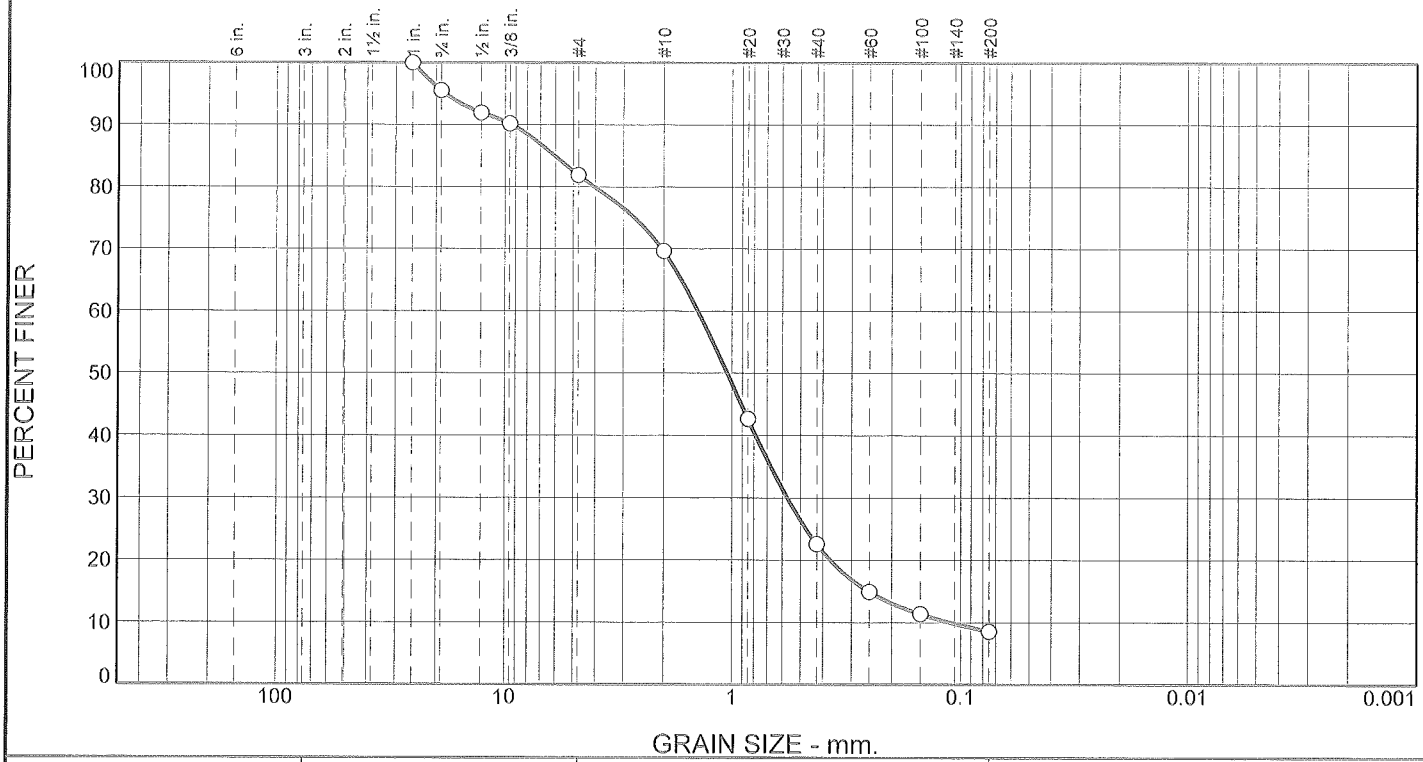
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.4	13.7	12.3	47.0	14.1	8.5	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	95.6		
1/2"	92.0		
3/8"	90.2		
#4	81.9		
#10	69.6		
#20	42.7		
#40	22.6		
#60	14.9		
#100	11.4		
#200	8.5		

* (no specification provided)

Material Description

Brown Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SW-SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 9.3043 D_{85}= 6.0427 D_{60}= 1.4131
D_{50}= 1.0496 D_{30}= 0.5711 D_{15}= 0.2521
D_{10}= 0.1112 C_u= 12.71 C_c= 2.07

Remarks

Date Received: 8/22/13 **Date Tested:** 9/16/13
Tested By: TP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-38 **Depth:** 35'-36' **Date Sampled:**
Sample Number: HMA#7543-36/S-10

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00891, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

9/16/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-38
Depth: 35'-36'
Sample Number: HMA#7543-36/S-10
Material Description: Brown Sand with Silt and Gravel
Date Received: 8/22/13
USCS Classification: SW-SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/JF
Test Date: 9/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 1016.20
Tare Wt. = 621.80
Minus #200 from wash = 8.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
1054.10	621.80	1"	0.00	0.00	100.0
		3/4"	1524.10	1504.90	95.6
		1/2"	1434.80	1419.30	92.0
		3/8"	1491.10	1483.40	90.2
		#4	1392.40	1356.50	81.9
		#10	1566.80	1513.80	69.6
		#20	1182.90	1066.40	42.7
		#40	1030.60	943.80	22.6
		#60	911.00	877.80	14.9
		#100	858.40	843.00	11.4
		#200	1031.30	1019.10	8.5

Fractional Components

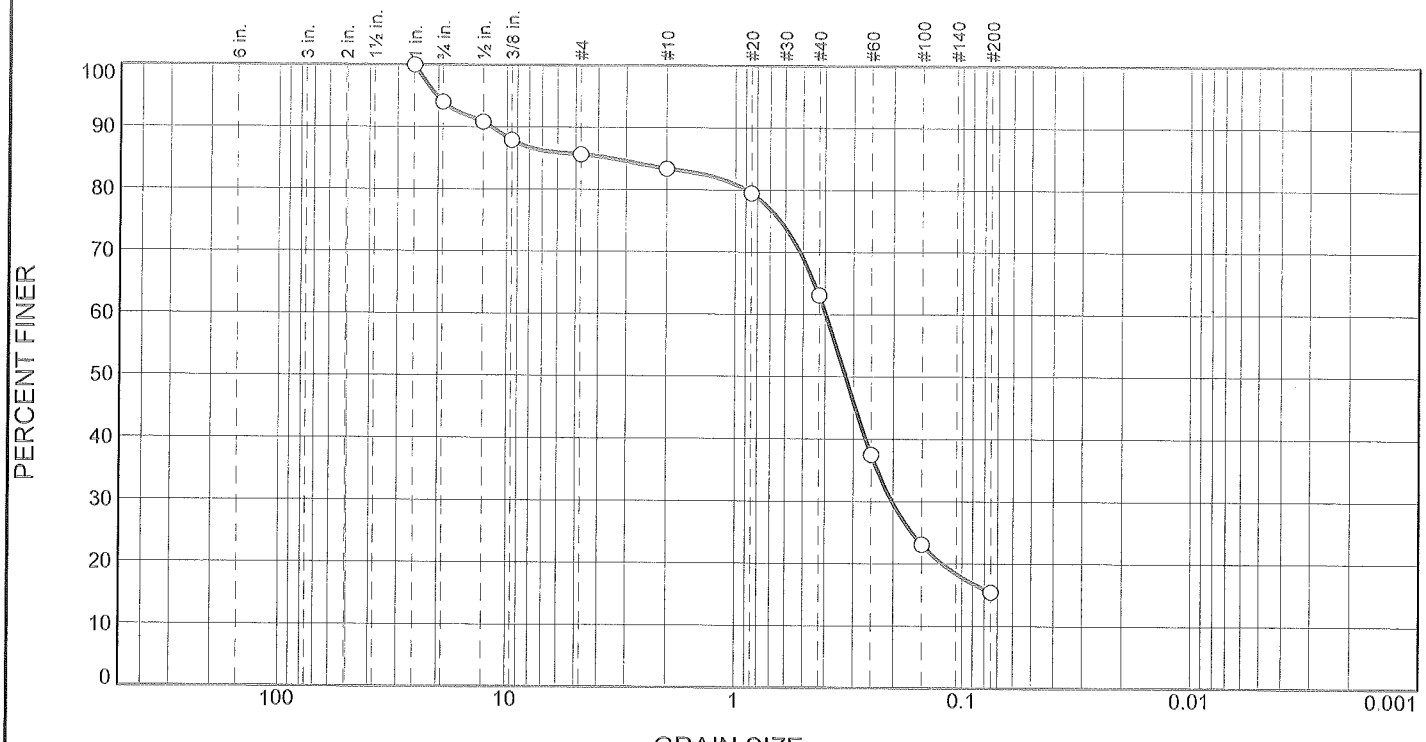
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	4.4	13.7	18.1	12.3	47.0	14.1	73.4			8.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1112	0.2521	0.3707	0.5711	1.0496	1.4131	4.0329	6.0427	9.3043	18.2085

Fineness Modulus	C_u	C_c
3.46	12.71	2.07

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.0	8.3	2.3	20.3	47.7	15.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	94.0		
1/2"	90.8		
3/8"	87.9		
#4	85.7		
#10	83.4		
#20	79.5		
#40	63.1		
#60	37.5		
#100	23.1		
#200	15.4		

* (no specification provided)

Material Description

Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 11.6338 D_{85}= 3.5006 D_{60}= 0.3966
D_{50}= 0.3242 D_{30}= 0.2025 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/22/13 **Date Tested:** 9/16/13
Tested By: TP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-39 **Depth:** 5'-6.5' **Date Sampled:**
Sample Number: HMA#7543-37/S-2

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

9/16/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-39
Depth: 5'-6.5'
Sample Number: HMA#7543-37/S-2
Material Description: Brown Silty Sand
Date Received: 8/22/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/JF
Test Date: 9/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 1038.10
Tare Wt. = 595.80
Minus #200 from wash = 15.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
1116.70	595.80	1"	0.00	0.00	100.0
		3/4"	1536.10	1504.90	94.0
		1/2"	1436.00	1419.40	90.8
		3/8"	1498.70	1483.50	87.9
		#4	1368.50	1356.80	85.7
		#10	1525.70	1513.80	83.4
		#20	1086.80	1066.40	79.5
		#40	1029.20	943.80	63.1
		#60	1010.90	877.70	37.5
		#100	918.00	843.10	23.1
		#200	1059.20	1019.10	15.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	6.0	8.3	14.3	2.3	20.3	47.7	70.3			15.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1218	0.2025	0.3242	0.3966	0.8978	3.5006	11.6338	20.2406

Fineness Modulus
2.24

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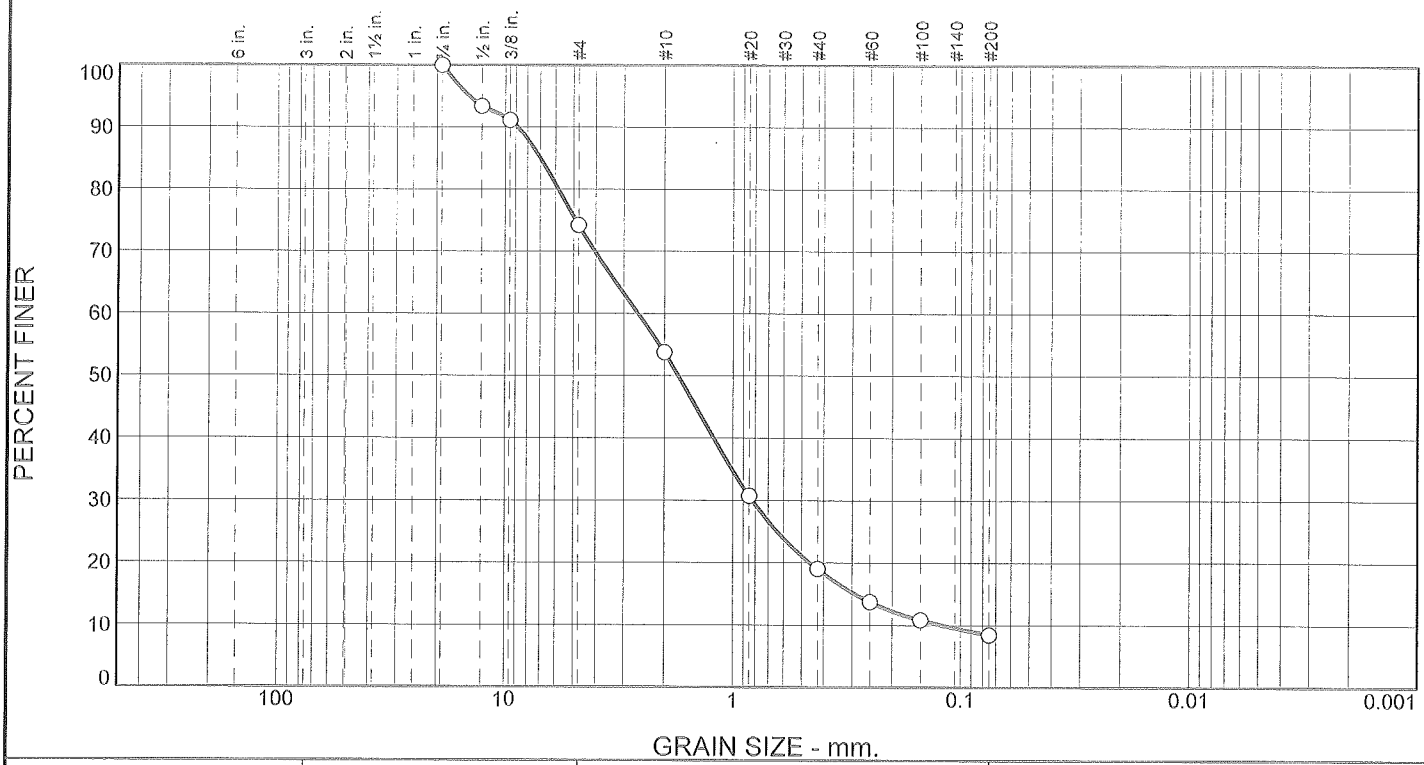
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	25.8	20.4	34.8	10.6	8.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	93.4		
3/8"	91.1		
#4	74.2		
#10	53.8		
#20	30.7		
#40	19.0		
#60	13.7		
#100	10.9		
#200	8.4		

* (no specification provided)

Material Description

Brown Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SW-SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 8.7869 D_{85}= 6.9807 D_{60}= 2.6014
D_{50}= 1.7349 D_{30}= 0.8229 D_{15}= 0.2916
D_{10}= 0.1205 C_u= 21.59 C_c= 2.16

Remarks

Date Received: 8/22/13 **Date Tested:** 9/16/13
Tested By: TP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-39 **Depth:** 20'-21.5' **Date Sampled:**
Sample Number: HMA#7543-38/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

9/16/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-39
Depth: 20'-21.5'
Sample Number: HMA#7543-38/S-7
Material Description: Brown Sand with Silt and Gravel
Date Received: 8/22/13
USCS Classification: SW-SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/JF
Test Date: 9/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 1139.60
Tare Wt. = 603.50
Minus #200 from wash = 8.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
1188.20	603.50	3/4"	0.00	0.00	100.0
		1/2"	1458.00	1419.40	93.4
		3/8"	1496.60	1483.40	91.1
		#4	1455.50	1356.50	74.2
		#10	1633.30	1513.70	53.8
		#20	1201.00	1066.40	30.7
		#40	1012.30	943.80	19.0
		#60	908.70	877.80	13.7
		#100	859.90	843.10	10.9
		#200	1033.30	1019.20	8.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	25.8	25.8	20.4	34.8	10.6	65.8			8.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1205	0.2916	0.4591	0.8229	1.7349	2.6014	5.8258	6.9807	8.7869	14.4493

Fineness Modulus	C_u	C_c
3.88	21.59	2.16

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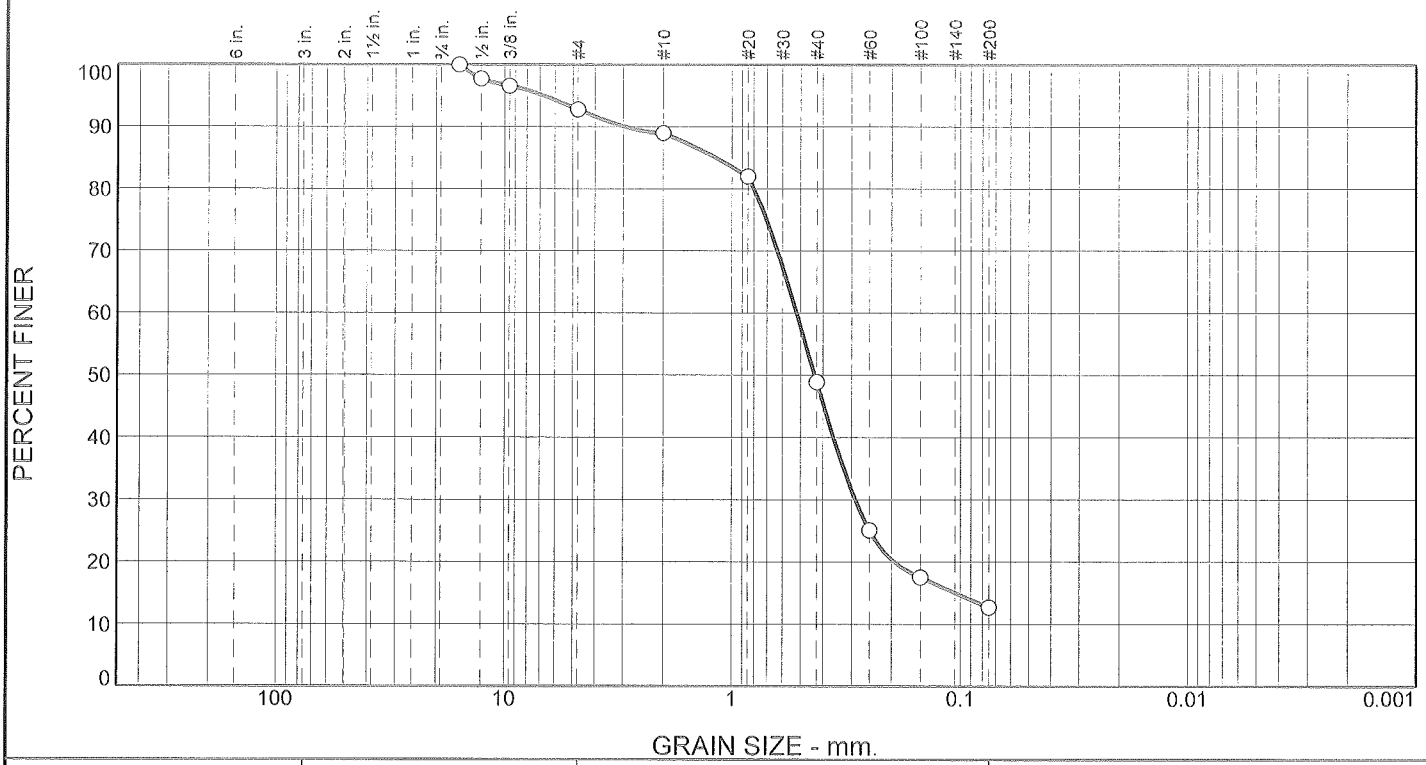
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.2	3.8	40.1	36.2	12.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
1/2"	97.7		
3/8"	96.6		
#4	92.8		
#10	89.0		
#20	82.0		
#40	48.9		
#60	25.1		
#100	17.5		
#200	12.7		

* (no specification provided)

Material Description

Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 2.9578 D_{85}= 1.1755 D_{60}= 0.5206
D_{50}= 0.4337 D_{30}= 0.2881 D_{15}= 0.1050
D_{10}= C_u= C_c=

Remarks

Date Received: 8/22/13 **Date Tested:** 9/16/13
Tested By: JF/TP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-39 **Depth:** 35'-36.5' **Date Sampled:**
Sample Number: HMA#7543-39/S-10

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

9/16/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-39
Depth: 35'-36.5'
Sample Number: HMA#7543-39/S-10
Material Description: Brown Silty Sand
Date Received: 8/22/13
USCS Classification: SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: JF/TP
Test Date: 9/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 840.00
Tare Wt. = 366.00
Minus #200 from wash = 12.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
908.00	366.00	5/8"	0.00	0.00	100.0
		1/2"	1431.50	1419.30	97.7
		3/8"	1489.70	1483.50	96.6
		#4	1377.30	1356.60	92.8
		#10	1534.60	1513.90	89.0
		#20	1104.30	1066.40	82.0
		#40	1123.10	943.80	48.9
		#60	1006.70	877.80	25.1
		#100	884.10	843.10	17.5
		#200	1045.40	1019.20	12.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	7.2	7.2	3.8	40.1	36.2	80.1			12.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1050	0.1944	0.2881	0.4337	0.5206	0.7998	1.1755	2.9578	6.7296

Fineness Modulus
2.20

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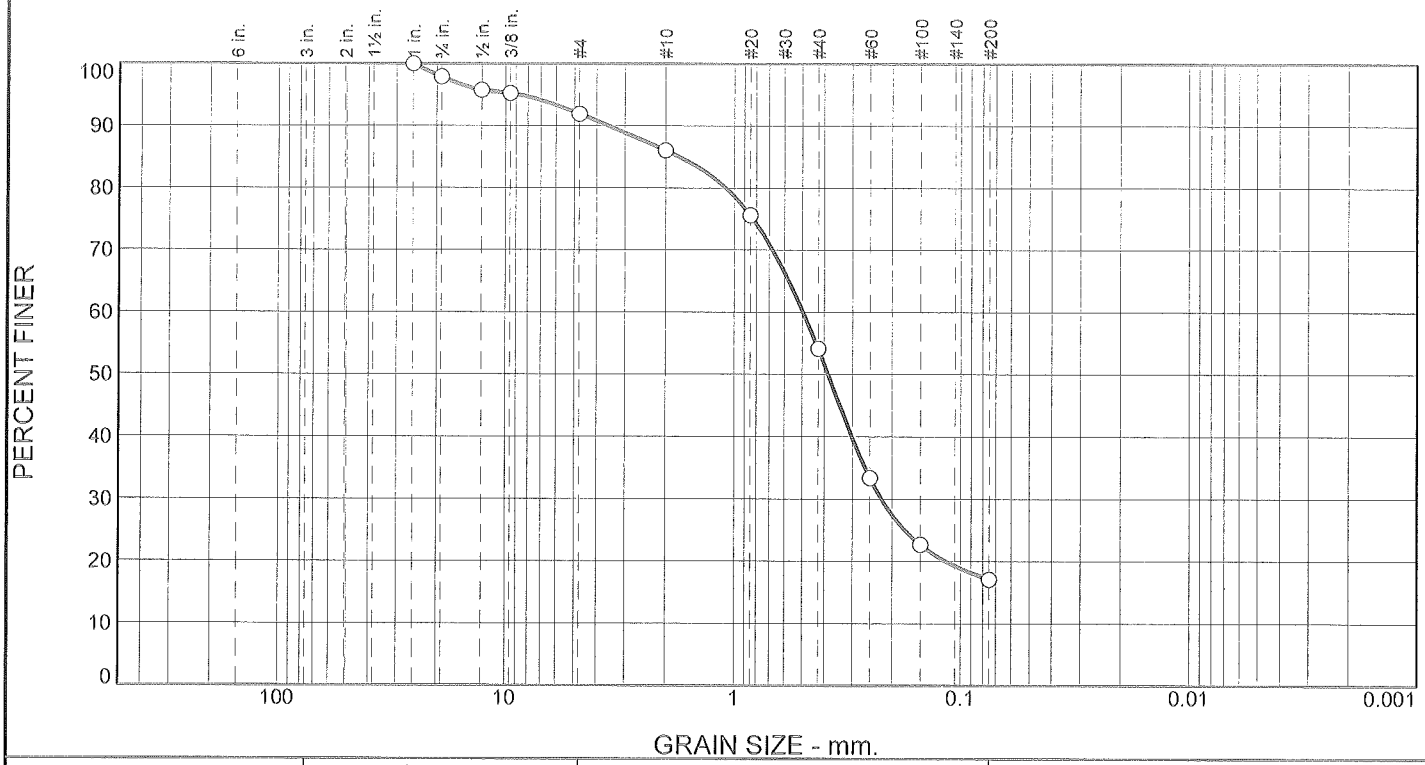
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.1	6.0	5.9	31.9	37.0	17.1	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	97.9		
1/2"	95.8		
3/8"	95.2		
#4	91.9		
#10	86.0		
#20	75.6		
#40	54.1		
#60	33.4		
#100	22.7		
#200	17.1		

* (no specification provided)

Material Description

Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 3.5365 D_{85}= 1.7432 D_{60}= 0.4962
D_{50}= 0.3842 D_{30}= 0.2224 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 8/22/13 **Date Tested:** 9/16/13
Tested By: TP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-40 **Depth:** 7.5'-9' **Date Sampled:**
Sample Number: HMA#7543-40/S-3

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

9/16/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-40
Depth: 7.5'-9'
Sample Number: HMA#7543-40/S-3
Material Description: Brown Silty Sand
Date Received: 8/22/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/JF
Test Date: 9/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 720.40
Tare Wt. = 217.70
Minus #200 from wash = 16.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
822.90	217.70	1"	0.00	0.00	100.0
		3/4"	1517.70	1505.00	97.9
		1/2"	1432.50	1419.50	95.8
		3/8"	1486.60	1483.50	95.2
		#4	1376.80	1356.60	91.9
		#10	1549.30	1513.80	86.0
		#20	1129.30	1066.20	75.6
		#40	1073.80	943.70	54.1
		#60	1003.30	877.69	33.4
		#100	907.60	843.00	22.7
		#200	1053.00	1019.20	17.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.1	6.0	8.1	5.9	31.9	37.0	74.8			17.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1162	0.2224	0.3842	0.4962	1.0883	1.7432	3.5365	8.6751

Fineness Modulus
2.18

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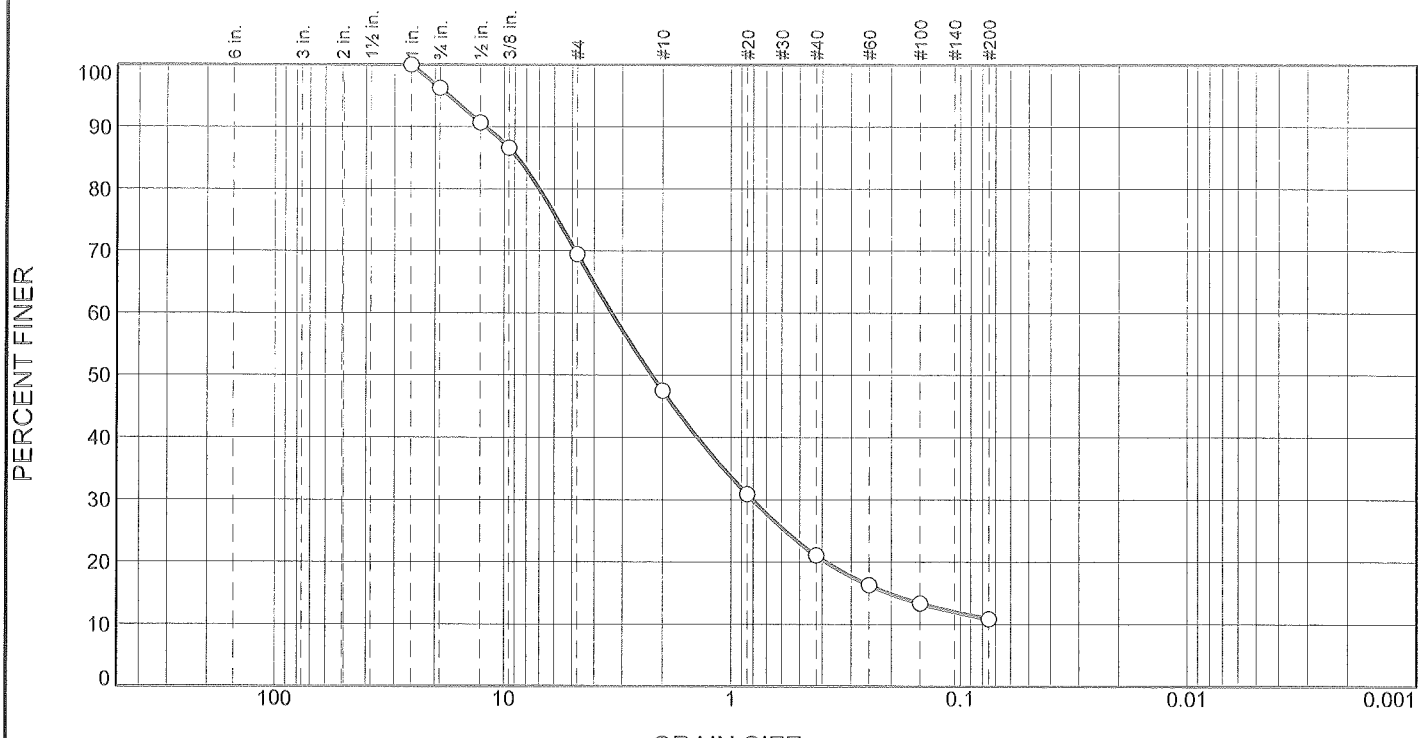
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.7	26.9	21.9	26.4	10.2	10.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	96.3		
1/2"	90.7		
3/8"	86.6		
#4	69.4		
#10	47.5		
#20	30.9		
#40	21.1		
#60	16.3		
#100	13.4		
#200	10.9		

* (no specification provided)

Material Description

Brown Poorly Graded Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-1-a

Coefficients

D_{90}= 12.0649 D_{85}= 8.7236 D_{60}= 3.3437
D_{50}= 2.2296 D_{30}= 0.8052 D_{15}= 0.2051
D_{10}= C_u= C_c=

Remarks

Date Received: 8/22/13 **Date Tested:** 9/16/13
Tested By: TP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-40 **Depth:** 20'-21' **Date Sampled:**
Sample Number: HMA#7543-41/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

9/16/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-40
Depth: 20'-21' **Sample Number:** HMA#7543-41/S-7
Material Description: Brown Poorly Graded Sand with Silt and Gravel
Date Received: 8/22/13
USCS Classification: SP-SM **AASHTO Classification:** A-1-a
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/JF **Test Date:** 9/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 798.60
Tare Wt. = 293.80
Minus #200 from wash = 10.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
860.60	293.80	1"	0.00	0.00	100.0
		3/4"	1525.90	1504.80	96.3
		1/2"	1451.10	1419.30	90.7
		3/8"	1506.20	1483.30	86.6
		#4	1453.90	1356.50	69.4
		#10	1638.00	1513.70	47.5
		#20	1160.40	1066.20	30.9
		#40	999.40	943.70	21.1
		#60	904.90	877.80	16.3
		#100	859.50	843.00	13.4
		#200	1033.40	1019.20	10.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	3.7	26.9	30.6	21.9	26.4	10.2	58.5			10.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.2051	0.3851	0.8052	2.2296	3.3437	7.0041	8.7236	12.0649	17.3641

Fineness Modulus
4.03

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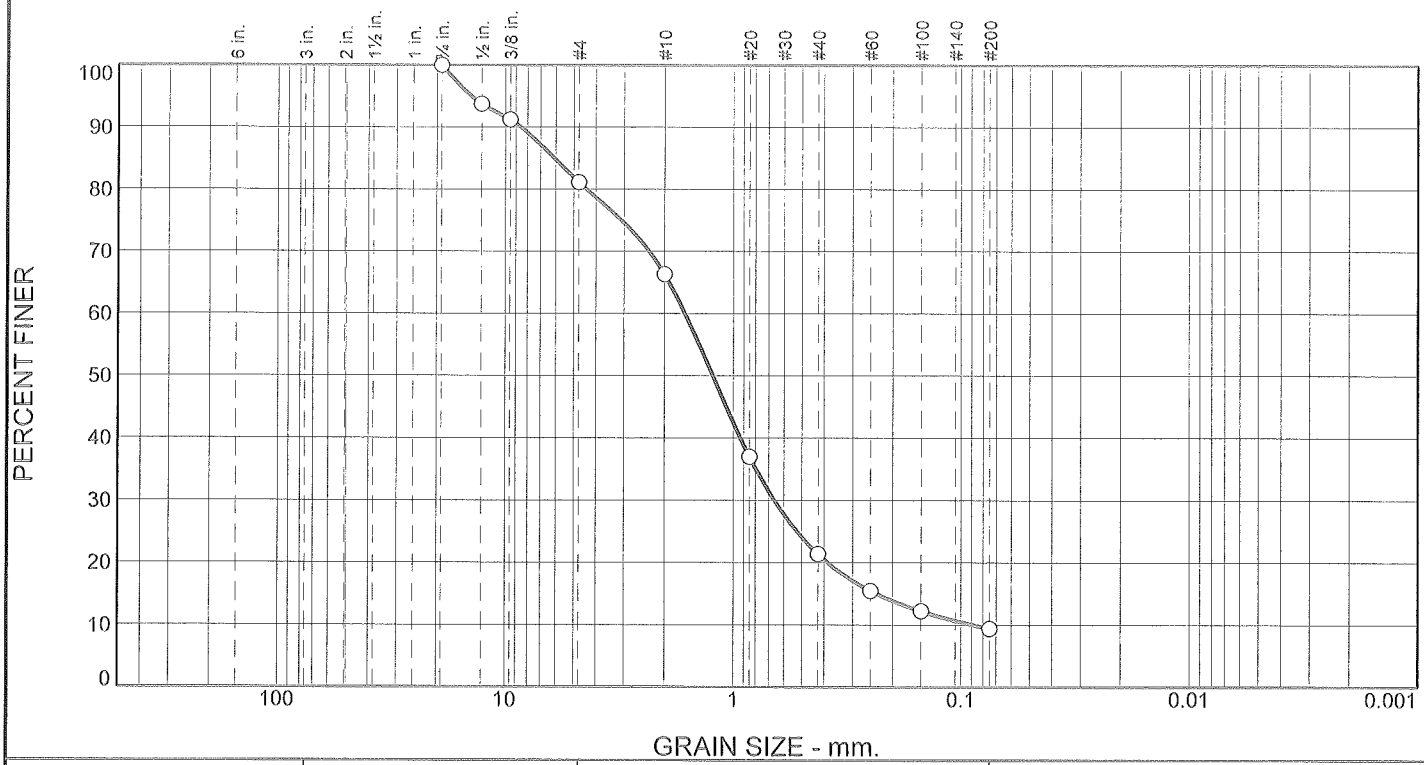
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.9	14.8	44.9	12.0	9.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	93.7		
3/8"	91.2		
#4	81.1		
#10	66.3		
#20	37.0		
#40	21.4		
#60	15.5		
#100	12.2		
#200	9.4		

* (no specification provided)

Material Description

Gray Brown Poorly Graded Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 8.5293 D_{85}= 6.0834 D_{60}= 1.6275
D_{50}= 1.2303 D_{30}= 0.6610 D_{15}= 0.2352
D_{10}= 0.0880 C_u= 18.50 C_c= 3.05

Remarks

Date Received: 8/22/13 **Date Tested:** 9/16/13

Tested By: TP/JF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-40 **Depth:** 40'-40.11' **Date Sampled:**

Sample Number: HMA#7543-42/S-11

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

9/16/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-40
Depth: 40'-40.11'
Sample Number: HMA#7543-42/S-11
Material Description: Gray Brown Poorly Graded Sand with Silt and Gravel
Date Received: 8/22/13
USCS Classification: SP-SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/JF
Test Date: 9/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 1060.90
Tare Wt. = 598.50
Minus #200 from wash = 9.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
1108.80	598.50	3/4"	0.00	0.00	100.0
		1/2"	1451.20	1419.20	93.7
		3/8"	1496.10	1483.30	91.2
		#4	1408.20	1356.50	81.1
		#10	1589.30	1513.80	66.3
		#20	1215.80	1066.40	37.0
		#40	1023.40	943.70	21.4
		#60	907.90	877.70	15.5
		#100	859.60	843.00	12.2
		#200	1033.40	1019.10	9.4

Fractional Components

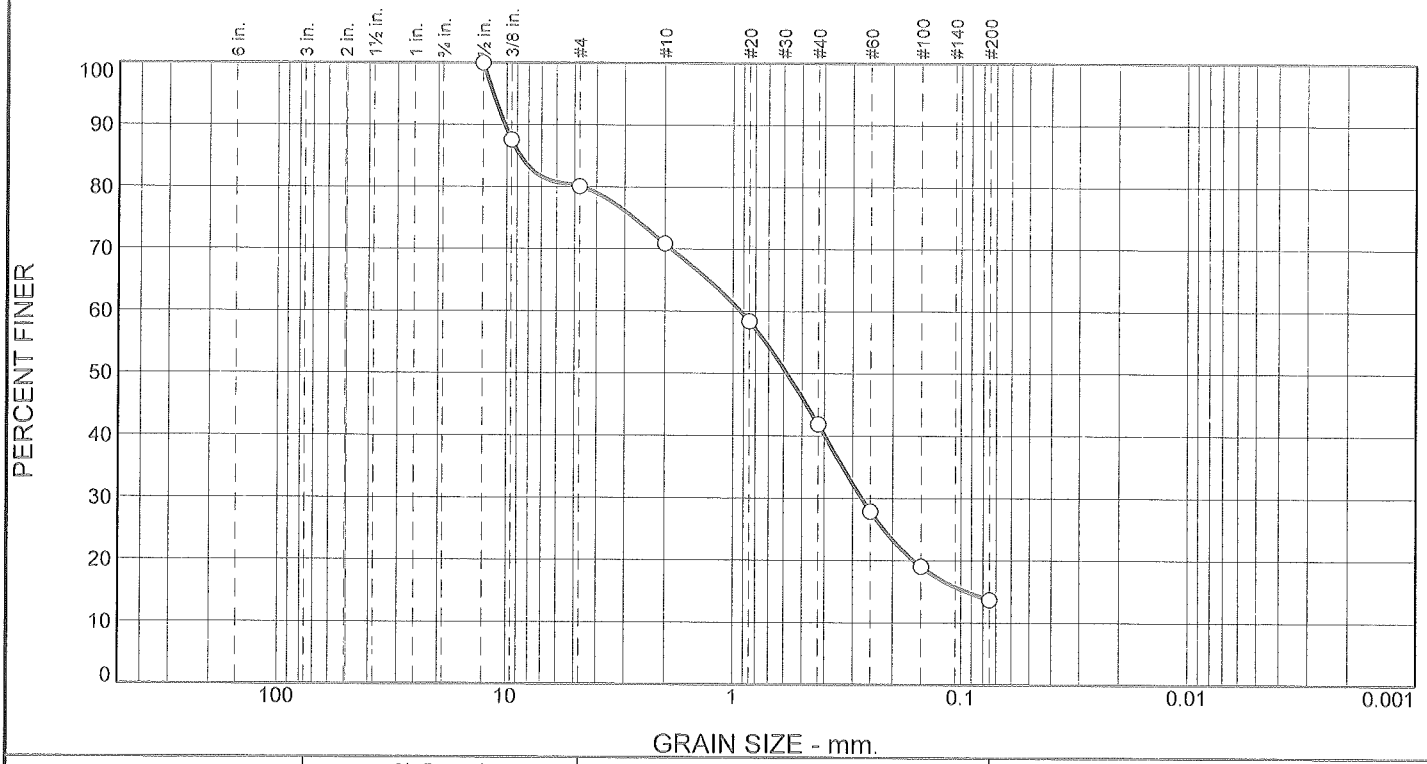
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	18.9	18.9	14.8	44.9	12.0	71.7			9.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0880	0.2352	0.3850	0.6610	1.2303	1.6275	4.4049	6.0834	8.5293	14.0717

Fineness Modulus	C_u	C_c
3.52	18.50	3.05

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00888, BLDG-2018-00895

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	19.9	9.2	29.1	28.1	13.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	87.6		
#4	80.1		
#10	70.9		
#20	58.4		
#40	41.8		
#60	27.9		
#100	19.0		
#200	13.7		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 10.1857 D_{85}= 8.6958 D_{60}= 0.9263
D_{50}= 0.5810 D_{30}= 0.2733 D_{15}= 0.9944
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/7/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-041 **Depth:** 5'-6.5' **Date Sampled:**
Sample Number: HMA#7551-24/S-2

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-041
Depth: 5'-6.5'
Sample Number: HMA#7551-24/S-2
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/7/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 591.70
Tare Wt. = 118.80
Minus #200 from wash = 30.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
798.70	118.80	1/2"	0.00	0.00	100.0
		3/8"	1567.50	1483.00	87.6
		#4	1407.20	1356.20	80.1
		#10	1576.40	1513.80	70.9
		#20	1151.30	1066.70	58.4
		#40	1056.70	943.90	41.8
		#60	972.60	877.80	27.9
		#100	903.30	843.10	19.0
		#200	1055.50	1019.10	13.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	19.9	19.9	9.2	29.1	28.1	66.4			13.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0944	0.1617	0.2733	0.5810	0.9263	4.6719	8.6958	10.1857	11.4356

Fineness Modulus
2.93

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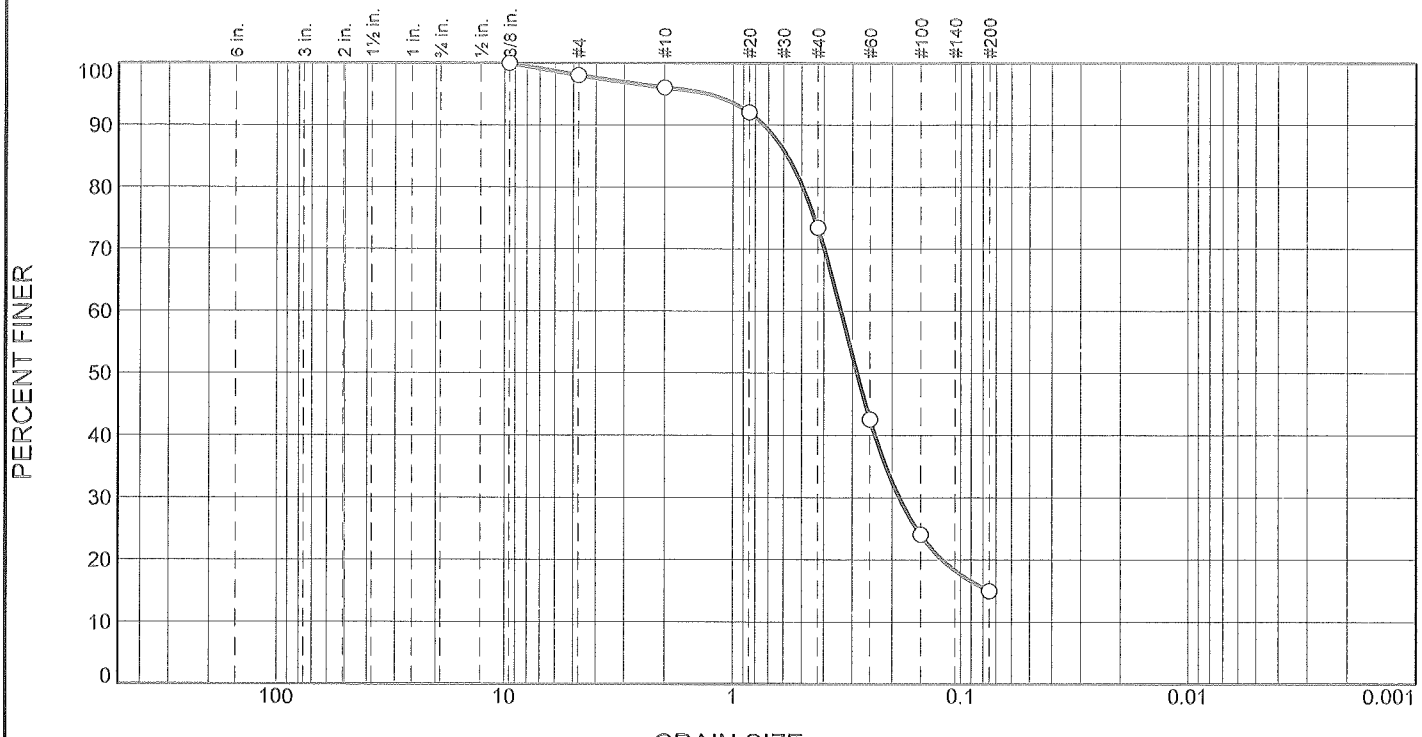
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.9	2.0	22.6	58.5	15.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	98.1		
#10	96.1		
#20	92.0		
#40	73.5		
#60	42.6		
#100	24.1		
#200	15.0		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.7302 D_{85}= 0.5770 D_{60}= 0.3356
D_{50}= 0.2851 D_{30}= 0.1858 D_{15}= 0.0752
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/7/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-041 **Depth:** 12.5'-14' **Date Sampled:**
Sample Number: HMA#7551-25/S-5

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-041
Depth: 12.5'-14'
Sample Number: HMA#7551-25/S-5
Material Description: Olive Gray Silty Sand
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/7/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 581.50
Tare Wt. = 117.20
Minus #200 from wash = 14.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
660.10	117.20	3/8"	0.00	0.00	100.0
		#4	1366.60	1356.20	98.1
		#10	1524.80	1513.80	96.1
		#20	1088.50	1066.70	92.0
		#40	1044.80	943.90	73.5
		#60	1045.50	877.80	42.6
		#100	943.50	843.10	24.1
		#200	1068.50	1019.10	15.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.9	1.9	2.0	22.6	58.5	83.1			15.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0752	0.1206	0.1858	0.2851	0.3356	0.4942	0.5770	0.7302	1.2818

Fineness Modulus
1.48

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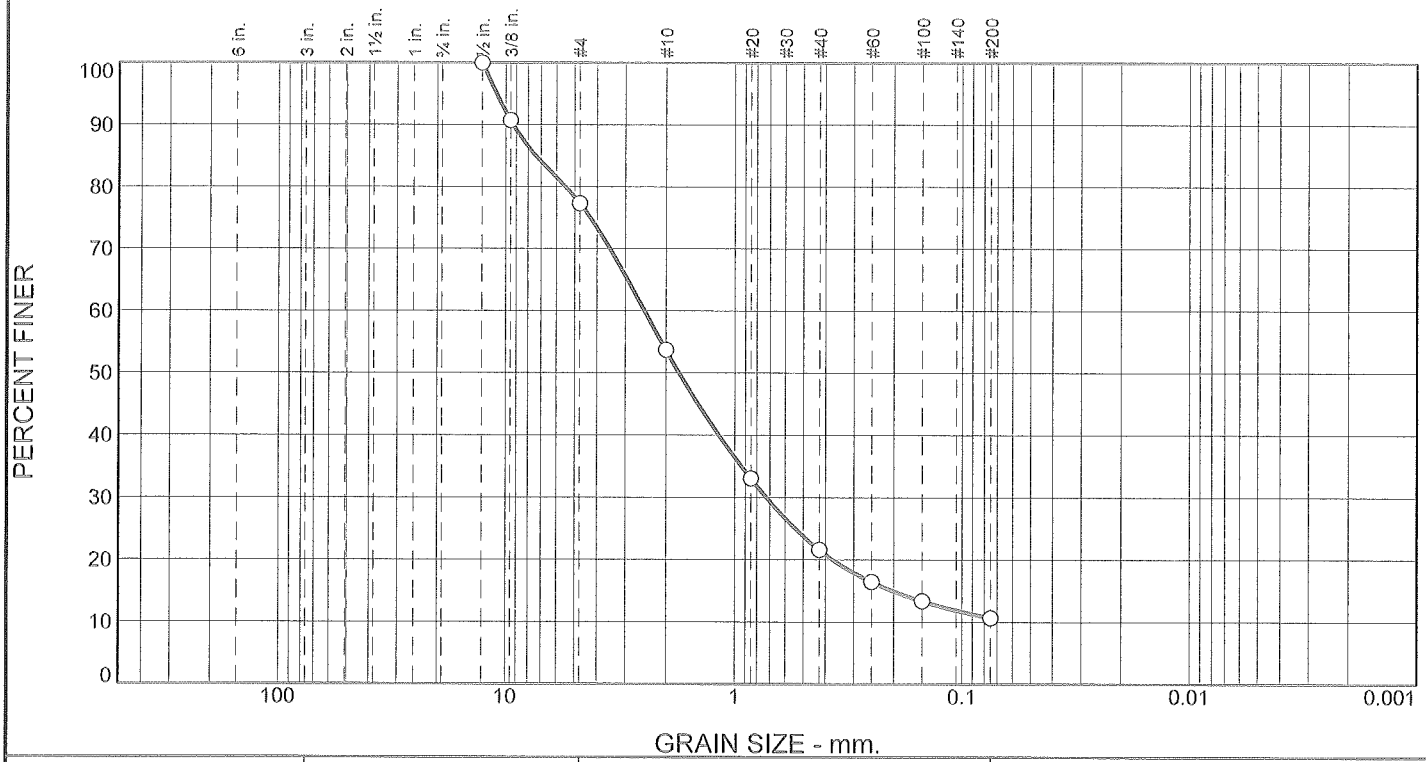
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	22.7	23.6	32.1	10.9	10.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	90.7		
#4	77.3		
#10	53.7		
#20	33.1		
#40	21.6		
#60	16.5		
#100	13.4		
#200	10.7		

* (no specification provided)

Material Description

Gray Brown Poorly Graded Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 9.2758 D_{85}= 7.3696 D_{60}= 2.4797
D_{50}= 1.7497 D_{30}= 0.7248 D_{15}= 0.2021
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/7/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-041 **Depth:** 20'-21.5' **Date Sampled:**
Sample Number: HMA#7551-26/S-8

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00891, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-041
Depth: 20'-21.5' **Sample Number:** HMA#7551-26/S-8
Material Description: Gray Brown Poorly Graded Sand with Silt and Gravel
Date Received: 9/26/13
USCS Classification: SP-SM **AASHTO Classification:** A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF **Test Date:** 10/7/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 748.00
Tare Wt. = 114.00
Minus #200 from wash = 10.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
823.40	114.00	1/2"	0.00	0.00	100.0
		3/8"	1549.00	1483.10	90.7
		#4	1451.10	1356.20	77.3
		#10	1681.40	1513.80	53.7
		#20	1213.00	1066.70	33.1
		#40	1025.40	943.90	21.6
		#60	914.30	877.80	16.5
		#100	865.00	843.10	13.4
		#200	1038.30	1019.10	10.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	22.7	22.7	23.6	32.1	10.9	66.6			10.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.2021	0.3708	0.7248	1.7497	2.4797	5.4845	7.3696	9.2758	10.9669

Fineness Modulus
3.75

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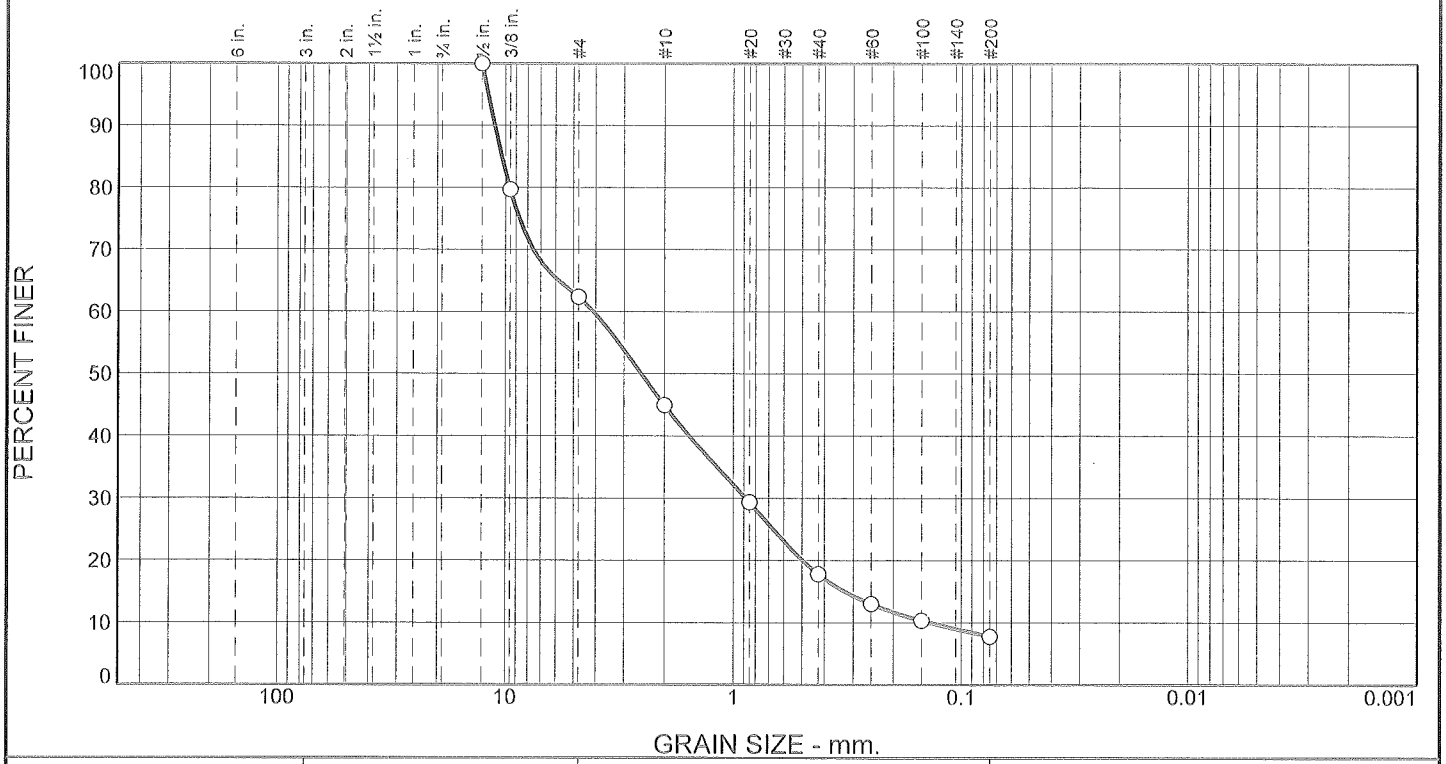
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	37.6	17.5	27.1	10.0	7.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	79.7		
#4	62.4		
#10	44.9		
#20	29.3		
#40	17.8		
#60	13.0		
#100	10.4		
#200	7.8		

* (no specification provided)

Material Description

Olive Gray Well Graded Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SW-SM AASHTO (M 145)= A-1-a

Coefficients

D_{90}= 11.1408 D_{85}= 10.3783 D_{60}= 4.0883
D_{50}= 2.5231 D_{30}= 0.8820 D_{15}= 0.3264
D_{10}= 0.1378 C_u= 29.67 C_c= 1.38

Remarks

Date Received: 9/26/13 **Date Tested:** 10/7/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-041 **Depth:** 30'-31.5' **Date Sampled:**
Sample Number: HMA#7551-27/S-10

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-041
Depth: 30'-31.5'
Sample Number: HMA#7551-27/S-10
Material Description: Olive Gray Well Graded Sand with Silt and Gravel
Date Received: 9/26/13
USCS Classification: SW-SM
AASHTO Classification: A-1-a
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/7/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 626.30
Tare Wt. = 116.00
Minus #200 from wash = 7.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
668.40	116.00	1/2"	0.00	0.00	100.0
		3/8"	1595.40	1483.10	79.7
		#4	1451.80	1356.20	62.4
		#10	1610.00	1513.80	44.9
		#20	1152.90	1066.70	29.3
		#40	1007.60	943.90	17.8
		#60	904.30	877.80	13.0
		#100	857.70	843.00	10.4
		#200	1033.20	1019.10	7.8

Fractional Components

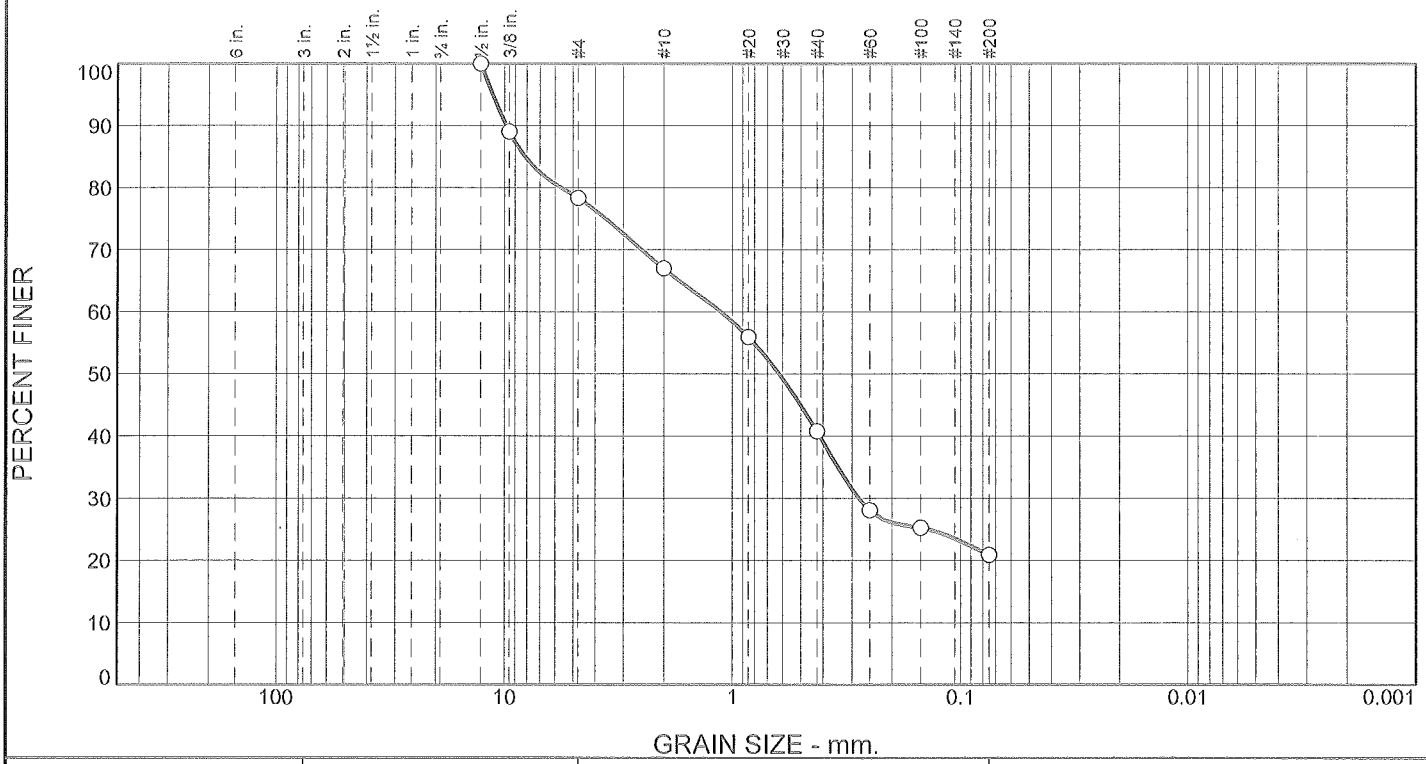
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	37.6	37.6	17.5	27.1	10.0	54.6			7.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1378	0.3264	0.4961	0.8820	2.5231	4.0883	9.5804	10.3783	11.1408	11.9062

Fineness Modulus	C_u	C_c
4.27	29.67	1.38

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	21.7	11.3	26.2	19.9	20.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	89.1		
#4	78.3		
#10	67.0		
#20	56.0		
#40	40.8		
#60	28.1		
#100	25.3		
#200	20.9		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 9.8117 D_{85}= 8.1310 D_{60}= 1.1232
D_{50}= 0.6218 D_{30}= 0.2791 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/7/13

Tested By: TP/RF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-042 **Depth:** 10'-11.5' **Date Sampled:**
Sample Number: HMA#7551-28/S-4

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-042
Depth: 10'-11.5'
Sample Number: HMA#7551-28/S-4
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/7/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 548.50
Tare Wt. = 114.00
Minus #200 from wash = 16.7%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
635.50	114.00	1/2"	0.00	0.00	100.0
		3/8"	1540.20	1483.10	89.1
		#4	1412.10	1356.20	78.3
		#10	1573.10	1513.80	67.0
		#20	1124.10	1066.70	56.0
		#40	1023.10	943.90	40.8
		#60	944.10	877.90	28.1
		#100	857.70	843.00	25.3
		#200	1042.00	1019.10	20.9

Fractional Components

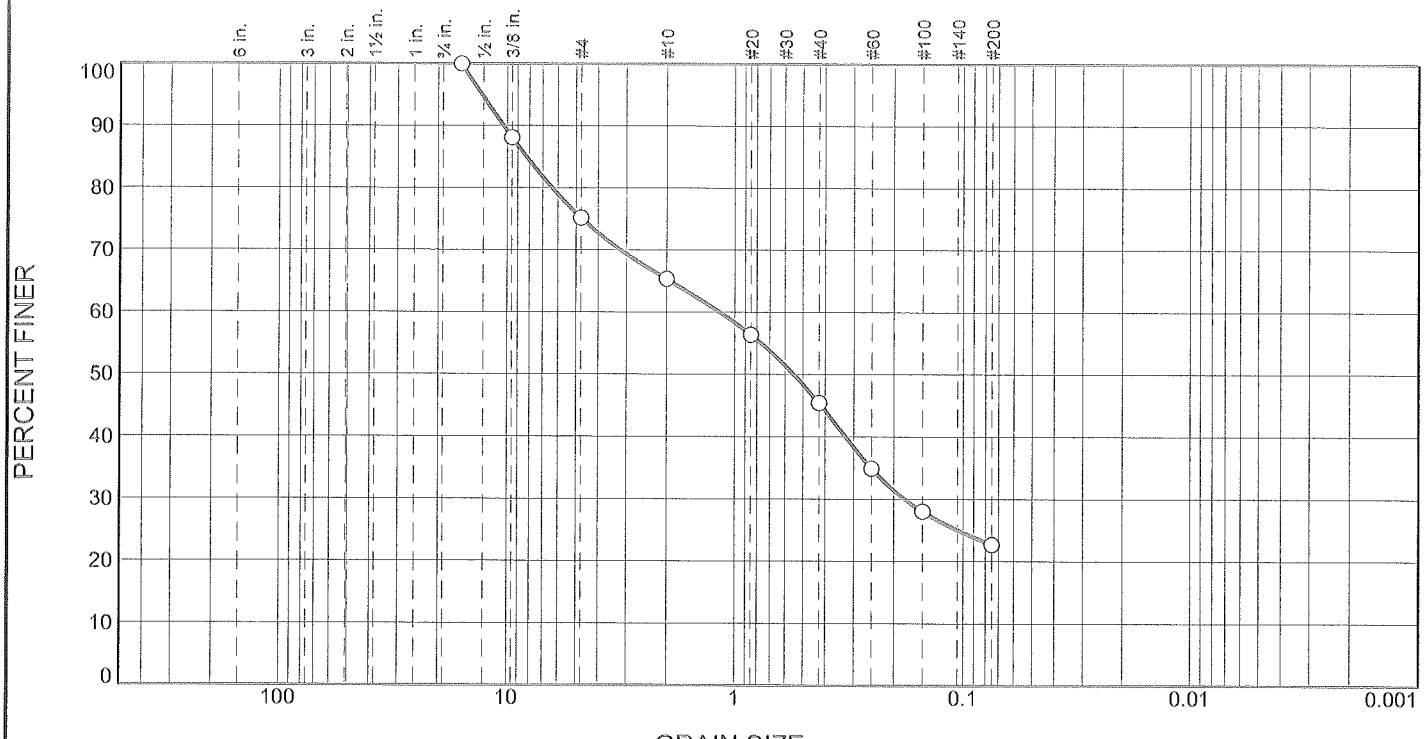
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	21.7	21.7	11.3	26.2	19.9	57.4			20.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.2791	0.6218	1.1232	5.6573	8.1310	9.8117	11.2412

Fineness Modulus
2.97

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	24.9	9.8	19.9	22.7	22.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
3/8"	88.1		
#4	75.1		
#10	65.3		
#20	56.4		
#40	45.4		
#60	34.9		
#100	28.0		
#200	22.7		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 10.3647 D_{85}= 8.2255 D_{60}= 1.1617
D_{50}= 0.5480 D_{30}= 0.1789 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/7/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-042 **Depth:** 15'-16' **Date Sampled:**
Sample Number: HMA#7551-29/S-6

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-042
Depth: 15'-16'
Sample Number: HMA#7551-29/S-6
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/7/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 561.80
Tare Wt. = 118.50
Minus #200 from wash = 22.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
690.20	118.50	5/8"	0.00	0.00	100.0
		3/8"	1551.00	1483.10	88.1
		#4	1430.40	1356.20	75.1
		#10	1570.00	1513.80	65.3
		#20	1117.70	1066.70	56.4
		#40	1006.60	943.90	45.4
		#60	937.80	877.80	34.9
		#100	882.40	843.00	28.0
		#200	1049.60	1019.10	22.7

Fractional Components

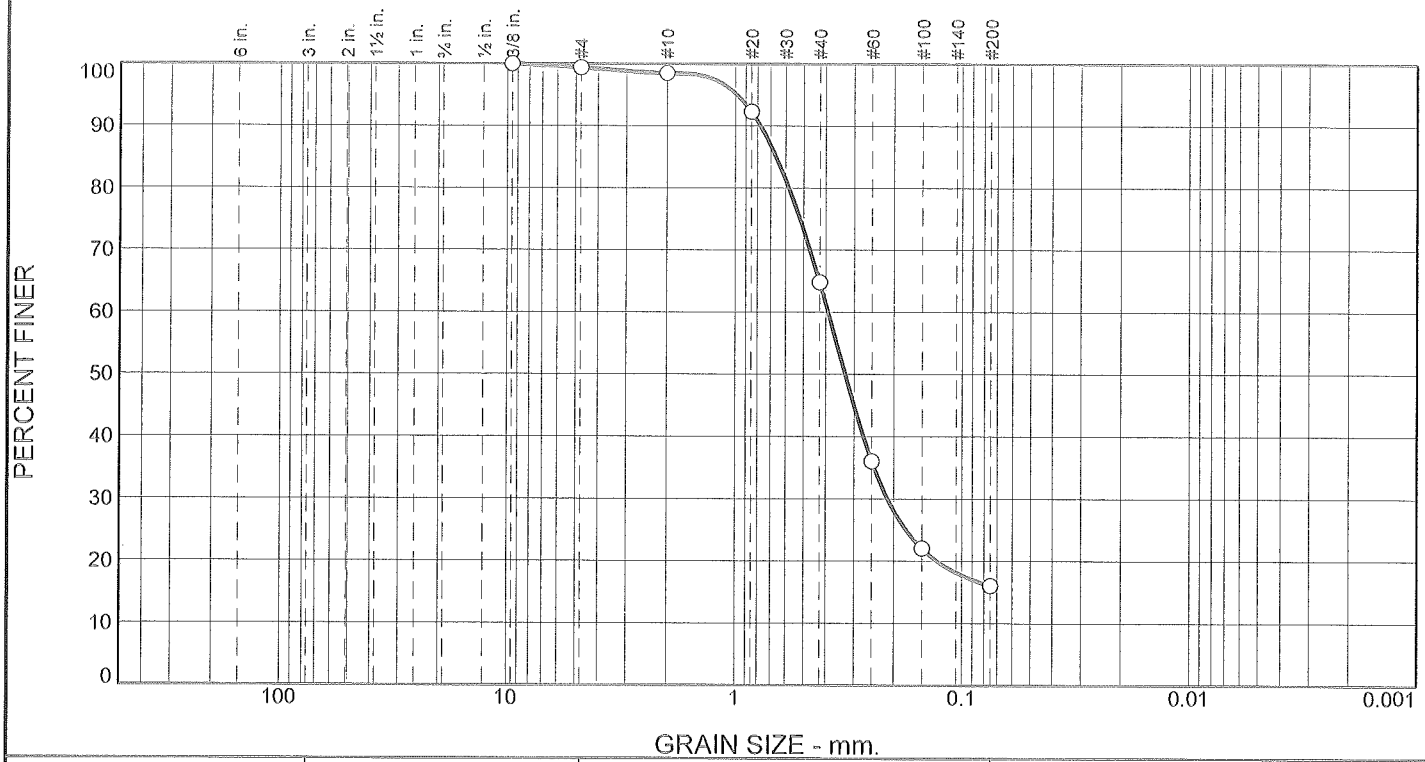
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	24.9	24.9	9.8	19.9	22.7	52.4			22.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1789	0.5480	1.1617	6.3626	8.2255	10.3647	12.8684

Fineness Modulus
2.92

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	0.9	33.7	48.8	16.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	99.4		
#10	98.5		
#20	92.3		
#40	64.8		
#60	36.0		
#100	22.1		
#200	16.0		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.7745 D_{85}= 0.6614 D_{60}= 0.3898
D_{50}= 0.3277 D_{30}= 0.2128 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/7/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-042 **Depth:** 25'-26.5' **Date Sampled:**
Sample Number: HMA#7551-30/S-8

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-042
Depth: 25'-26.5'
Sample Number: HMA#7551-30/S-8
Material Description: Olive Gray Silty Sand
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/7/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 597.00
Tare Wt. = 157.10
Minus #200 from wash = 13.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
663.10	157.10	3/8"	0.00	0.00	100.0
		#4	1359.10	1356.20	99.4
		#10	1518.40	1513.80	98.5
		#20	1097.50	1066.20	92.3
		#40	1083.00	943.90	64.8
		#60	1023.50	877.80	36.0
		#100	913.80	843.00	22.1
		#200	1049.50	1019.10	16.0

Fractional Components

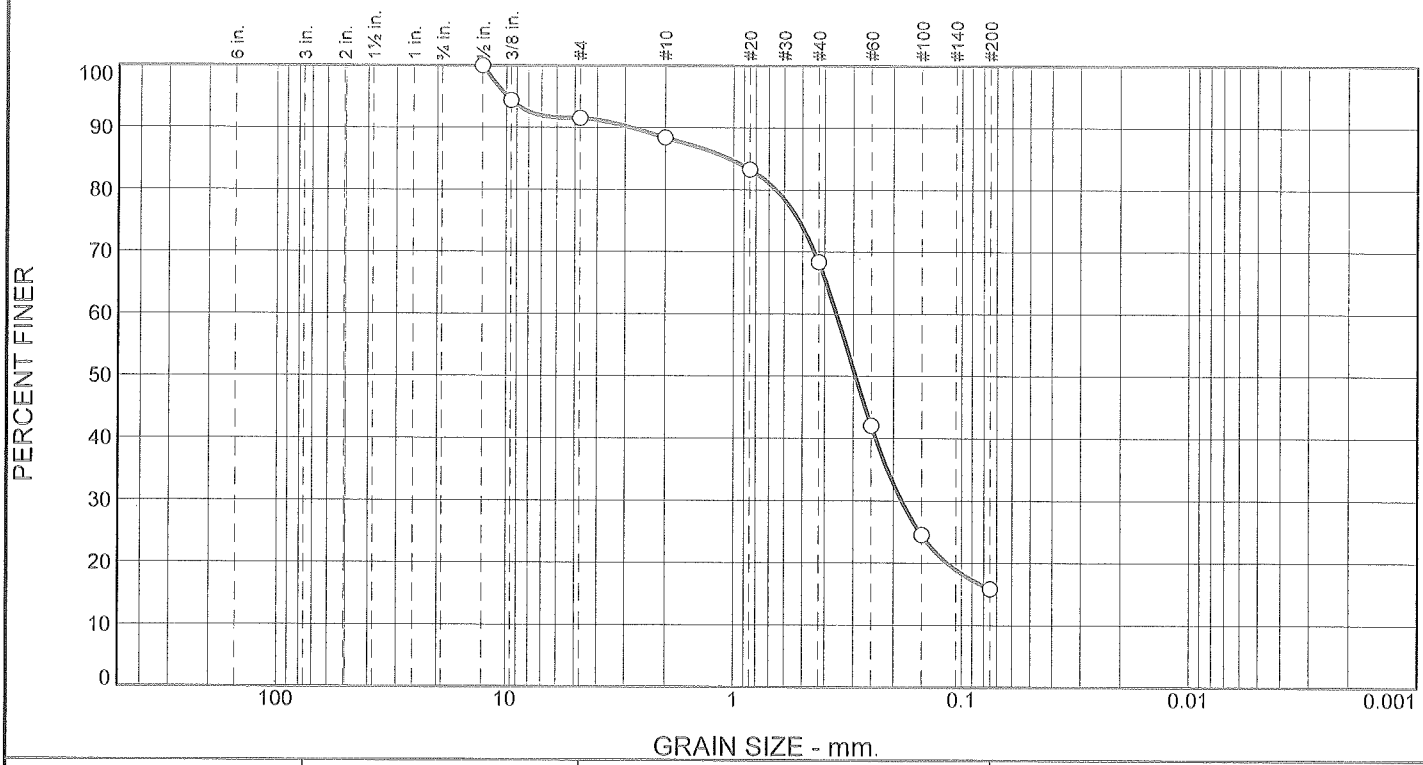
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.6	0.6	0.9	33.7	48.8	83.4			16.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1287	0.2128	0.3277	0.3898	0.5812	0.6614	0.7745	0.9792

Fineness Modulus
1.56

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.5	3.1	20.0	52.6	15.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	94.4		
#4	91.5		
#10	88.4		
#20	83.3		
#40	68.4		
#60	42.0		
#100	24.5		
#200	15.8		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 2.8228 D_{85}= 1.0454 D_{60}= 0.3548
D_{50}= 0.2930 D_{30}= 0.1838 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/8/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-042 **Depth:** 40'-41.5' **Date Sampled:**
Sample Number: HMA#7551-31/S-11

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450

Figure

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-042
Depth: 40'-41.5'
Sample Number: HMA#7551-31/S-11
Material Description: Olive Gray Silty Sand
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/8/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 578.80
Tare Wt. = 115.00
Minus #200 from wash = 15.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
663.60	115.00	1/2"	0.00	0.00	100.0
		3/8"	1513.70	1483.20	94.4
		#4	1372.40	1356.40	91.5
		#10	1530.90	1513.80	88.4
		#20	1094.30	1066.20	83.3
		#40	1025.50	943.70	68.4
		#60	1022.30	877.80	42.0
		#100	939.00	843.00	24.5
		#200	1066.80	1019.10	15.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	8.5	8.5	3.1	20.0	52.6	75.7			15.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1159	0.1838	0.2930	0.3548	0.6521	1.0454	2.8228	9.8772

Fineness Modulus
1.85

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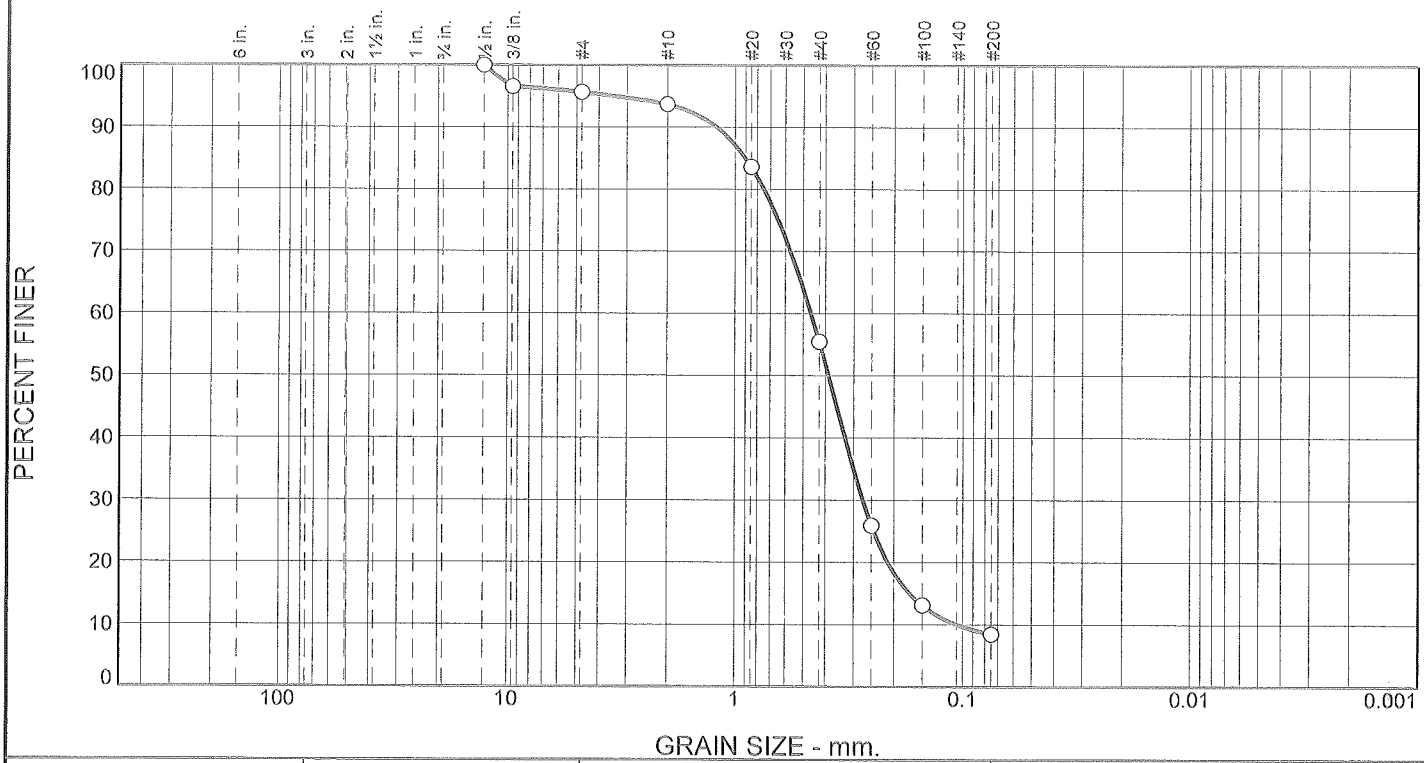
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00883, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.4	1.9	38.2	47.1	8.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	96.6		
#4	95.6		
#10	93.7		
#20	83.6		
#40	55.5		
#60	25.9		
#100	13.1		
#200	8.4		

* (no specification provided)

Material Description

Olive Gray Poorly Graded Sand with Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-3

Coefficients

D_{90}= 1.2048 D_{85}= 0.8999 D_{60}= 0.4620
D_{50}= 0.3866 D_{30}= 0.2728 D_{15}= 0.1703
D_{10}= 0.1058 C_u= 4.37 C_c= 1.52

Remarks

Date Received: 9/26/13 **Date Tested:** 10/8/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-043 **Depth:** 2.5'-4' **Date Sampled:**
Sample Number: 7551-32/S-1

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-043
Depth: 2.5'-4'
Sample Number: 7551-32/S-1
Material Description: Olive Gray Poorly Graded Sand with Silt
Date Received: 9/26/13
USCS Classification: SP-SM
AASHTO Classification: A-3
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/8/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 640.10
Tare Wt. = 114.60
Minus #200 from wash = 8.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
687.90	114.60	1/2"	0.00	0.00	100.0
		3/8"	1502.80	1483.20	96.6
		#4	1361.80	1356.40	95.6
		#10	1524.80	1513.80	93.7
		#20	1124.00	1066.20	83.6
		#40	1105.20	943.70	55.5
		#60	1047.20	877.80	25.9
		#100	916.30	843.00	13.1
		#200	1046.00	1019.10	8.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.4	4.4	1.9	38.2	47.1	87.2			8.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1058	0.1703	0.2121	0.2728	0.3866	0.4620	0.7465	0.8999	1.2048	3.4067

Fineness Modulus	C_u	C_c
2.04	4.37	1.52

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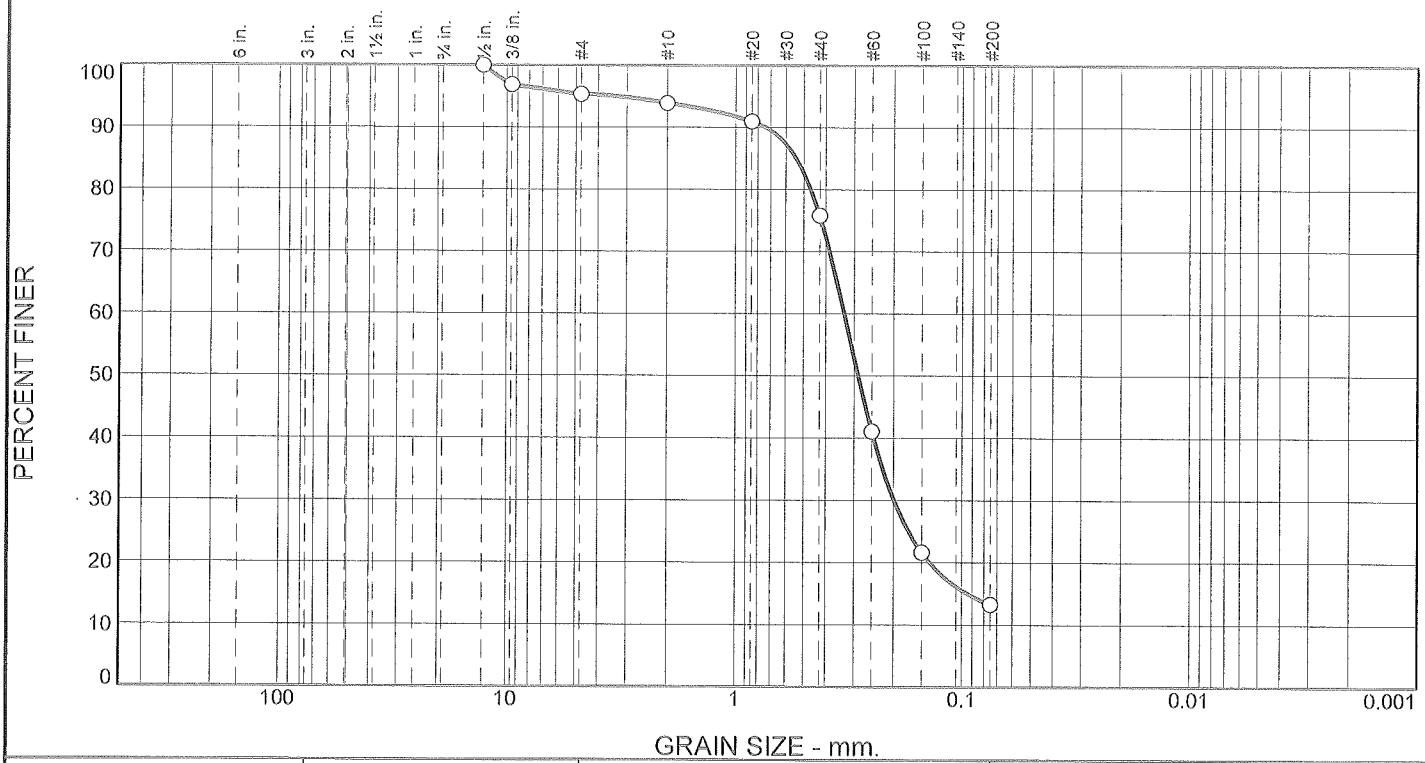
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.7	1.4	18.1	62.5	13.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	96.9		
#4	95.3		
#10	93.9		
#20	91.0		
#40	75.8		
#60	41.1		
#100	21.7		
#200	13.3		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.7339 D_{85}= 0.5390 D_{60}= 0.3311
D_{50}= 0.2872 D_{30}= 0.1988 D_{15}= 0.0941
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/8/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-043 **Depth:** 10'-11.5' **Date Sampled:**
Sample Number: 7551-33/S-4

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-043
Depth: 10'-11.5'
Sample Number: 7551-33/S-4
Material Description: Gray Brown Silty Sand
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/8/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 644.60
Tare Wt. = 114.20
Minus #200 from wash = 13.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
723.80	114.20	1/2"	0.00	0.00	100.0
		3/8"	1502.30	1483.20	96.9
		#4	1365.70	1356.40	95.3
		#10	1522.40	1513.80	93.9
		#20	1084.20	1066.20	91.0
		#40	1036.00	943.70	75.8
		#60	1089.80	877.80	41.1
		#100	961.30	843.00	21.7
		#200	1070.30	1019.10	13.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.7	4.7	1.4	18.1	62.5	82.0			13.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0941	0.1383	0.1988	0.2872	0.3311	0.4647	0.5390	0.7339	3.2976

Fineness Modulus
1.59

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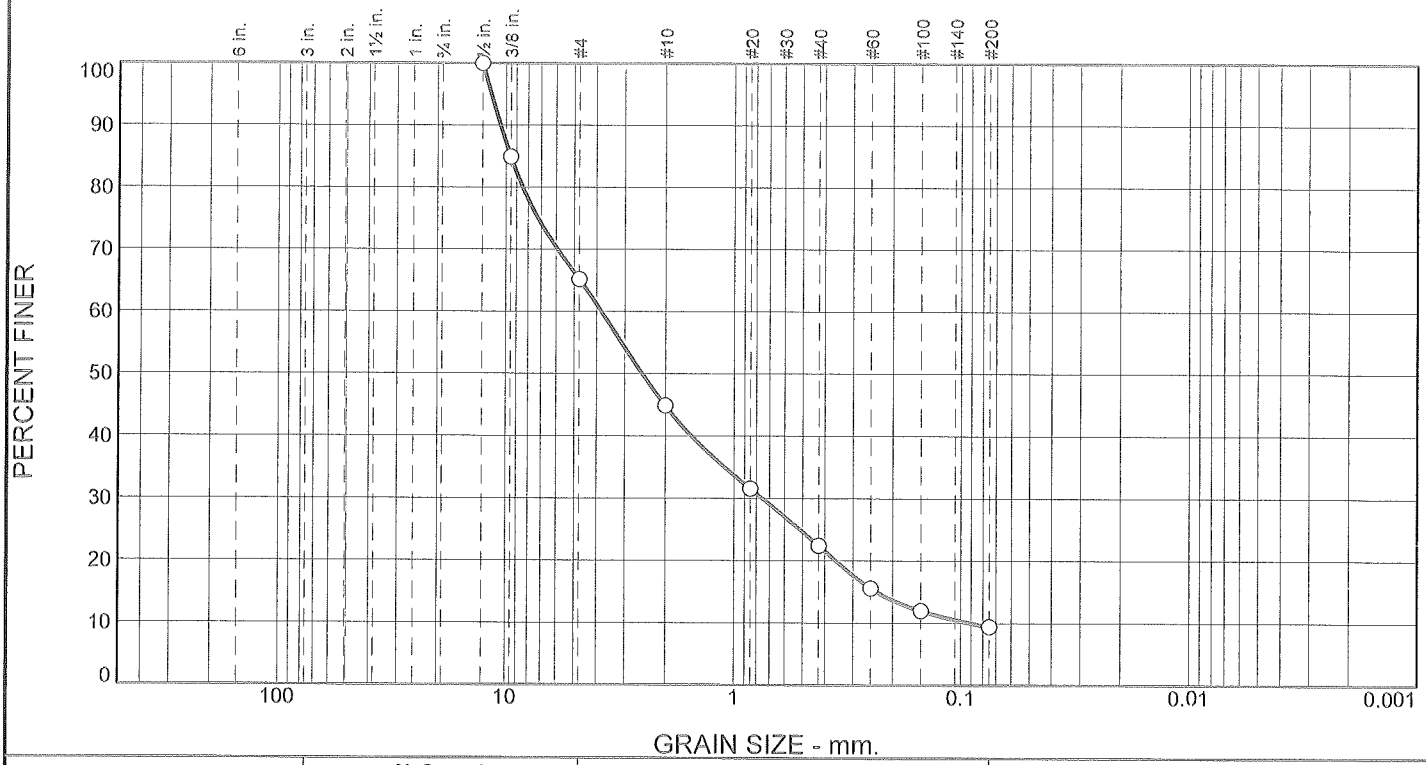
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00882, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	34.8	20.3	22.5	13.0	9.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	84.9		
#4	65.2		
#10	44.9		
#20	31.6		
#40	22.4		
#60	15.6		
#100	12.0		
#200	9.4		

* (no specification provided)

Material Description

Gray Brown Well Graded Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SW-SM AASHTO (M 145)= A-1-a

Coefficients

D_{90}= 10.5735 D_{85}= 9.5381 D_{60}= 3.8029
D_{50}= 2.5214 D_{30}= 0.7520 D_{15}= 0.2354
D_{10}= 0.0902 C_u= 42.16 C_c= 1.65

Remarks

Date Received: 9/26/13 **Date Tested:** 10/8/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-043 **Depth:** 25'-26.5' **Date Sampled:**
Sample Number: 7551-34/S-8

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450

Figure

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-043
Depth: 25'-26.5' **Sample Number:** 7551-34/S-8
Material Description: Gray Brown Well Graded Sand with Silt and Gravel
Date Received: 9/26/13
USCS Classification: SW-SM **AASHTO Classification:** A-1-a
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF **Test Date:** 10/8/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 647.10
Tare Wt. = 113.30
Minus #200 from wash = 9.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
702.20	113.30	1/2"	0.00	0.00	100.0
		3/8"	1571.90	1483.20	84.9
		#4	1472.60	1356.40	65.2
		#10	1633.50	1513.80	44.9
		#20	1144.50	1066.20	31.6
		#40	997.50	943.70	22.4
		#60	918.20	877.80	15.6
		#100	864.20	843.00	12.0
		#200	1034.30	1019.10	9.4

Fractional Components

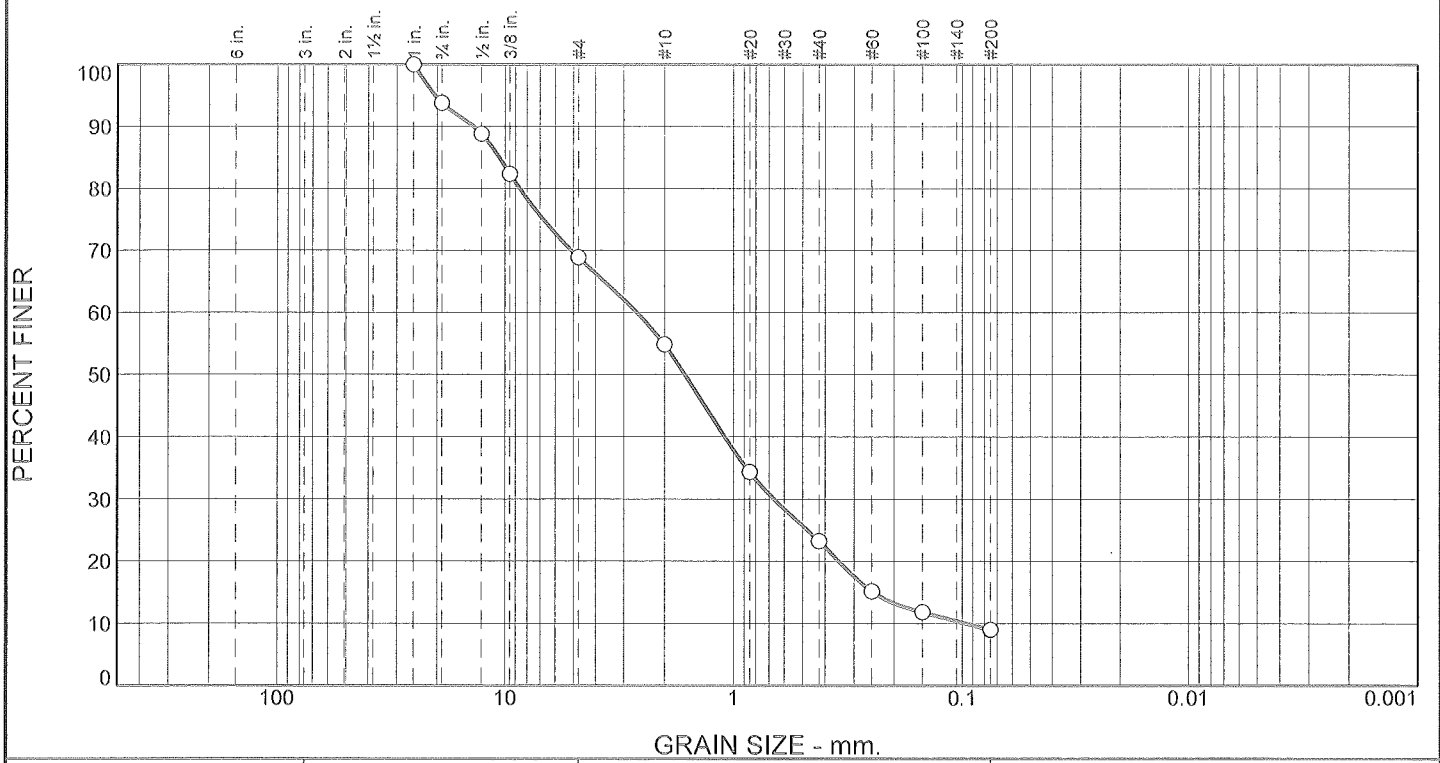
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	34.8	34.8	20.3	22.5	13.0	55.8			9.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0902	0.2354	0.3565	0.7520	2.5214	3.8029	8.4315	9.5381	10.5735	11.6100

Fineness Modulus	C_u	C_c
4.09	42.16	1.65

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00883, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.2	24.9	14.1	31.5	14.3	9.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	93.8		
1/2"	88.8		
3/8"	82.3		
#4	68.9		
#10	54.8		
#20	34.4		
#40	23.3		
#60	15.2		
#100	11.8		
#200	9.0		

* (no specification provided)

Material Description

Olive Gray Well Graded Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SW-SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 13.7209 D_{85}= 10.6184 D_{60}= 2.6343
D_{50}= 1.6214 D_{30}= 0.6658 D_{15}= 0.2459
D_{10}= 0.0964 C_u= 27.33 C_c= 1.75

Remarks

Date Received: 9/26/13 **Date Tested:** 10/8/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-043 **Depth:** 40'-41.5' **Date Sampled:**
Sample Number: 7551-35/S-11

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-043
Depth: 40'-41.5'
Sample Number: 7551-35/S-11
Material Description: Olive Gray Well Graded Sand with Silt and Gravel
Date Received: 9/26/13
USCS Classification: SW-SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/8/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 765.00
Tare Wt. = 118.10
Minus #200 from wash = 8.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
828.10	118.10	1"	0.00	0.00	100.0
		3/4"	1548.60	1504.80	93.8
		1/2"	1454.60	1419.20	88.8
		3/8"	1529.40	1483.20	82.3
		#4	1451.90	1356.40	68.9
		#10	1613.50	1513.80	54.8
		#20	1211.80	1066.30	34.4
		#40	1022.40	943.70	23.3
		#60	935.20	877.80	15.2
		#100	866.90	843.00	11.8
		#200	1039.20	1019.10	9.0

Fractional Components

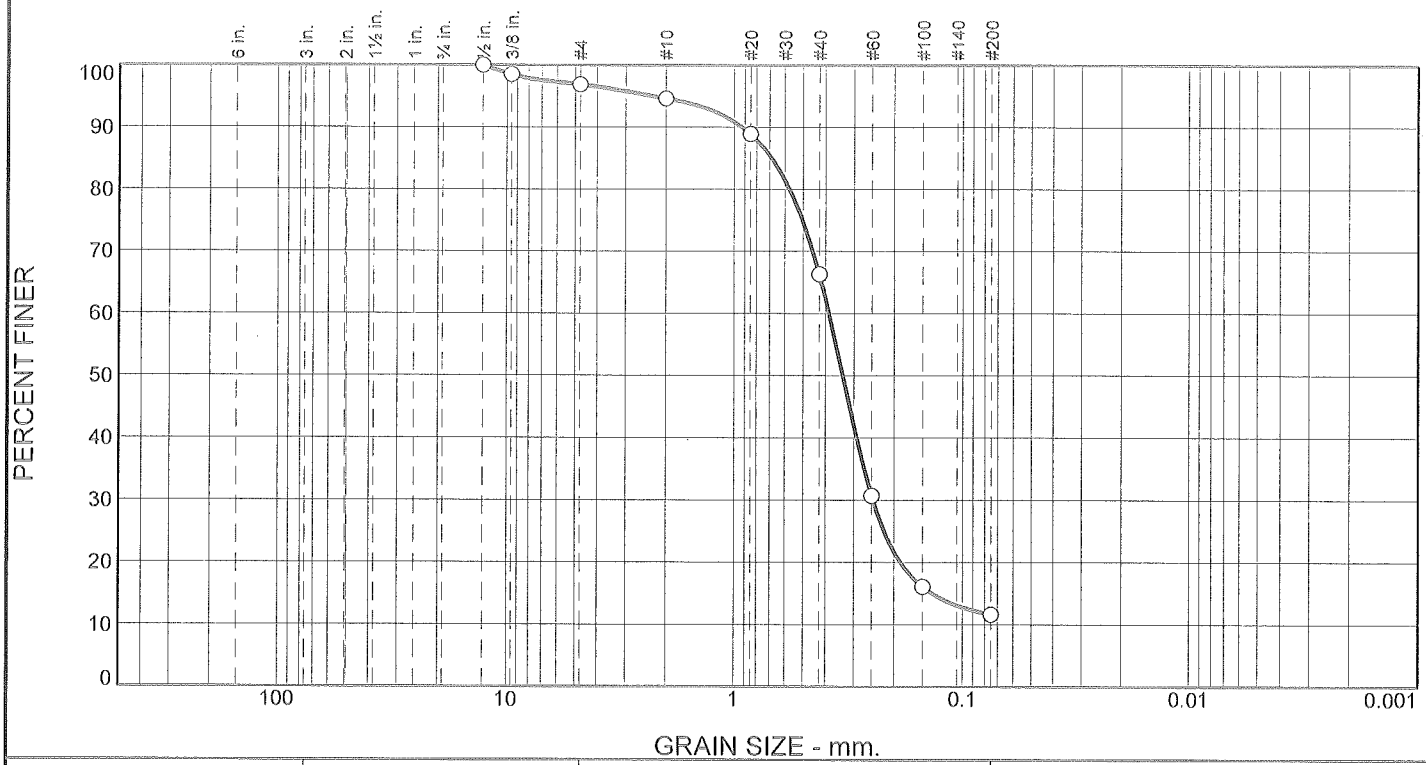
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	6.2	24.9	31.1	14.1	31.5	14.3	59.9			9.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0964	0.2459	0.3480	0.6658	1.6214	2.6343	8.6169	10.6184	13.7209	20.3572

Fineness Modulus	C_u	C_c
3.97	27.33	1.75

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.1	2.3	28.3	54.7	11.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	98.5		
#4	96.9		
#10	94.6		
#20	88.9		
#40	66.3		
#60	30.7		
#100	16.1		
#200	11.6		

* (no specification provided)

Material Description

Olive Gray Poorly Graded Sand with Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.9238 D_{85}= 0.6846 D_{60}= 0.3855
D_{50}= 0.3349 D_{30}= 0.2467 D_{15}= 0.1360
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/8/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-044 **Depth:** 7.5'-9.0' **Date Sampled:**
Sample Number: HMA#7551-36/S-3

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-044
Depth: 7.5'-9.0'
Sample Number: HMA#7551-36/S-3
Material Description: Olive Gray Poorly Graded Sand with Silt
Date Received: 9/26/13
USCS Classification: SP-SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/8/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 661.10
Tare Wt. = 161.90
Minus #200 from wash = 11.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
726.90	161.90	1/2"	0.00	0.00	100.0
		3/8"	1491.60	1483.20	98.5
		#4	1365.60	1356.40	96.9
		#10	1526.50	1513.70	94.6
		#20	1098.50	1066.20	88.9
		#40	1071.40	943.70	66.3
		#60	1078.90	877.70	30.7
		#100	925.10	842.80	16.1
		#200	1044.40	1019.00	11.6

Fractional Components

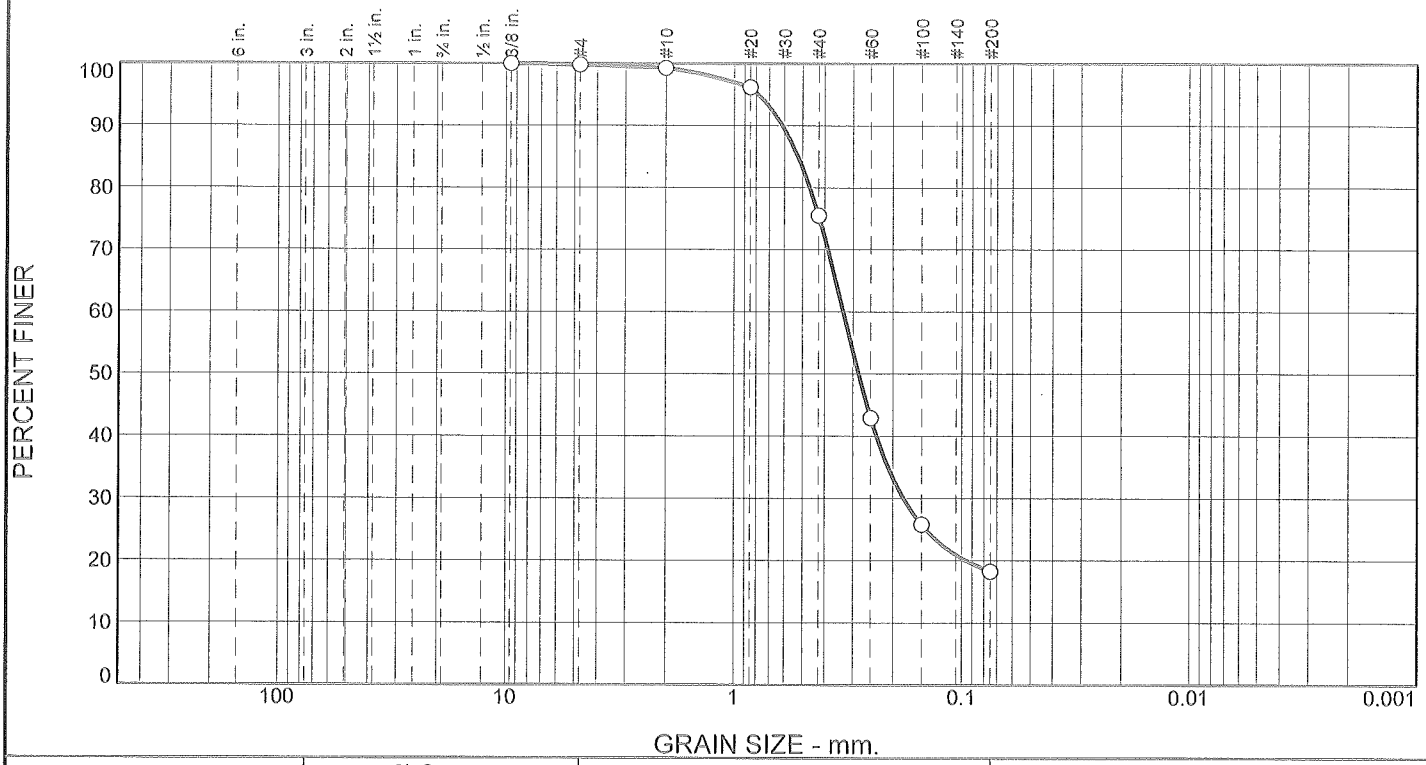
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.1	3.1	2.3	28.3	54.7	85.3			11.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1360	0.1874	0.2467	0.3349	0.3855	0.5722	0.6846	0.9238	2.2752

Fineness Modulus
1.77

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00888, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.5	23.8	57.2	18.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	99.8		
#10	99.3		
#20	96.2		
#40	75.5		
#60	42.9		
#100	25.8		
#200	18.3		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.6122 D_{85}= 0.5237 D_{60}= 0.3303
D_{50}= 0.2827 D_{30}= 0.1796 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/8/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-044 **Depth:** 15'-16.5' **Date Sampled:**
Sample Number: HMA#7551-37/S-6

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-044
Depth: 15'-16.5'
Sample Number: HMA#7551-37/S-6
Material Description: Gray Brown Silty Sand
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/8/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 632.60
Tare Wt. = 117.90
Minus #200 from wash = 17.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
744.40	117.90	3/8"	0.00	0.00	100.0
		#4	1357.70	1356.50	99.8
		#10	1516.60	1513.60	99.3
		#20	1085.90	1066.40	96.2
		#40	1073.30	943.70	75.5
		#60	1082.00	877.80	42.9
		#100	950.20	843.00	25.8
		#200	1066.40	1019.00	18.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	0.5	23.8	57.2	81.5			18.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0954	0.1796	0.2827	0.3303	0.4646	0.5237	0.6122	0.7781

Fineness Modulus
1.34

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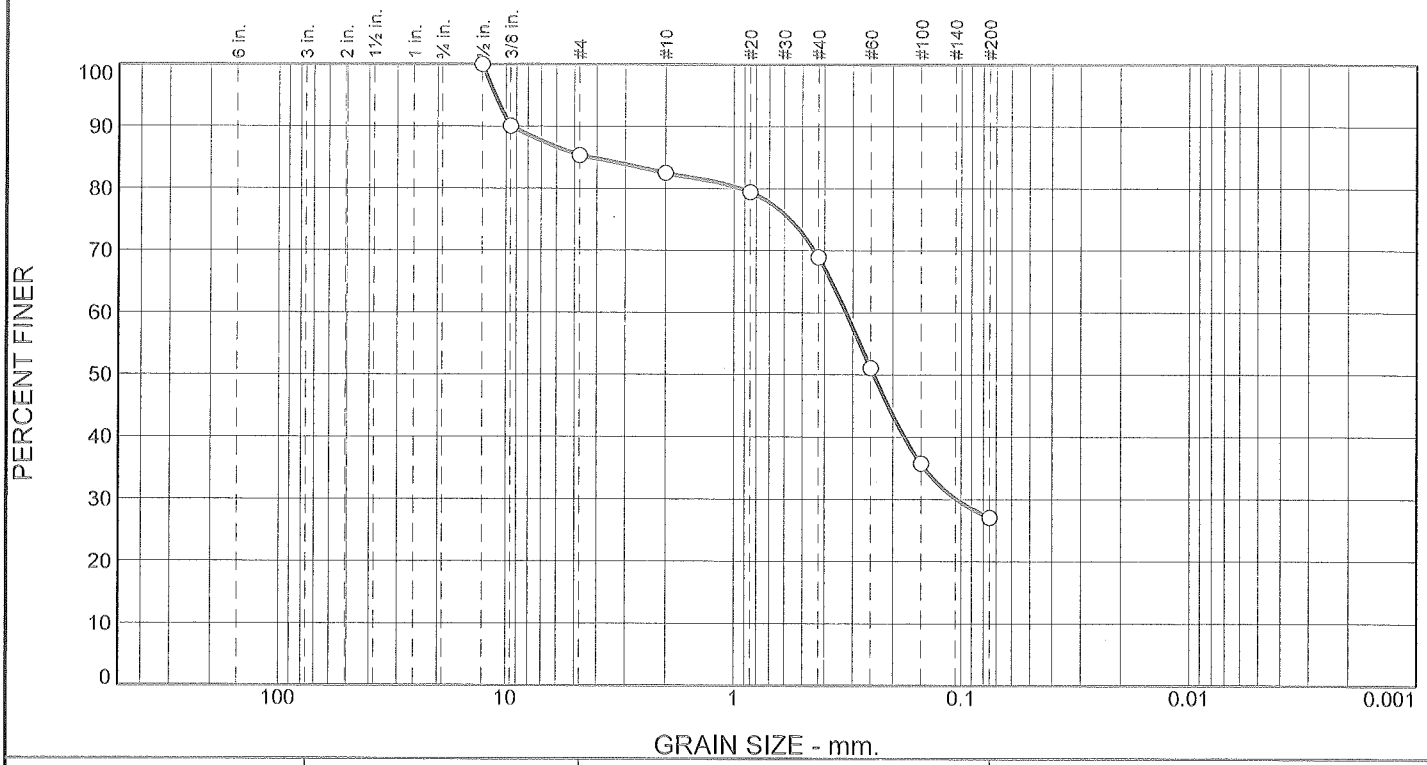
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.7	2.8	13.6	41.9	27.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	90.1		
#4	85.3		
#10	82.5		
#20	79.4		
#40	68.9		
#60	51.1		
#100	35.7		
#200	27.0		

* (no speeifieation provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 9.4571 D_{85}= 4.2605 D_{60}= 0.3205
D_{50}= 0.2424 D_{30}= 0.1049 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/8/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-044 **Depth:** 35'-36.5' **Date Sampled:**
Sample Number: HMA#7551-38/S-10

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-044
Depth: 35'-36.5'
Sample Number: HMA#7551-38/S-10
Material Description: Olive Gray Silty Sand
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/8/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 592.60
Tare Wt. = 123.20
Minus #200 from wash = 26.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
761.00	123.20	1/2"	0.00	0.00	100.0
		3/8"	1546.70	1483.30	90.1
		#4	1386.60	1356.50	85.3
		#10	1531.70	1513.60	82.5
		#20	1086.20	1066.40	79.4
		#40	1010.40	943.70	68.9
		#60	991.60	877.80	51.1
		#100	941.00	842.90	35.7
		#200	1074.50	1019.10	27.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	14.7	14.7	2.8	13.6	41.9	58.3			27.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1049	0.2424	0.3205	0.9387	4.2605	9.4571	11.1330

Fineness Modulus
1.91

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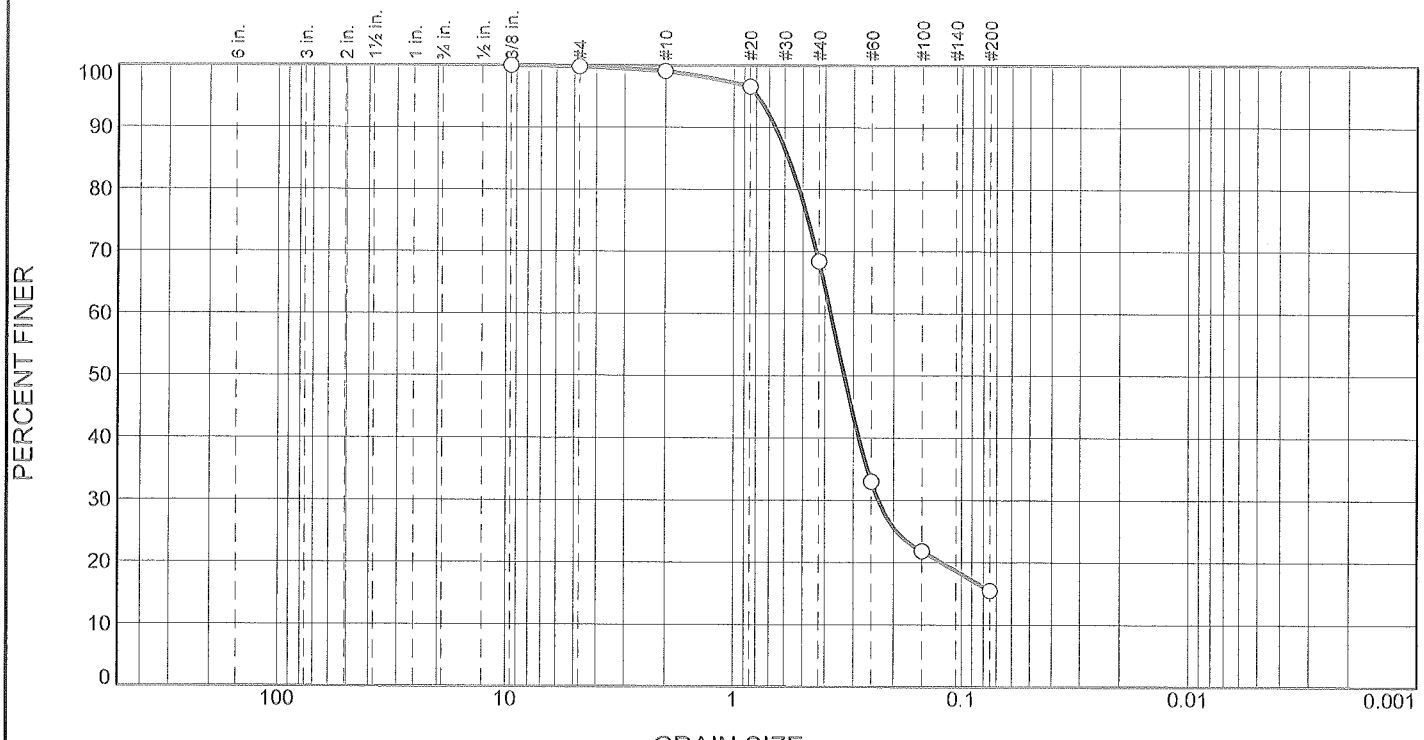
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.7	30.7	52.9	15.5	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	99.8		
#10	99.1		
#20	96.6		
#40	68.4		
#60	33.0		
#100	21.9		
#200	15.5		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.6576 D_{85}= 0.5774 D_{60}= 0.3767
D_{50}= 0.3284 D_{30}= 0.2329 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/9/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-044 **Depth:** 45'-46.5' **Date Sampled:**
Sample Number: HMA#7551-39/S-12

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-044
Depth: 45'-46.5'
Sample Number: HMA#7551-39/S-12
Material Description: Olive Gray Silty Sand
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/9/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 625.80
Tare Wt. = 193.00
Minus #200 from wash = 15.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
705.00	193.00	3/8"	0.00	0.00	100.0
		#4	1357.40	1356.40	99.8
		#10	1517.00	1513.40	99.1
		#20	1078.90	1066.20	96.6
		#40	1088.20	943.70	68.4
		#60	1059.10	877.80	33.0
		#100	899.90	843.00	21.9
		#200	1051.80	1019.10	15.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	0.7	30.7	52.9	84.3			15.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1222	0.2329	0.3284	0.3767	0.5188	0.5774	0.6576	0.7848

Fineness Modulus
1.51

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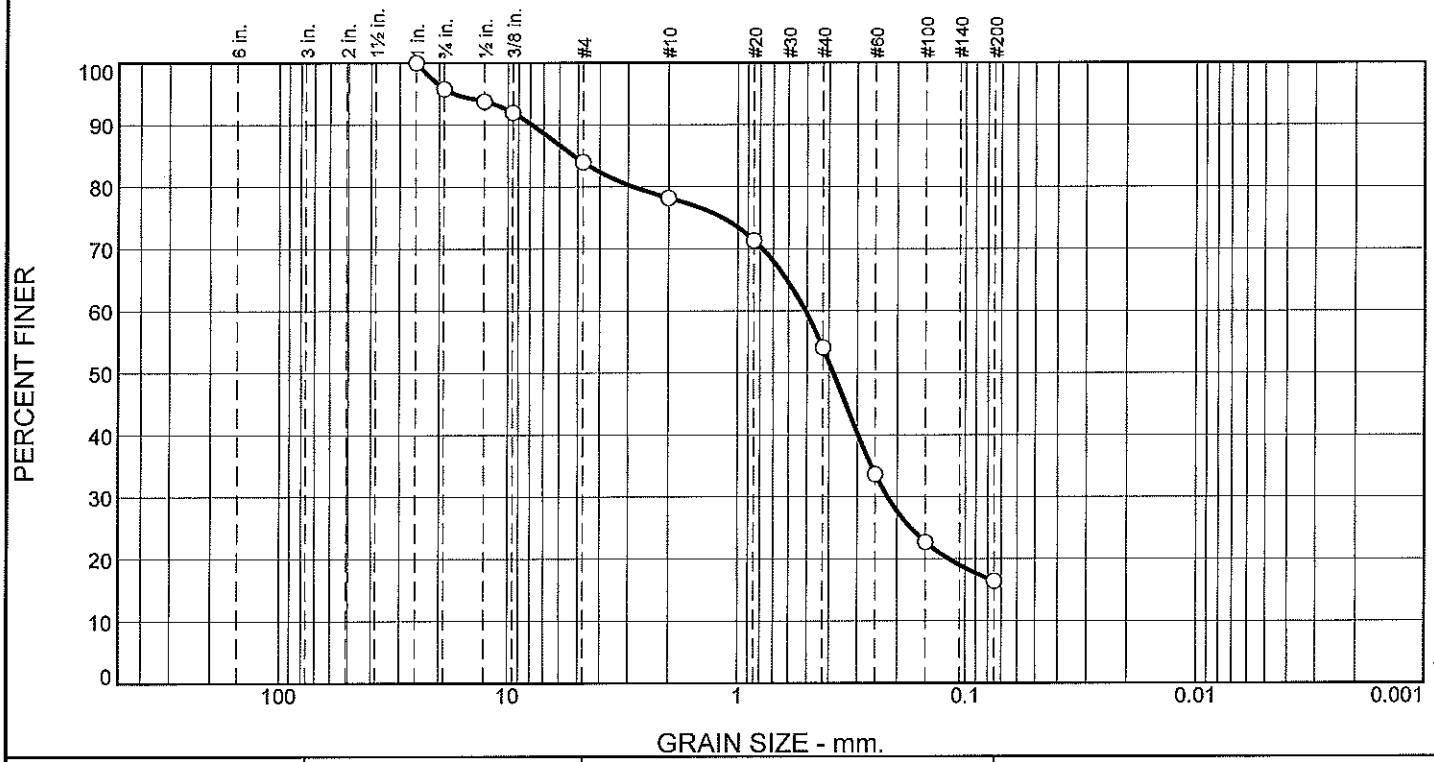
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00888, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.2	11.8	5.8	24.2	37.6	16.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	95.8		
1/2"	93.8		
3/8"	91.9		
#4	84.0		
#10	78.2		
#20	71.3		
#40	54.0		
#60	33.6		
#100	22.7		
#200	16.4		

* (no specification provided)

Material Description

Olive Brown Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 7.8850 D_{85}= 5.2154 D_{60}= 0.5083
D_{50}= 0.3823 D_{30}= 0.2205 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/14/13
Tested By: TEP/AH
Checked By: JAM
Title:

Source of Sample: Boring E360-B-045 **Depth:** 2.5'-4' **Date Sampled:**
Sample Number: HMA#7555-5/S-1

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/18/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-045
Depth: 2.5'-4'
Sample Number: HMA#7555-5/S-1
Material Description: Olive Brown Silty Sand with Gravel
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/AH
Test Date: 10/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 722.20
Tare Wt. = 225.90
Minus #200 from wash = 16.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
817.80	225.90	1"	0.00	0.00	100.0
		3/4"	1529.80	1504.90	95.8
		1/2"	1431.10	1419.20	93.8
		3/8"	1494.20	1483.30	91.9
		#4	1403.60	1356.40	84.0
		#10	1548.00	1513.70	78.2
		#20	1106.80	1066.40	71.3
		#40	1046.60	944.20	54.0
		#60	998.60	877.80	33.6
		#100	907.50	842.90	22.7
		#200	1056.50	1019.00	16.4

Fractional Components

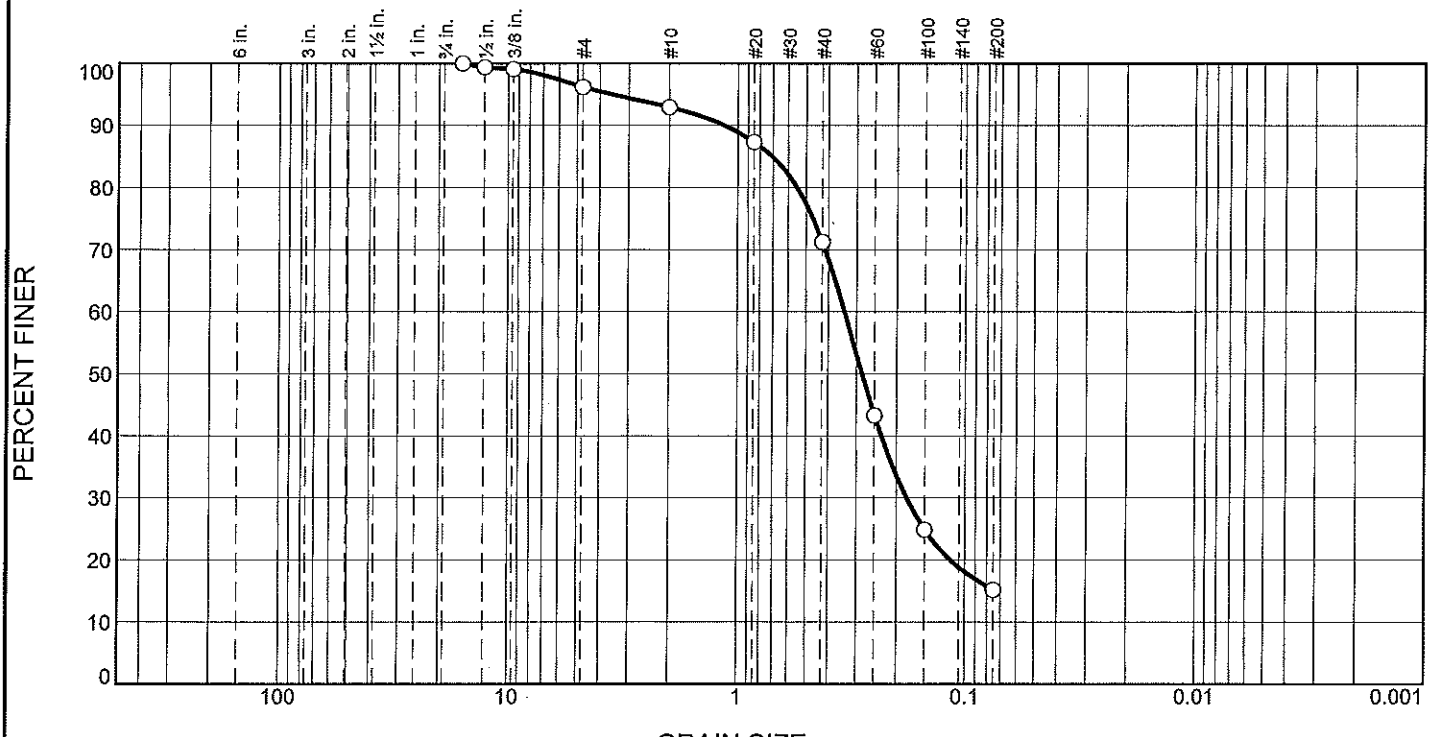
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	4.2	11.8	16.0	5.8	24.2	37.6	67.6			16.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1185	0.2205	0.3823	0.5083	2.8671	5.2154	7.8850	17.2795

Fineness Modulus
2.47

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.8	3.3	21.7	56.0	15.2	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
1/2"	99.4		
3/8"	99.1		
#4	96.2		
#10	92.9		
#20	87.3		
#40	71.2		
#60	43.3		
#100	24.9		
#200	15.2		

* (no specification provided)

Material Description

Olive Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 1.1508 D_{85}= 0.7074 D_{60}= 0.3401
D_{50}= 0.2842 D_{30}= 0.1803 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/14/13

Tested By: TEP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-045 **Depth:** 12.5'-14' **Date Sampled:**

Sample Number: HMA#7555-6/S-5

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/18/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-045
Depth: 12.5'-14'
Sample Number: HMA#7555-6/S-5
Material Description: Olive Brown Silty Sand
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 10/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 646.70
Tare Wt. = 120.10
Minus #200 from wash = 14.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
738.90	120.10	5/8"	0.00	0.00	100.0
		1/2"	1423.20	1419.30	99.4
		3/8"	1485.10	1483.30	99.1
		#4	1374.10	1356.30	96.2
		#10	1533.90	1513.60	92.9
		#20	1101.50	1066.70	87.3
		#40	1043.80	944.30	71.2
		#60	1050.90	877.90	43.3
		#100	956.70	842.90	24.9
		#200	1078.90	1018.90	15.2

Fractional Components

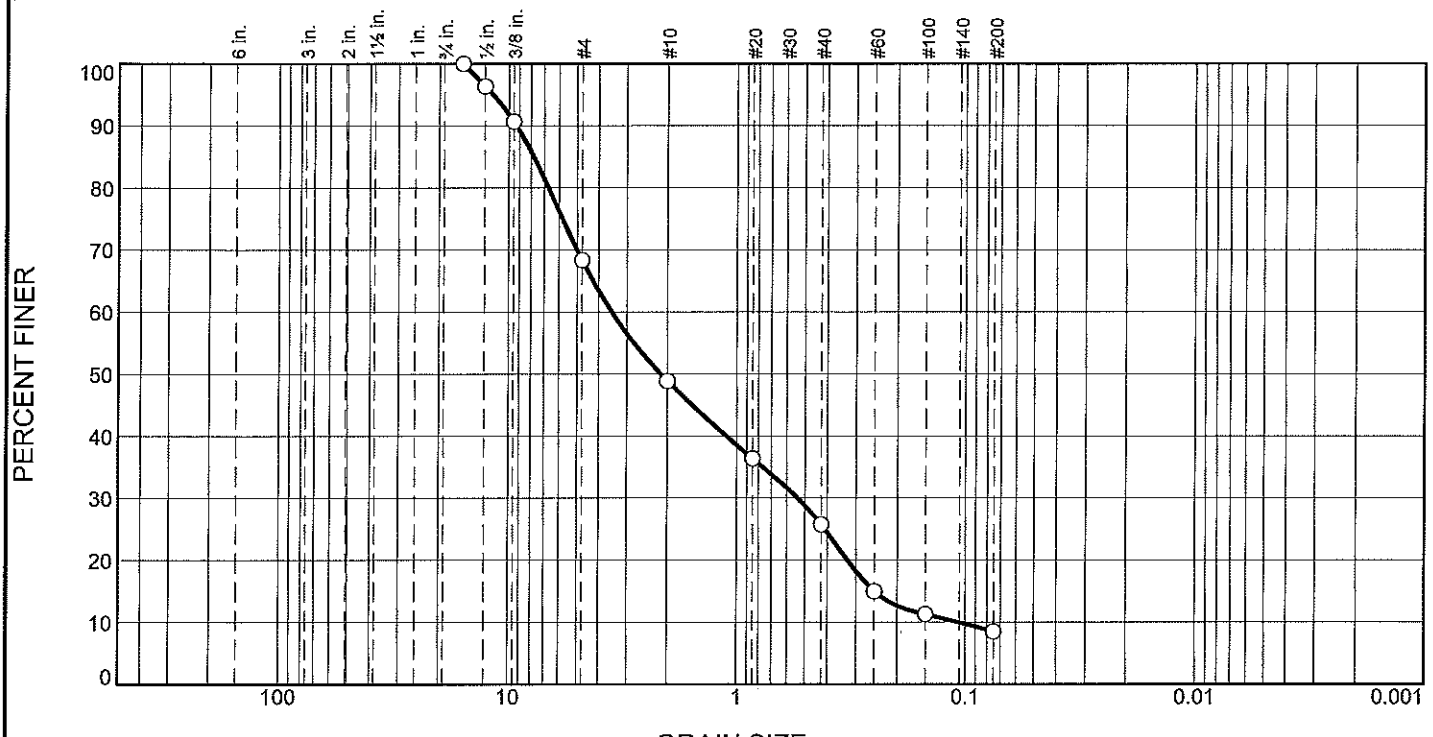
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.8	3.8	3.3	21.7	56.0	81.0			15.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1161	0.1803	0.2842	0.3401	0.5497	0.7074	1.1508	3.5542

Fineness Modulus
1.61

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	31.7	19.5	23.1	17.2	8.5	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
1/2"	96.3		
3/8"	90.7		
#4	68.3		
#10	48.8		
#20	36.4		
#40	25.7		
#60	15.0		
#100	11.3		
#200	8.5		

* (no specification provided)

Material Description

Olive Brown Poorly Graded Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-1-a

Coefficients

D_{90}= 9.2703 D_{85}= 7.7964 D_{60}= 3.5102
D_{50}= 2.1419 D_{30}= 0.5386 D_{15}= 0.2509
D_{10}= 0.1075 C_u= 32.67 C_c= 0.77

Remarks

Date Received: 10/4/13 **Date Tested:** 10/14/13

Tested By: TEP/AH

Checked By: JAM

Title:

Source of Sample: Boring E360-B-045 **Depth:** 35'-36' **Date Sampled:**

Sample Number: HMA#7555-7/S-10

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/18/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-045
Depth: 35'-36' **Sample Number:** HMA#7555-7/S-10
Material Description: Olive Brown Poorly Graded Sand with Silt and Gravel
Date Received: 10/4/13
USCS Classification: SP-SM **AASHTO Classification:** A-1-a
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/AH **Test Date:** 10/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 654.40
Tare Wt. = 118.50
Minus #200 from wash = 8.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
703.10	118.50	5/8"	0.00	0.00	100.0
		1/2"	1440.70	1419.20	96.3
		3/8"	1516.30	1483.30	90.7
		#4	1486.90	1356.30	68.3
		#10	1627.60	1513.60	48.8
		#20	1139.60	1066.70	36.4
		#40	1006.50	944.40	25.7
		#60	941.00	877.90	15.0
		#100	864.20	842.80	11.3
		#200	1035.20	1019.00	8.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	31.7	31.7	19.5	23.1	17.2	59.8			8.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1075	0.2509	0.3265	0.5386	2.1419	3.5102	6.7050	7.7964	9.2703	11.7611

Fineness Modulus	C_u	C_c
3.87	32.67	0.77

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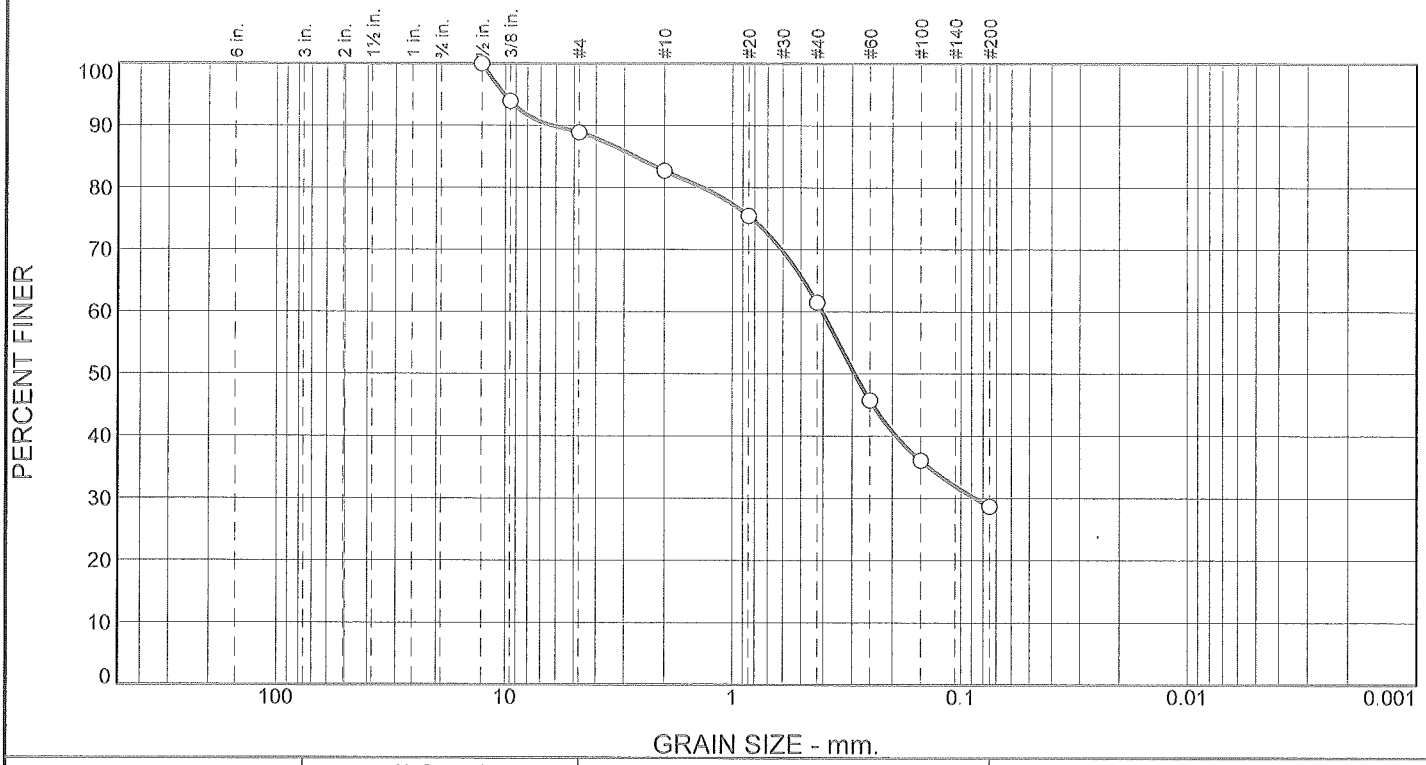
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.1	6.2	21.2	32.8	28.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	93.9		
#4	88.9		
#10	82.7		
#20	75.5		
#40	61.5		
#60	45.7		
#100	36.1		
#200	28.7		

* (no specification provided)

Material Description

Olive Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 6.2483 D_{85}= 2.6828 D_{60}= 0.4037
D_{50}= 0.2911 D_{30}= 0.0865 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/9/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-046 **Depth:** 10'-11.5' **Date Sampled:**
Sample Number: HMA#7551-40/S-4

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-046
Depth: 10'-11.5'
Sample Number: HMA#7551-40/S-4
Material Description: Olive Brown Silty Sand
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/9/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 483.00
Tare Wt. = 194.20
Minus #200 from wash = 28.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
597.40	194.20	1/2"	0.00	0.00	100.0
		3/8"	1507.80	1483.40	93.9
		#4	1376.80	1356.40	88.9
		#10	1538.60	1513.70	82.7
		#20	1095.40	1066.20	75.5
		#40	1000.10	943.70	61.5
		#60	941.20	877.70	45.7
		#100	881.70	842.90	36.1
		#200	1049.00	1019.00	28.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	11.1	11.1	6.2	21.2	32.8	60.2			28.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0865	0.2911	0.4037	1.3573	2.6828	6.2483	10.1019

Fineness Modulus
1.98

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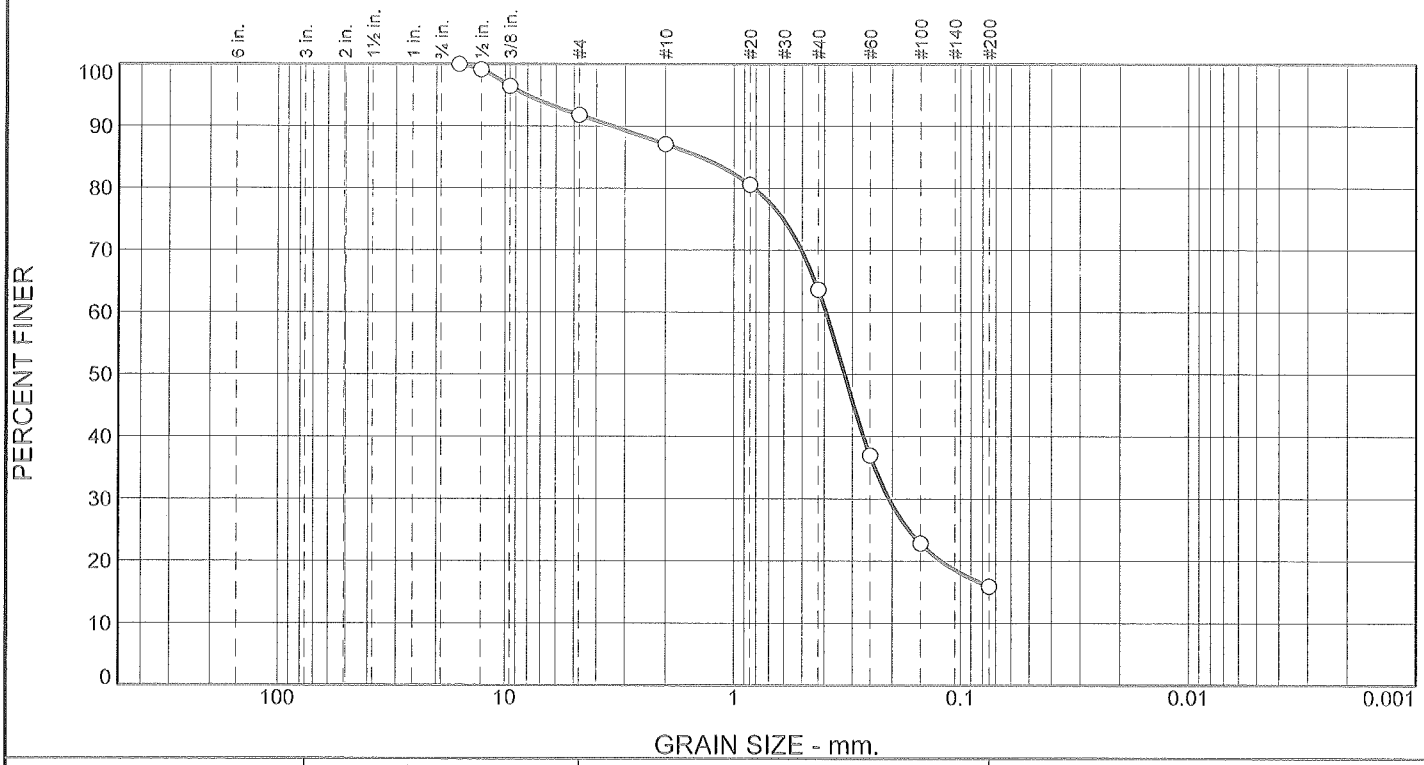
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00888, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.2	4.7	23.4	47.8	15.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
1/2"	99.1		
3/8"	96.5		
#4	91.8		
#10	87.1		
#20	80.5		
#40	63.7		
#60	36.9		
#100	22.9		
#200	15.9		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 3.4084 D_{85}= 1.4039 D_{60}= 0.3928
D_{50}= 0.3243 D_{30}= 0.2065 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/9/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-046 **Depth:** 20'-21.5' **Date Sampled:**
Sample Number: HMA#7551-41/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-046
Depth: 20'-21.5'
Sample Number: HMA#7551-41/S-7
Material Description: Olive Gray Silty Sand
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/9/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 720.40
Tare Wt. = 196.10
Minus #200 from wash = 15.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
815.60	196.10	5/8"	0.00	0.00	100.0
		1/2"	1424.50	1419.20	99.1
		3/8"	1499.70	1483.30	96.5
		#4	1385.50	1356.40	91.8
		#10	1542.90	1513.60	87.1
		#20	1106.60	1066.10	80.5
		#40	1048.20	943.70	63.7
		#60	1043.20	877.70	36.9
		#100	930.10	842.80	22.9
		#200	1062.10	1019.10	15.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	8.2	8.2	4.7	23.4	47.8	75.9			15.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1219	0.2065	0.3243	0.3928	0.8141	1.4039	3.4084	8.0117

Fineness Modulus
1.96

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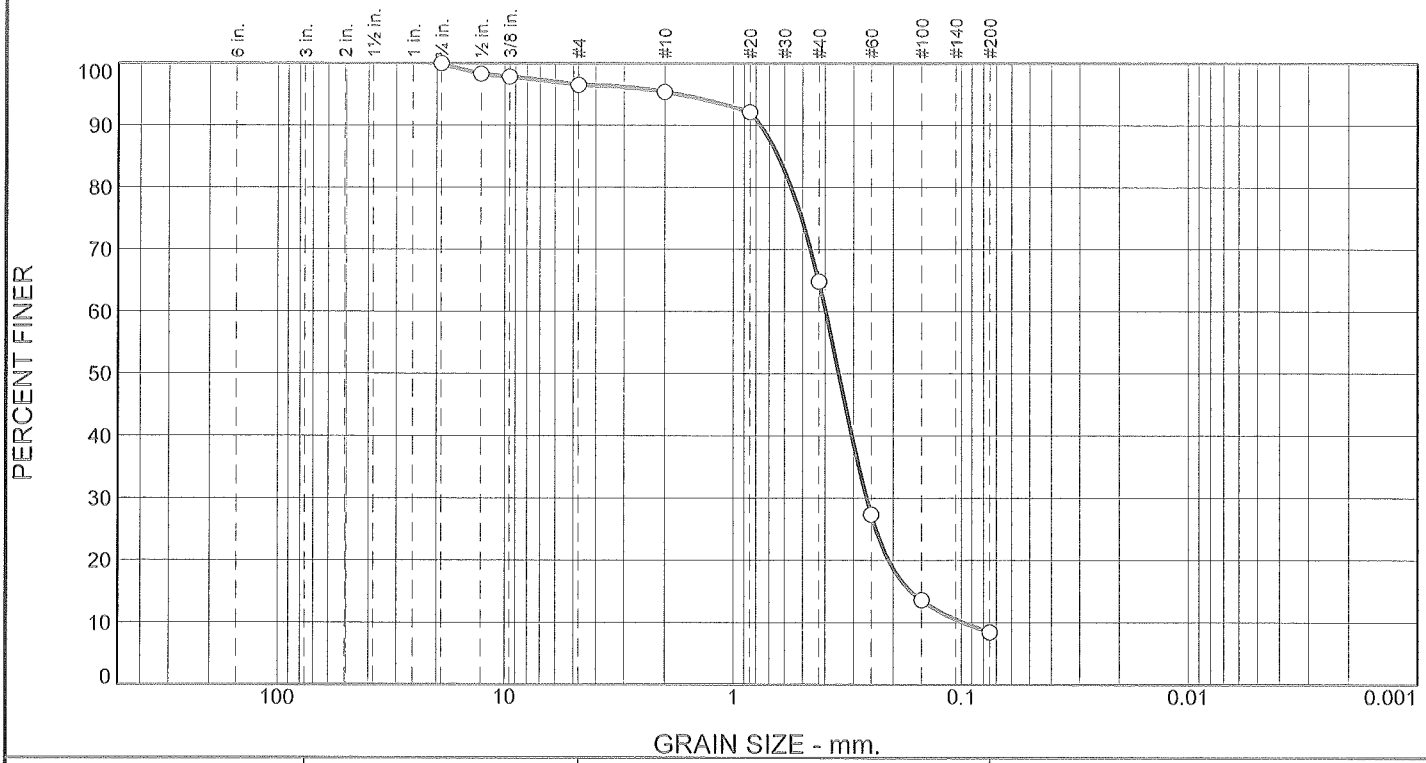
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00883, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.5	1.1	30.6	56.4	8.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	98.3		
3/8"	97.9		
#4	96.5		
#10	95.4		
#20	92.2		
#40	64.8		
#60	27.4		
#100	13.6		
#200	8.4		

* (no specification provided)

Material Description

Olive Gray Poorly Graded Sand with Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-3

Coefficients

D_{90}= 0.7617 D_{85}= 0.6385 D_{60}= 0.3967
D_{50}= 0.3472 D_{30}= 0.2619 D_{15}= 0.1669
D_{10}= 0.0984 C_u= 4.03 C_c= 1.76

Remarks

Date Received: 9/26/13 **Date Tested:** 10/9/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-046 **Depth:** 35'-36.5' **Date Sampled:**
Sample Number: HMA#7551-42/S-10

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-046
Depth: 35'-36.5'
Sample Number: HMA#7551-42/S-10
Material Description: Olive Gray Poorly Graded Sand with Silt
Date Received: 9/26/13
USCS Classification: SP-SM
AASHTO Classification: A-3
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/9/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 718.10
Tare Wt. = 164.90
Minus #200 from wash = 8.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
766.40	164.90	3/4"	0.00	0.00	100.0
		1/2"	1429.30	1419.30	98.3
		3/8"	1486.20	1483.30	97.9
		#4	1364.50	1356.40	96.5
		#10	1520.20	1513.60	95.4
		#20	1085.60	1066.20	92.2
		#40	1108.30	943.60	64.8
		#60	1102.90	877.80	27.4
		#100	925.70	842.90	13.6
		#200	1050.10	1019.00	8.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.5	3.5	1.1	30.6	56.4	88.1			8.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0984	0.1669	0.2093	0.2619	0.3472	0.3967	0.5610	0.6385	0.7617	1.7215

Fineness Modulus	C_u	C_c
1.81	4.03	1.76

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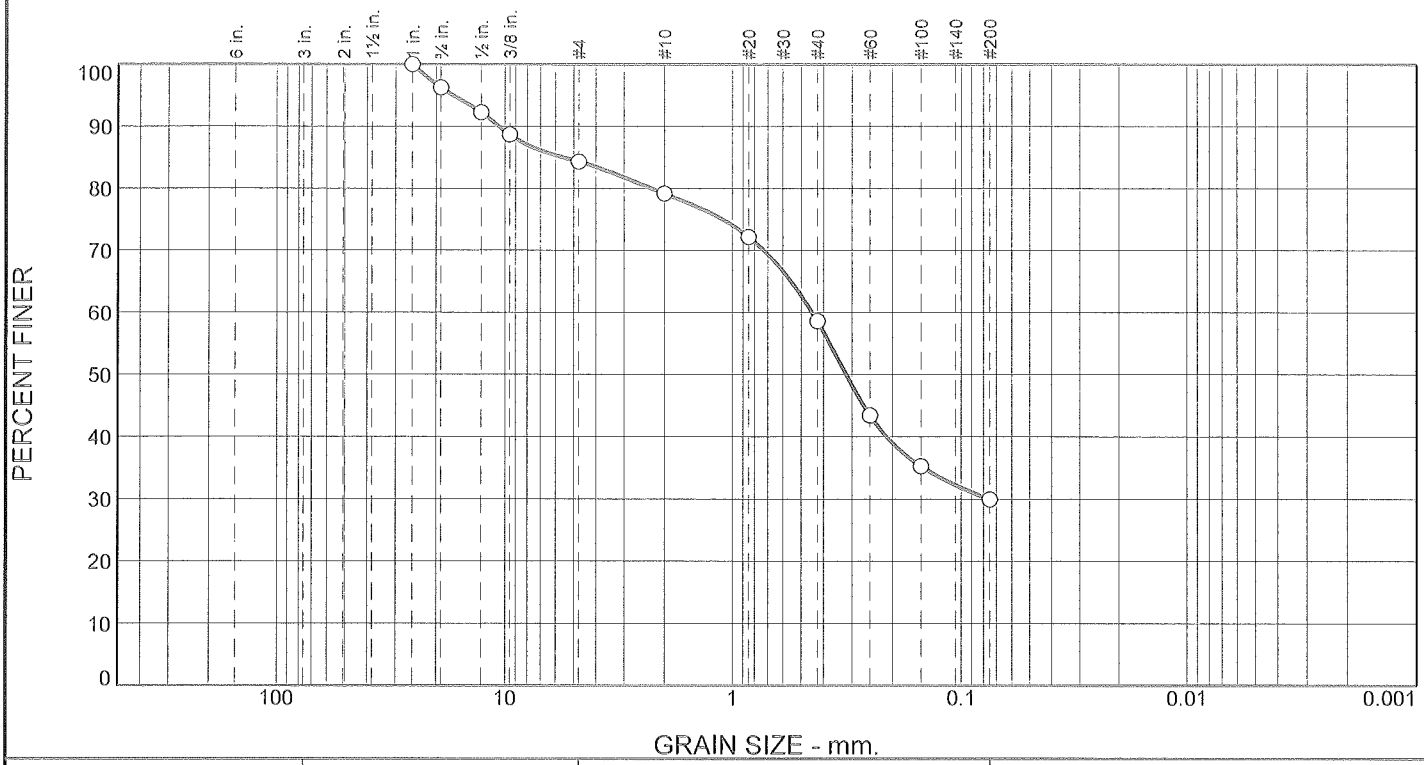
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.7	12.0	5.1	20.6	28.7	29.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	96.3		
1/2"	92.3		
3/8"	88.6		
#4	84.3		
#10	79.2		
#20	72.2		
#40	58.6		
#60	43.4		
#100	35.3		
#200	29.9		

* (no specification provided)

Material Description

Gray Brown Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 10.6290 D_{85}= 5.5565 D_{60}= 0.4475
D_{50}= 0.3175 D_{30}= 0.0759 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/9/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-047 **Depth:** 1.0'-2.5' **Date Sampled:**
Sample Number: HMA#7551-43/S-1

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-047
Depth: 1.0'-2.5'
Sample Number: HMA#7551-43/S-1
Material Description: Gray Brown Silty Sand with Gravel
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/9/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 471.30
Tare Wt. = 198.20
Minus #200 from wash = 29.7%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
586.50	198.20	1"	0.00	0.00	100.0
		3/4"	1519.40	1504.90	96.3
		1/2"	1434.80	1419.30	92.3
		3/8"	1497.40	1483.30	88.6
		#4	1373.20	1356.40	84.3
		#10	1533.60	1513.60	79.2
		#20	1093.30	1066.20	72.2
		#40	996.30	943.60	58.6
		#60	936.70	877.80	43.4
		#100	874.50	842.80	35.3
		#200	1039.80	1019.00	29.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	3.7	12.0	15.7	5.1	20.6	28.7	54.4			29.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0759	0.3175	0.4475	2.2812	5.5565	10.6290	16.7918

Fineness Modulus
2.25

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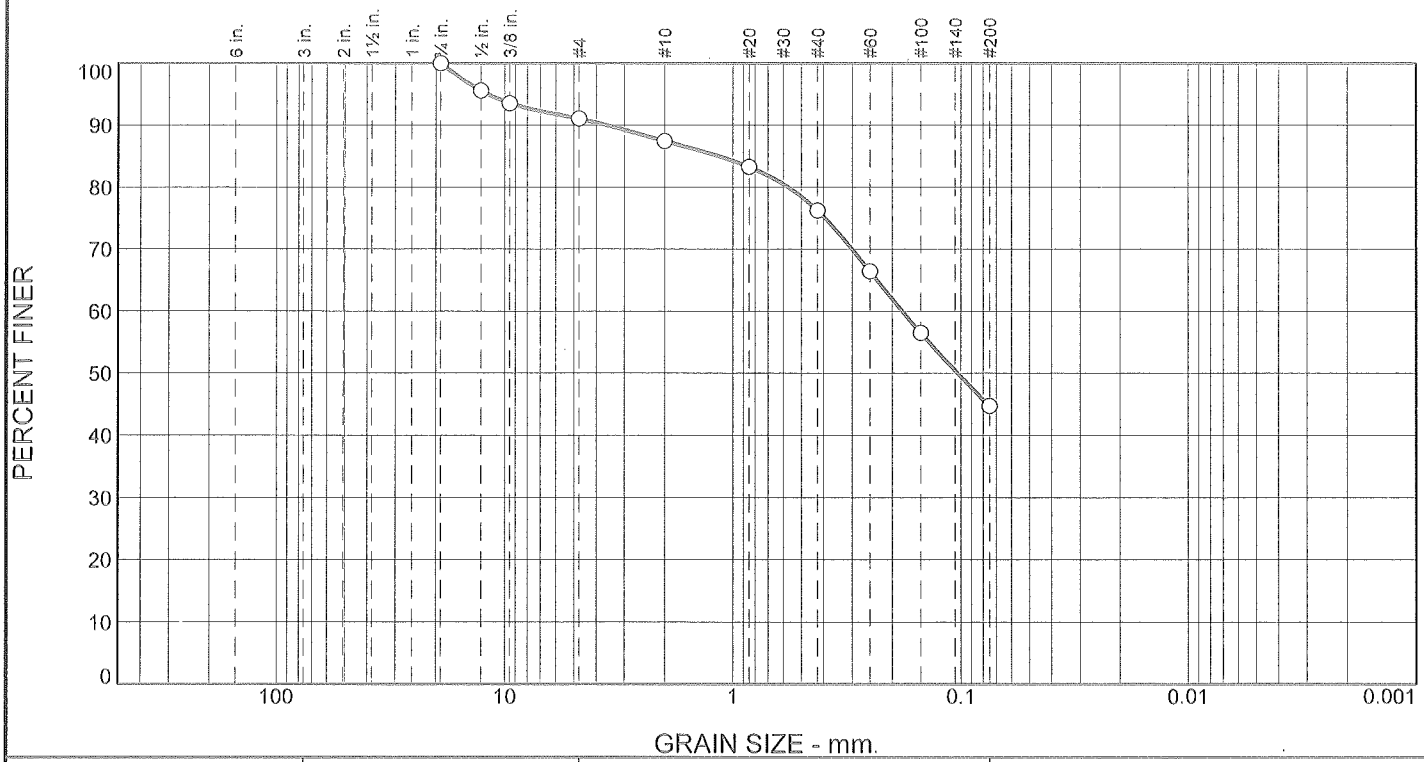
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00883, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.9	3.7	11.2	31.5	44.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	95.6		
3/8"	93.6		
#4	91.1		
#10	87.4		
#20	83.3		
#40	76.2		
#60	66.4		
#100	56.5		
#200	44.7		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 3.5787 D_{85}= 1.1540 D_{60}= 0.1807
D_{50}= 0.1033 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/9/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-047 **Depth:** 10'-11.5' **Date Sampled:**
Sample Number: 7551-44/S-5

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/10/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-047
Depth: 10'-11.5'
Sample Number: 7551-44/S-5
Material Description: Gray Brown Silty Sand
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/9/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 410.20
Tare Wt. = 190.10
Minus #200 from wash = 43.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
577.30	190.10	3/4"	0.00	0.00	100.0
		1/2"	1436.30	1419.20	95.6
		3/8"	1491.10	1483.30	93.6
		#4	1366.10	1356.40	91.1
		#10	1527.90	1513.90	87.4
		#20	1082.60	1066.40	83.3
		#40	970.80	943.60	76.2
		#60	915.80	877.70	66.4
		#100	881.00	842.70	56.5
		#200	1064.60	1019.00	44.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	8.9	8.9	3.7	11.2	31.5	46.4			44.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1033	0.1807	0.5713	1.1540	3.5787	11.8455

Fineness Modulus
1.35

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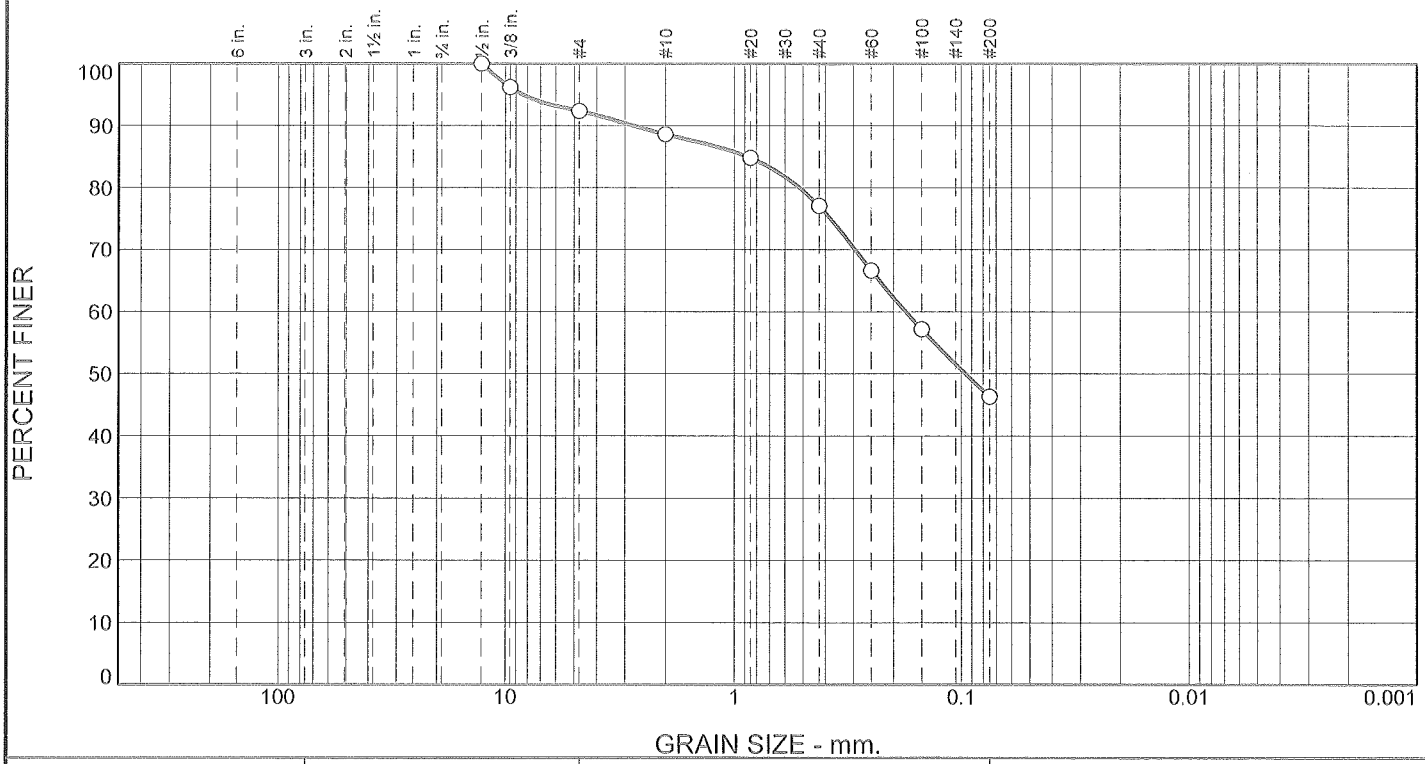
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.6	3.8	11.5	30.8	46.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	96.2		
#4	92.4		
#10	88.6		
#20	84.8		
#40	77.1		
#60	66.6		
#100	57.2		
#200	46.3		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 2.7517 D_{85}= 0.8780 D_{60}= 0.1764
D_{50}= 0.0958 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/9/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-047 **Depth:** 15'-16.5' **Date Sampled:**
Sample Number: 7551-45/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00892, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/10/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-047
Depth: 15'-16.5'
Sample Number: 7551-45/S-7
Material Description: Olive Gray Silty Sand
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/9/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 423.50
Tare Wt. = 214.00
Minus #200 from wash = 45.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
599.20	214.00	1/2"	0.00	0.00	100.0
		3/8"	1497.80	1483.30	96.2
		#4	1371.30	1356.40	92.4
		#10	1528.50	1514.00	88.6
		#20	1081.20	1066.50	84.8
		#40	973.40	943.60	77.1
		#60	917.80	877.70	66.6
		#100	879.30	842.80	57.2
		#200	1060.80	1019.00	46.3

Fractional Components

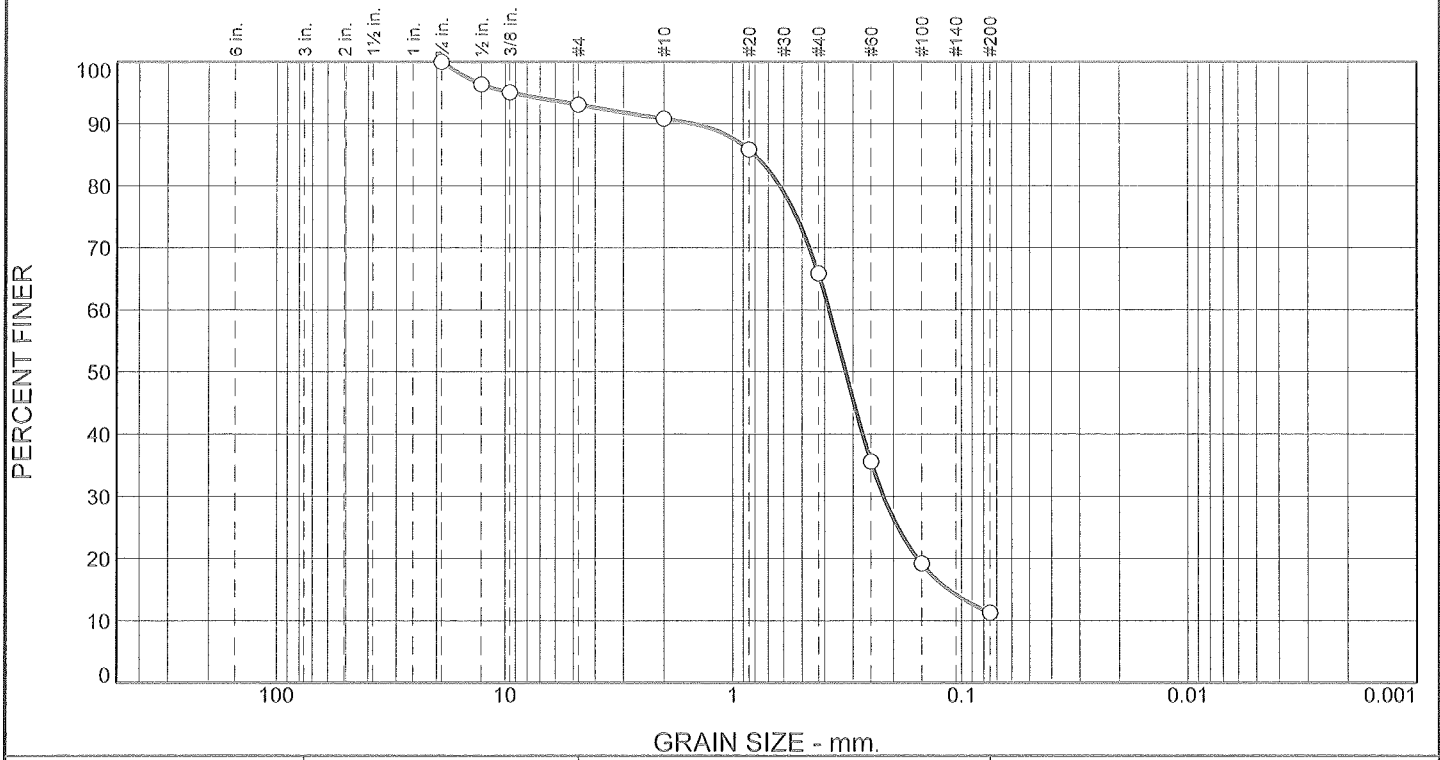
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	7.6	7.6	3.8	11.5	30.8	46.1			46.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0958	0.1764	0.5178	0.8780	2.7517	8.3327

Fineness Modulus
1.26

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.9	2.3	25.0	54.5	11.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	96.4		
3/8"	95.1		
#4	93.1		
#10	90.8		
#20	85.8		
#40	65.8		
#60	35.6		
#100	19.2		
#200	11.3		

* (no specification provided)

Material Description

Olive Brown Poorly Graded Sand W/Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 1.4733 D_{85}= 0.8013 D_{60}= 0.3815
D_{50}= 0.3226 D_{30}= 0.2204 D_{15}= 0.1141
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/9/13

Tested By: TP/RF

Checked By: JAM

Title:

Source of Sample: Boring E360-B-047 **Depth:** 25'-26.5' **Date Sampled:**
Sample Number: 7551-46/S-9

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450

Figure

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/10/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-047
Depth: 25'-26.5'
Sample Number: 7551-46/S-9
Material Description: Olive Brown Poorly Graded Sand W/Silt
Date Received: 9/26/13
USCS Classification: SP-SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/9/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 445.20
Tare Wt. = 212.40
Minus #200 from wash = 11.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
474.40	212.40	3/4"	0.00	0.00	100.0
		1/2"	1428.80	1419.30	96.4
		3/8"	1486.60	1483.20	95.1
		#4	1361.50	1356.30	93.1
		#10	1519.70	1513.70	90.8
		#20	1079.30	1066.30	85.8
		#40	996.10	943.70	65.8
		#60	956.90	877.60	35.6
		#100	885.80	842.80	19.2
		#200	1039.70	1019.00	11.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	6.9	6.9	2.3	25.0	54.5	81.8			11.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1141	0.1564	0.2204	0.3226	0.3815	0.6232	0.8013	1.4733	9.3101

Fineness Modulus
1.88

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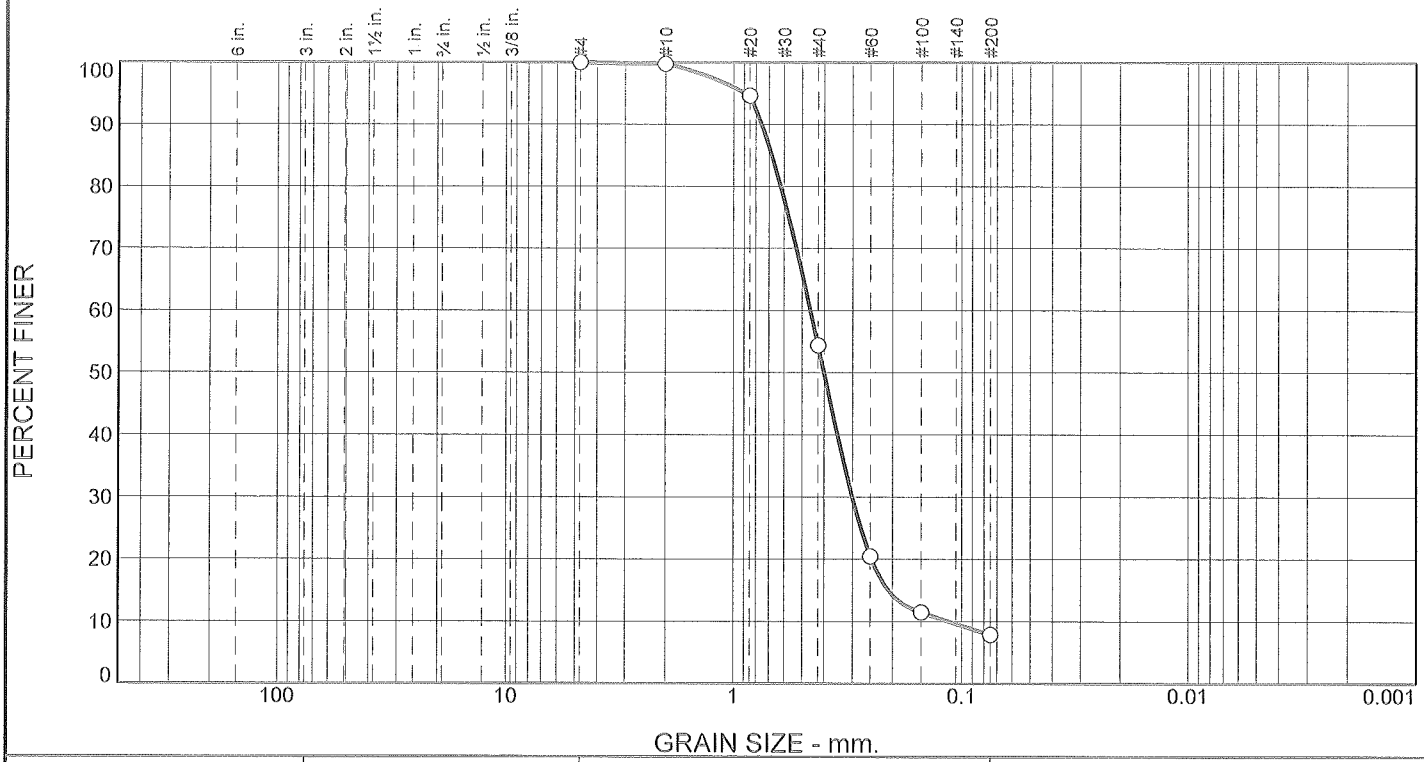
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00888, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	45.4	46.5	7.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.8		
#20	94.7		
#40	54.4		
#60	20.5		
#100	11.5		
#200	7.9		

* (no specification provided)

Material Description

Olive Gray Poorly Graded Sand with Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-3

Coefficients

D_{90}= 0.7533 D_{85}= 0.6795 D_{60}= 0.4590
D_{50}= 0.4003 D_{30}= 0.3002 D_{15}= 0.2083
D_{10}= 0.1140 C_u= 4.03 C_c= 1.72

Remarks

Date Received: 9/26/13 **Date Tested:** 10/10/13
Tested By: TP/RF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-047 **Depth:** 35'-36' **Date Sampled:**
Sample Number: 7551-47/S-11

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/10/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-047
Depth: 35'-36'
Sample Number: 7551-47/S-11
Material Description: Olive Gray Poorly Graded Sand with Silt
Date Received: 9/26/13
USCS Classification: SP-SM
AASHTO Classification: A-3
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/RF
Test Date: 10/10/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 448.80
Tare Wt. = 198.90
Minus #200 from wash = 7.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
468.90	198.90	#4	0.00	0.00	100.0
		#10	1514.20	1513.60	99.8
		#20	1080.50	1066.70	94.7
		#40	1052.60	943.90	54.4
		#60	969.30	877.70	20.5
		#100	867.00	842.70	11.5
		#200	1028.60	1018.90	7.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	45.4	46.5	92.1			7.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1140	0.2083	0.2470	0.3002	0.4003	0.4590	0.6210	0.6795	0.7533	0.8832

Fineness Modulus	C_u	C_c
1.84	4.03	1.72

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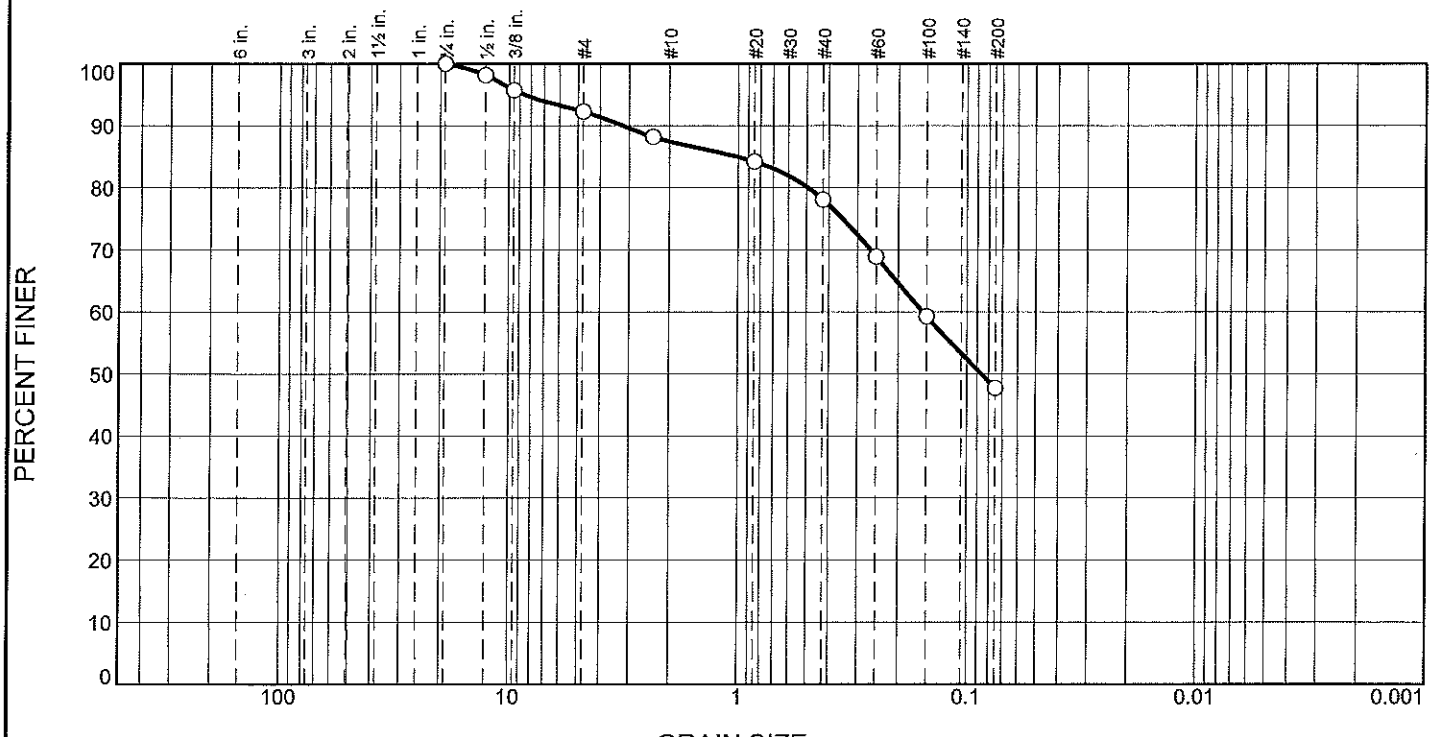
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.7	4.9	9.3	30.4	47.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	98.1		
3/8"	95.7		
#4	92.3		
#8	88.2		
#20	84.2		
#40	78.1		
#60	68.9		
#100	59.2		
#200	47.7		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 3.2200 D_{85}= 1.0138 D_{60}= 0.1564
D_{50}= 0.0866 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/14/13
Tested By: AH
Checked By: JAM
Title:

Source of Sample: Boring E360-B-048 **Depth:** 7.5'-9' **Date Sampled:**
Sample Number: 7555-8/S-3

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-048
Depth: 7.5'-9'
Sample Number: 7555-8/S-3
Material Description: Olive Gray Silty Sand
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: AH
Test Date: 10/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 395.30
Tare Wt. = 114.00
Minus #200 from wash = 47.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
646.40	114.00	3/4"	0.00	0.00	100.0
		1/2"	1429.20	1419.30	98.1
		3/8"	1496.20	1483.30	95.7
		#4	1374.80	1356.40	92.3
		#8	1535.30	1513.60	88.2
		#20	1088.00	1066.80	84.2
		#40	976.90	944.40	78.1
		#60	926.90	877.90	68.9
		#100	894.20	842.80	59.2
		#200	1080.40	1019.00	47.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	7.7	7.7	4.9	9.3	30.4	44.6			47.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0866	0.1564	0.4943	1.0138	3.2200	8.6057

Fineness Modulus
1.25

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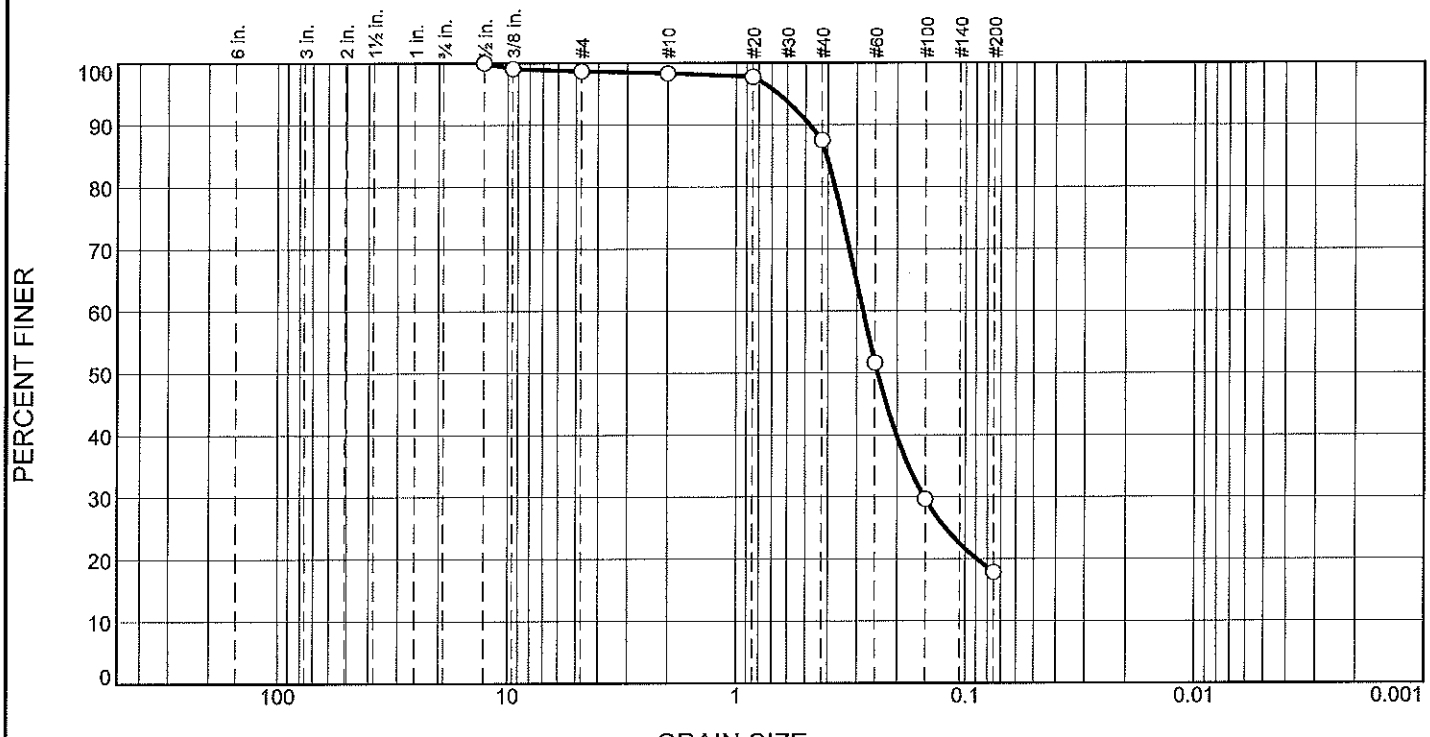
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.3	0.4	10.8	69.6	17.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	99.1		
#4	98.7		
#10	98.3		
#20	97.8		
#40	87.5		
#60	51.6		
#100	29.6		
#200	17.9		

* (no specification provided)

Material Description

Olivr Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.4811 D_{85}= 0.4051 D_{60}= 0.2825
D_{50}= 0.2435 D_{30}= 0.1519 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/14/13

Tested By: AH

Checked By: JAM

Title:

Source of Sample: Boring E360-B-048 **Depth:** 15'-16.5' **Date Sampled:**
Sample Number: 7555-9/S-6

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-048
Depth: 15'-16.5'
Sample Number: 7555-9/S-6
Material Description: Olivr Gray Silty Sand
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: AH
Test Date: 10/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 586.90
Tare Wt. = 117.90
Minus #200 from wash = 17.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
683.20	117.90	1/2"	0.00	0.00	100.0
		3/8"	1489.80	1484.50	99.1
		#4	1358.70	1356.40	98.7
		#10	1515.60	1513.60	98.3
		#20	1069.80	1066.70	97.8
		#40	1002.40	944.60	87.5
		#60	1081.10	878.20	51.6
		#100	967.20	842.90	29.6
		#200	1085.60	1019.00	17.9

Fractional Components

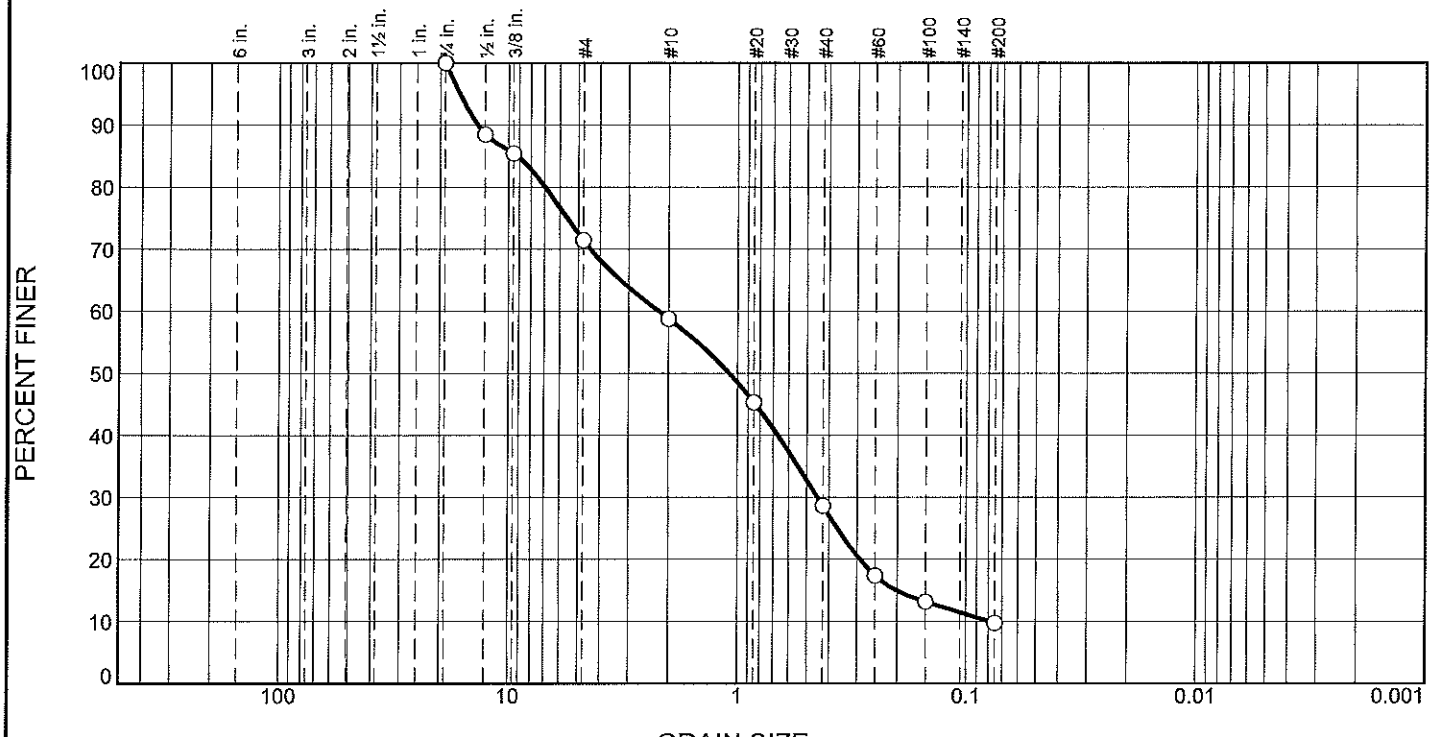
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.3	1.3	0.4	10.8	69.6	80.8			17.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0893	0.1519	0.2435	0.2825	0.3732	0.4051	0.4811	0.6582

Fineness Modulus
1.18

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	28.6	12.7	30.1	18.8	9.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	88.4		
3/8"	85.4		
#4	71.4		
#10	58.7		
#20	45.3		
#40	28.6		
#60	17.4		
#100	13.2		
#200	9.8		

* (no specification provided)

Material Description

Olive Gray Well-graded Sand W/Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SW-SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 13.7410 D_{85}= 9.2110 D_{60}= 2.2153
D_{50}= 1.0889 D_{30}= 0.4490 D_{15}= 0.2013
D_{10}= 0.0786 C_u= 28.18 C_c= 1.16

Remarks

Date Received: 10/4/13 **Date Tested:** 10/14/13

Tested By: AH

Checked By: JAM

Title:

Source of Sample: Boring E360-B-048 **Depth:** 40'-40.9' **Date Sampled:**

Sample Number: 7555-10/S-11

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-048
Depth: 40'-40.9' **Sample Number:** 7555-10/S-11
Material Description: Olive Gray Well-graded Sand W/Silt and Gravel
Date Received: 10/4/13
USCS Classification: SW-SM **AASHTO Classification:** A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: AH **Test Date:** 10/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 426.00
Tare Wt. = 113.30
Minus #200 from wash = 9.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
459.20	113.30	3/4"	0.00	0.00	100.0
		1/2"	1459.20	1419.20	88.4
		3/8"	1493.70	1483.20	85.4
		#4	1404.70	1356.30	71.4
		#10	1557.30	1513.50	58.7
		#20	1113.40	1066.90	45.3
		#40	1002.40	944.70	28.6
		#60	916.80	878.00	17.4
		#100	857.50	842.90	13.2
		#200	1030.80	1019.00	9.8

Fractional Components

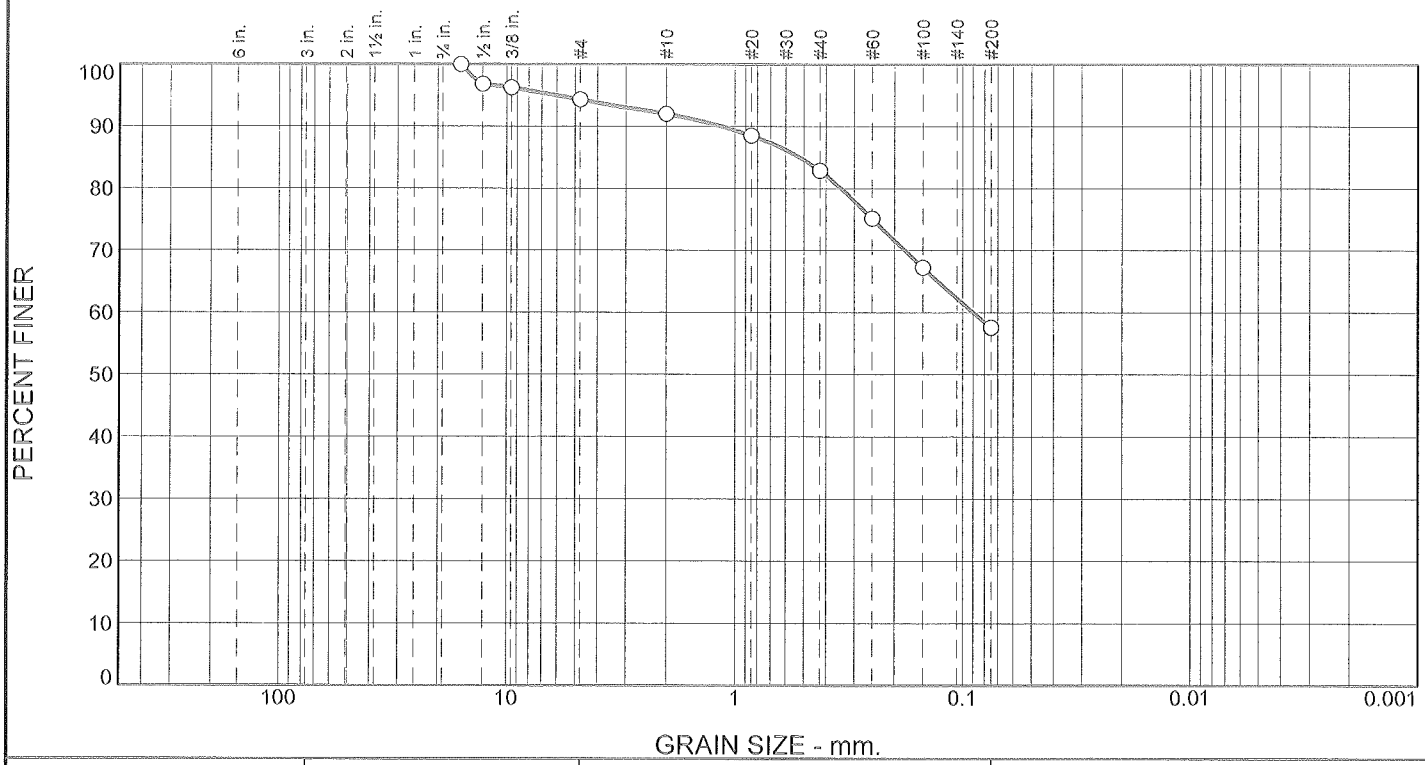
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	28.6	28.6	12.7	30.1	18.8	61.6			9.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0786	0.2013	0.2914	0.4490	1.0889	2.2153	6.9653	9.2110	13.7410	16.4218

Fineness Modulus	C_u	C_c
3.60	28.18	1.16

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.7	2.3	9.1	25.3	57.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
1/2"	96.8		
3/8"	96.3		
#4	94.3		
#10	92.0		
#20	88.5		
#40	82.9		
#60	75.1		
#100	67.2		
#200	57.6		

* (no specification provided)

Material Description

Yellow Brown/Gray Sandy Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 1.1491 D_{85}= 0.5195 D_{60}= 0.0896
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/10/13
Tested By: TP/AH
Checked By: JAM
Title:

Source of Sample: Boring E360-B-049 **Depth:** 2.5'-4' **Date Sampled:**
Sample Number: 7551-48/S-2

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/10/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-049
Depth: 2.5'-4'
Sample Number: 7551-48/S-2
Material Description: Yellow Brown/Gray Sandy Silt
Date Received: 9/26/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/AH
Test Date: 10/10/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 350.60
Tare Wt. = 213.10
Minus #200 from wash = 55.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
520.80	213.10	5/8"	0.00	0.00	100.0
		1/2"	1429.00	1419.20	96.8
		3/8"	1485.00	1483.30	96.3
		#4	1362.20	1356.30	94.3
		#10	1520.90	1513.70	92.0
		#20	1077.50	1066.70	88.5
		#40	961.10	943.80	82.9
		#60	901.50	877.70	75.1
		#100	867.00	842.70	67.2
		#200	1048.60	1018.90	57.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	5.7	5.7	2.3	9.1	25.3	36.7			57.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.0896	0.3427	0.5195	1.1491	6.0319

Fineness Modulus
0.95

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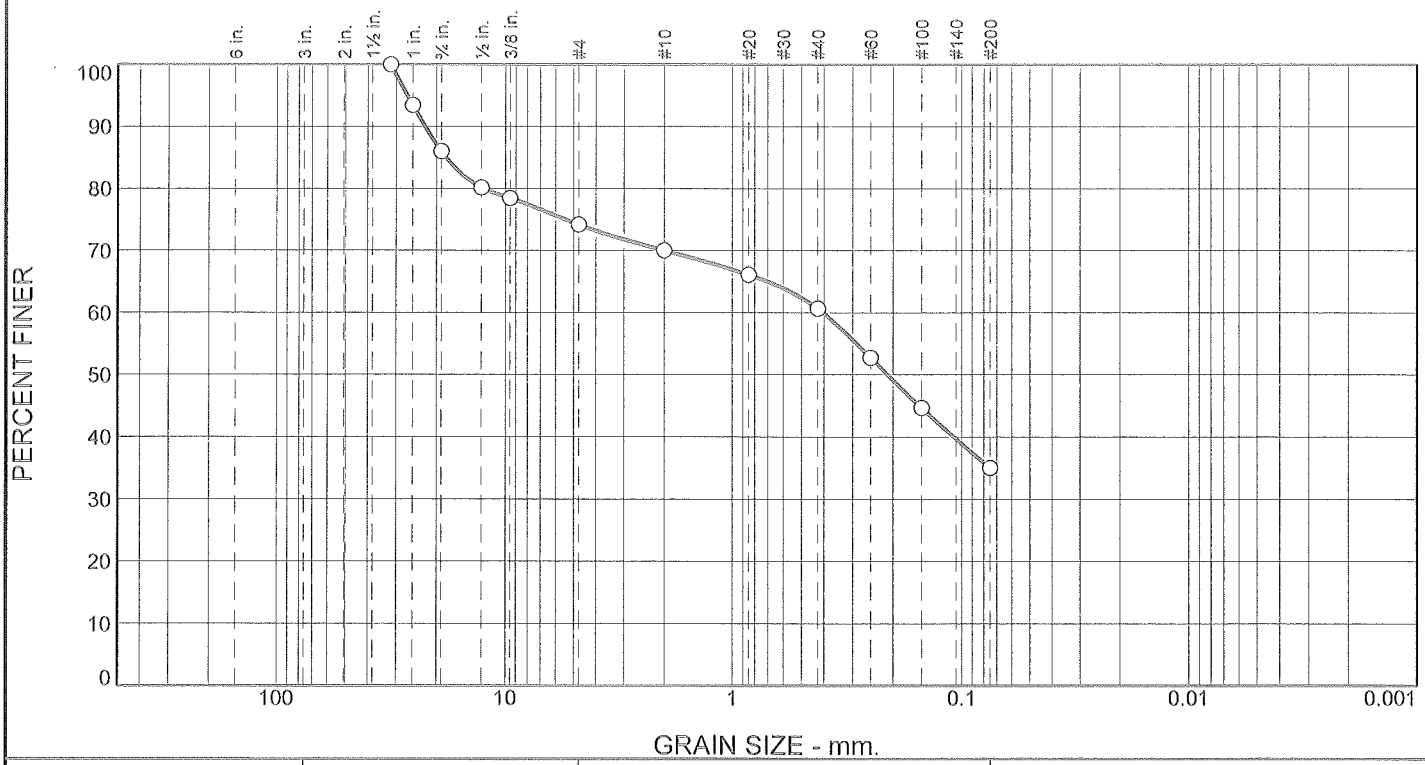
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.0	11.8	4.2	9.4	25.6	35.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/4"	100.0		
1"	93.4		
3/4"	86.0		
1/2"	80.1		
3/8"	78.4		
#4	74.2		
#10	70.0		
#20	66.1		
#40	60.6		
#60	52.8		
#100	44.7		
#200	35.0		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 22.4404 D_{85}= 18.1479 D_{60}= 0.4037
D_{50}= 0.2107 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/10/13
Tested By: TP/AH
Checked By: JAM
Title:

Source of Sample: Boring E360-B-049 **Depth:** 7.5'-9' **Date Sampled:**
Sample Number: 7551-49/S-4

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/10/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-049
Depth: 7.5'-9'
Sample Number: 7551-49/S-4
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/AH
Test Date: 10/10/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 456.60
Tare Wt. = 213.70
Minus #200 from wash = 35.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
587.40	213.70	1 1/4"	0.00	0.00	100.0
		1"	1494.00	1469.50	93.4
		3/4"	1532.60	1504.80	86.0
		1/2"	1441.30	1419.30	80.1
		3/8"	1489.50	1483.20	78.4
		#4	1372.40	1356.40	74.2
		#10	1529.20	1513.70	70.0
		#20	1081.30	1066.70	66.1
		#40	964.20	943.80	60.6
		#60	907.00	877.60	52.8
		#100	873.00	842.80	44.7
		#200	1055.00	1018.90	35.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	14.0	11.8	25.8	4.2	9.4	25.6	39.2			35.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.2107	0.4037	12.5141	18.1479	22.4404	26.8051

Fineness Modulus
2.59

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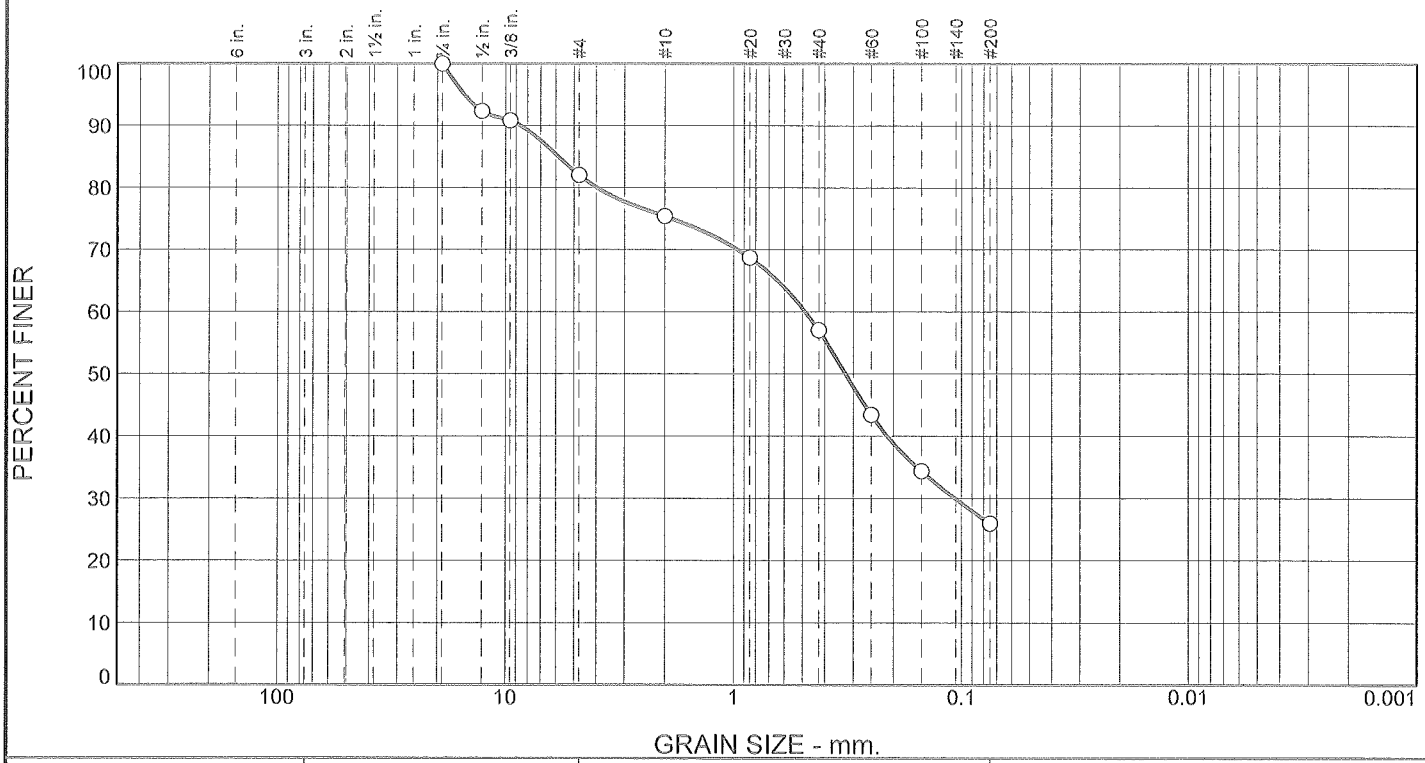
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.0	6.6	18.3	31.1	26.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	92.3		
3/8"	90.8		
#4	82.0		
#10	75.4		
#20	68.7		
#40	57.1		
#60	43.4		
#100	34.4		
#200	26.0		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 8.5462 D_{85}= 5.8583 D_{60}= 0.4853
D_{50}= 0.3236 D_{30}= 0.1067 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9/26/13 **Date Tested:** 10/10/13
Tested By: TP/AH
Checked By: JAM
Title:

Source of Sample: Boring E360-B-049 **Depth:** 15'-16.5' **Date Sampled:**
Sample Number: 7551-50/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/10/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-049
Depth: 15'-16.5'
Sample Number: 7551-50/S-7
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 9/26/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/AH
Test Date: 10/10/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 472.20
Tare Wt. = 214.20
Minus #200 from wash = 25.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
560.20	214.20	3/4"	0.00	0.00	100.0
		1/2"	1445.70	1419.20	92.3
		3/8"	1488.60	1483.40	90.8
		#4	1386.90	1356.40	82.0
		#10	1536.50	1513.60	75.4
		#20	1089.60	1066.50	68.7
		#40	984.30	943.90	57.1
		#60	924.80	877.70	43.4
		#100	874.10	842.80	34.4
		#200	1048.10	1018.90	26.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	18.0	18.0	6.6	18.3	31.1	56.0			26.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1067	0.3236	0.4853	3.9674	5.8583	8.5462	15.1787

Fineness Modulus
2.33

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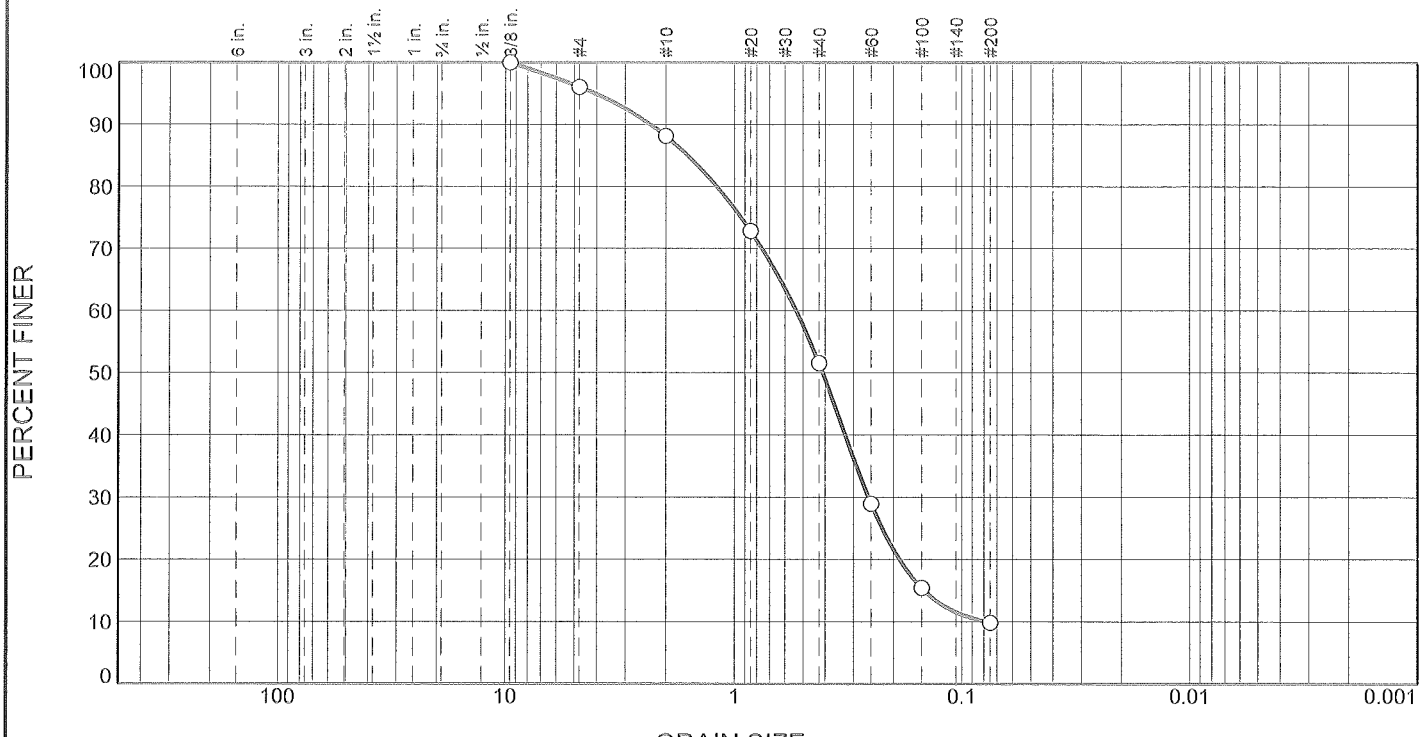
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.9	7.9	36.7	41.7	9.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	96.1		
#10	88.2		
#20	72.8		
#40	51.5		
#60	29.0		
#100	15.4		
#200	9.8		

* (no speeifieation provided)

Material Description

Olive Brown Well Graded Sand with Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SW-SM AASHTO (M 145)= A-3

Coefficients

D_{90}= 2.3305 D_{85}= 1.5974 D_{60}= 0.5353
D_{50}= 0.4093 D_{30}= 0.2568 D_{15}= 0.1461
D_{10}= 0.0780 C_u= 6.86 C_c= 1.58

Remarks

Date Received: 9/26/13 **Date Tested:** 10/10/13
Tested By: TP/AH
Checked By: JAM
Title:

Source of Sample: Boring E360-B-049 **Depth:** 30'-31.5' **Date Sampled:**
Sample Number: 7551-51/S-10

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450

Figure

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BLDG-2018-00887, BLDG-2018-00891, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/10/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-049
Depth: 30'-31.5'
Sample Number: 7551-51/S-10
Material Description: Olive Brown Well Graded Sand with Silt
Date Received: 9/26/13
USCS Classification: SW-SM
AASHTO Classification: A-3
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP/AH
Test Date: 10/10/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 421.20
Tare Wt. = 217.40
Minus #200 from wash = 10.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
443.80	217.40	3/8"	0.00	0.00	100.0
		#4	1365.20	1356.30	96.1
		#10	1531.40	1513.50	88.2
		#20	1101.10	1066.40	72.8
		#40	992.00	943.80	51.5
		#60	928.80	877.70	29.0
		#100	873.40	842.70	15.4
		#200	1031.60	1019.00	9.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.9	3.9	7.9	36.7	41.7	86.3			9.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0780	0.1461	0.1873	0.2568	0.4093	0.5353	1.1927	1.5974	2.3305	4.0617

Fineness Modulus	C_u	C_c
2.19	6.86	1.58

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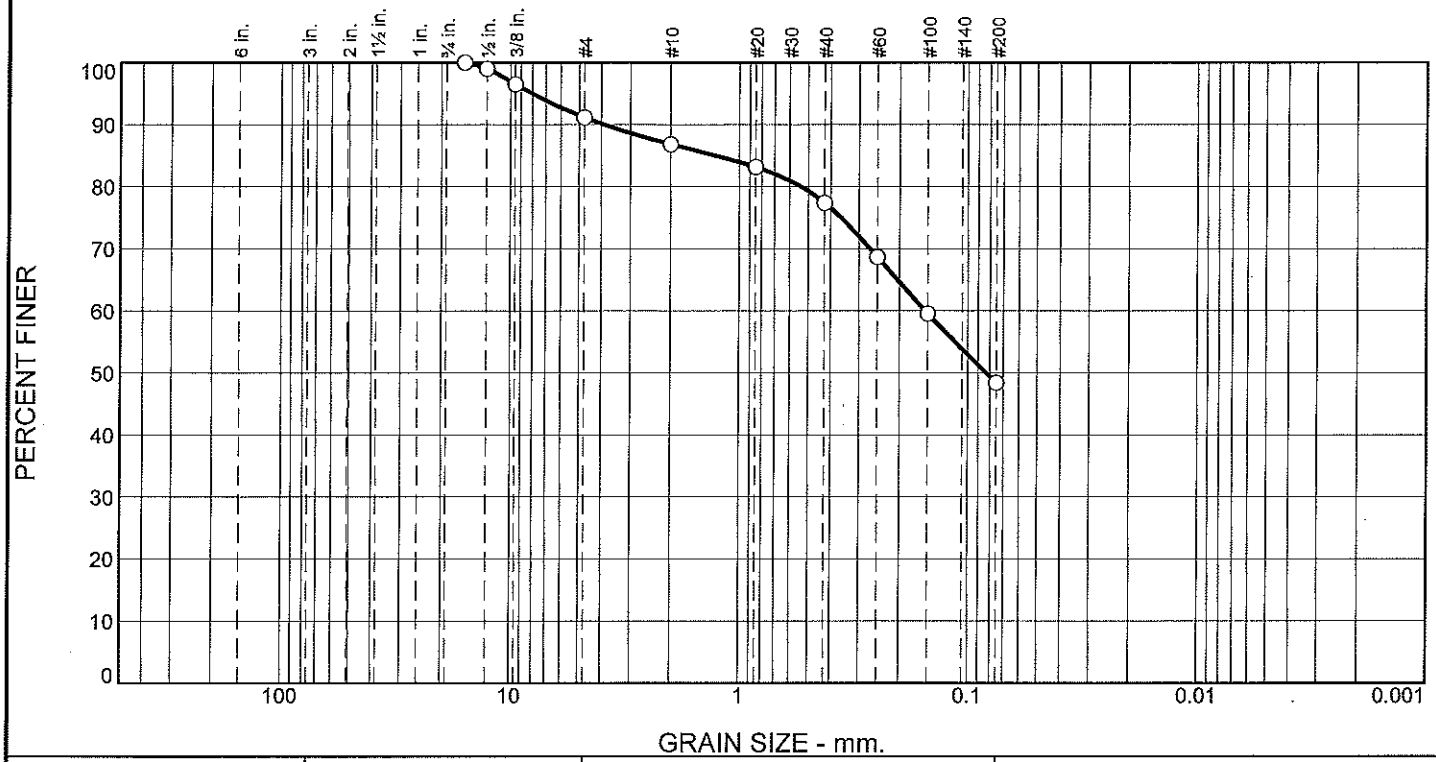
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00888, BLDG-2018-00885

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.9	4.3	9.4	29.0	48.4	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
1/2"	99.0		
3/8"	96.5		
#4	91.1		
#10	86.8		
#20	83.1		
#40	77.4		
#60	68.6		
#100	59.5		
#200	48.4		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 3.9116 D_{85}= 1.2749 D_{60}= 0.1544
D_{50}= 0.0833 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/14/13

Tested By: AH

Checked By: JAM

Title:

Source of Sample: Boring E360-B-050 **Depth:** 5'-6.5' **Date Sampled:**
Sample Number: 7555-11/S-2

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-050
Depth: 5'-6.5'
Sample Number: 7555-11/S-2
Material Description: Olive Gray Silty Sand
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: AH
Test Date: 10/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 362.90
Tare Wt. = 114.10
Minus #200 from wash = 47.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
591.90	114.10	5/8"	0.00	0.00	100.0
		1/2"	1424.20	1419.20	99.0
		3/8"	1495.00	1483.20	96.5
		#4	1381.80	1356.30	91.1
		#10	1534.40	1513.70	86.8
		#20	1084.40	1066.80	83.1
		#40	972.10	944.60	77.4
		#60	919.80	878.10	68.6
		#100	886.60	842.90	59.5
		#200	1072.20	1019.00	48.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	8.9	8.9	4.3	9.4	29.0	42.7			48.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0833	0.1544	0.5388	1.2749	3.9116	8.0547

Fineness Modulus
1.28

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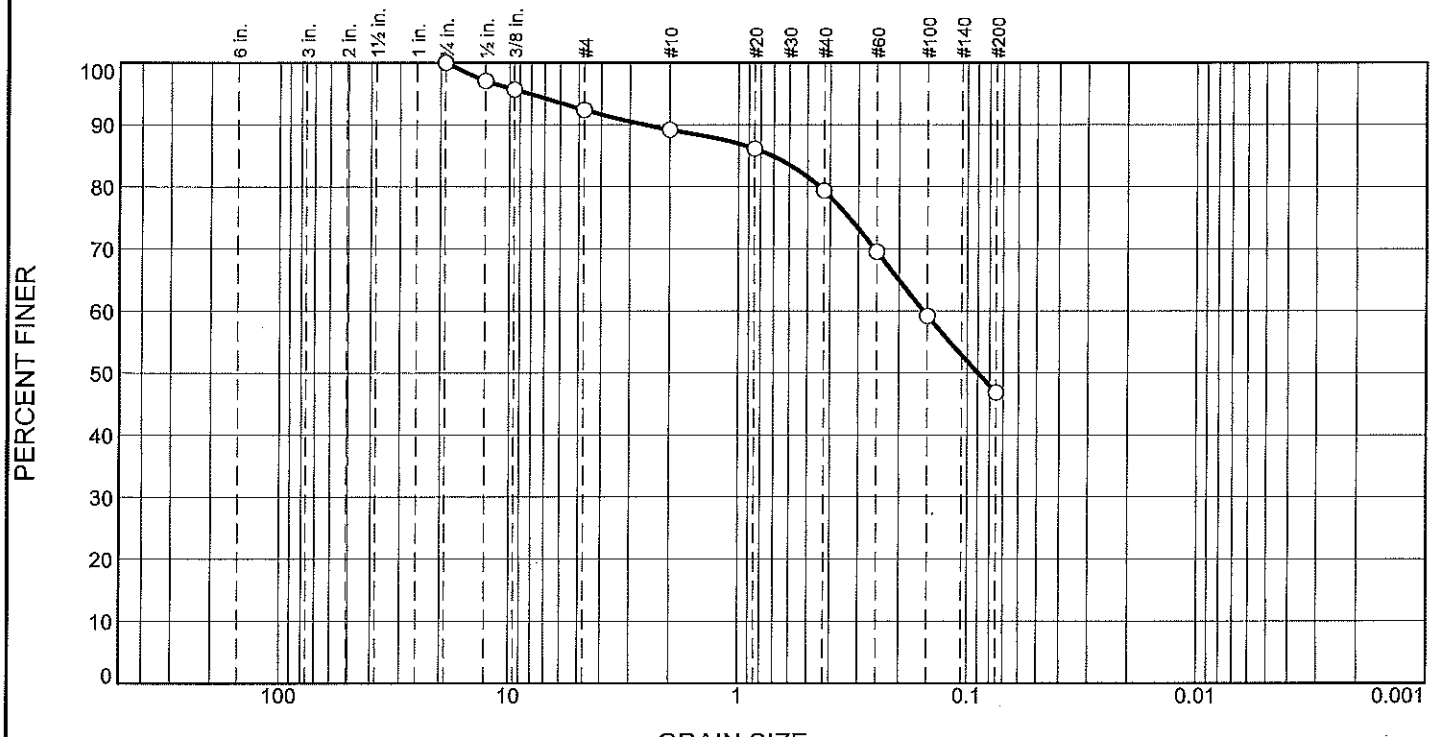
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.6	3.2	9.8	32.6	46.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	97.1		
3/8"	95.7		
#4	92.4		
#10	89.2		
#20	86.1		
#40	79.4		
#60	69.5		
#100	59.2		
#200	46.8		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 2.6142 D_{85}= 0.7158 D_{60}= 0.1565
D_{50}= 0.0902 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/14/13

Tested By: AH

Checked By: JAM

Title:

Source of Sample: Boring E360-B-050 **Depth:** 10'-11.5' **Date Sampled:**

Sample Number: 7555-12/S-4

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-050
Depth: 10'-11.5'
Sample Number: 7555-12/S-4
Material Description: Olive Gray Silty Sand
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: AH
Test Date: 10/14/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 397.70
Tare Wt. = 114.60
Minus #200 from wash = 46.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
643.00	114.60	3/4"	0.00	0.00	100.0
		1/2"	1434.70	1419.20	97.1
		3/8"	1490.50	1483.20	95.7
		#4	1373.90	1356.40	92.4
		#10	1530.80	1513.80	89.2
		#20	1083.10	1067.00	86.1
		#40	980.30	944.60	79.4
		#60	930.00	878.10	69.5
		#100	897.70	843.00	59.2
		#200	1084.20	1019.00	46.8

Fractional Components

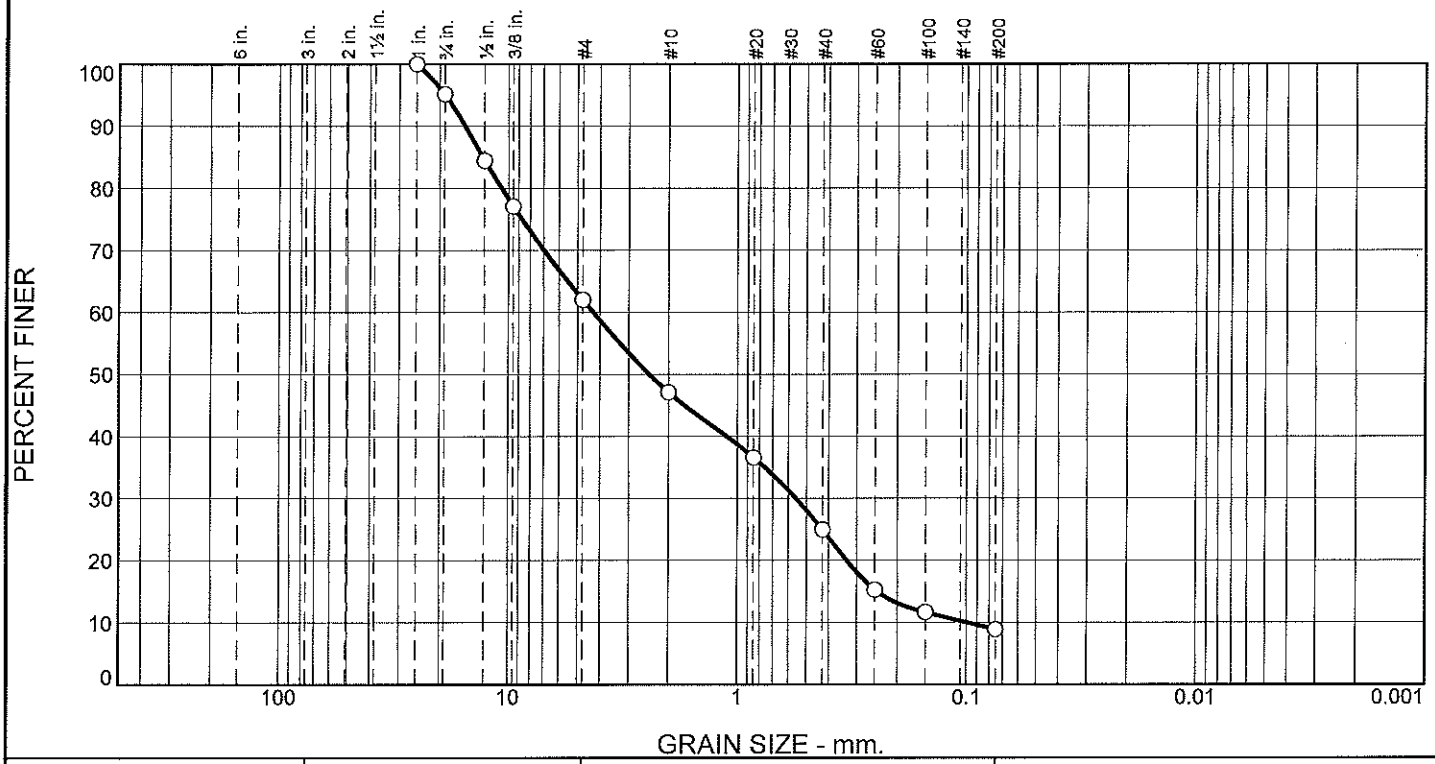
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	7.6	7.6	3.2	9.8	32.6	45.6			46.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0902	0.1565	0.4442	0.7158	2.6142	8.2133

Fineness Modulus
1.19

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.9	33.1	14.9	22.1	16.1	8.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	95.1		
1/2"	84.4		
3/8"	77.1		
#4	62.0		
#10	47.1		
#20	36.6		
#40	25.0		
#60	15.3		
#100	11.6		
#200	8.9		

* (no specification provided)

Material Description

Olive Gray Poorly Graded Sand W/Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-1-a

Coefficients

D_{90}= 15.5026 D_{85}= 12.9693 D_{60}= 4.2898
D_{50}= 2.4375 D_{30}= 0.5568 D_{15}= 0.2449
D_{10}= 0.0998 C_u= 42.97 C_c= 0.72

Remarks

Date Received: 10/4/13 **Date Tested:** 10/15/13

Tested By: TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-050 **Depth:** 20'-20.9' **Date Sampled:**

Sample Number: 7555-13/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-050
Depth: 20'-20.9' **Sample Number:** 7555-13/S-7
Material Description: Olive Gray Poorly Graded Sand W/Silt and Gravel
Date Received: 10/4/13
USCS Classification: SP-SM **AASHTO Classification:** A-1-a
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP **Test Date:** 10/15/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 397.40
Tare Wt. = 115.20
Minus #200 from wash = 9.7%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
427.80	115.20	1"	0.00	0.00	100.0
		3/4"	1520.10	1504.90	95.1
		1/2"	1452.70	1419.20	84.4
		3/8"	1506.30	1483.30	77.1
		#4	1403.50	1356.40	62.0
		#10	1560.30	1513.70	47.1
		#20	1099.10	1066.30	36.6
		#40	980.20	943.80	25.0
		#60	908.30	878.00	15.3
		#100	854.10	842.80	11.6
		#200	1027.50	1018.80	8.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	4.9	33.1	38.0	14.9	22.1	16.1	53.1			8.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0998	0.2449	0.3319	0.5568	2.4375	4.2898	10.7330	12.9693	15.5026	18.9281

Fineness Modulus	C_u	C_c
4.15	42.97	0.72

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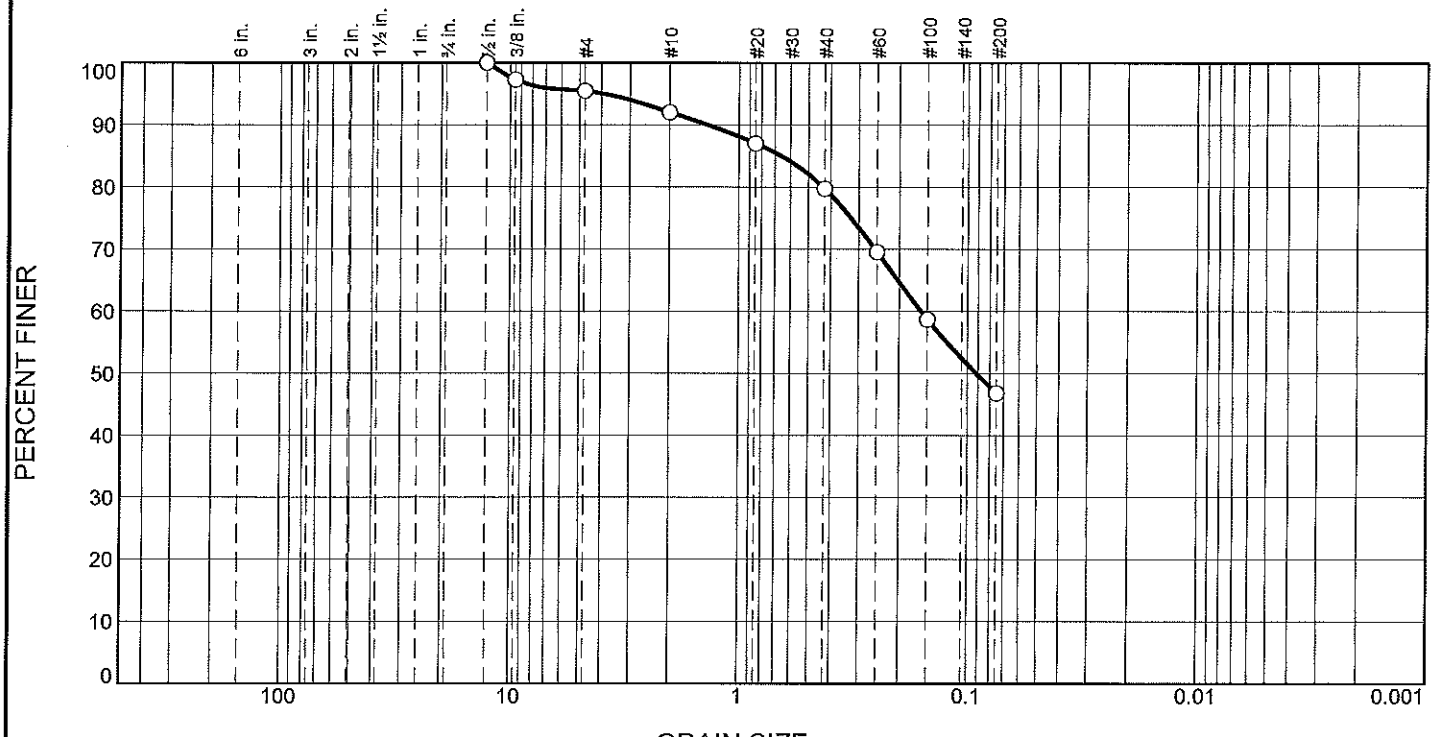
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.5	3.5	12.2	33.0	46.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	97.2		
#4	95.5		
#10	92.0		
#20	87.0		
#40	79.8		
#60	69.5		
#100	58.6		
#200	46.8		

* (no specification provided)

Material Description

Olive Brown/Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 1.3679 D_{85}= 0.6600 D_{60}= 0.1606
D_{50}= 0.0919 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/15/13

Tested By: TP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-055 **Depth:** 2.5'-4' **Date Sampled:**
Sample Number: 7555-14/S-1

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-055
Depth: 2.5'-4'
Sample Number: 7555-14/S-1
Material Description: Olive Brown/Gray Silty Sand
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TP
Test Date: 10/15/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 319.20
Tare Wt. = 118.10
Minus #200 from wash = 46.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
492.50	118.10	1/2"	0.00	0.00	100.0
		3/8"	1493.60	1483.30	97.2
		#4	1363.20	1356.50	95.5
		#10	1526.60	1513.70	92.0
		#20	1084.80	1066.10	87.0
		#40	970.80	943.60	79.8
		#60	916.00	877.70	69.5
		#100	883.60	842.80	58.6
		#200	1063.50	1019.10	46.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.5	4.5	3.5	12.2	33.0	48.7			46.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0919	0.1606	0.4319	0.6600	1.3679	3.9129

Fineness Modulus
1.09

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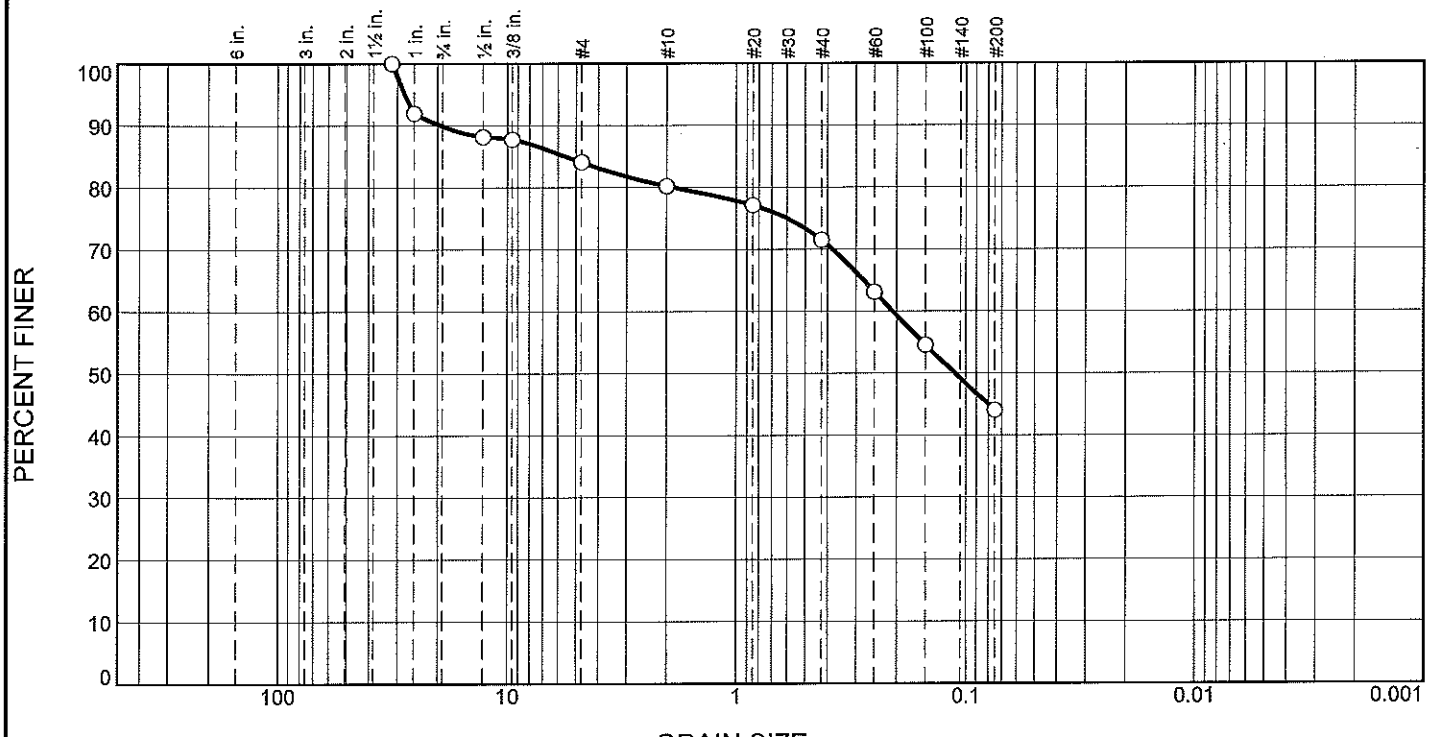
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.1	5.9	3.8	8.7	27.5	44.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/4"	100.0		
1"	91.9		
1/2"	88.1		
3/8"	87.7		
#4	84.0		
#10	80.2		
#20	77.1		
#40	71.5		
#60	63.1		
#100	54.5		
#200	44.0		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 19.5010 D_{85}= 5.5948 D_{60}= 0.2087
D_{50}= 0.1124 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/15/13

Tested By: TEP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-055 **Depth:** 10'-11.5' **Date Sampled:**

Sample Number: 7555-15/S-4

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-055
Depth: 10'-11.5'
Sample Number: 7555-15/S-4
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 10/15/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 352.60
Tare Wt. = 116.00
Minus #200 from wash = 43.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
535.80	116.00	1 1/4"	0.00	0.00	100.0
		1"	1503.50	1469.70	91.9
		1/2"	1435.50	1419.40	88.1
		3/8"	1484.90	1483.30	87.7
		#4	1371.80	1356.30	84.0
		#10	1529.80	1513.60	80.2
		#20	1079.20	1066.20	77.1
		#40	967.10	943.60	71.5
		#60	912.90	877.70	63.1
		#100	878.90	842.80	54.5
		#200	1063.20	1019.00	44.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	10.1	5.9	16.0	3.8	8.7	27.5	40.0			44.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1124	0.2087	1.8957	5.5948	19.5010	27.9101

Fineness Modulus
1.83

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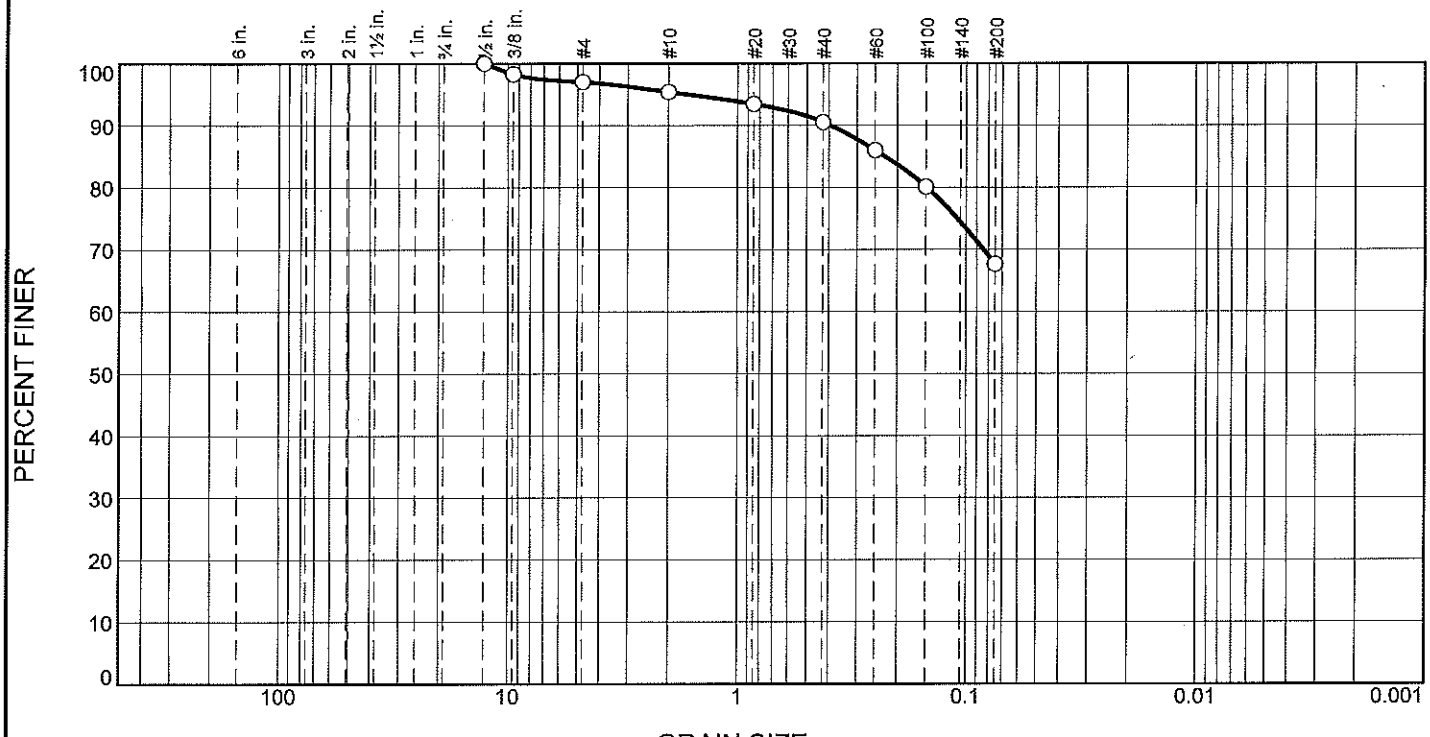
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.0	1.6	4.9	22.8	67.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	98.3		
#4	97.0		
#10	95.4		
#20	93.4		
#40	90.5		
#60	86.0		
#100	80.1		
#200	67.7		

* (no specification provided)

Material Description

Olive Gray Sandy Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.3941 D_{85}= 0.2272 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/15/13

Tested By: TEP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-055 **Depth:** 25'-25.9' **Date Sampled:**

Sample Number: 7555-16/S-8

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-055
Depth: 25'-25.9'
Sample Number: 7555-16/S-8
Material Description: Olive Gray Sandy Silt
Date Received: 10/4/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 10/15/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 249.70
Tare Wt. = 114.00
Minus #200 from wash = 66.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
519.70	114.00	1/2"	0.00	0.00	100.0
		3/8"	1490.10	1483.20	98.3
		#4	1361.90	1356.60	97.0
		#10	1520.10	1513.60	95.4
		#20	1074.10	1066.20	93.4
		#40	955.40	943.60	90.5
		#60	896.20	877.60	86.0
		#100	866.50	842.80	80.1
		#200	1069.40	1019.00	67.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.0	3.0	1.6	4.9	22.8	29.3			67.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.1489	0.2272	0.3941	1.6670

Fineness Modulus
0.55

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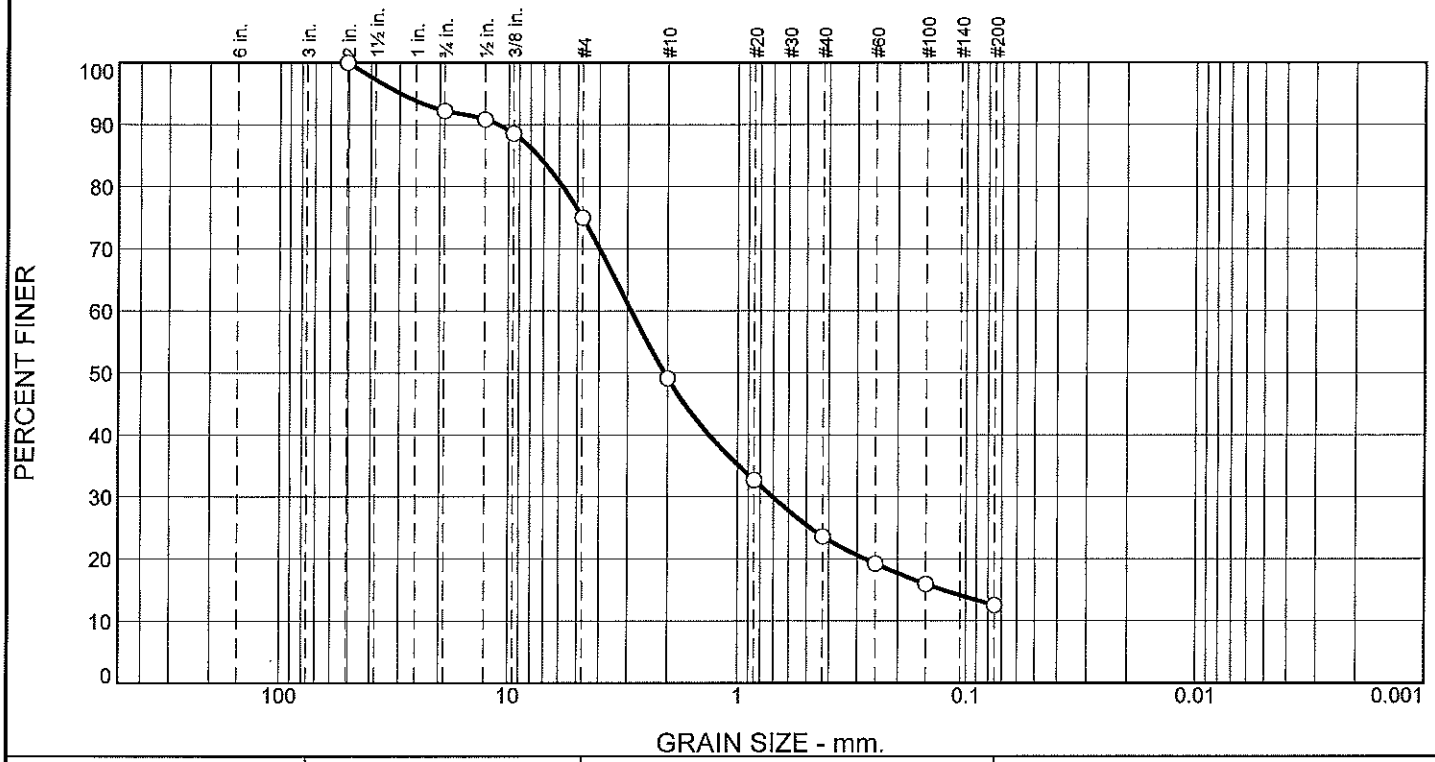
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.8	17.2	25.9	25.5	11.0	12.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2"	100.0		
3/4"	92.2		
1/2"	90.8		
3/8"	88.5		
#4	75.0		
#10	49.1		
#20	32.7		
#40	23.6		
#60	19.2		
#100	15.9		
#200	12.6		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-a

Coefficients

D_{90}= 11.1355 D_{85}= 7.4352 D_{60}= 2.8972
D_{50}= 2.0691 D_{30}= 0.7059 D_{15}= 0.1262
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/16/13

Tested By: TEP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-055 **Depth:** 45'-46' **Date Sampled:**
Sample Number: 7555-17/S-12

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-055
Depth: 45'-46'
Sample Number: 7555-17/S-12
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-1-a
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 10/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 419.10
Tare Wt. = 118.20
Minus #200 from wash = 12.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
460.80	118.20	2"	0.00	0.00	100.0
		3/4"	1531.50	1504.90	92.2
		1/2"	1424.10	1419.30	90.8
		3/8"	1491.20	1483.30	88.5
		#4	1402.70	1356.40	75.0
		#10	1602.40	1513.60	49.1
		#20	1122.30	1066.20	32.7
		#40	974.70	943.60	23.6
		#60	892.80	877.70	19.2
		#100	854.10	842.80	15.9
		#200	1030.50	1018.90	12.6

Fractional Components

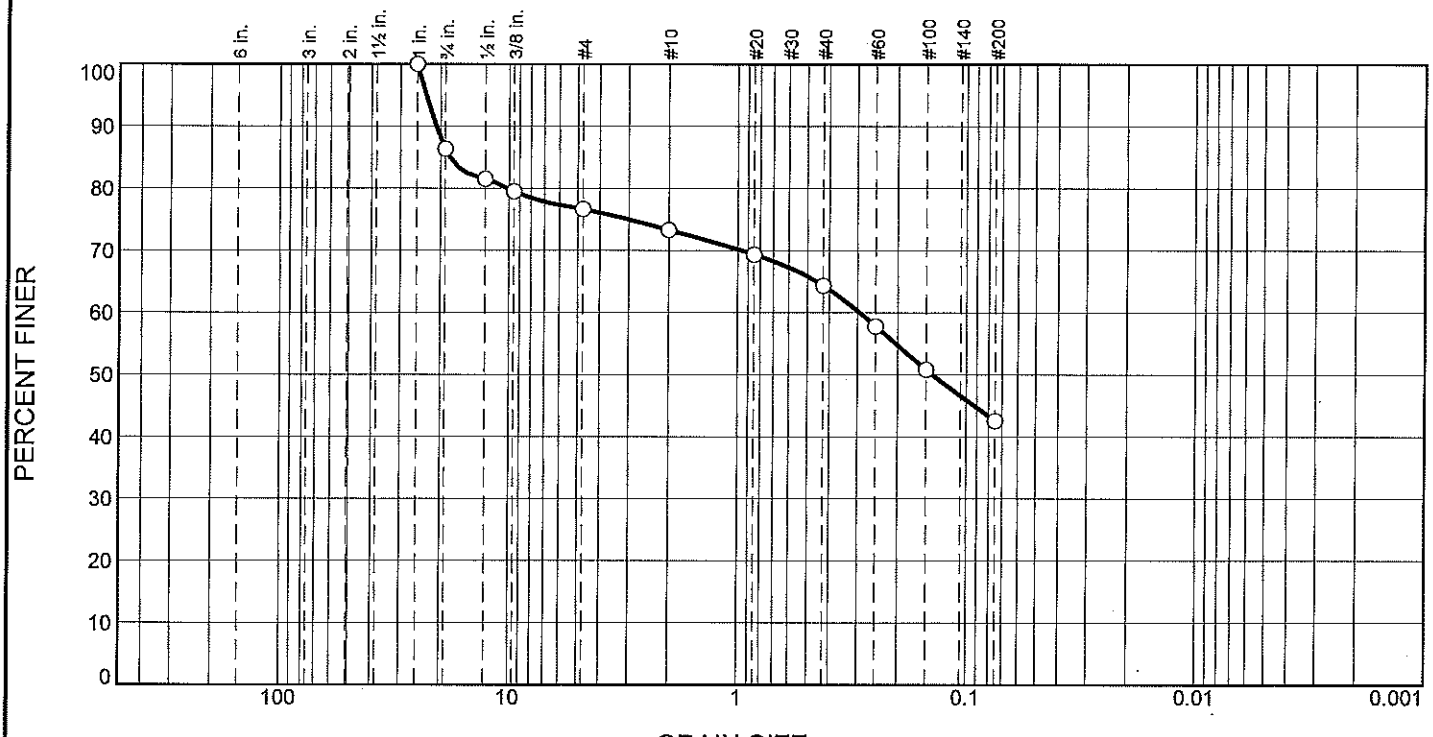
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	7.8	17.2	25.0	25.9	25.5	11.0	62.4			12.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1262	0.2781	0.7059	2.0691	2.8972	5.7952	7.4352	11.1355	29.7223

Fineness Modulus
3.91

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.7	9.7	3.3	9.0	21.7	42.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	86.3		
1/2"	81.5		
3/8"	79.5		
#4	76.6		
#10	73.3		
#20	69.3		
#40	64.3		
#60	57.8		
#100	50.8		
#200	42.6		

* (no specification provided)

Material Description

Olive Brown Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 20.9476 D_{85}= 18.1830 D_{60}= 0.2947
D_{50}= 0.1410 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/16/13

Tested By: TEP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-056 **Depth:** 2.5'-4' **Date Sampled:**
Sample Number: 7555-18/S-1

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-056
Depth: 2.5'-4'
Sample Number: 7555-18/S-1
Material Description: Olive Brown Silty Sand with Gravel
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 10/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 372.70
Tare Wt. = 118.60
Minus #200 from wash = 42.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
557.80	118.60	1"	0.00	0.00	100.0
		3/4"	1565.00	1504.90	86.3
		1/2"	1440.40	1419.30	81.5
		3/8"	1492.20	1483.20	79.5
		#4	1368.80	1356.30	76.6
		#10	1528.30	1513.60	73.3
		#20	1083.40	1066.10	69.3
		#40	965.60	943.60	64.3
		#60	906.40	877.70	57.8
		#100	873.40	842.70	50.8
		#200	1055.00	1018.90	42.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	13.7	9.7	23.4	3.3	9.0	21.7	34.0			42.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1410	0.2947	10.2265	18.1830	20.9476	23.1777

Fineness Modulus
2.34

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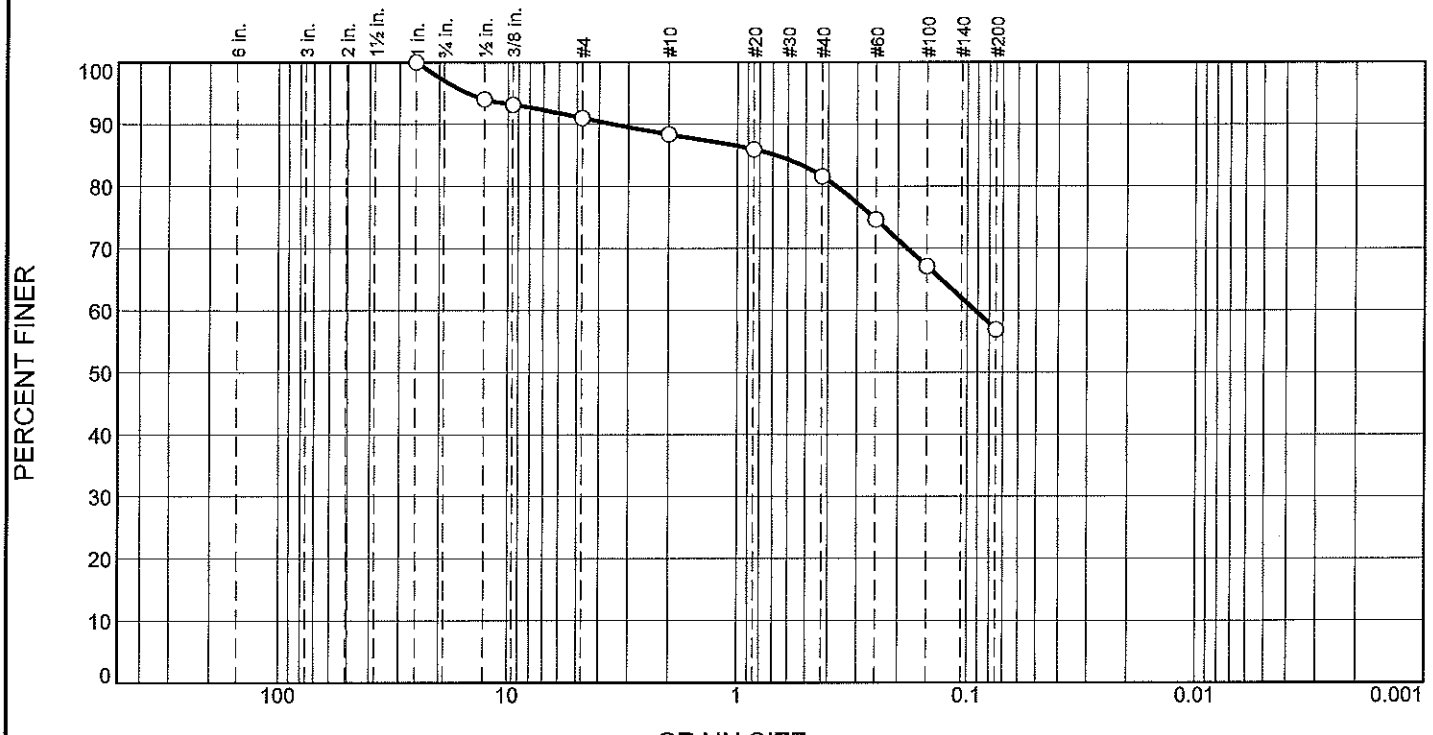
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.0	6.0	2.7	6.7	24.7	56.9	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
1/2"	94.0		
3/8"	93.2		
#4	91.0		
#10	88.3		
#20	85.9		
#40	81.6		
#60	74.6		
#100	67.1		
#200	56.9		

* (no specification provided)

Material Description

Olive Gray Sandy Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 3.5085 D_{85}= 0.6831 D_{60}= 0.0928
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/16/13
Tested By: TEP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-056 **Depth:** 7.5'-9.0' **Date Sampled:**
Sample Number: 7555-19/S-3

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00888, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-056
Depth: 7.5'-9.0'
Sample Number: 7555-19/S-3
Material Description: Olive Gray Sandy Silt
Date Received: 10/4/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/JF
Test Date: 10/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 297.30
Tare Wt. = 117.10
Minus #200 from wash = 56.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
529.30	117.10	1"	0.00	0.00	100.0
		1/2"	1443.90	1419.20	94.0
		3/8"	1486.80	1483.30	93.2
		#4	1365.40	1356.50	91.0
		#10	1524.60	1513.60	88.3
		#20	1076.10	1066.10	85.9
		#40	961.60	943.80	81.6
		#60	906.40	877.70	74.6
		#100	873.90	842.80	67.1
		#200	1061.10	1019.00	56.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	3.0	6.0	9.0	2.7	6.7	24.7	34.1			56.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.0928	0.3692	0.6831	3.5085	15.0279

Fineness Modulus
1.14

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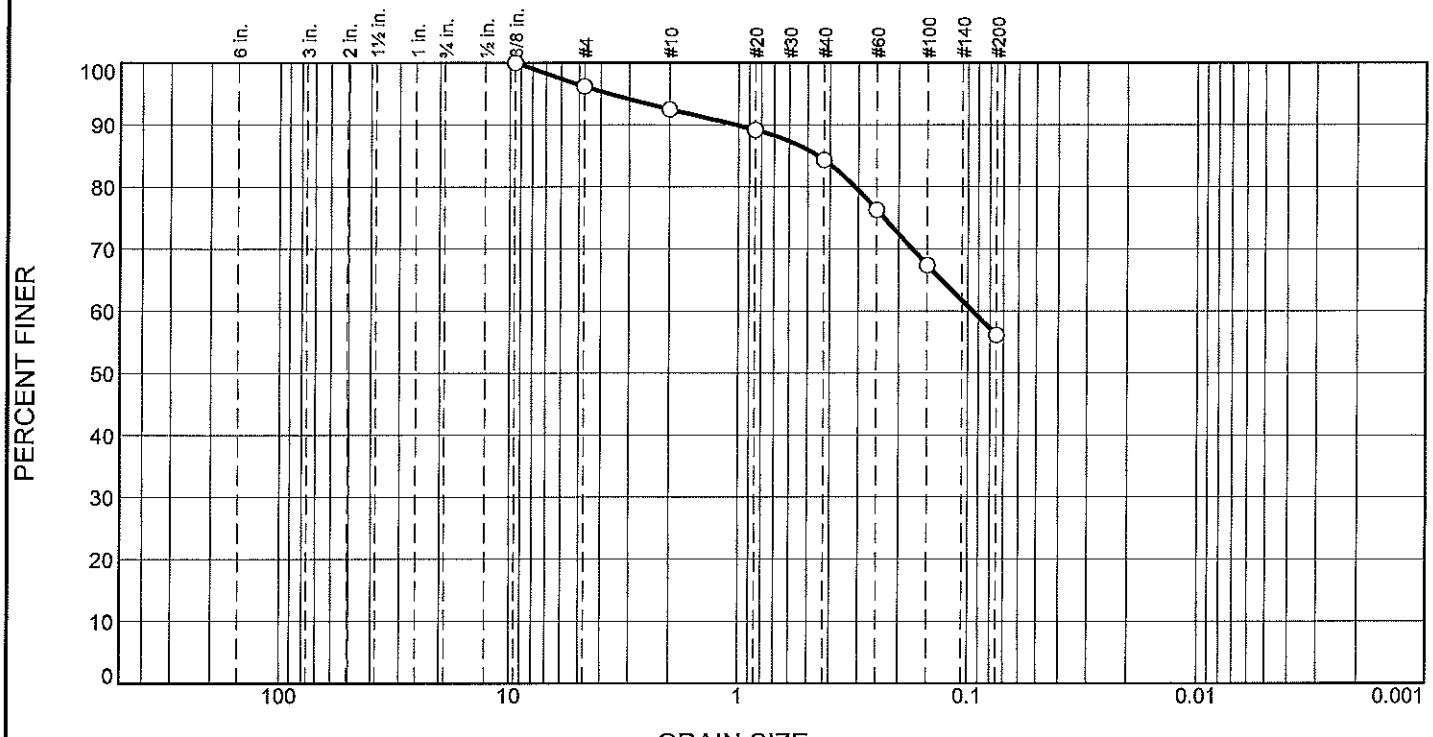
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.8	3.7	8.2	28.2	56.1	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	96.2		
#10	92.5		
#20	89.2		
#40	84.3		
#60	76.3		
#100	67.4		
#200	56.1		

* (no specification provided)

Material Description

Olive Gray Sandy Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 1.0397 D_{85}= 0.4519 D_{60}= 0.0958
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/16/13
Tested By: TEP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-056 **Depth:** 20'-20.4' **Date Sampled:**
Sample Number: 7555-20/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-056
Depth: 20'-20.4'
Sample Number: 7555-20/S-7
Material Description: Olive Gray Sandy Silt
Date Received: 10/4/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/JF
Test Date: 10/16/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 303.70
Tare Wt. = 198.00
Minus #200 from wash = 55.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
436.00	198.00	3/8"	0.00	0.00	100.0
		#4	1365.50	1356.40	96.2
		#10	1522.40	1513.60	92.5
		#20	1074.00	1066.10	89.2
		#40	955.10	943.60	84.3
		#60	896.90	877.80	76.3
		#100	864.20	842.90	67.4
		#200	1045.70	1019.00	56.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.8	3.8	3.7	8.2	28.2	40.1			56.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.0958	0.3118	0.4519	1.0397	3.7061

Fineness Modulus
0.86

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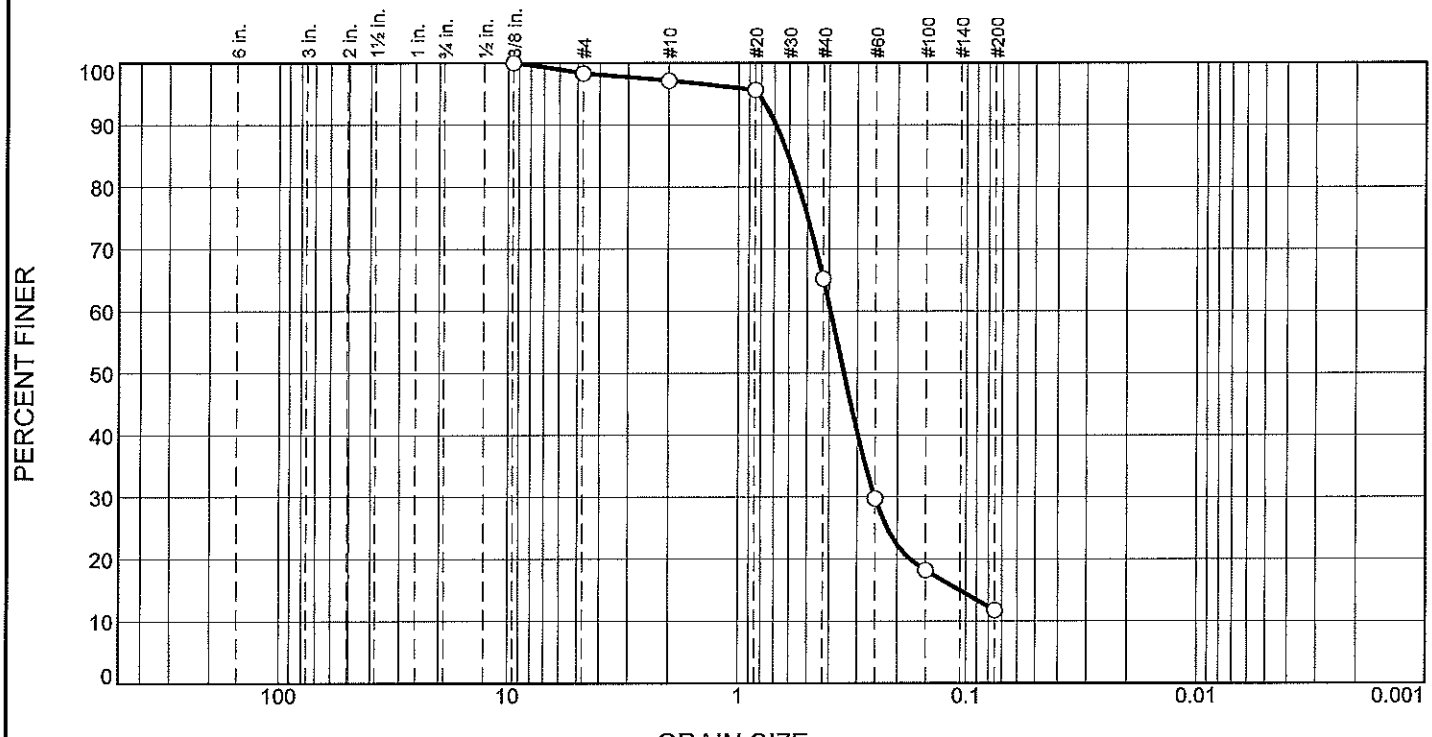
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.7	1.2	31.9	53.4	11.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	98.3		
#10	97.1		
#20	95.6		
#40	65.2		
#60	29.8		
#100	18.2		
#200	11.8		

* (no specification provided)

Material Description

Olive Gray Poorly Graded Sand with Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.6906 D_{85}= 0.6071 D_{60}= 0.3945
D_{50}= 0.3439 D_{30}= 0.2512 D_{15}= 0.1069
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/17/13

Tested By: TEP/AH

Checked By: JAM

Title:

Source of Sample: Boring E360-B-056 **Depth:** 40'-40.8' **Date Sampled:**
Sample Number: 7555-21/S-11

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-056
Depth: 40'-40.8'
Sample Number: 7555-21/S-11
Material Description: Olive Gray Poorly Graded Sand with Silt
Date Received: 10/4/13
USCS Classification: SP-SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/AH
Test Date: 10/17/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 303.30
Tare Wt. = 164.90
Minus #200 from wash = 11.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
321.80	164.90	3/8"	0.00	0.00	100.0
		#4	1359.40	1356.70	98.3
		#10	1515.40	1513.60	97.1
		#20	1068.60	1066.20	95.6
		#40	991.40	943.70	65.2
		#60	933.40	877.80	29.8
		#100	861.00	842.90	18.2
		#200	1029.20	1019.10	11.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.7	1.7	1.2	31.9	53.4	86.5			11.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1069	0.1756	0.2512	0.3439	0.3945	0.5458	0.6071	0.6906	0.8256

Fineness Modulus
1.65

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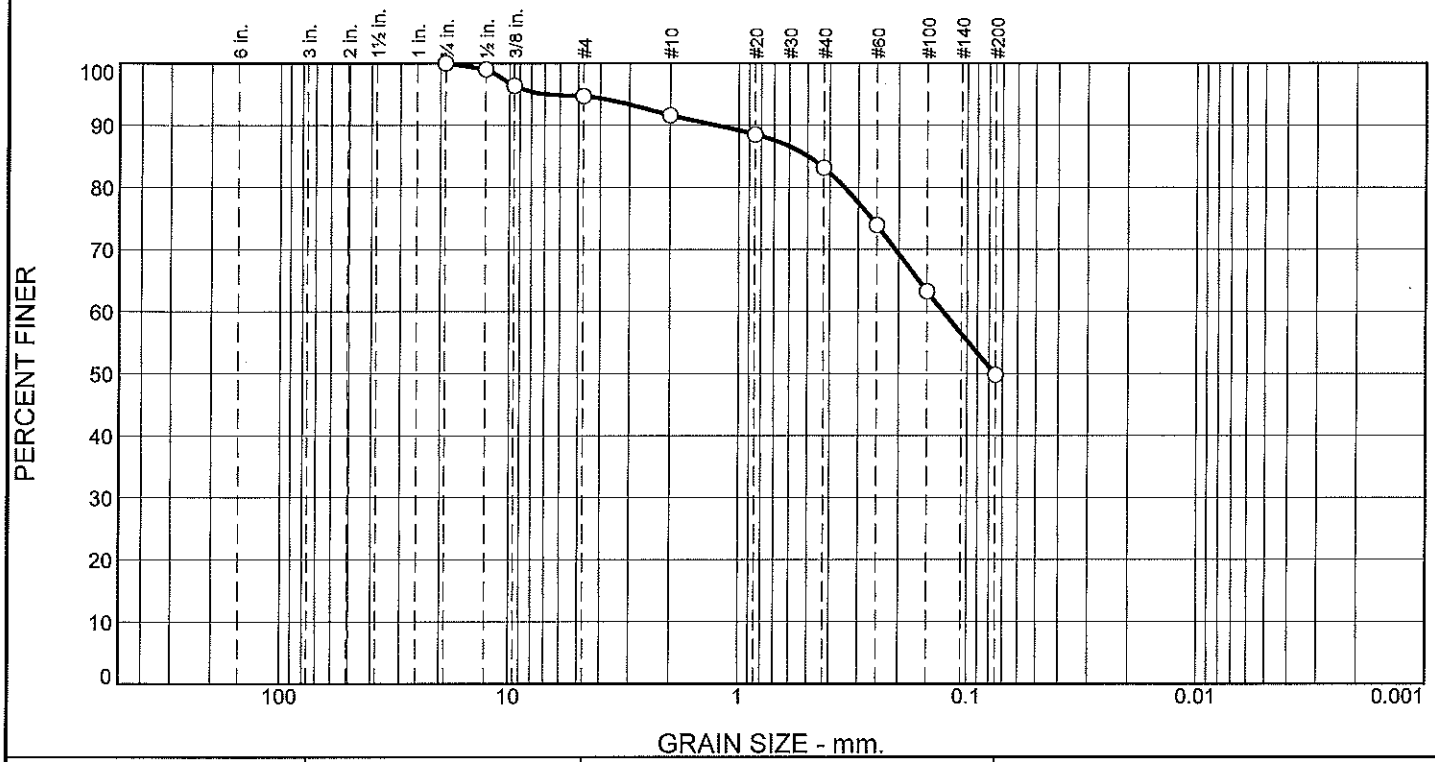
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.3	3.1	8.5	33.3	49.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	99.0		
3/8"	96.4		
#4	94.7		
#10	91.6		
#20	88.5		
#40	83.1		
#60	73.9		
#100	63.2		
#200	49.8		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 1.2662 D_{85}= 0.4990 D_{60}= 0.1279
D_{50}= 0.0758 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/17/13
Tested By: TEP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-057 **Depth:** 7.5'-9.0' **Date Sampled:**
Sample Number: 7555-22/S-3

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-057
Depth: 7.5'-9.0'
Sample Number: 7555-22/S-3
Material Description: Olive Gray Silty Sand
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/JF
Test Date: 10/17/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 407.50
Tare Wt. = 196.00
Minus #200 from wash = 48.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
609.50	196.00	3/4"	0.00	0.00	100.0
		1/2"	1423.30	1419.30	99.0
		3/8"	1494.20	1483.30	96.4
		#4	1363.50	1356.40	94.7
		#10	1526.40	1513.70	91.6
		#20	1079.00	1066.20	88.5
		#40	965.90	943.70	83.1
		#60	916.00	877.70	73.9
		#100	886.70	842.60	63.2
		#200	1074.50	1019.00	49.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	5.3	5.3	3.1	8.5	33.3	44.9			49.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0758	0.1279	0.3455	0.4990	1.2662	6.9574

Fineness Modulus
1.00

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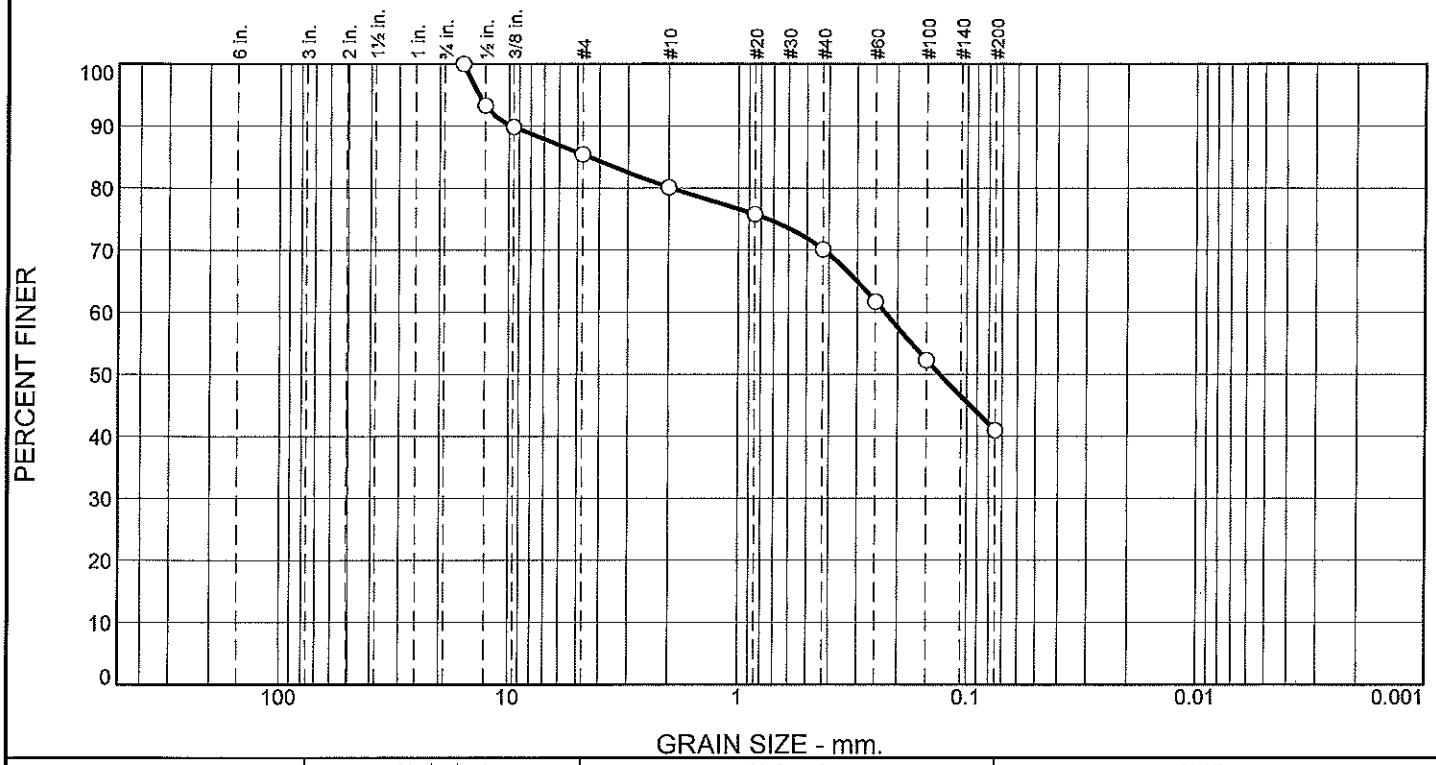
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.6	5.3	10.0	29.1	41.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
1/2"	93.3		
3/8"	89.9		
#4	85.4		
#10	80.1		
#20	75.7		
#40	70.1		
#60	61.7		
#100	52.3		
#200	41.0		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 9.7194 D_{85}= 4.4532 D_{60}= 0.2278
D_{50}= 0.1316 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/17/13
Tested By: TEP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-057 **Depth:** 15'-16.5' **Date Sampled:**
Sample Number: 7555-23/S-6

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-057
Depth: 15'-16.5'
Sample Number: 7555-23/S-6
Material Description: Olive Gray Silty Sand
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/JF
Test Date: 10/17/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 418.50
Tare Wt. = 161.90
Minus #200 from wash = 40.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
591.00	161.90	5/8"	0.00	0.00	100.0
		1/2"	1447.90	1419.20	93.3
		3/8"	1498.00	1483.20	89.9
		#4	1375.50	1356.40	85.4
		#10	1536.40	1513.50	80.1
		#20	1084.60	1066.00	75.7
		#40	967.90	943.70	70.1
		#60	913.80	877.80	61.7
		#100	883.20	842.70	52.3
		#200	1067.50	1019.00	41.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	14.6	14.6	5.3	10.0	29.1	44.4			41.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1316	0.2278	1.9728	4.4532	9.7194	13.5760

Fineness Modulus
1.76

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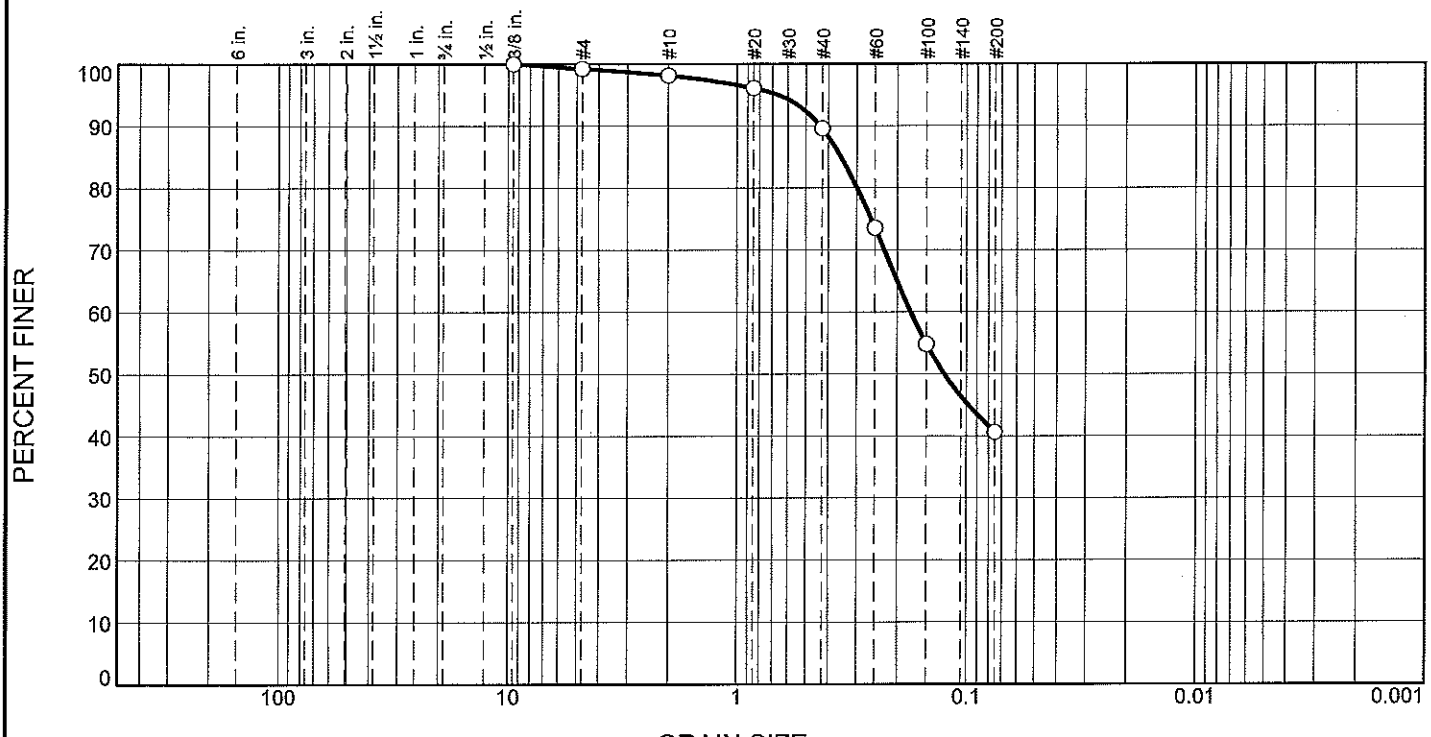
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.8	1.1	8.5	49.0	40.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0		
#4	99.2		
#10	98.1		
#20	96.1		
#40	89.6		
#60	73.5		
#100	54.8		
#200	40.6		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.4342 D_{85}= 0.3525 D_{60}= 0.1752
D_{50}= 0.1257 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/17/13
Tested By: TEP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-057 **Depth:** 40'-40.5' **Date Sampled:**
Sample Number: 7555-24/S-11

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-057
Depth: 40'-40.5'
Sample Number: 7555-24/S-11
Material Description: Olive Gray Silty Sand
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/JF
Test Date: 10/17/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 389.90
Tare Wt. = 194.10
Minus #200 from wash = 39.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
519.20	194.10	3/8"	0.00	0.00	100.0
		#4	1358.90	1356.30	99.2
		#10	1517.00	1513.50	98.1
		#20	1072.70	1066.00	96.1
		#40	964.90	943.80	89.6
		#60	929.80	877.70	73.5
		#100	903.80	842.80	54.8
		#200	1065.00	1018.90	40.6

Fractional Components

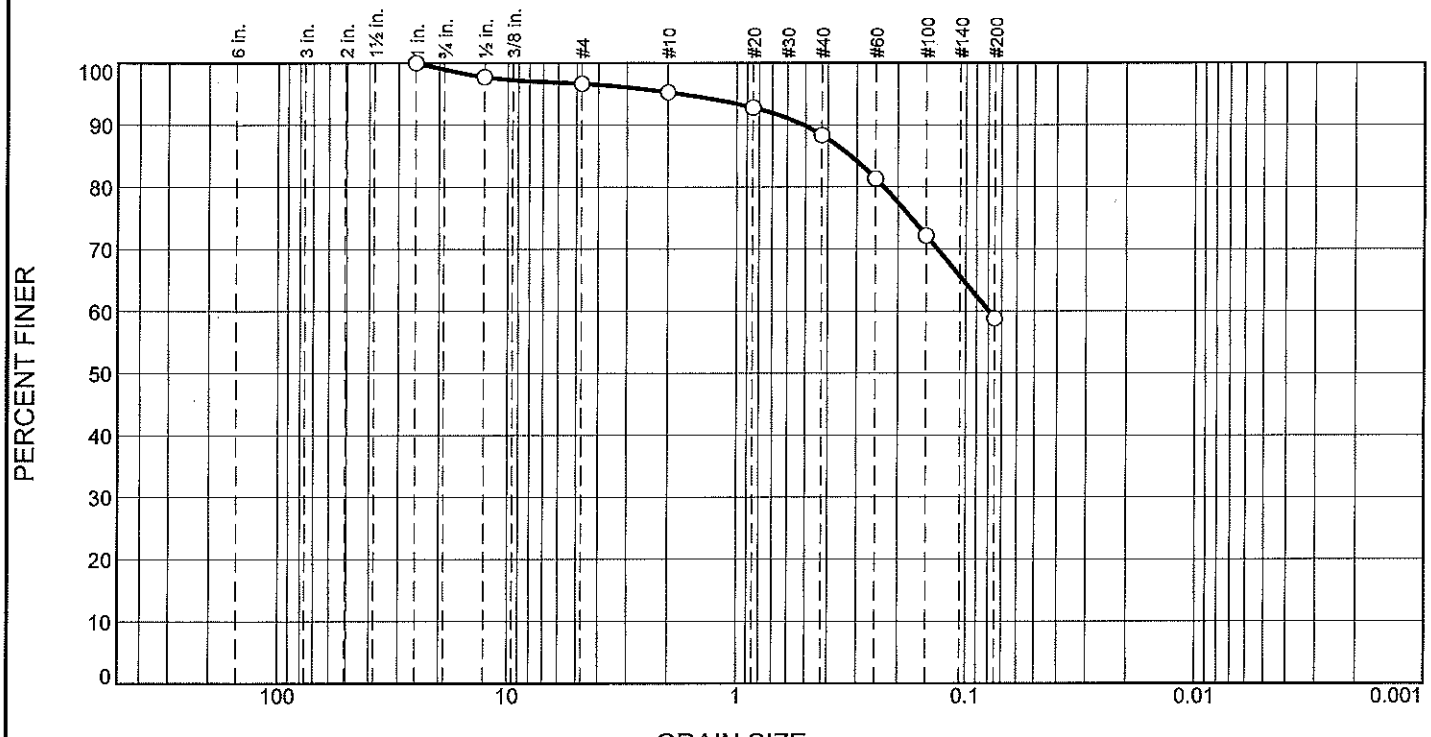
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.8	0.8	1.1	8.5	49.0	58.6			40.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1257	0.1752	0.2998	0.3525	0.4342	0.6653

Fineness Modulus
0.76

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.1	2.2	1.4	6.9	29.6	58.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
1/2"	97.7		
#4	96.7		
#10	95.3		
#20	92.8		
#40	88.4		
#60	81.3		
#100	72.1		
#200	58.8		

* (no specification provided)

Material Description

Olive Gray Sandy Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.5124 D_{85}= 0.3195 D_{60}= 0.0797
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/17/13
Tested By: TEP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-058 **Depth:** 5'-6.5' **Date Sampled:**
Sample Number: 7555-25/S-3

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-058
Depth: 5'-6.5'
Sample Number: 7555-25/S-3
Material Description: Olive Gray Sandy Silt
Date Received: 10/4/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/JF
Test Date: 10/17/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 357.70
Tare Wt. = 192.90
Minus #200 from wash = 58.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
585.00	192.90	1"	0.00	0.00	100.0
		1/2"	1428.00	1419.10	97.7
		#4	1360.50	1356.30	96.7
		#10	1519.10	1513.60	95.3
		#20	1075.90	1066.10	92.8
		#40	960.90	943.70	88.4
		#60	905.30	877.70	81.3
		#100	878.80	842.80	72.1
		#200	1071.20	1018.90	58.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	1.1	2.2	3.3	1.4	6.9	29.6	37.9			58.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.0797	0.2307	0.3195	0.5124	1.7837

Fineness Modulus
0.70

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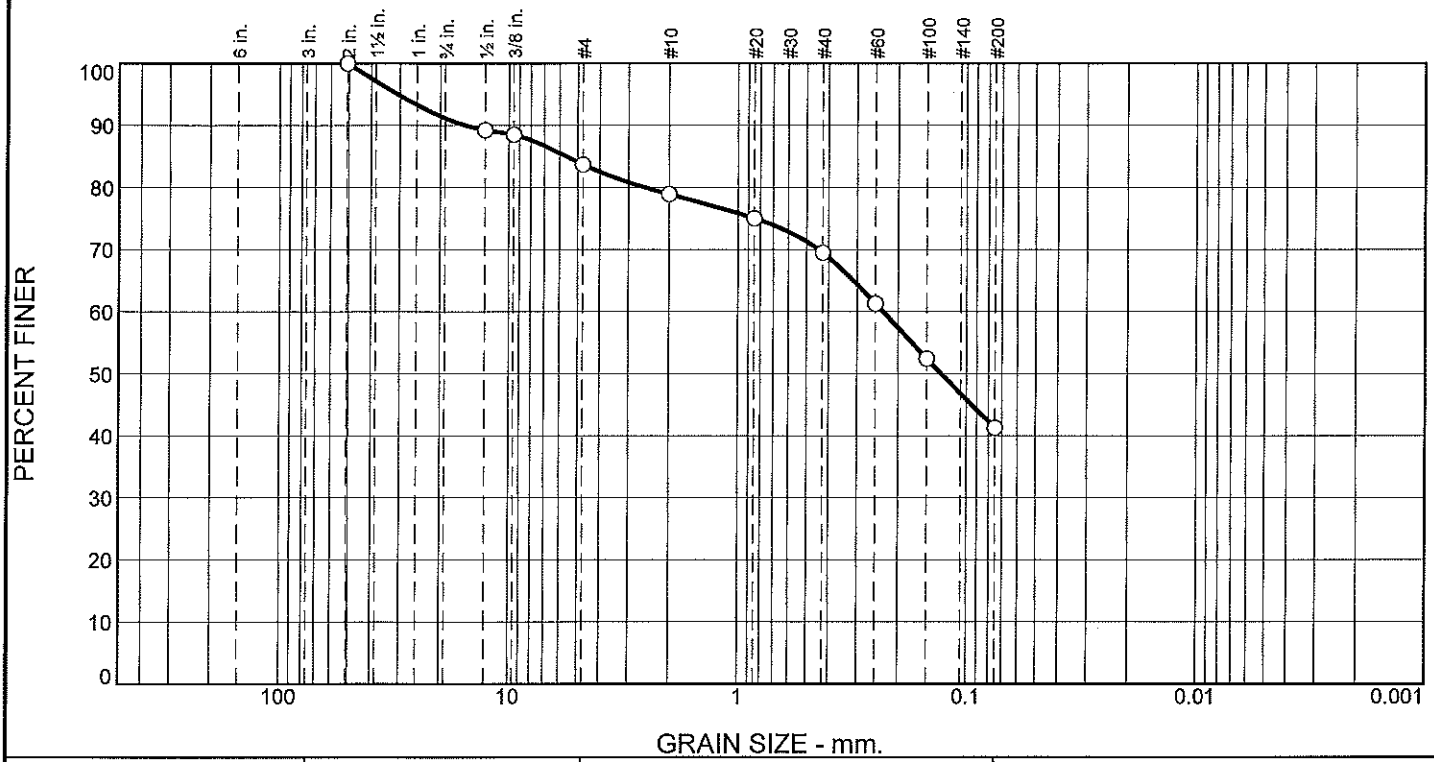
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.9	7.5	4.7	9.4	28.3	41.2	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2"	100.0		
1/2"	89.2		
3/8"	88.5		
#4	83.6		
#10	78.9		
#20	75.0		
#40	69.5		
#60	61.3		
#100	52.4		
#200	41.2		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 15.5762 D_{85}= 5.6416 D_{60}= 0.2326
D_{50}= 0.1299 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/17/13
Tested By: TEP/JF
Checked By: JAM
Title:

Source of Sample: Boring E360-B-058 **Depth:** 10'-11.5' **Date Sampled:**
Sample Number: 7555-26/S-5

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-058
Depth: 10'-11.5'
Sample Number: 7555-26/S-5
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/JF
Test Date: 10/17/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 442.50
Tare Wt. = 157.40
Minus #200 from wash = 40.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
636.20	157.40	2"	0.00	0.00	100.0
		1/2"	1470.90	1419.30	89.2
		3/8"	1486.70	1483.20	88.5
		#4	1379.60	1356.40	83.6
		#10	1536.40	1513.60	78.9
		#20	1084.60	1066.00	75.0
		#40	970.10	943.70	69.5
		#60	917.10	877.70	61.3
		#100	885.30	842.90	52.4
		#200	1072.30	1018.90	41.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	8.9	7.5	16.4	4.7	9.4	28.3	42.4			41.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1299	0.2326	2.5611	5.6416	15.5762	30.7436

Fineness Modulus
1.94

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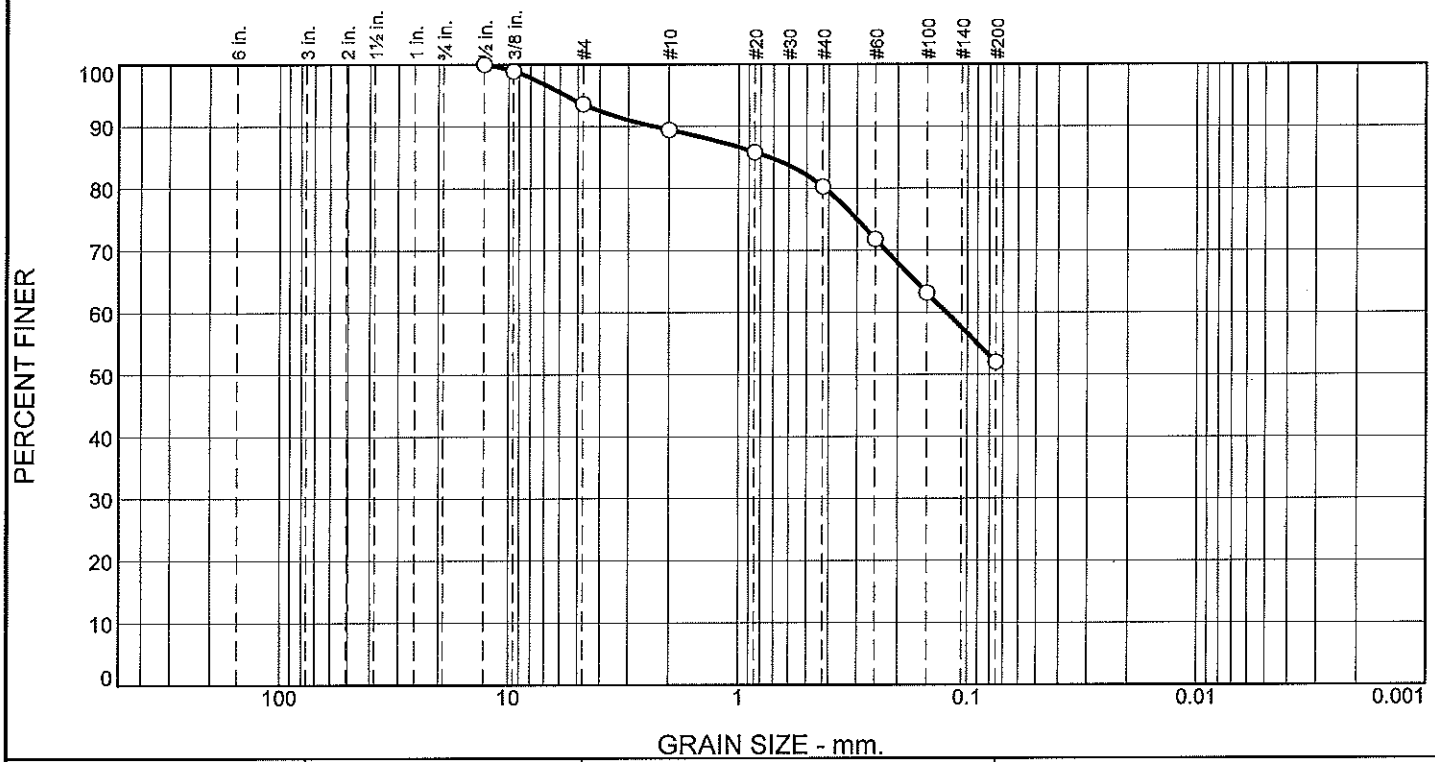
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.4	4.2	9.1	28.3	52.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	98.9		
#4	93.6		
#10	89.4		
#20	85.8		
#40	80.3		
#60	71.8		
#100	63.1		
#200	52.0		

* (no specification provided)

Material Description

Olive Gray Sandy Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 2.3278 D_{85}= 0.7314 D_{60}= 0.1240
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/21/13

Tested By: TEP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-058 **Depth:** 20'-20.5' **Date Sampled:**

Sample Number: 7555-27/S-8

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-058
Depth: 20'-20.5'
Sample Number: 7555-27/S-8
Material Description: Olive Gray Sandy Silt
Date Received: 10/4/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 10/21/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 370.00
Tare Wt. = 230.70
Minus #200 from wash = 51.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
517.80	230.70	1/2"	0.00	0.00	100.0
		3/8"	1486.40	1483.30	98.9
		#4	1371.70	1356.40	93.6
		#10	1525.40	1513.50	89.4
		#20	1076.50	1066.10	85.8
		#40	959.70	943.70	80.3
		#60	902.00	877.70	71.8
		#100	867.80	842.90	63.1
		#200	1050.90	1019.00	52.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	6.4	6.4	4.2	9.1	28.3	41.6			52.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.1240	0.4168	0.7314	2.3278	5.6727

Fineness Modulus
1.08

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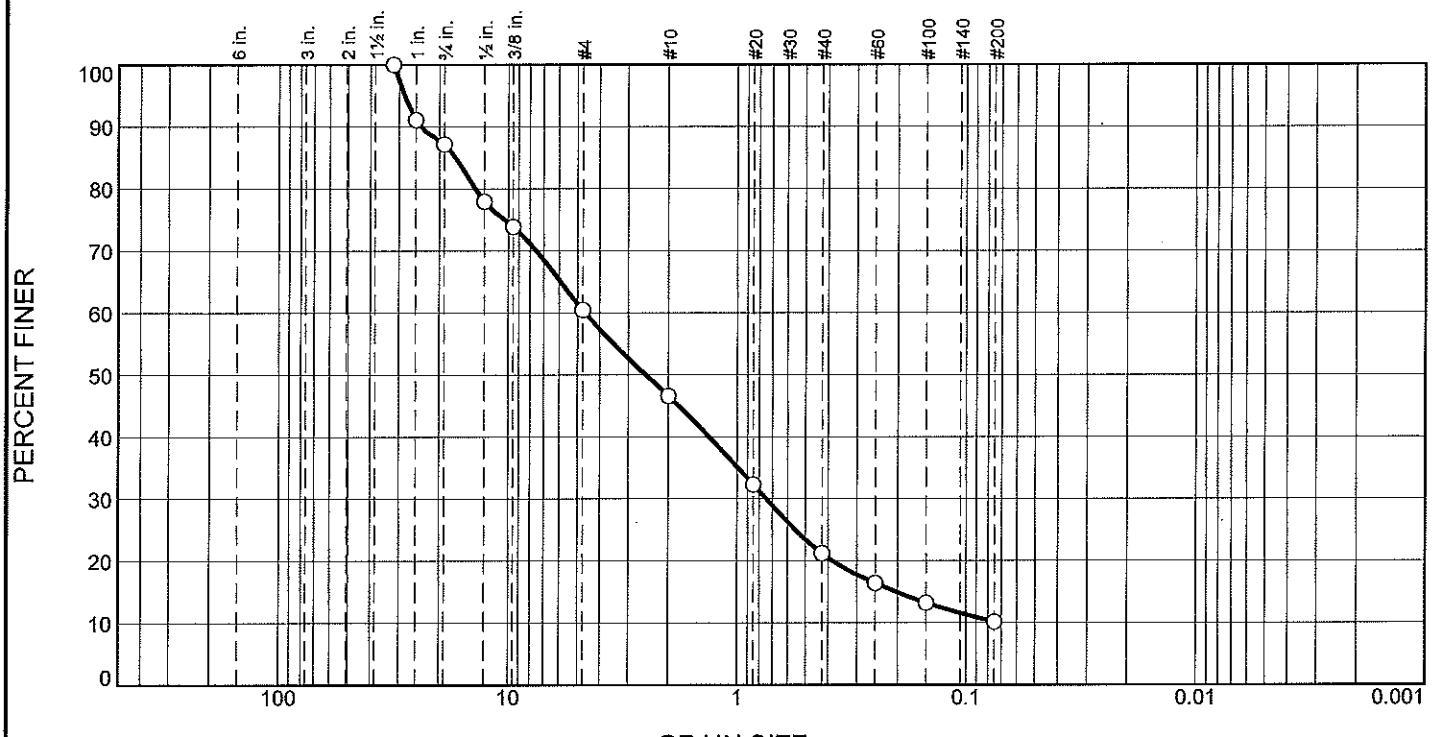
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.8	26.7	13.9	25.4	11.1	10.1	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/4"	100.0		
1"	91.1		
3/4"	87.2		
1/2"	77.9		
3/8"	73.9		
#4	60.5		
#10	46.6		
#20	32.3		
#40	21.2		
#60	16.4		
#100	13.2		
#200	10.1		

* (no specification provided)

Material Description

Olive Gray Poorly Graded Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-1-a

Coefficients

D_{90}= 24.1815 D_{85}= 17.0094 D_{60}= 4.6405
D_{50}= 2.5171 D_{30}= 0.7464 D_{15}= 0.2030
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/18/13
Tested By: TEP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-058 **Depth:** 45'-45.7' **Date Sampled:**
Sample Number: 7555-28/S-13

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-058
Depth: 45'-45.7' **Sample Number:** 7555-28/S-13
Material Description: Olive Gray Poorly Graded Sand with Silt and Gravel
Date Received: 10/4/13
USCS Classification: SP-SM **AASHTO Classification:** A-1-a
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP **Test Date:** 10/18/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 560.30
Tare Wt. = 234.60
Minus #200 from wash = 9.9%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
596.20	234.60	1 1/4"	0.00	0.00	100.0
		1"	1501.70	1469.50	91.1
		3/4"	1519.10	1504.90	87.2
		1/2"	1452.50	1419.00	77.9
		3/8"	1497.80	1483.20	73.9
		#4	1404.90	1356.40	60.5
		#10	1563.90	1513.70	46.6
		#20	1117.80	1066.20	32.3
		#40	983.90	943.70	21.2
		#60	895.00	877.70	16.4
		#100	854.30	842.80	13.2
		#200	1030.10	1019.00	10.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	12.8	26.7	39.5	13.9	25.4	11.1	50.4			10.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.2030	0.3832	0.7464	2.5171	4.6405	13.9454	17.0094	24.1815	28.4112

Fineness Modulus
4.34

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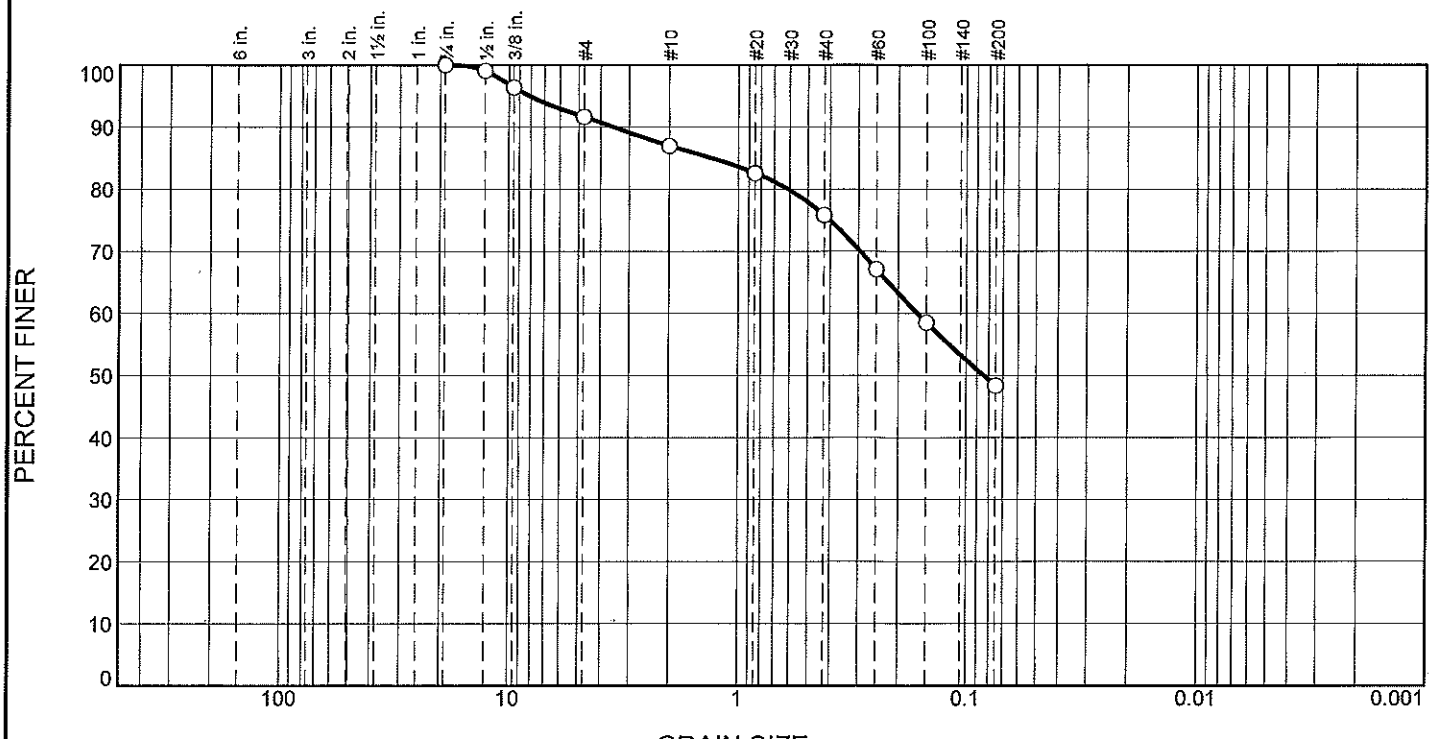
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.4	4.6	11.2	27.5	48.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	99.1		
3/8"	96.4		
#4	91.6		
#10	87.0		
#20	82.6		
#40	75.8		
#60	67.1		
#100	58.5		
#200	48.3		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 3.5390 D_{85}= 1.3116 D_{60}= 0.1646
D_{50}= 0.0845 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/21/13
Tested By: TEP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-059 **Depth:** 2.5'-4.0' **Date Sampled:**
Sample Number: 7555-29/S-1

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-059
Depth: 2.5'-4.0'
Sample Number: 7555-29/S-1
Material Description: Olive Gray Silty Sand
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 10/21/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 470.80
Tare Wt. = 225.90
Minus #200 from wash = 47.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
693.50	225.90	3/4"	0.00	0.00	100.0
		1/2"	1423.50	1419.10	99.1
		3/8"	1495.70	1483.20	96.4
		#4	1378.50	1356.30	91.6
		#10	1535.40	1513.60	87.0
		#20	1086.50	1066.00	82.6
		#40	975.10	943.40	75.8
		#60	918.50	877.70	67.1
		#100	882.70	842.60	58.5
		#200	1066.70	1019.00	48.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	8.4	8.4	4.6	11.2	27.5	43.3			48.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0845	0.1646	0.6114	1.3116	3.5390	8.1291

Fineness Modulus
1.31

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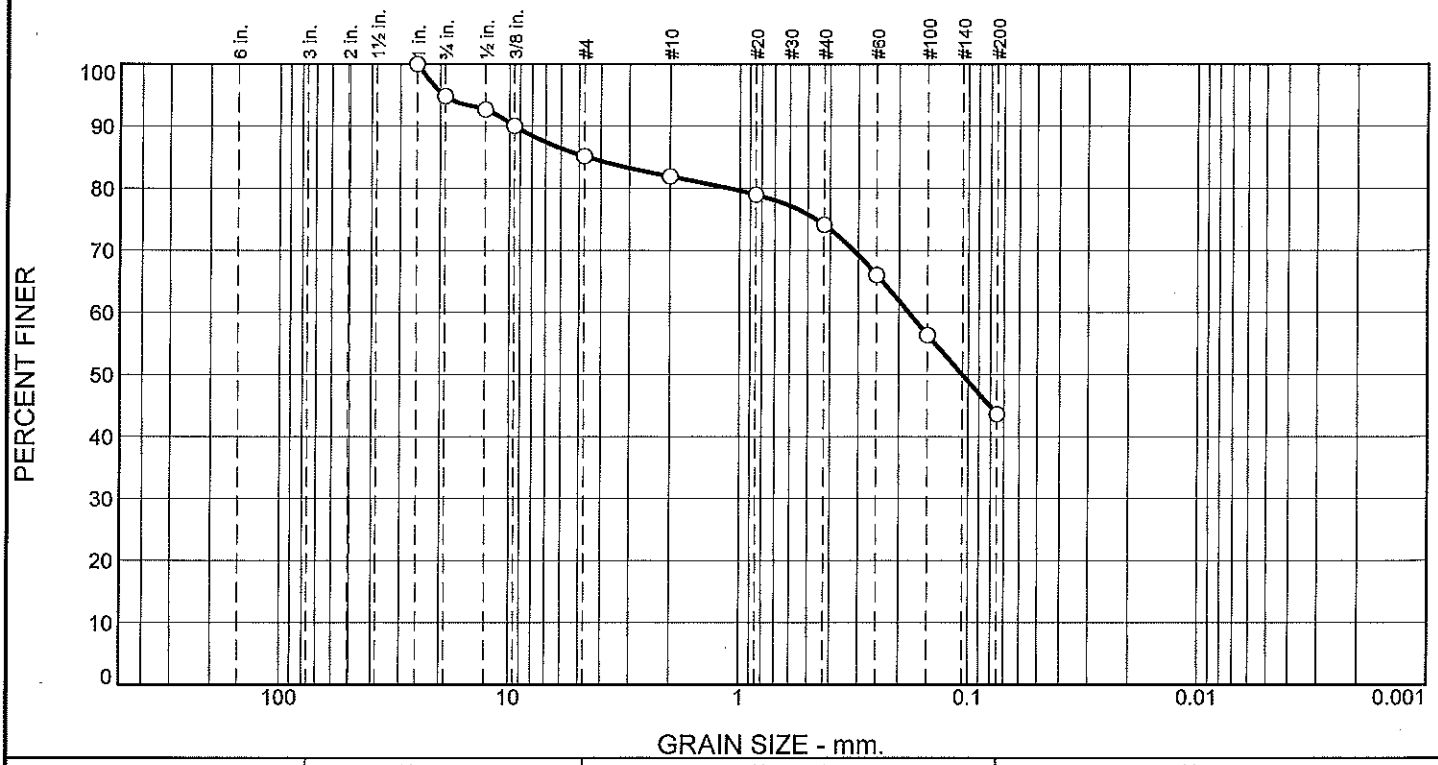
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.2	9.7	3.2	7.8	30.5	43.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	94.8		
1/2"	92.7		
3/8"	90.0		
#4	85.1		
#10	81.9		
#20	79.0		
#40	74.1		
#60	66.0		
#100	56.3		
#200	43.6		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 9.5005 D_{85}= 4.6186 D_{60}= 0.1815
D_{50}= 0.1068 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/21/13

Tested By: TEP

Checked By: JAM

Title:

Source of Sample: Boring E360-B-059 **Depth:** 10'-11.5' **Date Sampled:**
Sample Number: 7555-30/S-4

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-059
Depth: 10'-11.5'
Sample Number: 7555-30/S-4
Material Description: Olive Gray Silty Sand
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 10/21/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 481.50
Tare Wt. = 190.10
Minus #200 from wash = 42.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
699.40	190.10	1"	0.00	0.00	100.0
		3/4"	1531.10	1504.80	94.8
		1/2"	1430.20	1419.10	92.7
		3/8"	1496.50	1483.10	90.0
		#4	1381.20	1356.30	85.1
		#10	1530.10	1513.50	81.9
		#20	1080.90	1066.00	79.0
		#40	968.20	943.60	74.1
		#60	918.90	877.70	66.0
		#100	892.20	842.80	56.3
		#200	1083.80	1018.90	43.6

Fractional Components

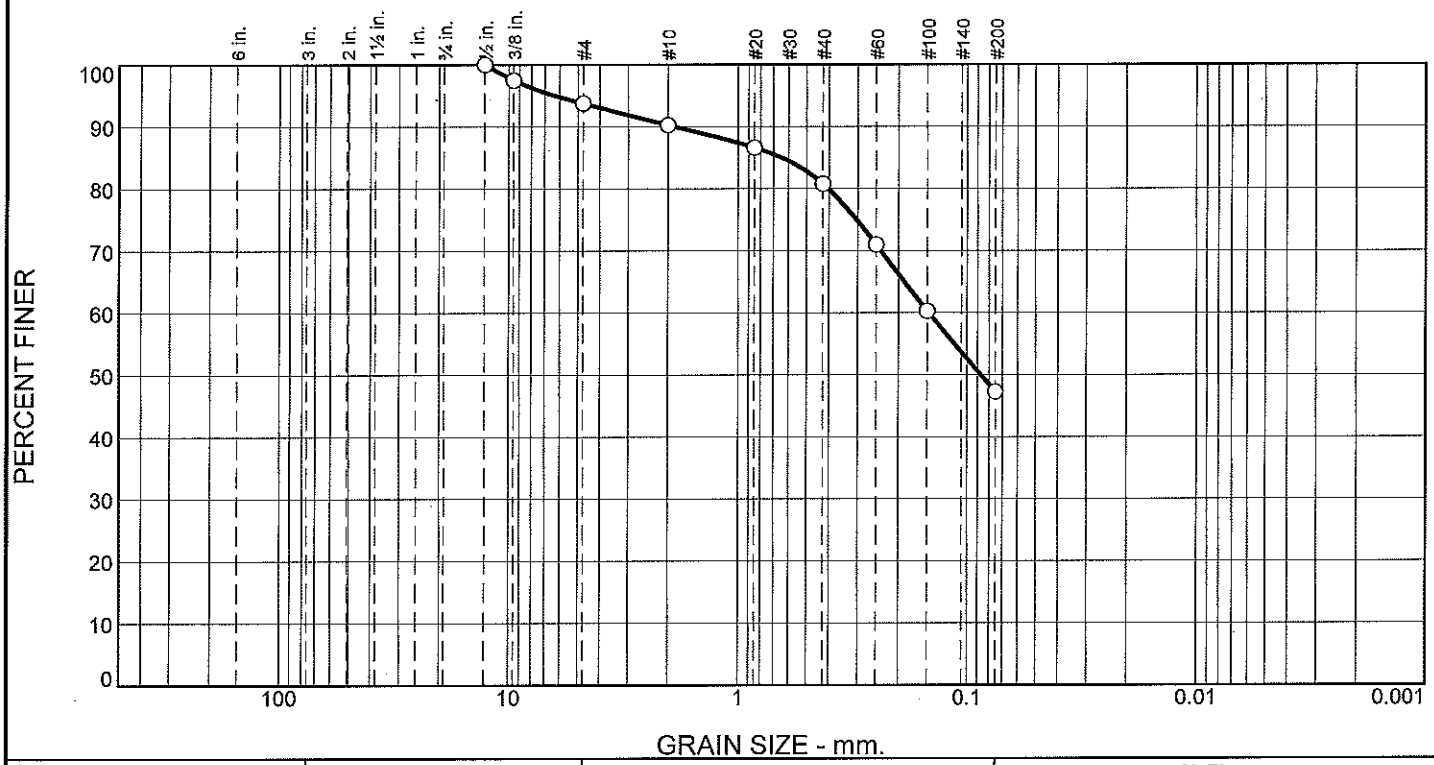
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	5.2	9.7	14.9	3.2	7.8	30.5	41.5			43.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1068	0.1815	1.1158	4.6186	9.5005	19.3096

Fineness Modulus
1.65

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.3	3.5	9.4	33.5	47.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	97.5		
#4	93.7		
#10	90.2		
#20	86.6		
#40	80.8		
#60	71.0		
#100	60.2		
#200	47.3		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 1.8841 D_{85}= 0.6464 D_{60}= 0.1482
D_{50}= 0.0873 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 10/4/13 **Date Tested:** 10/21/13
Tested By: TEP
Checked By: JAM
Title:

Source of Sample: Boring E360-B-059 **Depth:** 20'-20.5' **Date Sampled:**
Sample Number: 7555-31/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

10/21/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring E360-B-059
Depth: 20'-20.5'
Sample Number: 7555-31/S-7
Material Description: Olive Gray Silty Sand
Date Received: 10/4/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 10/21/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 368.60
Tare Wt. = 198.80
Minus #200 from wash = 46.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
515.20	198.80	1/2"	0.00	0.00	100.0
		3/8"	1491.20	1483.20	97.5
		#4	1368.20	1356.40	93.7
		#10	1524.80	1513.70	90.2
		#20	1077.70	1066.20	86.6
		#40	962.20	943.70	80.8
		#60	908.70	877.70	71.0
		#100	876.70	842.80	60.2
		#200	1060.20	1019.10	47.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	6.3	6.3	3.5	9.4	33.5	46.4			47.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0873	0.1482	0.4038	0.6464	1.8841	6.3421

Fineness Modulus
1.10

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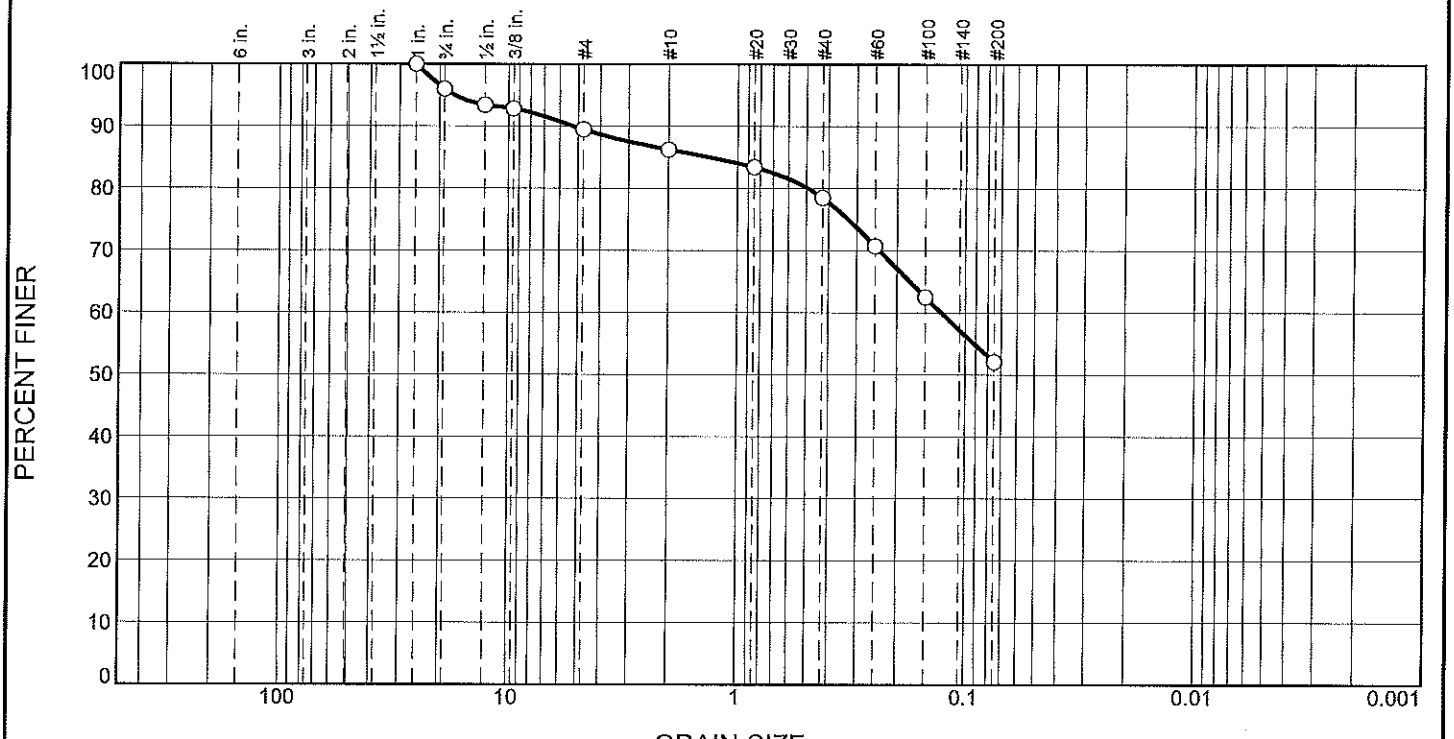
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.0	6.5	3.3	7.7	26.5	52.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	96.0		
1/2"	93.4		
3/8"	92.8		
#4	89.5		
#10	86.2		
#20	83.4		
#40	78.5		
#60	70.7		
#100	62.4		
#200	52.0		

* (no specification provided)

Material Description

Olive Gray Sandy Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 5.2475 D_{85}= 1.3256 D_{60}= 0.1282
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 11/25/13

Tested By: TEP

Checked By: JAM

Title:

Source of Sample: Boring OTC-B-003 **Depth:** 7.5'-8.8' **Date Sampled:**

Sample Number: HMA#7567-1/S-3

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/11/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring OTC-B-003
Depth: 7.5'-8.8'
Sample Number: HMA#7567-1/S-3
Material Description: Olive Gray Sandy Silt
Date Received: 11/19/13
USCS Classification: ML
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 11/25/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 322.10
Tare Wt. = 118.00
Minus #200 from wash = 50.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
533.00	118.00	1"	0.00	0.00	100.0
		3/4"	1521.50	1504.80	96.0
		1/2"	1429.90	1419.20	93.4
		3/8"	1485.50	1483.10	92.8
		#4	1370.10	1356.20	89.5
		#10	1526.90	1513.50	86.2
		#20	1077.90	1066.00	83.4
		#40	963.80	943.50	78.5
		#60	909.80	877.60	70.7
		#100	877.10	842.70	62.4
		#200	1062.20	1019.00	52.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	4.0	6.5	10.5	3.3	7.7	26.5	37.5			52.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.1282	0.4929	1.3256	5.2475	17.2421

Fineness Modulus
1.33

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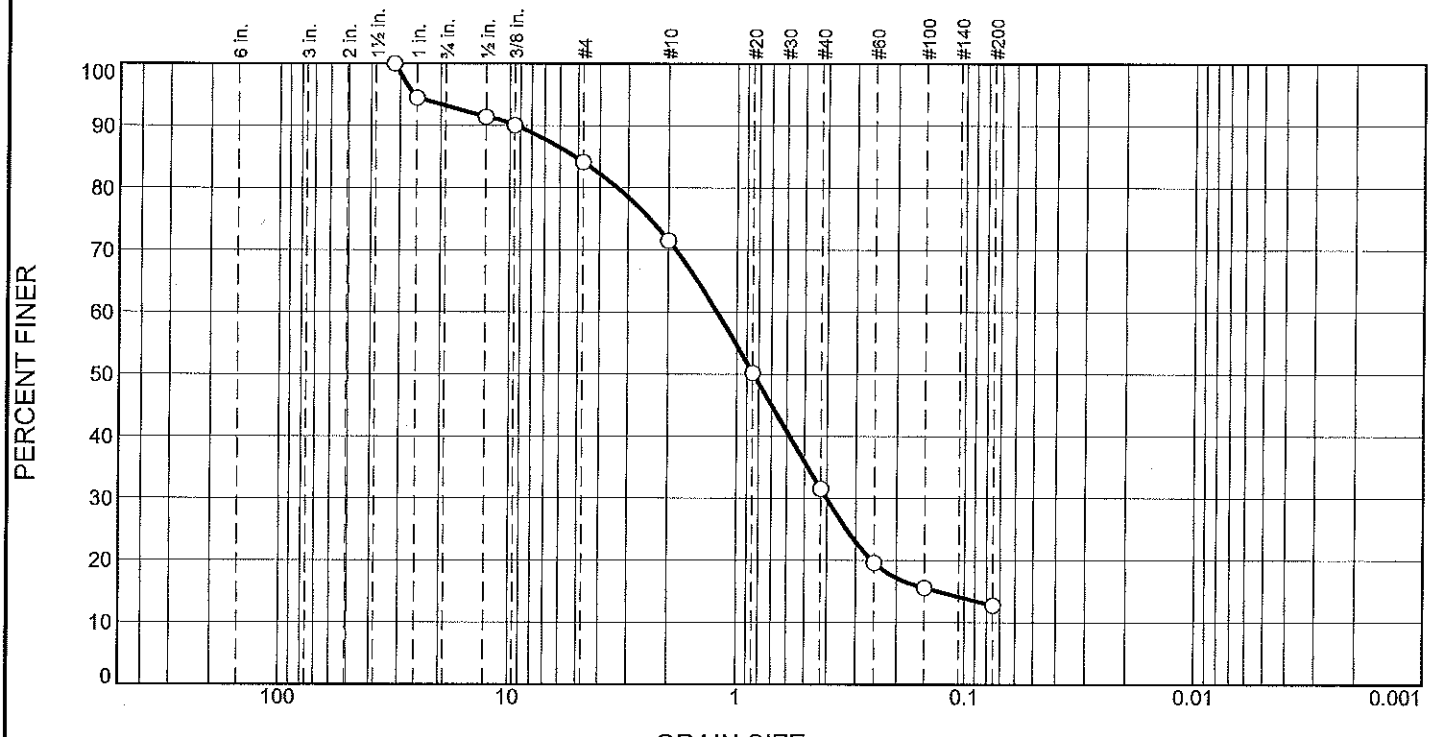
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.8	9.1	12.6	40.0	18.8	12.7	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/4"	100.0		
1"	94.5		
1/2"	91.4		
3/8"	90.1		
#4	84.1		
#10	71.5		
#20	50.2		
#40	31.5		
#60	19.6		
#100	15.6		
#200	12.7		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 9.4466 D_{85}= 5.1631 D_{60}= 1.2259
D_{50}= 0.8446 D_{30}= 0.4013 D_{15}= 0.1308
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 11/25/13
Tested By: TEP
Checked By: JAM
Title:

Source of Sample: Boring OTC-B-003 **Depth:** 30'-31.3' **Date Sampled:**
Sample Number: HMA#7567-2/S-9

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/5/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring OTC-B-003
Depth: 30'-31.3'
Sample Number: HMA#7567-2/S-9
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 11/19/13
USCS Classification: SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 11/25/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 493.30
Tare Wt. = 116.10
Minus #200 from wash = 12.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
547.40	116.10	1 1/4"	0.00	0.00	100.0
		1"	1493.30	1469.60	94.5
		1/2"	1432.60	1419.10	91.4
		3/8"	1488.80	1483.10	90.1
		#4	1381.80	1356.30	84.1
		#10	1567.90	1513.40	71.5
		#20	1158.00	1066.00	50.2
		#40	1023.90	943.40	31.5
		#60	929.00	877.70	19.6
		#100	860.20	842.80	15.6
		#200	1031.30	1019.00	12.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	6.8	9.1	15.9	12.6	40.0	18.8	71.4			12.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1308	0.2563	0.4013	0.8446	1.2259	3.3457	5.1631	9.4466	26.0397

Fineness Modulus
3.20

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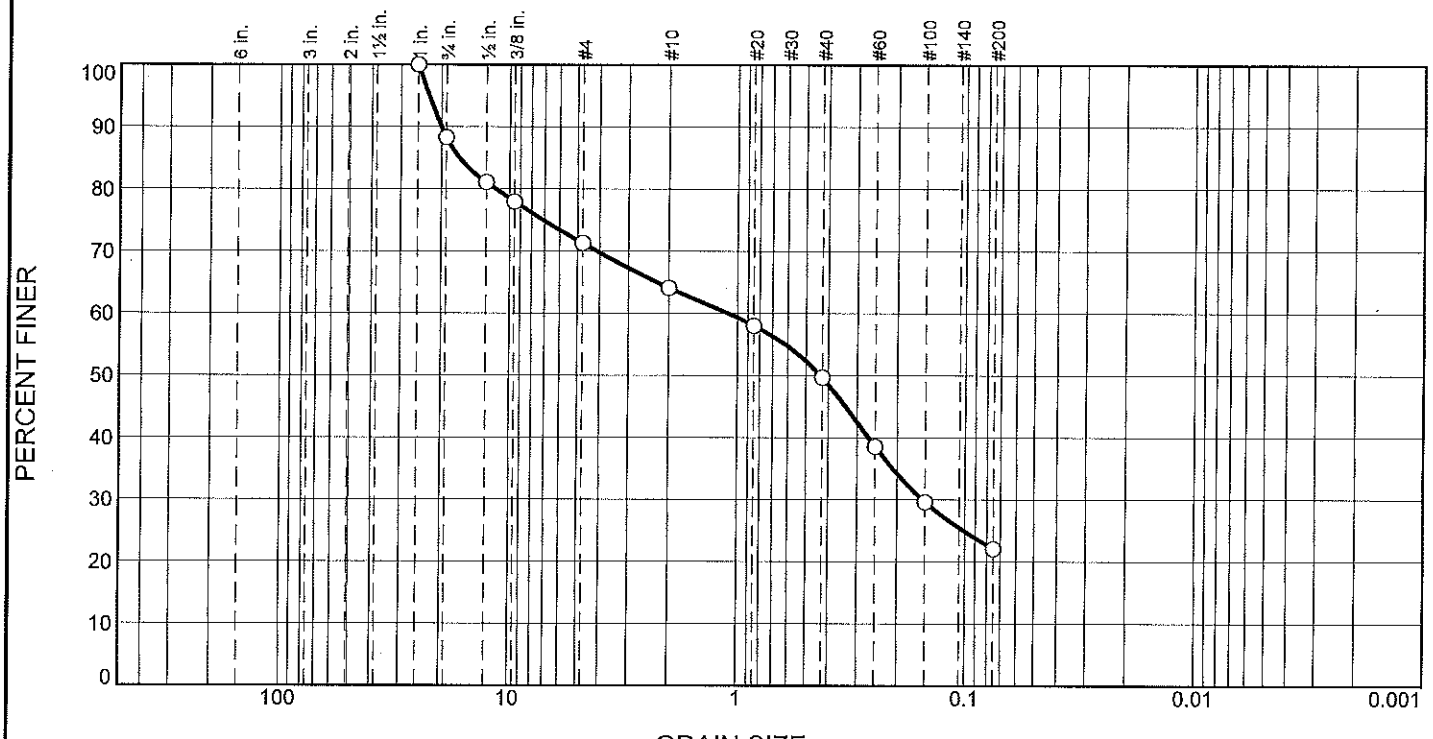
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	11.7	17.0	7.2	14.4	27.6	22.1	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	88.3		
1/2"	81.1		
3/8"	77.9		
#4	71.3		
#10	64.1		
#20	58.0		
#40	49.7		
#60	38.5		
#100	29.6		
#200	22.1		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 20.0305 D_{85}= 16.7210 D_{60}= 1.1078
D_{50}= 0.4333 D_{30}= 0.1540 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 11/26/13
Tested By: TEP
Checked By: JAM
Title:

Source of Sample: Boring OVS-B-001 **Depth:** 12.5'-13.5' **Date Sampled:**
Sample Number: HMA#7567-3/S-5

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/5/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring OVS-B-001
Depth: 12.5'-13.5'
Sample Number: HMA#7567-3/S-5
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 11/19/13
USCS Classification: SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP
Test Date: 11/26/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 363.60
Tare Wt. = 114.10
Minus #200 from wash = 21.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
431.70	114.10	1"	0.00	0.00	100.0
		3/4"	1542.00	1504.90	88.3
		1/2"	1442.00	1419.00	81.1
		3/8"	1493.20	1483.20	77.9
		#4	1377.50	1356.30	71.3
		#10	1536.40	1513.60	64.1
		#20	1085.40	1066.10	58.0
		#40	970.10	943.60	49.7
		#60	913.10	877.70	38.5
		#100	871.00	842.80	29.6
		#200	1042.90	1019.00	22.1

Fractional Components

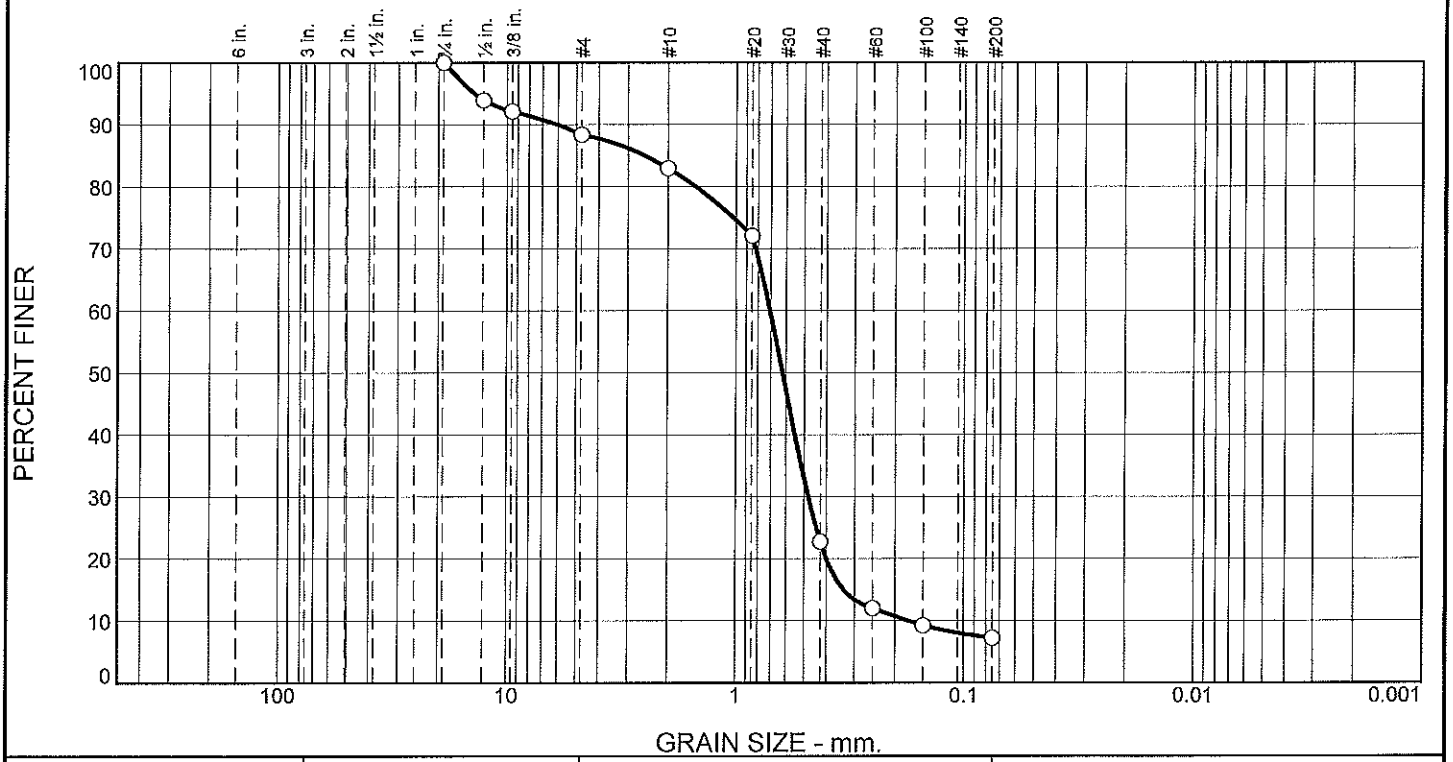
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	11.7	17.0	28.7	7.2	14.4	27.6	49.2			22.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1540	0.4333	1.1078	11.5285	16.7210	20.0305	22.7065

Fineness Modulus
3.10

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.6	5.5	60.2	15.4	7.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4"	100.0		
1/2"	93.9		
3/8"	92.1		
#4	88.4		
#10	82.9		
#20	72.0		
#40	22.7		
#60	12.0		
#100	9.3		
#200	7.3		

* (no specification provided)

Material Description

Olive Gray Poorly Graded Sand with Silt

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SP-SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 6.0836 D_{85}= 2.5431 D_{60}= 0.7081
D_{50}= 0.6234 D_{30}= 0.4803 D_{15}= 0.3365
D_{10}= 0.1743 C_u= 4.06 C_c= 1.87

Remarks

Date Received: 11/19/13 **Date Tested:** 11/26/13

Tested By: TEP/RJF

Checked By: JAM

Title:

Source of Sample: Boring OVS-B-001 **Depth:** 25'-26' **Date Sampled:**

Sample Number: HMA#7567-4/S-8

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/5/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring OVS-B-001
Depth: 25'-26'
Sample Number: HMA#7567-4/S-8
Material Description: Olive Gray Poorly Graded Sand with Silt
Date Received: 11/19/13
USCS Classification: SP-SM
AASHTO Classification: A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 11/26/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 452.70
Tare Wt. = 118.50
Minus #200 from wash = 7.1%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
478.20	118.50	3/4"	0.00	0.00	100.0
		1/2"	1440.90	1419.00	93.9
		3/8"	1489.60	1483.20	92.1
		#4	1369.90	1356.30	88.4
		#10	1533.10	1513.60	82.9
		#20	1105.30	1066.10	72.0
		#40	1120.90	943.60	22.7
		#60	916.20	877.70	12.0
		#100	852.80	842.80	9.3
		#200	1026.20	1019.00	7.3

Fractional Components

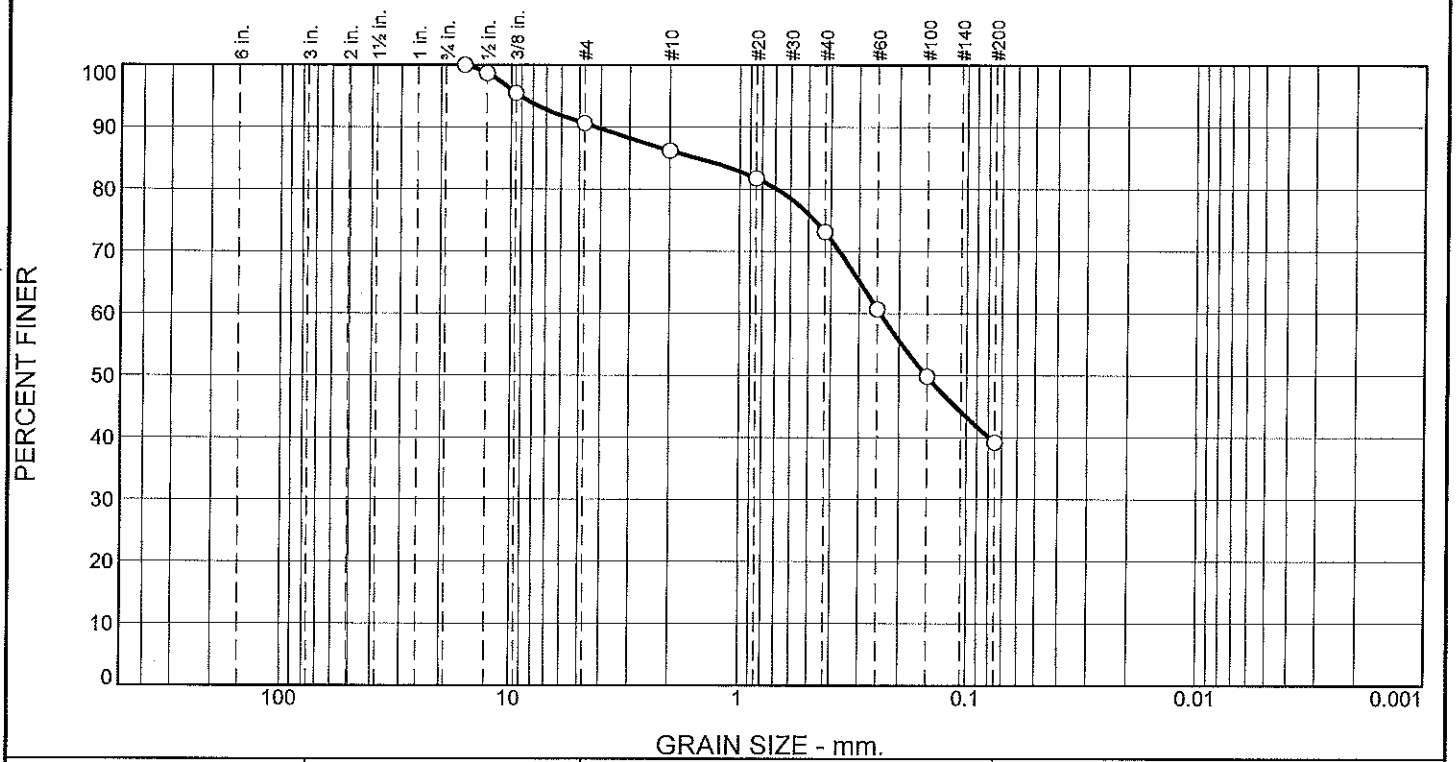
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	11.6	11.6	5.5	60.2	15.4	81.1			7.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1743	0.3365	0.4000	0.4803	0.6234	0.7081	1.5155	2.5431	6.0836	13.9582

Fineness Modulus	C_u	C_c
2.89	4.06	1.87

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.4	4.4	13.1	33.9	39.2	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
1/2"	98.7		
3/8"	95.5		
#4	90.6		
#10	86.2		
#20	81.7		
#40	73.1		
#60	60.7		
#100	49.8		
#200	39.2		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 4.2287 D_{85}= 1.5395 D_{60}= 0.2430
D_{50}= 0.1514 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 12/2/13
Tested By: TEP/RJF
Checked By: JAM
Title:

Source of Sample: Boring OVS-B-002 **Depth:** 5'-6.5' **Date Sampled:**
Sample Number: HMA#7567-5/S-2

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring OVS-B-002
Depth: 5'-6.5'
Sample Number: HMA#7567-5/S-2
Material Description: Olive Gray Silty Sand
Date Received: 11/19/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 12/2/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 348.70
Tare Wt. = 118.20
Minus #200 from wash = 39.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
496.10	118.20	5/8"	0.00	0.00	100.0
		1/2"	1424.20	1419.20	98.7
		3/8"	1495.20	1483.10	95.5
		#4	1374.60	1356.20	90.6
		#10	1530.30	1513.50	86.2
		#20	1082.70	1066.00	81.7
		#40	976.10	943.50	73.1
		#60	924.60	877.60	60.7
		#100	883.70	842.70	49.8
		#200	1059.20	1019.00	39.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	9.4	9.4	4.4	13.1	33.9	51.4			39.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1514	0.2430	0.6913	1.5395	4.2287	9.1113

Fineness Modulus
1.50

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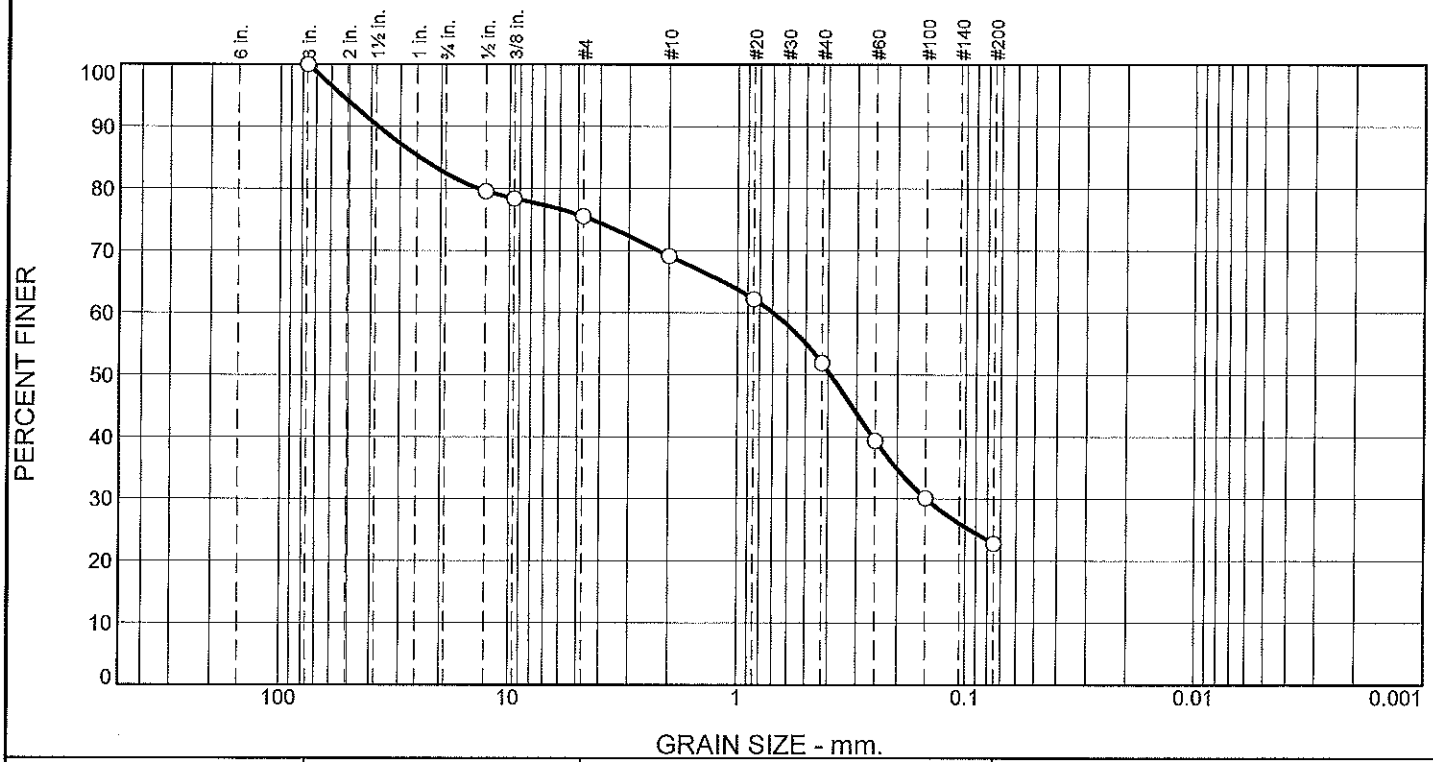
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.6	6.9	6.4	17.2	29.1	22.8	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
1/2"	79.5		
3/8"	78.4		
#4	75.5		
#10	69.1		
#20	62.2		
#40	51.9		
#60	39.4		
#100	30.1		
#200	22.8		

* (no specification provided)

Material Description

Olive Gray Silty Sand with Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 37.4176 D_{85}= 24.7002 D_{60}= 0.7000
D_{50}= 0.3898 D_{30}= 0.1489 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 12/2/13
Tested By: TEP/RJF
Checked By: JAM
Title:

Source of Sample: Boring OVS-B-002 **Depth:** 15'-15.5' **Date Sampled:**
Sample Number: HMA#7567-6/S-6

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring OVS-B-002
Depth: 15'-15.5'
Sample Number: HMA#7567-6/S-6
Material Description: Olive Gray Silty Sand with Gravel
Date Received: 11/19/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 12/2/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 400.80
Tare Wt. = 114.00
Minus #200 from wash = 23.2%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
487.40	114.00	3"	0.00	0.00	100.0
		1/2"	1495.60	1419.20	79.5
		3/8"	1487.50	1483.10	78.4
		#4	1366.90	1356.20	75.5
		#10	1537.40	1513.50	69.1
		#20	1091.90	1066.00	62.2
		#40	981.80	943.50	51.9
		#60	924.40	877.60	39.4
		#100	877.30	842.70	30.1
		#200	1046.20	1019.00	22.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	17.6	6.9	24.5	6.4	17.2	29.1	52.7			22.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1489	0.3898	0.7000	13.7937	24.7002	37.4176	53.8948

Fineness Modulus
3.06

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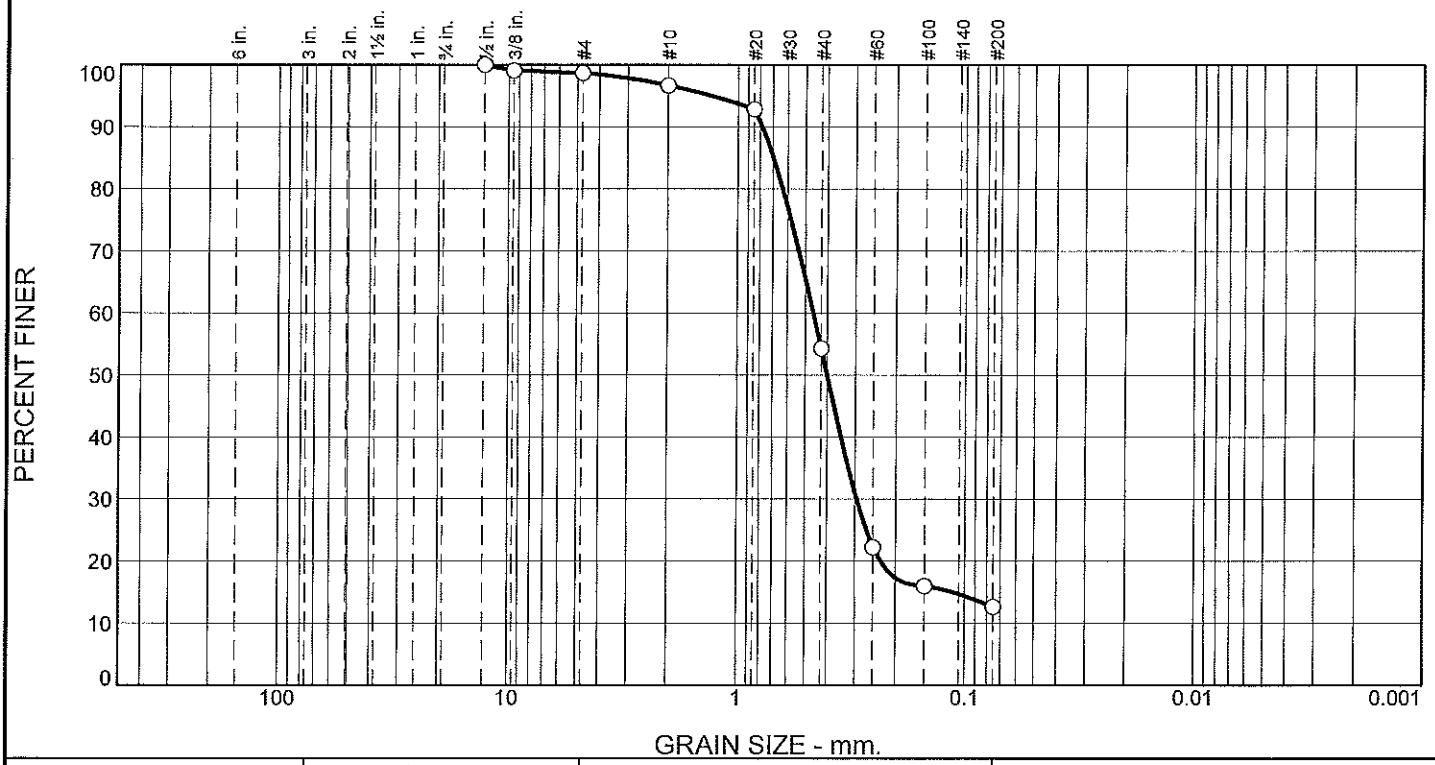
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.3	2.0	42.4	41.7	12.6	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	99.1		
#4	98.7		
#10	96.7		
#20	92.8		
#40	54.3		
#60	22.2		
#100	16.0		
#200	12.6		

* (no specification provided)

Material Description

Olive Gray Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.7828 D_{85}= 0.6975 D_{60}= 0.4612
D_{50}= 0.4002 D_{30}= 0.2954 D_{15}= 0.1128
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 12/3/13

Tested By: TEP/RJF

Checked By: JAM

Title:

Source of Sample: Boring OVS-B-002 **Depth:** 25'-26' **Date Sampled:**

Sample Number: HMA#7567-7/S-8

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates

Project: Sound Transit East Link

Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring OVS-B-002
Depth: 25'-26'
Sample Number: HMA#7567-7/S-8
Material Description: Olive Gray Silty Sand
Date Received: 11/19/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 12/3/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 424.60
Tare Wt. = 118.30
Minus #200 from wash = 12.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
469.70	118.30	1/2"	0.00	0.00	100.0
		3/8"	1486.30	1483.10	99.1
		#4	1357.70	1356.20	98.7
		#10	1520.50	1513.50	96.7
		#20	1079.50	1066.00	92.8
		#40	1079.00	943.50	54.3
		#60	990.20	877.60	22.2
		#100	864.60	842.70	16.0
		#200	1030.80	1019.00	12.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.3	1.3	2.0	42.4	41.7	86.1			12.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1128	0.2326	0.2954	0.4002	0.4612	0.6331	0.6975	0.7828	1.3090

Fineness Modulus
1.87

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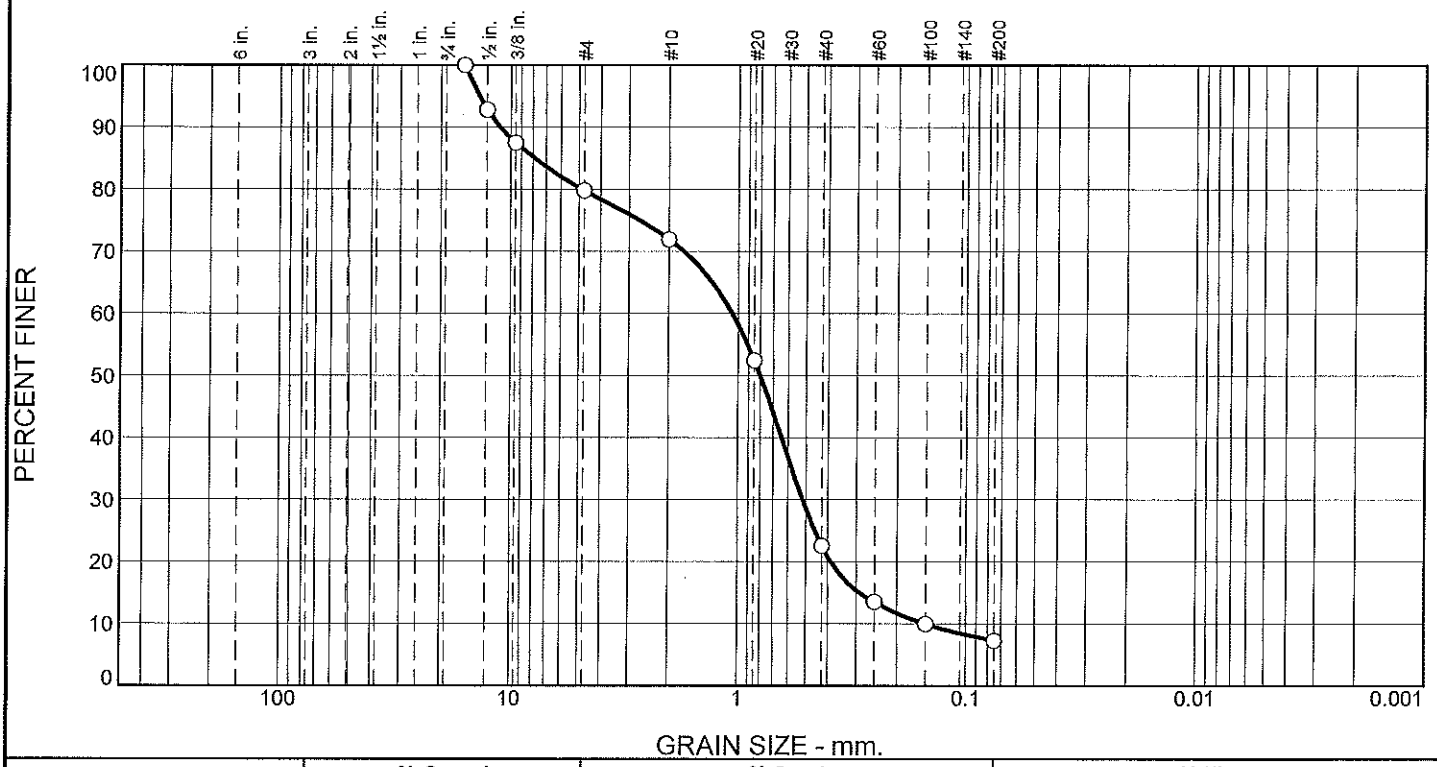
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	20.2	7.9	49.3	15.3	7.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
1/2"	92.8		
3/8"	87.5		
#4	79.8		
#10	71.9		
#20	52.4		
#40	22.6		
#60	13.5		
#100	10.0		
#200	7.3		

* (no specification provided)

Material Description

Olive Gray Well Graded Sand with Silt and Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SW-SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 11.1968 D_{85}= 7.8688 D_{60}= 1.0620
D_{50}= 0.8017 D_{30}= 0.5174 D_{15}= 0.2906
D_{10}= 0.1512 C_u= 7.03 C_c= 1.67

Remarks

Date Received: 11/19/13 **Date Tested:** 12/3/13
Tested By: TEP/RJF
Checked By: JAM
Title:

Source of Sample: Boring OVS-B-002 **Depth:** 35'-36.5' **Date Sampled:**
Sample Number: HMA#7567-8/S-10

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring OVS-B-002
Depth: 35'-36.5' **Sample Number:** HMA#7567-8/S-10
Material Description: Olive Gray Well Graded Saud with Silt and Gravel
Date Received: 11/19/13
USCS Classification: SW-SM **AASHTO Classification:** A-1-b
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF **Test Date:** 12/3/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 569.60
Tare Wt. = 114.70
Minus #200 from wash = 7.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
605.70	114.70	5/8"	0.00	0.00	100.0
		1/2"	1454.60	1419.20	92.8
		3/8"	1509.20	1483.10	87.5
		#4	1394.00	1356.20	79.8
		#10	1552.20	1513.50	71.9
		#20	1161.70	1066.00	52.4
		#40	1090.00	943.50	22.6
		#60	922.10	877.60	13.5
		#100	860.10	842.70	10.0
		#200	1032.10	1019.00	7.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	20.2	20.2	7.9	49.3	15.3	72.5			7.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1512	0.2906	0.3879	0.5174	0.8017	1.0620	4.8712	7.8688	11.1968	13.7016

Fineness Modulus	C_u	C_c
3.34	7.03	1.67

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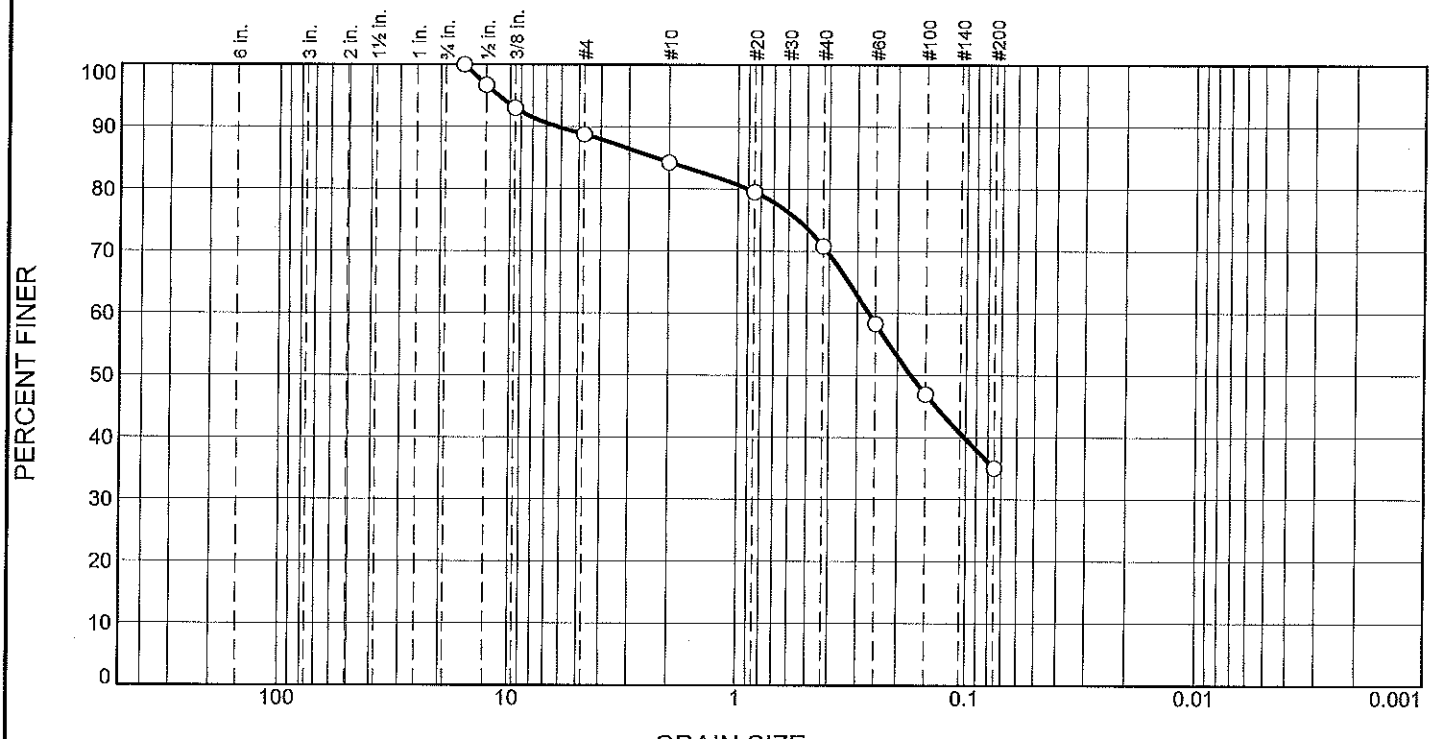
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.2	4.6	13.4	35.8	35.0	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
1/2"	96.7		
3/8"	93.0		
#4	88.8		
#10	84.2		
#20	79.5		
#40	70.8		
#60	58.3		
#100	47.0		
#200	35.0		

* (no specification provided)

Material Description

Light Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 6.2897 D_{85}= 2.3133 D_{60}= 0.2678
D_{50}= 0.1740 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 12/4/13
Tested By: TEP/RJF
Checked By: JAM
Title:

Source of Sample: Boring OVS-B-003 **Depth:** 2.5'-4.0' **Date Sampled:**
Sample Number: HMA#7567-9/S-1

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring OVS-B-003
Depth: 2.5'-4.0'
Sample Number: HMA#7567-9/S-1
Material Description: Light Brown Silty Sand
Date Received: 11/19/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 12/4/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 358.50
Tare Wt. = 114.20
Minus #200 from wash = 33.5%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
481.60	114.20	5/8"	0.00	0.00	100.0
		1/2"	1431.40	1419.20	96.7
		3/8"	1496.70	1483.10	93.0
		#4	1371.70	1356.20	88.8
		#10	1530.10	1513.50	84.2
		#20	1083.50	1066.00	79.5
		#40	975.50	943.50	70.8
		#60	923.40	877.60	58.3
		#100	884.40	842.70	47.0
		#200	1062.90	1019.00	35.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	11.2	11.2	4.6	13.4	35.8	53.8			35.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1740	0.2678	0.9129	2.3133	6.2897	11.2611

Fineness Modulus
1.66

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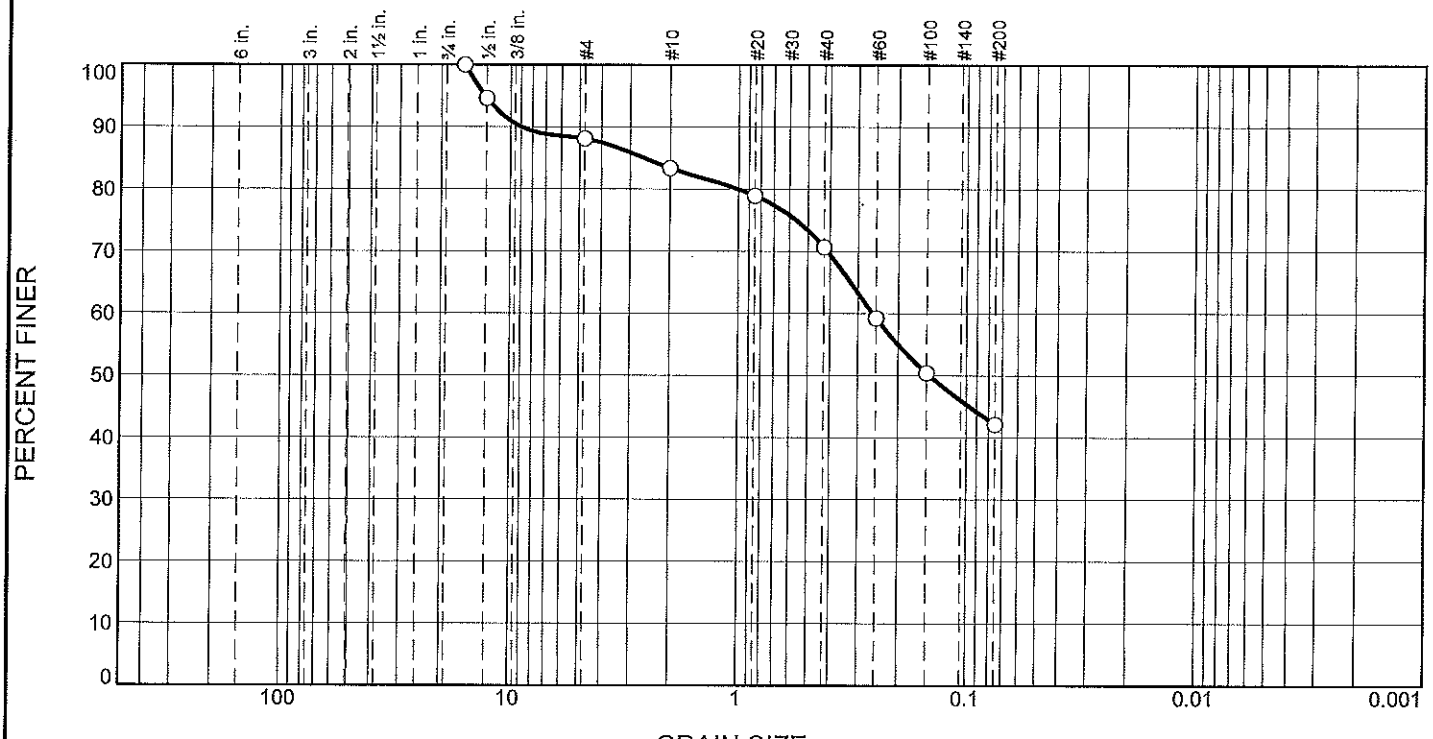
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.9	4.8	12.7	28.5	42.1	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
5/8"	100.0		
1/2"	94.6		
#4	88.1		
#10	83.3		
#20	78.9		
#40	70.6		
#60	59.2		
#100	50.4		
#200	42.1		

* (no specification provided)

Material Description

Light Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 9.0034 D_{85}= 2.6229 D_{60}= 0.2596
D_{50}= 0.1459 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 12/4/13
Tested By: TEP/RJF
Checked By: JAM
Title:

Source of Sample: Boring OVS-B-003 **Depth:** 10'-10.4' **Date Sampled:**
Sample Number: HMA#7567-10/S-4

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring OVS-B-003
Depth: 10'-10.4'
Sample Number: HMA#7567-10/S-4
Material Description: Light Brown Silty Sand
Date Received: 11/19/13
USCS Classification: SM
AASHTO Classification: A-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 12/4/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 250.50
Tare Wt. = 118.80
Minus #200 from wash = 42.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
347.00	118.80	5/8"	0.00	0.00	100.0
		1/2"	1431.50	1419.20	94.6
		#4	1371.10	1356.20	88.1
		#10	1524.30	1513.50	83.3
		#20	1076.10	1066.00	78.9
		#40	962.40	943.50	70.6
		#60	903.70	877.60	59.2
		#100	862.80	842.70	50.4
		#200	1037.90	1019.00	42.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	11.9	11.9	4.8	12.7	28.5	46.0			42.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1459	0.2596	1.0096	2.6229	9.0034	12.9383

Fineness Modulus
1.67

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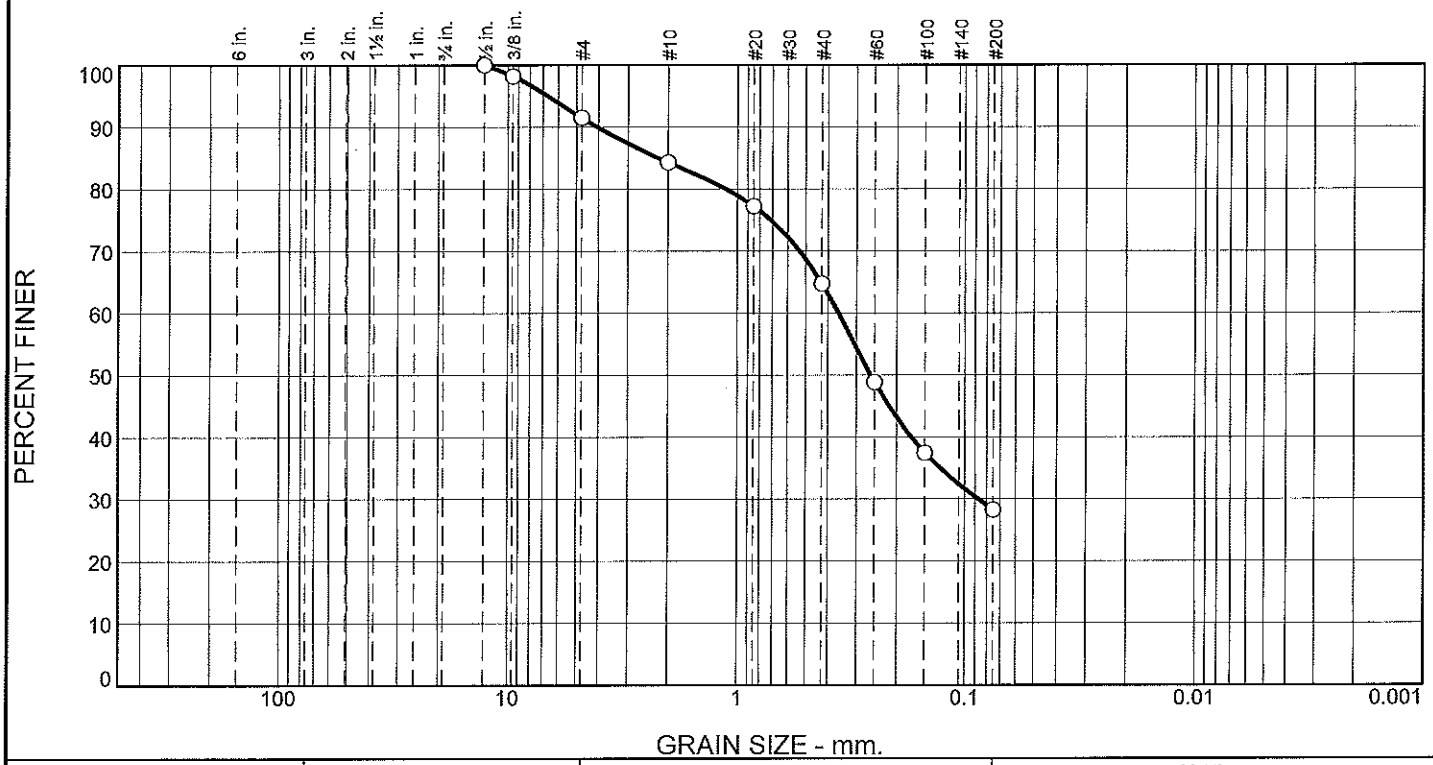
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.5	7.3	19.5	36.4	28.3	

Test Results (ASTM C136 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1/2"	100.0		
3/8"	98.2		
#4	91.5		
#10	84.2		
#20	77.2		
#40	64.7		
#60	48.8		
#100	37.5		
#200	28.3		

* (no specification provided)

Material Description

Gray Brown Silty Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 4.0744 D_{85}= 2.2195 D_{60}= 0.3605
D_{50}= 0.2603 D_{30}= 0.0872 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 11/19/13 **Date Tested:** 12/4/13

Tested By: TEP/RJF

Checked By: JAM

Title:

Source of Sample: Boring OVS-B-003 **Depth:** 20'-20.5' **Date Sampled:**
Sample Number: HMA#7567-11/S-7

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Golder Associates
Project: Sound Transit East Link
Project No: 12-450 **Figure**

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

GRAIN SIZE DISTRIBUTION TEST DATA

12/9/2013

Client: Golder Associates
Project: Sound Transit East Link
Project Number: 12-450
Location: Boring OVS-B-003
Depth: 20'-20.5'
Sample Number: HMA#7567-11/S-7
Material Description: Gray Brown Silty Sand
Date Received: 11/19/13
USCS Classification: SM
AASHTO Classification: A-2-4(0)
Grain Size Test Method: ASTM C136
#200 Wash Method: ASTM D1140
Tested By: TEP/RJF
Test Date: 12/4/13
Checked By: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 326.20
Tare Wt. = 115.30
Minus #200 from wash = 28.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
409.90	115.30	1/2"	0.00	0.00	100.0
		3/8"	1488.40	1483.10	98.2
		#4	1376.00	1356.20	91.5
		#10	1534.80	1513.50	84.2
		#20	1086.80	1066.00	77.2
		#40	980.20	943.50	64.7
		#60	924.40	877.60	48.8
		#100	876.20	842.70	37.5
		#200	1046.10	1019.00	28.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	8.5	8.5	7.3	19.5	36.4	63.2			28.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0872	0.2603	0.3605	1.1272	2.2195	4.0744	6.6834

Fineness Modulus
1.80

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Moisture Contents

Golder Associates - STEL Batch #11

HMA Sample #	Golder Sample #	Location	Date Received	Date of Test	Tare #	Wt of Tare	Tare+ Wet	Tare+ Dry	Moisture %
7529-1	Shelby tube sample containing mostly organics, which was not scheduled to be tested								
7529-2	S-4	E330-B-030	7/15/2013	7/18/2013	M3	198.2	798.9	704.4	18.7
7529-3	S-3	E360-B-003	7/15/2013	7/18/2013	2A	217.3	694.2	650.4	10.1
7529-4	S-6	E360-B-003	7/15/2013	7/18/2013	E-4	199.0	781.9	717.4	12.4
7529-5	S-9	E360-B-003	7/15/2013	7/18/2013	3A	213.7	745.2	670.6	16.3
7529-6	S-12	E360-B-003	7/15/2013	7/18/2013	2AA	214.2	848.7	751.2	18.2
7529-7	S-15	E360-B-003	7/15/2013	7/18/2013	4A	212.5	730.3	668.3	13.6
7529-8	S-22	E360-B-003	7/15/2013	7/19/2013	1A	213.0	401.3	369.7	20.2
7529-9	S-22	E360-B-007	7/15/2013	7/19/2013	M2	214.10	606.70	551.20	16.5
7529-10	S-5	E360-B-007	7/15/2013	7/19/2013	M3	198.30	828.00	760.70	12.0
7529-11	S-9A	E360-B-007	7/15/2013	7/22/2013	S6	117.9	692.00	653.80	7.1
7529-12	S-11A	E360-B-007	7/15/2013	7/22/2013	S9	114.1	685.7	611.0	15.0
7529-13	S-14A	E360-B-007	7/15/2013	7/22/2013	S10	114.0	379.7	321.00	28.4
7529-14	S-17A	E360-B-007	7/15/2013	7/22/2013	M5	120.1	928.9	858.3	9.6
7529-15	S-21A	E360-B-007	7/15/2013	7/22/2013	S5	118.7	710.2	625.6	16.7
7529-16	S-23B	E360-B-007	7/15/2013	7/22/2013	S7	116.2	295.3	260.9	23.8
7529-17	S-1	E330-B-08A	7/15/2013	7/22/2013	M6	117.3	601.8	557.7	10.0
7529-18	S-3	E330-B-08A	7/15/2013	7/23/2013	6A	114.6	588.3	545.8	9.9
7529-19	S-7	E330-B-08A	7/15/2013	7/23/2013	5A	114.1	527.8	471.9	15.6
7529-20	S-10	E330-B-08A	7/15/2013	7/23/2013	S4	118.4	259.1	236.9	18.7
7529-21	S-12	E330-B-08A	7/15/2013	7/23/2013	S8	113.3	463.2	423.8	12.7
7529-22	S-15	E330-B-08A	7/15/2013	7/23/2013	S1	118.2	536.8	466.2	20.3
7529-23	S-18	E330-B-08A	7/15/2013	7/23/2013	S3	118.4	282.2	251.2	23.3
7529-24	S-20	E330-B-08A	7/15/2013	7/24/2013	B3	115.2	211.3	196.4	18.3
7529-25	S-1	E340-B-07A	7/15/2013	7/24/2013	M7	123.2	197.4	186.2	17.8
7529-26	S-4	E340-B-07A	7/15/2013	7/24/2013	8A	136.2	451.5	415.1	13.1
7529-27	S-8	E340-B-07A	7/15/2013	7/25/2013	AB	157.4	282.4	258.9	23.2
7529-28	S-11	E340-B-07A	7/15/2013	7/25/2013	7A	87.3	772.7	722.1	8.0
7529-29	S-15	E340-B-07A	7/15/2013	7/25/2013	9A	161.7	465.6	440.1	9.2
7529-30	S-1	E340-B-018	7/15/2013	7/25/2013	X8	194.1	741.5	682.2	12.1
7529-31	S-4	E340-B-018	7/15/2013	7/25/2013	X7	192.9	603.1	537.3	19.1
7529-32	S-6	E340-B-018	7/15/2013	7/26/2013	AJ2	164.8	615.3	544.0	18.8
7529-33	S-8	E340-B-018	7/15/2013	7/26/2013	X5	198.0	402.2	381.8	11.1
7529-34	S-14	E340-B-018	7/15/2013	7/26/2013	X6	195.9	454.1	428.9	10.8
7529-35	S-21	E340-B-018	7/15/2013	7/26/2013	MG1	363.6	738.8	671.1	22.0

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7543-24	S-1	E320-B-158, 2.5'-4'	8/22/2013	9/6/2013	7A	87.3	553.3	521.4	7.3
7543-25	S-3	E320-B-158, 7.5'-9'	8/22/2013	9/9/2013	8A	136.3	612.6	568.9	10.1
7543-26	S-9	E320-B-158, 30'-31'	8/22/2013	9/9/2013	AB	157.5	730.8	672.2	11.4
7543-27	S-13	E320-B-158, 50'-51.5'	8/22/2013	9/10/2013	9A	161.8	611	572.8	9.3
7543-28	S-1	E320-B-159, 2.5'-4'	8/22/2013	9/10/2013	X7	192.9	523.7	480.7	14.9
7543-29	S-4	E320-B-159, 10'-11.5	8/22/2013	9/11/2013	X8	194.1	687.8	639.6	10.8
7543-30	S-8	E320-B-159, 25'-25.8'	8/22/2013	9/11/2013	X6	196.1	611	562.8	13.1
7543-31	S-10	E320-B-159, 35'-36'	8/22/2013	9/11/2013	AJ	164.9	546.7	504.6	12.4
7543-32	S-3	E360-B-37, 12.5'-14'	8/22/2013	9/12/2013	X5	199	796.3	736	11.2
7543-33	S-8	E360-B-37, 35'-35.5'	8/22/2013	9/12/2013	M4	190.1	743.1	685.3	11.7
7543-34	S-3	E360-B-38, 7.5'-9'	8/22/2013	9/13/2013	X9	230.8	853.5	759.3	17.8
7543-35	S-6	E360-B-38, 7.5'-9'	8/22/2013	9/13/2013	X10	234.6	849	773.4	14.0
7543-36	S-10	E360-B-38, 35'-36'	8/22/2013	9/16/2013	BB	621.8	1115.5	1054.1	14.2
7543-37	S-2	E360-B-39, 5'-6.5'	8/22/2013	9/16/2013	X2	595.8	1188.5	1116.7	13.8
7543-38	S-7	E360-B-39, 20'-21.5'	8/22/2013	9/16/2013	A	603.5	1264.7	1188.2	13.1
7543-39	S-10	E360-B-39, 35'-36.5'	8/22/2013	9/16/2013	RJ	366	989.6	908	15.1
7543-40	S-3	E360-B-40, 7.5'-9'	8/22/2013	9/16/2013	2A	217.7	901.1	822.9	12.9
7543-41	S-7	E360-B-40, 20'-21'	8/22/2013	9/16/2013	BL9	293.8	905.3	860.6	7.9
7543-42	S-11	E360-B-40, 40'-40.11'	8/22/2013	9/16/2013	A5	598.5	1159.2	1108.8	9.9

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Moisture Contents

Golder Associates - STEL Remainder of Batch #14

HMA Sample #	Golder Sample #	Location	Date Received	Date of Test	Tare #	Wt of Tare	Tare+ Wet	Tare+ Dry	Moisture %
7551-24	S-2	E360-B-041, 5'	9/26/2013	10/7/2013	S5	118.8	855.3	798.7	8.3
7551-25	S-5	E360-B-041, 12.5'	9/26/2013	10/7/2013	M6	117.2	715.7	660.1	10.2
7551-26	S-8	E360-B-041, 20'	9/26/2013	10/7/2013	S9	114.0	888.7	823.4	9.2
7551-27	S-10	E360-B-041, 30'	9/26/2013	10/7/2013	S7	116.0	707.7	668.4	7.1
7551-28	S-4	E360-B-042, 10'	9/26/2013	10/7/2013	S10	114.0	693.4	635.5	11.1
7551-29	S-6	E360-B-042, 15'	9/26/2013	10/7/2013	S3	118.5	752.4	690.2	10.9
7551-30	S-8	E360-B-042, 25'	9/26/2013	10/7/2013	AB	157.1	752.9	663.1	17.7
7551-31	S-11	E360-B-042, 40'	9/26/2013	10/8/2013	B3	115.0	746.5	663.6	15.1
7551-32	S-1	E360-B-043, 2.5'	9/26/2013	10/8/2013	6A	114.60	765.30	687.90	13.5
7551-33	S-4	E360-B-043, 10'	9/26/2013	10/8/2013	5A	114.20	826.70	723.80	16.9
7551-34	S-8	E360-B-043, 25'	9/26/2013	10/8/2013	S8	113.3	740.90	702.20	6.6
7551-35	S-11	E360-B-043, 40'	9/26/2013	10/8/2013	S1	118.1	890.7	828.1	8.8
7551-36	S-3	E360-B-044, 7.5'	9/26/2013	10/8/2013	9A	161.9	778.6	726.90	9.2
7551-37	S-6	E360-B-044, 15'	9/26/2013	10/8/2013	S6	117.9	825.3	744.4	12.9
7551-38	S-10	E360-B-044, 35'	9/26/2013	10/8/2013	M7	123.2	832.6	761.0	11.2
7551-39	S-12	E360-B-044, 45'	9/26/2013	10/9/2013	X7	193.0	730.8	705.0	5.0
7551-40	S-4	E360-B-046, 10'	9/26/2013	10/9/2013	X8	194.2	629.2	597.4	7.9
7551-41	S-7	E360-B-046, 20'	9/26/2013	10/9/2013	X6	196.1	877.8	815.6	10.0
7551-42	S-10	E360-B-046, 35'	9/26/2013	10/9/2013	AJ2	164.9	806.8	766.4	6.7
7551-43	S-1	E360-B-047, 1'	9/26/2013	10/9/2013	X5	198.2	586.5	554.0	9.1
7551-44	S-5	E360-B-047, 10'	9/26/2013	10/9/2013	M4	190.1	630.8	577.3	13.8
7551-45	S-7	E360-B-047, 15'	9/26/2013	10/9/2013	M2	214.0	639.6	599.2	10.5
7551-46	S-9	E360-B-047, 25'	9/26/2013	10/9/2013	4A	212.4	507.2	474.4	12.5
7551-47	S-11	E360-B-047, 35'	9/26/2013	10/10/2013	E4	198.9	500.5	468.9	11.7
7551-48	S-2	E360-B-049, 2.5'	9/26/2013	10/10/2013	1A	213.1	583.4	520.8	20.3
7551-49	S-4	E360-B-049, 7.5'	9/26/2013	10/10/2013	3A	213.7	620.3	587.4	8.8
7551-50	S-7	E360-B-049, 15'	9/26/2013	10/10/2013	2AA	214.2	593.4	560.2	9.6
7551-51	S-10	E360-B-049, 30'	9/26/2013	10/10/2013	2A	217.4	468.7	443.8	11.0

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Moisture Contents

Golder Associates - Batch #15

HMA Sample #	Golder Sample #	Location	Date Received	Date of Test	Tare #	Wt of Tare	Tare+ Wet	Tare+ Dry	Moisture %
7555-1	S-13A	E360-B-007, 50'	10/4/2013	10/11/13	10	31.5	147.2	117.9	33.9
7555-2	S-22B	E360-B-007, 95'	10/4/2013	10/11/13	81	36.6	171.2	145.5	23.6
7555-3	S-12	E360-B-011, 40'	10/4/2013	10/11/13	80	35.4	142.6	113.1	38.0
7555-4	S-15	E360-B-011, 55'	10/4/2013	10/11/13	17	37.0	137.1	111.5	34.4
7555-5	S-1	E360-B-045, 2.5'	10/4/2013	10/14/13	M1	225.9	885.1	817.8	11.4
7555-6	S-5	E360-B-045, 12.5'	10/4/2013	10/14/13	M5	120.1	844.3	738.9	17.0
7555-7	S-10	E360-B-045, 35'	10/4/2013	10/14/13	S3	118.5	770.1	703.1	11.5
7555-8	S-3	E360-B-048, 7.5'	10/4/2013	10/14/13	S10	114.0	710.5	646.4	12.0
7555-9	S-6	E360-B-048, 15'	10/4/2013	10/14/13	S6	117.90	772.70	683.20	15.8
7555-10	S-11	E360-B-048, 40'	10/4/2013	10/14/13	S8	113.30	493.00	459.20	9.8
7555-11	S-2	E360-B-050, 5'	10/4/2013	10/14/13	5A	114.1	641.90	591.90	10.5
7555-12	S-4	E360-B-050, 10'	10/4/2013	10/14/13	6A	114.6	692.6	643.0	9.4
7555-13	S-7	E360-B-050, 20'	10/4/2013	10/15/13	B3	115.2	445.3	427.80	5.6
7555-14	S-1	E360-B-055, 2.5'	10/4/2013	10/15/13	S1	118.1	563.6	492.5	19.0
7555-15	S-4	E360-B-055, 10'	10/4/2013	10/15/13	S7	116.0	583.6	535.8	11.4
7555-16	S-8	E360-B-055, 25'	10/4/2013	10/15/13	S9	114.0	579.9	519.7	14.8
7555-17	S-12	E360-B-055, 45'	10/4/2013	10/16/13	S4	118.2	483.0	460.8	6.5
7555-18	S-1	E360-B-056, 2.5'	10/4/2013	10/16/13	S5	118.6	635.1	557.8	17.6
7555-19	S-3	E360-B-056, 7.5'	10/4/2013	10/16/13	M6	117.1	580.0	529.3	12.3
7555-20	S-7	E360-B-056, 20'	10/4/2013	10/16/13	X5	198.0	460.3	436.0	10.2
7555-21	S-11	E360-B-056, 40'	10/4/2013	10/17/13	AJ2	164.9	344.9	321.8	14.7
7555-22	S-3	E360-B-057, 7.5'	10/4/2013	10/17/13	X6	196.0	656.3	609.5	11.3
7555-23	S-6	E360-B-057, 15'	10/4/2013	10/17/13	9A	161.9	638.8	591.0	11.1
7555-24	S-11	E360-B-057, 40'	10/4/2013	10/17/13	X8	194.1	563.5	519.2	13.6
7555-25	S-3	E360-B-058, 5'	10/4/2013	10/17/13	X7	192.9	655.2	585.0	17.9
7555-26	S-5	E360-B-058, 10'	10/4/2013	10/17/13	AB	157.4	688.5	636.2	10.9
7555-27	S-8	E360-B-058, 20'	10/4/2013	10/18/13	X9	230.7	550.1	517.8	11.3
7555-28	S-13	E360-B-058, 45'	10/4/2013	10/18/13	X10	234.6	622.0	596.2	7.1
7555-29	S-1	E360-B-059, 2.5'	10/4/2013	10/21/13	M1	225.9	773.6	693.5	17.1
7555-30	S-4	E360-B-059, 10'	10/4/2013	10/21/13	M4	190.1	767.3	699.4	13.3
7555-31	S-7	E360-B-059, 20'	10/4/2013	10/21/13	E4	198.8	539.7	515.2	7.7

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Moisture Contents

Golder Associates - Batch #16

HMA Sample #	Golder Sample #	Location	Date Received	Date of Test	Tare #	Wt of Tare	Tare+ Wet	Tare+ Dry	Moisture %
7567-1	S-3	OTC-B-003, 7.5'	11/19/13	11/25/13	S6	118.0	575.0	533.0	10.1
7567-2	S-9	OTC-B-003, 30'	11/19/13	11/26/13	S7	116.1	587.5	547.4	9.3
7567-3	S-5	OVS-B-001, 12.5'	11/19/13	11/26/13	S10	114.1	448.1	431.7	5.2
7567-4	S-8	OVS-B-001, 25'	11/19/13	12/2/13	S3	118.5	518.6	478.2	11.2
7567-5	S-2	OVS-B-002, 5'	11/19/13	12/2/13	S1	118.2	529.1	496.1	8.7
7567-6	S-6	OVS-B-002, 15'	11/19/13	12/3/13	S9	114.0	506.5	487.4	5.1
7567-7	S-8	OVS-B-002, 25'	11/19/13	12/3/13	S4	118.3	514.2	469.7	12.7
7567-8	S-10	OVS-B-002, 35'	11/19/13	12/3/13	6A	114.7	645.4	605.7	8.1
7567-9	S-1	OVS-B-003, 2.5'	11/19/13	12/4/13	5A	114.20	506.30	481.60	6.7
7567-10	S-4	OVS-B-003, 10'	11/19/13	12/4/13	S5	118.80	361.90	347.00	6.5
7567-11	S-7	OVS-B-003, 20'	11/19/13	12/4/13	B3	115.3	426.60	409.90	5.7
7567-12	S-2	E360-B-034, 5'	11/19/13	12/4/13	M6	117.1	621.5	597.1	5.1
7567-13	S-6	E360-B-034, 15'	11/19/13	12/4/13	S8	113.4	588.9	531.00	13.9
7567-14	S-9	E360-B-034, 30'	11/19/13	12/4/13	M5	120.2	562.0	535.6	6.4
7567-15	S-2	E360-B-036, 5'	11/19/13	12/4/13	7A	87.4	492.1	466.3	6.8
7567-16	S-7	E360-B-036, 20'	11/19/13	12/4/13	E4	198.9	483.7	474.7	3.3
7567-17	S-9	E360-B-036, 27.5'	11/19/13	12/4/13	2A	217.4	585.6	553.4	9.6
7567-18	S-14	E360-B-036, 45'	11/19/13	12/4/13	4A	212.5	851.6	762.6	16.2
7567-19	S-2	E340-PZ-008, 2.5'	11/19/13	12/5/13	3A	213.7	580.0	535.4	13.9
7567-20	S-4	E340-PZ-008, 7.5	11/19/13	12/5/13	M1	226.0	403.6	381.9	13.9
7567-21	S-7	E340-PZ-008, 15'	11/19/13	12/5/13	9A	162.0	778.7	736.9	7.3
7567-22	S-1	E330-B-015, 2.5'	11/19/13	12/6/13	M2	214.1	576.3	548.1	8.4
7567-23	S-8	E330-B-015, 25'	11/19/13	12/6/13	M7	123.2	413.8	385.6	10.7
7567-24	S-13	E330-B-015, 50'	11/19/13	12/6/13	2AA	214.4	435.0	414.9	10.0
7567-25	S-17	E330-B-015, 70'	11/19/13	12/9/13	1A	213.2	365.6	331.5	28.8
7567-26	S-21	E330-B-015, 90'	11/19/13	12/9/13	AJ2	164.9	298.4	266.0	32.0
7567-27	S-1	E330-B-016, 2.5'	11/19/13	12/9/13	S6	118.0	583.2	538.2	10.7
7567-28	S-6	E330-B-016, 15'	11/19/13	12/10/13	S7	115.9	423.4	400.1	8.2
7567-29	S-14	E330-B-016, 55'	11/19/13	12/10/13	X5	198	450.4	424.4	11.5
7567-30	S-18	E330-B-016, 75'	11/19/13	12/10/13	10	31.5	153.3	130	23.7
7567-31	S-21	E330-B-016, 90'	11/19/13	12/10/13	S10	113.8	522.7	470.3	14.7
7567-32	S-2	E340-B-030A, 5'	11/19/13	12/10/13	8A	136.3	554.7	525.5	7.5
7567-33	S-7	E340-B-030A, 20'	11/19/13	12/11/13	X9	230.8	530.7	507.2	8.5

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BLDG-2018-00983, BLDG-2018-00985

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-ES-6p, SS-4	20.0-21.5	16						16.2				SM	Grayish brown, silty SAND
B-D-ES-6p, SS-6	30.0-31.5	14				8.7	79.1	12.2				SM	Dark olive brown, silty SAND
B-D-ES-6p, SS-9	55.0-56.5	13						17.4				SM	Dark gray silty SAND
B-D-ES-6p, SS-11	70.0-71.5	23						21.1				SM	Dark gray silty SAND

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

HWA GEOSCIENCES INC.

SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-ES-6p

PROJECT NO.
2009-142

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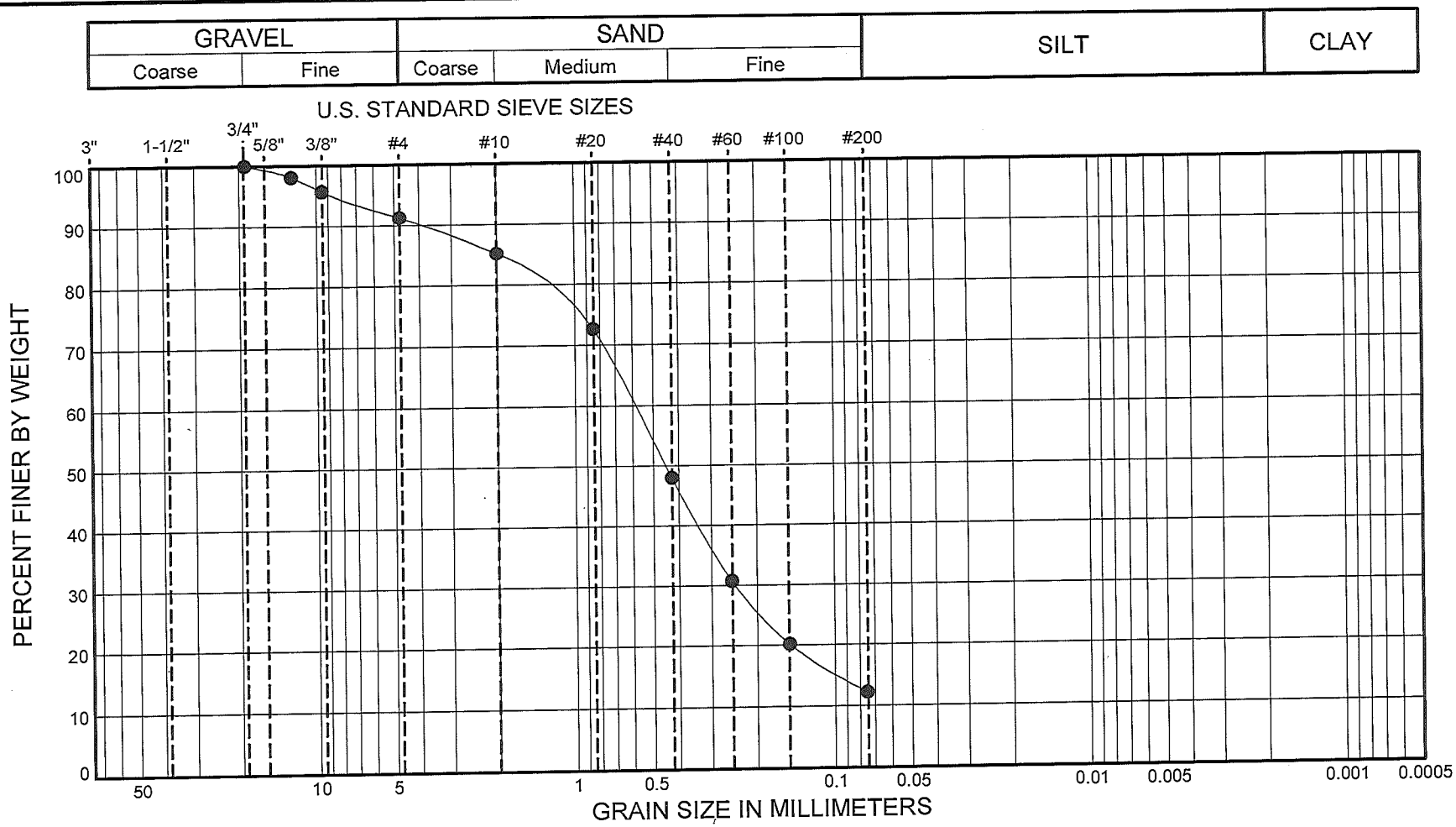
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-6p	SS-6	30.0 - 31.5	(SM) Dark olive brown, silty SAND	14				8.7	79.1	12.2

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SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

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ELDG-2018-00983, ELDG-2018-00985

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-6p

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-ES-7, SS-2	10.0-11.5	7				13.6	57.8	28.7				SM	Grayish brown, silty SAND
B-D-ES-7, SS-4	20.0-21.5	8				10.0	63.2	26.8				SM	Dark gray, silty SAND
B-D-ES-7, SS-7	35.0-36.5	15				25.7	47.4	27.0				SM	Olive brown, silty SAND with gravel
B-D-ES-7, SS-11	55.0-56.5	19				9.9	74.0	16.1				SM	Olive brown, silty SAND
B-D-ES-7, SS-13	65.0-66.5	16				4.2	76.5	19.2				SM	Olive brown, silty SAND
B-D-ES-7, SS-14B	70.0-71.5	35	43	20	23							CL	Dark gray, lean CLAY
B-D-ES-7, SS-20B	97.5-99.0	23						97.2				ML	Dark gray, SILT

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

HWA GEOSCIENCES INC.

SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-ES-7

PROJECT NO.
2009-142

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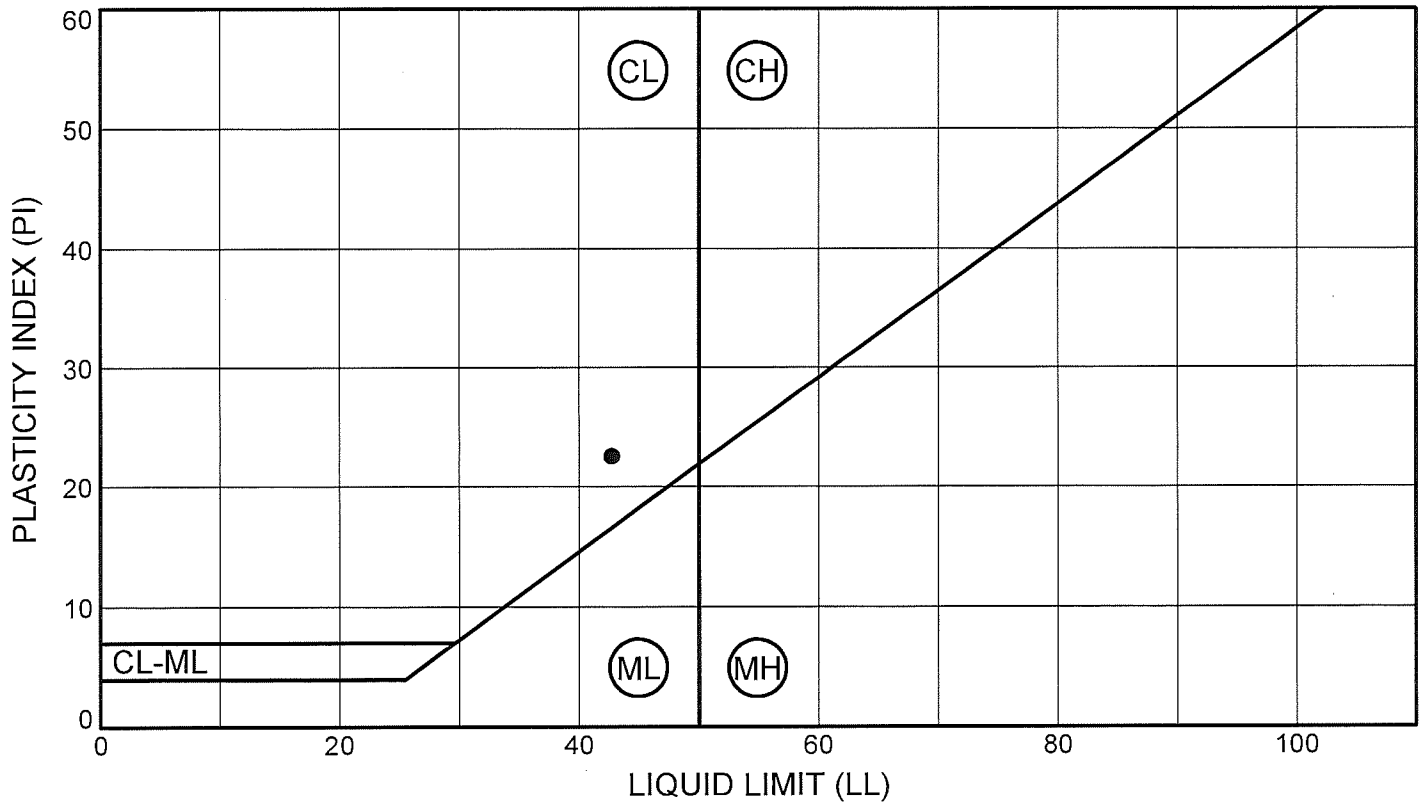
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	B-D-ES-7	SS-14B	70.0 - 71.5	(CL) Dark gray, lean CLAY	35	43	20	23	

HWA GEOSCIENCES INC.

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

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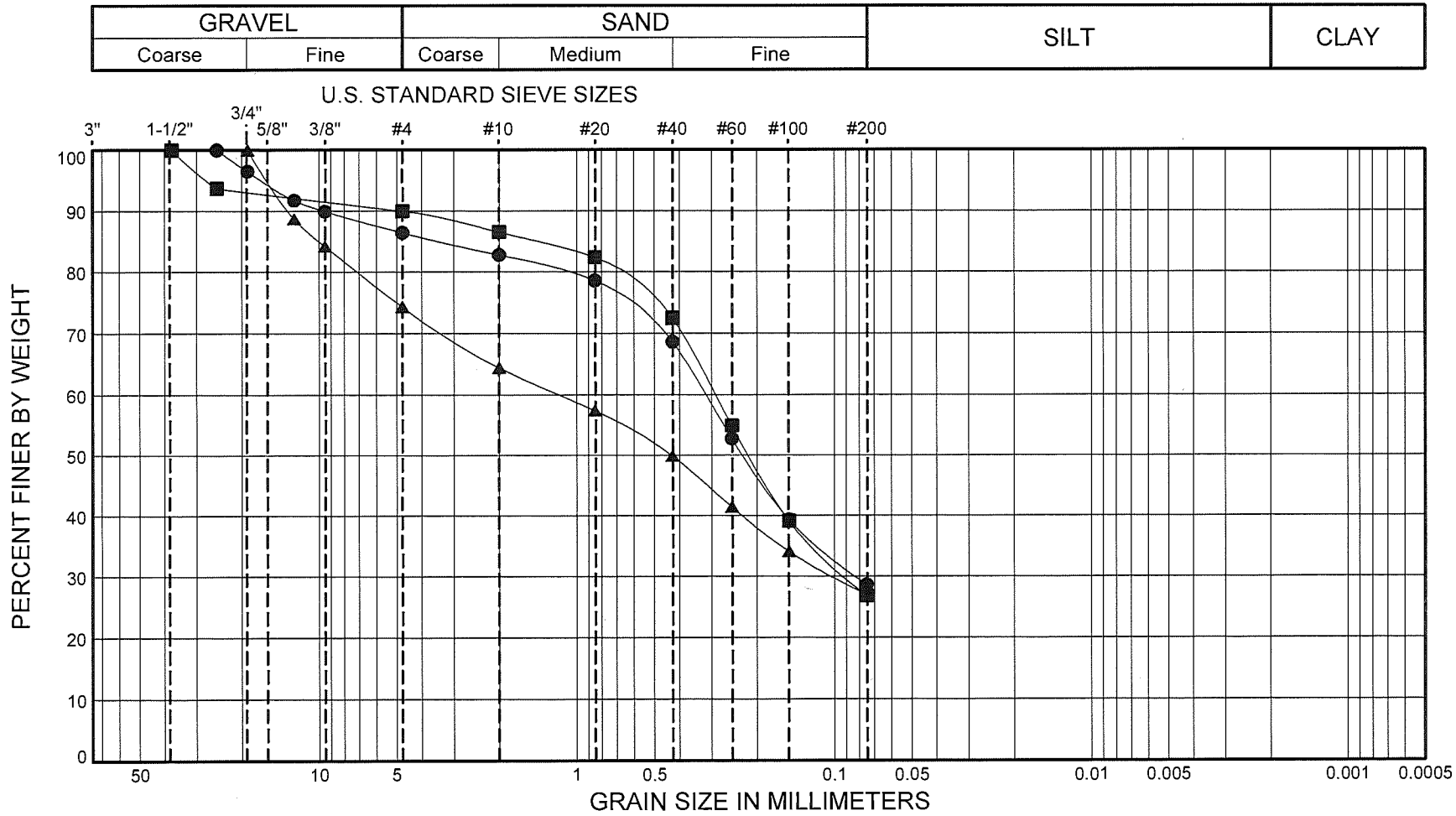
BLDG-2018-00983, BLDG-2018-00985

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-7



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-7	SS-2	10.0 - 11.5	(SM) Grayish brown, silty SAND	7				13.6	57.8	28.7
■	B-D-ES-7	SS-4	20.0 - 21.5	(SM) Dark gray, silty SAND	8				10.0	63.2	26.8
▲	B-D-ES-7	SS-7	35.0 - 36.5	(SM) Olive brown, silty SAND with gravel	15				25.7	47.4	27.0

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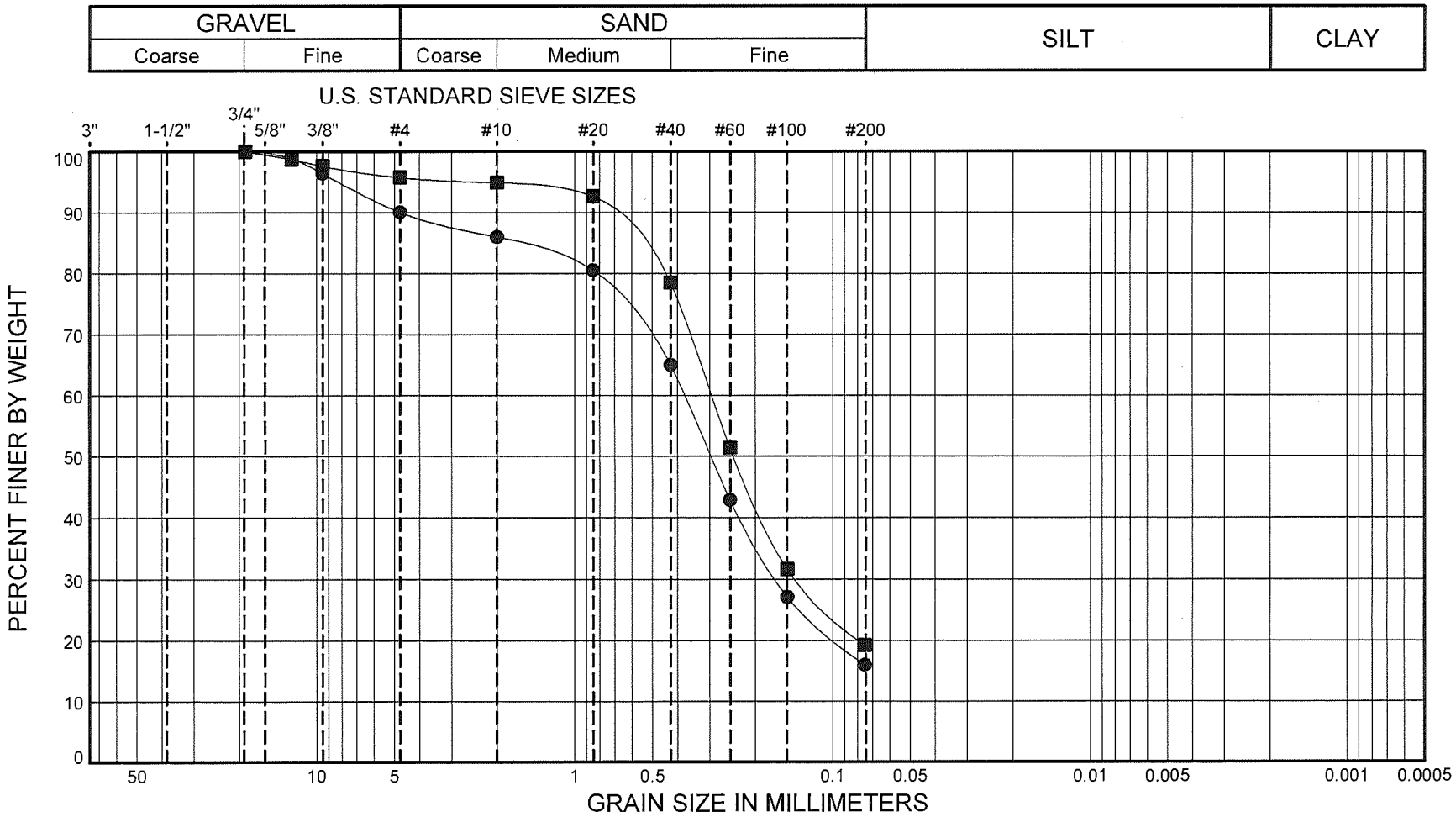
SOUND TRANSIT EASTLINK PHASE 3
King County, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-7



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-7	SS-11	55.0 - 56.5	(SM) Olive brown, silty SAND	19				9.9	74.0	16.1
■	B-D-ES-7	SS-13	65.0 - 66.5	(SM) Olive brown, silty SAND	16				4.2	76.5	19.2

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BLDG-2018-00983, BLDG-2018-00985

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-7

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	SPECIFIC GRAVITY	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-ES-7, ST-15	75-77	36	42	21	21			96		2.78		CL	Dark gray, lean CLAY
B-D-ES-7, ST-19	95-97	30	43	18	25			82		2.77		CL	Dark gray, lean CLAY

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

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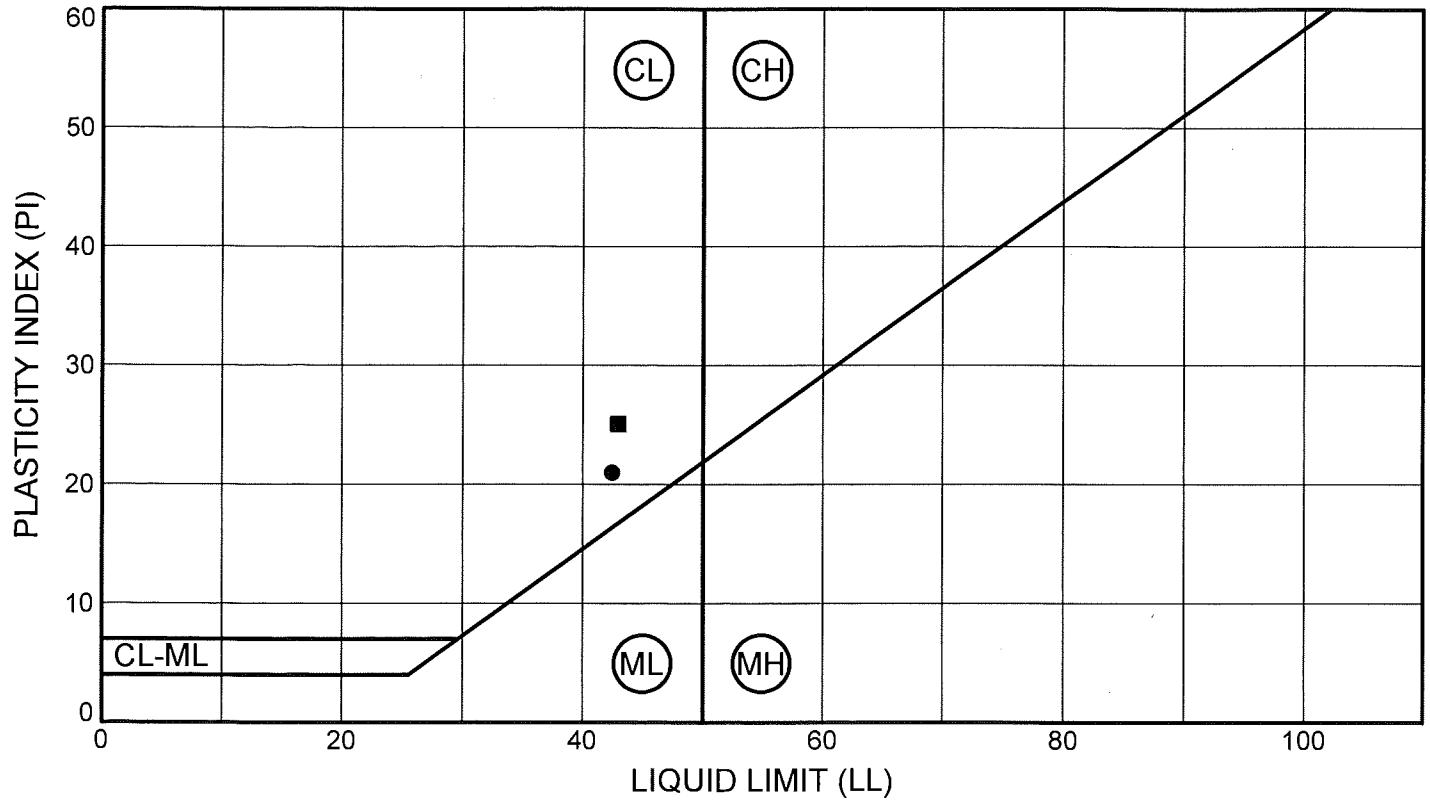
BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC.

SUMMARY OF MATERIAL PROPERTIES
SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-ES-7

PROJECT NO.
2009-142



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	B-D-ES-7	ST-15	75.0 - 77.0	(CL) Dark gray, lean CLAY	36	42	21	21	
■	B-D-ES-7	ST-19	95.0 - 97.0	(CL) Dark gray, lean CLAY	30	43	18	25	

HWA GEOSCIENCES INC.

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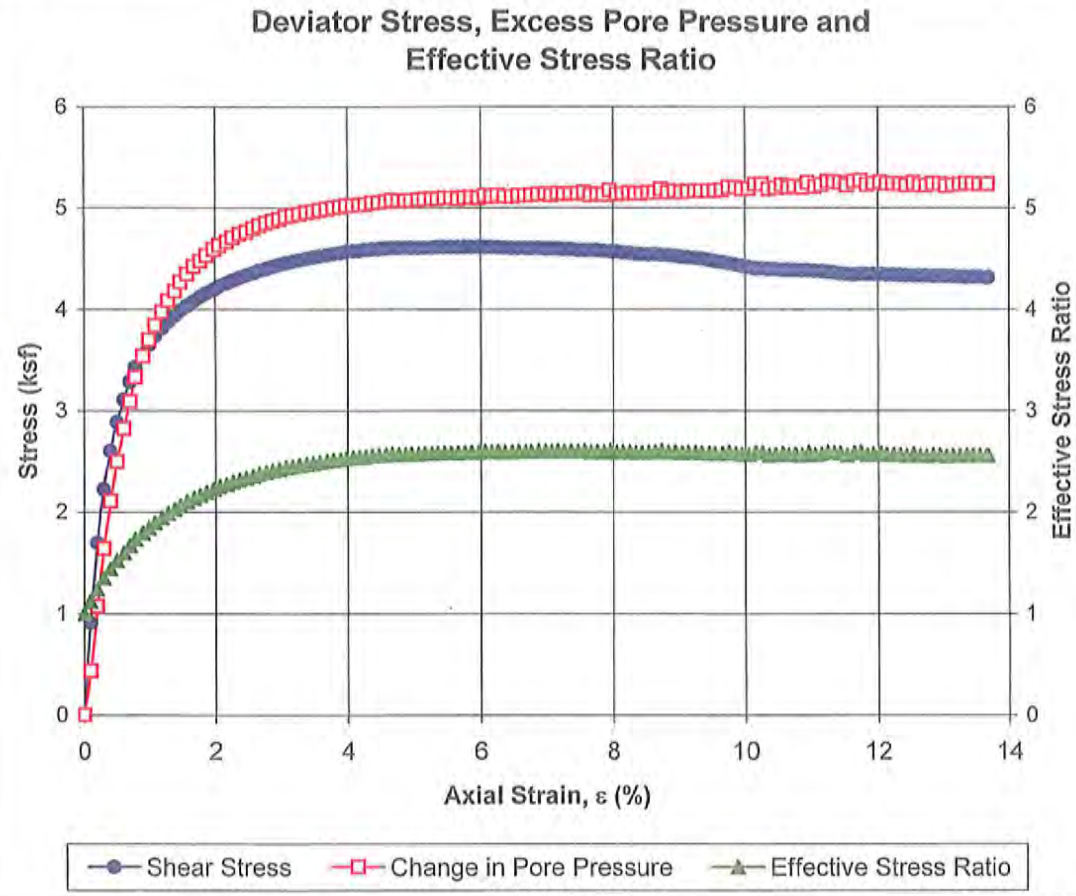
BLDG-2018-00980, BLDG-2018-00985

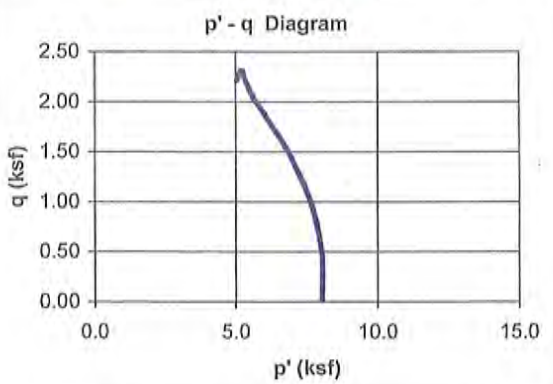
SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

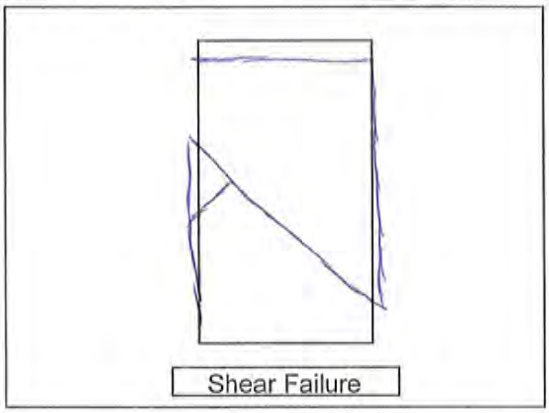
LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-7

HWA GeoSciences Inc - Materials Testing Laboratory					
Consolidated-Undrained Triaxial Compression Test for Cohesive Soils (ASTM D 4767)					
Project Name:	Sound Transit, East Link			Date:	6/1/2010
Project No.:	2009-142	Exploration ID		B-D-ES-7	
Technician:	HBenny	Sample No:		ST-19	
Sample Description:	Gray lean CLAY	Sample Depth:		95-97	
Strain Rate, in/min:	0.0013	Confining Pressure:		55.6 psi	
Initial Moisture, %	29.8	Initial Wet Density	124.3	Initial Dry Density	95.0
Shear Plots:					







Reviewed by: _____ Figure 1

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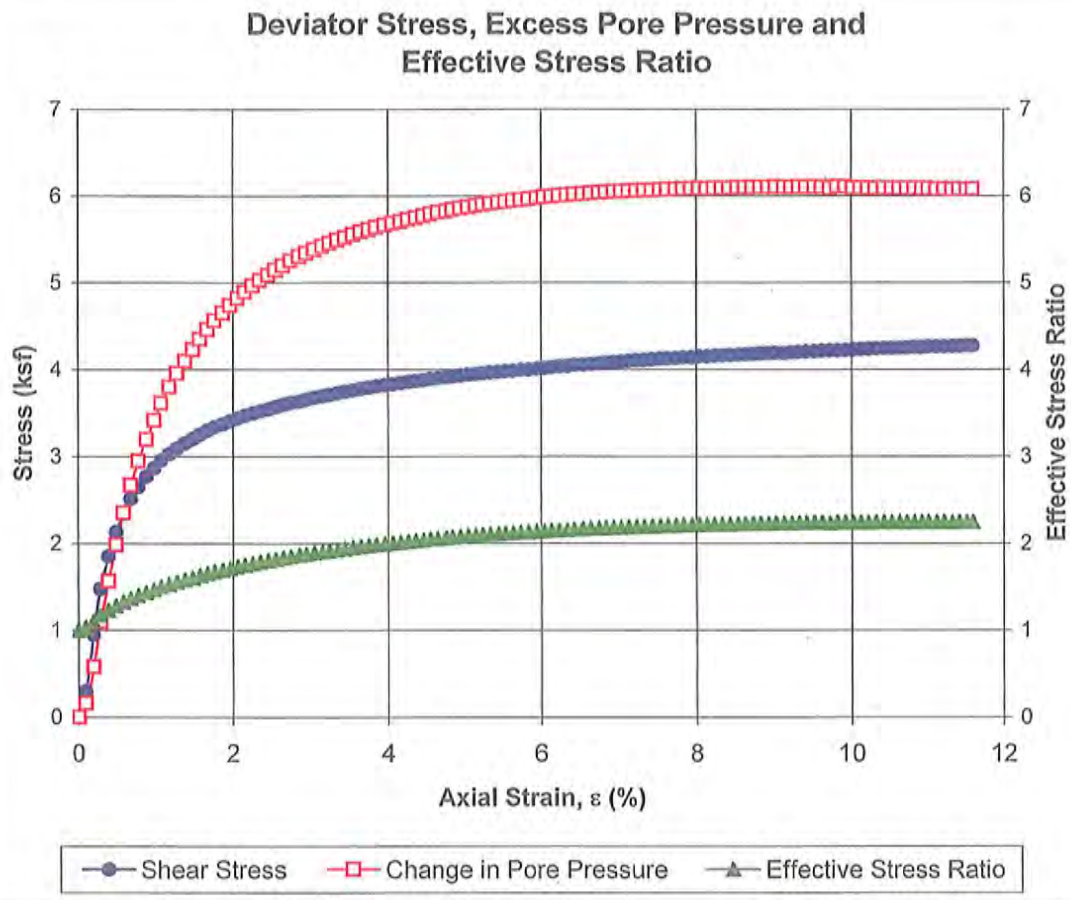
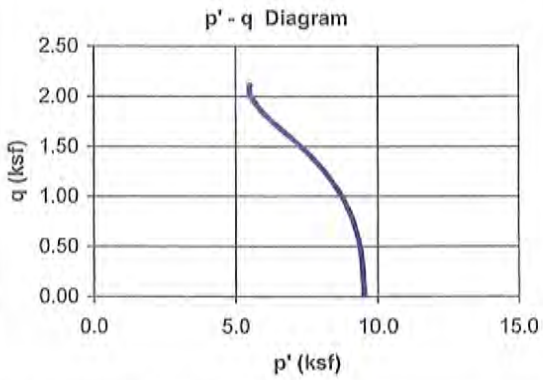
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

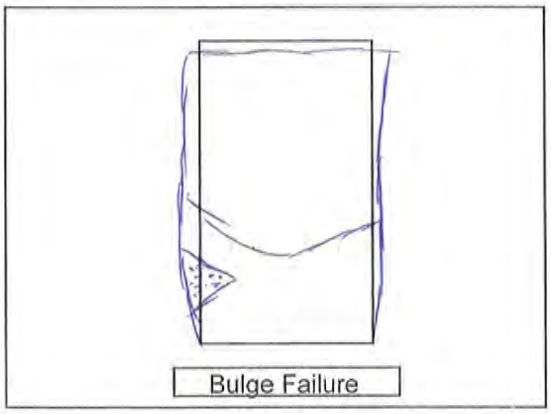
B-D-ES-7, ST-19 @ 55 psi

FIGURE 1A

HWA GeoSciences Inc - Materials Testing Laboratory					
Consolidated-Undrained Triaxial Compression Test for Cohesive Soils (ASTM D 4767)					
Project Name:	Sound Transit, East Link			Date:	6/1/2010
Project No.:	2009-142	Exploration ID		B-D-ES-7	
Technician:	HBenny	Sample No:		ST-19	
Sample Description:	Gray lean CLAY	Sample Depth:		95-97	
Strain Rate, in/min:	0.0013	Confining Pressure:		66.0 psi	
Initial Moisture, %	41.0	Initial Wet Density	113.6	Initial Dry Density	81.7
Shear Plots:					







Reviewed by: _____ Figure 2

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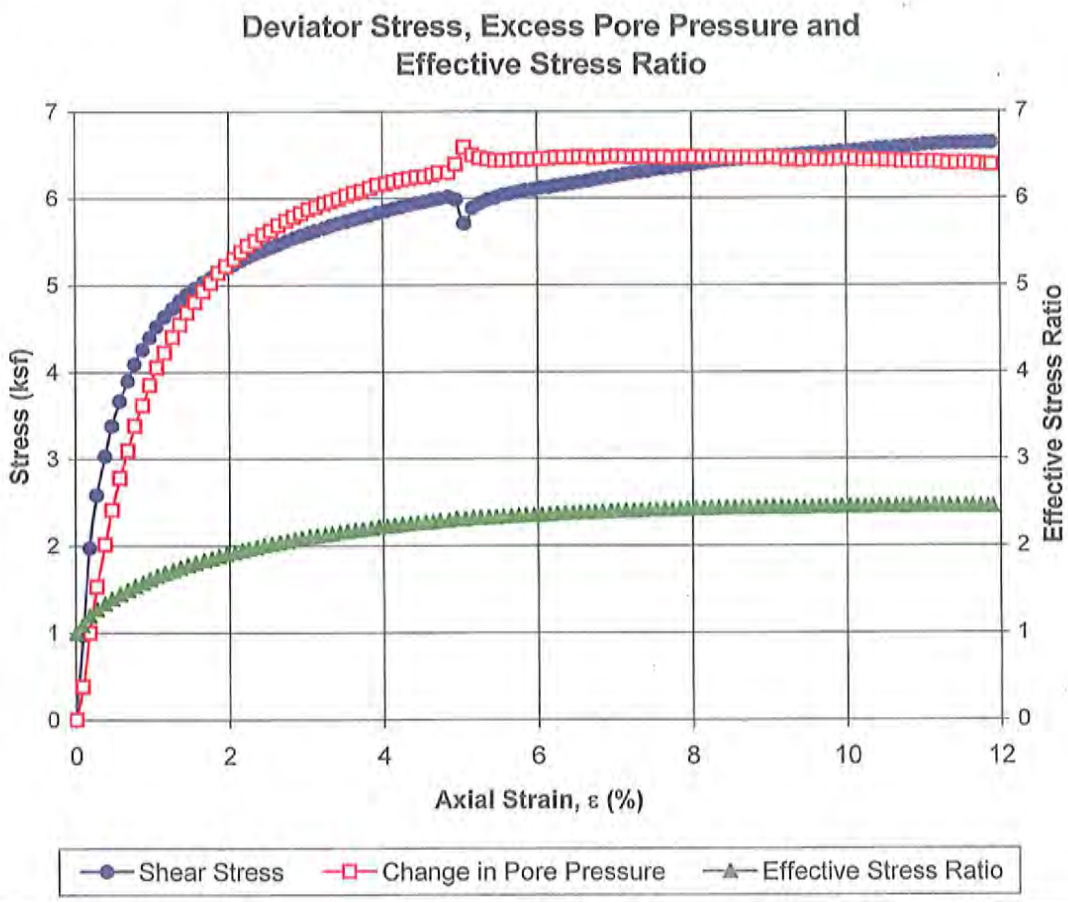
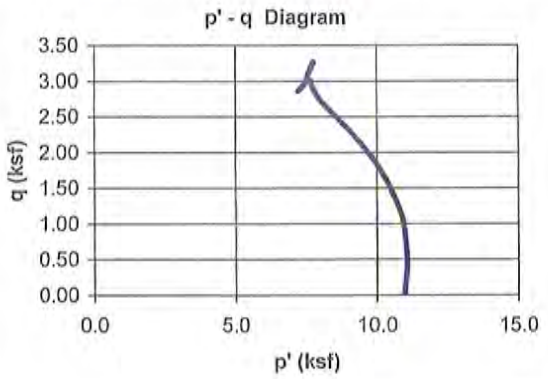
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

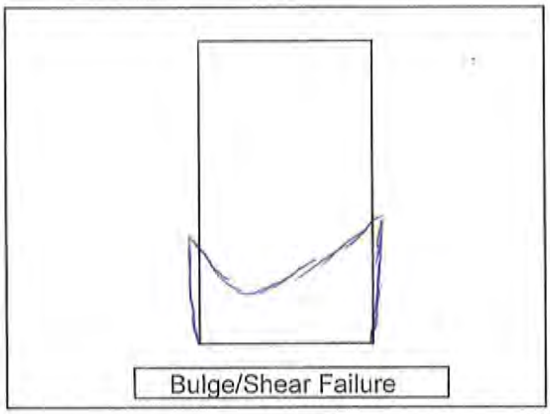
B-D-ES-7, ST-19 @ 66 psi

FIGURE 2A

HWA GeoSciences Inc - Materials Testing Laboratory					
Consolidated-Undrained Triaxial Compression Test for Cohesive Soils (ASTM D 4767)					
Project Name:	Sound Transit, East Link			Date:	6/1/2010
Project No.:	2009-142	Exploration ID		B-D-ES-7	
Technician:	HBenny	Sample No:		ST-19	
Sample Description:	Gray lean CLAY	Sample Depth:		95-97	
Strain Rate, in/min:	0.0013	Confining Pressure:		76.4 psi	
Initial Moisture, %	24.0	Initial Wet Density	117.2	Initial Dry Density	86.7
Shear Plots:					







Reviewed by: _____ Figure 3

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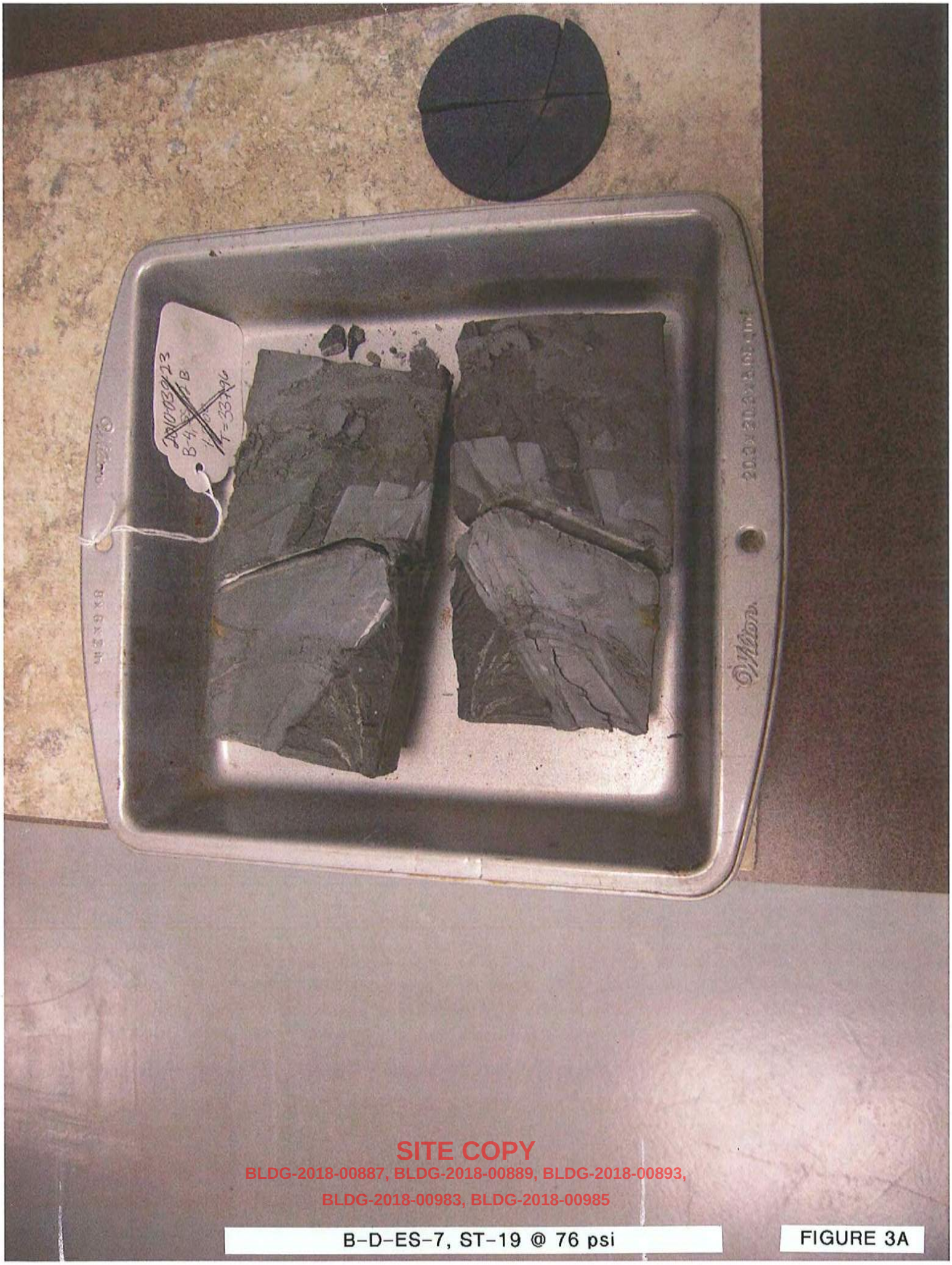

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

B-D-ES-7, ST-19 @ 76 psi

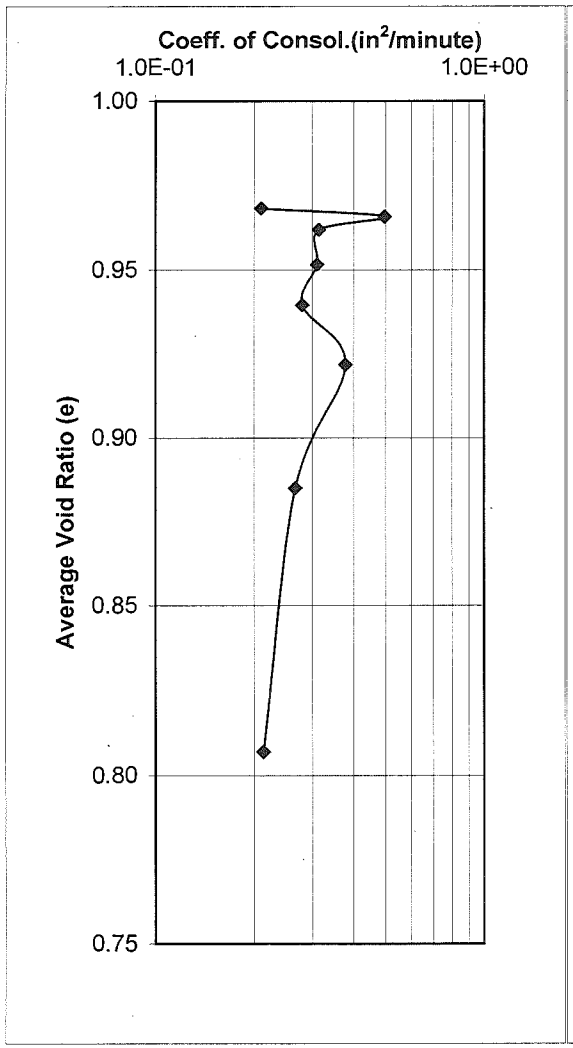
FIGURE 3A

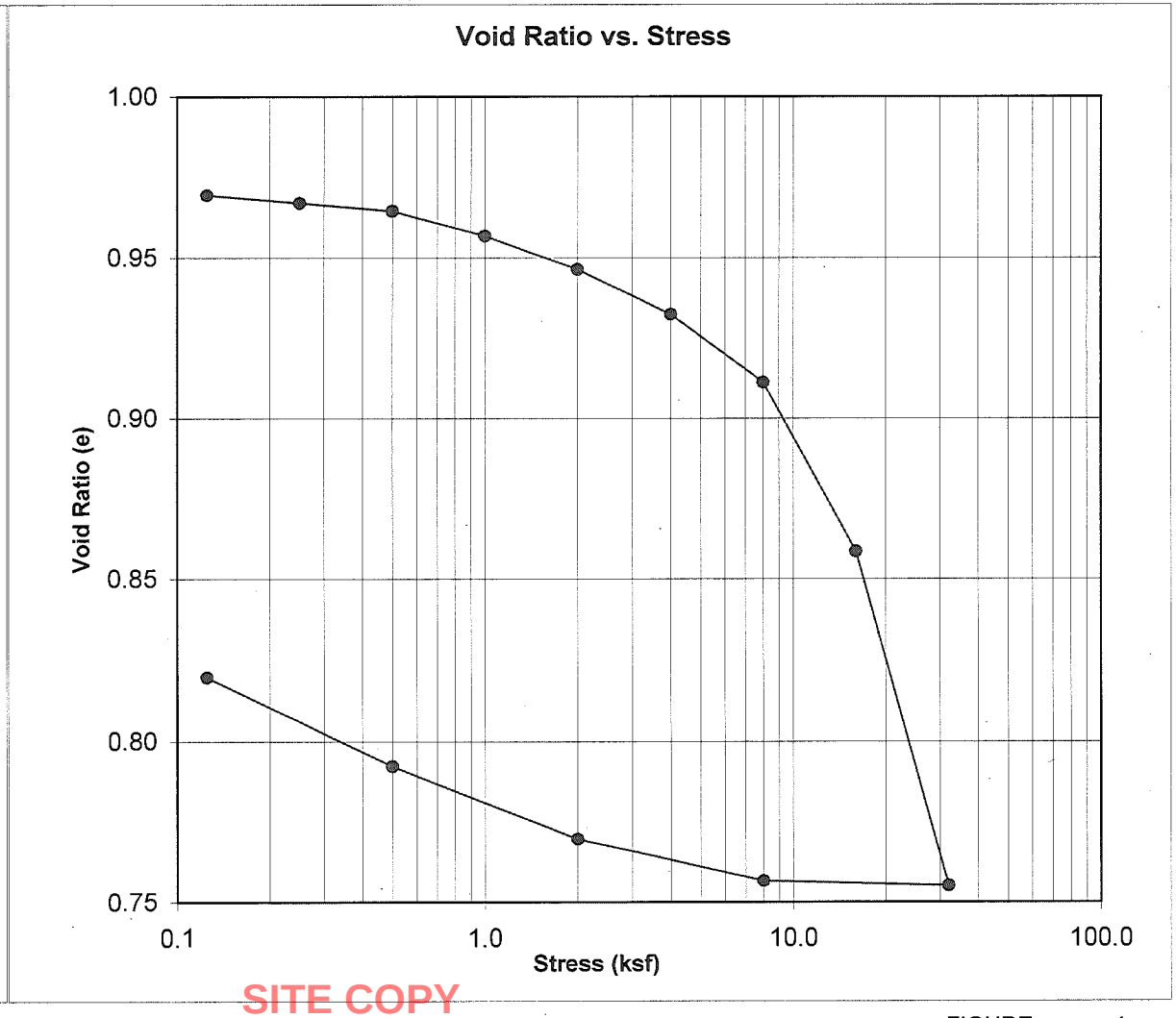
HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION ASTM D 2435

Project Name:	Sound Transit E. Link
Project Number:	2009-142
Borehole Number:	B-D-ES-7
Sample Number:	ST-15
Sample Depth:	75-77
Soil Description:	Dark gray CLAY

	Start	Finish	
Moisture Content	37.1	32.4	%
Saturation	102.4	110.4	%
Dry Density	85.2	94.0	pcf





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BLDG-2018-00983, BLDG-2018-00985

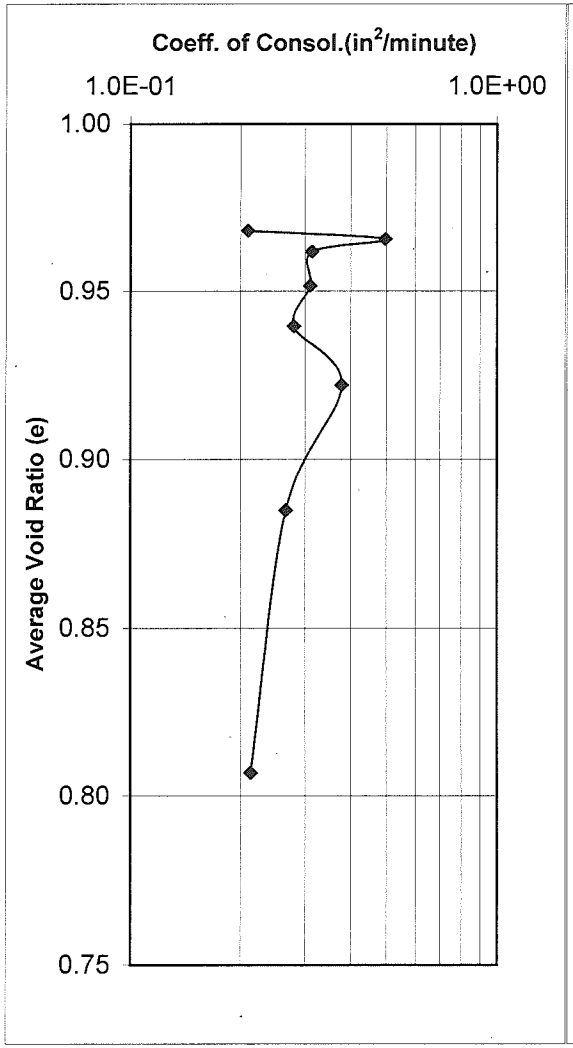
FIGURE 4

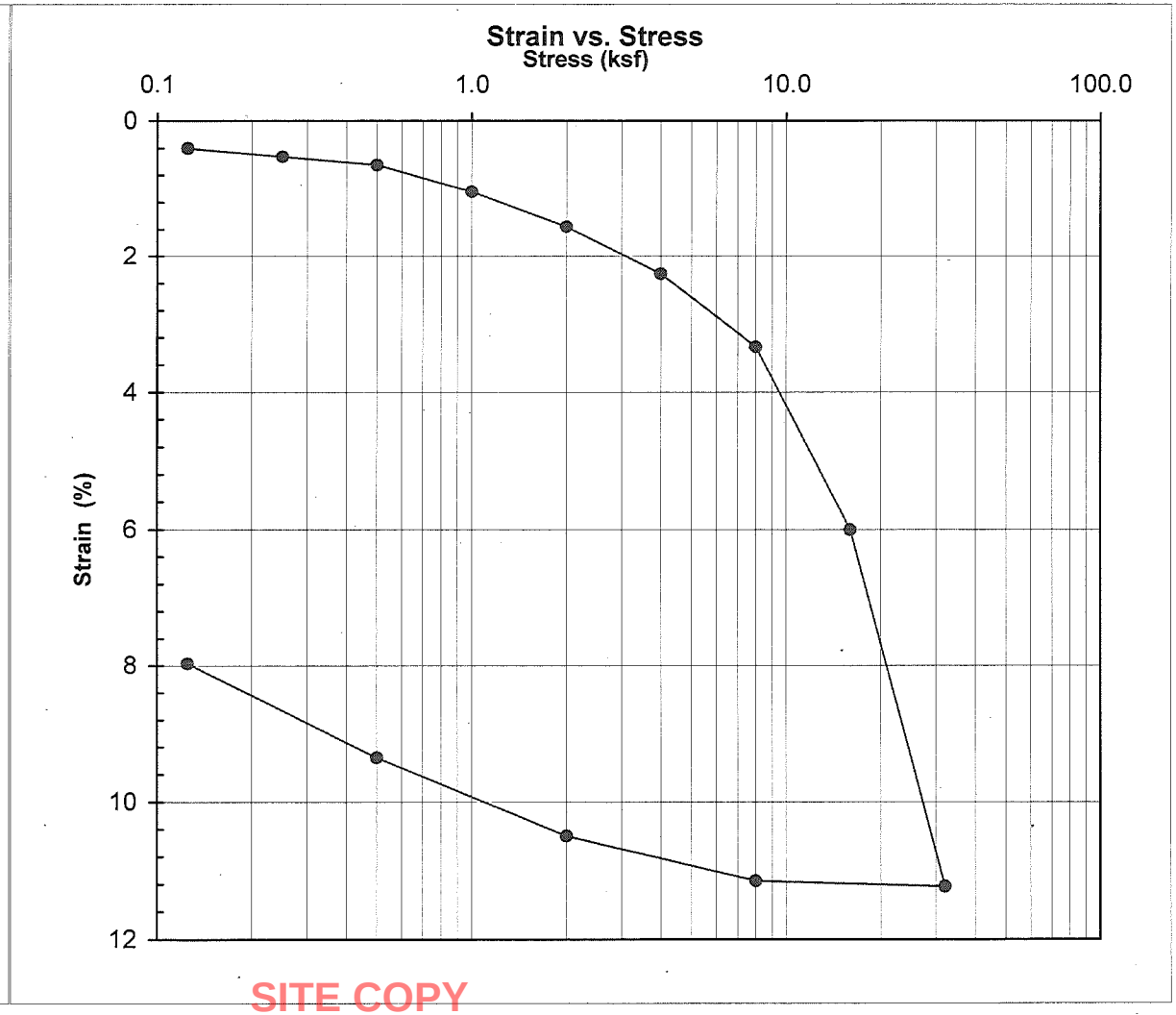
HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION ASTM D 2435

Project Name: Sound Transit E. Link
Project Number: 2009-142
Borehole Number: B-D-ES-7
Sample Number: ST-15
Sample Depth: 75-77
Soil Description: Dark gray CLAY

	Start	Finish
Moisture Content	37.1	32.4 %
Saturation	102.4	110.4 %
Dry Density	85.2	94.0 pcf





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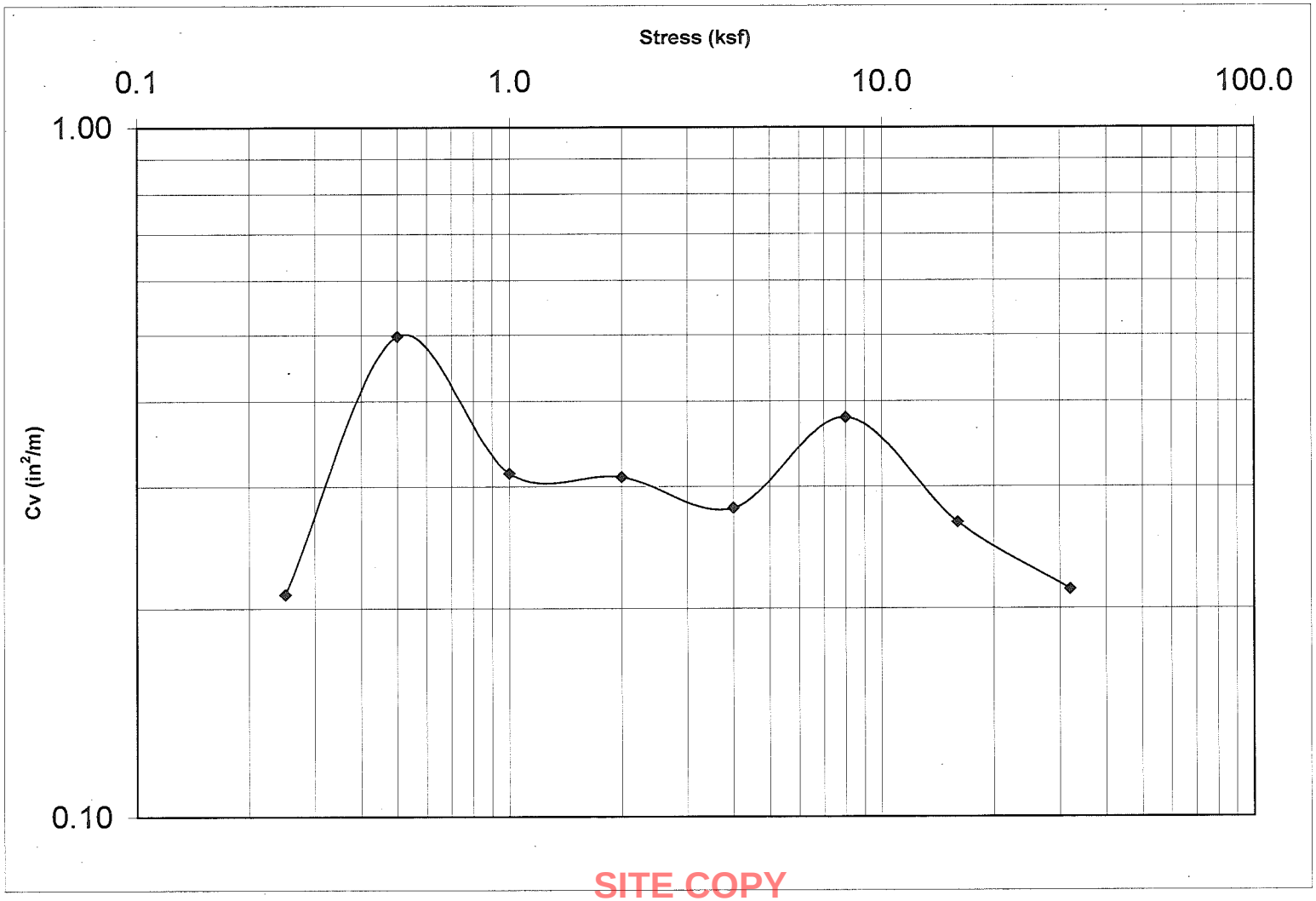
BLDG-2018-00983, BLDG-2018-00985

FIGURE 5

HWA GEOSCIENCES INC.

ONE DIMENSIONAL CONSOLIDATION ASTM D 2435

Project Name: Sound Transit E. Link
Project Number: 2009-142
Borehole Number: B-D-ES-7
Sample Number: ST-15
Sample Depth: 75-77
Soil Description: Dark gray, lean CLAY



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BLDG-2018-00983, BLDG-2018-00985

FIGURE 6

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name: Sound Transit E. Link
Project Number: 2009-142
Borehole Number: B-D-ES-7
Sample Number: ST-15
Depth: 75-77
Normal Stress (ksf): Seating Load 0.125

HWA GEOSCIENCES INC.

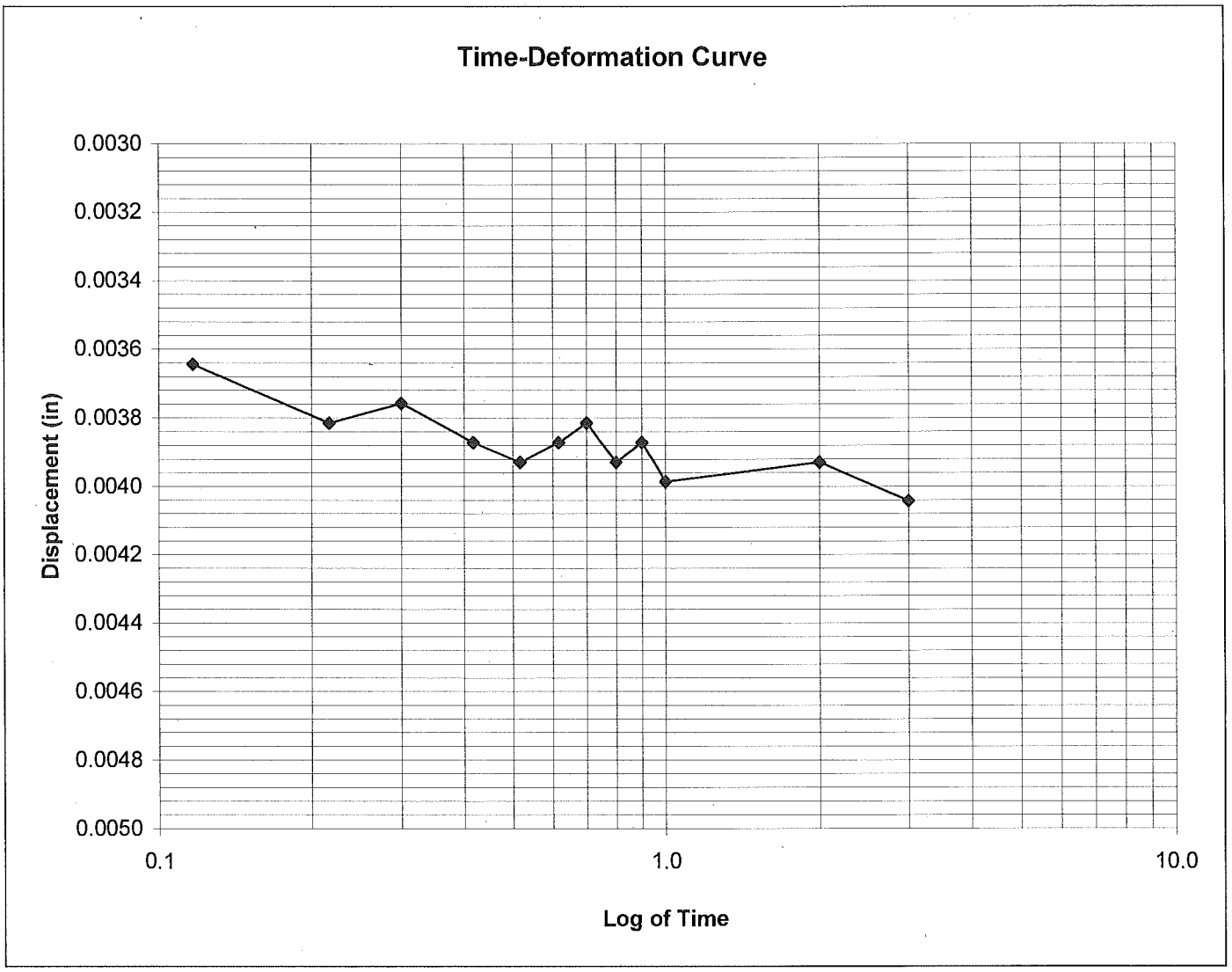

Figure 7

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BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name:	Sound Transit E. Link
Project Number:	2009-142
Borehole Number:	B-D-ES-7
Sample Number:	ST-15
Depth:	75-77
Normal Stress (ksf):	Load 0.25

HWA GEOSCIENCES INC.

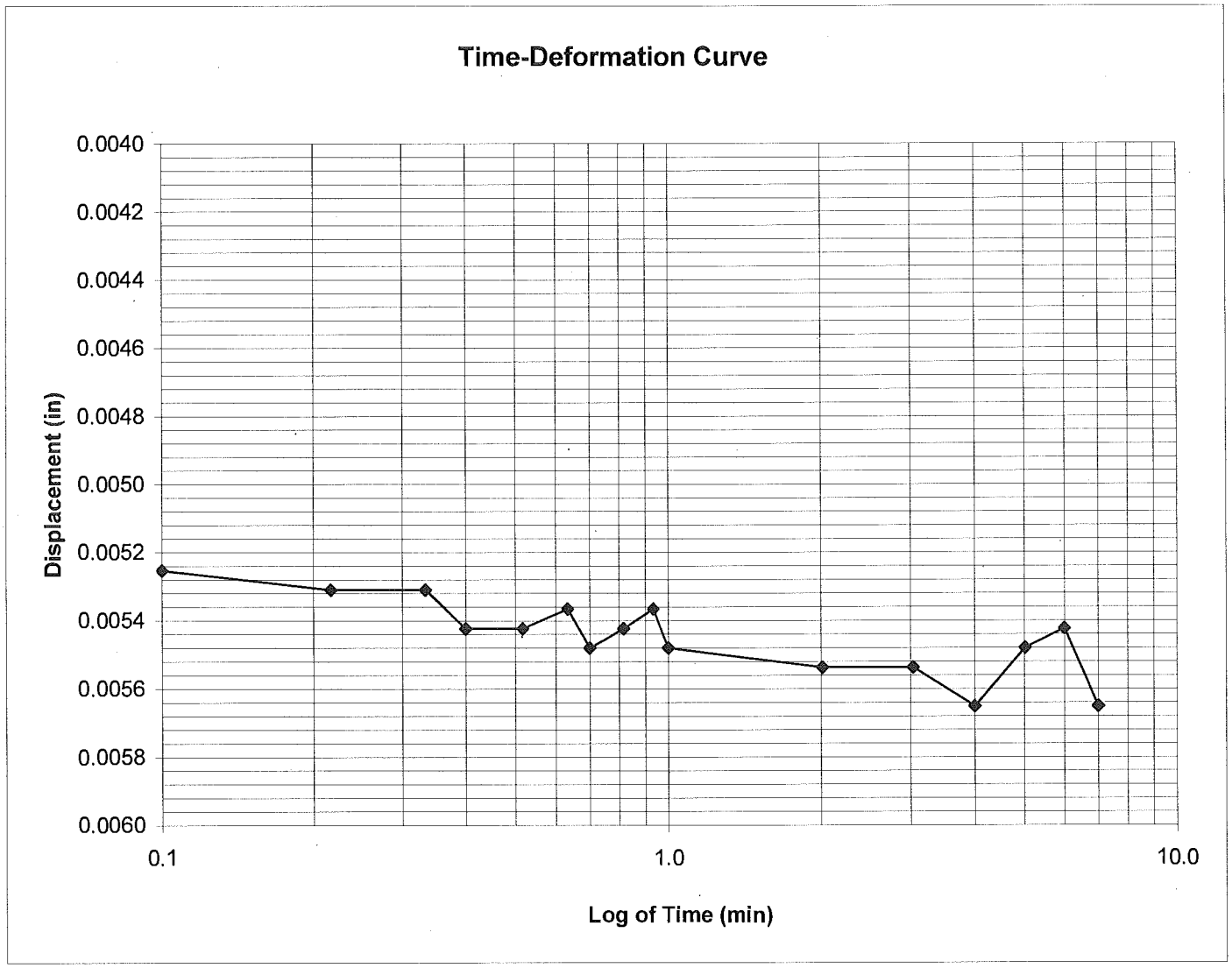

Figure 8

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BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name:	Sound Transit E. Link
Project Number:	2009-142
Borehole Number:	B-D-ES-7
Sample Number:	ST-15
Depth:	75-77
Normal Stress (ksf):	Load 0.5

HWA GEOSCIENCES INC.

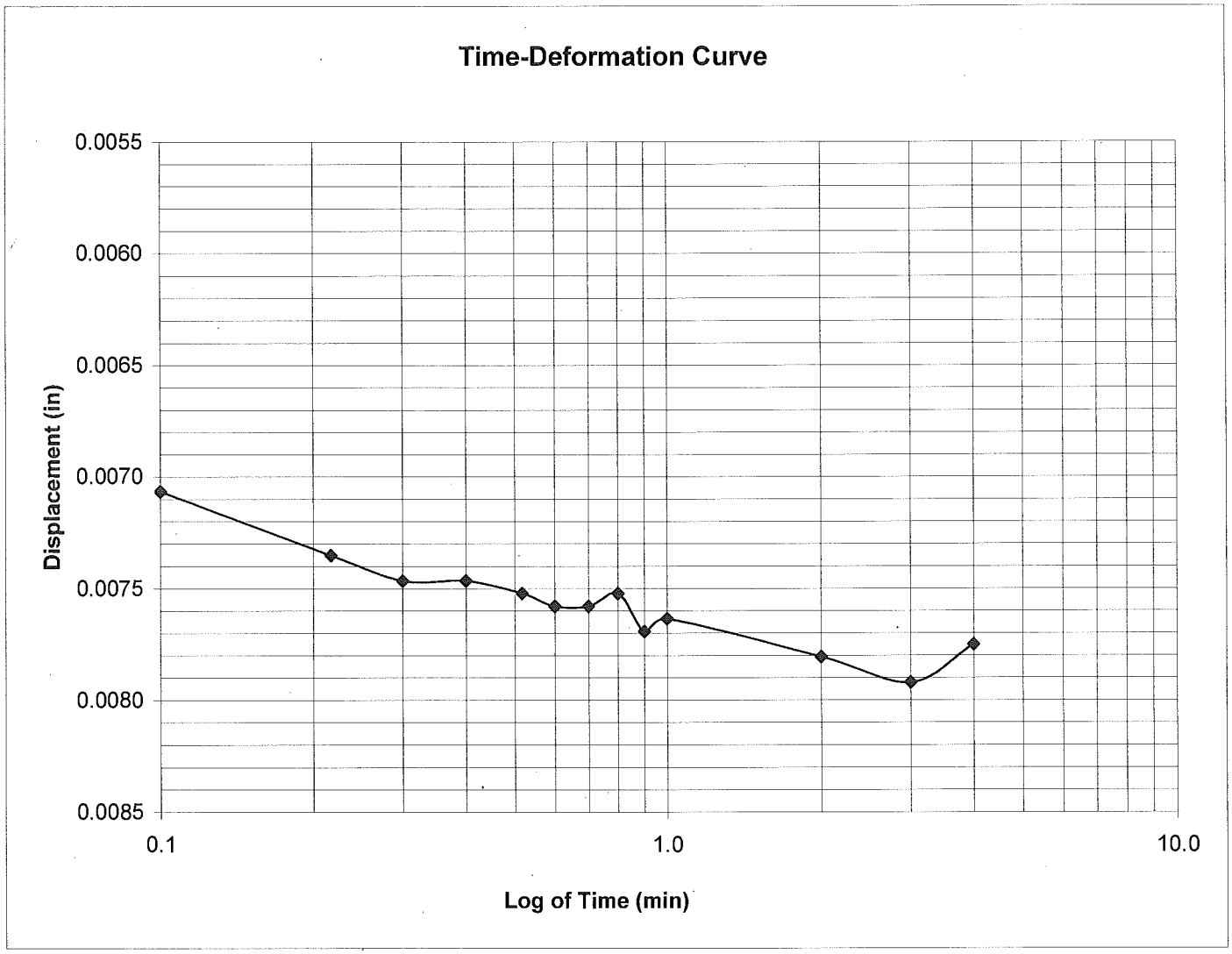

Figure 9

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name:	Sound Transit E. Link
Project Number:	2009-142
Borehole Number:	B-D-ES-7
Sample Number:	ST-15
Depth:	75-77
Normal Stress (ksf):	Load 1

HWA GEOSCIENCES INC.

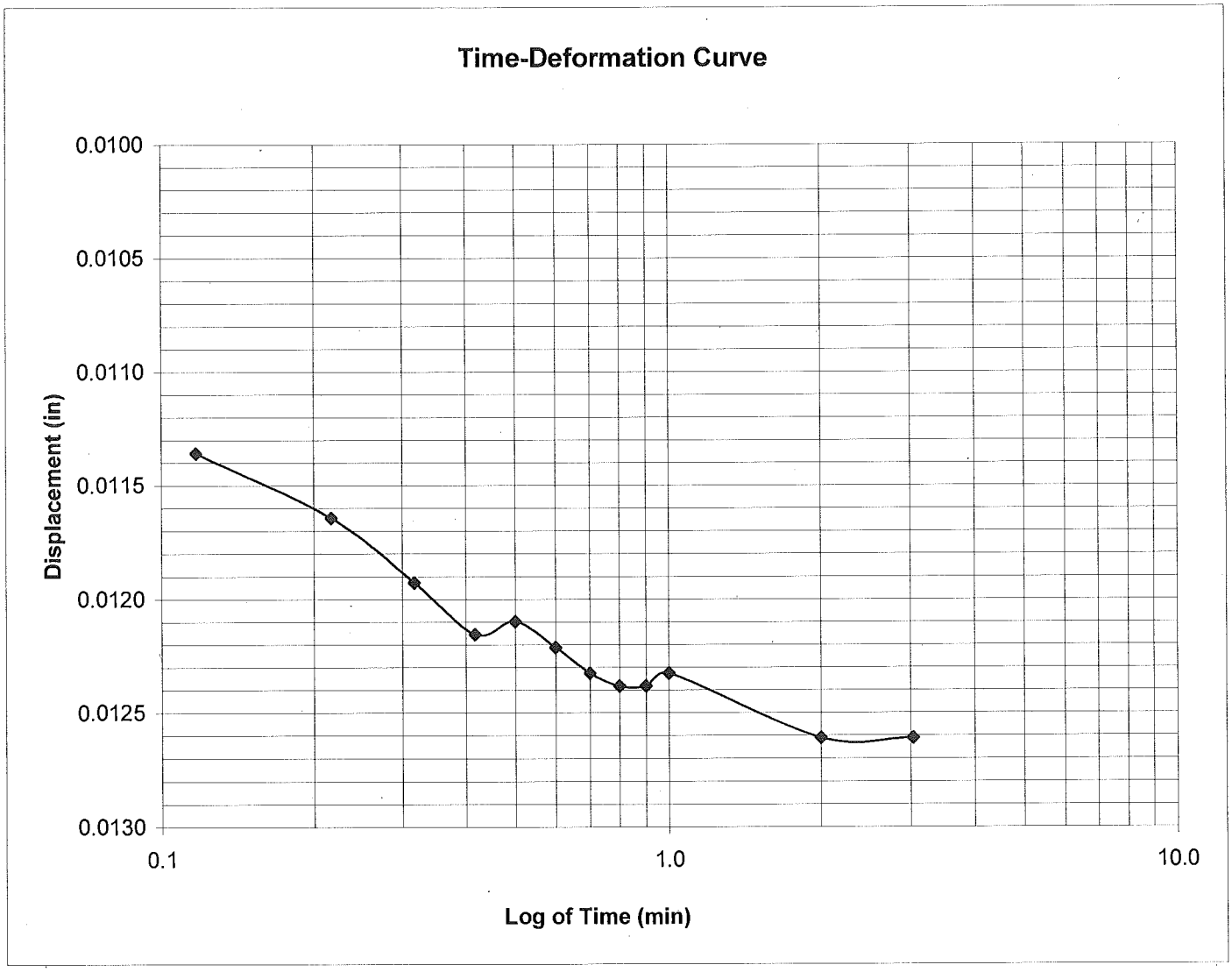

Figure 10

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name: Sound Transit E. Link
Project Number: 2009-142
Borehole Number: B-D-ES-7
Sample Number: ST-15
Depth: 75-77
Normal Stress (ksf): Load 2

HWA GEOSCIENCES INC.

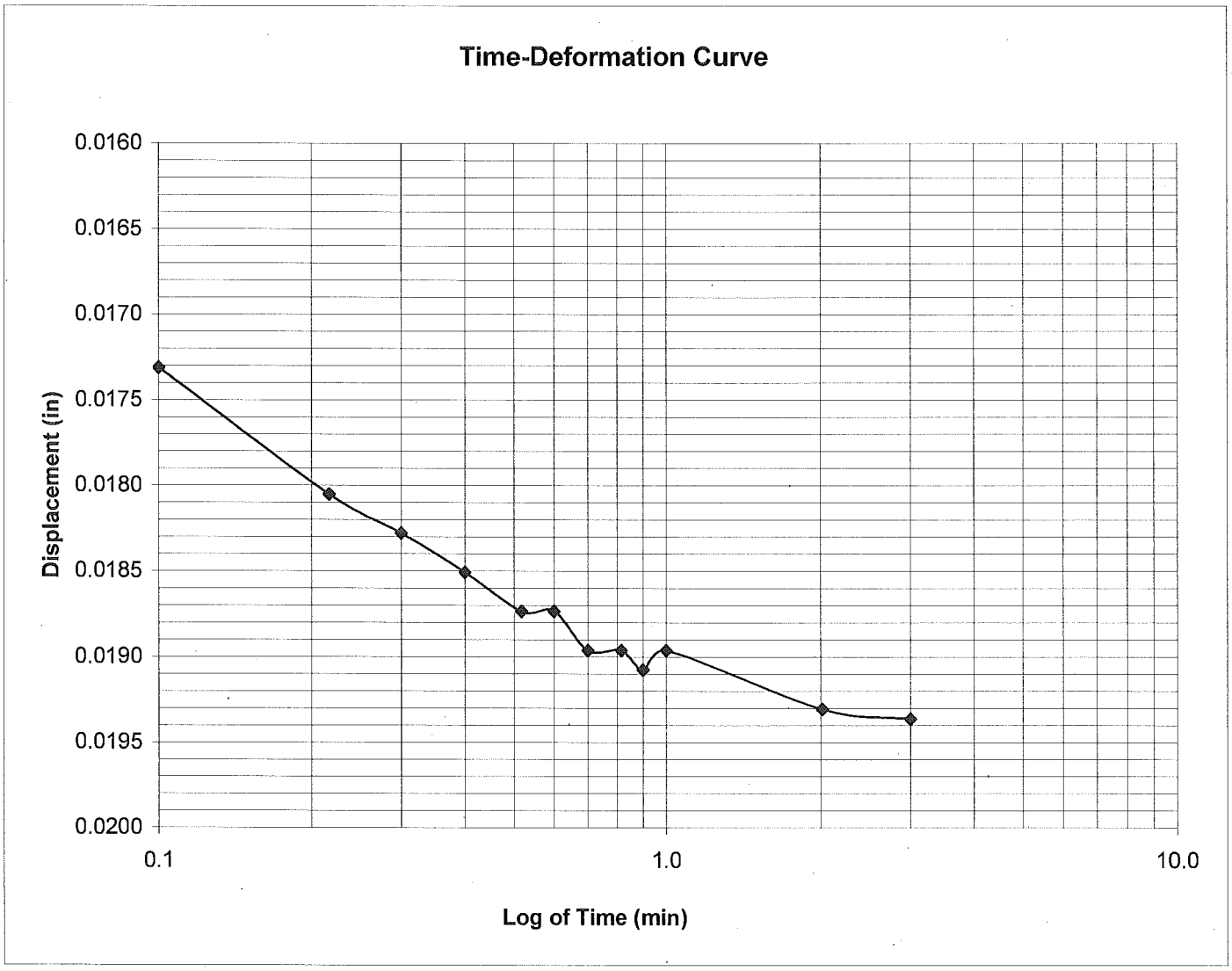

Figure 11

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name: Sound Transit E. Link
Project Number: 2009-142
Borehole Number: B-D-ES-7
Sample Number: ST-15
Depth: 75-77
Normal Stress (ksf): Load 4

HWA GEOSCIENCES INC.

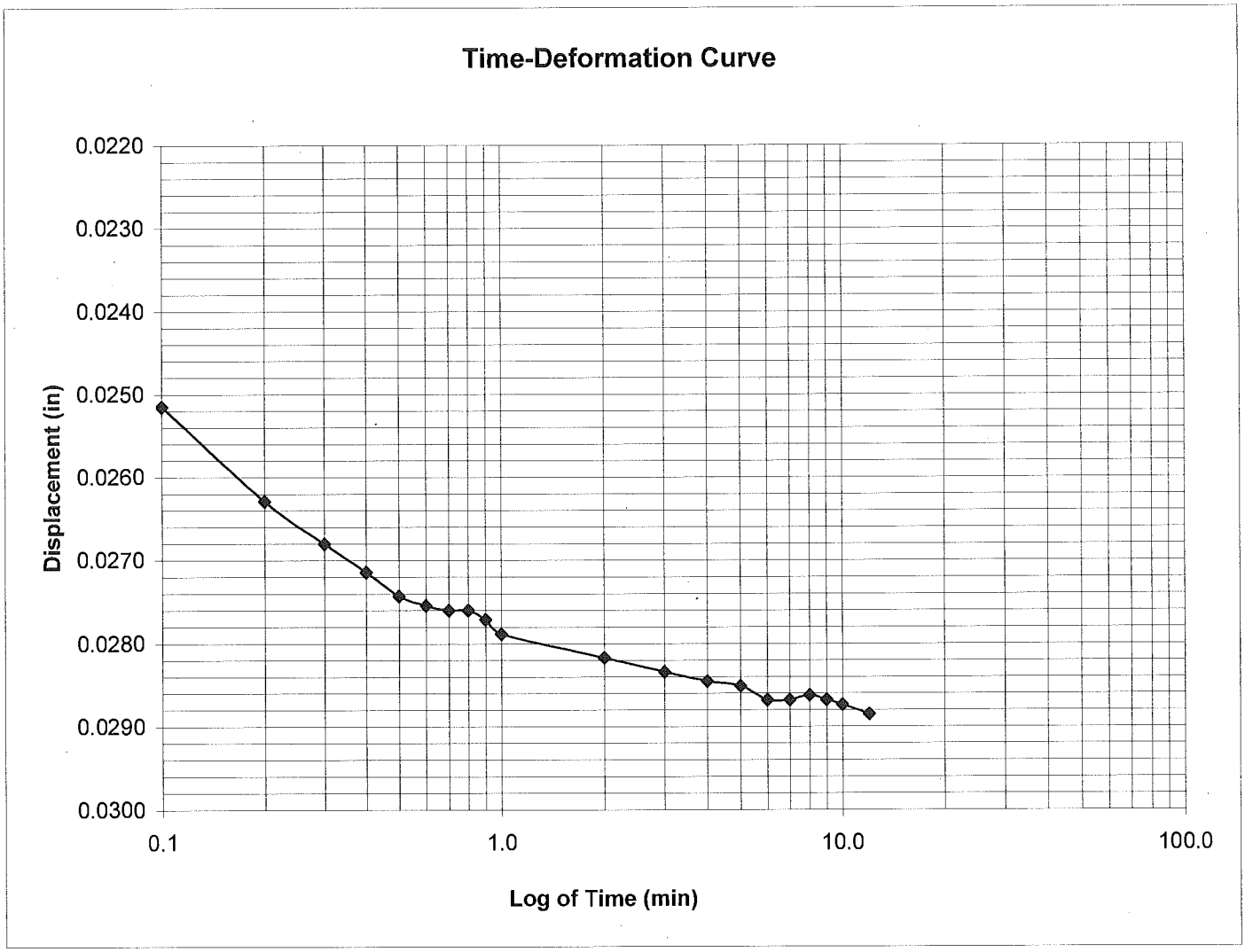

Figure 12

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name: Sound Transit E. Link
Project Number: 2009-142
Borehole Number: B-D-ES-7
Sample Number: ST-15
Depth: 75-77
Normal Stress (ksf): Load 8

HWA GEOSCIENCES INC.

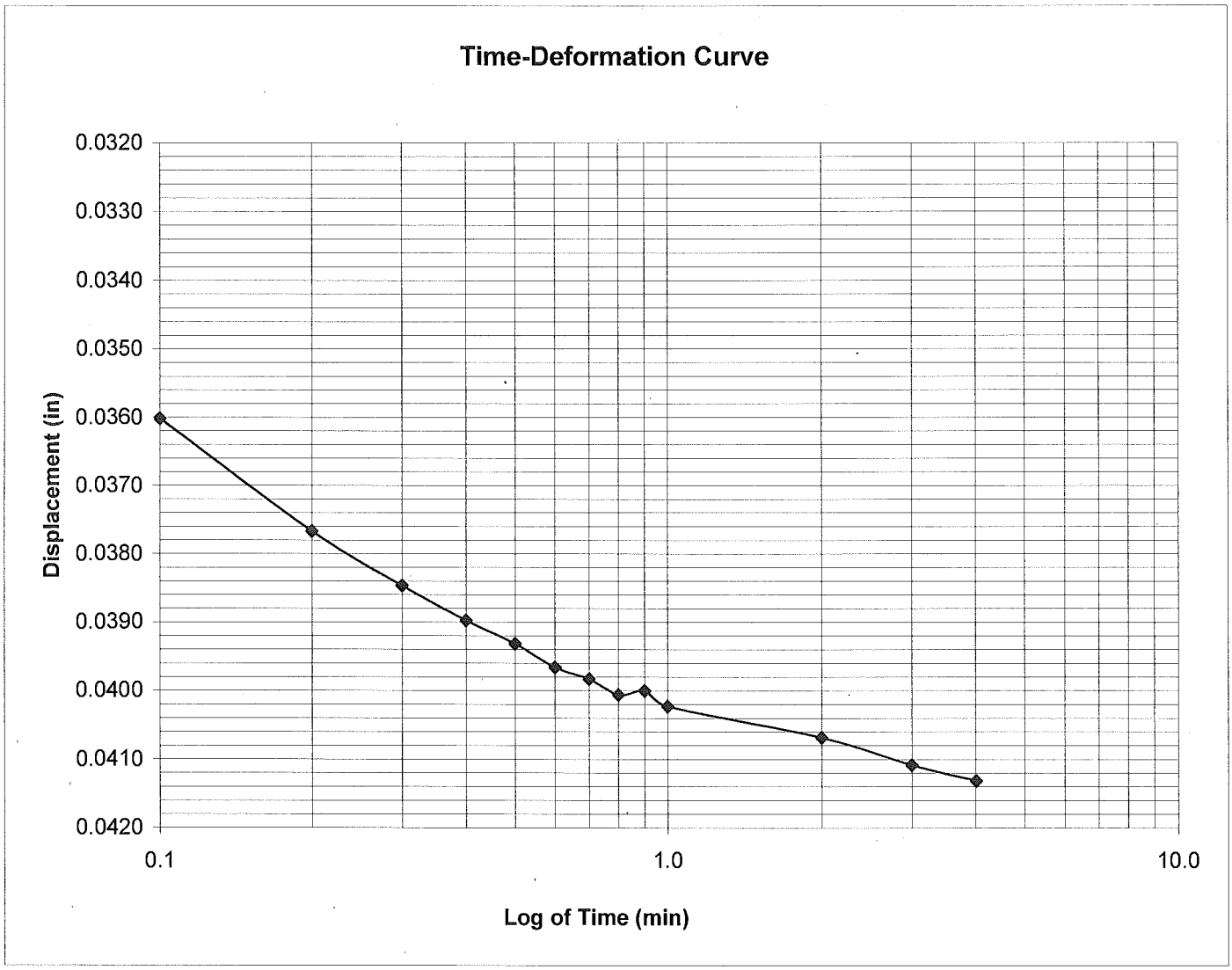

Figure 13

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name: Sound Transit E. Link
Project Number: 2009-142
Borehole Number: B-D-ES-7
Sample Number: ST-15
Depth: 75-77
Normal Stress (ksf): Load 16

HWA GEOSCIENCES INC.

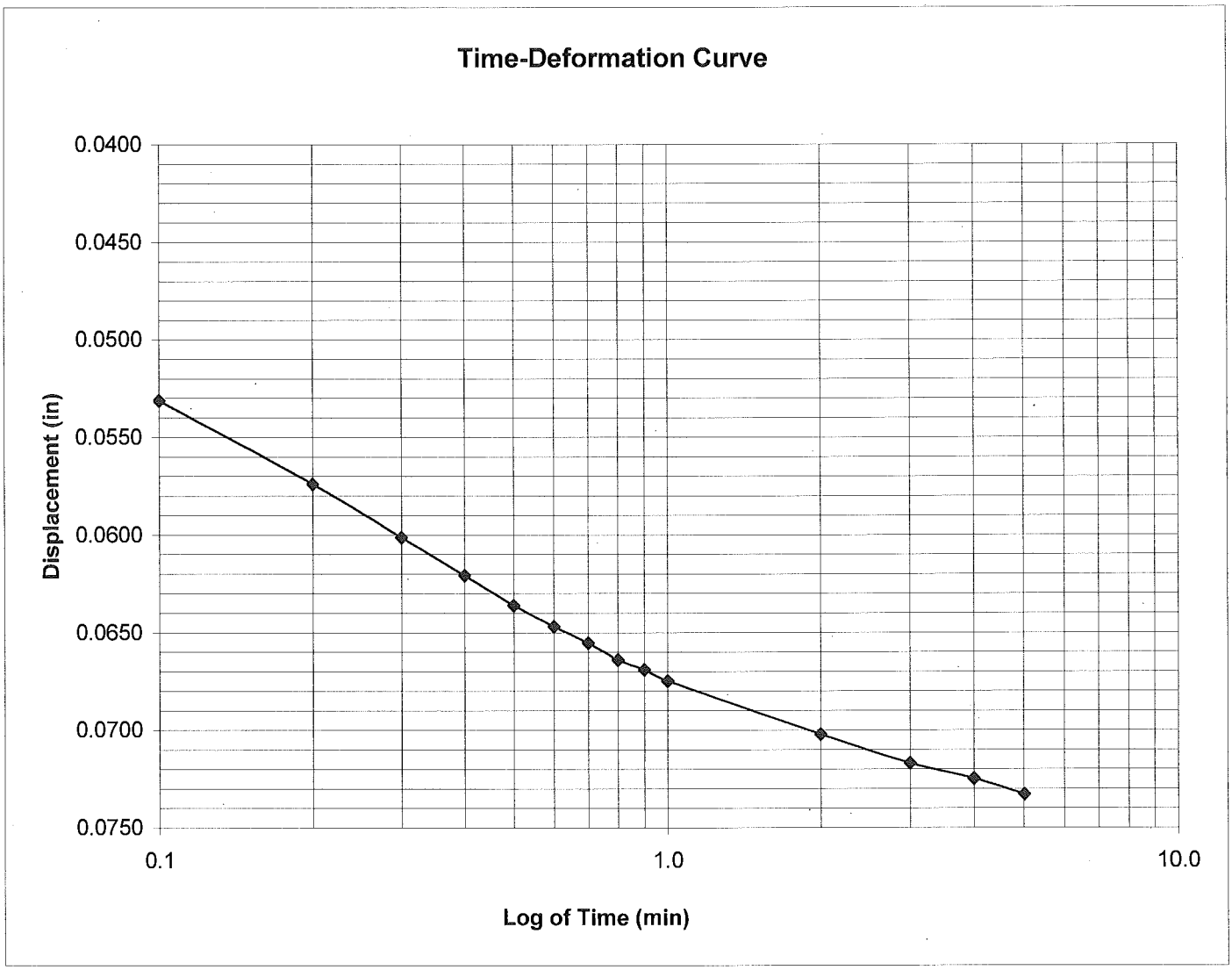

Figure 14

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name: Sound Transit E. Link
Project Number: 2009-142
Borehole Number: B-D-ES-7
Sample Number: ST-15
Depth: 75-77
Normal Stress (ksf): Load 32

HWA GEOSCIENCES INC.

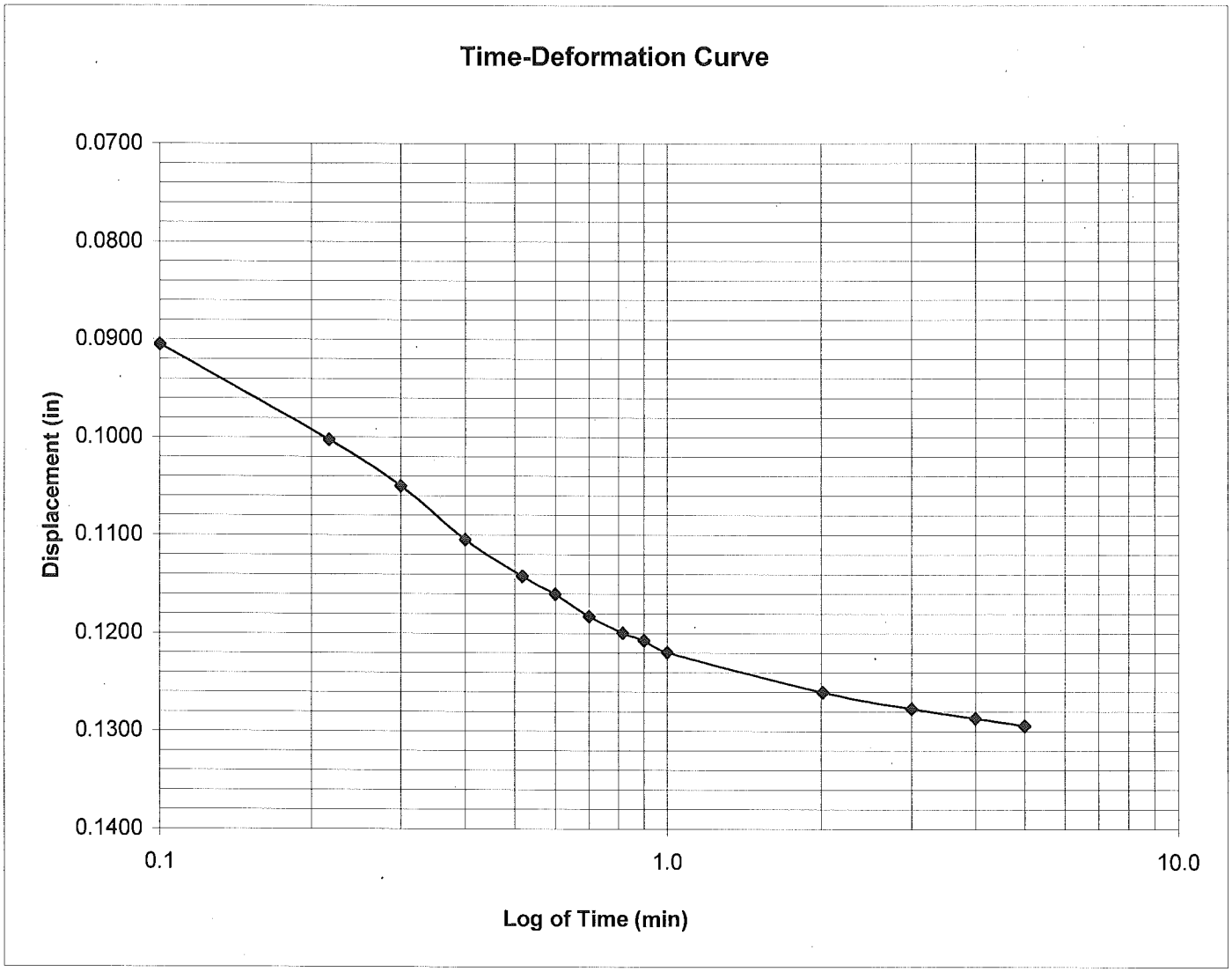

Figure 15

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name:	Sound Transit E. Link
Project Number:	2009-142
Borehole Number:	B-D-ES-7
Sample Number:	ST-15
Depth:	75-77
Normal Stress (ksf):	Unload 8 ksf

HWA GEOSCIENCES INC.

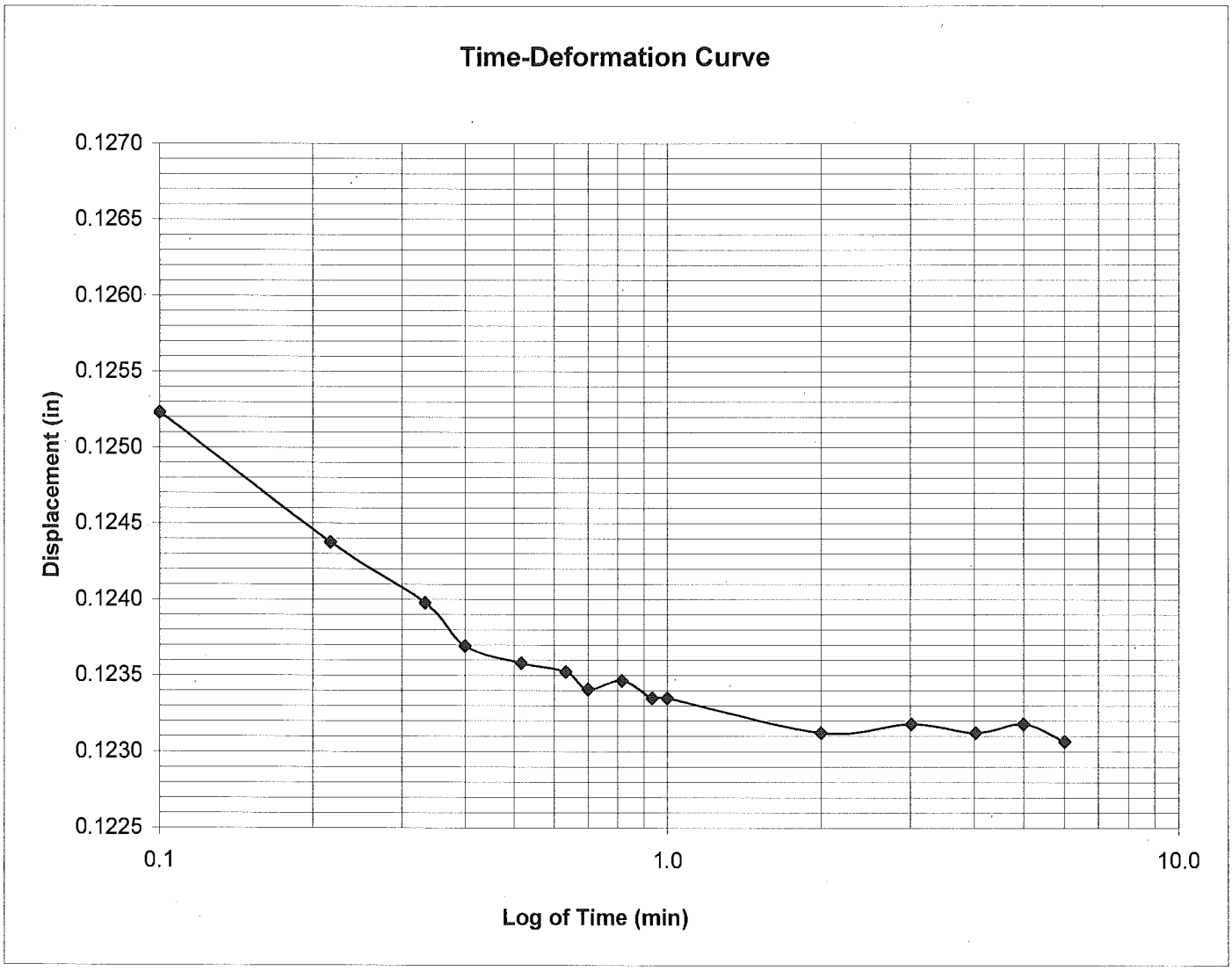


Figure 16

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name:	Sound Transit E. Link
Project Number:	2009-142
Borehole Number:	B-D-ES-7
Sample Number:	ST-15
Depth:	75-77
Normal Stress (ksf):	Unload 2

HWA GEOSCIENCES INC.

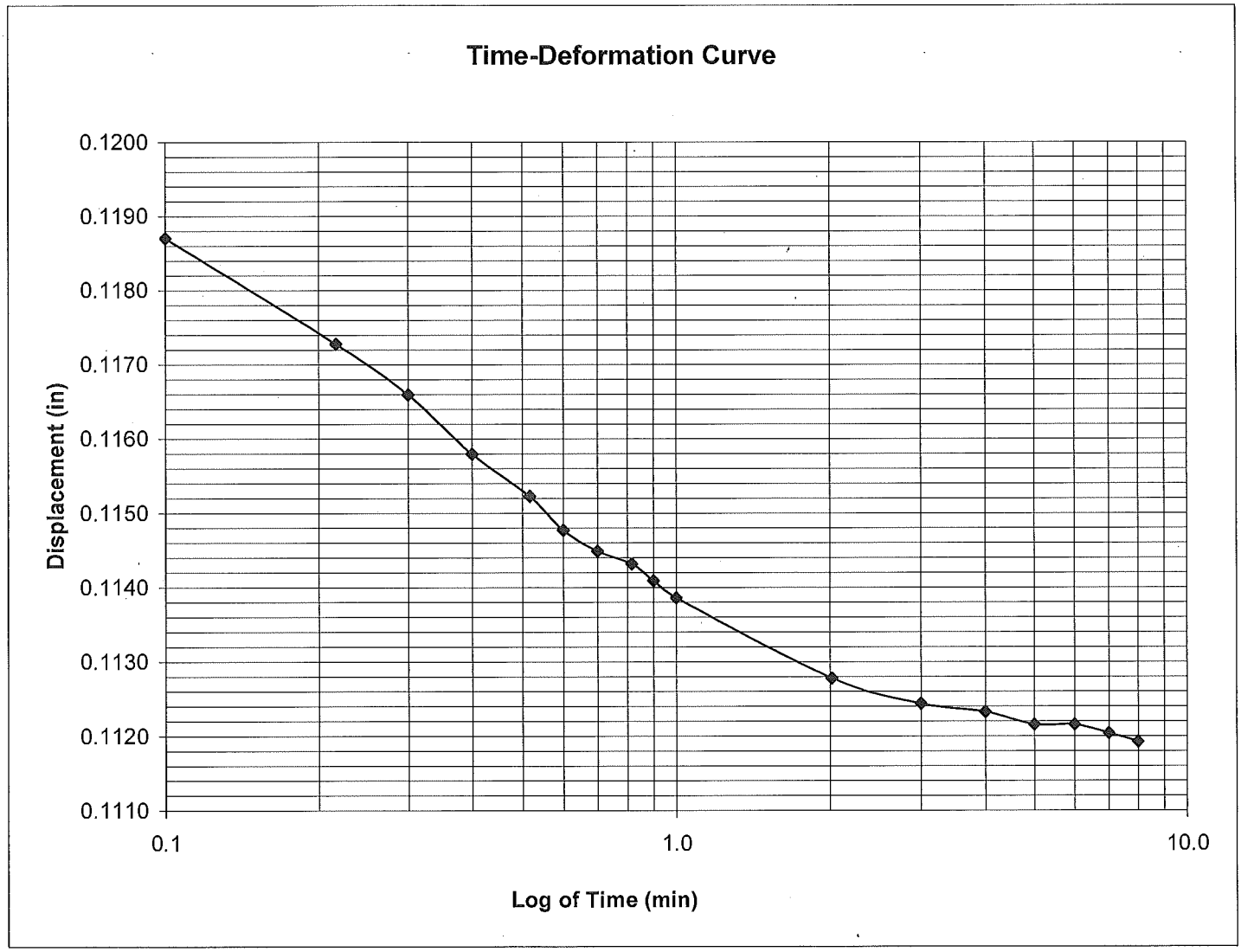


Figure 17

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name: Sound Transit E. Link
Project Number: 2009-142
Borehole Number: B-D-ES-7
Sample Number: ST-15
Depth: 75-77
Normal Stress (ksf): Unload 0.5

HWA GEOSCIENCES INC.

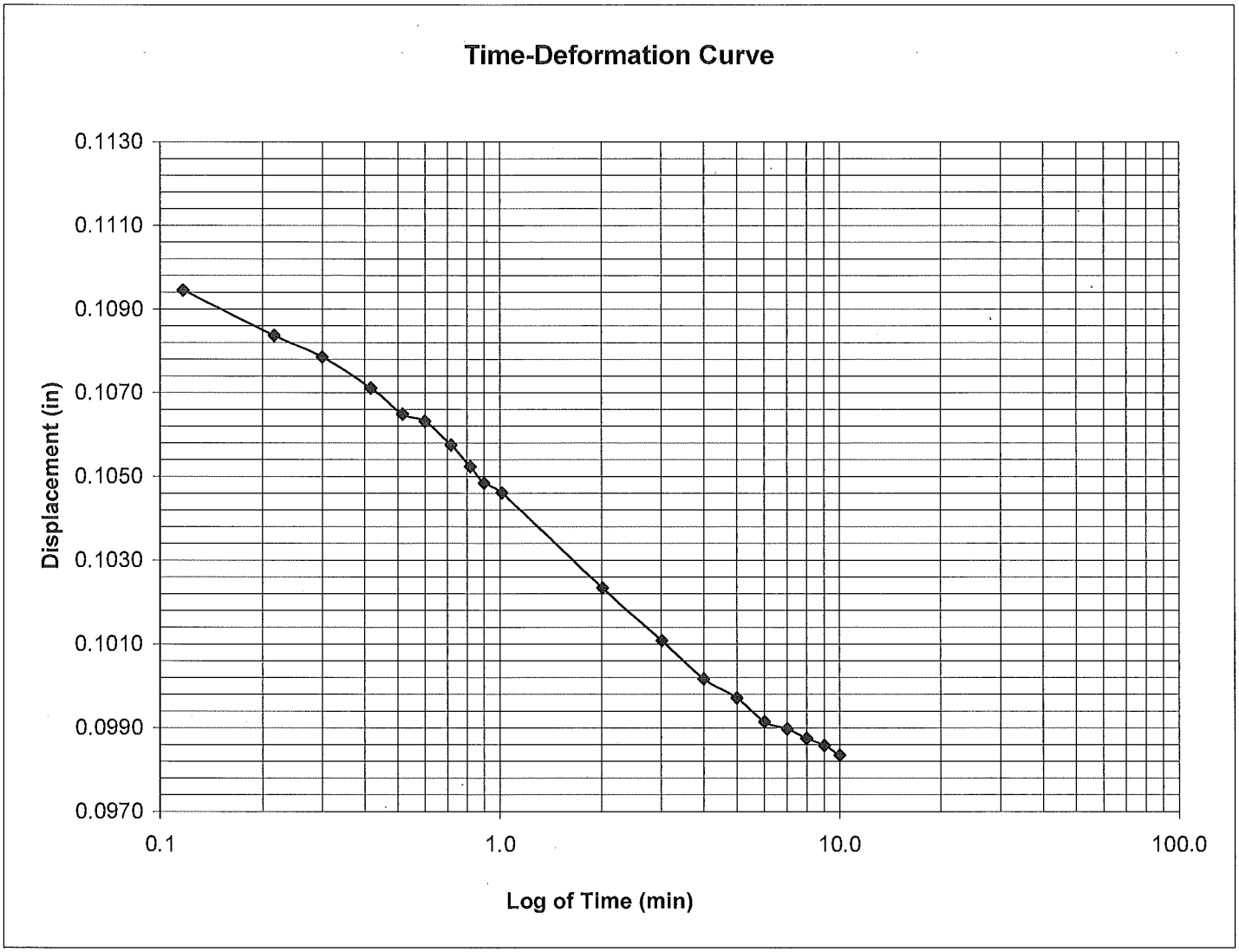


Figure 18

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

HWA GEOSCIENCES INC. Materials Testing Laboratory - One Dimensional Consolidation-ASTM D 2435

Project Name: Sound Transit E. Link
Project Number: 2009-142
Borehole Number: B-D-ES-7
Sample Number: ST-15
Depth: 75-77
Normal Stress (ksf): Unload 0.125

HWA GEOSCIENCES INC.

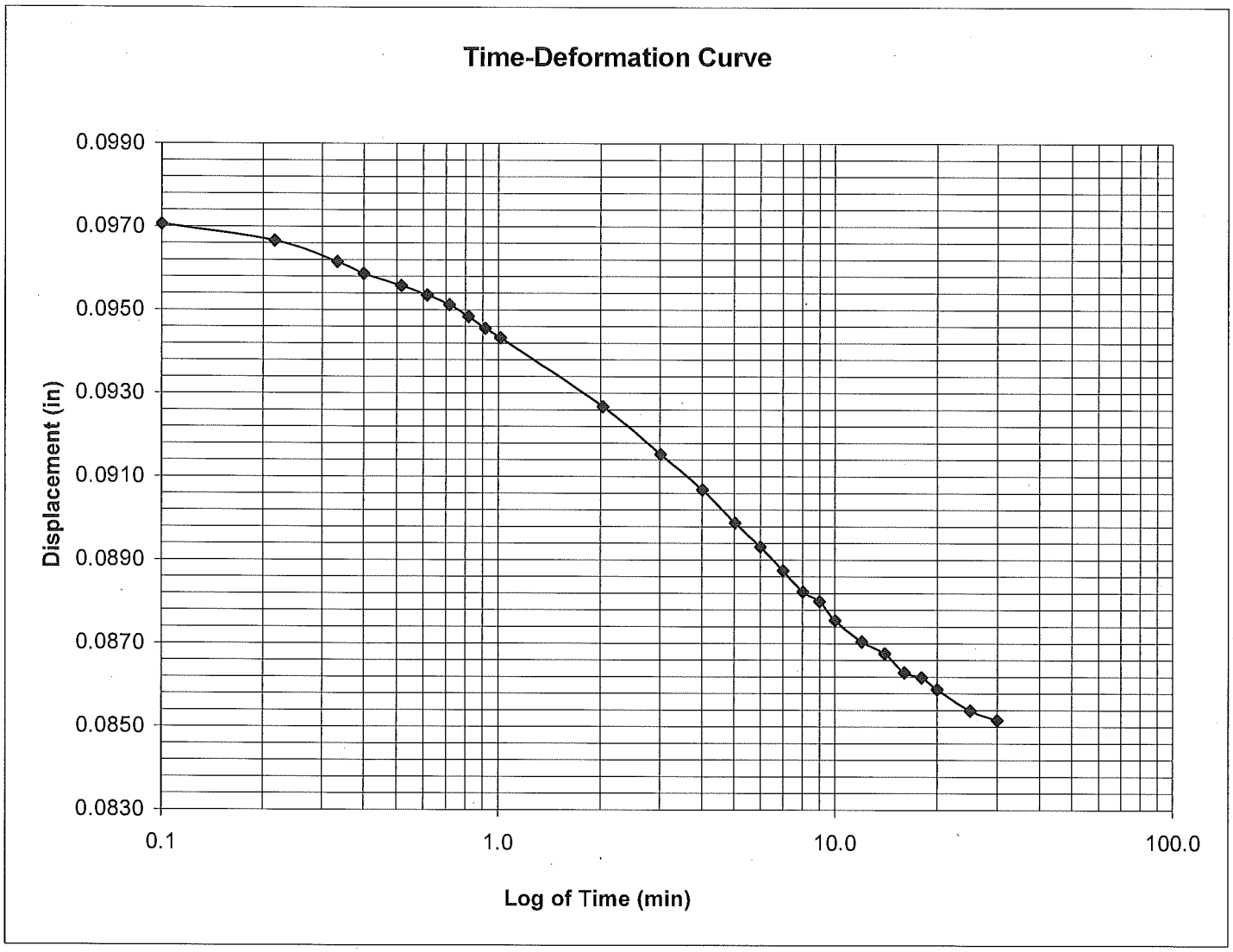


Figure 19

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-ES-8p, SS-6	30.0-31.5	13						15.7				SM	Dark gray silty SAND
B-D-ES-8p, SS-9	50.0-51.5	15	32	17	15	3.2	32.6	64.2				CL	Dark gray, sandy lean CLAY
B-D-ES-8p, SS-10	60.0-61.5	24	54	23	31							CH	Dark gray, fat CLAY
B-D-ES-8p, SS-11B	70.0-71.5	21						80.7				ML	Dark gray SILT with sand

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

HWA GEOSCIENCES INC.

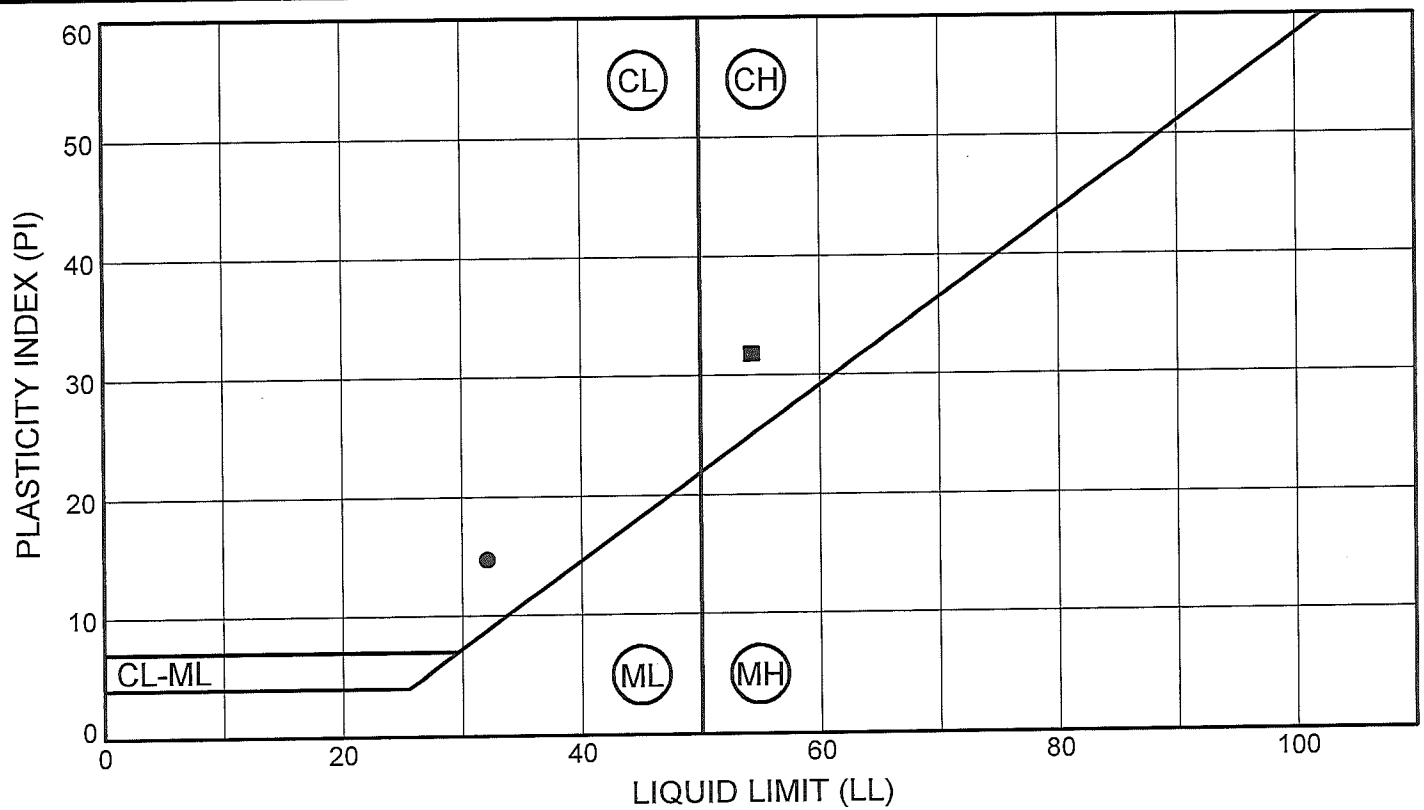
SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-ES-8p

PROJECT NO.
2009-142

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	B-D-ES-8p	SS-9	50.0 - 51.5	(CL) Dark gray, sandy lean CLAY	15	32	17	15	64.2
■	B-D-ES-8p	SS-10	60.0 - 61.5	(CH) Dark gray, fat CLAY	24	54	23	31	

HWA GEOSCIENCES INC.

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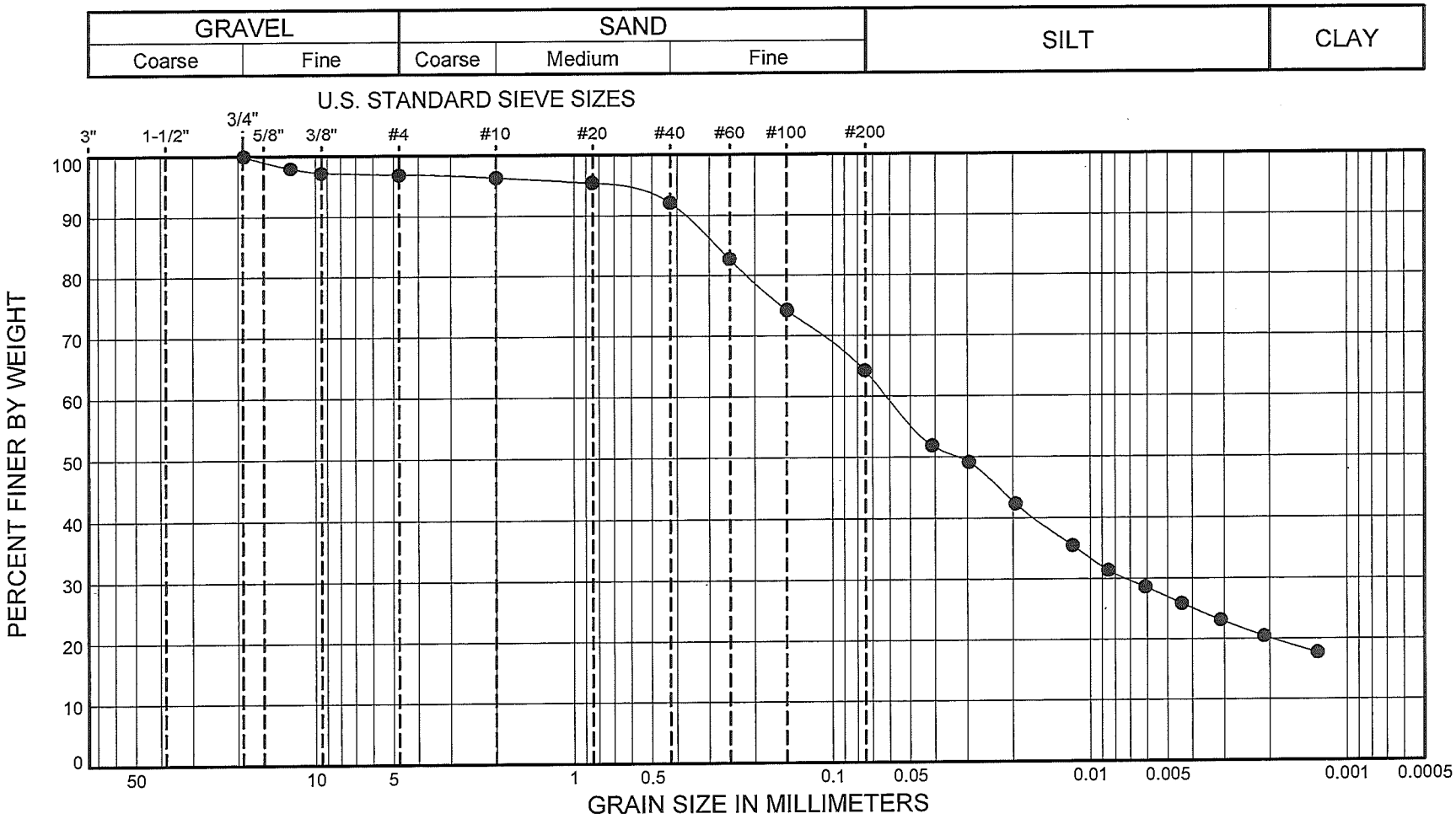
SOUND TRANSIT, EASTLINK, PHASE 3
King County, Washington

BLDG-2018-00897, BLDG-2018-00898, BLDG-2018-00893, BLDG-2018-00895, BLDG-2018-00985

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-8p



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-8p	SS-9	50.0 - 51.5	(CL) Dark gray, sandy lean CLAY	15	32	17	15	3.2	32.6	64.2

HWA GEOSCIENCES INC.

SITE COPY
BLDG-2018-00893, BLDG-2018-00985, BLDG-2018-00893,
BLDG-2018-00985, BLDG-2018-00985

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-8p

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-ES-9, SS-2	10.0-11.5	9						34.5				SM	Brown, silty SAND
B-D-ES-9, SS-4	20.0-21.5	8				4.2	61.2	34.6				SM	Gray, silty SAND
B-D-ES-9, SS-5	25.0-26.5	11						31.9				SM	Dark gray, silty SAND

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

HWA GEOSCIENCES INC.

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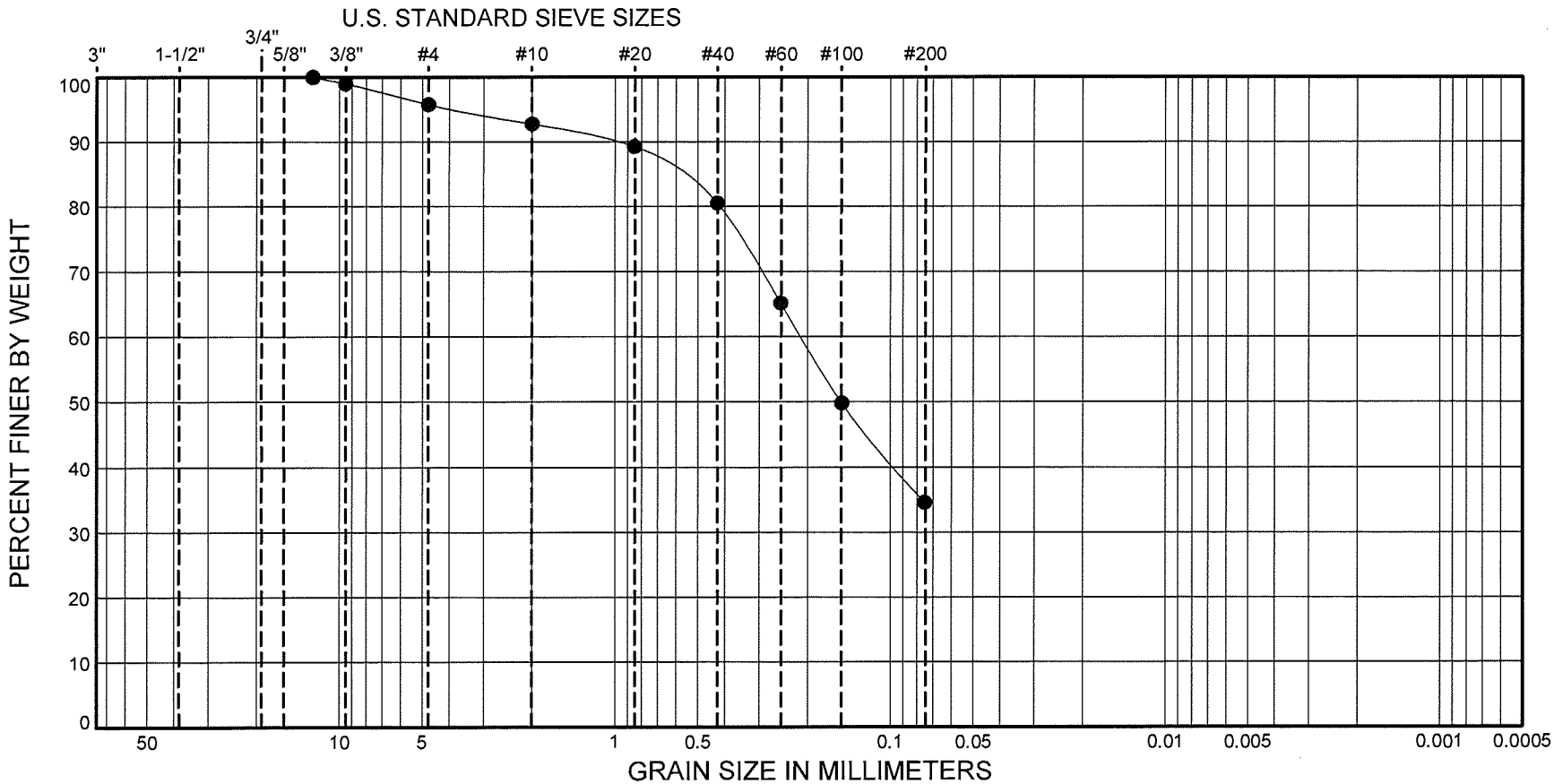
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985

SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-ES-9

PROJECT NO.
2009-142



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-9	SS-4	20.0 - 21.5	(SM) Gray, silty SAND	8				4.2	61.2	34.6

HWA GEOSCIENCES INC.

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00985, BLDG-2018-00985

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

PARTICLE-SIZE ANALYSIS OF SOILS METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-9

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-ES-10p, SS-3	15.0-16.5	11				18.3	60.3	21.4				SM	Olive brown, silty SAND with gravel
B-D-ES-10p, SS-6	30.0-31.5	20				0.0	91.8	8.2				SP-SM	Grayish brown, poorly graded SAND with silt
B-D-ES-10p, SS-8	40.0-41.5	21						67.9				ML	Olive gray, sandy SILT
B-D-ES-10p, SS-9B	45.0-46.5	10				19.5	67.3	13.2				SM	Gray, silty SAND with gravel
B-D-ES-10p, SS-13	65.0-66.5	26						73.2				ML	Dark gray, SILT with sand
B-D-ES-10p, SS-14	70.0-71.5	24						49.1				SM	Dark gray, silty SAND

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

HWA GEOSCIENCES INC.

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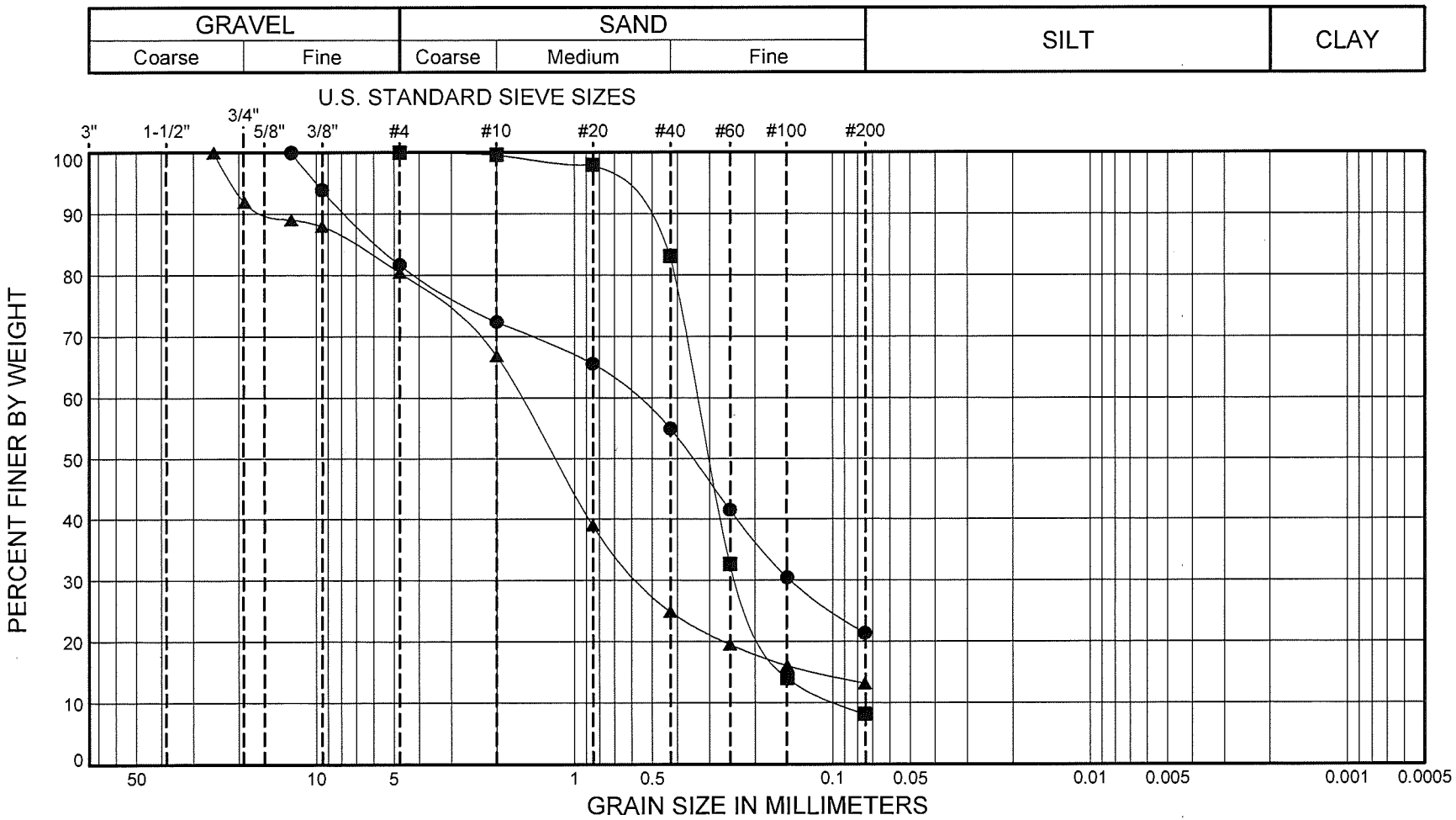
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985

SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-ES-10p

PROJECT NO.
2009-142



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-10p	SS-3	15.0 - 16.5	(SM) Olive brown, silty SAND with gravel	11				18.3	60.3	21.4
■	B-D-ES-10p	SS-6	30.0 - 31.5	(SP-SM) Grayish brown, poorly graded SAND with silt	20				0.0	91.8	8.2
▲	B-D-ES-10p	SS-9B	45.0 - 46.5	(SM) Gray, silty SAND with gravel	10				19.5	67.3	13.2

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SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-10p

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-ES-11p, SS-4	20.0-21.5	14				12.9	53.3	33.8				SM	Light olive brown, silty SAND
B-D-ES-11p, SS-5	25.0-26.5	15						49.2				SM	Light olive brown, silty SAND
B-D-ES-11p, SS-7	35.0-36.5	21				0.6	87.5	11.9				SP-SM	Grayish brown, poorly graded SAND with silt
B-D-ES-11p, SS-10	50.0-51.5	16				8.2	78.1	13.7				SM	Gray, silty SAND
B-D-ES-11p, SS-15	75.0-76.5	17				6.9	73.1	19.9				SM	Grayish brown, silty SAND
B-D-ES-11p, SS-17	85.0-86.5	19						56.2				ML	Dark gray, sandy SILT
B-D-ES-11p, SS-18/SS-19	90.0-96.5	20				0.2	54.5	45.3				SM	Dark gray, silty SAND

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

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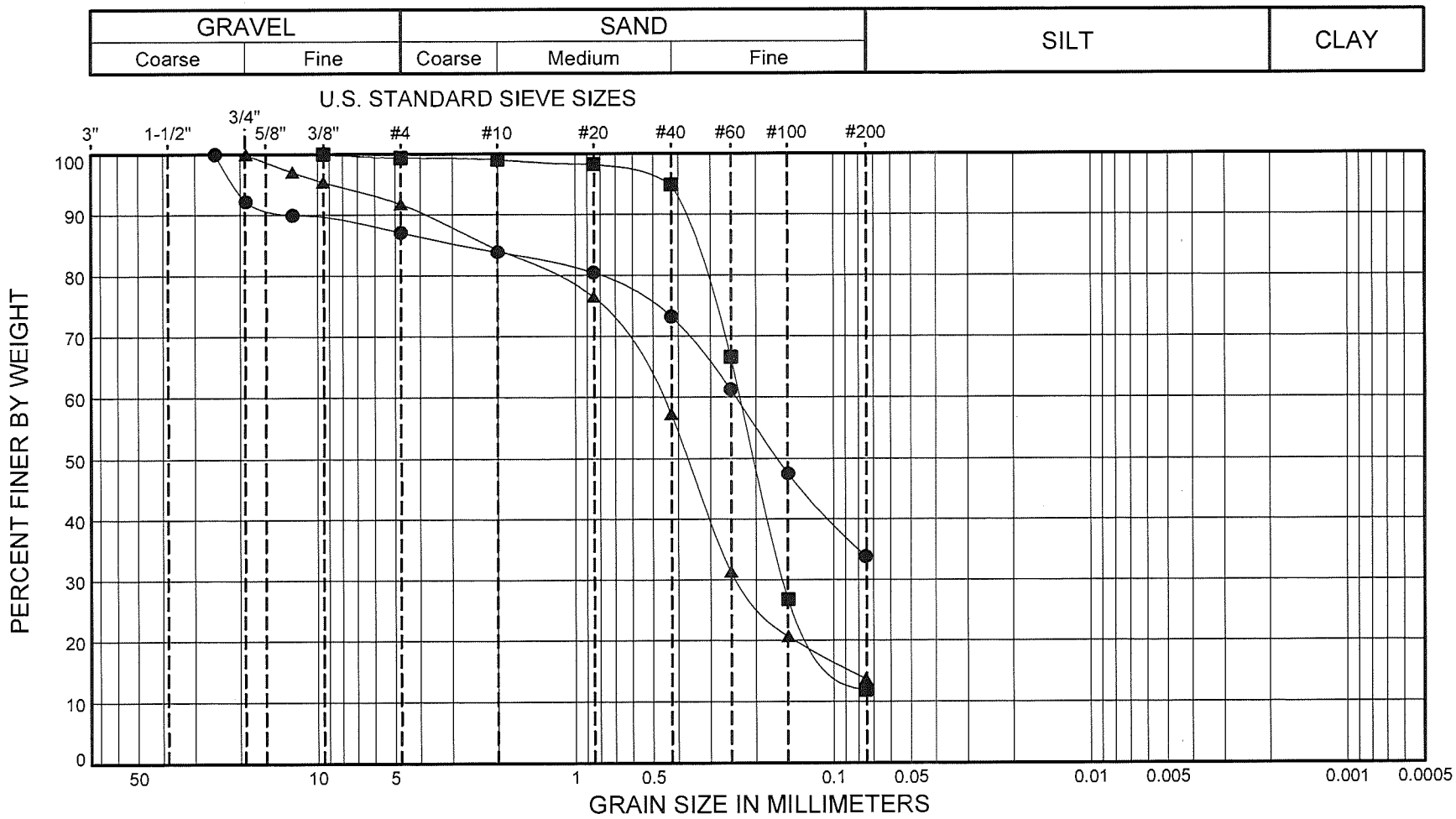
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-11p	SS-4	20.0 - 21.5	(SM) Light olive brown, silty SAND	14				12.9	53.3	33.8
■	B-D-ES-11p	SS-7	35.0 - 36.5	(SP-SM) Grayish brown, poorly graded SAND with silt	21				0.6	87.5	11.9
▲	B-D-ES-11p	SS-10	50.0 - 51.5	(SM) Gray, silty SAND	16				8.2	78.1	13.7

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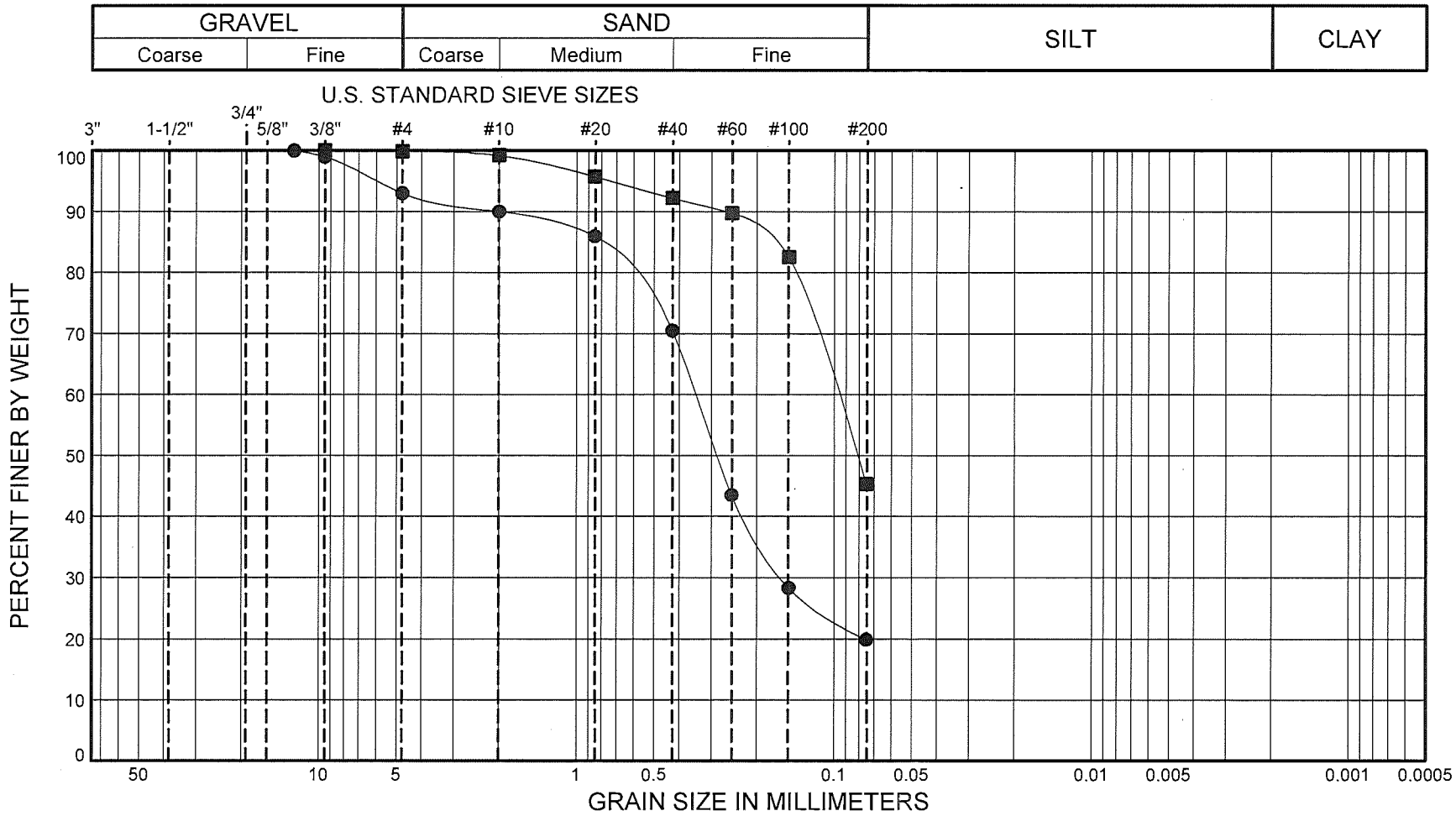
BLDG-2018-00983, BLDG-2018-00985

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-11p



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-11p	SS-15	75.0 - 76.5	(SM) Grayish brown, silty SAND	17				6.9	73.1	19.9
■	B-D-ES-11p	SS-18/SS-19	90.0 - 96.5	(SM) Dark gray, silty SAND	20				0.2	54.5	45.3

HWA GEOSCIENCES INC.

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

SITE COPY
BLDG-2018-00881, BLDG-2018-00883, BLDG-2018-00893,
BLDG-2018-00963, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

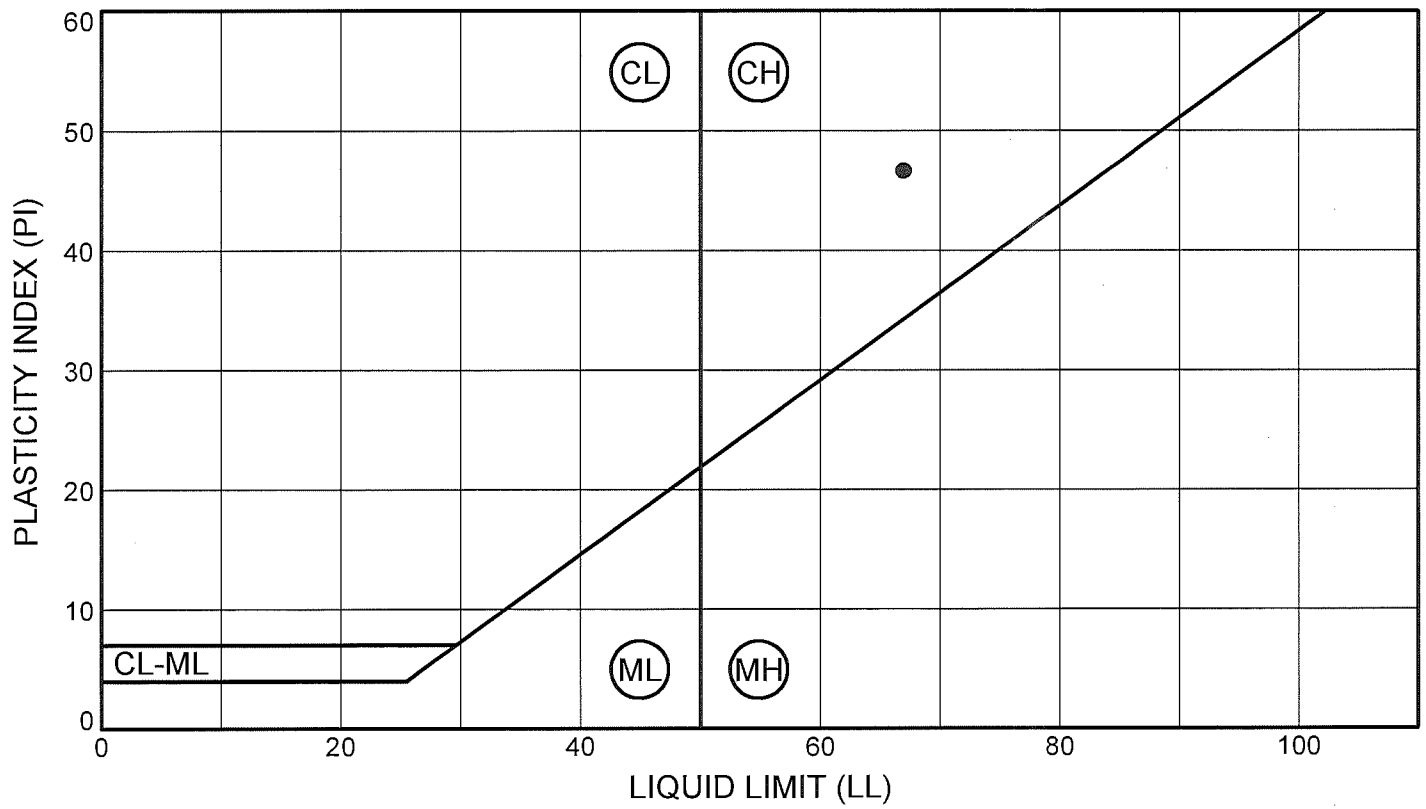
PROJECT NO.: 2009-142 BORING NAME: B-D-ES-11p

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-ES-12p, SS-3	15.0-16.5	15				17.9	44.6	37.5				SM	Dark olive brown, silty SAND with gravel
B-D-ES-12p, SS-5	25.0-26.5	10				19.4	59.4	21.2				SM	Dark olive brown, silty SAND with gravel
B-D-ES-12p, SS-6	30.0-31.5	7				16.0	60.6	23.4				SM	Gray, silty SAND with gravel
B-D-ES-12p, SS-10	50.0-51.5	7				14.2	57.6	28.1				SM	Olive gray, silty SAND
B-D-ES-12p, SS-16	80.0-81.5	15				5.6	69.8	24.6				SM	Dark olive brown, silty SAND
B-D-ES-12p, SS-18	90.0-91.5	15				3.6	88.8	7.6				SP-SM	Olive brown, poorly graded SAND with silt
B-D-ES-12p, SS-20	100.0-101.5	22				0.5	86.1	13.4				SM	Olive brown, silty SAND
B-D-ES-12p, SS-22	115.0-116.5	25	67	20	47							CH	Dark gray, fat CLAY

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985



SYMBOL	SAMPLE	DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	B-D-ES-12p SS-22	115.0 - 116.5	(CH) Dark gray, fat CLAY	25	67	20	47	

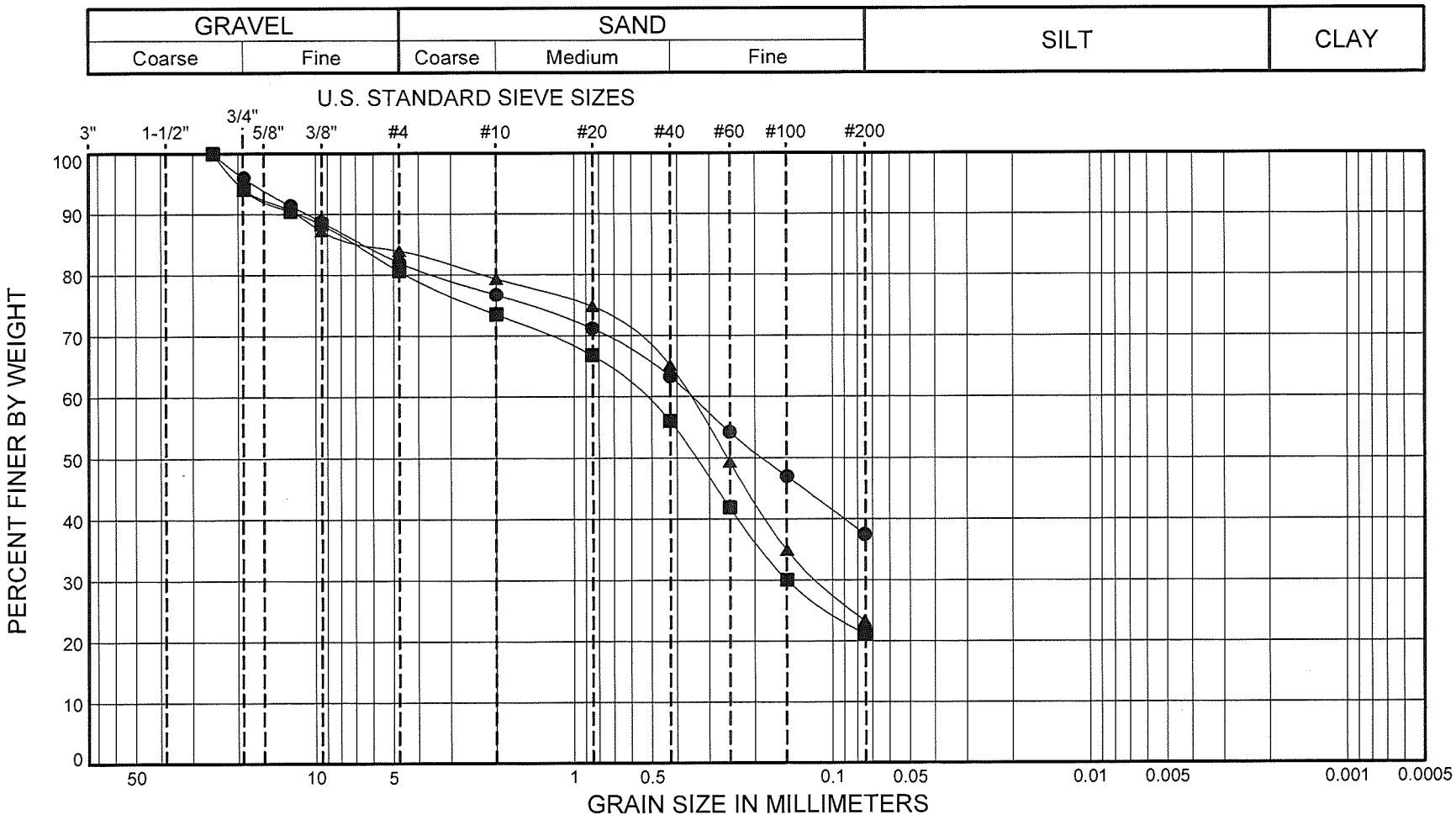
HWA GEOSCIENCES INC.

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893, BLDG-2018-00983, BLDG-2018-00985

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS METHOD ASTM D4318

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-12p



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-12p	SS-3	15.0 - 16.5	(SM) Dark olive brown, silty SAND with gravel	15				17.9	44.6	37.5
■	B-D-ES-12p	SS-5	25.0 - 26.5	(SM) Dark olive brown, silty SAND with gravel	10				19.4	59.4	21.2
▲	B-D-ES-12p	SS-6	30.0 - 31.5	(SM) Gray, silty SAND with gravel	7				16.0	60.6	23.4

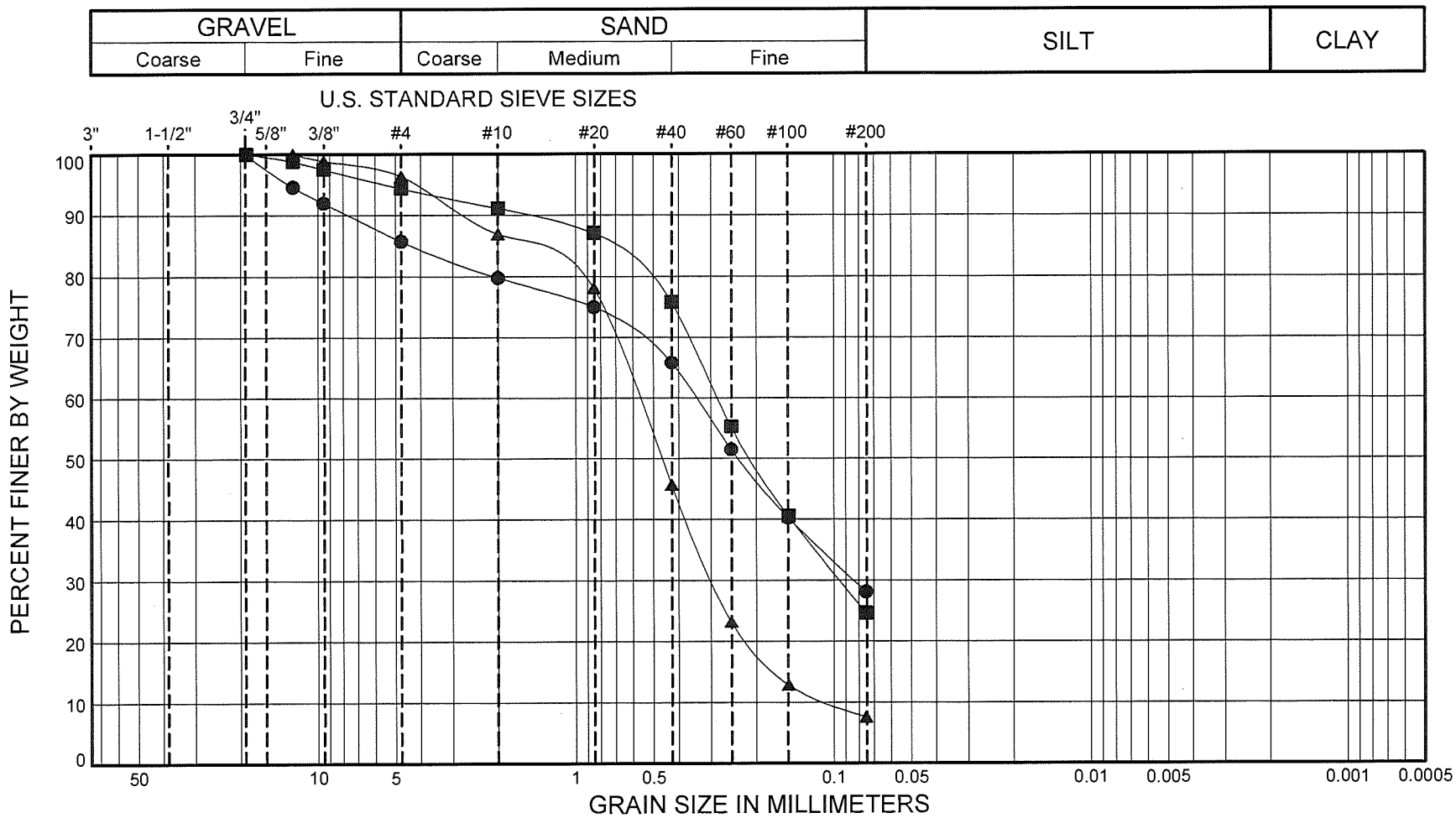
HWA GEOSCIENCES INC.

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-12p



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-12p	SS-10	50.0 - 51.5	(SM) Olive gray, silty SAND	7				14.2	57.6	28.1
■	B-D-ES-12p	SS-16	80.0 - 81.5	(SM) Dark olive brown, silty SAND	15				5.6	69.8	24.6
▲	B-D-ES-12p	SS-18	90.0 - 91.5	(SP-SM) Olive brown, poorly graded SAND with silt	15				3.6	88.8	7.6

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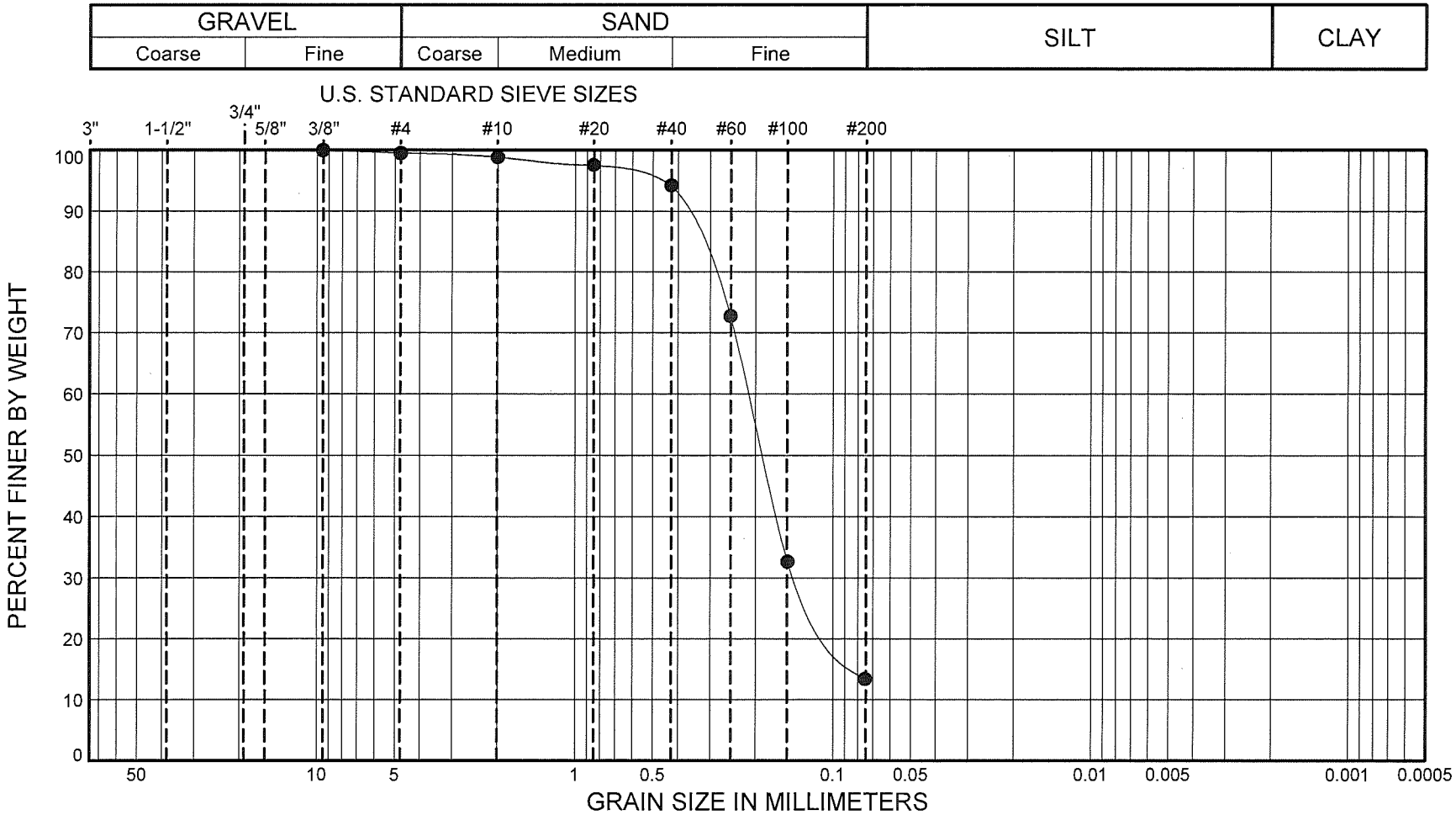
BLDG-2018-00983, BLDG-2018-00985

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-12p



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-12p	SS-20	100.0 - 101.5	(SM) Olive brown, silty SAND	22				0.5	86.1	13.4

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SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-12p

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-ES-13p, SS-2	10.0-11.5	20				1.6	90.0	8.4				SP-SM	Grayish brown, poorly graded SAND with silt
B-D-ES-13p, SS-5	25.0-26.5	12				5.9	68.6	25.5				SM	Grayish brown, silty SAND
B-D-ES-13p, SS-8	40.0-41.5	29	70	28	42							CH	Dark gray, fat CLAY
B-D-ES-13p, SS-12	70.0-71.5	33	73	21	52							CH	Dark gray, fat CLAY

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

HWA GEOSCIENCES INC.

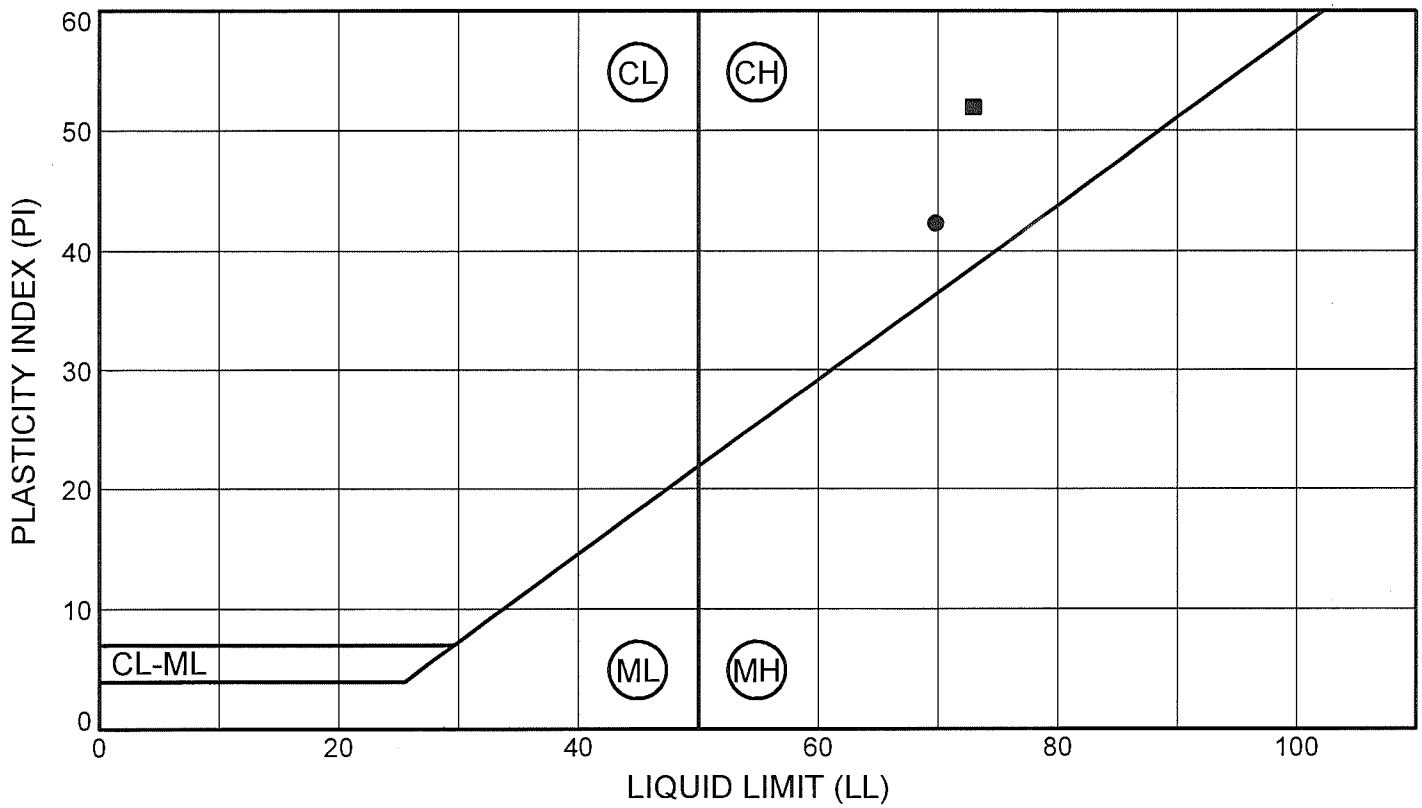
SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-ES-13p

PROJECT NO.
2009-142

SITE COPY
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985



SYMBOL	SAMPLE	DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	B-D-ES-13p SS-8	40.0 - 41.5	(CH) Dark gray, fat CLAY	29	70	28	42	
■	B-D-ES-13p SS-12	70.0 - 71.5	(CH) Dark gray, fat CLAY	33	73	21	52	

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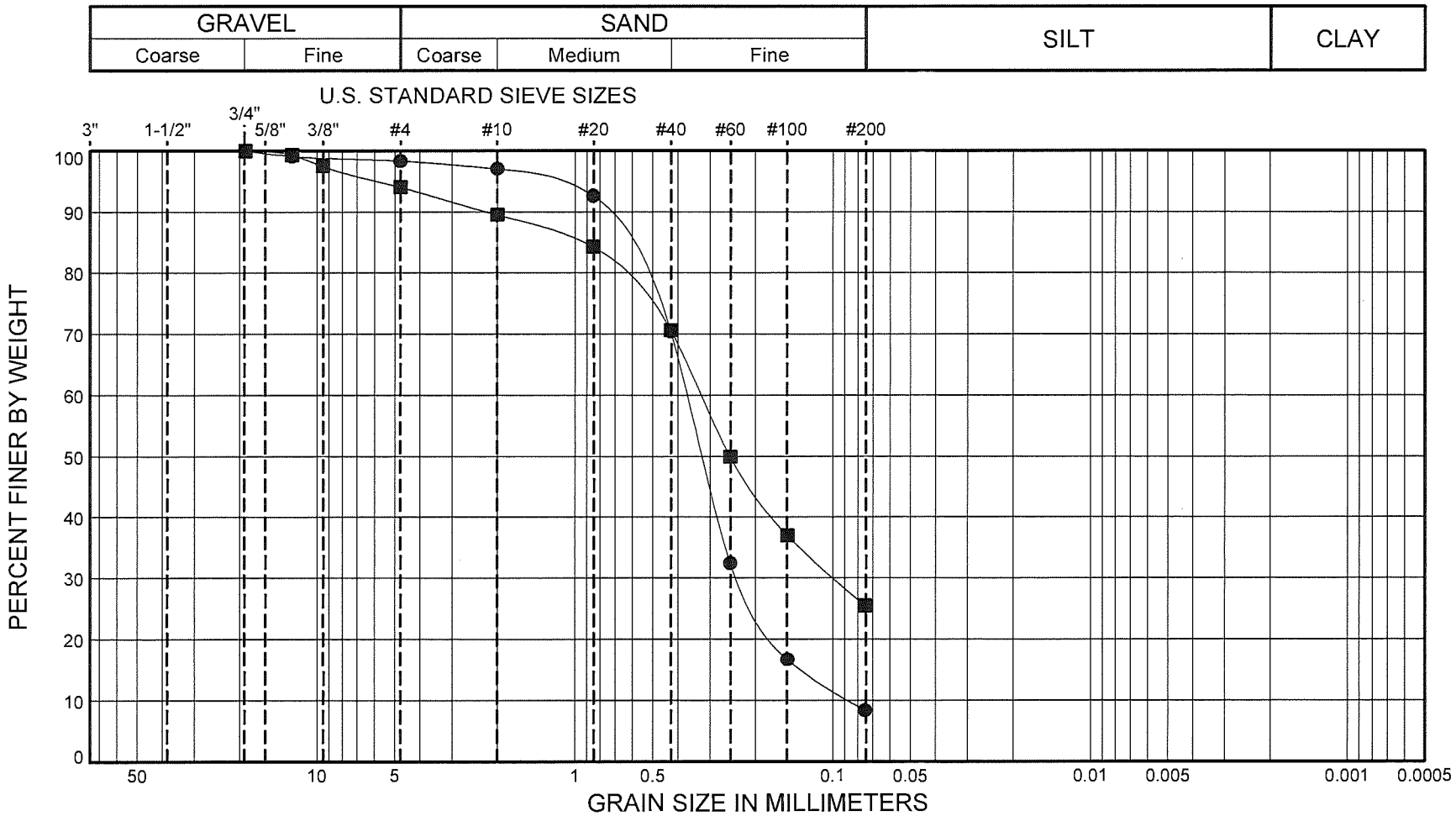
BLDG-2018-00983, BLDG-2018-00985

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS METHOD ASTM D4318

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-13p



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-13p	SS-2	10.0 - 11.5	(SP-SM) Grayish brown, poorly graded SAND with silt	20				1.6	90.0	8.4
■	B-D-ES-13p	SS-5	25.0 - 26.5	(SM) Grayish brown, silty SAND	12				5.9	68.6	25.5

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SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

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BLDG-2018-00983, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-13p

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-ES-14p, SS-3	15.0-16.5	11				10.9	59.8	29.4				SM	Olive gray, silty SAND
B-D-ES-14p, SS-7	35.0-36.5	22	24	18	6							CL-ML	Dark gray, silty CLAY
B-D-ES-14p, SS-9/SS-10	45.0-51.5	15				11.2	73.0	15.7				SM	Dark gray, silty SAND
B-D-ES-14p, SS-13	65.0-66.5	22	32	17	15							CL	Dark gray, lean CLAY
B-D-ES-14p, SS-16	90.0-91.5	23				0.3	16.2	83.5				ML	Dark gray, SILT with sand

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

HWA GEOSCIENCES INC.

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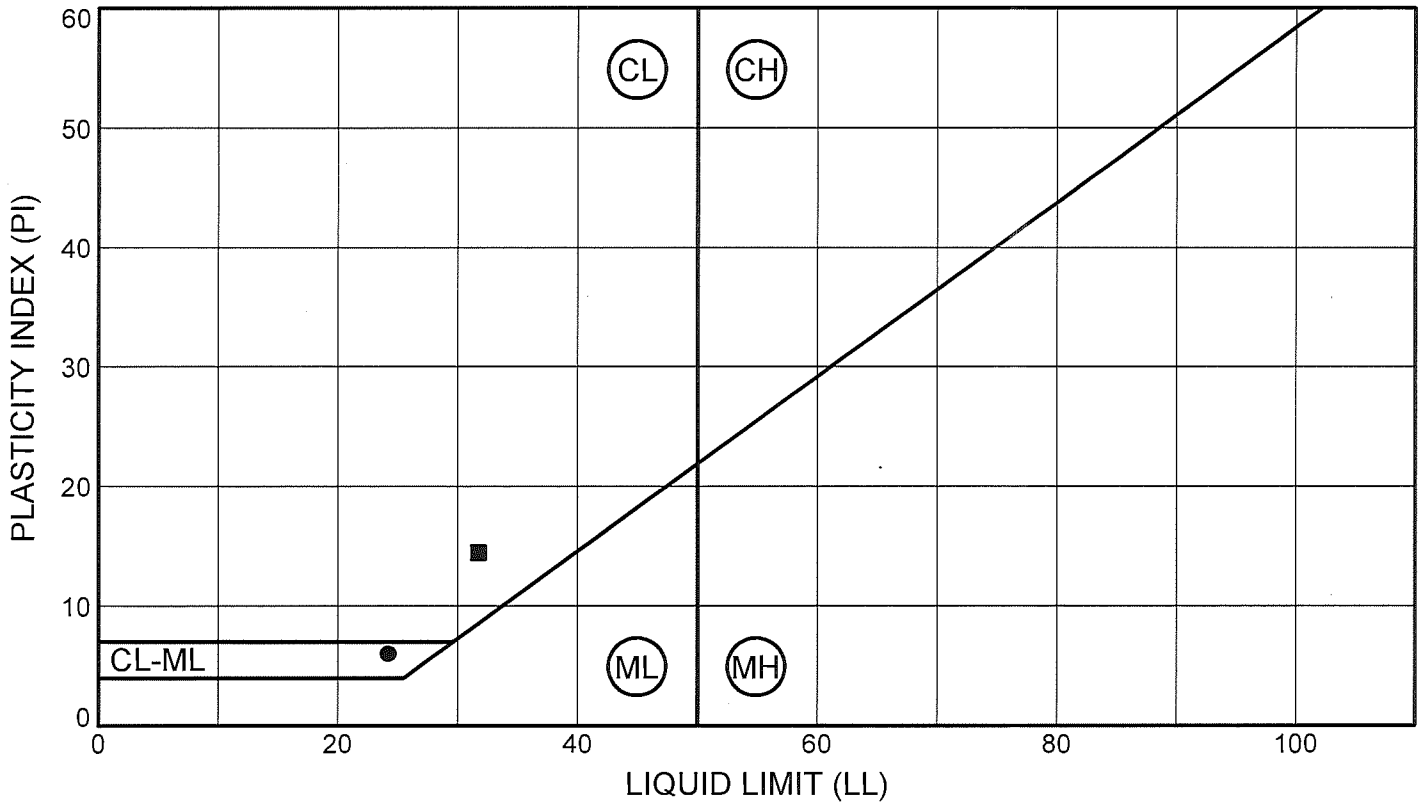
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985

SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-ES-14p

PROJECT NO.
2009-142



SYMBOL	SAMPLE	DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	B-D-ES-14p SS-7	35.0 - 36.5	(CL-ML) Dark gray, silty CLAY	22	24	18	6	
■	B-D-ES-14p SS-13	65.0 - 66.5	(CL) Dark gray, lean CLAY	22	32	17	15	

HWA GEOSCIENCES INC.

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

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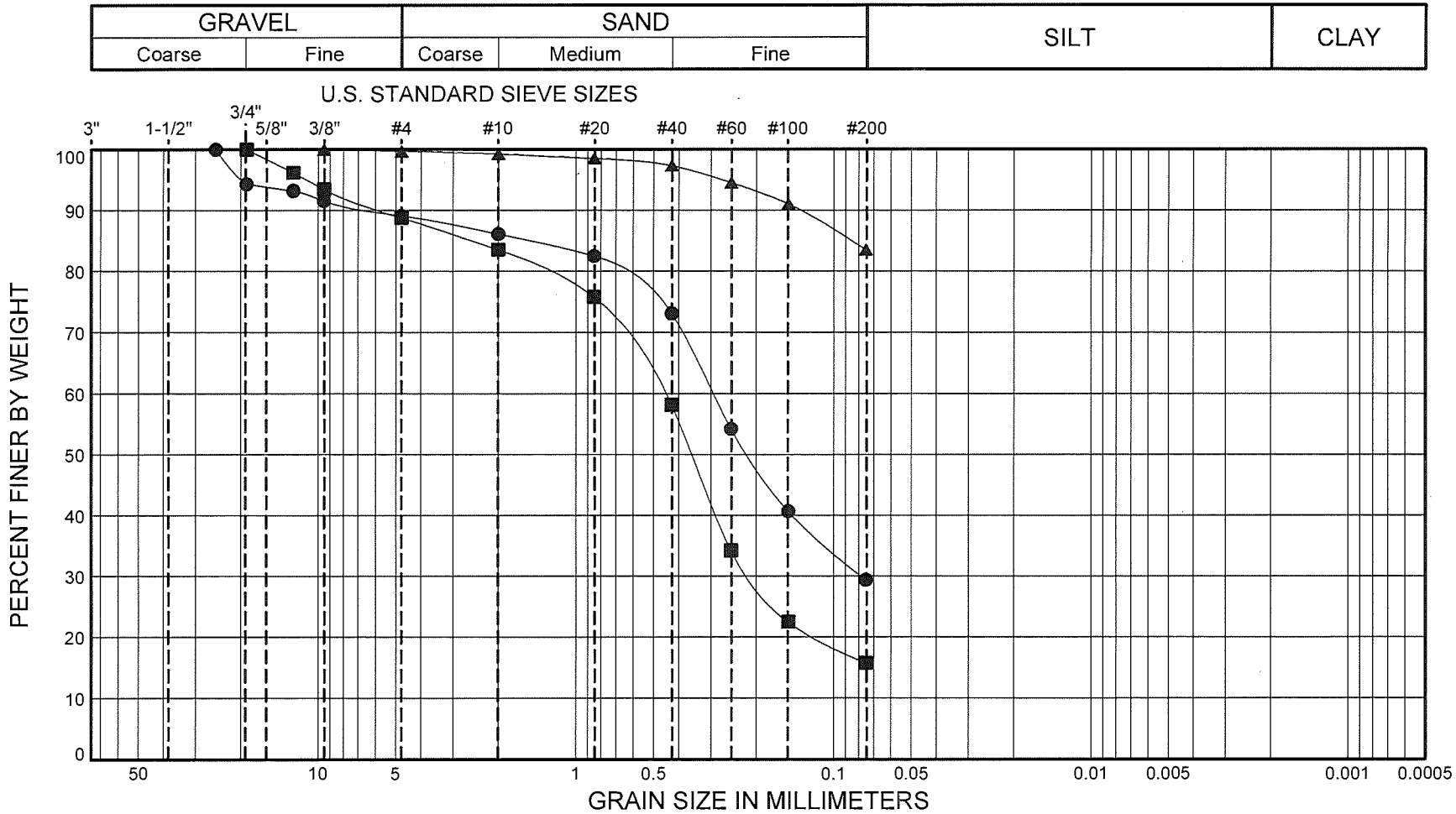
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-14p



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-ES-14p	SS-3	15.0 - 16.5	(SM) Olive gray, silty SAND	11				10.9	59.8	29.4
■	B-D-ES-14p	SS-9/SS-10	45.0 - 51.5	(SM) Dark gray, silty SAND	15				11.2	73.0	15.7
▲	B-D-ES-14p	SS-16	90.0 - 91.5	(ML) Dark gray, SILT with sand	23				0.3	16.2	83.5

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SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-ES-14p

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-PK-1p, SS-2	10.0-11.5	12				7.5	43.8	48.7				SM	Grayish brown, silty SAND
B-D-PK-1p, SS-5	25.0-26.5	8				1.3	90.4	8.3				SP-SM	Olive brown, poorly graded SAND with silt
B-D-PK-1p, SS-7	35.0-36.5	9				32.5	52.5	15.0				SM	Olive brown, silty SAND with gravel
B-D-PK-1p, SS-9	45.0-46.5	7				42.3	51.3	6.4				SP-SM	Dark olive brown, poorly graded SAND with silt and gravel
B-D-PK-1p, SS-10	50.0-51.5	8				15.1	77.6	7.3				SP-SM	Dark olive brown, poorly graded SAND with silt and gravel
B-D-PK-1p, SS-12	60.0-61.5	14						7.0				SP-SM	Olive brown, poorly graded SAND with silt

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

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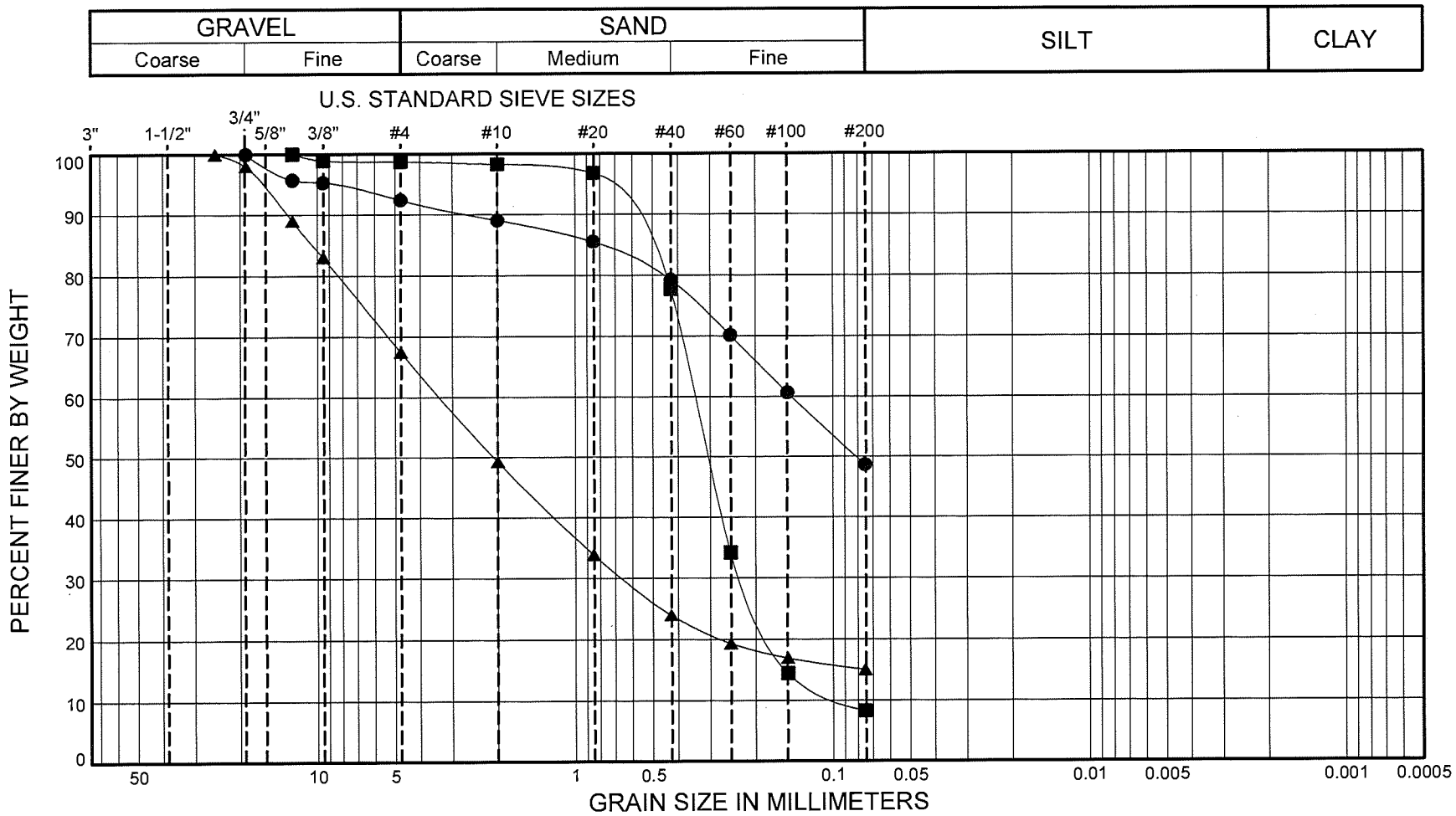
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-PK-1p	SS-2	10.0 - 11.5	(SM) Grayish brown, silty SAND	12				7.5	43.8	48.7
■	B-D-PK-1p	SS-5	25.0 - 26.5	(SP-SM) Olive brown, poorly graded SAND with silt	8				1.3	90.4	8.3
▲	B-D-PK-1p	SS-7	35.0 - 36.5	(SM) Olive brown, silty SAND with gravel	9				32.5	52.5	15.0

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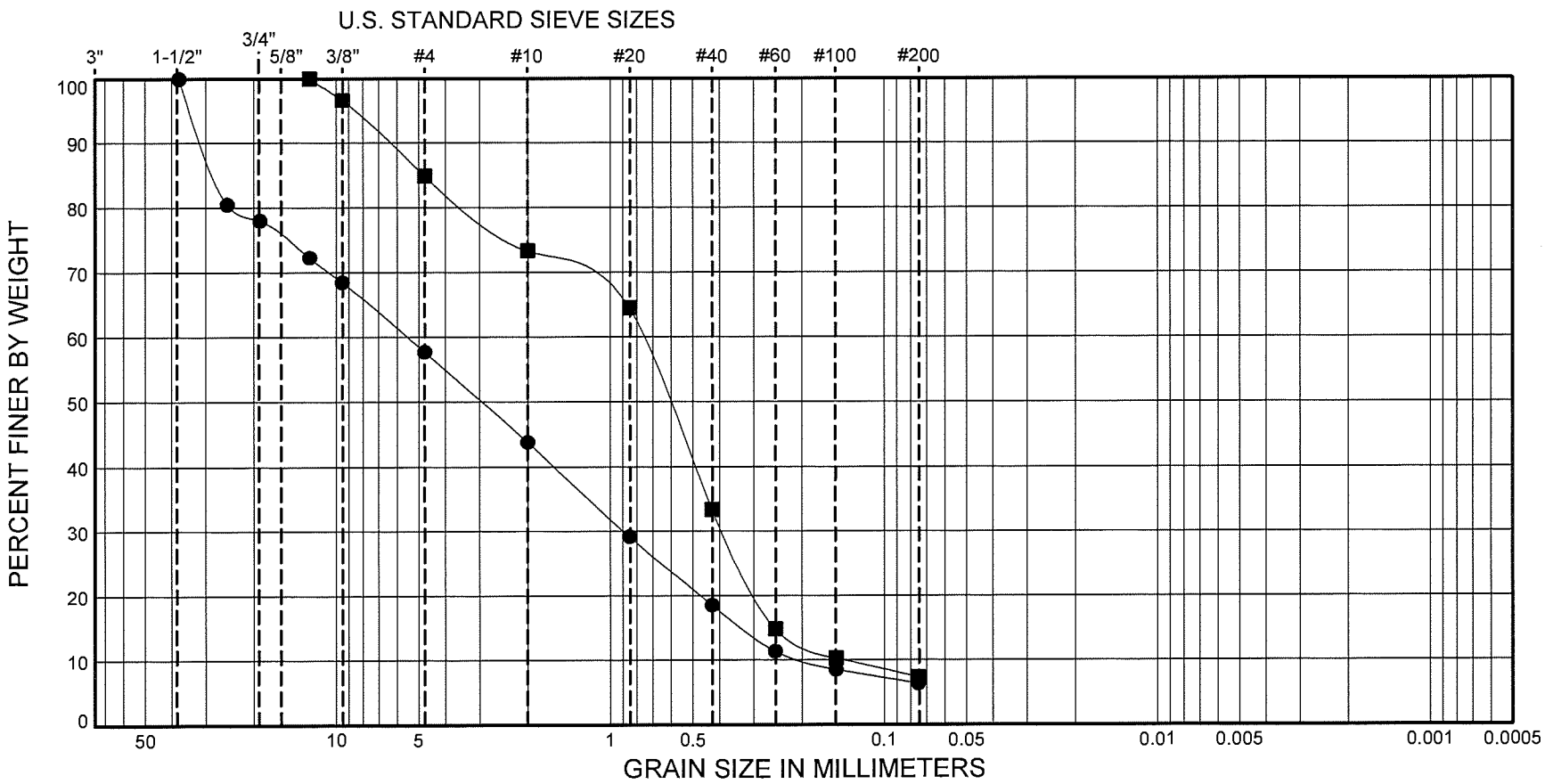
BLDG-2018-00986, BLDG-2018-00985

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

PARTICLE-SIZE ANALYSIS OF SOILS METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-PK-1p



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-PK-1p	SS-9	45.0 - 46.5	(SP-SM) Dark olive brown, poorly graded SAND with silt and gravel	7				42.3	51.3	6.4
■	B-D-PK-1p	SS-10	50.0 - 51.5	(SP-SM) Dark olive brown, poorly graded SAND with silt and gravel	8				15.1	77.6	7.3

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BLDG 2018-00983, BLDG 2018-00985

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-PK-1p

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-PK-2p, SS-2	10.0-11.5	13				3.1	45.7	51.2				ML	Grayish brown, sandy SILT
B-D-PK-2p, SS-3	15.0-16.5	10				12.4	49.4	38.1				SM	Olive brown, silty SAND
B-D-PK-2p, SS-8	40.0-41.5	7				49.1	45.3	5.6				GW-GM	Olive brown, well graded GRAVEL with silt and sand
B-D-PK-2p, SS-9	45.0-46.5	12				21.5	73.4	5.1				SP-SM	Dark olive brown, poorly graded SAND with silt and gravel
B-D-PK-2p, SS-10	50.0-51.5	13				4.4	91.4	4.2				SP	Dark olive brown, poorly graded SAND

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

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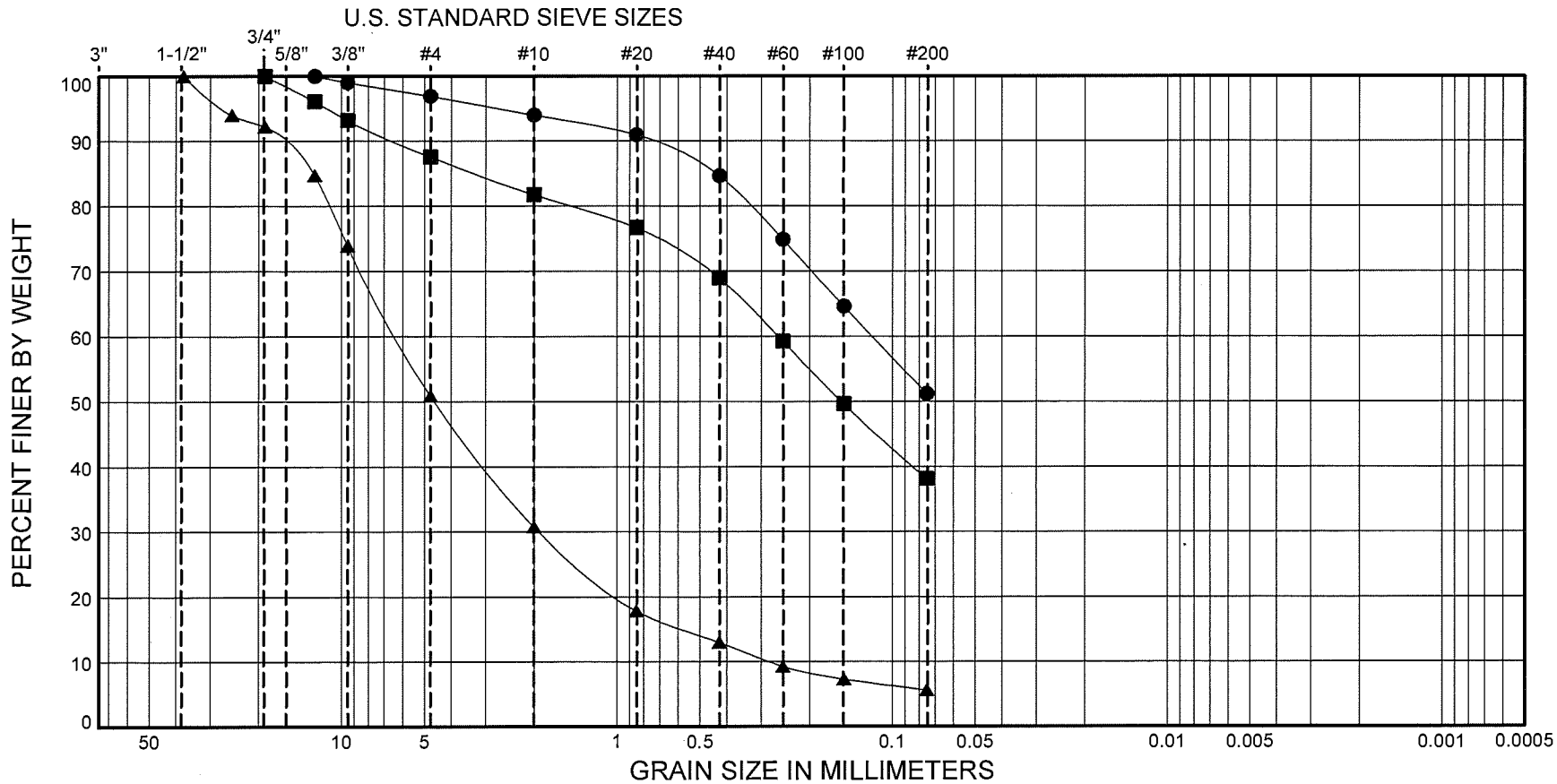
BLDG-2018-00983, BLDG-2018-00985

SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-PK-2p

PROJECT NO.
2009-142



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-PK-2p	SS-2	10.0 - 11.5	(ML) Grayish brown, sandy SILT	13				3.1	45.7	51.2
■	B-D-PK-2p	SS-3	15.0 - 16.5	(SM) Olive brown, silty SAND	10				12.4	49.4	38.1
▲	B-D-PK-2p	SS-8	40.0 - 41.5	(GW-GM) Olive brown, well graded GRAVEL with silt and sand	7				49.1	45.3	5.6

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SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

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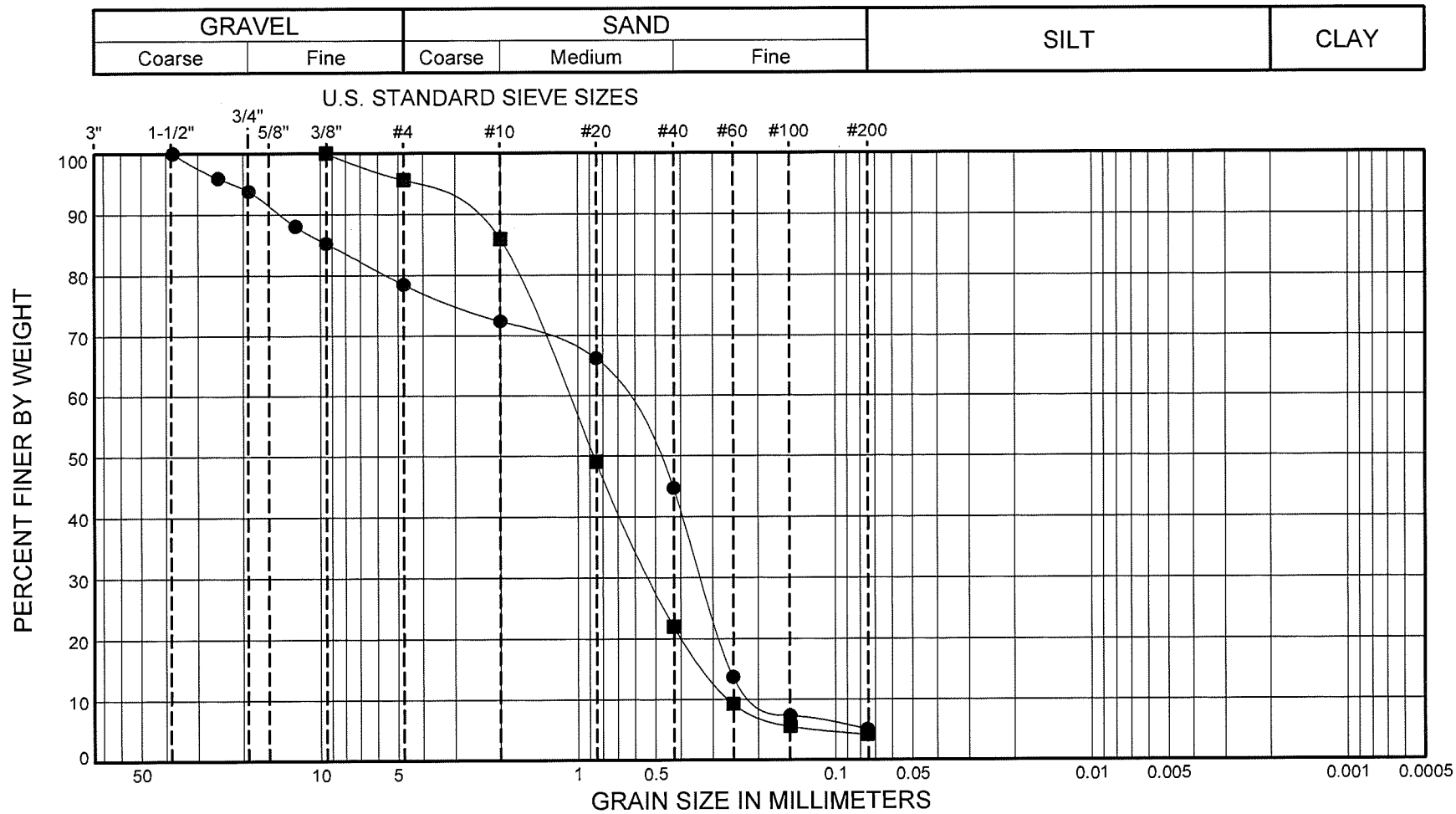
BLDG-2018-00983, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS OF SOILS METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-PK-2p



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-PK-2p	SS-9	45.0 - 46.5	(SP-SM) Dark olive brown, poorly graded SAND with silt and gravel	12				21.5	73.4	5.1
■	B-D-PK-2p	SS-10	50.0 - 51.5	(SP) Dark olive brown, poorly graded SAND	13				4.4	91.4	4.2

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SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

BLDG-2018-00893, BLDG-2018-00893, BLDG-2018-00893, BLDG-2018-00985, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS OF SOILS METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-PK-2p

HWAGRSZCH2 2009142.GPJ 2/1/10

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-OTCST-1, SS-1	5.0-6.5	25						52.7				ML	Dark olive brown, sandy SILT
B-D-OTCST-1, SS-4	20.0-21.5	9						23.8				SM	Olive brown, silty SAND
B-D-OTCST-1, SS-6	30.0-31.5	7				46.1	48.3	5.6				SP-SM	Olive brown, poorly graded SAND with silt and gravel
B-D-OTCST-1, SS-11	55.0-56.5	12						8.4				SP-SM	Olive brown, poorly graded SAND with silt

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

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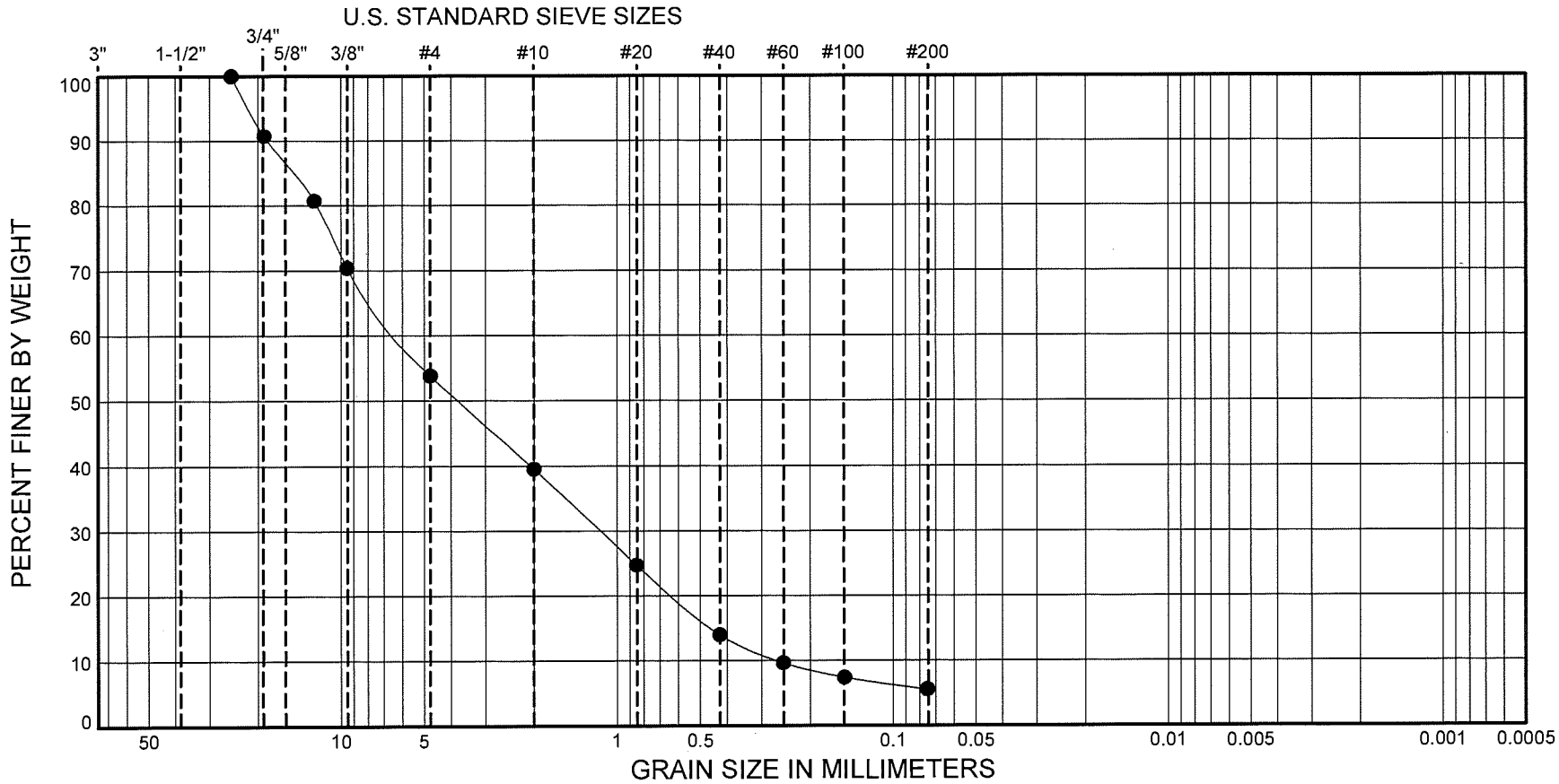
BLDG-2018-00983, BLDG-2018-00985

SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-OTCST-1

PROJECT NO.
2009-142



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-OTCST-1	SS-6	30.0 - 31.5	(SP-SM) Olive brown, poorly graded SAND with silt and gravel	7				46.1	48.3	5.6

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-OTCST-1

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-OTCST-2, SS-2	10.0-11.5	8						40.2				SM	Grayish brown, silty SAND
B-D-OTCST-2, SS-4	20.0-21.5	10						41.8				SM	Olive brown, silty SAND
B-D-OTCST-2, SS-7	35.0-36.5	13				6.2	82.2	11.6				SP-SM	Olive brown, poorly graded SAND with silt
B-D-OTCST-2, SS-11	55.0-56.5	14						6.6				SP-SM	Dark olive brown, poorly graded SAND with silt
B-D-OTCST-2, SS-12	60.0-61.5	15				7.6	87.7	4.7				SP	Olive brown, poorly graded SAND

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

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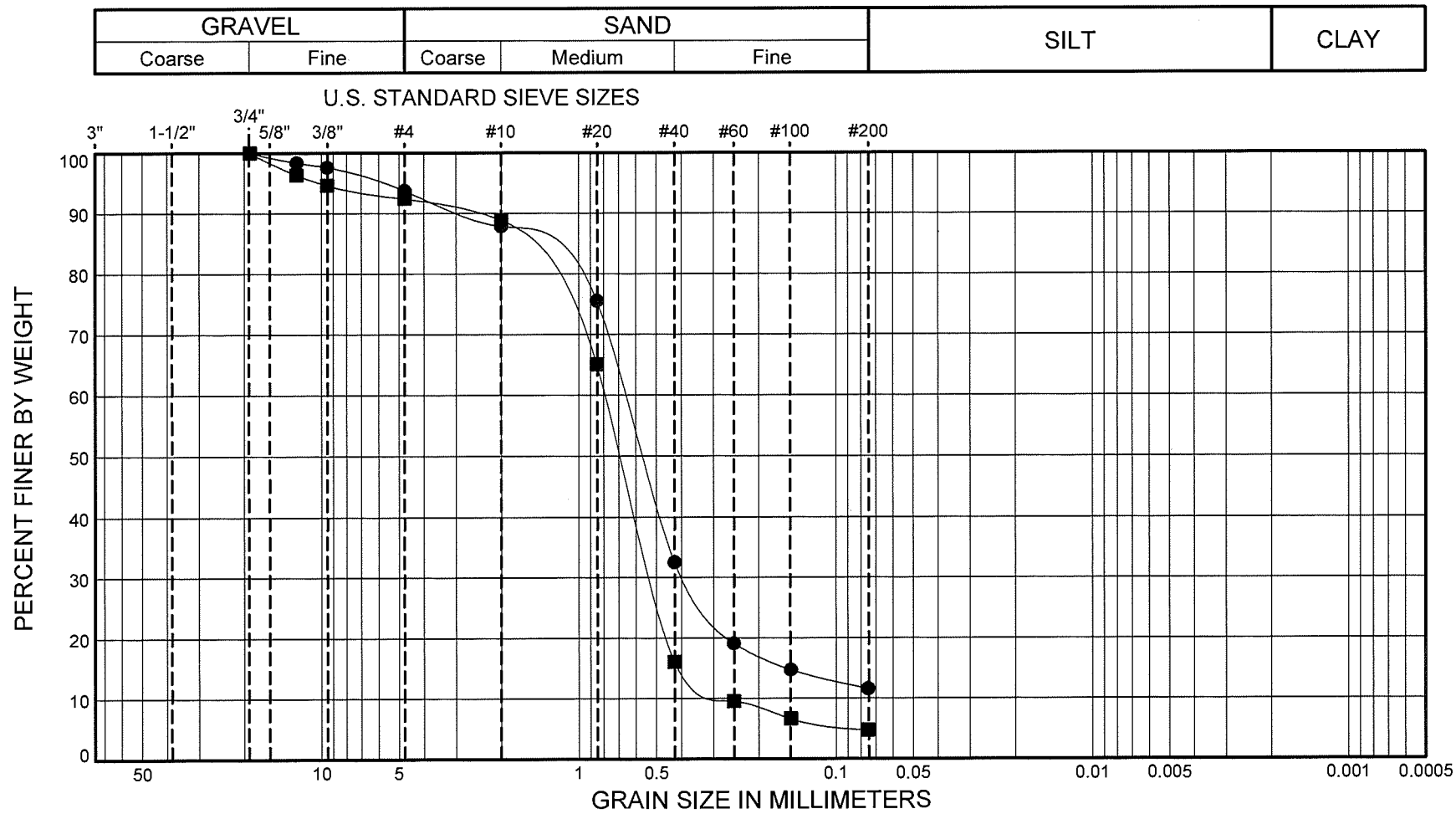
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985

SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-OTCST-2

PROJECT NO.
2009-142



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-OTCST-2	SS-7	35.0 - 36.5	(SP-SM) Olive brown, poorly graded SAND with silt	13				6.2	82.2	11.6
■	B-D-OTCST-2	SS-12	60.0 - 61.5	(SP) Olive brown, poorly graded SAND	15				7.6	87.7	4.7

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SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

BLDG-2018-00887, BLDG-2018-00886, BLDG-2018-00893,
BLDG-2018-00988, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-OTCST-2

HWAGRSZCH2 2009142.GPJ 2/1/10

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-OTCST-3p, SS-1	5.0-6.5	13				4.9	47.2	47.9				SM	Grayish brown, silty SAND
B-D-OTCST-3p, SS-3	15.0-16.5	20				6.1	34.4	59.6				ML	Olive brown, sandy SILT
B-D-OTCST-3p, SS-5	25.0-26.5	13				8.3	41.4	50.3				ML	Olive brown, sandy SILT
B-D-OTCST-3p, SS-12	60.0-61.5	9						6.8				SP-SM	Olive brown, poorly graded SAND with silt
B-D-OTCST-3p, SS-13	65.0-66.5	5				28.0	67.7	4.4				SP	Olive brown, poorly graded SAND with gravel

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

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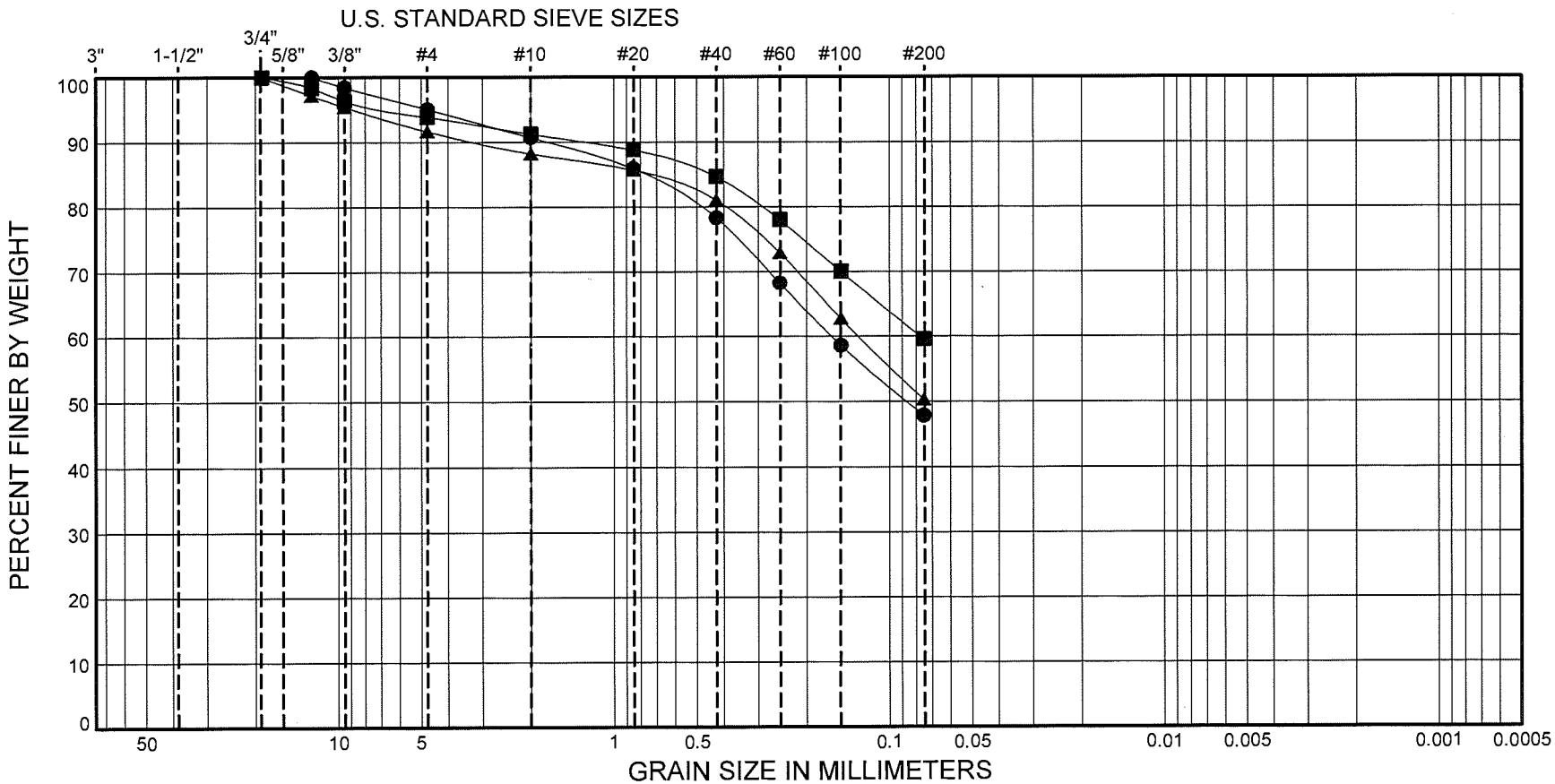
BLDG-2018-00983, BLDG-2018-00985

SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-OTCST-3p

PROJECT NO.
2009-142



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-OTCST-3p	SS-1	5.0 - 6.5	(SM) Grayish brown, silty SAND	13				4.9	47.2	47.9
■	B-D-OTCST-3p	SS-3	15.0 - 16.5	(ML) Olive brown, sandy SILT	20				6.1	34.4	59.6
▲	B-D-OTCST-3p	SS-5	25.0 - 26.5	(ML) Olive brown, sandy SILT	13				8.3	41.4	50.3

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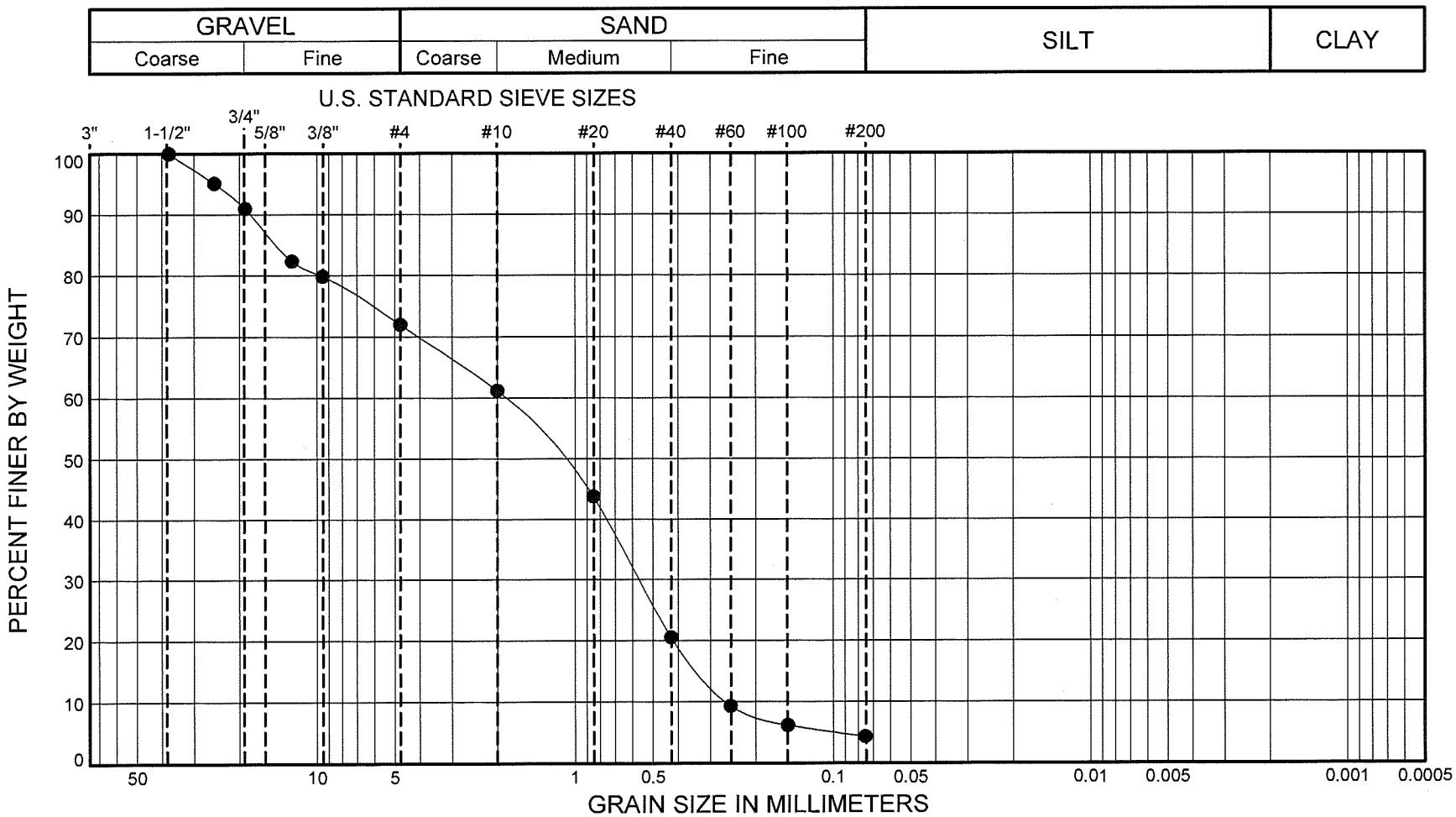
BLDG-2018-00988, BLDG-2018-00985

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-OTCST-3p

HWAGRSZCH2 2009142.GPJ 2/1/10



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-OTCST-3p	SS-13	65.0 - 66.5	(SP) Olive brown, poorly graded SAND with gravel	5				28.0	67.7	4.4

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SOUND TRANSIT EASTLINK, PHASE 3

King County, Washington

BLDG-2018-00886, BLDG-2018-00893, BLDG-2018-00985, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS OF SOILS METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-OTCST-3p

HWAGRSZCH2 2009142.GPJ 2/1/10

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-OVSSP-1p, SS-1	10.0-11.5	9				5.0	53.6	41.4				SM	Grayish brown, silty SAND
B-D-OVSSP-1p, SS-5	30.0-31.5	11				15.5	68.1	16.4				SM	Light olive brown, silty SAND with gravel
B-D-OVSSP-1p, SS-6	35.0-36.5	7				21.6	69.8	8.5				SW-SM	Light olive brown, well graded SAND with silt and gravel

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

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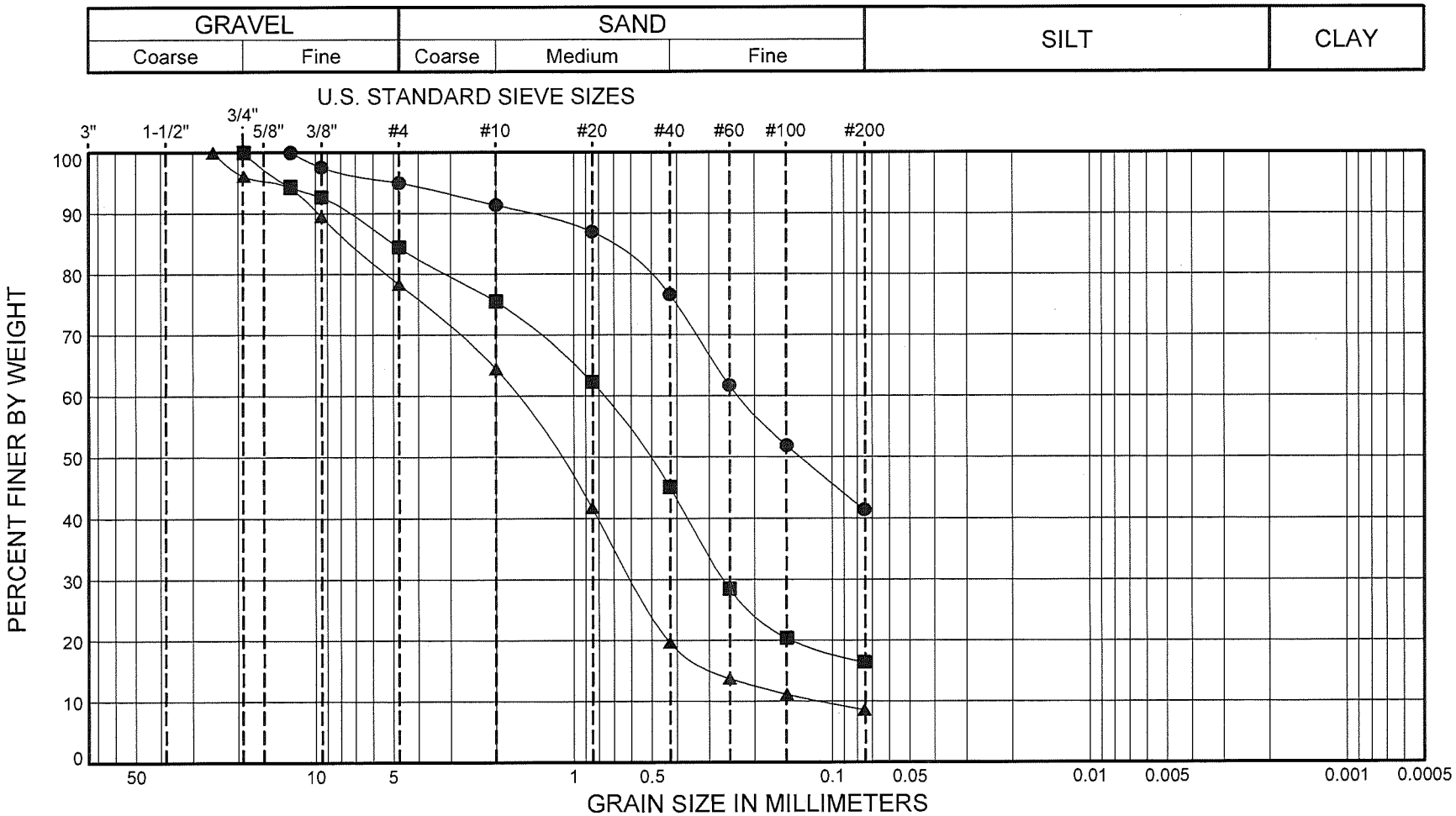
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-OVSSP-1p	SS-1	10.0 - 11.5	(SM) Grayish brown, silty SAND	9				5.0	53.6	41.4
■	B-D-OVSSP-1p	SS-5	30.0 - 31.5	(SM) Light olive brown, silty SAND with gravel	11				15.5	68.1	16.4
▲	B-D-OVSSP-1p	SS-6	35.0 - 36.5	(SW-SM) Light olive brown, well graded SAND with silt and gravel	7				21.6	69.8	8.5

HWA GEOSCIENCES INC.

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

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BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-OVSSP-1p

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-RW2-1p, SS-2	10.0-11.5	16						30.4				SM	Dark gray, silty SAND
B-D-RW2-1p, SS-3	15.0-16.5	22						60.2				ML	Dark gray, sandy SILT
B-D-RW2-1p, SS-5	25.0-26.5	14				32.6	54.8	12.6				SM	Gray, silty SAND with gravel
B-D-RW2-1p, SS-6	30.0-31.5	18				0.8	80.2	19.0				SM	Dark gray, silty SAND

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

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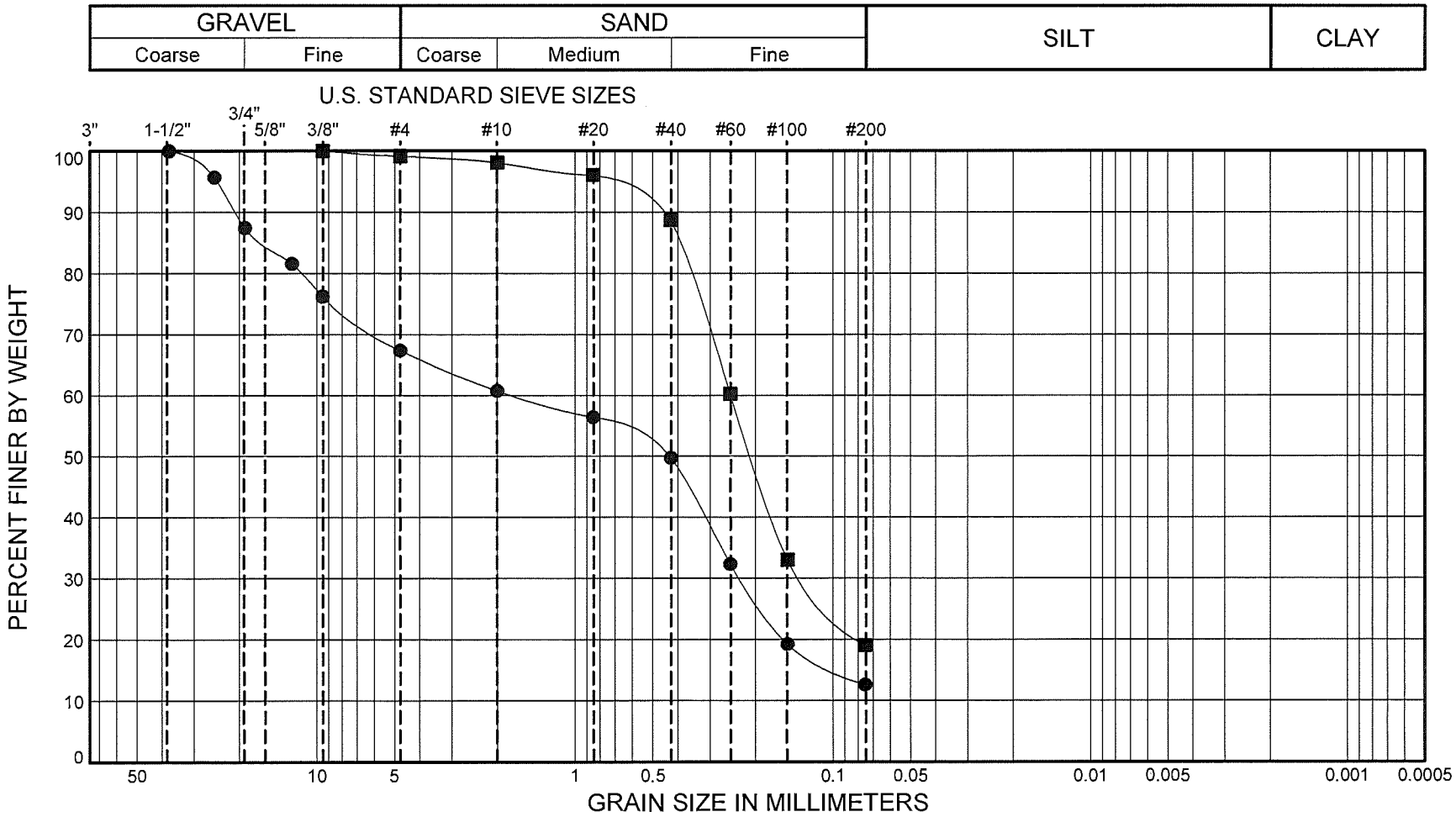
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893
BLDG-2018-00983, BLDG-2018-00985

SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-RW2-1p

PROJECT NO.
2009-142



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-RW2-1p	SS-5	25.0 - 26.5	(SM) Gray, silty SAND with gravel	14				32.6	54.8	12.6
■	B-D-RW2-1p	SS-6	30.0 - 31.5	(SM) Dark gray, silty SAND	18				0.8	80.2	19.0

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SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

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BLDG-2018-00881, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-RW2-1p

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-RW5-3, SS-1	5.0-6.5	11				1.5	86.5	11.9				SP-SM	Olive brown, poorly graded SAND with silt
B-D-RW5-3, SS-3	15.0-16.5	11				7.7	82.7	9.7				SP-SM	Olive brown, poorly graded SAND with silt
B-D-RW5-3, SS-5	25.0-26.5	7				41.0	53.4	5.5				SW-SM	Olive brown, well graded SAND with silt and gravel
B-D-RW5-3, SS-7	35.0-36.5	12				10.9	82.9	6.2				SP-SM	Olive brown, poorly graded SAND with silt
B-D-RW5-3, SS-9	45.0-46.5	11				15.8	75.8	8.4				SW-SM	Olive brown, well graded SAND with silt and gravel

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

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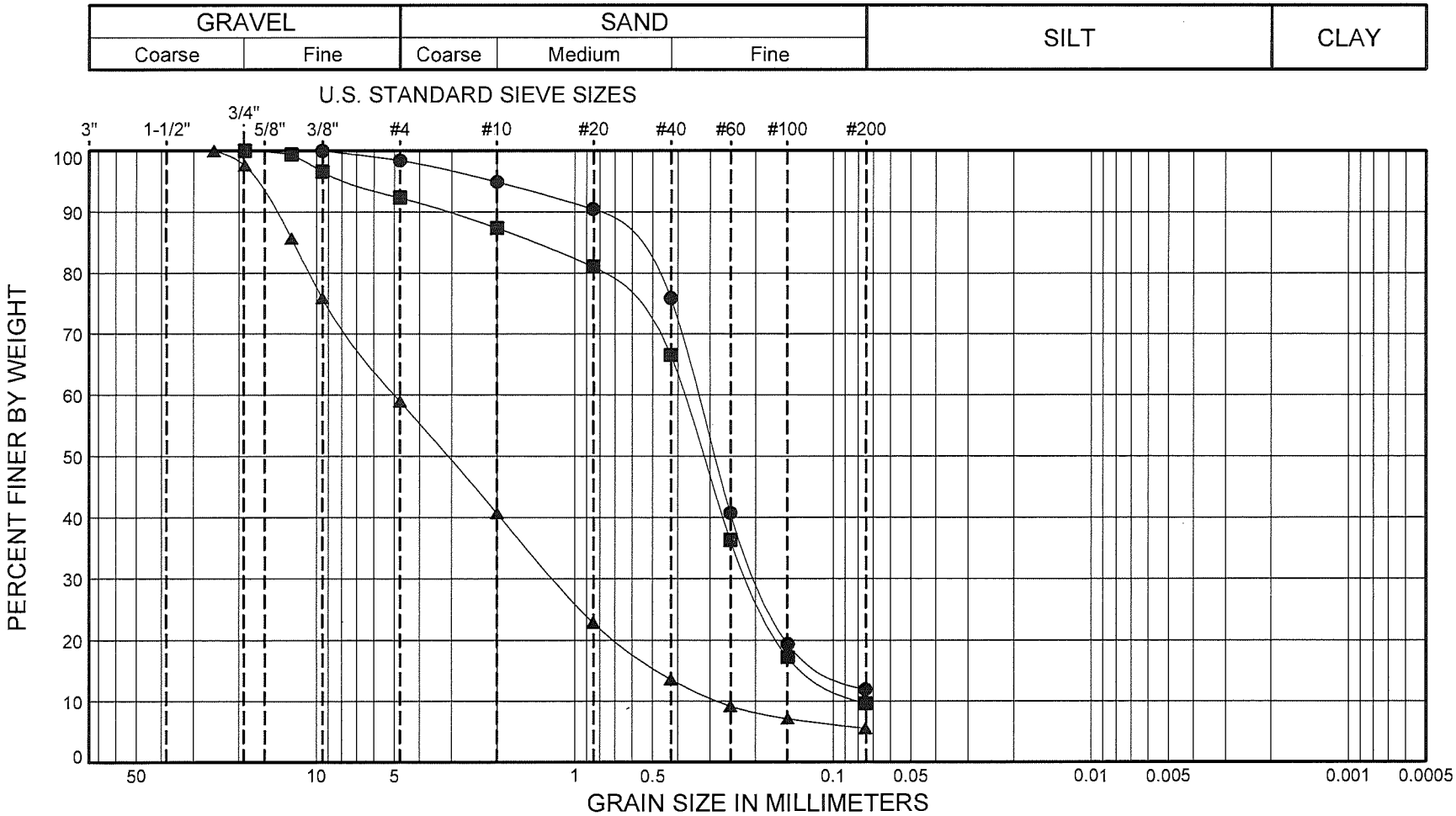
BLDG-2018-00983, BLDG-2018-00985

SUMMARY OF MATERIAL PROPERTIES

SOUND TRANSIT EASTLINK, PHASE 3
KING COUNTY, WASHINGTON

BORING NAME
B-D-RW5-3

PROJECT NO.
2009-142



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-RW5-3	SS-1	5.0 - 6.5	(SP-SM) Olive brown, poorly graded SAND with silt	11				1.5	86.5	11.9
■	B-D-RW5-3	SS-3	15.0 - 16.5	(SP-SM) Olive brown, poorly graded SAND with silt	11				7.7	82.7	9.7
▲	B-D-RW5-3	SS-5	25.0 - 26.5	(SW-SM) Olive brown, well graded SAND with silt and gravel	7				41.0	53.4	5.5

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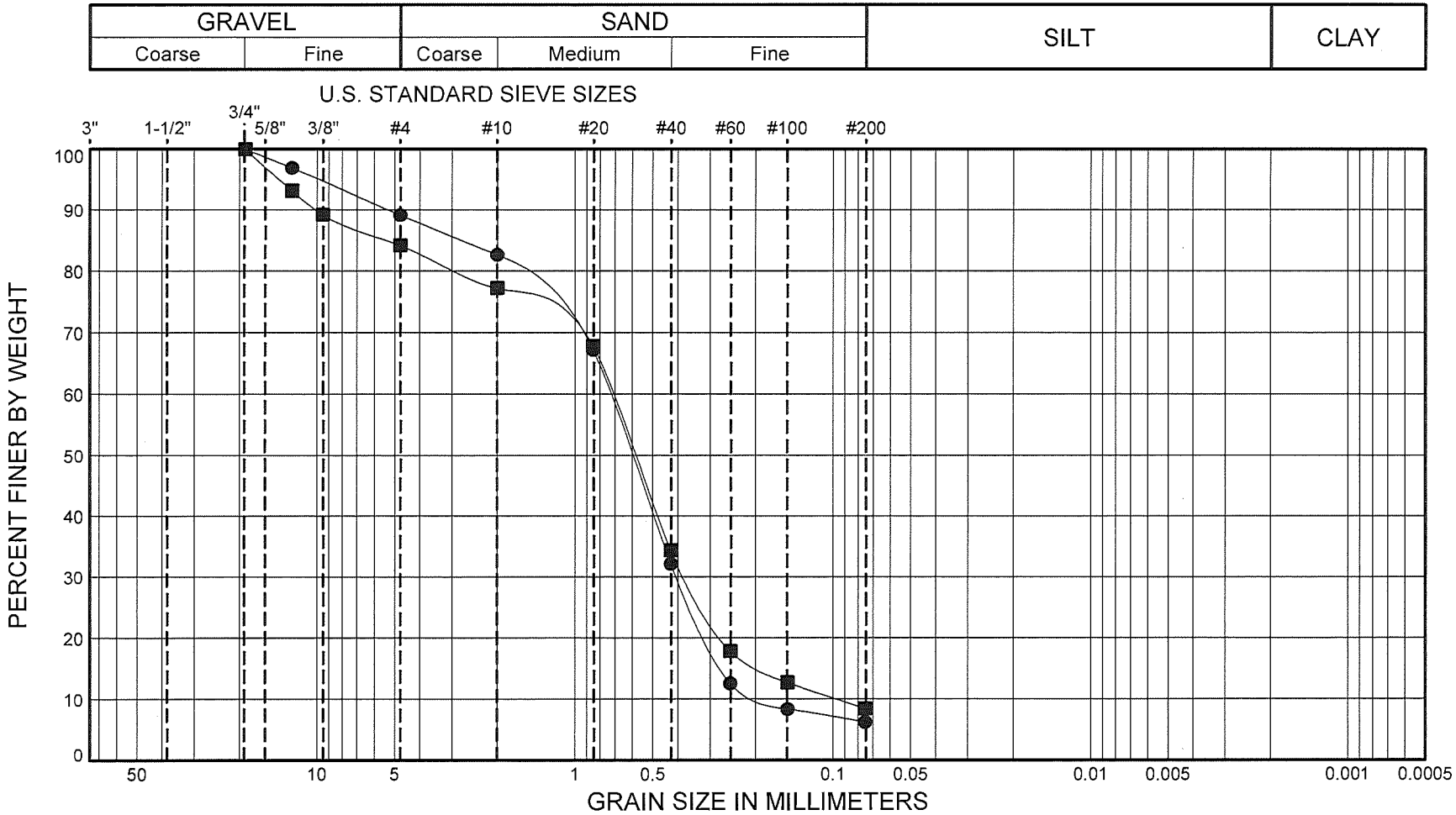
BLDG-2018-00983, BLDG-2018-00985

SOUND TRANSIT EASTLINK, PHASE 3
King County, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-RW5-3



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-RW5-3	SS-7	35.0 - 36.5	(SP-SM) Olive brown, poorly graded SAND with silt	12				10.9	82.9	6.2
■	B-D-RW5-3	SS-9	45.0 - 46.5	(SW-SM) Olive brown, well graded SAND with silt and gravel	11				15.8	75.8	8.4

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SOUND TRANSIT EASTLINK PHASE 3
King County, Washington

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BLDG-2018-00983, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-RW5-3

SAMPLE IDENTIFICATION	Depth (ft)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			% GRAVEL	% SAND	% FINES	pH	RESISTIVITY (Ω – cm)	ORGANIC CONTENT (%)	ASTM CLASSIFICATION[1]	SAMPLE DESCRIPTION[1]
			LL	PL	PI								
B-D-RW6-1p, SS-2	10.0-11.5	8				14.4	44.7	40.9				SM	Grayish brown, silty SAND
B-D-RW6-1p, SS-5	25.0-26.5	10						52.5				ML	Olive brown, sandy SILT
B-D-RW6-1p, SS-8	40.0-41.5	7				43.7	49.1	7.2				SW-SM	Olive brown, well graded SAND with silt and gravel
B-D-RW6-1p, SS-10	50.0-51.5	7				39.5	55.3	5.3				SW-SM	Olive brown, well graded SAND with silt and gravel
B-D-RW6-1p, SS-12	60.0-61.5	14						5.2				SP-SM	Dark olive brown, poorly graded SAND with silt

1. Soil classification and descriptions based on ASTM D 2487 or D 2488, as appropriate

Note: This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables, and the exploration logs.

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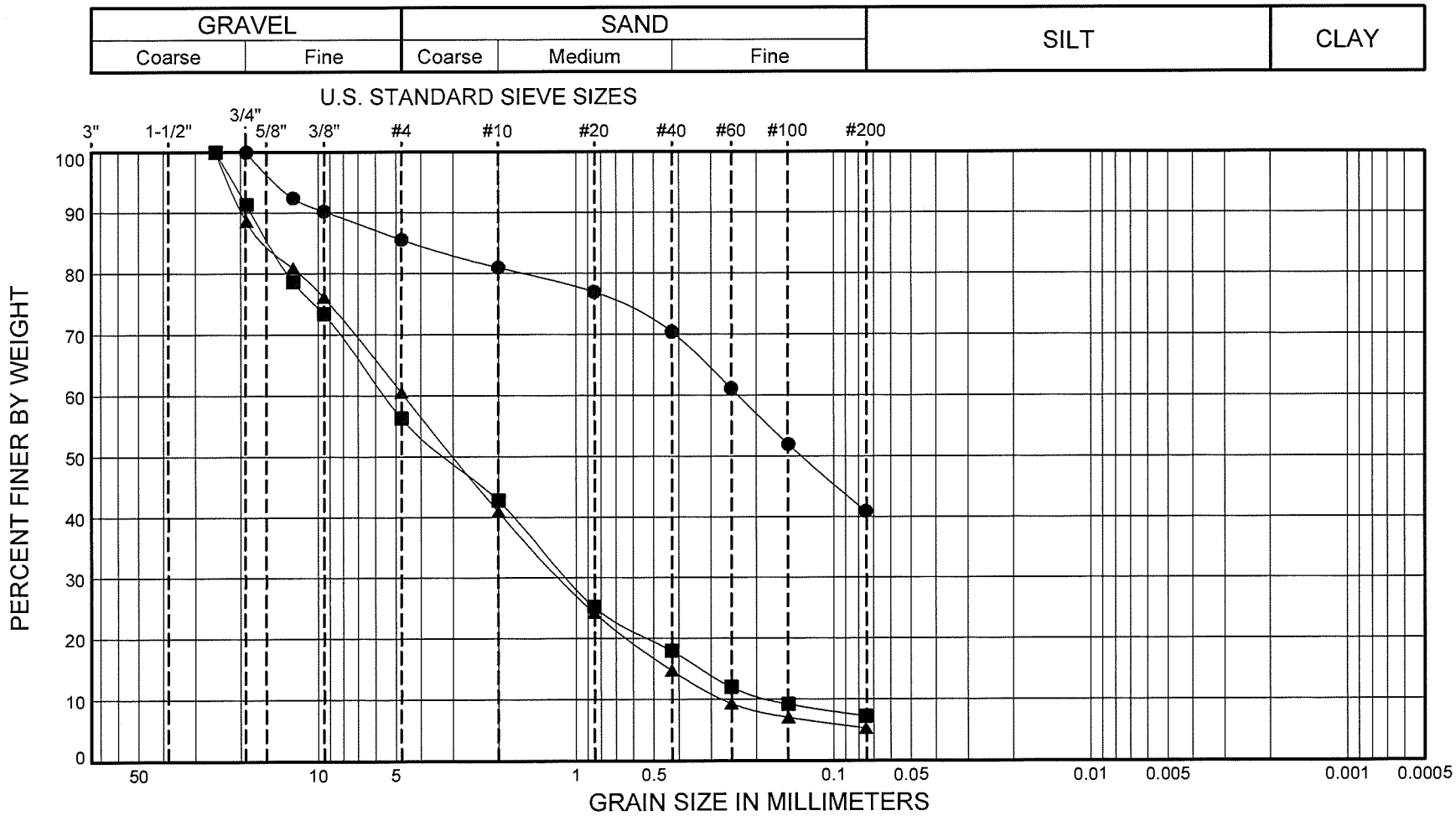
BLDG-2018-00983, BLDG-2018-00985



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	B-D-RW6-1p	SS-2	10.0 - 11.5	(SM) Grayish brown, silty SAND	8				14.4	44.7	40.9
■	B-D-RW6-1p	SS-8	40.0 - 41.5	(SW-SM) Olive brown, well graded SAND with silt and gravel	7				43.7	49.1	7.2
▲	B-D-RW6-1p	SS-10	50.0 - 51.5	(SW-SM) Olive brown, well graded SAND with silt and gravel	7				39.5	55.3	5.3

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SOUND TRANSIT EASTLINK, PHASE 3
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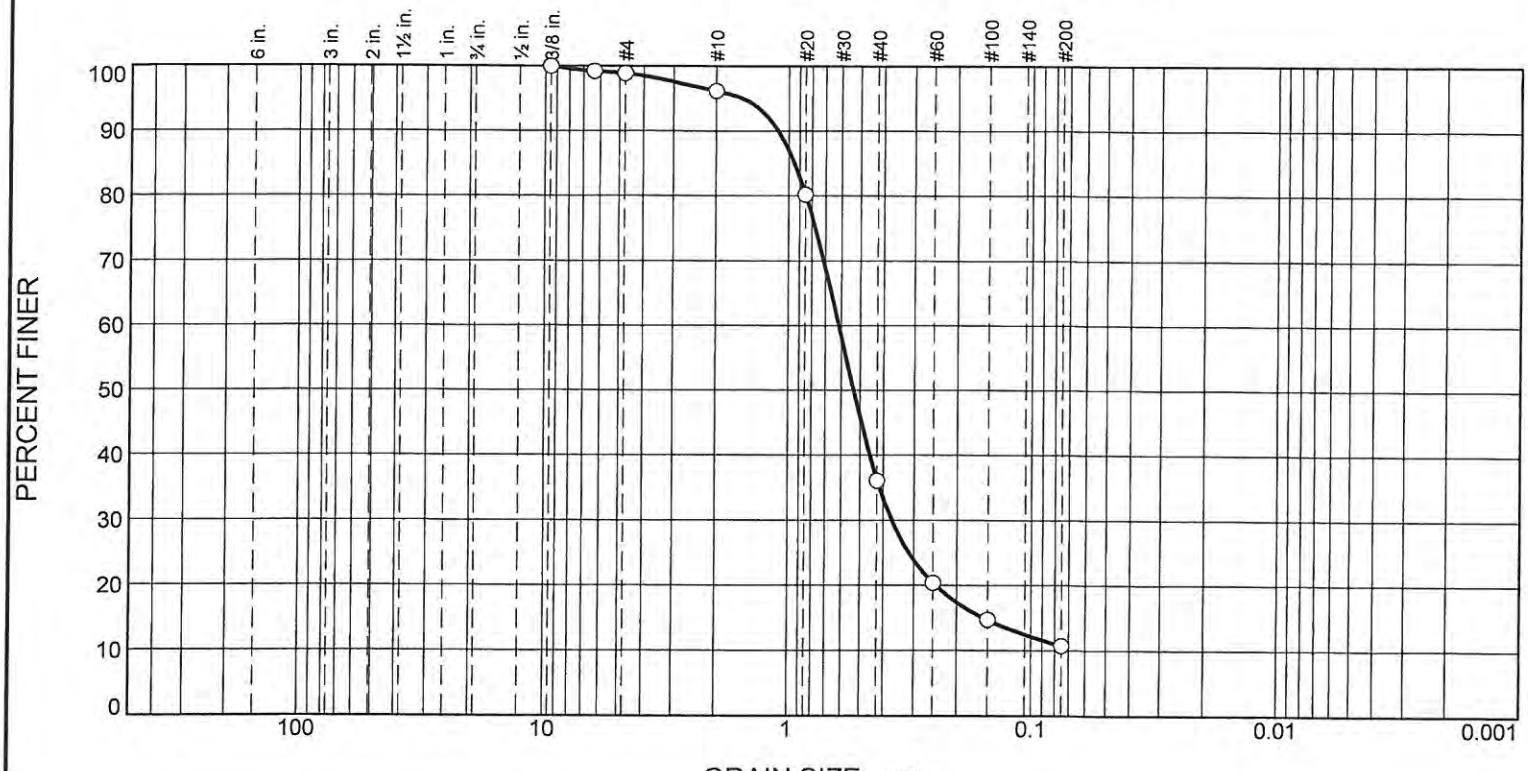
BLDG-2018-00983, BLDG-2018-00985

PARTICLE-SIZE ANALYSIS OF SOILS METHOD ASTM D422

PROJECT NO.: 2009-142 BORING NAME: B-D-RW6-1p

Krazan & Assoc. Sieve Analysis



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.1	2.7	60.1	25.3	10.8	

Test Results (ASTM C-136 & ASTM C-117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
.25	99.2		
#4	98.9		
#10	96.2		
#20	80.2		
#40	36.1		
#60	20.4		
#100	14.8		
#200	10.8		

* (no specification provided)

Material Description

Brown poorly graded sand with silt.

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 1.1065 D_{85}= 0.9462 D_{60}= 0.6163
D_{50}= 0.5336 D_{30}= 0.3699 D_{15}= 0.1545
D_{10}= C_u= C_c=

Remarks

Sample ID: 46499-A.
Permeabiltiy Rate (Modified ASTM D-2434): 1.1 in/hr.

Date Received: 9/16/13 **Date Tested:** 9/20/13
Tested By: Corbett Mercer
Checked By: Corbett Mercer
Title: Lab Manager

Location: Client Supplied; MW-PS-10, S-8
Sample Number: 46499-A **Depth:** 32.5' - 34'
Date Sampled: 9/16/13

Krazan

Client: AMEC Earth & Infrastructure, Inc.
Project: Overlake Village Station (#3-917-17625-0)

Project No: 09613290

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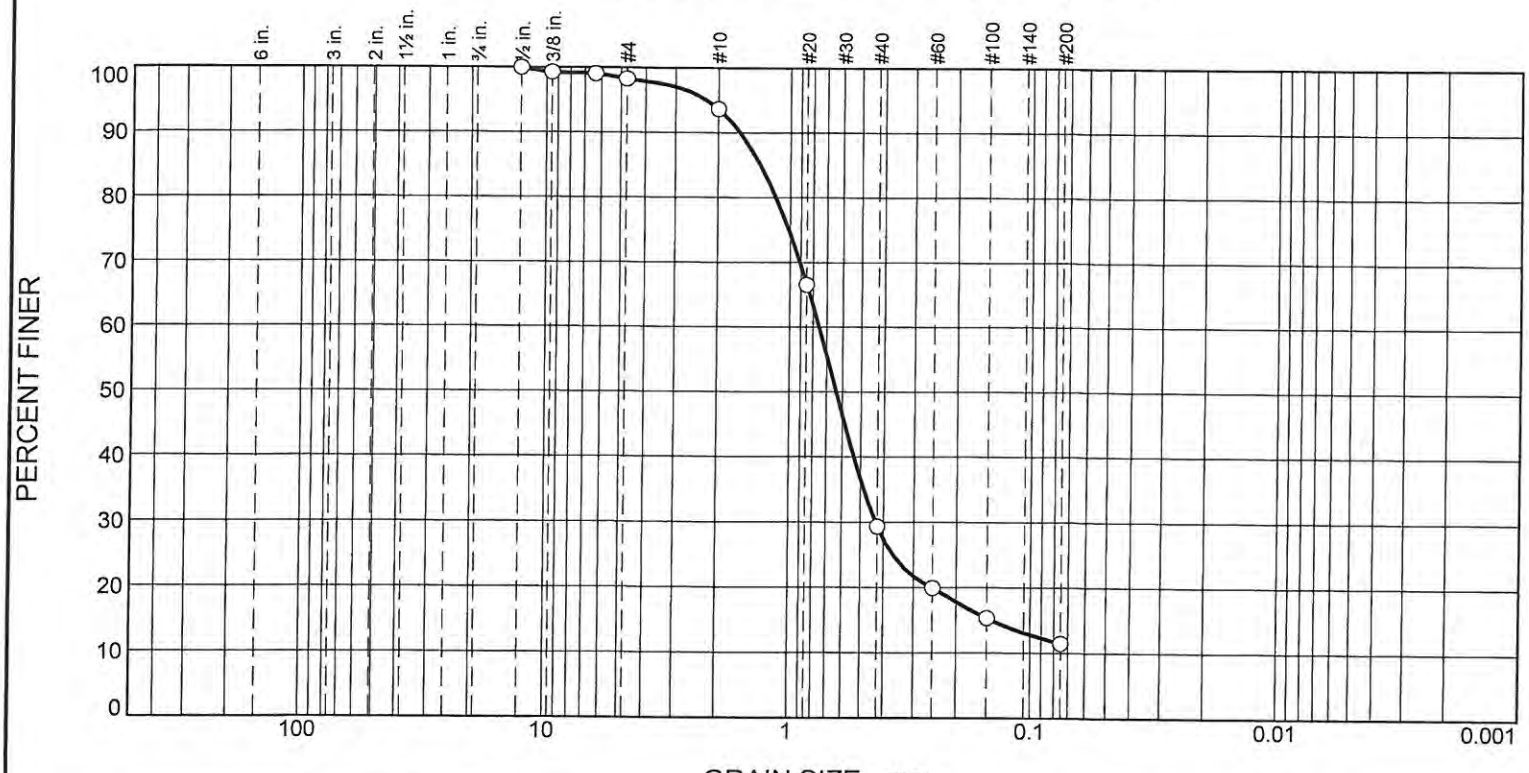
BLDG-2018-00983, BLDG-2018-00985

Krazan & Assoc. Sieve Analysis



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.7	4.6	64.4	17.8	11.5	

Test Results (ASTM C-136 & ASTM C-117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.5	100.0		
.375	99.3		
.25	99.0		
#4	98.3		
#10	93.7		
#20	66.6		
#40	29.3		
#60	20.0		
#100	15.4		
#200	11.5		

* (no specification provided)

Material Description

Brownish-gray poorly graded sand with silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=**

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 1.6255 D_{85}= 1.3362 D_{60}= 0.7551
D_{50}= 0.6377 D_{30}= 0.4328 D_{15}= 0.1425
D_{10}= C_u= C_c=

Remarks

Sample ID: 46499-B.
Permeability Rate (Modified ASTM D-2434): 12.2 in/hr.

Date Received: 9/16/13 **Date Tested:** 9/21/13
Tested By: Corbett Mercer
Checked By: Corbett Mercer
Title: Lab Manager

Location: Client Supplied; MW-PS-11, S-7
Sample Number: 46499-B **Depth:** 30' - 31.5'
Date Sampled: 9/16/13

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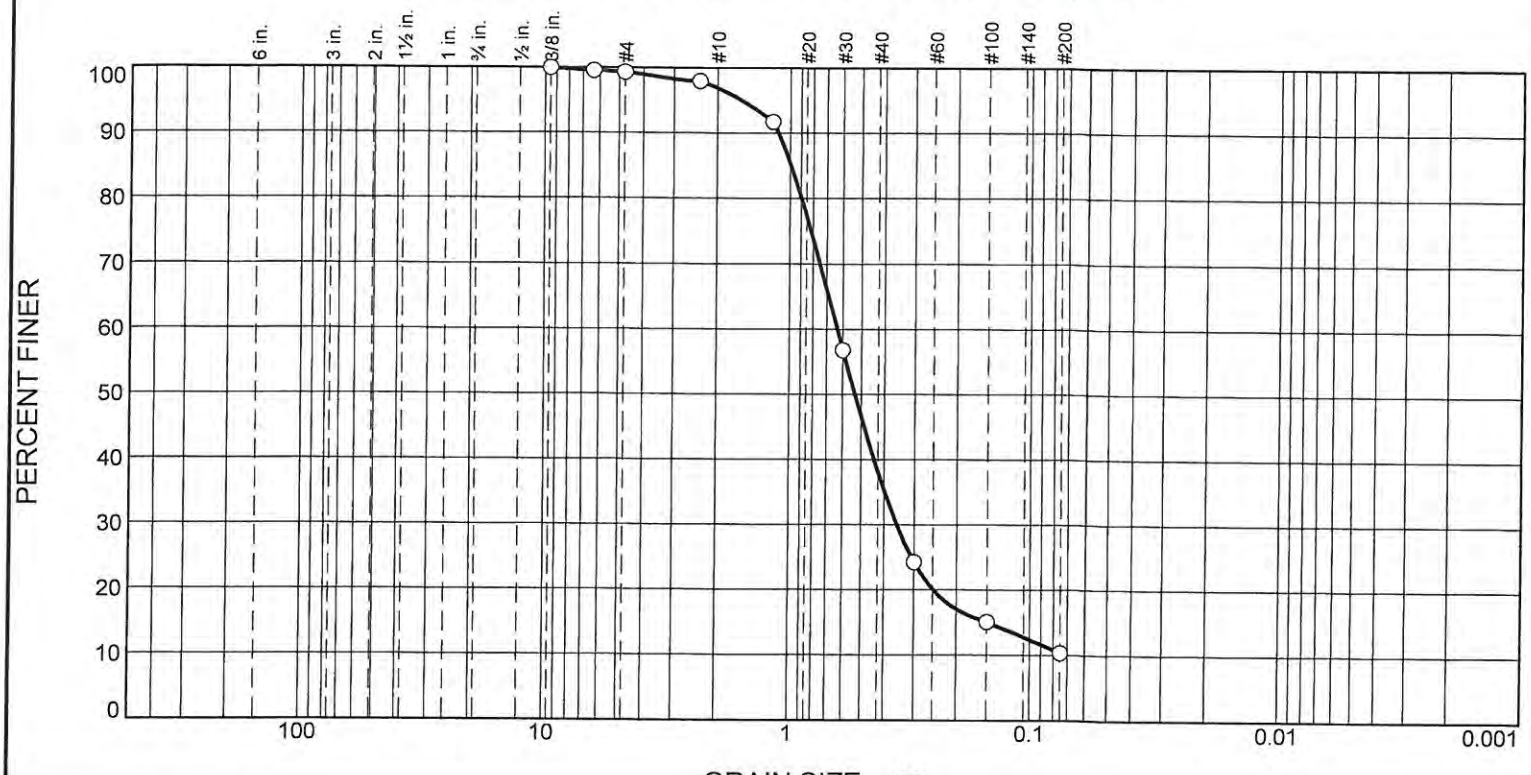
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Client: AMEC Earth & Infrastructure, Inc.
Project: Overlake Village Station (#3-917-17625-0)
Project No: 09613290

Krazan & Assoc. Sieve Analysis



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.7	2.3	59.0	27.6	10.4	

Test Results (ASTM C-136 & ASTM C-117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
.25	99.6		
#4	99.3		
#8	98.0		
#16	91.7		
#30	56.8		
#50	24.2		
#100	15.1		
#200	10.4		

* (no specification provided)

Material Description

Brown poorly graded sand with silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=**

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 1.1201 D_{85}= 0.9917 D_{60}= 0.6330
D_{50}= 0.5333 D_{30}= 0.3547 D_{15}= 0.1478
D_{10}= C_u= C_c=

Remarks

Sample ID: 46499-C.

Date Received: 9/16/13 **Date Tested:** 9/18/13
Tested By: Corbett Mercer
Checked By: Corbett Mercer
Title: Lab Manager

Location: Client Supplied; MW-PS-11, S-9
Sample Number: 46499-C **Depth:** 35' - 36.5' **Date Sampled:** 9/16/13

Krazan

Client: AMEC Earth & Infrastructure, Inc.
Project: Overlake Village Station (#3-917-17625-0)

Project No: 09613290

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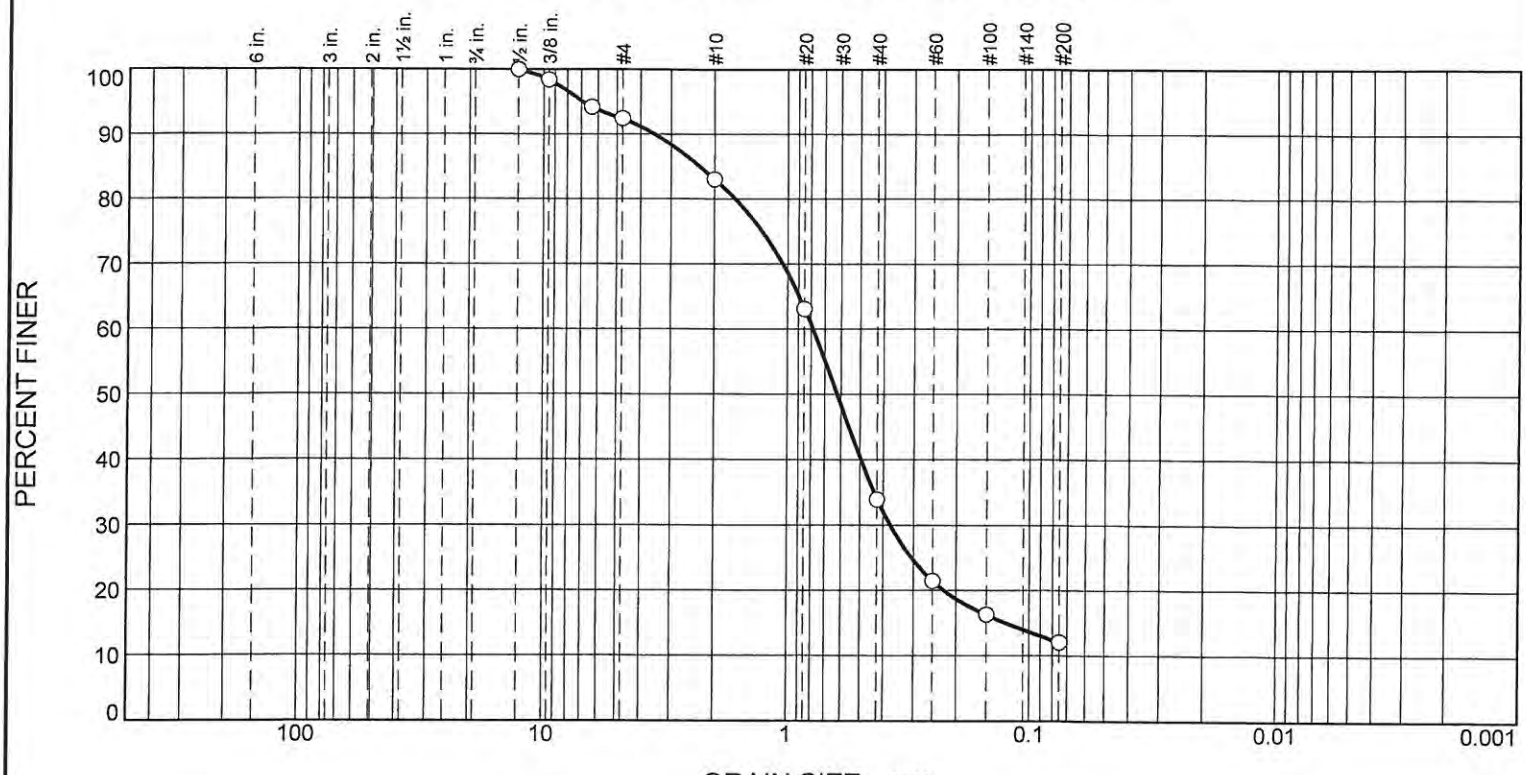
BLDG-2018-00983, BLDG-2018-00985

Krazan & Assoc. Sieve Analysis



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.6	9.3	49.1	21.9	12.1	

Test Results (ASTM C-136 & ASTM C-117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.5	100.0		
.375	98.4		
.25	94.2		
#4	92.4		
#10	83.1		
#20	63.1		
#40	34.0		
#60	21.4		
#100	16.3		
#200	12.1		

* (no specification provided)

Material Description

Brownish-gray silty sand

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI=

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-1-b

Coefficients

D_{90}= 3.4923 D_{85}= 2.2906 D_{60}= 0.7852
D_{50}= 0.6238 D_{30}= 0.3754 D_{15}= 0.1236
D_{10}= C_u= C_c=

Remarks

Sample ID: 46499-D.

Date Received: 9/16/13 **Date Tested:** 9/18/13
Tested By: Corbett Mercer
Checked By: Corbett Mercer
Title: Lab Manager

Location: Client Supplied; MW-PS-11, S-10
Sample Number: 46499-D **Depth:** 37.5' - 38.5' **Date Sampled:** 9/16/13

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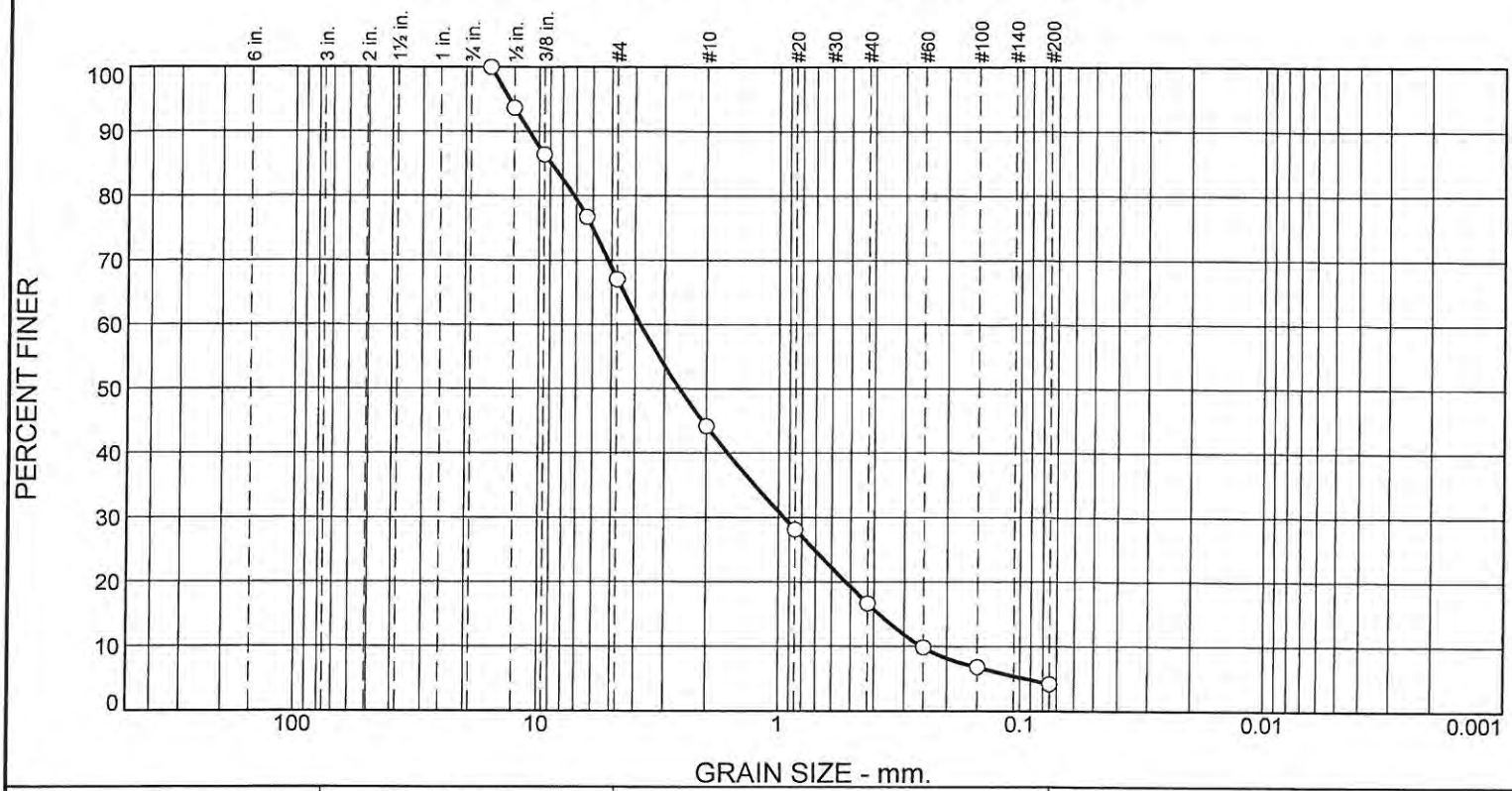
BLDG-2018-00983, BLDG-2018-00985

Krazan

Client: AMEC Earth & Infrastructure, Inc.
Project: Overlake Village Station (#3-917-17625-0)

Project No: 09613290

Krazan & Assoc. Sieve Analysis



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	33.0	22.8	27.5	12.5	4.2	

Test Results (ASTM C-136 & ASTM C-117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.625	100.0		
.5	93.7		
.375	86.4		
.25	76.7		
#4	67.0		
#10	44.2		
#20	28.1		
#40	16.7		
#60	9.9		
#100	6.8		
#200	4.2		

* (no specification provided)

Material Description

Grayish-brown poorly graded sand with gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=**

Classification

USCS (D 2487)= SP **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 11.0438 D_{85}= 8.9280 D_{60}= 3.7974
D_{50}= 2.5967 D_{30}= 0.9471 D_{15}= 0.3802
D_{10}= 0.2538 C_u= 14.96 C_c= 0.93

Remarks

Sample ID: 46499-F.

Date Received: 9/16/13 **Date Tested:** 9/18/13
Tested By: Corbett Mercer
Checked By: Corbett Mercer
Title: Lab Manager

Location: Client Supplied; MW-PS-12, S-8
Sample Number: 46499-F **Depth:** 32.5' - 33'
Date Sampled: 9/16/13

Krazan

Client: AMEC Earth & Infrastructure, Inc.
Project: Overlake Village Station (#3-917-17625-0)

Project No: 09613290

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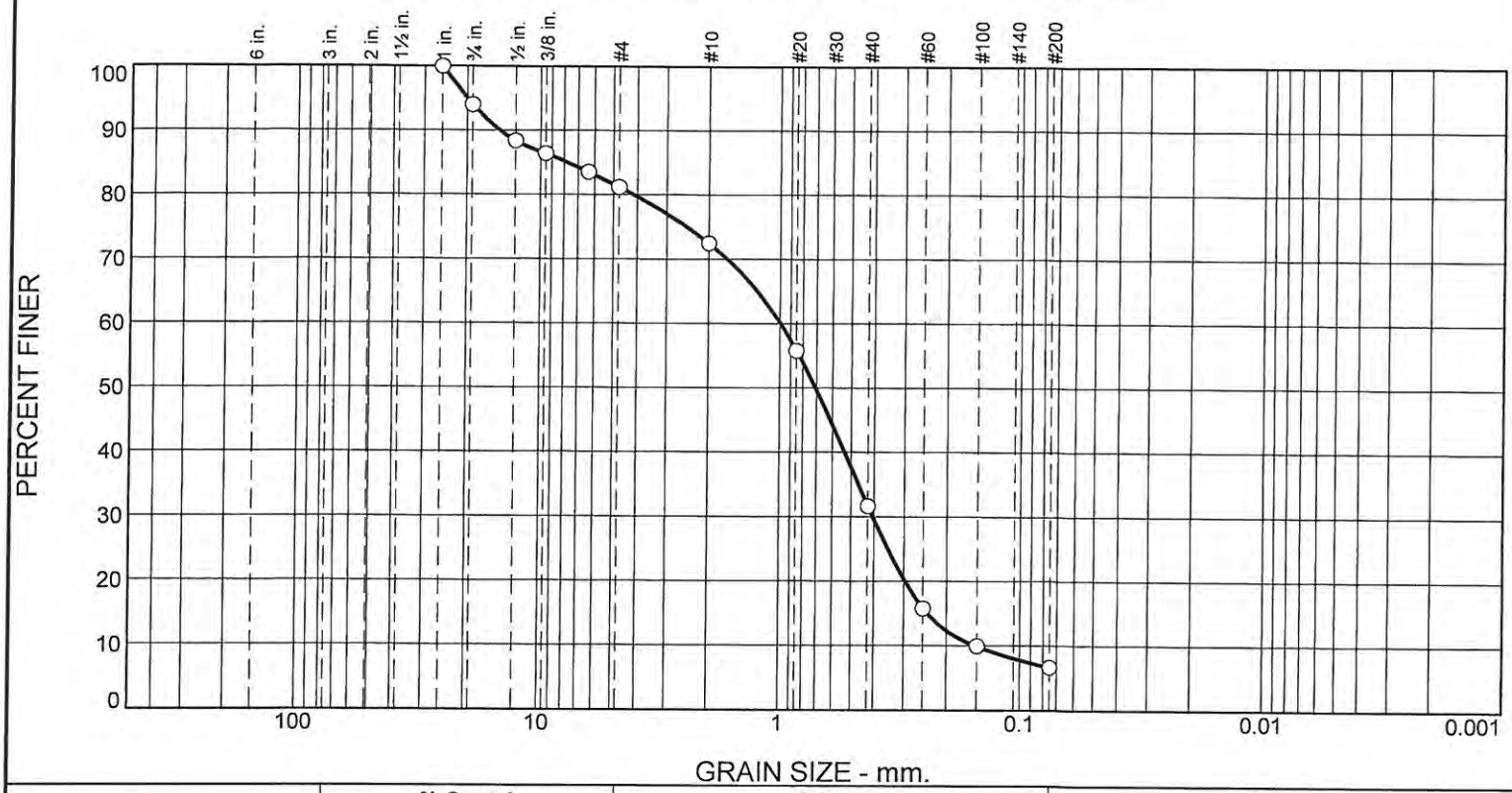
BLDG-2018-00887, BLDG-2018-00889, BLDG-2018-00893,
BLDG-2018-00983, BLDG-2018-00985

Krazan & Assoc. Sieve Analysis



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.0	12.8	8.7	40.9	24.9	6.7	

Test Results (ASTM C-136 & ASTM C-117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1	100.0		
.75	94.0		
.5	88.4		
.375	86.4		
.25	83.5		
#4	81.2		
#10	72.5		
#20	55.8		
#40	31.6		
#60	15.8		
#100	9.9		
#200	6.7		

* (no specification provided)

Material Description

Brownish-gray well-graded sand with silt and gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=**

Classification

USCS (D 2487)= SW-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 14.7392 D_{85}= 7.6926 D_{60}= 0.9943
D_{50}= 0.7079 D_{30}= 0.4060 D_{15}= 0.2399
D_{10}= 0.1514 C_u= 6.57 C_c= 1.10

Remarks

Sample ID: 46499-G.

Date Received: 9/16/13 **Date Tested:** 9/19/13
Tested By: Corbett Mercer
Checked By: Corbett Mercer
Title: Lab Manager

Location: Client Supplied; MW-PS-12, S-10
Sample Number: 46499-G **Depth:** 37.5' - 38.5'
Date Sampled: 9/16/13

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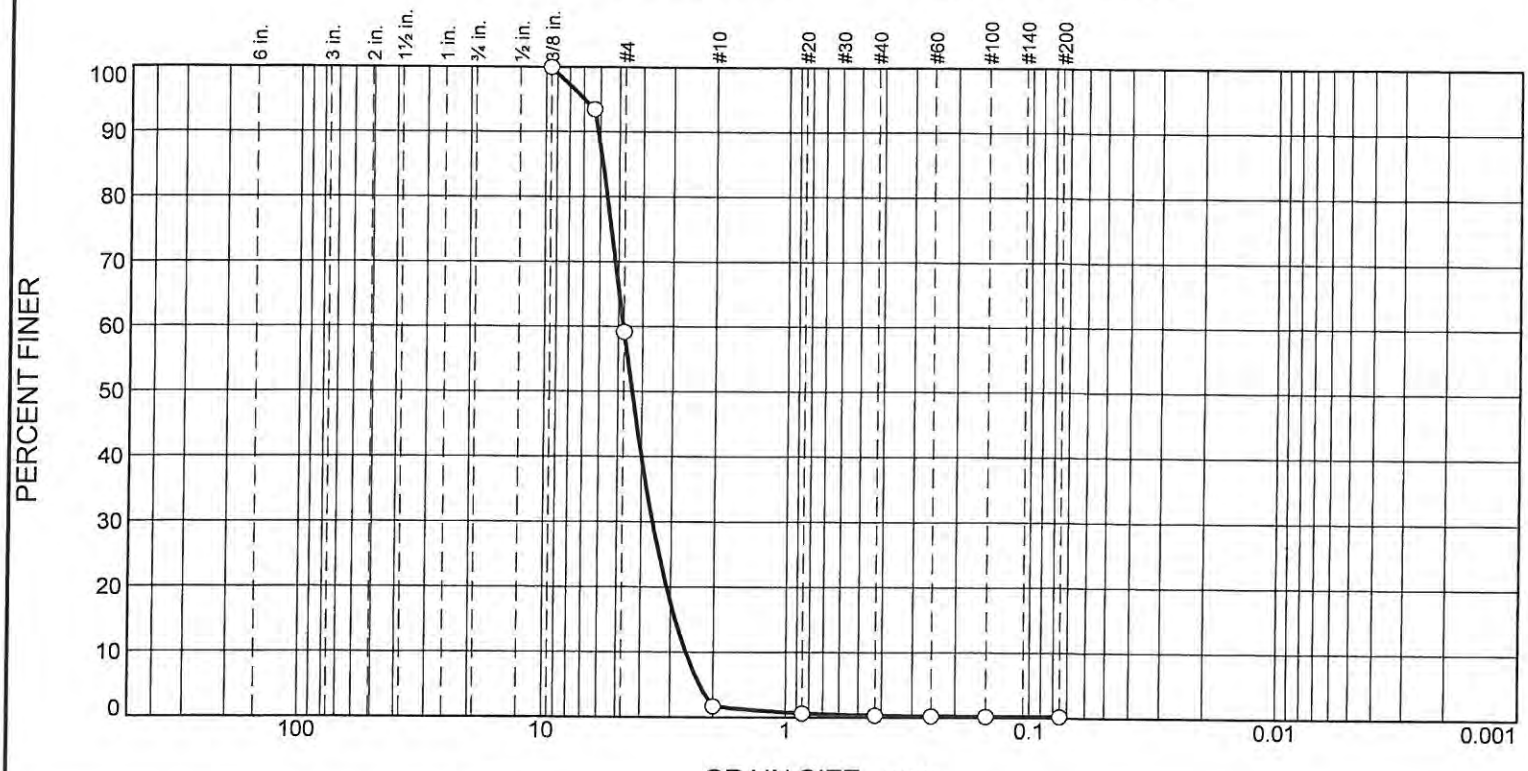
BLDG-2018-00983, BLDG-2018-00985

Client: AMEC Earth & Infrastructure, Inc.
Project: Overlake Village Station (#3-917-17625-0)
Project No: 09613290

Krazan & Assoc. Sieve Analysis



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	40.8	57.5	1.4	0.1	0.2	

Test Results (ASTM C-136 & ASTM C-117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.375	100.0		
.25	93.5		
#4	59.2		
#10	1.7		
#20	0.6		
#40	0.3		
#60	0.2		
#100	0.2		
#200	0.2		

* (no specification provided)

Material Description

Pea Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=**

Classification

USCS (D 2487)= SP **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 6.1068 D_{85}= 5.8241 D_{60}= 4.7820
D_{50}= 4.3981 D_{30}= 3.5812 D_{15}= 2.8763
D_{10}= 2.6000 C_u= 1.84 C_c= 1.03

Remarks

Sample ID: 46499-H.
Permeability Rate (Modified ASTM D-2434): 7.25 in/hr

Date Received: 9/16/13 **Date Tested:** 9/21/13
Tested By: Corbett Mercer
Checked By: Corbett Mercer
Title: Lab Manager

Location: Client Supplied; MW-PS-10
Sample Number: 46499-H

Date Sampled: 9/16/13

Krazan

Client: AMEC Earth & Infrastructure, Inc.
Project: Overlake Village Station (#3-917-17625-0)

Project No: 09613290

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BLDG-2018-00983, BLDG-2018-00985

KRAZAN & ASSOCIATES, INC. TESTING REPORT

Job Name: Overlake Village Station (#3-917-17625-0)
Job # : 096-13290

Client: AMEC Earth & Infrastructure, Inc.
Date: 9/16/2013

Laboratory Determination of Water (Moisture) Content of Soils by Mass (ASTM D-2216)

Sample ID	Sample Description	Location	Depth	Wet & Tare	Dry &Tare	Tare	Results
46499-A	Brown poorly graded sand with silt	MW-PS-10, S-8	32.5' - 34'	1213.7	1153.9	322.4	**7.19%**
46499-B	Brownish-gray poorly graded sand with silt	MW-PS-11, S-7	30' - 31.5'	826.4	780.2	186.3	**7.78%**
46499-C	Brown poorly graded sand with silt	MW-PS-11, S-9	35' - 36.5'	942.2	889.9	188.7	**7.46%**
46499-D	Brownish-gray silty sand	MW-PS-11, S-10	37.5' - 38.5'	639.2	588.7	185.4	**12.52%**
46499-E	Gray silty sand with gravel	MW-PS-11, S-11	40' - 41'	917.1	829.5	141.4	**12.73%**
46499-F	Grayish-brown poorly graded sand with gravel	MW-PS-12, S-8	32.5' - 33'	498.3	472.2	177.0	**8.84%**
46499-G	Brownish-gray well-graded sand with silt and gravel	MW-PS-12, S-10	37.5' - 38.5'	847.3	769.5	219.4	**14.14%**

Tested By: Corbett Mercer

Checked By: Corbett Mercer (Lab Manager)

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BLDG-2018-00983, BLDG-2018-00985

Appendix D

Geophysical Testing

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BLDG-2018-00983, BLDG-2018-00985

DOWNHOLE SHEAR WAVE SEISMIC SURVEY

E360 EAST LINK EXTENSION
STATE ROUTE 520
BELLEVUE, WASHINGTON

FOR

McMILLEN JACOBS ASSOCIATES
SEATTLE, WASHINGTON

OCTOBER 2016

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BLDG-2018-00983, BLDG-2018-00985

PHILIP H. DUOOS
GEOPHYSICAL CONSULTANT

October 27, 2016 Our Ref: 1222-16

Ms. Lynn Salvati
McMillen Jacobs Associates
1109 First Avenue, Suite 501
Seattle, WA 98101

REPORT: Downhole Seismic Shear Wave Survey
E360 East Link Extension
State Route 520, Bellevue, Washington

Dear Ms. Salvati:

This report presents the final results of the downhole seismic survey that I performed in the three borings at the site. Preliminary results were provided to you earlier this month. The three borings that were evaluated were:

Boring E360-K-009: West Area, Total Depth: 105.0 feet
Boring E360-K-012: Central Area, Total Depth: 102.5 feet
Boring E360-K-023: East Area, Total Depth: 102.5 feet

The total depth is the depth of the deepest seismic sensor location. The sensor is near the top of the downhole tool, and is about 2.25 feet above the bottom of the tool.

Borings 9 and 12 were located about 100 feet or more to the south of SR 520 and below the roadway. Boring 23 was located in the SR 520/ NE 148th Ave. NE interchange, and was about 70 feet south of SR 520 and above the highway, and about 40 feet west of 148th Ave. NE. The data from Boring 23 was more difficult to interpret in the shallow portions of the hole. The shear wave data from Boring 23 were evaluated again, with the reinterpreted results provided in this report.

INTERPRETATION RESULTS

The results are presented for each boring in three separate figures. The first figure shows the shear wave travel time data (recorded at 2.5-foot increments) and the interpreted layer velocities. The second figure shows the compressional wave travel time data (recorded at 5-foot increments) and the interpreted layer velocities. The third figure for each boring provides a graphical summary of the interpreted shear and compressional velocities.

Shear Wave Velocities

The shear wave velocities were interpreted first based only on the seismic data and the best fit line through the data. Upon receiving the geologic logs with descriptions of materials and blow counts some of these layer interpretations were slightly revised. However, the initial interpretation was typically in good agreement with the drill logs – especially with regard to the blow counts. Interpreted shear wave velocities range from about 1,150 to 1,990 feet/sec (fps) in materials with higher blow counts (around 100 blows/foot). Shear wave velocities ranging from 730 to 1100 fps were interpreted in materials with lower blow counts (below about 60 blows/foot).

While it is often difficult to delineate thin layers from the shear wave data, even the thin layers initially interpreted in Boring 9 (**Figure 9-S**) at depth (below about 80 feet) correlate fairly well with the geologic log. However, the last layer of 1,770 fps is questionable. The data near the bottoms of the borings is often noisy and questionable.

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BLDG-2018-00983, BLDG-2018-00985

In Boring 12 (**Figure 12-S**) my initial interpretation attempted to take into account the data points between 77.5 and 82.5 feet deep. However, based on the drilling logs, the values of these three data points are probably due to delays in the arrival time caused by disturbed materials near the casing rather than abrupt and thin changes in the geology. Loss of material and drilling mud in Boring 12 was observed at this depth during drilling.

The shear wave data in Boring 23 (**Figure 23-S**) was difficult to interpret in the shallower portions of the hole, probably due to noise from the nearby traffic. My initial draft results interpreted a very high shear wave layer for the near surface, probably due to picking the compressional wave arrival within this zone of noisier data. Further analysis indicates a lower and more reasonable shear wave layer velocity of about 1,900 fps for the materials ranging in depth from 6 to 41 feet. While this is still a fairly high shear wave velocity, the blow counts over most of this depth are 100 blows/foot, so this velocity is in the range observed for these types of materials.

Compressional Wave Velocities

The interpreted compressional wave data (also known as the primary wave, or "P-wave") is less affected by very thin layers, so it was recorded at 5-foot intervals. The compressional wave is greatly affected by the presence of water, and is not as useful as the shear wave data in delineating changes in materials. In general, compressional waves at this site above about 5,100 fps were usually observed in materials with high blow counts. However, in Boring 9 (**Figure 9-P**) a compressional wave velocity of about 5,670 fps (17 to 45 feet in depth) was observed in a zone with very low blow counts. This higher velocity is in a zone with silt and clay and probably increased water content.

In Boring 23 (**Figure 23-P**), a lower compressional velocity of 2,910 fps (6 to 31.5 feet in depth) was interpreted in an area of high blow counts. This zone was primarily silty sand and gravel, and perhaps less moisture content.

In general, there is a wide range of seismic velocities for any given geologic material, so it is very difficult to determine the material based on only the seismic velocity. While it is difficult to assign a specific seismic velocity value to a specific geologic material, the seismic velocities can be used to help with the interpretation of the geologic materials, and provides another set of information. The seismic wave velocities interpreted at this site are within the typical range for similar materials in the Puget Sound area.

In a recent shear wave study that I performed in downtown Bellevue, shear wave velocities of 1,500 to 1,800 fps and compressional wave velocities of 2,300 to 8,000 fps were interpreted where the geologic log indicated Lodgement Till and materials with ice loading features. Very dense, over-ridden Pre-Vashon sand and gravel had shear wave velocities of 1,600 to 2,500 fps and compressional velocities of 4,000 fps and greater.

FIELD METHODOLOGY

The first-arrival travel times were measured using a triaxial geophone in the borehole and the depth referenced to the ground surface. The borehole was cased with Slope Indicator casing (2.75-inch inside diameter) with vertical grooves which allowed us to maintain a constant orientation with the downhole geophone tool. The casing was bailed dry to a depth of about 40 feet to minimize the possibility of surface waves traveling down the borehole.

The shear wave energy was generated by hitting both ends of a wood beam (8 feet long) placed on the ground surface about 7 feet away from each borehole. The wood beam has metal cleats, and the loose surface soils were removed in order to reach firmer soils and provide a horizontal surface (checked with a carpenter's level) for the beam. The beam was placed parallel to one set of the grooves in the casing, and was weighted down by driving the front wheels of a truck onto the beam. The travel times shown on the charts have been corrected for the horizontal offset of the seismic source.

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BLDG-2018-00983, BLDG-2018-00985

Hitting the beam on both ends, and recording both of the orientations of the impulse wave helps to identify the shear wave and also provides an idea on the quality of the data. The data from Borings 9 and 12 were very good, with the two shear wave orientation arrival times within 0.4 milliseconds (ms) at most depths. In Boring 23 the data was fair, with most of the arrival times being within about 0.7 ms for the two orientations.

After the shear wave survey, the beam was removed and replaced by a small metal plate. The triaxial geophone was then placed in the boring again, and P-wave data were recorded at 5.0-foot intervals, with the metal plate struck vertically with the sledge hammer.

The data were recorded using a Geostuff Instruments BHG-2 triaxial geophone and a Geometrics Geode seismograph. Firm coupling between the borehole and geophone was provided using a mechanical clamping spring arm. The slotted Slope Indicator casing provided a constant orientation of the geophone which provided optimum data quality. As with any geophysical method, bulk properties are measured and may not discern small variations in geology.

Please feel free to contact me if you have any questions or comments regarding this information.

Sincerely,

Philip H. Duoos
Geophysical Consultant

Attachments:

Boring E360-K-009

Figure 9-S: Shear Wave Travel Times with Best-Fit Velocity Layers
Figure 9-P: Compressional Wave Travel Times and Best-Fit Velocity Layers
Figure 9-SP: Shear and Compressional Wave Summary Chart

Boring E360-K-012

Figure 12-S: Shear Wave Travel Times with Best-Fit Velocity Layers
Figure 12-P: Compressional Wave Travel Times and Best-Fit Velocity Layers
Figure 12-SP: Shear and Compressional Wave Summary Chart

Boring E360-K-023

Figure 23-S: Shear Wave Travel Times with Best-Fit Velocity Layers
Figure 23-P: Compressional Wave Travel Times and Best-Fit Velocity Layers
Figure 23-SP: Shear and Compressional Wave Summary Chart

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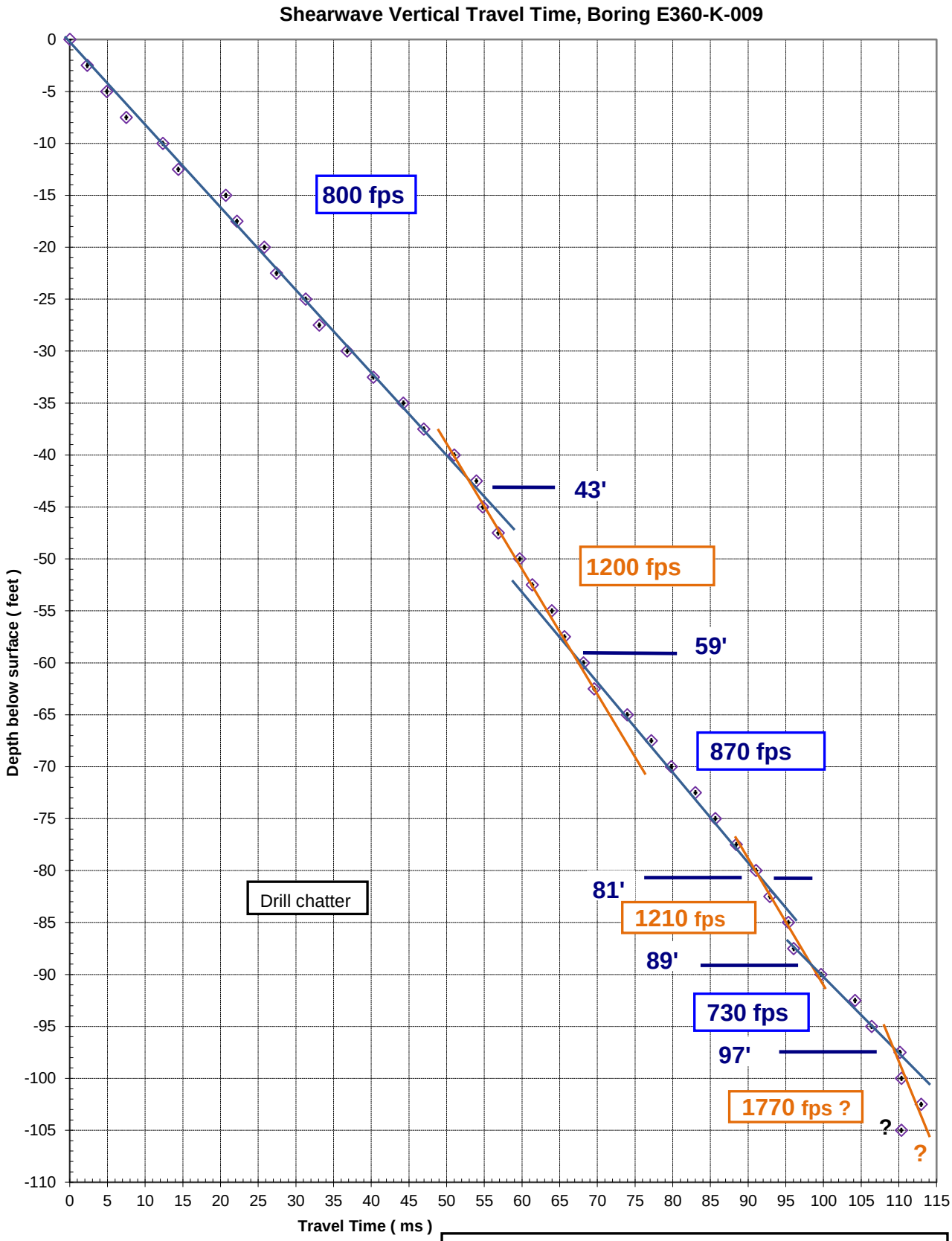
BLDG-2018-00983, BLDG-2018-00985



SHEAR WAVE LAYER VELOCITIES
BORING E360-K-009

E360 East Link Extension
Bellevue, Washington

Figure 9-S

Philip H. Duoos, Geophysical Consultant
for McMillen Jacobs Associates
Proj. #1222-16, October 2016

10/27/2016

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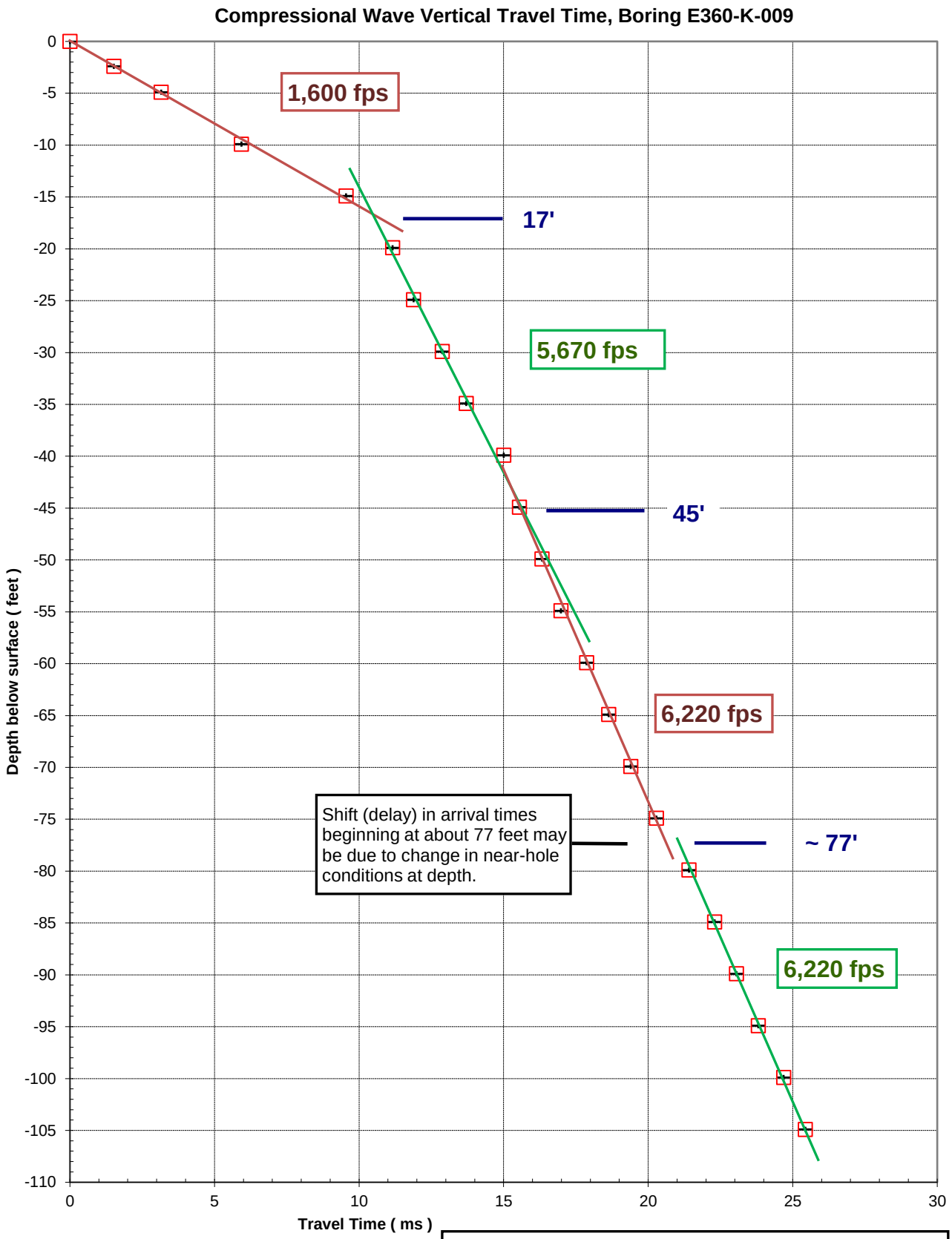
BLDG-2018-00983, BLDG-2018-00985



COMPRESSIONAL WAVE LAYER DATA
BORING E360-K-009

E360 East Extension
Bellevue, Washington

Figure 9-P

Philip H. Duoos, Geophysical Consultant
for McMillan Jacobs Associates
Proj. #1222-16, October, 2016

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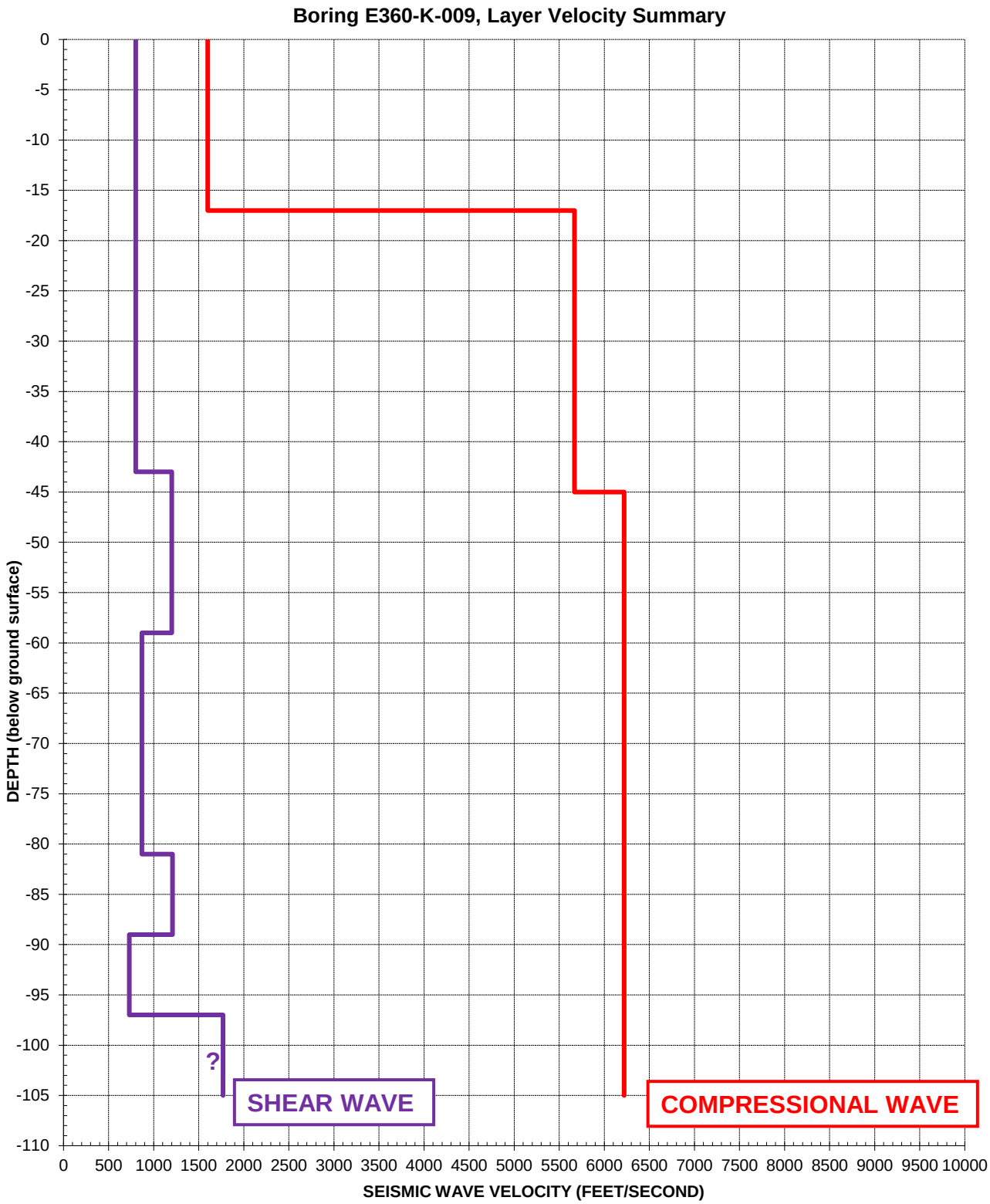
BLDG-2018-00983, BLDG-2018-00985
10/27/2016



SEISMIC WAVE LAYER VELOCITY SUMMARY
BORING E360-K-009

E360 East Link Extension
Bellevue, Washington

Figure 9-SP

Philip H. Duoos, Geophysical Consultant
for McMillen Jacobs Associates
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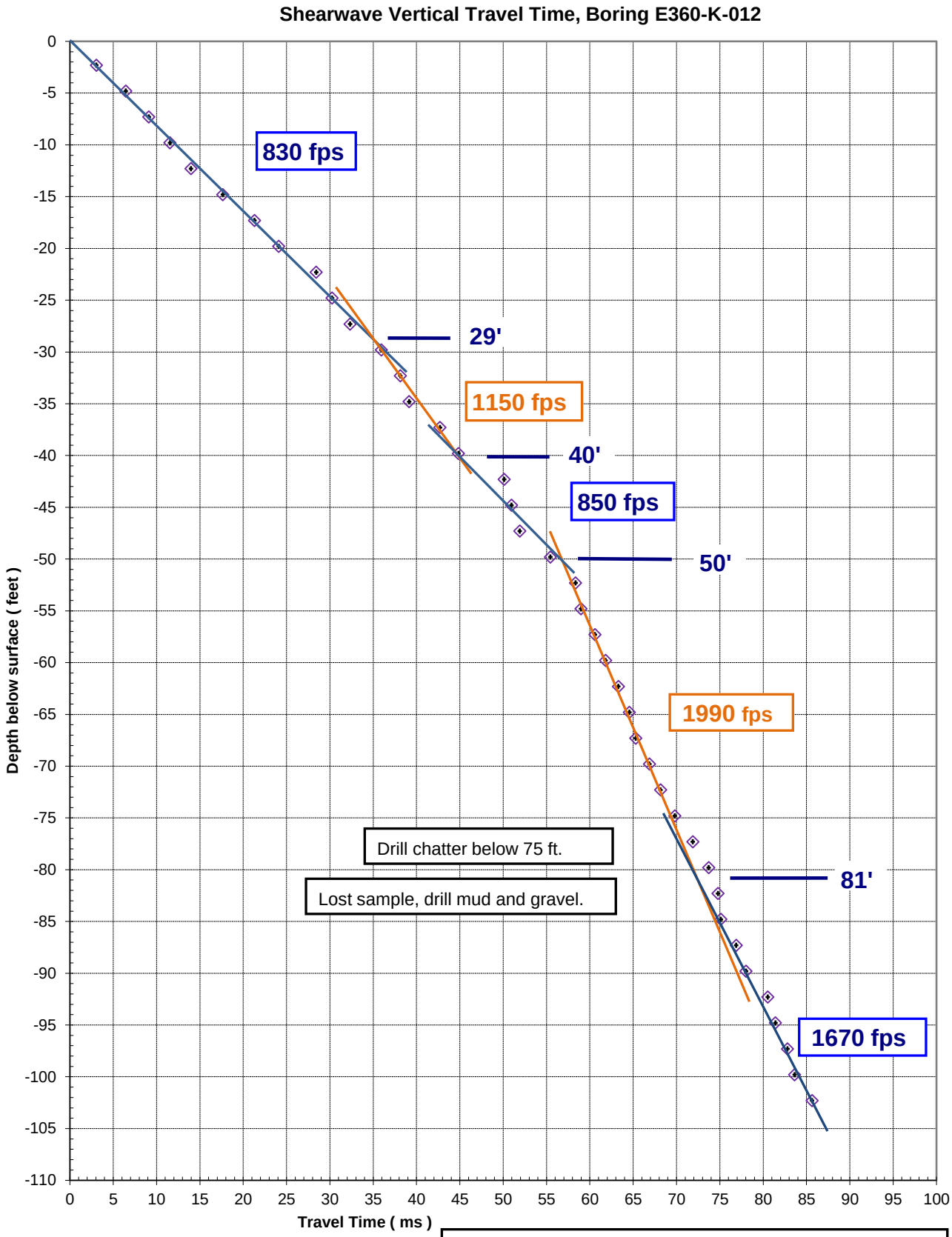

SHEAR WAVE LAYER VELOCITIES
BORING E360-K-012

E360 East Link Extension
Bellevue, Washington

Figure 12-S

Philip H. Duoos, Geophysical Consultant
for McMillen Jacobs Associates
Proj. #1222-16, October 2016

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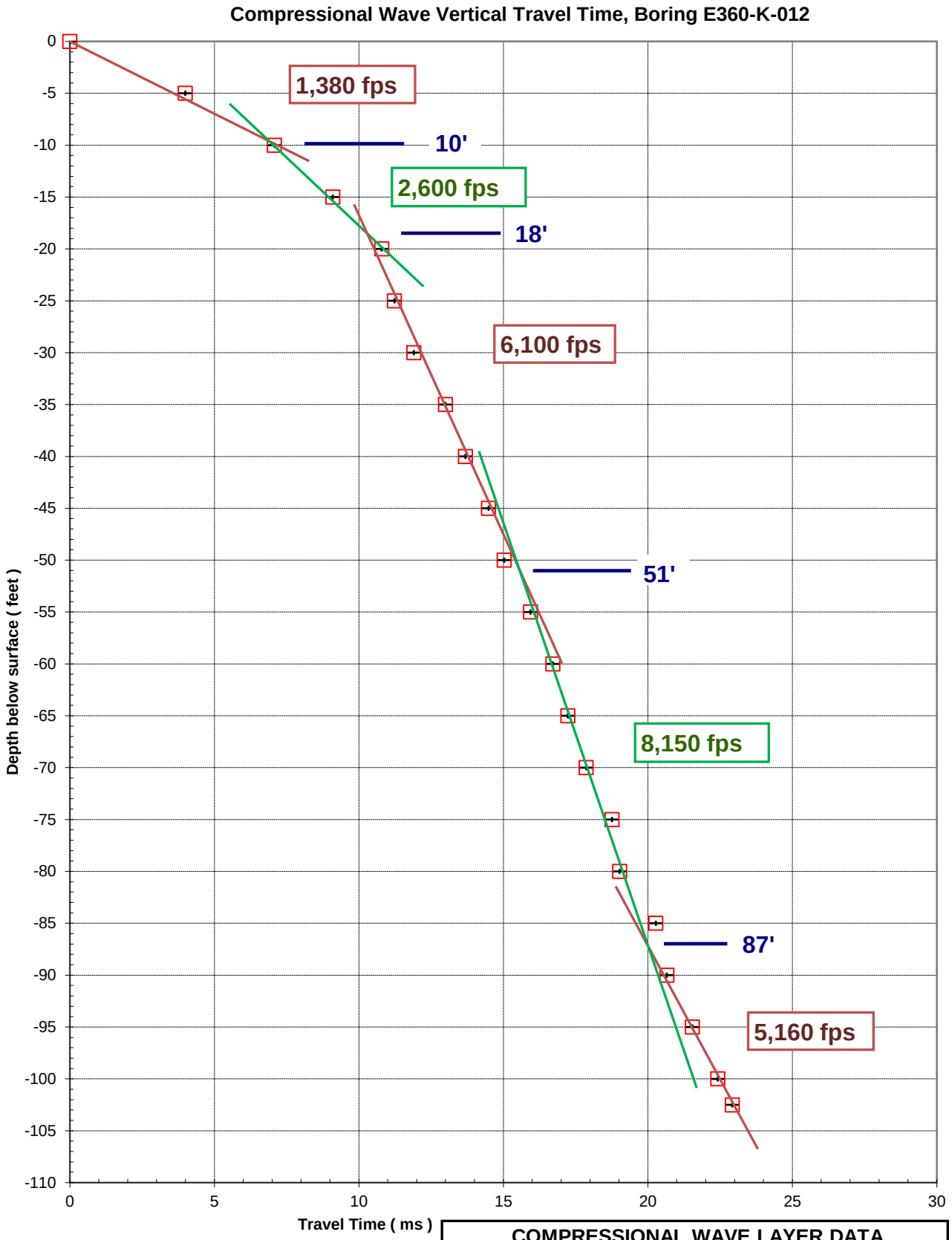
BLDG-2018-00983, BLDG-2018-00985

10/27/2016



COMPRESSIONAL WAVE LAYER DATA
BORING E360-K-012

E360 East Link Extension
Bellevue, Washington

Figure 12-P

Philip H. Duoos, Geophysical Consultant
for McMillan Jacobs Associates
Proj. #1222-16, October, 2016

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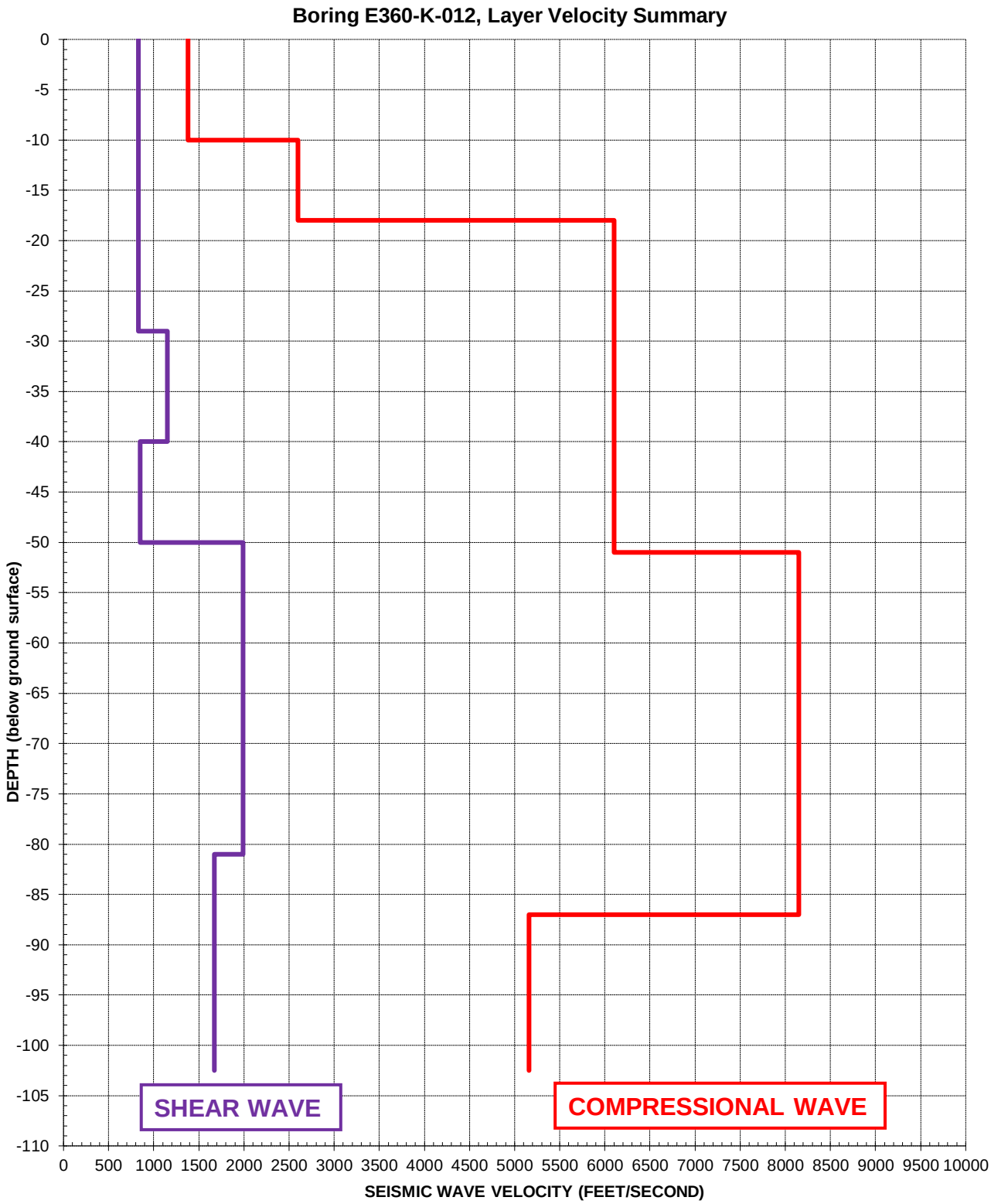

SEISMIC WAVE LAYER VELOCITY SUMMARY
BORING E360-K-012

E360 East Link Extension
Bellevue, Washington

10/27/2016

Figure 12-SP

Philip H. Duoos, Geophysical Consultant
for McMillen Jacobs Associates
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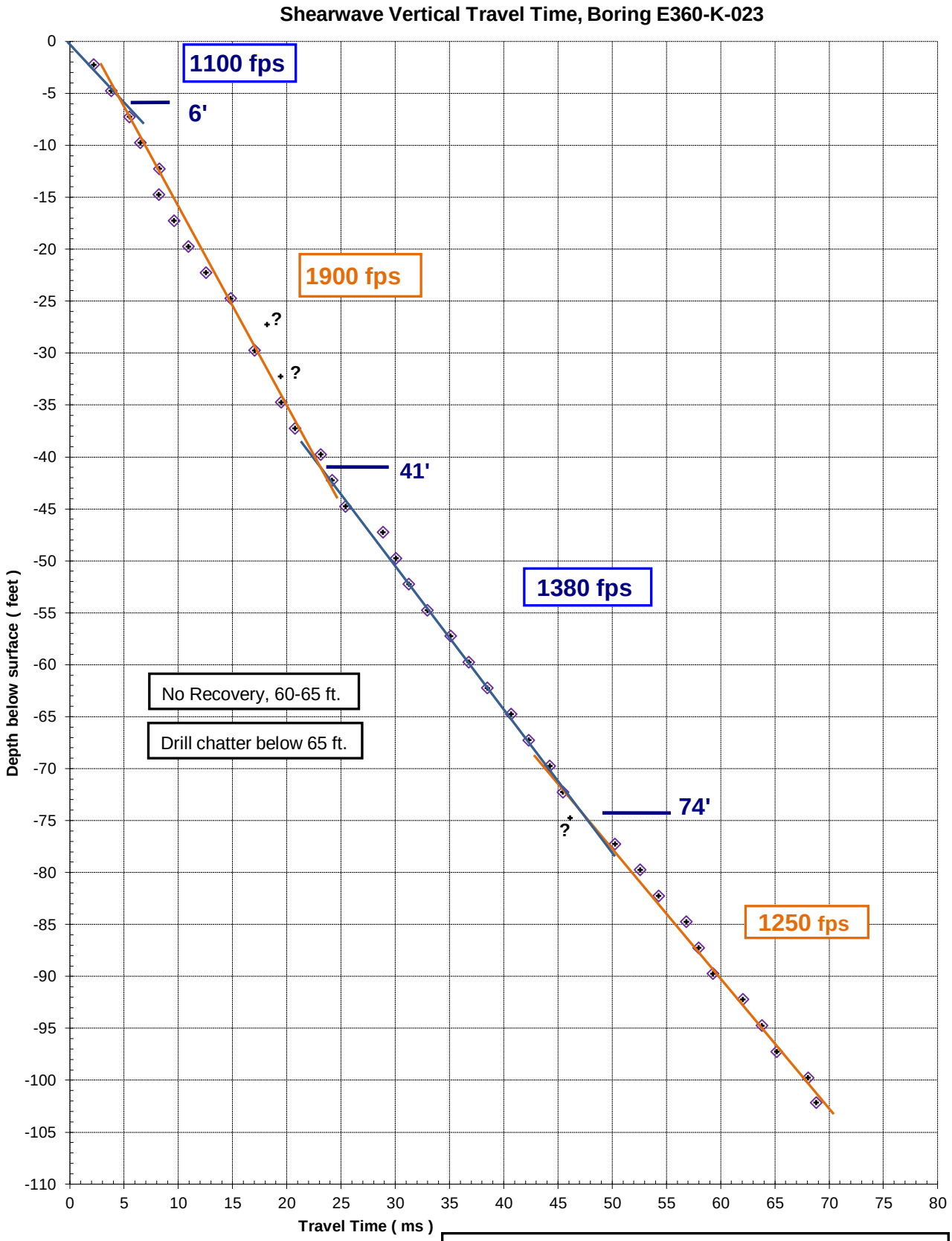

SHEAR WAVE LAYER VELOCITIES
BORING E360-K-023

E360 East Link Extension
Bellevue, Washington

10/27/2016

Figure 23-S

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for McMillen Jacobs Associates
Proj. #1222-16, October 2016

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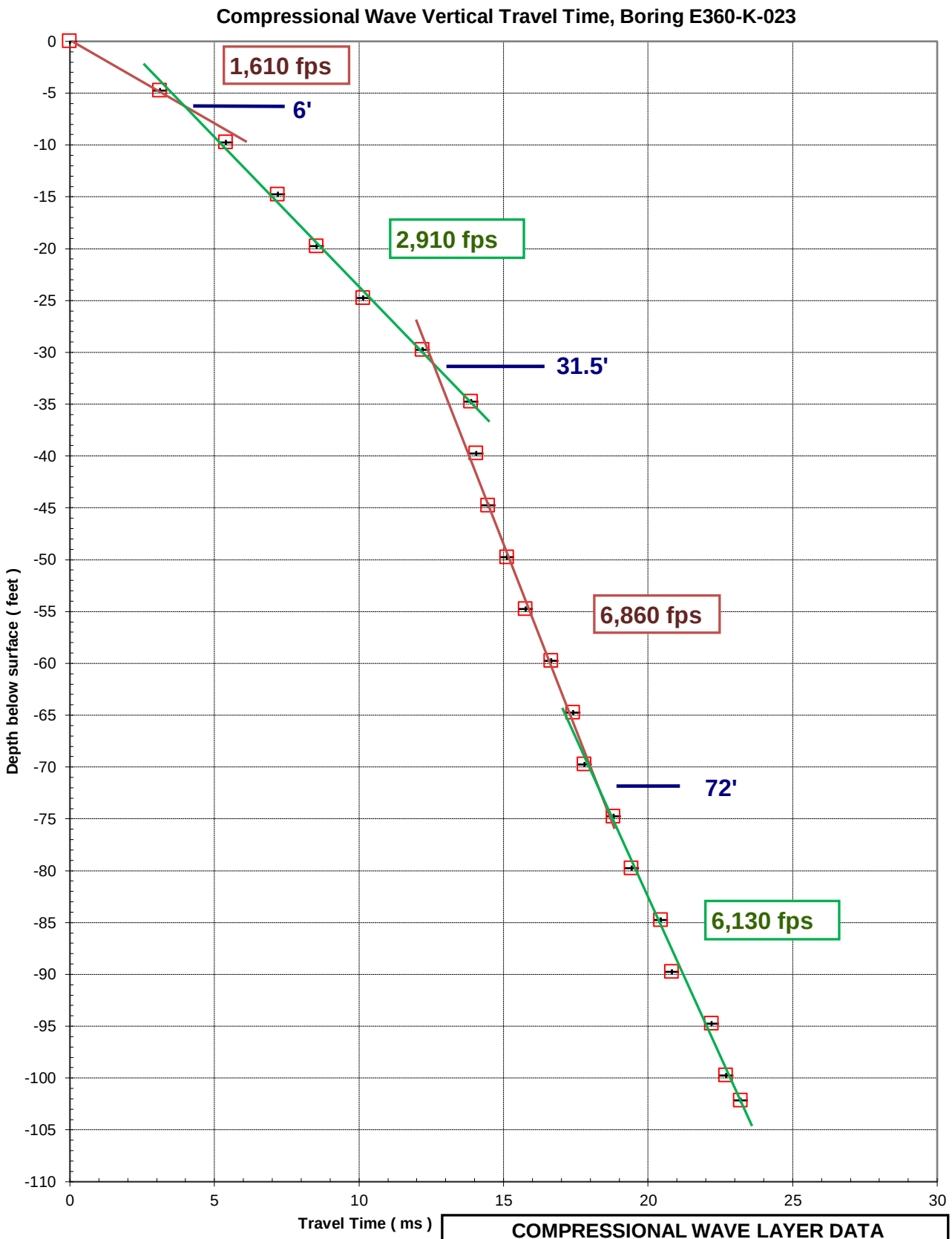

COMPRESSIONAL WAVE LAYER DATA
BORING E360-K-023

E360 East Link Extension
Bellevue, Washington

Philip H. Duoos, Geophysical Consultant
for McMillen Jacobs Associates
Proj. #1222-16, October 2016 10/27/2016

Figure 23-P

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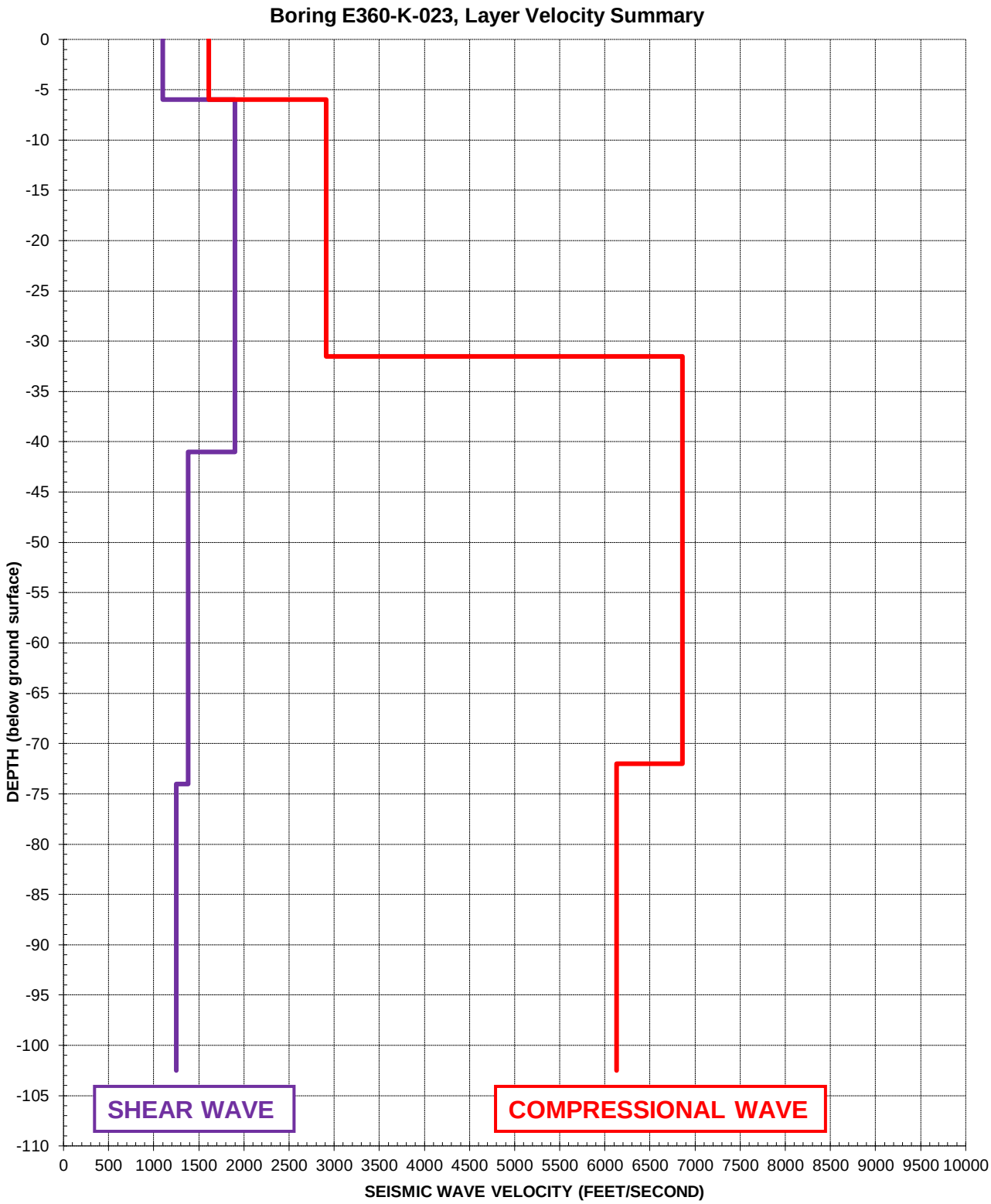
BLDG-2018-00983, BLDG-2018-00985



SEISMIC WAVE LAYER VELOCITY SUMMARY
BORING E360-K-023

E360 East Link Extension
Bellevue, Washington

Figure 23-SP

Philip H. Duoos, Geophysical Consultant
for McMillen Jacobs Associates
Proj. #1222-16, October 2016

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BLDG-2018-00983, BLDG-2018-00985