FINAL GEOTECHNICAL REPORT

SR 202
SR 520 to Sahalee Way NE – Stage 2
Redmond, Washington

OL-3498, SR-202, MP 8.35 to MP 10.53

11/9/04

TONY M. ALLEN
STATE OF WASHINGTON
25339
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES 07-01-05

Tony M. Allen, P.E.
State Geotechnical Engineer

Prepared by:
Donald A. Williams
Geotechnical Engineer

Reviewed by:
David L. Sowers
Senior Geotechnical Engineer

11/9/04

DAVID SOWERS
STATE OF WASHINGTON
33811
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES 7/24/05

November 8, 2004

Washington State Department of Transportation
Douglas B. MacDonald
Secretary of Transportation

Environmental & Engineering Programs Division
Materials Laboratory
P.O. Box 47365
Olympia, WA 98504-7365

CONTENTS

1. PROJECT OVERVIEW 1

2. REGIONAL SETTING 1

2.1. SURFACE AND TOPOGRAPHIC CONDITIONS 1
2.2. REGIONAL GEOLOGY 2
2.3. REGIONAL SEISMICITY 3

3. SITE INVESTIGATION 4

3.1. PREVIOUS STUDIES 4
3.2. EXPLORATION PROGRAM 5
3.3. FIELD INSTRUMENTATION 6

4. LABORATORY TESTING 6

5. SITE CONDITIONS 7

5.1. SOIL CONDITIONS 7
5.2. SURFACE WATER AND GROUND WATER 8

6. GEOLOGIC HAZARDS 9

6.1. SITE SEISMICITY 9
6.2. LIQUEFACTION 9
6.3. LANDSLIDES 10

7. GEOTECHNICAL RECOMMENDATIONS 11

7.1. ALIGNMENT CUT/FILL RECOMMENDATIONS 11
7.1.1. Embankment Construction – Station 186+80 to Station 200+90 11
7.1.2. Embankment Construction – Station 210+50 to Station 223+65 12
7.1.3. Embankment Construction – Station 228+60 to Station 237+60 12
7.1.4. Settlement Impacts To Project Elements 13
7.1.5. Settlement Monitoring 14
7.2. BRIDGE DESIGNS 16
7.2.1. Bridge No. 202/46 Foundation Recommendations 16
7.2.2. Bridges No. 202/47 and 202/47A Foundation Recommendations 17
7.2.3. Bridge Nos. 202/46, 202/47 and 202/47A Walls Recommendations 19
7.3. BRIDGE APPROACH SLABS 19
7.4. RETAINING WALL RECOMMENDATIONS 20
7.4.1. Wall 1 - Station 143+31 to Station 153+79, Right 20
7.4.1.1. Wall 1A - Station 143+31 to Station 147+70 20
7.4.1.2. Wall 1B - Station 147+70 to Station 153+79 21
7.4.2. Walls 2, 3, 4 and 5 - Rock Walls, Left 21
7.4.3. Wall 6 - Station 153+46 to 185th Station 12+10, Left 22
7.4.4. Wall 7 - 185th Station 11+01 to 185th Station 13+50, 29.5, Right 22
7.4.5. Wall 8 - Station 160+03.5 to Station 168+65, Left 22
7.4.6. Wall 9 - Station 161+80 to Station 167+19.44, Right 23
7.4.7. Wall 10 - Station 168+00 to 187th Station 8+30, Right 23
7.4.8. Wall 11 - Station 173+00 to Station 178+10, Left 24
7.4.9. Wall 12 - Station 181+24 to Station 188+12, Right 24

7.4.10. Walls 13 and 14 ..... *26*
7.4.11. Wall 15 - Station 203+70 to Station 223+65, Right *27*
7.4.11.1. Wall 15A - Station 203+70 to Station 210+50 28
7.4.11.2. Wall 15B - Station 210+50 to Station 223+65 28
7.4.12. Wall 16 - Station 211+70 to Station 218+80, 65 ft, Left *29*
7.4.12.1. Wall 16A - Station 211+70 to Station 215+50 30
7.4.12.2. Wall 16B - Station 215+50 to Station 218+80 30
7.4.13. Wall 17 - Station 225+50, 70.7 ft, Left, to Station 228+15, 63.6 ft, Left *30*
7.4.14. Walls 18 and 19 ..... *31*
7.4.15. Wall 20 - Station 238+30 to Station 239+45, Left *32*
7.4.16. Wall 21 - Station 244+55 to Station 245+49, Left *32*
7.4.17. Temporary Walls *32*
7.4.18. MSE Walls Design Requirements *33*
7.5. WET VAULTS 1 AND 2 35
7.5.1. Wet Vault 1 ..... *35*
7.5.2. Wet Vault 2 ..... *35*
7.6. WETLAND MITIGATION SITES AND DETENTION POND SITES 36
7.6.1. Detention Pond –1A at the Junction of 188th Ave. NE and SR 202 ..... *36*
7.6.2. Floodplain Mitigation Area in the vicinity of 192nd Drive NE *37*
7.6.3. Turple Mitigation Site *37*
7.6.4. Detention Pond 4 and Happy Valley Mitigation Site *37*

8. CONSTRUCTION CONSIDERATIONS 38

8.1. GENERALIZED CONSTRUCTION CONSIDERATIONS 38
8.2. BRIDGE CONSTRUCTION CONSIDERATIONS 39
8.3. WET VAULTS AND WALL 17 CONSTRUCTION CONSIDERATIONS 40

9. CLOSURE 41

10. INTENDED REPORT USE AND LIMITATIONS 42

APPENDIX – A ..... Vicinity Map, Test Hole Locations, Bridge Site Plans and Soil Cross Sections
APPENDIX – B ..... Logs of Test Borings
APPENDIX – C ..... Laboratory Test Data
APPENDIX – D ..... Geologic Figures and Cross-Sections
APPENDIX – E ..... Ground Water Information
APPENDIX – F ..... Figures for Bridge and Vault Design
APPENDIX – G ..... Retaining Wall Design Figures
APPENDIX – H ..... Special Provisions and Associated Figures

1. Project Overview

The widening project from SR 520 to Sahalee Way NE between SR 202 MP 7.62 to MP 10.53 has been subdivided into two stages. Stage 1 is the section from SR-520 to East Lake Sammamish Parkway vicinity at MP 8.47 (Stations 105+60 to 149+27.8). Stage 2 will be the section from East Lake Sammamish Parkway vicinity to Sahalee Way NE vicinity between MP 8.35 to MP 10.53 (approximate Stations 142+94 to 256+00) of SR 202.

Stage 1 geotechnical recommendations were presented in our Geotechnical Report dated October 20, 2003. Stage 1 is currently under construction.

This report presents the available Geotechnical information for the 2.18 miles of Stage 2 widening. The existing alignment will be improved by bringing the plan roadway section up to current deign standards with two additional lanes throughout the length of the project. The work includes up to 21 new retaining walls, 2 bridge replacements, and new bridge that spans half of the roadway, approximately 2150 linear feet of new fill/retaining walls over soft ground, 2 large wet vaults, and three major wetland mitigation sites.

A series of geotechnical memorandums have previously been prepared for various elements. This final geotechnical report supersedes these previous memorandums, and summarizes the final geotechnical recommendations for the entire length of the project. In addition, the scope of the project has changed from our original recommendations. The intent of this report is to revise our earlier recommendations, where necessary, and to conform to the current design plan.

The analyses, conclusions and recommendations presented in this memorandum are based on the project description and site conditions existing at the time of the field explorations. We assume that the exploratory borings represent the subsurface conditions in the project area. If different subsurface conditions are encountered or appear to be present during construction, we should be contacted so that we can reevaluate our conclusions and recommendations and assist you.

2. Regional Setting

2.1. Surface and Topographic Conditions

Land use along the project alignment varies from a mixed light commercial/industrial area and residential area within the city limits of Redmond and Sammamish to more undeveloped and rural land use in King County. Within the city limits of Redmond and Sammamish, the alignment is relatively flat and dominated by one-to tree-story office buildings and commercial buildings, condominiums/apartments, and associated parking lots. The alignment in the unincorporated King County is relatively flat and is dominated by wetlands, nurseries, and single-family dwellings. The wetlands lie in the floodplain of Evans Creek. The alignment runs adjacent to the flood plain for much of the project length. A substantial hillside between Stations 211+00 and 229+00 is present with identified areas of slope instability.

2.2. Regional Geology

The project site is located in the central portion of the Puget Sound lowland between the Cascade Range to the east and the Olympic Mountains to the west. The present day topography and the near-surface geology of the Puget Lowland are largely the result of multiple cycles of continental glaciation that occurred during the Pleistocene epoch. The last major episode was the Frasier glaciation, which occurred roughly between 20,000 and 12,000 years ago. The Frasier ice sheet is believed to have filled the lowland to a thickness of up to one mile thick in the deepest part of the trough. As the glacier retreated, a variable thickness of glacial sediment was deposited.

The Puget Sound area is primarily underlain by a thick, complex sequence of glacial and interglacial sediments. Meltwater flowing from the advancing ice sheet transported a variety of sediment that built a broad outwash plain. Coarse sediment such as sand and gravel was deposited in the high-energy environment near the advancing and recessing glacier. Finer sediments such as silt and clay were deposited in a low-energy environments further from the glacier, in ponds and lakes. These ponds and lakes were formed as advancing ice sheet blocked regional drainages. As the ice sheet advanced, the previously deposited sediments were overridden compacting the deposits to their present dense condition. Following the last glacial advance and retreat, alluvial (river) and lacustrine (lakebed) sediments were deposited by runoff from the slopes of the Olympic and Cascade Ranges, and the melt waters of the glaciers. The more recent portions of these sediments (lower-energy) consist of fine-grained sands, silts, and clay.

As part of this study, we reviewed the available geologic data in the vicinity of the project. USGS Map MF-2016, *Geologic Map of the Redmond Quadrangle, King County, Washington* by James P. Minard and Derek Booth, 1988 indicates a 1.1-mile wide trough was carved into these deposits during the last advance. As the glacier receded, perhaps more than 100 ft of recessional lacustrine and younger alluvial soils were deposited in the present day Sammamish River, Bear Creek, and Evans Creek drainage channels. The Stage 2 alignment crosses over several mapped geological soil units, including younger and older alluvium, Redmond delta deposit, recessional lacustrine deposits, transitional beds and pre-Vashon interglacial deposits (vicinity of 187th Avenue NE), and soils of the Evans Creek floodplain. The alignment cuts into the adjacent hillside between NE 55th Place and the vicinity of 204th Place NE.

A copy of the geologic map is presented in Figure D-1. The units are described in further detail in the following paragraphs:

The older alluvium (Qoal) consists of well-drained, oxidized stream laid sands and gravels that form a low terrace deposit. These soils typically consist of sands and gravels with silt, cobbles and boulders. These sediments were observed between Stations 142+94 and 153+00, right.

Redmond delta (Qvrd) consists of silty sands and gravels to well-graded sand and gravel with cobbles and boulders and lenses of silt and sandy silt. These sediments were deposited in recessional glacial Lake Bretz during the late Pleistocene time. These sediments were observed along Stations 142+94 and 153+00, left, and between Stations 153+00 and 175+00 vicinity.

Evans Creek flows in an ancient glacial river channel, which was approximately 2,000 ft wide and up to 300 deep. The younger alluvium (Qyal) in the drainage channels typically consists of loose to soft organic-rich fine sand, silt, and clay. This loose to soft soils are up to 30 ft thick in

places. The loose sediments are underlain by older alluvial deposits (Qoal) consisting of stream-laid sand and gravel with layers of low energy deposits of organic–rich fine sand, silt, and clay. These deposits were formed since the last glaciation, which ended about 12,000 years ago. These sediments were observed between Stations 190+00 and 202+00, and Stations 229+00 and 240+00.

Younger recessional outwash deposits (Qvry) were encountered between Stations 202+00 and 211+00, and approximate Stations 240+00 and 245+00. These soils typically consist of stream lain sands and gravels with silt, cobbles and boulders.

Landslide deposits (Qls) located mapped between approximate Stations 211+00 and 229+00 can be interpreted as landslide deposits within a recessional lacustrine deposit (Qvrl). The lacustrine sediments were deposited in glacial Lake Bretz, and are interpreted to extend up to about elevation 165 feet in the Evans Creek valley. The Qvrl deposits consist of stiff to very stiff, disturbed to homogeneous silts and clays. The Qls deposits consist medium stiff disturbed silts and clays with lenses of loose sandy silt with gravel to clayey sand with gravel.

The surrounding hills consist of a geologic sequence of over-consolidated glacial deposits. In general, the hills are capped by Till (Qvt), which consists of a dense to very dense mixture of clay, silt, sand, gravel, cobbles and boulders. The till is underlain by advance outwash deposits, which locally vary in thickness up to 30 ft. The advance outwash deposits are usually dense to very dense sand with gravel to silty sand with gravel, cobbles and boulders. The advance outwash deposits are underlain by Transitional Beds (Qtb) consisting of glacial and non-glacial lacustrine sediments up to 240 ft thick. The Transitional Beds are mapped between the vicinity of Stations 180+00 to 190+00 and in the hillside between Stations 211+00 and 229+00. This unit consists mostly of thin-bedded to thick-bedded blocky jointed clay and silt in the lower part grading up into sand in the upper part. These lacustrine deposits are underlain by the Olympia Beds (Qob), a unit deposited prior to the onset of the Fraser glaciation, which consists of dense to very dense sands and gravels with minor thin silt-clay lenses.

2.3. Regional Seismicity

Washington is situated at a convergent continental margin, the collision boundary between two tectonic plates. The Cascadia subduction zone, which is the convergent boundary between the North American plate and the Juan de Fuca plate, lies offshore from northernmost California to southernmost British Columbia. The northward-moving Pacific plate is pushing on the Juan de Fuca plate, causing complex seismic strain to accumulate. Earthquakes are caused by the abrupt release of this slowly accumulated strain.

There are three types or sources of earthquakes in Washington. The first is Intraplate or Benioff Zone Earthquakes. Intraplate or Benioff earthquakes occur in the subducting Juan de Fuca plate at depths of 25–100 km (15–62 miles). The largest of these recorded were the magnitude (M) 7.1 Olympia Earthquake in 1949, the M 6.5 Seattle-Tacoma earthquake in 1965, M 5.1 Satsop earthquake, and the M 6.8 Nisqually earthquake of 2001.

The second source or type of earthquake is the Shallow Crustal Earthquake. Shallow crustal earthquakes occur within 24 to 30 km (15 to 19 miles) of the surface. The most recent example was an M 3.5 earthquake approximately 7 miles east of the site on June 19, 2003. The majority of the shallow earthquakes are less than M 4.0 in the vicinity of the site. Significant earthquakes

(magnitude greater than 4.0) occurring in approximately 20-mile radius of the site include the following events. A magnitude 5.4 earthquake occurred approximately 5 miles ENE of Duvall (13 miles NE of the site) on May 3, 1996. A magnitude 4.2 earthquake occurred 13 miles ESE of the site on December 31, 1978. A magnitude 4.1 earthquake occurred approximately 9 miles SSW of the site on December 28, 1971. A magnitude 4.0 earthquake occurred approximately 2.5 miles NNE of the site on July 30, 1964. A magnitude 4.6 earthquake occurred approximately 18 miles ESE of the site on January 24, 1963. On August 6, 1932, an M 5.0 earthquake occurred approximately 8 miles to the WNW of the site.

The third source or type of earthquake is the Subduction Zone (Interplate) Earthquake. Subduction zone earthquakes occur along the interface between tectonic plates. Compelling evidence for great-magnitude earthquakes along the Cascadia subduction zone has recently been discovered. These earthquakes were evidently enormous (M 8-9+) and recurred on average every 550 years. The last of these great earthquakes struck Washington about 300 years ago.

The Puget Lowland is believed to have a series of buried geologic structures. The site is on the northern limb of an east-west (east plunging) anticline fold. The axis of the anticline fold is believed to be located between 10 and 11 miles north of the bridge sites. The anticline fold is bounded in the north by a NW to SE trending South Whidbey fault located south of Everett. This fault is between 10 to 11 miles north of the proposed bridge sites. The anticline is bounded to the south by the Seattle fault. This east-west trending fault zone is believed to be approximately 6 miles south of the alignment. This fault moved approximately 1000 years ago and has generated massive landslides into Lake Washington.

3. Site Investigation

3.1. Previous Studies

A series of field investigations have been conducted along the alignment by three consulting firms and WSDOT. CH2M Hill prepared a "*Final Soils Report – SR 202 East Lake Sammamish Parkway to Sahalee Way NE,*" dated November 1992. This Geotechnical Report provided conceptual and preliminary design recommendations for bridge foundations, retaining walls, drainage facilities, cut slopes, and fill slopes for the proposed widening and roadway improvement. Terra Associates, Inc prepared a Geotechnical Report for JPI Development Partners, "*Geotechnical Report, Jefferson at Marymoor Park, Redmond Washington,*" dated December 8, 2000. Earth Consultants, Inc. drilled two test holes for Signal Pole Recommendations at the junction of 192nd Dive NE in September 1998. Both Hong West & Associates and WSDOT drilled a series of test holes in 1999 to investigate potential drainage, wall sites over soft ground, two bridge sites, and wetland mitigation sites. These test holes were not previously published. During 2000 and 2001, NW Region drilled additional holes for detention ponds and wetland mitigation sites, and for signs and signal foundations.

Fifty-five test holes and 6 test pits were provided in previous investigations. Information on other geotechnical work performed, which was used in this report, are listed below:

- One test hole, H-1-28, was shown on the as-built drawings of Bridge No. 202/46 constructed in 1928.

- Eight test holes were included in the Geotechnical Report prepared by CH2M Hill in November 1992. We used seven test holes. One test hole, B-6-92 was inconsistent with the more recent test holes drilled at the same location, and was omitted from this report.
- Four test holes and six test pits are included from the *"Geotechnical Report, Jefferson at Marymoor Park, Redmond Washington"* prepared byt Terra Associates, Inc in December 8, 2000.
- Earth Consultants, Inc. drilled two test holes for Signal Pole Recommendations at the junction of 192nd Dive NE in September 1998.
- Hong West & Associates and WSDOT drilled a series of test holes in 1999. Nineteen test holes were drilled at various locations along the alignment.
- Northwest Region Materials drilled a series of test borings in 2000 for monitoring potential wetland mitigation and detention pond sites. Eighteen test holes were drilled.
- Northwest Region Materials drilled 4 test holes for cantilever signal standards at Sahalee Way NE and 204th Place NE intersections in January 2001.

The selected borings are provided in Appendix B, and their locations are shown on the Site and Exploration figures in Appendix A.

3.2. Exploration Program

The most recent investigation was designed to provide additional subsurface information to better define the foundation conditions for the final design of the proposed structures along the alignment. A total of 21 retaining walls, two bridge sites, and a major landslide area were investigated. In addition, the Project Design Office requested additional drilling for a detention pond, a wet vault, and for two wetland mitigation sites. Where possible, existing test hole information was used from the previous studies.

The current field investigation includes the following information:

- Six portable-penetrometer tests were performed at four proposed rock wall locations.
- Three test pits, TP-1-02, TP-2-02, and TP-03, were dug at Wall 6, Wall 8, and Wall 12 locations respectively to determine stand up time for a possible soil nail wall option.
- Two test holes were drilled for Bridge No. 202/47 and Wall 20.
- Thirty-four test holes were drilled at proposed wall locations.
- Nine test holes were drilled in the hillside between NE 55th Place and 204th Place NE to evaluate an ancient landslide deposit.
- Eight additional test holes were drilled for wetland areas and Pond 1A.

The test hole and test pit information is provided in Appendix B, and their locations are shown on the Site and Exploration Figures 5 through 29 in Appendix A. The edited logs of the test boring should be included in the final contract documents.

3.3. *Field Instrumentation*

A series of field instrumentation was used on this project, including 41 open standpipe piezometers, 3 vibrating wire piezometers, and 4 slope inclinometers. The piezometers were used to monitor the seasonal variations of the water table at potential detention pond and vault sites, and in a known landslide area. The inclinometers were installed in the hillside between NE 55th Place and 204th Place NE to monitor slope stability. Instrumentation was placed in the following locations:

- Stage 1 Infiltration Pond Site east of the SR 520 off-ramp, two piezometers.
- Potential pond site in the vicinity of 185th Avenue NE, two piezometers.
- Pond Site 1A in the vicinity 188th Avenue NE, one piezometer.
- Flood Plain Mitigation Area in the vicinity of 192nd Place NE, three piezometers.
- Potential mitigation sites between 192nd Place NE and 196th Avenue NE, four piezometers.
- Bridge No. 202/46 and County Bridge at 196th Avenue, three piezometers.
- Turple Wetland Mitigation Area; five piezometers.
- Hillside between NE 55th Place and 204th Place; nine standpipe peizometers, 3 vibrating wire piezometers in two test holes, and four slope inclinometers.
- Wet Vault 2, one piezometer.
- Happy Valley Wetland Mitigation Area, eleven piezometers.

4. Laboratory Testing

Laboratory testing was performed on selected samples from the field exploration program. The testing consisted of performing particle size analyses, determining the liquid limit if applicable, and determining the plastic limit and plasticity index if applicable. The tests were done in accordance with AASHTO T-88, T-89, and T-90 guide specifications respectively. After the testing was completed, the samples were classified using the Unified Soil Classification System (USCS).

Specialized testing was performed on selected samples in 1992 and 2002 to determine the soil strength and rate of settlement for the soft clay/silt, three in 1992 and six in 2002. A total of nine consolidation tests were performed to predict the rate and amount of settlement. Six unconfined-compression tests in 2002 and four direct shear tests were preformed to determine the short-term soil strength, three in 1992 and one in 2002. In addition, fourteen *in situ* field vain shear in 2002 and three tore-vane shear tests in 1992 were preformed on medium stiff to very stiff, silt to lean clay soils. All of the soil samples were taken from various locations with in the project limits.

The results from this and previous laboratory testing were used to establish the soil parameters for the geotechnical design. The results of all laboratory testing are summarized in Appendix C.

5. Site Conditions

5.1. Soil Conditions

Widely varying soil conditions are found along the project alignment. These soils ranged from soft silt with organics to glacially over-consolidated sands and gravel. In general, the soils encountered were grouped based on similarities in materials and engineering properties. In Appendix A and Appendix G, a series of soil profiles and soil cross-sections along the project alignment show the various soil types relative to the planned structures on this project. These principle units along the alignment can be summarized as follows:

- **Fill** – Fill generally consists of loose to dense, silty sand to poorly graded sand with silt and /or gravel. The thickness of this unit varies up to 15 ft in places along the alignment.
- **Younger alluvium** – These deposits are located in and along the present Evans Creek floodplain as slack water deposits. These soils consist of very loose to loose, sandy silt with organics to soft to medium stiff, silt, and medium stiff, lean clay with sand and organics. The thickness varies along the alignment. Between Stations 191+50 and 202+00 and Stations 229+00 and 240+00, the thickness of this unit varies between 5 ft and 22 ft.
- **Older alluvium** – These deposits consist of medium dense to dense, silty sand with gravel to well graded gravel with sand, cobbles and boulders. These sediments were observed between Stations 142+94 and 153+00, right. Between Stations 191+50 and 202+00, the depth of this unit varies up to 21 ft, and is underlain by advance outwash and older sediments.
- **Redmond delta deposits** - The delta deposits consist of three sub-units deposited in a deltaic environment. The first sub-unit consists of loose to medium dense, silty gravel with sand and cobbles to silty sand with gravel and cobbles. These sediments were observed along Stations 142+94 and 159+00, left. The second sub-unit consists of loose to medium dense, sandy silt to silty sand with gravel. These sediments were observed between Stations 153+00 and 167+00. The third sub-unit consists of loose to medium dense, poorly graded to well-graded sand with silt. These sediments were observed between Stations 167+00 and 183+00. The delta deposits are underlain by either advance outwash or Olympia beds.
- **Recessional outwash** – These deposits consist of medium dense to dense, silty sand with gravel to well graded gravel with sand, cobbles and boulders. The unit consists of terrace deposits along the Evans Creek floodplain. They were encountered between Stations 183+00 and 190+00, left, Stations 202+00 and 211+00, left, and approximate Stations 240+00 and 245+00.
- **Recessional lacustrine/Landslide debris** – These soils primarily consist of disturbed to homogeneous very loose to loose, sandy silt with organics to soft to hard, silt, and lean clay with sand. These deposits were observed between Stations 215+50 and 229+00, and varied in thickness between 14 ft and 30 ft along the right side of the alignment under Walls 15B and 17. Upslope of Wall 16, these deposits are intrepid to be as much as 130

feet thick. Near the base of the slope adjacent to the alignment between Stations 215+50 and 230+00, discontinuous beds 4 ft and 35 ft thick of loose, poorly graded gravel with cobbles, to medium dense to dense silt with gravel were encountered.

- **Advance outwash** – These deposits are found throughout the alignment and are typically over-consolidated. They consist of dense to very dense, poorly graded to well-graded gravel with sand. Beds of very stiff to hard, silt to very dense sandy silt up to 16 ft in thickness were observed within the unit in test borings, MW-1-99, MW-6-99, H-29-02.
- **Transitional Beds/Olympia Beds** – These highly over-consolidated soils typically consist of oxidized, dense to very dense, lean clay and silt to sandy silt coarsening downwardly to poorly graded sand with silt to silty sand with gravel. Geologic mapping shows this unit to be exposed on the surface between Stations 182+00 and 189+00, right, and Stations 211+00 and 215+50, left.

5.2. Surface Water and Ground Water

The ground water varies with the topography and geologic soil units along the project alignment. In general, ground water varies seasonally between the wet winter and spring months and the dryer summer and early fall months. The highest ground water observations occurred between December and April at this site. The lowest readings occurred summer and late fall. We have summarized all the water level readings, both Stage 1 and Stage 2, up to July 2004 in tables in Appendix E.

The following roadway sections are covered in the Tables:

- Tables 1 and 2, the section between SR 520 and East Lake Sammamish Parkway. The ground water was observed between 5 ft and 17 ft below the ground surface.
- Table 3, the section between East Lake Sammamish Parkway and 187th Ave. NE. The ground water was observed in 8 of 22 test holes. In the vicinity of Wall 1, ground water was observed between 4.5 ft and 5 ft below the ground surface in two test holes. In the vicinity of Walls 6 and 11, perched ground water was encountered near the ground surface in two hand holes. The water was encountered in November near the boundary of fill and very dense over-consolidated silty sands with gravel. In general, for the remainder of the test holes in this section, ground water was found between approximately 14 ft to over 20 ft below the ground surface.
- Tables 4 and 5, the segment between 187th Ave NE and 192nd Drive NE. Table 4 covers the ground water in the vicinity of Wall 12, south side of SR-202. Water level readings from B-3-92 indicated the groundwater to be approximately 15 ft below the lowest portion of Wall 12. Test hole H-13-02 and H-14-02 indicates water at approximately 5 ft to 10 ft above the bottom of the wall. We suspect that there is a perched ground water zone behind Wall 12. Table 5 covers Detention Pond 1A and the Floodplain Wetland mitigation area north of SR 202.
- Tables 6, 7, 8, 9, 10, 11, and 13 cover the sections within the Evans Creek flood plain. This area is subject to seasonal flooding in the low-lying areas with the ground water varying approximately 2.5 ft seasonally.

- Table 12 covers the hillside between NE 55th Place and 204th Place NE. This area has been mapped as a landside deposit and will be further discussed in the Geologic Hazards Landslide section.

There is a seasonal "spring" that is reported to be located between Stations 240+00 and 243+00, right, in the existing ditch. The "spring" dries up during the summer months when the water levels are at their lowest.

6. Geologic Hazards

6.1. Site Seismicity

A bedrock acceleration coefficient of 0.29g is recommended for seismic design of the structures on this project in accordance with the June 1996 US Geological Survey National Seismic Hazard Map. The recommended acceleration coefficient is based on expected peak bedrock acceleration (PBA) at the project site that has a 90 percent probability of not being exceeded in a 50-year period. The AASHTO soil profile falls between Types II and III. For Bridge 202/46 and Wet Vault 1, we recommend using Type II soil profile response spectrum and a site coefficient (S) of 1.2 for seismic design. For Bridge 202/47 and Wet Vault 2, we recommend using a Type III soil profile response spectrum and a site coefficient (S) of 1.5 for seismic design.

It is our understanding that the vaults were designed based on the ACI Manual of Concrete Practices 2002, which uses the International Building Code Standards. For this case, we recommend the following seismic information:

- The design response spectra in the 2003 International Building Code.
- In accordance with the 1996 US Geological Survey National Seismic Hard Mapping project, we recommend Wet Vaults 1 and 2 be designed for the following accelerations:

  Peak Bedrock Acceleration 0.29 g
  0.2 sec Spectral Acceleration 0.63 g
  0.3 sec Spectral Acceleration 0.57 g
  1.0 sec Spectral Acceleration 0.20 g

- We recommend using Site Class D for the seismic design for Wet Vault 1, and Site Class E for Wet Vault 2. Site Class D is typified by soils having standard penetration (N_{60}) resistances between 15 to 50, and soil shear wave velocity between 600 to 1,200 ft/sec. Site Class E is typified by soils having standard penetration resistances less than 15, and an average saturated undrained strength (S_u) value less than 1,000 psf *in situ.* We did encounter a relative thin layer of stiff sandy lean clay that varies in thickness up to 6 ft under the Wet Vault 2. The soils encountered in the field explorations meet these requirements.

6.2. Liquefaction

The liquefaction potential of saturated soils is evaluated mainly on soil gradation, density, and the depth of the deposit. The potential for liquefaction is highest for loose, fine to medium

grained sands and silty sands. Increasing fines content (i.e., silt and clay) decreases the potential for liquefaction. Clean coarse, grained granular soils (gravels) are also less susceptible to liquefaction due to their high permeability. Typically the potential for liquefaction also decreases with increasing density and depth.

We have evaluated the potential for liquefaction of the project soils based on the SPT data obtained from the field explorations and the percentages of silt and clay. Because the alignment soil either has a high fine content or a medium dense to very dense blow counts, it is our opinion that the potential for liquefaction is low where the bridge widening and retaining walls are planned.

6.3. Landslides

The hillside between NE 55th Place and 204th Place NE, between Stations 211+00 and 229+00 has been mapped as a landside deposit (Qls) as shown in Figure D-2. Figure D-2 is a composite figure of the USGS drawing prepaired by Minard and Booth in 1988, LIDAR imaging, and field survey information. The ancient landslide measures approximately 3,400 ft long and up to 600 ft wide. A county road, 204th Place crosses the middle of the slide mass. Several slides have occurred in the past along this section of 204th Place.

The current SR 202 alignment is located at the toe of this ancient slide for an approximately 1,500 ft. Two slide scarps appears to intersect the proposed SR 202 alignment between Stations 215+00 and 219+00. The roadway crosses over slide debris to approximate Station 229+00. It appears that the ancient river that flowed in the existing Evans Creek flood plain had under cut the hillside in a bend of the river, which is the probable cause of the slide. Debris material was deposited into the river, which was later reworked into the valley floor sediments.

We drilled approximately 23 test holes in this area to better define the slide within the project limits. Fifteen test holes received instrumentation, nine open standpipe piezometers, three vibrating wire piezometers, and four slope inclinometers. From this data, two generalized soil cross-sections were developed, Figures D-3 and D-4. Figure D-3, section A-A, is perpendicular to SR 202 at Station 217+00. Figure D-4, section B-B, is skewed to SR 202 and crosses the SR 202 alignment at approximate Station 220+20.

Currently, the hillside appears marginally stable. No apparent movement has been observed in the existing roadway. However, some of the trees on the slope show pistol butts typical of surficial ground movement. A slope stability analyzes of the existing slope indicated that a deep seated slope failure is not likely with the current ground water levels.

We have monitored the slope inclinometers for the past 2 years. Some surficial movement, approximately 0.25 inches in the top 10 ft to 15 ft, was observed in two of the inclinometers, H-23A-02 and H-25-02.

One or more layers of perched ground water are located in the hillside. Once the test holes penetrated the very dense silty sand to poorly graded sand with silt (Qob) between elevation 35 ft and 40 ft, ground water under artesian pressure was encountered in test holes H-27-02, H-24-02, H-34-02, H-35-02, and H-36-02. A surface water table was also encountered in test holes MW-2-99, H-21-02, H-22A-02, H-23-02, H-25A-02, H-34-02, H-35A-02, and H-43-02.

To mitigate any potential stability problems, the current design will raise the grade within the landslide limits. By raising the grade, the amount of cut can be minimized, and a buttress will be created at the toe of the landslide. The buttress should improve the overall stability of the existing hillside. Two retaining walls, Walls 16 and 17 will retain the cuts. We plan to monitor the slope inclinometers during construction for any possible movement. Wall 16 is not designed to mitigate a remobilization of a deep seated landslide during an extreme earthquake event, which we consider to have very low probability of occurring. The wall as design will withstand minor to moderate earthquakes.

7. Geotechnical Recommendations

7.1. Alignment Cut/Fill Recommendations

It is our understanding that both the new cuts and fills will be retained by walls. For the remaining slopes, we recommend slopes be constructed at 2:1 or flatter. Slopes constructed at 2:1 should be stable provided that the fill slopes are constructed of select borrow or gravel borrow, and hillside terraces as required under Section 2-03.3(14) in the Standard Specifications are used. Common Borrow may be used on slopes 2.5:1 or flatter. However, the use of Common Borrow will likely be limited to only the driest summer months, if it can be used at all.

We expect the new fills behind the walls located in and along the Evans Creek flood plain will experience a significant amount of settlement (immediate and post-construction) between 192nd Drive NE and Sahalee Way NE. For design, we have divided this section of SR 202 into three areas. Area 1 is behind Walls 13 and 14, from 192nd Dive NE to 196th Ave NE. Area 2 is behind Wall 15B, from NE 55th Place to 204th Place NE. Area 3 is behind is behind Walls 18 and 19, from 204th Place NE vicinity to the Bridge No. 202/47 Replacement.

In these areas, adjacent to and on the Evans Creek flood plain, the fill will be constructed in two phases. The north (left) side or the road will be constructed first (Phase 1), and the south (right) side of the road will be constructed second (Phase 2). We recommend that soil stabilizing geotextile be placed under the footprint of both Phase 1and 2 fill located in wetland areas. As shown in Figures G-24 and G-27, a separation barrier is needed to prevent contamination of the gravel borrow to be used at this site with the underlying soft fine gained soil. In order to provide a firm base for the proposed MSE retaining walls (Walls 13, 14, 18, 19, 21, and a portion of Wall 15B) up to 2 feet of over-excavation and backfilling of quarry spalls may be required. The top of the quarry spalls need to be choked with Shoulder Ballast or Crushed Surfacing in order to fill the voids between the quarry spalls. Further, we recommend limiting the use of vibrating compaction equipment for the bottom 2 feet of the new fill. Vibratory compaction equipment could create pumping soils at the base of the fill. Method B compaction should be used throughout the remaining embankment. We recommend using a layer of Shoulder Ballast for the first two feet of new fill. It may be easier to compact under static compaction than gravel borrow.

7.1.1. Embankment Construction – Station 186+80 to Station 200+90

The new alignment will result in the placement of fills of up to 11 feet in thickness behind Wall 13 between Stations 186+80 and 200+90, and up to 3 feet of thickness behind Wall 14. The

finished grade will be approximately one foot higher than the current roadway grade. It is our understanding that gravel borrow will be used at this site.

During Phase 1 construction, the new wall will enter the Evans Creek flood plain in the vicinity of Station 191+50 (Wall 13 Station 14+70). The fill height at this location is approximately 10 ft. Ahead on station, the fill varies in thickness between 6 ft and 10 ft for approximately 940 ft. Soft fine-grained soil will be encountered under the fill.

During Phase 1 construction, settlement will vary under the width of the new embankment due to varying thickness and soil density of the underlying soils. In the area between Stations 192+00 and 200+90 (north side of SR 202), we estimate up to 7 inches of settlement will occur under the new fill, and 0.5 inches of settlement will occur under the existing roadway embankment. The majority of the settlement should occur within the first 6 months after the fill is placed. The section between Station 186+80 and 192+00 should settle as the fill is placed. We expect up to 2 inches of total settlement will occur in this section. Once the primary settlement is complete, long-term settlement should be negligible in both sections.

During the second phase, approximately 3 feet of additional sliver fill thickness will be placed on the shoulder of the existing alignment. Settlement should occur as the fill is placed. Total settlement for Phase 2 should be less than one inch. Long-term settlement should be negligible.

7.1.2. Embankment Construction – Station 210+50 to Station 223+65

The new alignment will result in the placement of fills of up to 15 ft in height above the current roadway grade during both Phase 1 and 2. In order to maintain traffic along SR 202, a temporary retaining wall will be constructed along the existing roadway shoulder during Phase 1. During Phase 2, Walls 15A and 15B will be constructed along with the new fill. It is our understanding that gravel borrow will be used at this site.

Settlement will vary under the width of the new embankment due to varying thickness and soil density of the underlying soils. During Phase 1 construction, the fill placed between 203+70 and 217+50 should settle as it is placed. Between Stations 217+50 and 224+00, we estimate that between 0.5 and 6.5 inches of settlement will occur along the temporary wall face, and the majority of the settlement should occur within the first six months after the fill is placed. Settlement should be near complete by the time that the Phase 2 fill is placed.

During Phase 2 construction, we expect Wall 15B and the new fill behind the wall will settle up to 10.5 inches. The largest differential settlement, approximately 3 inches over 50 ft, will occur between Stations 210+50 and 211+50. We estimate that Wall 15B will have differential settlement on the order of 1.0 inch per 100 ft between Stations 211+50 and 223+65. The time rate of settlement will vary along Wall 15B. We estimate settlement should take between 2 and 16 months to complete. We expect that long-term, post construction settlement will occur in the vicinity of Wall 15B. We estimate as much as 3 inches over a 10-year period.

7.1.3. Embankment Construction – Station 228+60 to Station 237+60

The new alignment will result in the placement of fills of up to 13 ft in thickness behind Walls 18 and 19. The finished grade will vary between 5 ft and 7 ft higher than the current roadway grade. It is our understanding that gravel borrow will be used at this site.

During Phase 1, Wall 18 will enter the Evans Creek flood plain in the vicinity of Station 231+00 (Wall 18 Station 12+48). The fill height at this location is approximately 12 ft. Between Stations 228+60 and 231+00, we expect 17 ft of very loose to loose, silty sand with organics underlain by 15 ft of medium stiff, sandy silty clay. Ahead on station, the fill varies in thickness between 11 ft and 13 ft for approximately 660 ft. We expect up to 21 ft of soft fine-grained soil with organics will be encountered under the fill.

Settlement will vary under the width of the new embankment due to varying thickness and soil density of the underlying soils. We estimate between 6 and 10 inches of settlement will occur under the new shoulder, and up to 2.5 inches of settlement under the existing roadway embankment. The majority of the settlement should occur within the first 6 months after the fill is placed. Long-term settlement should be negligible.

During Phase 2, additional fill will be placed between 5 ft and 9 ft thick on the shoulder of the existing alignment. We expect the new wall and fill will settle up to 4.0 inches. We estimate that Wall 18 and Wall 19 may experience differential settlements on the order of 1.0 inch per 100 ft. The majority of the settlement should occur within the first 6 months after the fill is placed. Long-term settlement should be negligible.

7.1.4. Settlement Impacts To Project Elements

The amount of expected settlement will have some impacts to the buried utilities, drainage structures, the traffic barrier, and pavement in the areas mention in Sections 7.1.1, 7.1.2, and 7.13. Buried utilities are shown on the plan sheets. Behind Wall 15B, buried power lines are shown that run perpendicularly to SR 202 at approximate Stations 215+00, 216+95, and 218+10, and run parallel between approximate Stations 219+15 and 223+85. Behind Wall 18, buried power lines are shown running parallel to the wall between approximate Stations 229+90 and 237+39. Behind Wall 19, a buried telephone and/or fiber optic line is shown running the length of the wall between Stations 233+25 and 237+39. Storm drains are shown crossing SR 202 in the vicinity of Stations 200+00, 219+20, 222+95, and 223+40. A drain should be placed behind the MSE reinforcement as shown in Figures G-23 through G-27. These lines need to be flexible enough to handle the expected total settlement of up to 12 inches, and up to 4 inches of differential settlement between Phase 1 and Phase 2 fills. There is a good possibility that the connections between different phases may not line up. The storm drains and the six-inch drain behind the MSE walls may be raised and/or cambered so that they will be near plan flow-line elevations when settlement is complete.

The site data shows that guardrail will be placed behind Walls 13, 14, 18 and 19, and a F-shaped barrier, Standard Plan D-3b or D-3c, will be place on top of Wall 15. The settlement along the wall may leave a wavy appearance at the top of the barriers. To mitigate this effect, we recommend that construction of the barriers be delayed as long as possible to allow time for the settlement to be complete. If the guardrails are placed within the reinforcement zone of the MSE wall, a hole may have to be pre-cut in the wall reinforcement in order to allow for the guardrail placement. In addition, the guardrail needs be a minimum of 4 ft behind the face of the proposed MSE wall in order to prevent wall deformation in the wall face.

The roadway pavement may experience significant amount of cracking due to the settlement along the alignment and between Phases 1 and 2 fills. The amount of cracking may be mitigated with a delay in construction of the final roadway pavement section as long as possible.

The Phase 2 fill will be built adjacent the Phase 1 walls/or fill. We expect that the Phase 1 fill will have for the most part settled out before the Phase 2 wall/or fill is constructed. After Phase 2 fill is built, there is a potential for cracks to develop along the sections of roadway constructed on the existing embankment and new fill sections. The amount of cracking may be mitigated with a delay in construction of the final roadway pavement section. However, some cracking will occur due to the differential settlement between the Phase 1 and Phase 2 fills. There will be some long-term maintenance cost associated with roadway crack repair.

The amount of time for the completion of primary settlement varies along the alignment. In the areas of Walls 13, 18, and 19, this period of time is estimated to be approximately 6 months, and the area behind Wall 15B the period of time is estimated to be approximately 9 months.

We recommend a minimum delay period of 9 months in the area behind Wall 15B, and 6 months in the area behind Wall 19 be included in the contract documents prior to paving these areas. If a long delay period is not possible, ground improvement techniques will be required for Phase 2 for Walls 15B and associated fills. We recommend wick drains be used, if it is decided to use ground improvement. This method will accelerate the settlement under and behind Wall 15B, significantly reducing the required delay period. The added benefit would be additional soils strength gain under the wall. We can provide a detailed wick drain design should this option be selected by the PE Office.

The amount of expected differential settlement behind Wall 19 will not warrant ground improvement. We estimated that approximately one inch or less of differential settlement will occur between Phase 1 and Phase 2 fills.

7.1.5. Settlement Monitoring

Settlement monitoring is recommended in the areas where over 4 inches of long-term settlement is expected. During Phase 1, these areas include the fills behind Wall 13 between Stations 191+50 and 200+67, the temporary geosynthetic wall between Stations 211+50 and 223+65, and Wall 18 between Stations 228+60 and 237+39. Survey hubs in the new roadway shoulder are recommended. The settlement information would better define the delay period for the final roadway pavement section for Phase 1.

The area between Stations 211+080 and 223+00 during Phase 2 construction should require settlement monitoring. Any of the following three methods may be used:

1. Survey hubs consisting of a series of hubs no more than 50 ft apart located in the shoulder of the fill between the above stations. These survey points would require a survey crew to monitor the points. Initial readings consisting of two consecutive independent sets of readings after the completion of the embankment should be made. The points should be read twice a week for a period of two weeks, once a week for the next three weeks, and then once every other week during the contract.

2. Settlement plates placed in the fill with extensions that are added as the fill is placed. A settlement plate is a three foot square by 0.25 inch thick steel base plate with a two inch diameter threaded steel fitting welded to the center. The fitting should be compatible with the connecting two inch diameter steel threaded conduit. Figure H-1 in Appendix H shows a typical settlement plate detail. This device will require a survey reference hub that is located away from the area affected by the settlement. A fixed point in the vicinity of NE 55th Place could be used as a reference point. We recommend settlement plates be placed at the following locations:

Device	Station	Offset	Zone of Influence
SP-1	214+00	47 ft Rt.	Station 211+00 to Station 214+00
SP-2	217+00	47 ft Rt.	Station 215+00 to Station 219+00
SP-3	220+00	45 ft Rt.	Station 219+00 to Station 221+00
SP-4	223+00	45 ft Rt.	Station 221+00 to Station 224+00

3. A settlement indicating device (a liquid filled pneumatic device) is monitored at a location off to the side of the new fill. For this device, settlement is measured by a readout unit that measures changes in fluid pressure. Figure H-2 in Appendix H shows a typical settlement indicating device detail. We recommend settlement indicating devices be placed at the following locations:

Device	Station	Offset	Zone of Influence
SI-1	214+00	35 ft Rt.	Station 211+00 to Station 214+00
SI-2	217+00	35 ft Rt.	Station 215+00 to Station 219+00
SI-3	220+00	30 ft Rt.	Station 219+00 to Station 221+00

Special provisions for the settlement hubs, settlement plates and settlement indicating devices are attached in Appendix H. We recommend that the details be put into the contract plans depending on the method or methods selected. The data collected should be forwarded to the E&EP Materials Lab, Geotechnical Division for reduction and interpretation. Based on our interpretation of the settlement rate, the delay period can be evaluated during construction. If the settlement occurs faster than expected, the delay period can be shortened.

7.2. *Bridge Designs*

There will two bridge replacements and a half bridge proposed for this project, Bridge Nos. 202/46, 202/47, and 202/47A. The existing Bridge No. 202/46 is an approximately 30 ft long, 27 ft wide T-Beam structure located between Stations 201+11 and 201+41. Bridge 202/27 is an approximately 20 ft long and 27 ft wide T-Beam located between Stations 237+87 and 238+07.

7.2.1. Bridge No. 202/46 Foundation Recommendations

The new bridge consists of a 70 ft long replacement bridge, which will be built in two stages. We recommend a spread footing supported bridge at this site, provided the structure can be founded on medium dense to dense gravel with sand at or below elevation 60 ft. The bottom of the adjacent stream channel is at approximate elevation 66.5 ft.

For our analyses, we assumed a minimum cover above the top of the footing of approximately 2 feet below the flow line of the creek channel for scour. However, The Hydraulics Office should provide the estimated scour depth for this project. The bridge foundation should be located such that the bottom of the footing is below the scour elevation. Should scour extend below elevation 60 ft an alternate foundation type may be needed. Our office should be contacted if scour elevation is lower than elevation 60 ft.

Load and Resistance Factor Design (LRFD) methodology is currently used by the Bridge Office for structural design. Capacity charts for the Strength, Service and Extreme limit states are shown on Figure F-1.

We recommend that the following resistance factors be used when evaluating the different limit states for shallow foundations.

Table 1: Resistance Factors

Limit State	Resistance Factor ϕ		
	Shear Resistance to Sliding	**Bearing**	**Passive Pressure Resistance to Sliding**
Strength	0.80	0.35	0.50
Service	1.00	1.00	1.00
Extreme	1.00	1.00	1.00

For passive pressure resistance at the foundation toe and active pressure acting on the abutments, the following soil properties should be used to estimate the forces.

Table 2: Soil Properties

Parameter for Piers 1 and 2	Soil Values above Elevation 60 ft	Soil Values below Elevation 60 ft
Unit Weight (γ) [γ'= below the W.T.]	100 pcf [37.6 pcf]	[67.6 pcf]
Soil Friction (ϕ'_f)	28°	36°
Active Earth Pressure Coefficient (k_a)	0.33	0.25
Passive Earth Pressure Coefficient (k_p)	2.9	5.0
Coefficient of Sliding (tan ϕ_f)	0.53	0.73
Seismic Coefficient (ΔK_{ae})	0.11	0.10

Note: Depending on scour, the use of passive pressure may not be appropriate for foundation design.

7.2.2. Bridges No. 202/47 and 202/47A Foundation Recommendations

Bridge 202/47 consists of a 70 ft long replacement bridge with a finished roadway width of 68 ft, and Bridge 202/47A consist of a 115 ft long structure with a finished roadway width of 34 ft. Cast-in-place displacement piles are the preferred foundation type for both structures. The piles will be driven into medium dense to dense, sands and gravels, and act primarily in end bearing. For our analyses, we assumed a minimum cover above the top of the footing of approximately 2 feet below the flow line of Evans Creek.

Enclosed in Appendix F are ultimate capacity charts for Strength and Extreme event limit states for LRFD foundation design. The charts show nominal bearing and uplift capacity. We are providing charts (Figures F-5 through F-8) for pile diameters of 14-inch, 16-inch, 18-inch, and 24-inch piles. Please note that the weight of the pile has not been deducted from the compressive capacity in the figures and is not included in the uplift values. We expect that the piles will settle less than one inch provided the piles are tipped at/or below elevation 60 ft.

We recommend that the resistance factors in Table 3 be used when evaluating the different limit states.

Table 3: Resistance Factors for pile foundations

Limit State	Resistance Factor ϕ	
	Bearing Capacity	Uplift
Strength	0.50	0.60
Extreme	1.00	1.00
Service	1.00	1.00

Lateral load analyses for driven piles can be accomplished using the p-y parameters shown in Figure F-9 in Appendix F.

Ground settlement and static downdrag at the abutment will occur over a period of time. We estimate primary settlement will take between 1 to 6 months to occur. The amount of settlement will also vary across the width of the new roadway as previously discussed in the embankment section. Negative skin friction (downdrag) and skin friction loss are expected. The loads shown in Table 4 should be added to the other applied loads to account for static downdrag. To account for skin friction loss due to downdrag, subtract the appropriate value in Table 5 from the capacity plots shown in Appendix F to determine the nominal resistance at any given tip elevation.

Table 4: Estimated Downdrag Load per Pile.

Pile Diameter	DD, Static Conditions
	Piers 1 and 2
14 in	8.3 (kips)
16 in	9.5 (kips)
18 in	10.7 (kips)
24 in	14.2 (kips)

Table 5: Estimated Skin Friction Loss Due to Downdrag Loads.

Pile Diameter	R_{Sdd}, Static Conditions
	Piers 1 and 2
14 in	8.3 (kips)
16 in	9.5 (kips)
18 in	10.7 (kips)
24 in	14.2 (kips)

7.2.3. Bridge Nos. 202/46, 202/47 and 202/47A Walls Recommendations

The bridges will have a series of short retaining walls at the corners of the new structures, designated Walls A, B, C, D, F, G, H and J. These walls will extend the length of the new approach slabs, and will be approximately 21 ft in length. They will be designed to retain the new bridge approach fill adjacent to wetlands. The maximum exposed wall height will be between 1 and 8 feet. It is our understanding that cantilever soldier pile walls are the preferred wall type due to the soft soil conditions encountered at the sites.

At Bridge 202/46, Walls A, B, C and D will be constructed. Walls 13 and 14 will tie into Walls A and D, respectively. Either MSE or a cantilever soldier pile walls are feasible for Walls A, B, C, or D. We have provided typical design sections for both options. Figure F-3 shows the typical section for a MSE wall design. Figure F-2 provides the typical earth pressure diagram for a soldier pile wall design.

At Bridge 202/47, Walls F, H, G, and J will be constructed at this site at the NW and SW corners of Pier 1, the SE corner of Pier 2, and the NE corner of Pier 3, respectively. Walls 18 and 19 will tie into Walls F and H. A soldier pile wall is preferred at this site. Figure F-10 provides the typical earth pressure diagram for a soldier pile wall design.

In order to satisfy global stability, the tips of the soldier piles should be at/or below elevation 57 ft at Bridge 202/46 and elevation 68 ft at Bridges 202/47 and 202/47A. A soldier pile wall requires timber lagging to be placed between the H-pile members. This lagging should not extend below the water table elevation. It is our understanding that the Evans Creek channel will have riprap slope protection in order to prevent scour of the new bridge footings. If the lagging is required below the water table, dewatering may be required and larger cofferdams may be required to construct both the soldier pile wall and the new bridge footings in the dry.

The soldier piles may be subject to downdrag loads at both bridge sites. Table 4 can be used to estimate downdrag loads on the piles.

7.3. Bridge Approach Slabs

The Design Manual Section 1120.03(6) requires all bridges to have approach slabs unless approval for their deletion has been given. Typically for Geotechnical reasons, we consider approach slabs not desirable if there is excessive settlement (8 inches or more), long-term settlement (2 inches or more of post construction settlement), or low fill heights (10 ft or less). However, approach slabs may still be necessary based on non-geotechnical issues such as design speed, average daily traffic, and temperature.

In our previous recommendations, we were concerned with potential differential settlement and long-term creep settlement occurring between the existing fill shoulder and the new fill shoulder. We recommend mitigating the potential differential settlement of the approach fills by delaying the construction of the approach slabs until after Phase 2 construction. If the approach slab is constructed immediately after the fill is placed, the slab could be displaced as settlement occurs and/or a void could be created below a section of the slab. We understand that part of the load of the approach slabs will be bearing on soldier pile walls.

Based on the criteria given above, approach slabs can be constructed. However, we expect that over time, patching may be necessary at the bridge approach slabs.

7.4. Retaining Wall Recommendations

We were requested to provide geotechnical design recommendations for 21 wall locations with a total wall length of 12,950 LF. Eleven walls are within the Redmond City limits. Wall 12 is within the Samamish City limits. Walls 13 through 21 are within King County. Each of these public entities has their own wall type preference. For example, the City of Redmond is resistant to using Mechanically Stabilized Earth (MSE) walls that require reinforcing behind the walls. Other constraints such as limited right-of-way, limited construction space, and environmental constraints limit the selection of feasible wall types.

Of the 21 walls on this project, seven Rock Walls are proposed (Walls 2, 3, 4, 5, 7, segments of 6 and 8), one concrete L-wall (Wall 1B), one Permanent Sheet Pile wall (Wall 20), four Combination Soldier Pile/Noise Walls (Walls 1A, 8, 9, and 10), five Soldier Pile Walls (portions of Wall 6, Walls 11, 16A, and 17), Wall 16B will be designed as a tieback wall, Wall 12 will be designed as a combination, Soldier Pile/Tieback Wall/ Soil Nail Wall, and six MSE walls (Walls 13, 14, 15, 18, 19, and 21) are planned. The layout of the wall alignment and generalized geologic profiles are provided in Appendix A.

Recommendations for each wall are discussed below. Many of these walls will require special designs from Bridge and Structures, Geotechnical Division, or both.

7.4.1. Wall 1 - Station 143+31 to Station 153+79, Right

Wall 1 will be constructed in a fill section between SR 202 and an existing development, Jefferson at Marymoor Park. This wall will support an 11-foot wide green strip and sidewalk. Two existing rock walls were constructed in Jefferson at Marymoor Park development adjacent to the existing SR 202 right-of-way. The first rock wall is located between approximate Stations 144+27 and 147+00. The second rock wall is located between approximate Stations 148+70 and 159+95. The wall is divided into two different design segments. The first segment will be a combination noise wall/retaining wall between Stations 143+31 and 147+70. The second segment will be between Stations 147+70 and 153+79. The preferred option for this segment is a special designed concrete L-wall.

7.4.1.1. Wall 1A - Station 143+31 to Station 147+70

A combination noise wall/retaining wall is planned within 3 ft of right-of-way and 10 ft behind an existing rockery. This wall will support an 11 ft wide green strip and sidewalk. The noise wall will have between 7 ft and 20 ft of exposed wall face in front of the wall, and retain between 2.5 ft and 11 ft of compacted fill. A special design soldier pile/noise wall is the preferred option at this site. We have provided two typical earth pressure diagrams, Figures G-1 and G-2 for the design of this wall. Based on the preliminary site data, the wall shafts will be placed behind the geotextile reinforcement zone for the existing rock wall.

7.4.1.2. Wall 1B - Station 147+70 to Station 153+79

Wall 1B will retain between 4 ft and 7 ft of fill. We looked at two different design options. The first option consisted of a 14 ft wide green strip and sidewalk along SR 202. This option would require a soldier pile wall that is within 5 ft of an existing 10 ft high rock wall with geotextile reinforcement. The soldier pile shafts would be placed in the geotextile reinforcement zone. The wall will have to be designed to support both the new fill height and the rock wall fill height. This total height was estimated to be 15 ft. We provided a typical earth pressure diagram to Bridge and Structures in May 2004, Figure G-3, to further evaluate this design option.

On June 30, 2004, we received a request from the Region Design Office to evaluate a second option. The second option consists of setting back the face of the wall approximately 7.5 ft from the right-of-way line between Stations 147+70 and 153+79. This section would result in a 3 ft wide green strip and 5 ft wide sidewalk adjacent to SR 202.

This option consists of constructing either a concrete L-wall or a Standard Plan wall Type 1 or 2 with barrier at the heel of the existing rock wall geotextile reinforcement. This wall option is feasible. By moving the wall back from the right-of-way line, the stresses on the geotextile reinforcement are reduced to an acceptable level. The global stability of both wall systems is acceptable. It is our understanding that the second option is preferred.

It is our understanding that Bridge and Structures has provided a special design for a concrete reinforced L-wall based on load factored design (LFD) methods. Figure G-4 provides a typical design section behind the existing rock wall. We recommend limiting the maximum allowable bearing pressure behind the existing rock wall to 2 ksf. The wall outside the limits of the rock wall can be design to an allowable bearing pressure of 6 ksf provided that the wall meets the minimum embedment requirements on slopes as outlined in the Bridge Design Manual.

7.4.2. Walls 2, 3, 4 and 5 - Rock Walls, Left

A series of four rock walls are planned long the left side of SR 202. These walls will be in a cut into an embankment slope or berm with a 2H: 1V back slope. The soils consist of medium dense, silty sands and gravels. The first wall, Wall 5, will be built in a cut adjacent to the right-of way boundary between Stations 150+65 and 153+10, 47 ft Left. Wall 5 will have a maximum exposed wall face of 5 ft. Wall 2 will be built between Stations 168+84 to 169+32, 47.5 ft to 53 ft Left. Wall 2 will have a maximum exposed wall face of 6 ft. Wall 3 will be built between Stations 169+99 to 170+47, 47.5 ft to 53.5 ft Left. Wall 3 will have a maximum exposed wall face of 7 ft. Wall 4 will be built between Stations 172+34 to 173+00, 47.5 ft to 53 ft Left. Wall 4 will have a maximum exposed wall face of 5 ft.

Walls 2, 3, and 4 will be constructed in an existing berm between SR 202 and the Archstone Communities development. These rock walls are planned to provide access for proposed utility vaults. Due to the short time frame of request for a retaining wall design, which we received on September 17, 2004, a detailed geotechnical investigation was not performed at this site. We are basing our design recommendations on previous field investigations in the area of the site.

The wall should be stable provided that the construction requirements for rock walls in Sections 8-24 and 9-13.7 of the Standard Specifications are followed. Figure G-5 provides the typical design section for a 6 ft exposed face rock wall in a cut.

7.4.3. Wall 6 - Station 153+46 to 185th Station 12+10, Left

Wall 6 will be in a cut supporting in dense to very dense, silty sand with gravel to silty gravel with sand and cobbles. A combination rock wall and soldier pile wall is planned along the length of the wall. The wall is needed to retain the existing embankment and provide a bus pullout area.

The wall can be divided into three segments. The first segment will be a rock wall with a maximum exposed wall face of 6.5 ft with a 2H: 1V back slope between Wall 6 Stations 10+00 and 13+62.3, see Figure G-6B. The second segment is planed as a soldier pile wall between Wall 6 Stations 13+62.3 and 15+54.3, see Figure G-6. The third segment will be built in a cut adjacent to the right-of way boundary with a maximum exposed wall face of 5.5 ft and flat back slope between Wall 6 Stations 15+54.3 and 16+07.

For design segments 1 and 3, Figure G-6B provides the typical design section for rock wall in a cut. The wall should be stable provided that the construction requirements for rock walls in Sections 8-24 and 9-13.7 of the Standard Specifications are followed.

Design segment 2 is planned as a soldier pile wall in a cut. Figure G-6 provides the typical earth pressure diagram to design the soldier pile wall section. As an alternate design to the soldier pile, we looked at a rock wall design at this location. Figure G-6A provides a rock walk design for this segment. The main disadvantage of this wall type at this location is the limited right-of-way. We understand that the soldier pile wall design is preferred.

7.4.4. Wall 7 - 185th Station 11+01 to 185th Station 13+50, 29.5, Right

Wall 7 will be in a cut section supported in dense sandy silt to silty sand. It is our understanding that the 185th Ave NE roadway grade will be lowered up to 5 ft, which will require raising an existing rock wall a similar height. The Region Design Office has requested a rock wall be used at this location. The existing wall will be replaced with a wall approximately 9.3 ft in exposed wall height. Figure G-7 provides the typical design section for rock wall in a cut. The wall should be stable provided that the construction requirements for rock walls in Section 8-24 are followed.

7.4.5. Wall 8 - Station 160+03.5 to Station 168+65, Left

Wall 8 will be a combination wall in a cut. The Region Design Office has proposed a rock wall for the first 24 ft. The rock wall will match the existing wall at this site, and will have between 3.5 ft and 7 ft of exposed wall face. The remaining wall length will be a special designed soldier pile/noise wall combination. The wall will be a cut adjacent to the Archstone Communities development with limit space between the wall and right-of-way and buried underground utilities. SR 202 will provide a widening for a turn out lane to 185th Ave. NE and a new sidewalk.

The wall can be divided into three design segments, 160+03.5 and 160+27.5, 160+27.5 and 164+40, and 164+40 and 168+65. The first segment is between Stations 160+03.5 and 160+27.5, 59.5 ft Left. A rock wall in a cut is planned for this section with an exposed wall height of 7 ft. Figure G-7 provides the typical design section for rock wall in a cut. The wall should be stable provided that the construction requirements for rock walls in Section 8-24 are followed.

Wall segment 2 is between Stations 160+27+27.5 and 164+40. This segment will be a combination soldier pile/noise wall with a combined height of approximately 15.5 ft. The wall in this segment will be retaining medium dense to loose, silty sand to sandy silt, which varies in height between 1.5 ft and 12 ft of exposed wall face. Figure G-8 provides the typical earth pressures to design this section of wall.

Wall segment 3 is between Stations 164+40 and 168+65. This segment will be a combination soldier pile/noise wall with a combined height of approximately 20.5 ft. The wall in this segment will be retaining dense to very dense poorly graded sand with silt and gravel, which varies in height up to 7 ft of exposed wall face. Figure G-9 provides the typical earth pressures to design this section of wall.

There are 13 possible conflict points with existing water, buried power, sewer, and storm drains. The plans show buried sewer and storm drains between Stations 160+80 and 161+00, Stations 162+90 and 163+00, Station 164+35, and Stations 168+40 and 168+55. Waterlines were reported to be in the vicinity of Stations 163+10, 164+20, and 168+10. Buried power is shown in the vicinity of Stations 164+00 and 168+10. The buried utilities may need to be relocated to avoid the soldier piles.

7.4.6. Wall 9 - Station 161+80 to Station 167+19.44, Right

Wall 9 will be primarily in a fill, and will be a combination retaining wall and noise wall up to 26 ft in height. The wall can be subdivided into two design segments. The first segment will be between Stations 161+80 and 165+55, 47.5 ft Right. Along this segment, a soldier pile/noise wall is preferred. The wall will retain up to 10.5 ft of new fill. Figure G-10 provides the typical earth pressures to design this section of wall.

The second segment between Stations 165+55 and 167+19.5 will be built in a minor cut/fill section that is less than ± 2.5 ft in height. A standard plan noise wall may work for this minor cut/fill section using Type 4 or Type 5 with a shaft or a trench depth of D_1. If special designed noise wall is required, the design soil parameters provided in Figure G-10 may be used. Bridge and Structures should be consulted if this option is acceptable for this segment.

7.4.7. Wall 10 - Station 168+00 to 187th Station 8+30, Right

Wall 10 will be primarily in a cut, and be a combination retaining wall/noise wall that has between 12 ft and 14 ft of exposed wall face. The wall can be divided into three design segments. The first segment will be between Stations 168+80 and 171+75, 47.5 ft Right. This segment of wall will be built on a berm that separates SR 202 and the English Grove Condominium Association, and will be within 5 ft of the right-of-way line. A soldier pile/noise wall is preferred for this segment. The wall will retain up to 8 ft of loose, silty sand with gravel (fill). Figure G-11 provides the typical earth pressures to design this section of wall.

The second segment is between Stations 171+75 and 177+00. This segment will be built in a minor cut section that is less than 4 ft of exposed wall face. Only the section between Stations 173+10 and 175+05, has cuts that range between 2.5 ft and 4 ft of exposed wall height. A standard plan noise wall may work for this minor cut/fill section using Type 1 or Type 4 with a shaft or a trench depth of D_1. If special designed noise wall is required, the design soil parameters provided in Figure G-11 may be used.

Design segment 3 extends from Station 177+00 to the end of the wall, or approximately 295 ft. This segment will be in a cut that will retain up to 9 ft of loose silty sand with gravel (fill). Figure G-12 provides the typical earth pressures to design this section of wall.

There are five possible conflict points with existing water, buried power and storm drains. If a Standard Plan Type 1 Noise barrier, trench foot type, noise wall is built, the waterline at Wall Station 13+66 may need to be relocated. The water line will be approximately three feet below the final ground surface.

7.4.8. Wall 11 - Station 173+00 to Station 178+10, Left

Wall 11 will be in a cut. The foundation soils change in the vicinity of Station 175+50. The wall will be built in a berm from Stations 173+00 and 175+50. The wall then transitions in a cut in native soils with up to 15 ft of fill that consists of loose to medium dense, silty sand to poorly graded sand with silt. The native soil consists of medium dense, silty sand and stiff to very stiff, elastic silt to sandy, silty, clay. Two options were considered for this wall. One option would be to build a rock wall between Stations 173+00 and 175+41 and a soldier pile wall between Stations 175+41 and 178+10. The preferred option would be to build a soldier pile wall for the entire length of the wall. The soldier pile wall is needed to support the fill underlain by stiff silt and clay. In addition, the soldier pile wall will have to support an existing Keystone Wall located behind the proposed wall between Stations 177+60 and 178+10. It is our understanding that the second option was chosen for design.

For design, the wall was divided into three design segments. The wall will have a maximum height of approximately 8 ft for all design segments. The first segment will be between Stations 173+00 and 175+50, 47.5 ft Left, first 250 ft. This segment of wall will be built in a berm that separates SR 202 and the Archstone Communities development. We have provided design recommendations for both options. Figure G-5 provides a typical design rock wall section. Figures G-13, G-14 and G-15 provide the typical earth pressure diagram for a soldier pile wall design, for each segment of the three segments.

7.4.9. Wall 12 - Station 181+24 to Station 188+12, Right

Wall 12 is primarily a cut wall above the eastbound lanes of SR 202 between 187th Ave. NE and 192nd Drive NE (SR 202 Station 181+24.00, 50 ft right to Station 188+11.42, 59.5 ft right). We understand Wall 12 will have a maximum height of 31 ft. The wall will be a combination wall consisting of soldier pile walls, soldier pile tieback walls, and a soil nail wall.

We recommend three wall types to support the planed cut and fill for Wall 12, a soldier pile wall, soldier pile/tieback wall, and a soil nail wall. The fill situation and loose soil conditions at the beginning of the wall, Wall Stations 10+00 to 10+78, necessitate using a soldier pile wall. The granular nature of the soils at the end of the wall, Wall Stations 15+57.16 to 16+88.92, also necessitates the use of a soldier pile wall. For the middle section of the wall, Wall Stations 10+78 to 15+57.16, we are recommending a soil nail wall. A soldier pile/tieback wall is also a feasible wall type for the middle section of the wall. However, tieback walls are generally much more expensive than soil nail walls.

Earth pressure diagrams for both the soldier pile wall and tieback wall designs are provided in Figures G-16, G-17, and G-18 in Appendix G. We recommend that these walls be embedded a

minimum of five feet below the finished grade in front of the wall to provide an adequate factor of safety for overall stability. Tiebacks will likely be required for wall sections over 15 ft in height. Between Wall Stations 10+00 to 10+78, the ultimate load transferred from the bond length to the soil is estimated to be 6 kips/foot. For design, 70 kips may be used to estimate the allowable tieback anchor capacity. Between Wall Stations 10+78 and 16+89, the ultimate load transferred from the bond length to the soil is estimated to be 11 kips/foot. For design, 130 kips may be used to estimate the allowable tieback anchor capacity. The unbonded length, or "no load zone," should be determined based on Figure 9.4.3-4a in the *Bridge Design Manual, M 23-50.*

Our design recommendations for the soil nail wall are provided in Figures G-19 through G-23 in Appendix G. The soil nail portion of Wall 12 was designed in accordance with the Federal Highway Administration Manual for Design and Construction Monitoring of Soil Nail Walls, November 1966 (Publication Number FHWA-SA-(6-069)). Our analysis included overall stability, minimum nail size, minimum nail spacing, and nail embedment requirements.

Our wall design assumed the following:

1. Epoxy coated Grade 60 bars (minimum).
2. Minimum ultimate nail head strength of 30 kips and an allowable nail head strength of 20 kips.
3. Minimum 6-inch diameter nail bore holes.
4. Minimum 1-inch of grout cover for corrosion protection.

Verification testing is required. Test nails will be considered sacrificial. The tests are needed to verify the contractor's installation methods, hole diameter, and design assumptions. The test nails should be located between the proposed permanent nails to avoid disruption of the soils surrounding the permanent nails. We recommend a minimum of three verification tests at the following locations:

Test Nail	Location (Station Range)	Elevation (ft)	Design Load Transfer ((DLT), (lbs/ft)
1	10+84 to 10+90	130	2000
2	11+64 to 11+84	128	2000
3	13+33 to 13+83	117	2000

The Bridge and Structures Office will complete the design of the soil nail portion of Wall 12 and provide your office with plan sheets and specifications to be included in the PS&E.

Drainage structures and pipes located behind the soil nail portion of Wall 12 should be installed prior to construction of the wall. Soil nails adjacent to drainage structures may be splayed outwards to miss the drainage structure. All drainage features should be clearly shown on the wall plans and profiles.

The proposed soil nails in the vicinity of SR 202 Station 183+31.40 (Wall Station 12+07.4) will conflict with adjacent nails due to the angle point in the wall alignment. We recommend the nails between SR 202 Stations 183+31.4 and 183+81.4 (Wall Stations 12+07.4 and 12+58.9) be placed perpendicular to the roadway centerline as shown in Figure G-23. The nails will be

installed at approximately a 14-degree skew to the wall face. The nail lengths should be increased so the nail embedment perpendicular to the wall face meets the recommended minimum nail length of the other soil nails along the wall face.

7.4.10. Walls 13 and 14

Fill walls will be constructed on both sides of SR 202. Wall 13 is located between Stations 186+80 and 200+69, 46 ft to 48 ft Left, and Wall 14 is located between Stations 191+20 and 200+69, 46 ft Right. We recommend a welded wire Mechanically Stabilized Earth (MSE) wall, at both locations.

For design, Wall 13 can be divided into two segments. The first segment is between Stations 186+80, 48 ft Left, and 191+50, 46 ft Left, Wall 13 Stations 10+00 and 14+70. The second segment is between Stations 191+50 and 200+69, Wall 13 Stations 14+70 and 23+95. Wall 13 transitions from medium dense, granular soils to the Evans Creek flood plain, which is underlain by up to 20 ft of saturated, soft to medium stiff sandy silt and lean clay. The foundation soil type changes between approximate Stations 191+50 and 192+50. The low-lying area floods annually. The wall will retain new fill with an Ecology Embankment between the wall and the new roadway shoulder. The material in the reinforcement zone needs to be free draining material, such as gravel borrow or shoulder ballast.

Wall 14 will be constructed in the existing fill slope and will retain a sliver fill up to 3 ft in thickness. The wall encroaches the Evans Creek flood plain at approximate Station 192+20. The wall will have an exposed wall face between 3 ft and 5 ft in height. Wall 14 should use a similar design as Wall 13, segment 2.

The first 520 ft of Wall 13 will be constructed on medium dense, silty sand with gravel. The wall varies in height up to 13 ft. The wall should be stable with a minimum reinforcement length (B) of 0.7 H. Please note that MSE walls typically have a minimum width of 8 ft for constructability reasons. Settlement should occur as the fill is placed for this section of wall. The Post-construction settlement should be negligible.

As part of the Welded Wire GSP, specific design information needs to be included. The following design information should be inserted in the GSP for Wall 13 between Wall Stations 10+00 and 14+70, left:

Soil Properties	Wall Backfill	Retained Soil	Foundation Soil
Unit Weight (pcf)	130	125	125
Friction Angle (degrees)	36°	34°	34°
Cohesion (psf)	0	0	0
		AASHTO Load Group I	AASHTO Load Group VII
Allowable Bearing Capacity		6 ksf	12 ksf
Peak Ground Acceleration Coefficient (g)		0	0.34

The minimum base width for the first segment should be B = 0.7 H as shown in Figure G-23.

The second segment for Wall 13 and Wall 14 is between approximate Stations 191+50 and 200+69, Wall 13 Stations 14+70 and 23+95, and Wall 14 Stations 10+00 and 19+55. Settlement issues were previously discussed under embankment construction Section 7.1.1 of this report.

The minimum base width of the second segment should be B = 0.8 H as shown in Figure G-24.

As part of the Welded Wire GSP, specific design information needs to be included. The following design information should be inserted in the GSP for Wall 13 between Wall Stations 14+70 and 23+95, Left, and Wall 14, right:

Soil Properties	Wall Backfill	Retained Soil	Foundation Soil
Unit Weight (pcf)	130	125	110
Friction Angle (degrees)	36°	34°	30°
Cohesion (psf)	0	0	0
		AASHTO Load Group I	AASHTO Load Group VII
Allowable Bearing Capacity		3.5 ksf	6.5 ksf
Peak Ground Acceleration Coefficient (g)		0	0.29

7.4.11. Wall 15 - Station 203+70 to Station 223+65, Right

Wall 15 is primarily a fill wall below the eastbound lanes of SR 202 between 196th Avenue NE e and 204th Place. Wall 15 can be subdivided in to two design sections, Walls 15A and 15B. We recommend a flexible MSE wall for both walls such as a welded wire wall or a permanent geosynthetic wall. Currently WSDOT has only one pre-approved welded-wire wall, the Hilfiker Welded Wire Retaining wall. If a concrete face is required, a welded wire wall or a permanent geosynthetic wall can be built and a concrete face can be attached after the wall has settled. For a permanent geosynthetic wall, such as Standard Plan D-3, we recommend that a Type 1 design be used, providing the minimum wall reinforcing length requirements in Figure G-26 are met.

Structural earth walls that utilize precast concrete panels are also feasible at the wall site provided ground improvement is utilized between Stations 210+50 and 223+65. The potential drawback of walls with precast concrete panels is that differential settlement could deform and crack the panels at the Wall 15B location.

Ground improvement may be used to improve the foundation bearing capacity and accelerate the fill settlement under Wall 15B as previously discussed under embankment construction Section 7.1.2 of this report. This would allow for quicker construction by reducing the long-term and short-term settlement as discussed below. Ground improvement is not required if the welded wire or Geosynthetic Standard Plan wall options are selected.

7.4.11.1. Wall 15A - Station 203+70 to Station 210+50

The first section, Wall 15A, is between Station 203+50 and Station 210+50 (680 LF) in a fill with a maximum exposed wall height of 10 ft. The soils consist primarily of medium dense, silty sand with gravel. The minimum wall reinforcing length is provided in Figure G-26.

Settlement should occur as the fill is placed. Total settlement within Wall 15A limits should be less than 1.0 inch. Long-term settlement should be negligible.

As part of the Welded Wire GSP, specific design information needs to be included. The following design information should be inserted in the GSP:

Soil Properties	Wall Backfill	Retained Soil	Foundation Soil
Unit Weight (pcf)	130	125	125
Friction Angle (degrees)	36°	34°	34°
Cohesion (psf)	0	0	0
		AASHTO Load Group I	AASHTO Load Group VII
Allowable Bearing Capacity		6 ksf	9 ksf
Peak Ground Acceleration Coefficient (g)		0	0.34

If the geosynthetic wall is selected, we recommend using a Standard Plan D-3 Type 1 wall. The geosynthetic wall should be considered a Class 1 structure. The wall class should be indicated in the contract.

7.4.11.2. Wall 15B - Station 210+50 to Station 223+65

Wall 15B will have exposed wall heights up to 21 ft. This section of the wall will be constructed on soft compressible soil at the base of an ancient landslide and adjacent to wetlands along Evans Creek. The existing roadway fill will provide a working platform for most of the Wall 15B alignment.

Between Station 210+50 to Station 217+00, we recommend soil stabilizing geotextile be placed under the footprint of Wall 15B, as shown in Figure G-27. We expect soft fine gained soil will be encountered, and a separation barrier is needed to prevent contamination of the gravel borrow to be used at this site. In order to provide a firm base for the proposed retaining wall, the area under the wall will require up to 2 ft of over-excavation and backfilling of quarry spalls. The top of the quarry spalls should to be choked with Shoulder Ballast or Crushed Surfacing Base Course in order to fill the voids between the quarry spalls. Further, we recommend limiting the use of vibrating compaction equipment for the bottom 2 ft of the new fill. Vibratory compaction equipment could create pumping soils at the base of the fill.

We have determined MSE walls can be constructed to the full design height and maintain overall stability. The wall will have a minimum global factor of safety of 1.15 assuming no strength

gain of the underlying soil and provided the minimum wall reinforcing lengths provided in Figure G-26 are used. Some strength gain of the underlying soft soils is required for the final designed factor of safety to be achieved. A factor of safety greater than 1.33 will be achieved as the settlement occurs. We estimate that strength gain will be achieved within 9 months after the placement of Phase 2 fill.

Settlement will vary under the width of the new embankment due to varying thickness and soil density of the underlying soils. During Stage 1 construction (north side of SR 202), the temporary wall settlement will vary along the alignment. We estimate that between 0.5 and 6.5 inches of settlement will occur along the temporary wall face. We expect most settlement will occur between Stations 217+00 and 224+00. The majority of the settlement should occur within the first 6 months after the fill is placed. Settlement should be near complete by the time that the Stage 2 fill is placed.

During Phase 2 construction, settlement issues were previously discussed under embankment construction Section 7.1.2 of this report.

We recommend that the current amended Standard Specifications, Sections 6-13, 6-14, and 6-18, and GSPs for construction of the Structural Earth Walls and/or the Permanent Geosynthetic Walls. As part of the Welded Wire GSP, specific design information needs to be included. The following design information should be inserted in the GSP for 15B:

Soil Properties	**Wall Backfill**	**Retained Soil**	**Foundation Soil**
Unit Weight (pcf)	130	125	110
Friction Angle (degrees)	36°	34°	30°
Cohesion (psf)	0	0	0
		AASHTO Load Group I	AASHTO Load Group VII
Allowable Bearing Capacity		4.2 ksf	6.5 ksf
Peak Ground Acceleration Coefficient (g)		0	0.29

7.4.12. Wall 16 - Station 211+70 to Station 218+80, 65 ft, Left

Wall 16 is primarily a cut wall above the westbound lanes of SR 202 between NE 55th Place and 204th Place NE (Station 211+70.0, 60.5 ft Left to Station 218+80.0, 59.33 ft Left). Wall 16 can be subdivided in to two design sections, Walls 16A and 16B. The wall will be in a cut across the toe of an ancient landslide. Two landslide scarps appear to intersect the wall in the vicinity of Stations 215+50 and 219+00. A layout of the wall alignment and the generalized geologic profile are provided in Figures A-20, A-21, and A-22 in Appendix A, respectively.

7.4.12.1. Wall 16A - Station 211+70 to Station 215+50

Wall 16A is between approximate Station 211+70 and Station 215+50 (359 LF), with a maximum design wall height of 10 ft. The soil behind this section of wall consists of medium stiff to stiff, silt and clay. We recommend a soldier pile wall at this location. Figure G-28 provides the typical earth pressures to design this section of wall. We recommend that the wall be embedded a minimum of six feet below the finished grade in front of the wall to provide an adequate factor of safety for overall stability.

7.4.12.2. Wall 16B - Station 215+50 to Station 218+80

Wall 16B will be between approximate Stations 215+50 and 218+80 (312 LF)] with a maximum design wall height of 15 ft. The wall will be constructed in medium stiff, clay and silt (landside debris) with lenses of loose, silty sand with gravel. We recommend a tieback wall at this location.

Wall 16B is not designed to mitigate a remobilization of a deep-seated landslide during an extreme earthquake event, which we consider to have very low probability of occurring. If such a major event does occur, Walls 16B and 15B will likely be moved toward the Evans Creek valley along with SR 202. Wall 16B as designed will withstand minor to moderate earthquakes that are more likely to occur within the design life for the wall. To design the wall for the extreme event would be costly and very difficult to do.

We have divided Wall 16B in to two design segments. Earth pressure diagrams for both the segments are provided in Figures G-29 and G-30. We recommend that these walls be embedded a minimum of 12 feet below the finished grade in front of the wall to provide an adequate factor of safety for overall stability. Tiebacks should be founded in very stiff, lean clay to silt. The ultimate load transferred from the bond length to the soil is estimated to be 3 kips/foot. For design, 35 kips may be used to estimate the allowable tieback anchor capacity. The unbonded length, or "no load zone," should be determined based on Figures G-29 and G-30, and is estimated to be 30 ft and 55 ft respectively. These values are than the values shown in Figure 9.4.3-4a in the *Bridge Design Manual, M 23-50.*

The verification tests should be located between the proposed permanent anchor locations to avoid disruption of the soils surrounding the permanent anchors. We recommend a minimum of two verification tests at the following locations:

Test Anchor	Location (Wall Station Range)	Elevation (ft)	Allowable Anchor Loads (kips)
1	15+50 to 15+90	95	35
2	16+30 to 16+70	100	35

7.4.13. Wall 17 - Station 225+50, 70.7 ft, Left, to Station 228+15, 63.6 ft, Left

Wall 17 is in a cut section. The wall is located east of 204th Place NE between Stations 225+50 (70.7 ft Lt.) and 228+15 (63.6 ft Lt.) in an ancient landslide debris. Wet Vault No. 2 will be

located between 10 ft and 14 ft in front of the wall face between SR 202 Stations 226+25 and 228+25. The bottom of the vault will likely be 12 ft below the bottom of Wall 17. The wall is needed to protect private property at this location.

We recommend Wall 17 consist of a soldier pile wall. This wall will have a design height up to 10.5 feet. Figure G-31 provides a typical earth pressure diagram for this wall. In our earth pressure diagram, residual soil parameters were used since the cut will be made at the base of an ancient landslide. A resistance factor of 1.0 should be applied to nominal passive earth pressures on this figure (per LRFD Bridge Design Specifications).

In order to satisfy global stability, a minimum tip elevation will be required for this wall. The tip of the soldier piles should be at or below elevation 60.5 ft within the limits of Wet Vault No. 2. Wet Vault 2 is located between Stations 226+22 and 228+23. The first 55 ft of Wall 17 is outside the limits of the Wet Vault No. 2 with the design wall height is 6 ft or less. The minimum tip requirement may be waved between Wall 17 Stations 10+00 and 10+55.

7.4.14. Walls 18 and 19

Fill walls will be constructed on both sides of SR 202. Wall 18 is located between Stations 228+60 and 200+69, 39 ft to 55.5 ft Left, and Wall 19 is located between Stations 233+25 and 237+39, 40.8 to 47 ft Right. Wall 18 will have an exposed wall face between 6 ft and 13 ft, and Wall 19 will have an exposed wall face between 7 ft and 10 ft. We recommend a welded wire MSE wall, at both locations. A fill wall will be constructed across the Evans Creek flood plain, and is underlain by up to 20 ft of saturated, soft to medium stiff sandy silt with organics and lean clay. The minimum base width of both walls should be B = 0.8 H, as shown in Figure G-24.

Settlement issues were previously discussed under embankment construction Section 7.1.3 of this report.

As part of the Welded Wire GSP, specific design information needs to be included. The following design information should be inserted in the GSP for Walls 18 and 19:

Soil Properties	Wall Backfill	Retained Soil	Foundation Soil
Unit Weight (pcf)	130	125	110
Friction Angle (degrees)	36°	34°	30°
Cohesion (psf)	0	0	0
		AASHTO Load Group I	AASHTO Load Group VII
Allowable Bearing Capacity		3.5 ksf	6.5 ksf
Peak Ground Acceleration Coefficient (g)		0	0.29

7.4.15. Wall 20 - Station 238+30 to Station 239+45, Left

We recommended a Permanent "Sheet Pile" Wall be constructed along the new centerline. Wall 20 is planned along the south side of the half bridge. This wall will be approximately 115 ft long, and will retain the existing embankment. During Stage 1 the wall will provide a temporary shoring wall. In addition, Wall 20 needs to be designed to provide a permanent wall to retain up to 5 ft of fill placed during Stage 2 construction, and to provide protection the embankment from potential scour caused by Evans Creek. The exposed wall face will be approximately 7 ft. The design wall height will be approximately 15 ft.

We have provided two possible earth pressure diagrams for Wall 20. Figure G-32 assumes an active earth pressure case, and Figure G-33 assumes an at-rest earth pressure. The at-rest case assumes that the top of sheet pile is restrained from moving horizontally. Bridge and Structures needs to evaluate the wall and determine which case is applicable.

We estimate up to 1.5 inches of additional settlement will occur as Phase 2 fill is applied behind the walls. Total (primary) settlement will take between 1 and 6 months to be complete. Long-term settlement should be negligible after the primary settlement has been completed.

7.4.16. Wall 21 - Station 244+55 to Station 245+49, Left

Wall 21 will be a fill wall that will have up to 5 ft of exposed wall face between Stations 244+55.29, 43 ft Left, and 245+49, 41 ft Left. The wall will be constructed adjacent to the Evans Creek flood plain. We expect to encounter wet loose sandy silt with gravel or medium dense well-graded sand with gravel based on TH-2-01. We recommend a welded wire MSE wall at this location similar to Walls 13, 14, 18, and 19.

Wall 21 is similar to Wall 14, and therefore we recommend using the same design as Wall 14. The fill-ins for the GSP should be same as those for Wall 14. If soft soils are encountered, we recommend using the typical section shown in Figure G-24. This wall will have minor sliver fills up to 5 feet in height. Settlement should occur as the fill is placed. Post-construction will be negligible.

7.4.17. Temporary Walls

It is our understanding that a number of temporary retaining walls are required to retain the first phase fill along the traveled lanes of SR 202. Eventually, these walls will be buried in the fill. The new roadway grade will be raised between 196th Avenue NE and Sahalee Way NE between approximate Stations 208+50 and 244+00, 2315 ft. Starting at Station 208+50, the roadway fill will rise above the existing roadway grade approximately 15 ft at Station 212+00. We expect that the temporary wall will have an exposed wall face of 15 ft between Stations 212+00 and 220+00. The grade will fall to approximately 6 ft in height in the vicinity of 204th Place NE at Station 224+50. The grade continues to fall to approximately 5 ft in height at Station 206+50. A five-foot difference in grade will be maintained for another 1350 ft before the new grade matches the existing grade near the vicinity of Sahalee Way NE.

A temporary geosynthetic wall is the preferred wall type for these walls. For a temporary geosynthetic wall, we recommend that the GSP 300101.FR8 be used. Figure G-34 provides the

typical design section for a temporary geosynthetic wall. As part of the GSP, specific design information needs to be included. The minimum geosynthetic tensile strength requirements have been revised to meet the current standards. The following design information should be inserted in the GSP:

Wall Location	**Vertical Spacing of Reinforcement Layers**	**Reinforcement Layer Distance from Top of Wall**	**Minimum Ultimate Tensile Strength Based on ASTM D4595**	**Minimum Base Width**
To be determined by the Design Office.	0.75 ft 1.0 ft 1.25 ft	0 – 5 ft 0 – 5 ft 0 – 5 ft	845 lbs/ft 1,130 lbs/ft 1,400 lbs/ft	5.0 ft 5.0 ft 5.0 ft
To be determined by the Design Office.	0.75 ft 1.0 ft 1.25 ft	5 – 10 ft 5 – 10 ft 5 – 10 ft	1,270 lbs/ft 1,690 lbs/ft 2,120 lbs/ft	8.0 ft 8.0 ft 8.0 ft
To be determined by the Design Office.	0.75 ft 1.0 ft 1.25 ft	10 – 15 ft 10 – 15 ft 10 – 15 ft	1,800 lbs/ft 2,400 lbs/ft 3,000 lbs/ft	11.0 ft 11.0 ft 11.0 ft

Settlement of this wall will vary along its length due to the placement of new fill. We expect this settlement will vary up to 2 inches for wall heights of 5 ft exposed wall face. At the tallest wall sections, approximately 15 ft of exposed wall face, we expect settlements will be approximately 5 inches. The walls should be stable, since this wall system will allow large amount of deflection due to settlement.

7.4.18. MSE Walls Design Requirements

For MSE Wall designs, the following items should be considered in preparation of contract documents:

1. The wall should be placed on a level foundation in the direction perpendicular to the wall face.
2. Leveling pads and bottoms of MSE walls should be located above the water table, which will require using a minimum embedment of 1.0 ft below the final ground surface for an MSE walls on the Evans Creek floodplain. Examples of this design are shown in Figures G-24 and G-27 in Appendix G. MSE walls in the embankments slope and where ground water is not a problem should have a minimum embedment of 2.0 ft below the final ground surface or 10% of the total wall height, which ever is greater. Examples of this design are shown in Figures G-23 and G-26 in Appendix G.
3. MSE walls should have a wall face batter no steeper than 48V:1H.

4. The base width of the MSE walls should not be less than 70 percent of the wall height to insure overall stability. Figures G-24 and G-26 provide the minimum wall reinforcing length for the walls. Greater wall base widths may be needed to provide adequate overturning, sliding, and internal stability for the walls.
5. Backfill within the reinforced wall prism should consist of gravel borrow.
6. Properly compacted (Method C) gravel borrow or select borrow may be used behind the reinforced wall prism depending on weather conditions during construction. Common Borrow is not recommended.

Detailed wall plans and design for the propriety wall options will not be developed until after the contract is awarded. Therefore, a wall plan and profile should be prepared for each wall showing the following (Region responsibility):

1. A profile showing neat-line top and bottom of wall as well as final ground line in front of and final ground line at the back of wall facing at the top of wall.
2. The backfill slope above the wall should be shown in the Plans.
3. Typical cross-section.
4. Generic details for the desired appurtenances, drainage requirements, guardrail post, and/or traffic barrier, which need to be included in the contract PS&E for proprietary walls. Locations of potential conflicts with the soil reinforcement must be shown.
5. A geotextile wrapped under-drain should be provided at the base of the wall behind the reinforced zone. This should be shown in the plans. Figure G-26 shows a typical example.
6. The drainage pipe needs to daylight through the MSE wall or at a sag (low) point or at a maximum 300 ft interval along the wall face.

Ideally the catch basins, grate inlets, signal foundations should be located outside the reinforced backfill zone of the MSE walls to avoid interference with the soil reinforcement. However, in some cases it may not be possible to do this. In those cases where conflict with the reinforcement cannot be avoided, the location(s) and dimensions of the reinforcement obstruction(s) relative to the wall must be clearly indicated on the retaining wall plans. The Region should contact the Bridge and Structures Office to determine the limits on the size and location of the obstructions for which pre-approved wall details and designs are available, and regarding what generic details should be provided in the plans.

Once the detailed wall plans and designs are available as shop drawings after the contract is awarded, the Bridge and Structures Office will need to review and approve the wall shop drawings and calculations.

We recommend using the current amended Standard Specifications, Sections 6-13, 6-14, and 6-18, and GSPs for construction of the Structural Earth Walls and/or the Permanent Geosynthetic Walls. The GSPs for construction of both walls are included as attachments in Appendix H. This information is also available on the WSDOT web site under http://www.wsdot.wa.gov/eesc/design/projectdev/gsp. The Welded Wire information is found under 13.ap6, 13.gb6, 1302.gb6, 130201.gb6, 1303.gb6, 13031.gb6, 130302.gb6, and

13030201.fb6. The Geosynetic Wall information is found under 14.ap6, 14.gb6, 1402.gb6, 14021.gb6, and 140201.fb6. The Shotcrete Facing information is found under 18.ap6, 18.gb6, 1802.gb6, and 180201.gb6.

7.5. Wet Vaults 1 and 2

Two large vaults are planed to capture and treat the roadway run-off water. Wet Vault 1 is currently planned between Stations 209+54 and 210+85 left of the existing SR 202 roadway section, as shown in Figure A-14. Wet Vault 2 is located in front of Wall 17 between Stations 226+22 and 228+23, as shown in Figure A-23. Wet Vault 1and Wet Vault 2 will be built under Phase 1.

7.5.1. Wet Vault 1

Wet Vault 1 will be located between Stations 209+54 and 210+85 left of the existing SR 202 roadway section as shown in Figure A-18. The vault will have the approximate inside dimensions of 127 ft long by 30 ft wide by 7 ft high. The floor of the vault is at elevation 70.0 ft. The new roadway grade will be raised between 3 ft and 6 ft above the existing SR 202 grade. We estimate there will be between 3 ft and 7 ft of cover over the vault.

The footing of the vault can be designed for an allowable bearing pressure of up to 6 ksf. We estimate a total settlement of less than one inch will occur beneath the footing. The majority of the settlement should occur as the fill is placed. Post construction settlement should be negligible.

At-rest earth pressures acting on the vault are provided in Figure F-11. We assumed the worst case to be at high ground water with empty vaults. The weight of the vault and fill cover will provide adequate load to prevent uplift of the vault due to buoyancy forces.

7.5.2. Wet Vault 2

Wet Vault 2 is located between Stations 226+22 and 228+23 between 19 ft and 52 ft Lt. of the new centerline. Wet Vault 2 will be located in front of and below Wall 17 as shown in Figures A-23 and A-24. The distance between the vault and Wall 17 varies between 11.5 ft and 18 ft. The vault will have the approximate inside dimensions of 198 ft long by 30 ft wide by 7 ft high. The floor of the vault is at elevation 75.0 ft. The new roadway grade will be raised between 5 ft and 6 ft above the existing SR 202 grade. We estimate that there will be between 2.5 ft and 5 ft of cover over the vault.

The footing of the vault can be designed for an allowable bearing pressure of up to 6 ksf. We estimate a total settlement will be 1.5 inches under the vault. The majority of the settlement should occur as the fill is placed. Post construction settlement should be negligible.

Typical at-rest earth pressures acting on the vault are provided in Figure F-12. We assumed the worst case to be at high ground water with empty vaults. The weight of the vault and fill cover will provide adequate load to prevent uplift of the vault due to buoyancy forces.

To maintain the existing roadway shoulder and the existing hillside, temporary shoring will be required for Wet Vault 2. It is our understanding that Bridge and Structures will provide a

temporary shoring design for the contract plans, due the special foundation resulting from the limited space requirements and poor foundation soils at this location. Figure F-13 provides a typical earth pressure diagram for this wall. We assumed a braced shoring wall constructed during low ground water conditions.

7.6. Wetland Mitigation Sites and Detention Pond Sites

The final design will have two detention ponds sites and three wetland mitigation sites. Detention Pond – 1A is located in the NE quadrant of the intersection of 188th Ave NE and SR-202, Stations 180+40 and 181+40, left. A floodplain mitigation area is planed north of SR-202 between approximate Stations 183+00 and 190+60. The Tuptle Wetland Mitigation site is located south of Evans Creek at in the SE quadrant of the intersection of 196th Ave NE and SR 202 between approximate Stations 205+00 and 210+00, right. Detention Pond – 4 and Happy Valley Wetland Mitigation Site is located in the SW quadrant of the intersection of Sahalee Way and SR 202 between approximate Stations 235+00 and 244+00, right. The plan view with test hole locations are shown in Figures E-1, E-2, and E-3.

7.6.1. Detention Pond –1A at the Junction of 188th Ave. NE and SR 202

It is our understanding that an existing detention pond will be enlarged to treat the roadway runoff. An observation well (piezometer) was installed in the bank of the existing detention pond to monitor the variations in the ground water, H-30-02. Water level readings were taken between July 2002 and July 2004. Ground water is shown on the boring logs, and is presented in Appendix E.

Based on the Washington State Department of Ecology Storm Water Management Manual for Western Washington, August 2001 (DOE Manual), the pond site will not meet the criteria for infiltration basins. The DOE Manual requires a minimum of $\geq$ 5 ft above the seasonal high-water mark. A separation of 3 feet may be considered if the ground water mounding analysis, volumetric receptor capacity, and the design of the overflow and/or bypass structures are judged by the site professional to be adequate to prevent overtopping and meet the site suitability criteria specified in the DOE Manual.

The soil at the bottom of the detention pond is variable. The bottom of the pond will be in silty sand layer underlain by poorly graded to well-graded sand with silt and gravel. As observed in H-30-02, the existing ground water varies between elevations 101 ft and 102.6 ft. We understand that the based of the pond will be at elevation of 103 ft. Between late November and April the pond will be filled with roadside runoff to a design elevation 113 ft. The long-term soil infiltration rate at or below the pond basin will be virtually zero.

It is our understanding that mixing untreated surface runoff with the ground water is an environmental concern. Special treatment may be required such as pond liners or other treatment of the bottom and sides of the ponds. It is our understanding that a clay liner will be used at this site.

The maximum cut will be approximately 5 ft below the existing ground line. The recommended cut slopes for a lined pond should be 3H:1V or flatter.

7.6.2. Floodplain Mitigation Area in the vicinity of 192nd Drive NE

In order to create additional wetland adjacent to the current Evans Creek Floodplain, the grade will be lowered north of the right-of-way boundary. As planned, the ground will be excavated at a 3H:1V slope to a finished grade of approximate elevation 68 ft. Ground water is defined by three test holes drilled in the vicinity of the proposed site, H-46-04, H47-04, and H-48-04. Observation wells (piezometers) were installed in the test hole locations in May 2004. Ground water is shown on the boring log and present in Appendix E.

Based the limited ground water information, the bottom of the new cut will be at/or above the existing water table. The cut should be in medium dense, silty sand to dense, poorly graded sand with gravel, and the slopes should be stable at 3H:1V.

7.6.3. Turple Mitigation Site

Turple Wetland Mitigation soils are defined in test holes H-7-00, H-8-00, H-9-00, H-11-00, and H-8-02. The holes are located in an ancient glacial stream channel. The soils consist of 10 ft to 15 ft of very loose to loose silty sand to sandy silt with gravel underlain by an approximately 10 ft thick layer of silt. Water bearing sands and gravels are found between 20 ft and 30 ft below the ground surface.

Based on the preliminary hydraulic plan, the bottom of the wetland mitigation site will be at approximate elevation 74 ft, which is at or below the water table for 7 months of the year. The maximum cut will be approximately 7 ft along the southern boundary of the site. The embankment slopes should be stable at 2.5H: 1V or flatter.

The base of the pond elevation will be located in the silty sand to sandy silt layer. Infiltration in the **vertical** direction will be minimal. The seepage rate **horizontally** will vary between 0.15 and 3.0 in/hr for this soil layer. We recommend 1.0 in/hr as a characteristic rate through the soil above the water table.

In general, the ground water may vary as much as 5 feet between approximate elevations 77.5 ft and 72.5 ft. Ground water is shown on the boring log and present in Appendix E.

7.6.4. Detention Pond 4 and Happy Valley Mitigation Site

The proposed Detention Pond 4 site will be located in well-graded stream channel deposits. Based on the pond elevation of 79 ft, the bottom of the pond may be flooded between late in November to March. The pond needs to be designed as a retention pond since the long-term soil infiltration rate at or below the pond basin will be virtually zero.

Based on the preliminary hydraulic plan, the basin of the wetland mitigation site will be at approximate elevation 79 ft, which is at or above the observed high water elevation. The maximum cut will be approximately 14 ft along the southern boundary of the site. The stability of the embankment slopes will depend on soils encountered. The embankment slopes constructed in granular fill may be stable at 2H: 1V or flatter. The areas that border the southern boundary along NE 50th Street and Sahalee Way NE consist of landslide debris that has run out onto the stream channel deposits consisting of soft to very stiff silt to lean clay with sand. The landslide debris should be stable at 3H: 1V or flatter slopes.

The seepage rate **horizontally** will vary between 2 and 100 in/hr for the well-graded sands and gravels with cobbles and boulders layer adjacent to the current Evans Creek channel. We recommend 10 in/hr as a characteristic rate through the soil above the water table.

In general, the ground water may vary as much as 4 feet between approximate elevations 76 ft and 80 ft. Ground water is shown on the boring logs and present in Appendix E.

8. Construction Considerations

8.1. Generalized Construction Considerations

The new Stage 2 alignment covers approximately 2.18 miles of SR 202. There are several generalized construction considerations that will require attention during design and construction of this project. In order to maintain traffic, the construction will be done in multiple phases. The first phase will be to build north of the existing SR 202 alignment. Staging the construction sequence will be an important item.

The generalized construction considerations are as follows:

1. At several locations, the contractor will have a limited area to perform his work. Within the city limits of Redmond and Sammamish there is limited space between the existing roadway and the new right-of-way. Several of the new retaining walls will be built adjacent to the right-of-way boundary. Construction easements may be required to construct the new walls. In the areas adjacent to Evans Creek and associated wetland areas in King County, the hydraulic permits limit the work to be outside the normal high water elevation of Evans Creek, which varies along the alignment. The current Evans Creek channel will be maintained.

2. Construction of fill on very loose to soft soil can present a potential construction problem. Compaction will be difficult to achieve in the bottom layers of the fill. The native undisturbed soil has adequate strength to provide the required bearing capacity. However, the movement of heavy construction equipment over the site can degrade the foundation subgrade. We recommend that soil stabilizing geotextile be placed under the footprint of the new fill located in wetland areas to address this problem. The soil stabilization geotextile properties are covered in Section 9-33 (Table 3) in the Standard Specifications. Further, we recommend limiting the use of vibratory compaction equipment in the bottom two feet of the new fill. Vibratory compaction equipment could create pumping soils at the base of the fill.

3. There is a potential for cracks to develop along the new shoulder of the road and in the embankment due to the expected settlement of the new fill. The cracks should be filled in order to prevent surface water from seeping into the embankment. Large cracks in the slope can be filled with sand. The cracks in the road should be repaired according to Section 5-04.3(5) C Crack Sealing in the Standard Specifications. We recommend delaying the paving operations for a minimum length of time after fill placement to allow for settlement to occur. During Stage 1, we recommend a minimum of 60 days delay period behind Walls 13 and 18. With this length of time, we expect only one-half of the settlement will occur in these areas. During Stage 2, we recommend a minimum of 90 days behind Wall 19 and 9 months behind

Wall 15B before placing the final pavement lift.

The Project Office may want to consider including an item for crack sealing or specifically making crack sealing incidental to paving in the Special Provisions.

4. Major new fills should be monitored for settlement. We recommend using survey hubs in areas of greatest fill thickness between Stations 225+00 and 238+30. We recommend using a vibrating wire liquid settlement indicating device for Wall 15 B, Stage 2 fill. Specific areas to be monitored are along the shoulders. The hubs should be placed a minimum of 50 ft apart. The guidance for monitoring the hubs is provided in Section 8.1.4 Settlement Monitoring. The reference TBM should be placed away from areas of new fill to prevent damaged during construction and so it will not be affected by new fill settlement.
5. Based on the conditions observed during drilling and test pit excavations, we anticipate cobbles and boulders will be encountered during drilling for the soldier piles, tiebacks, and soil nails for Walls 1, 6, 8, 9, 10, 11, and 12. Difficult drilling conditions should be expected in the dense and very dense soils.
6. During the excavation for the wall face, ground water seepage may be encountered near the toe of the cut of Walls 12 and 16.
7. The grading upslope of the new retaining walls should be completed prior to beginning excavation of the walls.
8. For Wall 12 soil nails, if the clearing and grubbing operations and/or preparatory grading lowers the ground surface to below the elevation of the top row nails, the location of the top row of nails will need to be adjusted. If nail locations need to be adjusted, we should be contacted so we can reevaluate our design and assist with their location.

8.2. Bridge Construction Considerations

There will two bridge replacements proposed for this project, Bridge Nos. 202/46 and 202/47 Replacements. In order to maintain traffic, the construction will be done in multiple stages. The first stage will be to build the northern half the new bridge. For Bridge 202/46, the Phase 1 widening will be approximately 36 ft north of the existing roadway. For Bridge 202/47, the Stage 1 widening will be between 20 ft and 25 ft north of the existing alignment.

At Bridge 202/46 site, construction of half the structure is feasible without additional phases. At Bridge 202/47 site multiple phases may be required. There is a seasonal "spring" that has to be relocated before any work can be done south of the existing SR 202 embankment. Wall 20 will be constructed down the centerline of the existing alignment. The remaining stages need to be determined prior to the final PS&E documents.

In a meeting on January 9, 2003, several scenarios were considered for the construction of Bridge 202/47. The construction concerns are based on how to construct the Pier 2 foundations, soldier pile walls at the bridge ends, and remove the existing bridge foundations without encroaching on the wetted perimeter of Evens Creek. The contractor needs room for his equipment and material in order to do his work. One option would be to construct a wider roadway section during Phase 1. The traffic can then be re-routed on the newly constructed roadway section while the remaining structures are constructed. This could be handled in one of

two ways. One way is to permanently widen the south side of the roadway in the vicinity of the bridge site by 4 ft. Another way would be to construct a temporary detour bridge to carry the extra traffic. This option is preferred from a geotechnical point of view.

Another option was to have nighttime road closures to perform the critical work, and re-route the traffic along NE 50th Street (Old Fall City to Redmond Road). The contactor could move his equipment and construct the new pier and wall foundations along the northern 22 ft of the new roadway section. This would allow the traffic to use the existing roadway during the daytime, the period of heaviest traffic volume. After this section is constructed, the east-bounded traffic can then be re-routed to the newly constructed section. One problem with this option is that the new Bridge 202/47 would be constructed in three sections.

A proposed third option is to construct a temporary construction trestle or working pad between Evans Creek and Pier 2. This option is considered questionable. There is limited amount of room in this area, and the temporary foundation may encroach on the normal high water elevation of Evans Creek.

Additional construction considerations that require attention during design and construction of the bridges are as follows:

1. The grade will be approximately 5 feet higher than the existing roadway elevation. A temporary fill wall needs to be one of the first orders of work. The wall is needed in order to support the elevated grade from the traveled section of the SR 202.
2. The approach fill section in the NW quadrant may be overbuilt approximately 5 inches to account for the expected settlement in this area.
3. Method B compaction should be used for the first 2 ft of fill, but vibratory equipment should not be allowed. Method B should be used throughout the remaining embankment as shown in Figure G-24.
4. Cofferdams will be required to construct the various segments of the new foundations. We do not anticipate problems in driving the sheet piling or H-piles in well-graded gravel with sand to a depth equal to the design height of the exposed face. During our field investigation, we did not encounter any cobbles and boulders in our test drilling. However, cobbles and boulders may be present in the medium dense to very dense gravel with sand soil units based on the geologic history of these soil units. The presence of cobbles and boulders could lead to hard driving conditions. The cobbles and boulders could also affect alignment of the sheets. If the design requires the sheets to be driven deeper than 15 feet, a special shoring plan may need to be developed.
5. We recommend that temporary casing be used in construction of soldier pile shafts full depth. The soft to medium stiff elastic silt and the medium dense well-graded gravel with sand have the potential to cave during construction. Hard driving conditions should be expected if cobbles and boulders are encountered in the well-graded gravel with sand soils.

8.3. Wet Vaults and Wall 17 Construction Considerations

In order to maintain traffic, the construction will be done in multiple phases. We expect that the vault construction will be one of the first orders of work during Phase 1 construction.

Wet Vault 1 will require a minimum of 10 ft of excavation, and Wet Vault 2 will require a minimum of 7 feet of excavation adjacent to the existing SR 202 roadway. After the vault is constructed, the final roadway grade can be built. There will be a temporary retaining wall constructed along the right side of the vault and the existing SR202 roadway. There appears to be enough room between the vaults and the front face of the temporary retaining wall so that a special designed retaining wall will not be required.

The staging of constructing both Wall 17 and Wet Vault 2 is an issue at this site. Both the wall and the vault will likely be constructed in ancient landside debris. The amount of exposed cut should be limited in order to minimize potential re-mobilization of the slide debris. We recommend limiting the excavation to minimize and ground movement. Since the vault is constructed in front and below the new retaining wall, we recommend that the vault be constructed first. It will difficult to design a cantilever soldier pile wall for both the design height and the full depth of the vault excavation.

Additional construction considerations that require attention during design and construction of this project are as follows:

1. The contractor will have a limited area to perform his work at Wall 17 and Wet Vault 2. The contractor will be confined between the existing SR 202 roadway and the existing hillside.
2. To maintain the existing roadway shoulder and the existing hillside, temporary shoring will be required for Wet Vault 2, and may be required for Wet Vault 1. A shoring system such as driven sheet piles is feasible at this site. Please note that the determination of the actual slope or shoring methods used for temporary excavation is the responsibility of the contractor.
3. We expect wet ground conditions to be encountered during construction. Depending on the time of the year, we expect between 1 to 5 feet of water in the bottom of the excavation at Wet Vault 1, and 2.5 to 6 feet of water in the bottom of the excavation for Wet Vault 2. We expect that the water is perched in one or more zones at this site, and may be controlled by dewatering methods. During periods of high ground water, cofferdams may be required to construct the foundations in the dry.
4. Compaction of the backfill below the water table will be difficult. We recommend using shot rock or quarry spalls for backfill below the water table. The top of the quarry spalls should be choked with Shoulder Ballast or Gravel Borrow before placing the remainder of the fill. The quarry spalls should provide an adequate base so that compaction of the fill can be achieved. Another option is to fill the excavation cavity with lean concrete.
5. Due to the medium stiff, sandy silty clay at the base of Wet Vault 2, a working platform will need to be constructed beneath the vault. The working platform should consist of a minimum of 2 feet of quarry spalls choked with Shoulder Ballast, as shown in Figure F-12.
6. At Wall 17, we recommend that temporary casing be used in the construction of soldier piles. The very loose to loose, soils have potential to cave during construction.

9. Closure

The test hole locations and subsurface profile sheets are in Appendix A. Logs of Test Borings undated information, laboratory test data are included in Appendices B and C, respectively. In

Appendices D and E, provided geology figures, wetland mitigation area, and ground water information. In Appendix F, we have provided the bridge and wet vault design figures. Wall and Miscellaneous Typical Figures are included in Appendix G. In Appendix H, we have included special provisions for Settlement Hubs, Settlement Plates and Settlement Indicating Devices.

Because the future performance and integrity of the structure and the geotechnical elements of this project will depend largely on proper PS&E preparation and diligent construction procedures, we recommend that the Geotechnical Division (GD) provide the following post-report services:

- The GD should prepare the Summary of Geotechnical Conditions to be included in the PS&E as an appendix. The summary should be prepared as part of the PS&E review process.
- The GD should review all construction plans and specifications to verify that the design criteria presented in this report have been interpreted correctly and properly integrated into the design.
- The GD should attend pre-construction conferences with the Construction Project Engineer and the Contractor to discuss important geotechnical construction issues.
- The GD or the Region Materials Engineer should observe all exposed subgrades for spread footings after completion of stripping and excavation to contract elevations. The GD or the Region Materials Engineer should confirm that suitable soil conditions have been reached and determine appropriate subgrade compaction methods.

10. Intended Report Use and Limitations

This report has been prepared to assist the Washington State Department of Transportation in the engineering design and construction of the subject project. It should not be used, in part or in whole for other purposes without contacting the E&EP Geotechnical Division for a review of applicability of such reuse. This report should be made available to prospective contractors for their information or factual data only and not as a warranty of ground conditions.

The conclusions and recommendations contained in this report are based on the Geotechnical Division's understanding of the project at the time that the report was written on site conditions that existed at the time of the field exploration. If significant changes to the nature, configuration, or scope of the project occur during the design process, the Geotechnical Division should be consulted to determine the impact of such changes on the recommendations and conclusions presented in this report.

Site exploration and testing describes subsurface conditions only at the sites of subsurface exploration and at intervals where samples are collected. These data are interpreted by members of the Geotechnical Division who render an opinion regarding the general subsurface conditions. The distribution, continuity, thickness, and characteristic of identified (and unidentified) subsurface materials may vary considerably from that indicated by the subsurface data. While nothing can be done to prevent such variability, the Geotechnical Division is prepared to work with the Design Team to reduce the impacts of variability on the project design, construction, and performance. Periodic geotechnical observation during construction may be beneficial in

this respect. This ongoing involvement of the Geotechnical Division throughout the design and project development process will also help to avoid shortcomings of project design or contract documents.

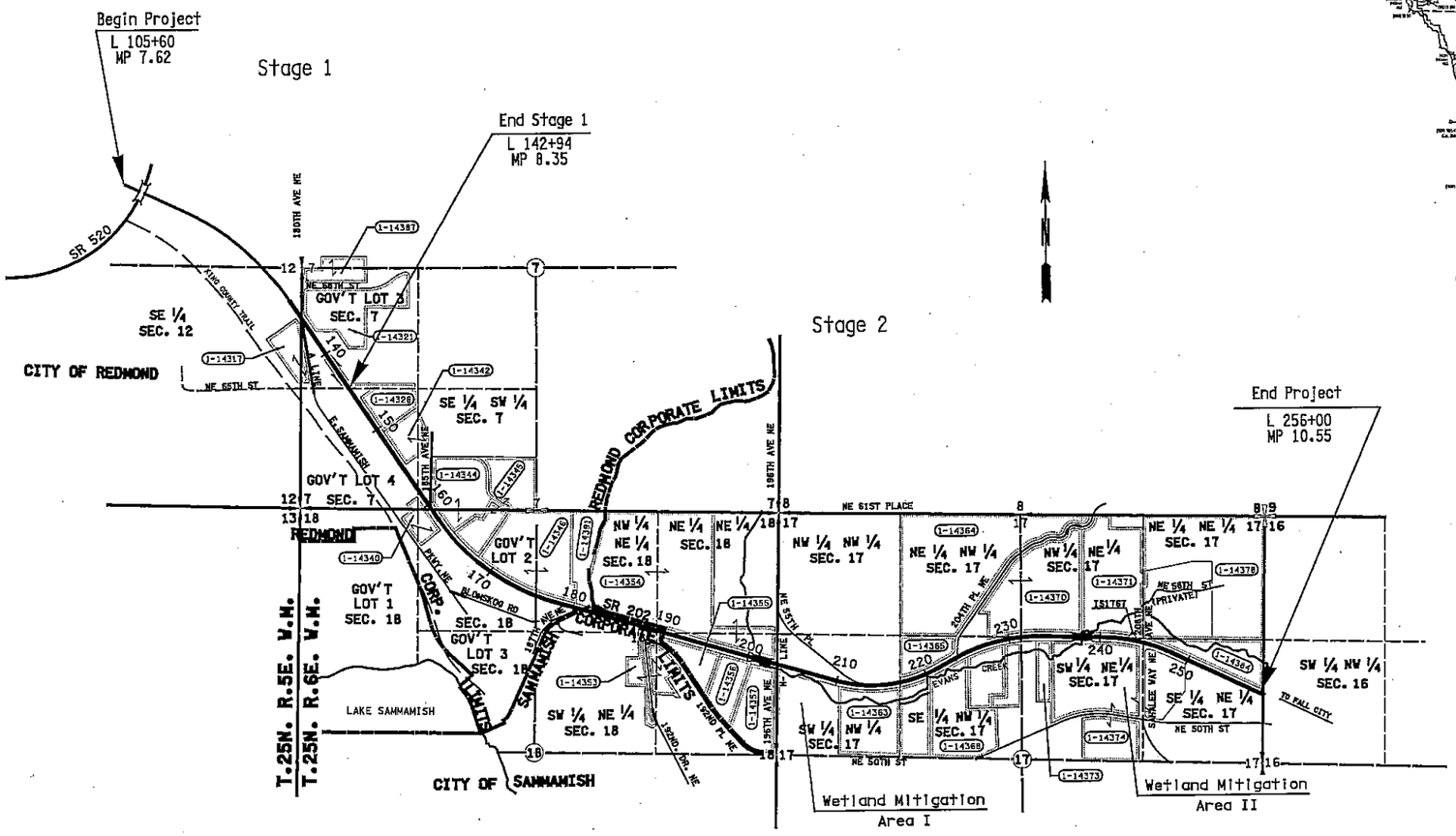
The conclusions and recommendations presented in this report assume that surface and subsurface conditions, as observed during field exploration activities, are representative of the site conditions throughout the project area. Accordingly, the Geotechnical Division and/or the Region Materials Engineer should be involved in the construction of the project in order to make appropriate observations and recommendations for alteration in design as appropriate.

APPENDIX - A

Figure A-1	Vicinity Map
Figure A-2	Site and Exploration Plan - Stations 110+00 to 116+50
Figure A-3	Site and Exploration Plan - Stations 116+50 to 125+50
Figure A-4	Site and Exploration Plan - Stations 125+50 to 140+50
Figure A-5	Site and Exploration Plan - Stations 140+50 to 155+50
Figure A-6	Soil Profile - Wall 1 Stations 143+31 to 147+00 Right
Figure A-7	Soil Profile - Wall 1 Stations 148+00 to 154+00 Right
Figure A-8	Site and Exploration Plan - Stations 155+50 to 169+00
Figure A-9	Soil Profile - Wall 8
Figure A-10	Site and Exploration Plan - Stations 169+00 to 182+50
Figure A-11	Soil Profile - Wall 11
Figure A-12	Site and Exploration Plan - Stations 182+50 to 196+00
Figure A-13	Soil Profile - Wall 12
Figure A-14	Site and Exploration Plan - Stations 196+00 to 208+00
Figure A-15	Soil Profile - Walls 13 and 14
Figure A-16	Bridge Plan View – Bridge 202/46 Replacement
Figure A-17	Soil Profile - Bridge 202/46 Replacement
Figure A-18	Site and Exploration Plan - Stations 208+00 to 220+00
Figure A-19	Soil Profile - Wall 15
Figure A-20	Soil Profile - Wall 16
Figure A-21	Soil Cross-Section - Station 213+70
Figure A-22	Soil Cross-Section - Station 217+00
Figure A-23	Site and Exploration Plan - Stations 220+00 to 234+00
Figure A-24	Soil Profile - Wall 17
Figure A-25	Site and Exploration Plan - Stations 234+00 to 248+00
Figure A-26	Soil Profile - Wall 18
Figure A-27	Bridge Plan View – Bridge 202/47 Replacement
Figure A-28	Soil Profile - Wall 20
Figure A-29	Soil Cross-Section - Station 238+60

APPENDIX - A

Figure A-1	Vicinity Map
Figure A-2	Site and Exploration Plan - Stations 110+00 to 116+50
Figure A-3	Site and Exploration Plan - Stations 116+50 to 125+50
Figure A-4	Site and Exploration Plan - Stations 125+50 to 140+50
Figure A-5	Site and Exploration Plan - Stations 140+50 to 155+50
Figure A-6	Soil Profile - Wall 1 Stations 143+31 to 147+00 Right
Figure A-7	Soil Profile - Wall 1 Stations 148+00 to 154+00 Right
Figure A-8	Site and Exploration Plan - Stations 155+50 to 169+00
Figure A-9	Soil Profile - Wall 8
Figure A-10	Site and Exploration Plan - Stations 169+00 to 182+50
Figure A-11	Soil Profile - Wall 11
Figure A-12	Site and Exploration Plan - Stations 182+50 to 196+00
Figure A-13	Soil Profile - Wall 12
Figure A-14	Site and Exploration Plan - Stations 196+00 to 208+00
Figure A-15	Soil Profile - Walls 13 and 14
Figure A-16	Bridge Plan View – Bridge 202/46 Replacement
Figure A-17	Soil Profile - Bridge 202/46 Replacement
Figure A-18	Site and Exploration Plan - Stations 208+00 to 220+00
Figure A-19	Soil Profile - Wall 15
Figure A-20	Soil Profile - Wall 16
Figure A-21	Soil Cross-Section - Station 213+70
Figure A-22	Soil Cross-Section - Station 217+00
Figure A-23	Site and Exploration Plan - Stations 220+00 to 234+00
Figure A-24	Soil Profile - Wall 17
Figure A-25	Site and Exploration Plan - Stations 234+00 to 248+00
Figure A-26	Soil Profile - Wall 18
Figure A-27	Bridge Plan View – Bridge 202/47 Replacement
Figure A-28	Soil Profile - Wall 20
Figure A-29	Soil Cross-Section - Station 238+60



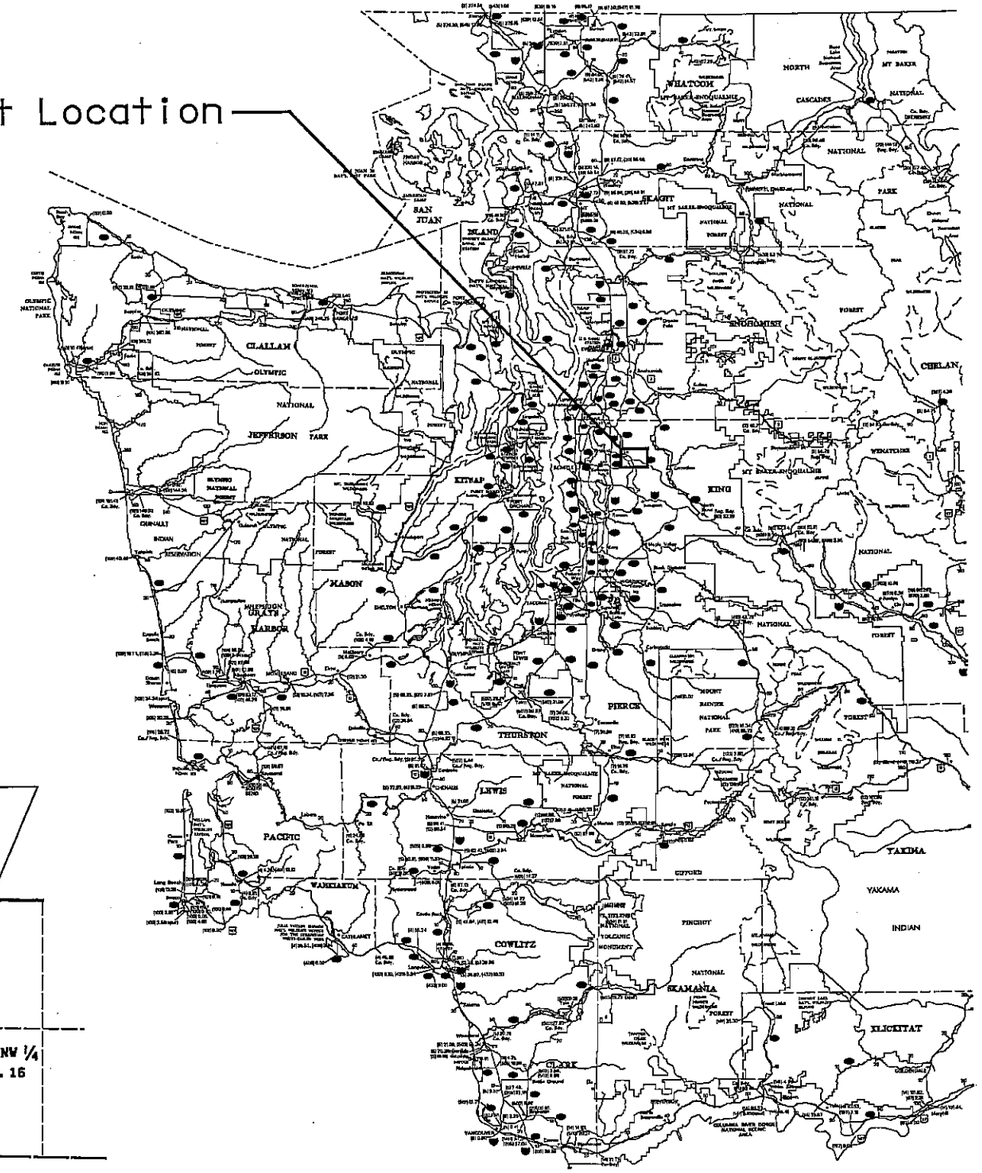


Figure A-1: Vicinity Map

JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR-520 to Sahalee Way NE
M.P. 7.75 to 10.53

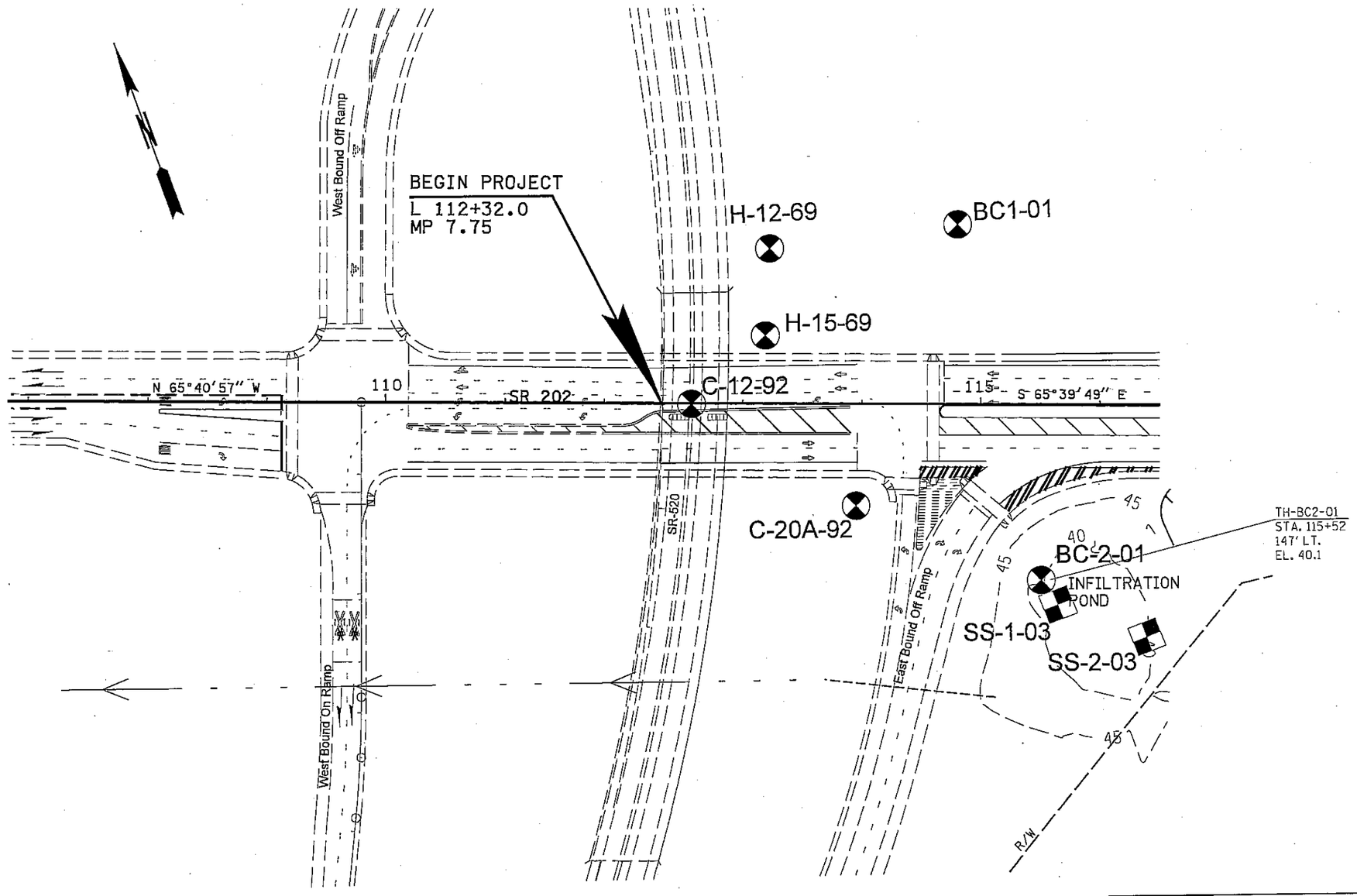
WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION

MATERIALS BRANCH

T. E. BAKER MATERIALS ENGINEER

DATE 6/2004
SCALE NOT TO SCALE VERT. HORIZ.
SHEET ____ OF ____
DRAWN BY DWG

...\VICINITY.dgn 10/21/2004 01:37:25 PM



RETAINING WALL

TEST HOLE LOCATION

HAND HOLE LOCATION

TEST PIT LOCATION

JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 TO SAHALEE WAY NE
STAGE 1 ROADWAY WIDENING

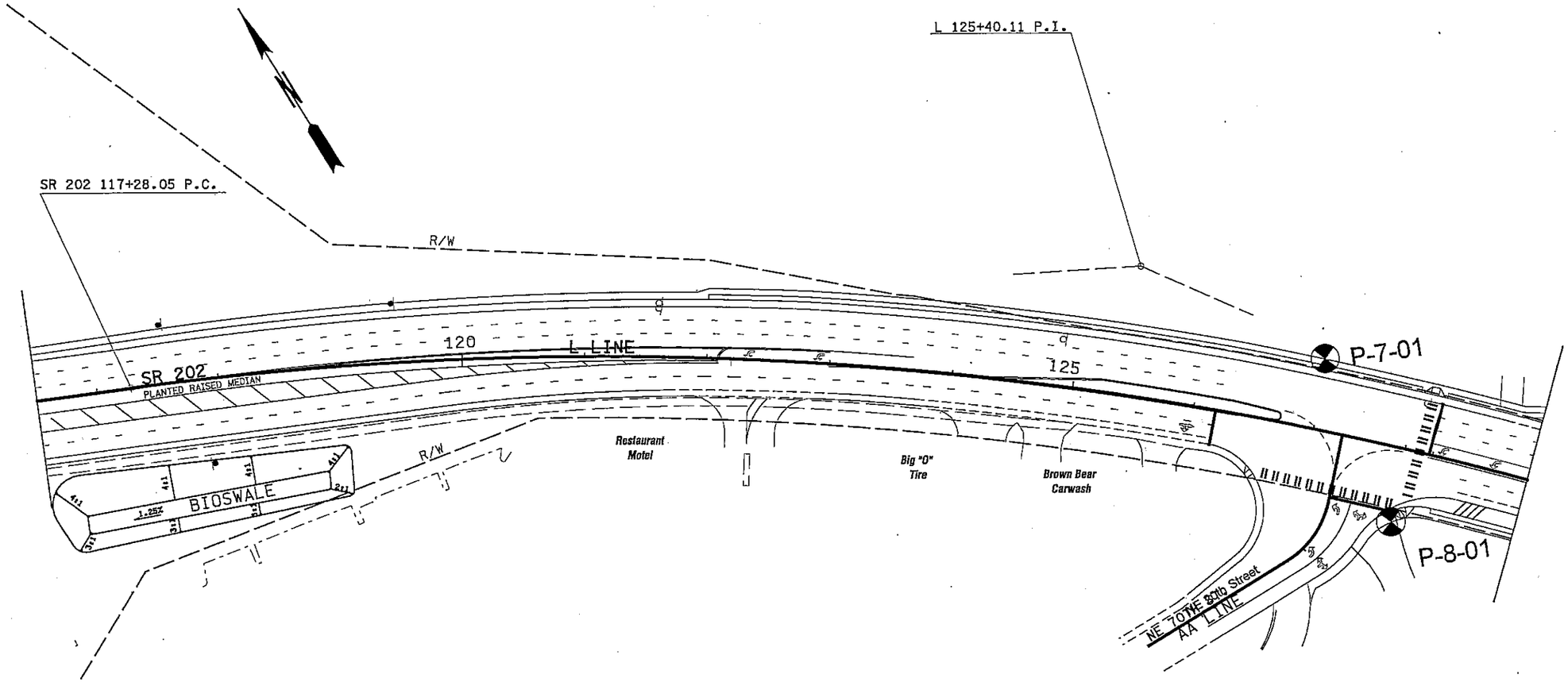
WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 6/2004
SCALE 1"=100' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-2: Site and Exploration Plan

...\004-21-04\202boringsheets.dgn 09/23/2004 11:03:39 AM

T.25N. R.5E. W.M.



RETAINING WALL

TEST HOLE LOCATION

HAND HOLE LOCATION

TEST PIT LOCATION

JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 TO SAHALEE WAY NE
STAGE 1 ROADWAY WIDENING

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 6/2004
SCALE 1"=100' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-3: Site and Exploration Plan

...\004-21-04\202boringsheets.dgn 09/23/2004 12:55:00 PM

T.25N. R.5E. W.M.
T.25N. R.6E. W.M.

A 13+99.070 P.T.
A 13+04.650 P.I.
A 12+10.089 P.C.
L 133+10.66 P.T.
15
N 00°11'03" W
180th AVE.
180TH AVE. NE
P-5-01
P-4-01
P-6-01
MW-5-99
TP-1-99
H-1-02
(BUS PULLOUT)
130
L LINE
135
50R
N 05°16'34" W 10
SR 202
A LINE
50 R
140
S 34°00'50" E
R/W
R/W
EAST LAKE SAMMAMISH PARKWAY NE
Lake Sammamish Pkwy NE
N 08°47'29" W
A 8+09.381 P.T.
A 7+48.118 P.I.
A 6+86.816 P.C.

RETAINING WALL
TEST HOLE LOCATION
HAND HOLE LOCATION
TEST PIT LOCATION

JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

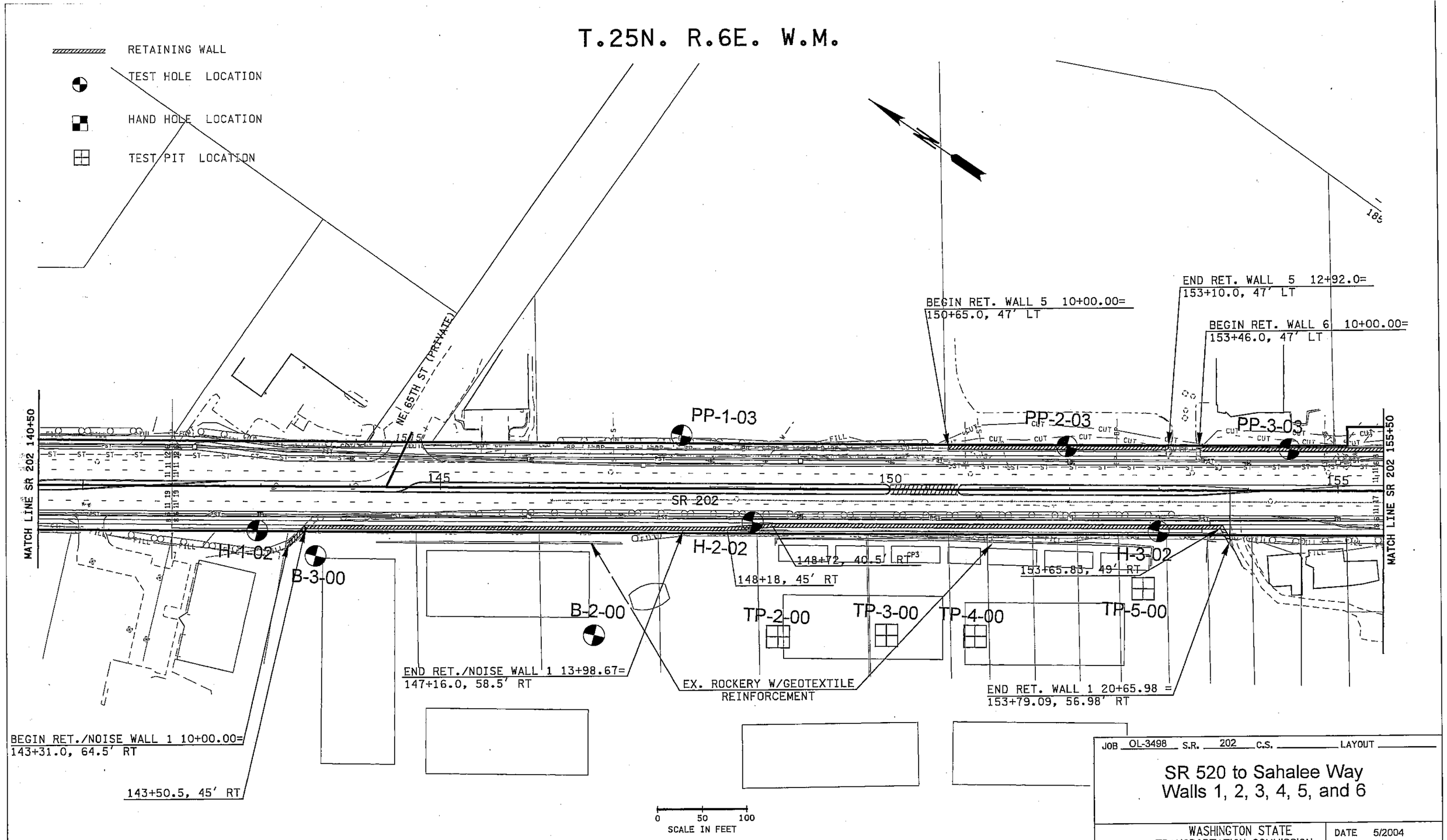
SR 520 TO SAHALEE WAY NE
STAGE 1 ROADWAY WIDENING

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 6/2004
SCALE 1"=100' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-4: Site and Exploration Plan

...\004-21-04\202boringsheets.dgn 09/23/2004 12:54:53 PM



JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 to Sahalee Way
Walls 1, 2, 3, 4, 5, and 6

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 5/2004
SCALE 1"=100' VERT.
1"=100' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-5: Site and Exploration Plan

...\WALL SHEETS\202wallsheets1.dgn 09/23/2004 12:52:01 PM

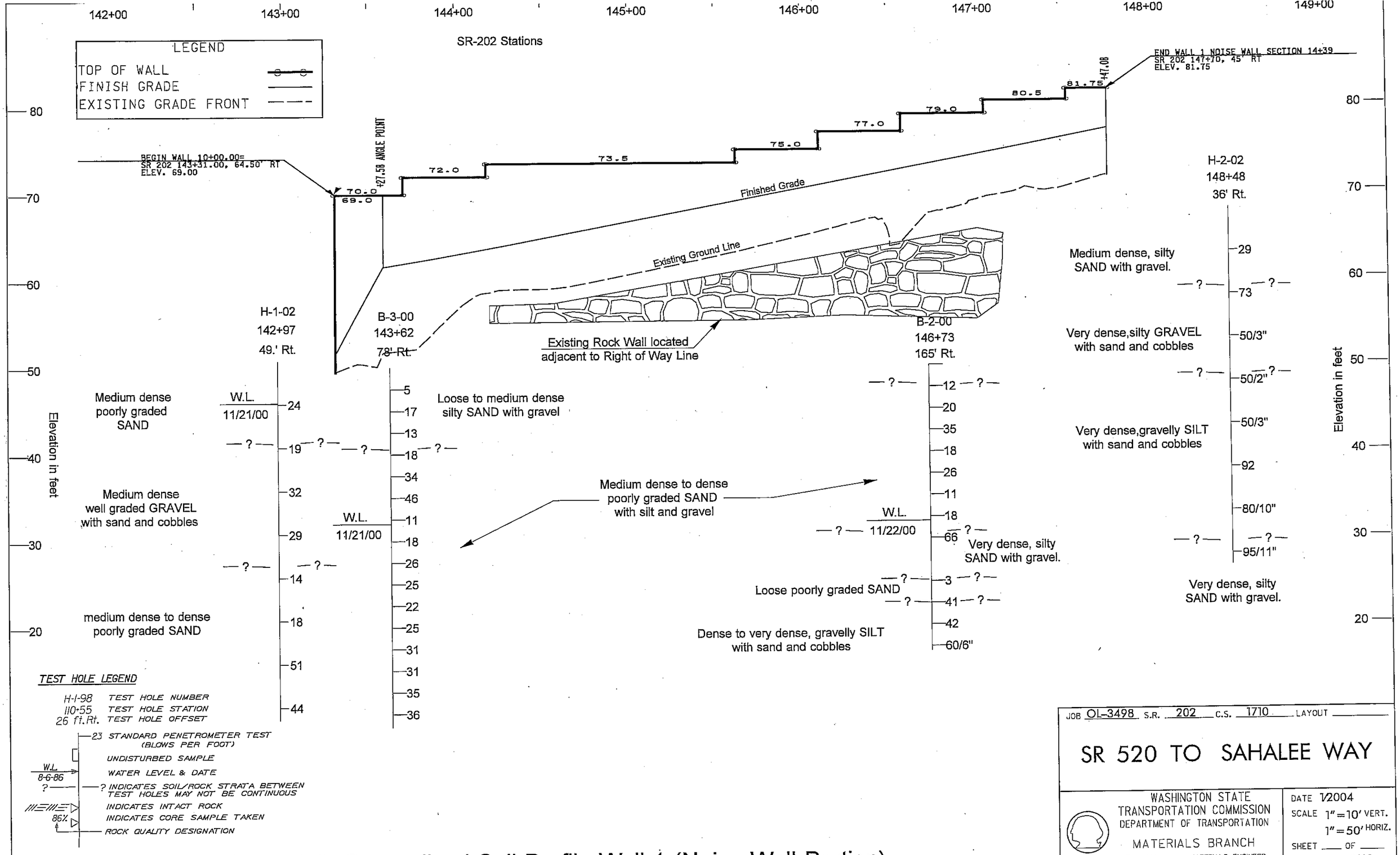


Figure A-6: Generalized Soil Profile Wall 1 (Noise Wall Portion)

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1" = 10' VERT.
1" = 50' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\Wall profiles\wall 1.dgn 09/23/2004 03:16:46 PM

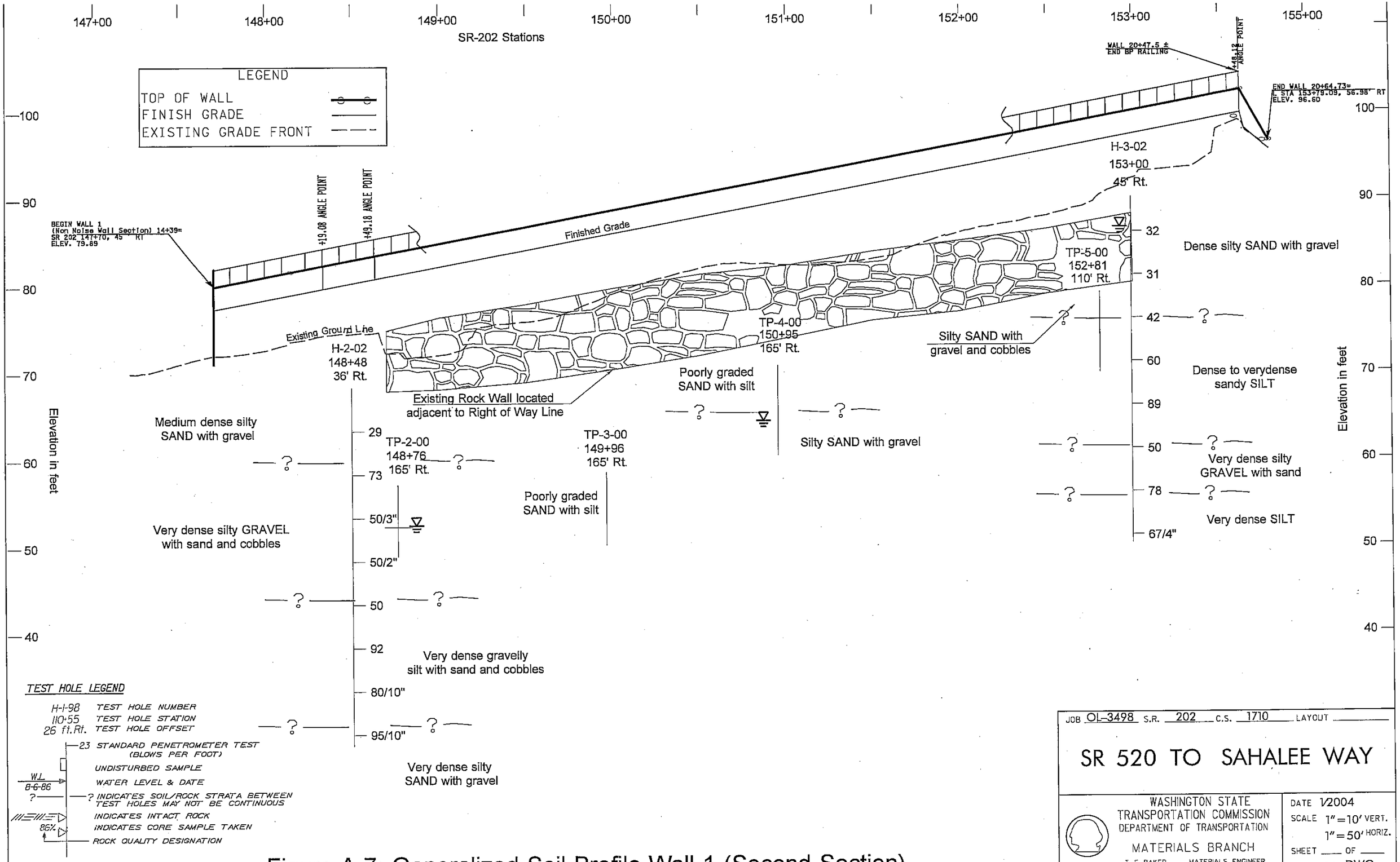


Figure A-7: Generalized Soil Profile Wall 1 (Second Section)

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

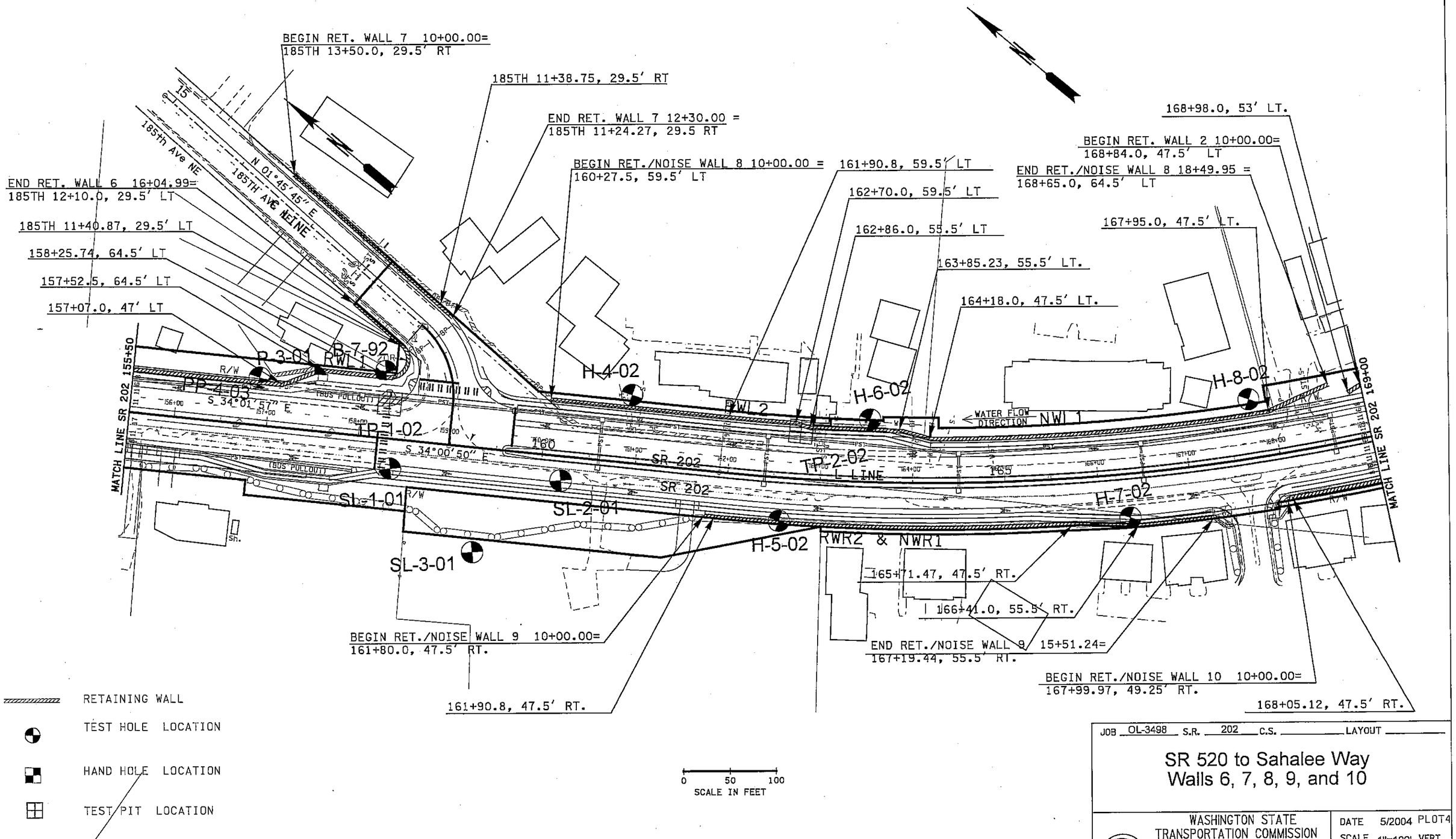
SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT.
1"=50' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\Wall profiles\wall 1.dgn 09/24/2004 07:36:17 AM

T.25N. R.6E. W.M.



JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

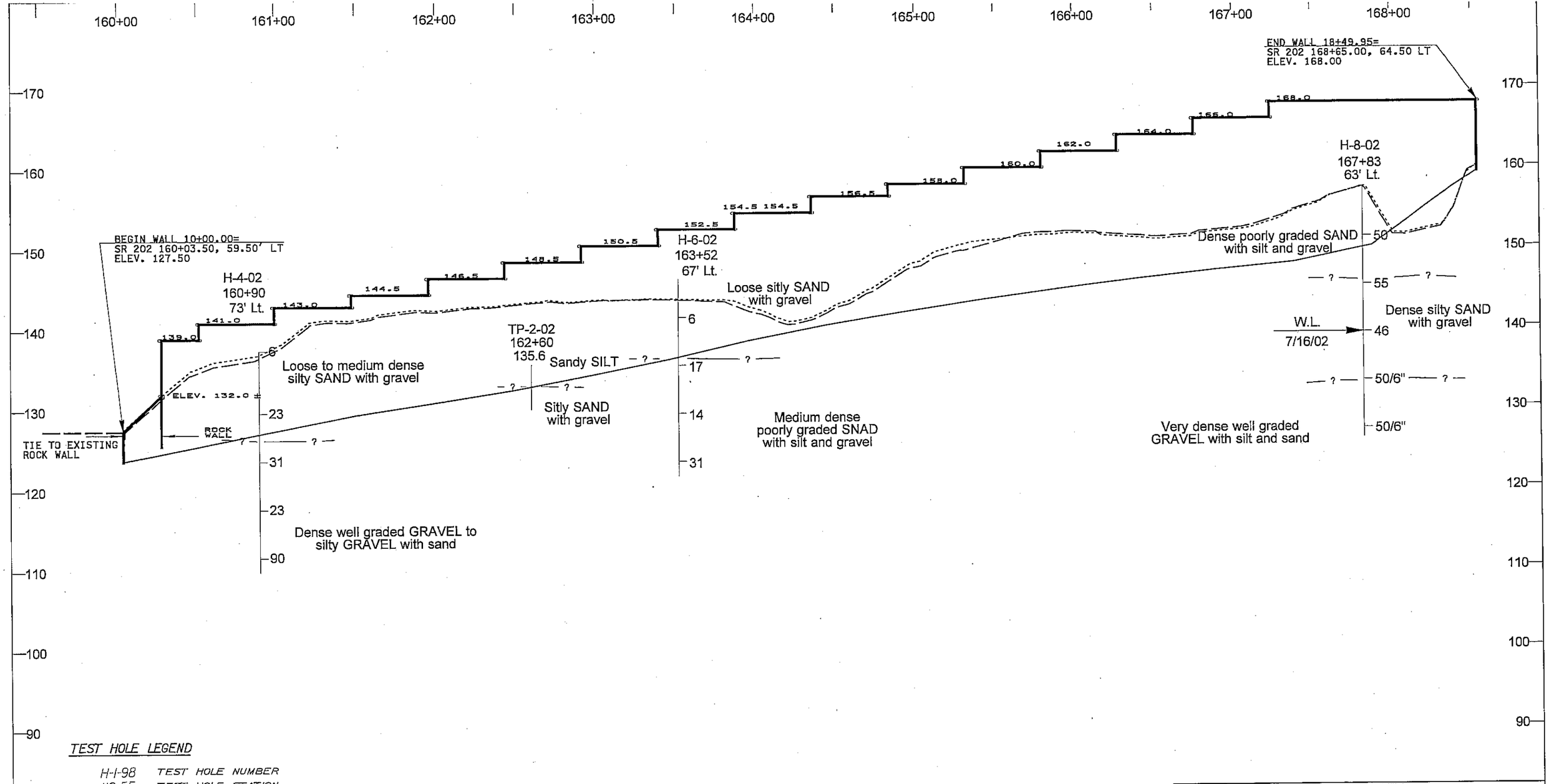
SR 520 to Sahalee Way
Walls 6, 7, 8, 9, and 10

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 5/2004 PLOT4
SCALE 1"=100' VERT.
1"=100' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-8: Site and Exploration Plan

...\WALL SHEETS\202wallsheets1.dgn 09/24/2004 02:14:00 PM



TEST HOLE LEGEND

H-1-98	TEST HOLE NUMBER
110+55	TEST HOLE STATION
26 ft.Rt.	TEST HOLE OFFSET
23	STANDARD PENETROMETER TEST (BLOWS PER FOOT)
	UNDISTURBED SAMPLE
W.L. 8-6-86	WATER LEVEL & DATE
?	? INDICATES SOIL/ROCK STRATA BETWEEN TEST HOLES MAY NOT BE CONTINUOUS
	INDICATES INTACT ROCK
86%	INDICATES CORE SAMPLE TAKEN
	ROCK QUALITY DESIGNATION

Figure A-9: Generalized Soil Profile Wall 8

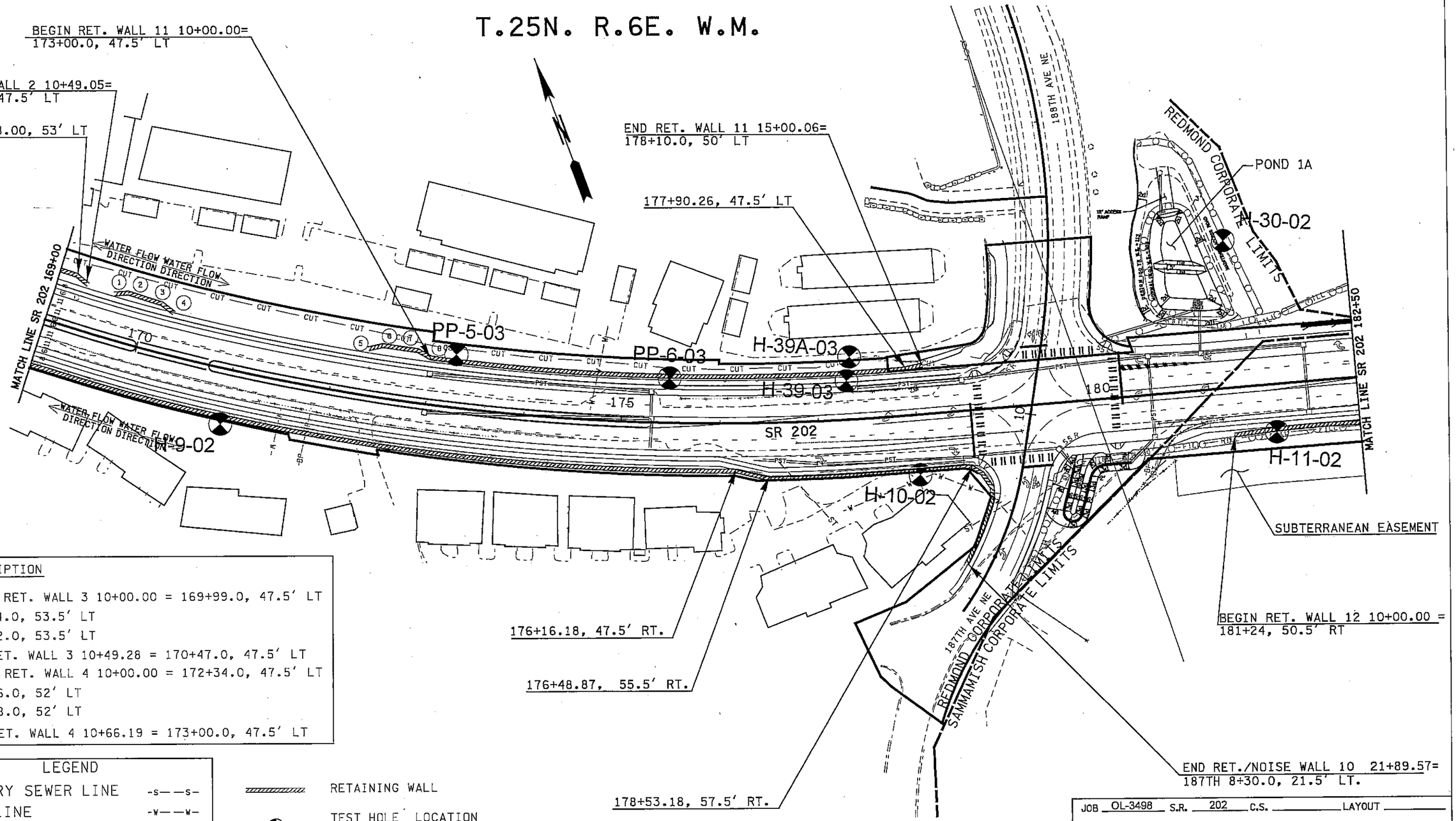
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1" = 12' VERT.
1" = 60' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\Wall profiles\wall 8.dgn 10/08/2004 07:14:18 AM



DESCRIPTION

1. BEGIN RET. WALL 3 10+00.00 = 169+99.0, 47.5' LT
2. 170+14.0, 53.5' LT
3. 170+32.0, 53.5' LT
4. END RET. WALL 3 10+49.28 = 170+47.0, 47.5' LT
5. BEGIN RET. WALL 4 10+00.00 = 172+34.0, 47.5' LT
6. 172+46.0, 52' LT
7. 172+88.0, 52' LT
8. END RET. WALL 4 10+66.19 = 173+00.0, 47.5' LT

LEGEND

SANITARY SEWER LINE	-S— —S-
WATER LINE	-W— —W-
STORM DRAIN	—ST—ST
BURIED POWER	-BP— —BP—
BURIED TELEPHONE	-BT——BT—

RETAINING WALL

TEST HOLE LOCATION

HAND HOLE LOCATION

TEST PIT LOCATION

JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

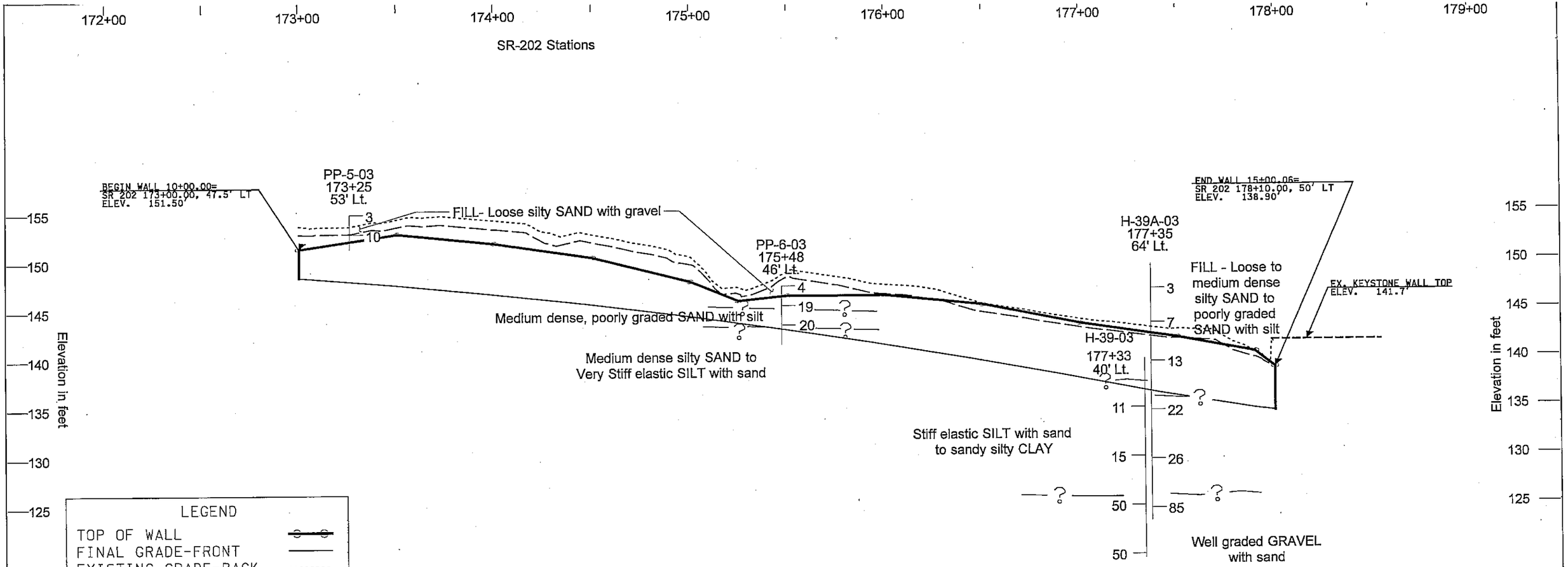
SR 520 to Sahalee Way
Walls 10, 11, and 12

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 5/2004 PLOT5
SCALE 1"=200' VERT.
1"=200' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-10: Site and Exploration Plan

...\WALL SHEETS\202wallsheets2.dgn 09/24/2004 02:39:36 PM



TEST HOLE LEGEND

H-1-98	TEST HOLE NUMBER
110+55	TEST HOLE STATION
26 ft.Rt.	TEST HOLE OFFSET
23	STANDARD PENETROMETER TEST (BLOWS PER FOOT)
	UNDISTURBED SAMPLE
W.L. 8-6-86	WATER LEVEL & DATE
?	INDICATES SOIL/ROCK STRATA BETWEEN TEST HOLES MAY NOT BE CONTINUOUS
	INDICATES INTACT ROCK
86%	INDICATES CORE SAMPLE TAKEN
	ROCK QUALITY DESIGNATION

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

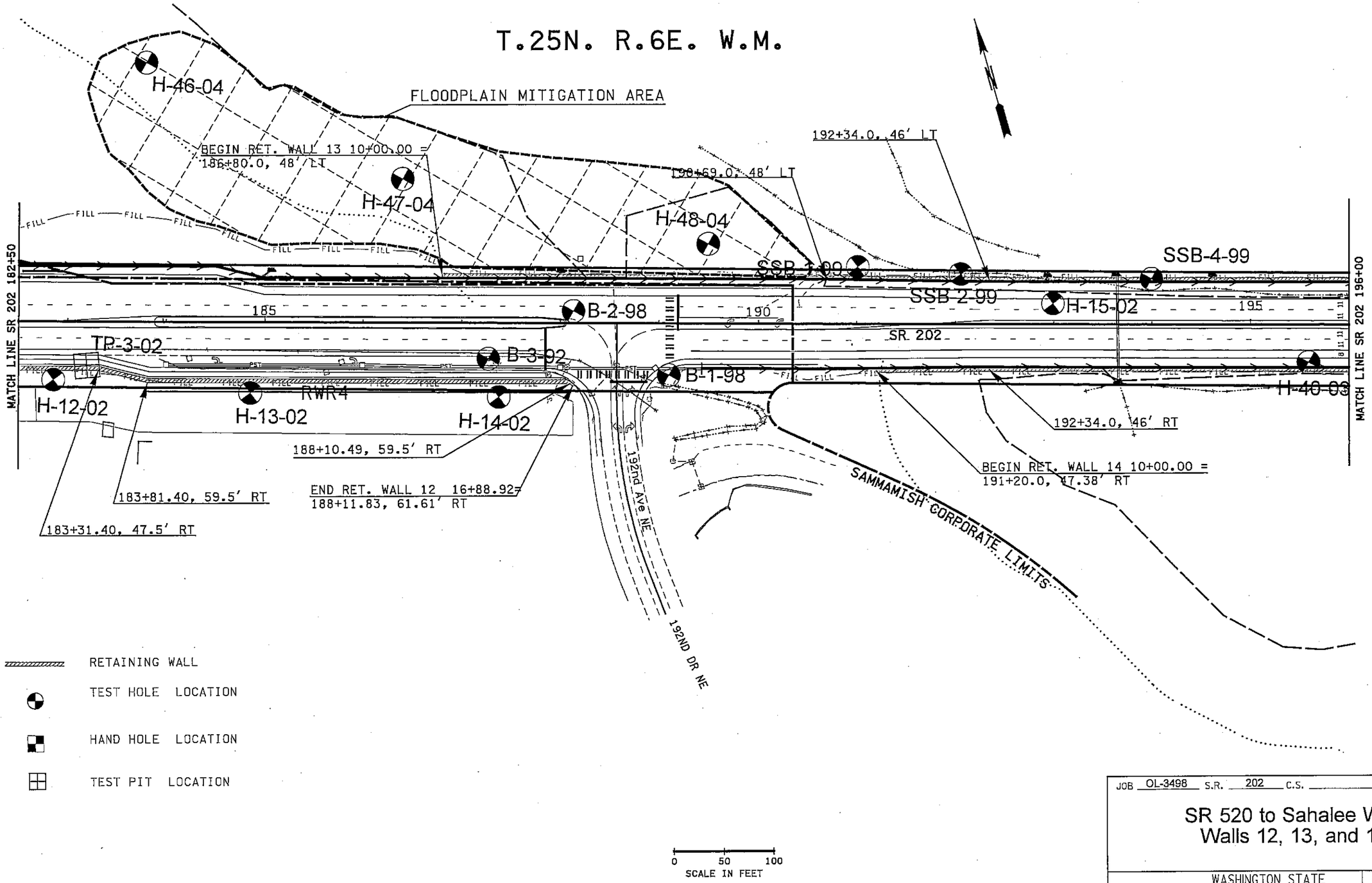
SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT.
1"=50' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-11: Generalized Soil Profile Wall 11

...\Wall profiles\wall 11.DGN 10/08/2004 11:11:18 AM



JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

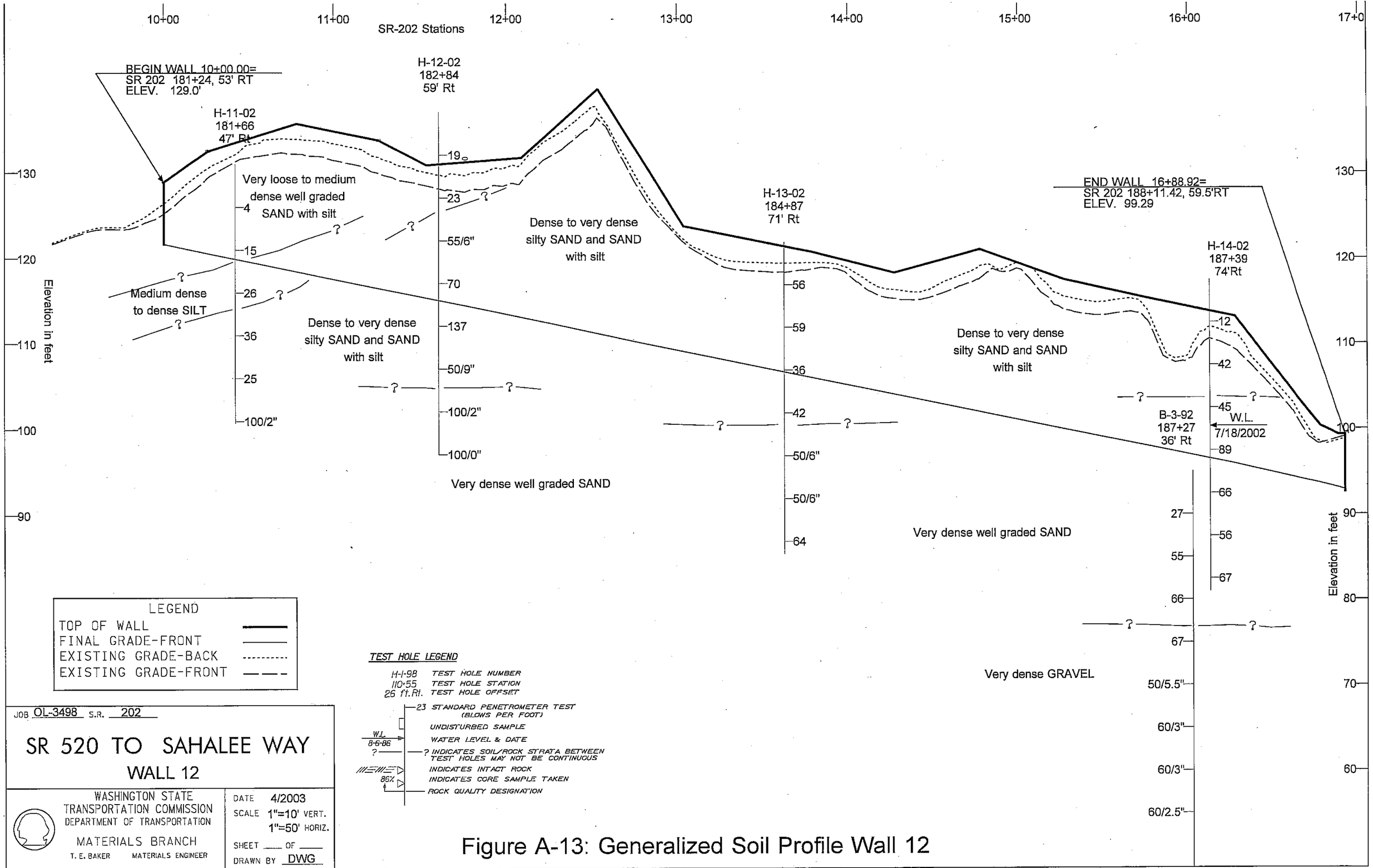
SR 520 to Sahalee Way
Walls 12, 13, and 14

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 5/2004
SCALE 1"=100' VERT.
1"=100' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-12: Site and Exploration Plan

...\202 wallsheets3.dgn 10/27/2004 02:22:46 PM



LEGEND

TOP OF WALL	———
FINAL GRADE-FRONT	———
EXISTING GRADE-BACK	- - - - - -
EXISTING GRADE-FRONT	— — —

TEST HOLE LEGEND

H-1-98	TEST HOLE NUMBER
110+55	TEST HOLE STATION
26 ft.Rt.	TEST HOLE OFFSET
23	STANDARD PENETROMETER TEST (BLOWS PER FOOT)
	UNDISTURBED SAMPLE
W.L. 8-6-86	WATER LEVEL & DATE
?	INDICATES SOIL/ROCK STRATA BETWEEN TEST HOLES MAY NOT BE CONTINUOUS
	INDICATES INTACT ROCK
86%	INDICATES CORE SAMPLE TAKEN
	ROCK QUALITY DESIGNATION

JOB OL-3498 S.R. 202

SR 520 TO SAHALEE WAY

WALL 12

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 4/2003
SCALE 1"=10' VERT. 1"=50' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-13: Generalized Soil Profile Wall 12

...\Wall profiles\wall 12.dgn 09/24/2004 03:48:56 PM

T.25N. R.6E. W.M.

END RET. WALL 13 23+95.14=
200+69.0, 37.5' LT

EVANS CREEK

196th Ave NE

TP-6-99

TP-4A-99

TP-4B-99

MW-4-99

200+69.0, 43' LT

199+00, 46' LT

200+49.0, 48' LT

P-23-00

B-2W-90

TP-5-99

B-8-92

P-24-00

SSB-7-99

H-16-02

SSB-10-99

MW-3A-99

MW-3B-99

H-1-28

SR 202

H-18-02

MW-6-99

H-41-03

H-17-02

MATCH LINE SR 202 196+00

MATCH LINE SR 202 208+00

203+65.48, 36' RT

206+56.0, 36' RT

203+50.20, 45.55' RT

END RET. WALL 14 19+55.14=
200+69.0, 37.5' RT

PROPOSED BRIDGE 202/46

P-8-00

P-5-00

BEGIN RET. WALL 15 10+00.00=
203+49.97, 46.01' RT

P-9-00

LEGEND

WETLAND BOUNDARY	— — — —
WETLAND BUFFER	.....
STORM SEWER	-ST— —ST— —

0 50 100
SCALE IN FEET

JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 to Sahalee Way
Walls 13, 14, and 15

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION

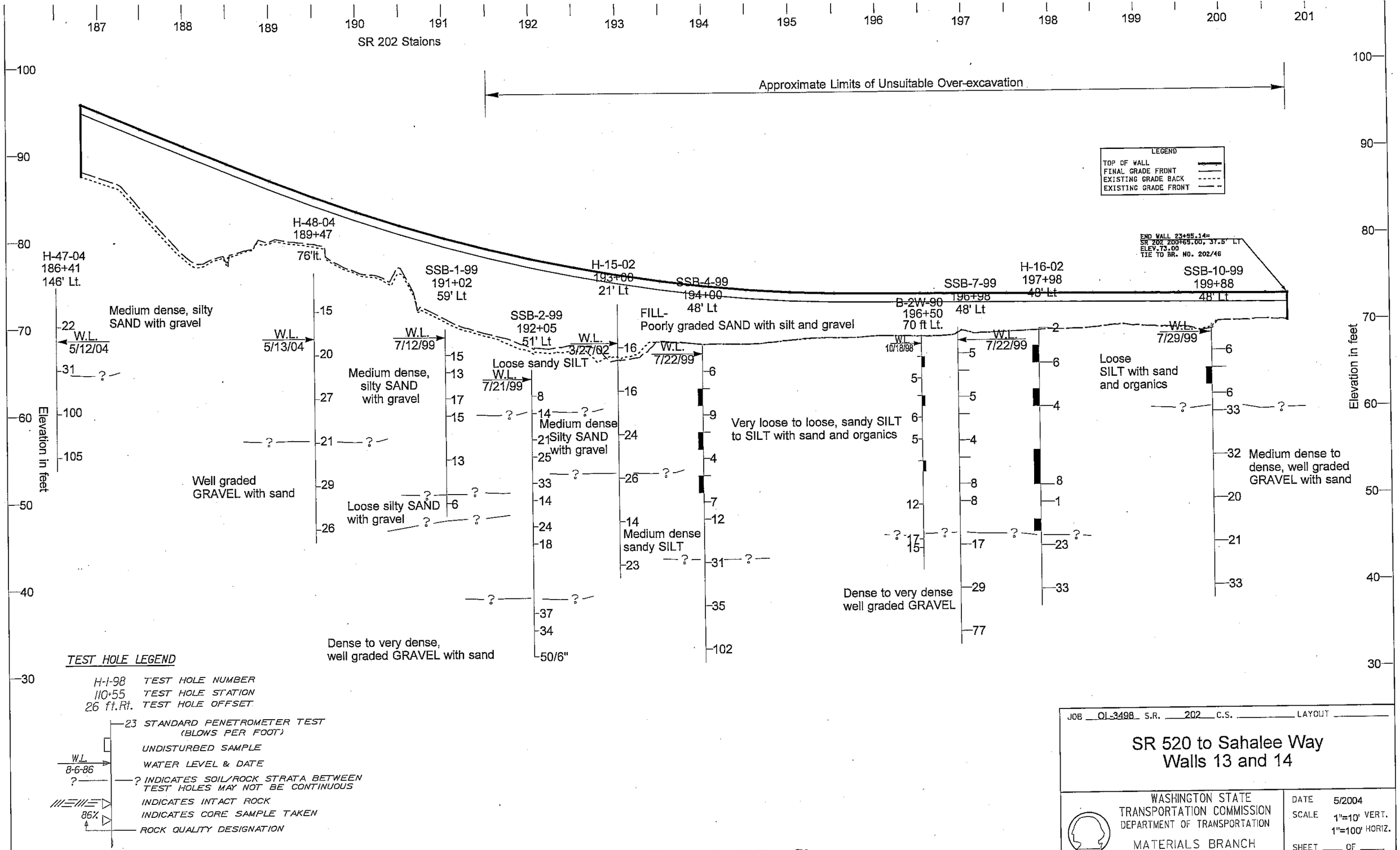
MATERIALS BRANCH

T. E. BAKER MATERIALS ENGINEER

DATE 5/2004
SCALE 1"=100' VERT.
1"=100' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-14: Site and Exploration Plan

...\WALL SHEETS\202wallsheets4.dgn 09/21/2004 03:10:04 PM



JOB OI-3498 S.R. 202 C.S. _____ LAYOUT _____

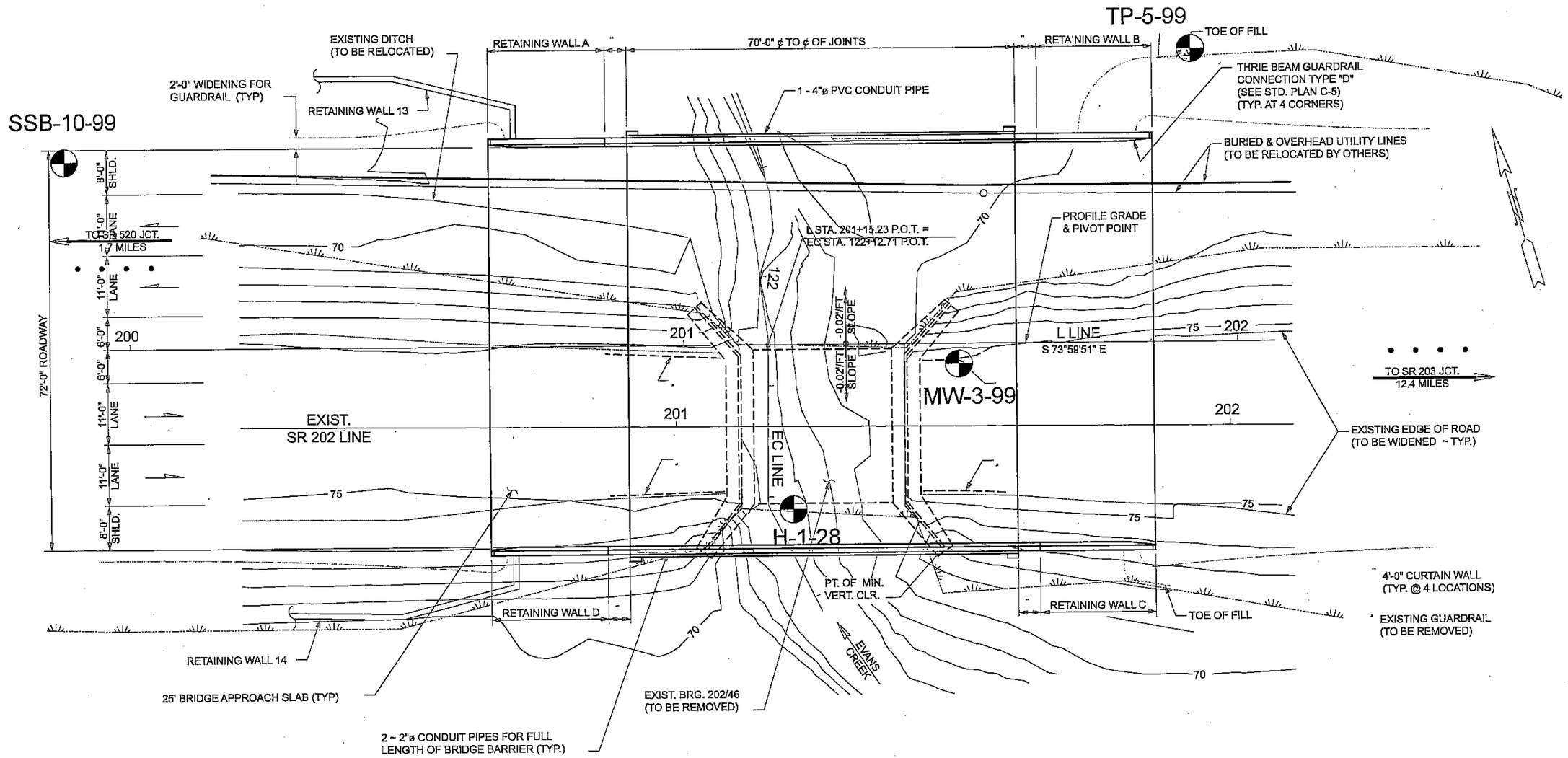
SR 520 to Sahalee Way
Walls 13 and 14

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 5/2004
SCALE 1"=10' VERT. 1"=100' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-15: Generalized Soil Profile

...\Wall profiles\wall 13.dgn 10/20/2004 01:29:53 PM



Test Hole designation and approximate location

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

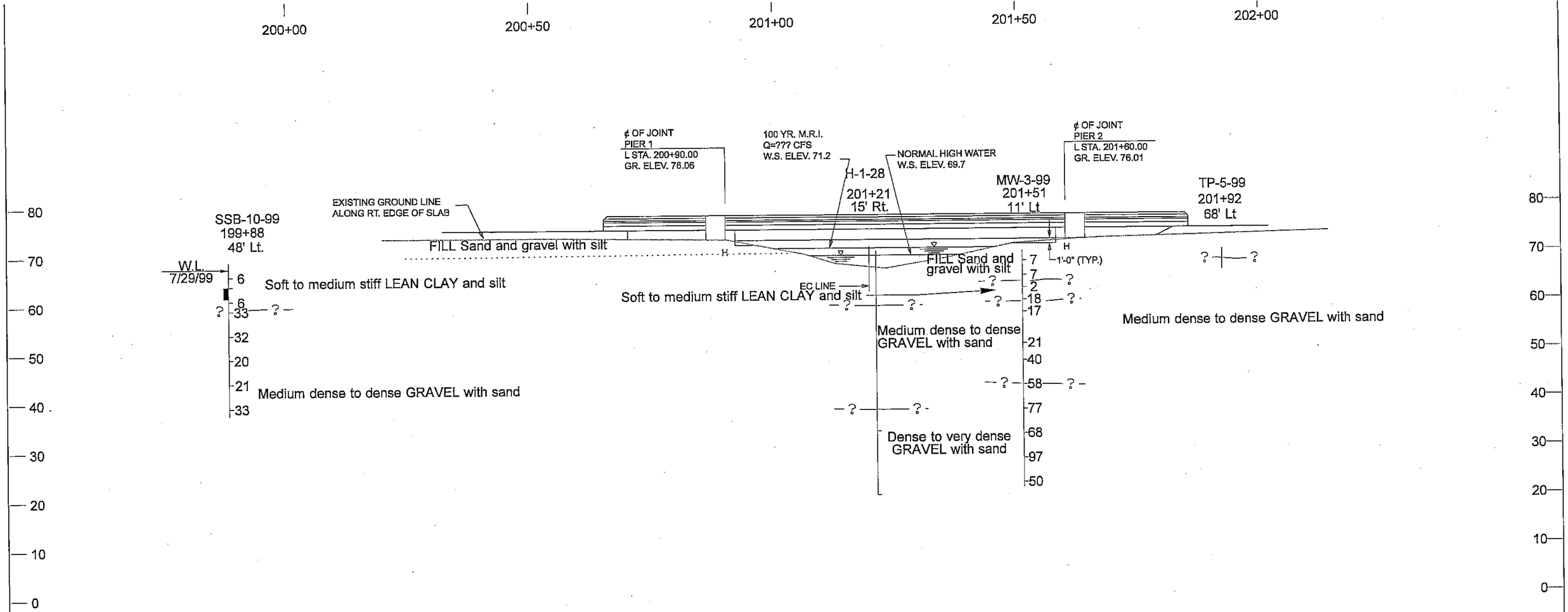
SR-520 to Sahalee Way NE
M.P. 7.75 to 10.53

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 12/2003
SCALE 1"=20' VERT.
1"=20' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-16: Site and Exploration PLan - Bridge 202/46

...\004-21-04\F\202_46 planpro.dgn 09/24/2004 03:54:34 PM



TEST HOLE LEGEND

H-1-98	TEST HOLE NUMBER
110+55	TEST HOLE STATION
26 ft.Rt.	TEST HOLE OFFSET
23	STANDARD PENETROMETER TEST (BLOWS PER FOOT)
	UNDISTURBED SAMPLE
W.L. 8-6-86	WATER LEVEL & DATE
?	INDICATES SOIL/ROCK STRATA BETWEEN TEST HOLES MAY NOT BE CONTINUOUS
	INDICATES INTACT ROCK
86%	INDICATES CORE SAMPLE TAKEN
	ROCK QUALITY DESIGNATION

Figure A-17: Generalized Soil Profile - Bridge 202/46

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR-520 to Sahalee Way NE
M.P. 7.75 to 10.53

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 12/2003
SCALE 1"=20' VERT.
1"=20' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\F\202_46 planpro.dgn 09/24/2004 03:55:04 PM

T.25N. R.6E. W.M.

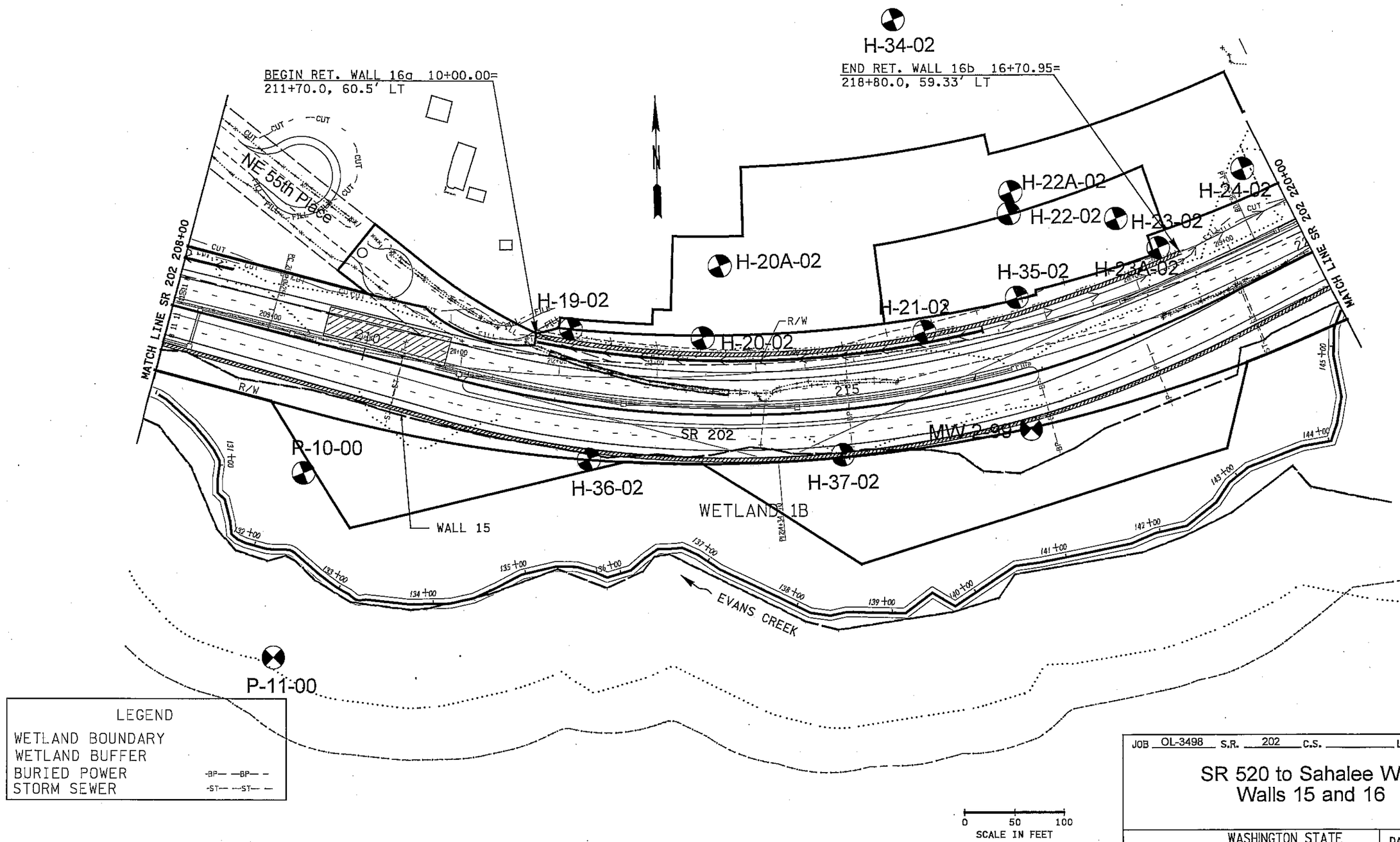


Figure A-18: Site and Exploration Plan

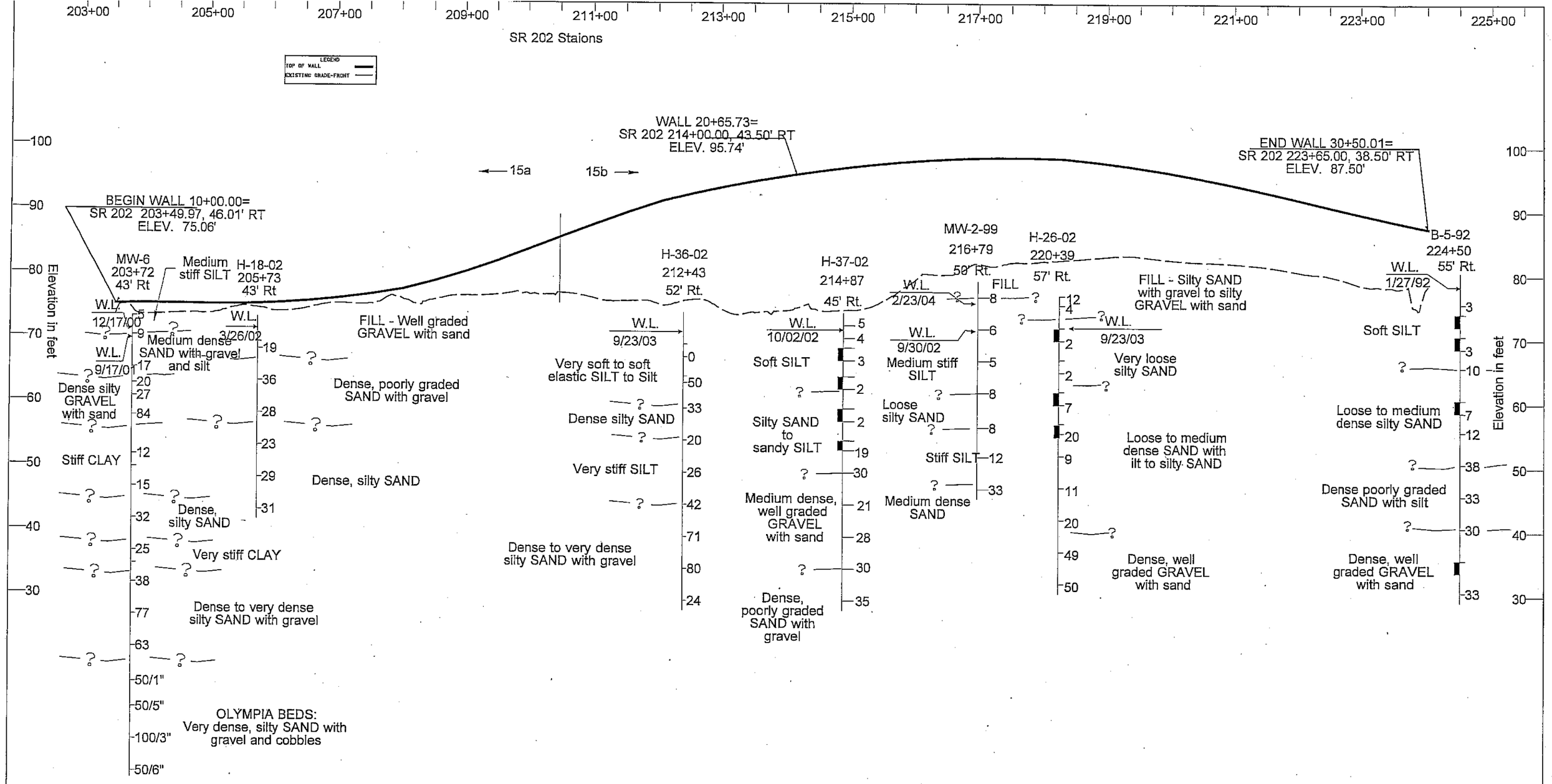
JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 to Sahalee Way
Walls 15 and 16

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 5/2004
SCALE 1"=100' VERT.
1"=100' HORIZ.
SHEET ____ OF ____
DRAWN BY DWG

...\WALL SHEETS\202wallsheets4.dgn 09/30/2004 09:01:04 AM



TEST HOLE LEGEND

H-1-98 TEST HOLE NUMBER
110+55 TEST HOLE STATION
26 ft.Rt. TEST HOLE OFFSET

23 STANDARD PENETROMETER TEST (BLOWS PER FOOT)
UNDISTURBED SAMPLE
W.L. 8-6-86 WATER LEVEL & DATE
? INDICATES SOIL/ROCK STRATA BETWEEN TEST HOLES MAY NOT BE CONTINUOUS
INDICATES INTACT ROCK
86% INDICATES CORE SAMPLE TAKEN
ROCK QUALITY DESIGNATION

Figure A-19: Generalized Soil Profile Wall 15

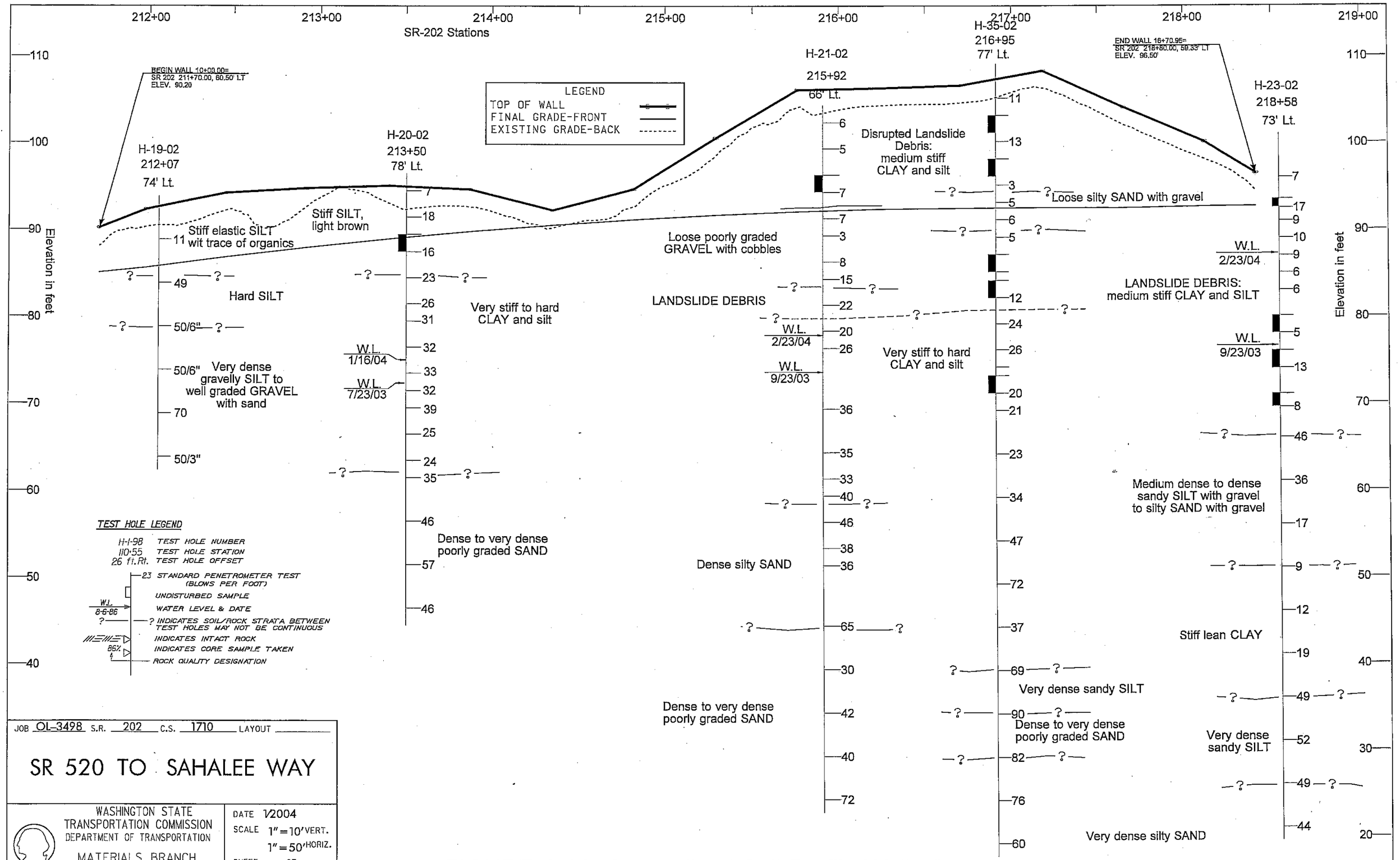
JOB OI-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 to Sahalee Way Walls 15a and 15b

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 5/2004
SCALE 1"=15 VERT. 1"=150' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\Wall profiles\wall 15.dgn 09/30/2004 08:55:51 AM



JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

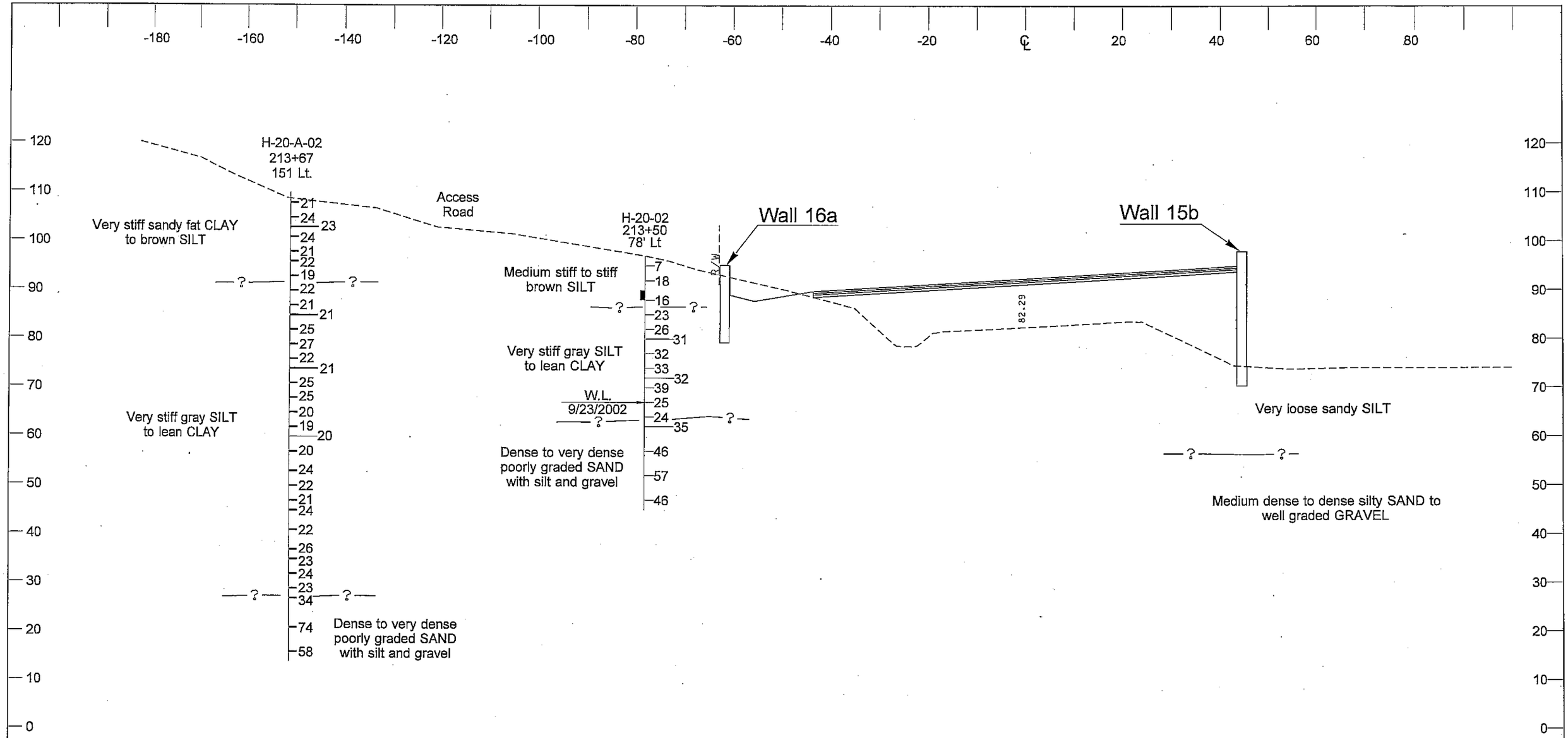
SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. 1"=50' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

FIGURE A-20: Generalized Soil Profile Wall 16

...\Wall profiles\wall 16.dgn 10/20/2004 01:20:29 PM



TEST HOLE LEGEND

H-1-98	TEST HOLE NUMBER
110+55	TEST HOLE STATION
26 ft. Rt.	TEST HOLE OFFSET
23	STANDARD PENETROMETER TEST (BLOWS PER FOOT)
	UNDISTURBED SAMPLE
W.L. 8-6-86	WATER LEVEL & DATE
?	INDICATES SOIL/ROCK STRATA BETWEEN TEST HOLES MAY NOT BE CONTINUOUS
	INDICATES INTACT ROCK
86%	INDICATES CORE SAMPLE TAKEN
	ROCK QUALITY DESIGNATION

Figure A-21: Generalized Soil Cross-section at Station 213+75

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR-520 to Sahalee Way

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 6/2004
SCALE 1"=20' VERT. 1"=20' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\217.dgn 09/27/2004 09:30:09 AM

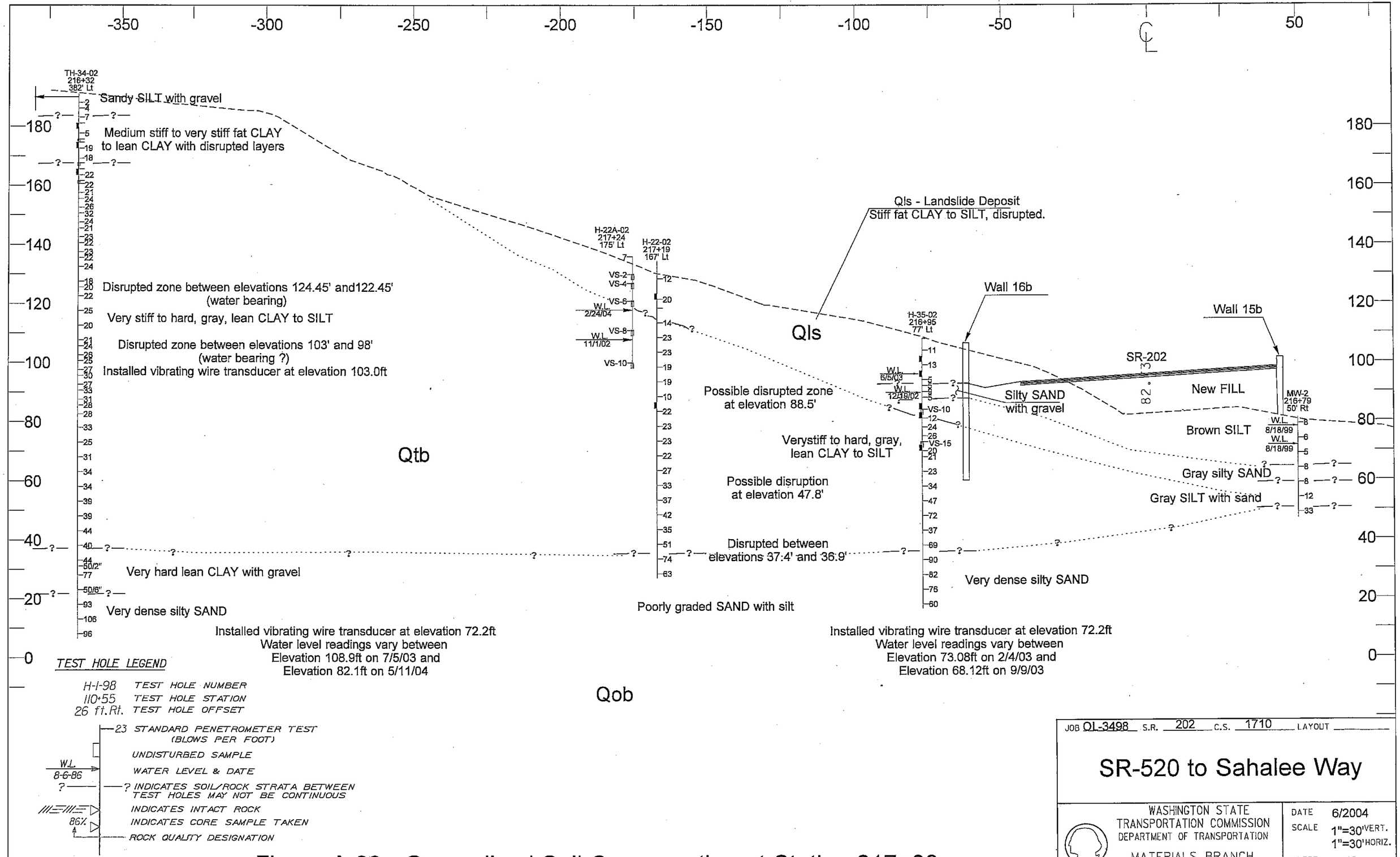


Figure A-22: Generalized Soil Cross-section at Station 217+00

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

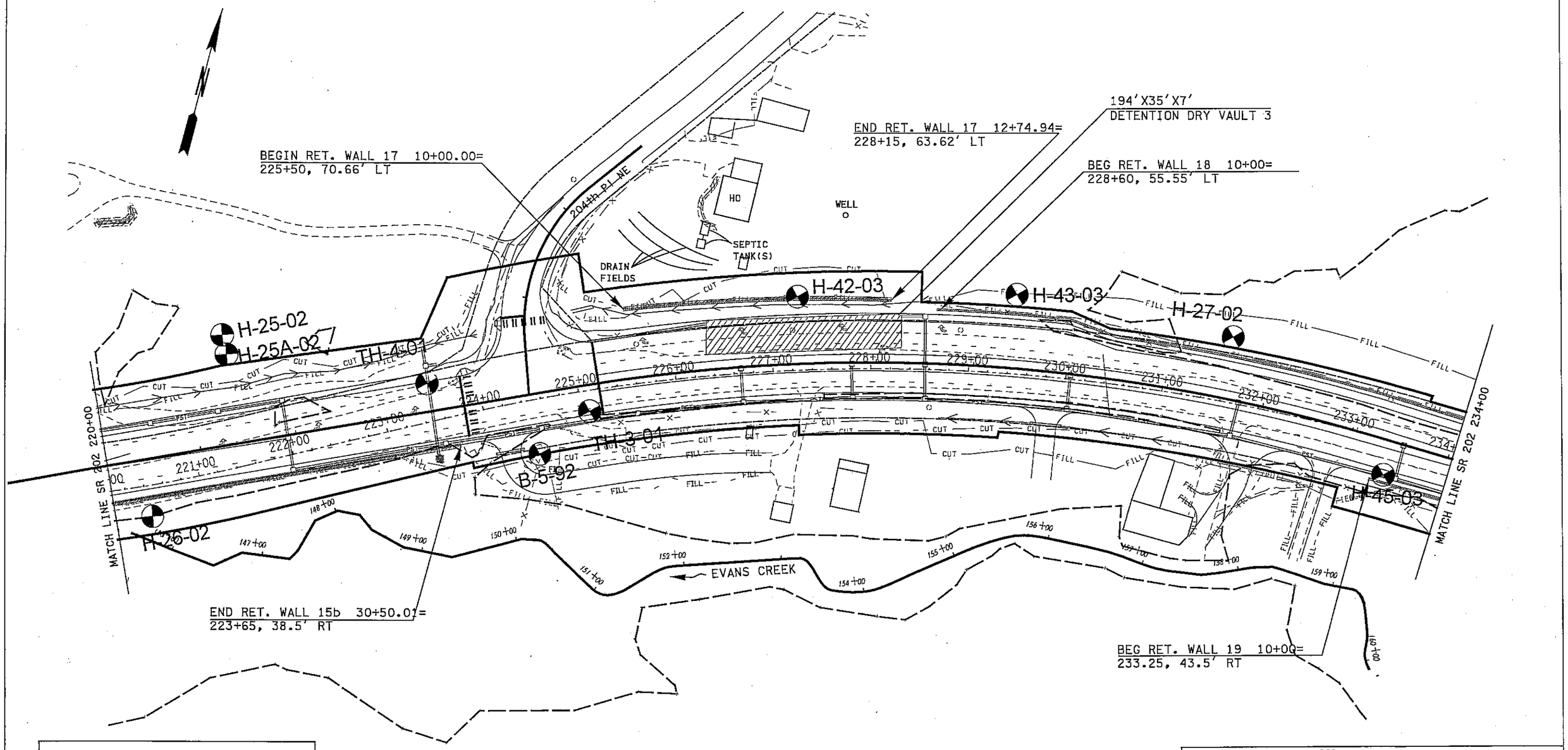
SR-520 to Sahalee Way

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 6/2004
SCALE 1"=30'VERT.
1"=30'HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\217.dgn 09/27/2004 09:37:57 AM

T.25N. R.6E. W.M.



JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

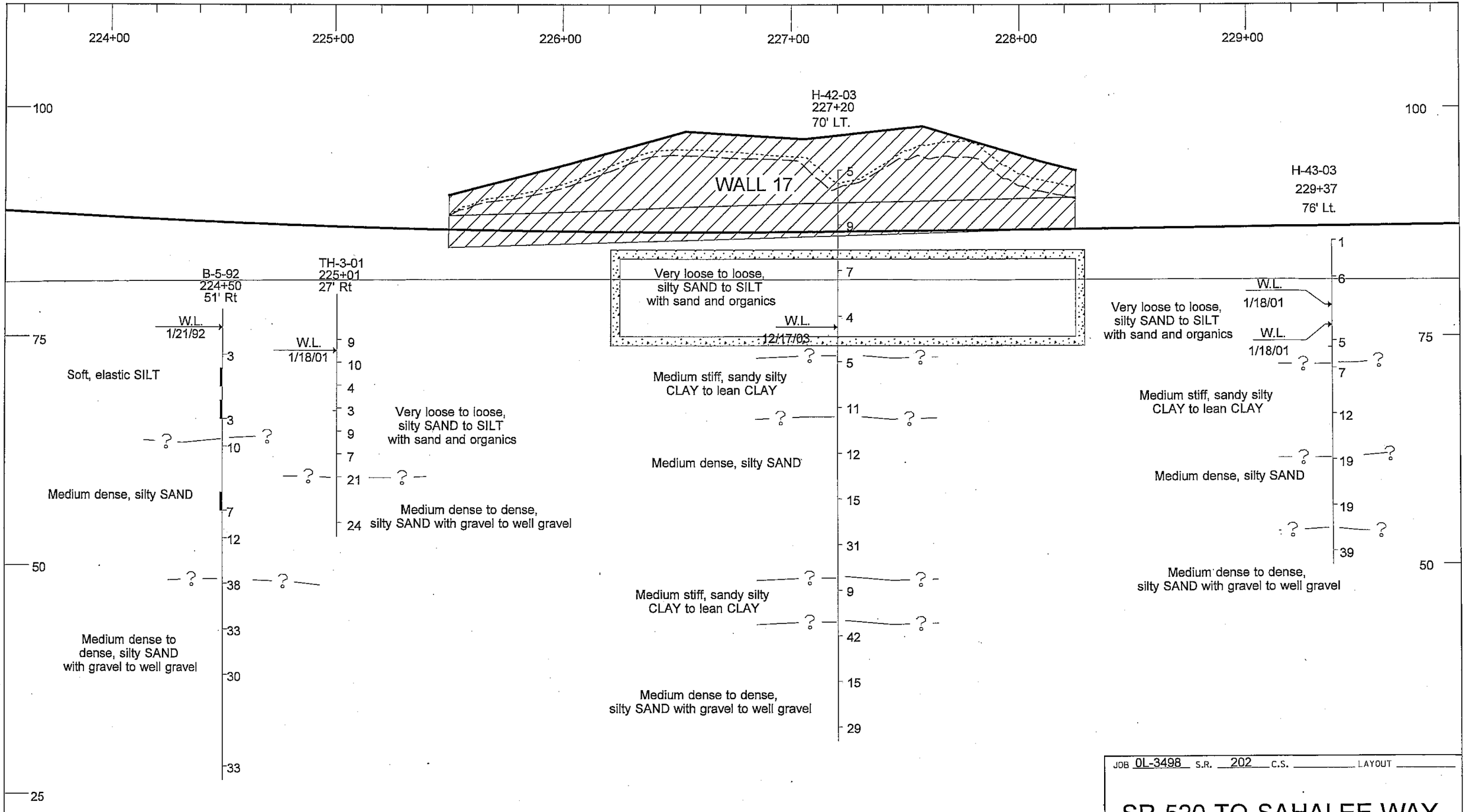
SR 520 to Sahalee Way
Walls 15, 17, 18, and 19

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 5/2004
SCALE 1"=200' VERT.
1"=200' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-23: Site and Exploration Plan

...\202 wallsheets5.dgn 09/21/2004 03:10:24 PM



JOB 0L-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 6/2004
SCALE 1"=10' VERT.
1"=40' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-24: Generalized Soil Profile Wall 17

...\wet vaults\profil.dgn 09/27/2004 09:46:39 AM

T.25N. R.6E. W.M.

PROPOSED BRIDGE 202/47

PROPOSED BRIDGE 202/47A

END RET. WALL 18 18+96.20=
237+39.0, 35.5' LT

237+39.0, 39' LT

235+72.0, 39' LT

B-4E-90

H-29-02

H-28-02

B-1-92

Wall 20

MW-1-99

TP-8B-99

TP-8A-99

TP-9B-99

TP-9A-99

TH-1-01

TH-2-01

END RET. WALL 19 14+17.64=
237+39.0, 43.5' RT

234+88.0, 40.75' RT

P-15-00

P-16-00

P-13-00

P-14-00

P-12-00

H-38-02

EVANS CREEK

SR 202

MATCH LINE SR 202 234+00

MATCH LINE SR 202 248+00

208TH AVE NE

SAHALEE WAY NE

BEGIN RET. WALL 21 10+00=
244+67.0, 43' LT

245+10.0, 41' LT

END RET. WALL 21 10+84.0=
245+49.0, 41' LT

LEGEND

WETLAND BOUNDARY

WETLAND BUFFER

BURIED POWER

BURIED TELEPHONE AND/OR FIBER OPTIC

BURIED TELEPHONE

RETAINING WALL

TEST HOLE LOCATION

HAND HOLE LOCATION

TEST PIT LOCATION

0 50 100
SCALE IN FEET

JOB OL-3498 S.R. 202 C.S. LAYOUT

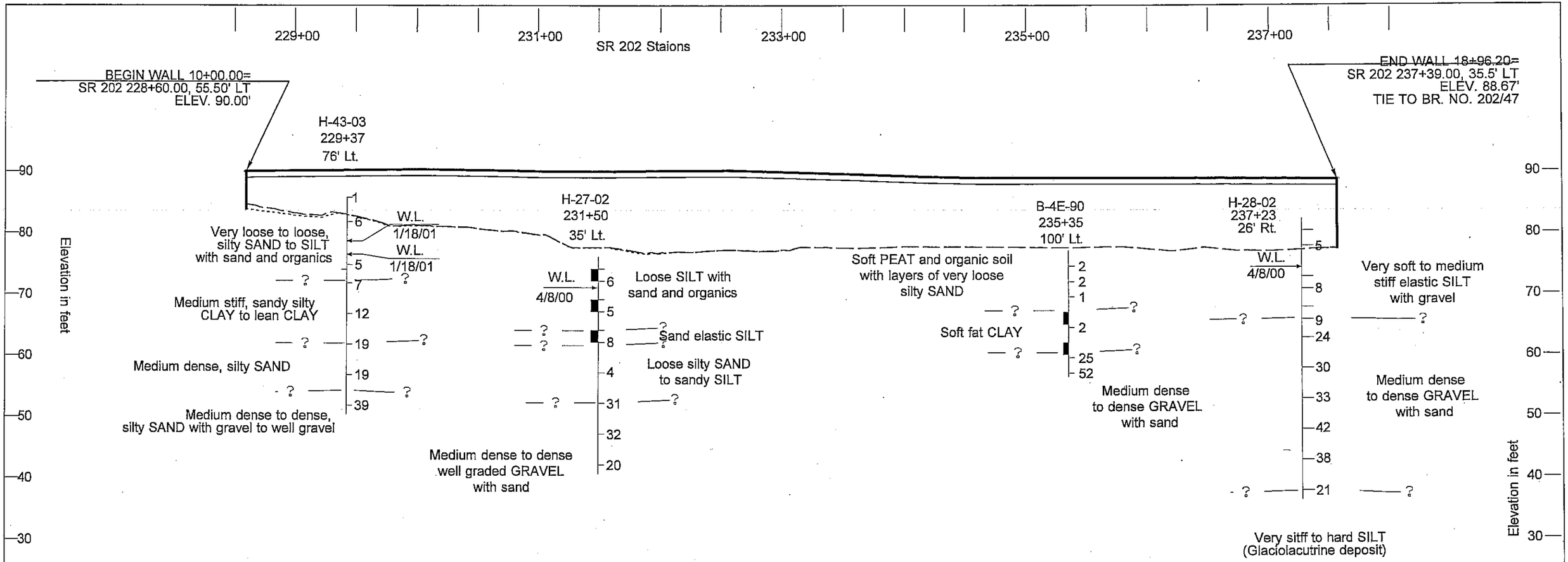
SR 520 to Sahalee Way
Walls 18, 19, 20, and 21

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 5/2004
SCALE 1"=200' VERT.
1"=200' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-25: Site and Exploration Plan

...\WALL SHEETS\202wallsheets6.dgn 09/27/2004 10:00:15 AM



LEGEND	
TOP OF WALL	
FINAL GRADE FRONT	
EXISTING GRADE BACK	
EXISTING GRADE FRONT	

TEST HOLE LEGEND

H-1-98 TEST HOLE NUMBER
110+55 TEST HOLE STATION
26 ft. Rt. TEST HOLE OFFSET

23 STANDARD PENETROMETER TEST (BLOWS PER FOOT)
UNDISTURBED SAMPLE
W.L. 8-6-86 WATER LEVEL & DATE
? INDICATES SOIL/ROCK STRATA BETWEEN TEST HOLES MAY NOT BE CONTINUOUS
INDICATES INTACT ROCK
86% INDICATES CORE SAMPLE TAKEN
ROCK QUALITY DESIGNATION

JOB OI-3498 S.R. 202 C.S. _____ LAYOUT _____

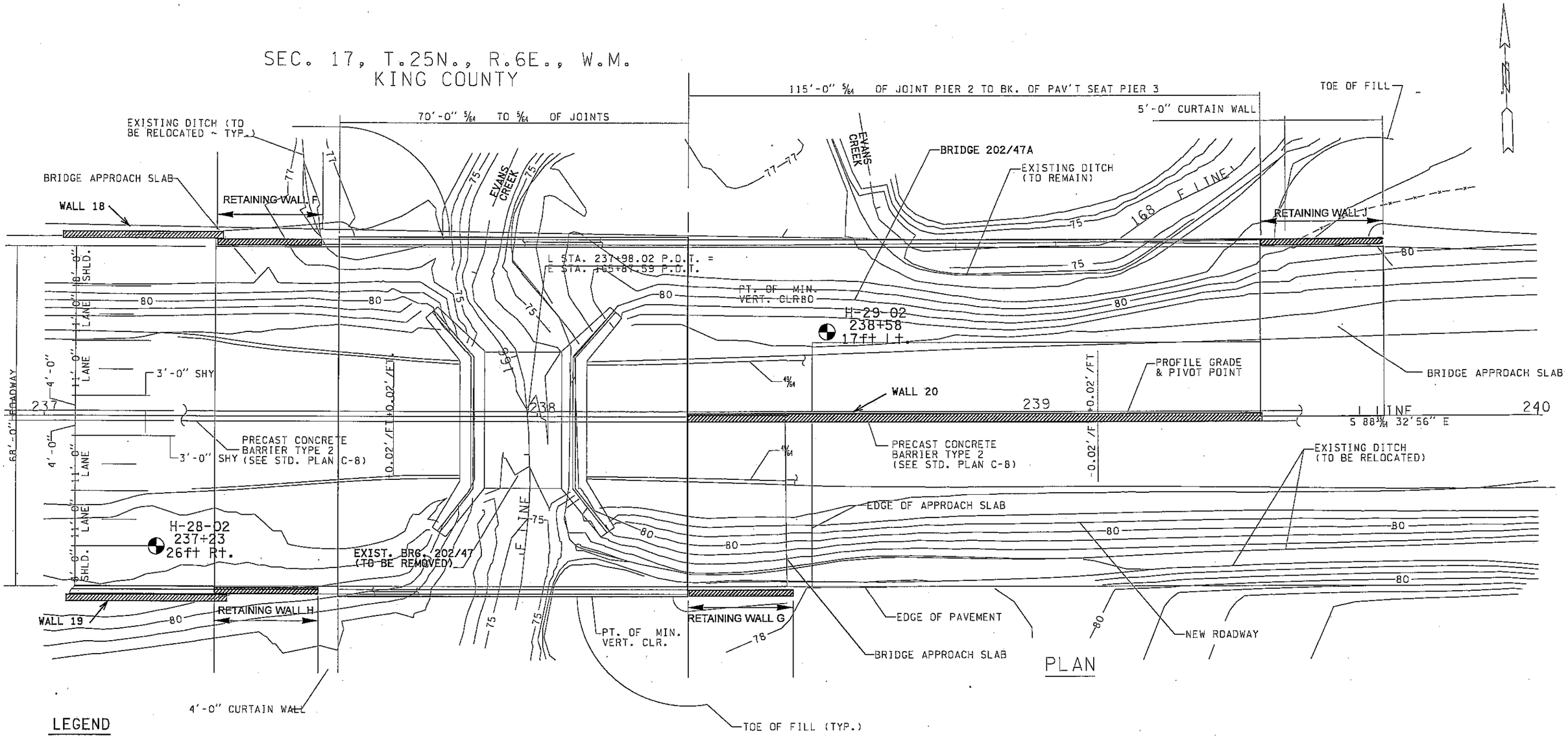
SR 520 to Sahalee Way

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 6/2004
SCALE 1"=16 VERT. 1"=80' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure A-26: Generalized Soil Profile Wall 18

...\Wall profiles\wall 18.dgn 09/27/2004 10:22:06 AM



JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

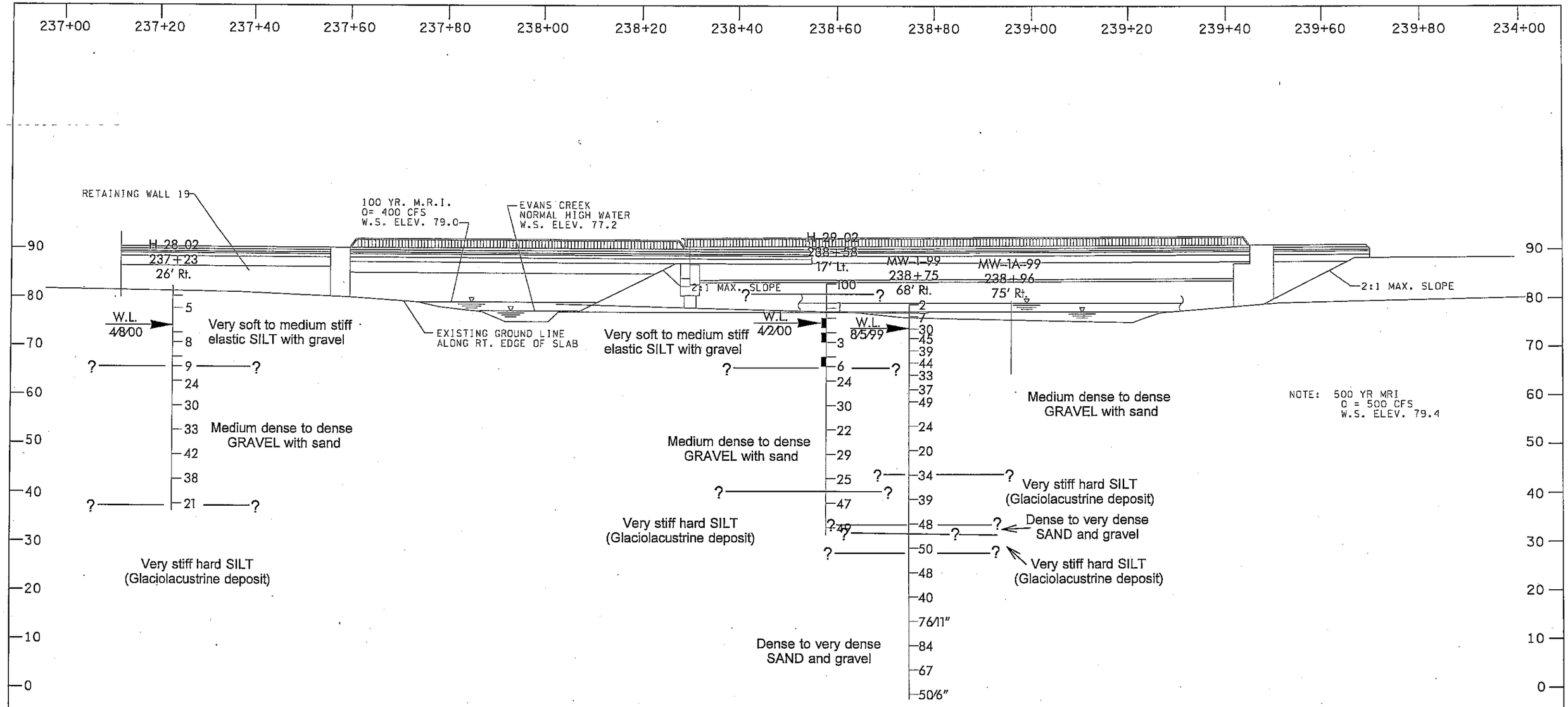
SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 2/2003
SCALE 1"=20' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DG-WM

FIGURE A-27: Site and Exploration Plan
Bridges 202/47 and 202/47A

...\004-21-04\202_47 AND HALF.dgn 10/28/2004 08:59:35 AM



TEST HOLE LEGEND

H-1-98 TEST HOLE NUMBER
110+55 TEST HOLE STATION
26 ft.Rt. TEST HOLE OFFSET

23 STANDARD PENETROMETER TEST (BLOWS PER FOOT)
UNDISTURBED SAMPLE
W.L. 8-6-86 WATER LEVEL & DATE
? INDICATES SOIL/ROCK STRATA BETWEEN TEST HOLES MAY NOT BE CONTINUOUS
INDICATES INTACT ROCK
86% INDICATES CORE SAMPLE TAKEN
ROCK QUALITY DESIGNATION

DATUM
NAVD 1988

Figure A-28: Typical Soil Profile Bridge #202/47

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY
BRIDGE 202/47 REPLACEMENT

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 2/2003
SCALE 1"=20' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DG-WM

...\004-21-04\202_47 AND HALF.dgn 10/27/2004 09:10:23 AM

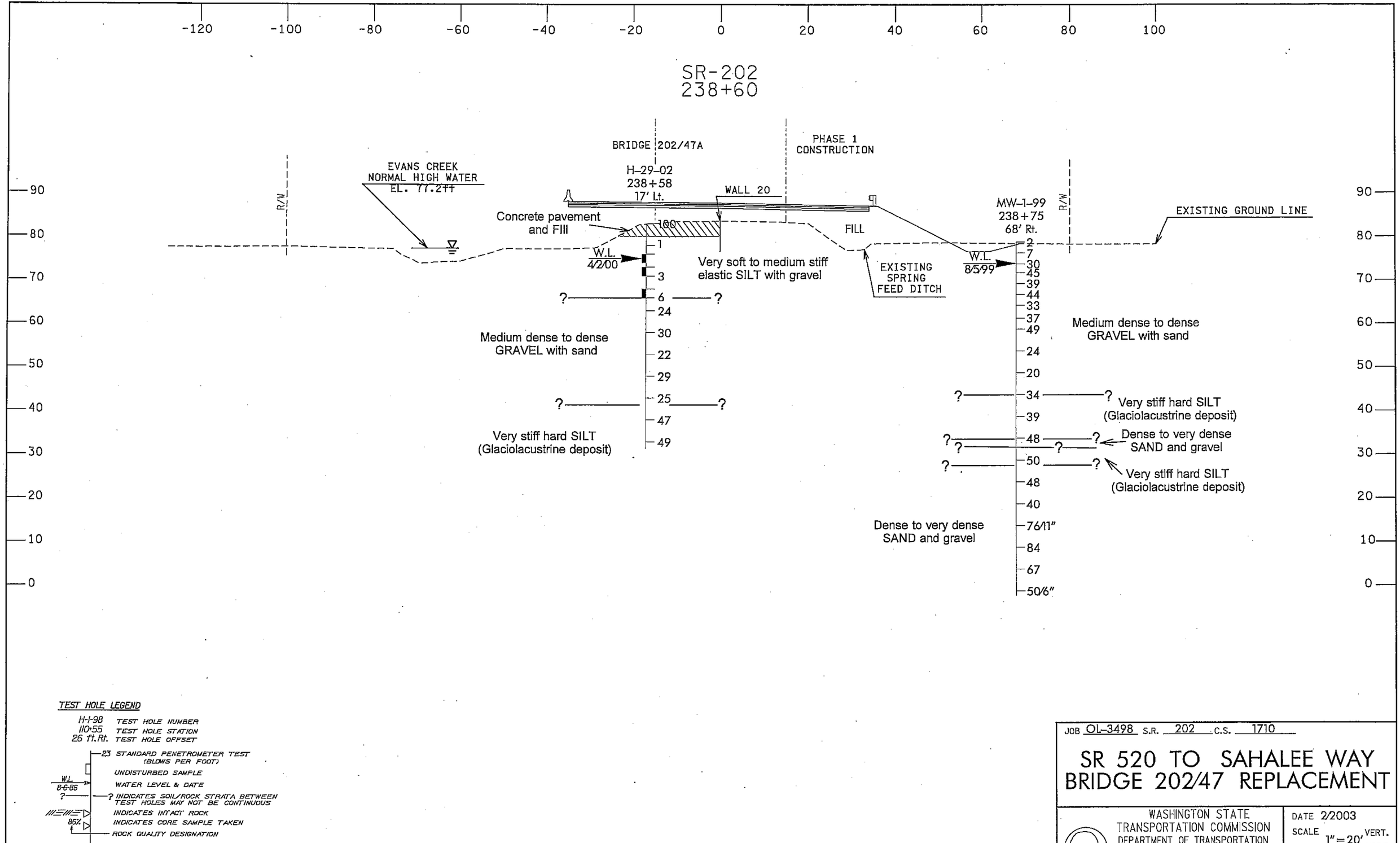


Figure A-29: Typical Soil Cross-Section Vic. Bridge Sta. 238+60

JOB OL-3498 S.R. 202 C.S. 1710

SR 520 TO SAHALEE WAY
BRIDGE 202/47 REPLACEMENT

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 2/2003
SCALE 1"=20' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY W.M.

...\004-21-04\202_47 AND HALF.dgn 10/28/2004 09:01:59 AM

APPENDIX - B

Logs of Test Borings

Summary of Test Holes

Stage 1 – SR 520 to East Lake Sammamish Parkway - L 112+32 to L 142+00

Test Hole	Station	Offset	Elev. (ft.)
Junction of SR 520 and SR 202			
C-12-92	112+58	0 ft. LT	~ 45.9
H-15-69	113+20	60 ft. LT	38.2
H-12-69	113+21	130 ft. LT	37.0
C-20A-92	113+95	86 ft. RT	~ 42.2
BC-1-01	114+79	151 ft. LT	47.8
BC-2-01	115+52	147 ft. RT	40.1
East Lake Sammamish Parkway			
MW-5-99	136+00	70 ft. RT	~ 52.7
TP-1-99	137+80	150 ft. RT	~ 52.8

Test Hole	Station	Offset	Elev. (ft.)
Signals Test Holes			
P-4-01	136+45	55 ft. RT	53.0
P-5-01	135+05	87 ft. LT	53.0
P-6-01	135+22	55 ft. RT	51.4
P-7-01	126+95	60 ft. LT	52.8
P-8-01	127+80	60 ft. RT	50.0

Stage 2 – SR 520 to East Lake Sammamish Parkway - L 142+00 to L 257+56

Test Hole	Station	Offset	Elev. (ft.)
Wall 1			
H-1-02	142+97	49 ft. RT	50.9
H-2-02	148+48	36 ft. RT	68.0
H-3-02	153+00	45 ft. RT	90.7
Drilled for a rock wall that was later deleted			
PP-1-03	147+66	60 ft. LT	70.1
Wall 5			
PP-2-03	151+97	51 ft. LT	101.7
Wall 6			
PP-3-03	154+44	48 ft. LT	109.3
PP-4-03	156+89	53 ft. LT	123.7
B-7-92	158+25	65 ft. LT	~ 127.6
TP-1-02	158+20	40 ft. LT	~ 124.4
Wall 8			
H-4-02	160+90	73 ft. LT	137.5
TP-2-02	162+60	38 ft. LT	~ 135.6
H-6-02	163+52	67 ft. LT	144.6
H-8-02	167+83	63 ft. LT	157.2

Test Hole	Station	Offset	Elev. (ft.)
Jefferson at Marymoor Park – Wall 1 Vicinity			
B-1-00	145+45	343 ft. RT	~ 52
B-2-00	146+73	165 ft. RT	~ 50
B-3-00	143+62	78 ft. RT	~ 50
B-4-00	143+32	280 ft. RT	~ 52
TP-1-00	148+61	279 ft. RT	~ 48
TP-2-00	148+76	133 ft. RT	~ 57
TP-3-00	149+96	182 ft. RT	~ 59
TP-4-00	150+95	111 ft. RT	~ 71
TP-5-00	152+81	110 ft. RT	~ 79
TP-6-00	151+05	276 ft. RT	NA
Junction of SR 202 and 185th Ave.			
SL-1-00	158+37	30 ft. RT	114.8
SL-3-00	159+35	111 ft. RT	105.8
SL-2-00	160+23	25 ft. RT	121.7

Test Hole	Station	Offset	Elev. (ft.)
Wall 9			
H-5-02	162+60	45 ft. RT	132.4
H-7-02	166+31	47 ft. RT	151.3
Wall 10			
H-9-02	171+00	56 ft. RT	164.0
H-10-02	177+82	62 ft. RT	144.5
Wall 11			
PP-5-03	173+25	53 ft. LT	155.3
PP-6-03	175+49	46 ft. LT	147.5
H-39-03	177+33	40 ft. LT	139.0
H-39a-03	177+35	64 ft. LT	149.6
Wall 12			
H-11-02	181+66	47 ft. RT	131.0
H-12-02	182+84	59 ft. RT	137.1
H-13-02	184+87	71 ft. RT	121.9
H-14-02	187+37	74 ft. RT	117.5
TP-3-02	183+20	45 ft. RT	~ 119.6
B-3-92	187+27	36 ft. RT	96.5
188th Ave to 192nd Place Vic.			
H-30-02	181+24	144 ft. LT	114.6
H-46-04	183+80	236 ft. LT	76.0
H-47-04	186+41	146 ft. LT	74.7
H-48-04	189+47	76 ft. LT	77.8
B-2-98	188+15	20 ft. LT	91.7
B-1-98	189+10	50 ft. RT	91.0
Wall 13			
SSB-1-99	191+02	59 ft. LT	68.9
SSB-2-99	192+05	51 ft. LT	65.9
H-15-02	193+00	21 ft. LT	72.6
SSB-4-99	194+00	48 ft. LT	67.7
B-2W-90	196+50	70 ft. LT	~ 68.5
SSB-7-99	196+98	48 ft. LT	69.1
H-16-02	197+98	48 ft. LT	69.1
SSB-10-99	199+88	48 ft. LT	69.0
Wall 14			
H-40-03	195+60	37 ft. RT	72.7
H-41-03	199+64	35 ft. RT	73.7

Test Hole	Station	Offset	Elev. (ft.)
Bridge 202/46			
H-1-28	201+21	15 ft. RT	70.5
MW-3-99	201+51	11 ft. LT	70.5
TP-5-99	201+92	68 ft. LT	70.4
B-8-92	202+90	85 ft. LT	~70.1
192nd Place to 196 Ave NE Vic. – Wetland Areas			
MW-4-99	196+23	179 ft. LT	68.8
TP-4A-99	197+71	176 ft. LT	69.1
TP-4B-99	198+27	182 ft. LT	69.4
P-4-00	201+08	451 ft. RT	72.7
TP-6-99	202+19	218 ft. LT	76.5
P-5-00	202+45	290 ft. RT	71.1
P-6-00	203+14	488 ft. RT	74.2
H-17-02	202+83	46 ft. RT	72.2
196 Ave NE to NE 55th Place Vicinity			
P-23-00	203+60	120 ft. LT	75.9
P-24-00	207+60	70 ft. LT	80.2
Turple Wetland Mitigation Area			
P-7-00	205+33	453 ft. RT	78.5
P-8-00	206+50	216 ft. RT	78.1
P-9-00	207+96	404 ft. RT	81.6
P-10-00	209+72	128 ft. RT	72.9
P-11-00	209+88	319 ft. RT	78.1
Wall 15			
MW-6-99	203+72	43 ft. RT	72.9
H-18-02	205+73	43 ft. RT	72.9
H-36-02	212+43	52 ft. RT	74.2
H-37-02	214+87	45 ft. RT	74.5
MW-2-99	216+79	50 ft. RT	80.6
H-26-02	220+39	57 ft. RT	77.4
Junction SR-202 and 204th Place			
TH-4-01	223+50	39 ft. LT	~82.2
B-5-92	224+50	55 ft. RT	~80.7
TH-3-01	225+01	27 ft. RT	79.6

Test Hole	Station	Offset	Elev. (ft.)
Hillside – Wall 16			
H-19-02	212+07	74 ft. LT	94.3
H-20-02	213+50	78 ft. LT	96.8
H-20A-02	213+67	151 ft. LT	109.6
H-21-02	215+92	66 ft. LT	104.0
H-34-02	216+32	382 ft. LT	187.9
H-35-02	216+95	77 ft. LT	108.1
H-35A-02	216+98	77 ft. LT	108.7
H-22-02	217+19	167 ft. LT	134.3
H-22A-02	217+24	175 ft. LT	136.4
H-23-02	218+58	73 ft. LT	101.2
H-23A-02	218+30	119 ft. LT	118.5
H-24-02	219+77	106 ft. LT	96.6
H-25-02	221+41	105 ft. LT	102.1
H-25A-02	221+35	92 ft. LT	102.7
Wall 17			
H-42-03	227+21	70 ft. LT	93.1
Wall 18			
H-43-03	229+37	76 ft. LT	85.4
H-27-02	231+50	60 ft. LT	~76
B-4E-90	235+35	100 ft. LT	~77
Wall 19			
H-45-03	233+38	35 ft. RT	79.7
B-1-92	236+00	30 ft. RT	~82
Wall 20 and Bridge No. 202/47			
H-28-02	237+23	26 ft. RT	82.1
H-29-02	238+54	17 ft. LT	82.9
SR-202 and Sahalee Way NE			
TH-2-01	244+00	70 ft. LT	81.6
TH-1-01	243+91	40 ft. RT	83.8

Test Hole	Station	Offset	Elev. (ft.)
Happy Valley Wetland Mitigation Area			
P-12-00	235+55	465 ft. RT	83.0
P-13-00	236+59	250 ft. RT	77.4
P-14-00	237+83	413 ft. RT	87.9
MW-1-99	238+75	68 ft. RT	78.7
MW-1A-99	238+98	75 ft. RT	79.4
P-15-00	239+43	202 ft. RT	88.2
TP-8B-99	240+25	69 ft. RT	84.5
TP-8A-99	240+84	71 ft. RT	84.4
P-16-00	242+62	217 ft. RT	87.7
TP-9A-99	243+67	70 ft. RT	~84.5
TP-9B-99	242+67	80 ft. RT	84.7
H-38-02	243+94	280 ft. RT	89.0
H-31-02	246+60	499 ft. RT	101.4
H-32-02	242+22	831 ft. RT	119.0
H-33-02	237+42	861 ft. RT	129.5

Definitions of Field Explorations and Instrumentation

In the test hole either a standard penetration test (SPT) or an undisturbed sample were performed and samples taken at between 5-foot to 10-foot intervals. In fine-grained soils, either a Shelby tube or Washington Undisturbed Sampler was pushed followed by a SPT. The disturbed soil samples were visually identified in the field and then submitted to the Materials Laboratory for a more detailed classification.

The Standard Penetration Test (SPT) is the most widely used method for determining soil conditions in the world. Disturbed soil samples were obtained in general accordance with ASTM D-1586. SPTs are obtained by driving a 2-inch outside diameter split-spoon sampler 18 inches into the soil with a 140-pound weight falling a distance of 30 inches. The number of blows required to achieve each 6 inches of penetration is recorded and the soil's SPT resistance, or N-value, is calculated as the number of blows required to achieve the final 12 inches of penetration. The samples are designated by the preface of D.

A portable-penetrometer test is a dynamic penetration test, which is a derivative of the SPT test. The penetrometer consists of a cone-shaped tip attached to dill rod sections (one inch OD steel pipe), and a hammer section. The hammer section consists of a 35-lb weight free falling 25.5 inches and impacting on the drill rod coupling device. The weight is manually raised and allowed to free fall and impact the dill rods. The number of blows per six inches is counted. The test holes are designated by the preface of PP.

A Washington Undisturbed Sampler consists of a 2.4-inch outside diameter steel tube sampler with brass tube liners that is pushed into fine-grained soils using hydraulic pressure to obtain relatively undisturbed samples. The brass tubes that fit inside the sampler are 4 inches long and have inside diameters of 1.915 inches. The samples are designated by the preface of U.

Shelby tube undisturbed sampler consist of either a 2.0 inch or 3.0 inch outside diameter thin walled steel tube that is pushed into fine-grained soils using hydraulic pressure. The tube is 30 inches long with a wall thickness of approximately 0.067 inches with a beveled end that acts like a cookie cutter. The samples are designated by the preface of S.

Open standpipe piezometers are constructed of 2-inch diameter Schedule 40 PVC pipe with a 2-foot long screened section for a tip. Piezometer tips were surrounded with pea gravel. A seal of either bentonite or Hole Plug was used to cap the pea gravel from the ground surface. In general each piezometer was enclosed at the surface by a steel monument seated is concrete. A water level is measured by a water level indicator device, which consists of a graduated cable with a steel weight at its lower end. The upper end of the cable I connected to a battery operated indicator light and/or buzzer. When the probe is lowered into the standpipe and encounters the water surface, the electrical circuit is complete and the length of cable can be measured.

The vibrating wire piezometer consists of a tension wire that is attached to the midpoint of a diaphragm, which is encased a dried and hermetically sealed cavity. Deflection of the diaphragm causes changes in the wire tension. Measurements can be electronically made and collected in a frequency counter via a signal cable to a readout unit. The vibrating wire piezometer was attached to a TDR cable, lowered into the test hole at the desired depth, and then the hole was grouted. The readout box and batteries are housed in a steel monument located at the ground surface.

The inclinometer system consist of a guide casing with oriented tracked groves in its side walls, and a probe that contain a gravity-sensing transducer design to measure inclination with respect to the vertical. The casing is grouted into the test hole. A portable probe, which attached by a graduated electrical cable to a read out unit, is use to measure the horizontal deflection of the casing. The probe is lowered to the bottom and an inclination reading is made at known depth intervals. A series of reading are required after the initial readings to measure the differences between the initial readings. These differences allow calculation of absolute horizontal deformation at any point along the casing.

GrfcTextBORLEGSOIL 6/15/2004 8:51:04 AM

Washington State
Department of Transportation

Test Boring Legend

Sampler Symbols

	Standard Penetration Test
	Oversized Penetration Test (Dames & Moore, California)
	Shelby Tube
P	Piston Sample
	Washington Undisturbed
	Vane Shear Test
	Core
	Becker Hammer
B	Bag Sample

Well Symbols

	Cement Surface Seal
	Piezometer Pipe in Granular Bentonite Seal
	Piezometer Pipe in Sand
	Well Screen in Sand
	Granular Bentonite Bottom Seal
	Inclinometer Casing in Concrete Bentonite Grout

Laboratory Testing Codes

UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
UC	Unconfined Compression Test
DS	Direct Shear Test
CN	Consolidation Test
GS	Grain Size Distribution
MC	Moisture Content
SG	Specific Gravity
OR	Organic Content
DN	Density
AL	Atterberg Limits
PT	Point Load Compressive Test
SL	Slake Test
DG	Degradation
LA	LA Abrasion
HT	Hydrometer Test

Soil Density Modifiers

Gravel, Sand & Non-plastic Silt		Elastic Silts and Clay	
SPT Blows/ft	Density	SPT Blows/ft	Consistency
0-4	Very Loose	0-1	Very Soft
5-10	Loose	2-4	Soft
11-24	Medium Dense	5-8	Medium Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

Angularity of Gravel & Cobbles

Angular	Coarse particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Coarse grained particles are similar to angular but have rounded edges.
Subrounded	Coarse grained particles have nearly plane sides but have well rounded corners and edges.
Rounded	Coarse grained particles have smoothly curved sides and no edges.

Soil Moisture Modifiers

Dry	Absence of moisture; dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water

Soil Structure

Stratified	Alternating layers of varying material or color at least 6mm thick; note thickness and inclination.
Laminated	Alternating layers of varying material or color less than 6mm thick; note thickness and inclination.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, somtimes striated.
Blocky	Cohesive soil that can be broken down into smaller angular lumps which resist further breakdown.
Disrupted	Soil structure is broken and mixed. Infers that material has moved substantially - landslide debris.
Homogeneous	Same color and appearance throughout.

HCL Reaction

No HCL Reaction	No visible reaction.
Weak HCL Reaction	Some reaction with bubbles forming slowly.
Strong HCL Reaction	Violent reaction with bubbles forming imediately.

Degree of Vesicularity of Pyroclastic Rocks

Slightly Vesicular	5 to 10 percent of total
Moderately Vesicular	10 to 25 percent of total
Highly Vesicular	25 to 50 percent of total
Scoriaceous	Greater than 50 percent of total

GrfcTextBORLEGROCK 5/6/2003 2:02:33 PM

Washington State
Department of Transportation

Test Boring Legend

Grain Size

Fine Grained	< 1mm	Few crystal boundaries/grains are distinguishable in the field or with hand lens.
Medium Grained	1mm to 5mm	Most crystal boundaries/grains are distinguishable with the aid of a hand lens.
Coarse Grained	> 5mm	Most crystal boundaries/grains are distinguishable with the naked eye.

Weathered State

Term	Description	Grade
Fresh	No visible sign of rock material weathering; perhaps slight discoloration in major discontinuity surfaces.	I
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than its fresh condition.	II
Moderately Weathered	Less than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as a continuous framework or as core stones.	III
Highly Weathered	More than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as discontinuous framework or as core stone.	IV
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.	V
Residual Soil	All rock material is converted to soil. The mass structure and material fabric is destroyed. There is a large change in volume, but the soil has not been significantly transported.	VI

Relative Rock Strength

Grade	Description	Field Identification	Uniaxial Compressive Strength approx
R1	Very Weak	Specimen crumbles under sharp blow from point of geological hammer, and can be cut with a pocket knife.	150-3500 psi
R2	Moderately Weak	Shallow cuts or scrapes can be made in a specimen with a pocket knife. Geological hammer point indents deeply with firm blow.	3500-7500 psi
R3	Moderately Strong	Specimen cannot be scraped or cut with a pocket knife, shallow indentation can be made under firm blows from a hammer.	7500-15000 psi
R4	Strong	Specimen breaks with one firm blow from the hammer end of a geological hammer.	15000-350000 psi
R5	Very Strong	Specimen requires many blows of a geological hammer to break intact sample.	Greater than 30000 psi

Discontinuities

Spacing	
Very Widely	Greater than 3 m
Widely	1 m to 3 m
Moderately	0.3 m to 1 m
Closely	50 mm to 300 mm
Very Closely	Less than 50 mm

RQD (%)

$$\frac{100(\text{length of core in pieces} > 100\text{mm})}{\text{Length of core run}}$$

Condition	
Excellent	Very rough surfaces, no separation, hard discontinuity wall
Good	Slightly rough surfaces, separation less than 1 mm, hard discontinuity wall.
Fair	Slightly rough surfaces, separation greater than 1 mm, soft discontinuity wall.
Poor	Slickensided surfaces, or soft gouge less than 5 mm thick, or open discontinuities 1 to 5 mm.
Very Poor	Soft gouge greater than 5 mm thick, or open discontinuities greater than 5 mm.

Fracture Frequency (FF) is the average number of fractures per 300 mm of core.
Does not include mechanical breaks caused by drilling or handling.

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. H-1-28

Job No. OL-3498 SR 202 Elevation 70.4 ft (21.5 m)

Sheet 1 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector _____

Start _____, 1928 Completion _____, 1928 Well ID# _____ Equipment N/A

Station 201+21 Offset 15' Rt. Casing _____ Method _____

Northing 569828.221 Easting 1661403.395 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
								Top soil soft mud(Brown SILT with sand and organics)		
5	1									
10	2									
15	3			10						
20	4									
	5							Coarse SAND and gravel (Water bearing) (SAND with gravel and silt to well graded GRAVEL with sand)		
	6									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. H-1-28

Job No. OL-3498 SR 202 Elevation 70.4 ft (21.5 m)

Sheet 2 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
25	7									
30	8									
	9									
	10			33				Gravely Hard Pan (very dense silty SAND)		
35	11			37						
40	12							Coarse SAND and fine gravel. Increasing coarseness with depth. (poorly graded gravel with sand)		
45	13									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. H-1-28

Job No. OL-3498 SR 202 Elevation 70.4 ft (21.5 m)

Sheet 3 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
	14									
	15									
50				50						
								End of Test Hole Boring at 50 feet below ground elevation.		
	16									
55										
	17									
	18									
60										
	19									
65										
	20									
	21									
70										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 048997

HOLE No. BC-1-01

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 47.8 ft (14.6 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike Brun Lic# 1711

Site Address

Inspector Mike Brun

Start January 3, 2001 Completion January 3, 2001 Well ID#

Equipment CME 850 w/ autohammer

Station 114+79 Offset 151' Lt. Casing Hollow Stem Method Auger

Northing 575041.568 Easting 1654929.034 Latitude Longitude

County King Subsection SW 1/4 of the NE 1/4 Section 12 Range 5 EWM Township 25 N

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
						SS-1		Well graded GRAVEL with sand, and few cobbles, subrounded, medium dense, brown, moist, Homogeneous, no HCl reaction, Retained 40lb. Bag sample.		
5	1			4 5 6 (11)		D-1	GS MC	SM, M.C=9% Silty SAND, medium dense, brown, moist, Homogeneous, no HCl reaction. Length Recovered 1.3 ft, Length Retained 1.3 ft		
	2					SS-2		Sandy SILT with gravel, loose, dark gray, moist, Homogeneous, no HCl reaction, Retained 40lb. Bag sample.		
10	3			23 15 22 (37)		D-2	GS MC	SM, M.C.=2% Silty SAND with gravel, dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft	11/1/02	
	4					SS-3		Well graded GRAVEL with sand, subrounded, dense, gray-brown, dry, Homogeneous, no HCl reaction, Retained 40lb. Bag sample.	4/23/02	
15	5			25 21 19 (40)		D-3	GS MC	GP, M.C.=5% Poorly graded GRAVEL with sand, dense, gray-brown, wet, Homogeneous, no HCl reaction Length Recovered 0.4 ft, Length Retained 0.4 ft		
	6					SS-4		Silty SAND with gravel, dense, gray, moist, Homogeneous, no HCl reaction, Retained 40lb. Bag sample.		
20										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 048997

HOLE No. BC-1-01

Job No. OL-3498 SR 202 Elevation 47.8 ft (14.6 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike Brun Lic# 1711

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
				23 15 14 (29)		D-4	GS MC	SM, M.C.=8% Silty SAND with gravel, dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 0.6 ft, Length Retained 0.6 ft		
	7					SS-5		Silty SAND with gravel, dense, gray, wet, Homogeneous, no HCl reaction, Retained 40lb. Bag sample.		
25	8			4 10 12 (22)		D-5		Silty SAND with gravel, medium dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 0.6 ft, Length Retained 0.6 ft		
								End of test hole boring at 26.5 ft below ground elevation.		
30	9							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
35	10									
40	11									
45	12									
	13									

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
1/3/2001	-16.5	31.3
3/27/2002	-12.67	35.1
4/23/2002	-12.3	35.5
5/22/2002	-12.6	35.2
6/20/2002	-13.1	34.7
8/13/2002	-16.95	30.86
9/30/2002	-17.2	30.6
11/1/2002	-17.4	30.4
12/18/2002	-17.2	30.6
2/11/2003	-13.8	34.0
3/18/2003	-13.5	34.3
5/6/2003	-13.3	34.5
6/5/2003	-15.3	32.5
7/23/2003	-16.1	31.7
9/23/2003	-17.3	30.5
12/9/2003	-12.2	35.6
1/16/2004	-12.2	35.6
2/23/2004	-12.2	35.6
4/6/2004	-12.7	35.1
5/11/2004	-13.2	34.6
6/23/2004	-16.0	31.8

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-048997

HOLE No. BC-2-01

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 40.1 ft (12.2 m)

Project SR 202 - SR520 to Sahalee Way NE Driller Mike Brun Lic# 1711

Site Address Inspector Mike Brun

Start January 2, 2001 Completion January 2, 2001 Well ID# Equipment CME 850 w/ autohammer

Station 115+52 Offset 147' Rt. Casing Hollow Stem Method Auger

Northing 574739.579 Easting 1654872.326 Latitude Longitude

County King Subsection SW 1/4 of the NE 1/4 Section 12 Range 5 EWM Township 25 N

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
					B	SS-1		Well graded SAND with gravel, trace of cobbles, medium dense, brown, moist, Homogeneous, no HCl reaction, Retained 40 lb. Bag sample.		
5	1			10 12 16 (28)		D-1		Well graded SAND with gravel, subrounded, dense, brown, dry, Homogeneous, no HCl reaction. Length Recovered 0.5 ft, Length Retained 0.5 ft		
	2				B	SS-2		Silty SAND with gravel, subrounded, medium dense, gray, moist, Homogeneous, no HCl reaction, Retained 40 lb. Bag sample.	4/23/02	
10	3			4 4 6 (10)		D-2		Silty SAND with gravel, subrounded, loose, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.4 ft, Length Retained 0.4 ft	11/1/02	
	4				B	SS-3		Silty SAND with gravel, subrounded, loose, brown, wet, Homogeneous, no HCl reaction, Retained 40 lb. Bag sample.		
15	5			11 21 16 (37)		D-3		Poorly graded GRAVEL with sand, subrounded, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	6				B	SS-4		Well graded GRAVEL with sand, subrounded, medium dense, brown, wet, Homogeneous, no HCl reaction, Retained 40 lb. Bag sample.		
20										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-048997

HOLE No. BC-2-01

Job No. OL-3498 SR 202 Elevation 40.1 ft (12.2 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike Brun Lic# 1711

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
				5 11 10 (21)		D-4		Well graded SAND with gravel, subrounded, medium dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	7					SS-5		Well graded GRAVEL with sand, subrounded, medium dense, brown, wet, Homogeneous, no HCl reaction, Retained 40 lb. Bag sample.		
25	8			14 16 17 (33)		D-5		Well graded SAND with gravel, subrounded, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
30	9							End of test hole boring at 26.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
35	10									
40	11									
45	12									
	13									

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
1/2/2001	-9.20	30.9
3/27/2002	-7.25	32.8
4/23/2002	-7.20	32.9
5/22/2002	-7.60	32.5
6/20/2002	-8.50	31.6
8/13/2002	-9.35	30.7
9/30/2002	-9.50	30.6
11/1/2002	-9.8	30.3
12/18/2002	-9.7	30.4
2/11/2003	-6.3	33.8
3/18/2003	-6.1	34.0
5/6/2003	-6.0	34.1
6/5/2003	-7.7	32.4
7/23/2003	-8.6	31.5
9/23/2003	-9.5	30.6
12/9/2003	-5.1	35.0
1/16/2004	-5.0	35.1
2/23/2004	-4.8	35.3
4/6/2004	-5.3	34.8
5/11/2004	-6.1	34.0
6/23/2004	-8.5	31.6

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-1-99

Sheet 1 of 4

Job No. OL-3498 SR 202 Elevation 78.7 ft (24.0 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector B. Thurber(HWA Inc.)

Start August 3, 1999 Completion August 5, 1999 Well ID# _____ Equipment Mud rotary, CME 850

Station 238+75 Offset 68' Rt. Casing _____ Method _____

Northing 569972.042 Easting 1665021.488 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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 1 1 (2)		S-1		Very soft, brownish gray, SILT, with occasional fine gravel and organics, moist.		
								Loose, gray, silty, sandy GRAVEL, wet. Poor recovery. **(OUTWASH)**		
	1			1 1 6 (7)		S-2				
5				13 17 13 (30)		S-3		Becomes dense, brown, silty, sandy, fine to coarse GRAVEL, subrounded, wet.	▽ 8/5/99	
	2			22 23 22 (45)		S-4				
10	3			27 19 20 (39)		S-5				
	4			15 28 16 (44)		S-6				
15				9 16 17 (33)		S-7				
	5			15 20 17 (37)		S-8				
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/8/04,8:35:28 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-1-99

Job No. OL-3498 SR 202 Elevation 78.7 ft (24.0 m)

Sheet 2 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
				27 27 22 (49)		S-9				
	7									
25				7 12 12 (24)		S-10		Becomes medium dense.		
	8									
	9									
30				7 8 12 (20)		S-11		Becomes gray.		
								Gravelly drilling, gravel collapsing on barrel.		
	10									
35				10 15 19 (34)		S-12		Hard, gray, SILT, with silty fine sand in upper 2", mostly massive, wet. **(GLACIOLACUSTRINE)**		
	11									
	12									
40				10 17 22 (39)		S-13		Hard, gray, massive, SILT, non-plastic, slightly fine sandy, granular coarse silt, wet.		
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-1-99

Job No. OL-3498 SR 202 Elevation 78.7 ft (24.0 m)

Sheet 3 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
	14			16 24 24 (48)		S-14		Dense, gray, fine to medium SAND, wet.		
	15									
50				13 22 28 (50)		S-15		Dense, gray, interbedded SILT, sandy SILT, and fine to medium SAND, wet.		
	16									
55	17			15 21 27 (48)		S-16		Dense, gray, silty, fine SAND, wet. **(OUTWASH)**		
	18									
60				10 16 24 (40)		S-17		Dense, gray, slightly silty, fine to medium SAND, with coarse sand and pebbles, wet.		
	19									
65	20		>>	9 26 50/5" (76/11")		S-18		Very dense, gray, medium to coarse SAND with interbed of fine SAND, occasional fine gravel, wet.		
	21									
70			>>							

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-1-99

Job No. OL-3498 SR 202 Elevation 78.7 ft (24.0 m)

Sheet 4 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
			>>	17 34 50 (84)		S-19		Very dense, gray, interbedded fine to medium SAND, wet.		
	22									
75	23		>>	24 30 37 (67)		S-20		Very dense, gray, fine to medium SAND, wet.		
	24									
80				43 50 (50/6")		S-21		Very dense, gray, silty, sandy, fine to coarse GRAVEL, wet.		
	25							Boring terminated at 81 feet.		
								Ground water observed at about 5 feet during drilling.		
								NOTE: Well installation not observed by HWA.		
85	26							WATER LEVEL READINGS		
								DATE / DEPTH / ELEVATION		
								8/5/99 / -5.0 / 73.7		
								7/10/2002 / -3.2 / 75.5		
								8/13/2002 / -3.1 / 75.6		
								9/30/2002 / -3.1 / 75.6		
	27									
90										
	28									
95										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-1A-99

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 79.4 ft (24.2 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic#. _____

Site Address _____

Inspector B. Thurber(HWA Inc.)

Start August 9, 1999 Completion August 10, 1999 Well ID# _____ Equipment HSA, CME 850

Station 238+98 Offset 75' Rt. Casing _____ Method _____

Northing 569964.558 Easting 1665042.72 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
								Medium dense, silty, sandy, fine to coarse GRAVEL, moist grading to wet.		
5	1, 2							Becomes dense.		
10	3, 4									
15	5, 6							Boring terminated at 15 feet.		
20										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
7/10/2002	-3.2	76.2
8/13/2002	-3.1	76.2
9/30/2002	-3.2	76.2

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/8/04,8:36:50 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-2-99

Job No. OL-3498 SR 202 Elevation 80.6 ft (24.6 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector G. Emens

Start August 18, 1999 Completion August 18, 1999 Well ID# _____ Equipment HSA, CME 850

Station 216+79 Offset 50' Rt. Casing _____ Method _____

Northing 569512.0224 Easting 1662932.3211 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
								Very dense, silty, sandy GRAVEL, difficult drilling, moist.		
	1			1 3 5 (8)		S-1		Medium stiff, tan-brown, mottled, iron oxide, slightly sandy, SILT, moist. Easier drilling. 2/23/04		
5	2			1 2 4 (6)		S-2		Medium stiff, light to medium brown, SILT, moist. 9/30/02		
10	3									
	4			1 2 3 (5)		S-3				
15	5									
				2 4 4 (8)		S-4		Loose, gray, silty SAND, wet.		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/28/04,12:50:02 P6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-2-99

Job No. OL-3498 SR 202 Elevation 80.6 ft (24.6 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
								Medium stiff grading to stiff, gray, slightly sandy, SILT, wet.		
	7			1 3 5 (8)		S-5				
25										
	8			1 5 7 (12)		S-6				
30	9									
	10			8 14 19 (33)		S-7		Dense, gray, silty, fine to medium SAND, wet.		
35	11							Boring terminated at 34 feet.		
								Ground water observed at about 17 feet during drilling.		
40	12									
45	13									

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
8/18/1999	-17.0	63.7
7/10/2002	-6.8	73.9
8/13/2002	-7.6	73.1
9/30/2002	-7.7	73.0
11/1/2002	-6.7	74.0
12/18/2002	-6.6	74.1
02/11/2003	-5.5	75.2
03/18/2003	-5.8	74.9
05/06/2003	-5.6	75.1
06/05/2003	-6.6	74.1
07/27/2003	-7.1	73.6
09/23/2003	-7.5	73.2
12/09/2003	-5.3	75.4
01/16/2004	-5.1	75.6
02/23/2004	-3.2	77.5
04/06/2004	-4.1	76.6
05/11/2004	-4.2	76.5
06/23/2004	-6.9	73.8

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-3-99

Sheet 1 of 3

Job No. OL-3498 SR 202 Elevation 70.5 ft (21.5 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector B. Thurber(HWA Inc.)

Start August 12, 1999 Completion August 13, 1999 Well ID# _____ Equipment Mud rotary, CME 850

Station 201+51 Offset 11' Lt Casing _____ Method _____

Northing 569844.482 Easting 1661439.314 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
								Loose to medium dense, light brown, slightly silty, sandy, fine to coarse GRAVEL, moist. (FILL)		
				2 3 4 (7)		S-1		Loose, gray, fine to coarse sandy, fine GRAVEL, wet.		
5	1			5 4 3 (7)		S-2				
	2			0 1 1 (2)		S-3		Very soft, light grey, slightly gravelly, SILT, wet. **(ALLUVIUM)**		
								Very soft, dark brown, silty, PEAT, wet.		
10	3			9 9 9 (18)		S-4		Medium dense, greenish gray, slightly gravelly, very silty, fine to coarse SAND, wet.		
	4			4 8 9 (17)		S-5		Medium dense, olive brown, silty, fine to coarse, sandy, fine GRAVEL, wet.		
15	5									
	6			4 9		S-6		Sample washed; sand and gravel.		
20										

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/8/04,11:18:24 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-3-99

Job No. OL-3498 SR 202 Elevation 70.5 ft (21.5 m)

Sheet 2 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		12 (21)						
	7	17 18 22 (40)		S-7		Dense, olive brown, silty, sandy, fine to coarse GRAVEL, wet.		
25	8	>> 20 29 29 (58)		S-8		Very dense, greenish gray, slightly silty, medium to coarse sandy, fine to coarse GRAVEL, wet. **(GLACIAL TILL)**		
30	9							
	10	>> 37 27 50 (77)		S-9		Becomes olive-brown, silty.		
35	11	>> 19 18 50/4" (68/10")		S-10		Very dense, olive-brown, fine to medium SAND with interbeds of silt, wet.		
40	12							
	13	>> 38 47 50/5" (97/11")		S-11				
45								

Standard Penetration Blows/ft: 10 20 30 40

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-3-99

Job No. OL-3498 SR 202 Elevation 70.5 ft (21.5 m)

Sheet 3 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
	14			41 50/6" (50/6")		S-12				
	15							Boring terminated at 48.5 feet.		
50										
	16									
55										
	17									
	18									
60										
	19									
65										
	20									
	21									
70										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
8/8/2000	-1.52	69.0
9/5/2000	-1.55	67.0
10/12/2000	-1.10	69.4
11/27/2000	-0.36	70.2
12/17/2000	0.65	71.2
1/16/2001	0.65	71.2
2/21/2001	0.25	70.8
4/19/2001	-0.12	70.4
6/25/2001	-0.48	70.0
7/31/2001	-0.97	69.6
8/28/2001	-1.22	69.3
9/17/2001	-1.26	69.3
10/22/2001	-0.58	69.9
12/20/2001	-0.03	70.5
1/23/2002	0.15	70.7
2/20/2002	-0.16	70.4
3/27/2002	0.02	70.5
4/23/2002	0.05	70.6
5/22/2002	0.15	70.7
6/20/2002	-0.25	70.3
7/10/2002	-1.5	68.9
8/13/2002	-1.6	69.0
9/30/2002	-1.6	69.2
11/1/2002	-1.4	69.3
12/18/02	-1.4	69.4
2/11/2003	-0.5	71.3
3/8/2003	-0.5	71.3
5/6/2003	-0.7	71.1
6/5/2003	-1.0	71.0
7/23/2003	1.3	70.0
9/23/2003	Destroyed	

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-4-99

Sheet 1 of 3

Job No. OL-3498 SR 202 Elevation 68.8 ft (21.0 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector B. Thurber(HWA Inc.)

Start July 29, 1999 Completion July 29, 1999 Well ID# _____ Equipment HSA, CME 850

Station 196+24 Offset 179' Lt. Casing _____ Method _____

Northing 570151.408 Easting 1660977.951 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
								Loose, brown, fine sandy SILT, abundant rootlets, moist.		
	1			2 3 3 (6)		S-1		Medium stiff, rust-mottled tan, brown, and bluish gray, SILT with occasional fine organics, moist. **(ALLUVIUM)**		
5	2			1 2 2 (4)		S-2		Soft, rust mottled dark brownish gray, slightly fine sandy, SILT (plastic), moist to wet.	▽	
10	3			1 1 3 (4)		S-3		Soft, bluish-gray, SILT grading to loose, silty fine SAND, wet.		
15	5			2 3 3 (6)		S-4	GS MC	ML, M.C.=20% SILT,Loose, bluish-gray, laminated, wet.		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/8/04,11:45:49 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-4-99

Job No. OL-3498 SR 202 Elevation 68.8 ft (21.0 m)

Sheet 2 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
				3 11 11 (22)		S-5		Medium dense, bluish-gray, silty, fine sandy, fine GRAVEL, wet. **(OUTWASH)**		
25	7		>>	11 33 22 (55)		S-6		Becomes dense, olive-brown; gravel is fine to coarse. [Gravelly drilling action, slow drilling; 1/2 hr. to drill from 25 to 30 feet.]		
30	8 9		>>	50 50/3" (50/3")		S-7		End of Boring at 30.75 feet. Ground water observed at about 6 feet during drilling.		
35	10 11									
40	12 13									
45										

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/8/04,11:47:54 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-4-99

Job No. OL-3498 SR 202 Elevation 68.8 ft (21.0 m)

Sheet 3 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
	14							WATER LEVEL READINGS		
								DATE / DEPTH / ELEVATION		
								7/29/1999 -6.00 62.83		
								8/8/2000 -1.02 67.8		
								9/5/2000 -1.05 67.8		
								10/11/2000 -1.26 67.6		
								11/27/2000 -0.17 68.7		
								12/17/2000 -0.42 68.4		
								1/16/2001 -0.32 68.5		
								2/21/2001 0.55 69.4		
								4/19/2001 0.42 68.4		
	15							6/25/2001 -0.08 68.8		
								7/31/2001 -1.27 67.6		
50								8/28/2001 -1.68 67.1		
								9/17/2001 -1.83 67.0		
								10/22/2001 -0.05 68.8		
								12/20/2001 0.08 68.9		
								1/23/2002 -0.08 68.9		
								2/20/2002 -1.46 67.4		
	16							3/27/2002 -0.52 68.3		
								4/23/2002 -0.52 68.3		
								5/22/2002 -0.52 68.3		
								6/20/2002 -1.12 67.7		
								8/13/2002 -0.9 67.9		
								9/30/2002 -1.0 67.8		
								11/1/2002 -1.0 67.8		
55								12/18/2002 -0.7 68.1		
								02/11/2003 -0.8 68.0		
	17							03/18/2003 -0.8 68.0		
								05/06/2003 -1.0 67.8		
								06/05/2003 -0.7 68.1		
								07/23/2003 -0.9 67.9		
								09/23/2003 -1.2 67.6		
								12/09/2003 -0.4 68.4		
								02/23/2004 -0.5 68.3		
								04/06/2004 -1.1 67.7		
								05/11/2004 -1.5 67.3		
	18							06/23/2004 -0.9 67.9		
60										
	19									
65										
	20									
	21									
70										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-5-99

Job No. OL-3498 SR 202 Elevation 53.0 ft (16.2 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector N. Hagestedt

Start July 12, 1999 Completion July 15, 1999 Well ID# _____ Equipment Mud rotary, Dietric D25

Station 136+00 Offset 70' Rt. Casing _____ Method _____

Northing 573456.3079 Easting 1656430.9215 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
				7 6 5 (11)		S1		Loose, gray to olive-brown, slightly silty, gravelly, fine to medium SAND, moist. Organics at tip. (FILL)		
5	1									
	2			3 3 4 (7)		S2				
10	3							Medium dense, yellowish-brown, silty, fine to medium SAND, moist to wet. Trace coarse sand. **(ALLUVIUM)**		
				5 7 10 (17)		S3				
	4									
15								Medium dense, yellowish brown, fine to coarse SAND with fine gravel, wet. Subrounded to subangular.		
	5			5 6 8 (16)		S4				
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/19/04;1:05:48 P8

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-5-99

Job No. OL-3498 SR 202 Elevation 53.0 ft (16.2 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
				9 6 11 (17)		S5	GS MC	SM, M.C.=1% Silty SAND with gravel 21 to 24 feet: Becomes more gravelly (fine to coarse).		
	7									
25								Medium dense, green, gray & brown, slightly silty, sandy, fine to coarse GRAVEL, wet.		
	8			17 9 13 (22)		S6				
								Dense, grayish brown, slightly silty, fine to coarse gravelly, fine to coarse SAND, wet. Sub-rounded to rounded.		
	9									
30				18 20 23 (43)		S7				
	10							Boring terminated at 32.5 feet. Ground water measured at 19.8-feet (casing depth = 31-feet) below ground surface during drilling.		
35										
	11									
	12									
40										
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-6-99

Sheet 1 of 4

Job No. OL-3498 SR 202 Elevation 72.9 ft (22.2 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector N. Hagestedt

Start July 20, 1999 Completion July 27, 1999 Well ID# _____ Equipment Mud rotary, Dietric D25

Station 203+72 Offset 43' Rt. Casing _____ Method _____

Northing 569731.593 Easting 1661636.427 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
				2 3 2 (5)		S1		Medium stiff, brown, SILT, dry to moist. Trace fine to medium sand, trace organics. 12/17/00		
	1			6 5 4 (9)		S2		3 to 6 feet: Becomes stiff, dark brown and moist with trace fine gravel. 9/17/01		
5										
	2							Medium dense, greenish gray, fine gravelly fine to coarse SAND with silt, wet. Nonplastic fines.		
				15 10 7 (17)		S3				
10	3									
				8 10 10 (20)		S4				
								Very dense, gray, silty GRAVEL with fine to coarse sand, wet. Subrounded sand and gravel.		
	4			25 15 12 (27)		S5		12.5-feet: Switched drilling method from water to mud rotary.		
15			>>	25 47 37 (84)		S6				
	5									
								Stiff, gray, CLAY, slightly moist. Moderate plasticity, homogeneous, pp >4.5.		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/4/04 11:05:46 A6

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

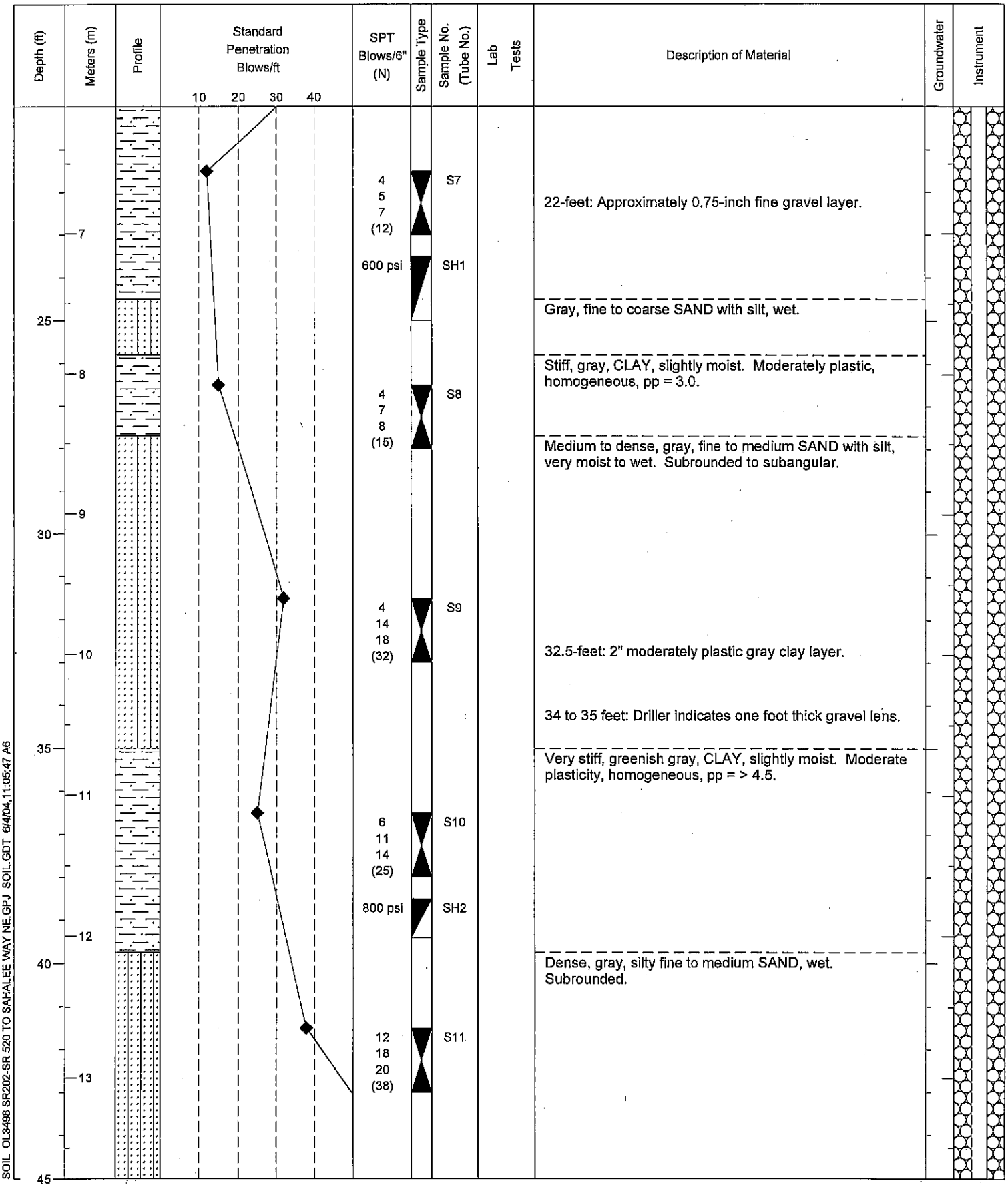
HOLE No. MW-6-99

Job No. OL-3498 SR 202 Elevation 72.9 ft (22.2 m)

Sheet 2 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____



22-feet: Approximately 0.75-inch fine gravel layer.

Gray, fine to coarse SAND with silt, wet.

Stiff, gray, CLAY, slightly moist. Moderately plastic, homogeneous, pp = 3.0.

Medium to dense, gray, fine to medium SAND with silt, very moist to wet. Subrounded to subangular.

32.5-feet: 2" moderately plastic gray clay layer.

34 to 35 feet: Driller indicates one foot thick gravel lens.

Very stiff, greenish gray, CLAY, slightly moist. Moderate plasticity, homogeneous, pp = > 4.5.

Dense, gray, silty fine to medium SAND, wet. Subrounded.

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. MW-6-99

Job No. OL-3498 SR 202 Elevation 72.9 ft (22.2 m)

Sheet 3 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
	14	23 33 44 (77)		S12		46.5 feet: No recovery, 3" gravel in shoe.
	15					
50						Very dense, gray, silty fine to coarse SAND with gravel.
	16	33 40 23 (63		S13	GS MC	SP-SM, M.C.=2% Poorly graded SAND with silt and gravel
						Gray, gravelly CLAY, moist.
55	17					55 to 59-feet: Boulders and gravels.
		Core 50/1"		S14 S15		
	18					Hard, gray, gravelly CLAY with silt and sand, moist.
60		38 50/5"(50/5")		S16	GS MC	SM, M.C.=1% Silty SAND with gravel
	19					Very dense, gray, COBBLES with sand.
65						63-feet: 8 to 10-inch boulder.
	20	100/3"		S17		
	21					Very dense, gray, silty fine to coarse SAND with fine gravel, wet.
70						

Standard Penetration Blows/ft: 10 20 30 40

Profile

Groundwater

Instrument

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. TP-1-99

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 52.8 ft (16.1 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector B. Thurber(HWA Inc.)

Start July 12, 1999 Completion July 12, 1999 Well ID# _____ Equipment Mud rotary, Dietric D25

Station 138+00 Offset 130' Rt. Casing _____ Method _____

Northing 573320.37719 Easting 1656426.133578 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
				6 11 13 (23)		S-1	GS MC	Medium dense, rust mottled, olive brown grading to rust-mottled gray, gravelly, silty, fine to coarse SAND, trace organics, moist. **(FILL)** SM, M.C.=7%		
								Silty SAND with gravel		
	1			6 10 11 (21)		S-2		Stiff, rust-mottled olive brown & gray, sandy SILT, moist.		
5								Medium dense, brown, slightly silty, sandy fine GRAVEL grading to slightly silty, fine to coarse SAND, moist. Occasional organics. Gravelly drilling action, slow drilling.		
	2			5 5 7 (12)		S-3		Becomes blackish-brown, silty.		
								Medium dense, olive brown, slightly silty, gravelly, fine to coarse SAND, moist. **(ALLUVIUM)**		
				4 5 5 (10)		S-4		No sample recovery		
10	3							Becomes fine to medium SAND.		
				3 5 5 (10)		S-5	GS MC	SW-SM, M.C.=11% Well graded SAND with silt and gravel Becomes slightly silty, slightly gravelly.		
	4									
				3 4 5 (9)		S-6		Becomes loose, rust-banded medium SAND.		
15	5			5 7 8 (15)		S-7		Becomes medium dense, fine to medium SAND.		
	6			6 6		S-8		Becomes olive-brown, fine gravelly, fine to coarse SAND, moist.		
20										

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/19/04,1:05:52 P8

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. TP-1-99

Job No. OL-3498 SR 202 Elevation 52.8 ft (16.1 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
				7 (13)						
								Boring terminated at 20.5 feet.		
								Drilling water draining into formation; water level measured at 10 feet below ground surface 15 minutes after drilling.		
	7									
25										
	8									
	9									
30										
	10									
35										
	11									
	12									
40										
	13									
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 06389

HOLE No. TH-1-01

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 83.8 ft (25.5 m)

Project SR 202 - SR520 to Sahalee Way NE Driller Jason Stewart Lic# 2520

Site Address Inspector Mike Brun

Start January 16, 2001 Completion January 16, 2001 Well ID# Equipment CME 45 w/ cathead

Station 243+91 Offset 40' Rt. Casing HQ Method Wet Rotary

Northing 569953.9065 Easting 1665526.4942 Latitude Longitude

County King Subsection SW 1/4 of the NE 1/4 Section 17 Range 6 EWM Township 25 N

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			12 10 18 (28)		D-1		Silty SAND with gravel, subangular, dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft 01/16/2001	▽	
5	2			5 10 15 (25)		D-2		Well graded SAND with gravel, subangular, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft		
10	3			15 25 18 (43)		D-3		Well graded SAND with gravel, subangular, dense, grayish brown, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft		
15	4			11 12 9 (21)		D-4	GS MC	GW-GM, M.C.=5% Well graded GRAVEL with silt and sand, subangular, medium dense, grayish brown, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft		
20	5			14 18		D-5		Well graded SAND with gravel, subangular, dense, grayish brown, wet, Homogeneous, no HCl reaction		
	6									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 06389

HOLE No. TH-1-01

Job No. OL-3498 SR 202 Elevation 83.8 ft (25.5 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 2520

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
				20 (38)				Length Recovered 0.3 ft, Length Retained 0.3 ft		
								End of test hole boring at 20.5 ft below ground elevation.		
								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	7									
25										
	8									
	9									
30										
	10									
35										
	11									
	12									
40										
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 06389

HOLE No. TH-2-01

Job No. OL-3498 SR 202 Elevation 81.6 ft (24.9 m)

Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 2520

Site Address

Inspector Mike Brun

Start January 17, 2001 Completion January 17, 2001 Well ID#

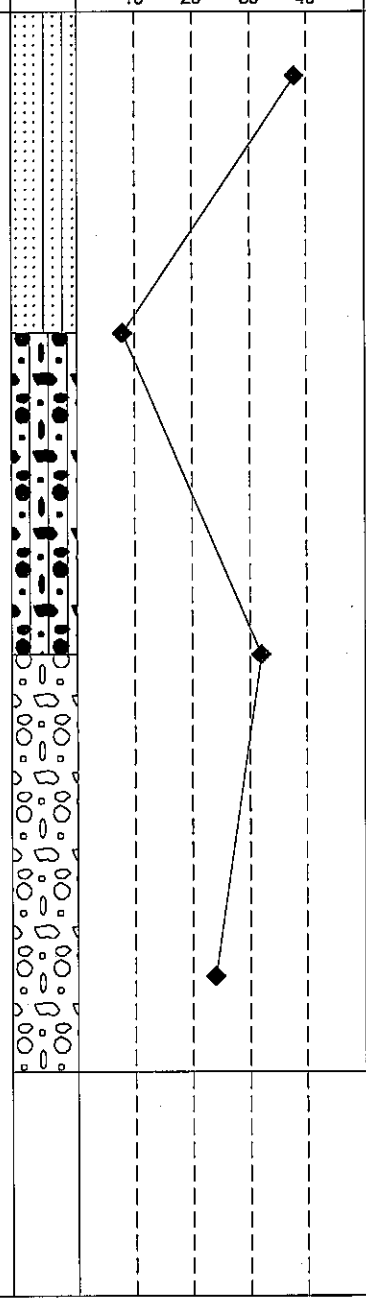
Equipment CME 45 w/ cathead

Station 244+00 Offset 70' Lt Casing HW

Method Wet Rotary

Northing 569922.7151 Easting 1665528.2405 Latitude Longitude

County King Subsection SW 1/4 of the NE 1/4 Section 17 Range 6 EWM Township 25 N



Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		5 18 20 (38)		D-1	GS MC	SP-SM, M.C.=9% Poorly graded SAND with silt and gravel, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.4 ft, Length Retained 0.4 ft 01/17/2001	▽	
5	1	2 3 5 (8)		D-2	GS MC	GM, MC=16%, SILTY grave with sandl, loose, dark brown, wet, Homogeneous, no HCl reaction, NOTE: Drilled through loose layer of silt from 4.0' to 7.0'. Material was dense after 7.0'. Length Recovered 0.3 ft, Length Retained 0.3 ft		
10	2	10 16 16 (32)		D-3		Well graded SAND with gravel, subangular and few silts, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft		
15	3	8 12 12 (24)		D-4		Well graded SAND with gravel, subangular and few silts, medium dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 0.2 ft, Length Retained 0.2 ft		
20	4 5 6					End of test hole boring at 16.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 06390

HOLE No. TH-3-01

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 79.6 ft (24.3 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 2520

Site Address

Inspector Mike Brun

Start January 18, 2001 Completion January 18, 2001 Well ID#

Equipment CME 850 w/ autohammer

Station 225+01 Offset 27' Rt. Casing Hollow Stem

Method Auger

Northing 569864.4982 Easting 1663684.0436 Latitude

Longitude

County King Subsection SE 1/4 of the NW 1/4 Section 17 Range 6 EWM Township 25 N

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
5	1			8 4 5 (9)		D-1		No Recovery		
	2							01/18/2001	▽	
				4 5 5 (10)		D-2		Sandy SILT with gravel, loose, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.1 ft, Length Retained 0.1 ft		
10	3			1 1 3 (4)		D-3		Sandy SILT with gravel, subangular, very loose, gray, wet, Laminated, no HCl reaction Length Recovered 0.6 ft, Length Retained 0.6 ft		
	4			1 1 2 (3)		D-4	GS MC AL	ML, M.C.=14%, LL=23 SILT with sand, very loose, gray, wet, Laminated, no HCl reaction Length Recovered 0.6 ft, Length Retained 0.6 ft		
15	5			3 4 5 (9)		D-5		SILT with sand, trace of organics, loose, gray, wet, Laminated, no HCl reaction Length Recovered 0.6 ft, Length Retained 0.6 ft		
20	6			1 3 4 (7)		D-6		SILT with sand, and trace of organics, loose, gray, wet, Laminated, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 06390

HOLE No. TH-3-01

Job No. OL-3498 SR 202 Elevation 79.6 ft (24.3 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 2520

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 9 12 (21)		D-7		Well graded SAND with gravel, medium dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
25	7			6 10 14 (24)		D-8	GS MC	SM, M.C.=16% Silty SAND with gravel, medium dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
	8							End of test hole boring at 26.5 ft below ground elevation.		
								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
30	9									
	10									
35	11									
40	12									
	13									
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 06390

HOLE No. TH-4-01

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 81.4 ft (24.8 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 2520

Site Address

Inspector Mike Brun

Start January 22, 2001 Completion January 22, 2001 Well ID#

Equipment CME 850 w/ autohammer

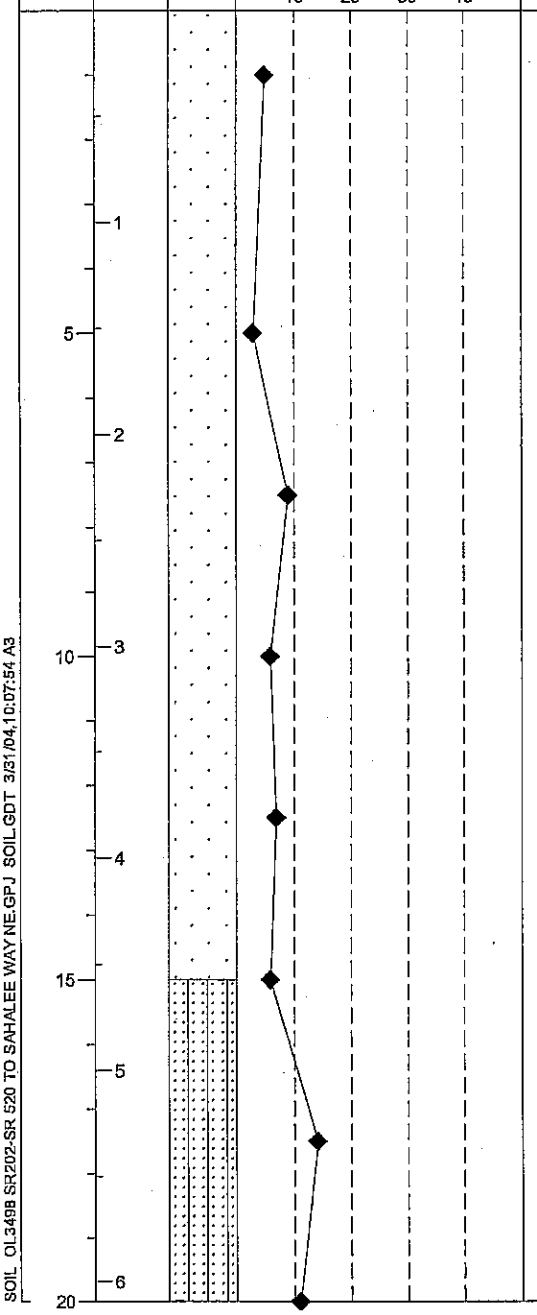
Station 223+50 Offset 39' Lt. Casing Hollow Stem

Method Auger

Northing 569860.4841 Easting 1663519.5815 Latitude

Longitude

County King Subsection SE 1/4 of the NW 1/4 Section 17 Range 6 EWM Township 25 N



SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
1 3 2 (5)		D-1		Sandy SILT with gravel, loose, gray, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
0 1 2 (3)		D-2		Sandy SILT with gravel, very loose, gray, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
3 4 5 (9)		D-3	GS MC	ML, M.C.=19% Sandy SILT with gravel and trace of organics, loose, grayish brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
0 2 4 (6)		D-4		Sandy SILT with gravel, trace of organics, loose, grayish brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
2 3 4 (7)		D-5		SILT with sand, trace of organics, loose, brownish gray, moist, Homogeneous, no HCl reaction Length Recovered 0.7 ft, Length Retained 0.7 ft		
0 3 3 (6)		D-6	GS MC	01/22/2001 SM, M.C.=19% Silty SAND, loose, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft	▽	
2 2 12 (14)		D-7		Silty SAND with gravel, medium dense, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 06390

HOLE No. TH-4-01

Job No. OL-3498 SR 202 Elevation 81.4 ft (24.8 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 2520

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
				2 5 6 (11)		D-8		Silty SAND with gravel, medium dense, grayish brown, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
25	7			4 7 10 (17)		D-9	GS MC	GM, M.C.=8% Silty GRAVEL with sand, subangular, medium dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft		
	8							End of test hole boring at 26.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
30	9									
35	10									
40	11									
45	12									
	13									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. TP-4A-99

Job No. OL-3498 SR 202 Elevation 69.1 ft (21.0 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector A. Sugar

Start July 28, 1999 Completion July 28, 1999 Well ID# _____ Equipment HSA, CME 850

Station 197+71 Offset 176' Lt. Casing _____ Method _____

Northing 570108.546 Easting 1661119.2932 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
								Soft, gray, rust mottled, CLAY and SILT with roots, dry to moist. **(ALLUVIUM)**		
	1			1-5-6		S-1				
5				1-1-3		S-2		Soft, gray, CLAY, some roots, moist.	▽	
	2			0-1-2		S-3				
10	3			1-2-3		S-4		Soft, dark gray CLAY interbedded with SILT, wet.		
	4			1-2-2		S-5		Loose, dark gray, silty fine SAND, wet.		
15	5			1-2-4		S-6		Medium stiff, gray, CLAY, wet.		
				2-6-9		S-7				
20	6							No recovery, 3" dia Cobble in shoe, some fine gravel.		

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. TP-4A-99

Job No. OL-3498 SR 202 Elevation 69.1 ft (21.0 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
				25-45-45		S-8		Dense, brown silty GRAVEL, with fine to coarse SAND, wet. **(OUTWASH)**		
	7			17-20-29		S-9				
25	8							Boring terminated at 24 feet. Ground water encountered at 6.5 feet.		
30	9									
	10									
35	11									
40	12									
	13									
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. TP-4B-99

Job No. OL-3498 SR 202 Elevation 63.4 ft (19.3 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector A. Sugar

Start July 28, 1999 Completion July 28, 1999 Well ID# _____ Equipment HSA, CME 850

Station 198+27 Offset 182' Lt. Casing _____ Method _____

Northing 570098.3915 Easting 1661175.0738 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
								Soft, gray CLAY, some roots, wet. **(ALLUVIUM)**		
5	1			0-1-2		S-1		Soft, gray CLAY, some organics, wet.		
10	2			0-1-2		S-2				
	3			0-0-3		S-3				
15	4			1-1-2		S-4		Water level after 1 hr. lunch was 9.7'		
	5			3-4-4		S-5		Medium stiff, gray CLAY, 2-3" SILT layer, wet.		
20	6									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. TP-4B-99

Job No. OL-3498 SR 202 Elevation 63.4 ft (19.3 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

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
				3-4-17		S-6		Medium dense, brown and orange, GRAVEL (fine to 2", rounded), wet. **(OUTWASH)**		
								Boring terminated at 21.5 feet.		
								Groundwater observed at about 10 feet during drilling.		
	7									
25										
	8									
	9									
30										
	10									
35										
	11									
	12									
40										
	13									
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. TP-5-99

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 70.4 ft (21.4 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector B. Thurber(HWA Inc.)

Start August 12, 1999 Completion August 12, 1999 Well ID# _____ Equipment Posthole digger

Station 201+92 Offset 68' Lt. Casing _____ Method _____

Northing 569887.611 Easting 1661494.847 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
						S-1		Soft, rust-mottled dark brown, SILT with abundant rootlets and wood fragments, wet.		
								(ALLUVIUM)	▼	
						S-2 S-3		Medium dense, rust-mottled light gray, silty, sandy, fine to coarse GRAVEL, wet.		
								(OUTWASH)		
	1							Handhole terminated at 2.75 feet.		
								Ground water seepage observed at 1.33 feet.		
5										
	2									
10	3									
	4									
15										
	5									
	6									
20										

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/20/04,12:58:29 P8

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. TP-6-99

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 76.5 ft (23.3 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector B. Thurber(HWA Inc.)

Start August 10, 1999 Completion August 11, 1999 Well ID# _____ Equipment HSA and mud rotary, CME 850

Station 202+19 Offset 218' Lt. Casing _____ Method _____

Northing 570024.92 Easting 1661561.874 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
								2" duff over Loose, yellow brown, silty, fine to medium sandy, fine to coarse GRAVEL with occasional cobbles, moist.		
				7-11-12		S-1		Becomes medium dense.		
	1							**(OUTWASH)**		
5			>>	24-24-27				No sample recovery.		
	2								▽	
			>>	38-50/4"		S-2		Very dense, olive-brown, silty, sandy, fine to coarse GRAVEL with occasional cobbles, moist. **(TILL)**		
								Gravelly, hard drilling; rig broke down.		
10	3		>>	31-52-35		S-4				
	4									
15			>>	24-28-32		S-5				
	5							Boring terminated at 16.5 feet.		
								Ground water observed at about 7 feet during drilling.		
20	6									

Washington State Department of Transportation

LOG OF TEST BORING

Job No. OL-3498 SR 202 HOLE No. TP-8A

PROJECT SR 202 - SR520 to Sahalee Way NE Sheet 1 of 2

Inspector N. Hagestedt

Station 240+85 Offset 70' Rt. Equipment Mud rotary, Dietric D25

Latitude Longitude Method

Northing 569963.083 Easting 1665228.377 Casing

Ground Elevation 84.4 (25.7 m) Start Date August 3, 1999 Completion Date August 4, 1999

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
				4-7-8		S1		Stiff, tan, coarse sandy SILT with fine gravel, dry. Subrounded sand and gravel.		
	1			10-15-26		S2		Medium dense, brown, gray & white, fine to coarse sandy fine to coarse GRAVEL with silt, moist to wet. Subrounded sand and gravel.		
5				>> 13-24-29		S3		6 to 6.5-feet: Becomes dense and grayish brown.		
	2			22-22-27		S4		Medium dense, brown & gray, fine to coarse gravelly fine to coarse SAND with silt, moist. Subrounded sand and gravel.		
10	3			15-15-15		S5		11 to 12.5-feet: Becomes wet.		
	4			>> 25-27-29		S6		Very dense, brown and gray, silty fine to coarse GRAVEL with fine to coarse sand, wet. Subrounded sand and gravel.		
15	5			14-25-16		S7		Dense, brown, gray and white, coarse sandy fine to coarse GRAVEL, wet. Subrounded sand and gravel.		
20	6			19-12-17		S8		Dense, brown, gray and white, fine gravelly fine to coarse SAND with silt, wet. Subrounded sand and gravel.		

Washington State Department of Transportation

LOG OF TEST BORING

Job No. OL-3498 SR 202 HOLE No. TP-8A

PROJECT SR 202 - SR520 to Sahalee Way NE Sheet 2 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
								Boring terminated at 20.5-feet. Water was pumped down the borehole when drilling from 2-feet below ground level to total depth. The ground water level could not be observed in the boring because drilling fluid was used and the borehole caved before a measurement could be made.		
	7									
25										
	8									
	9									
30										
	10									
35										
	11									
	12									
40										
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Job No. OL-3498 SR 202 HOLE No. TP-8B

PROJECT SR 202 - SR520 to Sahalee Way NE Sheet 1 of 2

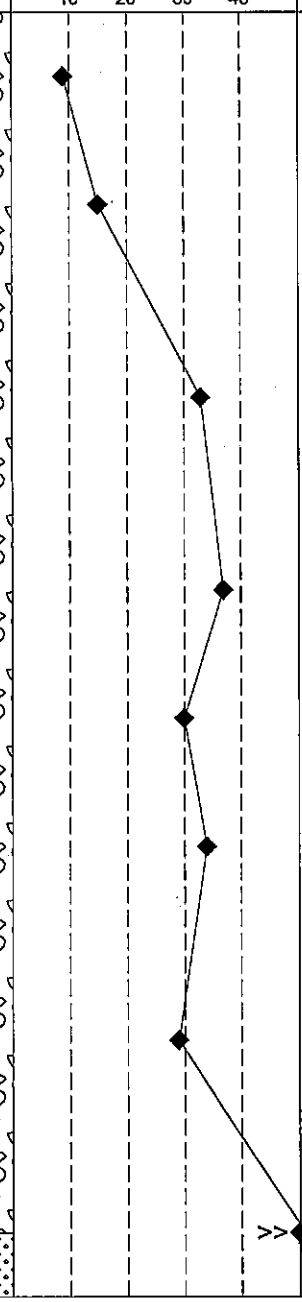
Inspector B. Thurber

Station 240+26 Offset 69' Rt. Equipment Mud rotary, Dietric D25

Latitude Longitude Method

Northing 569967.613 Easting 1665171.031 Casing

Ground Elevation 84.5 (25.8 m) Start Date August 4, 1999 Completion Date August 5, 1999



Depth (ft)	Meters (m)	Profile	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
							Loose, yellow-brown, slightly silty, fine to coarse sandy, fine to coarse GRAVEL with cobbles, dry to moist.		
			6-5-4		S-1		(OUTWASH)		
	1		5-7-8		S-2		Becomes medium dense, olive-brown.		
5									
	2		14-16-17		S-3		Dense, gray, medium to coarse sandy, fine to coarse GRAVEL, wet.	▼	
			15-17-20		S-4				
10	3								
			19-17-13		S-5				
	4		15-17-17		S-6		Becomes olive-brown, slightly silty.		
15									
	5		12-12-17		S-7		Gravel becomes fine.		
							Gravelly drilling.		
			>>7-40-50/4"		17		Dense, olive-brown, slightly silty, fine gravelly, fine to coarse SAND, wet. Fining upward.		
20	6								

SOIL OL-3498 SR-202, 520 TO SAHALEE WAY.GPJ SOIL.GDT 11/20/02,3:07:07 P11

Washington State
Department of Transportation

LOG OF TEST BORING

Job No. OL-3498 SR 202 HOLE No. TP-8B

PROJECT SR 202 - SR520 to Sahalee Way NE Sheet 2 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
								Boring terminated at 20.5 feet.		
								Ground water measured at 7 feet after drilling.		
	7									
25										
	8									
	9									
30										
	10									
35										
	11									
	12									
40										
	13									
45										

SOIL OL-3498 SR-202, 520 TO SAHALEE WAY.GPJ SOIL.GDT 11/20/02,3:07:07 P11

Washington State Department of Transportation

LOG OF TEST BORING

Job No. OL-3498 SR 202 HOLE No. TP-9A

PROJECT SR 202 - SR520 to Sahalee Way NE Sheet 1 of 1

Inspector B. Thurber

Station 243+67 Offset 70' Rt. Equipment Mud rotary, Dietric D25

Latitude Longitude Method

Northing Easting Casing

Ground Elevation 84.5 (25.8 m) Start Date August 5, 1999 Completion Date August 9, 1999

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
								Loose, brown, sandy, fine to coarse GRAVEL, dry to moist.		
				10-20-24		S-1		Dense, light brown, silty, fine sandy, fine to coarse GRAVEL with occasional fine roots, dry grading to moist. **(OUTWASH)**		
	1		>>	19-25-47		S-2				
5				11-17-20		S-3		Becomes brown, slightly silty, fine to coarse sandy.		
	2			20-25-20		S-4				
10	3			24-17-24		S-5		Becomes silty, fine to coarse sandy.		
	4		>>	28-50/4"		S-6		Little recovery, may be driving rock.		
15	5							Boring terminated at 14 feet. Groundwater not observed.		
20	6									

Washington State
Department of Transportation

LOG OF TEST BORING

Job No. OL-3498 SR 202 HOLE No. TP-9B

PROJECT SR 202 - SR520 to Sahalee Way NE Sheet 1 of 2

Inspector B. Thurber

Station 242+67 Offset 80' Rt. Equipment Mud rotary and coring, Dietric D

Latitude Longitude Method

Northing 569934.003 Easting 1665401.06 Casing

Ground Elevation 84.7 (25.8 m) Start Date August 10, 1999 Completion Date August 11, 1999

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
				>> 14-30-29		S-1		Medium dense, yellow-brown, silty, fine to coarse sandy, fine to coarse GRAVEL, dry to moist. **(OUTWASH)**		
	1			>> 23-24-27						
5										
	2			17-27-23		S-2		Dense, gray, medium to coarse sandy, fine GRAVEL, wet. Sample appears washed.	▼	
				15-23-26		S-3		Cobbly; coring from 8 to 9 feet. Becomes brown, slightly silty. Gravel has manganese oxide staining.		
10	3			18-12-15		S-4		Becomes medium dense.		
	4			>> 22-24-32		S-5				
15								Dense, olive-brown with gray, silty, fine to coarse sandy, fine to coarse GRAVEL, moist to wet. **(GLACIAL TILL)**		
	5			>> 49-38-48		S-6				
				>> 27-43-50/5 1/2"		S-7				
20	6									

SOIL OL-3498 SR-202, 520 TO SAHALEE WAY.GPJ SOIL.GDT 11/20/02,3:15:50 P11

Washington State
Department of Transportation

LOG OF TEST BORING

Job No. OL-3498 SR 202 HOLE No. TP-9B

PROJECT SR 202 - SR520 to Sahalee Way NE Sheet 2 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
								Boring terminated at 20 feet.		
								Ground water observed at about 6 feet after drilling.		
	7									
25										
	8									
	9									
30										
	10									
35										
	11									
	12									
40										
	13									
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card A 01361

HOLE No. SSB-1-99

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 68.9 ft (21.0 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller MIKE BRUN Lic# 1711

Site Address

Inspector VERNON F. WILLIAMS

Start July 12, 1999 Completion July 12, 1999 Well ID#

Equipment CME 850 w/ autohammer

Station 191+02 Offset 59' Lt. Casing 20

Method Auger

Northing 570180.0398 Easting 1660444.2505 Latitude

Longitude

County KING Subsection SW 1/4 OF NE 1/4 Section 18 Range 6EWM Township 25N

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
								07/12/1999	▽	
	1			5 8 7 (15)		D-1	GS MC	SM, M.C.=6% Silty SAND with gravel, medium dense, BROWN, wet, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft		
5				2 6 7 (13)		D-2		Silty SAND with gravel, medium dense, GREY, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft		
	2									
				5 9 8 (17)		D-3	GS MC	SM, M.C.=8% Silty SAND with gravel, medium dense, BROWN, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
10	3			3 6 9 (15)		D-4		Silty SAND with gravel, medium dense, BROWN, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	4									
15				6 6 7 (13)		D-5		Silty SAND with gravel, medium dense, BROWN, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	5									
	6									
20										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card A 01361

HOLE No. SSB-1-99

Job No. OL-3498 SR 202 Elevation 68.9 ft (21.0 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller MIKE BRUN Lic#. 1711

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 3 3 (6)		D-6	GS MC	SM, M.C.=5% Silty SAND with gravel, loose, BROWN, wet, Homogeneous, no HCl reaction, SILT IN TIP OF SAMPLER Length Recovered 1.0 ft, Length Retained 1.0 ft		
	7							End of test hole boring at 21.5 ft below ground elevation.		
25								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	8									
	9									
30										
	10									
35										
	11									
	12									
40										
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card A 01361

HOLE No. SSB-2-99

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 65.9 ft (20.1 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller MIKE BRUN Lic# 1711

Site Address

Inspector VERNON F. WILLIAMS

Start July 15, 1999 Completion July 21, 1999 Well ID#

Equipment CME 850 w/ autohammer

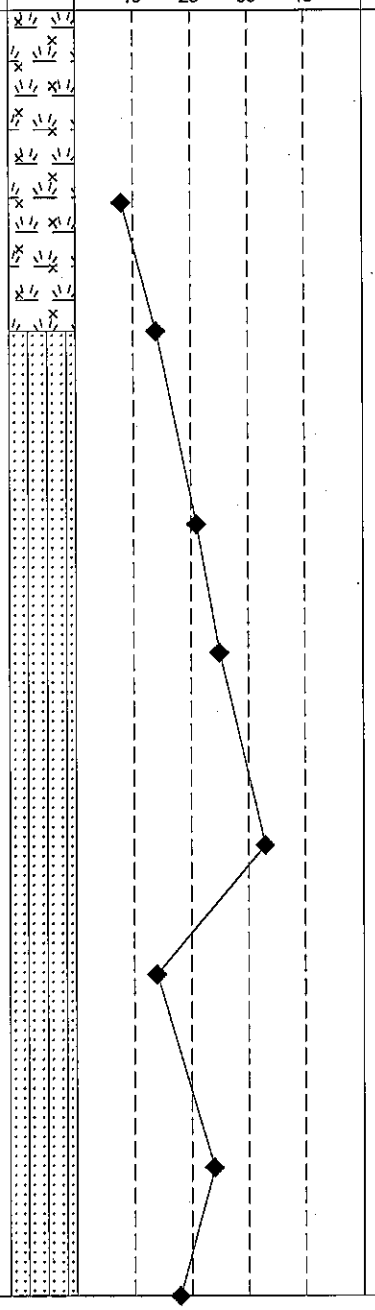
Station 192+05 Offset 51' Lt. Casing augers

Method Auger

Northing 570143.9682 Easting 1660540.8875 Latitude

Longitude

County KING Subsection SW 1/4 OF NE 1/4 Section 18 Range 6EWM Township 25N



Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
						07/21/1999	▽	
	1	1 2 6 (8)		D-1		ML, M.C.=20% Sandy SILT, loose, GREY, wet, Homogeneous, no HCl reaction. Length Recovered 1.2 ft, Length Retained 1.2 ft		
5	2	4 6 8 (14)		D-2		SM, M.C.=14% Silty SAND, medium dense, GREY, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
		5 8 13 (21)		D-3		Silty SAND, medium dense, GREY, wet, Homogeneous, no HCl reaction Length Recovered 1.2 ft, Length Retained 1.2 ft		
10	3	7 11 14 (25)		D-4		Silty SAND, dense, GREY, wet, Homogeneous, no HCl reaction Length Recovered 1.3 ft, Length Retained 1.3 ft		
	4	4 15 18 (33)		D-5		Silty SAND with gravel, dense, GREY, wet, Homogeneous, no HCl reaction Length Recovered 1.2 ft, Length Retained 1.2 ft		
15	5	5 6 8 (14)		D-6		Silty SAND with gravel, medium dense, GREY, wet, Homogeneous, no HCl reaction Length Recovered 0.4 ft, Length Retained 0.4 ft		
		7 11 13 (24)		D-7		Silty SAND with gravel, medium dense, GREY, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
20	6							

Washington State Department of Transportation

LOG OF TEST BORING

Start Card A 01361

HOLE No. SSB-2-99

Job No. OL-3498 SR 202 Elevation 65.9 ft (20.1 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller MIKE BRUN Lic# 1711

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
				6 8 10 (18)		D-8		Silty SAND with gravel, medium dense, GREY, wet, Homogeneous, no HCl reaction Length Recovered 0.6 ft, Length Retained 0.6 ft		
25	7									
	8			17 18 19 (37)		D-9		GM, M.C.=1% Well graded GRAVEL with sand, subrounded, dense, GREY, wet, Homogeneous, no HCl reaction. Length Recovered 0.7 ft, Length Retained 0.7 ft		
30	9			4 17 17 (34)		D-10		Well graded GRAVEL with sand, subrounded, dense, GREY, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
	10			50 (50/6")		D-11		No Recovery		
35	11							End of test hole boring at 33.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
40	12									
	13									
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card A-01361

HOLE No. SSB-4-99

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 67.7 ft (20.6 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller MIKE BRUN Lic# 1711

Site Address

Inspector VERNON F. WILLIAMS

Start July 21, 1999 Completion July 22, 1999 Well ID#

Equipment CME 850 w/ autohammer

Station 194+00 Offset 48' Lt. Casing 35'

Method Auger

Northing 570068.8905 Easting 1660727.3834 Latitude

Longitude

County KING Subsection SW 1/4 OF NE 1/4 Section 18 Range 6EWM Township 25N

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
								07/22/1999	▽	
	1			1 3 3 (6)		D-1		Sandy SILT with gravel, medium stiff, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
5	2					S-2		Sandy SILT, loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
				1 4 5 (9)		D-3		Sandy SILT, loose, GREY, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
10	3					S-4		Sandy SILT, loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	4			3 3 1 (4)		D-5		Sandy SILT, very loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
15	5					S-6		Sandy SILT, very loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
				2 2 5 (7)		D-7		Sandy SILT, loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
20	6									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card A-01361

HOLE No. SSB-4-99

Job No. OL-3498 SR 202 Elevation 67.7 ft (20.6 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller MIKE BRUN Lic# 1711

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
				3 6 6 (12)		D-8		Sandy SILT, medium dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
25	7			13 17 14 (31)		D-9		Well graded GRAVEL with sand, subrounded, dense, brown, wet, Homogeneous, no HCl reaction. Length Recovered 0.4 ft, Length Retained 0.4 ft		
30	8 9			9 18 17 (35)		D-10		Well graded GRAVEL with sand, subrounded, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.2 ft, Length Retained 0.2 ft		
35	10		>>	102 (102/6")		D-11		Well graded GRAVEL with sand, subrounded, very dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft		
40	11 12							End of test hole boring at 35.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
45	13									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card A- 01363

HOLE No. SSB-7-99

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 69.1 ft (21.1 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller MIKE BRUN Lic# 1711

Site Address

Inspector VERNON F. WILLIAMS

Start July 22, 1999 Completion July 22, 1999 Well ID#

Equipment CME 850 w/ autohammer

Station 196+98 Offset 48' Lt. Casing 35 AUGERS

Method Auger

Northing 570004.7107 Easting 1661013.9383 Latitude

Longitude

County KING Subsection SE 1/4 OF NE 1/4 Section 18 25N Range 6EWM Township 25N

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
								07/22/1999	▽	
	1			0 2 3 (5)		D-1		SILT with sand with organics, loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.2 ft, Length Retained 1.2 ft		
5						S-2		SILT with sand with organics, loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	2									
				1 2 3 (5)		D-3		SILT with sand with organics, loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
10	3					S-4		SILT with sand with organics, loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	4			1 1 3 (4)		D-5		SILT with sand with organics, very loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
15						S-6		SILT with sand with organics, loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	5									
				3 4 4 (8)		D-7		SILT with sand with organics, loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.2 ft, Length Retained 1.2 ft		
	6									
20				1 3 5 (8)		D-8		SILT with sand with organics, loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
	7									
25										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card A- 01363

HOLE No. SSB-7-99

Sheet 2 of 2

Job No. OL-3498 SR 202 Elevation 69.1 ft (21.1 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller MIKE BRUN Lic# 1711

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
	8			3 7 10 (17)		D-9		Well graded GRAVEL with sand, subrounded, medium dense, brown, wet, Homogeneous, no HCl reaction. Length Recovered 0.3 ft, Length Retained 0.3 ft		
30	9			9 12 17 (29)		D-10		Well graded GRAVEL with sand, subrounded, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.6 ft, Length Retained 0.6 ft		
35	10		>>	15 27 50 (77)		D-11		Poorly graded SAND with gravel, very dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.2 ft, Length Retained 1.2 ft		
40	11							End of test hole boring at 36.5 ft below ground elevation.		
45	12							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
50	13									
55	14									
	15									
	16									
	17									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card A 01363

HOLE No. SSB-10-99

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 69.0 ft (21.0 m)

Project SR 202 - SR520 to Sahalee Way NE Driller MIKE BRUN Lic# 1711

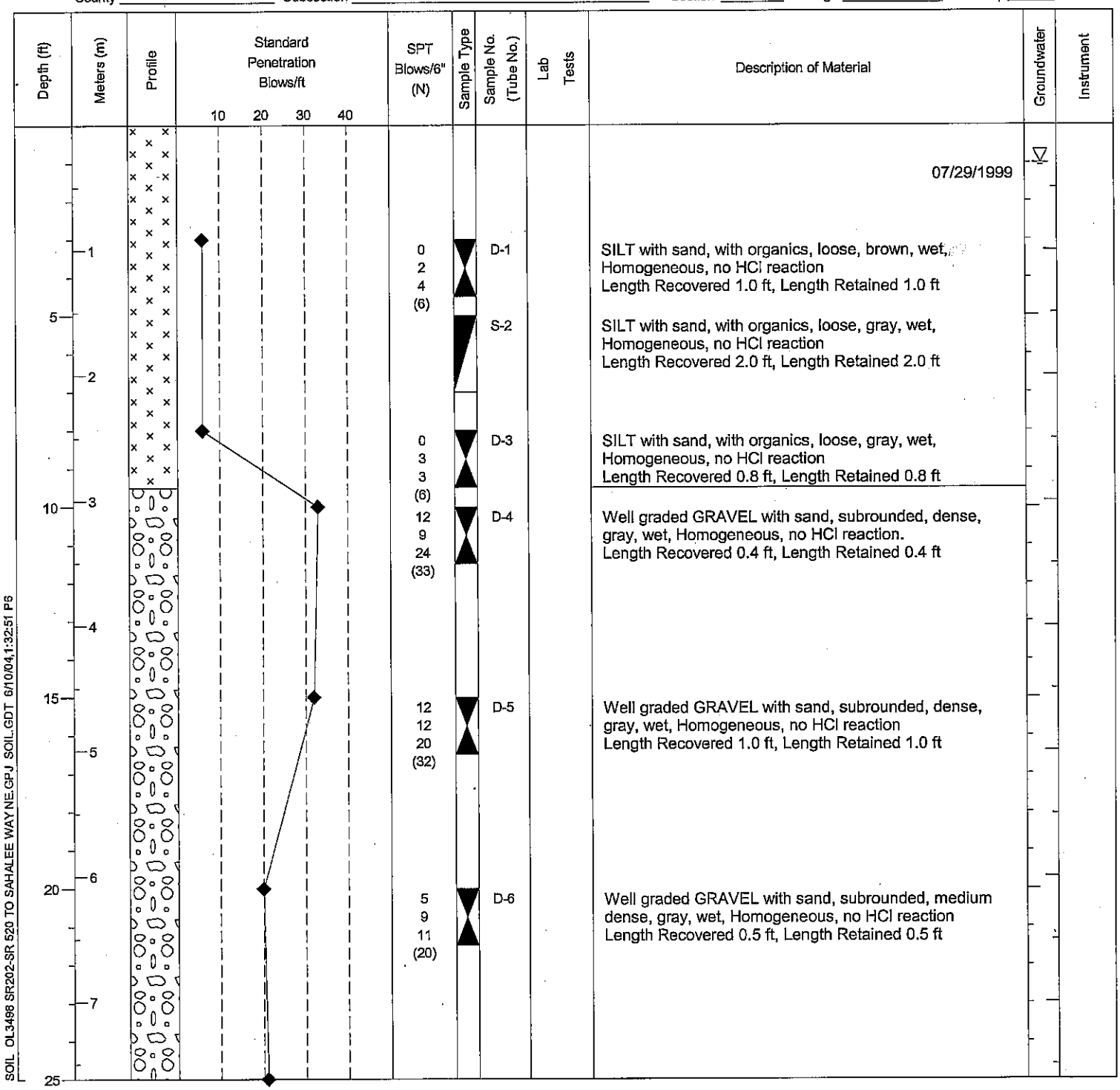
Site Address Inspector VERNON F. WILLIAMS

Start July 29, 1999 Completion July 29, 1999 Well ID# Equipment CME 850 w/ autohammer

Station 199+88 Offset 48' Lt. Casing 30 Method Auger

Northing 569924.7166 Easting 1661292.9891 Latitude Longitude

County KING Subsection SE 1/4 OF NE 1/4 Section 18 Range 6EWM Township 25N



Depth (ft)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
					07/29/1999	▽	
	0 2 4 (6)		D-1		SILT with sand, with organics, loose, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
			S-2		SILT with sand, with organics, loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	0 3 3 (6)		D-3		SILT with sand, with organics, loose, gray, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
	12 9 24 (33)		D-4		Well graded GRAVEL with sand, subrounded, dense, gray, wet, Homogeneous, no HCl reaction. Length Recovered 0.4 ft, Length Retained 0.4 ft		
	12 12 20 (32)		D-5		Well graded GRAVEL with sand, subrounded, dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	5 9 11 (20)		D-6		Well graded GRAVEL with sand, subrounded, medium dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/10/04 1:32:51 PS

Washington State Department of Transportation

LOG OF TEST BORING

Start Card A 01363

HOLE No. SSB-10-99

Job No. OL-3498 SR 202 Elevation 69.0 ft (21.0 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE Driller MIKE BRUN Lic# 1711

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
	8			2 8 13 (21)		D-7		Well graded SAND with gravel, medium dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
30	9			6 17 16 (33)		D-8		Well graded GRAVEL with sand, subrounded, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.4 ft, Length Retained 0.4 ft		
	10							End of test hole boring at 31.5 ft below ground elevation.		
35	11							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	12									
40	13									
45	14									
	15									
50	16									
55	17									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S23913

HOLE No. PP-1-03

Job No. OL-3498 SR 202 Elevation 82.5 ft (25.1 m)

Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

Site Address

Inspector Dan Reed

Start November 19, 2003 Completion November 19, 2003 Well ID#

Equipment Portable Penetrometer

Station 147+66 Offset 60' Lt. Casing A-rod

Method Hand Auger

Northing 572621 Easting 1657151.951 Latitude

Longitude

County King Subsection SW 1/4 Of The SW 1/4 Section 7 Range 6EWM Township 25 N

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
				5 6 8 11 (7)		B-1		Silty GRAVEL with sand and organics, subangular, loose, dark brown, moist, homogeneous, no HCl reaction.		
				7 11 16 28 (13)		B-2	GS MC	GM, M.C. = 12% Silty GRAVEL with sand, subrounded, medium dense, light brown, moist, homogeneous, no HCl reaction.		
	1			12 16 30 45 (23)		B-3		Silty GRAVEL with sand, subrounded, medium dense, light brown, moist, homogeneous, no HCl reaction.		
5				31 48 51 41 (50)		B-4	GS MC	GP, M.C. = 7% Poorly graded GRAVEL with sand, subrounded, dense, light brown, moist, homogeneous, no HCl reaction.		
	2			>> 53 51 (52)		B-5		Poorly graded GRAVEL with sand, subrounded, very dense, litght brown, moist, homogeneous, no HCl reaction.		
10	3							End of test hole boring at 9 ft below ground elevation.		
	4							No ground water observed.		
								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
								Samples obtained from hand auger cutings		
15	5							*The portable penetrometer blows per foot have been converted to approximate Standard Penetrometer blows based on WSDOT experience.		
20	6									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S23913

HOLE No. PP-2-03

Job No. OL-3498 SR 202 Elevation 101.7 ft (31.0 m)

Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

Site Address

Inspector Dan Reed

Start November 19, 2003 Completion November 19, 2003 Well ID#

Equipment Portable Penetrometer

Station 151+97 Offset 51' Lt. Casing Arod

Method Hand Auger

Northing 572258.225 Easting 1657386.044 Latitude

Longitude

County King Subsection SW 1/4 Of the SW 1/4 Section 7 Range 6EWM Township 25 N

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
				6 27 27 19 (27)		B-1	GS MC	SM, M.C. =16% Silty Sand, with organics, dense, Light Brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	1			4 10 13 26 (12)		B-2		Silty Sand, medium dense, Light Brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
5				14 9 17 26 (13)		B-3	GS MC	SM, M.C. =15% Silty SAND with gravel, Gravel Subrounded, medium dense, Light Brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	2			33 41 56 62 (49)		B-4		Silty SAND with gravel, Gravel Subrounded, dense, Light Brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
				23 31 41 45 (36)		B-5		Silty SAND with gravel, Gravel Sub Rounded, very dense, Light Brown, moist, Homogeneous, no HCl reaction, With Large Gravel Sample Obtained From Hand Auger Cuttings Length Recovered 1.5 ft, Length Retained 1.5 ft		
10	3									
								End of test hole boring at 10 ft below ground elevation. No ground water observed.		
	4							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
15								*The portable penetrometer blows per foot have been converted to approximate Standard Penetrometer blows based on WSDOT experience.		
	5									
20	6									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 23913

HOLE No. PP-3-03

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 109.3 ft (33.3 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Verlo Sean Lic# 2615

Site Address

Inspector Nelson

Start November 18, 2003 Completion November 18, 2003 Well ID# NA

Equipment Portable penetrometer

Station 154+48 Offset 48' Lt. Casing 2"

Method Portable Penetrometer

Northing 572051.847 Easting 1657520.642 Latitude Longitude

County King Subsection SW/SW Section 7 Range 6 EWM Township 25N

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
				6 12 18 17 (15)		B-1		Silty SAND with gravel, medium dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
				4 6 12 16 (9)		B-2		Silty SAND with gravel, loose, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
5	1							End of test hole boring at 3.5 ft below ground elevation. (Refusal of Portable Penetrometer and hand auger)		
	2							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
10	3							*The portable penetrometer blows per foot have been converted to approximate Standard Penetrometer blows based on WSDOT experience.		
15	4									
	5									
20	6									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 23913

HOLE No. PP-4-03

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 123.7 ft (37.7 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Verlo Sean Lic# 2615

Site Address

Inspector Nelson

Start November 18, 2003 Completion November 18, 2003 Well ID# NA

Equipment Portable Penetrometer

Station 156+89 Offset 53' Lt. Casing 2"

Method Portable Penetrometer

Northing 571851.648 Easting 1657662.779 Latitude Longitude

County King Subsection SW/SW Section 7 Range 6 EWM Township 25N

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
				6 24 41 34 (33)		B-1		Silty SAND with gravel, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	1			5 10 15 15 (13)		B-2		Silty SAND with gravel, medium dense, dark brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft 11/18/2003	▽	
5				10 37 50 (43)		B-3	GS MC	SM, M.C. = 23% Silty SAND, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	2							End of test hole boring at 5.5 ft below ground elevation.		
10	3							Water encountered at 3.0 ft. (Caving soils were encountered)		
								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	4							*The portable penetrometer blows per foot have been converted to approximate Standard Penetrometer blows based on WSDOT experience.		
15	5									
20	6									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 23912

HOLE No. PP-6-03

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 147.5 ft (45.0 m)

Project SR 202 - SR520 to Sahalee Way NE Driller Verlo Sean Lic# 2615

Site Address Inspector Nelson

Start November 18, 2003 Completion November 18, 2003 Well ID# NA Equipment Portable Penetrometer

Station 175+48 Offset 46' Lt. Casing 2" Method Portable Penetrometer

Northing 570605.943 Easting 1658955.798 Latitude Longitude

County King Subsection NE NW Section 18 Range 6 EWM Township 25N

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
				3 3 4 4 (4)	B	B-1		Silty SAND with gravel, loose, brown, wet, Homogeneous, no HCl reaction		
	1			3 16 23 21 (19)	B	B-2	GS MC	SP-SM, M.C. = 17% Poorly graded SAND with silt, dense, brown, wet, Laminated, no HCl reaction		
5				7 24 35 50 (20)	B	B-3	GS MC	SM, M.C. =34% Silty SAND, medium dense, brown, wet, Laminated, no HCl reaction		
	2							End of test hole boring at 6 ft below ground elevation.		
10	3							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	4							*The portable penetrometer blows per foot have been converted to approximate Standard Penetrometer blows based on WSDOT experience.		
15	5									
20	6									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 06386

HOLE No. SL-1-00

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 114.8 ft (35.0 m)

Project SR 202 - SR520 to Sahalee Way NE Driller Mike Brun Lic# 1711

Site Address Inspector Vernon F. Williams

Start December 12, 2000 Completion December 13, 2000 Well ID# Equipment CME 850 w/ autohammer

Station 158+37 Offset 30' Rt Casing HQ Method Wet Rotary

Northing 571682.4522 Easting 1657676.2739 Latitude Longitude

County King Subsection NE 1/4 of the NW 1/4 Section 18 Range 6 EWM Township 25 N

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 1 8 (9)		D-1		Silty SAND with gravel, loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.7 ft, Length Retained 0.7 ft		
5	1		>>	15 38 37 (75)		D-2		Silty GRAVEL with sand, subangular, very dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft		
10	2 3		>>	14 35 47 (82)		D-3	GS MC	SM, M.C.=6% Silty SAND with gravel, very dense, brown, moist, Homogeneous, no HCl reaction. Length Recovered 0.7 ft, Length Retained 0.7 ft		
15	4 5			43 50 (50/6")		D-4		Silty SAND with gravel, `, very dense, brown, moist, Homogeneous, no HCl reaction. Length Recovered 0.8 ft, Length Retained 0.8 ft		
20	6 7			50 (50/6")		D-5		Poorly graded SAND with gravel, very dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft		
25								End of test hole boring at 20.5 ft below ground elevation.		

This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 23912

HOLE No. PP-5-03

Job No. OL-3498 SR 202 Elevation 155.3 ft (47.3 m)

Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Driller Verlo Sean Lic# 2615

Site Address

Inspector Nelson

Start November 18, 2003 Completion November 18, 2003 Well ID# NA

Equipment Portable penetrometer

Station 173+25 Offset 53' Lt. Casing 2"

Method Portable Penetrometer

Northing 570704.633 Easting 1658760.917 Latitude Longitude

County KING Subsection NE NW Section 18 Range 6EWM Township 25N

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
				2 2 3 8 (3)		B-1		Silty SAND with gravel and organics, loose, brown, moist, Homogeneous, no HCl reaction		
				3 6 15 22 (10)		B-2	GS MC	SM, M.C. =29% Silty SAND with gravel, medium dense, brown, wet, Homogeneous, no HCl reaction	▽ 11/18/2003	
5	1							End of test hole boring at 3.5 ft below ground elevation. (Refusal of portable penetrometer and hand auger) Water encountered at 3.5 ft.		
10	2							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
15	3							*The portable penetrometer blows per foot have been converted to approximate Standard Penetrometer blows based on WSDOT experience.		
20	4									
	5									
	6									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 048996

HOLE No. SL-2-00

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 111.1 ft (33.9 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Hugh Clayton Lic# 1680

Site Address

Inspector VERNON F. WILLIAMS

Start December 14, 2000 Completion December 15, 2000 Well ID#

Equipment CME 850 w/ autohammer

Station 160+23 Offset 121' Rt Casing HQ

Method Wet Rotary

Northing 571477.3716 Easting 1657704.8908 Latitude

Longitude

County King Subsection NE 1/4 of the NW 1/4 Section 18 Range 6 EWM Township 25 N

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
5	1			9 10 10 (20)		D-1		SM, M.C.=10% Silty SAND with gravel, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft.NOTE:Retained pH and Resistivity sample.		
10	2			12 15 32 (47)		D-2		SM, M.C.=13% Silty SAND with gravel, dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.2 ft, Length Retained 1.2 ft		
15	3			11 50 (50)		D-3		Silty SAND with gravel, very dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
20	4			22 50 (50)		D-4		Silty SAND with gravel, very dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft		
	5									
	6									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 048996

HOLE No. SL-2-00

Job No. OL-3498 SR 202 Elevation 111.1 ft (33.9 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Hugh Clayton Lic# 1680

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
								12/15/2000	▽	
	7			21 24 20 (44)		D-5		Silty SAND with gravel, dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
25	8							End of test hole boring at 24.5 ft below ground elevation.		
30	9									
35	10									
40	11									
45	12									
	13									

This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
12/14/2000	22.0	99.7
1/16/2001	Dry	97.4
2/22/2001	Dry	97.4
4/18/2001	Dry	97.4
7/31/2001	Dry	97.4
8/28/2001	Dry	97.4
9/17/2001	Dry	97.4
10/22/2001	Dry	97.4
12/20/2001	24.3	97.4
1/23/2002	24.1	97.6
2/20/2002	24.8	96.9
3/27/2002	Dry	97.4
4/23/2002	Dry	97.4
5/22/2002	Dry	97.4
6/22/2002	Dry	97.4
8/13/2002	Dry	97.4
9/30/2002	Dry	97.4
11/1/2002	Dry	97.4
12/18/2002	Dry	97.4
2/11/2003	Dry	97.4
3/18/2003	Dry	97.4
5/6/2003	Dry	97.4
6/5/2003	Dry	97.4
7/23/2003	Dry	97.4
9/23/2003	Dry	97.4
12/9/2003	24.3	97.4
1/16/2004	24.1	97.6
2/23/2004	24.2	97.5
4/6/2004	24.3	97.4
5/11/2004	24.3	97.4
6/23/2004	DRY	97.4

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 048996

HOLE No. SL-3-00

Job No. OL-3498 SR 202 Elevation 106.0 ft (32.3 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Hugh Clayton Lic# 1680

Site Address

Inspector Mike Brun

Start December 18, 2000 Completion December 19, 2000 Well ID#

Equipment CME 850 w/ autohammer

Station 159+37 Offset 111' Rt Casing HQ

Method Wet Rotary

Northing 571554.2511 Easting 1657665.0721 Latitude

Longitude

County King Subsection NE 1/4 of the NW 1/4 Section 18 Range 6 EWM Township 25 N

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			4 14 20 (34)		D-1	GS MC	SM, M.C.=10% Silty SAND with gravel, subrounded, dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft.NOTE: Retained pH and Resistivity.		
5	2		>>	16 26 30 (56)		D-2		Silty SAND with gravel, subrounded,subangular, very dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
10	3									
	4			7 3 4 (7)		D-3	GS MC	SM, M.C.=31% Silty SAND, loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.7 ft, Length Retained 0.7 ft		
15	5								12/19/2000	
				32 50 (50)		D-4		Silty SAND, loose, brown, moist, Homogeneous, no HCl reaction Well graded SAND with gravel, angular,subangular and few silts, very dense, brown, wet, Homogeneous, no HCl reaction		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/29/04,10:10:05 A6

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 048996

HOLE No. SL-3-00

Job No. OL-3498 SR 202 Elevation 106.0 ft (32.3 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Hugh Clayton Lic# 1680

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
								Length Recovered 0.8 ft, Length Retained 0.8 ft		
	7			50 (50)		D-5		Well graded SAND with gravel, angular,subangular and few silts, very loose, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft End of test hole boring at 23.5 ft below ground elevation.		
25										
	8							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	9									
30										
	10									
35										
	11									
	12									
40										
	13									
45										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
1/16/2001	20.10	85.67
2/22.2001	19.60	86.17
4/18/2001	15.17	90.6
7/31/2001	20.00	85.77
8/28/2001	20.30	85.47
9/17/2001	21.10	84.67
10/22/2001	20.30	85.47
12/20/2001	13.85	91.92
1/23/2002	13.62	92.15
2/20/2002	14.80	90.97
3/27/2002	16.25	89.52
4/23/2002	16.20	89.57
5/22/2002	16.00	89.77
6/22/2002	16.60	89.17
8/13/2002	19.4	86.4
9/30/2002	19.5	86.3
11/1/2002	20.3	85.5
12/18/2002	20.0	85.8
2/11/2003	19.0	86.8
3/18/2003	18.8	87.0
5/6/2003	18.7	87.1
6/5/2003	17.8	88.0
7/23/2003	18.6	87.2
9/23/2003	19.3	86.5
12/9/2003	20.1	85.7
1/16/2004	19.8	86.0
2/23/2004	16.2	89.6
4/6/2004	16.6	89.2
5/11/2004	17.1	88.7
6/23/2004	18.5	87.3

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R- 48964

HOLE No. P-4-00

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 72.7 ft (22.2 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 1711

Site Address

Inspector Mike Brun

Start March 8, 2000 Completion March 8, 2000 Well ID# AGF-573

Equipment CME 850 w/ autohammer

Station 201+08 Offset 451' Rt. Casing Augers x 30'

Method Auger

Northing 569412.479 Easting 1661270.9 Latitude

Longitude

County King Subsection SW1/4,NE1/4 Section 18 Range 6E Township 25N

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
				2 4 5 (9)		D-1		Sandy SILT, loose, gray and brown, moist, laminated, no HCl reaction. Length Recovered 1.5 ft, Length Retained 1.5 ft.		
5	1			1 1 3 (4)		D-2		Sandy SILT, loose, gray and brown, moist, laminated, no HCl reaction. Length Recovered 1.5 ft, Length Retained 1.5 ft. 3/8/2000	▽	
10	2 3			1 2 2 (4)		D-3		SILT with sand, very loose, gray, wet, laminated, no HCl reaction. Length Recovered 1.5 ft, Length Retained 1.5 ft.		
15	4 5			1 2 2 (4)		D-4		SILT with organics, very loose, gray, moist, homogeneous, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/6/04,1:44:37 P6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R- 48964

HOLE No. P-4-00

Job No. OL-3498 SR 202 Elevation 72.7 ft (22.2 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 1711

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
				0 1 2 (3)		D-5		Lean CLAY, soft, gray, moist, homogeneous, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
25	7			2 3 3 (6)		D-6		Poorly graded SAND, loose, gray, homogeneous, no HCl reaction. Length Recovered: 1.0 ft, Length Retained: 1.0 ft		
30	8 9			5 6 8 (14)		d-7		Silty SAND, medium dense, gray, wet, homogeneous, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
35	10 11 12							End of Test Hole Boring at 31.5 feet below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
40	13									
45										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
3/8/2000	-6.50	66.2
4/5/2000	0.78	73.5
5/11/2000	0.54	73.2
6/18/2000	0.50	73.2
6/21/2000	0.10	72.8
8/8/2000	-0.60	72.1
9/5/2000	-1.02	71.7
10/11/2000	-0.61	72.1
11/27/2000	-1.81	70.9
12/17/2000	-0.10	72.6
1/16/2001	0.10	72.8
2/21/2001	-0.20	72.5
4/19/2001	-0.28	72.4
6/25/2001	0.04	72.7
7/31/2001	-0.92	71.8
8/28/2001	-1.28	71.4
9/17/2001	-1.50	71.2
10/22.2001	-0.81	71.9
12/20/2001	0.10	72.8
1/23/2002	0.15	72.8
2/20/2002	-0.20	72.5
3/27/2002	0.84	73.5
4/23/2002	0.9	73.6
5/22/2002	0.9	73.6
6/20/2002	0.6	73.3

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. P-5-00

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 71.1 ft (21.7 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector _____

Start _____ Completion _____ Well ID# _____ Equipment _____

Station 202+45 Offset 290' Rt. Casing _____ Method _____

Northing 569529.2642 Easting 1661446.4504 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
								Hand tools were used to install a piezometer to a depth of 10.8 feet.		

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
3/8/2000		
4/5/2000	-0.76	70.34
5/11/2000	-0.89	70.21
6/18/2000	-0.89	70.21
6/21/2000	-4.20	74.3
8/8/2000	-1.65	69.45
9/5/2000	-1.71	69.39
10/11/2000	-1.68	69.42
11/27/2000	-0.68	70.42
12/17/2000	-0.10	71.0
1/16/2001	-0.00	71.1
2/21/2001	-.0.10	71.0
4/19/2001	-1.10	70.0
6/25/2001	-2.12	68.98
7/31/2001	-2.68	68.42
8/28/2001	-3.16	67.94
9/17/2001	-3.41	67.69
10/22.2001	-1.66	69.44
12/20/2001	-1.20	69.90
1/23/2002	-0.35	70.75
2/20/2002	-1.40	69.70
3/27/2002	-0.77	70.33
4/23/2002	-0.7	70.40
5/22/2002	-0.7	70.40
6/20/2002	-0.9	70.20

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-048964

HOLE No. P-6-00

Job No. OL-3498 SR 202 Elevation 74.2 ft (22.6 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike B. Lic# 1711

Site Address

Inspector

Start March 8, 2000 Completion March 8, 2000 Well ID# AGF-574 Equipment CME 850 w/ autohammer

Station 203+14 Offset 488' Rt. Casing Augers x 30 Method Auger

Northing 569320.411 Easting 1661458.696 Latitude Longitude

County King Subsection SE 0F NE Section 18 Range 6E Township 25N

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 3 5 (8)		D-1		ORGANIC SOIL, medium stiff, dark brown, moist, homogeneous, no "HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft	▽ 3/8/2000	
5	1, 2			2 3 3 (6)		D-2		Sandy SILT, loose, gray and brown, moist, laminated, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
10	3, 4			1 2 3 (5)		D-3		SILT with sand, loose, gray, wet laminated, no HCl reation. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
15	5			1 1 2 (3)		D-4		SILT, very loose, gray, moist, homogeneous, no HCl reation. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
20	6			1 2		D-5		Sandy SILT with sand lenses, loose, gray, wet laminated, no HCl reation.		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/28/04 10:43:48 A6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-048964

HOLE No. P-6-00

Job No. OL-3498 SR 202 Elevation 74.2 ft (22.6 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike B. Lic#. 1711

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
				3 (5)				Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
	7									
25				1 1 3 (4)		D-6		Sandy SILT with sand, very loose, gray, wet laminated, no HCl reation. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
	8									
30	9			0 2 4 (6)		D-7		Poorly graded SAND, loose, gray, wet, homogeneous, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
	10							End of Test Hole Boring at 25 feet below ground elevation.		
35	11							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
40	12									
45	13									

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
3/8/2000	-2.30	71.2
4/5/2000	0.33	74.5
5/11/2000	-0.14	74.1
6/18/2000	-0.52	73.7
8/8/2000	-1.56	72.6
9/5/2000	-1.61	72.6
10/11/2000	-1.81	72.4
11/27/2000	-0.82	73.4
12/17/2000	0.00	74.2
1/16/2001	0.00	74.2
2/21/2001	-0.20	74.0
4/19/2001	-0.37	73.8
6/25/2001	-0.16	74.0
7/31/2001	-0.56	73.6
8/28/2001	-0.75	73.4
9/17/2001	-1.00	73.2
10/22.2001	-1.64	72.6
12/20/2001	-1.01	73.2
1/23/2002	-1.21	73.0
2/20/2002	-0.80	73.4
3/27/2002	0.20	74.4
4/23/2002	0.20	74.4
5/22/2002	0.20	74.4
6/20/2002	-0.40	73.8

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-48964

HOLE No. P-7-00

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 78.5 ft (23.9 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike B. Lic# 1711

Site Address

Inspector

Start March 14, 2000 Completion March 14, 2000 Well ID# AGF-575 Equipment CME 850 w/ autohammer

Station 205+33 Offset 453' Rt. Casing Augers x 25 Method Auger

Northing 569292.898 Easting 1661678.948 Latitude Longitude

County King Subsection SE of NE Section 18 Range 6E Township 25N

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
									2/21/01	
				1 1 1 (2)		D-1		Silty SAND, very loose, dark brown, wet, homogeneous, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
	1									
				0 0 2 (2)		D-2		Silty SAND with organics, very loose, dark brown, wet, homogeneous, no HCl reaction. Length Recovered: 1.2 ft, Length Retained: 1.2 ft		
5									9/17/01	
	2									
				2 3 3 (6)		D-3		Sandy SILT, loose, gray, moist, homogeneous, no HCl reation. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
10	3									
	4									
				2 3 3 (6)		D-4		SILT, loose, gray, moist, homogeneous, no HCl reation. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
15	5									
				2 3		D-5		SILT, loose, gray, moist, homogeneous, no HCl reation. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
20	6									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-48964

HOLE No. P-7-00

Job No. OL-3498 SR 202 Elevation 78.5 ft (23.9 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike B. Lic# 1711

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
				5 (8)						
	7									
25				2 6 12 (18)		D-6		Well graded GRAVEL with sand, subangular, medium dense, gray wet, homogeneous, no HCl reaction. Length Recovered: 0.4 ft, Length Retained: 0.4 ft		
	8							End of Test Hole Boring at 25.5 feet below ground elevation.		
	9							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
30										
	10									
35										
	11									
	12									
40										
	13									
45										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
3/14/2000	0.00	78.5
4/5/2000	-1.90	76.6
5/11/2000	-3.62	74.9
6/18/2000	-4.17	74.3
6/21/2000	-4.20	74.3
8/8/2000	-5.14	73.3
9/5/2000	-5.12	76.4
10/11/2000	-4.90	73.6
11/27/2000	-1.31	77.2
12/17/2000	-1.04	77.5
1/16/2001	-1.03	77.5
2/21/2001	-1.00	77.5
4/19/2001	-1.19	77.3
6/25/2001	-4.70	73.8
7/31/2001	-5.32	73.2
8/28/2001	-5.52	72.9
9/17/2001	-6.00	72.5
10/22.2001	-5.20	73.3
12/20/2001	-2.80	75.7
1/23/2002	-3.00	75.5
2/20/2002	-2.20	76.3
3/27/2002	-1.74	76.7
4/23/2002	-1.70	76.8
5/22/2002	-1.70	76.8
6/20/2002	-2.00	76.5
8/13/2002	-5.7	72.8
9/30/2002	-5.8	72.7
11/1/2002	-5.8	72.7
12/18/2002	-5.3	73.2
2/1/2003	-1.6	76.9
3/18/2003	-1.5	77.0
5/6/2003	-1.5	77.0
6/5/2003	-1.7	76.8
7/23/2003	-3.6	74.9
9/23/2003	-5.9	72.6
12/9/2003	-2.5	76.0
1/6/2004	-2.5	76.0
2/23/2004	-2.3	76.2
4/6/2004	-2.6	75.9
5/11/2004	-3.0	75.5
6/23/2004	-3.5	75.0

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-048964

HOLE No. P-8-00

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 78.1 ft (23.8 m)

Project SR 202 - SR520 to Sahalee Way NE Driller Mike B. Lic# 1711

Site Address Inspector

Start March 9, 2000 Completion March 9, 2000 Well ID# AGF-576 Equipment CME 850 w/ autohammer

Station 206+50 Offset 216' Rt. Casing Augers x 20 Method Auger

Northing 569488.41 Easting 1661856.377 Latitude Longitude

County King Subsection SE of NE Section 18 Range 6E Township 25N

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 2 2 (4)		D-1		Silty SAND with gravel, loose, brown, moist, homogeneous, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft	4/5/2000	
5	1			1 1 4 (5)		D-2		Silty SAND, loose, brown, wet, homogeneous, no HCl reaction. Length Recovered: 1.1 ft, Length Retained: 1.1 ft	9/17/2001	
10	2 3			1 2 2 (4)		D-3		SILT with organics, loose, wet, brown, homogeneous. Recovered 1.5 ft		
15	4 5			1 2 2 (4)		D-4		SILT with organics, very loose, dark gray, moist, stratified, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/7/04,3:38:30 P7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-048964

HOLE No. P-8-00

Job No. OL-3498 SR 202 Elevation 78.1 ft (23.8 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike B. Lic# 1711

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-5~~		Well graded GRAVEL with sand, subangular, very dense, gray, wet, homogeneous, no HCl reation. Length Recovered: 0.2 ft, Length Retained: 0.2 ft		
	7							End of Test Hole Boring at 20.2 feet below ground elevation.		
25								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	8									
30	9									
35	10									
40	11									
	12									
45	13									

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
3/9/2000	-2.10	76.0
4/5/2000	-0.77	77.3
5/11/2000	-1.48	76.6
6/18/2000	-1.97	76.1
8/8/2000	-3.58	74.5
9/5/2000	-3.43	74.7
10/11/2000	-3.98	74.1
11/27/2000	-4.17	73.9
12/17/2000	-4.34	73.8
1/16/2001	-3.63	74.5
2/21/2001	-3.12	75.0
4/19/2001	-3.47	74.6
6/25/2001	-3.67	74.4
7/31/2001	-4.11	74.0
8/28/2001	-4.57	73.5
9/17/2001	-4.60	73.5
10/22.2001	-3.67	74.4
12/20/2001	-1.67	76.4
1/23/2002	-1.50	76.6
2/20/2002	-1.80	76.3
3/27/2002	-2.27	75.8
4/23/2002	-2.20	75.9
5/22/2002	-2.00	76.1
6/20/2002	-2.40	75.7
8/13/2002	-3.8	74.3
9/30/2002	-3.9	74.2
11/1/2002	-4.6	73.5
12/18/2002	-4.0	74.1
2/11/2003	-3.0	75.1
3/18/2003	-2.9	75.2
5/6/2003	-3.0	75.1
6/5/2003	-3.1	75.0
7/23/2003	-3.8	74.3
9/23/2003	-4.1	74.0
12/9/2003	-3.3	74.8
1/6/2004	-3.2	74.8
2/23/2004	-3.1	75.0
4/6/2004	-3.3	74.8
5/11/2004	-3.9	74.2
6/23/2004	-3.6	74.5

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-04964

HOLE No. P-9-00

Job No. OL-3498 SR 202 Elevation 81.6 ft (24.9 m)

Sheet 1 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike B. Lic# 1711

Site Address

Inspector

Start March 14, 2000 Completion March 14, 2000 Well ID# AGF577 Equipment CME 850 w/ autohammer

Station 207+96 Offset 404' Rt. Casing Augers x 30 Method Auger

Northing 569267.605 Easting 1661944.54 Latitude Longitude

County King Subsection SE of NE Section 18 Range 6E Township 25N

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
				0 2 3 (5)		D-1		Silty SAND, loose, grayish brown, moist, homogeneous, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft	12/20/2001	
5	1			0 0 2 (2)		D-2		Silty SAND, very loose, dark brownish gray, wet, homogeneous, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft	11/1/02	
10	2 3			2 3 4 (7)		D-3		Sand SILT, loose, greenish gray, moist, homogeneous, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
15	4 5			1 2 3 (5)		D-4		SILT with sand lenses, loose, gray, wet, laminated, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/18/04,8:20:42 AB

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-04964

HOLE No. P-9-00

Job No. OL-3498 SR 202 Elevation 81.6 ft (24.9 m)

Sheet 2 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike B. Lic# 1711

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 3 2 (5)		D-5		SILT, loose, gray, wet, laminated, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
25	7			1 3 6 (9)		D-6		SILT with sand lenses, loose, gray, wet, laminated, no HCl reaction. Length Recovered: 1.2 ft, Length Retained: 1.2 ft		
30	8 9			9 10 8 (18)		D-7		Poorly graded SAND with gravel, medium dense, gray, wet, homogeneous, no HCl reaction. Length Recovered: 0.6 ft, Length Retained: 0.6 ft		
35	10 11 12							End of Test Hole Boring at 31.5 feet below ground elevation.		
40	13							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
45										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
3/14/200	-2.60	79.0
4/5/2000	-4.72	76.9
5/11/2000	-5.04	76.6
6/18/2000	-5.62	76.0
8/8/2000	-5.97	75.7
9/5/2000	-6.27	75.4
10/11/2000	-6.48	75.2
11/27/2000	-6.58	75.1
12/17/2000	-6.50	75.1
1/16/2001	-6.18	75.5
2/21/2001	-5.62	76.0
4/19/2001	-6.25	75.4
6/25/2001	-6.45	75.2
7/31/2001	-6.70	74.9
8/28/2001	-7.18	74.4
9/17/2001	-7.30	74.3
10/22.2001	-6.13	75.5
12/20/2001	-2.10	79.5
1/23/2002	-2.20	79.5

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-04964

HOLE No. P-9-00

Job No. OL-3498 SR 202 Elevation 81.6 ft (24.9 m)

Sheet 3 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike B. Lic# 1711

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
								2/20/2002	-9.48	72.1		
								3/27/2002	-6.38	75.3		
	14							4/23/2002	-6.31	75.3		
								5/22/2002	-6.10	75.5		
								6/20/2002	-6.60	75.0		
								8/13/2002	-6.6	75.0		
								9/30/2002	-6.8	74.8		
								11/1/2002	-7.4	74.2		
								12/18/2002	6.9-	74.7		
								2/11/2003	-7.0	74.6		
								3/18/2003	-7.0	74.6		
	15							5/6/2003	-6.9	74.7		
								6/5/2003	-7.1	74.5		
50								7/23/2003	-6.5	75.1		
								9/23/2003	-7.1	74.5		
								12/9/2003	-7.3	74.3		
								1/16/2004	-7.0	74.6		
								2/23/2004	-6.9	74.7		
								4/6/2004	-7.0	74.6		
	16							5/11/2004	-7.1	74.5		
								6/23/2004	-6.4	75.2		
55												
	17											
	18											
60												
	19											
65												
	20											
	21											
70												

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. P-10-00

Job No. OL-3498 SR 202 Elevation 72.9 ft (22.2 m)

Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector _____

Start March 15, 2000 Completion March 15, 2000 Well ID# _____ Equipment Hand Tools

Station 209+72 Offset 128' Rt. Casing Hand Tools Method _____

Northing 569484.456 Easting 1662189.996 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
								Sandy SILT with organics, loose, brownish gray, wet, homogeneous.		
								11/1/02 End of Test Hole Boring at 2.5 feet below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.	▽	

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
3/15/2000	0.40	73.3
4/5/2000	0.00	72.9
5/11/2000	-0.09	72.8
6/18/2000	-0.20	72.7
8/8/2000	-1.70	71.2
9/5/2000	-1.65	71.3
10/11/2000	-1.60	71.3
11/27/2000	0.22	73.1
12/17/2000	0.00	72.9
1/16/2001	0.10	73.0
2/21/2001	0.20	73.1
4/19/2001	-0.09	72.8
6/25/2001	-0.66	72.2
7/31/2001	-0.76	72.1
8/28/2001	-0.70	72.2
9/17/2001	-0.90	72.0
10/22.2001	-1.70	71.2
12/20/2001	0.30	73.2
1/23/2002	0.40	73.3
2/20/2002	0.20	73.1
3/27/2002	-0.02	72.9
4/23/2002	0.00	72.9
5/22/2002	0.00	72.9
6/20/2002	-0.70	72.2
8/13/2002	-2.0	70.9
9/30/2002	-2.0	70.9
11/1/2002	-3.1	69.8
12/18/2002	-1.8	71.1
2/11/2003	0.0	72.9
3/18.2003	0.0	72.9
5/6/2003	-0.4	72.5
6/5/2003	-0.4	72.5
7/23/2003	-0.9	72.0
9/23/2003	-2.2	70.7
12/9/2003	0.0	72.9
1/16/2004	0.0	72.9
2/23/2004	0.0	72.9
4/6/2004	0.0	72.9
5/11/2004	0.0	72.9
6/23/2004	-0.6	72.3

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-04964

HOLE No. P-11-00

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 78.1 ft (23.8 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike B. Lic# 1711

Site Address

Inspector

Start March 13, 2000 Completion March 13, 2000 Well ID# AGF-578 Equipment CME 850 w/ autohammer

Station 209+88 Offset 319' Rt. Casing Augers x 25 Method Auger

Northing 569296.941 Easting 1662153.115 Latitude Longitude

County King Subsection SE of NE Section 18 Range 6E Township 25N

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 1 1 (2)		D-1		Silty SAND with organics, very loose, grayish brown, moist, homogeneous, no HCl reaction. Length Recovered: 1.0 ft, Length Retained: 1.0 ft 1/23/02		
5	1			1 1 1 (2)		D-2		Sandy SILT, very loose, gray, wet, homogeneous, no HCl reaction. Length Recovered: 0.4 ft, Length Retained: 0.4 ft 9/17/01		
10	2 3			1 2 3 (5)		D-3		Sandy SILT with sandy lenses, loose, gray, wet, laminated, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
15	4 5			1 3 4 (7)		D-4		Sandy SILT with sandy lenses, loose, gray, wet, laminated, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
20	6			1 1		D-5		Sandy SILT with sandy lenses, loose, gray, moist, laminated, no HCl reaction.		

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-04964

HOLE No. P-11-00

Job No. OL-3498 SR 202 Elevation 78.1 ft (23.8 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike B. Lic# 1711

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
				3 (4)				Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
	7			8 11 17 (28)		D-6		Well graded GRAVEL with sand, subangular, dense, gray, wet, homogeneous, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
25										
	8							End of Test Hole Boring at 25.5 feet below ground elevation.		
								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	9							WATER LEVEL READINGS		
30										
	10									
35										
	11									
	12									
40										
	13									
45										

DATE	DEPTH	ELEVATION
3/13/2000	-2.80	75.3
4/5/2000	-8.95	
5/11/2000	-3.24	74.9
6/18/2000	-3.81	74.3
6/20/2000	-3.60	74.5
8/8/2000	-4.22	73.9
9/5/2000	-4.44	73.7
10/11/2000	-4.51	73.6
11/27/2000	-4.22	73.9
12/17/2000	-4.00	74.1
1/16/2001	-3.67	74.5
2/21/2001	-3.26	74.9
4/19/2001	-3.58	74.5
6/25/2001	-4.05	74.1
7/31/2001	-4.52	73.6
8/28/2001	-4.80	73.3
9/17/2001	-4.92	73.2
10/22.2001	-4.32	73.8
12/20/2001	-1.90	76.2
1/23/2002	-1.60	76.5
2/20/2002	-2.20	75.9
3/27/2002	-3.07	75.1
4/23/2002	-3.00	75.1
5/22/2002	-3.10	75.0
6/20/2002	-3.50	74.6
8/13/2002	-4.0	74.1
9/30/2002	-4.0	74.1
11/1/2002	-4.7	73.4
12/18/2002	-4.5	73.6
2/11/2003	-3.9	74.2
3/18/2003	-3.8	74.3
5/6/2003	-3.9	74.2
6/5/2003	-3.9	74.2
7/23/2003	-4.0	74.1
9/23/2003	-4.3	73.8
12/9/2003	-4.0	74.1
1/16/2004	-4.0	74.1
2/23/2004	-3.8	74.3
4/6/2004	-4.0	74.1
5/11/2004	-4.1	74.0
6/23/2004	-3.8	74.3

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-048964

HOLE No. P-12-00

Job No. OL-3498 SR 202 Elevation 82.0 ft (25.0 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike B. Lic# 1711

Site Address

Inspector

Start March 2, 2000 Completion March 2, 2000 Well ID# AGF-572 Equipment CME 850 w/ autohammer

Station 235+55 Offset 465' Rt. Casing Augers x 25 Method Auger

Northing 569583.252 Easting 1664691.138 Latitude Longitude

County King Subsection SW of NE Section Range 6E Township 25N

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 2 3 (50		D-1		Sandy SILT with organics, loose, brown, moist, homogeneous. Recovered 1.5 ft	1/23/02	
5	1 2			3 6 8 (14)		D-2		Well graded GRAVEL with sand, medium dense, brownish gray, wet, homogeneous. Recovered 1.5 ft	9/17/01	
10	3 4			11 17 12 (29)		D-3		Well graded GRAVEL with sand, dense, brown, wet, homogeneous. Recovered 0.8 ft		
15	5			4 7 12 (19)		D-4		Poorly graded SAND, medium dense, grayish brown, wet, homogeneous, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
20	6			4 8		D-5		Poorly graded SAND, medium dense, grayish brown, wet, homogeneous, no HCl reaction.		

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-048964

HOLE No. P-12-00

Job No. OL-3498 SR 202 Elevation 82.0 ft (25.0 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike B. Lic# 1711

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
				11 (19)				NOTE:(3 ft of heave in augers, fluid sand) Back into gravel at 21.0 ft Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
	7									
25				11 14 17 (31)		D-6		Well graded GRAVEL with sand, subangular, dense, grayish brown, wet, homogeneous, no HCl reaction. Length Recovered: 1.5 ft, Length Retained: 1.5 ft		
	8									
	9							End of Test Hole Boring at 25.5 feet below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
30										
	10									
35										
	11									
	12									
40										
	13									
45										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
3/2/2000	-3.7	78.3
4/5/2000	-3.75	78.2
5/11/2000	-3.97	78.0
6/18/2000	-4.15	77.8
8/8/2000	-5.12	76.9
9/5/2000	-5.13	78.8
10/11/2000	-5.32	76.7
11/27/2000	-4.85	77.13
12/17/2000	-2.15	79.8
1/16/2001	-3.75	78.2
2/21/2001	-1.91	80.1
4/19/2001	-4.12	77.9
6/25/2001	-4.73	76.8
7/31/2001	-5.16	76.8
8/28/2001	-5.15	76.6
9/17/2001	-5.35	76.8
10/22.2001	-5.13	80.2
12/20/2001	-1.76	80.2
1/23/2002	-1.75	80.1
2/20/2002	-1.86	78.5
3/27/2002	-3.45	78.6
4/23/2002	-3.35	78.6
5/22/2002	-3.35	78.6
6/20/2002	-4.05	77.9

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. P-13-00

Job No. OL-3498 SR 202 Elevation 77.4 ft (23.6 m)

Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Driller _____ Lic# _____

Site Address _____

Inspector _____

Start March 15, 2000 Completion March 15, 2000 Well ID# _____ Equipment Hand Tools

Station 236+59 Offset 250' Rt. Casing Hand Tools Method _____

Northing 569795.453 Easting 1664800.313 Latitude _____ Longitude _____

County _____ Subsection _____ Section _____ Range _____ Township _____

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
								Silty SAND with gravel, loose, gray, wet, homogeneous.		
						D-1		Well graded GRAVEL with sand, medium dense, brown, wet, homogeneous. 8/28/01	▽	
	1							End of Test Hole Boring at 2.5 feet below ground elevation.		
5										
	2							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
10	3									
	4									
15										
	5									
20	6									

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
3/15/2000	-0.3	77.1
4/5/2000	-0.00	77.4
5/11/2000	-0.14	77.3
6/18/2000	-0.14	77.3
8/8/2000	-1.42	76.0
9/5/2000	-1.46	75.9
10/11/2000	-0.93	76.5
11/27/2000	+0.03	77.4
12/17/2000	-0.00	77.41
1/16/2001	-0.28	77.1
2/21/2001	-0.25	77.2
4/19/2001	-0.20	77.2
6/25/2001	-1.36	76.1
7/31/2001	-1.71	75.7
8/28/2001	-1.97	75.4
9/17/2001	-1.95	75.5
10/22.2001	-1.52	75.9
12/20/2001	+1.05	78.5
1/23/2002	+1.05	78.5
2/20/2002	+1.03	78.4
3/27/2002	-0.15	77.3
4/23/2002	-0.15	77.3
5/22/2002	-0.35	77.1
6/20/2002	-0.85	76.6

Note: + readings are above ground surface

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R048963

HOLE No. P-14-00

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 87.9 ft (26.8 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller DOUG NELSON Lic# 2477

Site Address

Inspector VERNON F. WILLIAMS

Start February 23, 2000 Completion February 24, 2000 Well ID# AGF-571

Equipment Dietrich 25 w/ cathead

Station 237+83 Offset 413' Rt. Casing HW/HQ

Method Wet Rotary

Northing 569629.895 Easting 1664920.033 Latitude Longitude

County KING Subsection SW 1/4 OF NE 1/4 Section 17 Range 6E Township 25N

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
5	1, 2			12 12 11 (23)		D-1		Well graded SAND with gravel, medium dense, BROWN, moist, Homogeneous, no HCl reaction Length Recovered 0.4 ft, Length Retained 0.4 ft	02/23/2000	
10	3		>>	22 23 43 (66)		D-2		No Recovery	8/28/01	
15	4, 5			39 50 (50/6")		D-3	GS MC	GW-GM, M.C.=8% Well graded GRAVEL with silt and sand with cobbles, subrounded, very dense, BROWN, wet, Homogeneous, no HCl reaction Length Recovered 0.4 ft, Length Retained 0.4 ft		
20	6		>>							

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/18/04 8:55:33 AB

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R048963

HOLE No. P-14-00

Job No. OL-3498 SR 202 Elevation 87.9 ft (26.8 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller DOUG NELSON Lic# 2477

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
			>>	16 26 26 (52)		D-4		Well graded GRAVEL with sand with cobbles, subrounded, very dense, BROWN, wet, Homogeneous, no HCl reaction Length Recovered 0.4 ft, Length Retained 0.4 ft		
25	7		>>	38 28 28 (56)		D-5		Well graded GRAVEL with sand with cobbles, subrounded, very dense, BROWN, wet, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft		
30	8							End of test hole boring at 26.5 ft below ground elevation.		
35	9							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
40	10									
45	11									
	12									
	13									

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
2/23/2000	-8.0	79.9
4/5/2000	-9.68	78.2
5/11/2000	-9.90	78.0
6/18/2000	-10.54	77.4
8/8/2000	-11.56	76.4
9/5/2000	-11.51	76.4
10/11/2000	-10.74	77.2
11/27/2000	-9.70	78.2
12/17/2000	-9.98	77.9
1/16/2001	-10.00	77.9
2/21/2001	-9.44	78.5
4/19/2001	-9.88	78.0
6/25/2001	-11.24	76.7
7/31/2001	-11.56	76.4
8/28/2001	-11.62	76.3
9/17/2001	-11.10	76.8
10/22.2001	-11.50	76.4
12/20/2001	-8.70	79.2
1/23/2002	-9.59	78.3
2/20/2002	-9.68	78.2
3/27/2002	-9.70	78.2
4/23/2002	-9.70	78.2
5/23/2002	-9.90	78.0
6/22/2002	-10.80	77.1

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-048963

HOLE No. P-15-00

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 88.2 ft (26.9 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller DOUG NELSON Lic# 2477

Site Address

Inspector VERNON F. WILLIAMS

Start February 16, 2000 Completion February 22, 2000 Well ID# AGF-570

Equipment Dietrich 25 w/ cathead

Station 239+47 Offset 202' Rt. Casing HW/HQ

Method Wet Rotary

Northing 569836.137 Easting 1665085.256 Latitude

Longitude

County KING Subsection SW 1/4 OF NE 1/4 Section 17 Range 6E EWM Township 25N

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
5	1			24 28 19 (47)		D-1	GS MC	SW-SM, M.C.=12% Well graded SAND with silt and gravel, subrounded, dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft 02/22/2000		
10	2			16 28 18 (46)		D-2	GS MC	GW, M.C.=19% Well graded GRAVEL with sand, with cobbles, subrounded, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft 8/28/01	▽	
15	3		>>	33 27 25 (52)		D-3		Well graded GRAVEL with sand, with cobbles, subrounded, very dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft		
20	4									
	5									
	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/8/04,8:40:07 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-048963

HOLE No. P-15-00

Job No. OL-3498 SR 202 Elevation 88.2 ft (26.9 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller DOUG NELSON Lic# 2477

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
				15 16 17 (33)		D-4		Well graded GRAVEL with sand, subrounded, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft		
25	7 8			13 14 14 (28)		D-5		Well graded GRAVEL with sand, subrounded, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.4 ft, Length Retained 0.4 ft.		
30	9 10							End of test hole boring at 26.5 ft below ground elevation.		
35	11 12							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
40	13									
45										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
2/20/2000	-8.0	80.2
4/5/2000	-9.80	78.4
5/11/2000	-9.96	78.2
6/18/2000	-10.55	77.6
8/8/2000	-11.63	76.6
9/5/2000	-11.52	76.7
10/11/2000	-10.78	77.4
11/27/2000	-9.71	78.5
12/17/2000	-10.00	78.2
1/16/2001	-10.08	78.1
2/21/2001	-9.64	78.5
4/19/2001	-9.97	78.2
6/25/2001	-11.26	76.9
7/31/2001	-12.00	76.2
8/28/2001	-12.33	75.9
9/17/2001	-11.93	76.3
10/22.2001	-11.40	76.8
12/20/2001	-9.10	79.1
1/23/2002	-9.70	78.5
2/20/2002	-9.80	78.4
3/27/2002	-9.82	78.4
4/23/2002	-9.80	78.4
5/22/2002	-10.10	78.1
6/20/2002	-10.60	77.6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-048963

HOLE No. P-16-00

Job No. OL-3498 SR 202 Elevation 87.7 ft (26.7 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller DOUG NELSON Lic# 2477

Site Address

Inspector VERNON F. WILLIAMS

Start February 9, 2000 Completion February 15, 2000 Well ID# AGF-569

Equipment Dietrich 25 w/ cathead

Station 242+62 Offset 217' Rt. Casing HQ/HW

Method Wet Rotary

Northing 569802 Easting 1665375.885 Latitude

Longitude

County KING Subsection SW1/4 OF NE 1/4 Section 17 Range 6E EWM Township 25N

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
5	1		>>	15 51 (51)		D-1		Well graded GRAVEL with sand, subrounded, very dense, BROWN, moist, Homogeneous, no HCl reaction Length Recovered 0.1 ft, Length Retained 0.1 ft		
	2								12/20/2001	
10	3		>>	28 24 53 (77)		D-2			8/20/01	
	4									
15	5		>>	34 58 (58/6")		D-3		Well graded GRAVEL with sand and cobbles, subrounded, very dense, BROWN, wet, Homogeneous, no HCl reaction. Length Recovered 0.2 ft, Length Retained 0.2 ft		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/18/04,8:18:02 AB

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-048963

HOLE No. P-16-00

Job No. OL-3498 SR 202 Elevation 87.7 ft (26.7 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller DOUG NELSON Lic# 2477

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
				28 21 21 (42)		D-4		Well graded GRAVEL with sand and cobbles, subrounded, very dense, BROWN, wet, Homogeneous, no HCl reaction. Length Recovered 0.2 ft, Length Retained 0.2 ft		
25	7			19 19 16 (35)		D-5		Well graded GRAVEL with sand and cobbles, subrounded, very dense, BROWN, wet, Homogeneous, no HCl reaction. Length Recovered 0.8 ft, Length Retained 0.8 ft		
	8							End of test hole boring at 26.5 ft below ground elevation.		
30	9							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
35	10									
40	11									
45	12									
	13									

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
2/15/2000	-10.0	77.7
4/5/2000	-9.05	78.7
6/18/2000	-9.79	77.9
8/8/2000	-10.93	76.8
9/5/2000	-10.78	76.9
10/11/2000	-10.10	77.6
11/27/2000	-8.80	78.9
12/17/2000	-9.35	78.4
1/16/2001	-9.30	78.4
2/21/2001	-8.80	78.9
4/19/2001	-9.23	78.5
6/25/2001	-10.58	77.1
7/31/2001	-11.02	76.7
8/28/2001	-11.48	76.2
9/17/2001	-11.20	76.5
10/22.2001	-11.00	76.7
12/20/2001	-8.20	79.5
1/23/2002	-8.97	78.7
2/20/2002	-9.02	78.7
3/27/2002	-9.12	78.6
4/23/2002	-8.90	78.8
5/22/2002	-8.8	78.9
6/20/2002	-9.30	78.4
12/18/2002	-8.5	79.2
2/11/2003	-9.2	78.5
3/18/2003	-9.1	78.6
6/5/2003	-10.3	77.4
7/23/2003	-11.1	76.6
1/16/2004	-8.3	79.4
2/23/2004	-7.9	79.8
4/6/2004	-8.4	79.3
5/11/2004	-9.1	78.6
6/23/2004	-10.8	76.9

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 048973

HOLE No. P-23-00

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 75.9 ft (23.1 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 2520

Site Address

Inspector Michael Brun

Start August 3, 2000 Completion August 3, 2000 Well ID#

Equipment CME 850 w/ autohammer

Station 203+60 Offset 120' Lt. Casing HQ

Method Wet Rotary

Northing 569891.8437 Easting 1661670.2833 Latitude

Longitude

County King Subsection SW1/4 of the NW1/4 Section 17 Range 6 Township 25 N

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 1 2 (3)		D-1		Well graded GRAVEL with silt and sand, subrounded, very loose,brown,moist,homogeneous,no HCl reaction.		
5	1			4 7 9 (16)		D-2		Well graded GRAVEL with silt and sand, medium dense, brown moist, homogeneous, no HCl reaction.	08/03/2000	
10	2			10 14 19 (33)		D-3	GS MC	GW-GM, M.C.=1% Well graded GRAVEL with silt and sand, dense ,brown, moist, homogeneous, no HCl reaction.		
15	3			4 12 11 (23)		D-4		Silty SAND with gravel, medium dense, gray, moist, homogeneous, no HCl reaction.		
20	4									
	5									
	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/20/04,12:58:29 PB

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 048973

HOLE No. P-23-00

Job No. OL-3498 SR 202 Elevation 75.9 ft (23.1 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 2520

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 4 7 (11)		D-5		SILT with sand, medium dense, gray, moist, homogeneous, no HCl reaction.		
								End of test hole boring at 21.5 feet below ground elevation.		
								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
25	7									
	8									
30	9									
	10									
35	11									
40	12									
	13									
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 048973

HOLE No. P-24-00

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 80.2 ft (24.4 m)

Project SR 202 - SR520 to Sahalee Way NE Driller Jason Stewart Lic# 2520

Site Address Inspector Brian M Breck

Start August 6, 2000 Completion August 6, 2000 Well ID# Equipment CME 55 w/ autohammer

Station 207+60 Offset 70' Lt. Casing Augers x 21 Method Auger

Northing 569733.5095 Easting 1662040.999 Latitude Longitude

County King Subsection sw 1/4 of the NW 1/4 Section 17 Range 6 EWM Township 25N

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
				0 1 1 (2)		D - 1		Silty SAND with gravel and cobbles, very loose, brown, dry, Homogeneous, no HCl reaction Length Recovered 0.4 ft, Length Retained 0.4 ft		
5	1, 2			8 9 12 (21)		D - 2		Silty SAND with gravel and cobbles, medium dense, brown, dry, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft		
10	3			4 5 5 (10)		D - 3		Poorly graded SAND, loose, brownish gray, wet, Homogeneous, no HCl reaction Length Recovered 1.1 ft, Length Retained 1.1 ft	08/06/2000	
15	4, 5			3 8 14 (22)		D - 4		Poorly graded SAND, medium dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
20	6			4 12		D - 5		Poorly graded SAND, dense, gray, wet, Homogeneous, no HCl reaction		

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 048973

HOLE No. P-24-00

Job No. OL-3498 SR 202 Elevation 80.2 ft (24.4 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 2520

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
				18 (30)				Length Recovered 1.5 ft, Length Retained 1.5 ft		
								End of test hole boring at 20.5 ft below ground elevation.		
								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications.		
25	7									
	8									
30	9									
	10									
35	11									
40	12									
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card xxxxxx

HOLE No. P-4-01

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 53.0 ft (16.2 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 2520

Site Address

Inspector Mike Brun

Start October 22, 2001 Completion October 22, 2001 Well ID#

Equipment Hand Tools

Station 136+45 Offset 55' Lt. Casing Open Hole

Method Portable Penetrometer

Northing 573546.9546 Easting 1656520.5404 Latitude

Longitude

County King Subsection xxxxx Section xxxxx Range xxxx Township xxxx

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
				7 11 12 (23)		D-1		Well graded SAND with gravel, and few cobbles, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
	1			5 9 9 (18)		D-2		Well graded SAND with gravel, and trace of cobbles, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
5				8 13 21 (34)		D-3		Well graded SAND with gravel, dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
	2							End of test hole boring at 6.5 ft below ground elevation.		
10	3							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	4									
15										
	5									
20	6									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card xxxxx

HOLE No. P-5-01

Job No. OL-3498 SR 202 Elevation 53.0 ft (16.2 m)

Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 2520

Site Address

Inspector Mike Brun

Start October 22, 2001 Completion October 22, 2001 Well ID#

Equipment Hand Tools

Station 135+05 Offset 87' Lt. Casing Open Hole

Method Portable Penetrometer

Northing 573684.2171 Easting 1656466.5127 Latitude

Longitude

County King Subsection xxxxx Section xxxxx Range xxxx Township xxxx

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
				9 5 6 (11)		D-1		Silty SAND with gravel, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
	1			2 3 5 (8)		D-2		Poorly graded SAND with gravel, loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
5				8 13 21 (34)		D-3		Poorly graded SAND with gravel, dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
	2							End of test hole boring at 6.5 ft below ground elevation.		
10	3							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	4									
15										
	5									
	6									
20										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card xxxx

HOLE No. P-6-01

Job No. OL-3498 SR 202 Elevation 51.4 ft (15.7 m)

Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Driller Jason Stewart Lic# 2520

Site Address

Inspector Mike Brun

Start October 22, 2001 Completion October 22, 2001 Well ID#

Equipment Hand Tools

Station 135+22 Offset 55' Rt Casing Open Hole

Method Portable Penetrometer

Northing 573587.3763 Easting 1656360.5558 Latitude

Longitude

County King Subsection xxxxx Section xxxxx Range xxxxx Township xxxxx

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
			>>	10 25 50 (75)		D-1		Poorly graded SAND with gravel, and trace of cobbles, very dense, brown, dry, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
	1			4 8 10 (18)		D-2		Poorly graded SAND with gravel, and trace of cobbles, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
5				10 11 15 (26)		D-3		Poorly graded SAND with gravel, dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
	2							End of test hole boring at 6.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
10	3									
	4									
15										
	5									
20	6									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card xxxxxx

HOLE No. P-7-01

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 52.8 ft (16.1 m)

Project SR 202 - SR520 to Sahalee Way NE Driller Jason Stewart Lic# 2520

Site Address Inspector Mike Brun

Start October 22, 2001 Completion October 22, 2001 Well ID# Equipment Hand Tools

Station 126+95 Offset 60' Lt. Casing Open Hole Method Portable Penetrometer

Northing 574306.2633 Easting 1655932.9856 Latitude Longitude

County King Subsection xxxxxxx Section xxxxx Range xxx Township xxxx

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
			>>	13 25 50 (75)		D-1		Well graded SAND with gravel, and few cobbles, very dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
	1			8 14 19 (33)		D-2		Well graded SAND with gravel, and few cobbles, dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
5								End of test hole boring at 4.5 ft below ground elevation.		
	2							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
10	3									
	4									
15										
	5									
20	6									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card X

HOLE No. P-8-01

Job No. OL-3498 SR 202 Elevation 50.0 ft (15.2 m)

Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Driller Hugh Clayton Lic# 1681

Site Address

Inspector Hugh Clayton

Start November 20, 2001 Completion November 20, 2001 Well ID#

Equipment Hand Tools

Station 127+80 Offset 60' Rt. Casing none

Method Portable Penetrometer

Northing 573919.4654 Easting 1655664.622 Latitude

Longitude

County X Subsection x Section x Range x Township x

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
				3 6 6 (12)		D-1		poorly graded SAND, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft., Length Retained 0 ft.		
	1			4 7 6 (13)		D-2		Poorly graded SAND, medium dense, brown, dry, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
5				20 21 25 (46)		D-3		Well graded GRAVEL with sand, rounded, dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 0.0 ft		
	2			25 50 (50)		D-4		Well graded GRAVEL with sand, rounded, very dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 0.0 ft		
								End of test hole boring at 7.5 ft below ground elevation.		
10	3							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	4									
15										
	5									
20	6									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14857

HOLE No. H-1-02

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 50.9 ft (15.5 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dave Nelson

Start March 12, 2002 Completion March 13, 2002 Well ID#

Equipment CME 45 w/ autohammer

Station 142+97 Offset 49.' Rt. Casing HQ x 40

Method Wet Rotary

Northing 572948.1842 Easting 1656798.813 Latitude

Longitude

County King Subsection SW_SW Section 7 Range 6 EWM Township 25 N

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
5	1, 2			26 12 12 (24)		D-1	GS MC	SP, MC=17% Poorly graded SAND	03/13/2002	
10	3, 4			7 7 12 (19)		D-2	GS MC	GW, MC=13% Well graded GRAVEL with sand, medium dense, olive brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
								COBBLE at 14 ft		
15	5			13 14 18 (32)		D-3		Well graded GRAVEL with sand, subrounded, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft		
20	6, 7			9 12 17 (29)		D-4		Well graded GRAVEL with sand, dense, olive brown, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft		
25										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14857

HOLE No. H-1-02

Job No. OL-3498 SR 202 Elevation 50.9 ft (15.5 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
	8			5 5 9 (14)		D-5	GS MC	SP, MC=28% Poorly graded SAND, medium dense, yellowish brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
30	9			7 8 10 (18)		D-6		Poorly graded SAND, medium dense, olive brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
35	10 11		>>	6 27 24 (51)		D-7		Poorly graded SAND, very dense, olive brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
40	12			15 24 20 (44)		D-8	GS MC	SP-SM, MC=25% Poorly graded SAND with silt, dense, olive brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
45	13 14							End of test hole boring at 41.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
50	15 16									
55	17									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/10/04,1:48:36 P6

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S14857

HOLE No. H-2-02

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 68.0 ft (20.7 m)

Project SR 202 - SR520 to Sahalee Way NE Driller Kerry Cooper Lic# 2552

Site Address Inspector Dan Reed

Start May 22, 2002 Completion May 22, 2002 Well ID# Equipment CME 45 w/ autohammer

Station 148+48 Offset 36' Rt. Casing HW/HQ Method Wet Rotary

Northing 572499.177 Easting 1657117.9905 Latitude Longitude

County King Subsection SW 1/4 of the SW 1/4 Section 7 Range 6 EWM Township 25N

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
5	1, 2			10 13 16 (29)		D-1		Silty SAND with gravel, dense, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
10	3		>>	22 35 38 (73)		D-2	GS MC	GM, M.C.=15% Silty GRAVEL with sand and cobbles, rounded, very dense, gray, wet, Homogeneous, no HCl reaction. Length Recovered 1.3 ft, Length Retained 1.3 ft		
15	4, 5			26 50/3 (50/3")		D-3		Silty GRAVEL with sand and cobbles, very dense, gray, moist, Homogeneous, no HCl reaction. Length Recovered 0.8 ft, Length Retained 0.8 ft		
20	6, 7			32 50/2 (50/2")		D-4		Silty GRAVEL with sand and cobbles, very dense, gray, moist, Homogeneous, no HCl reaction. Length Recovered 0.7 ft, Length Retained 0.7 ft		
25										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14857

HOLE No. H-2-02

Job No. OL-3498 SR 202 Elevation 68.0 ft (20.7 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Kerry Cooper Lic# 2552

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-5		Gravelly SILT with sand and cobbles, very dense, gray, moist, Homogeneous, no HCl reaction. Length Recovered 0.3 ft, Length Retained 0.3 ft		
30	9		>>	16 36 56 (92)		D-6	GS MC	ML, M.C.=24% Gravelly SILT with cobbles, very dense, gray, moist, Homogeneous, no HCl reaction. Length Recovered 1.5 ft, Length Retained 1.5 ft		
35	11			18 30 50/4 (80/10")		D-7		Gravelly SILT with sand, very dense, gray, wet, Stratified, no HCl reaction, w/sand and gravel lenses Length Recovered 1.4 ft, Length Retained 1.4 ft		
40	12			21 45 50/5 (95/11")		D-8	GS MC	SM, M.C.=21% Silty SAND with gravel, very dense, gray, wet, Stratified, no HCl reaction, w/sand and gravel lenses Length Recovered 1.3 ft, Length Retained 1.3 ft		
45	13							End of test hole boring at 41.3 ft below ground elevation.		
50	15							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
55	16									
	17									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14857

HOLE No. H-3-02

Job No. OL-3498 SR 202 Elevation 90.7 ft (27.6 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dan Reed

Start February 28, 2002 Completion February 28, 2002 Well ID#

Equipment CME 45 w/ autohammer

Station 153+00 Offset 45' Rt. Casing HW/HQ

Method Wet Rotary

Northing 572119.2015 Easting 1657363.5605 Latitude

Longitude

County King Subsection SW 1/4 of the SW 1/4 Section 7 Range 6 EWM Township 25N

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
5	1			12 15 17 (32)		D-1	GS MC	SM, M.C.=19% Silty SAND with gravel, dense, light brown, moist, Homogeneous, no HCl reaction. Length Recovered 1.5 ft, Length Retained 1.5 ft 2/28/02	▽	
10	2, 3			19 15 16 (31)		D-2	GS MC AL	GM, M.C.=25%, LL=31 Silty GRAVEL with sand, dense, light brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft		
15	4, 5			15 17 25 (42)		D-3		Elastic SILT with sand and angular gravel, hard, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft		
20	6, 7		>>	25 25 35 (60)		D-4	GS MC AL	ML, M.C.=23%, PI=11 Sandy SILT with gravel, dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
25			>>	36 39		D-5		Sandy SILT, very dense, gray, moist, Laminated, no HCl reaction		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/11/04 1:20:23 P6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14857

HOLE No. H-3-02

Job No. OL-3498 SR 202 Elevation 90.7 ft (27.6 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
	8			50 (89)				Length Recovered 1.5 ft, Length Retained 1.0 ft		
30	9			29 36 50/4 (86/10")		D-6	GS MC	GM, M.C.=11% Silty GRAVEL with sand, angular, very dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.3 ft, Length Retained 1.3 ft		
	10									
35	11		>>	25 35 43 (78)		D-7	GS MC	ML, M.C.=30% SILT, very dense, gray, moist, Laminated, no HCl reaction, varying colors - light gray to light brown Length Recovered 1.5 ft, Length Retained 1.5 ft		
40	12		>>	27 67/4 (67/4")		D-8		SILT with lean clay lenses,dense, black and mixed gray, moist, Disrupted, no HCl reaction, w/lean clay lenses Length Recovered 0.9 ft, Length Retained 0.9 ft		
	13							End of test hole boring at 39.9 ft below ground elevation.		
45	14							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
50	15									
	16									
55	17									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 14858

HOLE No. H-4-02

Job No. OL-3498 SR 202 Elevation 137.5 ft (41.9 m)

Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

Site Address

Inspector Cleo Andrews

Start July 16, 2002 Completion July 16, 2002 Well ID#

Equipment CME 55 w/ autohammer

Station 160+90 Offset 73' Lt. Casing 4" hollow core augers x 25.0' Method Auger

Northing 571530.241 Easting 1657903.166 Latitude Longitude

County King Subsection NE 1/4 of the NW 1/4 Section 18 Range 6 EWM Township 25 N

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 2 4 4 (6)		D-1		Silty SAND with gravel, medium dense, brown, moist, Homogeneous, no HCl reaction. Length Recovered 0.7 ft, Length Retained 0.7 ft **(Fill material)?**		
5	1									
	2			8 12 11 (23)		D-2		Silty SAND with gravel, medium dense, brown, moist, Homogeneous, no HCl reaction. Length Recovered 1.0 ft, Length Retained 1.0 ft		
10	3			6 12 19 (31)		D-3		GW-GM, M.C.=9% Well graded GRAVEL with silt and sand, angular, dense, brownish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.1 ft, Length Retained 1.0 ft		
15	4									
	5			17 8 15 (23)		D-4		Silty GRAVEL with sand, subrounded, medium dense, brownish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.3 ft, Length Retained 1.0 ft		
20	6									
			>>	31 50 40 (90)		D-5		Silty GRAVEL with sand, angular, very dense, dark yellowish brown, moist, Homogeneous, no HCl reaction. Length Recovered 1.5 ft, Length Retained 1.0 ft		
	7							End of test hole boring at 23 ft below ground elevation.		
25	8							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from field identifications and laboratory test data. (Dry Hole)		
30	9									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 9/28/04,2:00:45 P9

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14858

HOLE No. H-5-02

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 132.4 ft (40.4 m)

Project SR 202 - SR520 to Sahalee Way NE Driller Joe Judd Lic# 2454

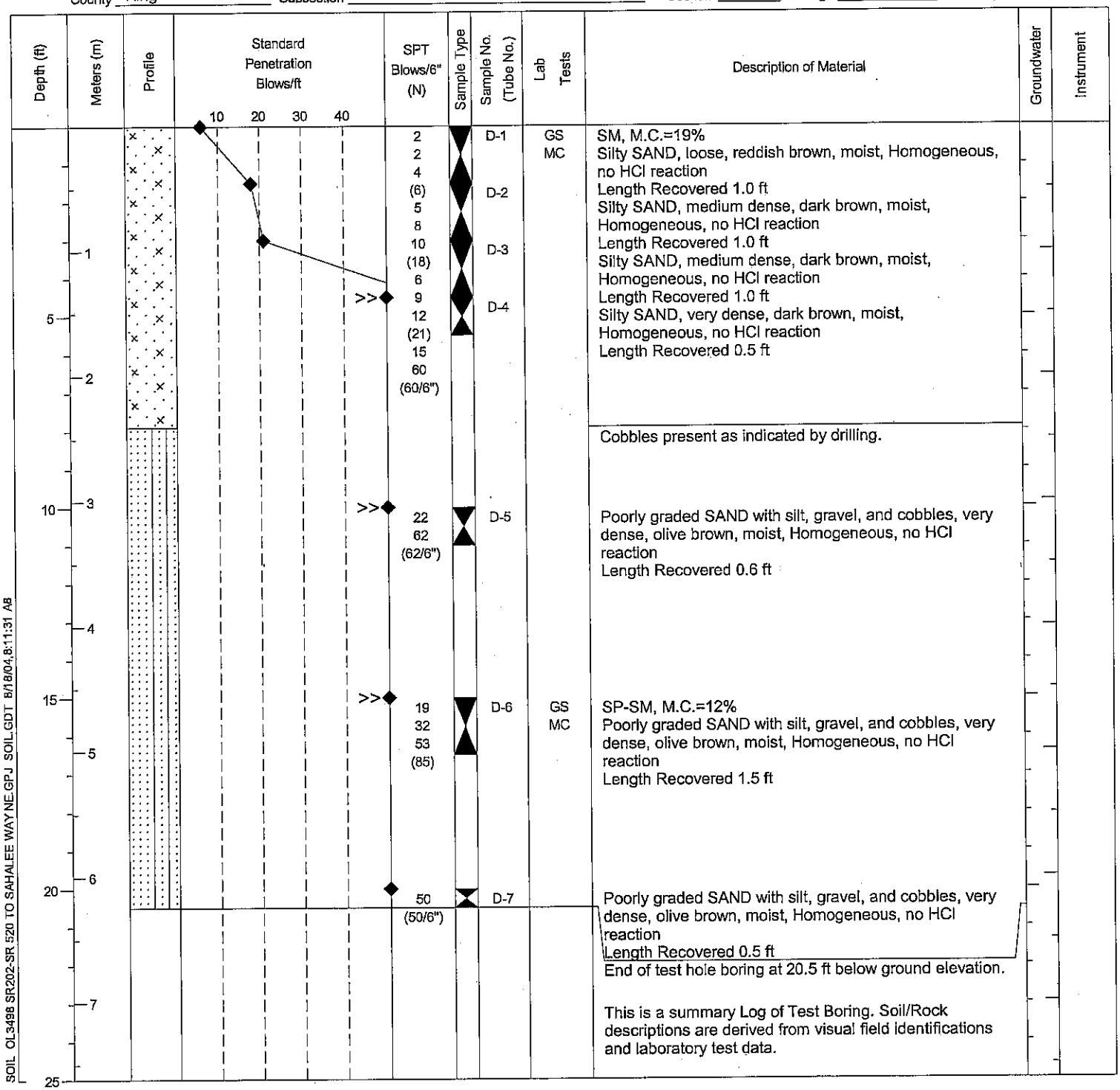
Site Address Inspector Dave Nelson

Start March 13, 2002 Completion March 14, 2002 Well ID# Equipment CME 45 w/ autohammer

Station 162+60 Offset 35' Rt. Casing HQ x 20.0 Method Wet Rotary

Northing 571322.9953 Easting 1657901.722 Latitude Longitude

County King Subsection NE-NW Section 18 Range 6 EWM Township 25 N



Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
		2 2 4 (6)		D-1	GS MC	SM, M.C.=19% Silty SAND, loose, reddish brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft
		5 8 10 (18)		D-2		Silty SAND, medium dense, dark brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft
		6 9 12 (21)		D-3		Silty SAND, medium dense, dark brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft
5	1	15 60 (60/6")		D-4		Silty SAND, very dense, dark brown, moist, Homogeneous, no HCl reaction Length Recovered 0.5 ft
	2					Cobbles present as indicated by drilling.
10	3	22 62 (62/6")		D-5		Poorly graded SAND with silt, gravel, and cobbles, very dense, olive brown, moist, Homogeneous, no HCl reaction Length Recovered 0.6 ft
15	4	19 32 53 (85)		D-6	GS MC	SP-SM, M.C.=12% Poorly graded SAND with silt, gravel, and cobbles, very dense, olive brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft
20	5	50 (50/6")		D-7		Poorly graded SAND with silt, gravel, and cobbles, very dense, olive brown, moist, Homogeneous, no HCl reaction Length Recovered 0.5 ft
	6					End of test hole boring at 20.5 ft below ground elevation.
	7					This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
25						

Standard Penetration Blows/ft: 10 20 30 40

Groundwater

Instrument

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/18/04,8:11:31 AB

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 14858

HOLE No. H-6-02

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 144.6 ft (44.1 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Brian Hilts Lic# 2532

Site Address

Inspector Cleo Andrews

Start June 26, 2002 Completion June 26, 2002 Well ID#

Equipment BK-81 w/ autohammer

Station 163+52 Offset 67' Lt. Casing Hollow core auger 4" x 25.0' Method Auger

Northing 571316.982 Easting 1658046.976 Latitude Longitude

County King Subsection NE 1/4 of the NW 1/4 Section 18 Range 6 EWM Township 25 N

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
								Top surface lawn grass, shurbs, over head power lines, surrounding trees and apt. complex. 0.0' to 4.0' Sandy SILT with gravel as shown in auger returns. **(Fill material).**		
5	1, 2			2 2 4 (6)		D-1		SM, M.C.=13% Silty SAND with gravel, loose, brown, moist, Homogeneous, no HCl reaction, traces of organic and root hairs. Length Recovered 1.0 ft, Length Retained 1.0 ft **(Fill material)**		
10	3			3 5 12 (17)		D-2		Silty SAND with gravel and cobbles, medium dense, gray, moist, Stratified, no HCl reaction, with silt lenses. (Fill material). Length Recovered 1.5 ft, Length Retained 1.0 ft		
15	4, 5			13 8 6 (14)		D-3		SP-SM, M.C.=12% Poorly graded SAND with silt and gravel, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
20	6			12 14 17 (31)		D-4		Poorly graded SAND with silt and gravel, dense, grayish brown, moist, Homogeneous, no HCl reaction, Ended and abandoned test hole at 20.5' below ground elevation. Length Recovered 1.0 ft, Length Retained 1.0 ft		
								End of test hole boring at 20.5 ft below ground elevation.		
25	7							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. **(Dry hole)**		

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-14858

HOLE No. H-7-02

Job No. OL-3498 SR 202 Elevation 151.3 ft (46.1 m)

Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dave Nelson

Start March 19, 2002 Completion March 19, 2002 Well ID#

Equipment CME 45 w/ autohammer

Station 166+31 Offset 47' Rt. Casing HQx20.0

Method Wet Rotary

Northing 571033.9137 Easting 1658145.592 Latitude

Longitude

County King Subsection NE-NW Section 18 Range 6 EWM Township 25 N

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
5	1, 2			4 8 9 (17)		D-1		Poorly graded SAND, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10	3, 4			20 8 6 (14)		D-2		Poorly graded SAND, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
15	5			4 5 6 (11)		D-3		Poorly graded SAND, medium dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
20	6			6 6 8 (14)		D-4	GS MC	ML, M.C.=18% Sandy SILT with gravel, mottled color reddish brown, medium dense, yellowish brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
25	7, 8							End of test hole boring at 21.5 ft below ground elevation.		
30	9							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. NOTE: Wet soil encounterd at 15' below ground surface		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/11/04,3:38:29 P6

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S14858

HOLE No. H-8-02

Job No. OL-3498 SR 202 Elevation 157.2 ft (47.9 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Dan Reed (Mike Harvey) ID# 2339

Site Address

Inspector Dan Reed

Start July 16, 2002 Completion July 16, 2002 Well ID#

Equipment CME 45 w/ autohammer

Station 167+83 Offset 63' Lt. Casing HW/HQ

Method Wet Rotary

Northing 571009.983 Easting 1658331.285 Latitude

Longitude

County King Subsection NE 1/4 of the NW 1/4 Section 18 Range 6 EWM Township 25N

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
5	1, 2			19 21 29 (50)		D-1		SP-SM, M.C.=12% Poorly graded SAND with silt and gravel, dense, gray, wet, Homogeneous, no HCl reaction, silty Length Recovered 1.5 ft, Length Retained 1.5 ft		
10	3, 4		>>	6 22 33 (55)		D-2		Silty SAND with gravel, dense, light brown, wet, Homogeneous, no HCl reaction. Length Recovered 1.5 ft, Length Retained 1.5 ft		
15	5			10 17 29 (46)		D-3		Silty SAND with gravel, dense, light brown, wet, Homogeneous, no HCl reaction. Length Recovered 1.5 ft, Length Retained 1.5 ft	▽ 07/16/2002	
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAYNE.GPJ SOIL.GDT 6/11/04,3:44:55 P6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14858

HOLE No. H-8-02

Job No. OL-3498 SR 202 Elevation 157.2 ft (47.9 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Dan Reed (Mike Harvey) # 2339

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
				25 50 (50/6")		D-4		Well graded SAND with silt and gravel, dense, light brown, moist, Homogeneous, no HCl reaction. Length Recovered 1.0 ft, Length Retained 1.0 ft		
	7									
25				43 50 (50/6")		D-5		Well graded GRAVEL with silt and sand, subangular, dense, light brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	8							End of test hole boring at 26 ft below ground elevation.		
	9									
30								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	10									
35										
	11									
	12									
40										
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14858

HOLE No. H-9-02

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 164.0 ft (50.0 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dave Nelson

Start March 20, 2002 Completion March 20, 2002 Well ID#

Equipment CME 45 w/ autohammer

Station 171+00 Offset 56' Rt. Casing HQ x 30.0

Method Wet Rotary

Northing 570724.3403 Easting 1658511.5034 Latitude

Longitude

County King Subsection NE-NW Section 18 Range 6 EWM Township 25 N

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 1 1 1 (2)		D-1	GS MC	SM, M.C.=25% Silty SAND with gravel, and organics, very loose, dark brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
5	1			1 2 3 (5)		D-2		Silty SAND, loose, dark brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10	2 3		>>	4 44 23 (67)		D-3		Poorly graded SAND with silt and gravel, mottled reddished brown, very dense, bluishgrey, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
15	4 5			15 20 24 (44)		D-4		Poorly graded SAND with silt and gravel, very dense, light grey, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/14/04,7:32:31 A6

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-14858

HOLE No. H-9-02

Job No. OL-3498 SR 202 Elevation 164.0 ft (50.0 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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 (50/6")		D-5		Poorly graded SAND with silt and gravel, very dense, olive brown, moist, Homogeneous, no HCl reaction Length Recovered 0.5 ft		
	7									
25				50 (50/6")		D-6		Silty SAND with gravel, very dense, light grey, moist, Homogeneous, no HCl reaction Length Recovered 0.2 ft		
	8									
	9									
30				50 (50/6")		D-7		No Recovery End of test hole boring at 30 ft below ground elevation.		
	10							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
35	11									
	12									
40										
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 14859

HOLE No. H-10-02

Job No. OL-3498 SR 202 Elevation 144.5 ft (44.0 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

Site Address

Inspector Cleo Andrews

Start April 24, 2002 Completion April 24, 2002 Well ID#

Equipment CME 55 w/ autohammer

Station 177+82 Offset 62' Rt. Casing HQ 3" x 35.0

Method Wet Rotary

Northing 570427.68 Easting 1659142.325 Latitude

Longitude

County King Subsection NW 1/4 of the NE 1/4 Section 18 Range 6 EWM Township 25 N

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
								Top surface 0.5' of asphalt. 0.5' to 4.0' Silty SAND with some gravel as indicated by drilling and wash return. (Fill?).		
5	1, 2			1 2 1 (3)		D-1	GS MC	SM, M.C.=25% Silty SAND, very loose, moderate brown, moist, Homogeneous, no HCl reaction, traces of root particles. (Fill material). Length Recovered 1.2 ft, Length Retained 1.0 ft		
10	3, 4			4 4 3 (7)		D-2		Poorly graded SAND with gravel, loose, dark yellowish brown, moist, Stratified, no HCl reaction, with 0.7' of sandy Silt stratigied with very fine grained sand lens and brownish orange stain. (Fill material). 100% drilling fluid return. Length Recovered 1.5 ft, Length Retained 1.0 ft		
15	5			6 7 5 (12)		D-3	GS MC AL	SM, M.C.=29%, PI=12 Silty SAND with gravel and organics, medium dense, dark yellowish brown, moist, Stratified, no HCl reaction, with sandy Silt with traces of organic, 0.2' of elastic Silt and very fine grained sand partings. 100% drillin g fluid return. Length Recovered 1.5 ft, Length Retained 1.0 ft		
20	6			9 10		D-4		Silty SAND with gravel, dense, dark yelloowish brown, moist, Homogeneous, no HCl reaction, traces of brown		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/14/04,8:01:14 A6

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 14859

HOLE No. H-10-02

Job No. OL-3498 SR 202 Elevation 144.5 ft (44.0 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

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
				17 (27)				stains. 100% drilling fluid return. (Note encountered some coarser gravel, drilling extremely harder from 23.5' to 24.0'). Length Recovered 1.5 ft, Length Retained 1.0 ft		
25	7 8		>>	16 31 31 (62)		D-5	GS MC	SM,M.C.=8%, Silty SAND with gravel, very dense, dark yellowish brown, moist, Homogeneous, no HCl reaction, (Till). 100% drilling fluid return. Length Recovered 1.5 ft, Length Retained 1.0 ft		
30	9		>>	20 29 27 (56)		D-6		Silty SAND with gravel, very dense, dark yellowish brown, moist, Stratified, no HCl reaction, with very fine grained sand lenses. Length Recovered 1.5 ft, Length Retained 1.0 ft		
35 40 45	10 11 12 13							End of test hole boring at 30.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. **(Dry test hole)**		

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-14859

HOLE No. H-11-02

Job No. OL-3498 SR 202 Elevation 131.0 (39.9 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dave Nelson

Start April 10, 2002 Completion April 10, 2002 Casing HQ x 30.0

Equipment CME 45 w/ auto hammer

Station 181+66 Offset 47' Rt.

Method Wet Rotary

Northing 570335.859 Easting 1659514.825 Latitude Longitude

County King Subsection NW-NE Section 18 Range 6 EWM Township 25N

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
5	1			3 2 2 (4)		D-1	GS MC	SW-SM, M.C.=19% Well graded SAND with silt and gravel, loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10	2			5 7 8 (15)		D-2		Poorly graded SAND with gravel, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
15	3			8 12 14 (26)		D-3	GS MC	ML, M.C.=19% Sandy SILT, dense, light brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
20	4							Gravel and cobbles were encountered at 18 feet below ground surface.		
	5									
	6									

SOIL OL-3498 SR-202, 520 TO SAHALEE WAY.GPJ SOIL.GDT 4/15/03,8:18:17 A4

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-14859

HOLE No. H-11-02

Job No. OL-3498 SR 202 Elevation 131.0 (39.9 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
				10 20 16 (36)		D-4		Silty SAND with gravel, dense, light grey, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	7									
25				6 11 14 (25)		D-5		Silty SAND with gravel, dense, light grey, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	8									
	9									
30			>>	100 (100/2")		D-6		No Recovery (cobble?)		
								End of test hole boring at 30.2 ft below ground elevation.		
	10							No ground water observed during drilling.		
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										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14859

HOLE No. H-12-02

Job No. OL-3498 SR 202 Elevation 137.1 ft (41.8 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dave Nelson

Start April 11, 2002 Completion April 16, 2002 Well ID#

Equipment CME 45 w/ auto hammer

Station 182+85 Offset 58' Rt. Casing HQ x 40.0

Method Wet Rotary

Northing 570292.36 Easting 1659625.96 Latitude

Longitude

County King Subsection NW-NE Section 18 Range 6 EWM Township 25N

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
5	1			5 9 10 (19)		D-1		Silty SAND, medium dense, light brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10	2			5 10 13 (23)		D-2		Sandy SILT, medium dense, light brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
15	3		>>	25 55 (55/6")		D-3		Silty SAND with gravel, very dense, light brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
20	4		>>							
	5									
	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/14/04,8:17:06 AG

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14859

HOLE No. H-12-02

Job No. OL-3498 SR 202 Elevation 137.1 ft (41.8 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
				21 32 38 (70)		D-4		Silty SAND with gravel, very dense, light grey, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
25	7			37 37 100/0" (137/6")		D-5		Silty SAND with gravel, very dense, grey, wet, Homogeneous, no HCl reaction, water bearing in gravels Length Recovered 1.0 ft		
30	8			50 (50/9")		D-6	GS MC	SM, MC=7% Silty SAND with gravel, very dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft		
35	9			100 (100/2")		D-7	GS MC	SW, MC=7% Well graded SAND with gravel, cobbles and boulders, very dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 0.1 ft		
40	10			100 (100/0")		D-8		No Recovery (cobble)		
	11							End of test hole boring at 40 ft below ground elevation.		
	12							No ground water observed during drilling.		
	13							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S14859

HOLE No. H-13-02

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 121.9 ft (37.2 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Kerry Cooper Lic# 2552

Site Address

Inspector Dan Reed

Start June 17, 2002 Completion June 18, 2002 Well ID#

Equipment CME 45 w/ autohammer

Station 184+87 Offset 71' Rt. Casing HW/HQ

Method Wet Rotary

Northing 570224.399 Easting 1659817.451 Latitude

Longitude

County King Subsection

Section 18 Range 6 EWM Township 25N

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
5	1		>>	17 25 31 (56)		D-1	GS MC	SM, M.C.=19% Silty SAND, very dense, brown, moist, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
10	2 3		>>	18 24 35 (59)		D-2		Silty SAND, very dense, brown, moist, Stratified, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
15	4 5			17 18 18 (36)		D-3	GS MC	SM, M.C.=18% Silty SAND, dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/14/04,8:21:02 A6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14859

HOLE No. H-14-02

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 117.5 (35.8 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike Harvey Lic# 2599 T

Site Address

Inspector Dan Reed

Start July 18, 2002 Completion July 18, 2002 Casing HW/HQ

Equipment CME 45 w/ autohammer

Station 187+37 Offset 74' Rt.

Method Wet Rotary

Northing 570152.3 Easting 1660056.823 Latitude

Longitude

County King Subsection NW-NE Section 18 Range 6 EWM Township 25N

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
5	1			2 5 7 (12)		D-1		Poorly graded SAND with silt, medium dense, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
10	2			9 19 23 (42)		D-2	GS MC	SP-SM, M.C.=14% Poorly graded SAND with silt, dense, light brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
15	3			18 21 24 (45)		D-3		Poorly graded SAND with silt, dense, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.3 ft, Length Retained 1.3 ft	▽ 07/18/2002	
20	4									
	5									
	6									

SOIL OL-3498 SR-202, 520 TO SAHALEE WAY.GPJ SOIL.GDT 4/15/03,8:18:19 A4

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14859

HOLE No. H-14-02

Job No. OL-3498 SR 202 Elevation 117.5 (35.8 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Mike Harvey Lic# 2599 T

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
			>>	31 39 50 (89)		D-4		SP, M.C.=13% Poorly graded SAND with gravel, very dense, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
25	7		>>	23 29 37 (66)		D-5		Well graded SAND with silt and gravel, very dense, light brown, wet, Homogeneous, weak HCl reaction Length Recovered 1.3 ft, Length Retained 1.3 ft		
30	8 9		>>	21 25 31 (56)		D-6		Well graded SAND with silt and gravel, very dense, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
35	10 11		>>	23 29 38 (67)		D-7		Well graded SAND with silt and gravel, very dense, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
40	12 13							End of test hole boring at 36.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14860

HOLE No. H-15-02

Job No. OL-3498 SR 202 Elevation 72.6 ft (22.1 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dave Nelson

Start March 27, 2002 Completion March 27, 2002 Well ID#

Equipment CME 45 w/ auto hammer

Station 193+00 Offset 21' Lt. Casing HQ x 30.0

Method Wet Rotary

Northing 570089.2747 Easting 1660623.9744 Latitude

Longitude

County King Subsection SE-NE Section 18 Range 6 EWM Township 25 N

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									
								03/27/2002	▽	
5				5 7 9 (16)		D-1	GS MC	SP-SM, M.C.=18% Poorly graded SAND with silt,gravel and organics, medium dense, bluishgrey, wet, Stratified, no HCl reaction Length Recovered 1.0 ft		
	2									
10	3			7 7 9 (16)		D-2	GS MC	SM, M.C.=21% Silty SAND, medium dense, bluishgrey, wet, Stratified, no HCl reaction, sand stratified Length Recovered 1.0 ft		
	4									
15				10 12 12 (24)		D-3	GS MC	SM, M.C.=14% Silty SAND, medium dense, bluishgrey, moist, Stratified, no HCl reaction, sand stratified Length Recovered 1.0 ft		
	5									
	6									
20										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-14860

HOLE No. H-15-02

Job No. OL-3498 SR 202 Elevation 72.6 ft (22.1 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE Driller Joe Judd Lic# 2454

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
				10 12 14 (26)		D-4		Sandy SILT, dense, bluishgrey, moist, Stratified, no HCl reaction, sand stratified Length Recovered 1.0 ft		
	7									
25				5 6 8 (14)		D-5	GS MC AL	CL, M.C.=29% Lean CLAY, stiff, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	8									
	9									
30				8 11 12 (23)		D-6		Sandy SILT, medium dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	10							End of test hole boring at 31.5 ft below ground elevation.		
35								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	11							Ground water at time of drilling. 4.5ft		
	12									

-014/04,8:28:12 A6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 14860

HOLE No. H-16-02

Job No. OL-3498 SR 202 Elevation 69.1 ft (21.1 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Judd Lic# 2454

Site Address

Inspector Hanning

Start June 19, 2002 Completion June 19, 2002 Well ID#

Equipment CME 850 w/ autohammer

Station 197+98 Offset 48' Lt. Casing HWT

Method Wet Rotary

Northing 569977.6452 Easting 1661110.0617 Latitude

Longitude

County King Subsection SE/NE Section 18 Range 6E Township 25N

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
				0 1 1 1 (2)		D-1		SILT with organics, very loose, grayish brown, wet, Homogeneous, no HCl reaction Length Recovered 0.6 ft, Length Retained 0.6 ft		
	1					S-2	GS MC AL UU	CL, M.C.=26%, PI=19 Lean CLAY with sand and organics, soft, blueish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft CL, MC=28%, PI=23 Lean CLAY with sand		
5				2 3 3 3 (6)		D-3		Lean CLAY with sand and organics, soft, blueish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.6 ft, Length Retained 1.6 ft		
	2					S-4	GS MC AL UU	ML, MC=28%, LL=29 SILT, loose, dark greenish gray, wet, Stratified, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft ML, MC=27%, LL=21 Sandy SILT		
10	3			1 2 2 3 (4)		D-5		Sandy SILT, very loose, dark greenish gray, wet, Stratified, no HCl reaction Length Recovered 1.8 ft, Length Retained 1.8 ft		
15	4					S-6		No Recovery		
	5					S-7		Sandy SILT with organics, loose, dark greenish gray, wet, Stratified, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
20	6			2 3 5 6 (8)		D-9		Sandy SILT with organics, loose, dark greenish gray, wet, Stratified, no HCl reaction Length Recovered 1.6 ft, Length Retained 1.6 ft		

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 14860

HOLE No. H-16-02

Job No. OL-3498 SR 202 Elevation 69.1 ft (21.1 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Judd Lic# 2454

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
				0 0 1 3 (1)		D-9		Sandy SILT with organics, very loose, dark greenish gray, wet, Stratified, no HCl reaction, Note top 1' water bearing. Length Recovered 2.0 ft, Length Retained 2.0 ft		
						S-10		Sandy SILT, very loose, dark greenish gray, wet, Stratified, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	7									
25				7 12 11 13 (23)		D-11	GS MC	GW, MC=7% Well graded GRAVEL with sand, subrounded, medium dense, brownish gray, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
	8									
	9									
30				8 10 23 33 (33)		D-12		Well graded GRAVEL with sand, subrounded, dense, grayish brown, wet, Homogeneous, no HCl reaction Length Recovered 0.9 ft, Length Retained 0.9 ft		
	10							End of test hole boring at 32 ft below ground elevation.		
35	11							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data		
	12									
40										
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14860

HOLE No. H-17-02

Job No. OL-3498 SR 202 Elevation 72.2 ft (22.0 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dave Nelson

Start March 21, 2002 Completion March 21, 2002 Well ID#

Equipment CME 45 w/ autohammer

Station 202+83 Offset 46' Rt. Casing HQ x 30.0

Method Wet Rotary

Northing 569573.4022 Easting 1661550.4446 Latitude

Longitude

County King Subsection SE-NE Section 18 Range 6 EWM Township 25 N

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
						S-1		No Recovery 03/21/2002	▽	
5	1 2			1 1 6 (7)		D-2	MC GS	SM, M.C.=36% Silty SAND with gravel, loose, olive grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10	3 4			12 9 9 (18)		D-3	MC GS	GW, M.C.=11% Well graded GRAVEL with sand, subangular, medium dense, bluishgrey, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft		
15	5			10 10 11 (21)		D-4		Well graded GRAVEL with sand, subangular, medium dense, bluishgrey, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/14/04,8:41:25 A6

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-14860

HOLE No. H-17-02

Job No. OL-3498 SR 202 Elevation 72.2 ft (22.0 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
				6 8 11 (19)		D-5		Well graded GRAVEL with sand, subrounded, medium dense, bluishgrey, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft		
	7									
25				19 19 15 (34)		D-6		Well graded GRAVEL with sand, dense, grey, wet, Homogeneous, no HCl reaction, driving on large gravel Length Recovered 0.1 ft		
	8									
	9									
30				6 8 14 (22)		D-7	MC GS	SM, M.C.=26% Silty SAND, medium dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	10							End of test hole boring at 31.5 ft below ground elevation.		
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										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14863

HOLE No. H-18-02

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 72.9 ft (22.2 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dave Nelson

Start March 26, 2002 Completion March 26, 2002 Well ID#

Equipment CME 45 w/ autohammer

Station 205+73 Offset 43' Rt. Casing HQ x 30.0

Method Wet Rotary

Northing 569676.5631 Easting 1661830.3035 Latitude

Longitude

County King Subsection SW-NW Section 17 Range 6 EWM Township 25 N

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
								0.0-5.0ft Rip-Rap FILL		
									03/26/2002	
	1									
5				42 13 6 (19)		D-1		Well graded GRAVEL with sand, wash, medium dense, black, wet, Homogeneous, no HCl reaction, The sample I got was wash only Length Recovered 0.3 ft		
	2									
10	3			19 20 16 (36)		D-2	GS MC	SP, MC=12% Poorly graded SAND with gravel, dense, bluishgrey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	4									
15				21 12 16 (28)		D-3		Poorly graded SAND with gravel, dense, bluishgrey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	5									
	6									
20										

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 3/31/04,10:07:36 A3

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-14863

HOLE No. H-18-02

Job No. OL-3498 SR 202 Elevation 72.9 ft (22.2 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
				6 9 14 (23)		D-4		Silty SAND, medium dense, bluishgrey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	7									
25				10 13 16 (29)		D-5		Silty SAND, dense, bluishgrey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	8									
	9									
30				10 13 18 (31)		D-6		Silty SAND, dense, bluishgrey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	10							End of test hole boring at 31.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications.		
35	11									
	12									
40										
	13									
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S14863

HOLE No. H-19-02

Job No. OL-3498 SR 202 Elevation 94.3 ft (28.7 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dan Reed

Start July 9, 2002 Completion July 9, 2002 Well ID#

Equipment CME 45 w/ autohammer

Station 212+07 Offset 74' Lt. Casing HW/HQ

Method Wet Rotary

Northing 569620.1565 Easting 1662466.3091 Latitude

Longitude

County King Subsection SW 1/4 of the NW 1/4 Section 17 Range 6 EWM Township 25N

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
5	1, 2			3 5 8 (11)		D-1		Elastic SILT with trace of organic, stiff, light brown, moist, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
10	3, 4			7 24 25 (49)		D-2	GS MC LL PL	ML, MC=33%, LL=42 SILT, dense, light brown, moist, Blocky, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
15	5			27 50/6 (50/6")		D-3		Gravelly SILT, dense, light brown, moist, Stratified, no HCl reaction, gravel lens at 16.1-16.5' Length Recovered 1.0 ft, Length Retained 1.0 ft	▽ 07/09/2002	
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/19/04,1:05:45 P8

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14863

HOLE No. H-19-02

Job No. OL-3498 SR 202 Elevation 94.3 ft (28.7 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
				28 50/6 (50/6")		D-4		Well graded GRAVEL with sand, subangular, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
25	7		>>	18 23 47 (70)		D-5	GS MC	SM, MC=20% Silty SAND with silt lenses, very dense, gray, wet, Stratified, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
30	8 9			39 50/3 (50/3")		D-6		Well graded GRAVEL with sand, subangular, dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
35	10 11 12 13							End of test hole boring at 31.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data		
40										
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62109

HOLE No. H-20-02

Job No. OL-3498 SR 202 Elevation 96.8 ft (29.5 m)

Sheet 1 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dan Reed

Start September 23, 2002 Completion September 23, 2002 Well ID# AGS709

Equipment CME 850 w/ autohammer

Station 213+50 Offset 78' Lt. Casing HW/HQ

Method Wet Rotary

Northing 569607.677 Easting 1662598.878 Latitude

Longitude

County King Subsection SW/NW Section 17 Range 6 EWM Township 25N

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
				4 3 4 3 (7)		D-1	GS MC AL	ML, MC=36%, PI=15 SILT, loose, light brown, wet, Laminated, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
5	1			5 7 11 10 (18)		D-2		SILT, very stiff, light brown, wet, Laminated, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.5 ft		
	2					S-3		SILT, very stiff, light brown, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
10	3			5 7 9 10 (16)		D-4		SILT, very stiff, light brown, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	4			7 9 14 18 (23)		D-5		Lean CLAY, very stiff, gray, moist, Homogeneous, no HCl reaction, material change at 12.0' light brown to gray Length Recovered 2.0 ft, Length Retained 1.0 ft		
15	5			9 11 15 17 (26)		D-6	GS MC AL	CL, MC=30%, PI=19 Lean CLAY, very stiff, gray, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
				10 13 18 19 (31)		D-7		Lean CLAY, very stiff, light brown, moist, Laminated, no HCl reaction, light brown and gray lenses Length Recovered 2.0 ft, Length Retained 1.0 ft		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/14/04 9:00:45 AS

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62109

HOLE No. H-20-02

Job No. OL-3498 SR 202 Elevation 96.8 ft (29.5 m)

Sheet 2 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
		13, 15, 17, 18, (32)		D-8		Lean CLAY, hard, light brown, moist, Laminated, no HCl reaction, light brown and gray lenses Length Recovered 2.0 ft, Length Retained 1.0 ft
	7	10, 15, 18, 21, (33)		D-9		Lean CLAY, hard, gray, wet, Homogeneous, no HCl reaction, disrupted zone 24.0 - 25.0 Length Recovered 2.0 ft, Length Retained 1.0 ft
25		9, 13, 19, 22, (32)		D-10		Lean CLAY, hard, gray, wet, Stratified, no HCl reaction, Disrupted zone 25.0 - 25.5 Length Recovered 2.0 ft, Length Retained 1.0 ft
	8	11, 18, 21, 24, (39)		D-11		Lean CLAY, hard, gray, wet, Stratified, no HCl reaction, Disrupted zone 26.5 - 27.0 Length Recovered 2.0 ft, Length Retained 1.0 ft
	9					
30		8, 11, 14, 20, (25)		D-12	GS MC AL	ML, MC=32%, PI=10 SILT, hard, gray, wet, Blocky, no HCl reaction, Disrupted zone 30.5- 32.0 Length Recovered 2.0 ft, Length Retained 1.0 ft
	10	6, 10, 14, 24, (24)		D-13		SILT, very stiff, gray, wet, Blocky, no HCl reaction, Disrupted zone 33.0 - 35.0 Length Recovered 2.0 ft, Length Retained 1.0 ft
35		12, 16, 19, 20, (35)		D-14		Poorly graded SAND with gravel, dense, light brown, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft
	11					
	12					
40		10, 23, 23, 20, (46)		D-15		Poorly graded SAND with gravel, dense, brown, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft
	13					
45						

Standard Penetration Blows/ft: 10 20 30 40

Groundwater

Instrument

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62109

HOLE No. H-20-02

Job No. OL-3498 SR 202 Elevation 96.8 ft (29.5 m)

Sheet 3 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
	14			12 28 29 35 (57)		D-16	GS MC	ML, MC=24% Sandy SILT, very dense, brown, wet, Stratified, no HCl reaction, w/silt lenses Length Recovered 2.0 ft, Length Retained 1.5 ft		
	15									
50				17 21 25 24 (46)		D-17		Poorly graded SAND, dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.5 ft		
	16									
55	17							End of test hole boring at 52 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Bailed Hole WT=27.5' after 30 min.		
	18									
60										
	19									
65	20									
	21									
70										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
9/23/2002	-27.5	69.4
11/1/2002	-23.4	73.5
12/18/2002	-22.3	74.6
02/11/2003	-21.6	75.3
03/18/2003	-21.8	75.1
05/06/2003	-21.5	75.4
06/05/2003	-22.5	74.4
07/23/2003	-23.5	73.4
09/23/2003	-23.4	73.5
12/09/2003	-21.5	74.5
01/16/2004	-21.2	75.7
02/24/2004	-21.6	75.3
04/06/2004	-21.7	75.2
05/11/2004	-22.1	74.8
06/23/2004	-23.0	73.9

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62058

HOLE No. H-20-A-02

Job No. OL-3498 SR 202 Elevation 109.6 ft (33.4 m)

Sheet 1 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dan Reed

Start October 15, 2002 Completion October 15, 2002 Well ID# AGS675

Equipment CME 850 w/ autohammer

Station 213+67 Offset 151 Lt. Casing HQ

Method Wet Rotary

Northing 569680.222 Easting 1662617.767 Latitude

Longitude

County King Subsection SW 1/4 of the NW 1/4 Section 17 Range 6 EWM Township 25

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
				6 9 12 15 (21)		D-1	GS MC AL	CH, MC=34%, PI=26 Sandy fat CLAY, very stiff, light brown, moist, Disrupted, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
5	1			0 11 13 14 (24)		D-2		Lean CLAY, very stiff, light brown, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	2			6 11 12 11 (23)		D-3		SILT, medium dense, light brown, moist, Homogeneous, no HCl reaction, material change at 8.7' to gray Length Recovered 2.0 ft, Length Retained 1.0 ft		
10	3			7 11 13 13 (24)		D-4		SILT, medium dense, gray, moist, Disrupted, no HCl reaction, disrupted zone 9.0 to 10.5' Length Recovered 2.0 ft, Length Retained 1.5 ft		
	4			9 10 11 11 (21)		D-5		SILT, medium dense, gray, moist, Stratified, no HCl reaction, color change gray to light brown 13.3-14.0' Length Recovered 2.0 ft, Length Retained 1.0 ft		
15				10 10 12 10 (22)		D-6		SILT with sand, medium dense, light brown, moist, Disrupted, no HCl reaction, mixed colors zone w/sand 14.5 - 16.0' Length Recovered 2.0 ft, Length Retained 1.0 ft		
	5			8 9 10 10 (19)		D-7		SILT, very stiff, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft	10/16/02	
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/14/04,11:30:25 A6

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R62058

HOLE No. H-20-A-02

Job No. OL-3498 SR 202 Elevation 109.6 ft (33.4 m)

Sheet 2 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		10 11 11 12 (22)		D-8		SILT, very stiff, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	7	6 9 12 15 (21)		D-9		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
25	8	8 10 11 15 (21)		D-10		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	9	7 11 14 16 (25)		D-11		SILT, dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
30	10	9 11 16 14 (27)		D-12		Lean CLAY, hard, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
35	11	9 9 13 12 (22)		D-13		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
		7 10 11 12 (21)		D-14		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
40	12	9 12 13 14 (25)		D-15		SILT, dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	13	8 11 14 14 (25)		D-16		SILT, dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
45								

Standard Penetration Blows/ft: 10 20 30 40

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62058

HOLE No. H-20-A-02

Job No. OL-3498 SR 202 Elevation 109.6 ft (33.4 m)

Sheet 3 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		6, 9, 11, 11, (20)		D-17		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	14							
		8, 8, 11, 10, (19)		D-18		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	15							
50		7, 9, 11, 13, (20)		D-19		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	16							
		9, 9, 11, 11, (20)		D-20		SILT, medium dense, gray, moist, Disrupted, no HCl reaction, disrupted zone 54.0 to 55.0' Length Recovered 2.0 ft, Length Retained 1.0 ft		
55								
	17							
		9, 11, 13, 14, (24)		D-21		SILT, medium dense, gray, moist, Disrupted, no HCl reaction, disrupted zone 58.0 to 59.0' Length Recovered 2.0 ft, Length Retained 1.0 ft		
	18							
60		7, 11, 11, 12, (22)		D-22		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	19							
		7, 10, 11, 12, (21)		D-23		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
65		9, 11, 11, 12, (22)		D-24		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	20							
	21	11, 11		D-25		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction		
70								

Standard Penetration Blows/ft: 10, 20, 30, 40

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62058

HOLE No. H-20-A-02

Job No. OL-3498 SR 202 Elevation 109.6 ft (33.4 m)

Sheet 4 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		13 14 (24)				Length Recovered 2.0 ft, Length Retained 1.0 ft		
	22							
		12 13 13 15 (26)		D-26	GS MC AL	CL, MC=29%, PI=15 Lean CLAY, very stiff, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
75	23	9 9 14 15 (23)		D-27		Lean CLAY, medium dense, gray, moist, Homogeneous, no HCl reaction, disrupted zone 75.0 to 75.7' Length Recovered 2.0 ft, Length Retained 1.0 ft		
	24	7 9 15 15 (24)		D-28		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
80	25	9 11 12 14 (23)		D-29		SILT, medium dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
		9 10 24 50/3 (34)		D-30	GS MC	SM, MC=31% Gravelly SILT with sand, dense, gray, moist, Disrupted, no HCl reaction, material change at 84.0' Length Recovered 2.0 ft, Length Retained 1.0 ft		
85	26							
	27	>> 25 34 40 50 (74)		D-31	GS MC	SP-SM, MC=7% Poorly graded SAND with silt and gravel, very dense, gray, wet, Homogeneous, no HCl reaction, contact at 84.5' as indicated by drilling. Length Recovered 2.0 ft, Length Retained 1.5 ft		
90	28							
95		>> 21 27		D-32		Well graded SAND, very dense, gray, wet, Stratified, no HCl reaction, organic lens 94.5' to 94.8' in material		

Standard Penetration Blows/ft: 10 20 30 40

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/14/04,11:30:26 AG

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62058

HOLE No. H-20-A-02

Job No. OL-3498 SR 202 Elevation 109.6 ft (33.4 m)

Sheet 5 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
	29			31 40 (58)				changeat 92.5' as indicated by drilling. Length Recovered 2.0 ft, Length Retained 1.5 ft		
								End of test hole boring at 96 ft below ground elevation.		
	30							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
100										
	31							WATER TABLE INFORMATION		
								10/14/02, Hole cased to 25.5ft bailed hole to -22ft. RECHARGE TIME DEPTH 15 min -21.0 30 min -20.5 15 hrs -14.0		
105	32							10/15/02, Hole drilled to 94.0ft bailed hole to -40ft. RECHARGE TIME DEPTH 15 min -39.2 30 min -38.2 18 hrs -19.0		
	33									
110										
	34									
115	35									
	36									
120										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62109

HOLE No. H-21-02

Sheet 1 of 4

Job No. OL-3498 SR 202 Elevation 104.0 ft (31.7 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

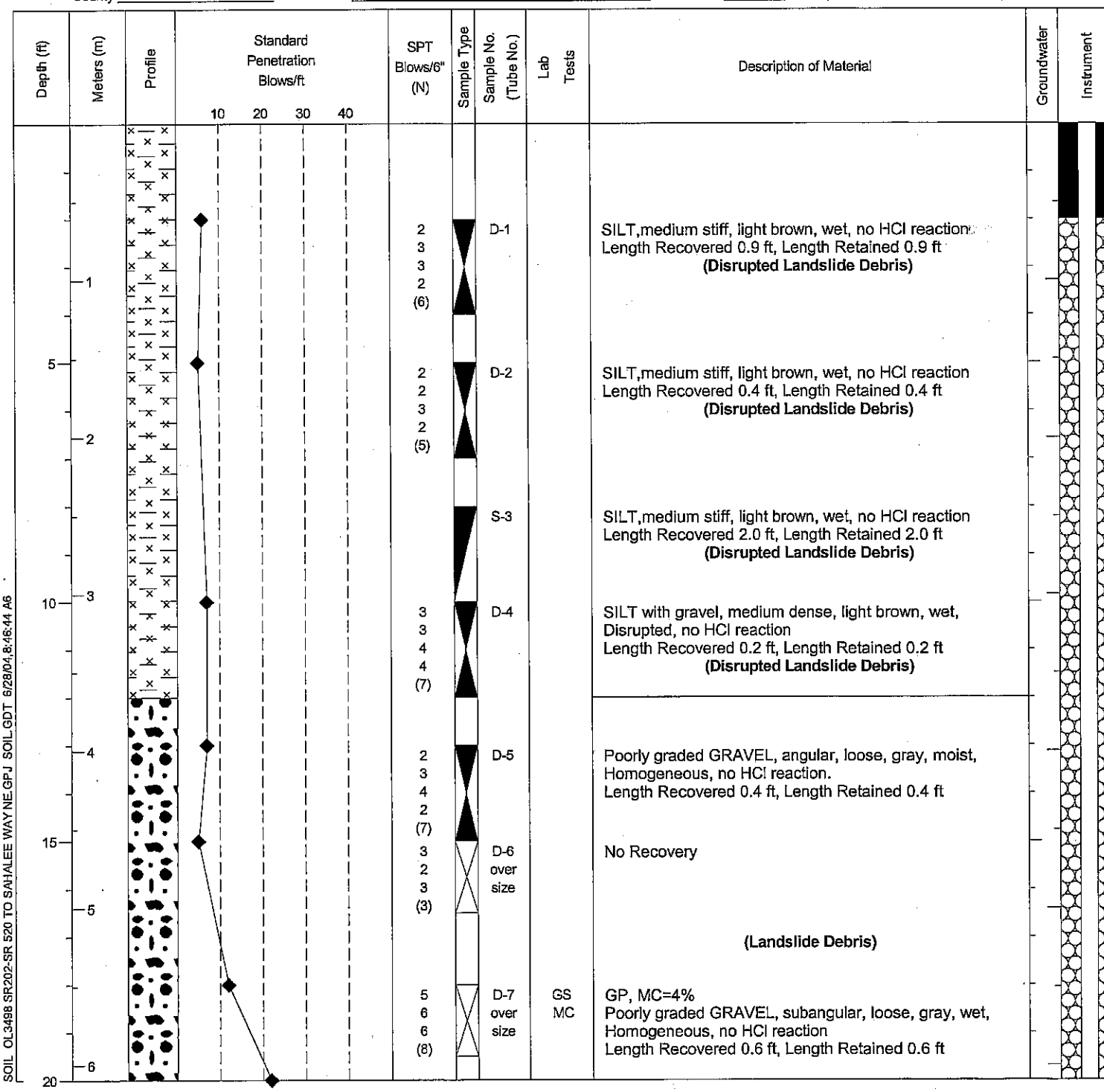
Inspector Dan Reed

Start October 9, 2002 Completion October 10, 2002 Well ID# AGS710 Equipment CME 850 w/ autohammer

Station 215+92 Offset 66' Lt. Casing HW/HQ Method Wet Rotary

Northing 569608.417 Easting 1662824.536 Latitude Longitude

County King Subsection SW 1/4 of the NW 1/4 Section 17 Range 6 EWM Township 25N



SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/28/04,8:46:44 A6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62109

HOLE No. H-21-02

Job No. OL-3498 SR 202 Elevation 104.0 ft (31.7 m)

Sheet 2 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater
		7 9 13 (15)		D-8 over size		Sandy SILT with gravel, dense, gray, moist, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft Material change at 20.5 --sandy silt	
	7	8 10 12 14 (22)		D-9		SILT, very stiff, gray, moist, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft	
25	8	5 9 11 14 (20)		D-10		Lean CLAY, very stiff, gray, moist, Homogeneous, no HCl reaction, 75% fluid loss Length Recovered 2.0 ft, Length Retained 1.0 ft 2/23/04	
		9 13 13 14 (26)		D-11		Lean CLAY, very stiff, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft	
	9						
30						9/23/03	
	10						
35		18 17 19 21 (36)		D-12		Lean CLAY, hard, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft	
	11						
	12						
40		13 16 19 23 (35)		D-13		Lean CLAY, hard, gray, moist, Homogeneous, no HCl reaction, disrupted zone 40' to 41' 100% fluid loss Length Recovered 2.0 ft, Length Retained 1.0 ft	
	13						
		16 17 16 15 (33)		D-14		Lean CLAY, hard, gray, wet, Homogeneous, no HCl reaction, disrupted zone 43.0' to 44.0' Length Recovered 2.0 ft, Length Retained 1.0 ft	
45							

Standard Penetration Blows/ft: 10 20 30 40

Instrument

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/28/04,8:46:44 A6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62109

HOLE No. H-21-02

Job No. OL-3498 SR 202 Elevation 104.0 ft (31.7 m)

Sheet 3 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
	14	13 15 25 32 (40)		D-15	GS MC AL	ML, MC=28% SILT with gravel, dense, gray, wet, Stratified, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft material change at 46.0' -- light brown sand with gravel
50	15	22 23 23 30 (46)		D-16	GS MC	SM, MC=24% Silty SAND, dense, light brown, wet, Stratified, no HCl reaction, material change 49.0' to 50.0' -- poorly graded sand lenses Length Recovered 2.0 ft, Length Retained 2.0 ft
	16	19 18 20 22 (38)		D-17	GS MC	SM, MC=21% Silty SAND, dense, light brown, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft.
55	17	13 15 21 23 (36)		D-18		Silty SAND, dense, lightt brown, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft
60	18	>>9 15 50 (65)		D-19	GS MC	SM, MC=17% Silty SAND with gravel, dense, gray, wet, Stratified, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft Material change at 60.5' -- gray
65	19 20	13 15 15 16 (30)		D-20		Poorly graded SAND, dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.5 ft
70	21					

Standard Penetration Blows/ft: 10 20 30 40

Groundwater

Instrument

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62109

HOLE No. H-21-02

Job No. OL-3498 SR 202 Elevation 104.0 ft (31.7 m)

Sheet 4 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
				13 16 26 35 (42)		D-21		Silty SAND, dense, gray, wet, Stratified, no HCl reaction, sand lense 70.5' Length Recovered 2.0 ft, Length Retained 1.5 ft		
	22									
75	23			12 18 22 31 (40)		D-22		Poorly graded SAND with gravel, dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.5 ft		
	24									
80			>>	16 22 50 (72)		D-23		Poorly graded SAND with silt lenses, dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft		
	25									
85	26									
	27									
90										
	28									
95										

End of test hole boring at 81.5 ft below ground elevation.

Installed Piezometer to a depth of 50ft

This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.

NOTE: over size Indicates blow counts obtained with an oversize sampler

WATER TABLE INFORMATION
10/9/02, Hole drilled to 61.5ft bailed hole to -490ft.

RECHARGE TIME	DEPTH
14 hrs	-32.0

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
10/9/2002	-32.0	72.0
11/1/2002	-29.8	74.2
12/18/2002	-28.4	75.6
02/11/2003	-27.2	76.8
03/18/2003	-27.3	76.7
05/06/2003	-26.9	77.1
06/05/2003	-28.4	75.6
07/23/2003	-29.1	74.9
09/23/2003	-30.2	73.8
12/09/2003	-27.9	76.1
01/16/2004	-27.4	76.3
02/23/2004	-26.7	77.3
04/06/2004	-26.7	77.3
05/11/04	-26.9	77.2
06/23/04	-28.8	75.2

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 62109

HOLE No. H-22-02

Job No. OL-3498 SR 202 Elevation 134.3 ft (40.9 m)

Sheet 1 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Judd Lic# 2454

Site Address

Inspector Hanning

Start July 23, 2002 Completion July 30, 2002 Well ID# AGS 711

Equipment CME 850 w/ autohammer

Station 217+19 Offset 167' Lt. Casing HQ

Method Wet Rotary

Northing 569731.631 Easting 1662913.757 Latitude

Longitude

County King Subsection SW/NW Section 17 Range 6E Township 25N

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
5	1									
	2			3 6 6 (12)		D-1	GS MC	ML, MC=31% Sandy SILT, trace organics, medium dense, olive gray, moist, Homogeneous, no HCl reaction, Note some iron staining & approximately 10% water loss. Length Recovered 1.5 ft, Length Retained 1.5 ft		
10	3									
						S-2		SILT, loose, olive gray, moist, Homogeneous, no HCl reaction, Water loss 10%. Length Recovered 2.0 ft, Length Retained 2.0 ft		
	4			10 10 10 (20)		D-3		Sandy SILT, with trace organics, medium dense, olive gray, moist, Stratified,Homogeneous, no HCl reaction, Iron staining throughout. Water loss 15%. Length Recovered 1.5 ft, Length Retained 1.5 ft		
15	5			4 7 8 (15)		D-4		Sandy SILT, medium dense, olive gray, wet, Stratified, no HCl reaction, Water loss 20% Length Recovered 1.5 ft, Length Retained 1.5 ft		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/20/04,12:55:38 PB

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 62109

HOLE No. H-22-02

Job No. OL-3498 SR 202 Elevation 134.3 ft (40.9 m)

Sheet 2 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Judd Lic# 2454

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
		4 7 7 (14)		D-5	GS MC AL	ML, MC=30%, PI=5 SILT, medium dense, dark greenish gray, moist, Homogeneous, no HCl reaction, Water loss 20% Length Recovered 1.5 ft, Length Retained 1.5 ft
25	7	5 10 13 (23)		D-6		SILT, medium dense, dark greenish gray, moist, Homogeneous, no HCl reaction, Water loss 30% Length Recovered 1.3 ft, Length Retained 1.3 ft
30	8 9	8 10 13 (23)		D-7		SILT, with trace organics, medium dense, dark greenish gray, wet, Homogeneous, no HCl reaction, Water loss 50%. Length Recovered 1.5 ft, Length Retained 1.5 ft
35	10 11	6 7 12 (19)		D-8		SILT, medium dense, dark greenish gray, moist, Homogeneous, no HCl reaction, Water loss 70%. Length Recovered 1.5 ft, Length Retained 1.5 ft
40	12 13	4 8 11 (19)		D-9		SILT, medium dense, dark greenish gray, moist, Homogeneous, no HCl reaction, Water loss 70%. Length Recovered 1.5 ft, Length Retained 1.5 ft
45						

Standard Penetration Blows/ft: 10 20 30 40

Profile

Groundwater

Instrument

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 62109

HOLE No. H-22-02

Job No. OL-3498 SR 202 Elevation 134.3 ft (40.9 m)

Sheet 3 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Judd Lic# 2454

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
	14			4 4 6 (10)		D-10	GS MC AL	ML, MC=35%, PI=14 SILT, loose, dark greenish gray, moist, Homogeneous, no HCl reaction, Water loss 70%. Length Recovered 1.5 ft, Length Retained 1.5 ft		
						S-11		SILT, loose, dark greenmish gray, moist, Homogeneous, no HCl reaction, Water loss 70%. Length Recovered 1.5 ft, Length Retained 1.5 ft		
	15									
50										
				7 10 12 (22)		D-12		SILT, medium dense, dark greenish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	16									
55										
	17			8 9 14 (23)		D-13		Elastic SILT, medium stiff, dark greenish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	18									
60										
				7 10 13 (23)		D-14		SILT, medium dense, dark greenish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	19									
65										
	20			7 10 12 (22)		D-15		SILT, medium dense, dark greenish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	21									
70										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 62109

HOLE No. H-22-02

Job No. OL-3498 SR 202 Elevation 134.3 ft (40.9 m)

Sheet 4 of 5

Project SR 202 - SR520 to Sahalee Way NE Driller Judd Lic# 2454

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
	22			8 12 15 (27)		D-16		SILT, medium dense, dark greenish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
75	23			9 14 19 (33)		D-17		SILT, medium dense, dark greenish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	24									
80				10 17 20 (37)		D-18		SILT, with sand lenses, medium dense, dark greenish gray, moist, Stratified, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	25									
85	26			13 15 27 (42)		D-19	GS MC AL	CL, MC=29%, PI=21 Lean CLAY, dense, dark greenish gray, moist, Stratified, no HCl reaction, Note possible disruption at 86.5'. Length Recovered 1.5 ft, Length Retained 1.5 ft		
	27									
90				6 14 21 (35)		D-20		SILT, dense, dark greenish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	28									
95										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62109

HOLE No. H-22-02

Job No. OL-3498 SR 202 Elevation 134.3 ft (40.9 m)

Sheet 5 of 5

Project SR 202 - SR520 to Sahalee Way NE Driller Judd Lic# 2454

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
	29		>>	14 17 34 (51)		D-21		SILT, very dense, dark greenish gray, moist, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	30									
100										
	31		>>	31 35 39 (74)		D-22		Poorly graded SAND with some silt, very dense, dark greenish gray, moist, Stratified, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
105	32									
			>>	24 28 35 (63)		D-23	GS MC	SP-SM, MC=25% Poorly graded SAND with silt, very dense, gray, moist, Stratified, no HCl reaction, Note water loss from 51' to 106', 70% to 100%. Length Recovered 1.5 ft, Length Retained 1.5 ft		
	33							End of test hole boring at 107.5 ft below ground elevation.		
110								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	34									
115	35									
	36									
120										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62109

HOLE No. H-22A-02

Job No. OL-3498 SR 202 Elevation 136.4 ft (41.6 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Judd Lic# 2454

Site Address

Inspector Hanning

Start July 30, 2002 Completion July 31, 2002 Well ID# AGS716

Equipment CME 850 w/ autohammer

Station 217+24 Offset 175' Lt Casing HQ

Method Wet Rotary

Northing 569740.317 Easting 1662915.57 Latitude

Longitude

County King Subsection SW/NW Section 17 Range 6E Township 25N

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 3 4 (7)		D-1		SILT with organics, loose, olive brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
5	1									
	2					VS-2				
10	3					VS-4	GS MC AL	ML, MC=33%, PI=10 SILT		
	4									
15	5					VS-6				
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/8/04,11:09:47 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62109

HOLE No. H-22A-02

Job No. OL-3498 SR 202 Elevation 136.4 ft (41.6 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Judd Lic# 2454

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
									6/23/2004	
	7									
									08/01/2002	
25						VS-8				
	8							WATER LEVEL READINGS		
								DATE / DEPTH / ELEVATION		
								8/1/02 -24.3 112.1		
								8/13/02 -24.2 112.2		
								9/30/02 -28.2 108.2		
								11/1/02 -29.5 106.9		
								12/18/02 -18.6 117.8		
								2/11/03 -19.0 117.4		
								3/18/03 -19.3 117.1		
	9							5/6/03 -19.7 116.7		
30								6/5/03 -21.3 115.1		
								7/23/03 -23.8 112.6		
								9/23/03 -26.0 110.4		
								12/9/03 -19.8 116.6		
								1/16/04 -19.6 116.8		
								2/24/04 -18.5 117.9		
								4/6/04 -20.0 116.4		
								5/11/04 -20.4 116.0		
	10							6/23/04 -20.3 116.1		
35										
	11					VS-10	GS MC AL	CL, MC=31%, PI=15 Lean CLAY		
								End of test hole boring at 37.5 ft below ground elevation.		
	12							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
40										
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-62059

HOLE No. H-23-02

Job No. OL-3498 SR 202 Elevation 101.2 ft (30.8 m)

Sheet 1 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

Site Address

Inspector Dave Neslson

Start September 17, 2002 Completion September 24, 2002 Well ID# AGS-673

Equipment CME 45 w/ auto hammer

Station 218+58 Offset 73' Lt. Casing HWT & HQ

Method Wet Rotary

Northing 569684.336 Easting 1663061.718 Latitude

Longitude

County King Subsection SE-NW Section 17 Range 6 EWM Township 25

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
5	1			2 3 4 (7)		D-1	GS MC AL	CH, MC=37%, PI=31 Fat CLAY, medium dense, brown, moist, Disrupted,Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	2					VS-2		Undisturbed Shear Strength = 932psf Remolded Shear Strength = 373psf		
						S-3		Lean CLAY, brown, moist, Disrupted,Homogeneous, no HCl reaction Length Recovered 0.6 ft		
				7 8 9 (17)		D-4	GS MC AL	CL, MC=21%, PI=16 Sandy lean CLAY with gravel, very stiff, brown, moist, Disrupted,Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10	3			3 4 5 (9)		D-5		Sandy lean CLAY with gravel, stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.6 ft		
	4			3 5 5 (10)		D-6		Sandy lean CLAY with gravel, stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.8 ft 2/23/04	▽	
15				2 4 5 (9)		D-7		Sandy lean CLAY with gravel, soft, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	5			2 2 4 (6)		D-8		Sandy lean CLAY with gravel, medium stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.8 ft		
	6			2 2 4 (6)		D-9	GS MC AL	ML, MC=42%, PI=14 SILT, loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
20										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-62059

HOLE No. H-23-02

Job No. OL-3498 SR 202 Elevation 101.2 ft (30.8 m)

Sheet 2 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

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
						VS-10		Undisturbed Shear Strength = 1,694psf Remolded Shear Strength = 155psf		
						S-11		SILT, loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft		
	7			2 2 3 (5)		D-12			09/23/2002	
25						S-13		SILT, loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.7 ft		
	8			10 6 7 (13)		D-14		SILT with gravel, medium dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 0.4 ft		
	9									
30						S-15		SILT with gravel, loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft		
	10			2 3 5 (8)		D-15		SILT with gravel, loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
35	11			7 20 26 (46)		D-17		Sandy SILT with gravel, dense, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
40	12			12 15 21 (36)		D-18		Sandy SILT with gravel, dense, grey, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
45	13									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-62059

HOLE No. H-23-02

Job No. OL-3498 SR 202 Elevation 101.2 ft (30.8 m)

Sheet 3 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

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
	14			7 8 9 (17)		D-19	GS MC	SM, MC=12% Silty SAND with gravel, medium dense, grey, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	15									
50				3 4 5 (9)		D-20	GS MC AL	CL, MC=33%, PI=18 Lean CLAY, medium stiff, grey, wet, Disrupted,Homogeneous, no HCl reaction, 51 to 51.5 disrupted Length Recovered 1.0 ft		
	16									
55				3 5 7 (12)		D-21		Lean CLAY, medium stiff, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	17									
	18									
60				5 9 10 (19)		D-22		Lean CLAY, medium stiff, grey, wet, Disrupted,Homogeneous, no HCl reaction Length Recovered 1.0 ft		
	19									
65				16 22 27 (49)		D-23	GS MC	ML, MC=31% Sandy SILT, dense, grey, wet, Stratified,Homogeneous, no HCl reaction, sand stratified Length Recovered 1.0 ft		
	20									
	21									
70										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-62059

HOLE No. H-23-02

Job No. OL-3498 SR 202 Elevation 101.2 ft (30.8 m)

Sheet 4 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

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
				17 23 29 (52)		D-24		Sandy SILT, dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft		
75	22			16 22 27 (49)		D-25	GS MC	SM, MC=28% Silty SAND, dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
80	23 24			13 20 24 (44)		D-26		Silty SAND, dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
85	25 26							End of test hole boring at 81.5 ft below ground elevation.		
90	27 28									
95										

This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.

WATER TABLE INFORMATION

9/19/02, Hole drilled to 81.5ft bailed hole to -500ft.

RECHARGE TIME	DEPTH
4 days	-23

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
9/23/2002	-23	78.2
9/30/2002	-23.6	77.6
11/1/2002	-23.9	77.3
12/18/2002	-22.7	78.5
02/11/2003	-18.3	82.9
03/18/2003	-17.7	83.5
05/06/2003	-15.1	86.1
06/05/2003	-16.1	85.1
07/23/2003	-19.8	81.4
09/23/2003	-24.2	77.0
12/09/2003	-20.0	81.2
01/16/2004	-20.0	81.2
02/23/2004	-13.2	88.0
04/06/2004	-13.9	87.3
05/11/2004	-14.3	86.9
06/23/2004	-19.6	81.6

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R62059

HOLE No. H-23A-02

Job No. OL-3498 SR 202 Elevation 118.5 ft (36.1 m)

Sheet 1 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dan Reed

Start October 1, 2002 Completion October 1, 2002 Well ID# AGS674

Equipment CME 850 w/ autohammer

Station 218+30 Offset 119' Lt. Casing HQ

Method Wet Rotary

Northing 569717.05 Easting 1663020.188 Latitude

Longitude

County King Subsection SE 1/4 of the NW 1/4 Section 17 Range 6 Township 25

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					S-1		Fat CLAY, light brown, moist, Disrupted, no HCl reaction, watertable - bailed hole 27' in casing overnight 32' Length Recovered 1.7 ft, Length Retained 1.7 ft		
5										
	2			4 4 5 4 (9)		D-2		Fat CLAY, stiff, light brown, moist, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft		
						S-3		Fat CLAY, light brown, moist, Disrupted, no HCl reaction Length Recovered 1.7 ft, Length Retained 1.7 ft		
10	3			3 3 4 5 (7)		D-4		LEAN clay, medium stiff, light brown, moist, Disrupted, no HCl reaction, material color change at 11.5' to light gray Length Recovered 2.0 ft, Length Retained 1.0 ft		
	4					S-5		Elastic SILT, light brown, moist, Disrupted, no HCl reaction Length Recovered 1.7 ft, Length Retained 1.7 ft		
15						VS-6		Undisturbed Shear Strength = 1,396psf Remolded Shear Strength = 93psf		
	5			2 3 4 4 (8)		D-7	GS MC AL	ML, MC=39%, PI=7 SILT, stiff, gray, moist, Disrupted, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
20	6									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62059

HOLE No. H-23A-02

Job No. OL-3498 SR 202 Elevation 118.5 ft (36.1 m)

Sheet 2 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
						S-8		SILT, gray, moist, Disrupted, no HCl reaction, attempted shelby tube 18.0-20.0' --no recovery Length Recovered 2.0 ft, Length Retained 2.0 ft		
	7			4 5 7 7 (12)		D-9		SILT, stiff, gray, moist, Disrupted, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
25						S-10		SILT, stiff, gray, moist, Disrupted, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	8			4 6 8 9 (14)		D-11		SILT, stiff, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.5 ft		
	9									
30				4 7 8 11 (15)		D-12		Lean CLAY, stiff, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.5 ft		
	10					S-13		Lean CLAY, gray, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
35				4 4 3 4 (7)		D-14		Lean CLAY, stiff, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	11									
						S-15		Lean CLAY, gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	12									
40						VS-16		Undisturbed Shear Strength = 1,520psf Remolded Shear Strength = 109psf		
				4 5 7 7 (14)		D-17	GS MC AL	ML, MC=40%, PI=14 SILT, stiff, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	13			7 9 10 11 (19)		D-18		SILT, stiff, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62059

HOLE No. H-23A-02

Job No. OL-3498 SR 202 Elevation 118.5 ft (36.1 m)

Sheet 3 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
	14	8 11 15 17 (26)		D-19		SILT, very stiff, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft
		9 10 17 18 (27)		D-20		SILT, very stiff, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft
	15					
50		9 10 17 18 (27)		D-21		SILT, very stiff, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft
	16					
		7 9 13 16 (22)		D-22		SILT, very stiff, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft
55						
	17	13 11 18 17 (29)		D-23		SILT, very stiff, gray, wet, Disrupted, no HCl reaction, disrupted zone 57' to 58' Length Recovered 2.0 ft, Length Retained 1.0 ft
		9 11 13 15 (24)		D-24		Lean CLAY, very stiff, gray, wet, Disrupted, no HCl reaction, disrupted zone 58' to 59' Length Recovered 2.0 ft, Length Retained 1.0 ft
	18					
60		10 11 15 22 (26)		D-25	GS MC AL	CL, MC=31%, PI=20 Lean CLAY, very stiff, gray, moist, Disrupted, no HCl reaction, disrupted zone 60' to 61' Length Recovered 2.0 ft, Length Retained 1.0 ft
	19					
		11 13 16 20 (29)		D-26	GS MC AL	CL, MC=32%, PI=11 Lean CLAY, dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft
65		12 16 27 38 (43)		D-27		Sandy SILT, dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft
	20					
		14 19 23 24 (42)		D-28		Sandy SILT, dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft
	21					
70						

Standard Penetration Blows/ft: 10 20 30 40

Groundwater

Instrument

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R62059

HOLE No. H-23A-02

Job No. OL-3498 SR 202 Elevation 118.5 ft (36.1 m)

Sheet 4 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
	22									
75	23		>>	10 19 35 50/4 (54)		D-29		Sandy SILT, dense, gray, moist, Laminated, no HCl reaction, w/sand lenses start 5.0' runs Length Recovered 2.0 ft, Length Retained 1.5 ft		
80	24		>>	25 37 40 50/4 (77)		D-30		SILT with sand, dense, gray, wet, Stratified, no HCl reaction, contact w/dense sand 79.0-80.0' Length Recovered 1.9 ft, Length Retained 1.9 ft		
	25									
85	26		>>	24 36 39 47 (75)		D-31		Silty SAND, very dense, gray, wet, Homogeneous, no HCl reaction, water table 45' bailed hole in casing 46' overnight Length Recovered 2.0 ft, Length Retained 1.5 ft		
90	27		>>	20 28 38 43 (66)		D-32		Silty SAND, very dense, gray, wet, Homogeneous, no HCl reaction, installed slope indicator at 89.0' Length Recovered 2.0 ft, Length Retained 1.5 ft		
	28							End of test hole boring at 91 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
95										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 62108

HOLE No. H-24-02

Job No. OL-3498 SR 202 Elevation 96.5 ft (29.4 m)

Sheet 1 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Hobbs Lic# 2517

Site Address

Inspector Hanning

Start July 2, 2002 Completion July 9, 2002 Well ID# AGS712

Equipment CME 850 w/ autohammer

Station 219+77 Offset 106' Lt. Casing HQ

Method Wet Rotary

Northing 569673.294 Easting 1663153.062 Latitude Longitude

County King Subsection SE/NW Section 17 Range 6E Township 25N

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
				3 3 3 (9)		D-1	GS MC AL	CL, MC=25%, PI=13 Lean CLAY, loose, grayish brown, dry, Stratified, no HCl reaction Length Recovered 1.4 ft, Length Retained 1.0 ft		
1				2 2 2 (4)		D-2		SILT, very loose, olive brown, moist, Stratified, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft **(Landslide Deposit)**	2/23/03	
5	2					S-3		No Recovery		
10	3			2 2 4 (6)		D-4		SILT, loose, light yellowish brown, moist, Laminated, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft	11/1/02	
	4					S-5		SILT, loose, light yellowish brown, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
15	5			3 5 6 (11)		D-6		SILT, loose, light grayish brown, moist, disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft **(Landslide Deposit)**		
20	6					S-7		No Recovery		

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 62108

HOLE No. H-24-02

Job No. OL-3498 SR 202 Elevation 96.5 ft (29.4 m)

Sheet 2 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Hobbs Lic# 2517

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
						S-8		Sandy SILT with gravel, loose, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
				3 4 6 (10)		D-9		Sandy SILT with gravel, loose, light brown, wet, Homogeneous, no HCl reaction Length Recovered 0.4 ft, Length Retained 0.4 ft		
	7									
25						S-10		Sandy SILT with gravel, loose, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.4 ft, Length Retained 1.4 ft		
	8			5 5 3 (8)		D-11	GS MC AL	SC, MC=21%, PI=9 Clayey SAND with gravel, loose, light brown, wet, Stratified, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	9									
30				1 2 3 (5)		D-12		Sandy SILT with gravel, loose, light brown, wet, Stratified, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	10									
35				3 4 5 (9)		D-13		SILT with gravel, loose, light brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	11									
	12									
40				2 5 5 (10)		D-14	GS MC AL	CH, MC=46%, PI=33 Fat CLAY, medium stiff, grey, wet, disrupted, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft **(Landslide Deposit)**		
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62108

HOLE No. H-24-02

Job No. OL-3498 SR 202 Elevation 96.5 ft (29.4 m)

Sheet 3 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Hobbs Lic# 2517

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
	14			2 4 4 (8)		D-15		Lean CLAY, medium stiff, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	15									
50				2 4 6 (10)		D-16		Lean CLAY, stiff, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	16							Water bearing deposit under arteasian pressure		
55				2 3 4 (7)		D-17		Lean CLAY, medium stiff, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft **(Landslide Deposit)**		
	17									
	18									
60				7 8 10 (18)		D-18		Poorly graded GRAVEL, subrounded, medium dense, black, wet, Homogeneous, no HCl reaction, Note contact with gravel at 58'. Length Recovered 1.0 ft, Length Retained 1.0 ft		
	19							End of test hole boring at 61.5 ft below ground elevation.		
65								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	20									
	21									
70										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
7/10/2002	-18.2	78.4
8/13/2002	-9.2	87.4
9/30/2002	-11.8	84.8
11/1/2002	-12.5	84.1
12/18/2002	-9.8	86.8
02/11/2003	-9.0	87.6

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 62108

HOLE No. H-24-02

Job No. OL-3498 SR 202 Elevation 96.5 ft (29.4 m)

Sheet 4 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Hobbs Lic# 2517

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
								03/18/2003	-8.7	87.9		
								05/06/2003	-8.8	87.8		
								06/05/2003	-7.0	89.6		
								07/27/2003	-9.5	87.1		
								09/23/2003	-12.6	84.0		
	22							12/09/2003	-6.6	90.0		
								01/16/2004	-6.3	90.3		
								02/23/2004	-5.0	91.6		
								04/06/2004	-5.8	90.8		
								05/11/2004	-6.7	89.9		
								06/23/2004	-9.2	87.4		
75												
	23											
	24											
80												
	25											
85												
	26											
	27											
90												
	28											
95												

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62108

HOLE No. H-25-02

Job No. OL-3498 SR 202 Elevation 102.1 ft (31.1 m)

Sheet 1 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Fetterly Lic# 2507

Site Address

Inspector Hanning

Start June 26, 2002 Completion June 26, 2002 Well ID# AGS 713 Equipment CME 850 w/ autohammer

Station 221+41 Offset 105' Lt. Casing HWT Method Wet Rotary

Northing 569831.526 Easting 1663302 Latitude Longitude

County King Subsection SE/NW Section 17 Range 6E Township 25N

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
				2 3 3 2 (6)		D-1		SILT with organics and trace gravel, loose, olive brown, moist, Homogeneous, no HCl reaction, Note iron staining. Length Recovered 1.4 ft, Length Retained 1.4 ft		
	1					S-2		SILT with trace organics, loose, olive brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
5				1 2 2 2 (4)		D-3	GS MC AL	ML, MC=48%, PI=13 SILT, very loose, olive brown, moist, Homogeneous, no HCl reaction, Note bottom .3' possible disrupted Length Recovered 1.6 ft, Length Retained 1.6 ft		
	2									
						S-4		SILT, loose, olive brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
10	3			2 2 3 3 (5)		D-5		SILT, loose, olive brown, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	4									
						S-6	GS MC AL	ML, MC=34%, PI=11 SILT, loose, olive brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
15	5			2 2 3 5 (5)		D-7		SILT, loose, olive brown, moist, Homogeneous, no HCl reaction Length Recovered 1.8 ft, Length Retained 1.8 ft		
						S-8		SILT with some gravel and sand, loose, olive brown, moist, Stratified, no HCl reaction		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/16/04,11:22:28 A6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62108

HOLE No. H-25-02

Job No. OL-3498 SR 202 Elevation 102.1 ft (31.1 m)

Sheet 2 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Fetterly Lic# 2507

Depth (ft)	Meters (m)	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
							Length Recovered 1.5 ft, Length Retained 1.5 ft		
			3 4 5 9 (9)		D-9		SILT with some gravel and sand, loose, olive brown, moist, Stratified, no HCl reaction, Note some iron staining Length Recovered 1.8 ft, Length Retained 1.8 ft		
	7								
			4 8 10 12 (18)		D-10	GS MC AL	ML, MC=22%, LL=31 SILT, medium dense, olive gray, wet, Stratified, no HCl reaction Length Recovered 1.8 ft, Length Retained 1.8 ft		
25									
	8								
			2 3 4 4 (7)		D-11		SILT, loose, olive gray, wet, Stratified, no HCl reaction Length Recovered 1.8 ft, Length Retained 1.8 ft		
	9								
30									
					S-12		SILT, loose, dark greenish gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	10		1 3 3 3 (6)		D-13	GS MC AL	ML, MC=34%, LL=39 SILT, loose, dark greenish gray, wet, Homogeneous, no HCl reaction Length Recovered 1.3 ft, Length Retained 1.3 ft		
35									
	11								
					S-14		Sandy SILT with gravel, medium dense, dark greenish gray, wet, Stratified, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	12								
40			8 6 6 8 (12)		D-15	GS MC AL	ML, MC=29%, LL=28 Sandy SILT, medium dense, dark greenish gray, wet, Stratified, no HCl reaction Length Recovered 1.3 ft, Length Retained 1.3 ft		
	13								
			3 3		D-16		SILT with trace sand, loose, dark greenish gray, moist, Homogeneous, no HCl reaction		
45									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62108

HOLE No. H-25-02

Sheet 3 of 3

Job No. OL-3498 SR 202 Elevation 102.1 ft (31.1 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Fetterly Lic# 2507

Job N
Proje
Site Addres
Star
Statio
Northin
Count

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
		5 6 (8)				Length Recovered 1.5 ft, Length Retained 1.5 ft
	14			S-17		SILT, loose, dark greenish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft
	15			S-18		SILT with some sand, medium dense, dark greenish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft
50		4 5 6 7 (11)		D-19	GS MC	ML, MC=33% SILT, medium dense, dark greenish gray, moist, Homogeneous, no HCl reaction Length Recovered 1.2 ft, Length Retained 1.2 ft
	16					
55		2 4 6 6 (10)		D-20		SILT, loose, dark greenish gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft
	17					
	18			S-21		SILT, loose, dark greenish gray, moist, Homogeneous, no HCl reaction, Note possibl disrupted, need to determine Length Recovered 1.5 ft, Length Retained 1.5 ft
60		10 12 16 23 (28)		D-22		SILT with trace sand, dense, dark greenish gray, moist, Homogeneous, no HCl reaction, Note possible disrupted Length Recovered 1.2 ft, Length Retained 1.2 ft
	19					
65		27 22 19 (41)		D-23	GS MC	GW, MC=10% Well graded GRAVEL with sand, subrounded, dense, grayish brown, wet, Homogeneous, no HCl reaction, Note contact with gravel at 63' Length Recovered 0.9 ft, Length Retained 0.9 ft
	20					
						End of test hole boring at 65.5 ft below ground elevation.
						This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
	21					
70						

Standard Penetration Blows/ft: 10 20 30 40

Groundwater

Instrument

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/7/04,1:42:00 P7

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/16/04,11:22:28 A6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14111

HOLE No. H-26-02

Job No. OL-3498 SR 202 Elevation 77.4 ft (23.6 m)

Sheet 3 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

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
	14			25 25 25 (50)		D-14		Well graded GRAVEL with sand, sub angular, dense, black, wet, Homogeneous, no HCl reaction Length Recovered 0.1 ft		
								End of test hole boring at 46.5 ft below ground elevation.		
								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	15									
50										
	16									
55										
	17									
	18									
60										
	19									
65										
	20									
	21									
70										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 14861

HOLE No. H-27-02

Job No. OL-3498 SR 202 Elevation 77.2 ft (23.5 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller James Fetterly Lic# 2507

Site Address

Inspector Cleo Andrews

Start April 9, 2002 Completion April 9, 2002 Well ID#

Equipment CME 850 w/ autohammer

Station 231+50 Offset 60' Lt. Casing (HWT 4" x 7.0')(HQ 3" x 40.0') Method Wet Rotary

Northing 570085.0068 Easting 1664295.4833 Latitude Longitude

County King Subsection SE 1/4 of the NW 1/4 Section 17 Range 6 EWM Township 25 N

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
								Top surface grass, water in ditch 15.0' south of test hole, down existing pole and barbwire fence on south side of ditch. (Note elevation approximately 2.0' below road grade).	▽	
								0.0' to 2.0' Sandy SILTvery loose (Wetland material).		
						SH-1		04/09/2002 Sandy SILT, very loose, dushy yellowish brown, moist, Stratified, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	1									
				2 2 4 (6)		D-2	GS MC	ML, M.C.=28% SILT with sand and organics, loose, dusky yellowish brown, moist, Stratified, no HCl reaction (Split sample's MC-2a & D-2 from same depth). Length Recovered 1.5 ft, Length Retained 1.5 ft		
5										
	2									
						U-3 A to E	GS MC CN UU	U-3/B 7.5' ML, M.C.=28%, LL=28 Silt with SAND, loose, dusky yellowish brown, moist, Stratified, no HCl reaction traces of organic and small angular gravel. (100% drilling fluid return). Length Recovered 1.7 ft, Length Retained 1.7 ft		
				2 2 3 (5)		D-4	GS MC	U-3/C 7.83' SM, M.C.=23%, LL=20 Silty SAND SM, M.C.=25% Silty SAND, loose, dark yellowish brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft		
10	3									
						U-5 A to E		Sandy Elastic SILT, medium stiff, medium light gray, moist, Stratified, no HCl reaction Length Recovered 1.7 ft, Length Retained 1.7 ft		
	4									
				3 3 5 (8)		D-6		Silty SAND, loose, medium gray, moist, Stratified, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft		
15										
	5									
				1 1		D-7		Sandy SILT, very loose, medium gray, moist, Stratified, no HCl reaction, with fine grained sand lenses, traces of		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/18/04 8:06:39 AB

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 14861

HOLE No. H-27-02

Job No. OL-3498 SR 202 Elevation 77.2 ft (23.5 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller James Fetterly Lic# 2507

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
				3 (4)				small angular gravel. Length Recovered 1.5 ft, Length Retained 1.0 ft		
25	7, 8			10 15 16 (31)		D-8	GS MC	GW, M.C.=6% Well graded GRAVEL with sand, subrounded, dense, medium gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
30	9, 10			18 14 18 (32)		D-9		Well graded GRAVEL with sand, subrounded, dense, medium gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
35	11			6 10 10 (20)		D-10		Poorly graded GRAVEL with sand, angular, medium dense, medium gray, wet, Homogeneous, no HCl reaction, traces of some coarser grains. (Clean outwash till). Length Recovered 0.8 ft, Length Retained 0.8 ft		
40	12							End of test hole boring at 35.5 ft below ground elevation.		
45	13							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
								Note encountered artesian pressure at 17.0' had a 10.0' head with 2 1/2 gallons per minute before stabilizing to a trickle after approximately 5 minutes.		

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14862

HOLE No. H-28-02

Sheet 1 of 3

Job No. OL-3498 SR 202 Elevation 82.1 ft (25.0 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Mike Mulhern

Start April 3, 2002 Completion April 8, 2002 Well ID#

Equipment CME 45 w/ autohammer

Station 237+23 Offset 26' Rt. Casing HQ

Method Wet Rotary

Northing 570018.185 Easting 1664870.485 Latitude

Longitude

County King Subsection nwsw 1/4-1/4 of the ne ne 1/4 Section 17 Range 6 EWM Township 25N

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
								(0 to 3' No samples taken)		
5	1					S-1		Elastic SILT with gravel, stiff, gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	2			1 2 3 (5)		D-2	GS MC AL	MH, M.C.=54%, PI=12 Elastic SILT with gravel, medium stiff, gray, wet, Homogeneous, no HCl reaction, some organics Length Recovered 1.3 ft, Length Retained 1.0 ft	▽ 04/08/2002	
10	3					S-3	GS MC AL CN UU	10.8' MH, M.C.=81%, PI=13 11.2' MH, M.C.=63%, PI=27 Elastic SILT with sand, medium stiff, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	4			3 4 4 (8)		D-4		Elastic SILT with gravel, stiff, greenish gray, wet, Homogeneous, no HCl reaction, few organics Length Recovered 1.5 ft, Length Retained 1.0 ft		
15						S-5	GS MC AL CN	ML, M.C.=39%, PI=17 Elastic SILT, stiff, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	5			2 2 7 (9)		D-6	GS MC AL	CL, M.C.=53%, PI=18 Lean CLAY, stiff, gray, wet, Homogeneous, no HCl reaction, hit gravels at 18.5' Length Recovered 1.5 ft, Length Retained 1.0 ft		
20	6			15		D-7		Well graded GRAVEL with sand, medium dense, dark		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 9/8/04 8:07:37 A9

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14862

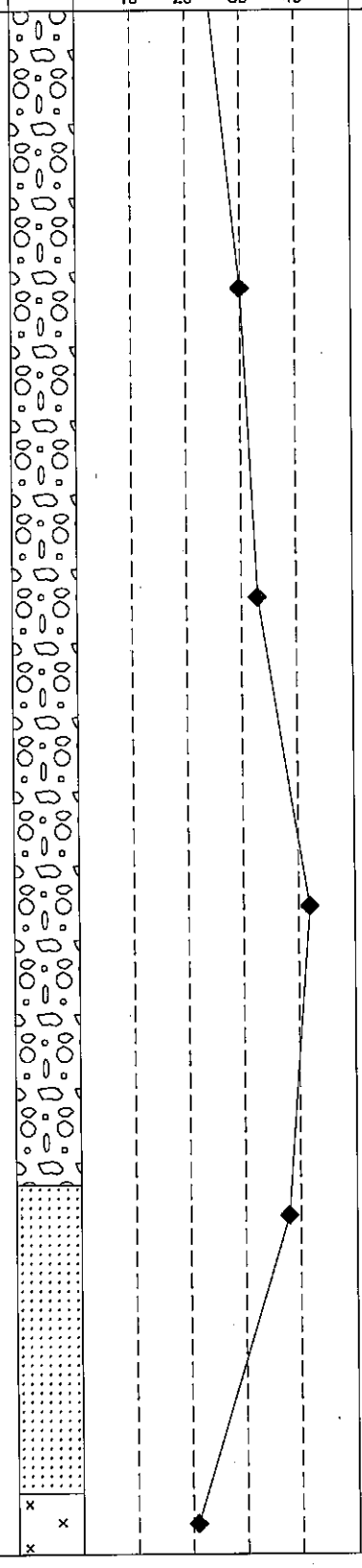
HOLE No. H-28-02

Job No. OL-3498 SR 202 Elevation 82.1 ft (25.0 m)

Sheet 2 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454



Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		14 10 (24)				gray, wet, Homogeneous, no HCl reaction Length Recovered 0.7 ft, Length Retained 0.7 ft		
	7							
25		29 17 13 (30)		D-8		Well graded GRAVEL with sand, subangular, dense, dark gray, wet, Homogeneous, no HCl reaction, maybe trace silt Length Recovered 0.3 ft, Length Retained 0.3 ft		
	8							
	9	12 15 18 (33)		D-9		Well graded SAND with gravel, dense, olive brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
30								
	10							
35		12 15 27 (42)		D-10		Well graded SAND with gravel, dense, olive, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
	11							
	12							
40		15 17 21 (38)		D-11	GS MC	SP, M.C.=13% Poorly graded SAND, dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	13							
45		10		D-12		Elastic SILT with gravel, very stiff, gray, wet,		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 9/8/04 8:07:37 A9

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-14862

HOLE No. H-28-02

Job No. OL-3498 SR 202 Elevation 82.1 ft (25.0 m)

Sheet 3 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
		× × ×		10 11 (21)				Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	14									
								End of test hole boring at 46 ft below ground elevation.		
	15							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
50										
	16									
55										
	17									
	18									
60										
	19									
65										
	20									
	21									
70										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S14862

HOLE No. H-29-02

Job No. OL-3498 SR 202 Elevation 82.9 ft (25.3 m)

Sheet 1 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Mike Mulhern

Start March 28, 2002 Completion April 2, 2002 Well ID#

Equipment CME 45 w/ autohammer

Station 238+54 Offset 17' Lt. Casing HQ

Method Wet Rotary

Northing 570057.492 Easting 1665002.303 Latitude

Longitude

County King Subsection nw sw 1/4 1/4 of the ne ne 1/4 Section 17 Range 6EWM Township 25N

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
				100/6 (100/6")		D-1		Drilled through old concrete		
5	1			1 0 1 (1)		D-2		Elastic SILT, very soft, olive gray, wet, Homogeneous, no HCl reaction, mottled Length Recovered 1.0 ft, Length Retained 1.0 ft		
	2					S-3		Silty SAND, very loose, olive brown, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft 04/02/2002	▽	
10	3					S-4	GS MC AL CN	ML, M.C.=99%, LL=94 SILT, very soft, gray, wet, Stratified, no HCl reaction, stratified sand Length Recovered 2.0 ft, Length Retained 2.0 ft		
	4			2 2 1 (3)		D-5		MH, M.C.=62%, PI=29 Elastic SILT Elastic SILT with gravel, Length Recovered 1.0 ft, Length Retained 1.0 ft		
15	5					S-6		Elastic SILT, soft, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	6			3 3 3 (6)		D-7		Elastic SILT with gravel, medium stiff, gray, wet, Stratified, no HCl reaction, strat with sand Length Recovered 1.0 ft, Length Retained 1.0 ft		
20										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14862

HOLE No. H-29-02

Job No. OL-3498 SR 202 Elevation 82.9 ft (25.3 m)

Sheet 2 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
				7 9 15 (24)		D-8	GS MC	GW, M.C.=8% Well graded GRAVEL with sand, subangular, medium dense, bluish gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	7									
25				10 16 14 (30)		D-9		Well graded GRAVEL with sand, subangular, dense, bluish gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	8									
	9									
30				5 10 12 (22)		D-10		Well graded GRAVEL with sand, subrounded, medium dense, bluish gray, wet, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft		
	10									
35				14 14 15 (29)		D-11		Well graded GRAVEL with sand, subrounded, dense, greenish gray, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft		
	11									
	12									
40				9 13 12 (25)		D-12	GS MC	SM, M.C.=18% Silty SAND with gravel, dense, gray, wet, Homogeneous, no HCl reaction, trace gravel Length Recovered 1.5 ft, Length Retained 1.0 ft		
	13									
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S14862

HOLE No. H-29-02

Job No. OL-3498 SR 202 Elevation 82.9 ft (25.3 m)

Sheet 3 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
	14			29 18 29 (47)		D-13	GS MC	ML, M.C.=27% SILT, dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	15									
50				17 23 26 (49)		D-14		SILT, dense, gray, wet, Homogeneous, no HCl reaction, trace gravel Length Recovered 0.5 ft, Length Retained 0.5 ft		
	16							End of test hole boring at 51.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
55	17									
	18									
60	19									
65	20									
	21									
70										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62103

HOLE No. H-30-02

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 114.6 ft (34.9 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Brian Hilts Lic# 2249

Site Address

Inspector Cleo Andrews

Start June 25, 2002 Completion June 25, 2002 Well ID# AMF 651

Equipment BK-81 w/ autohammer

Station 181+24 Offset 144' Lt. Casing HWT 4" x 35.0

Method Wet Rotary

Northing 570531.741 Easting 1659527.846 Latitude Longitude

County King Subsection NE/NE Section 18 Range 6 EWM Township 25 N

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
5	1			5 5 7 (12)		D-1		Poorly graded sand with silt and gravel, angular, medium dense, dark brown, wet, Homogeneous, no HCl reaction, traces of organic. (Fill material). Length Recovered 0.7 ft, Length Retained 0.7 ft		
10	2			10 11 13 (24)		D-2	GS MC	SP-SM, M.C.=10% Poorly graded SAND with silt and gravel, medium dense, dark brown, moist, Homogeneous, no HCl reaction. Recovered 1.1 ft, Length Retained 1.0 ft		
15	3			2 3 6 (9)		D-3	GS MC	ML, M.C.=15% Sandy SILT, loose, grayish brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft	06/25/2002	
20	4			7 9 14 (23)		D-4		Silty GRAVEL with sand, angular, medium dense, grayish brown, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 6/29/04 2:00:09 P6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62103

HOLE No. H-30-02

Job No. OL-3498 SR 202 Elevation 114.6 ft (34.9 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Brian Hilts Lic# 2249

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
7				17 23 22 (45)		D-5	GS MC	SM, MC=10% Silty SAND with gravel, dense, grayish brown, moist, Stratified, no HCl reaction, with fine grained sand lens. Note started drilling harder at 24.5'. Length Recovered 1.3 ft, Length Retained 1.0 ft		
25										
8										
				15 14 18 22 (32)		D-6	GS MC	ML, MC=17% Sandy SILT, dense, dark gray, moist, Homogeneous, no HCl reaction, traces of dark reddish brown stain. Length Recovered 2.0 ft, Length Retained 1.0 ft		
9										
30										
10								End of test hole boring at 30 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
35										
11										
12										
40										
13										
45										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
6/25/2002	-13.0	101.6
8/13/2002	-12.85	101.8
9/30/2002	-13.0	101.6
11/1/2002	-13.6	101.0
12/18/2002	-13.2	101.4
2/11/2003	-12.5	102.1
3/18/2003	-12.2	102.4
5/6/2003	-12.0	102.6
6/5/2003	-13.0	101.6
7/23/2003	-13.2	101.4
9/23/2003	-12.7	101.9
12/9/2003	-12.2	102.4
1/16/2004	-11.9	102.7
2/23/2004	-12.6	102.0
11/1/2002	-13.6	101.9
4/6/2004	-12.7	101.6
5/11/2004	-13.0	101.3
6/23/2004	-13.3	101.3

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62107

HOLE No. H-31-02

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 101.4 ft (30.9 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Hilts, Brian Lic# 2249

Site Address

Inspector Johnson, Vince

Start June 27, 2002 Completion June 27, 2002 Well ID# AGS 714 Equipment BK-81 w/ autohammer

Station 246+60 Offset 499' Lt. Casing HQ Method Wet Rotary

Northing 569449.517 Easting 1665607.616 Latitude Longitude

County King Subsection SE 1/4, NE 1/4 Section 17 Range 6 EWM Township 25N

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
								Asphalt=0.5 ft		
5	1			4 5 6 (11)		D-1		SILT with sand and gravel, medium dense, Brownish gray, moist, Laminated, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft		
10	2			3 2 4 (6)		D-2	GS MC AL	CL, MC=32%, PI=17 LEAN CLAY, medum stiff, loose, Grayish brown, moist, Laminated, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft		
15	3			27 50/4" (50/4")		D-3	GS MC	SW, MC=11% Well graded SAND with gravel, very dense, Gray, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft	06/27/2002	
20	4			8 11 12 (23)		D-4	GS MC	ML, MC=30% Sandy SILT, medium dense, Grayish brown, moist, Laminated, no HCl reaction, Change out of gravels at 18.0 ft.		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/18/04,8:42:40 A8

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62107

HOLE No. H-31-02

Job No. OL-3498 SR 202 Elevation 101.0 ft (30.8 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Hilts, Brian Lic# 2249

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
								Length Recovered 1.5 ft, Length Retained 1.0 ft		
	7									
25				6 9 15 (24)		D-5	GS MC AL	ML, MC=33%, LL=29 SILT, medium dense, gray, moist, Laminated, no HCl reaction, Color change at 21.5 ft to gray Length Recovered 1.5 ft, Length Retained 1.0 ft		
	8									
	9			9 12 19 (31)		D-6	GS MC AL	SILT, dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 1.4 ft, Length Retained 1.0 ft		
30								End of test hole boring at 30 ft below ground elevation.		
	10							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
35	11							WATER LEVEL READINGS		
	12									
40	13									
45										

DATE	DEPTH	ELEVATION
6/27/02	-17.1	84.3
8/13/02	-18.0	83.4
9/30/02	-18.7	82.7
11/1/02	-18.4	83.0
12/18/2002	-18.7	82.7
2/11/2003	-16.6	84.8
3/18/2003	-16.5	84.9
5/6/2003	-16.5	84.9
6/5/2003	-17.5	83.9
7/23/2003	-17.7	83.7
9/23/2003	-18.6	82.8
12/9/2003	-16.6	84.8
1/16/2004	-16.2	85.2
2/23/2004	-16.4	85.0
4/6/2004	-16.6	84.8
5/11/2004	-16.8	84.6
6/23/2004	-17.4	84.0

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-62107

HOLE No. H-32-02

Sheet 1 of 3

Job No. OL-3498 SR 202 Elevation 119.0 ft (36.3 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Brian Hilts Lic# 2249

Site Address

Inspector Brian Hilts

Start July 23, 2002 Completion July 25, 2002 Well ID# AGS 715 Equipment Burley 4500

Station 242+22 Offset 831' Rt. Casing HWTx52 Method Wet Rotary

Northing 569198.006 Easting 1665263.722 Latitude Longitude

County King Subsection SW1/4 NE1/4 Section 17 Range 6 EWM Township 25N

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			7 8 11 (19)		D-1		SILT, medium dense, grayish brown, dry, Homogeneous, no HCl reaction, mottled with orange color with traces of black organics and hair roots. Length Recovered 1.0 ft, Length Retained 1.0 ft (Landslide debris?)		
5	2			3 4 5 (9)		D-2	GS MC AL	SILT, loose, grayish brown, moist, Homogeneous, no HCl reaction, mottled with orange throughout. Length Recovered 1.3 ft, Length Retained 1.3 ft		
10	3			2 4 7 (11)		D-3		SILT, medium dense, grayish brown, moist, Homogeneous, no HCl reaction, mottled with orange Length Recovered 1.0 ft, Length Retained 1.0 ft. (Landslide debris?)		
15	4			2 2		D-4	GS MC	ML, MC=39%, PI=35 SILT, very loose, grayish brown, moist, Homogeneous,		
20	5									
	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/8/04,10:16:02 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-62107

HOLE No. H-32-02

Job No. OL-3498 SR 202 Elevation 119.0 ft (36.3 m)

Sheet 2 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Brian Hilts Lic# 2249

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
				2 (4)			AL	no HCl reaction, mottled with orange. Length Recovered 1.2 ft, Length Retained 1.2 ft		
	7									
25				6 9 21 (30)		D-5		SILT, dense, grayish brown, moist, Homogeneous, no HCl reaction, with a trace of FeO stains, Color change to dark gray at approx. 26'. Length Recovered 1.1 ft, Length Retained 1.1 ft. (Landslide Debris?)		
	8									
30	9			8 10 18 (28)		D-6		SILT, dense, dark gray, moist, Laminated, no HCl reaction. Length Recovered 1.5 ft, Length Retained 1.5 ft		
	10									
35				9 19 29 (48)		D-7	GS MC AL	CL, MC=34% , PI=22 LEAN Clay, hard, dark gray, moist, Homogeneous, no HCl reaction. Length Recovered 1.5 ft, Length Retained 1.5 ft 07/25/2002	▽	
	11									
40	12		>>	10 19 50 (69)		D-8		LEAN CLAY, very hard, dark gray, moist, Homogeneous, no HCl reaction. Length Recovered 1.0 ft, Length Retained 1.0 ft		
	13									
45			>>	19 36		D-9	GS MC	ML, MC=27% Silty SAND, very dense, dark gray, wet, Homogeneous,		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/8/04,10:16:02 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-62107

HOLE No. H-32-02

Job No. OL-3498 SR 202 Elevation 119.0 ft (36.3 m)

Sheet 3 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Brian Hilts Lic#. 2249

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
	14			43 (79)				no HCl reaction. Length Recovered 1.0 ft, Length Retained 1.0 ft		
50	15		>>	11 36 34 (70)		D-10		SILT with sand, very dense, dark gray, wet, Homogeneous, no HCl reaction, (bailed hole) After installing the piezometer the water table was at 35.5'. Length Recovered 0.8 ft, Length Retained 0.8 ft		
	16							End of test hole boring at 50.5 ft below ground elevation.		
55	17							Installed Piezometer between -37.5 to -47.5 ft.		
	18							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
60	19							Bailed hole to -37.3 ft. one ft recharge after 50 min.		
65	20							Bailed hole to -41.9 ft. on 7/24/02 recharged to -34.6 ft overnight.		
	21									
70										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
7/24/2002	-35.5	83.5
8/13/2002	-35.9	83.1
9/30/2002	-36.2	82.8
11/120/02	-36.6	82.4
12/18/2002	-36.8	82.2
2/11/2003	-35.7	83.3
3/18/2003	-35.5	83.5
5/6/2003	-35.5	83.5
6/5/2003	-35.3	83.7
7/23/2003	-35.5	83.5
9/23/2003	-36.8	82.2
12/9/2003	-35.9	83.1
1/16/2004	-35.6	83.4
2/23/2004	-34.6	84.4
4/6/2004	-34.9	84.1
5/11/2004	-35.0	84.0
6/23/2004	-35.4	83.6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R- 62110

HOLE No. H-33-02

Job No. OL-3498 SR 202 Elevation 129.5 ft (39.5 m)

Sheet 1 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Jamie Fetterly Lic# 2507

Site Address

Inspector Brian Hilts

Start July 30, 2002 Completion July 30, 2002 Well ID# AGS-718 Equipment Burley 4500

Station 237+42 Offset 861' Rt. Casing HWTx17 HQx57 Method Wet Rotary

Northing 569182.944 Easting 1664868.102 Latitude Longitude

County King Subsection SW1/4 NE1/4 Section 17 Range 6 EWM Township 25N

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
								Top 3 ft consisted of sands and gravels.		
5	1			5 5 6 (11)		D-1		SILT, medium dense, grayish brown, moist, Homogeneous, no HCl reaction, trace of hair roots Length Recovered 1.0 ft, Length Retained 1.0 ft		
10	2 3			4 6 8 (14)		D-2	GS AL	ML, MC=31%, PI=14 SILT, stiff, grayish brown, moist, Homogeneous, no HCl reaction, with orange stains throughout and trace of hair roots. Length Recovered 0.9 ft, Length Retained 0.9 ft (Landslide Debris?)		
15	4 5			4 6 8 (14)		D-3		SILT, stiff, grayish brown, moist, Homogeneous, no HCl reaction, with orange stains and a trace of hair roots. Length Recovered 1.3 ft, Length Retained 1.3 ft		
20	6			3		D-4		SILT, stiff, grayish brown, moist, Homogeneous, no HCl		

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R- 62110

HOLE No. H-33-02

Job No. OL-3498 SR 202 Elevation 129.5 ft (39.5 m)

Sheet 2 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Jamie Fetterly Lic# 2507

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
				6 7 (13)				reaction, with orange stains throughout Length Recovered 1.5 ft, Length Retained 1.5 ft		
	7									
25				3 6 6 (12)		D-5		SILT, stiff, grayish brown, moist, Homogeneous, no HCl reaction, with orange stains Length Recovered 1.5 ft, Length Retained 1.5 ft		
	8							(Landslide debris?)		
30	9			3 5 5 (10)		D-6		SILT, loose, grayish brown, moist, Homogeneous, no HCl reaction, trace of orange stains, at -31', color change to dark gray and drilling became easier. Length Recovered 1.5 ft, Length Retained 1.5 ft		
	10									
35				2 4 6 (10)		D-7		SILT, stiff, dark gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	11									
40	12			3 4 5 (9)		D-8		SILT, stiff, dark gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	13							07/30/2002	▽	
45				3		D-9		SILT, very stiff, dark gray, moist, Stratified, no HCl		

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R- 62110

HOLE No. H-33-02

Job No. OL-3498 SR 202 Elevation 129.5 ft (39.5 m)

Sheet 3 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Jamie Fetterly Lic# 2507

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
				8 13 (21)				reaction, the top .2' dark gray, middle .5' grayish brown, bottom .2' grayish brown with gravel (sub angular). At approx.46' the water pressure dropped and lost 50% water return, at 48' we regained 100% return. Length Recovered 0.9 ft, Length Retained 0.9 ft		
50	14 15			7 15 19 (34)		D-10	GS	SW-SM, MC=19% Silty SAND with gravel, dense, grayish brown, wet, Stratified, no HCl reaction, with a trace of FeO stains, the middle .3' (ml) silt, at 51.5' we came out of gravels and drilling became smoother, gravels from approx. 45.5' to 51.5'. Length Recovered 1.0 ft, Length Retained 1.0 ft		
55	16 17			3 4 6 (10)		D-11	GS AL	ML, MC=33%, PI=17 SILT, loose, grayish brown, moist, Homogeneous, no HCl reaction, Length Recovered 1.5 ft, Length Retained 1.5 ft		
60	18 19							End of test hole boring at 56 ft below ground elevation.		
65	20 21							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
70								Loss of drill fluid at -26.5 ft. returned at -31 ft.		

BAIL RECHARGE TEST

Minutes	Water Table
0	-49.5'
5	-43.2'
10	-42.1'
15	-40.6
25	-40.6

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
7/30/2002	-42.4	87.1
8/13/2002	-45.0	84.5
9/30/2002	-45.4	84.1
11/120/02	-46.1	83.4
12/18/2002	-48.0	81.5
2/11/2003	-46.1	83.4
3/18/2003	-46.0	83.5
5/6/2003	-46.0	83.5
6/5/2003	-45.5	84.0
7/23/2003	-45.6	83.9
9/23/2003	-51.0	78.5

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R- 62110

HOLE No. H-33-02

Job No. OL-3498 SR 202 Elevation 129.5 ft (39.5 m)

Sheet 4 of 4

Project SR 202 - SR520 to Sahalee Way NE

Driller Jamie Fetterly Lic# 2507

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
								12/9/2003	-47.2	82.3		
								1/16/2004	-46.9	82.6		
								2/23/2004	-45.6	83.9		
								4/6/2004	-45.7	83.8		
								5/11/2004	-45.7	83.8		
								6/23/2004	-45.5	84.0		
	22											
75	23											
	24											
80												
	25											
85	26											
	27											
90												
	28											
95												

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-34-02

Job No. OL-3498 SR 202 Elevation 187.9 ft (57.3 m)

Sheet 1 of 9

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

Site Address

Inspector Cleo Andrews

Start September 17, 2002 Completion September 17, 2002 Well ID#

Equipment CME 55 w/ autohammer

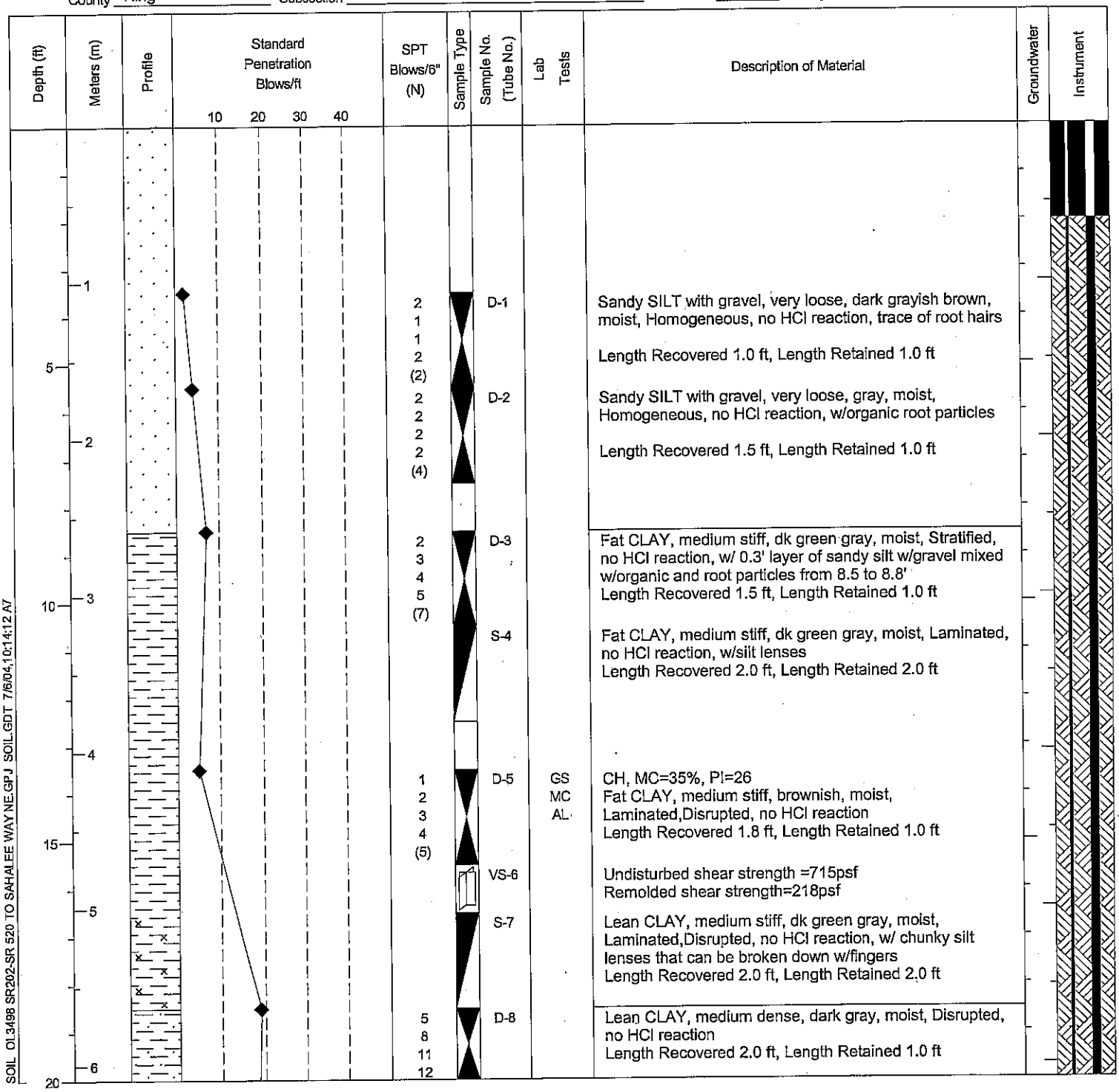
Station 216+32 Offset 382' Lt. Casing HW/HQ

Method Wet Rotary

Northing 569924.828 Easting 1662799.494 Latitude

Longitude

County King Subsection SW 1/4 of the NW 1/4 Section 17 Range 6 EWM Township 25



Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-34-02

Job No. OL-3498 SR 202 Elevation 187.9 ft (57.3 m)

Sheet 2 of 9

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

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
				(19)						
				9 8 10 (18)		D-9	GS MC AL	CL, MC=32%, PI=20 Lean CLAY, medium dense, dark gray, moist, Slickensided, no HCl reaction, w/chunky silt lenses Length Recovered 1.5 ft, Length Retained 1.0 ft		
	7					VS-10		Undisturbed shear strength =5,384psf Remolded shear strength=653psf		
25						S-11		Lean CLAY, medium dense, dk gray, moist, Homogeneous, no HCl reaction, 200 to 175 PSI to push shelby tube 2.0' Length Recovered 2.0 ft, Length Retained 2.0 ft		
	8			10 12 16 (22)		D-12		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	9					VS-13		Undisturbed shear strength =refusal		
30				8 10 12 12 (22)		D-14		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	10			6 9 12 12 (21)		D-15		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
35	11			5 12 12 16 (24)		D-16		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
	12			7 10 16 19 (26)		D-17		Lean CLAY, dense, dark gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
40				8 14 18 22 (32)		D-18		Lean CLAY, dense, dark gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
	13			7 10 14 17		D-19		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-34-02

Job No. OL-3498 SR 202 Elevation 187.9 ft (57.3 m)

Sheet 3 of 9

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

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
				(24)					3/21/04	
	14			6 10 11 14 (21)		D-20		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
	15			8 10 13 14 (23)		D-21		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
50				6 9 13 15 (22)		D-22		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
	16			7 10 13 15 (23)		D-23		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
55	17			6 9 13 15 (22)		D-24		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
	18			7 11 13 16 (24)		D-25		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
60	19								10/8/02	
				5 8 10 14 (18)		D-26	GS MC AL	CL, MC=30%, PI=21 Lean CLAY, medium dense, dark gray, moist, Disrupted,Homogeneous, no HCl reaction Disrupted zone between -63.5 to -65.5ft (water bearing ?) Length Recovered 2.0 ft, Length Retained 1.0 ft		
65	20			5 9 11 14 (20)		D-27		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
	21			7 10 12 15		D-28		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft		
70										

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/6/04,10:14:12 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-34-02

Job No. OL-3498 SR 202 Elevation 187.9 ft (57.3 m)

Sheet 4 of 9

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
		(22)				
	22					
		8 11 14 17 (25)		D-29		Lean CLAY, dense, dark gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft
75	23					
	24	7 9 11 14 (20)		D-30		Lean CLAY, medium dense, dark gray, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.0 ft
80	25					
		4 9 12 15 (21)		D-31		Lean CLAY, medium dense, dark gray, moist, Stratified, no HCl reaction, with 0.5' of disrupted silt w/chunky silt lenses from 85.0 to 85.5 Length Recovered 2.0 ft, Length Retained 1.0 ft
85	26	6 11 13 19 (24)		D-32		Lean CLAY, medium dense, dark gray, moist, Laminated, no HCl reaction, w/horizontal chunky silt lenses and one med. grained sand lenses Length Recovered 2.0 ft, Length Retained 1.0 ft
	27	9 12 14 20 (26)		D-33		Lean CLAY, medium dense, dark gray, moist, slickensided, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft
90		8 12 13 19 (25)		D-34		Lean CLAY, very stiff, gray, wet, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft
	28					
		9 11 16 19		D-35		ML, MC=29%, PI=6 SILT, very stiff, gray, wet, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft
95						

Standard Penetration Blows/ft: 10 20 30 40

Groundwater

Instrument

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/6/04 10:14:12 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-34-02

Job No. OL-3498 SR 202 Elevation 187.9 ft (57.3 m)

Sheet 5 of 9

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	29	(27)						
		10		D-36		SILT, very stiff, gray, wet, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
		12						
		18						
		20						
		(30)						
	30	8		D-37		SILT, very stiff, gray, wet, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
		12						
		15						
		18						
100		(27)						
		8		D-38		SILT, hard, gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
		14						
		19						
	31	25						
		(33)						
		9		D-39		SILT, hard, gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
		14						
		17						
		23						
105	32	(31)						
		8		D-40		SILT, very stiff, gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
		12						
		16						
		21						
		(28)						
	33	9		D-41		SILT, very stiff, gray, moist, Homogeneous, no HCl reaction. reduced to AQ steel also 5.0' runs Length Recovered 2.0 ft, Length Retained 1.0 ft		
		11						
		17						
		21						
110		(28)						
	34							
		10		D-42		Lean CLAY, hard, gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
		15						
		18						
		24						
		(33)						
115	35							
	36	7		D-43	GS	CL, MC=34%, PI=15		
		11			MC	Lean CLAY, very stiff, gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
		14			AL			
		20						
120		(25)						

Standard Penetration Blows/ft: 10 20 30 40

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-34-02

Job No. OL-3498 SR 202 Elevation 187.9 ft (57.3 m)

Sheet 6 of 9

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	37							
		11 13 18 26 (31)		D-44		Lean CLAY, hard, gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
125	38							
	39	10 14 20 22 (34)		D-45		SILT, hard, gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
130	40							
		10 15 19 25 (34)		D-46		SILT, hard, gray, moist, Homogeneous, no HCl reaction. (Disrupted zone at 134.0 - 134.5') Length Recovered 2.0 ft, Length Retained 1.0 ft		
135	41							
	42	11 16 23 25 (39)		D-47		SILT, hard, gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
140	43							
		11 17 22 25 (39)		D-48		Lean CLAY, hard, gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft		
145	44							

Standard Penetration Blows/ft: 10 20 30 40

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/6/04,10:14:13 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-34-02

Job No. OL-3498 SR 202 Elevation 187.9 ft (57.3 m)

Sheet 7 of 9

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
	45	11 17 24 28 (44)		D-49		Lean CLAY, hard, gray, moist, Homogeneous, no HCl reaction. Length Recovered 2.0 ft, Length Retained 1.0 ft
150	46					
	47	13 15 25 40 (40)		D-50	GS MC AL	CL, MC=25%, PI=11 Lean CLAY, hard, gray, moist, Stratified, no HCl reaction. gravel lenses at 154.0 - 154.5' Length Recovered 2.0 ft, Length Retained 1.0 ft
155	48	7 15 29 46 (44)		D-51		Lean CLAY with gravel, hard, gray, moist, Homogeneous, no HCl reaction. Length Recovered 0.7 ft, Length Retained 0.7 ft
160	49	50/2 (50/2")		D-52		Lean CLAY with gravel, very hard, gray, moist, Homogeneous, no HCl reaction Length Recovered 0.2 ft, Length Retained 0.2 ft
	50	>> 12 27 50 (77)		D-53		Lean CLAY, very hard, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.0 ft
165	51	44 50/6 (50/6")		D-54		Lean CLAY, dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft
170						

Standard Penetration Blows/ft: 10 20 30 40

Groundwater

Instrument

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-34-02

Job No. OL-3498 SR 202 Elevation 187.9 ft (57.3 m)

Sheet 8 of 9

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

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
	52									
	53		>>	30 43 50 (93)		D-55		Silty SAND, very dense, gray, wet, Homogeneous, no HCl reaction. Material change very dense sand and gravel as indicated by drilling Length Recovered 1.5 ft, Length Retained 1.5 ft		
175										
	54		>>	33 46 60 (106)		D-56		Silty SAND, very dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
180	55									
	56		>>	34 46 50 (96)		D-57		Silty SAND, very dense, gray, moist, Stratified, no HCl reaction, silt lenses at 184.0 - 184.5' Length Recovered 1.5 ft, Length Retained 1.5 ft		
185	57									
190	58							End of test hole boring at 187.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Set TDD Cable at 187.5ft Vibrating wire transducers set at 85.0ft and 180ft respectively.		
	59									
195										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-34-02

Job No. OL-3498 SR 202 Elevation 187.9 ft (57.3 m)

Sheet 9 of 9

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

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
								WATER LEVEL INFORMATION		
								DATE INTERVAL		
								9/18/02 0-65' Bailed test hole to 63.2 ft at end of shift. Water Level reading 56,4 at 9am 9/19/02		
	60							9/19/02 65' to 85' Bailed test hole to 81.9 ft at 1:30 pm. Water Level reading 60,4 at 9am 9/20/02		
								9/24/02 95' to 140' Bailed test hole to 85 ft at 4:00 PM, 9/24/02. Water Level reading 95.3 at 9am 9/25/02		
200	61							9/25/02 140' to 180' Bailed test hole to 122 ft water level after 15min = 120ft Water Level reading 119ft at 9:30am 9/26/02		
								9/30/02 180' to 187' Bailed test hole to 141.9 ft		
								Minutes Depth Elevation		
	62							0 141.9 46.0		
								1 137.0 50.9		
								2 135.2 52.7		
								3 133.7 54.2		
								4 132.6 55.3		
205								5 132.4 55.5		
								6 132.0 55.9		
								10 130.8 57.1		
								15 129.8 58.1		
	63							20 129.0 58.9		
								10/06/02		
								(180' sensor) 157.4 30.5		
								(85' sensor) 58.5 129.4		
								6/23/2004		
								(180' sensor) 107.5 7.1		
								(85' sensor) 39.4 75.2		
210	64									
	65									
215										
	66									
220	67									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-35-02

Job No. OL-3498 SR 202 Elevation 108.1 ft (32.9 m)

Sheet 1 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dan Reed

Start September 10, 2002 Completion September 11, 2002 Well ID#

Equipment CME 850 w/ autohammer

Station 216+95 Offset 77' Lt. Casing HQ

Method Wet Rotary

Northing 569638.932 Easting 1662916.432 Latitude

Longitude

County King Subsection SW 1/4 of the NW 1/4 Section 17 Range 6 EWM Township 25

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
5	1			5 6 5 (11)		D-1		Fat CLAY, stiff, light brown, moist, Disrupted, no HCl reaction, w/ lean clay lenses Length Recovered 1.3 ft, Length Retained 1.3 ft		
	2					S-2		No Recovery		
10	3			3 6 7 (13)		D-3		SILT, stiff, light brown, moist, Disrupted, no HCl reaction, w/lean clay lenses Length Recovered 0.8 ft, Length Retained 0.8 ft		
	4					S-4		No Recovery		
15				1 3 2 (3)*		D-5		SILT with cobbles, soft, light brown, moist, Disrupted, no HCl reaction (oversize sampler)* Length Recovered 0.3 ft, Length Retained 0.3 ft		
	5			2 3 2 (5)		D-6		Silty SAND with gravel,loose, light brown, wet, Disrupted, no HCl reaction, 100% fluid loss Length Recovered 0.3 ft, Length Retained 0.3 ft		
20	6			4 5 4 (6)*		D-7		Silty SAND with gravel and cobbles, loose, light brown, wet, Homogeneous, no HCl reaction (oversize sampler)* Length Recovered 0.3 ft, Length Retained 0.3 ft		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/6/04,3:39:04 P7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-35-02

Job No. OL-3498 SR 202 Elevation 108.1 ft (32.9 m)

Sheet 2 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Depth (ft)	Meters (m)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater
		2 3 2 (5)		D-8	GS MC AL	ML, MC=38%, PI=13 SILT, medium stiff, gray, wet, Blocky, no HCl reaction, material change at 20.0 - color structure Length Recovered 1.5 ft, Length Retained 1.5 ft	
				S-9		09/11/2002	▽
	7						
				VS-10		Undisturbed shear strength =777psf Remolded shear strength=124psf	
25				S-11		SILT, very stiff, gray, wet, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft	
	8						
		3 9 3 (12)		D-12		SILT, stiff, gray, wet, Disrupted, no HCl reaction **(Landslide Debris)** **Length Recovered 1.5 ft, Length Retained 1.5 ft**	
	9						
30		9 11 13 (24)		D-13		SILT, very stiff, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft	
	10	10 12 14 (26)		D-14	GS MC AL	CL, MC=31%, PI=18 Lean CLAY, very stiff, gray, moist, Blocky, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft	
35				VS-15		Undisturbed shear strength =186psf Remolded shear strength=93psf	
	11			S-16		Lean CLAY, very stiff, gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft	
		6 9 11 (20)		D-17		Lean CLAY, very stiff, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.3 ft, Length Retained 1.3 ft	
	12						
40		7 9 12 (21)		D-18		Lean CLAY, very stiff, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft	
	13						
45							

Standard Penetration Blows/ft: 10 20 30 40

Profile

Instrument

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/6/04,3:39:04 P7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-35-02

Job No. OL-3498 SR 202 Elevation 108.1 ft (32.9 m)

Sheet 3 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
	14			9 11 12 (23)		D-19	GS MC AL	ML, MC=30%, PI=12 SILT, very stiff, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	15									
50				10 15 19 (34)		D-20		SILT, hard, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	16									
55	17			13 20 27 (47)		D-21	GS MC AL	CL, MC=26%, PI=13 Lean CLAY with sand, hard, gray, wet, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	18									
60			>>	17 37 35 (72)		D-22		Lean CLAY with sand, very hard, gray, wet, Disrupted, no HCl reaction, w/sand lenses Length Recovered 1.5 ft, Length Retained 1.5 ft		
	19									
65	20			15 18 19 (37)		D-23		SILT, hard, gray, wet, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	21									
70			>>							

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-35-02

Job No. OL-3498 SR 202 Elevation 108.1 ft (32.9 m)

Sheet 4 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
			>>	25 32 37 (69)		D-24		Sandy SILT, very dense, gray, wet, Disrupted, no HCl reaction, w/sand lenses material change Length Recovered 1.5 ft, Length Retained 1.5 ft		
	22									
75	23		>>	37 40 50 (90)		D-25		Poorly graded SAND, very dense, gray, wet, Homogeneous, no HCl reaction, drive head broke off SPT recovered SPT body material change at 79' - 80' w/gravel Length Recovered 1.3 ft, Length Retained 1.3 ft		
	24									
80			>>	19 27 55 (82)		D-26	GS MC	SM, MC=23% Silty SAND, very dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	25									
85	26		>>	21 37 39 (76)		D-27		Silty SAND, very dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	27									
90			>>	25 27 33 (60)		D-28		Silty SAND, very dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	28							End of test hole boring at 91.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
95										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S14110

HOLE No. H-35-02

Job No. OL-3498 SR 202 Elevation 108.1 ft (32.9 m)

Sheet 5 of 5

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
	29							Installed Slope inclinometer and a vibrating wire transducer to measure water levels.		
	30							* NOTE: Oversize sampler blow counts obtained with the following hammer wt. = 140lbs. height of drop = 30" outside diameter = 2 15/16" inside diameter = 2 1/2" have been corected to blow counts obtained with a standard pennetrometer. hammer wt. = 140lbs. height of drop = 30" outside diameter = 2.0" inside diameter = 1.375"		
100										
	31									
105	32							WATER LEVEL READINGS DATE / DEPTH / ELEVATION 9/12/2002 / -15.1 / 93.0 9/30/2002 / -35.8 / 72.4 11/1/2002 / -36.7 / 71.4 12/18/2002 / -36.7 / 71.4 2/11/2003 / -36.6 / 71.5 3/18/2003 / -36.6 / 71.5 4/1/2003 / -36.8 / 71.3 6/5/2003 / -38.2 / 69.9 7/23/2003 / -39.3 / 68.8 9/23/2003 / -39.3 / 68.8 12/9/2003 / -36.9 / 71.2 1/16/2004 / -37.1 / 71.0 2/23/2004 / -37.8 / 70.3 4/6/2004 / -38.1 / 70.1 5/11/2004 / -39.0 / 69.1 6/23/2004 / -39.4 / 68.7		
	33									
110										
	34									
115	35									
	36									
120										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R62064

HOLE No. H-35A-02

Sheet 1 of 1

Job No. OL-3498 SR 202 Elevation 108.7 ft (33.1 m)

Project SR 202 - SR520 to Sahalee Way NE Driller Joe Judd Lic# 2454

Site Address Inspector Dan Reed

Start September 11, 2002 Completion September 11, 2002 Well ID# AGS-685 Equipment CME 850 w/ autohammer

Station 216+98 Offset 77' Lt. Casing HQ Method Wet Rotary

Northing 569639.65 Easting 1662920.042 Latitude Longitude

County King Subsection SW 1/4 of the NW 1/4 Section 17 Range 6 EWM Township 25

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
				0 0 0 (0)		D-1		No Recovery		

Piezometer Test Hole

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
9/11/2002	-22.0	86.7
9/30/2002	-26.5	82.2
11/1/2002	-28.3	80.4
12/18/2002	-129.0	79.7
2/11/2003	-24.4	84.3
3/18/2003	-26.6	82.1
5/6/2003	-19.7	89.0
6/5/2003	-19.2	89.5
7/23/2003	-24.0	84.7
9/23/2003	-28.8	79.9
12/9/2003	-29.1	79.6
1/16/2004	-29.0	79.7
2/23/2004	-19.2	89.5
4/6/2004	-19.2	89.5
5/11/2004	-19.7	89.0
6/23/2004	-19.4	89.3

6/25/2002

12/18/2002

End of test hole boring at 35 ft below ground elevation.

This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-62058

HOLE No. H-36-02

Job No. OL-3498 SR 202 Elevation 74.2 ft (22.6 m)

Sheet 1 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

Site Address

Inspector Dave Nelson

Start October 3, 2002 Completion October 8, 2002 Well ID# AGS-678

Equipment CME 45 w/ auto hammer

Station 212+43 Offset 52' Rt. Casing HWT

Method Wet Rotary

Northing 569489.664 Easting 1662479.562 Latitude

Longitude

County King Subsection SW-NW Section 17 Range 6 EWM Township 25

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
								10/08/2002		
5	1					S-1	GS MC AL	MH, MC=74%, PI=16 Elastic SILT, very soft, brown, wet, Homogeneous, no HCl reaction Length Recovered 1.9 ft		
	2			1 0 0 (0)		D-2		SILT with organics, very loose, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
10	3					S-3		SILT, medium dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
				16 30 20 (50)		D-4	GS MC AL	ML, MC=33%, PI=11 SILT, dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft (Small disrupted zone, 2mm thin sand layer underlain with slickensides)		
	4									
15	5			14 19 14 (33)		D-5	GS MC	SM, MC=25% Silty SAND, dense, grey, wet, Stratified, no HCl reaction, stratified with silt Length Recovered 1.0 ft		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/7/04,7:47:04 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-62058

HOLE No. H-36-02

Job No. OL-3498 SR 202 Elevation 74.2 ft (22.6 m)

Sheet 2 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

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
				6 9 11 (20)		D-6		SILT, medium dense, grey, wet, Laminated, no HCl reaction, sand lamination on 45 fractures Length Recovered 1.0 ft (Disrupted)		
25	7			6 10 16 (26)		D-7		SILT, dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft (Disrupted)		
30	8 9			11 18 24 (42)		D-8	GS MC	SM, MC=21% Silty SAND with gravel, dense, grey, wet, Stratified, no HCl reaction, stratified with silt Length Recovered 1.0 ft		
35	10 11		>>	17 21 50/5 (71/11")		D-9		Silty SAND with gravel, very dense, grey, wet, Stratified, no HCl reaction, stratified with coarse sand Length Recovered 1.0 ft		
40	12 13		>>	20 40 40 (80)		D-10		Silty SAND with gravel, very dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 0.7 ft		
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-62058

HOLE No. H-36-02

Job No. OL-3498 SR 202 Elevation 74.2 ft (22.6 m)

Sheet 3 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

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
	14			12 12 12 (24)		D-11	GS MC	SM, MC=29% Silty SAND, medium dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
50	15									
55	16									
60	17									
65	18									
70	19									
	20									
	21									

End of test hole boring at 46.5 ft below ground elevation.

This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
10/8/2002	-2.4	71.8
11/1/2002	-1.0	73.2
12/18/2002	-0.8	73.4
2/11/2003	-0.4	74.6
3/18/2003	-0.0	74.2
5/6/2003	-0.0	74.2
6/5/2003	-0.3	73.9
7/23/2003	-0.5	73.7
9/23/2003	-1.4	72.8
12/9/2003	-0.8	75.0
1/16/2004	-0.8	75.0
2/23/2004	-0.8	75.0
4/6/2004	-0.4	74.6
5/11/2004	-0.3	74.5
6/23/2004	-0.4	74.6

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14110

HOLE No. H-37-02

Job No. OL-3498 SR 202 Elevation 74.5 ft (22.7 m)

Sheet 1 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

Site Address

Inspector Dave Nelson

Start October 1, 2002 Completion October 2, 2002 Well ID#

Equipment CME 45 w/ auto hammer

Station 214+87 Offset 45' Rt. Casing HWT

Method Wet Rotary

Northing 569485.677 Easting 1662734.833 Latitude

Longitude

County King Subsection SW-NW Section 17 Range 6 EWM Township 25

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 2 3 (5)		D-1	GS MC LL PL	ML, MC=48%, PI=9 SILT with sand and organics, medium stiff, grey, wet, Stratified, no HCl reaction Length Recovered 1.0 ft	▽ 10/02/2002	
5	1			2 2 2 (4)		D-2		SILT with sand and gravel, soft, grey, wet, Stratified, no HCl reaction Length Recovered 1.0 ft		
	2					S-3		SILT, soft, grey, wet, Stratified,Homogeneous, no HCl reaction Length Recovered 2.0 ft		
				1 2 1 (3)		D-4		Sandy SILT, loose, grey, wet, Homogeneous, no HCl reaction Length Recovered 0.4 ft		
10	3					S-5		Sandy SILT, loose, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.8 ft		
	4			1 1 1 (2)		D-6	GS MC	SM, MC=31% Silty SAND, very loose, grey, wet, Stratified, no HCl reaction Length Recovered 1.0 ft		
15	5					S-7		No Recovery		
				1 1 1 (2)		D-8	GS MC	ML, MC=30% Sandy SILT, very loose, grey, wet, Stratified, no HCl reaction Length Recovered 1.0 ft		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/7/04 8:22:02 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14110

HOLE No. H-37-02

Job No. OL-3498 SR 202 Elevation 74.5 ft (22.7 m)

Sheet 2 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

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
						S-9		Silty SAND, medium dense, grey, wet, Stratified, no HCl reaction Length Recovered 1.3 ft		
	7			2 8 11 (19)		D-10		Silty SAND with gravel, medium dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 0.4 ft		
25	8			8 14 16 (30)		D-11		Well graded GRAVEL with sand, sub angular, dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 0.2 ft		
30	9			14 14 7 (21)		D-12	GS MC	SP-SM, MC=17% Poorly graded SAND with silt and gravel, mottled with silt, sub angular, medium dense, brown, wet, Stratified, no HCl reaction Length Recovered 1.0 ft		
35	10 11			12 13 15 (28)		D-13		No Recovery		
40	12 13			6 14 16 (30)		D-14	GS MC	SP,MC=16% Poorly graded SAND with gravel, dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-14110

HOLE No. H-37-02

Job No. OL-3498 SR 202 Elevation 74.5 ft (22.7 m)

Sheet 3 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic#. 2615

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
	14			12 14 21 (35)		D-15		Poorly graded SAND with gravel, dense, grey, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft		
								End of test hole boring at 46.5 ft below ground elevation.		
	15									
50								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	16									
55								Bailed test hole to 35 ft Minutes / Depth / Elevation 1 / -9.5 / 65 2 / -5.2 / 69.3 3 / -4.6 / 69.9 6 / -4.0 / 70.5 3 / -3.2 / 71.3 18hrs / -2.8 / 71.7		
	17									
	18									
60										
	19									
65										
	20									
	21									
70										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62069

HOLE No. H-38-02

Job No. OL-3498 SR 202 Elevation 89.0 ft (27.1 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

Site Address

Inspector Cleo Andrews

Start December 11, 2002 Completion December 12, 2002 Well ID# AGS 690 Equipment CME 55 w/ autohammer

Station 243+94 Offset 280' Rt. Casing 4" OD Hollow Core Augers x 30.0' Method Auger

Northing 569719.3525 Easting 1665475.5847 Latitude Longitude

County King Subsection SW 1/4 of the NE 1/4 Section 17 Range 6 EWM Township 25 N

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
								0.0' to 4.0' Well graded Gravel with sand, modifiers cobbles and large chunks of concrete, fill material.		
5	1, 2			9 8 7 (17)		D-1		Well graded GRAVEL with sand, subrounded, medium dense, yellowish brown, moist, Homogeneous, no HCl reaction, Length Recovered 1.0 ft, Length Retained 1.0 ft		
10	3			8 12 12 (24)		D-2	GS MC	SW-SM, MC=9% Well graded SAND and silt, medium dense, grayish brown, moist, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft	12/12/2002	
15	4, 5			23 14 4 (18)		D-3	GS MC	GW, MC=10% Well graded GRAVEL with sand, subrounded, medium dense, light olive brown, wet, Homogeneous, no HCl reaction. Length Recovered 0.7 ft, Length Retained 0.7 ft		
20	6			5 6 6 (12)		D-4		Well graded GRAVEL with sand, subrounded, medium dense, light olive brown, wet, Homogeneous, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/7/04,10:32:34 A7

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62069

HOLE No. H-38-02

Job No. OL-3498 SR 202 Elevation 89.0 ft (27.1 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Vince Johnson Lic# 2532

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
	7			3 7 6 7 (13)		D-5		Well graded GRAVEL with sand, subrounded, medium dense, light olive brown, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
25	8							End of test hole boring at 25 ft below ground elevation.		
								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
30	9									
								Water table stabilized in piezo after bailing hole and a 30 minutes waiting period to 11.5' same as over night reading.		
	10									
35	11									
	12									
40	13									
45										

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
12/1/2002	-11.5	77.5
12/18/2002	-9.6	79.4
2/11/2003	-10.5	78.5
3/18/2003	-10.3	78.7
5/6/2003	-10.4	78.6
6/5/2003	-11.9	77.1
7/23/2003	-12.1	76.9
9/23/2003	-Destroyed	

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-23912

HOLE No. H-39-03

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 139.0 ft (42.4 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Hanning Lic# 2196

Site Address

Inspector Hanning

Start December 2, 2003 Completion December 2, 2003 Well ID# NA

Equipment Burley W/ Cathead

Station 177+32 Offset 40' Lt. Casing HQ, 3.5"

Method Wet Rotary

Northing 570539.403 Easting 1659123.516 Latitude

Longitude

County King Subsection NE/NW Section 18 Range 6EWM Township 25N

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
5	1			3 4 7 (11)		D-1	GS MC AL	MH, MC=24%, PI=30 Elastic SILT with sand, medium stiff, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
10	2 3			3 6 9 (15)		D-2	GS MC AL	CL-ML, MC=20%, PI=5 Sandy silty CLAY, medium dense, grayish brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
15	4 5			15 50/6" (50/6")		D-3		Silty SAND, very dense, gray, moist, Stratified, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
20	6									

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 7/7/04,10:39:25 A7

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-23912

HOLE No. H-39-03

Job No. OL-3498 SR 202 Elevation 139.0 ft (42.4 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Hanning Lic# 2196

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
				50/5" (50/5")		D-4		Well graded GRAVEL with sand, subrounded, very dense, gray, wet, Homogeneous, no HCl reaction Length Recovered 0.3 ft, Length Retained 0.3 ft		
								End of test hole boring at 20.4 ft below ground elevation.		
								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
25	7									
	8									
30	9									
	10									
35	11									
40	12									
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 23912

HOLE No. H-39A-03

Job No. OL-3498 SR 202 Elevation 149.6 ft (45.6 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Hanning Lic# 2196

Site Address

Inspector Hanning

Start December 8, 2003 Completion December 8, 2003 Well ID# NA

Equipment Burley w/cathead

Station 177+36 Offset 64' Lt. Casing HQ 3.5"

Method Wet Rotary

Northing 570561.514 Easting 1659133.723 Latitude Longitude

County King Subsection NE/NW Section 18 Range 6EWM Township 25N

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			1 1 2 3 (3)		D-1		Silty SAND, very loose, brown, moist, Stratified, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
5	2			5 3 4 4 (7)		D-2		Silty SAND, loose, grayish brown, moist, Stratified, no HCl reaction Length Recovered 0.6 ft, Length Retained 0.6 ft		
10	3			3 6 7 8 (13)		D-3		Poorly graded SAND with trace silt, medium dense, gray, moist, Stratified, no HCl reaction Length Recovered 0.9 ft, Length Retained 0.9 ft		
	4									
15	5			3 12 10 11 (22)		D-4		Drilling behavior indicated gravel between -14.5ft and -15.2ft Lean CLAY, medium stiff, brown, moist, Stratified, no HCl reaction Length Recovered 0.8 ft, Length Retained 0.8 ft		
20	6									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 23912

HOLE No. H-39A-03

Job No. OL-3498 SR 202 Elevation 149.6 ft (45.6 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Hanning Lic# 2196

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
				6 12 14 (26)		D-5	GS MC AL	CL-ML, MC=14%, PI=6 Sandy silty CLAY, dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 1.2 ft, Length Retained 1.2 ft		
25	7		>>	17 35 50/4" (85/10")		D-6		Well graded GRAVEL with sand, subangular, very dense, gray, moist, Homogeneous, no HCl reaction Length Recovered 0.1 ft, Length Retained 0.1 ft		
30	8							End of test hole boring at 26.3 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
35	9									
40	10									
45	11									
	12									
	13									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 23911

HOLE No. H-40-03

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 72.7 ft (22.2 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

Site Address

Inspector Dan Reed

Start November 19, 2003 Completion November 19, 2003 Well ID#

Equipment CME 45 w/ autohammer

Station 195+60 Offset 38' Rt. Casing HW 4.5 HQ3.5

Method Wet Rotary

Northing 569960.955 Easting 1660857.82 Latitude

Longitude

County King Subsection NW 1/4 Of The NE 1/4 Section 18 Range 6 EWM Township 25 N

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									
5				1 2 1 (3)		D-1	GS MC	SP-SM, MC=20% Poorly graded SAND with silt and subrounded gravel, very loose, dark brown, wet, Homogeneous, no HCl reaction, Trace Of Organics Length Recovered 1.0 ft, Length Retained 1.0 ft 11/19/2003	▽	
	2									
10	3			1 2 1 (3)		D-2	GS MC AL	CL, MC=35%, PI=18 Lean CLAY, very loose, Gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	4									
15						U-3 A B C D		SILT, very loose, Gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 1.6 ft		
	5			2 3 3 (6)		D-4		SILT, loose, Gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
20	6			1 4		D-5		Elastic SILT, stiff, Gray, wet, Homogeneous, no HCl reaction		

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 23911

HOLE No. H-40-03

Job No. OL-3498 SR 202 Elevation 72.7 ft (22.2 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Sean Verlo Lic# 2615

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
				6 (10)				Length Recovered 1.5 ft, Length Retained 1.5 ft		
25	7		>>	18 21 30 (51)		D-6	GS MC	ML, MC=27% Sandy SILT, dense, Gray , wet, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
30	8 9			16 21 25 (46)		D-7		Well graded GRAVEL with sand, angular, dense, Gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
35	10		>>	21 24 29 (53)		D-8		Well graded GRAVEL with sand, angular, very dense, Gray, wet, Homogeneous, no HCl reaction Length Recovered 0.9 ft, Length Retained 0.9 ft		
40	11 12							End of test hole boring at 35.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
45	13							Water level after bailing and recharge -4.7ft.		

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 23911

HOLE No. H-41-03

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 73.7 ft (22.5 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Hanning Lic# 2196

Site Address

Inspector Hanning

Start December 3, 2003 Completion December 3, 2003 Well ID# NA

Equipment Burley w/Cathead

Station 199+00 Offset 35' Rt. Casing HQ 3.5"

Method Wet Rotary

Northing 569851.935 Easting 1661246.871 Latitude Longitude

County King Subsection NW/NE Section 18 Range 6EWM Township 25N

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
				3 3 3 (6)		D-1		Silty SAND, loose, brown, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
5	1			1 2 1 2 (3)		D-2		Lean CLAY, very soft, grayish brown, moist, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft		
10	2 3 4			3 5 7 (12)		D-3		Lean CLAY, medium dense, gray, moist, Stratified, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
15	5 6			4 4 5 (9)		D-4		SILT, loose, gray, moist, Stratified, no HCl reaction Length Recovered 1.3 ft, Length Retained 1.3 ft		
20										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 23911

HOLE No. H-41-03

Job No. OL-3498 SR 202 Elevation 73.7 ft (22.5 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Hanning Lic# 2196

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
				5 4 4 (8)		D-5		SILT, loose, gray, moist, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	7							Note contact with gravel at 23.5 ft.		
25	8			15 11 17 (28)		D-6		Well graded GRAVEL with sand, subrounded, dense, grayish brown, wet, Stratified, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
30	9			15 17 19 (36)		D-7		Well graded GRAVEL with sand, subrounded, dense, gray, wet, Stratified, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
	10							End of test hole boring at 31.5 ft below ground elevation.		
35	11							This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note 100% water loss at 25'		
40	12									
	13									
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-23916

HOLE No. H-42-03

Sheet 1 of 3

Job No. OL-3498 SR 202 Elevation 93.1 ft (28.4 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Kerry Cooper Lic# 2552

Site Address

Inspector Brian Hilts

Start December 16, 2003 Completion December 17, 2003 Well ID#

Equipment CME 45 w/ autohammer

Station 227+20 Offset 70' LT. Casing 4"x62'

Method Wet Rotary

Northing 570035.463 Easting 1663856.661 Latitude Longitude

County King Subsection NE1/4 NW1/4 Section 17 Range 6 EWM Township 25N

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
				2 2 3 (5)		D-1		Sandy SILT with gravel and organics, loose, dark brown, moist, Homogeneous, no HCl reaction, with organics. Length Recovered 1.0 ft, Length Retained 1.0 ft		
5	1									
	2			4 4 5 (9)		D-2	GS MC AL	ML, MC=19% Sandy SILT with gravel, loose, grayish brown, moist, Homogeneous, no HCl reaction, with organics. Length Recovered 0.7 ft, Length Retained 0.7 ft		
10	3									
				1 3 4 (7)		D-3		SILT, loose, grayish brown, moist, Laminated, no HCl reaction, laminated with FeO stains and with a trace of gravel. Length Recovered 0.8 ft, Length Retained 0.8 ft		
15	4									
	5			2 2 2 (4)		D-4		Silty SAND, very loose, grayish brown, moist, Homogeneous, no HCl reaction, with a trace of gravel and organics. Length Recovered 1.2 ft, Length Retained 1.2 ft		
20	6									

SOIL OL-3498 SR-202, 520 TO SAHALEE WAY.GPJ SOIL.GDT 1/8/04, 4:07:26 P1

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-23916

HOLE No. H-42-03

Job No. OL-3498 SR 202 Elevation 93.1 ft (28.4 m)

Sheet 2 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Kerry Cooper Lic# 2552

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
				3 2 3 (5)		D-5		Sandy silty CLAY with gravel, medium stiff, grayish brown, moist, Stratified, no HCl reaction, with a trace of gravel. Length Recovered 1.3 ft, Length Retained 1.3 ft		
25	7			3 4 7 (11)		D-6		Sandy silty CLAY with gravel, stiff, grayish brown, moist, Laminated, no HCl reaction, with FeO stains and laminated with sand lenses. At 28' color change to dark gray. Length Recovered 1.1 ft, Length Retained 1.1 ft		
30	8			9 4 8 (12)		D-7		Silty SAND, medium dense, dark gray, moist, Homogeneous, no HCl reaction Length Recovered 0.7 ft, Length Retained 0.7 ft		
35	9			6 8 7 (15)		D-8		Silty SAND, medium dense, grayish brown, moist, Stratified,Laminated, no HCl reaction, laminated and stratified with sand with a trace of FeO stains. Length Recovered 1.1 ft, Length Retained 1.1 ft		
40	10			10 18 13 (31)		D-9		Silty SAND, dense, grayish brown, moist, Homogeneous, no HCl reaction Length Recovered 0.6 ft, Length Retained 0.6 ft		
45	11									
	12									
	13									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-23916

HOLE No. H-42-03

Job No. OL-3498 SR 202 Elevation 93.1 ft (28.4 m)

Sheet 3 of 3

Project SR 202 - SR520 to Sahalee Way NE

Driller Kerry Cooper Lic# 2552

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
	14			3 4 5 (9)		D-10	GS MC AL	CL, MC=27%, PI=11 Lean CLAY, stiff, dark gray, moist, Laminated, no HCl reaction, At 50' we encountered gravel demonstrated by drilling. Length Recovered 1.4 ft, Length Retained 1.4 ft		
50	15									
				32 26 16 (42)		D-11		Silty SAND with gravel, dense, dark gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
55	16									
	17			9 8 7 (15)		D-12		Well graded GRAVEL with sand, subangular, medium dense, dark gray, wet, Homogeneous, no HCl reaction, At 57' we lost water return and got it back at 60'. Length Recovered 0.4 ft, Length Retained 0.4 ft		
60	18									
	19			12 12 17 (29)		D-13		Well graded GRAVEL with sand, angular, dense, dark gray, wet, Homogeneous, no HCl reaction, We bailed the hole and the next morning the water table inside the casing was at 17'. Length Recovered 0.8 ft, Length Retained 0.8 ft		
65	20							End of test hole boring at 62.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	21									
70										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62161

HOLE No. H-43-03

Job No. OL-3498 SR 202 Elevation 85.4 ft (26.0 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

Site Address

Inspector Dan Reed

Start November 18, 2003 Completion November 18, 2003 Well ID# AHP 437

Equipment CME 850 w/ autohammer

Station 229+00 Offset 76' Lt. Casing HW 4.5 HQ 3.5

Method Wet Rotary

Northing 570097.561 Easting 1664073.218 Latitude

Longitude

County King Subsection NE 1/4 Of The NW 1/4 Section 17 Range 6EWM Township 25 N

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 0 1 (1)		D-1		Silty SAND with organics, very loose, Dark Brown, wet, Homogeneous, no HCl reaction Length Recovered 1.3 ft, Length Retained 1.3 ft		
5	1			2 3 3 (6)		D-2		Silty SAND, Trace Organics, loose, Light Brown, moist, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
10	2					S-3		SILT with sand, Trace Organics, loose, Light Brown, moist, Disrupted, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft 11/18/2003 11/19/2003	▼	
	3			2 3 2 (5)		D-4		Silty SAND, Silt Lenses, loose, Light Brown, wet, Disrupted, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
15	4			2 3 4 (7)		D-5	GS MC AL	CL-ML, MC=30%, PI=6 Sandy silty CLAY, Gravel Angular, loose, Light Brown, moist, Disrupted, no HCl reaction, Sand And Gravel Lenses Length Recovered 1.5 ft, Length Retained 1.5 ft		
20	5			3 6		D-6		Sandy silty CLAY, Well Graded Sand Lenses, medium dense, Light Brown, wet, Disrupted, no HCl reaction		
	6									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 62161

HOLE No. H-43-03

Job No. OL-3498 SR 202 Elevation 85.4 ft (26.0 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Joe Judd Lic# 2454

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
				6 (12)				Length Recovered 1.5 ft, Length Retained 1.5 ft		
	7									
25				5 9 10 (19)		D-7		Sandy silty CLAY, medium dense, Light Brown, moist, Disrupted, no HCl reaction, With Large Gravel As Indicated By Drilling Process Length Recovered 1.5 ft, Length Retained 1.5 ft		
	8									
	9			7 8 11 (19)		D-8	GS MC	SM, MC=17% Silty SAND, medium dense, Light Brown, moist, Disrupted, no HCl reaction, Sand Lenses With Large Gravel as Indicated By Drilling Process Contact With Gravel At 33.0 Ft. Length Recovered 1.5 ft, Length Retained 1.5 ft		
30										
	10									
35				15 19 20 (39)		D-9		Silty GRAVEL with sand, angular, dense, Light Brown, wet, Homogeneous, no HCl reaction, With Large Gravel As Indicated By Drilling Process Length Recovered 1.2 ft, Length Retained 1.2 ft		
	11									
	12									
40										
	13									
45										

End of test hole boring at 35.5 ft below ground elevation.

This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.

WATER LEVEL READINGS

DATE	DEPTH	ELEVATION
11/18/03	-9.3	76.1
12/9/03	-7.2	78.2
1/16/04	-7.1	78.3
2/23/04	-7.2	78.2
4/6/04	-7.3	78.1
5/11/04	-7.6	77.8
6/23/04	-9.1	76.3

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 23909

HOLE No. H-45-03

Job No. OL-3498 SR 202 Elevation 79.7 ft (24.3 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Donny Henderson Lic# 2598

Site Address

Inspector Joe Judd

Start November 17, 2003 Completion November 18, 2003 Well ID#

Equipment CME 850 w/ autohammer

Station 233+38 Offset 35' Rt. Casing HW 4.5/HQ3.5

Method Wet Rotary

Northing 570018.469 Easting 1664485.137 Latitude Longitude

County KING Subsection nw1/4 of the ne 1/4 Section 17 Range 6 ewm Township 25 n

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
				3 7 7 6 (14)		D-1	GS MC AL	(0.0' Before Drying)LL=47, PI=9 (0.0' After Drying)SM, MC=41%, LL=38 Silty SAND with organics, medium dense, Dark Brown, moist, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	1									
5				1 1 1 (2)		D-2 S-3		11/18/2003 Elastic SILT, soft, light gray, moist, Homogeneous, no HCl reaction Length Recovered 1.5 ft 11/17/2003 PEAT, soft, Dark Brown, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft		
	2									
10	3			1 1 1 (2)		D-4 S-5		Elastic SILT with organics, soft, Light Gray, wet, Homogeneous, no HCl reaction Length Recovered 1.5 ft, Length Retained 1.5 ft Elastic SILT, soft, Light Gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	4									
15						S-6		Elastic SILT, very soft, Light Gray, wet, Homogeneous, no HCl reaction Length Recovered 2.0 ft, Length Retained 2.0 ft		
	5			0 1 0 (1)		D-7		Lean CLAY, very soft, Light Gray, wet, Homogeneous, no HCl reaction Length Recovered 1.0 ft, Length Retained 1.0 ft		
20	6					S-8		Elastic SILT, very soft, Light Gray, wet, Stratified, no HCl reaction, Material Stiffened At 20.5 to Well Graded Sand		

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S 23909

HOLE No. H-45-03

Job No. OL-3498 SR 202 Elevation 79.7 ft (24.3 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Donny Henderson Lic# 2598

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
								Length Recovered 1.5 ft, Length Retained 1.5 ft		
	7			8 9 11 (20)		D-9		Poorly graded SAND with gravel, medium dense, Dark Gray, wet, Stratified, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft		
25	8			10 12 15 (27)		D-10		Well graded GRAVEL with sand, subrounded, dense, Dark Gray, wet, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft		
30	9			10 15 15 (30)		D-11		Well graded GRAVEL with sand, subrounded, dense, Dark Gray, wet, Homogeneous, no HCl reaction Length Recovered 0.5 ft, Length Retained 0.5 ft		
	10							End of test hole boring at 30.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. NOTE: Total Water Loss At 21.5		
35	11									
40	12									
	13									
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-62190

HOLE No. H-46-04

Job No. OL-3498 SR 202 Elevation 76.0 ft (23.2 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Jamie Fetterly Lic# 2708

Site Address Vic. of 202 & 192 nd. NE

Inspector Dave Nelson

Start May 12, 2004 Completion May 12, 2004 Well ID# AHN 825

Equipment CME 850 w/ autohammer

Station 183+80 Offset 236' Lt. Casing 8" x 23.5

Method Auger

Northing 570549.686 Easting 1659798.974 Latitude

Longitude

County King Subsection NW1/4 of NE 1/4 Section 18 Range 6 EWM Township 25 N

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			1 5 9 (14)		D-1		Silty SAND, mottled, medium dense, brown, moist, Homogeneous, HCl reaction not tested Length Recovered 0.8 ft		
5	2							Boulder encountered at 5.0 ft	05/12/2004	
			>>	7 27 30 (57)		D-2		Poorly graded SAND with gravel, very dense, brown, wet, Homogeneous, HCl reaction not tested Length Recovered 0.2 ft		
10	3									
	4			3 4 8 (12)		D-3		Poorly graded SAND with gravel, medium dense, brown, wet, Homogeneous, HCl reaction not tested Length Recovered 1.0 ft		
15	5									
	6			8 12 14 (26)		D-4		Well graded GRAVEL with sand, sub rounded, dense, brown, wet, Homogeneous, HCl reaction not tested Length Recovered 0.8 ft		
20										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-62190

HOLE No. H-46-04

Job No. OL-3498 SR 202 Elevation 76.0 ft (23.2 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Jamie Fetterly Lic# 2708

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
	7			5 12 27 (39)		D-5		Well graded GRAVEL with sand, sub rounded, dense, brown, wet, Homogeneous, HCl reaction not tested, Bailed Hole to 9.0 Recharged to 7.9 Recharged to 7.9 Length Recovered 1.0 ft		
25	8							End of test hole boring at 25 ft below ground elevation.		
								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
30	9							WATER LEVEL READINGS DATE / DEPTH / ELEVATION 5/12/2004 / -7.9 / 68.1 6/23/2004 / -6.9 / 69.1		
	10									
35	11									
40	12									
	13									
45										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-62190

HOLE No. H-47-04

Job No. OL-3498 SR 202 Elevation 74.7 ft (22.8 m)

Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Jamie Fetterly Lic# 2708

Site Address Vic. of 202 & 192 nd. NE

Inspector Dave Nelson

Start May 12, 2004 Completion May 12, 2004 Well ID# AHN-826

Equipment CME 850 w/ autohammer

Station 186+41 Offset 146' Lt. Casing 8" x 19.5

Method Auger

Northing 570390.684 Easting 1660024.908 Latitude

Longitude

County King Subsection NW1/4 of NE 1/4 Section 18 Range 6 EWM Township 25 N

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
5	1, 2			3 8 14 (22)		D-1		Silty SAND with gravel, medium dense, brown, moist, Homogeneous, HCl reaction not tested Length Recovered 0.8 ft	05/12/2004	
10	3, 4			3 13 18 (31)		D-2		Well graded SAND with gravel, dense, brown, wet, Homogeneous, HCl reaction not tested, drilling behavior indicates cobbles & boulders Length Recovered 1.0 ft		
15	5		>>	100 (100)		D-3		Well graded GRAVEL with sand, sub rounded, very dense, brown, wet, Homogeneous, HCl reaction not tested Length Recovered 0.5 ft		
20	6		>>	35		D-4		Well graded GRAVEL with sand, sub rounded, very		

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/19/04,1:10:12 P8

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-62190

HOLE No. H-47-04

Job No. OL-3498 SR 202 Elevation 74.7 ft (22.8 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Jamie Fetterly Lic# 2708

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
				46 59 (105)				dense, brown, wet, Homogeneous, HCl reaction not tested Bailed Hole to 8.6 Recharged to 6.6 Length Recovered 0.8 ft		
								End of test hole boring at 21 ft below ground elevation.		
	7									
25								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	8							WATER LEVEL READINGS DATE / DEPTH / ELEVATION 5/12/04 / -6.6 / 68.1 6/23/04 / -5.5 / 69.2		
	9									
30										
	10									
35										
	11									
	12									
40										
	13									
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-62190

HOLE No. H-48-04

Sheet 1 of 2

Job No. OL-3498 SR 202 Elevation 77.8 ft (23.7 m)

Project SR 202 - SR520 to Sahalee Way NE

Driller Jamie Fetterly Lic# 2708

Site Address Vic. of 202 & 192 nd. NE

Inspector Dave Nelson

Start May 13, 2004 Completion May 13, 2004 Well ID# AHN-827

Equipment CME 850 w/ autohammer

Station 189+47 Offset 76' lt. Casing 8" x 29.5

Method Auger

Northing 570239.537 Easting 1660299.615 Latitude Longitude

County King Subsection NW1/4 of NE 1/4 Section 18 Range 6 EWM Township 25 N

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
5	1			4 6 9 (15)		D-1		Silty SAND with gravel, medium dense, brown, moist, Homogeneous, HCl reaction not tested Length Recovered 0.7 ft		
10	2			5 10 10 (20)		D-2		Silty SAND with gravel, medium dense, brown, wet, Homogeneous, HCl reaction not tested drilling behavior indicates cobbles & boulders Length Recovered 1.0 ft		
15	3			9 12 15 (27)		D-3		Silty SAND with gravel, dense, brown, wet, Homogeneous, HCl reaction not tested Length Recovered 1.0 ft		
20	4			4		D-4		Well graded GRAVEL with sand and silt, medium dense,		

05/13/2004

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/18/04,9:19:29 AB

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-62190

HOLE No. H-48-04

Job No. OL-3498 SR 202 Elevation 77.8 ft (23.7 m)

Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Driller Jamie Fetterly Lic# 2708

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
				7 14 (21)				brown, wet, Homogeneous, HCl reaction not tested Length Recovered 1.0 ft		
	7									
25				6 14 15 (29)		D-5		Well graded GRAVEL with sand and silt, dense, brown, wet, Homogeneous, HCl reaction not tested Length Recovered 1.0 ft		
	8									
30	9			8 13 13 (26)		D-6		Well graded GRAVEL with sand and silt, dense, brown, wet, Homogeneous, HCl reaction not tested Length Recovered 1.0 ft		
	10							End of test hole boring at 31 ft below ground elevation.		
35								This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.		
	11							Bailed Hole to 18.7 Recharged to 7.6		
40	12							WATER LEVEL READINGS DATE / DEPTH / ELEVATION 5/13/2004 / -7.6 / 70.2 6/23/2004 / -8.3 / 69.5		
	13									
45										

SOIL OL3498 SR202-SR 520 TO SAHALEE WAY NE.GPJ SOIL.GDT 8/18/04,9:19:29 A8

Washington State
Department of Transportation

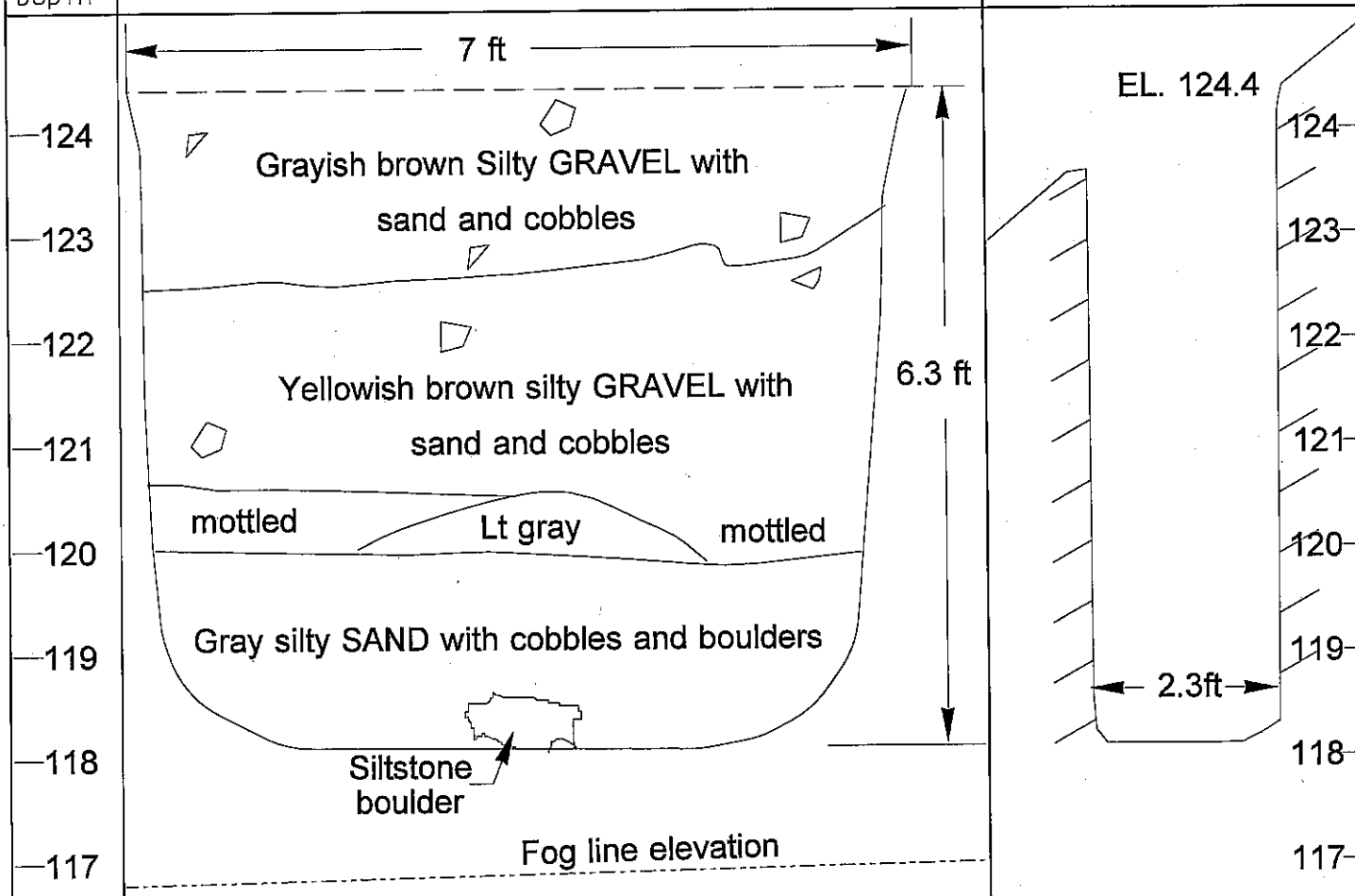
TEST PIT LOG

Location	Surface Elevation	Test Pit Number
STA 158+33 to 158+40 45 ft Lt.	124.4	TP-1-02

Project Name	Project Number
SR-202 - SR 520 to Sahalee Way NE	OL-3498

Equipment	Date Started	Date Completed
Bobcat Excavator	5/1/02	5/2/02

Elev / Depth	Desciption	Remarks



NOTES

1. Test pit excavated between 1 PM and 2PM on 5/1/02
2. Test pit backfilled 10:30 AM on 5/2/02
3. no sloughing was observed in the test pit

Drawing is NOT to scale

...\test pits.dgn 06/29/2004 01:30:48 PM

Test Pit TP-1-02

Washington State
Department of Transportation

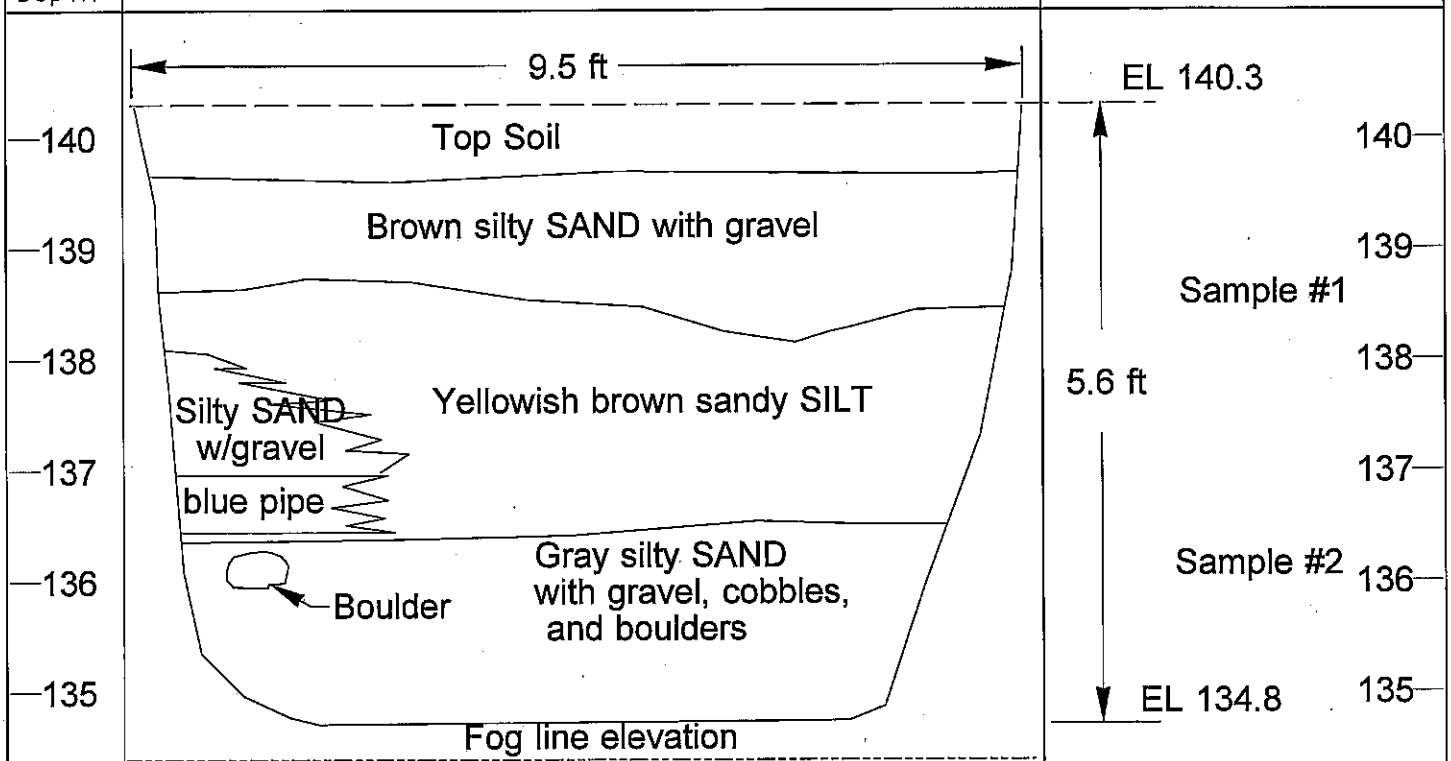
TEST PIT LOG

Location	Surface Elevation	Test Pit Number
STA 162+90to 163+00 46 ft Lt.	140.3	TP-2-02

Project Name	Project Number
SR-202 - SR 520 to Sahalee Way NE	OL-3498

Equipment	Date Started	Date Completed
Bobcat Excavator	5/1/02	5/2/02

Elev / Depth	Description	Remarks

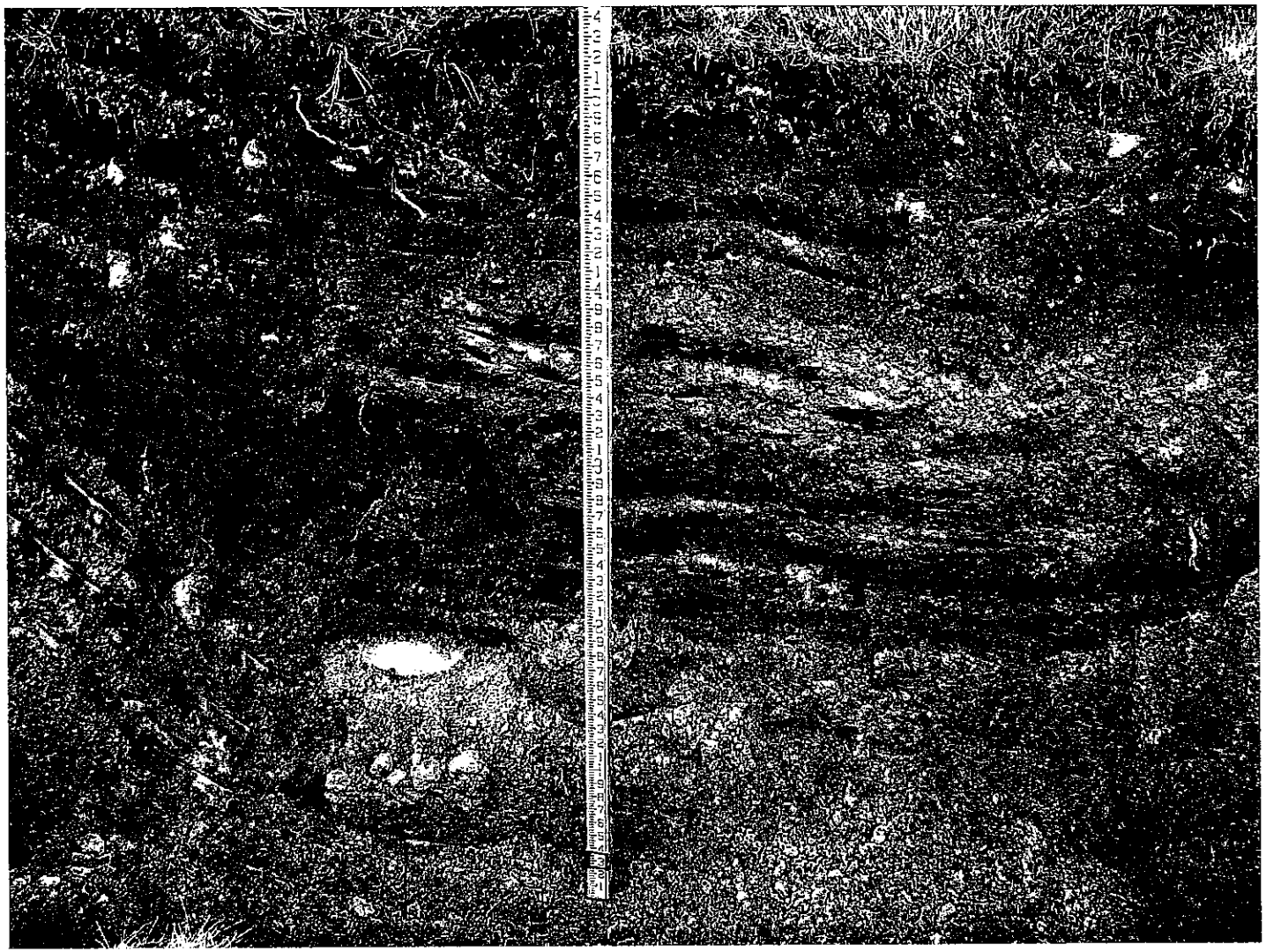


NOTES

1. Test pit excavated between 11:00 AM and 11:30 AM on 5/1/02
2. Test pit backfilled 11:00 AM on 5/2/02
3. No ground water or sloughing was observed in the test pit

Drawing is NOT to scale

...\test pits.dgn 06/29/2004 01:33:42 PM



Test Pit TP-2-02

Washington State
Department of Transportation

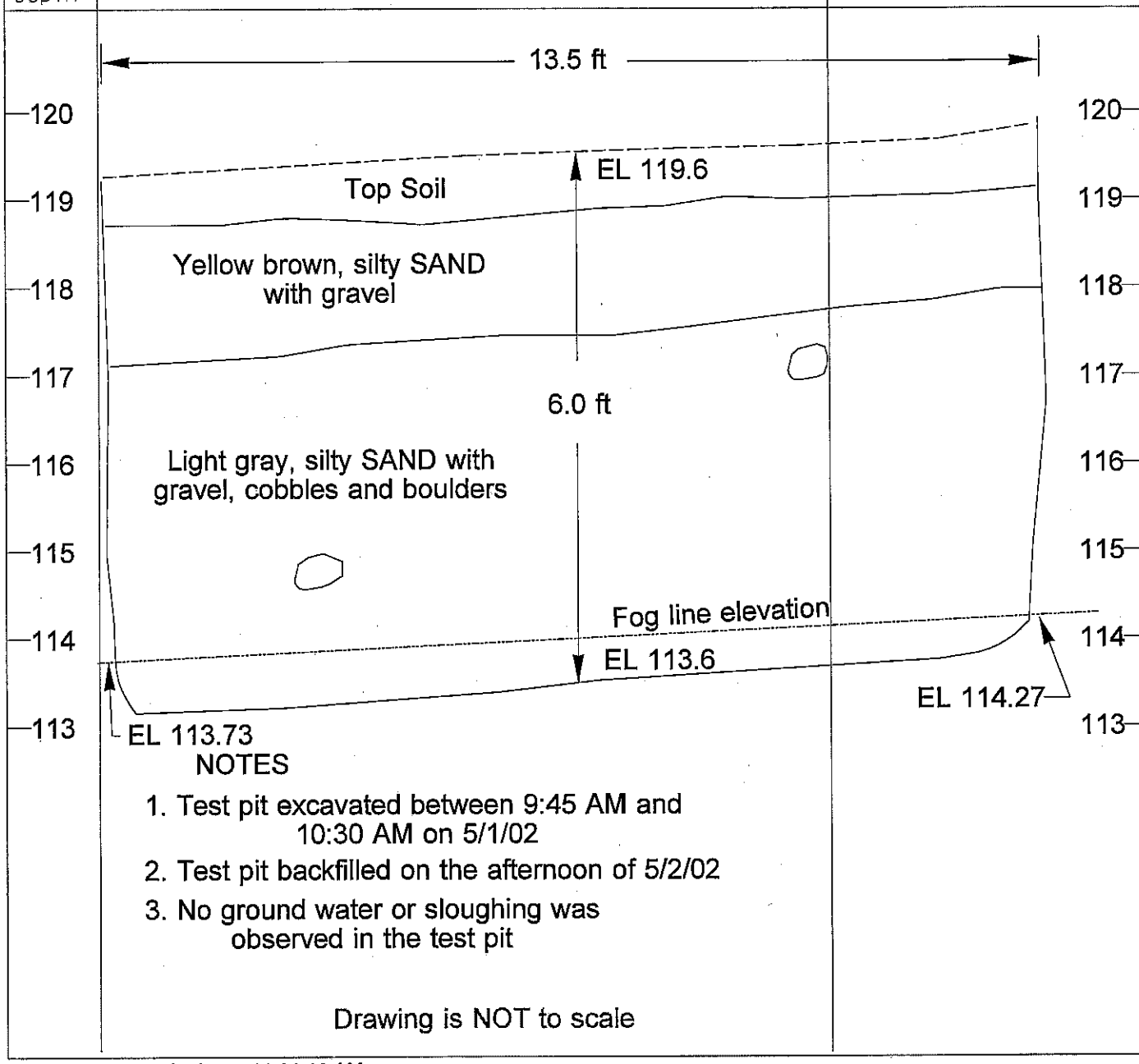
TEST PIT LOG

Location	Surface Elevation	Test Pit Number
STA 182+93 to 183+07 47 ft Rt.	119.6	TP-3-02

Project Name	Project Number
SR-202 - SR 520 to Sahalee Way NE	OL-3498

Equipment	Date Started	Date Completed
Bobcat Excavator	5/1/02	5/2/02

Elev / Depth	Desciption	Remarks



NOTES

1. Test pit excavated between 9:45 AM and 10:30 AM on 5/1/02
2. Test pit backfilled on the afternoon of 5/2/02
3. No ground water or sloughing was observed in the test pit

Drawing is NOT to scale

...\test pits.dgn 06/11/2002 11:01:16 AM

Test Pit TP-3-02

H. - 26.66 (Rev. 5-67)

WASHINGTON
STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS

Original to Materials Engineer
Copy to Bridge Engineer
Copy to District Engineer
Copy to _____

LOG OF TEST BORING

S.H. _____ S.R. 520 Section Northrup Road to Redmond Job No. L-3339
Hole No. H-15 Sub Section SR. 522 Intchg: EB-Pier 6 Cont. Sec. 1764-U
Station Lm 671+52 L 113+20 Offset 84' Rt. ℄ (60 ft. LT) Ground El. 38.2
Type of Boring Auger - 8C48-8 Casing 66.5 (Auger) W.T. El. 29.7
Inspector John H. Barnhouse Date 19 Aug. 1969 Sheet 1 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				TOPSOIL - Sand & Silt - brown with organic
	18		9 Std.	material throughout, slightly compact, dry
	21		9 Pen 1	SAND & GRAVEL - brown, silty, all sizes with
			11	occasional cobble, compact to dense, moist to
5			10	8.5' then saturated
			20 Std.	
	47		16 Pen 2	
			31	
10			21	
			9 Std.	
	20		12 Pen 3	
			8	
15			7	
			8 Std.	
	28		13 Pen 4	
			15	
20			9	

F. 26.66-A (Rev. 5-67)

Hole No. H-15 Sub Section SR 522 Intchg: EB-Pier 6 Sheet 2 of 3

DEPT.	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
			17 Std.	
			25 Pen	
	47		22 5	
			23	
25				
			14 Std.	
			15 Pen	
	31		16 6	
			18	
30				
			13 Std.	
			12 Pen	
	25		13 7	
			15	
35				
			6 Std.	
			11 Pen	
	26		15 8	
			21	
				SAND - grey, fine with occasional piece of fine
40				gravel, clean to silty, compact to dense
				wet to saturated.
			9 Std.	
			11 Pen	
	27		16 9	
			29	
45				

I. F. 26.66-A (Rev. 5-67)

No. H-15 Sub Section SR 522 Intchg: EB-Pier 6 Sheet 3 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
			10 Std.	
			11 Pen	
	35		24 10	
			25	
50				
			10 Std.	
			15 Pen	
	40		25 11	
			29	
55				
			9 Std.	
			22 Pen	
	62		40 12	
			52	
60				
			13 Std.	
			21 Pen	
	53		32 13	
			44	
65				
			23 Std.	
			32 Pen	
	69		37 14	
			42	TEST BORING STOPPED AT 69'-0"
70				Lost small amount of water throughout hole caved at 4.0 after auger removal

H. F. 26.66 [Rev. 5-67]

WASHINGTON
STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS

Original to Materials Engineer
Copy to Bridge Engineer
Copy to District Engineer
Copy to _____

LOG OF TEST BORING

S.H. _____ S.R. 520 Section Northrup Road to Redmond Job No. L-3339
Hole No. H-12 Sub Section SR 522 Intchg: EB-Pier 7 Cont. Sec. 1764-U
Station L^m 672+19 L 113+21 Offset 92' Rt. ℄ (130 ft. LT) Ground El. 37.0
Type of Boring Auger Casing 96.5 (Auger) W.T. El. See Note
Inspector John H. Barnhouse Date 14 Aug. 1969 Sheet 1 of 5

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				TOP SOIL - sand, silt, clay, brown, organic material
	4		2 Std.	throughout, very loose, dry to 2' then moist
			2 Pen	
	17		6 1	SAND & GRAVEL - brown, silty, all sizes with
			11	occasional cobble, slightly compact to dense
5				saturated after 8.0
			22 Std.	
	83		51 Pen	
			32 2	
			32	
10				
			12 Std.	
	34		18 Pen	
			16 3	
			17	
15				
			15 Std.	
	41		18 Pen	
			23 4	
			28	
20				

F. 26.66-A (Rev. 3-67)

Hole No. H-12 Sub Section SR 522 Intchg: EB-Pier 7 Sheet 2 of 5

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	38		25 Std. 19 Pen 19 5 19	
25				
	35		13 Std. 15 Pen 20 6 21	
30				
	27		6 Std. 12 Pen 15 7 15	SAND - brown, fine with occasional piece of fine to coarse gravel, compact, wet
35				
	34		12 Std. 17 Pen 17 8 19	SAND - grey, fine to course with occasional piece of fine gravel, slightly compact to dense, clean to silty, wet to saturated
40				
	36		8 Std. 17 Pen 19 9 28	
45				

F. 26.66-A (Rev. 5-67)

H-[illegible] No. H-12 Sub Section SR 522 Intchg: EB-Pier 7 Sheet 3 of 5

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
			8 Std.	
			14 Pen	
	36		22 10	
			27	
50				
			16 Std.	
			23 Pen	
	48		25 11	
			30	
55				
			17 Std.	
			21 Pen	
	47		26 12	
			30	
60				
			18 Std.	
			23 Pen	
	53		30 13	
			38	
65				
			12 Std.	
			16 Pen	
	34		18 14	(saturated)
			28	
70				

. F. 26.66-A (Rev. 5-67)

H- No. H-12 Sub Section SR 522 Intchg: EB-Pier 7 Sheet 4 of 5

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
			10 Std.	
			12 Pen	
	28		16 15	
			17	
75				
			9 Std.	
			7 Pen	
	26		19 16	(saturated)
			17	
80				
			10 Std.	
			8 Pen	
	17		9 17	(saturated)
			10	
85				
			2 Std.	
			4 Pen	
	12		8 18	(saturated)
			7	
90				
			12 Std.	
			19 Pen	(2" layer of silt this sample)
	46		27 19	
			29	SAND & GRAVEL - grey, silty, all sizes, dense, wet
95				

F. 26.66-A (Rev. 5-67)

Hole No. E-12 Sub Section SR 522 Intchg: EB-Pier 7 Sheet 5 of 5

DEP.	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
			22 Std.	
			19 Pen	
	43		24 20	
			22	TEST BORING STOPPED AT 98'-6"
100				W. T. El. 29.0 while boring
				34.0 24 hrs after auger removal
				Lost small amount of water throughout
105				

CH2M HILL

PROJECT NUMBER	BORING NUMBER	
SEA30738.G1	B-1	SHEET 1 OF 3

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 235+65, 30' RIGHT **(236+00, 30' RT)**

ELEVATION APPROXIMATELY 80 **(82 ft)** DRILLING CONTRACTOR D.A.KENNER

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS 6'bgs, 1-27-92 START 1-22-92 FINISH 1-23-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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
						2' of gravel over soft silt.
	5.0					
5.0	6.5	S-1	0.5	0-0-1 (1)	SILT, (ML), gray and brown mottled with rust, moist, very soft, with some organics.	
	10.0					
10.0	12.0	ST-2	0.0	N.A.	NO RECOVERY	Easy push. Suspect it is soft silt.
	12.5					
	14.0	S-3	N.R.	1-3-5 (8)	SILT, (ML), gray, moist to wet, firm, with organics.	
	15.0					
15.0	17.0	ST-4	2.0	N.A.	Top: SILT, (ML), gray, moist to wet, firm. Bottom: SILTY SAND, (SM), gray, moist, loose, with approximately 30%-40% silt.	Stiffer push. FP=1.75, 1.5, 1.25 tsf. Torvane = 0.6 tsf.
	18.5	S-5	1.5	3-2-2 (4)	POORLY GRADED SAND WITH SILT, (SP-SM), grading to SILTY SAND, (SM), at tip, gray, moist to wet, loose, uniform sand.	
	20.0					
20.0	21.5	S-6	1.3	0-0-4 (4)	ELASTIC SILT, (MH), gray, wet, soft.	
	25.0					Gravels at 21.7'. Some cobbles at 22.5'. Large, loose gravels from 24' to 25'.
25.0	26.5	S-7	0.6	16-15-17 (32)	WELL GRADED GRAVEL, (GW), gray and brown, wet, dense, angular 2" minus gravel with approximately 5% coarse grained sand.	
	30.0					

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-1 SHEET 2 OF 3

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 235+65, 30' RIGHT **(236+00, 30' RT)**

ELEVATION APPROXIMATELY 80' **(82 ft)** DRILLING CONTRACTOR D.A.KENNER

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS 6'bgs, 1-27-92 START 1-22-92 FINISH 1-23-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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	S-8	0.4	31-64/5"	POORLY GRADED GRAVEL, (GP), gray, wet, very dense, angular 2" minus gravel.	
	35.0					Driller notes – formation very dense to 34.5'.
35.0	36.5	S-9	1.1	27-21-15 (46)	WELL GRADED GRAVEL WITH SAND, (GW), gray and brown, wet, dense, subrounded, 0.75" minus gravel, with coarse grained sand.	
	40.0					
40.0	41.5	S-10	1.1	18-20-18 (38)	WELL GRADED GRAVEL, (GW), brown, wet, dense, subrounded 1.5" minus gravel, with approximately 5% sand.	
	45.0					
45.0	46.5	S-11	1.0	20-18-19 (37)	WELL GRADED GRAVEL WITH SAND, (GW), brown and gray, wet, dense, subrounded 1.5" minus gravel, with approximately 15% coarse grained sand.	
	50.0					
50.0	50.5	S-12	0.0	60/6"	NO RECOVERY	Suspect that material is well graded gravel and that we hit a cobble with the sampler. Large cobbles from 50.5' to 52'.
	55.0					
55.0	56.5	S-13	1.2	18-40-48 (88)	SILTY SAND, (SM), gray, moist, very dense, fine grained sand.	
	60.0					

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-1 SHEET 3 OF 3

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 235+65, 30' RIGHT **(236+00, 30' RT)**

ELEVATION APPROXIMATELY 80 **(82 ft)** DRILLING CONTRACTOR D.A.KENNER

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS 6'bgs, 1-27-92 START 1-22-92 FINISH 1-23-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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
	60.0–61.4	S-14	1.5	29-49-60/5	POORLY GRADED SAND, (SP), gray, moist to wet, very dense, Top 6": coarse grained sand, Bottom 12": fine grained sand.	
						Cobbles at 62'.
65.0	65.0–66.5	S-15	1.5	13-27-43 (70)	POORLY GRADED SAND WITH SILT, (SP-SM), gray, wet, very dense, fine grained sand, with some coarse grained sand in tip, with approximately 5%-10% silt.	
						Cobbles and gravel at 67.5'.
70.0	70.0–71.5	S-16	1.1	50-51-50 (101)	WELL GRADED GRAVEL WITH SAND, (GW), gray, wet, very dense, angular and subangular 1" minus gravel, with approximately 20% coarse grained sand.	
						Gravels.
75.0	75.0–75.3	S-17	0.2	60/3"	WELL GRADED GRAVEL, (GW), gray, wet, very dense, angular gravel.	
80.0	80.0–80.5	S-18	0.5	59/6"	POORLY GRADED SAND, (SP), gray, wet, very dense, coarse grained sand. END OF BORING AT 80.5 FEET.	BOH AT 80.5 FEET.
85.0						Installed 3/4" diameter sched 40 PVC piezometer. 0-1.5' - Flush mount monument cover seated in cement grout. 1.5'-54.0' - Bentonite seal. 54.0'-80.5' - Pea gravel. 74.0'-76.0' - 2" diameter slotted PVC tip.

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-2-W SHEET 1 OF 1

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 196+50, 70' LEFT

ELEVATION APPROXIMATELY 65 **(68.5 ft)** DRILLING CONTRACTOR M.GIBB, KENT, WA

DRILLING METHOD AND EQUIPMENT MUD ROTARY HYDRA-DRILL, HAND PORTABLE

WATER LEVELS 1' bgs, 10-18-90 START 10-14-90 FINISH 10-14-90 LOGGER K.S.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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
	2.5	1-G	N.A.	N.A.		Long grasses, mown at surface. Grab sample.
	4.0	2-ST	1.3	N.A.	FAT CLAY, (CH), gray to tan, moist, stiff, in bottom of tube.	Bit has clay in it, so trying a shelby push at 2.5'-5.0'. Tube drove hard - 35 blows.
	5.0					
5.0	6.5	3-S	1.0	2-2-3 (5)	FAT CLAY, (CH), blue/green, moist, firm, small wood fragments throughout sample.	Driller notes - a little easier at 4.5', then harder at 5.0'. Bit shows some clay at 5.0'. Already have good sample so drive SPT.
	7.0					
	9.5	4-ST	1.3	N.A.	SANDY CLAY, (CL), gray, moist, firm, @ bottom of tube.	
10.0	11.0	5-S	0.8	3-3-3 (6)	SANDY CLAY, (CL), as above.	
	12.0					
	13.5	6-S	0.7	2-2-3 (5)	SANDY CLAY, (CL), as above.	
	14.5					
15.0	17.0	7-ST	1.6	N.A.	ELASTIC CLAYEY SILT (MH), gray, moist, stiff, grades to SANDY SILT, (ML).	
	19.5					Going to 5' intervals and SPT samples.
20.0	21.0	8-S	1.0	5-5-7 (12)	SANDY/SILTY CLAY, (CL), gray, moist, stiff, with some small wood fragments.	
	23.5					
	24.5	10-S	NR	5-7-10 (17)	WELL GRADED GRAVEL, (GW), gray brown red, moist, medium dense.	Gravel zone encountered at 23.2'. Bit is binding in hole. Drilling faster at 23.8', ? Hit very permeable zone at 27.0'. Lost a lot of mud. Thickened mud to re-establish circulation.
25.0	26.0	9-S	0.1	7-8-7 (15)	CLAYEY GRAVEL, (GC), gray, wet, medium dense, may be sluff, very small recovery.	Cannot maintain circulation. Drilled to 27'. Trying to jet down to take sample. Top of slough at 24'. Jetted to 25'. Sloughed back to 23.5'. Taking SPT (10-S) at 23.5'.
					END OF BORING AT 27.0 FEET.	Gravel formation is very open and very permeable. Formation is taking mud. Driller cannot stop flow. Jetting as deep as possible and setting piezometer.
						BOH AT 27.0 FEET

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-3 SHEET 2 OF 3

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 187+27, 36' RIGHT

ELEVATION 96.5 ft DRILLING CONTRACTOR D.A.KENNER, SHERWOOD, OR

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS NOT AVAILABLE START 1-23-92 FINISH 1-24-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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
	30.0–35.2	S-6	0.1	60/3"	POORLY GRADED GRAVEL, (GP), gray, wet, very dense, with large gravel in tip.	Dense gravel and cobbles from about 30' to 50'.
35.0	35.0–35.8	S-7	0.8	55-60/3"	WELL GRADED GRAVEL WITH SAND AND SILT, (GW-GM), brown, wet to moist, very dense, 0.75" minus gravel, with approximatley 30% sand, approximately 10% silt.	
40.0	40.0–40.2	S-8	0.2	60/2.5"	WELL GRADED GRAVEL WITH SAND AND SILT, (GW-GM), gray, moist, very dense, cemented, 0.75" minus gravel, with approximately 30% sand, approximately 10% silt.	Drive hammer bounced when hit. The spoon cur a round cemented sample.
45.0						
50.0	50.0–50.2	S-9	0.2	60/3"	SILTY GRAVEL WITH SAND, (GM), gray, moist, very dense, 0.75" minus gravel, with approximately 30% sand, approximately 10% silt.	Hit cobbles at 52'. Siff/hard silt with gravel from 53' to 58'.
55.0						Gravel and cobbles at 58'.
	60.0					

CRM HILL

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-3 SHEET 3 OF 3

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 187+27, 36' RIGHT

ELEVATION 96.5 ft DRILLING CONTRACTOR D.A.KENNER, SHERWOOD, OR

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS NOT AVAILABLE START 1-23-92 FINISH 1-24-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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	S-10	0.7	29-60/3"	SILTY SAND, (SM), dark gray, moist, very dense, well graded sand, with approximately 35-45% silt.	
					END OF BORING AT 60.8 FEET.	Installed 3/4" diameter sched 40 PVC piezometer. 0-1.0' - Flush mount monument cover seated in cement grout. 1.0'-25.0' - Bentonite seal. 25.0'-50.0' - Pea gravel. 47.5'-49.5' - 2" diameter slotted PVC tip. 50.0'-60.8' - Bentonite seal.
65.0						
70.0						
75.0						
80.0						
85.0						

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-4-E SHEET 1 OF 1

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 235+00, 100' LEFT

ELEVATION APPROXIMATELY 76 **(77 ft)** DRILLING CONTRACTOR M.GIBB, KENT, WA

DRILLING METHOD AND EQUIPMENT MUD ROTARY HYDRA-DRILL, HAND PORTABLE

WATER LEVELS 0' - 10-18-92 START 10-13-90 FINISH 10-13-90 LOGGER K.S.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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
	2.5	1-G	N.A.	N.A.	PEAT/ORGANIC SOILS, (PT), very loose, wet.	Wetland, 3' tall reedy grasses, water standing on surface up to 3' deep.
	4.0	2-S	0.7	1-1-1 (2)	SILTY SAND, (SM), brown to gray, wet, very loose.	
	5.0					
5.0	6.5	3-S	0.8	2-1-1 (2)	POORLY GRADED SAND, (SP), gray, wet, very loose.	
	7.5					
	9.0	4-S	1.4	1/18" (<1)	PEAT, (PT), brown to black, wet, very loose, contains abundant wood fragments and roots, some coarsed grained sand dispersed through material.	
	10.0					
10.0	12.5	5-ST	N.A.		FAT CLAY, (CH), gray, wet, very soft.	Top of tube was clay with some sand. Base of tube appears to be clay.
	14.0	6-S	1.1	1-1-1 (2)	FAT CLAY, (CH), gray, wet, very soft, very plastic, with some wood fragments.	Slough in top 0.1' of sample. Sampler settled under weight of drill string.
	15.0					
15.0	17.5	7-ST	N.A.		FAT CLAY, (CH), as above, except softer, with some sand dispersed in clay.	Sample not retained in shelby tube, some material in end of tube was placed in jar.
	19.0	8-S	1.4	2-8-17 (25)	Top 7": FAT CLAY, (CH), as above. Bottom 11: POORLY GRADED SAND WITH GRAVEL, (SP), gray wet, medium dense.	Hard drilling and high blow counts due to gravel wedged in tip of sampler. Top 7" is 8-S-A, Bottom 11" is 8-S-B.
20.0	20.5	9-S	0.8	17-25-27 (52)	POORLY GRADED SAND WITH GRAVEL, (SP), gray, wet, very dense.	Stopped by gravel layer at 19.0'. Very slow drilling. Reducing from 3.25" drag bit to 2.25" coring type bit to get through gravel layer. .br Hole caving. Only able to drill back to about 19'. Driving an SPt here to 20.5'.
					END OF BORING AT 20.5 FEET.	BOH AT 20.5 FEET. Installed 3/4" diameter sched 40 PVC piezometer. 0-1.0' - Locking monument cover seated in cement grout. 1.0'-11.0' - Bentonite seal. 11.0'-20.5' - Pea gravel pack. 18.0'-20.5' - 2" diameter slotted PVC tip.
25.0						

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-5 SHEET 1 OF 2

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 224+50, 55' RIGHT

ELEVATION APPROXIMATELY 78 **(80.7 ft)** DRILLING CONTRACTOR D.A.KENNER, SHERWOOD, OR

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS 2' bgs, 1-27-92 START 1-21-92 FINISH 1-21-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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
						Sand and gravel to 2.5'.
	5.0					
5.0	6.5	S-1	0.8	1-2-1 (3)	ELASTIC SILT, (MH), gray with rust mottling, moist, stiff, soft, with organics.	
	8.6	ST -2	NR	N.A.	NO RECOVERY	May have pushed a rock or piece of wood. Soft material - probably elastic silt.
	10.0					
10.0	12.0	ST-3	1.5	N.A.	ELASTIC SILT, (MH), gray, moist to wet, soft.	PP=1.25 tsf, 1.1 tsf, 1.3 tsf. TOR=0.4 tsf.
	13.5	S-4	0.6	3-2-1 (3)	ELASTIC SILT, (MH), gray, moist to wet, soft, with some uniformly coarse grained sand at top of sample.	
	15.0					
15.0	16.5	S-5	1.5	2-4-6 (10)	SILTY SAND, (SM), gray, moist to wet, loose, approximately 30-40% silt, fine grained sand.	
	20.0					
20.0	22.0	ST-6	2.0	N.A.	SILTY SAND, (SM), as above.	PP=1.25 tsf, 1.25 tsf, 1.25 tsf. TOR=0.35 tsf.
	23.5	S-7	1.5	1-3-4 (7)	SILTY SAND, (SM), as above.	
	25.0					
25.0	26.5	S-8	1.2	5-6-6 (12)	SILTY SAND, (SM), brown in top 10" of sample, gray in bottom 4", moist to wet, medium dense, uniform sand lens.	
	30.0					

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-5 SHEET 2 OF 2

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 224+50, 55' RIGHT

ELEVATION APPROXIMATELY 78 **(80.7 ft)** DRILLING CONTRACTOR D.A.KENNER, SHERWOOD, OR

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS 2' bgs, 1-27-92 START 1-21-92 FINISH 1-21-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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	S-9	1.3	7-13-25 (38)	POORLY GRADED SAND, (SP), brown with rust colored lenses, moist, dense, with silt lenses.	Layered sand and gravel to 35'.
35.0	35.0–36.5	S-10	1.5	14-13-20 (33)	POORLY GRADED SAND, (SP), gray, moist to wet, dense, coarse grained sand, layered with fine grained sand and silty sand lenses.	Driller notes cobbles at 39.5'.
40.0	40.0–41.5	S-11	0.6	18-16-14 (30)	WELL GRADED GRAVEL WITH SAND, (GW), gray, wet, medium dense, 2" minus subangular gravel, with approximately 20% coarse grained sand.	
45.0					WELL GRADED GRAVEL WITH SAND, (GW), gray, wet, dense, 2" minus subrounded gravel, with approximately 25% coarse grained sand, and silt lens.	
50.0	50.0–51.5	S-12	0.7	16-14-19 (33)	WLL GRADED GRAVEL WITH SAND, (GW), as above, except with only approximately 15% sand.	
55.0					END OF BORING AT 51.5 FEET.	Installed 3/4" diameter sched 40 PVC piezometer. 0-1.0' - Flush mount monument cover seated in cement grout. 1.0'-31.0' - Bentonite seal. 31.0'-51.5' -. Pea gravel. 49.0'-51.0' - 2" diameter slotted PVC tip.

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-7 SHEET 1 OF 2

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 158+25, 65' LEFT

ELEVATION APPROXIMATELY 125 **(127.6 ft)** DRILLING CONTRACTOR D.A.KENNER, SHERWOOD, OR

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS NOT AVAILABLE START 1-20-92 FINISH 1-20-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: TYPE AND NUMBER	SAMPLE: RECOVERY (FT)	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
						Sand, silt and gravel to 5'.
						Large rock from 3-4'.
	5.0					
5.0	6.5	S-1	1.3	9-13-17 (30)	SILTY GRAVEL, (GM), brown, moist, medium dense, approximately 40% silt, 2" minus poorly graded gravel.	
	10.0					
10.0	11.0	S-2	1.0	48-56/6"	Top 4": SILTY SAND, (SM), brown, moist, very dense. Bottom 8": Weathered Quartz, white and brown, moist, very dense, breaks into 0.75" minus pieces.	
	15.0					
15.0	16.5	S-3	0.5	13-18-23 (41)	SILTY GRAVEL WITH SAND, (GM), brown, moist, dense, approximately 30% silt, 2" minus, poorly graded gravel, with approximately 15% fine and coarse grained sand.	
	20.0					Driller notes that the stratum is layered - gravle layer, silty gravel and cobbles, and then silt and sand.
20.0	21.4	S-4	1.1	36-38-60/5	WELL GRADED GRAVEL WITH SILT, (GW-GM), brown, moist, very dense, 2" minus gravel (broken by sampler), with approximately 10% silt.	
	25.0					
25.0	25.9	S-5	?	43-60/5"	WELL GRADED GRAVEL WITH SAND AND SILT, (GW-GM), brown, moist very dense, 1.5" minus gravel, approximately 15% sand, approximately 10% silt.	
	30.0					Driller notes that hit cobbles at 29'. Lost about 20 gallons of mud.

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-7 SHEET 2 OF 2

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 158+25, 65' LEFT

ELEVATION APPROXIMATELY 125 **(127.6 ft)** DRILLING CONTRACTOR D.A.KENNER, SHERWOOD, OR

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS NOT AVAILABLE START 1-20-92 FINISH 1-20-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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	S-6	1.2	21-31-52 (83)	SILTY SAND, (SM), brown, moist, very dense, fine grained sand with approximately 35% silt.	
					END OF SOIL BORING AT 31.5 FEET.	Backfilled hole with bentonite.
35.0						
40.0						
45.0						
50.0						
55.0						

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-8

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 202+90, 85' LEFT

ELEVATION APPROXIMATELY 70 **(70.1 ft)** DRILLING CONTRACTOR D.A.KENNER, SHERWOOD, OR

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS 3' bgs, 1-27-92 START 1-24-92 FINISH 1-24-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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
						Silty gravel in top 5'.
5.0	5.0					
	6.5	S-1	0.8	16-10-7 (17)	WELL GRADED GRAVEL WITH SILT, (GW-GM), rust brown, wet, meidum dense, 1.5" minus angular gravel, approximately 10% silt.	
						Loose gravel and cobbles to 10'.
10.0	10.0					
	11.5	S-2	1.0	17-17-17 (34)	WELL GRADED GRAVEL WITH SAND AND SILT, (GW-GM), olive, wet, dense, 2" minus subangular gravel.	
15.0	15.0					
	16.5	S-3	0.8	25-36-35 (71)	WELL GRADED GRAVEL WITH SAND, (GW), greenish gray, wet, very dense, 1.5" minus subangular gravel, approximately 25% coarse grained sand.	
20.0	20.0					
	21.5	S-4	0.7	15-14-15 (29)	WELL GRADED GRAVEL WITH SAND, (GW), gray, wet, medium dense, 1.5" minus subangular gravel, approximately 15% sand.	
						Material softened at 24'.
25.0	25.0					
	26.5	S-5	1.0	6-12-16 (28)	SANDY SILT WITH GRAVEL, (ML), dark gray, moist, very stiff, approximately 30% sand, approximately 20% gravel, with lenses of sand and gravel.	

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-8 SHEET 2 OF 3

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 202+90, 85' LEFT

ELEVATION APPROXIMATELY 70 **(70.1 ft)** DRILLING CONTRACTOR D.A.KENNER, SHERWOOD, OR

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS 3' bgs, 1-27-92 START 1-24-92 FINISH 1-24-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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
	30.5				SILT, (ML), dark gray, moist, very stiff, coarse silt.	Cobble or gravel from 30' to 30.5'.
	32.0	S-6	1.5	8-8-15 (23)		
						Silt to about 37'.
	35.0					
35.0	36.5	S-7	1.5	21-32-33 (65)	SANDY SILT WITH GRAVEL, (ML), dark gray, moist, hard, approximately 30% sand, approximately 15% gravel scattered in sample.	
						Gravelly silt or sand? to about 40'.
	40.0					
40.0	41.5	S-8	1.5	19-25-33 (58)	POORLY GRADED SAND, (SP), gray, wet, very dense, coarse grained sand.	Sand to about 43'.
						Sand with fine gravel to about 45'.
	45.0					
45.0	46.5	S-9	1.5	24-34--39 (73)	POORLY GRADED SAND, (SP), as above.	
	50.0					
50.0	51.5	S-10	1.3	20-35-45 (80)	POORLY GRADED SAND, (SP-SM), as above.	Into gravel from 51' to 60'.
	55.0					
55.0	56.5	S-11	1.5	28-35-40 (75)	POORLY GRADED SAND, (SP), as above.	
	60.0					

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-8 SHEET 3 OF 3

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 202+90, 85' LEFT

ELEVATION APPROXIMATELY 70 **(70.1 ft)** DRILLING CONTRACTOR D.A.KENNER, SHERWOOD, OR

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS 3' bgs, 1-27-92 START 1-24-92 FINISH 1-24-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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	S-12	1.2	12-22-33 (55)	Top 11": POORLY GRADED GRAVEL WITH SAND, (GP), gray, wet, very dense, subrounded 0.25" to 1" diameter gravel, approximately 30% coarse grained sand. Bottom 3": POORLY GRADED SAND, (SP), gray, wet, very dense, fine to medium grained sand.	
65.0	65.0–66.0	S-13	1.0	32-55/6"	POORLY GRADED SAND, (SP), gray, wet, very dense, gravel content increases toward bottom of sample, 0.25" to 1" diameter gravel.	Gravel from 66' to 67.5'. Mostly sand at 67.5' to 68.5'. Gravel to end of hole.
70.0	70.0–70.5	S-14	0.4	55/6"	WELL GRADED GRAVEL WITH SAND, (GW), gray, wet, very dense, 1.0" minus subrounded and subangular gravel, with approximately 25% sand.	
75.0	75.0–75.4	S-15	0.4	60/5"	WELL GRADED GRAVEL WITH SAND, (GW), gray, wet, very dense, 1.5" minus subrounded gravel, with approximately 35% sand.	
80.0	80.0–80.4	S-16	NR	60/5"	NO RECOVERY END OF BORING AT 80.4 FEET.	Suspect well graded gravel with sand. Installed 3/4" diameter sched 40 PVC piezometer. 0-2.0' - Flush mount monument cover seated in cement grout. 2.0'-49.5' - Bentonite seal. 49.5'-70.5' - Pea gravel. 67.5'-69.5' - 2" diameter slotted PVC tip. 70.5'-80.4' - Bentonite seal.
85.0						

CH2M HILL

PROJECT NUMBER	BORING NUMBER	
SFA32579.G2	C-12	SHEET 1 OF 4

SOIL BORING LOG

PROJECT SR 520 LOCATION L 112+58 ℄ NEAR CENTER OF SR 202, W. OF SR 520.

ELEVATION -45.9 FT DRILLING CONTRACTOR GEO-TECH EXPLORATIONS

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS NOT AVAILABLE START 8-2-92 FINISH 8-2-92 LOGGER C.J.B.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	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
					Approximately 6" ASPHALTIC CONCRETE OVER 5" PORTLAND CONCRETE.	
					WELL GRADED GRAVEL WITH SAND, (GW), subangular 1" minus gravel, with approximately 30% medium to coarse grained sand.	
	5.0					
5.0	6.5	S-1	0.4	3-2-3 (5)	WELL GRADED SAND WITH SILT, (SW-SM), gray-brown, damp, loose, fine to medium grained sand, with approximately 5% silt.	
	10.0					
10.0	11.5	S-2	0.4	2-4-9 (13)	SILTY SAND WITH GRAVEL, SM, dark brown, moist, medium dense, fine to coarse grained sand, with 36% subrounded 1" minus gravel and 17% silt.	
	15.0					
15.0	16.5	S-3	0.5	15-20-22 (42)	WELL GRADED SAND WITH SILT AND GRAVEL, (SW-SM), gray-brown, moist, dense, fine to coarse grained sand, with approximately 5% silt and 15% subrounded 0.5" minus gravel.	
	20.0					
20.0	21.5	S-4	0.5	21-15-14 (29)	WELL GRADED GRAVEL WITH SILT AND SAND, (GW-GM), gray, moist, medium dense, subrounded 0.75" minus gravel, with approximately 5% silt and 40% fine to coarse grained sand.	
	25.0					Driller notes- Cobbles at 23', lost 20 gal. mud at 25'.
25.0	26.5	S-5	0.1	12-9-12 (21)	WELL GRADED GRAVEL WITH SILT AND SAND, (GW-GM), as above.	
	30.0					Cobbles at 27'.

CRM HILL

PROJECT NUMBER	BORING NUMBER
SEA32579.G2	C-12 SHEET 2 OF 4

SOIL BORING LOG

PROJECT SR 520 LOCATION L 112+58 ℄ NEAR CENTER OF SR 202, W. OF SR 520.

ELEVATION ~45.9 FT DRILLING CONTRACTOR GEO-TECH EXPLORATIONS

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS NOT AVAILABLE START 8-2-92 FINISH 8-2-92 LOGGER C.J.B.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	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	S-6	0.8	25-27-17 (44)	SILTY SAND WITH GRAVEL, SM, brownish gray, wet, dense, fine to coarse grained sand, with 30% subrounded 1.25" minus gravel and 12% silt.	Driller notes- Cobbles.
35.0	35.0–36.5	S-7	0.4	44-27-23 (50)	WELL GRADED GRAVEL WITH SAND, (GW), brownish gray, wet, very dense, subrounded 0.75" minus gravel, with approximately 40% fine to coarse grained sand.	Driller notes- Cobbles.
40.0	40.0–41.5	S-8	0.7	18-24-21 (45)	WELL GRADED SAND WITH GRAVEL, (SW), gray-brown, wet, dense, fine to coarse grained sand, with approximately 20% subrounded 1.25" minus gravel.	Driller notes- Change at 43'.
45.0	45.0–46.5	S-9	0.5	12-14-15 (29)	POORLY GRADED SAND, (SP), gray, wet, medium dense, medium grained sand.	
50.0	50.0–51.5	S-10	0.6	13-18-19 (37)	POORLY GRADED SAND, (SP), as above, except dense.	
55.0	55.0–56.4	S-11	0.6	15-19-18 (37)	POORLY GRADED SAND, (SP), as above, except fine grained sand.	
	60.0					

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA32579.G2	C-12 SHEET 3 OF 4

SOIL BORING LOG

PROJECT SR 520 LOCATION L 112+58 ℄ NEAR CENTER OF SR 202, W. OF SR 520.

ELEVATION ~45.9 FT DRILLING CONTRACTOR GEO-TECH EXPLORATIONS

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS NOT AVAILABLE START 8-2-92 FINISH 8-2-92 LOGGER C.J.B.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	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	S-12	0.6	20-26-26 (52)	POORLY GRADED SAND, (SP), gray, wet, very dense, fine to medium grained sand.	
65.0	65.0–66.5	S-13	0.5	10-10-17 (27)	POORLY GRADED SAND WITH SILT, (SP-SM), gray, wet, medium dense, fine grained sand, with approximately 5% silt.	
70.0	70.0–71.5	S-14	0.6	20-28-29 (57)	POORLY GRADED SAND WITH SILT, (SP-SM), gray, wet, very dense, fine grained sand with approximately 5% silt, 1" wood fragment.	
75.0	75.0–76.5	S-15	0.6	26-40-43 (83)	POORLY GRADED SAND WITH SILT, (SP-SM), as above.	
80.0	80.0–81.5	S-16	0.6	20-27-30 (57)	POORLY GRADED SAND WITH SILT, (SP-SM), as above, except very fine grained sand.	
85.0	85.0–86.5	S-17	0.6	13-20-19 (39)	POORLY GRADED SAND WITH SILT, (SP-SM), as above, except fine grained sand, and dense.	
	90.0					

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA32579.G2	C-12 SHEET 4 OF 4

SOIL BORING LOG

PROJECT SR 520 LOCATION L 112+58 ℄ NEAR CENTER OF SR 202, W. OF SR 520.

ELEVATION ~45.9 FT DRILLING CONTRACTOR GEO-TECH EXPLORATIONS

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS NOT AVAILABLE START 8-2-92 FINISH 8-2-92 LOGGER C.J.B.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	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	S-18	0.5	21-29-28 (57)	POORLY GRADED SAND, (SP), gray, wet, very dense, medium grained sand.	
95.0	95.0–96.5	S-19	0.5	38-42-37 (79)	POORLY GRADED SAND, (SP), as above.	
100.0	100.0–101.5	S-20	0.7	15-15-21 (36)	POORLY GRADED SAND, (SP), as above, except dense.	
					END OF BORING AT 101.5 FEET.	BOH AT 101.5 FEET.
105.0						
110.0						
115.0						

CH2M HILL

PROJECT NUMBER	BORING NUMBER	
SEA32579.G2	C-20A	SHEET 1 OF 2

SOIL BORING LOG

PROJECT SR 520 LOCATION L 113+95 (86 ft. RT) S.W OF SR 520/SR 202 INTERSECTION.

ELEVATION ~42.2 FT DRILLING CONTRACTOR GEO-TECH EXPLORATIONS

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS ~13.7 FT (8-7-92) START 7-30-92 FINISH 7-30-92 LOGGER C.J.B.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	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
	2.5					
	4.0	S-1	0.8	10-12-23 (35)	SILTY SAND, (SM), dark brown, damp, dense, fine to coarse grained sand with approximately 15% silt.	
	5.0					
5.0	6.5	S-2	0.3	23-26-6 (32)	WELL GRADED SAND WITH SILT AND GRAVEL, (SW-SM), gray, moist, dense, fine to coarse grained sand with approximately 40% subrounded 1" minus gravel and 5% silt.	
	7.5					
	9.0	S-3	0.4	2-4-9 (13)	WELL GRADED SAND WITH GRAVEL, (SW), brown, wet, medium dense, fine to coarse grained sand, with approximately 30% subrounded 1.0" minus gravel.	
	10.0					
10.0	11.5	S-4	0.2	15-23-20 (43)	WELL GRADED SAND WITH GRAVEL, (SW), as above except dense, with approximately 40% subrounded 0.5" minus gravel.	
	12.5					
	14.0	S-5	0.3	16-13-15 (28)	WELL GRADED SAND WITH GRAVEL, (SW), gray-brown, damp, medium dense, fine to coarse grained sand, with approximately 15% subrounded 1.25" minus gravel.	Driller notes- Cobbles.
	15.0					
15.0	16.5	S-6	0.2	14-12-13 (25)	WELL GRADED SAND WITH GRAVEL, (SW), as above except wet, 25% gravel.	
	17.5					
	19.0	S-7	0.2	19-21-27 (48)	WELL GRADED SAND WITH GRAVEL, (SW), as above, except dense and 0.75" minus gravel.	
	20.0					
20.0	21.5	S-8	0.3	18-16-22 (38)	WELL GRADED SAND WITH GRAVEL, (SW), as above, except approximately 40% 1.25" minus gravel.	
	25.0					Driller notes- Gravel and cobbles.
25.0	26.5	S-9	0.3	14-10-13 (23)	POORLY GRADED GRAVEL WITH SAND, (GP), gray, wet, medium dense, subangular 1" minus gravel, with approximately 20% fine to coarse grained sand.	Driller notes- Lost mud while driving sampler.

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA32579.G2	C-20A SHEET 2 OF 2

SOIL BORING LOG

PROJECT SR 520 LOCATION L 113+95 (86 ft. RT) S.W OF SR 520/SR 202 INTERSECTION.

ELEVATION ~42.2 FT DRILLING CONTRACTOR GEO-TECH EXPLORATIONS

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS ~13.7 FT (8-7-92) START 7-30-92 FINISH 7-30-92 LOGGER C.J.B.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	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	S-10	0.3	19-22-17 (39)	POORLY GRADED GRAVEL WITH SAND (GP), as above, except dense and approximately 35% fine to coarse grained sand.	
					END OF BORING AT 31.5 FEET.	BOH AT 31.5 FEET.
35.0						Installed piezometer with 1" sch. 40 PVC pipe.
						0-1.5' Flush mount monument seated in cement grout.
						1.5-8' Bentonite seal.
						8-15.0' Pea gravel.
						15.0-31.5' Bentonite seal.
						12.0-14.0' 2" diameter slotted PVC tip.
40.0						
45.0						
50.0						
55.0						

Boring No. B-1

SR202 - SR520 to Sahalee Way NE
Station 145+45, Offset 342' RT
Approximate Elev. 52 ft.

Logged by: DKW

Date: 11/21/00

Approximate Elev. 48

Soil Description	Consistency/ Relative Density	Depth (ft.)	Sample	(N) Blows/ ft.	Moisture Content (%)
Grass/sod. Brown medium to fine SAND. (SP)	Loose	5		10	6.1
				8	6.4
Trace of pea gravel at 8 feet. (SP)				8	8.7
Brown to gray coarse to fine SAND with gravel to gravelly SAND. (SP)	Medium Dense to Dense	10		19	5.3
				18	2.0
		15		28	3.8
				25	3.5
		20 ▼		25	5.1
				5	
		25		20	
				31	
		30		26	
				36	
		35		25	
				25	

Boring terminated at 39 feet.
Groundwater observed at 20.5 feet at time of drilling.

TERRA ASSOCIATES
Geotechnical Consultants

BORING LOG
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj. No. T-4811	Date DEC 2000	Figure A-2

Boring No. B-2

SR202 - SR520 to Sahalee Way NE
Station 146+73, Offset 165' RT
Approximate Elev. 50 ft.

Logged by: DKW

Date: 11/22/00

Approximate Elev. 46

Soil Description	Consistency/ Relative Density	Depth (ft.)	Sample	(N) Blows/ ft.	Moisture Content (%)
Grass/sod. Brown silty gravelly SAND. (SM)					
Brown coarse to fine SAND with gravel/gravelly SAND. (SP)	Medium Dense to Dense to Medium Dense	5 10 15		12 20 35 18 26 11 18	5.3 2.8 3.5 5.4 9.7 9.2
Gray fine to coarse gravelly silty SAND. (SM)	Very Dense	20		66	12.2
Gray medium SAND. (SP) Gravel and cobbles at 27 feet.	Loose	25		3	
Gray fine to coarse gravelly silty SAND/sandy SILT. (SM/ML)	Dense to Very Dense	30		41 42 60/6"	8.6 23.9 21.9

Boring terminated at 33 feet.
Groundwater encountered at 18 feet at time of drilling.

TERRA ASSOCIATES
Geotechnical Consultants

BORING LOG
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj. No. T-4811	Date DEC 2000	Figure A-3

Boring No. B-3

SR202 - SR520 to Sahalee Way NE
Station 143+62, Offset 78' RT
Approximate Elev. 50 ft.

Logged by: DKW

Date: 11/21/00

Approximate Elev. 46

Soil Description	Consistency/ Relative Density	Depth (ft.)	Sample	(N) Blows/ ft.	Moisture Content (%)
Grass/sod over 6 inches of topsoil. Brown fine to coarse silty SAND with gravel. (SM)	Loose to Medium Dense	5		5	14.3
				17	8.3
				13	
		10		18	2.4
Brown fine to coarse SAND with silt and gravel. (SP-SM)	Medium Dense to Dense			34	3.7
		15		46	4.1
			▼	11	
		20		18	
Brown to gray fine to coarse SAND with silt, trace of gravel. (SP-SM)	Medium Dense to Dense			26	
		25		25	
				22	
		30		25	
				31	
		35		31	
				35	
		40		36	

Boring terminated at 41.5 feet.
Groundwater encountered at 18 feet at time of drilling.

TERRA ASSOCIATES
Geotechnical Consultants

BORING LOG
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj. No. T-4811 | Date DEC 2000 | Figure A-4

Boring No. B-4

SR202 - SR520 to Sahalee Way NE
Station 143+32, Offset 280' RT
Approximate Elev. 52 ft.

Logged by: DKW

Date: 11/21/00

Approximate Elev. 48

Soil Description	Consistency/ Relative Density	Depth (ft.)	Sample	(N) Blows/ ft.	Moisture Content (%)
Grass and crushed rock. FILL: brown silty SAND with gravel and some wood debris.	Very Loose			2	10.3
Brown fine to coarse SAND with silt. (SP-SM)	Loose to Medium Dense	5		7	10.2
				20	13.0
		10		25	11.5
Brown fine sandy GRAVEL. (GP)	Dense to Very Dense to Dense			41	4.6
		15		61	6.9
				30	5.4
		20	▼	25	4.8
Gray fine to coarse gravelly SAND to SAND with gravel. (SP)	Medium Dense to Dense			22	
		25		13	
				18	
		30		29	
				29	
		35		26	
				30	
		40		28	
				34	

Boring terminated at 44 feet.
Groundwater encountered at 21 feet at time of drilling.

TERRA ASSOCIATES
Geotechnical Consultants

BORING LOG
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj. No. T-4811	Date DEC 2000	Figure A-5

Test Pit No. TP-1

Logged by: DKW

Date: 11/20/00

SR202 - SR520 to Sahalee Way NE
Station 148+61, Offset 279' RT
Approximate Elev. 48 ft.

Approximate Elev. 44

Depth (ft.)	Soil Description	Moisture Content (%)
0	TOPSOIL: dark brown, loose, moist.	
	FILL: brown silty SAND with gravel and roots, loose, moist. (SM)	1.7
5	Brown clean gravelley SAND, medium dense, moist to dry.	
10	Test pit terminated at 9.5 feet. No groundwater seepage encountered.	
15		

Test Pit No. TP-2

Logged by: DKW

Date: 11/20/00

SR202 - SR520 to Sahalee Way NE
Station 148+76, Offset 133' RT
Approximate Elev. 57 ft.

Approximate Elev. 53

Depth (ft.)	Soil Description	Moisture Content (%)
0	TOPSOIL: dark brown, loose, moist.	
	Brown silty fine to medium SAND with gravel, medium dense, moist. (SM)	8.8 ▼
5		
10	Test pit terminated at 10 feet. Light groundwater seepage at 8 feet.	
15		

TERRA ASSOCIATES
Geotechnical Consultants

TEST PIT LOGS
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj. No. T-4811	Date DEC 2000	Figure A-6

Test Pit No. TP-3

Logged by: DKW

Date: 11/20/00

SR202 - SR520 to Sahalee Way NE
Station 149+96, Offset 182' RT
Approximate Elev. 59 ft.

Approximate Elev. 55

Depth (ft.)	Soil Description	Moisture Content (%)	
0	TOPSOIL: dark brown, loose, moist.		
	Brown SAND with silt and some gravel, medium dense, moist. (SP-SM)	9.0	▼
5			
	Gray gravelly SAND, medium dense, damp to wet. (SP)		
10	Test pit terminated at 9.75 feet. Light groundwater seepage at 7 feet.		
15			

Test Pit No. TP-4

Logged by: DKW

Date: 11/20/00

SR202 - SR520 to Sahalee Way NE
Station 150+95, Offset 111' RT
Approximate Elev. 71 ft.

Approximate Elev. 67

Depth (ft.)	Soil Description	Moisture Content (%)	
0	TOPSOIL: dark brownish-black.		
	Reddish-brown to brown SAND with silt, medium dense, moist. (SP-SM)		
	Brown fine to medium SAND with silt and some gravel, medium dense, moist. (SP-SM)	11.5	
5			
	Gray gravelly silty SAND, dense, damp. (Glacial till) (SM)	11.8	▼
10	Test pit terminated at 10 feet. Light groundwater seepage at 8 feet.		
15			

TERRA ASSOCIATES
Geotechnical Consultants

TEST PIT LOGS
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj. No. T-4811	Date DEC 2000	Figure A-7

Test Pit No. TP-5

Logged by: DKW

Date: 11/20/00

SR202 - SR520 to Sahalee Way NE
Station 152+81, Offset 110' RT
Approximate Elev. 79 ft.

Approximate Elev. 75

Depth (ft.)	Soil Description	Moisture Content (%)
0	TOPSOIL: black, loose, damp.	
	Gray gravelly silty SAND with cobbles, medium dense, moist to damp. (SM) (Glacial till) Becomes dense to very dense below 2.5 feet.	16.5
5		
10	Test pit terminated at 9 feet. No groundwater seepage encountered.	
15		

Test Pit No. TP-6

Logged by: DKW

Date: 11/20/00

SR202 - SR520 to Sahalee Way NE
Station 151+05, Offset 276' RT
Approximate Elev. N/A

Approximate Elev.

Depth (ft.)	Soil Description	Moisture Content (%)
0	TOPSOIL: dark brown, loose, moist.	
	Brown fine to medium SAND with silt, medium dense, moist. (SP-SM)	
5	Gray gravelly SAND with cobbles, medium dense, moist to dry. (SP)	5.1
10	Test pit terminated at 8.5 feet. No groundwater seepage encountered. Cast iron pipe at NE corner of test pit. Caving of test pit walls below 4 feet.	
15		

TERRA ASSOCIATES
Geotechnical Consultants

TEST PIT LOGS
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj. No. T-4811	Date DEC 2000	Figure A-8

Test Pit No. TP-7

Logged by: DKW

Date: 11/20/00

SR202 - SR520 to Sahalee Way NE
Station 151+95, Offset 327' RT
Approximate Elev. 49 ft.

Approximate Elev. 45

Depth (ft.)	Soil Description	Moisture Content (%)
0	TOPSOIL: black, loose, moist.	
	Brown SAND with silt and gravel, loose to medium dense. (SP-SM) Clean gravel/red clay with a 6-inch pipe (drain field trench) at 2.5 feet. Roots to 4.5 feet.	
5	Gray gravelly SAND with cobbles, medium dense, moist. (SP)	5.8
10	Test pit terminated at 9 feet. No groundwater seepage encountered.	
15		

TERRA ASSOCIATES
Geotechnical Consultants

TEST PIT LOGS
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj. No. T-4811	Date DEC 2000	Figure A-9

Boring Log

Project Name:				Sheet	of
Signal Pole SR202 & 192nd Drive N.E. STA 189+10 50 ft RT				1	1
Job No. 8001-4	Logged by: KME	Start Date: 9/17/98	Completion Date: 9/17/98	Boring No.: B-1	
Drilling Contactor: Boretec		Drilling Method: HSA		Sampling Method: SPT	
Ground Surface Elevation:		Hole Completion: ☐ Monitoring Well ☐ Piezometer ☒ Abandoned, sealed with bentonite			

W (%)	No. Blows Ft.	Graphic Symbol	Depth Ft.	Sample	USCS Symbol	Surface Conditions:
					GP-GM	(3" Asphalt-Concrete) FILL: Brown poorly graded GRAVEL with sand and silt, dense, moist
			1			
			2			
30.3	3		3		SM	Reddish brown silty SAND, loose, wet
			4			
17.0	2		5			
			6			
			7		SM	Brown silty SAND with gravel, very dense, moist
8.2	94/10"		8			
			9			
10.4	60		10			
			11			
			12			
8.7	54		13			
			14			
8.2	60		15			
			16			
			17			
12.5	68		18			
			19			Boring terminated at 19.0 feet below existing grade. Groundwater seepage encountered at 3.0 feet during drilling.

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

Boring Log
Signal Pole SR202 & 192nd Drive N.E.
King County, Washington

Proj. No. 8001-4	Dwn. GLS	Date Sept. '98	Checked KME	Date 9/28/98	Plate A2

Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use or interpretation by others of information presented on this log.

Boring Log

Project Name:				Sheet	of
Signal Pole SR202 & 192nd Drive N.E. STA 188+15 20 ft LT				1	1
Job No. 8001-4	Logged by: KME	Start Date: 9/17/98	Completion Date: 9/17/98	Boring No.: B-2	
Drilling Contactor: Boretec		Drilling Method: HSA		Sampling Method: SPT	
Ground Surface Elevation:		Hole Completion: ☐ Monitoring Well ☐ Piezometer ☒ Abandoned, sealed with bentonite			

	W (%)	No. Blows Ft.	Graphic Symbol	Depth Ft.	Sample	USCS Symbol	Surface Conditions:
						SP-SM	(8" Aspahlt-Concrete) FILL: Gray poorly graded SAND with gravel and cobbles, dense, moist
				1			-refusal on cobbles
				2			Boring terminated at 2.0 feet below existing grade. No groundwater encountered during drilling.

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

Boring Log
Signal Pole SR202 & 192nd Drive N.E.
King County, Washington

Proj. No. 8001-4	Dwn. GLS	Date Sept. '98	Checked KME	Date 9/28/98	Plate A3

Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use or interpretation by others of information presented on this log.

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SEA30738.G1	B-3

SOIL BORING LOG

PROJECT SR 202 LOCATION STA 187+27, 36' RIGHT

ELEVATION 96.5 ft DRILLING CONTRACTOR D.A.KENNER, SHERWOOD, OR

DRILLING METHOD AND EQUIPMENT MUD ROTARY CME 75

WATER LEVELS NOT AVAILABLE START 1-23-92 FINISH 1-24-92 LOGGER J.C.

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	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
5.0	5.0–6.5	S-1	1.5	8-12-15 (27)	POORLY GRADED SAND WITH SILT, (SP-SM), brown, moist, medium dense, coarse grained sand with approximately 5-7% silt.	
10.0	10.0–11.5	S-2	1.5	17-29-36 (55)	POORLY GRADED SAND WITH GRAVEL, (SP), brown, moist, very dense, coarse grained, patrially cemented sand, with approximately 15% angular, 1" minus gravel.	
15.0	15.0–16.5	S-3	1.1	19-32-34 (66)	POORLY GRADED SAND WITH GRAVEL, (SP), as above, piece of gravel plugged tip of spoon.	
20.0	20.0–21.5	S-4	1.5	20-27-40 (67)	WELL GRADED GRAVEL WITH SAND, (GW), brown, moist, very dense, 1.5" minus angular and subangular gravel, with approximatley 40% coarse grained sand.	Some cobbles at 22'.
25.0	25.0–26.0	S-5	1.0	50-50/5.5	WELL GRADED GRAVEL WITH SAND, (GW), brown, moist, very dense, 2" minus subangular gravel, with approximately 40% coarse grained sand, some silt in tip of spoon.	
	30.0					

APPENDIX - C

Laboratory Test Data

LABORATORY SUMMARY

Test Hole Number	Sample No.	Lab Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)						
Infiltration Pond Site																		
BC-1-01	D-1	F-4310	5.0-6.5	SM		9	2.1	72.3	25.6									
	D-2	F-4310	10.0-11.5	SM		2	28.9	53.3	17.9									
	D-3	F-4310	15.0-16.5	GP		5	53.4	41.9	4.7									
	D-4	F-4310	20.0-21.5	SM		8	38.7	48.9	12.5									
SS-1-03	1		2.0-3.0	SW			36	59.3	4.7									
SS-2-03	1		2.0-3.0	SW			31	64.9	4.1									
East Lake Sammamish Parkway Vic.																		
MW-5-99	S-5	F-3348	21.0-21.6	SM		1	38.9	47.1	14.0									
TP-1-99	S-1	F-3346	1.0-2.5	SM		7	16.6	48.2	35.1									
	S-5	F-3346	11.5-12.5	SW-SM		11	17.3	71.5	11.3									
Walls 1 (JPI Development – Terra Associates)																		
B-1-00	D-6		15.0-16.5	GP		3.8	55	42.5	2.5									
	D-9		22.5-25.0	SP			0.5	94	5.5									
B-2-00	D-5		12.5-14.0	SP		9.7	33	63	4									
	D-7		17.5-19.0	SP			10	84	6									
B-3-00	D-5		12.5-14.0	SP-SM		4.1	17.5	73.5	9									
	D-7		17.5-19.0	SP-SM			0	91	9									
	D-12		30.0-31.5	SP-SM			0	93.5	6.5									
B-4-00	D-7		17.5-19.0	GP		5.4	61	34	5									
	D-9		22.5-25.0	SP			29	66.5	4.5									

Test Hole Number	Sample No.	Lab Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)						
Wall 1																		
H-1-02	D-1	F-4330	5.0-6.5	SP		17	4.1	91.4	4.6									
	D-2	F-4330	10.0-11.5	GW		13	53.4	43.7	3.0									
	D-5	F-4330	25.0-26.5	SP		28	0	95.7	4.3									
	D-8	F-4330	40.0-41.5	SP-SM		25	0	89.2	10.8									
H-2-02	D-2	F-4438	10.0-11.5	GM		15	44.0	24.3	31.7									
	D-6	F-4438	30.0-31.5	ML		24	22.7	14.5	62.8									
	D-8	F-4438	40.0-41.5	SM		21	24.9	35.2	40.0									
H-3-02	D-1	F-4323	4.0-5.5	SM		19	13.4	41.1	45.5									
	D-2	F-4323	9.0-10.5	GM		25	35.0	21.3	43.7	31								
	D-4	F-4323	19.0-20.5	ML		23	21.6	24.0	54.4	36	25	11						
	D-6	F-4323	29.0-30.5	GM		11	57.0	26.8	16.3									
	D-7	F-4323	34.0-35.5	ML		30	0.2	4.6	95.3									
Rock Wall (deleted)																		
PP-1-03	D-2	F-5091	2.0-4.0	GM		12	46.1	41.1	12.8									
	D-4	F-5091	6.0-8.0	GP		7	80.2	15.9	3.9									
Wall 5																		
PP-2-03	D-1	F-5092	0.0-2.0	SM		16	14.0	65.5	20.4									
	D-3	F-5092	4.0-6.0	SM		15	31.7	46.7	21.6									

Test Hole Number	Sample No.	Lab Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction Gravel (%)	Sand (%)	Fines (%)	Atterberg Limits LL (%)	PL (%)	PI (%)	SPECIALIZED TESTING					Remarks
Wall 6																		
PP-4-03	B-3	F-5094	4.0-5.5	SM		23	9.6	68.6	21.8									
Hong West & Associates																		
B-7-92	S-2		10.0-11.0	SM		10	7	71	22									
	S-4		20.0-21.5	GW-GM		10							**Resistivity =**		1,400	OHM-CM		Natural Moisture
185th Avenue NE Vicinity																		
SL-1-01	D-3	F-4305	10.0-11.5	SM		6	31.1	52.1	16.8									
SL-2-01	D-1	F-4306	3.5- 5.0	SM		10	20.2	41.2	38.6									
	D-2	F-4306	8.0- 9.5	SM		13	26.6	28.5	44.9									
SL-3-01	D-1	F-4307	3.0-4.5	SM		10	10.2	44.8	44.9									
	D-3	F-4307	13.0-14.0	SM		31	2.4	54.6	43.0									
Wall 8																		
H-4-02	D-3	F-4482	11.5-13.0	GW-GM		9	55.4	36.9	7.7									
TP-2-02	#1	F-4430	2.5	ML		22	1.9	37.3	60.9									
	#2	F-4430	4.8	SM		14	24.7	40.8	34.5									
H-6-02	D-1	F-4477	4.0-5.5	SM		13	10.8	49.3	39.8									
	D-4	F-4477	14.0-15.5	SP-SM		12	44.8	47.7	7.5									
H-8-02	D-1	F-4491	5.0-6.5	SP-SM		12	35.2	56.0	8.8									

Test Hole Number	Sample No.	Lab Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)						
Wall 9																		
H-5-02	D-1	F-4331	0.0-1.5	SM		19	7.4	64.9	27.7									
	D-5	F-4331	10.0-11.0	SP-SM		12	39.1	49.7	11.2									
H-7-02	D-4	F-4338	20.0-21.5	ML		18	15.0	34.9	50.1									
Wall 10																		
H-9-02	D-1	F-4339	0.0-2.0	SM		25	14.0	51.7	34.4									
H-10-02	D-1	F-4395	4.0-5.5	SM		25	0	71.2	28.8									
	D-3	F-4395	14.0-15.5	SM		29	13.5	50.2	36.3	37	25	12						
	D-5	F-4395	24.0-25.5	SM		8	14.5	55.4	30.1									
Wall 11																		
PP-5-03	B-2	F-5096	2.0-4.0	SM		29	23.1	52.0	25.0									
PP-6-03	B-2	F-5095	2.0-4.0	SP-SM		17	2.4	90.8	6.8									
	B-3	F-5095	4.0-6.0	SM		34	0.0	55.6	44.4									
H-39-03	D-1	F-5098	5.0-6.5	MH		24	0	17.8	82.2	64	34	30						
	D-2	F-5098	10.0-11.5	CL-ML		20	6.0	31.6	62.4	22	17	5						
H-39A-03	D-5	F-5119	20.0-21.5	CL-ML		14	14.5	30.3	55.2	23	17	6						
Detention Pond 1A																		
H-30-02	D-2	F-4478	8.0-9.5	SP-SM		10	46.4	47.1	6.5									
	D-3	F-4478	13.0-14.5	ML		15	5.0	36.1	58.9									
	D-5	F-4478	23.0-24.5	SM		10	22.1	47.5	30.4									
	D-6	F-4478	28.0-30.0	ML		17	11.6	30.0	58.4									

Test Hole Number	Sample No.	Lab Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)	Type of Test					
Wall 12																		
H-11-02	D-1	F-4387	5.0-6.5	SW-SM		19	21.0	69.7	9.2									
	D-3	F-4387	15.0-16.5	ML		19	0.1	35.2	64.7									
H-12-02	D-6	F-4388	30.0-31.5	SM		7	40.1	47.6	12.3									
	D-7	F-4388	35.0-36.5	SW		7	40.9	56.7	2.4									
H-13-02	D-1	F-4471	5.0-6.5	SM		19	9.3	62.0	28.7									
	D-3	F-4471	15.0-16.5	SM		18	3.2	75.2	21.6									
	D-5	F-4471	20.0-21.5	SW-SM		25	0.1	90.8	9.2									
H-14-02	D-2	F-4492	10.0-11.5	SP-SM		14	1.5	92.3	5.2									
	D-4	F-4492	20.0-21.5	SP		13	28.9	67.2	3.9									
B-3-92	S-1		5.0-6.5.5	SP-SM			10.9	78.3	10.8				**Resistivity =**		2,750	OHM-CM		Natural Moisture
	S-2		10.0-11.5	SP-SM			10.9	78.3	10.8									
Wall 13																		
SSB-1-99	D-1	F-4308	3.0-4.5	SM		6	10.8	68.4	20.8									
	D-3	F-4308	7.0-8.5	SM		8	23.7	62.2	14.1									
	D-6	F-4308	20.0-21.5	SM		5	18.8	65.1	16.1									
SSB-2-99	D-1	F-4309	3.0-4.5	ML		20	0.4	36.2	63.4									
	D-2	F-4309	5.0-6.5	SM		14	1.9	74.1	24.0									
	D-9	F-4309	28.0-29.5	GW		1	62.7	32.6	4.7									

Test Hole Number	Sample No.	Lab Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)						
H-15-02	D-1	F-4349	5.0-6.5	SP-SM		18	29.9	59.4	10.7									
	D-2	F-4349	10.0-11.5	SM		21	0.9	58.1	41.0									
	D-3	F-4349	15.0-16.5	SM		14	1.1	69.9	29.1									
	D-5	F-4349	25.0-26.5	CL		29	0.0	9.2	90.8	33	23	10						
MW-4-99	D-4	F-3347	15.0-16.5	ML		20	0	4.8	95.2									
B-2W-90	S-3		5.0-6.5	CH		42.5				52	28	24						
	ST-4		7.0-9.5	CL									**Resistivity =**		160	OHM-CM		Natural Moisture
													Consolidation Test Results					
													Po	**Ca**	**Cc**	**Cv**	**C∞**	
													(Kips)			**Ft2/day**		
	ST-7		15.0-17.0	ML	123.1	37.9							2.25	0.011	0.081			
	S-8		19.5-21.0	ML		33	0	0	100	32	25	7						26 % Clay
H-16-02	S-2	F-4472	3.2	CL	122.7	28	0	16.0	84.0	46	23	23	1.40	0.011	0.085	0.27	.0014	
	S-2	F-4472	2.8	CL	122.0	26	0	9.2	90.8	42	23	19	**UU**	q = 651 psf		ε = 4.5 %		
	S-4	F-4472	7.8	ML	122.2	28	0	7.2	92.8	29			**UU**	q = 852 psf		ε = 5.5 %		
	S-4	F-4472	8.2	ML	122.4	27	0	40.8	59.2	21				0.014	0.041	4.21		
	D-11	F-4472	25.0-27.0	GW		7	66.3	31.5	2.2									
B-8-92	S-5		25.0-26.5	ML		8	1	21	78									26 % Clay
	S-6		30.5-36.0	CL		28				44	24	20						
	S-7		35.0-35.5	SM		6	2	49	49									12 % Clay
	S-10		50.0-51.5	SM		17.5	0.0	87.5	12.5				**Direct Shear**		(Remolded)			$\phi = 39.7°$
				SP-SM	105.3	17.5							$\sigma_n =$	1,462	psf	$\sigma_p =$	1,244.5	psf
					103.4	17.5							$\sigma_n =$	2,768	psf	$\sigma_p =$	2,240.7	psf
					103.6	17.5							$\sigma_n =$	5,949	psf	$\sigma_p =$	4,946.6	psf

Test Hole Number	Sample No.	Lab Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)						
Wall 14																		
H-40-03	D-1	F-5082	4.0-5.5	SP-SM		20	38.5	53.2	8.3									
	D-2	F-5082	9.0-10.5	CL		35	2.2	8.9	88.9	44	26	18						
	D-6	F-5082	24.0-25.5	ML		27	0.1	39.6	60.3									
SW of 196th Avenue																		
H-17-02	D-2	F-4340	5.0-6.5	SM		36	22.9	59.3	17.8									
	D-3	F-4340	10.0-11.5	GW		11	58.9	37.1	4.0									
	D-7	F-4340	30.0-31.5	SM		26	9.9	55.8	34.3									
NE of 196th Avenue																		
P-23-00	D-3	F-4304	10.0-11.5	GW-GM		1	71.6	22.5	5.9									
Wall 15																		
MW-6-99	S-13	F-3349	51.5-.53.0	SP-SM		2	37.5	56.5	6.0									
	S-16	F-3349	61.0-62.0	SM		1	20.9	45.4	33.6									
	S-18	F-3349	71.0-72.0	SW-SM		7	7.0	82.1	10.9									
H-18-02	D-2	F-4350	10.0-11.5	SP		12	34.4	62.7	3.0									
													Consolidation Test Results					
													Po	**Ca**	**Cc**	**Cv**	**C∞**	
													(Kips)			**Ft2/day**		
H-36-02	S-1	F-4611	6.7	MH	94.6	74	0	7.7	92.3	68	52	16	2.0	.050	0.183	0.031	0.004	
	D4	F-4611	11.0-12.5	ML		33	0	3.4	96.6	39	28	11						
	D5	F-4611	15.0-16.5	SM		25	0	86.4	13.6									
	D-8	F-4611	30.0-31.5	SM		21	23.7	57.8	18.5									
	D-11	F-4611	45.0-46.5	SM		29	0	77.0	23.0									

Test Hole Number	Sample No.	Lab Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)						
H-37-02	D-1	F-4593	2.0-3.5	ML		48	2.2	15.0	82.9	38	29	9						
	D-6	F-4593	12.0-13.5	SM		31	3.4	81.6	15.0									
	D-8	F-4593	17.0-18.5	ML		30	0.5	44.5	55.0									
	D-12	F-4593	30.0-31.5	SP-SM		17	43.1	51.8	5.1									
	D-14	F-4593	40.0-41.5	SP		16	16.2	82.8	1.1									
H-26-02	D-2	F-4572	1.5-3.0	ML		22	1.8	47.3	51.0									
	D-4	F-4572	7.0-8.5	SP-SM		39	8.8	83.9	7.3									
	D-6	F-4572	12.0-13.5	SM		52	0	75.4	24.6									
	S-7	F-4572	16.6	ML	119.9	31	0	1.2	98.8	34	24	10	**UU**	q_u = 730 psf		ε = 10 %		σ_3 = 8 psi
	D-8	F-4572	17.0-18.5	CL		34	0.1	3.3	96.6	32	23	9						
	D-12	F-4572	30.0-31.5	SM		25	3.8	48.6	47.6									
Wall 16																		
H-19-02	D-2	F-4481	10.0-11.5	ML		33	0	5.1	94.9	42								
	D-5	F-4481	25.0-26.5	SM		20	3.6	63.1	33.3									
H-20-02	D-1	F-4570	12.5-14.0	ML		36	1.1	2.1	96.8	43	28	15						
	D-6	F-4570	15.0-17.0	CL		30	0	0.4	99.6	44	25	19						
	D-12	F-4570	30.0-32.0	ML		32	2.1	0.5	97.4	36	26	10						
	D-16	F-4570	45.0-47.0	ML		24	11.4	33.4	55.2									
H-20A-02	D-1	F-4619	2.0-4.0	CH		34	8.7	27.5	63.8	52	26	26						
	D-26	F-4619	73.0-75.0	CL		29	0	0.1	99.9	38	23	15						
	D-30	F-4619	83.0-85.0	SM		31	8.5	48.0	43.4									
	D-31	F-4619	89.0-91.0	SP-SM		7	34.2	57.4	7.4									

Test Hole Number	Sample No.	Lab Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)	Field Vane Shear					
Wall 16 cont.													Undisturbed			Remolded		
H-21-02	D-7	F-4609	18.0-19.5	GP		4	86.8	9.3	3.9									
	D-15	F-4609	45.0-47.0	ML		28	0.1	8.4	91.5	24								
	D-16	F-4609	48.0-50.0	SM		24	0.6	61.7	37.7									
	D-17	F-4609	51.0-53.0	SM		21	1.0	76.6	22.3									
	D-19	F-4609	60.0-61.5	SM		17	19.7	42.5	37.8									
H-22-02	D-1	F-4495	6.0-7.5	ML		31	0	33.5	66.5									
	D-5	F-4495	21.0-22.5	ML		30	0	2.6	97.4	31	26	5						
	D-10	F-4495	46.0-47.5	ML		35	0	3.3	96.7	40	26	14						
	D-19	F-4495	89.0-87.5	CL		29	0	9.7	90.3	48	27	21						
	D-23	F-4495	106-107.5	SP-SM		25	0.2	88.9	10.9									
H-22A-02	VS-1	F-4505	6.0-7.5										Su =	4,500	psf	Su′ =	280	psf
	VS-2	F-4505	9.0-10.5	ML		33	0	1.9	98.1	36	26	10	Su =	310	psf	Su′ =	155	psf
	VS-3	F-4505	15.0-16.5										Su =	590	psf	Su′ =	120	psf
	VS-4	F-4505	25.0-26.5										Su =	1,240	psf	Su′ =	1,240	psf
	VS-5	F-4505	36.0-37.5	CL		31	0	2.6	97.4	39	24	15	Su =	620	psf	Su′ =	370	psf
H-35-02	D-8	F-4557	20.0-26.5	ML		38	0.4	0.7	99.0	38	25	13						
	VS-10	F-4557	24.0-25.0										Su =	780	psf	Su′ =	120	psf
	D-14	F-4557	30.0-31.5	CL		31	0	0.7	99.3	43	25	18						
	VS-15	F-4557	35.0-36.0										Su =	190	psf	Su′ =	90	psf
	D-19	F-4557	45.0-46.5	ML		30	0	0.2	99.8	38	26	12						
	D-21	F-4557	55.0-56.5	CL		26	4.4	12.1	83.5	35	22	13						
	D-26	F-4557	85.0-86.5	SM		23	2.6	77.0	20.4									

Test Hole Number	Sample No.	Laboratory Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)	Field Vane Shear					
													Undisturbed			Remolded		
H-23-02	D1	F-4571	5.0-6.5	CH		37	0	0.6	99.4	58	27	31						
	VS-2	F-4571	6.5-7.5										Su =	930	psf	Su′ =	370	psf
	D-4	F-4571	8.5-10.0	CL		21	18.4	27.2	54.3	37	21	16						
	D-9	F-4571	18.019.5	ML		42	6.7	4.4	88.9	40	26	14						
	V-10	F-4571	20.0-21.0										Su =	1,690	psf	Su′ =	155	psf
	D-19	F-4571	45.0-46.5	SM		12	23.1	47.9	29.0									
	D-20	F-4571	50.0-51.5	CL		33	0.1	0.9	99.0	43	25	18						
	D-23	F-4571	65.0-66.5	ML		31	0	44.9	55.1									
	D-25	F-4571	75.0-76.5	SM		28	0.2	58.8	41.0									
H-23A-02	VS-6	F-4610	15.0-16.0										Su =	1,400	psf	Su′ =	90	psf
	D-7	F-4610	16.0-18.0	ML		39	0	0.4	99.6	35	28	7						
	VS-16	F-4610	40.0-43.0										Su =	1,520	psf	Su′ =	110	psf
	D-17	F-4610	41.0-43.0	ML		40	0	0.8	99.2	40	26	14						
	D-25	F-4610	60.0-62.0	CL		31	0	5.3	94.7	45	25	20						
	D-26	F-4610	63.0-65.0	CL		32	0	1.7	98.3	35	24	11						
H-34-02	D-5	F-4573	13.5-15.5	CH		35	0	1.5	98.5	55	29	26						
	VS-6	F-4573	15.5-16.5										Su =	715	psf	Su′ =	220	psf
	D-9	F-4573	22.0-23.5	CL		32	0	0.2	99.8	44	24	20						
	VS-10	F-4573	23.5-24.5										Su =	5,380	psf	Su′ =	650	psf
	VS-13	F-4573	29.5-30.5										Su =	6,200+	psf			Refusal
	D-26	F-4573	63.5-65.5	CL		30	0	0.2	99.8	43	22	21						
	D-35	F-4573	93.5-95.5	ML		29	0	0.1	99.9	32	26	6						
	D-43	F-4573	118-120	CL		34	0	0	100.0	40	25	15						
	D-50	F-4573	153-155	CL		25	3.4	7.3	89.4	33	22	11						

Test Hole Number	Sample No.	Laboratory Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)	Type of Test					
B-6-92	ST-2		7.0-.9.0	MH		29				50	29	21						
	S-3		10.0-11.5	ML		26.5				46	27	19						
	S-5		20.0-21.5	ML		30	0	0	100	46	28	18						27 % Clay
	S-7		30.0-31.5	ML		20	0	48.0	52.0									
	S-9		40.0-41.5	ML			0	20.8	79.2				**Direct Shear**		(Remolded)			$\phi = 37.8°$
				SM	101.4	21							$\sigma_n =$	2,090	psf	$\sigma_p =$	1,810.2	psf
					101.4	20.9							$\sigma_n =$	4,025	psf	$\sigma_p =$	3,321.8	psf
					102.0	20.5							$\sigma_n =$	7,882	psf	$\sigma_p =$	6,269.6	psf
H-24-02	D-1	F-4496	2.0-3.5	CL		25	0	8.0	92.0	37	24	13						
	D-11	F-4496	26.4-27.9	SC		21	20.9	30.4	48.7	32	23	9						
	D-14	F-4496	40.0-41.5	CH		46	0.3	13.6	86.1	60	27	33						
H-25-02	D-3	F-4475	5.0-7.0	ML		48	0	3.5	96.5	42	29	13						
	S-6	F-4475	14.0-16.0	ML	119	34	0	2.7	92.3	44	33	11	**Direct Shear**		Undisturbed			C = 212 psf
					116.2	33.7							$\sigma_n =$	1,470	psf	$\sigma_p =$	1,233	psf $\phi = 34.0°$
					116.6	33.7							$\sigma_n =$	2,993	psf	$\sigma_p =$	2,182	psf
					117.7	33.7							$\sigma_n =$	5,957	psf	$\sigma_p =$	4,242	psf
	D-10	F-4475	24.0-26.0	ML		22	1.0	12.8	86.2	31					Remolded			C = 101 psf
	D-13	F-4475	33.0-35.0	ML		34	0	10.8	89.2	39			$\sigma_n =$	1,539	psf	$\sigma_p =$	973	psf $\phi = 29.3°$
	D-15	F-4475	40.0-42.0	ML		29	12.1	25.2	62.7	28			$\sigma_n =$	3,086	psf	$\sigma_p =$	1,817	psf
	D-19	F-4475	51.0-53.0	ML		33	0	8.3	91.7				$\sigma_n =$	5,867	psf	$\sigma_p =$	3393	psf
	D-23	F-4475	64.0-65.5	GW		10	56.2	39.2	4.7									

Test Hole Number	Sample No.	Labo Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)	Type of Test					
Junction of SR 204th Place																		
TH-4-01	D-3	F-4301	7.5-9.0	ML		19	9.9	25.6	64.5									
	D-6	F-4301	15.0-16.5	SM		19	7.0	45.1	48.0									
	D-9	F-4301	25.0-26.5	GM		8	50.0	34.8	15.2									
B-5-92	S-1		5.0-6.5	MH		38							**Resistivity =**		240	OHM-CM		Natural Moisture
	ST-3		10.0-12.0	CL						33	23	10	**Torvane shear**		Su =	800	psf	
	ST-6		20.0-22.0	SM											Su =	700	psf	
	S-8		25.0-26.5	ML		21	0	17.1	82.9									
TH-3-01	D-4	F-4300	12.5-14.0	ML		14	1.3	27.5	71.1	23								
	D-8	F-4300	25.0-26.5	SM		16	28.6	59.4	12.0									
Wall 17 – Vault 3																		
H-42-03	D-2	F-5121	6.0-8.0	ML		19	15.7	34.1	50.2	22								
	D-10	F-5121	46.0-47.5	CL		27	0	3.5	96.5	33	22	11						
													Consolidation Test Results					
Wall 18													**Po**	**Ca**	**Cc**	**Cv**	**C∞**	
H-27-02	D-2	F-4372	4.0-5.5	ML		28	0.1	25.3	74.6				**(Ksf)**			**Ft2/day**		
	U-3B	F-4372	7.5	ML	121.7	28	0.3	19.3	80.5	28			2.7	0.013	0.43	2.55	.0007	
	U-3C	F-4372	7.83	SM		23	0	50.7	49.3	20			**UU**	q = 651 psf		ε = 4.5 %		
	D-4	F-4372	9.0-10.5	SM		25	1.1	58.2	40.7									
	D-8	F-4372	25.0-25.5	GW		6	58.1	40.4	1.5									
B-4E-90	ST-5		10.0-12.5	MH	109.3	40	0	2	98	51.9	29.8	22.1	1.2	0.041	0.15			38 % Clay
H-43-03	D-5	F-5083	14.0-15.5	CL-ML		30	10.0	38.9	51.1	25	19	6						
	D-8	F-5083	29.0-30.5	SM		40	2.7	61.1	36.2									

Test Hole Number	Sample No.	Lab Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)	Type of Test					
Wall 19																		
H-45-03	D-1	F-5090	0.0-2.0	SM		41	10.5	53.4	36.1	47	38	9						(Before drying)
										38			**Consolidation Test Results**					
													Po	Ca	Cc	Cv	Cα	
B-1-92	S-3		12.5-14.0	MH		92.5				83.6	52.6	31.0	(Ksf)			Ft2/day		
	ST-4		15.0-17.0	ML	111.3	42.8							1.35	0.043	0.15			
													Torvane shear		Su =	1,200	psf	
	S-6		20.0-21.5	MH		30	0	0	100	50	27	23						31 % Clay
	S-9		35.0-36.5	SM		7.5	33.3	52.9	13.8									
	S-13		55.7-56.9	SM		19.5	0.4	52.7	46.9				**Direct Shear**		(Remolded)			$\phi = 40°$
	S-14		60.0-61.9	SP	124.4	21.5							$\sigma_n =$	1,776	psf	$\sigma_p =$	1,562	psf
					124.5	21.9							$\sigma_n =$	4,025	psf	$\sigma_p =$	3,259	psf
					124.4	21.4							$\sigma_n =$	7,882	psf	$\sigma_p =$	6,615	psf
H-28-02	D-2	F-4374	6.5-8.0	MH		54	10.6	8.8	80.6	57	45	12						
	S-3	F-4374	10.8	MH	92.5	81	0	12.0	88.0	85	72	13	UU	q = 1,177 psf		ε =8 %		
	S-3	F-4374	11.2	MH	98.8	63	0	17.8	82.1	74	47	27	2.30	0.048	0.19	0.23	.0025	
	S-5	F-4374	16.2	ML	114.5	39	0	2.0	98.0	44	27	17	1.9	0.043	0.155	0.27	.0017	
	D-6	F-4374	16.5-18.0	CL		53	0	1.4	98.6	44	26	18						
	D-11	F-4374	44.5-46.0	SP		13	1.2	97.6	1.1									
Bridge No. 202 / 47 & Wall 20																		
H-29-02	S-4	F-4375	11.33	ML	89.8	99	0	2.3	97.7	94			UU	q =835 psf		ε =7.6 %		
	S-4	F-4375	11.67	MH	95.7	62	0	4.7	95.3	73	44	29	2.0	0.067	0.18	0.10	.0014	
	D-8	F-4375	20.0-21.5	GW		8	56.8	39.9	3.3									
	D-12	F-4375	40.0-41.5	SM		18	25.8	28.5	45.7									
	D-13	F-4375	45.0-46.5	ML		27	3.6	10.5	85.9									

Test Hole Number	Sample No.	Lab Number	Sample Depth (feet)	USCS	Unit Weight (pcf)	Moisture Content (%)	Gradation Fraction			Atterberg Limits			SPECIALIZED TESTING					Remarks
							Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)	Type of Test					
Wall 21																		
TH-2-01	D-1	F-4299	1.0-2.5	SP-SM		9	40.5	53.6	6.0									
	D-2	F-4299	5.0-6.5	GM		16	40.4	38.9	20.7									
Wet Land Mitigation Site II																		
P-14-00	D-3	F-4302	15.0-16.5	GW-GM		8	51.6	41.5	7.0									
P-15-00	D-1	F-4303	5.0-6.5	SW-SM		12	42.4	49.6	8.0									
	D-2	F-4303	10.0-11.5	GW		19	56.3	40.8	2.8									
TH-1-01	D-4	F-4298	14.0-15.5	GW-GM		5	58.7	34.4	7.0									
H-31-02	D-2	F-4476	8.5-10.0	CL		32	0	8.2	91.8	40	23	17						
	D-3	F-4476	13.5-15.0	SW		11	42.3	53.7	4.0									
	D-4	F-4476	18.5-20.0	ML		30	0	32.7	67.3									
	D-5	F-4476	23.5-25.0	ML		33	0	1.8	98.2	29								
H-32-02	D-4	F-4493	19.0-20.5	ML		39	0	11.5	88.5	39	34	5						
	D-7	F-4493	34.0-35.5	CL		34	0	9.9	90.1	49	27	22						
	D-9	F-4493	44.0-45.5	ML		27	0	31.8	68.2									
H-33-02	D-2	F-4500	9.5-11.0	ML		31	0.1	6.0	93.9	41	27	14						
	D-10	F-4500	49.5-51.0	SW-SM		19	17.6	73.9	8.5									
	D-11	F-4500	54.5-56.0	ML		33	0	5.8	94.2	44	27	17						
H-38-02	D-2	F-4699	8.0-9.5	SW-SM		9	29.0	64.0	7.0									
	D-3	F-4699	13.0-14.5	GW		10	62.9	34.4	2.7									

Job No. **OL-3498** Date **March 26, 2002**

Hole No. **BC-1-01** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

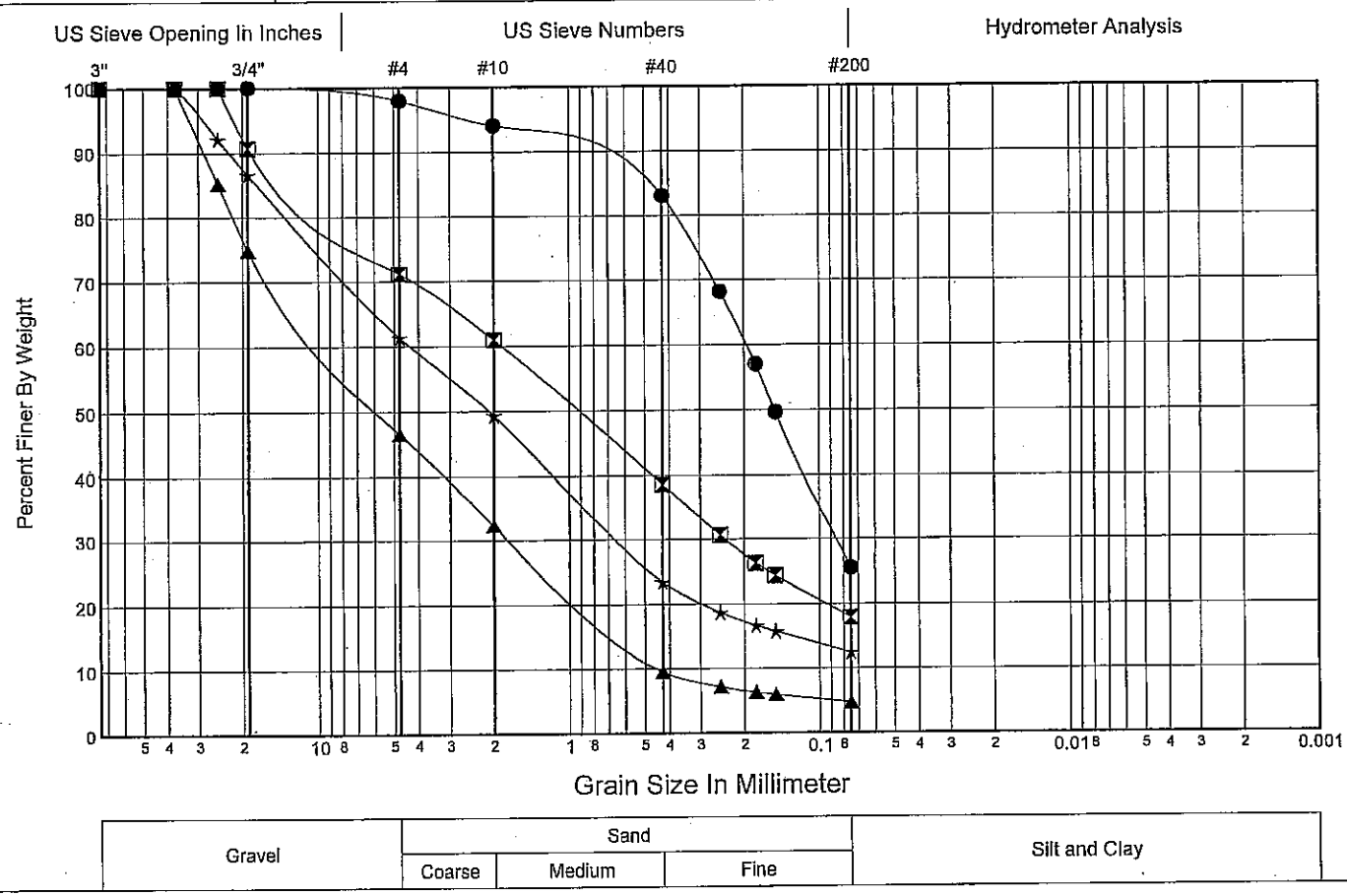
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	5.0	1.52	D-1	SM	See Boring Log	SILTY SAND	9			
⊠	10.0	3.05	D-2	SM	See Boring Log	SILTY SAND with GRAVEL	2			
▲	15.0	4.57	D-3	GP	See Boring Log	POORLY GRADED GRAVEL with SAND	5			
★	20.0	6.10	D-4	SM	See Boring Log	SILTY SAND with GRAVEL	8			

GRADATION FRACTIONS [47]

	%Gravel	%Sand	%Fines	Cc	Cu
●	2.1	72.3	25.6		
⊠	28.9	53.3	17.9		
▲	53.4	41.9	4.7	0.7	20.9
★	38.7	48.9	12.5	2.1	97.7

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.20	0.15	0.09		
⊠	1.87	0.94	0.24	0.09	
▲	9.18	5.62	1.73	0.87	0.44
★	4.31	2.09	0.63	0.29	



Job No. **OL-3498** Date **April 1, 2002**

Hole No. **MW-5** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

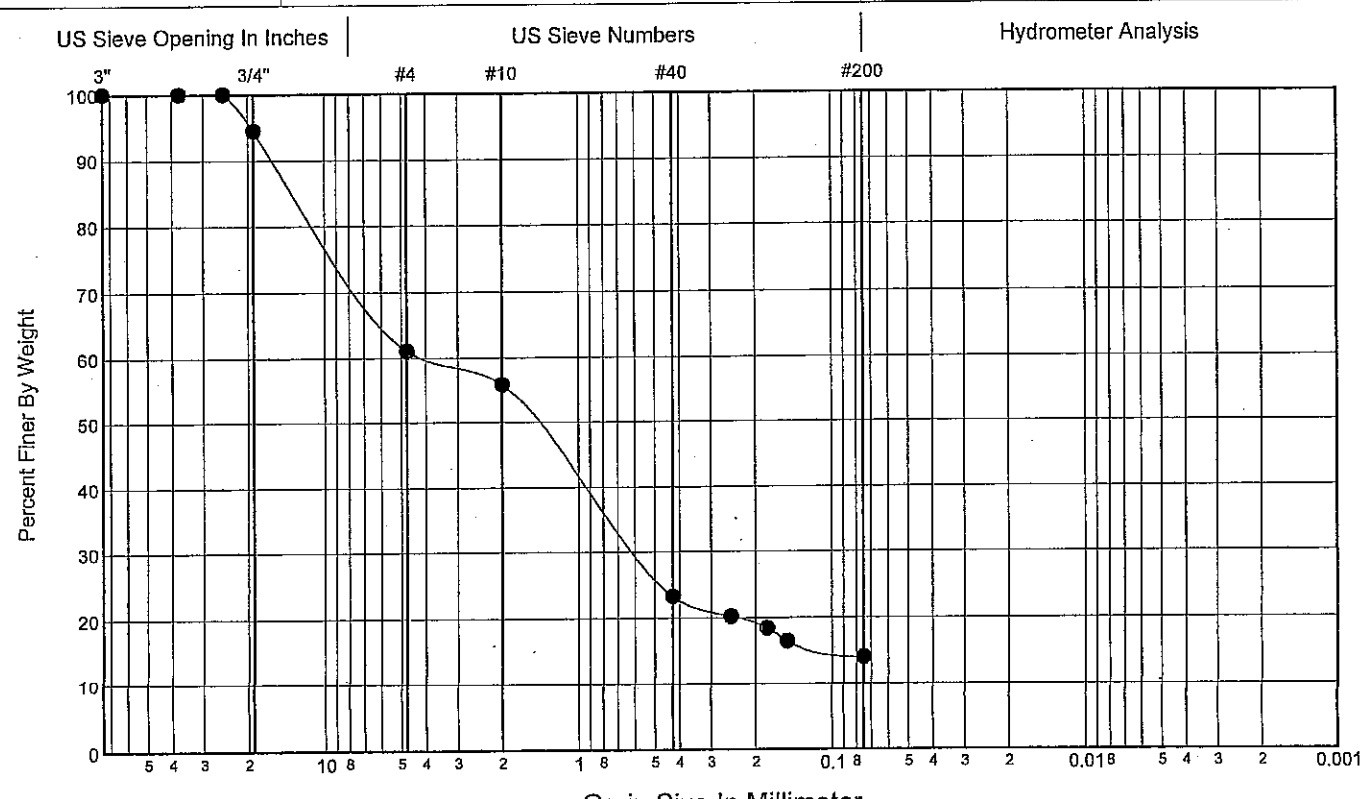
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	21.0	6.40	S-5	SM	See Boring Log	SILTY SAND with GRAVEL	1			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	38.9	47.1	14.0		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	3.99	1.51	0.59	0.24	



Job No. **OL-3498** Date **March 29, 2002**

Hole No. **TP-1** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

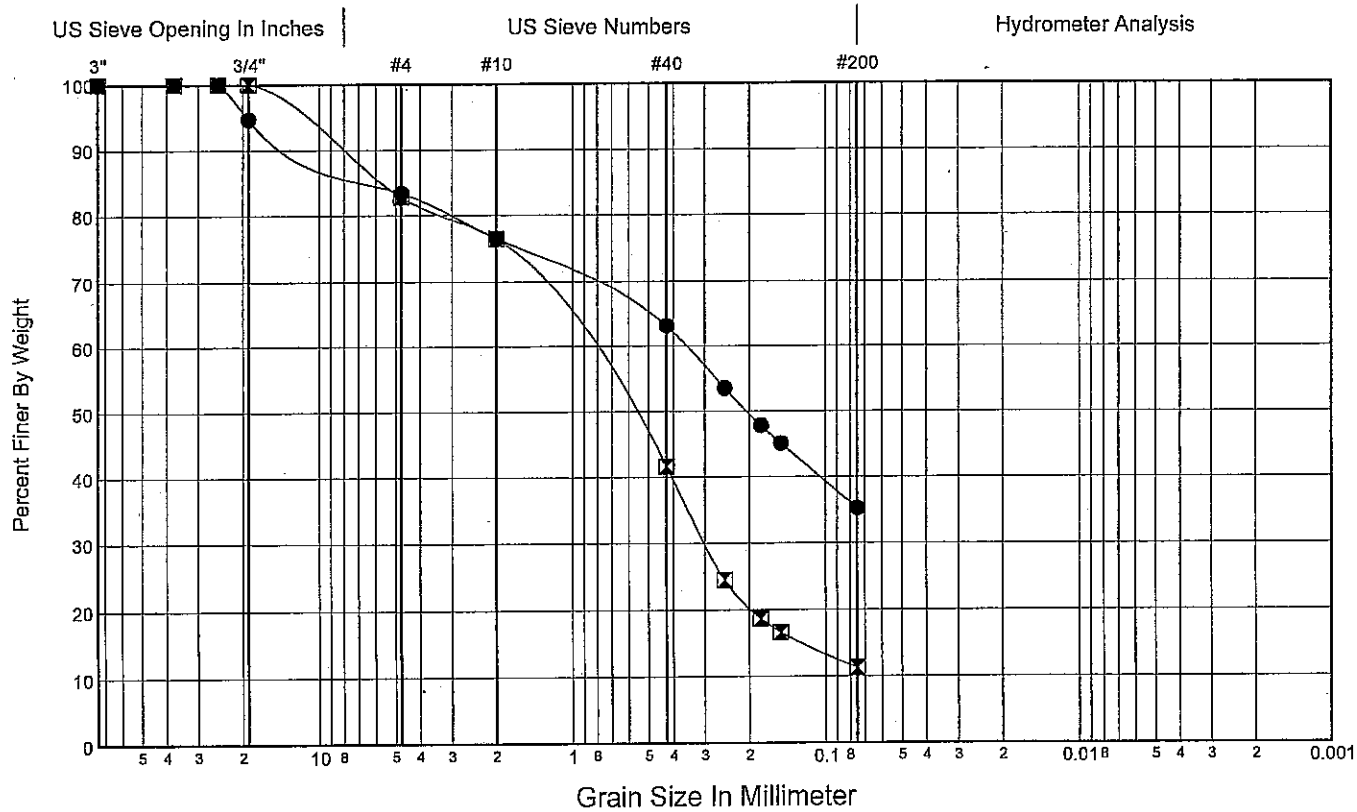
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	1.0	0.30	S-1	SM	See Boring Log	SILTY SAND with GRAVEL	7			
⊠	11.5	3.51	S-5	SW-SM	See Boring Log	WELL-GRADED SAND with SILT and GRAVEL	11			

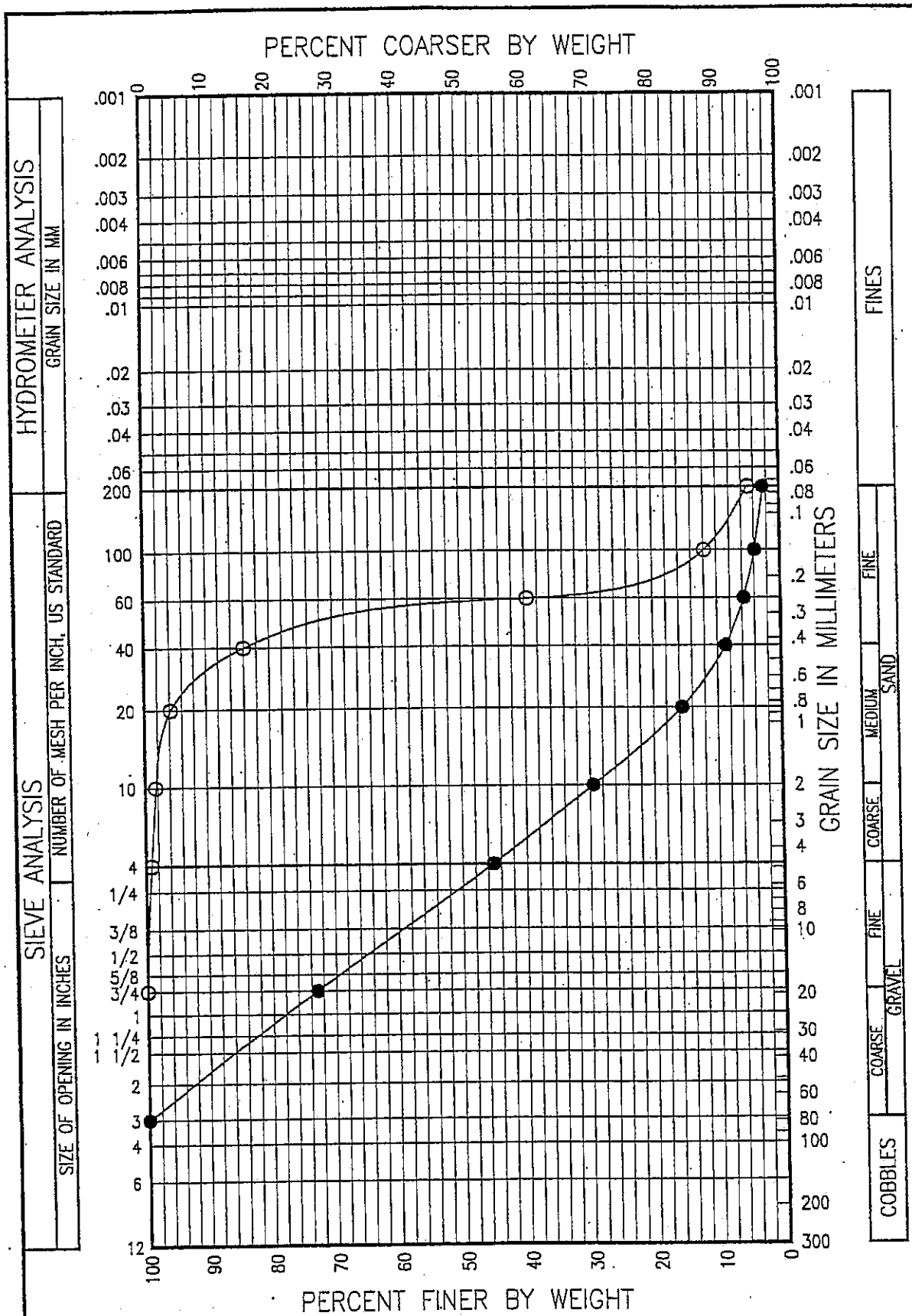
GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	16.6	48.2	35.1		
⊠	17.3	71.5	11.3	1.4	15.2

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.36	0.20			
⊠	0.96	0.62	0.30	0.19	



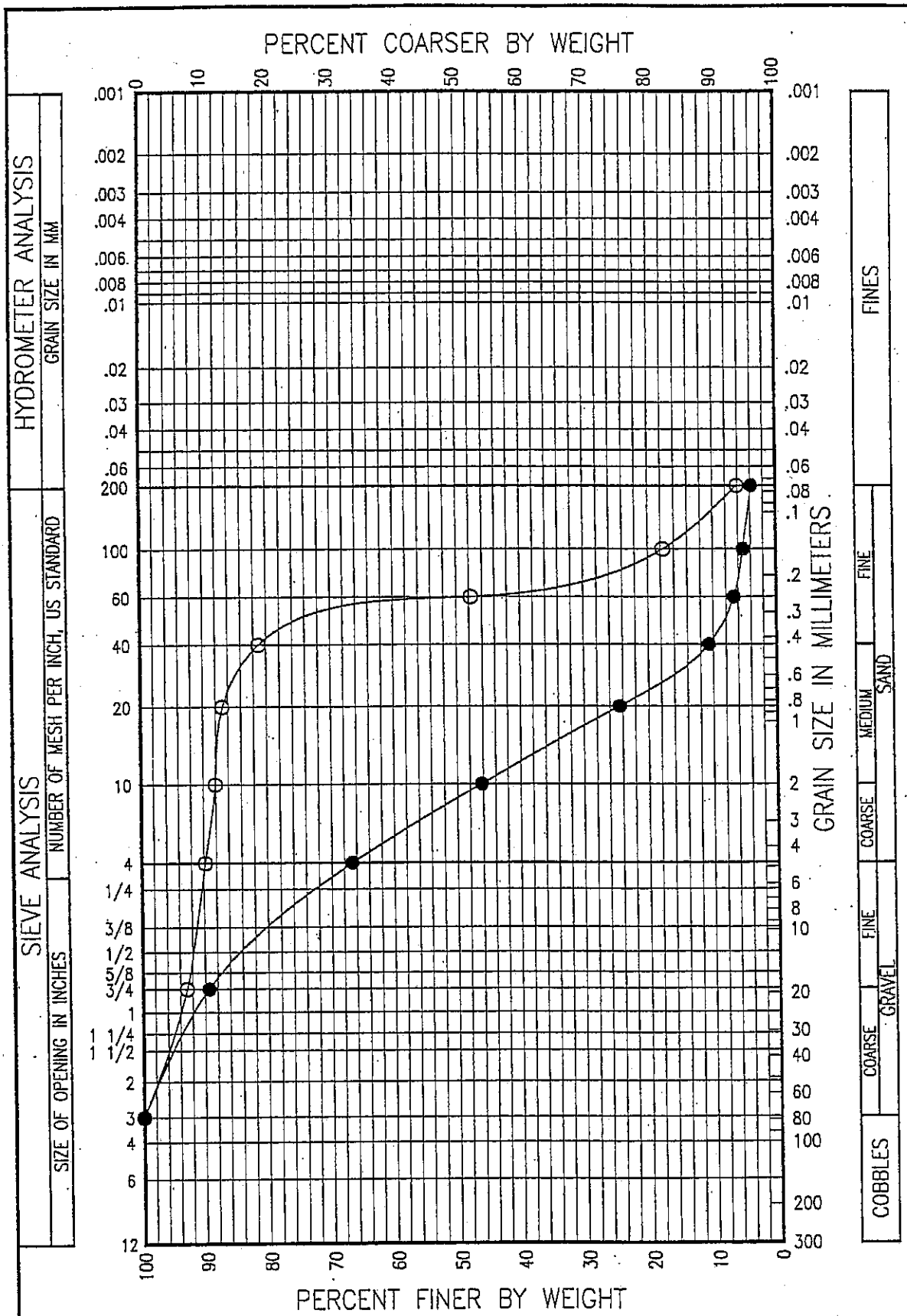


Key	Boring Number	Depth (ft.)	USCS	Description	Moisture Content (%)	LL	PL
●	B-1	15.0	GP	sandy GRAVEL			
○	B-1	22.5	SP	SAND			

TERRA ASSOCIATES
Geotechnical Consultants

GRAIN SIZE ANALYSIS
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj.No. 4811 | Date DEC. 2000 | Figure A-11

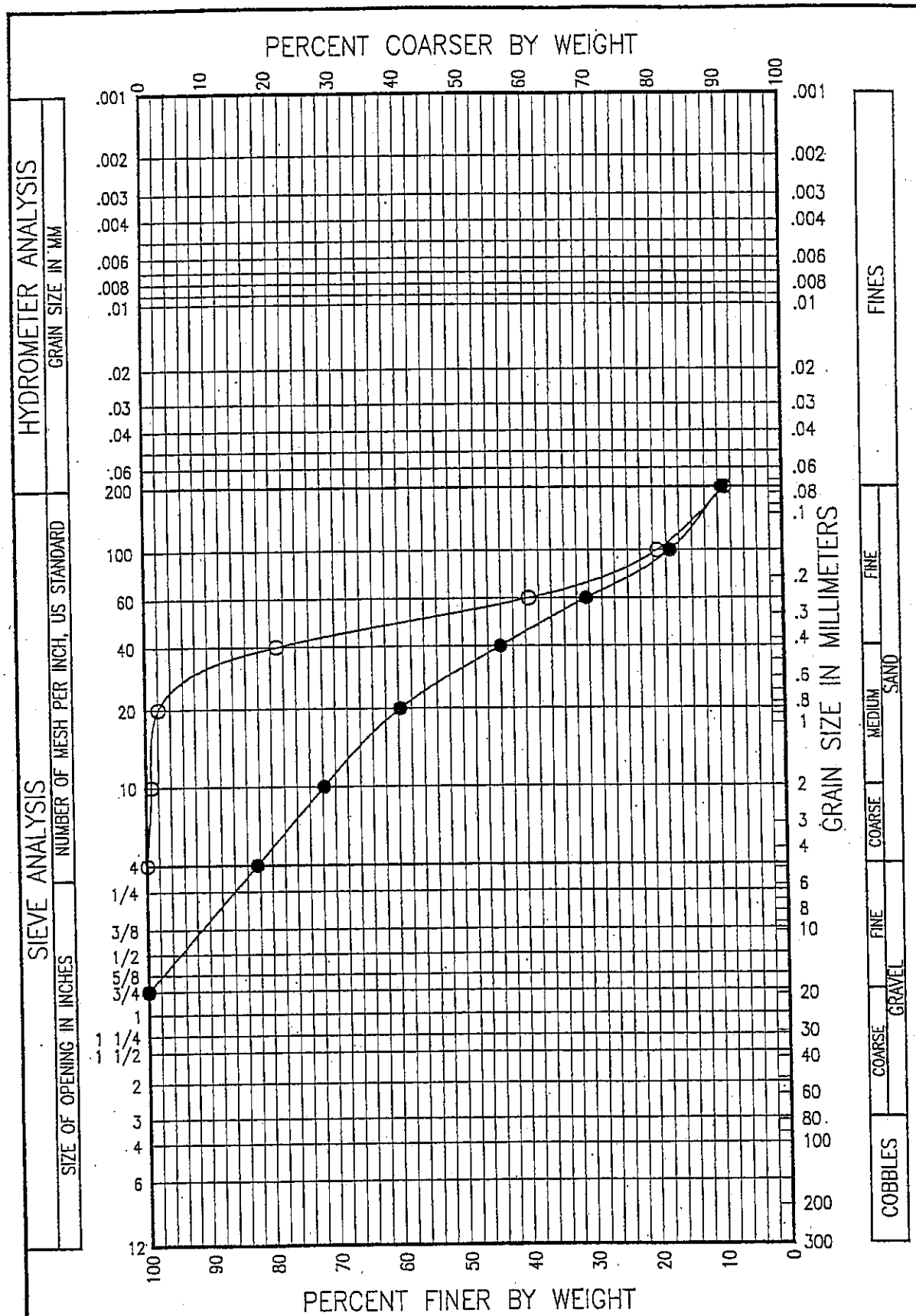


Key	Boring Number	Depth (ft.)	USCS	Description	Moisture Content (%)	LL	PL
●	B-2	12.5	SP	gravelly SAND			
○	B-2	17.5	SP	SAND			

TERRA ASSOCIATES
Geotechnical Consultants

GRAIN SIZE ANALYSIS
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj.No. 4811 | Date DEC. 2000 | Figure A-12

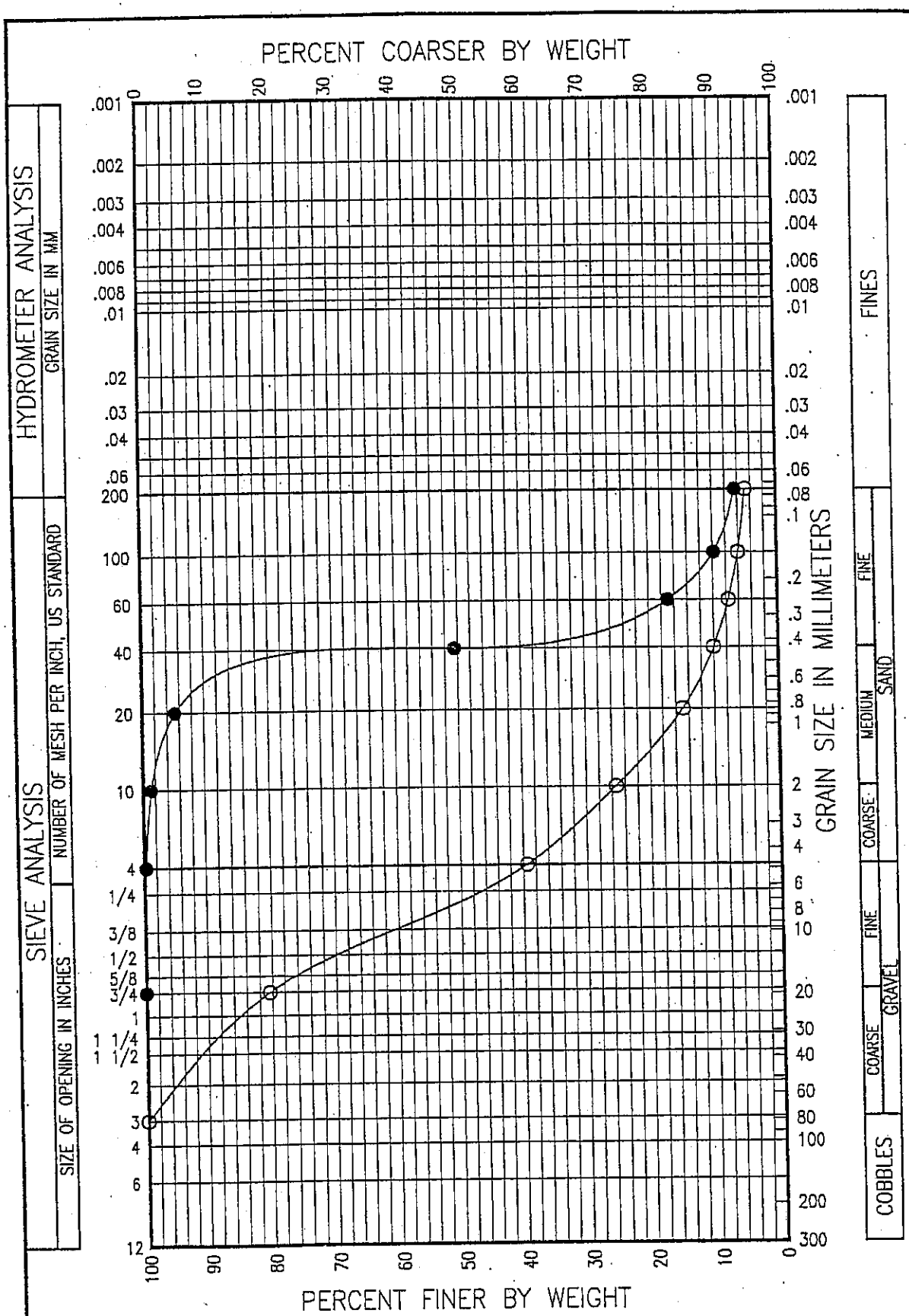


Key	Boring Number	Depth (ft.)	USCS	Description	Moisture Content (%)	LL	PL
●	B-3	12.5	SP-SM	SAND with gravel and silt			
○	B-3	17.5	SP-SM	SAND with silt			

TERRA ASSOCIATES
Geotechnical Consultants

GRAIN SIZE ANALYSIS
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj.No. 4811 | Date DEC. 2000 | Figure A-13

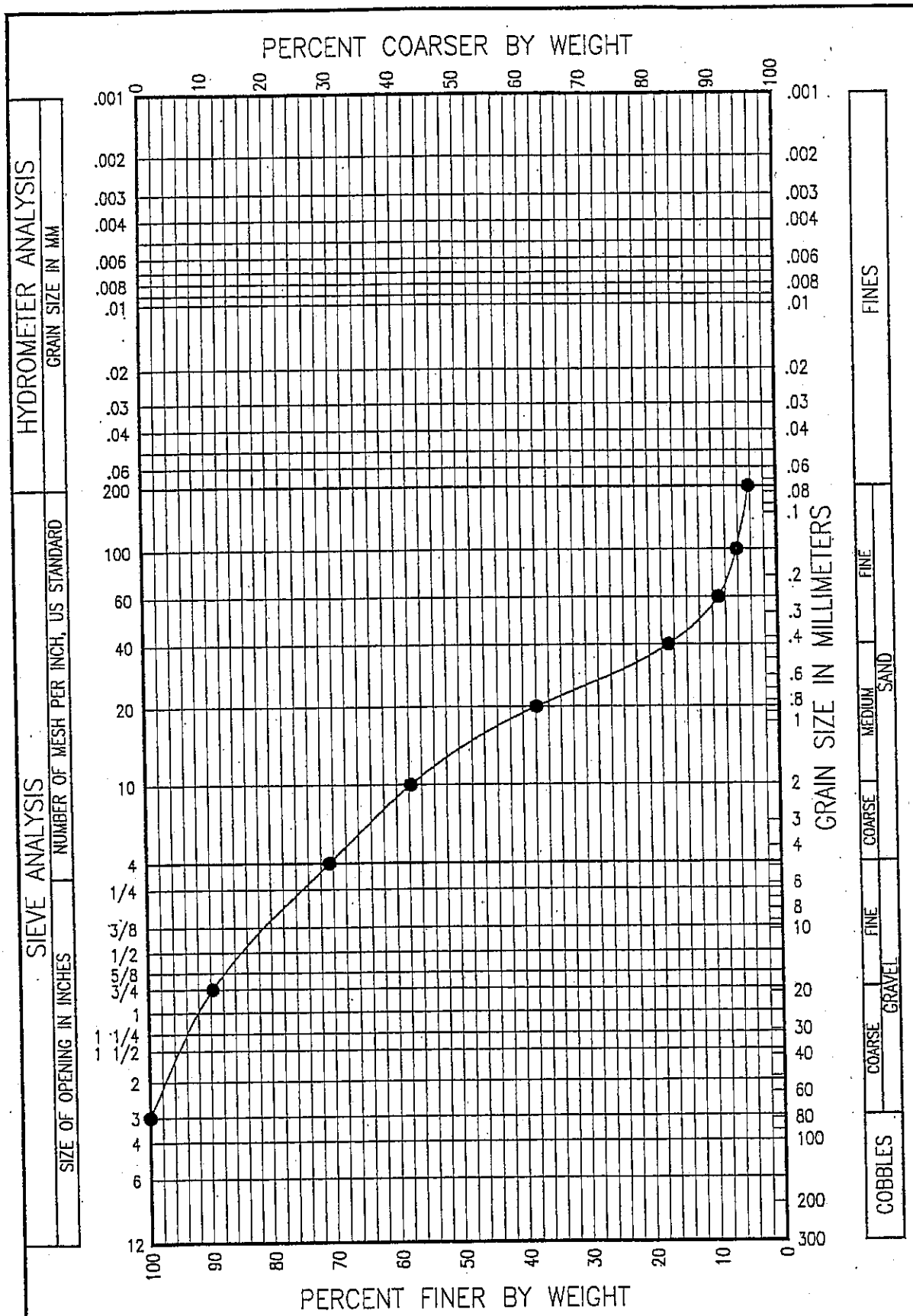


Key	Boring Number	Depth (ft.)	USCS	Description	Moisture Content (%)	LL	PL
●	B-3	30.0	SP-SM	SAND with silt			
○	B-4	17.5	GP	sandy GRAVEL			

TERRA ASSOCIATES
Geotechnical Consultants

GRAIN SIZE ANALYSIS
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj.No. 4811 | Date DEC. 2000 | Figure A-14



Key	Boring Number	Depth (ft.)	USCS	Description	Moisture Content (%)	LL	PL
●	B-4	22.5	SP	gravelly SAND			

TERRA ASSOCIATES
Geotechnical Consultants

GRAIN SIZE ANALYSIS
JEFFERSON AT MARYMOOR PARK
REDMOND, WASHINGTON

Proj.No. 4811 | Date DEC. 2000 | Figure A-15

Job No. OL-3498 | Date December 11, 2003

Hole No. PP-1-03 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

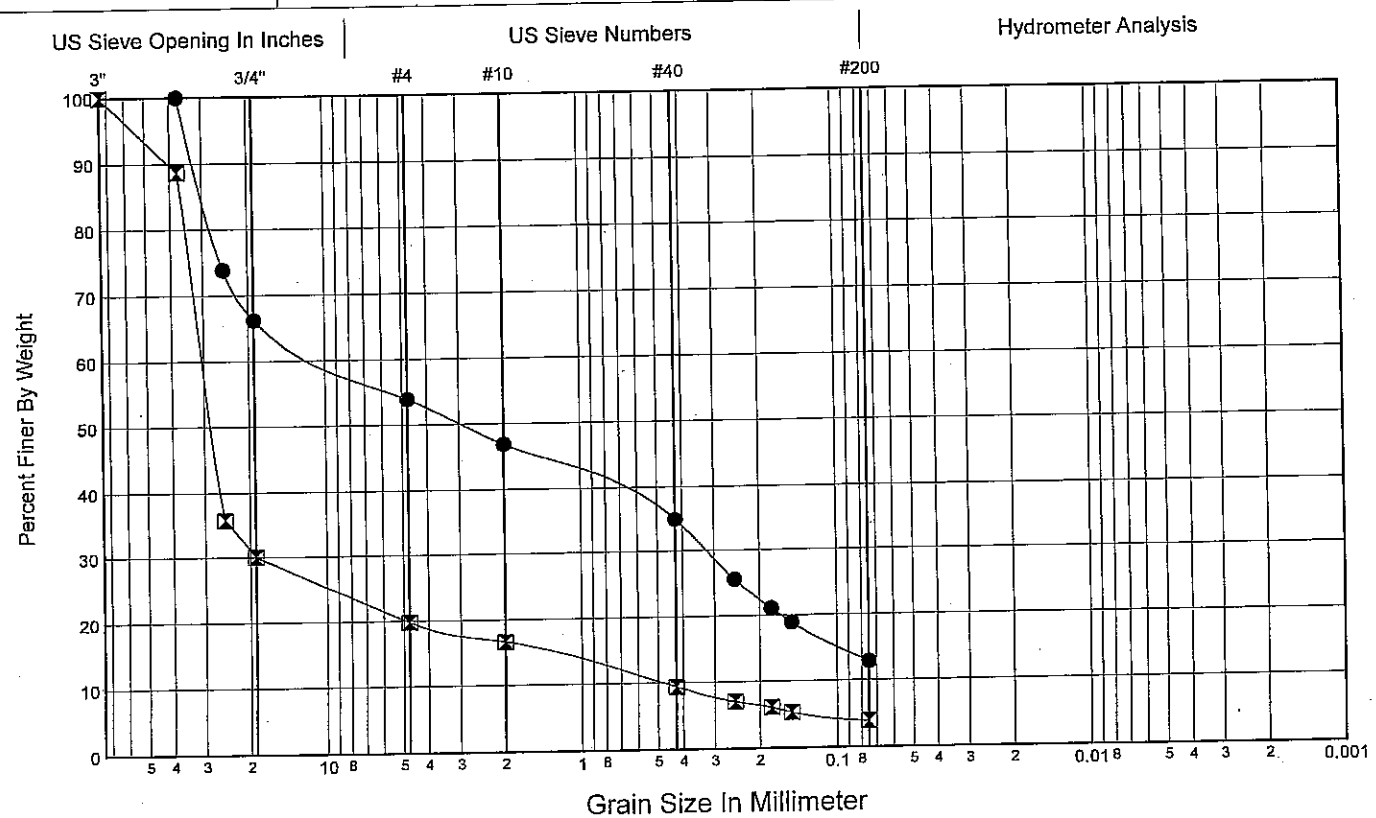
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	2.0	0.61	D-2	GM	See Boring Log	SILTY GRAVEL with SAND	12			
⊠	6.0	1.83	D-4	GP	See Boring Log	POORLY GRADED GRAVEL with SAND	7			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	46.1	41.1	12.8		
⊠	80.2	15.9	3.9	24.6	62.3

GRADATION VALUES

	D60	D50	D30	D20	D10
●	9.425	2.93	0.32	0.16	
⊠	30.120	27.90	18.95	4.86	0.484



Job No. OL-3498 | Date December 11, 2003

Hole No. PP-2-03 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

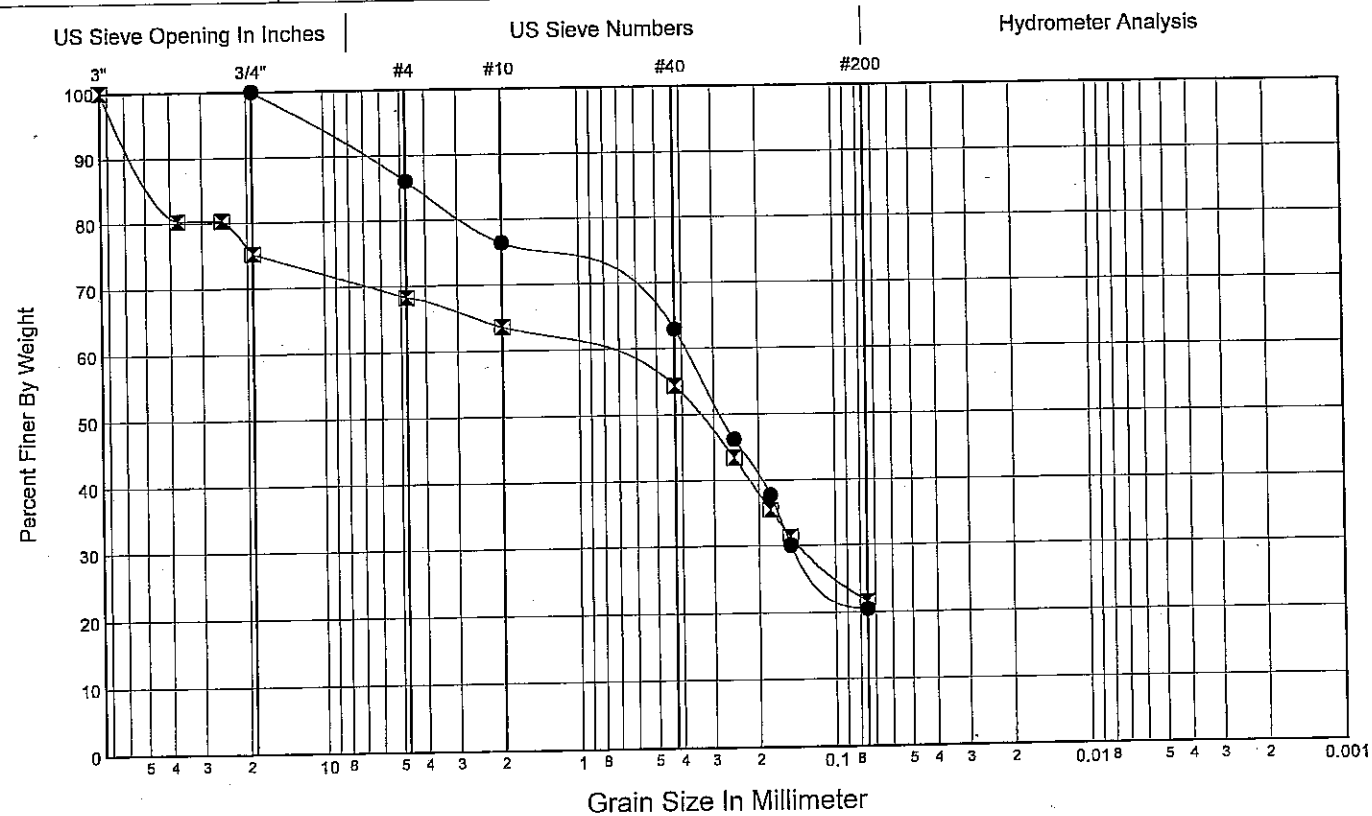
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	0.0	0.00	D-1	SM	See Boring Log	SILTY SAND	16			
⊠	4.0	1.22	D-3	SM	See Boring Log	SILTY SAND with GRAVEL	15			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	14.0	65.5	20.4		
⊠	31.7	46.7	21.6		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.387	0.28	0.15		
⊠	1.086	0.34	0.14		



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **June 4, 2004**

Hole No. **PP-4-03** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

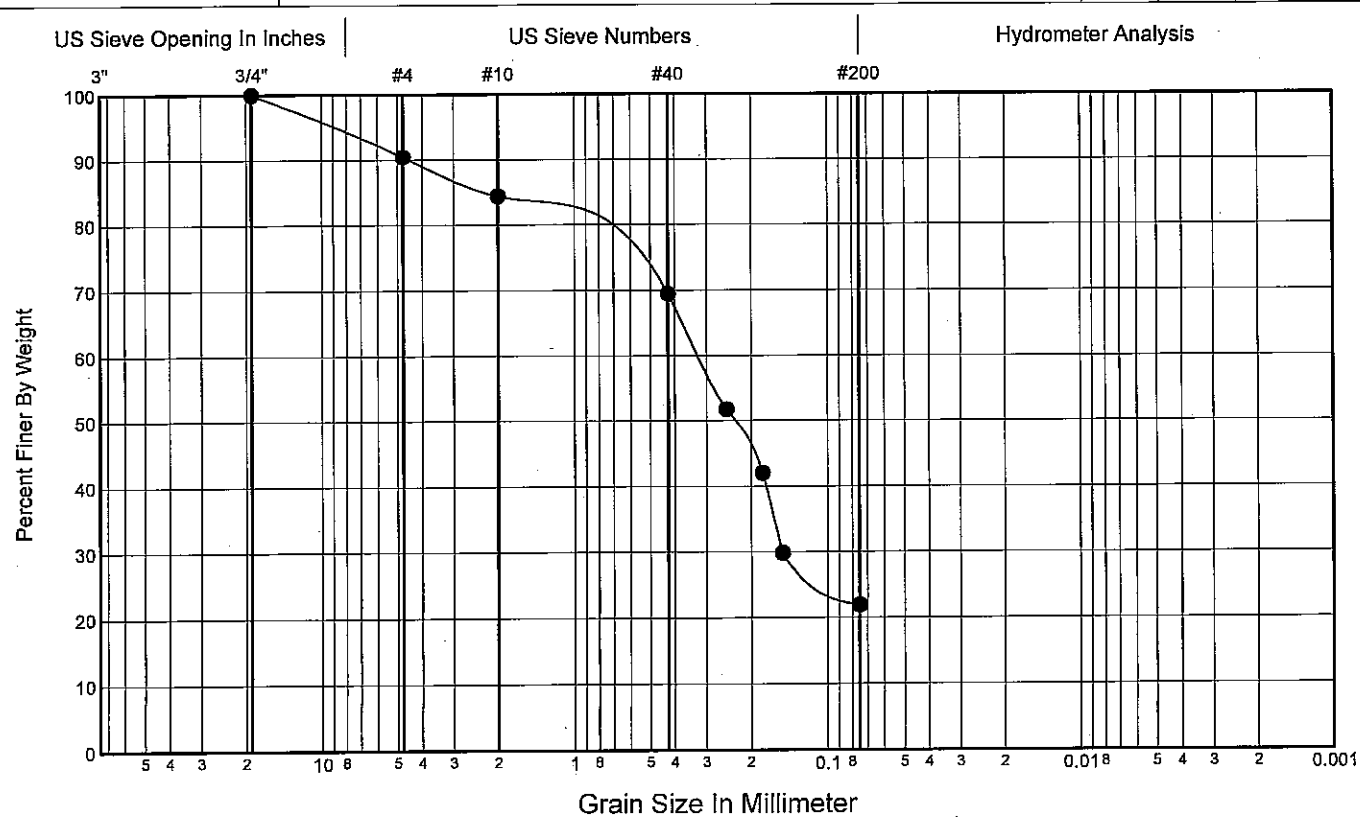
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	4.0	1.22	B-3	SM	See Boring Log	SILTY SAND	23			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	9.6	68.6	21.8		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.321	0.24	0.15		



Job No. OL-3498 | Date December 19, 2003

Hole No. PP-05-03 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

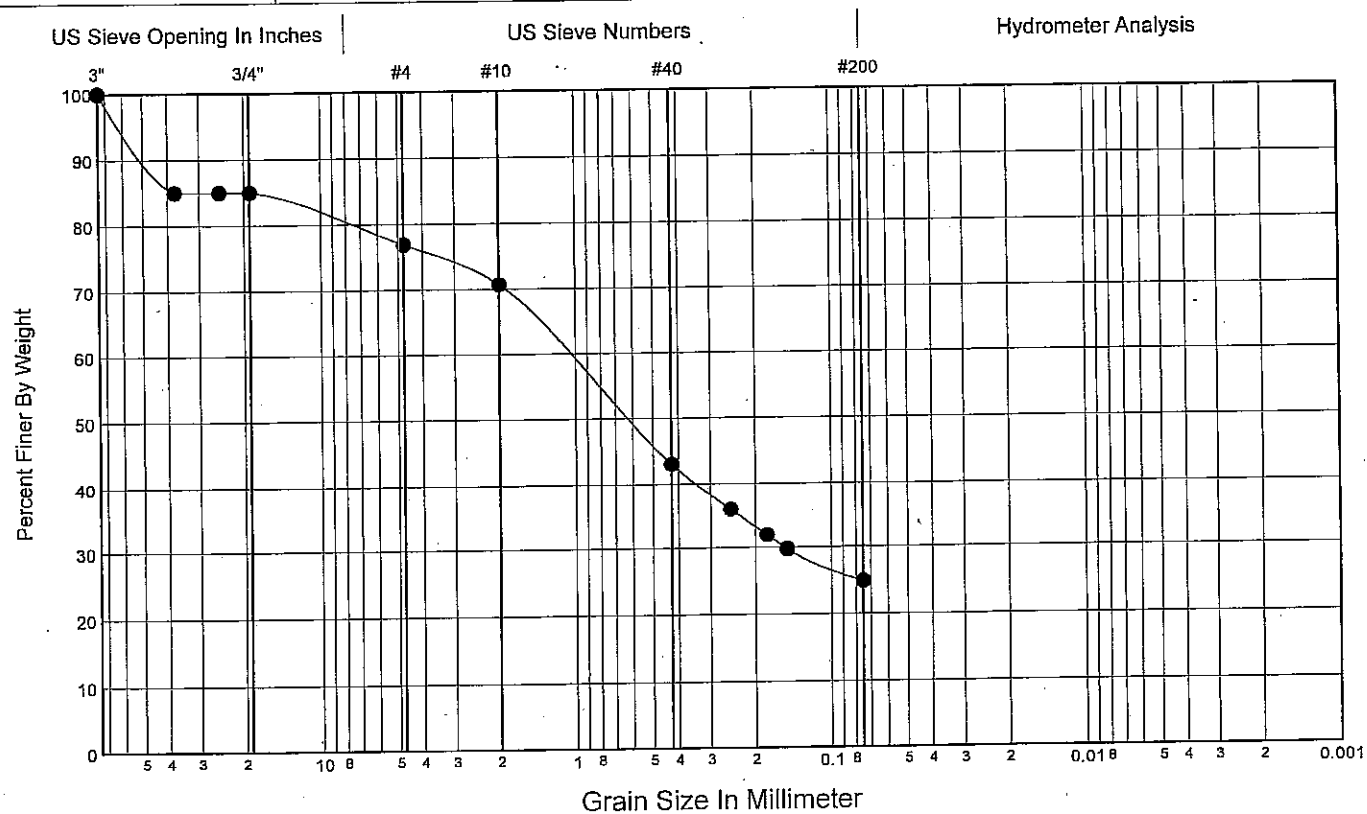
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	2.0	0.61	B-2	SM	See Boring Log	SILTY SAND with GRAVEL	29			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	23.1	52.0	25.0		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	1.096	0.63	0.15		



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3498 | Date February 12, 2004

Hole No. PP-6-03 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

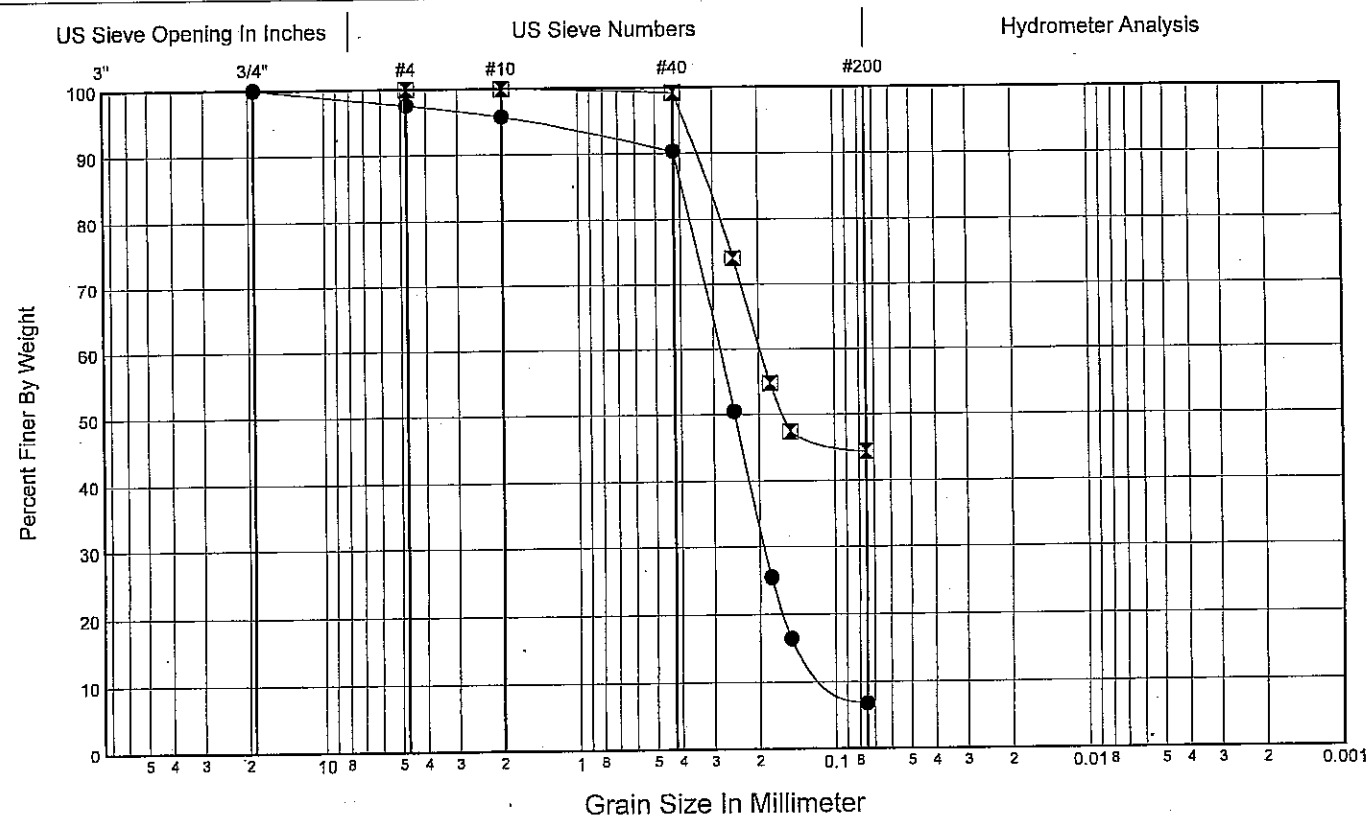
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	2.0	0.61	B-2	SP-SM	See Boring Log	POORLY GRADED SAND with SILT	17			
⊠	4.0	1.22	B-3	SM	See Boring Log	SILTY SAND	34			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	2.4	90.8	6.8	1.4	3.0
⊠	0.0	55.6	44.4		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.284	0.25	0.19	0.16	0.094
⊠	0.197	0.16			



Job No. **OL-3498** Date **April 24, 2002**

Hole No. **H-1-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

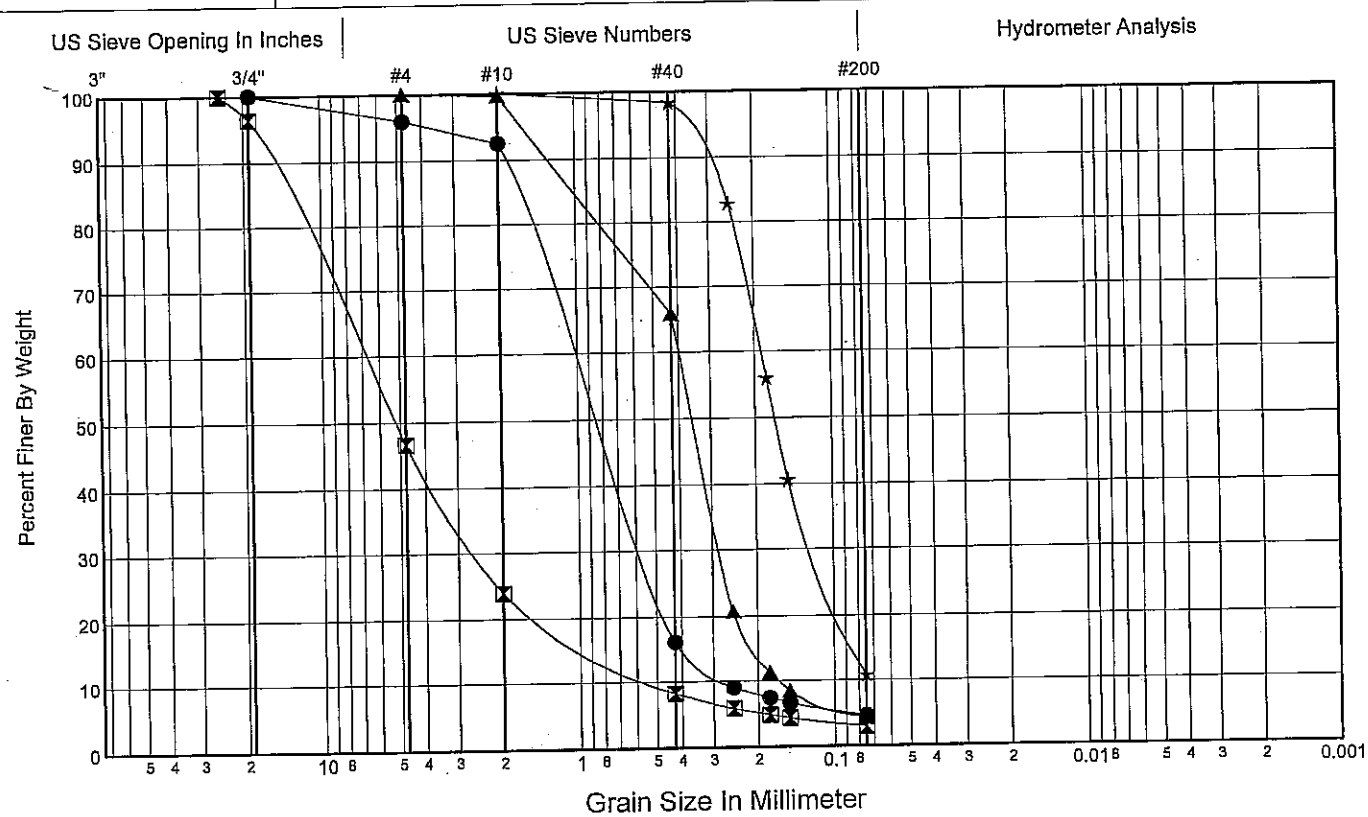
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	5.0	1.52	D-1	SP	See Boring Log	POORLY GRADED SAND	17			
⊠	10.0	3.05	D-2	GW	See Boring Log	WELL-GRADED GRAVEL with SAND	13			
▲	25.0	7.62	D-5	SP	See Boring Log	POORLY GRADED SAND	28			
★	40.0	12.19	D-8	SP-SM	See Boring Log	POORLY GRADED SAND with SILT	25			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	4.1	91.4	4.6	1.1	3.8
⊠	53.4	43.7	3.0	1.8	13.6
▲	0.0	95.7	4.3	1.2	2.4
★	0.0	89.2	10.8	1.0	2.6

GRADATION VALUES

	D60	D50	D30	D20	D10
●	1.03	0.84	0.56	0.46	0.27
⊠	6.90	5.22	2.52	1.35	0.51
▲	0.40	0.35	0.28	0.24	0.17
★	0.19	0.17	0.12	0.09	



Job No. **OL-3498** Date **July 10, 2002**

Hole No. **H-2-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

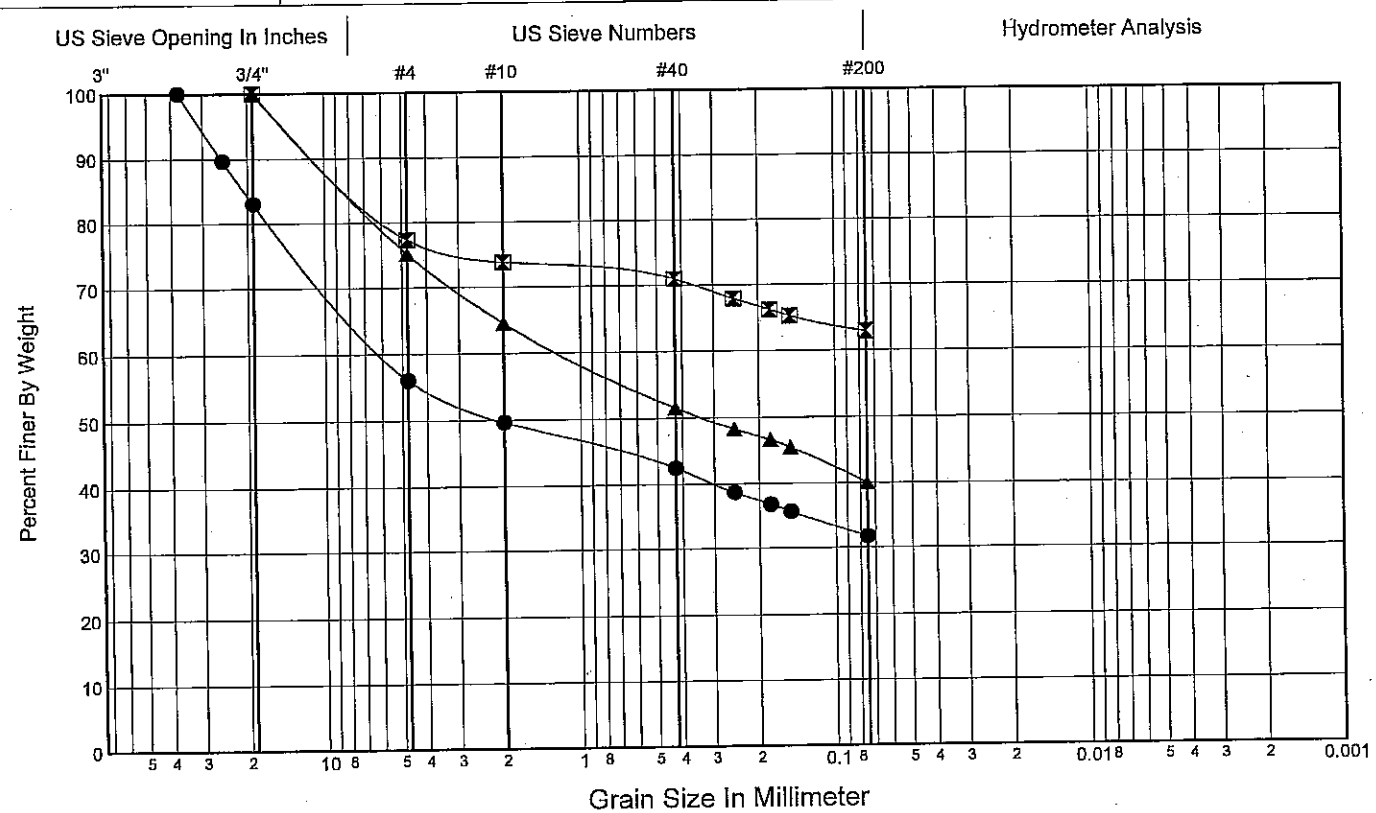
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	10.0	3.05	D-2	GM	See Boring Log	SILTY GRAVEL with SAND	15			
⊠	30.0	9.14	D-6	ML	See Boring Log	GRAVELLY SILT	24			
▲	40.0	12.19	D-8	SM	See Boring Log	SILTY SAND with GRAVEL	21			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	44.0	24.3	31.7		
⊠	22.7	14.5	62.8		
▲	24.9	35.2	40.0		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	5.826	2.11			
⊠					
▲	1.176	0.33			



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **April 4, 2002**

Hole No. **H-3-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

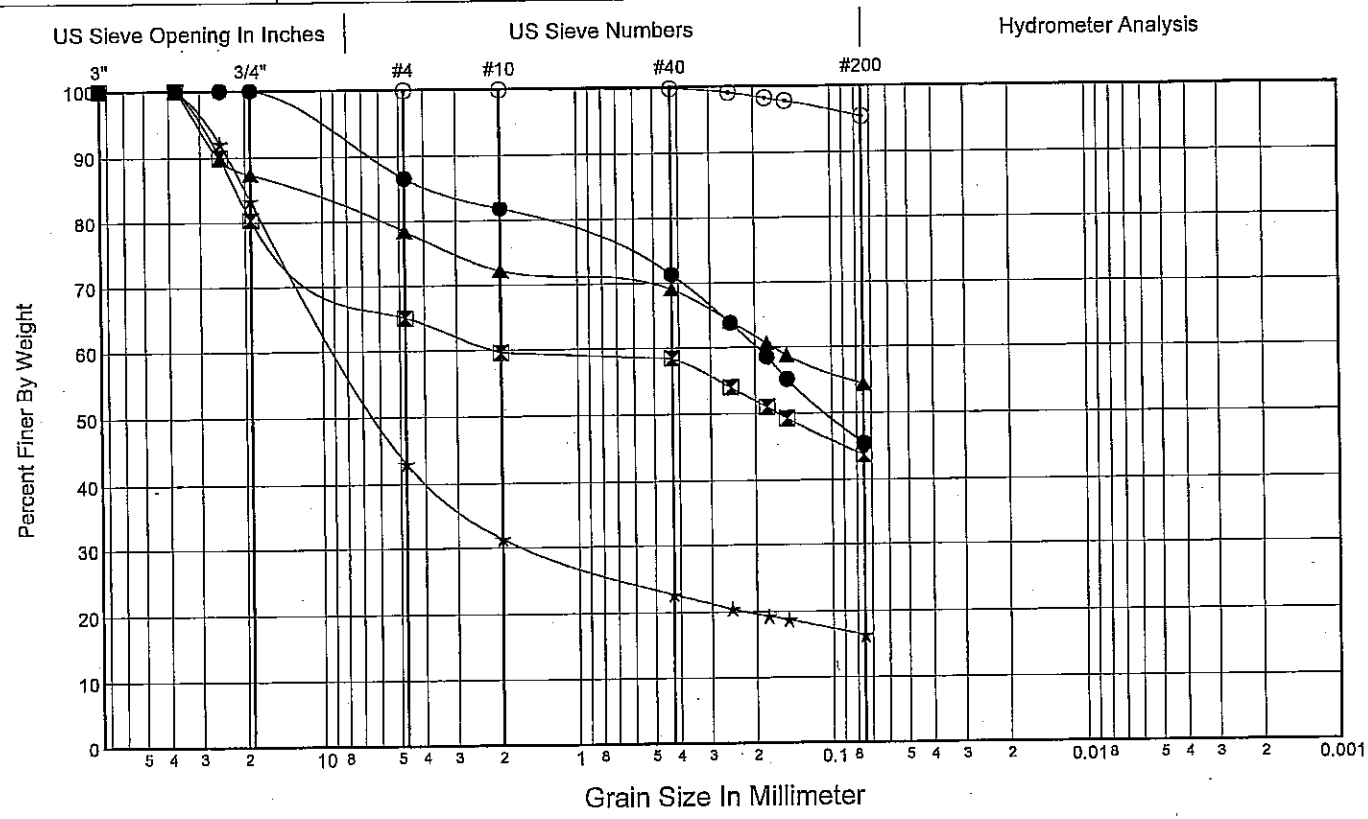
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	4.0	1.22	D-1	SM	See Boring Log	SILTY SAND	19			
⊠	9.0	2.74	D-2	GM	See Boring Log	SILTY GRAVEL with SAND	25	31		
▲	19.0	5.79	D-4	ML	See Boring Log	SANDY SILT with GRAVEL	23	36	25	11
★	29.0	8.84	D-6	GM	See Boring Log	SILTY GRAVEL with SAND	11			
⊙	34.0	10.36	D-7	ML	See Boring Log	SILT	30			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	13.4	41.1	45.5		
⊠	35.0	21.3	43.7		
▲	21.6	24.0	54.4		
★	57.0	26.8	16.3		
⊙	0.2	4.6	95.3		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.20	0.10			
⊠	2.12	0.16			
▲	0.17				
★	8.52	6.04	1.58	0.22	
⊙					



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **May 31, 2002**

Hole No. **TP-2-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

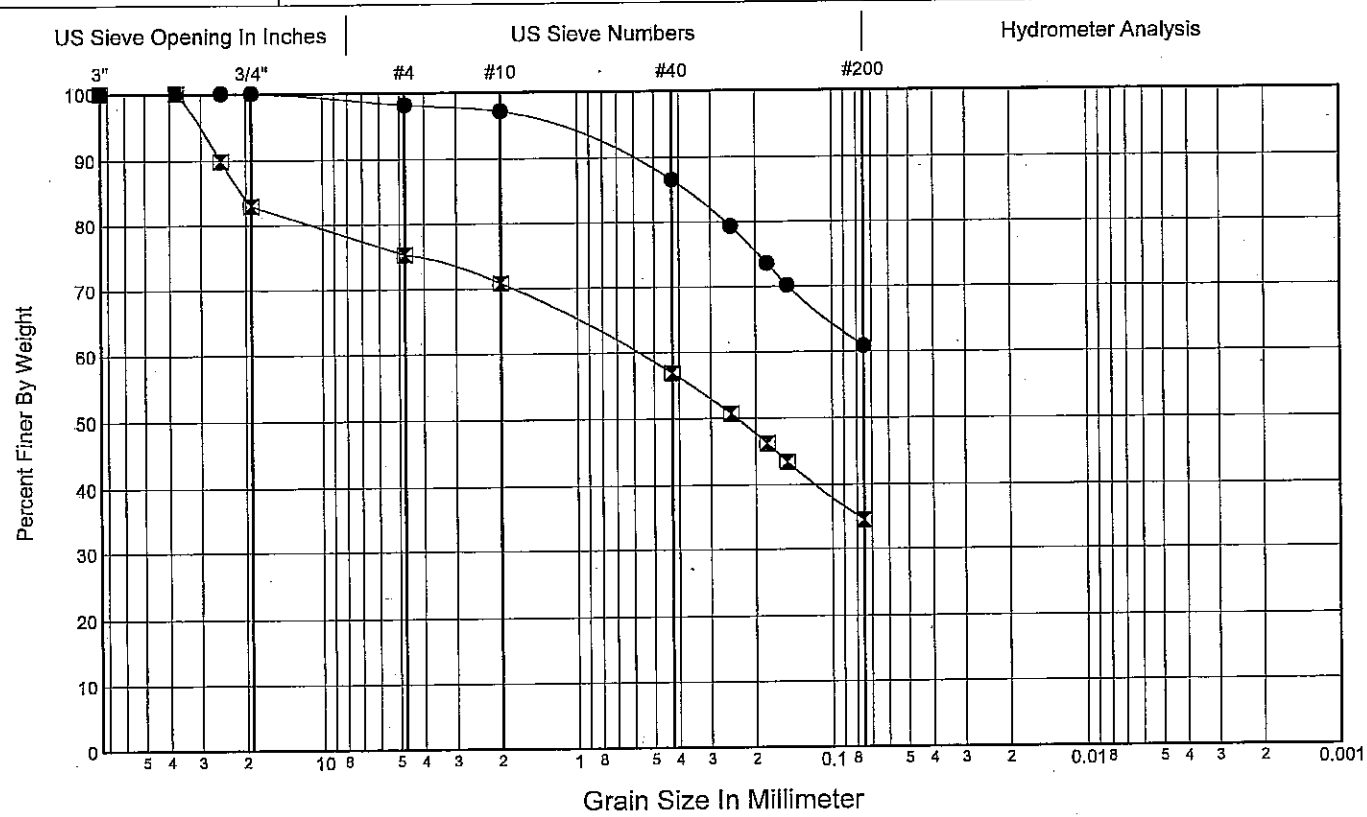
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	2.5	0.76		ML	See Boring Log	SANDY SILT	22			
⊠	4.8	1.46		SM	See Boring Log	SILTY SAND with GRAVEL	14			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	1.9	37.3	60.9		
⊠	24.7	40.8	34.5		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠	0.602	0.24			



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **October 1, 2002**

Hole No. **H-4-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

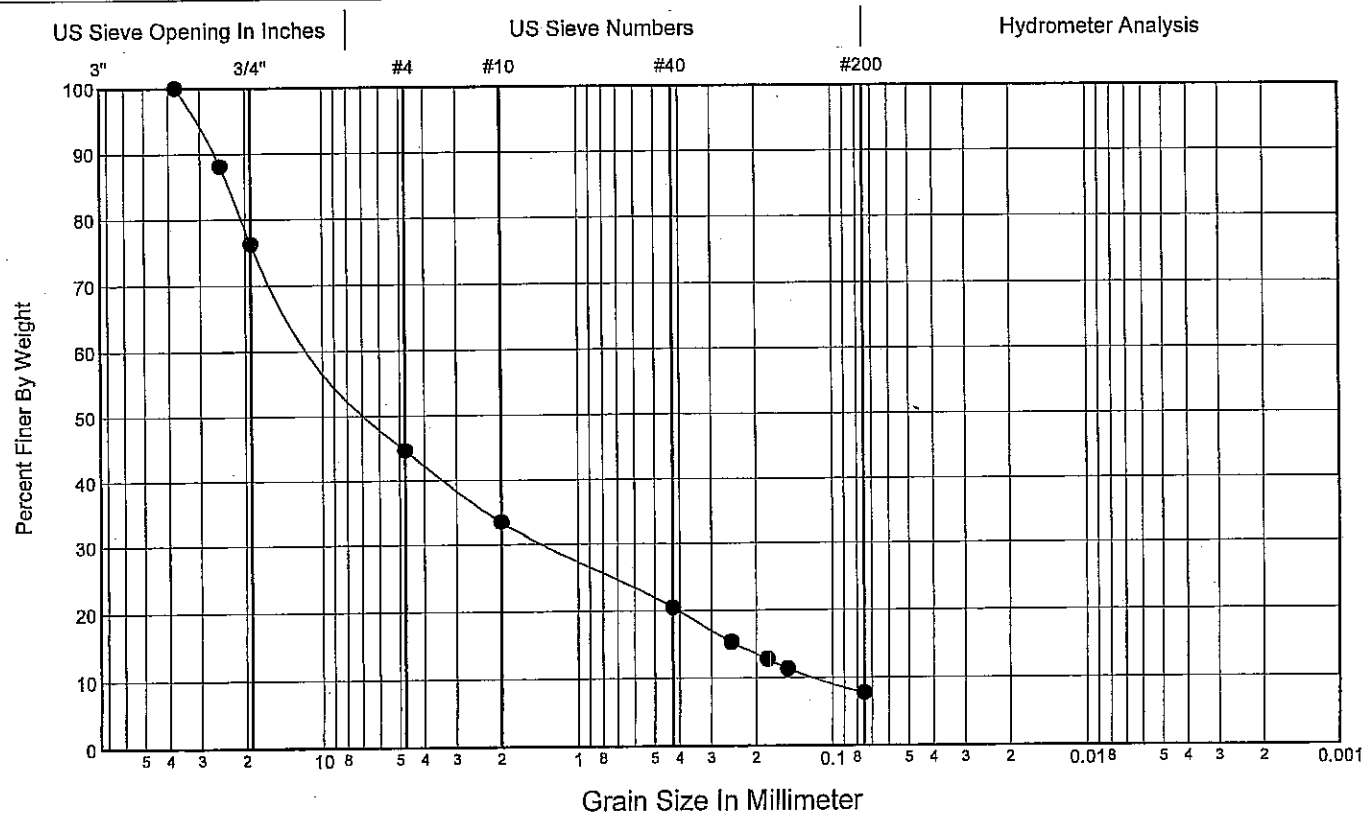
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	11.5	3.51	D-3	GW-GM	See Boring Log	WELL-GRADED GRAVEL with SILT and SAND	9			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	55.4	36.9	7.7	1.6	80.8

GRADATION VALUES

	D60	D50	D30	D20	D10
●	9.328	6.02	1.33	0.40	0.115



Job No. OL-3498 Date August 20, 2004

Hole No. H-5-02 Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

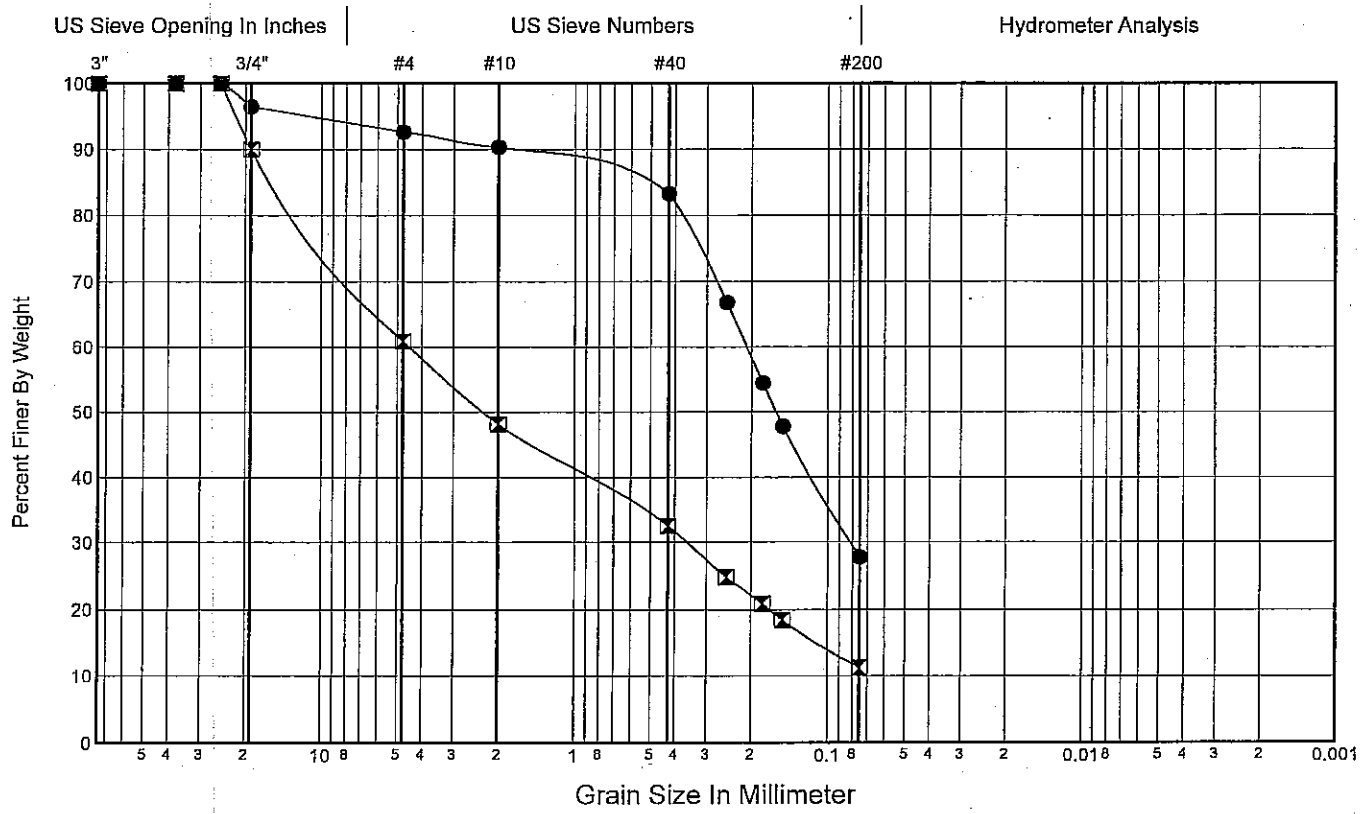
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	0.0	0.00	D-1	SM	See Boring Log	SILTY SAND	19			
⊠	15.0	4.57	D-6	SP-SM	See Boring Log	POORLY GRADED SAND with SILT and GRAVEL	12			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	7.4	64.9	27.7		
⊠	39.1	49.7	11.2	0.4	66.7

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.209	0.16	0.08		
⊠	4.480	2.27	0.36	0.17	



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **July 10, 2002**

Hole No. **H-6-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

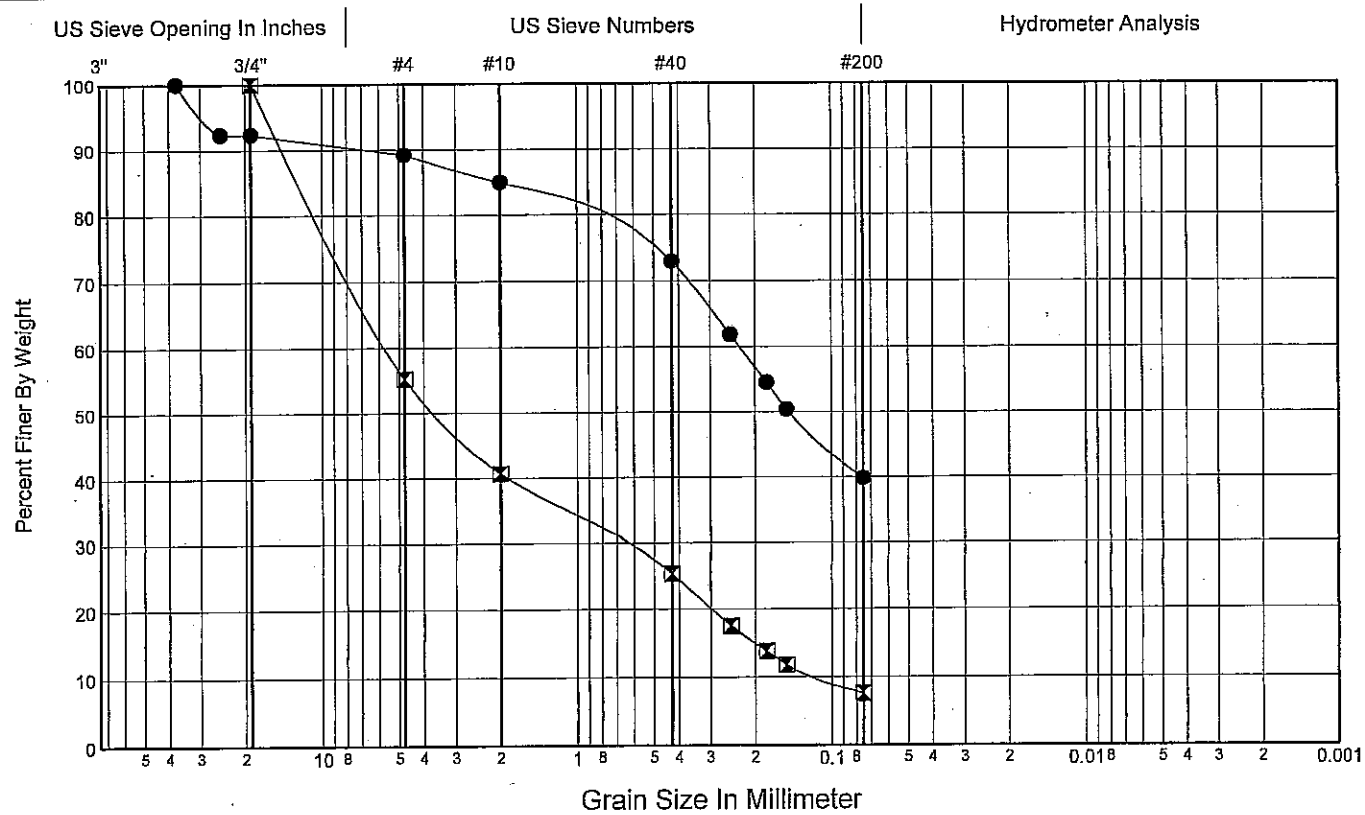
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	4.0	1.22	D-1	SM	See Boring Log	SILTY SAND	13			
⊠	14.0	4.27	D-3	SP-SM	See Boring Log	POORLY GRADED SAND with SILT and GRAVEL	12			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	10.8	49.3	39.8		
⊠	44.8	47.7	7.5	0.7	49.1

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.230	0.15			
⊠	5.509	3.48	0.68	0.30	0.112



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **May 6, 2002**

Hole No. **H-7-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

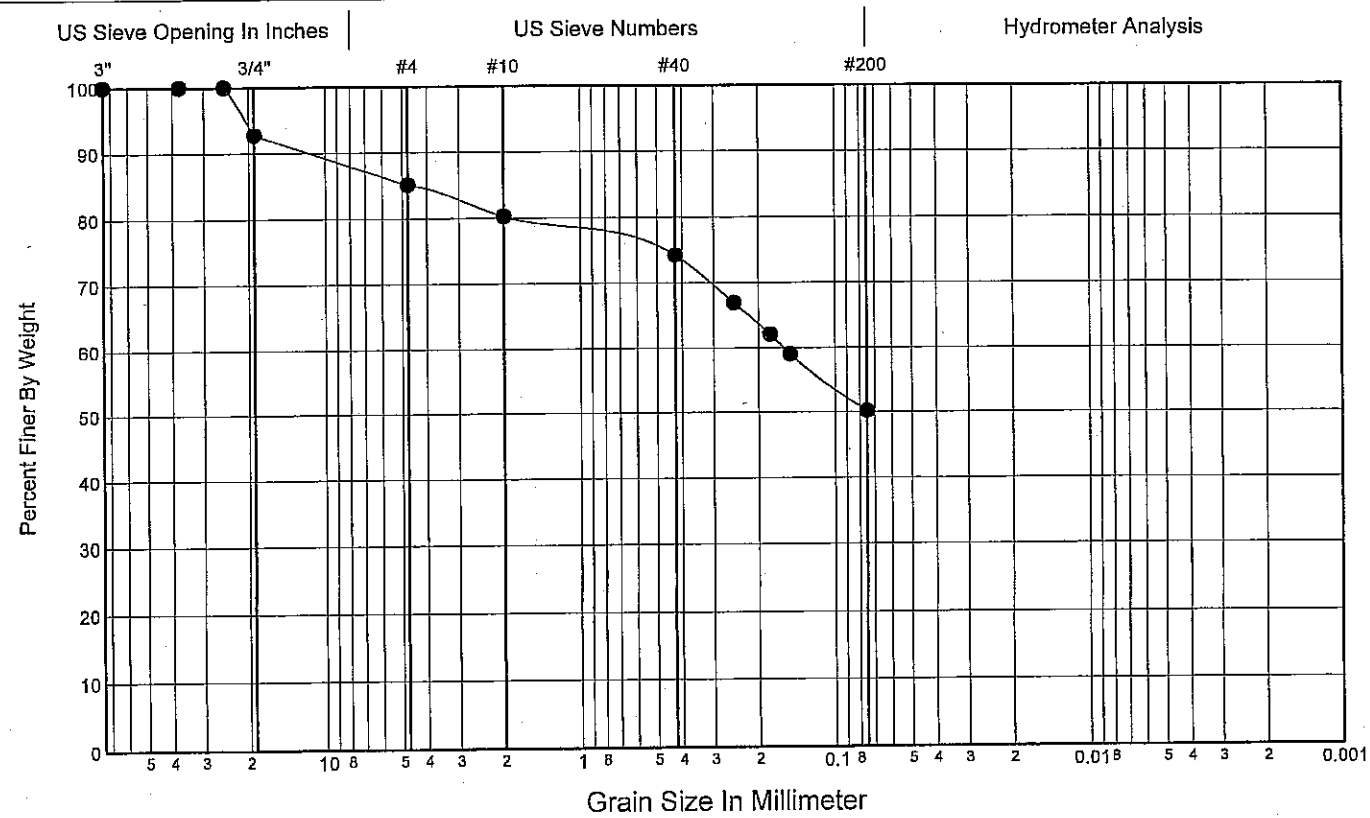
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	20.0	6.10	D-4	ML	See Boring Log	SANDY SILT	18			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	15.0	34.9	50.1		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.16				



Job No. **OL-3498** Date **August 21, 2002**

Hole No. **H-8-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

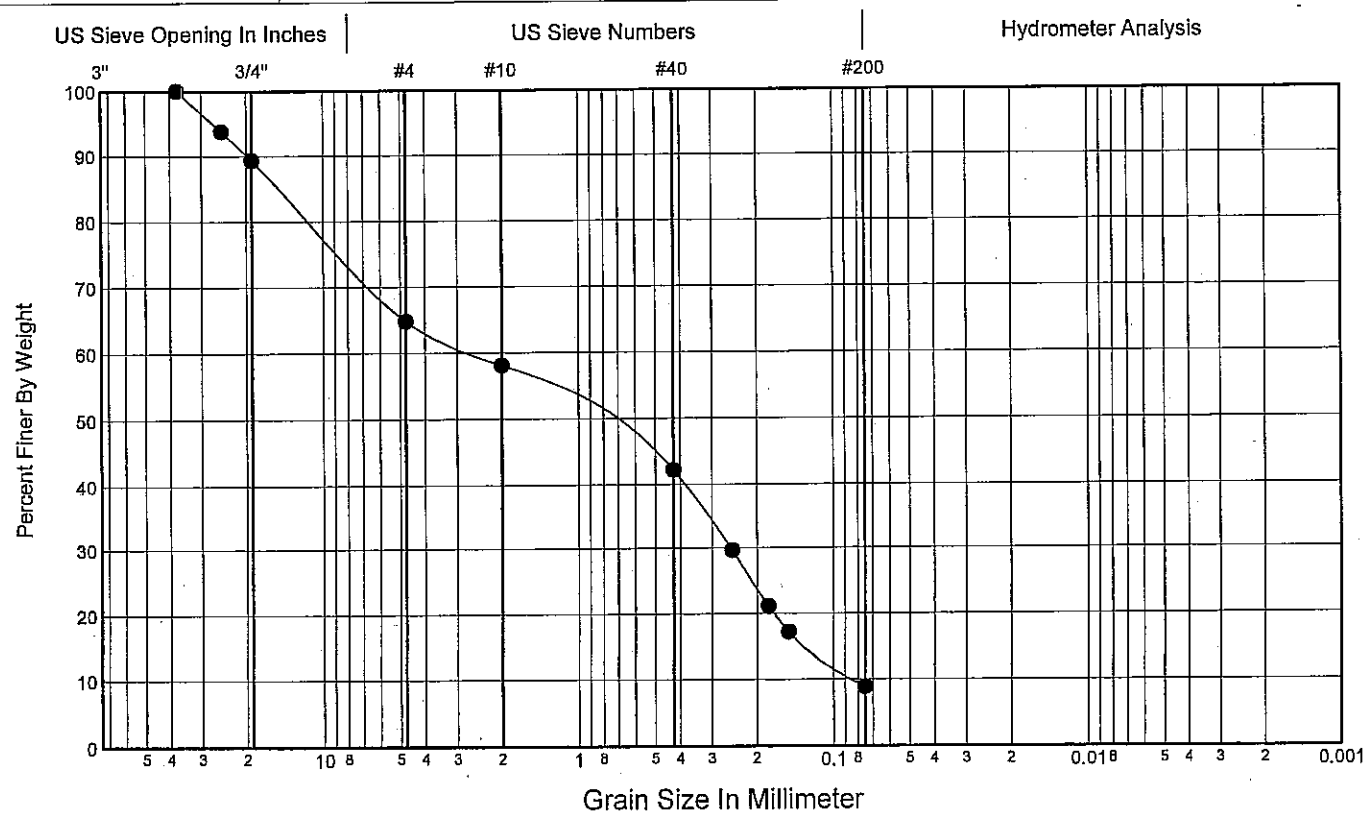
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	5.0	1.52	D-1	SP-SM	See Boring Log	POORLY GRADED SAND with SILT and GRAVEL	12			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	35.2	56.0	8.8	0.3	31.0

GRADATION VALUES

	D60	D50	D30	D20	D10
●	2.569	0.91	0.25	0.17	0.083



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **May 6, 2002**

Hole No. **H-9-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

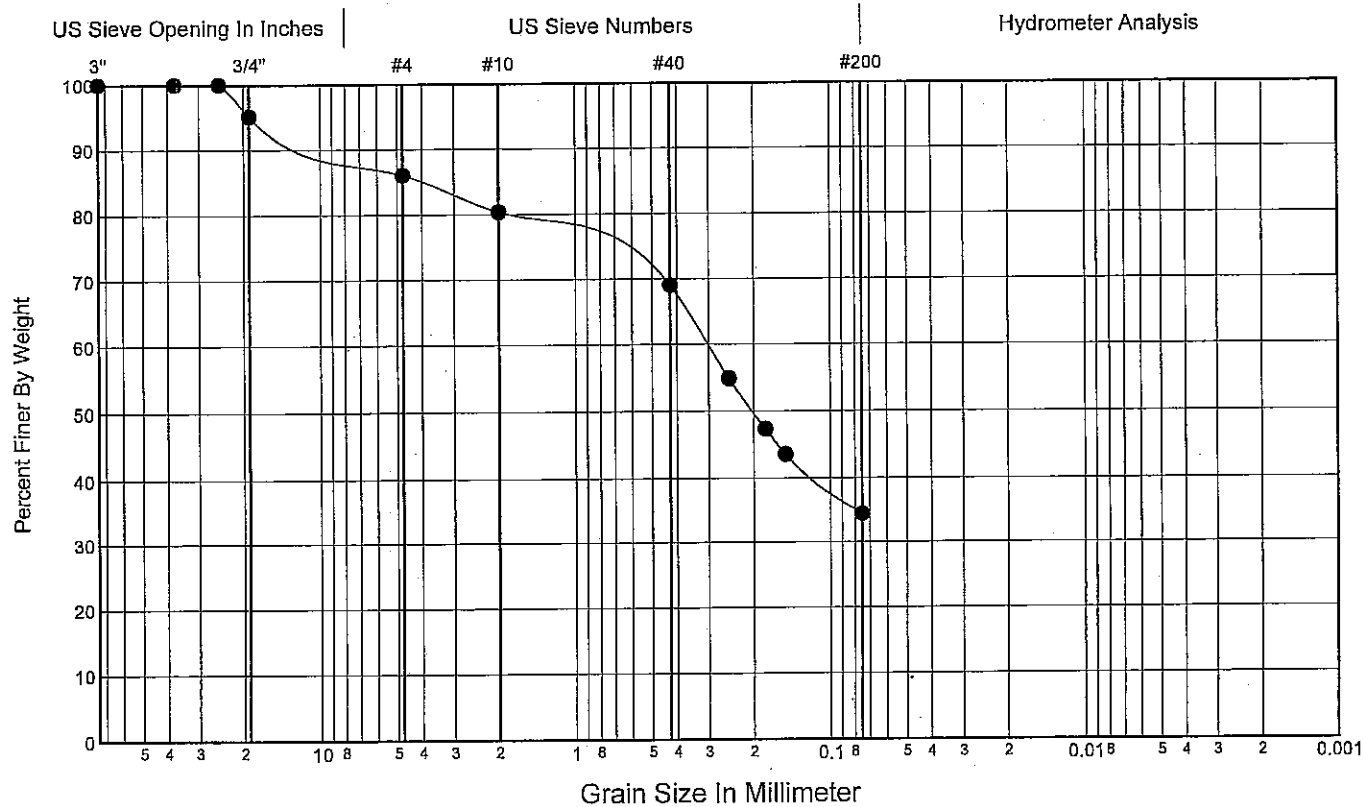
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	0.0	0.00	D-1	SM	See Boring Log	SILTY SAND	25			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	14.0	51.7	34.4		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.30	0.20			



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **July 18, 2002**

Hole No. **H-10-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

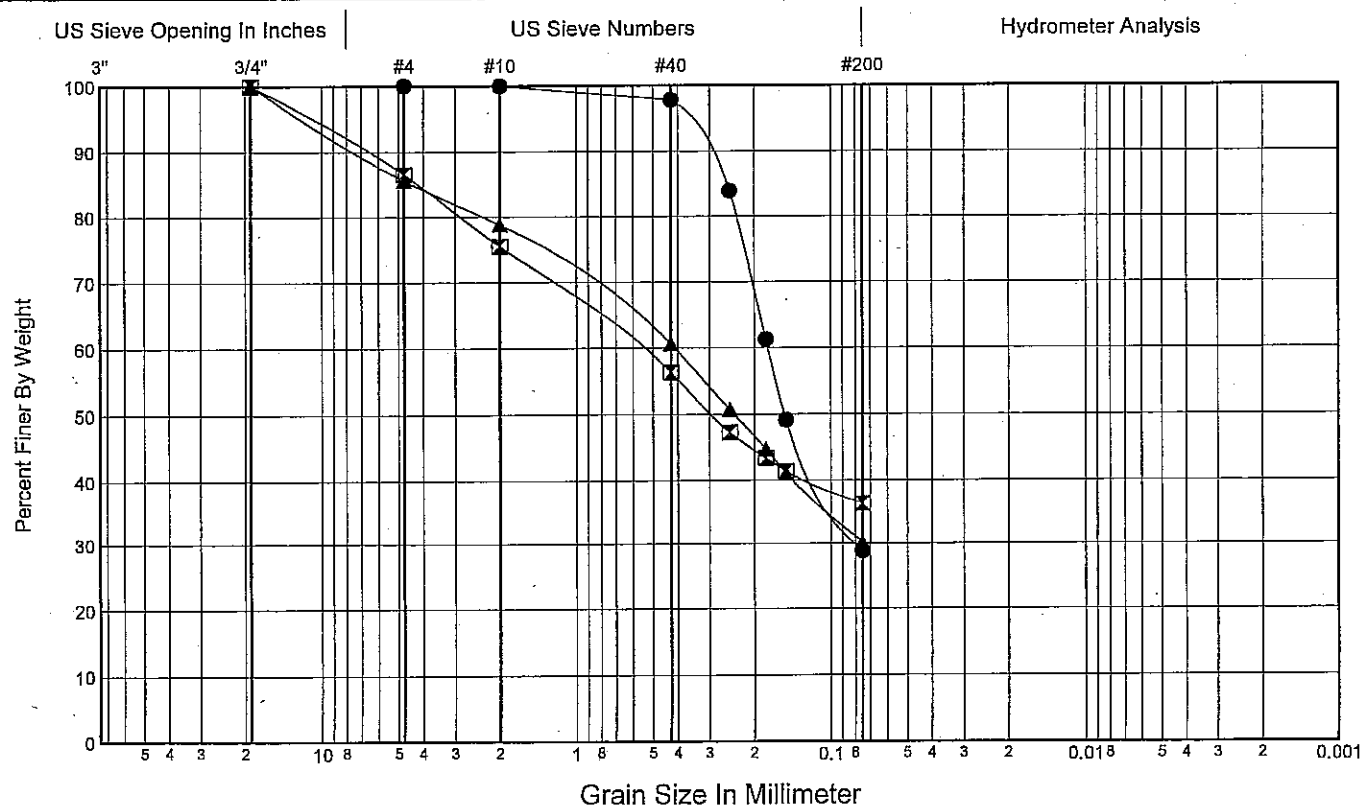
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	4.0	1.22	D-1	SM	See Boring Log	SILTY SAND	25			
⊠	14.0	4.27	D-3	SM	See Boring Log	SILTY SAND with organics	29	37	25	12
▲	24.0	7.32	D-5	SM	See Boring Log	SILTY SAND	8			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	71.2	28.8		
⊠	13.5	50.2	36.3		
▲	14.5	55.4	30.1		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.177	0.15	0.08		
⊠	0.572	0.29			
▲	0.412	0.24			



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **May 6, 2002**

Hole No. **H-11-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

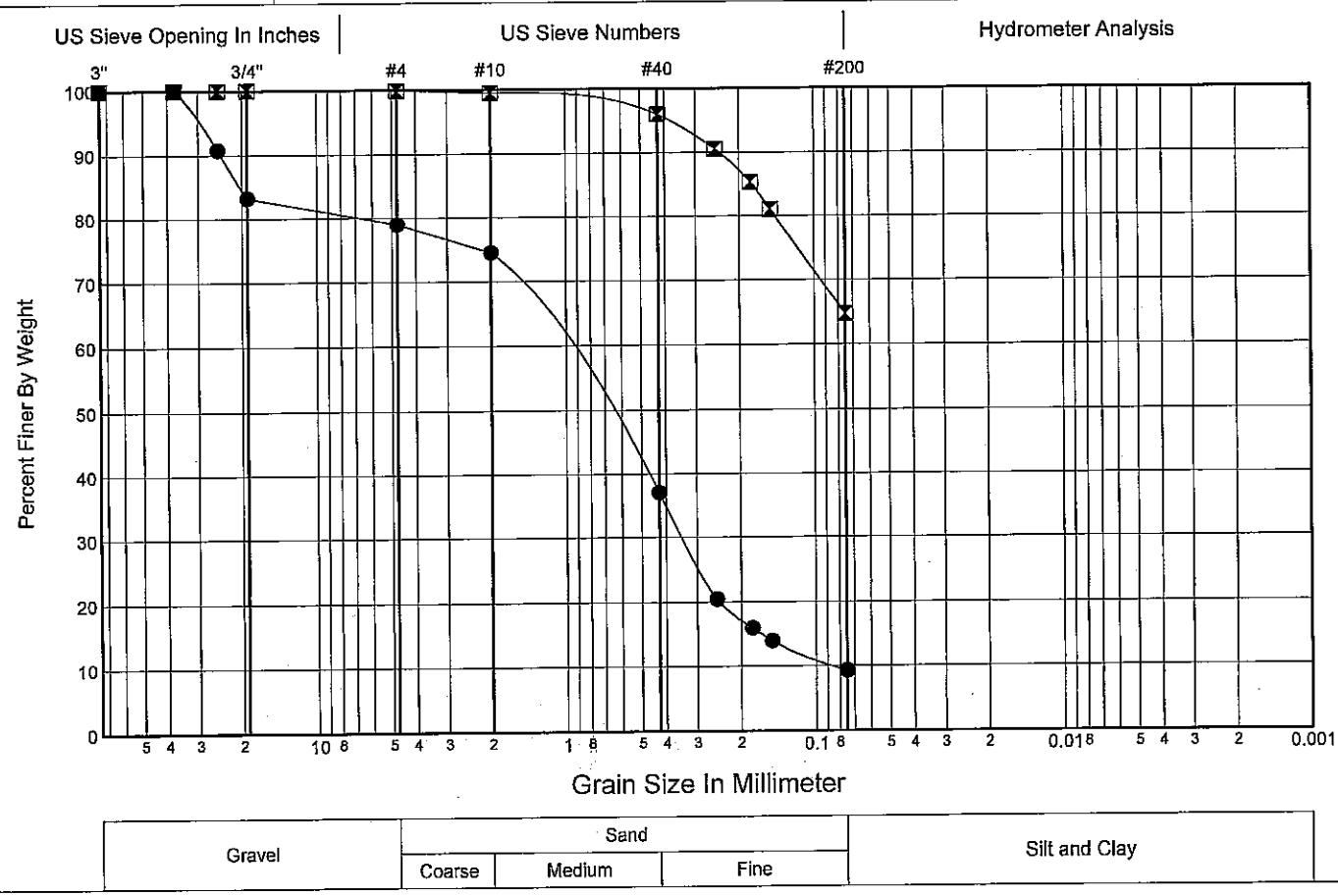
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	5.0	1.52	D-1	SW-SM	See Boring Log	WELL-GRADED SAND with SILT and GRAVEL	19			
⊠	15.0	4.57	D-3	ML	See Boring Log	SANDY SILT	19			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	21.0	69.7	9.2	1.2	13.1
⊠	0.1	35.2	64.7		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	1.10	0.73	0.34	0.24	0.08
⊠					



Job No. **OL-3498** Date **May 21, 2002**

Hole No. **H-12-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

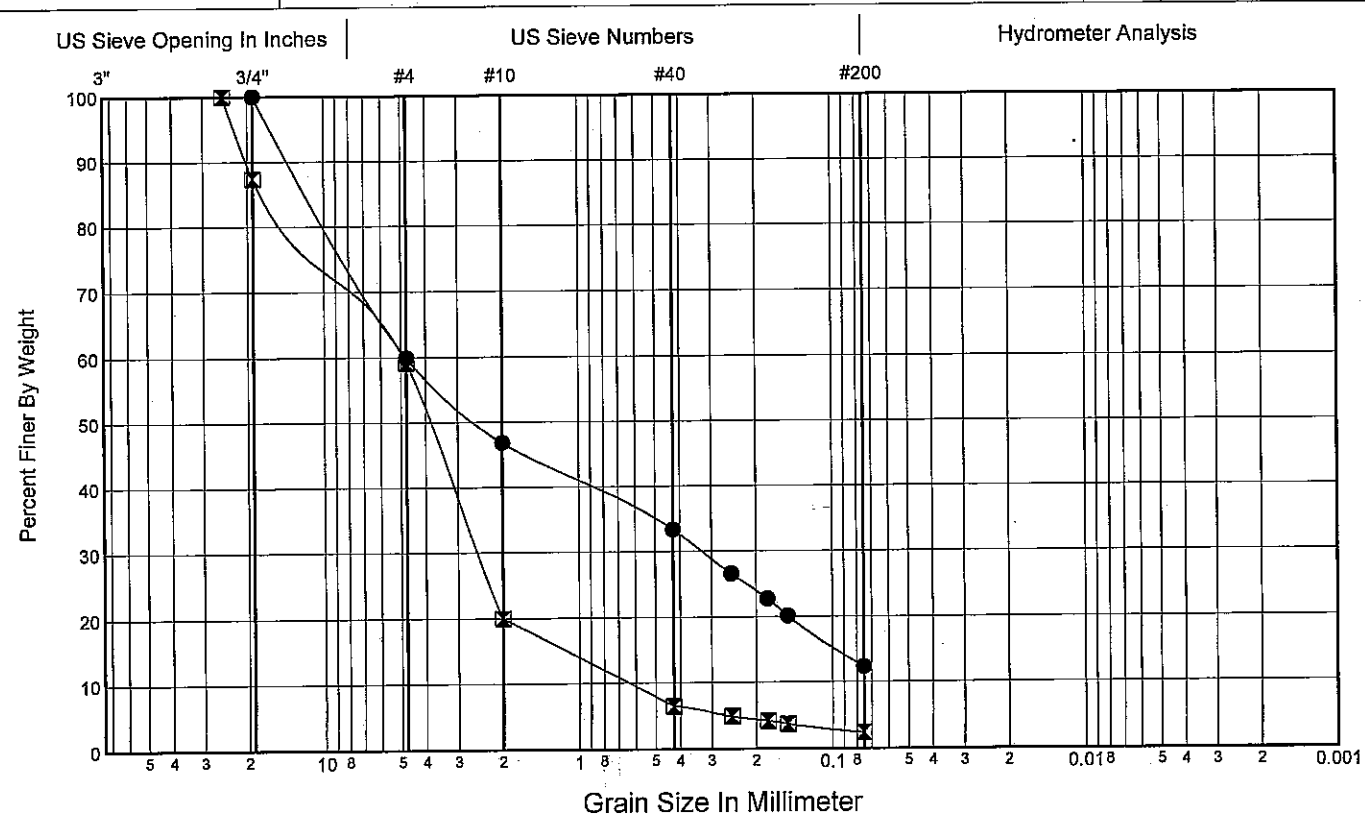
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	30.0	9.14	D-6	SM	See Boring Log	SILTY SAND with GRAVEL	7			
⊠	35.0	10.67	D-7	SW	See Boring Log	WELL-GRADED SAND with GRAVEL	7			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	40.1	47.6	12.3	0.4	78.0
⊠	40.9	56.7	2.4	2.0	7.8

GRADATION VALUES

	D60	D50	D30	D20	D10
●	4.764	2.47	0.33	0.15	
⊠	4.966	3.88	2.50	2.00	0.640



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **July 10, 2002**

Hole No. **H-13-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

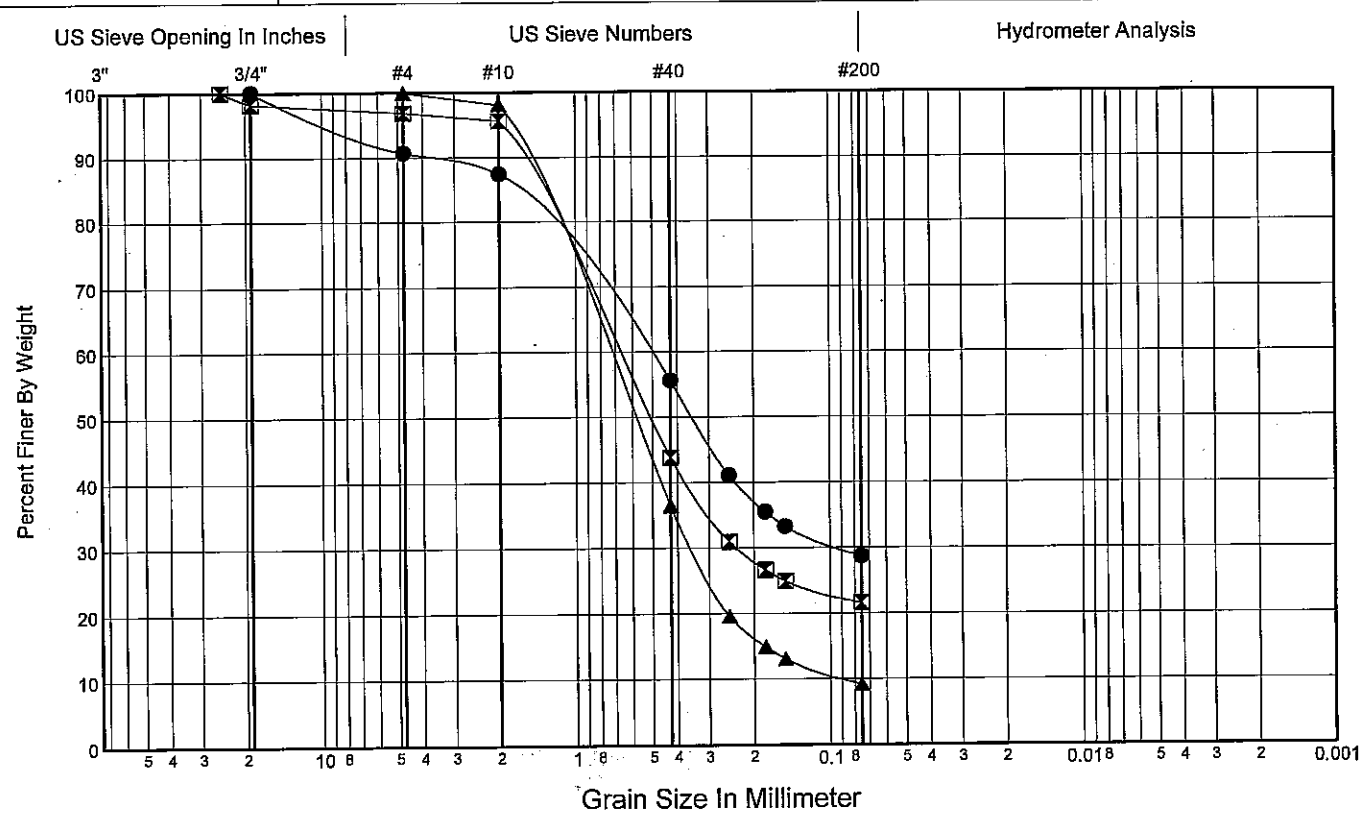
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	5.0	1.52	D-1	SM	See Boring Log	SILTY SAND	19			
⊠	15.0	4.57	D-3	SM	See Boring Log	SILTY SAND	18			
▲	20.0	6.10	D-4	SW-SM	See Boring Log	WELL-GRADED SAND with SILT	25			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	9.3	62.0	28.7		
⊠	3.2	75.2	21.6		
▲	0.1	90.8	9.2	1.8	8.8

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.527	0.35	0.09		
⊠	0.690	0.51	0.23		
▲	0.768	0.60	0.35	0.25	0.088



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **August 21, 2002**

Hole No. **H-14-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

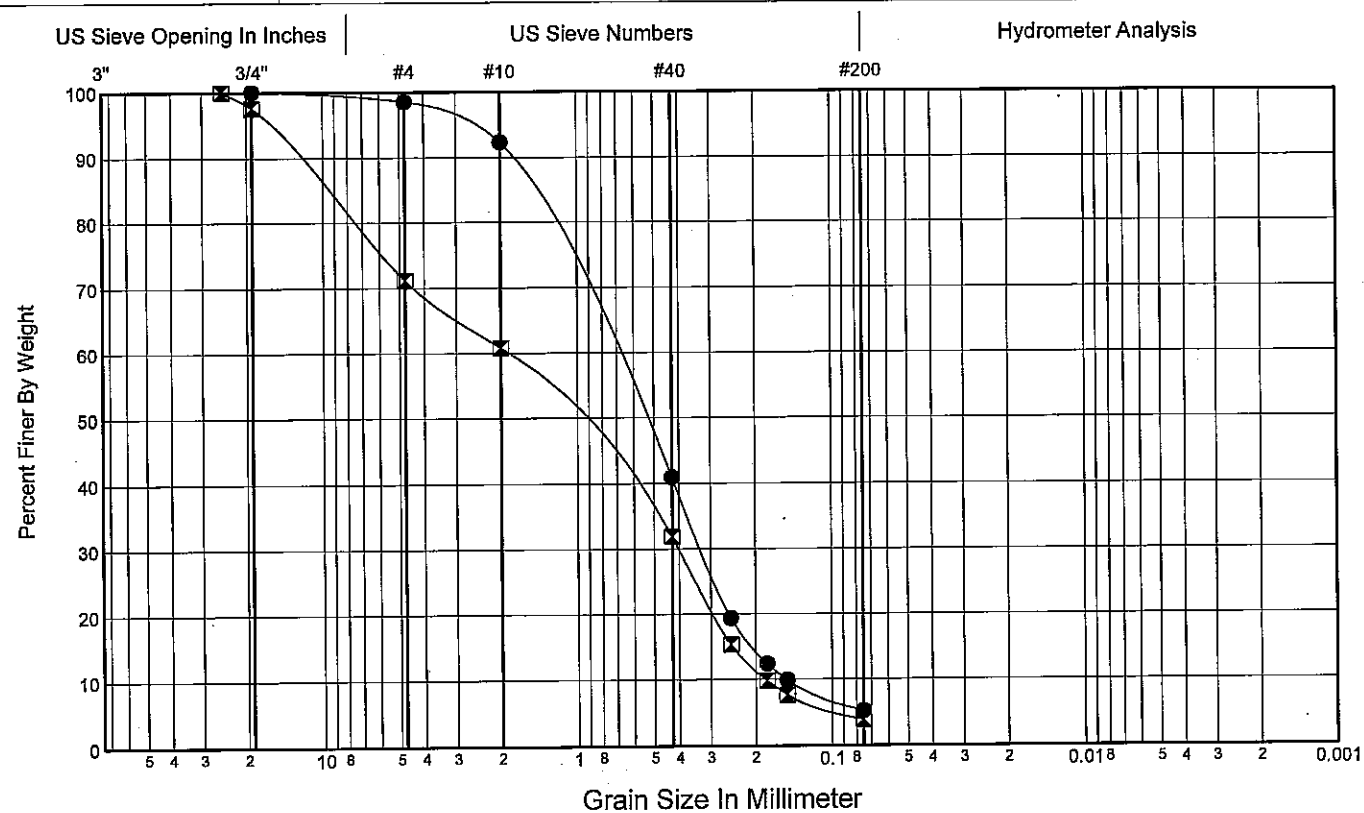
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	10.0	3.05	D-2	SP-SM	See Boring Log	POORLY GRADED SAND with SILT	14			
⊠	20.0	6.10	D-4	SP	See Boring Log	POORLY GRADED SAND with GRAVEL	13			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	1.5	93.3	5.2	0.9	5.0
⊠	28.9	67.2	3.9	0.5	10.5

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.756	0.56	0.32	0.25	0.152
⊠	1.919	1.12	0.40	0.29	0.183



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **May 6, 2002**

Hole No. **H-15-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

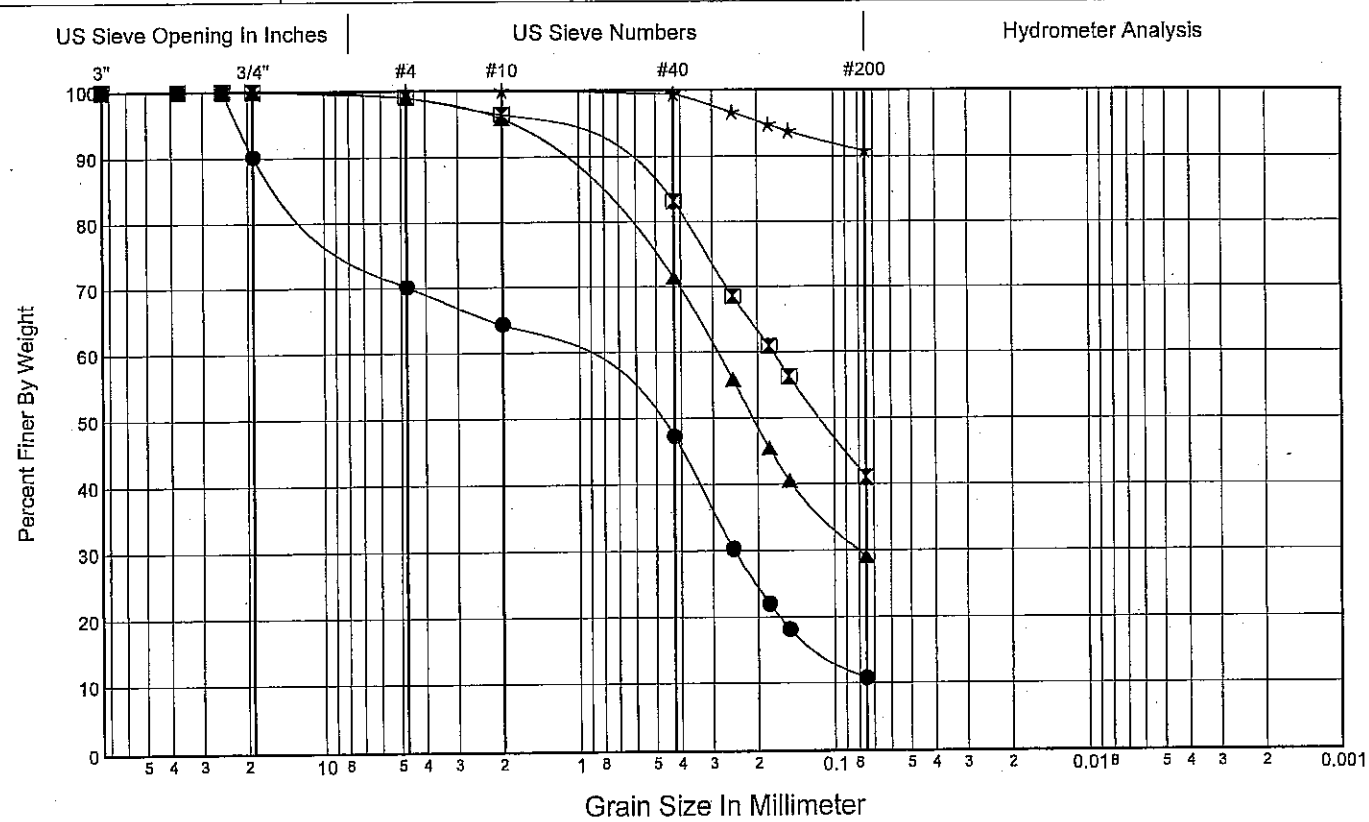
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	5.0	1.52	D-1	SP-SM	See Boring Log	POORLY GRADED SAND with SILT and GRAVEL	18			
⊠	10.0	3.05	D-2	SM	See Boring Log	SILTY SAND	21			
▲	15.0	4.57	D-3	SM	See Boring Log	SILTY SAND	14			
★	25.0	7.62	D-5	CL	See Boring Log	LEAN CLAY	29	33	23	10

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	29.9	59.4	10.7	0.6	19.3
⊠	0.9	58.1	41.0		
▲	1.1	69.9	29.1		
★	0.0	9.2	90.8		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	1.35	0.55	0.25	0.16	
⊠	0.17	0.11			
▲	0.29	0.21	0.08		
★					



Job No. **OL-3498** Date **October 9, 2002**

Hole No. **H-16-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

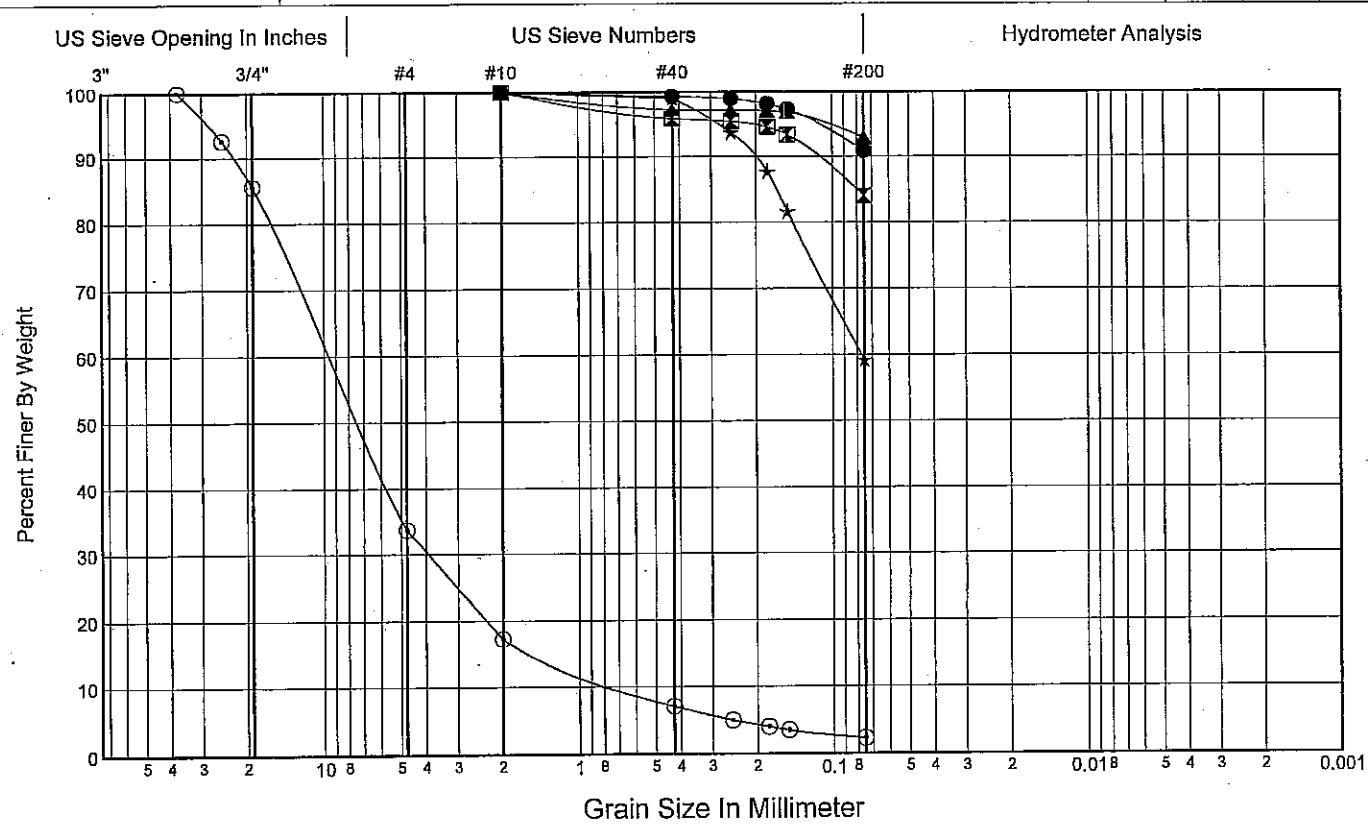
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	2.8	0.85	S-2	CL	See Boring Log	LEAN CLAY	26	42	23	19
⊠	3.2	0.98		CL	See Boring Log	LEAN CLAY with SAND	28	46	23	23
▲	7.8	2.38	S-4	ML	See Boring Log	SILT	28	29		
★	8.2	2.50		ML	See Boring Log	SANDY SILT	27	21		
⊙	25.0	7.62		GW	See Boring Log	WELL-GRADED GRAVEL with SAND	7			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	9.2	90.8		
⊠	0.0	16.0	84.0		
▲	0.0	7.2	92.8		
★	0.0	40.8	59.2		
⊙	66.3	31.5	2.2	2.4	14.4

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲					
★	0.077				
⊙	9.599	7.35	3.91	2.31	0.668



Job No. **OL-3498** Date **May 6, 2002**

Hole No. **H-17-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

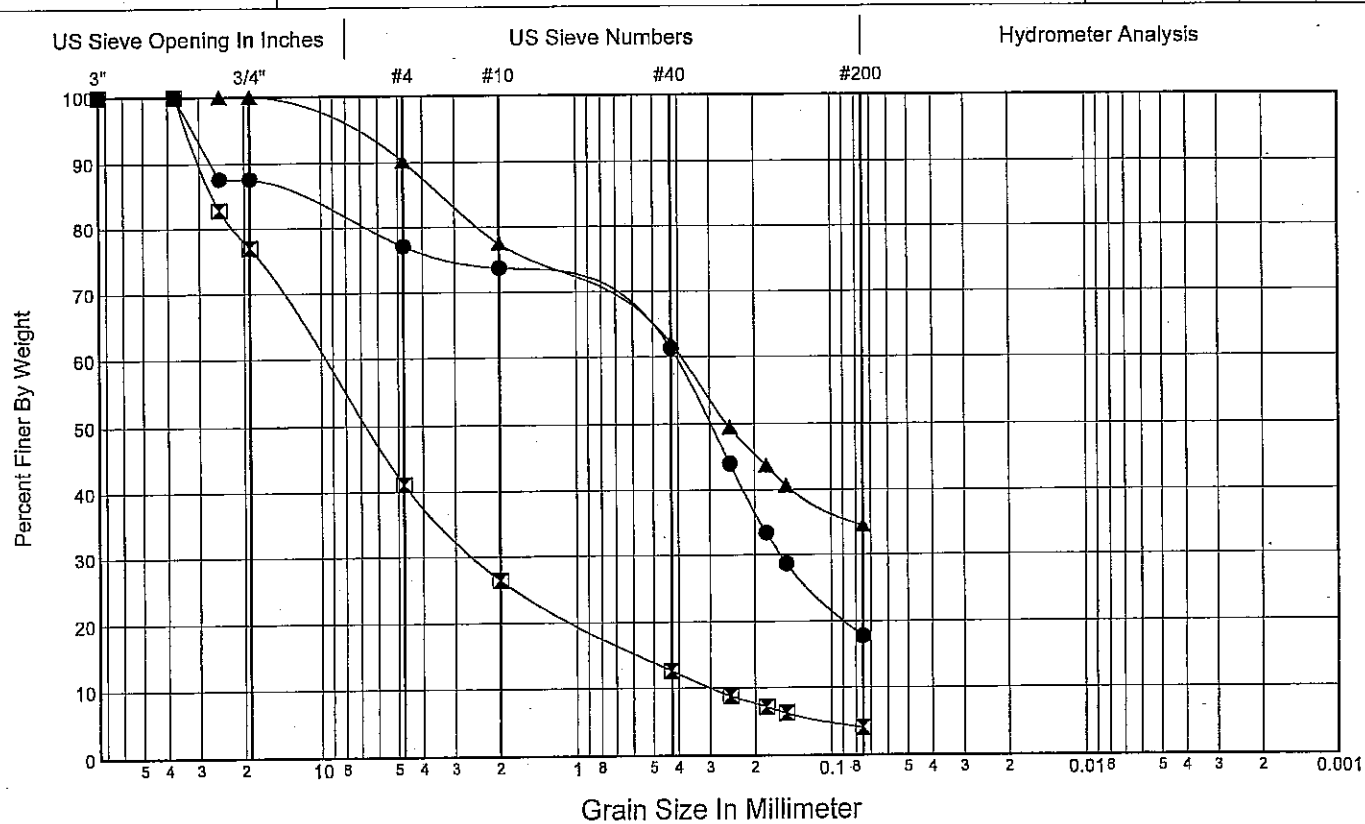
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	5.0	1.52	D-2	SM	See Boring Log	SILTY SAND with GRAVEL	36			
⊠	10.0	3.05	D-3	GW	See Boring Log	WELL-GRADED GRAVEL with SAND	11			
▲	30.5	9.30	D-7	SM	See Boring Log	SILTY SAND	26			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	22.9	59.3	17.8		
⊠	58.9	37.1	4.0	2.1	33.3
▲	9.9	55.8	34.3		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.41	0.30	0.16	0.09	
⊠	9.87	6.70	2.47	0.97	0.30
▲	0.39	0.26			



Job No. OL-3498 | Date April 24, 2002

Hole No. H-18-02 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

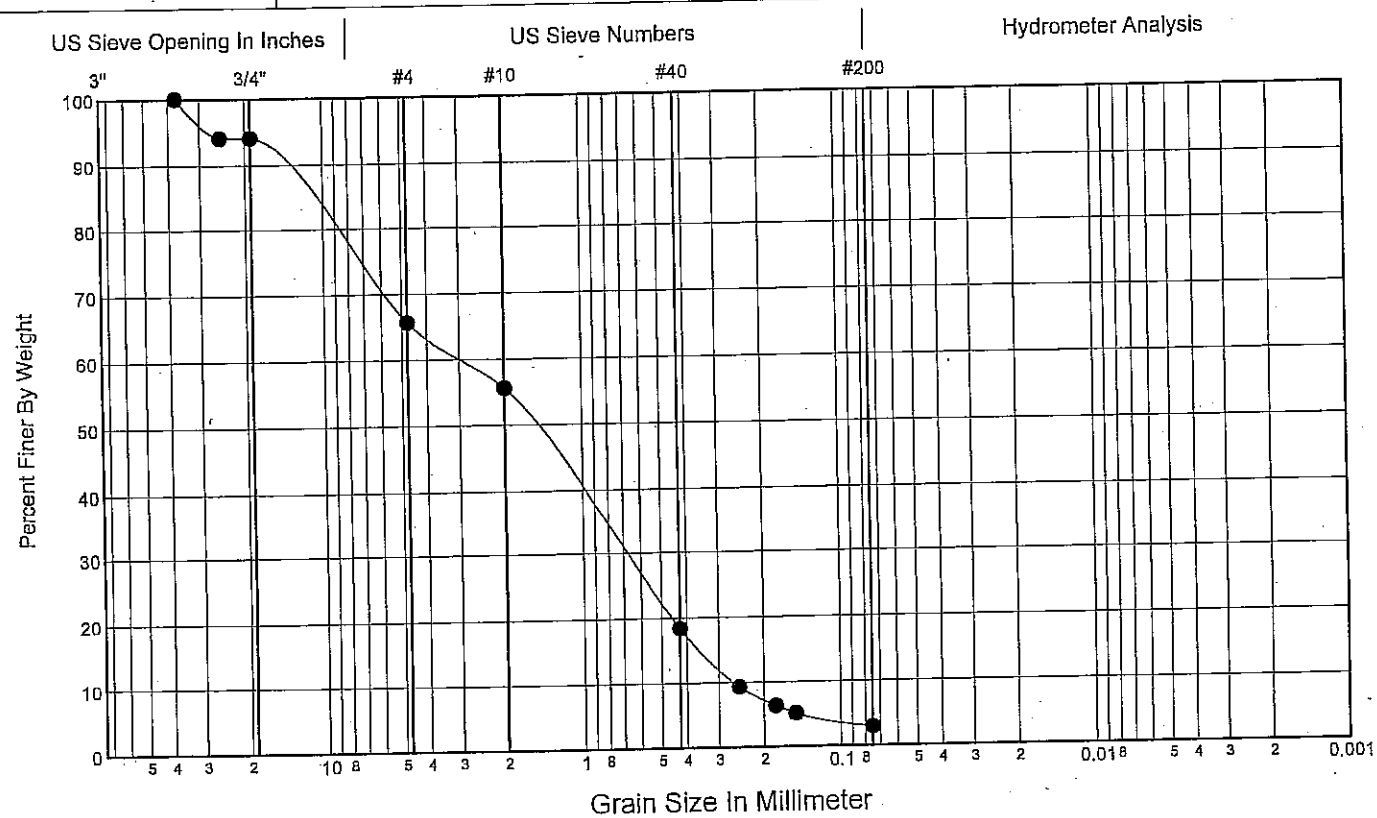
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	10.0	3.05	D-2	SP	See Boring Log	POORLY GRADED SAND with GRAVEL	12			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	34.4	62.7	3.0	0.6	11.2

GRADATION VALUES

	D60	D50	D30	D20	D10
●	2.92	1.58	0.69	0.45	0.26



Job No. OL-3498 | Date October 9, 2002

Hole No. H-19-02 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

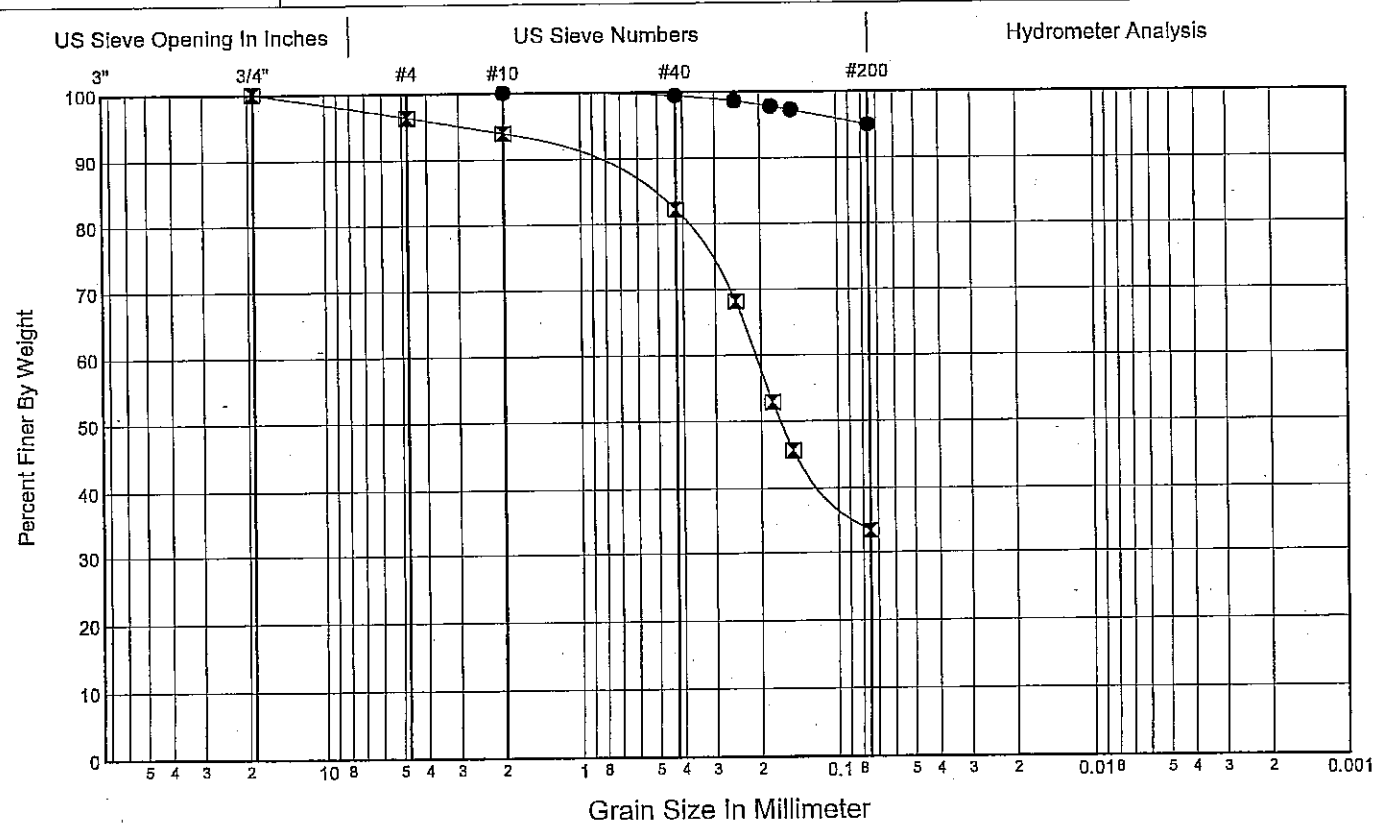
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	10.0	3.05		ML	See Boring Log	SILT	33	42		
⊠	25.0	7.62		SM	See Boring Log	SILTY SAND	20			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	5.1	94.9		
⊠	3.6	63.0	33.3		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠	0.210	0.17			



Job No. **OL-3498** Date **February 10, 2003**

Hole No. **H-20-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

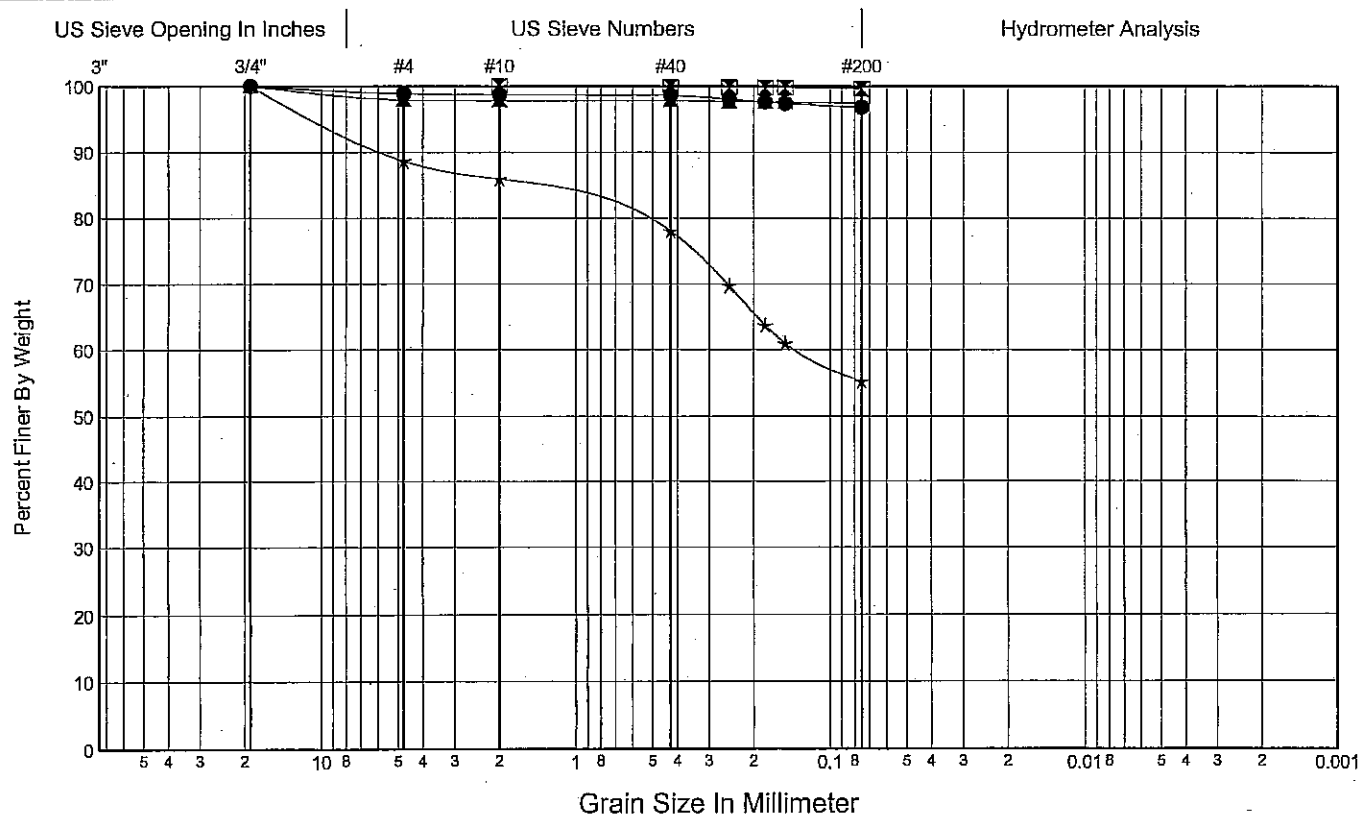
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	2.0	0.61	D-1	ML	See Boring Log	SILT	36	43	28	15
⊠	15.0	4.57	D-6	CL	See Boring Log	LEAN CLAY	30	44	25	19
▲	30.0	9.14	D-12	ML	See Boring Log	SILT	32	36	26	10
★	45.0	13.72	D-16	ML	See Boring Log	SANDY SILT	24			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	1.1	2.1	96.8		
⊠	0.0	0.4	99.6		
▲	2.1	0.5	97.4		
★	11.4	33.4	55.2		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲					
★	0.134				



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **February 10, 2003**

Hole No. **H-20-A-02** Sheet 1 of 1

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

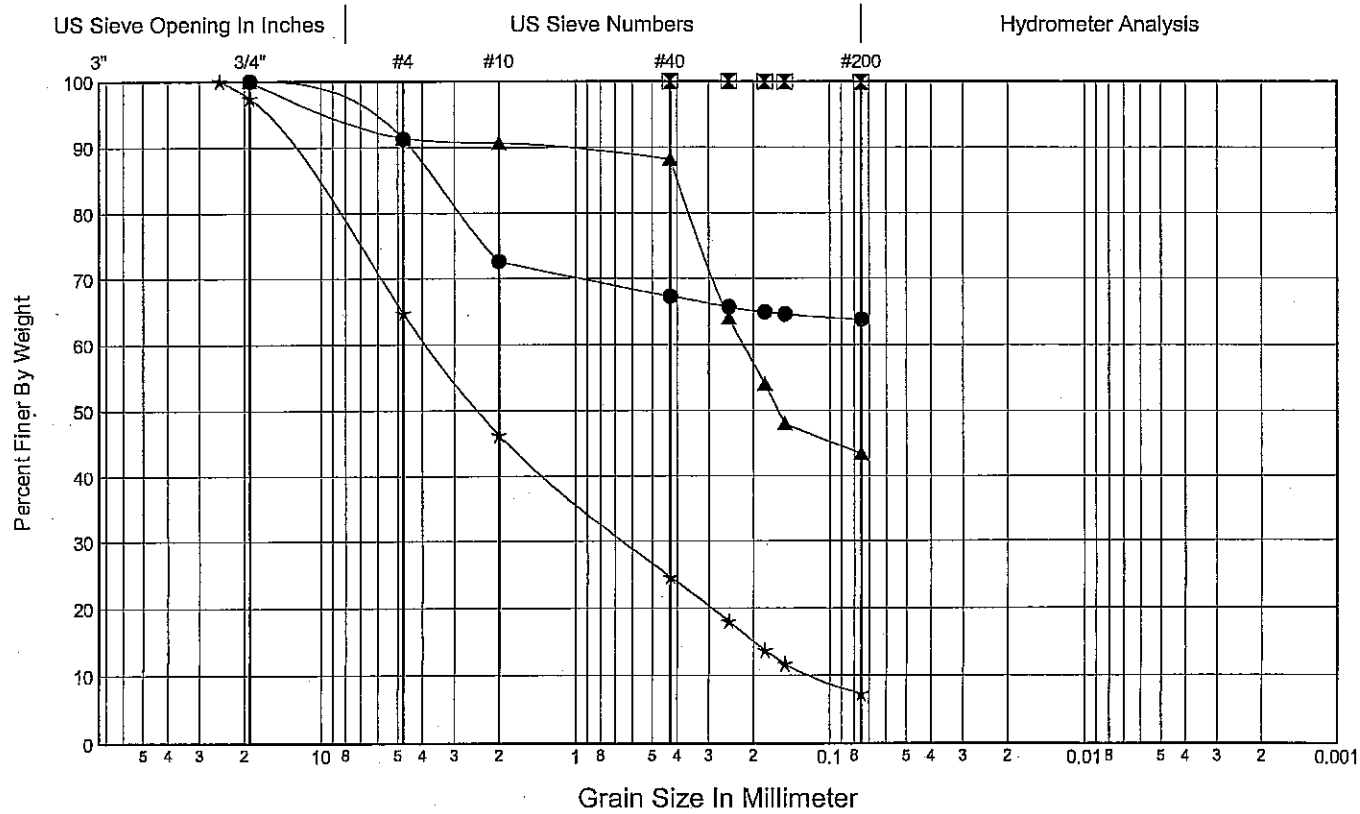
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	2.0	0.61	D-1	CH	See Boring Log	SANDY FAT CLAY	34	52	26	26
⊠	73.0	22.25	D-26	CL	See Boring Log	LEAN CLAY	29	38	23	15
▲	83.0	25.30	D-30	SM	See Boring Log	SILTY SAND	31			
★	89.0	27.13	D-31	SP-SM	See Boring Log	POORLY GRADED SAND with SILT and GRAVEL	7			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	8.7	27.5	63.8		
⊠	0.0	0.1	99.9		
▲	8.5	48.0	43.4		
★	35.2	57.4	7.4	0.9	33.1

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲	0.219	0.16			
★	3.799	2.38	0.62	0.29	0.115



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **February 4, 2003**

Hole No. **H-21-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

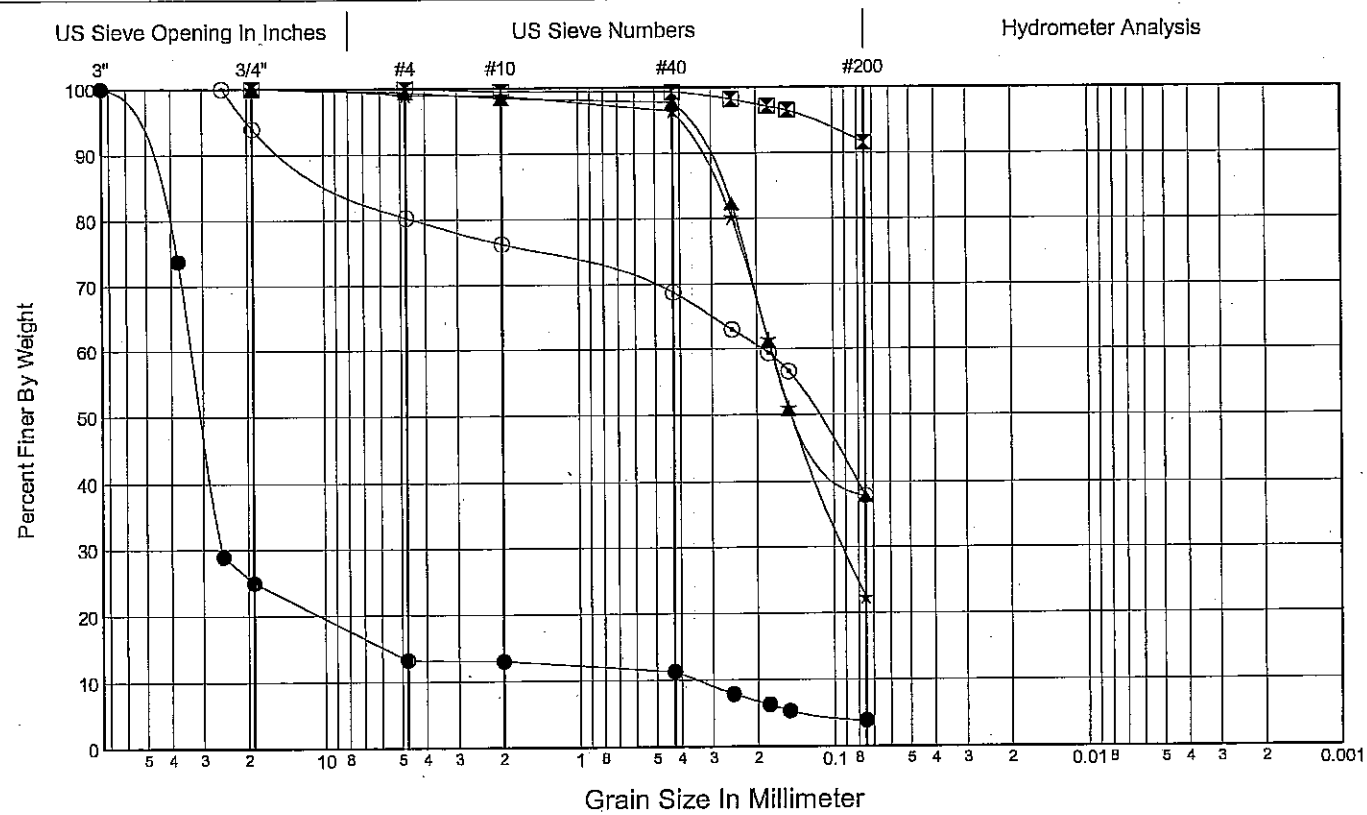
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	18.0	5.49	D-7	GP	See Boring Log	POORLY GRADED GRAVEL	4			
⊠	45.0	13.72	D-15	ML	See Boring Log	SILT	28	24		
▲	48.0	14.63	D-16	SM	See Boring Log	SILTY SAND	24			
★	51.0	15.54	D-17	SM	See Boring Log	SILTY SAND	21			
⊙	60.0	18.29	D-19	SM	See Boring Log	SILTY SAND with GRAVEL	17			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	86.8	9.3	3.9	55.3	95.2
⊠	0.1	8.4	91.5		
▲	0.6	61.7	37.7		
★	1.0	76.6	22.3		
⊙	19.7	42.5	37.8		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	33.118	30.25	25.24	10.61	0.348
⊠					
▲	0.176	0.14			
★	0.175	0.15	0.09		
⊙	0.191	0.12			



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3498 | Date October 11, 2002

Hole No. H-22-02 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

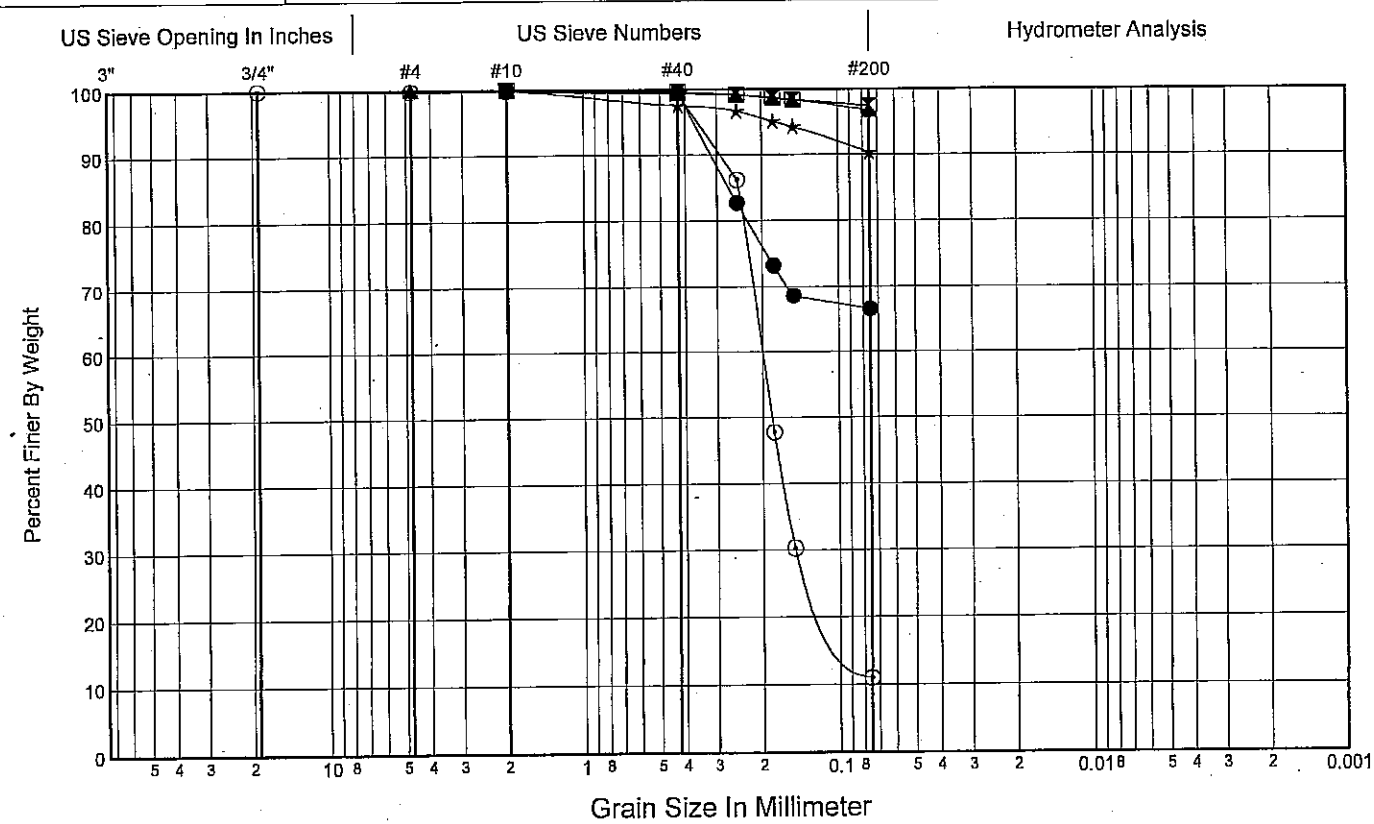
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	6.0	1.83	D-1	ML	See Boring Log	SANDY SILT	31			
⊠	21.0	6.40	D-5	ML	See Boring Log	SILT	30	31	26	5
▲	46.0	14.02	D-10	ML	See Boring Log	SILT	35	40	26	14
★	86.0	26.21	D-19	CL	See Boring Log	LEAN CLAY	29	48	27	21
⊙	106.0	32.31	D-23	SP-SM	See Boring Log	POORLY GRADED SAND with SILT	25			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	33.5	66.5		
⊠	0.0	2.6	97.4		
▲	0.0	3.3	96.7		
★	0.0	9.7	90.3		
⊙	0.2	88.9	10.9	1.5	2.8

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲					
★					
⊙	0.200	0.18	0.15	0.10	



Job No. OL-3498 | Date October 9, 2002

Hole No. H-22A-02 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

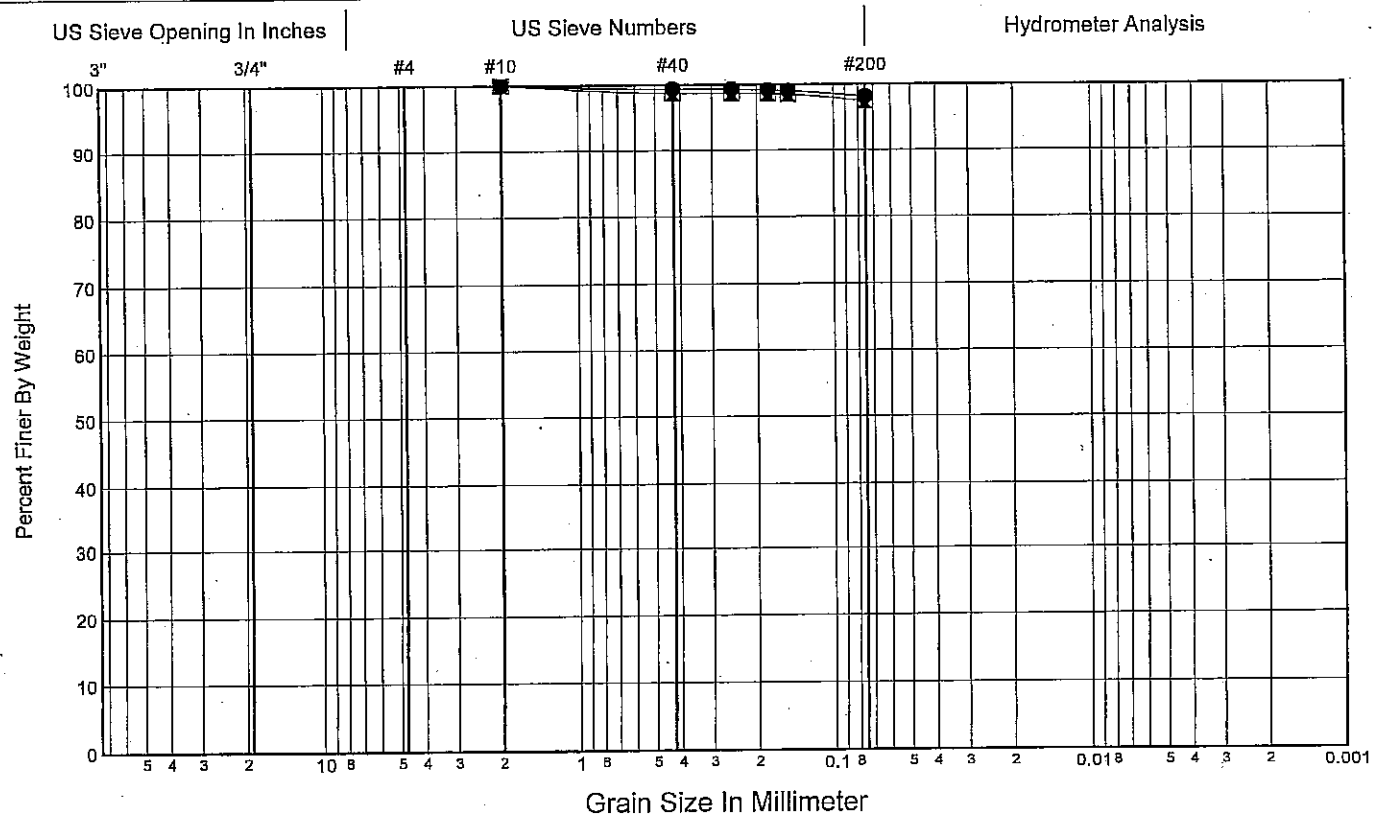
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	9.0	2.74		ML	See Boring Log	SILT	33	36	26	10
☒	36.0	10.97		CL	See Boring Log	LEAN CLAY	31	39	24	15

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	1.9	98.1		
☒	0.0	2.6	97.4		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
☒					



Job No. **OL-3498** Date **February 13, 2003**

Hole No. **H-23-02** Sheet **1** of **2**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

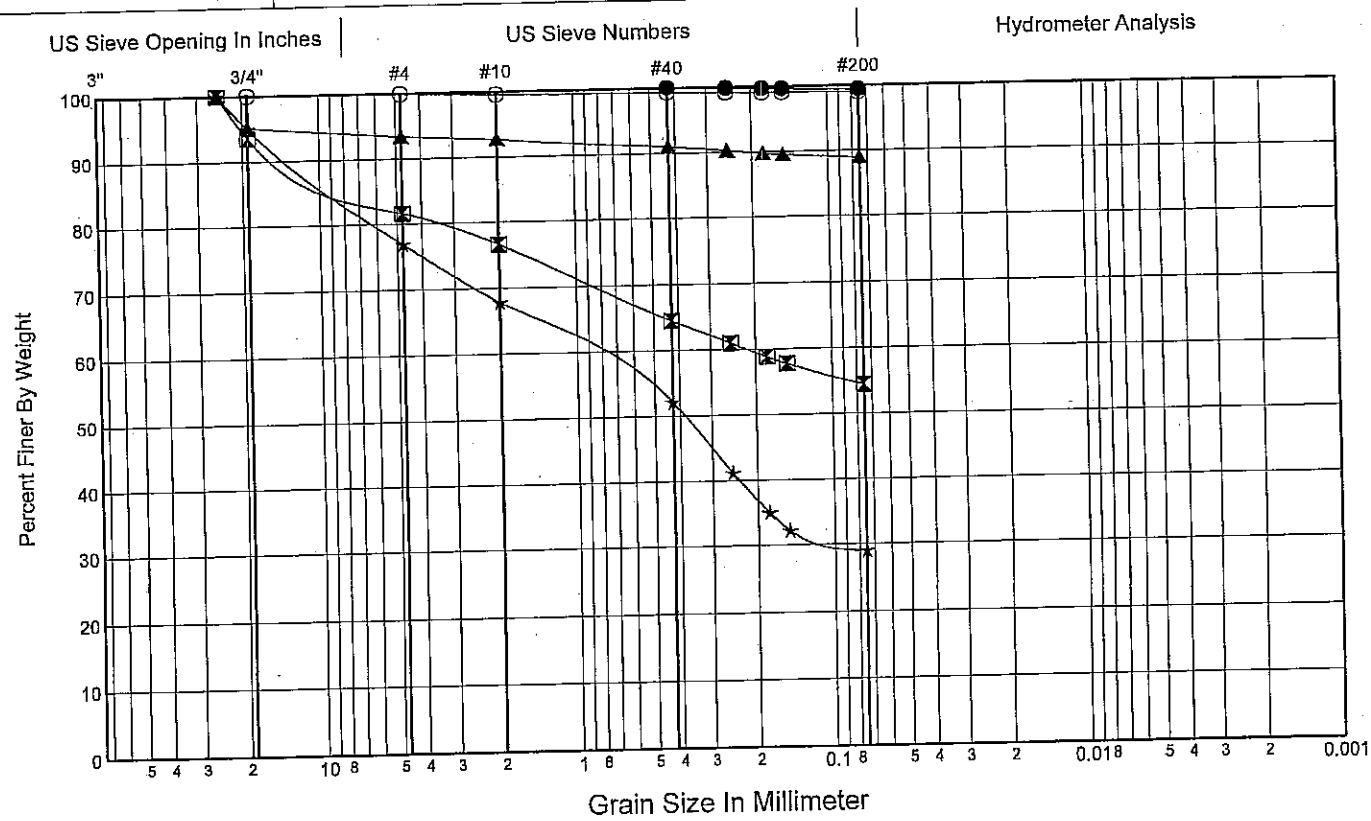
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	5.0	1.52	D-1	CH	See Boring Log	FAT CLAY	37	58	27	31
⊠	8.5	2.59	D-4	CL	See Boring Log	SANDY LEAN CLAY with GRAVEL	21	37	21	16
▲	18.0	5.49	D-9	ML	See Boring Log	SILT	42	40	26	14
★	45.0	13.72	D-19	SM	See Boring Log	SILTY SAND with GRAVEL	12			
⊙	50.0	15.24	D-20	CL	See Boring Log	LEAN CLAY	33	43	25	18

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	0.6	99.4		
⊠	18.4	27.2	54.3		
▲	6.7	4.4	88.9		
★	23.1	47.9	29.0		
⊙	0.1	0.9	99.0		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠	0.216				
▲					
★	0.923	0.38	0.09		
⊙					



Job No. OL-3498 | Date February 13, 2003

Hole No. H-23-02 | Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

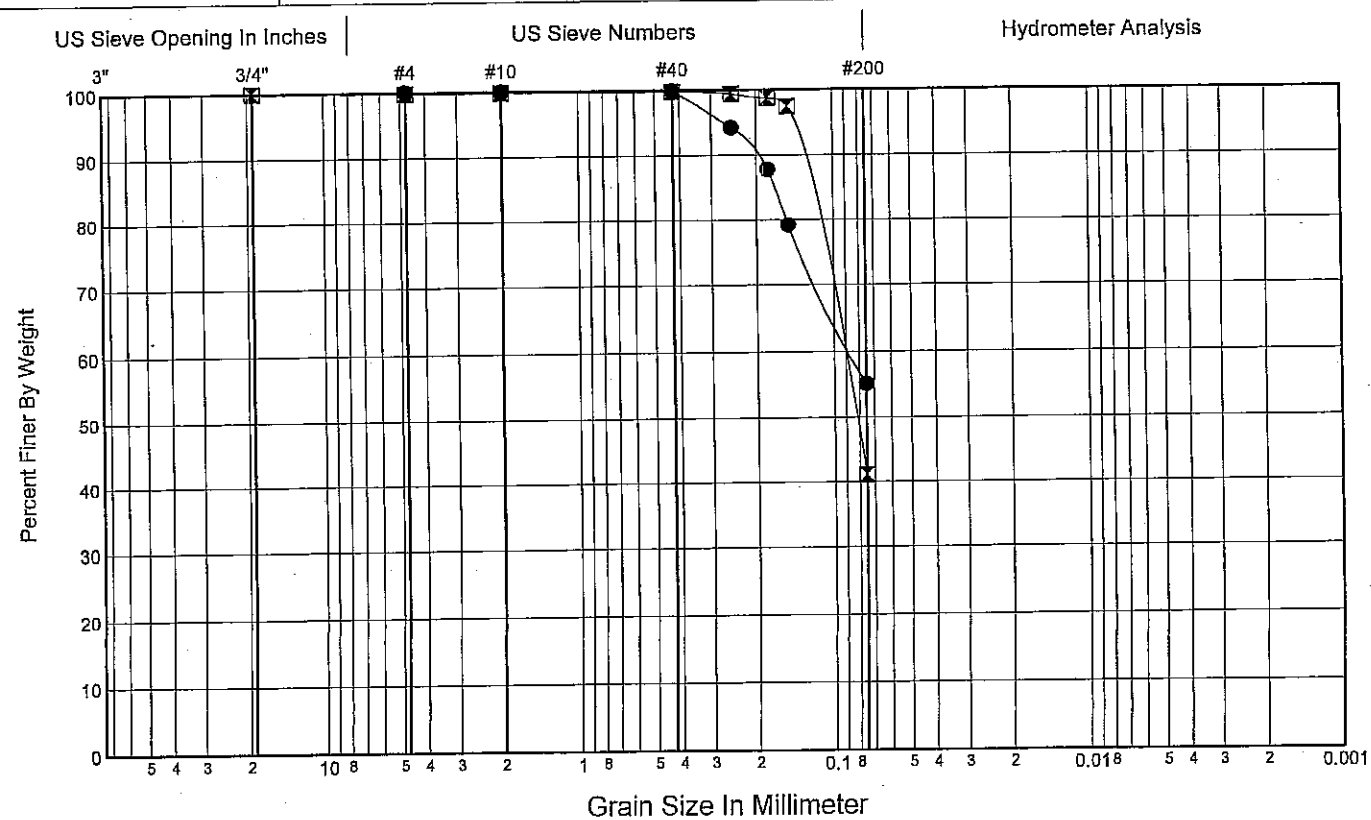
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	65.0	19.81	D-23	ML	See Boring Log	SANDY SILT	31			
⊠	75.0	22.86	D-25	SM	See Boring Log	SILTY SAND	28			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	44.9	55.1		
⊠	0.2	58.8	41.0		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.086				
⊠	0.095	0.08			



Job No. OL-3498 | Date February 13, 2003

Hole No. H-23A-02 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

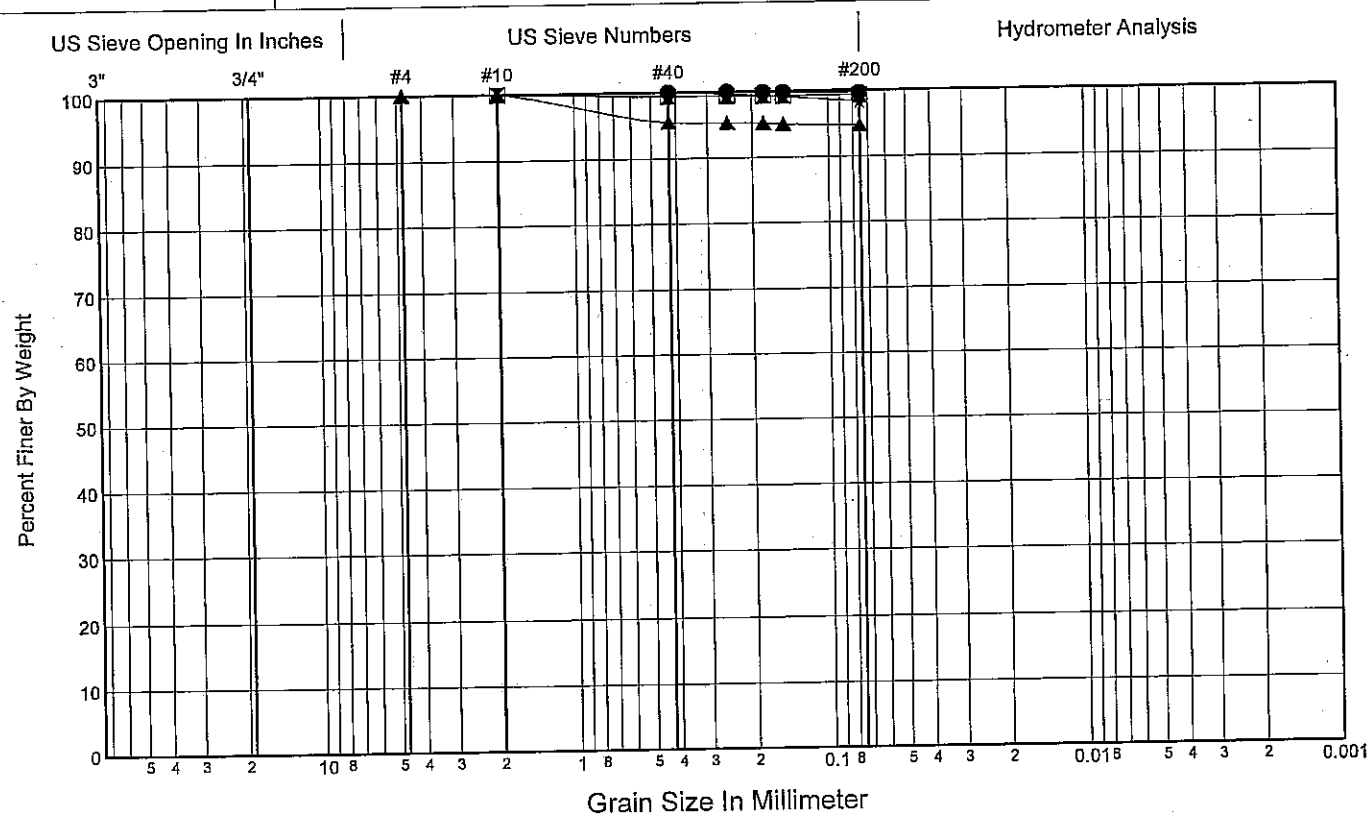
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	16.0	4.88	D-7	ML	See Boring Log	SILT	39	35	28	7
⊠	41.0	12.50	D-17	ML	See Boring Log	SILT	40	40	26	14
▲	60.0	18.29	D-25	CL	See Boring Log	LEAN CLAY	31	45	25	20
★	63.0	19.20	D-26	CL	See Boring Log	LEAN CLAY	32	35	24	11

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	0.4	99.6		
⊠	0.0	0.8	99.2		
▲	0.0	5.3	94.7		
★	0.0	1.7	98.3		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲					
★					



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **October 11, 2002**

Hole No. **H-24-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

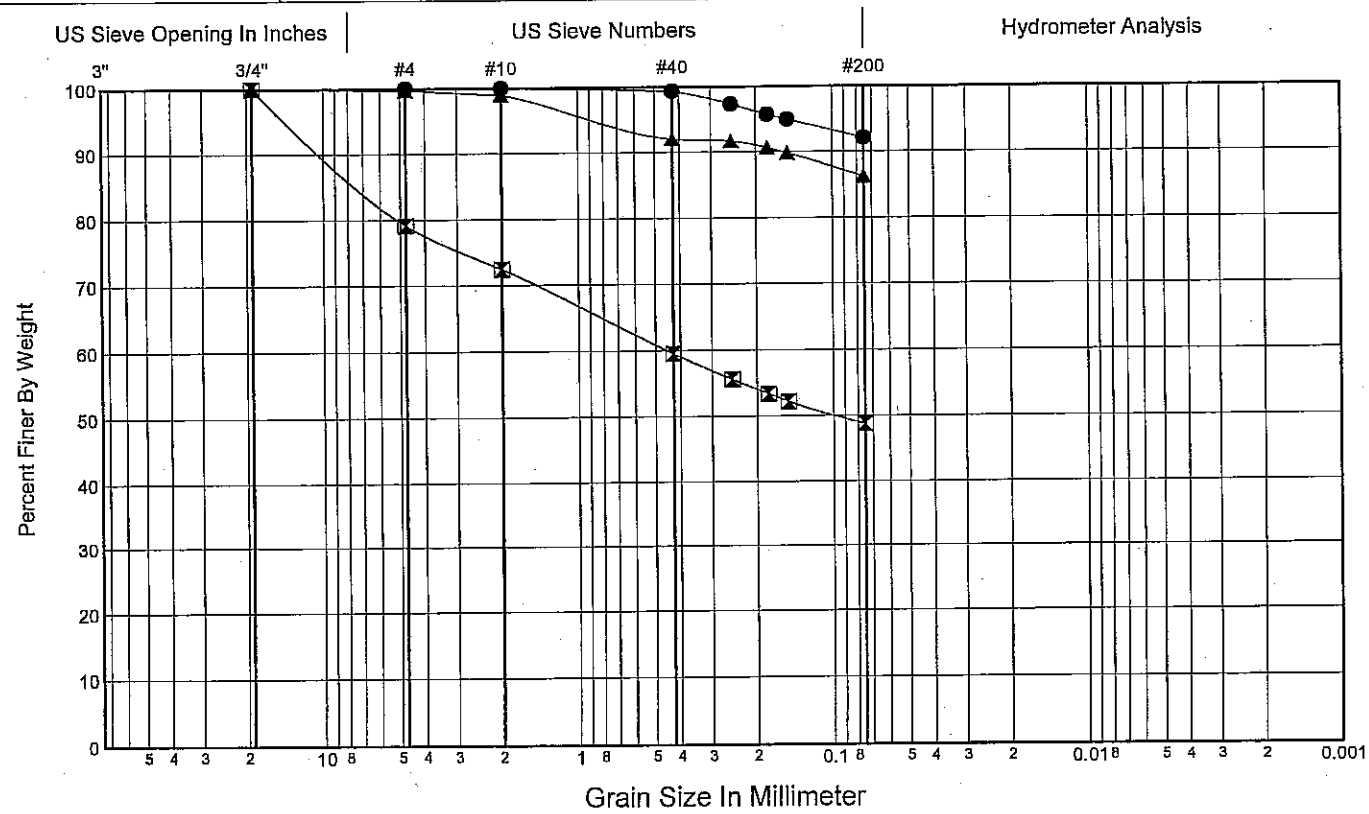
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	2.0	0.61	D-1	CL	See Boring Log	LEAN CLAY	25	37	24	13
⊠	26.4	8.05	D-11	SC	See Boring Log	CLAYEY SAND with GRAVEL	21	32	23	9
▲	40.0	12.19	D-14	CH	See Boring Log	FAT CLAY	46	60	27	33

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	8.0	92.0		
⊠	20.9	30.4	48.7		
▲	0.3	13.6	86.1		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠	0.452	0.10			
▲					



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **August 12, 2002**

Hole No. **H-25-02** Sheet **1** of **2**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

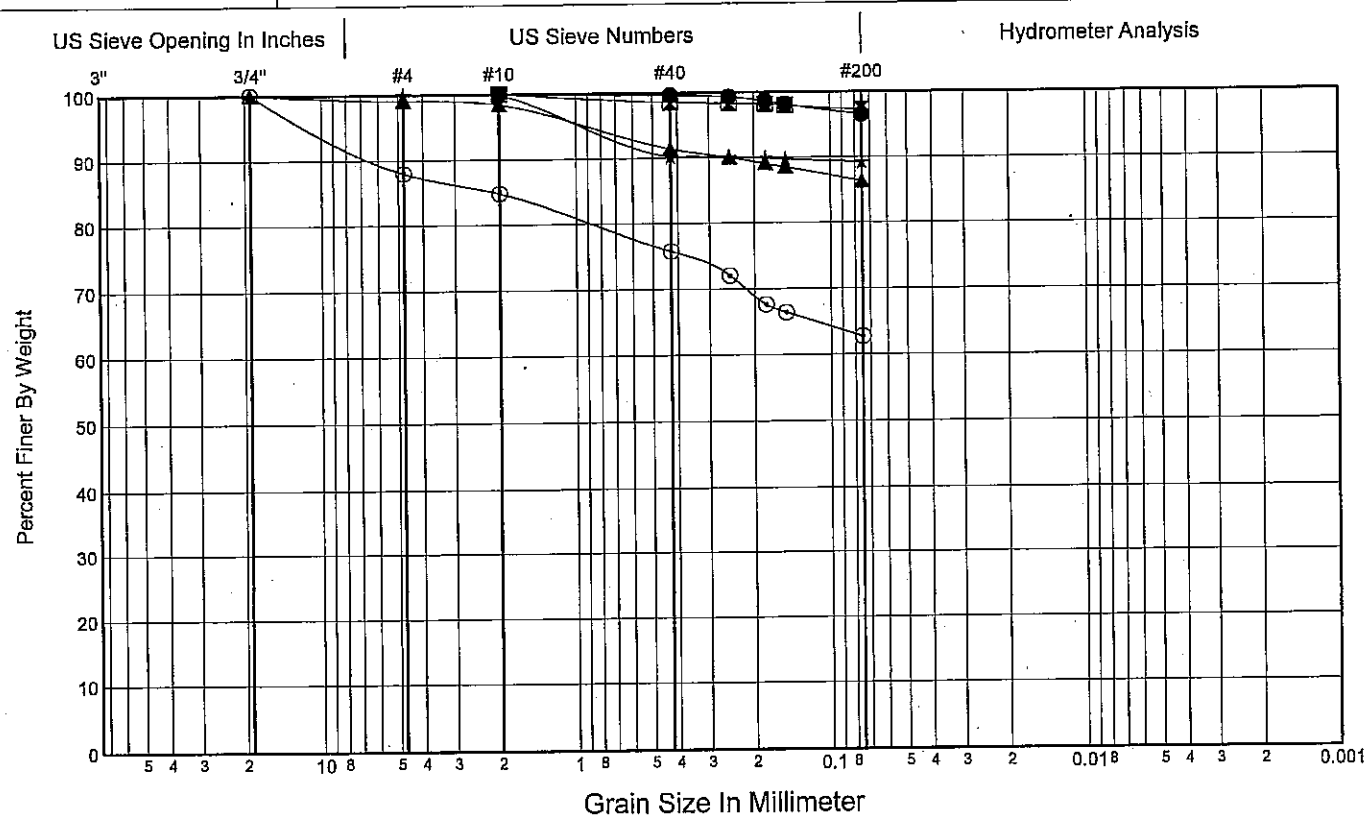
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	5.0	1.52	D-3	ML	See Boring Log	SILT	48	42	29	13
⊠	15.7	4.79	S-6	ML	See Boring Log	SILT	34	44	33	11
▲	24.0	7.32	D-10	ML	See Boring Log	SILT	22	31		
★	33.0	10.06	D-13	ML	See Boring Log	SILT	34	39		
⊙	40.0	12.19	D-15	ML	See Boring Log	SANDY SILT	29	28		

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	3.5	96.5		
⊠	0.0	2.7	97.3		
▲	1.0	12.8	86.2		
★	0.0	10.8	89.2		
⊙	12.1	25.2	62.7		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲					
★					
⊙					



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **August 12, 2002**

Hole No. **H-25-02** Sheet **2** of **2**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

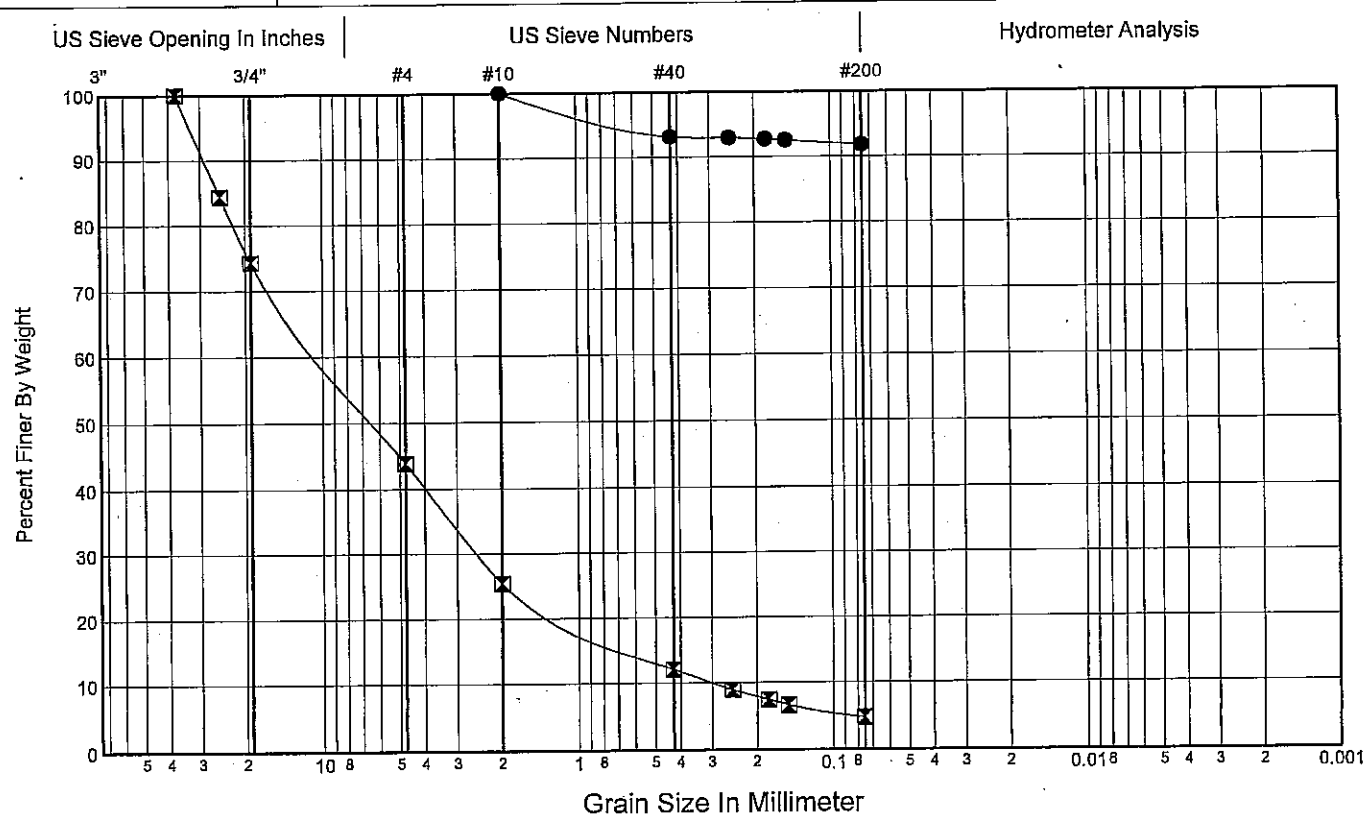
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	51.0	15.54	D-19	ML	See Boring Log	SILT	33			
⊠	64.0	19.51	D-23	GW	See Boring Log	WELL-GRADED GRAVEL with SAND	10			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	8.3	91.7		
⊠	56.2	39.2	4.7	2.1	32.8

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠	9.902	6.28	2.48	1.07	0.302



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **March 26, 2003**

Hole No. **H-26-02** Sheet **1** of **2**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

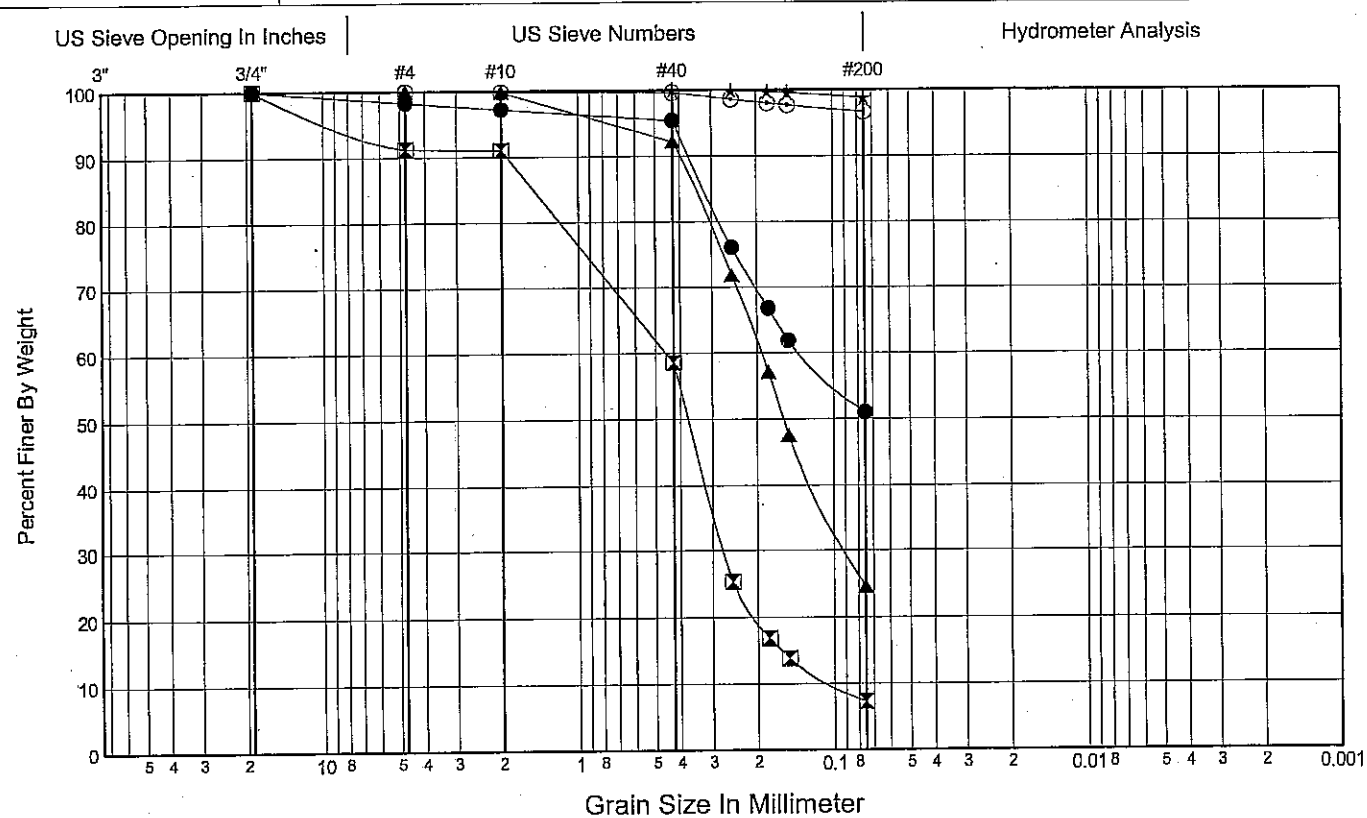
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	1.5	0.46	D-2	ML	See Boring Log	SANDY SILT with very small amount of organics.	22			
⊠	7.0	2.13	D-4	SP-SM	See Boring Log	POORLY GRADED SAND with SILT and organic wood chips.	39			
▲	12.0	3.66	D-6	SM	See Boring Log	SILTY SAND	52			
★	16.6	5.06	S-7	ML	See Boring Log	SILT	31	34	24	10
⊙	17.0	5.18	D-8	CL	See Boring Log	LEAN CLAY	34	32	23	9

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	1.8	47.3	51.0		
⊠	8.8	83.9	7.3	1.6	4.6
▲	0.0	75.4	24.6		
★	0.0	1.2	98.8		
⊙	0.1	3.3	96.6		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.13				
⊠	0.46	0.37	0.27	0.20	0.10
▲	0.19	0.16	0.09		
★					
⊙					



Job No. **OL-3498** Date **March 26, 2003**

Hole No. **H-26-02** Sheet **2** of **2**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

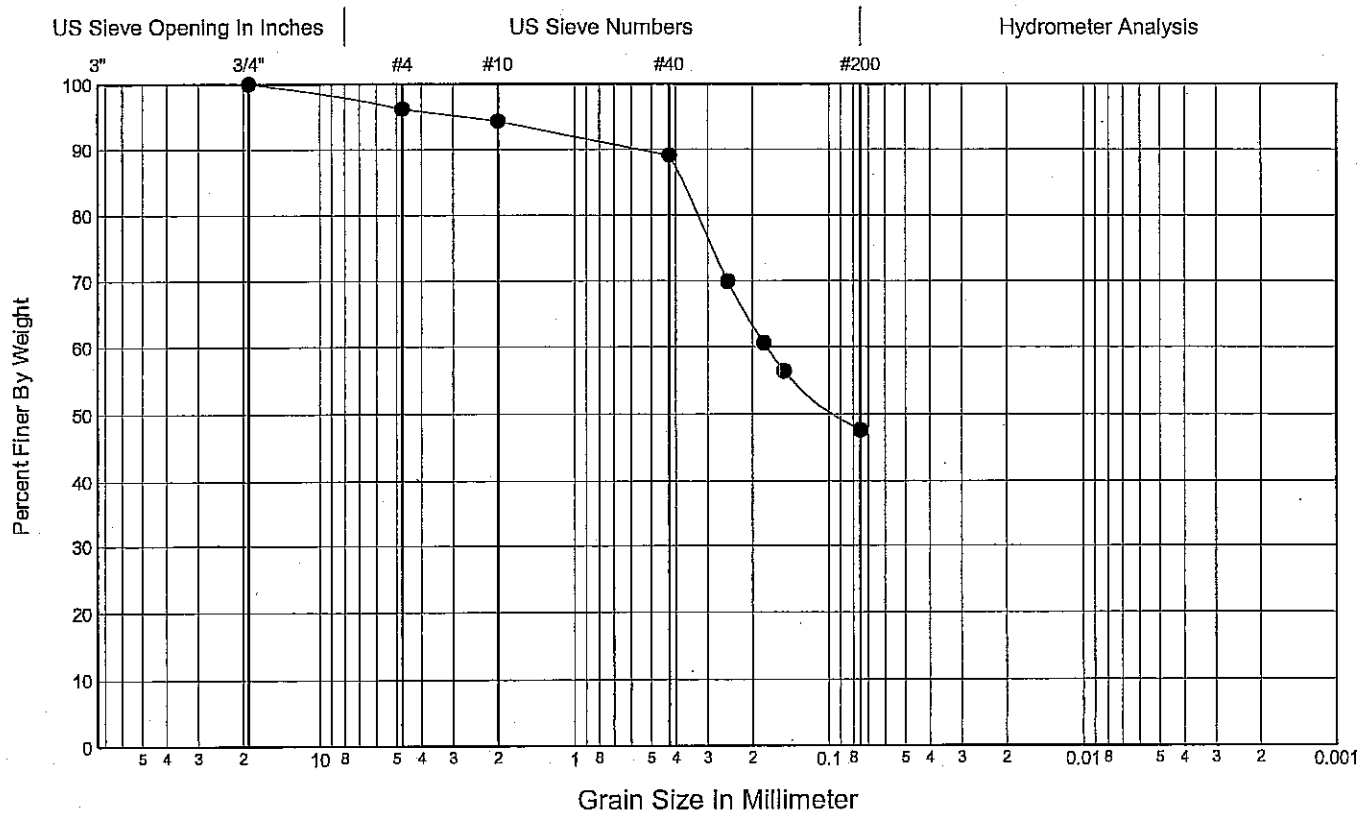
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	**30.0**	**9.14**	**D-12**	**SM**	**See Boring Log**	**SILTY SAND**	**25**			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	**3.8**	**48.6**	**47.6**		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	**0.18**	**0.09**			



Job No. **OL-3498** Date **June 29, 2004**

Hole No. **H-27-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

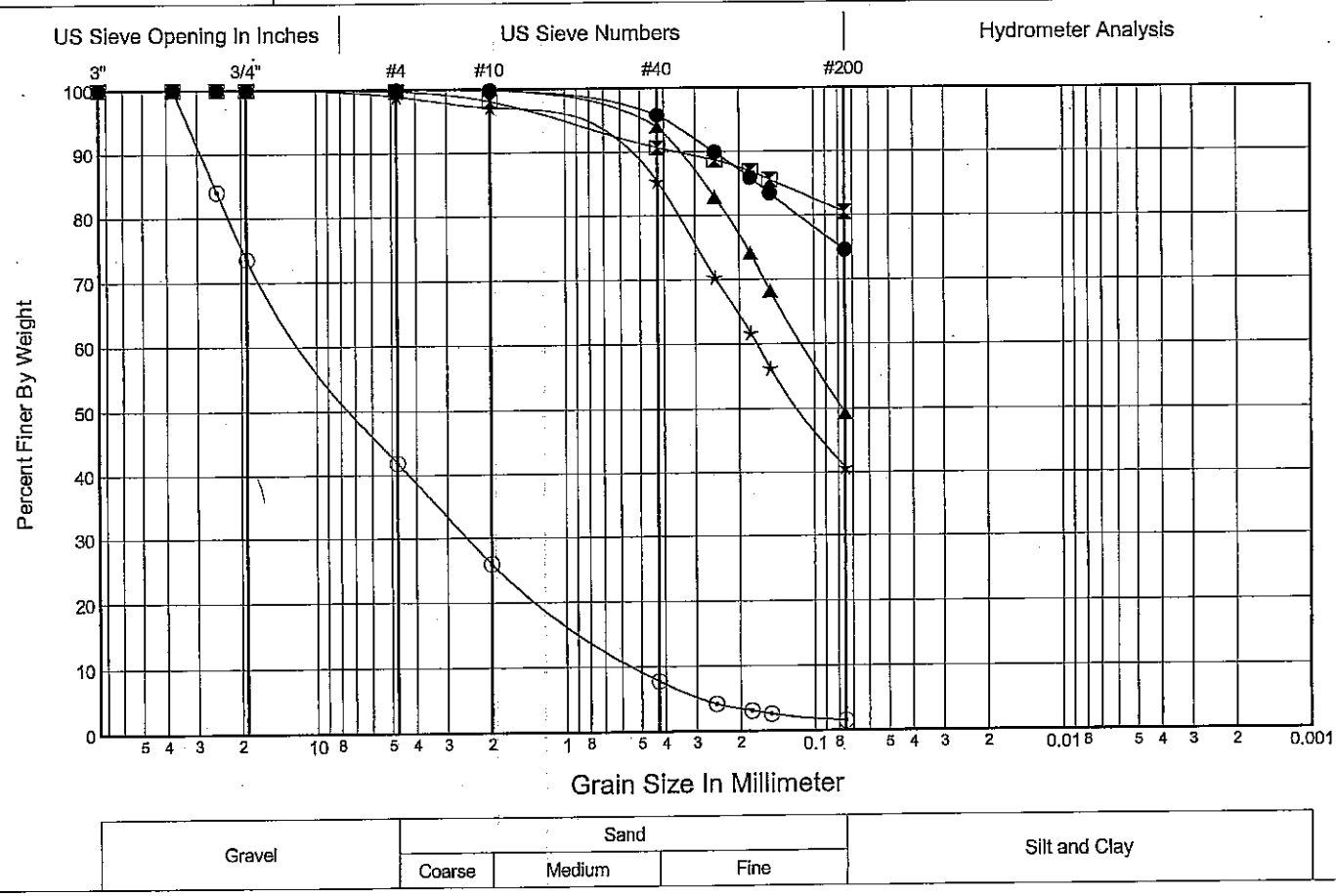
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	4.0	1.22	D-2	ML	See Boring Log	SILT with SAND	28			
⊠	7.5	2.29	U-3/B	ML	See Boring Log	SILT with SAND	28	28		.
▲	7.8	2.39	U-3/C	SM	See Boring Log	SILTY SAND	23	20		.
★	9.0	2.74	D-4	SM	See Boring Log	SILTY SAND	25			
⊙	24.0	7.32	D-8	GW	See Boring Log	WELL-GRADED GRAVEL with SAND	6			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.1	25.3	74.6		
⊠	0.3	19.3	80.5		
▲	0.0	50.7	49.3		
★	1.1	58.2	40.7		
⊙	58.1	40.4	1.5	1.1	20.4

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲	0.111	0.08			
★	0.170	0.11			
⊙	10.513	6.78	2.49	1.20	0.515



Job No. **OL-3498** Date **January 30, 2003**

Hole No. **H-28-02** Sheet **1** of **2**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

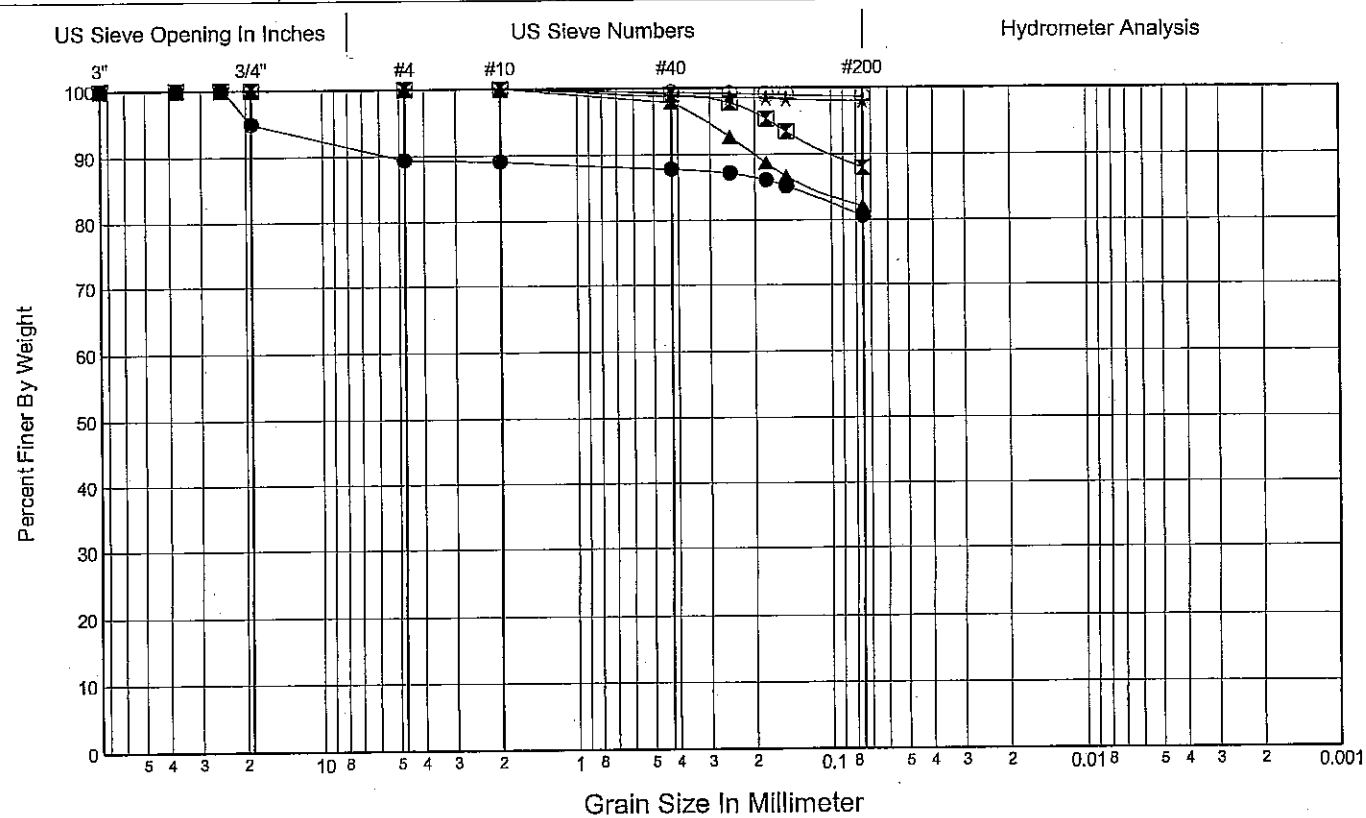
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	6.5	1.98	D-2	MH	See Boring Log	ELASTIC SILT with GRAVEL	54	57	45	12
⊠	10.8	3.30	S-3	MH	See Boring Log	ELASTIC SILT	81	85	72	13
▲	11.2	3.40	S-3	MH	See Boring Log	ELASTIC SILT with SAND	63	74	47	27
★	16.2	4.93	S-5	ML	See Boring Log	SILT	39	44	27	17
⊙	16.5	5.03	D-6	CL	See Boring Log	LEAN CLAY	53	44	26	18

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	10.6	8.8	80.6		
⊠	0.0	12.0	88.0		
▲	0.0	17.9	82.1		
★	0.0	2.0	98.0		
⊙	0.0	1.4	98.6		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲					
★					
⊙					



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **January 30, 2003**

Hole No. **H-28-02** Sheet **2** of **2**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

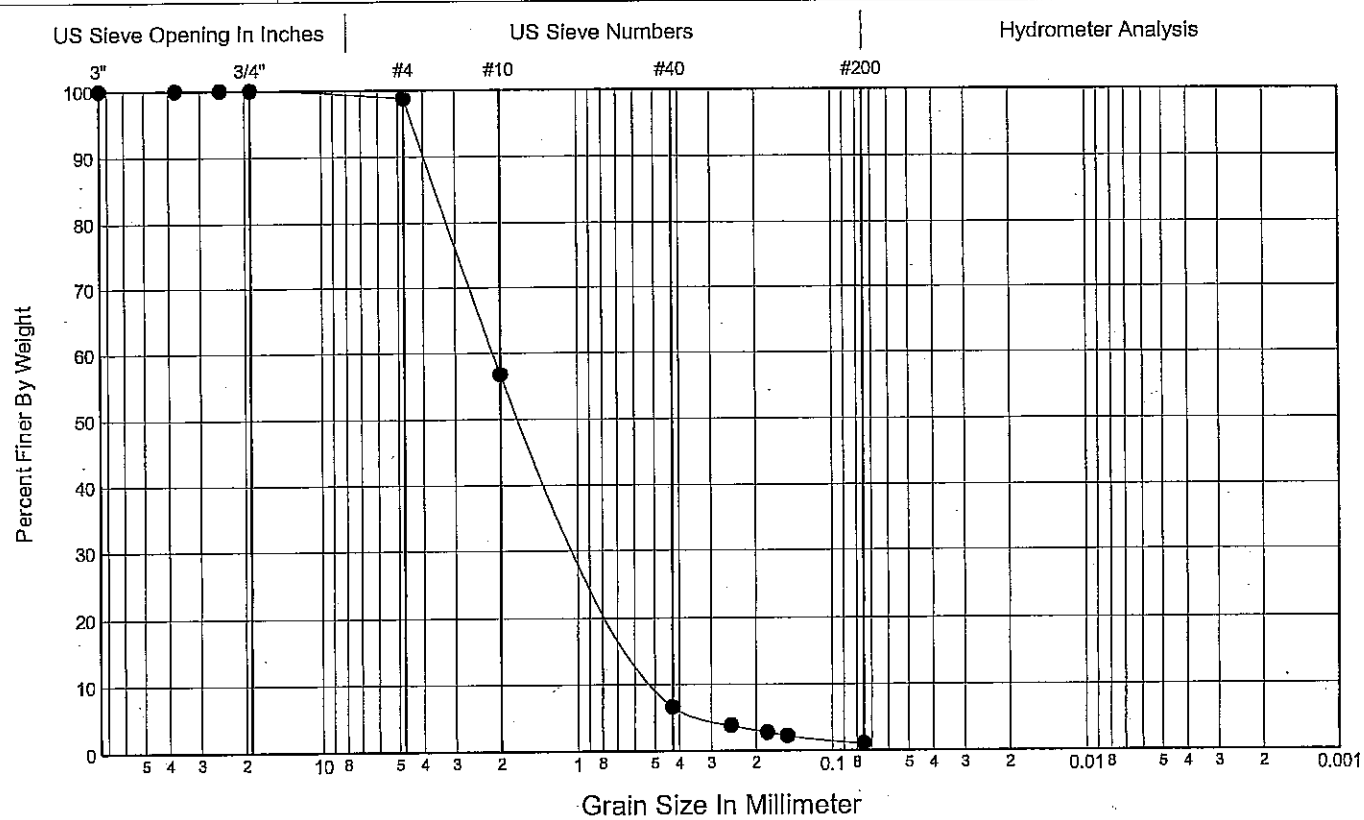
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	39.5	12.04	D-11	SP	See Boring Log	POORLY GRADED SAND	13			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	1.2	97.6	1.1	0.8	4.5

GRADATION VALUES

	D60	D50	D30	D20	D10
●	2.140	1.63	0.87	0.64	0.471



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **January 30, 2003**

Hole No. **H-29-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

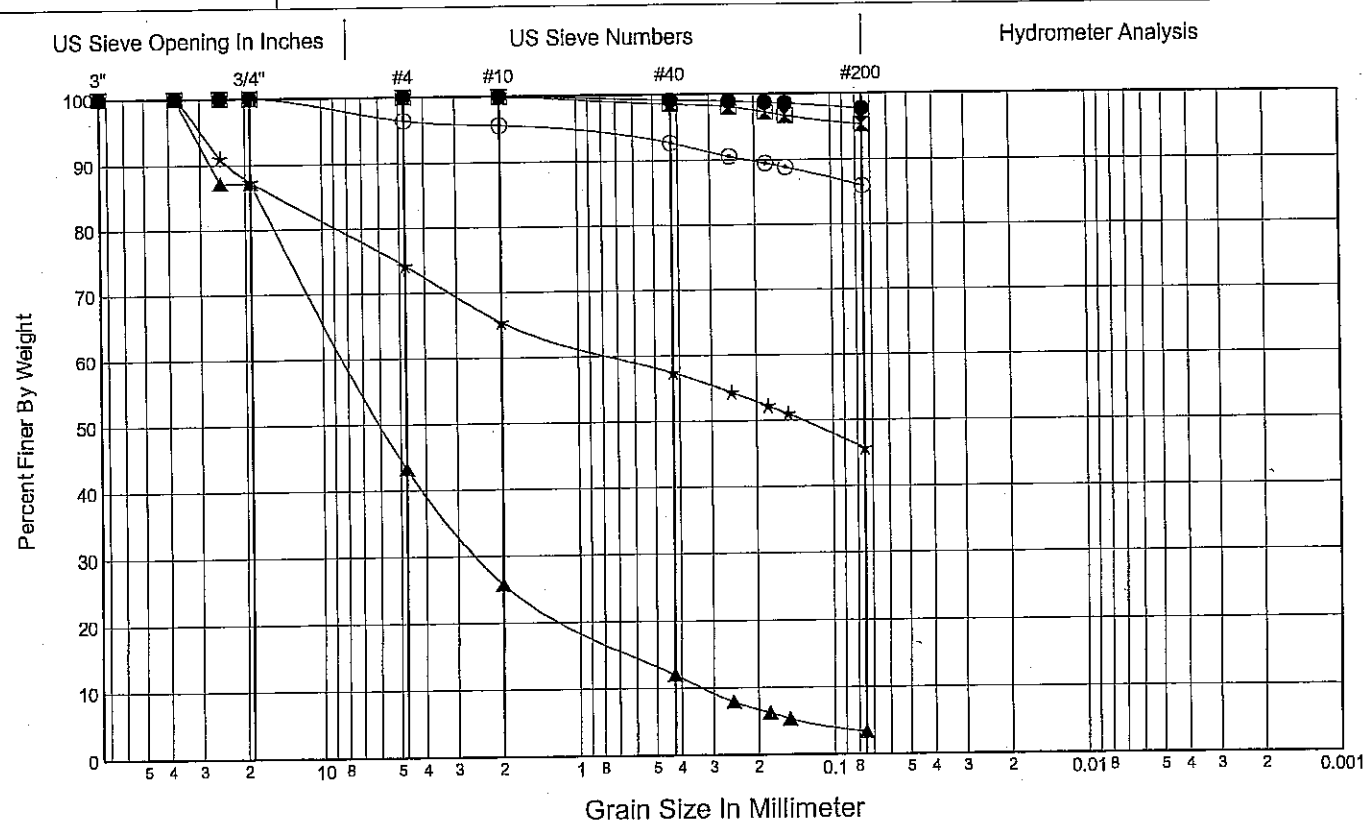
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	11.3	3.45	S-4	ML	See Boring Log	SILT	99	94		
⊠	11.7	3.56	S-4	MH	See Boring Log	ELASTIC SILT	62	73	44	29
▲	20.0	6.10	D-8	GW	See Boring Log	WELL-GRADED GRAVEL with SAND	8			
★	40.0	12.19	D-12	SM	See Boring Log	SILTY SAND with GRAVEL	18			
⊙	45.0	13.72	D-13	ML	See Boring Log	SILT	27			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	2.3	97.7		
⊠	0.0	4.7	95.3		
▲	56.8	39.9	3.3	2.3	24.5
★	25.8	28.5	45.7		
⊙	3.6	10.5	85.9		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲	8.068	5.88	2.47	1.05	0.329
★	0.703	0.13			
⊙					



Job No. OL-3498 | Date July 17, 2002

Hole No. H-30-02 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

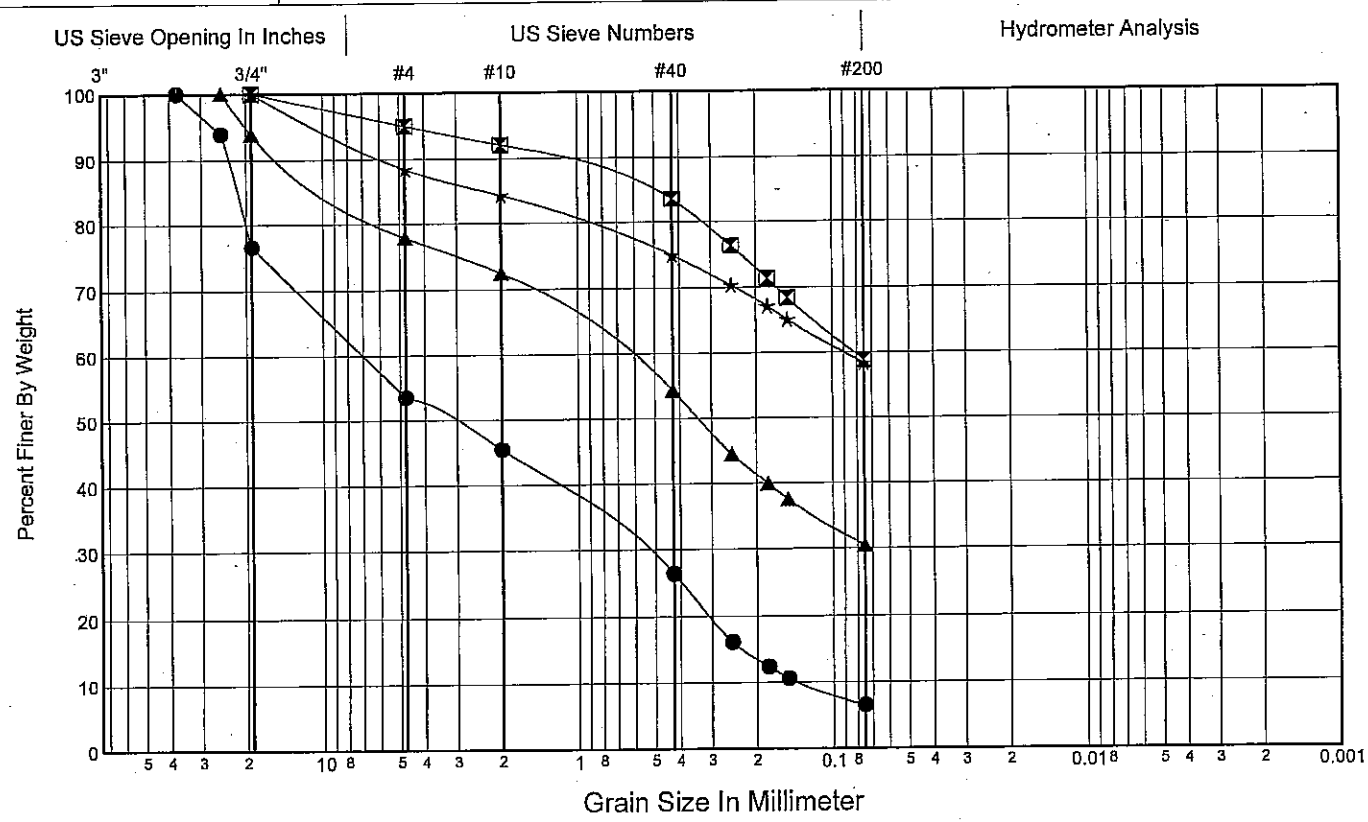
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	8.0	2.44	D-2	SP-SM	See Boring Log	POORLY GRADED SAND with SILT and GRAVEL	10			
⊠	13.0	3.96	D-3	ML	See Boring Log	SANDY SILT	15			
▲	23.0	7.01	D-5	SM	See Boring Log	SILTY SAND with GRAVEL	10			
★	28.0	8.53	D-6	ML	See Boring Log	SANDY SILT	17			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	46.4	47.1	6.5	0.3	51.7
⊠	5.0	36.1	58.9		
▲	22.1	47.5	30.4		
★	11.6	30.0	58.4		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	6.998	3.25	0.57	0.30	0.135
⊠	0.081				
▲	0.690	0.34			
★	0.089				



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3498 | Date October 18, 2002

Hole No. H-31-02 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

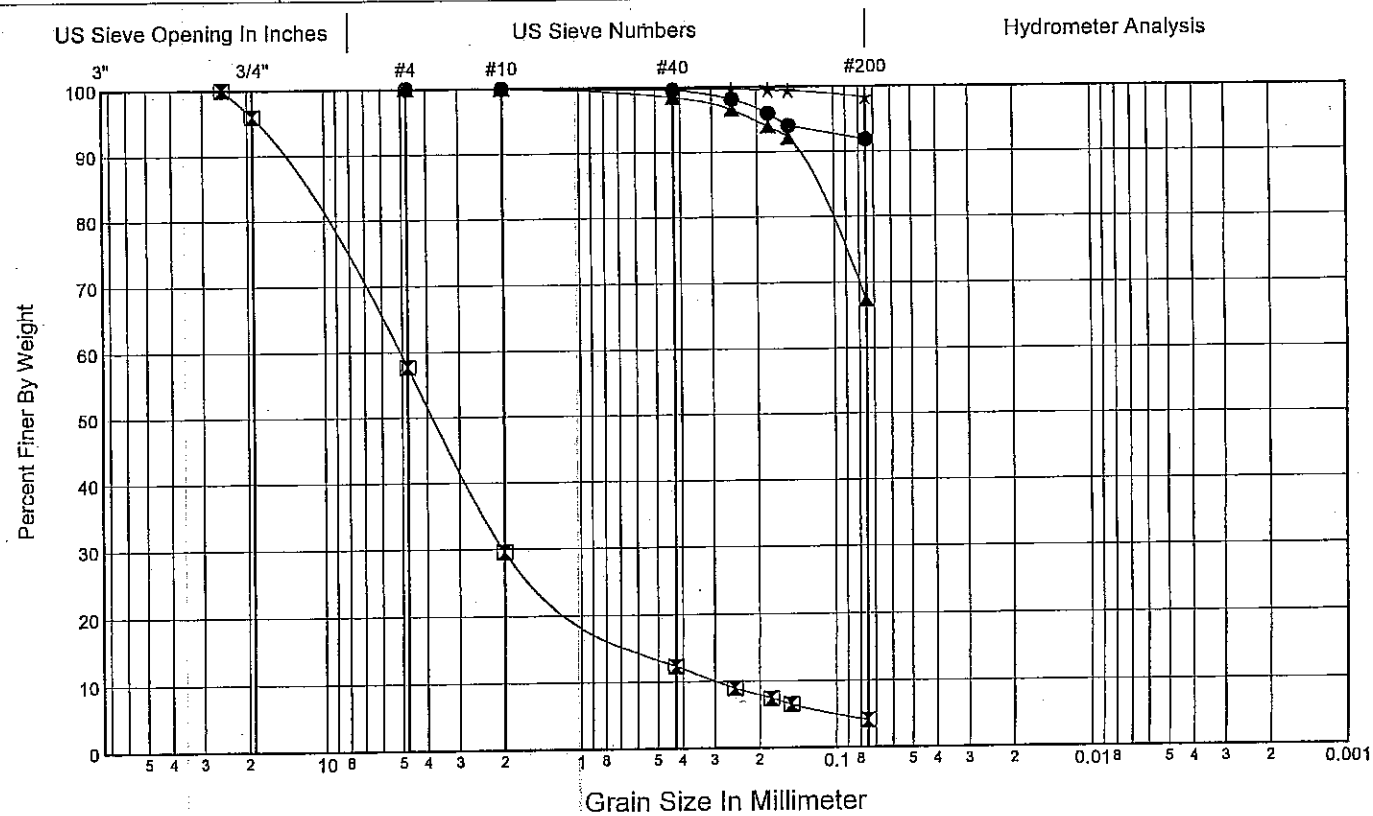
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	8.5	2.59		CL	See Boring Log	LEAN CLAY	32	40	23	17
⊠	13.5	4.11		SW	See Boring Log	WELL-GRADED SAND with GRAVEL	11			
▲	18.5	5.64		ML	See Boring Log	SANDY SILT	30			
★	23.5	7.16		ML	See Boring Log	SILT	33	29		

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	8.2	91.8		
⊠	42.3	53.7	4.0	2.7	17.6
▲	0.0	32.7	67.3		
★	0.0	1.8	98.2		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠	5.164	3.75	2.03	0.85	0.294
▲					
★					



Job No. **OL-3498** Date **October 10, 2002**

Hole No. **H-32-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

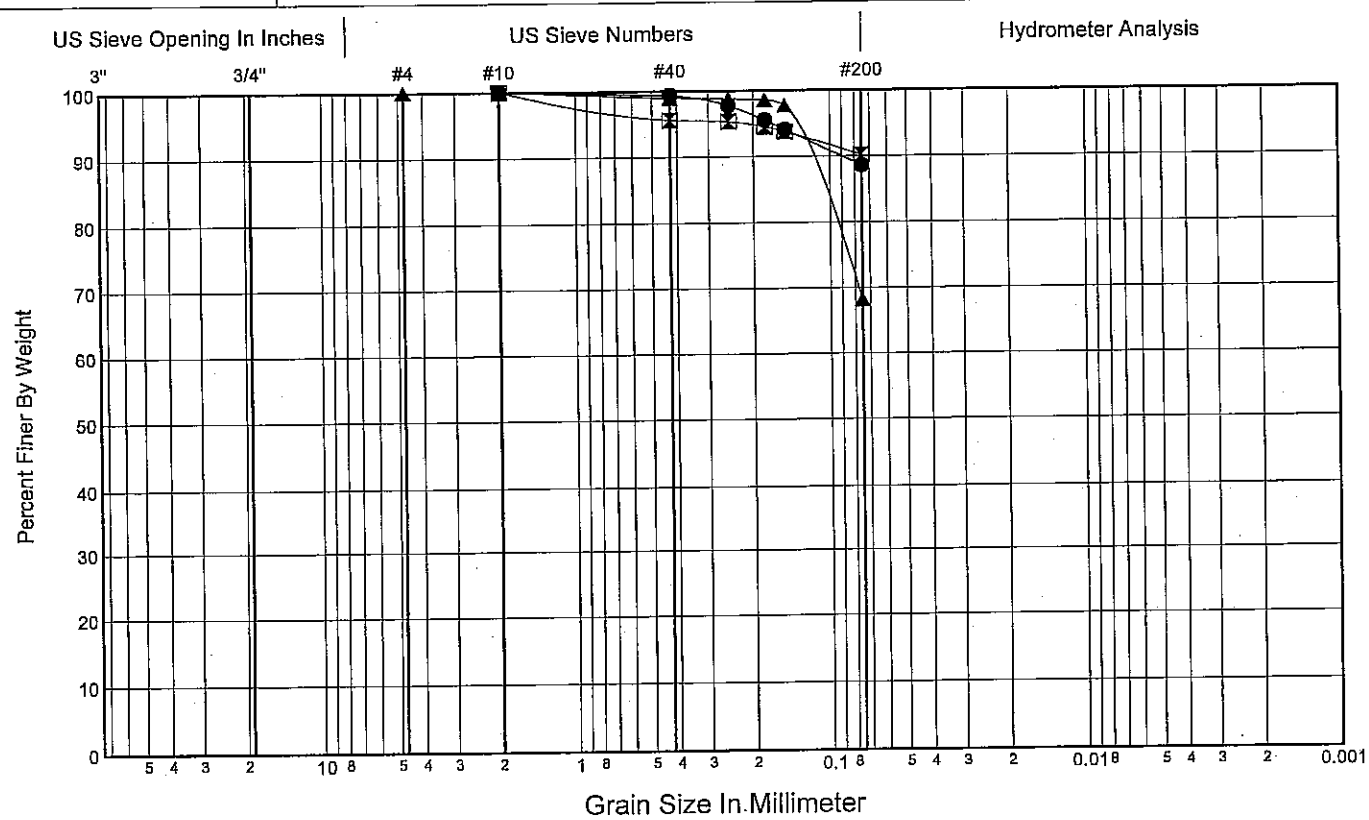
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	19.0	5.79	D-4	ML	See Boring Log	SILT	39	39	34	5
⊠	34.0	10.36	D-7	CL	See Boring Log	LEAN CLAY	34	49	27	22
▲	44.0	13.41	D-9	ML	See Boring Log	SANDY SILT	27			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	11.5	88.5		
⊠	0.0	9.9	90.1		
▲	0.0	31.8	68.2		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲					



Job No. **OL-3498** Date **October 11, 2002**

Hole No. **H-33-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

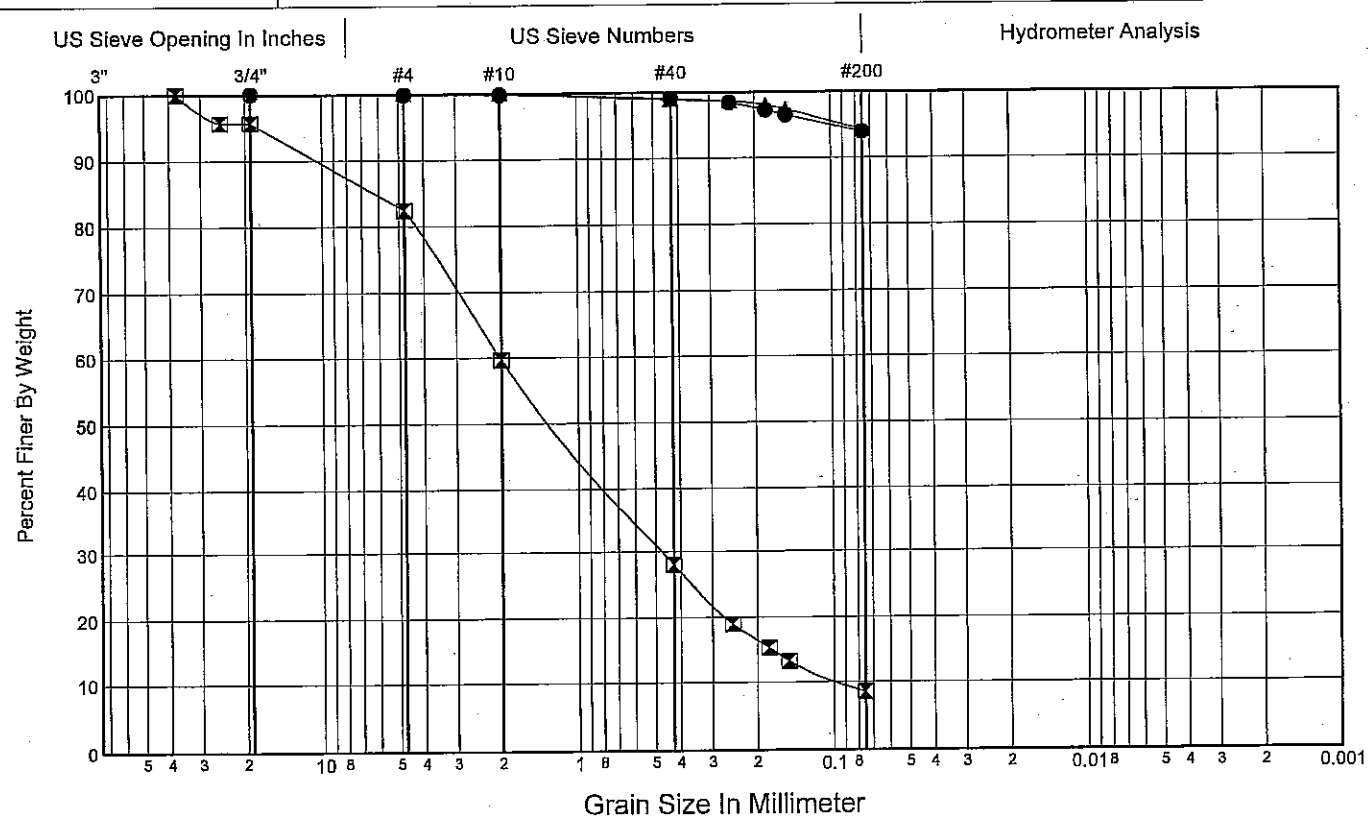
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	9.5	2.90	D-2	ML	See Boring Log	SILT	31	41	27	14
⊠	49.5	15.09	D-10	SW-SM	See Boring Log	WELL-GRADED SAND with SILT and GRAVEL	19			
▲	54.5	16.61	D-11	ML	See Boring Log	SILT	33	44	27	17

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.1	6.0	93.9		
⊠	17.6	73.9	8.5	1.2	21.7
▲	0.0	5.8	94.2		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠	2.028	1.25	0.47	0.27	0.094
▲					



Job No. OL-3498 | Date February 18, 2003

Hole No. H-34-02 | Sheet 1 of 2

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

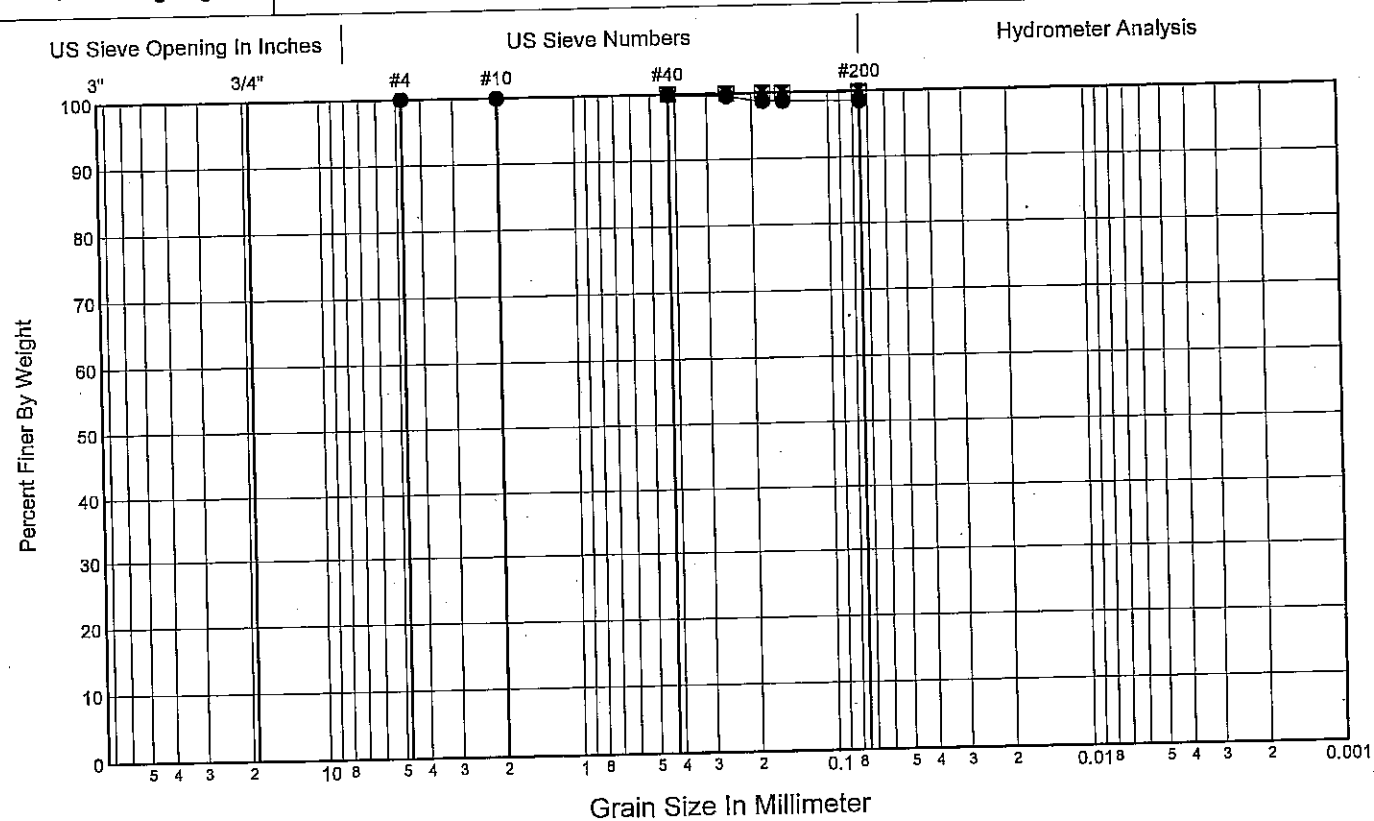
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	13.5	4.11	D-5	CH	See Boring Log	FAT CLAY	35	55	29	26
⊠	22.0	6.71	D-9	CL	See Boring Log	LEAN CLAY	32	44	24	20
▲	63.5	19.35	D-26	CL	See Boring Log	LEAN CLAY	30	43	22	21
★	93.5	28.50	D-35	ML	See Boring Log	SILT	29	32	26	6
⊙	118.0	35.97	D-43	CL	See Boring Log	LEAN CLAY	34	40	25	15

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	1.5	98.5		
⊠	0.0	0.2	99.8		
▲	0.0	0.2	99.8		
★	0.0	0.1	99.9		
⊙	0.0	0.0	100.0		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲					
★					
⊙					



Job No. OL-3498 | Date February 18, 2003

Hole No. H-34-02 | Sheet 2 of 2

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

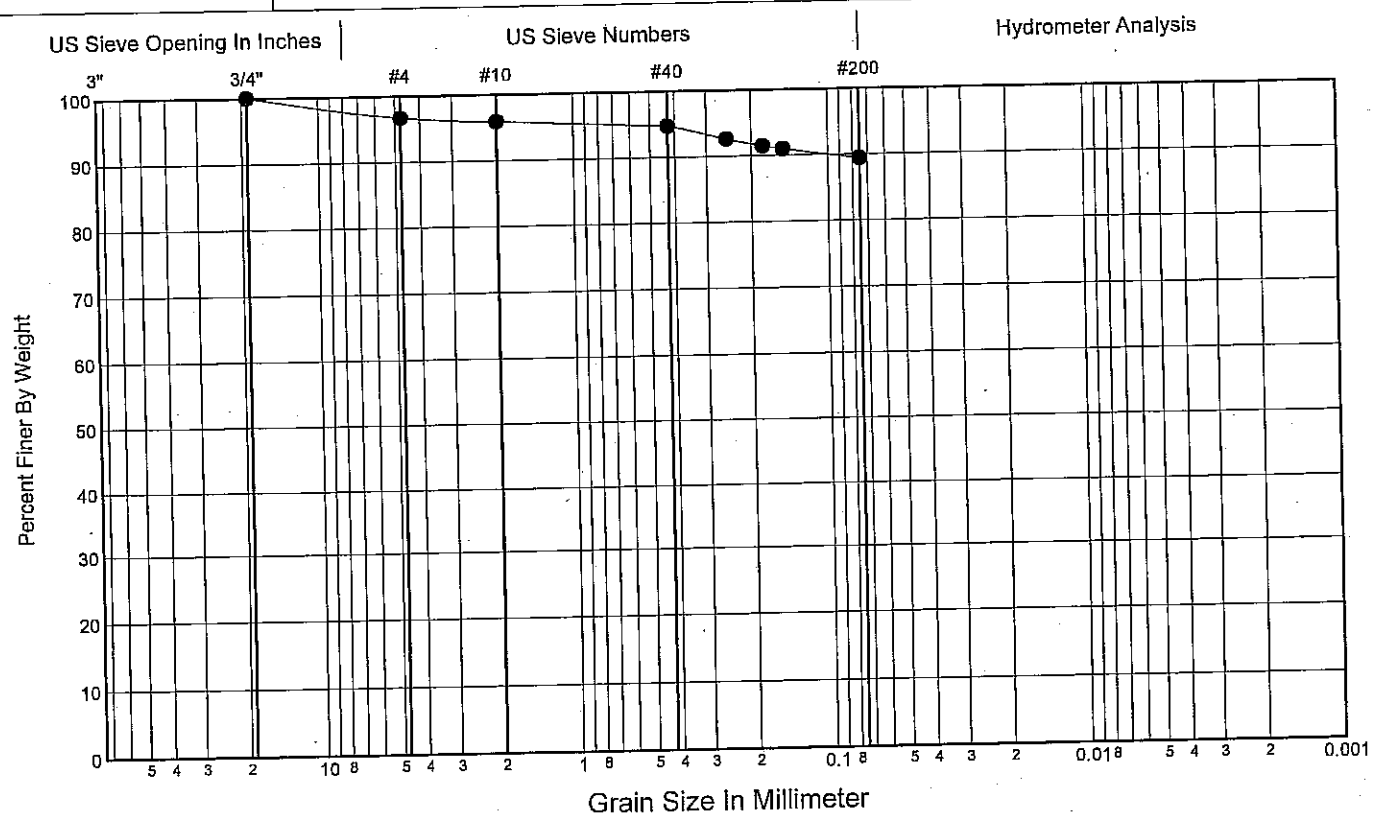
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	153.0	46.63	D-50	CL	See Boring Log	LEAN CLAY	25	33	22	11

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	3.4	7.3	89.4		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					



Job No. **OL-3498** Date **February 13, 2003**

Hole No. **H-35-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

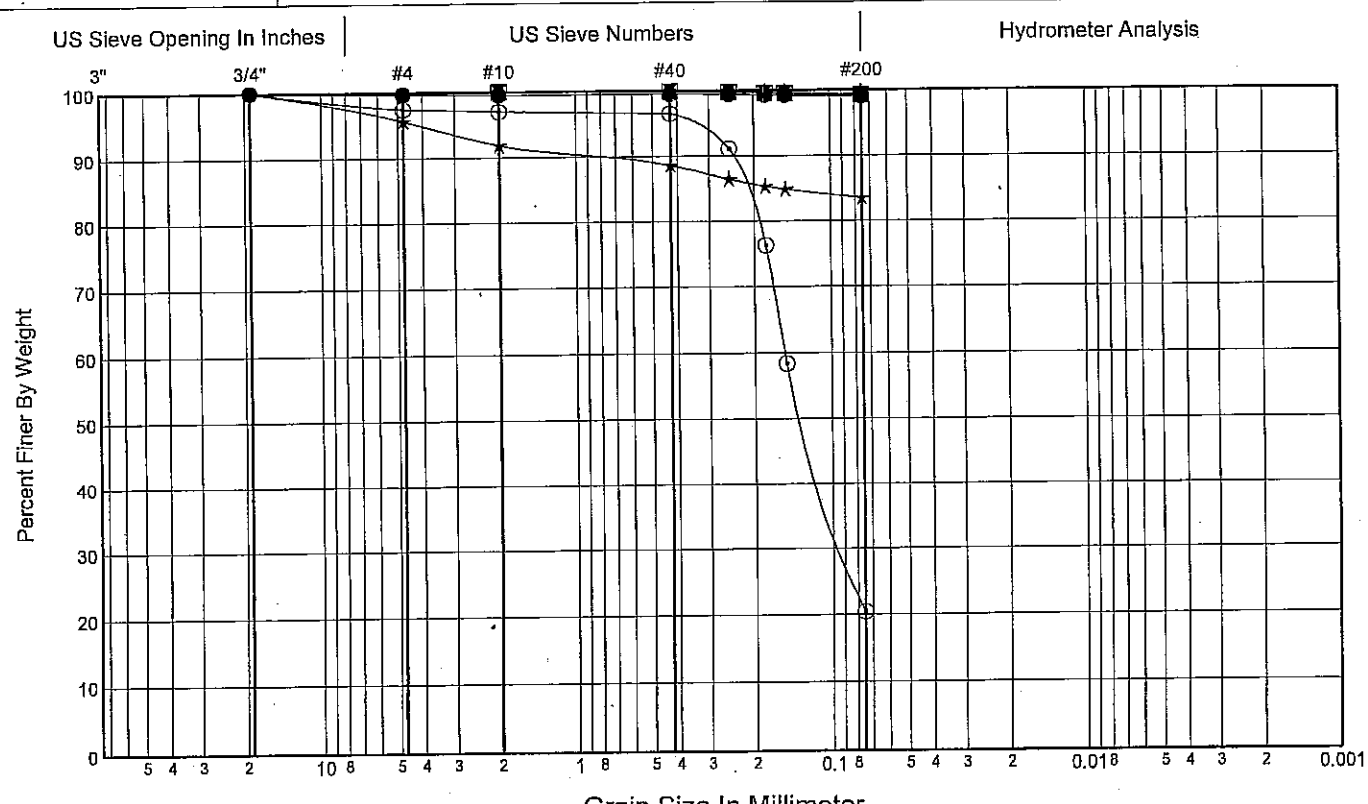
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	20.0	6.10	D-8	ML	See Boring Log	SILT	38	38	25	13
⊠	33.0	10.06	D-14	CL	See Boring Log	LEAN CLAY	31	43	25	18
▲	45.0	13.72	D-19	ML	See Boring Log	SILT	30	38	26	12
★	55.0	16.76	D-21	CL	See Boring Log	LEAN CLAY with SAND	26	35	22	13
⊙	80.0	24.38	D-26	SM	See Boring Log	SILTY SAND	23			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.4	0.7	99.0		
⊠	0.0	0.7	99.3		
▲	0.0	0.2	99.8		
★	4.4	12.1	83.5		
⊙	2.6	77.0	20.4		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲					
★					
⊙	0.152	0.13	0.09		



Job No. **OL-3498** Date **February 18, 2003**

Hole No. **H-36-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

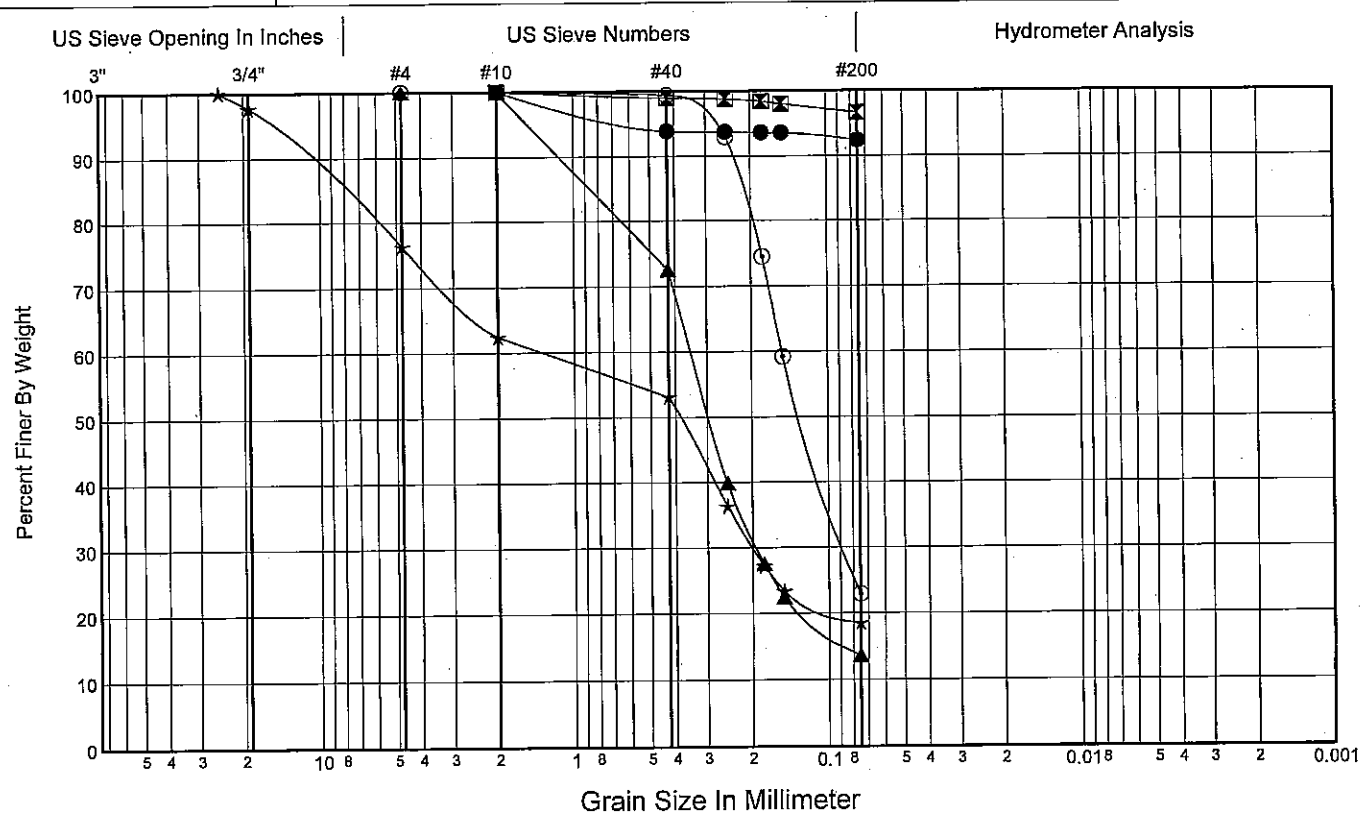
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	6.7	2.04	S-1	MH	See Boring Log	ELASTIC SILT with organics	74	68	52	16
⊠	11.0	3.35	D-4	ML	See Boring Log	SILT	33	39	28	11
▲	15.0	4.57	D-5	SM	See Boring Log	SILTY SAND	25			
★	30.0	9.14	D-8	SM	See Boring Log	SILTY SAND with GRAVEL	21			
⊙	45.0	13.72	D-11	SM	See Boring Log	SILTY SAND	29			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	7.7	92.3		
⊠	0.0	3.4	96.6		
▲	0.0	86.4	13.6		
★	23.7	57.8	18.5		
⊙	0.0	77.0	23.0		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					
▲	0.347	0.29	0.19	0.12	
★	1.339	0.39	0.20	0.09	
⊙	0.151	0.13	0.09		



Job No. **OL-3498** Date **March 26, 2003**

Hole No. **H-37-02** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

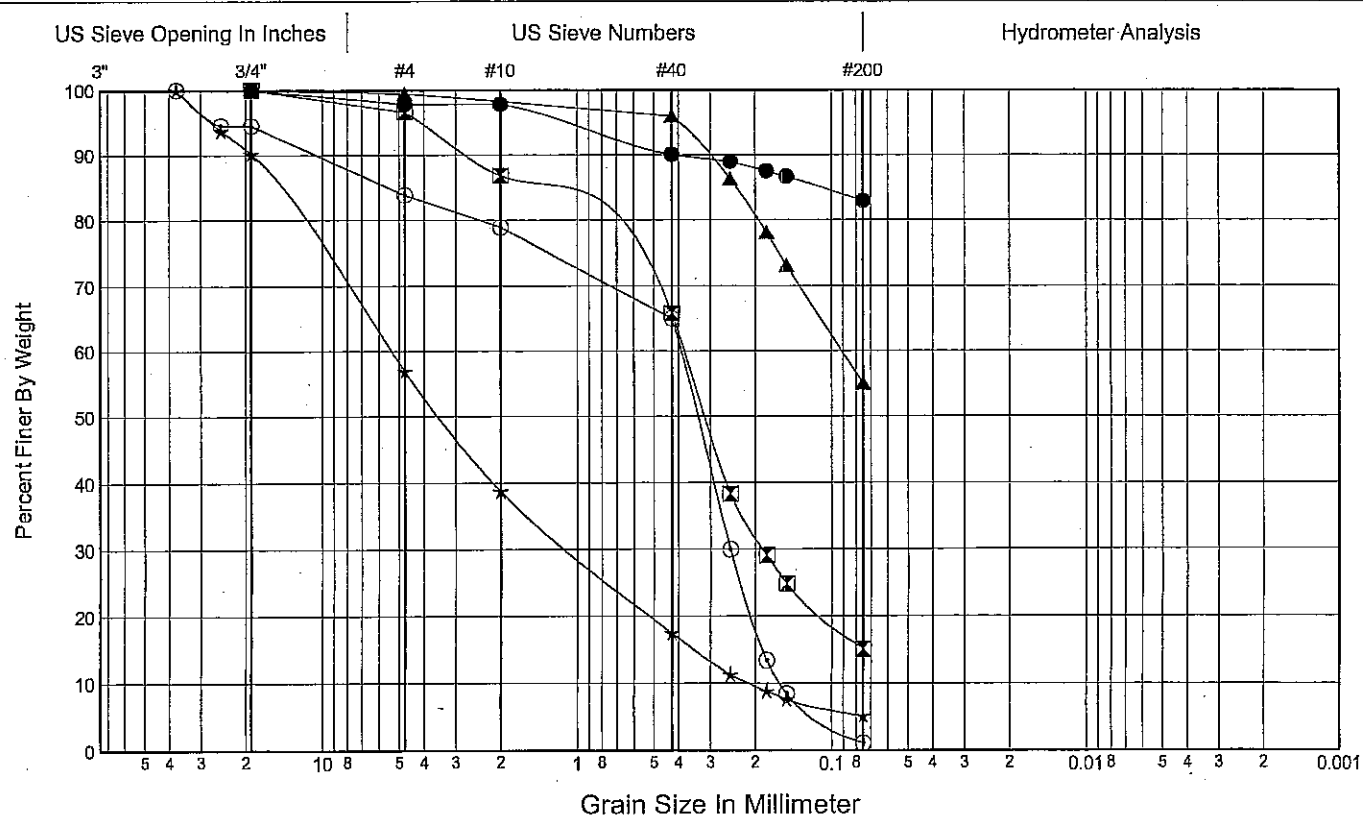
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	2.0	0.61	D-1	ML	See Boring Log	SILT with SAND	48	38	29	9
⊠	12.0	3.66	D-6	SM	See Boring Log	SILTY SAND	31			
▲	17.0	5.18	D-8	ML	See Boring Log	SANDY SILT	30			
★	30.0	9.14	D-12	SP-SM	See Boring Log	POORLY GRADED SAND with SILT and GRAVEL	17			
⊙	40.0	12.19	D-14	SP	See Boring Log	POORLY GRADED SAND with GRAVEL	16			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	2.2	15.0	82.9		
⊠	3.4	81.6	15.0		
▲	0.5	44.5	55.0		
★	43.1	51.8	5.1	1.0	25.7
⊙	16.2	82.8	1.1	1.0	2.5

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠	0.38	0.31	0.19	0.11	
▲	0.09				
★	5.40	3.42	1.06	0.51	0.21
⊙	0.39	0.34	0.25	0.21	0.16



Job No. OL-3498 Date January 29, 2003

Hole No. H-38-02 Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

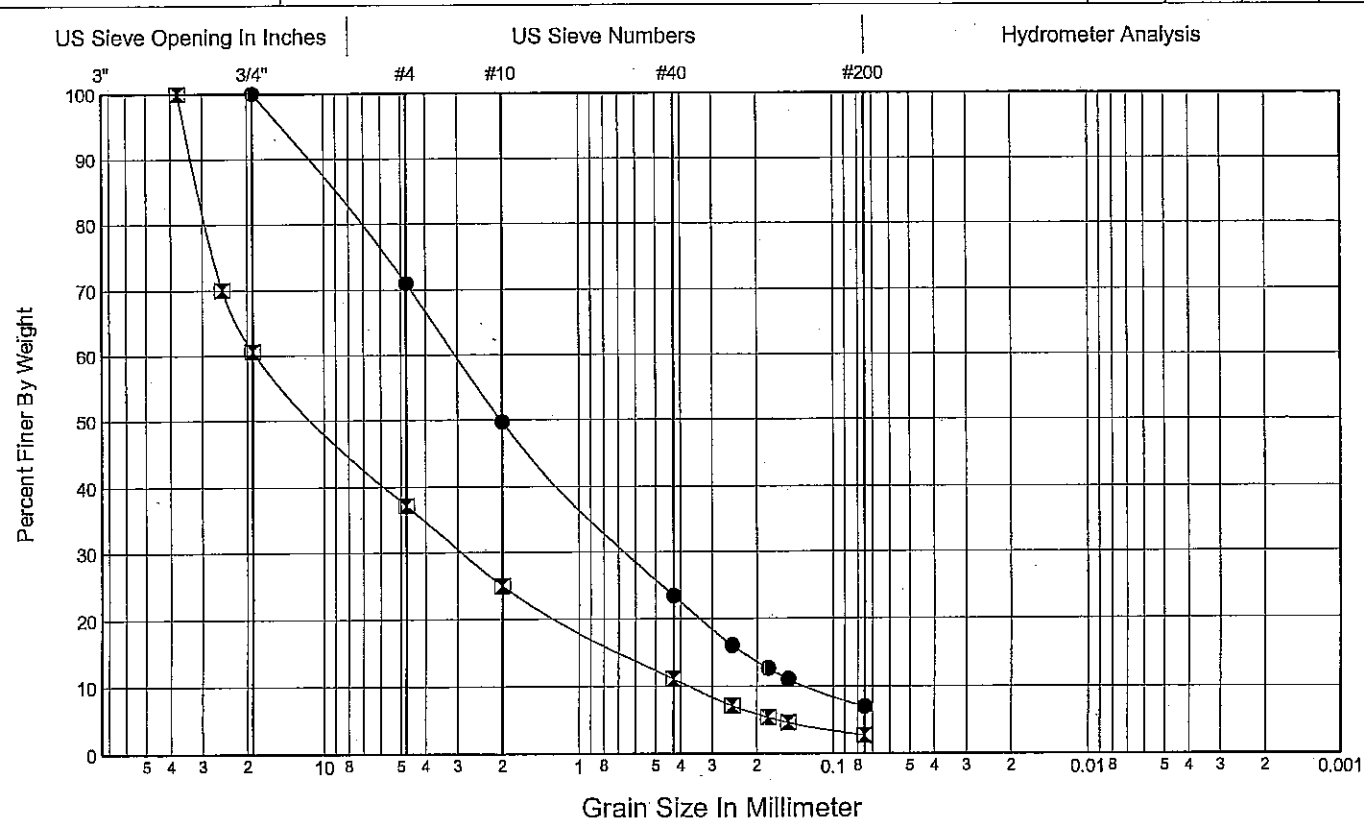
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	8.0	2.44	D-2	SW-SM	See Boring Log	WELL-GRADED SAND with SILT and GRAVEL	9			
⊠	13.0	3.96	D-3	GW	See Boring Log	WELL-GRADED GRAVEL with SAND	10			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	29.0	64.0	7.0	1.0	24.2
⊠	62.9	34.4	2.7	1.2	50.0

GRADATION VALUES

	D60	D50	D30	D20	D10
●	3.042	2.03	0.63	0.33	0.126
⊠	18.339	10.16	2.86	1.15	0.367



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3498 | Date January 8, 2004

Hole No. H-39-03 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

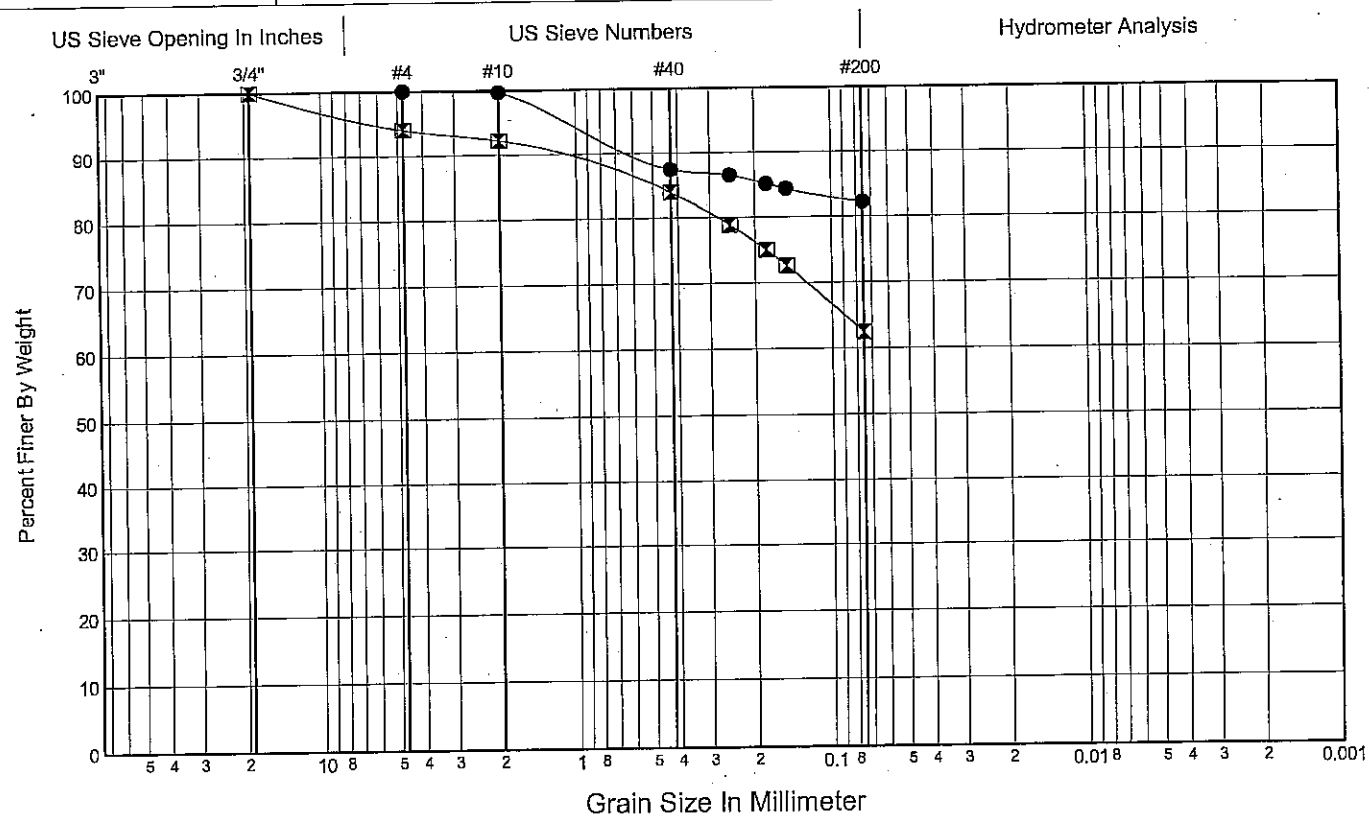
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	5.0	1.52	D-1	MH	See Boring Log	ELASTIC SILT with SAND	24	64	34	30
⊠	10.0	3.05	D-2	CL-ML	See Boring Log	SANDY SILTY CLAY	20	22	17	5

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	17.8	82.2		
⊠	6.0	31.6	62.4		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠					



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3498
Hole No. H-39A-03
Project SR 202 - SR520 to Sahalee Way NE

Date January 8, 2004
Sheet 1 of 1

Laboratory Summary

Washington State Department of Transportation

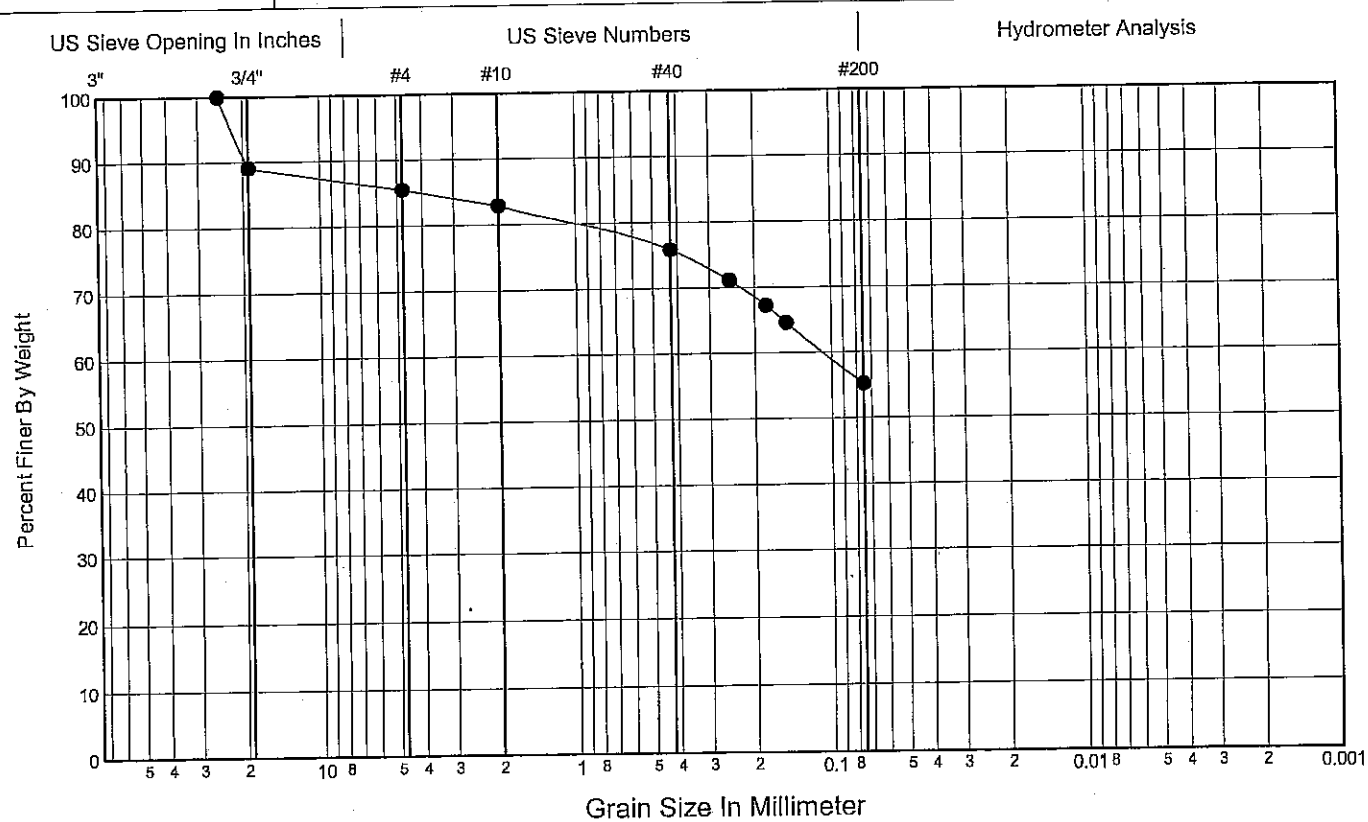
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	20.0	6.10	D-5	CL-ML	See Boring Log	SANDY SILTY CLAY	14	23	17	6

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	14.5	30.3	55.2		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.107				



Job No. OL-3498 | Date December 23, 2003

Hole No. H-40-03 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

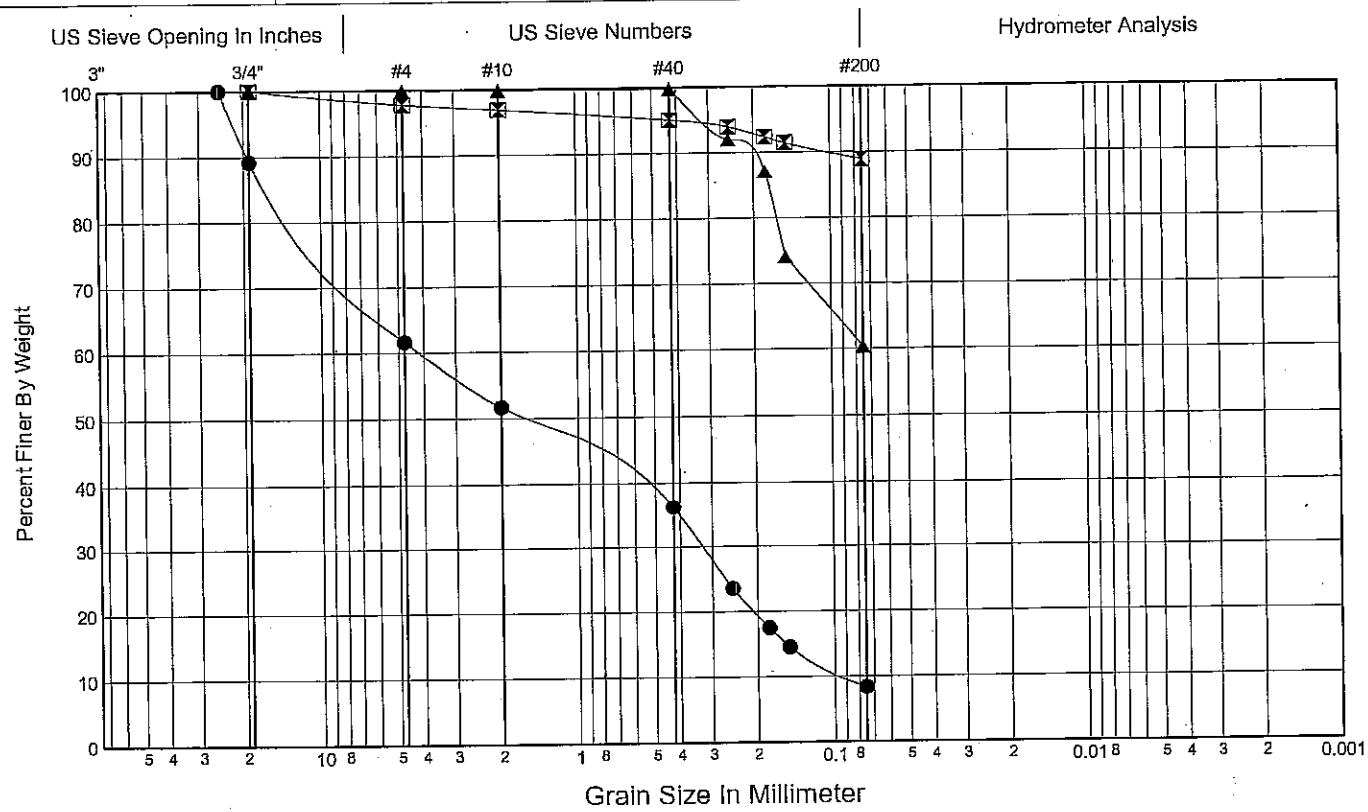
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	4.0	1.22	D-1	SP-SM	See Boring Log	POORLY GRADED SAND with SILT and GRAVEL	20			
⊠	9.0	2.74	D-2	CL	See Boring Log	LEAN CLAY	35	44	26	18
▲	24.0	7.32	D-6	ML	See Boring Log	SANDY SILT	27			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	38.5	53.2	8.3	0.3	45.7
⊠	2.2	8.9	88.9		
▲	0.1	39.6	60.3		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	4.153	1.70	0.33	0.21	0.091
⊠					
▲					



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3498 | Date January 8, 2004

Hole No. H-42-03 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

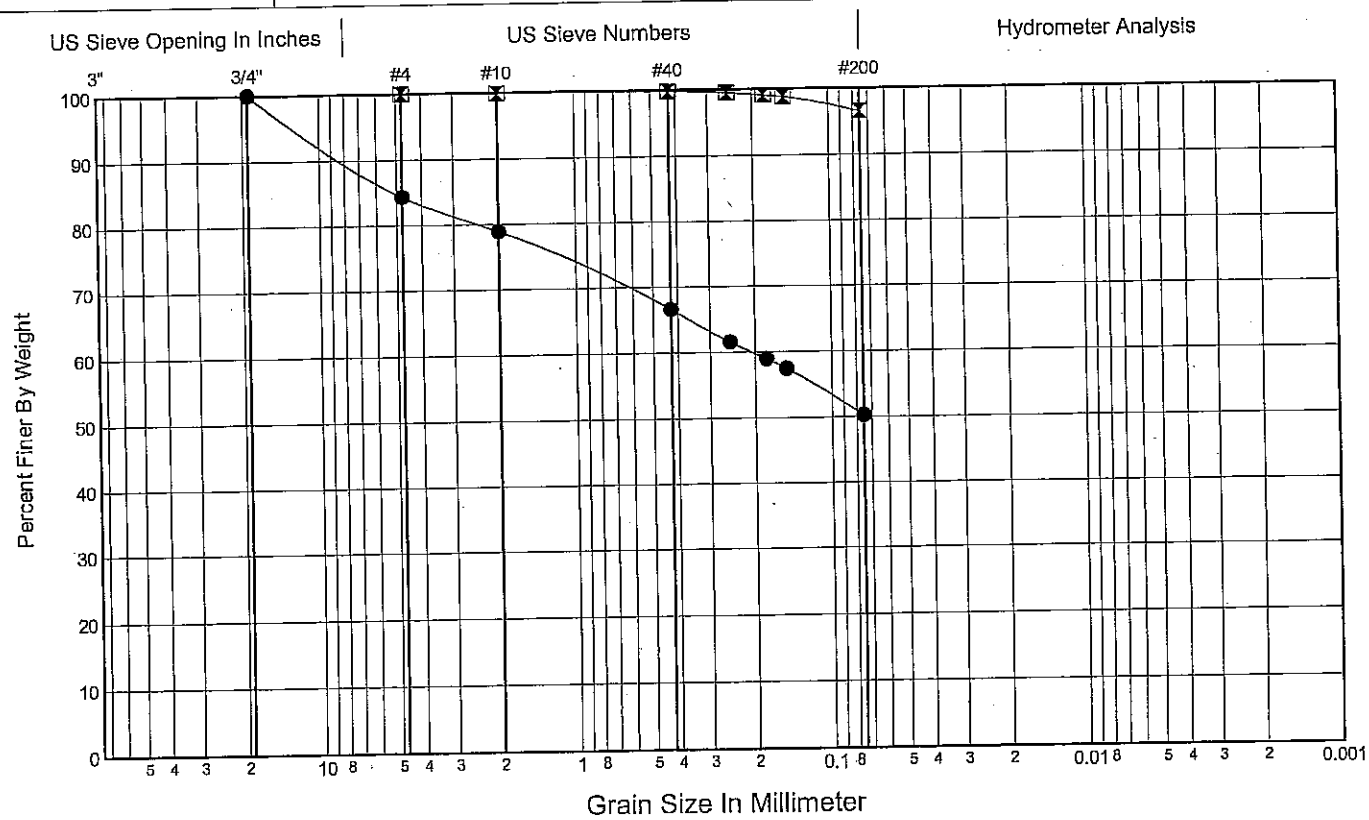
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	6.0	1.83	D-2	ML	See Boring Log	SANDY SILT with GRAVEL	19	22		
⊠	46.0	14.02	D-10	CL	See Boring Log	LEAN CLAY	27	33	22	11

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	15.7	34.1	50.2		
⊠	0.0	3.5	96.5		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.207				
⊠					



Job No. OL-3498 | Date December 23, 2003

Hole No. H-43-03 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

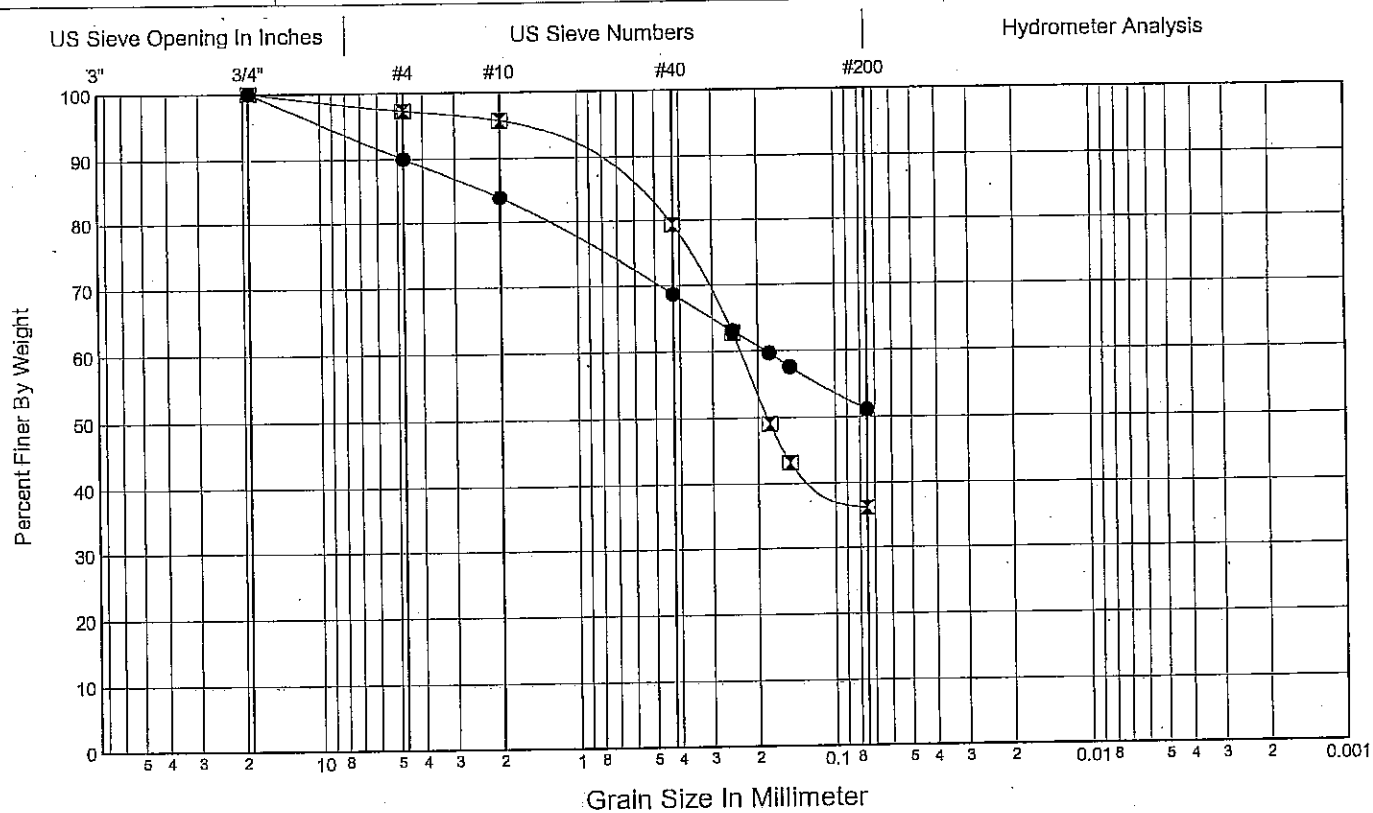
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	14.0	4.27	D-5	CL-ML	See Boring Log	SANDY SILTY CLAY	30	25	19	6
⊠	29.0	8.84	D-8	SM	See Boring Log	SILTY SAND	17			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	10.0	38.9	51.1		
⊠	2.7	61.1	36.2		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.186				
⊠	0.234	0.18			



Job No.	OL-3498	Date	July 7, 2004
Hole No.	H-45-03	Sheet	1 of 1
Project	SR 202 - SR520 to Sahalee Way NE		

Laboratory Summary

Washington State Department of Transportation

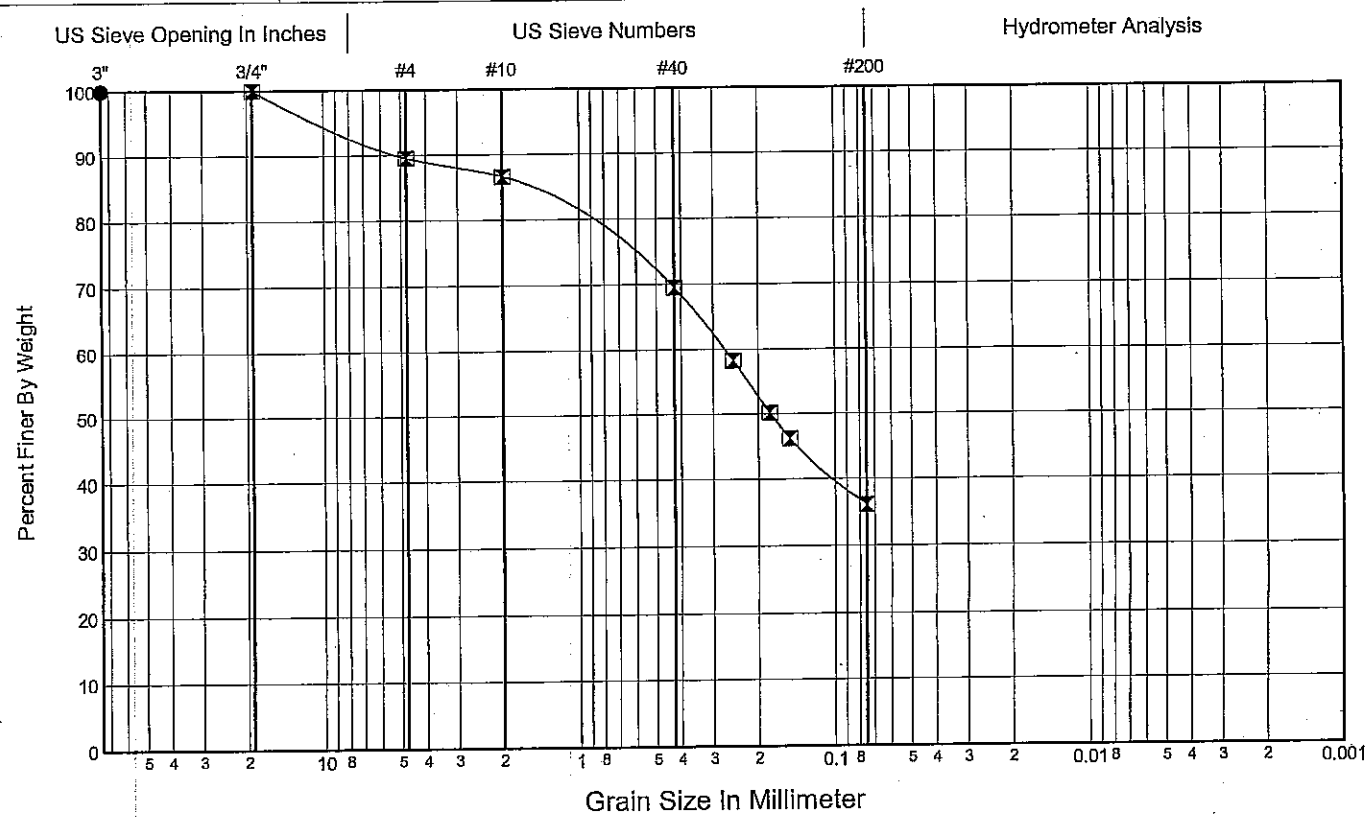
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	0.0	0.00	D-1		See Boring Log	Before Oven Drying		47	38	9
⊠	0.1	0.03	D-1	SM	See Boring Log	SILTY SAND with organics	41	38		

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●					
⊠	10.5	53.4	36.1		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠	0.272	0.18			



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **March 25, 2002**

Hole No. **TH-2-01** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

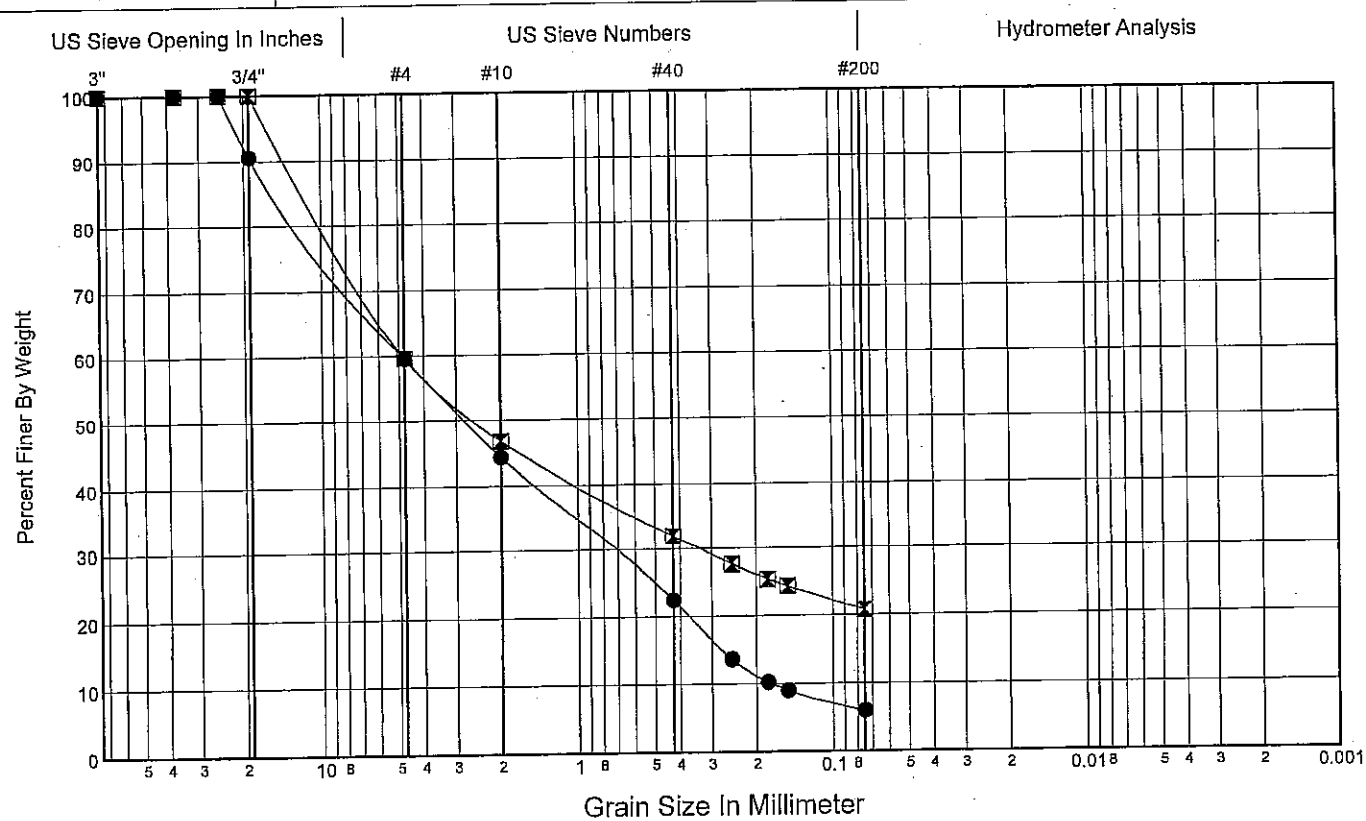
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	1.0	0.30	D-1	SP-SM	See Boring Log	POORLY GRADED SAND with SILT and GRAVEL	9			
⊠	5.0	1.52	D-2	GM	See Boring Log	SILTY GRAVEL with SAND	16			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	40.5	53.6	6.0	0.6	28.0
⊠	40.4	38.9	20.7		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	4.85	2.76	0.73	0.37	0.17
⊠	4.81	2.49	0.33		



Job No. OL-3498 | Date March 29, 2002

Hole No. TH-3-01 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

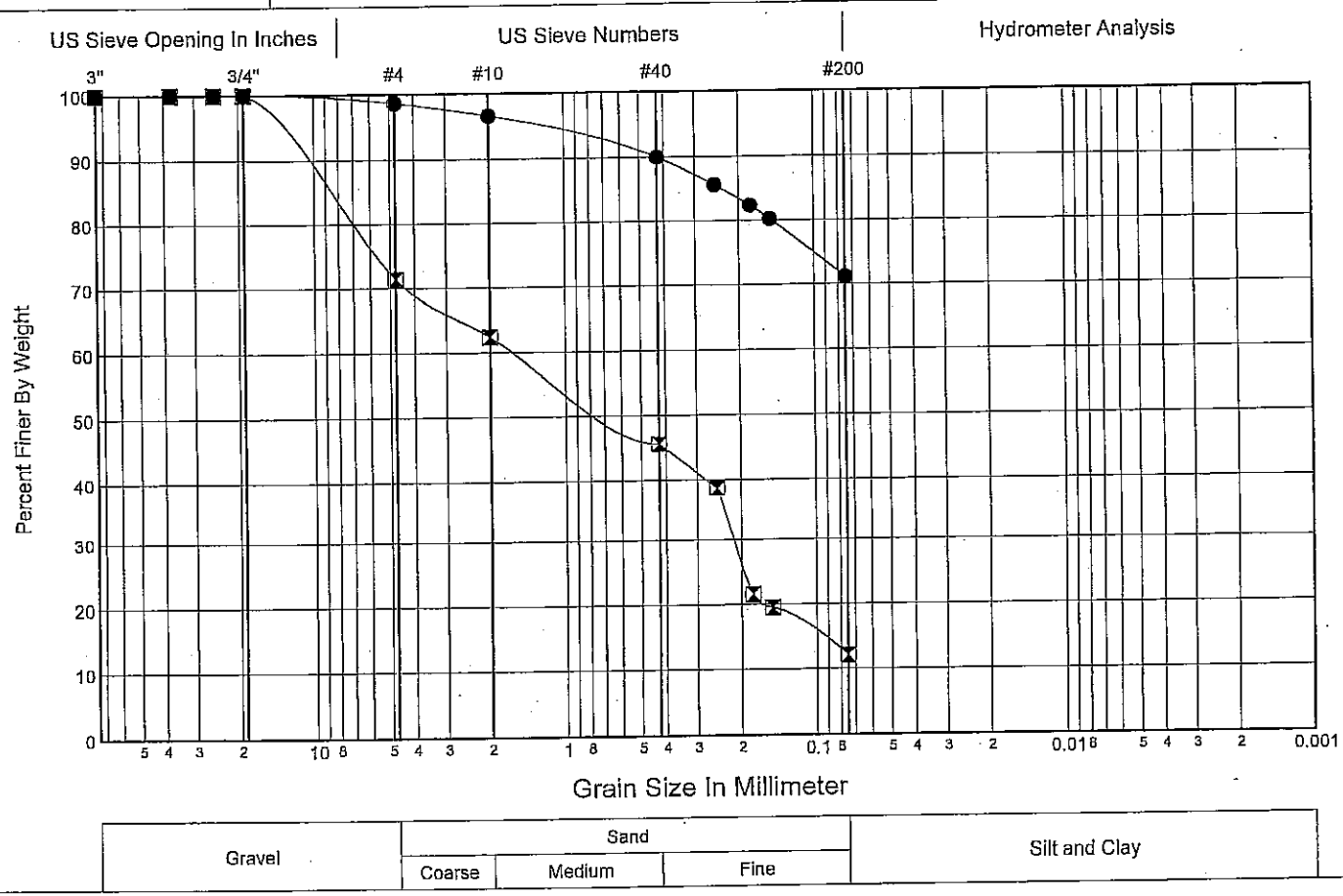
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	12.5	3.81	D-4	ML	See Boring Log	SILT with SAND	14	23		
⊠	25.0	7.62	D-8	SM	See Boring Log	SILTY SAND with GRAVEL	16			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	1.3	27.5	71.1		
⊠	28.6	59.4	12.0	0.5	25.9

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠	1.61	0.64	0.21	0.16	



Job No. OL-3498 | Date March 25, 2002

Hole No. TH-4-01 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

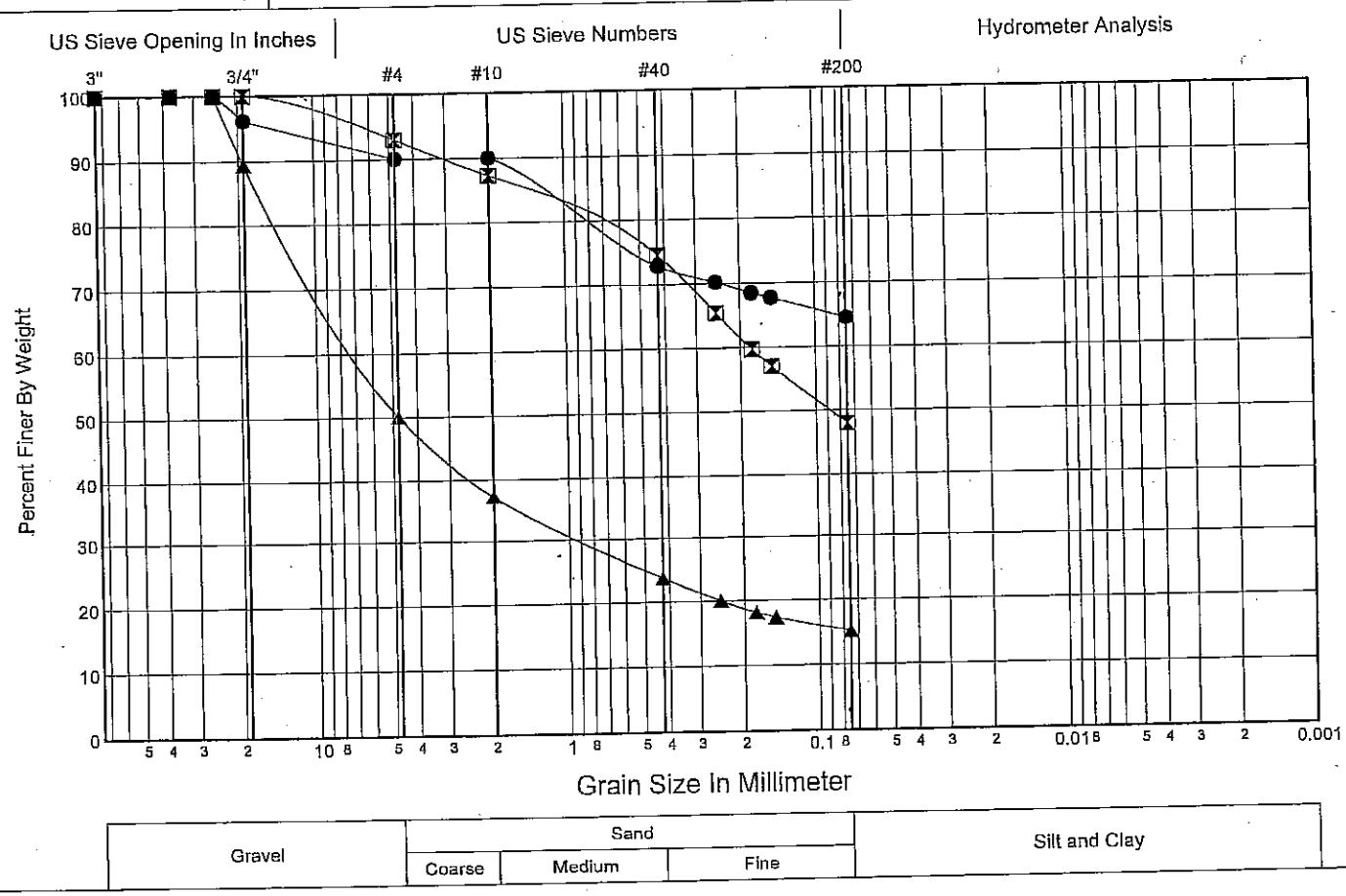
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	7.5	2.29	D-3	ML	See Boring Log	SANDY SILT	19			
⊠	15.0	4.57	D-6	SM	See Boring Log	SILTY SAND	19			
▲	25.0	7.62	D-9	GM	See Boring Log	SILTY GRAVEL with SAND	8			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	9.9	25.6	64.5		
⊠	7.0	45.1	48.0		
▲	50.0	34.8	15.2		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠	0.18	0.09			
▲	6.76	4.75	0.87	0.25	



Job No. **OL-3498** Date **March 25, 2002**

Hole No. **SL-1-00** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

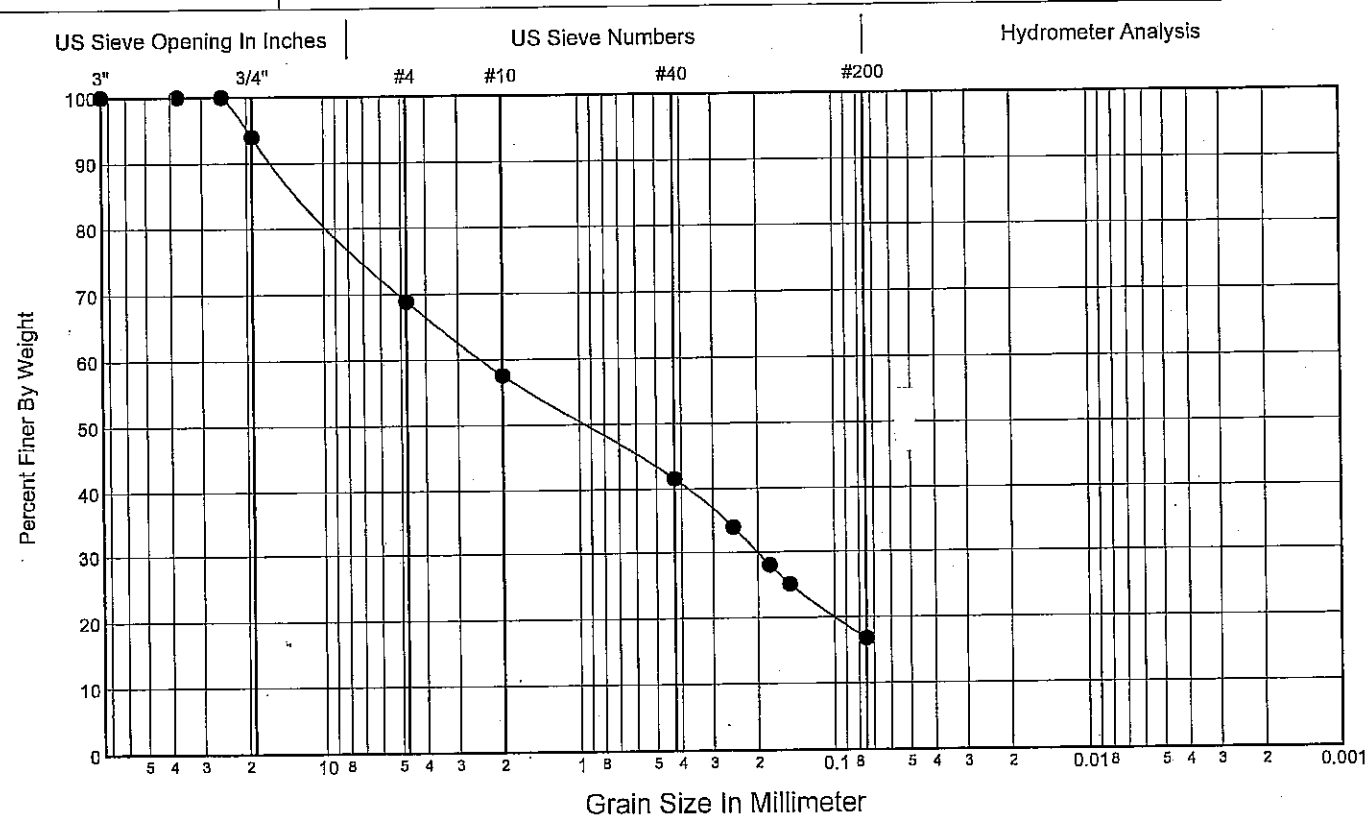
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	10.0	3.05	D-3	SM	See Boring Log	SILTY SAND with GRAVEL	6			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	31.1	52.1	16.8		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	2.41	0.96	0.20	0.10	



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **March 29, 2002**

Hole No. **SL-2-00** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

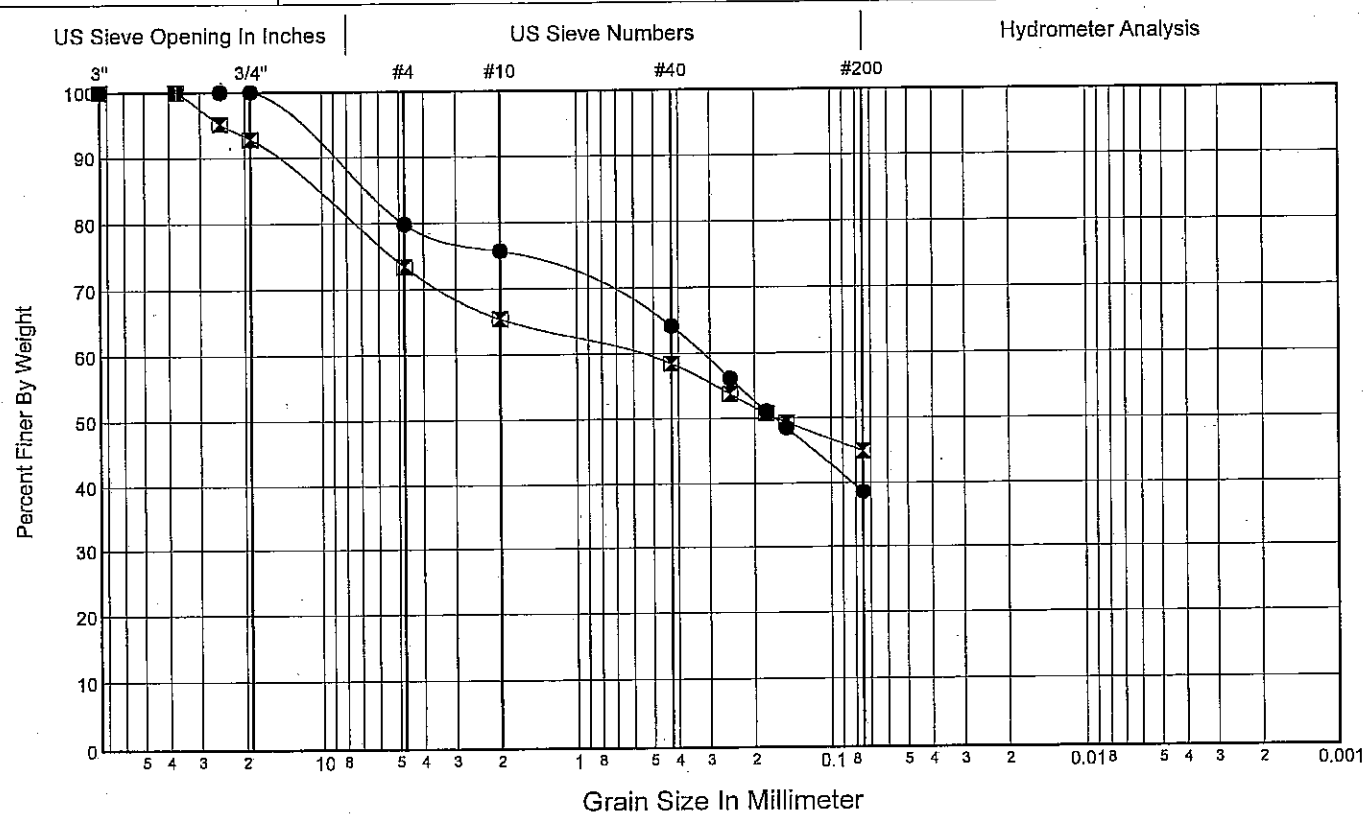
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	3.5	1.07	D-1	SM	See Boring Log	SILTY SAND with GRAVEL	10			
⊠	8.0	2.44	D-2	SM	See Boring Log	SILTY SAND with GRAVEL	13			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	20.2	41.2	38.6		
⊠	26.6	28.5	44.9		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.32	0.17			
⊠	0.60	0.16			



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. **OL-3498** Date **March 25, 2002**

Hole No. **P-14-00** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

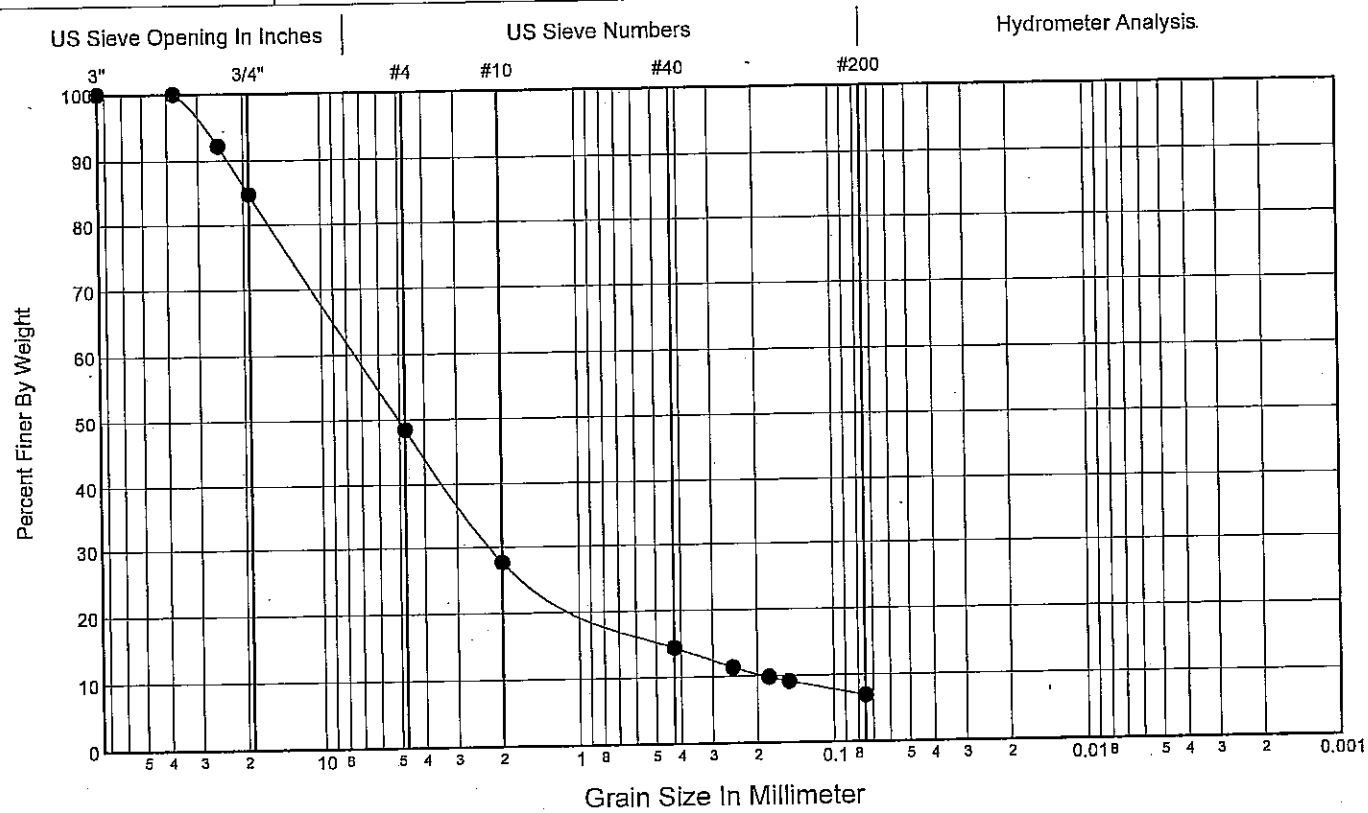
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	15.0	4.57	D-3	GW-GM	See Boring Log	WELL-GRADED GRAVEL with SILT and SAND	8	NP	NP	NP

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	51.6	41.5	7.0	3.5	39.4

GRADATION VALUES

	D60	D50	D30	D20	D10
●	7.39	5.04	2.20	0.82	0.19



Job No. **OL-3498** Date **March 25, 2002**

Hole No. **P-15-00** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

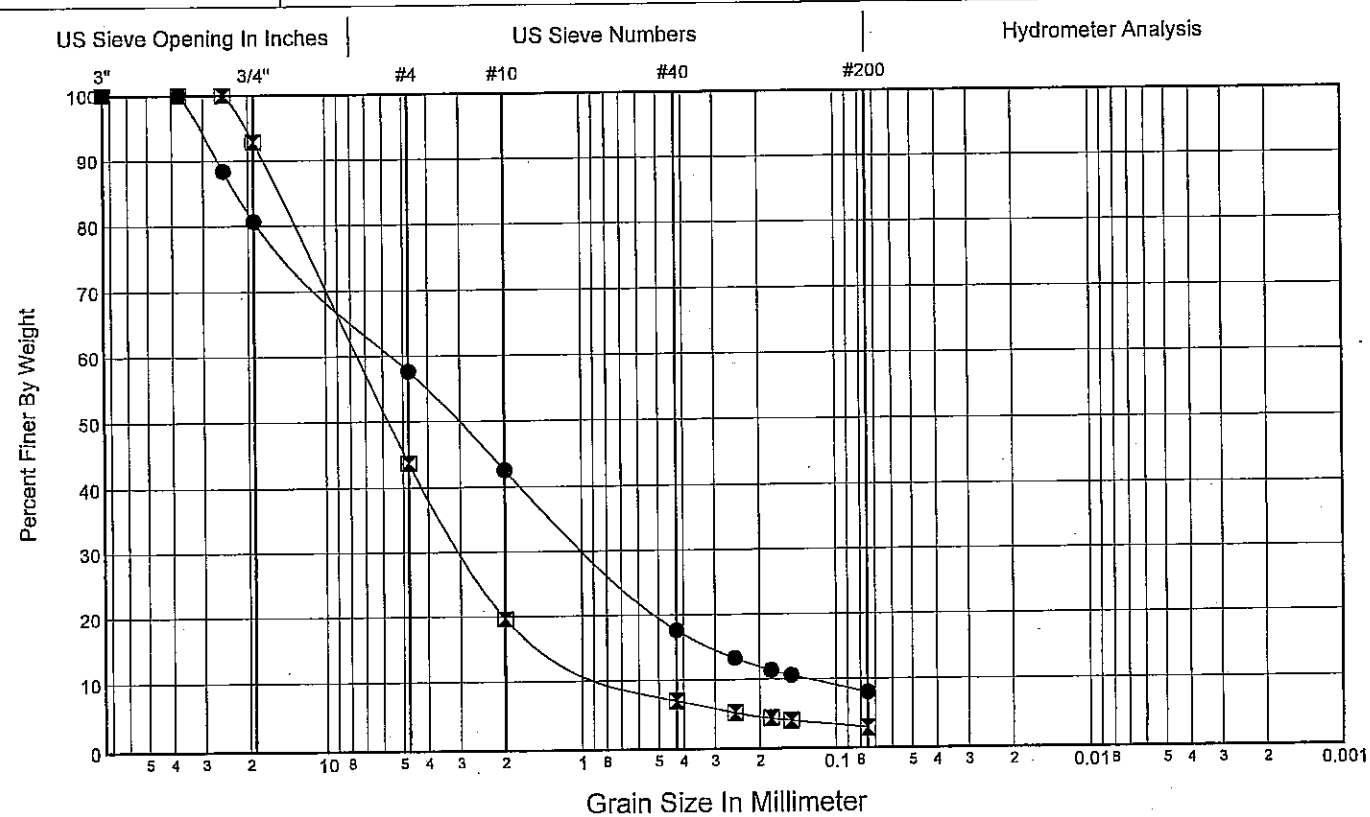
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	5.0	1.52	D-1	SW-SM	See Boring Log	WELL-GRADED SAND with SILT and GRAVEL	12	NP	NP	NP
⊠	10.0	3.05	D-2	GW	See Boring Log	WELL-GRADED GRAVEL with SAND	19	NP	NP	NP

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	42.4	49.6	8.0	1.2	43.0
⊠	56.3	40.8	2.8	1.8	12.2

GRADATION VALUES

	D60	D50	D30	D20	D10
●	5.47	3.07	0.92	0.49	0.13
⊠	7.53	5.68	2.90	2.03	0.62



Gravel	Sand			Silt and Clay
	Coarse	Medium	Fine	

Job No. OL-3498 | Date March 29, 2002

Hole No. P-23-00 | Sheet 1 of 1

Project SR 202 - SR520 to Sahalee Way NE

Laboratory Summary

Washington State Department of Transportation

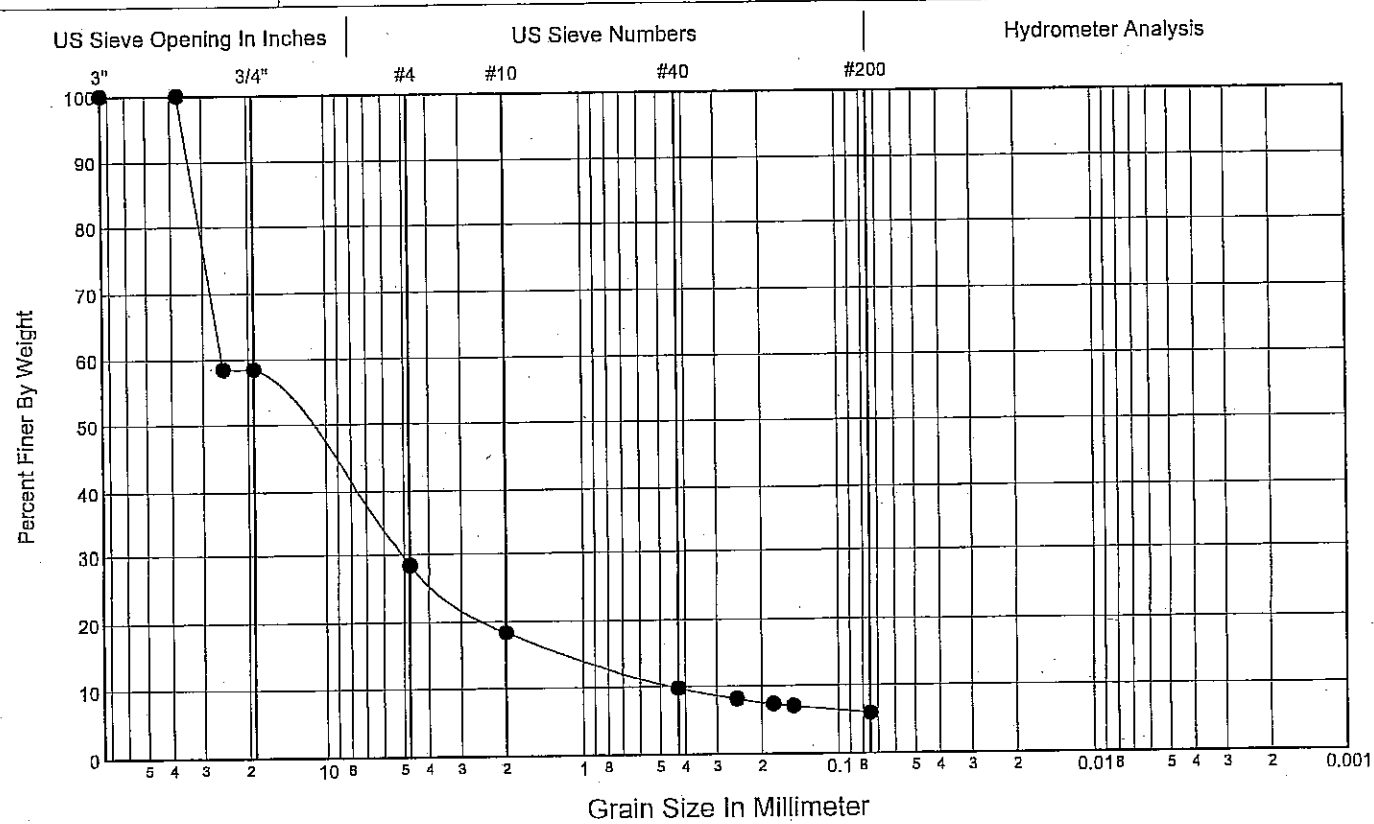
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	10.0	3.05	D-3	GW-GM	See Boring Log	WELL-GRADED GRAVEL with SILT and SAND	1			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	71.6	22.5	5.9	2.3	57.4

GRADATION VALUES

	D60	D50	D30	D20	D10
●	25.37	12.84	5.11	2.30	0.44



Job No. **OL-3498** Date **March 29, 2002**

Hole No. **SSB-1-99** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

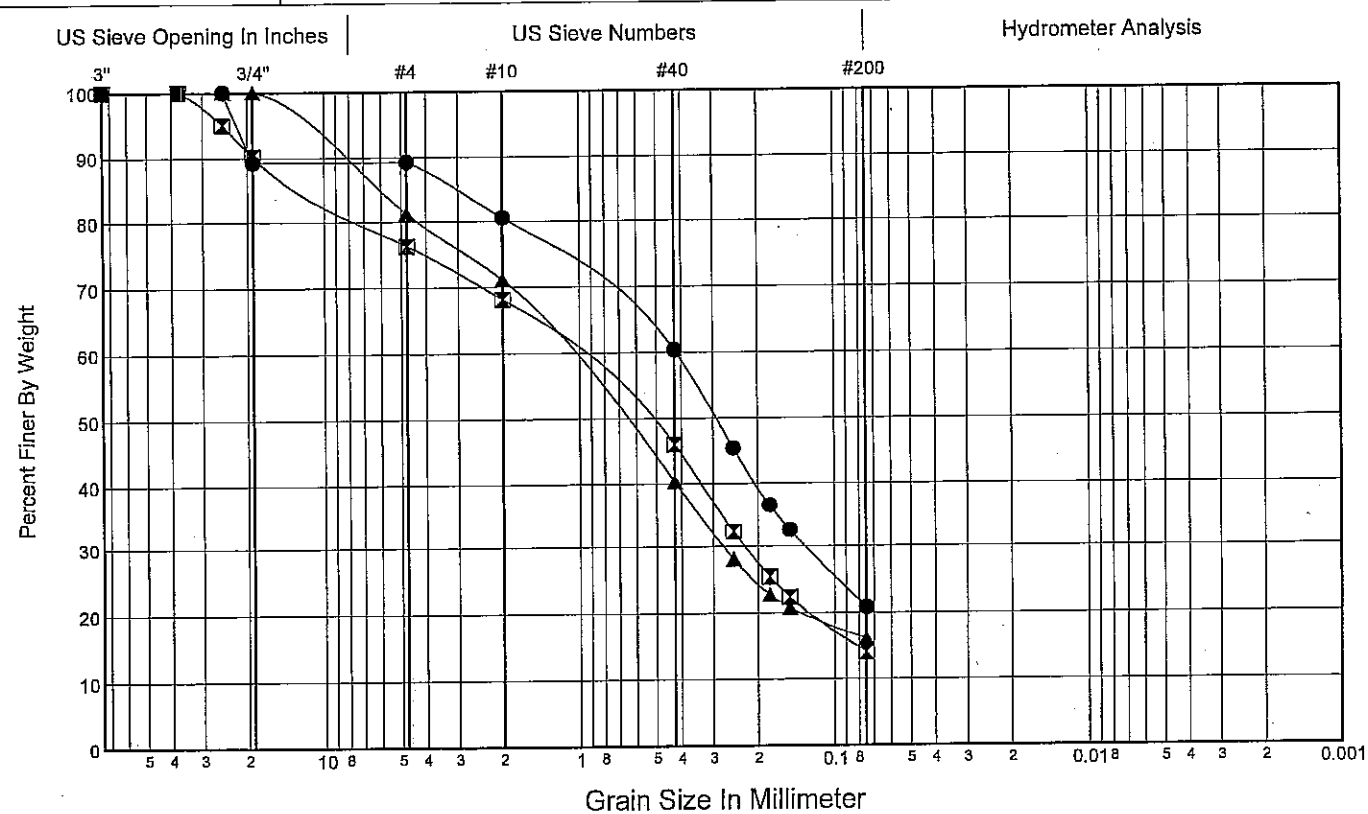
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	3.0	0.91	D-1	SM	See Boring Log	SILTY SAND	6			
⊠	7.0	2.13	D-3	SM	See Boring Log	SILTY SAND with GRAVEL	8			
▲	20.0	6.10	D-6	SM	See Boring Log	SILTY SAND with GRAVEL	5			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	10.8	68.4	20.8		
⊠	23.7	62.2	14.1		
▲	18.8	65.1	16.1		

GRADATION VALUES

	D60	D50	D30	D20	D10
●	0.42	0.29	0.13		
⊠	1.13	0.56	0.22	0.12	
▲	1.14	0.69	0.27	0.13	



Job No. **OL-3498** Date **March 29, 2002**

Hole No. **SSB-2-99** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

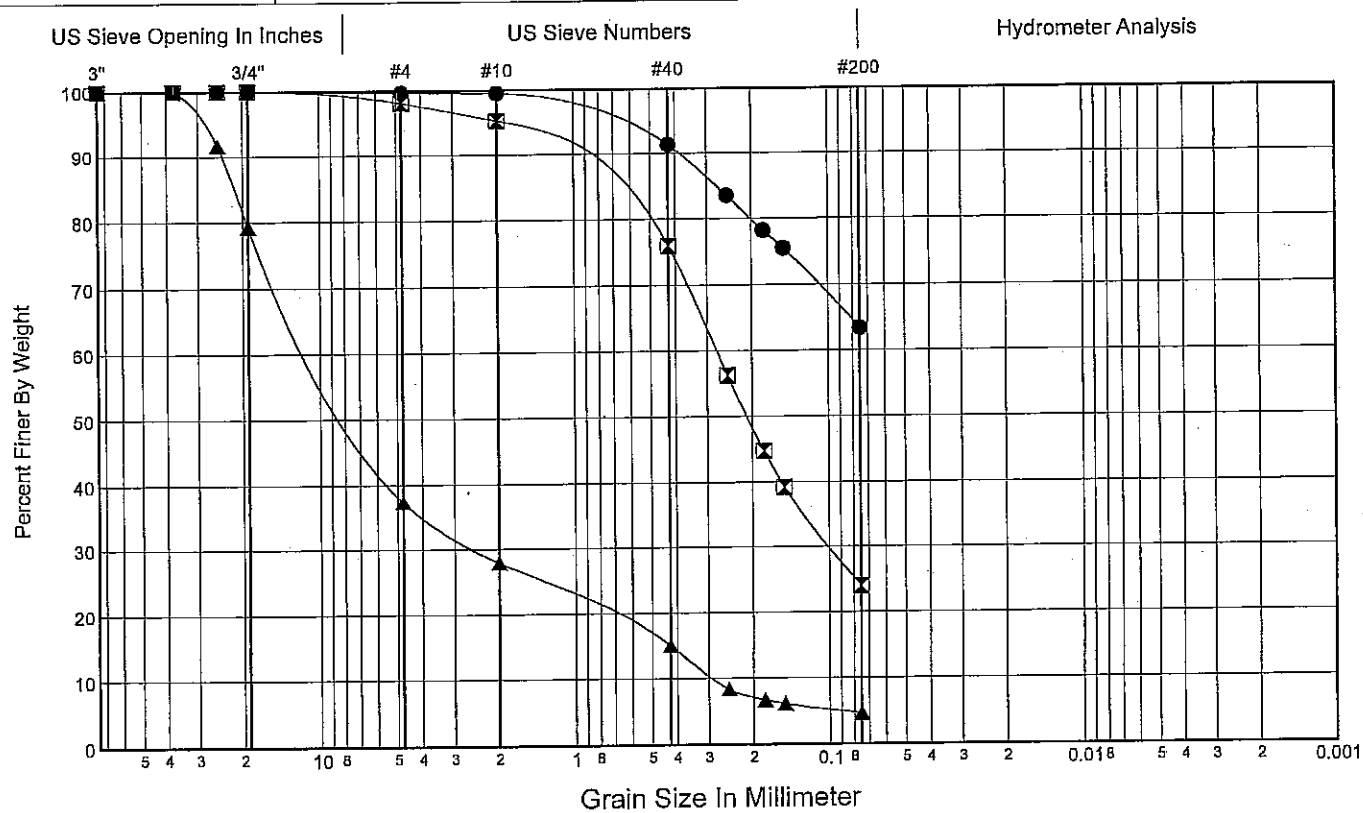
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	3.0	0.91	D-1	ML	See Boring Log	SANDY SILT	20			
⊠	5.0	1.52	D-2	SM	See Boring Log	SILTY SAND	14			
▲	28.0	8.53	D-9	GW	See Boring Log	WELL-GRADED GRAVEL with SAND	1			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.4	36.2	63.4		
⊠	1.9	74.1	24.0		
▲	62.7	32.6	4.7	2.1	35.2

GRADATION VALUES

	D60	D50	D30	D20	D10
●					
⊠	0.28	0.21	0.10		
▲	10.07	7.24	2.44	0.78	0.29



Job No. **OL-3498** Date **April 1, 2002**

Hole No. **MW-4** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

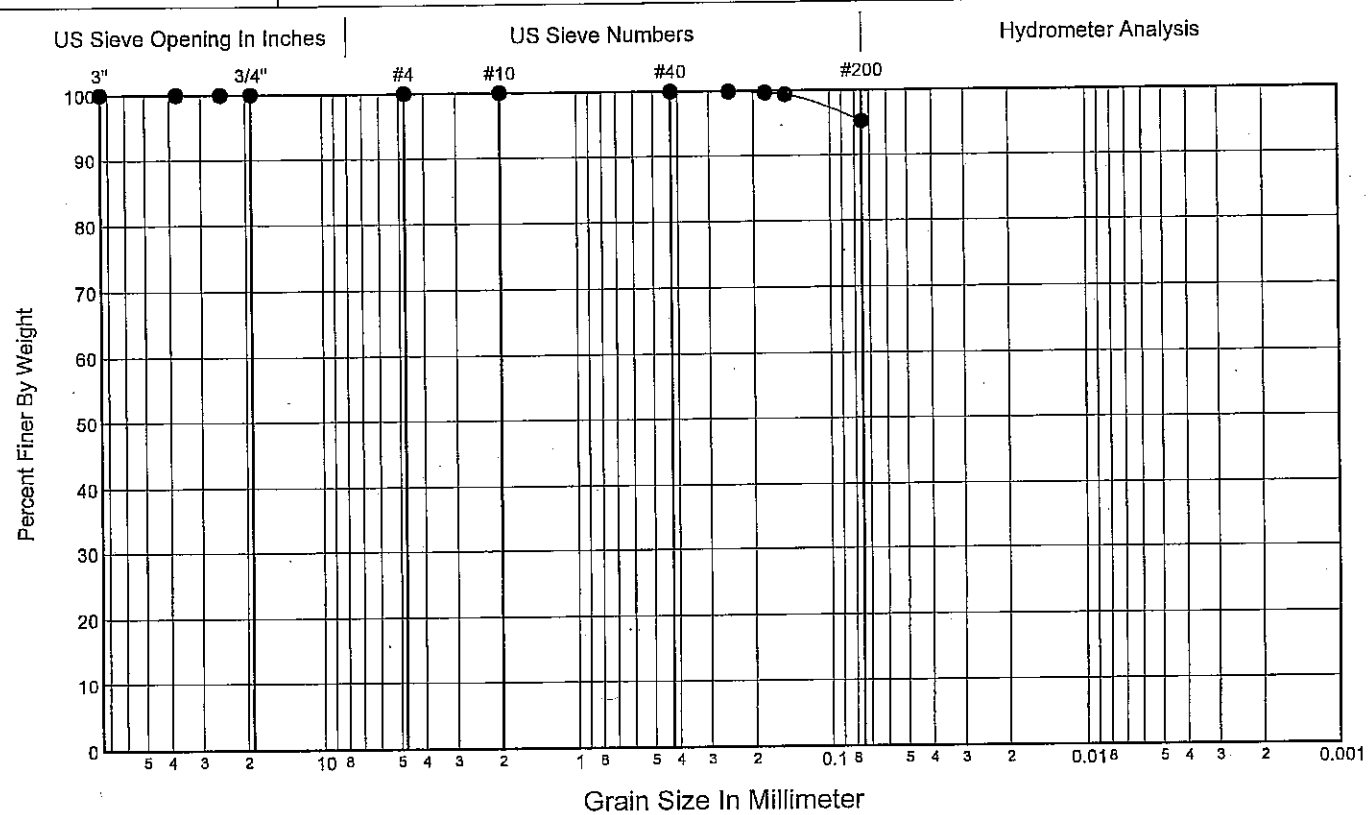
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	15.0	4.57	S-4	ML	See Boring Log	SILT	20			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	0.0	4.8	95.2		

GRADATION VALUES

	D60	D50	D30	D20	D10
●					



Job No. **OL-3498** Date **April 1, 2002**

Hole No. **MW-6** Sheet **1** of **1**

Project **SR 202 - SR520 to Sahalee Way NE**

Laboratory Summary

Washington State Department of Transportation

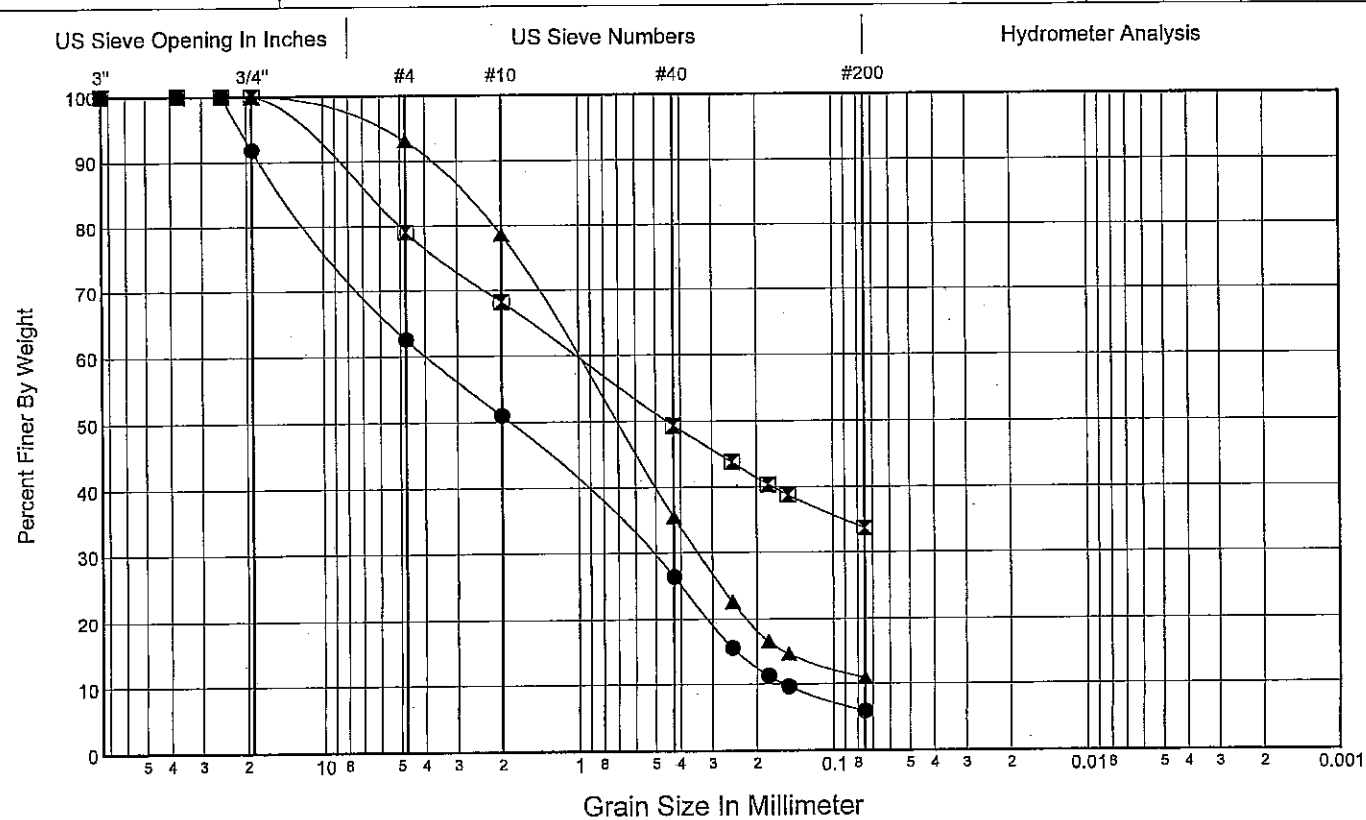
	Depth (ft)	Depth (m)	Sample No.	USCS	Color	Description	MC%	LL	PL	PI
●	51.5	15.70	S-13	SP-SM	See Boring Log	POORLY GRADED SAND with SILT and GRAVEL	2			
⊠	61.0	18.59	S-16	SM	See Boring Log	SILTY SAND with GRAVEL	1			
▲	71.0	21.64	S-18	SW-SM	See Boring Log	WELL-GRADED SAND with SILT	7			

GRADATION FRACTIONS

	%Gravel	%Sand	%Fines	Cc	Cu
●	37.5	56.5	6.0	0.5	25.4
⊠	20.9	45.4	33.6		
▲	7.0	82.1	10.9	1.8	16.2

GRADATION VALUES

	D60	D50	D30	D20	D10
●	3.94	1.88	0.53	0.31	0.16
⊠	1.02	0.45			
▲	1.03	0.72	0.34	0.22	



SR 202 SEA 30738.G1 92019

Borehole Number	B-1	B-1	B-1	B-1	B-1	B-1	B-2-W
Sample Number	S-1	S-3	ST-4	S-6	S-10	S-14	S-3
Depth of Sample	5.0-6.0	12.5-14.0	15.0-17.0	20.0-21.5	35.0-36.5	55.0-56.5	5.0-6.5
Container Number	242	274		239A	217	218	209
Wt. Wet Soil + Tare	104.16	96.70		126.00	148.26	94.48	97.42
Wt. Dry Soil + Tare	87.72	60.93		102.80	139.44	82.72	75.05
Weight of Water	16.44	35.77		23.20	8.82	11.76	22.37
Tare	27.46	22.26		22.55	22.40	22.44	22.52
Wt. of Dry Soil	60.26	38.67		75.25	117.04	60.28	52.53
Water Content w-%	27	92.5		30	7.5	19.5	42.5

Borehole Number	B-2-W	B-2-W	B-2-W	B-3	B-3	B-4-E	B-4-E
Sample Number	ST-4	ST-7	S-8	S-1	S-2	S-2	ST-5
Depth of Sample	7.0-9.5	15.0-17.0	19.5-21.0	5.0-6.5	10.0-11.5	2.5-4.0	10.0-12.5
Container Number	[illegible]	[illegible]	201	236	231	223	
Wt. Wet Soil + Tare			122.37	107.12	113.22	125.71	
Wt. Dry Soil + Tare			98.80	92.83	105.52	94.26	
Weight of Water			23.57	14.29	7.7	31.45	
Tare		[illegible]	27.82	22.38	27.41	27.95	
Wt. of Dry Soil			70.98	70.45	81.11	66.31	
Water Content w-%			33	20	9.5	47	

Borehole Number	B-5	B-5	B-5	B-5	B-6	B-6	B-6
Sample Number	S-1	ST-3	ST-6	S-8	S-1	S-3	S-5
Depth of Sample	5.0-6.5	10.0-12.0	20.0-22.0	25.0-26.5	5.0-6.5	10.0-11.5	20.0-21.5
Container Number	216			213	222	225	211
Wt. Wet Soil + Tare	106.06			156.69	88.71	116.93	99.99
Wt. Dry Soil + Tare	84.02			133.27	73.98	97.54	82.14
Weight of Water	22.04			23.42	14.73	19.39	17.85
Tare	26.52			22.36	22.26	27.68	22.44
Wt. of Dry Soil	57.5			110.91	51.72	72.86	59.7
Water Content w-%	38			21	28.5	26.5	30

Project No. 92019
Project CH2M HILL SR202

HONG CONSULTING ENGINEERS, INC.

Date 2-11-92
By GE

SR 202 SEA 30738.G1 92019

Borehole Number	B-6	B-7	B-7	B-8	B-8	B-8	B-8
mple Number	S-7	S-2	S-4	S-1	S-2	S-5	S-6
Depth of Sample	30.0-31.5	10.0-11.0	20.0-21.5	5.0-6.5	10.0-11.5	25.0-26.5	30.5-32.0
ntainer Number	230	235	240	214	274	203	239
Wt. Wet Soil + Tare	118.64	134.83	146.39	129.53	134.71	135.00	84.70
. Dry Soil + Tare	103.41	125.08	135.40	119.28	124.65	126.82	70.30
ight of Water	15.23	9.75	10.99	10.25	10.06	8.18	14.40
re	27.78	26.33	27.89	27.94	22.27	22.44	19.01
. of Dry Soil	75.63	98.75	107.51	91.34	102.38	104.38	51.29
Water Content w-%	20	10	10	11	10	8	28

rehole Number	B-8	B-8					
mple Number	S-7	S-10					
Depth of Sample	35.0-36.5	50.0-51.5					
ntainer Number	206	237					
Wt. Wet Soil + Tare	134.55	123.28					
. Dry Soil + Tare	128.44	108.23					
Weight of Water	6.11	15.05					
re	27.81	22.35					
Wt. of Dry Soil	100.63	85.88					
ater Content w-%	6	17.5					

rehole Number							
Sample Number							
pth of Sample							
ontainer Number							
t. Wet Soil + Tare							
. Dry Soil + Tare							
Weight of Water							
re							
Wt. of Dry Soil							
ter Content w-%							

Project No. 92019
Project Chan Hill SR 202

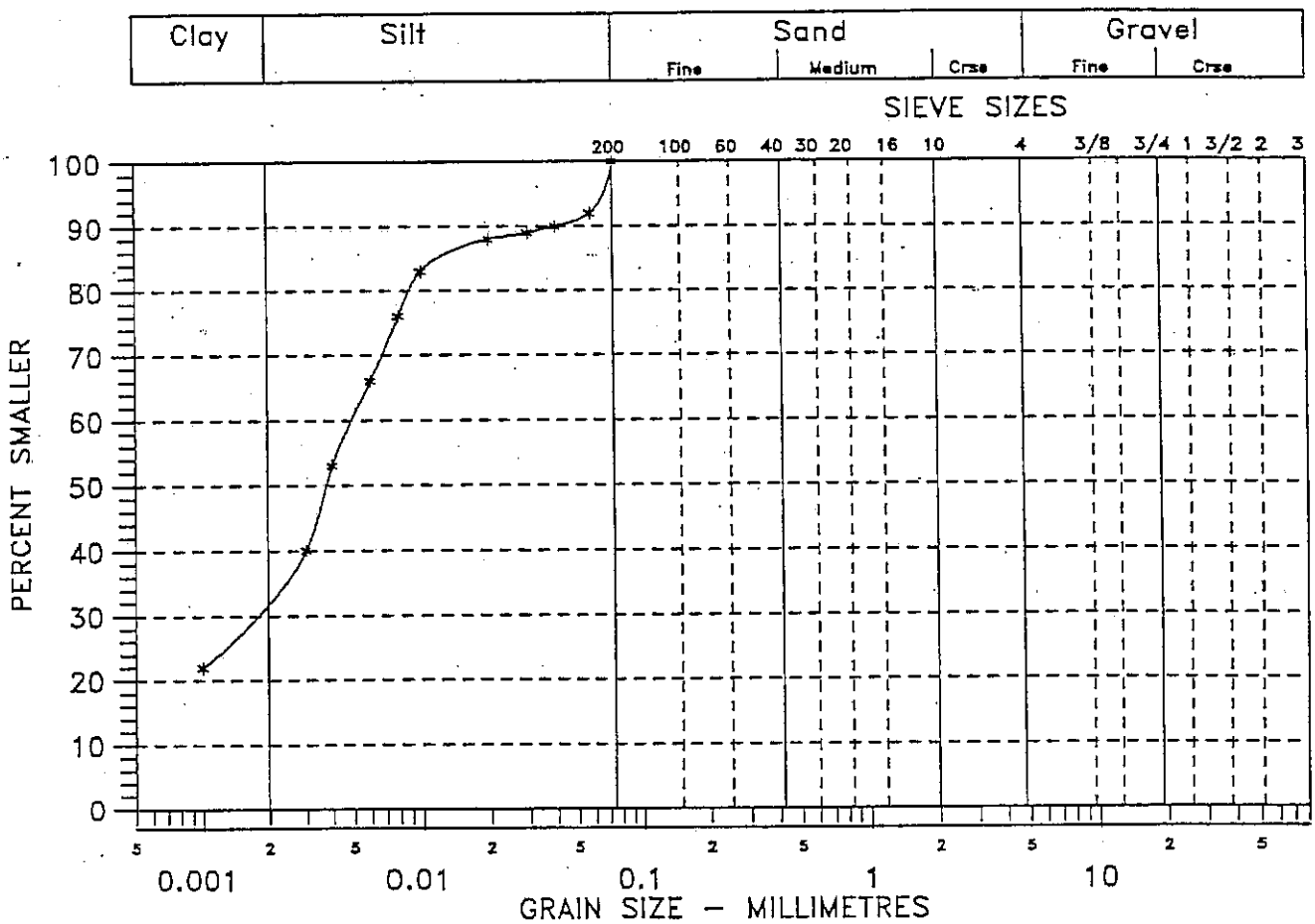
HONG CONSULTING ENGINEERS, INC.

Date 2-11-92
By GE

HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/17/92
Remarks: Dark gray clayey SILT (ML)

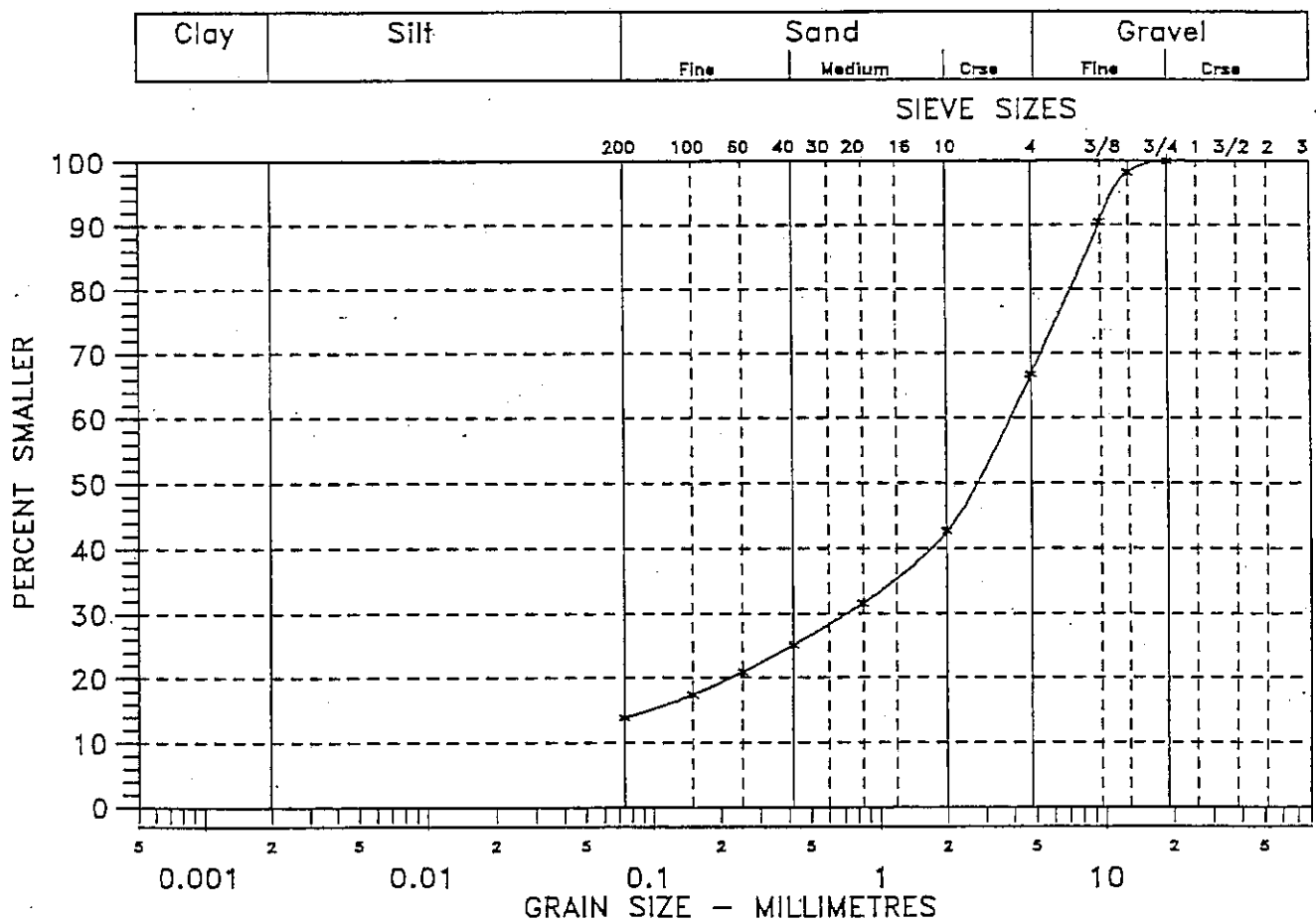
Test Hole Number: B-1
Sample Number: S-6
Depth: 20.0-21.5 feet
Sample Description:
Gravel: 0
Sand: 0
Silt: 69
Clay: 31



HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/18/92
Remarks: Olive gray gravelly, silty SAND (SM)

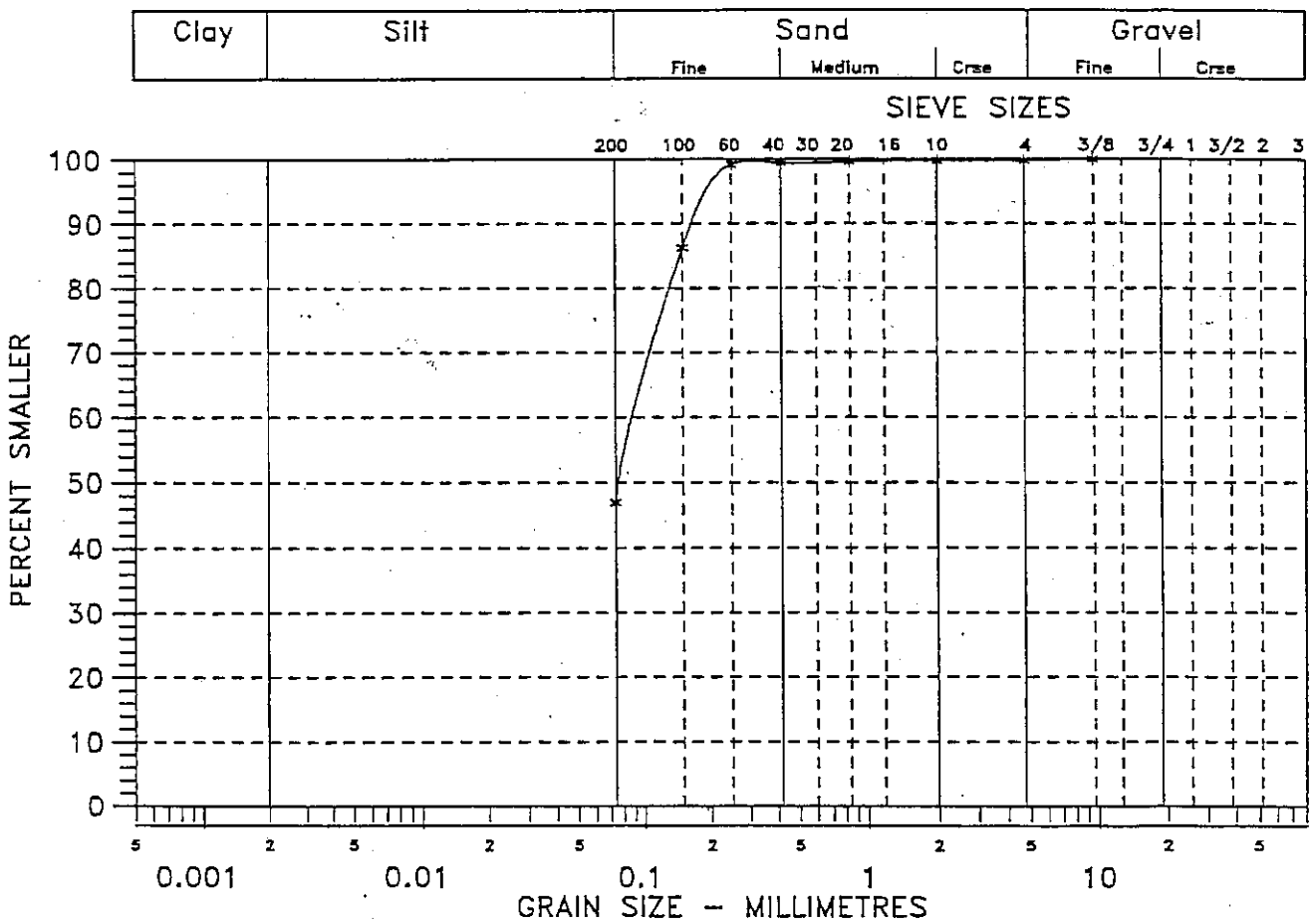
Test Hole Number: B-1
Sample Number: S-10 (S-9)
Depth: 35.0-36.5 feet
Sample Description:
Gravel: 33.3
Sand: 52.9
Silt: 13.8
Clay:



HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/18/92
Remarks: Dark gray, very silty fine SAND (SM)

Test Hole Number: B-1
Sample Number: S-14 (S-13)
Depth: 55.0-56.5 feet
Sample Description:
Gravel: 0.4
Sand: 52.7
Silt: 46.9
Clay:

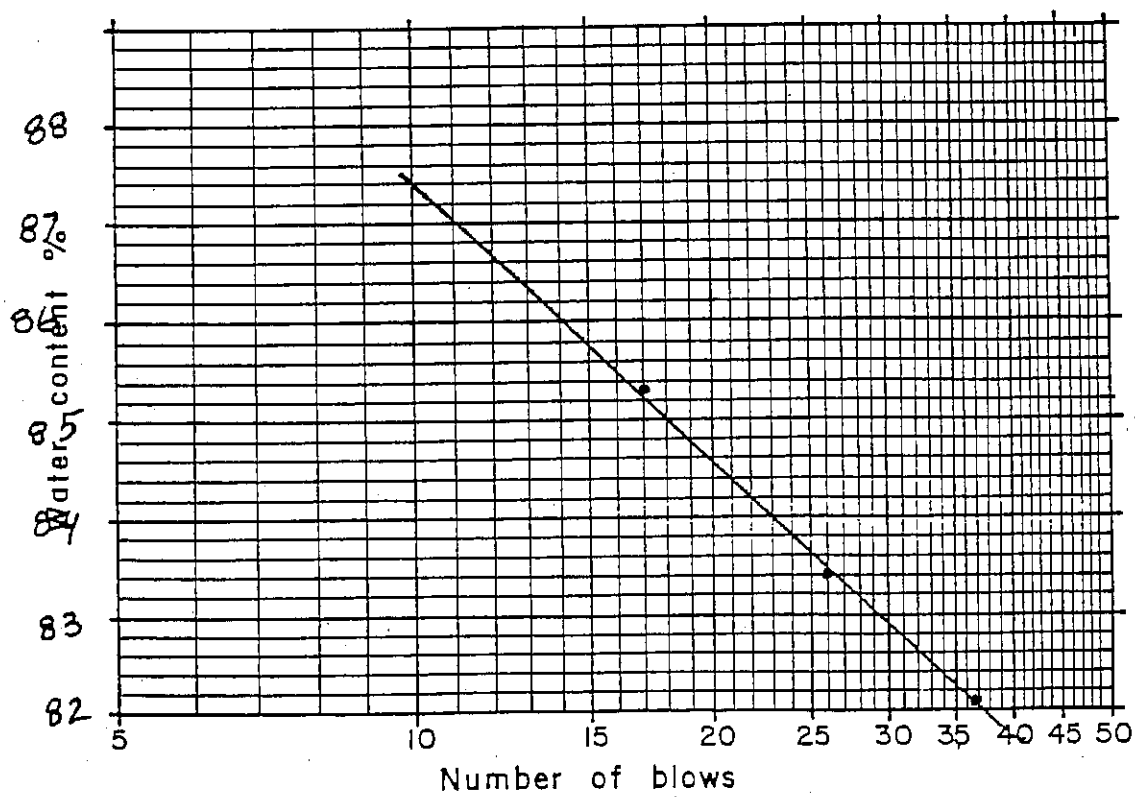


ATTERBERG LIMITS

FIGURE

Type of Test	LL	LL	LL	LL	Nat. MC
Container #					
Number of blows	22	37	17	26	
Wt. sample wet + tare	89.20	68.08	86.93	87.85	
Wt. sample dry + tare	81.61	60.64	80.40	80.99	
Weight of water	7.59	7.44	6.53	6.86	
Tare	72.76	51.58	72.76	72.76	
Wt. of dry soil	8.85	9.06	7.64	8.23	
Water content %	85.8	82.1	85.5	83.4	

Type of Test	PL	PL	Borehole #	B-1
Container #			Sample #	5-3
Wt. sample wet + tare	84.06	65.48	Depth	12.5-14'
Wt. sample dry	80.17	60.68	Liquid limit	83.6
Wt. of water	3.89	4.80	Plastic limit	52.6
Tare	72.76	51.58	Plasiticity index	31.0
Weight of dry soil	7.41	9.10	Moisture content	
Water content	52.5	52.7	Liquidity index	



Sample Description: dark gray clayey SILT (MH)

Project No. 92019
Project SR-202

HONG WEST & ASSOCIATES

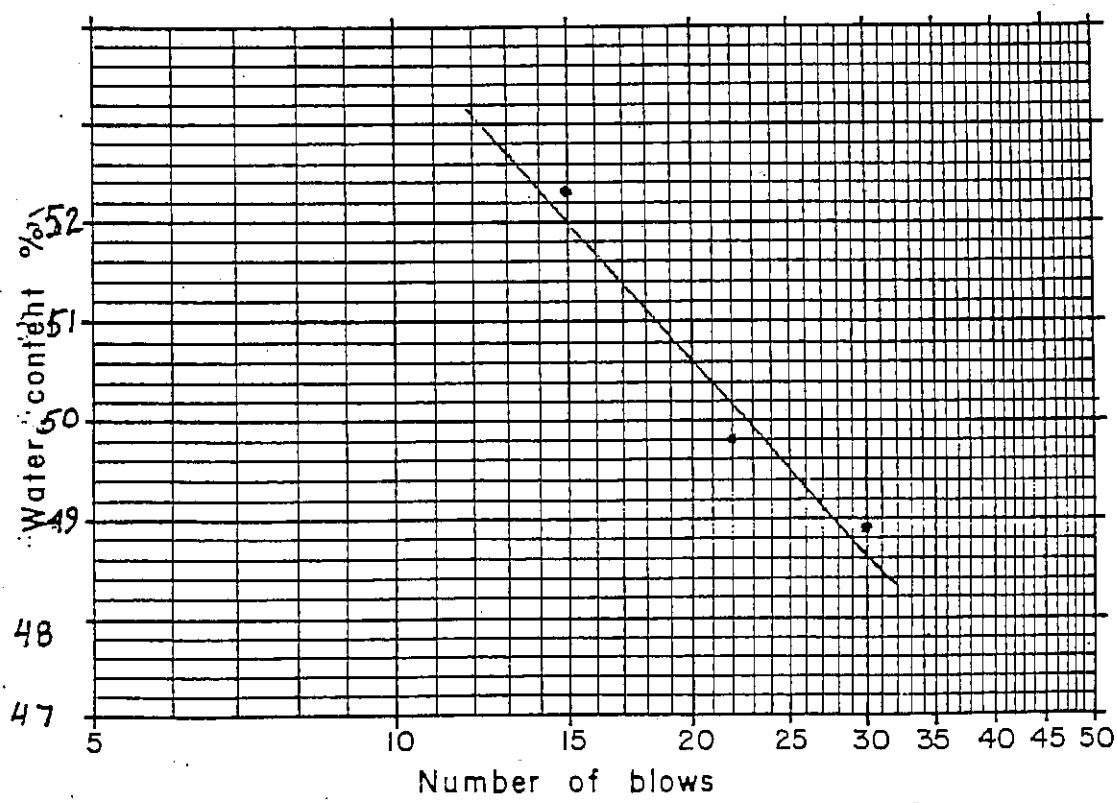
Date 2-21-92
By P.K.

ATTERBERG LIMITS

FIGURE

Type of Test	LL	LL	LL	LL	Nat. MC
Container #					30%
Number of blows	30	22	15		
Wt. sample wet + tare	94.08	91.30	91.74		
Wt. sample dry + tare	87.73	85.14	85.90		
Weight of water	6.35	6.16	5.84		
Tare	74.74	72.76	74.74		
Wt. of dry soil	12.99	12.38	11.16		
Water content %	48.9	49.8	52.3		

Type of Test	PL	PL	Borehole #	B-1
Container #	7		Sample #	5-6
Wt. sample wet + tare	65.92	89.07	Depth	20-21.5
Wt. sample dry	63.34	86.00	Liquid limit	50.6
Wt. of water	2.58	3.07	Plastic limit	27.5
Tare	54.12	74.74	Plasiticity index	23.1
Weight of dry soil	9.22	11.34	Moisture content	30%
Water content	28.0	27.1	Liquidity index	



Sample Description: dark gray SILT (MH) material Dilates

Project No. 92019
Project SR-202

HONG WEST & ASSOCIATES

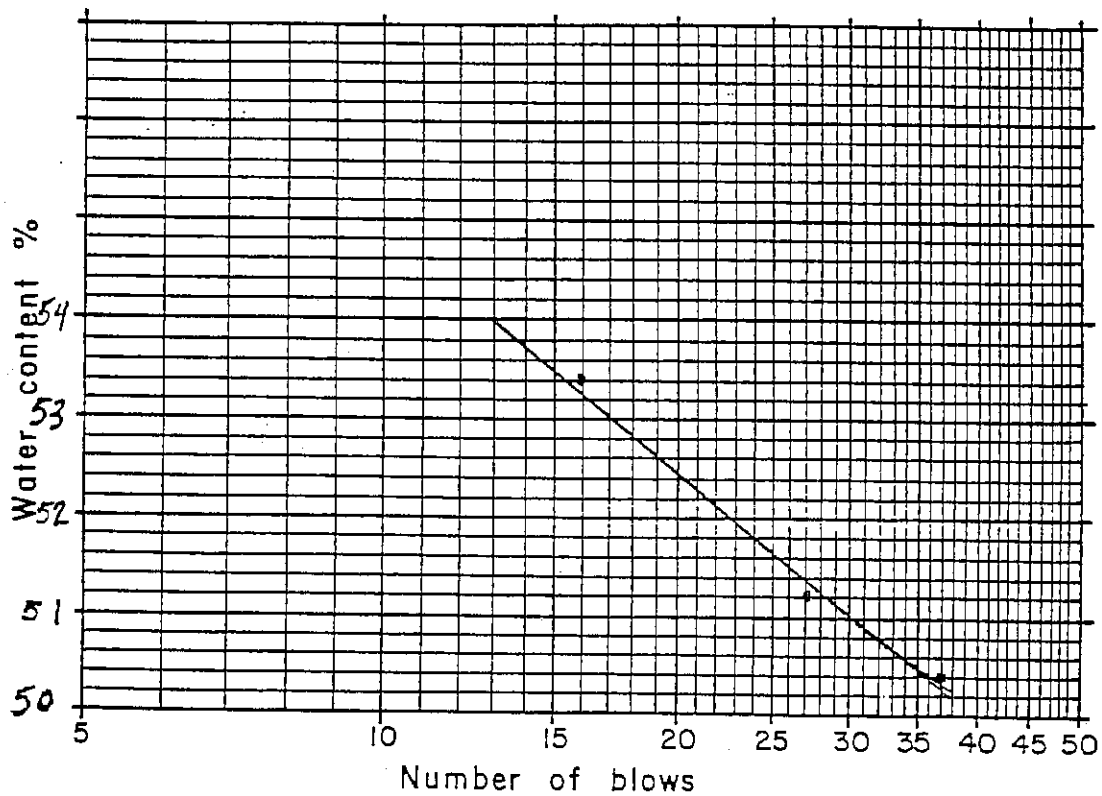
Date 2-17-92
By P.K.

ATTERBERG LIMITS

FIGURE

Type of Test	LL	LL	LL	LL	Nat. MC
Container #					
Number of blows	37	16	27		
Wt. sample wet + tare	77.56	98.14	77.03		
Wt. sample dry + tare	69.71	89.30	69.27		
Weight of water	7.85	8.84	7.76		
Tare	54.12	72.76	54.12		
Wt. of dry soil	15.59	16.54	15.15		
Water content %	50.4	53.4	51.2		42.5

Type of Test	PL	PL	Borehole #	B-2-W
Container #			Sample #	3-S
Wt. sample wet + tare	70.00	90.12	Depth	5-6.5'
Wt. sample dry	66.54	86.31	Liquid limit	51.6
Wt. of water	3.46	3.81	Plastic limit	28.0
Tare	54.12	72.76	Plasiticity index	23.6
Weight of dry soil	12.42	13.55	Moisture content	
Water content	27.9	28.1	Liquidity index	



Sample Description: olive gray fat clay (CH)

Project No. 92019
Project SR-202

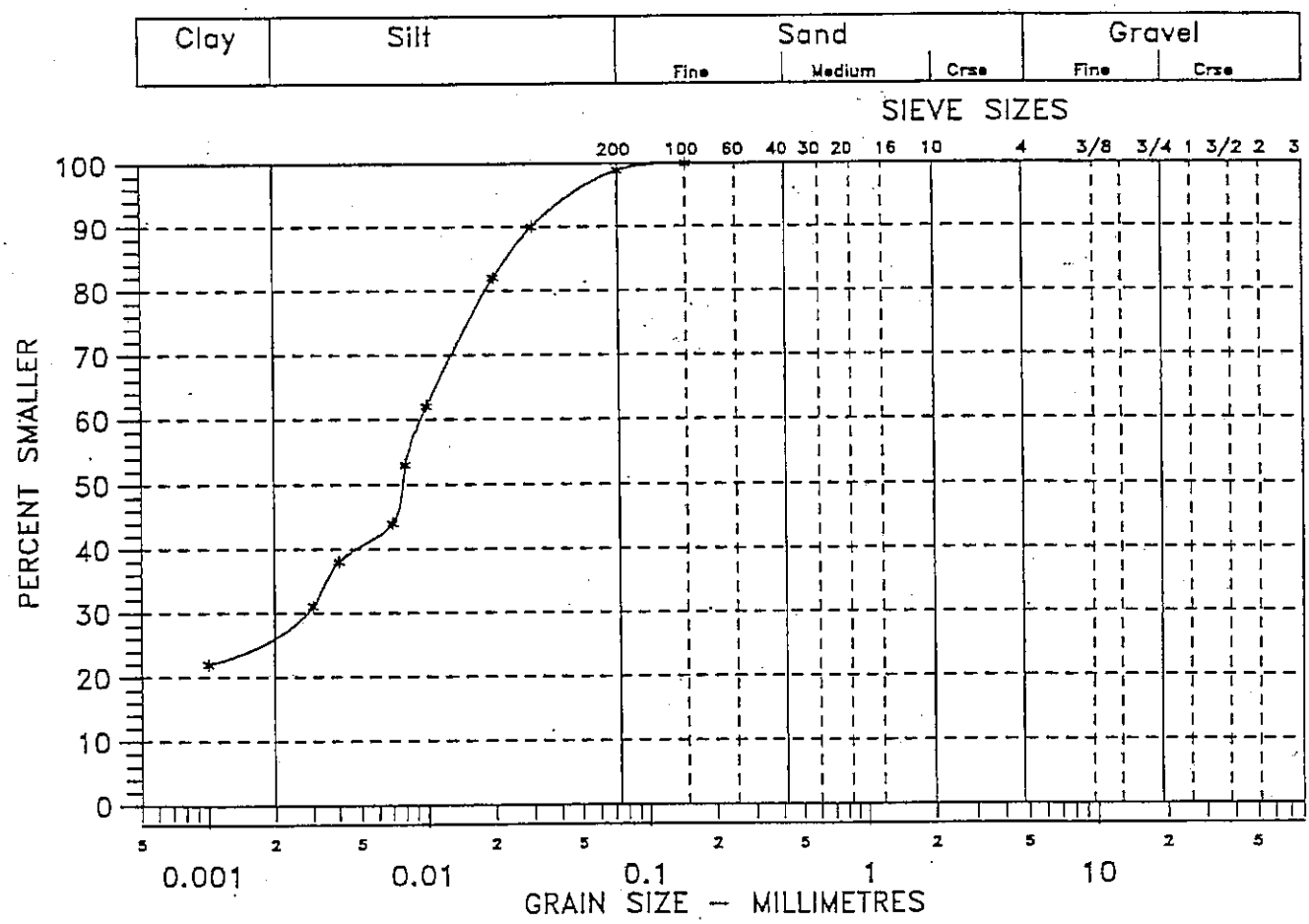
HONG WEST & ASSOCIATES

Date 2-17-92
By PK

HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/14/92
Remarks: Dark gray clayey SILT (ML)

Test Hole Number: B-2-W
Sample Number: 8-S
Depth: 19.5-21.0 feet
Sample Description:
Gravel: 0
Sand: 0
Silt: 74
Clay: 26

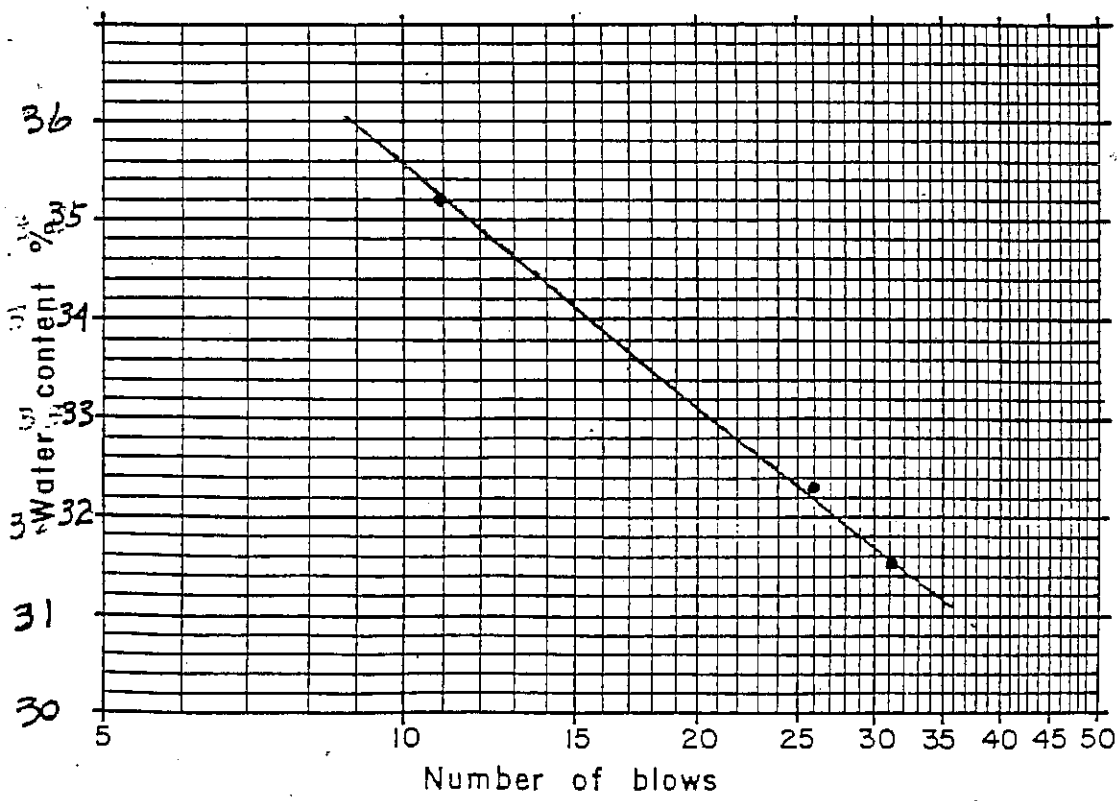


ATTERBERG LIMITS

FIGURE

Type of Test	LL	LL	LL	LL	Nat. MC
Container #					33 %
Number of blows	11	26	31		
Wt. sample wet + tare	75.82	76.70	99.96		
Wt. sample dry + tare	70.17	70.57	93.92		
Weight of water	5.65	6.13	6.04		
Tare	54.12	51.58	74.74		
Wt. of dry soil	16.05	18.99	19.18		
Water content %	35.2	32.3	31.5		

Type of Test	PL	PL	Borehole #	B-2-W
Container #			Sample #	8-S
Wt. sample wet + tare	96.03	92.24	Depth	19.5-21'
Wt. sample dry	91.78	88.33	Liquid limit	32.4
Wt. of water	4.25	3.91	Plastic limit	25.0
Tare	74.74	72.76	Plasiticity index	7.4
Weight of dry soil	17.04	15.57	Moisture content	
Water content	24.9	25.1	Liquidity index	



Sample Description: dark gray clayey SILT (ML)

Project No. 92019
Project SR-202

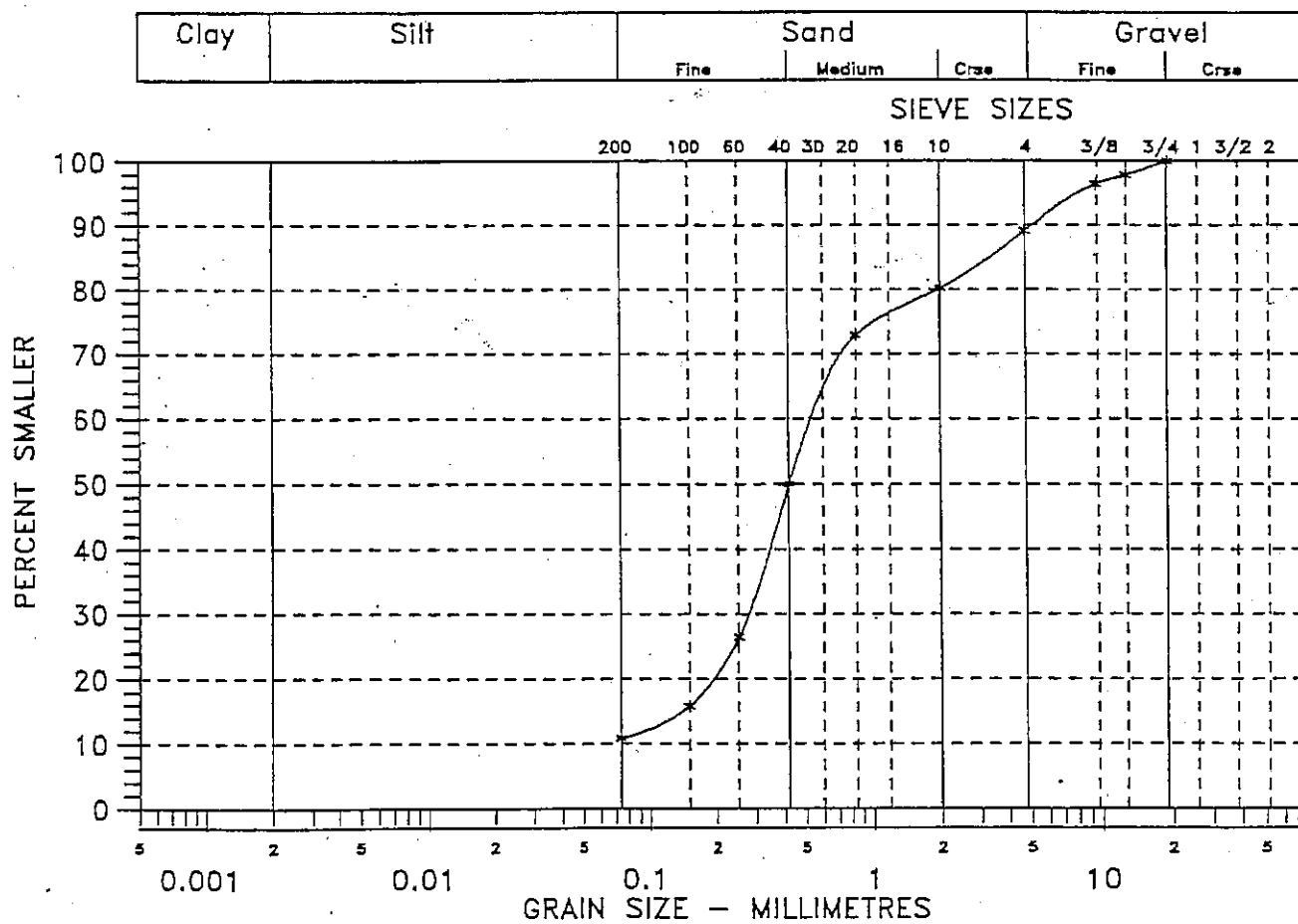
HONG WEST & ASSOCIATES

Date 2-18-92
By D.K.

HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/18/92
Remarks: Olive brown SAND with some gravel and silt (SW)

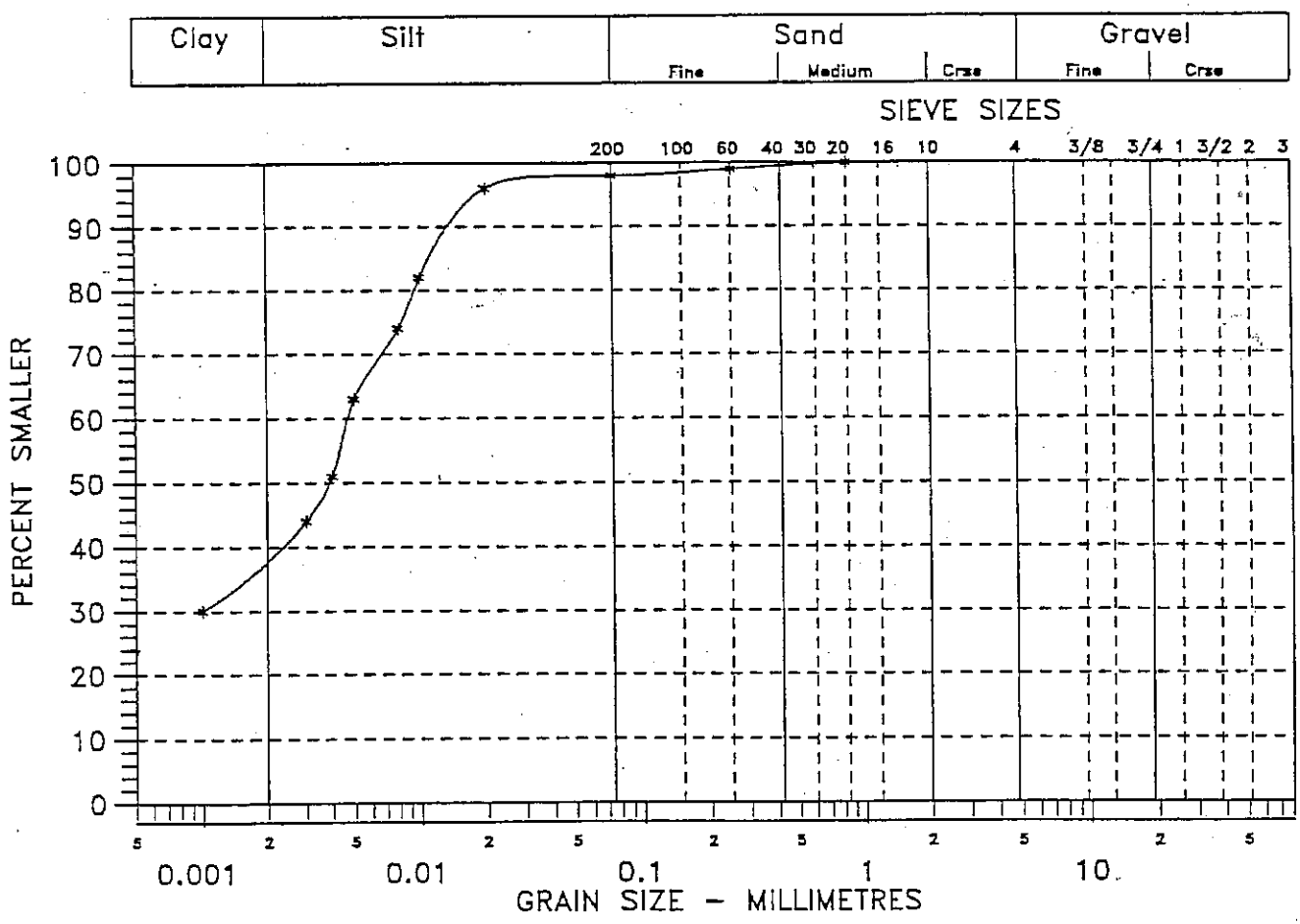
Test Hole Number: B-3
Sample Number: S-2
Depth: 10.0-11.5 feet
Sample Description:
Gravel: 10.9
Sand: 78.3
Silt: 10.8
Clay:



HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/17/92
Remarks: Gray very clayey SILT with trace of sand (MH)

Test Hole Number: B-4-E
Sample Number: ST-5
Depth: 10.0-12.5 feet
Sample Description:
Gravel: 0
Sand: 2
Silt: 60
Clay: 38

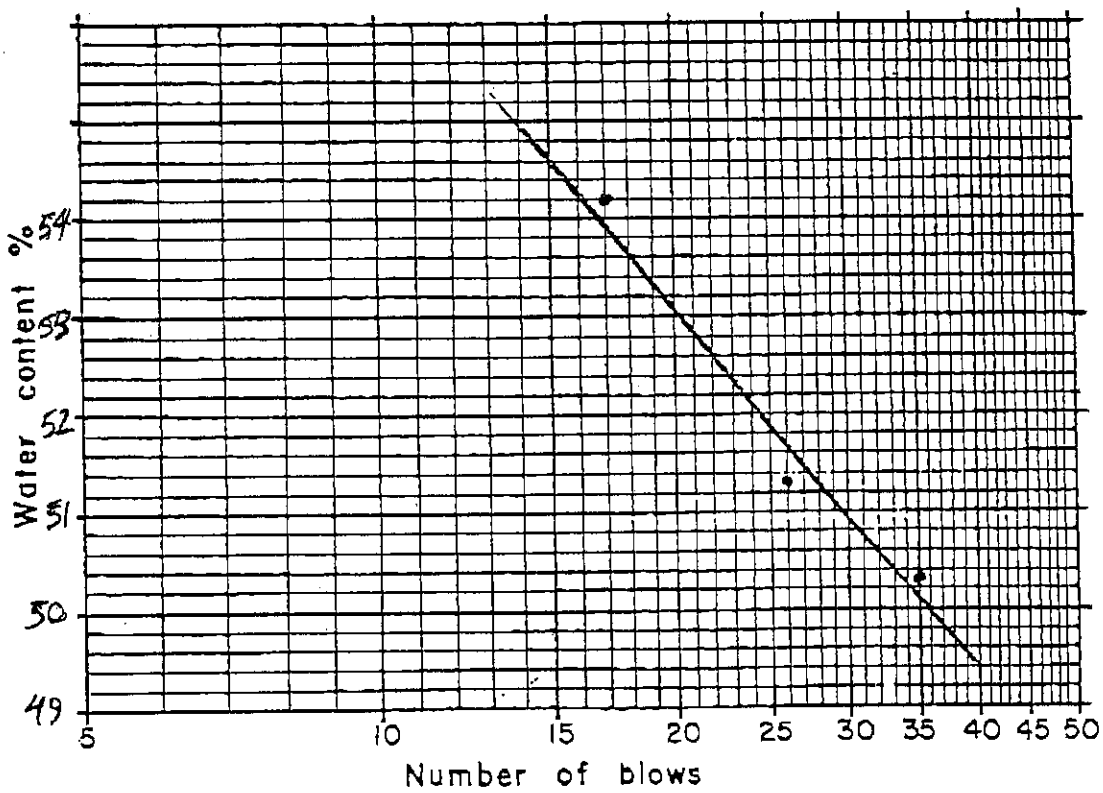


ATTERBERG LIMITS

FIGURE

Type of Test	LL	LL	LL	LL	Nat. MC
Container #					
Number of blows	26	35	17		
Wt. sample wet + tare	91.13	69.53	97.98		113.54
Wt. sample dry + tare	84.90	64.37	89.81		101.42
Weight of water	6.23	5.16	8.17		12.12
Tare	72.76	54.12	74.74		72.86
Wt. of dry soil	12.14	10.25	15.07		28.56
Water content %	51.3	50.3	54.2		42 %

Type of Test	PL	PL	Borehole #	B-4-E
Container #			Sample #	ST-5
Wt. sample wet + tare	69.66	89.99	Depth	10-12.5
Wt. sample dry	66.11	86.02	Liquid limit	51.9
Wt. of water	3.55	3.97	Plastic limit	29.8
Tare	54.12	72.76	Plasiticity index	22.1
Weight of dry soil	11.99	13.26	Moisture content	
Water content	29.6	29.9	Liquidity index	



Sample Description: gray very clayey SILT (MH)

Project No. 92019
Project SR-202

HONG WEST & ASSOCIATES

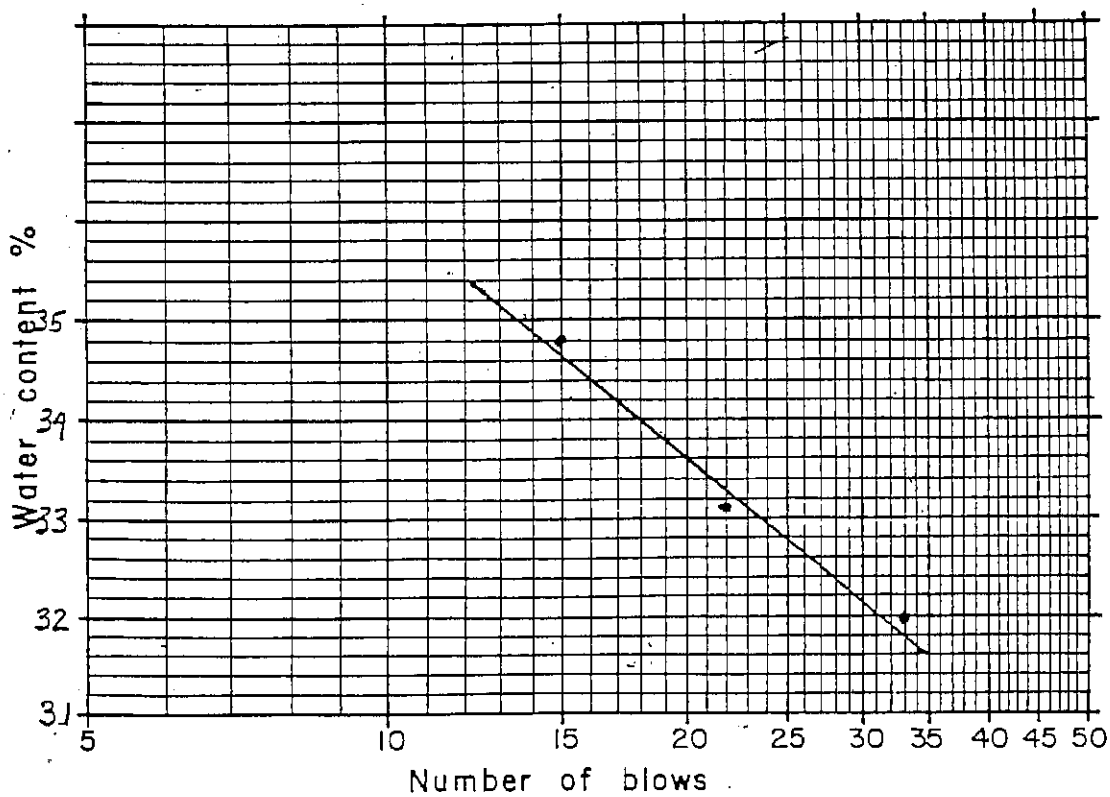
Date 2-17-92
By BK

ATTERBERG LIMITS

FIGURE

Type of Test	LL	LL	LL	LL	Nat. MC
Container #					
Number of blows	15	33	22		
Wt. sample wet + tare	100.93	107.89	104.96		81.95
Wt. sample dry + tare	94.17	99.37	97.44		69.65
Weight of water	6.76	8.52	7.52		12.30
Tare	74.74	72.76	74.74		27.15
Wt. of dry soil	19.43	26.61	22.70		42.50
Water content %	34.8	32.0			28.9 %

Type of Test	PL	PL	Borehole #	B-5
Container #			Sample #	ST-3
Wt. sample wet + tare	91.53	92.36	Depth	10-12'
Wt. sample dry	88.39	88.60	Liquid limit	32.8
Wt. of water	3.14	3.76	Plastic limit	23.4
Tare	74.74	72.76	Plasiticity index	9.4
Weight of dry soil	13.65	15.84	Moisture content	
Water content	23.0	23.7	Liquidity index	



Sample Description: Dark gray SILT with some fine sand (ML)

Project No. 92019
Project SR-202

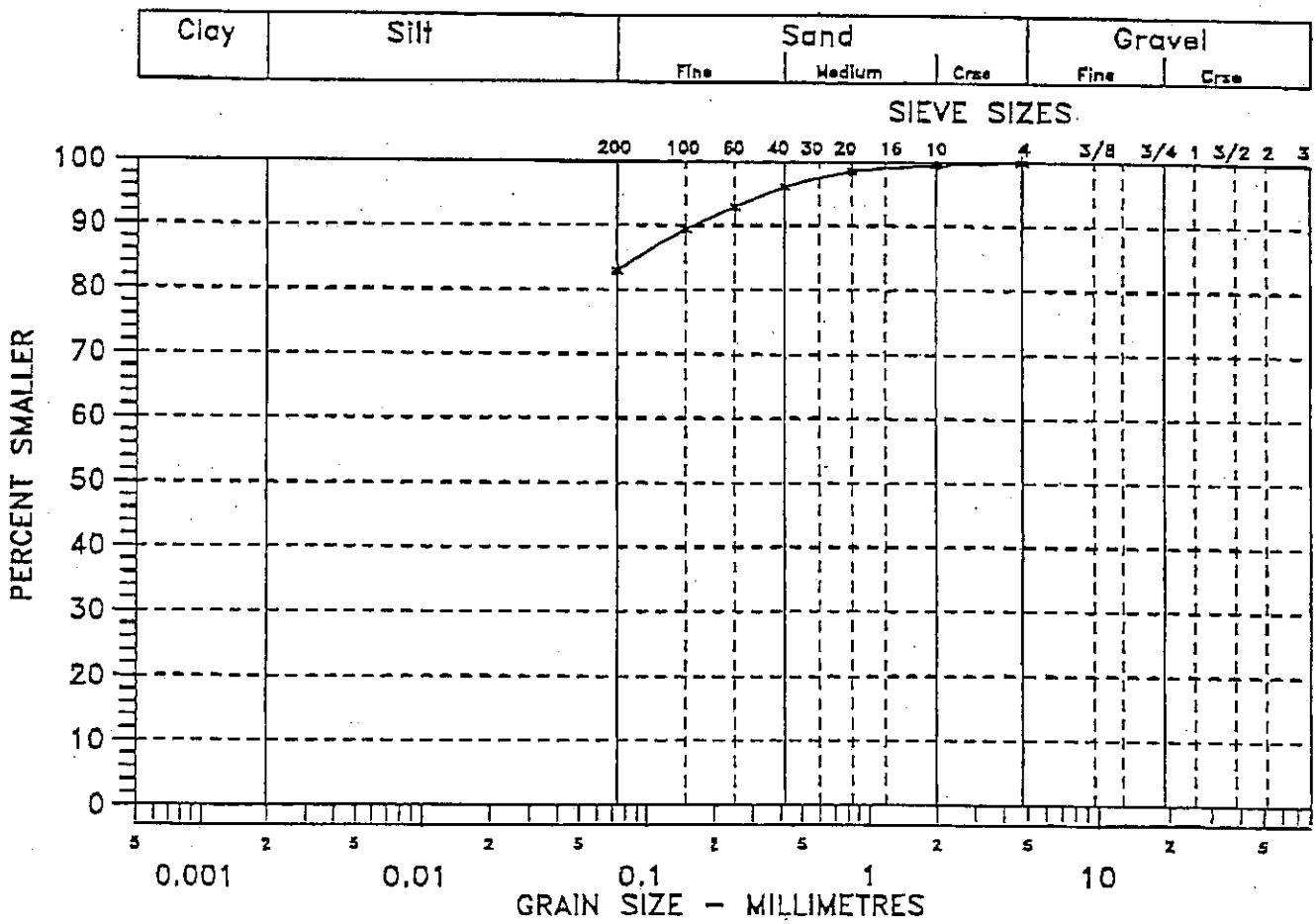
HONG WEST & ASSOCIATES

Date 2-21-92
By PK

HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/18/92
Remarks: Olive gray sandy SILT (ML)

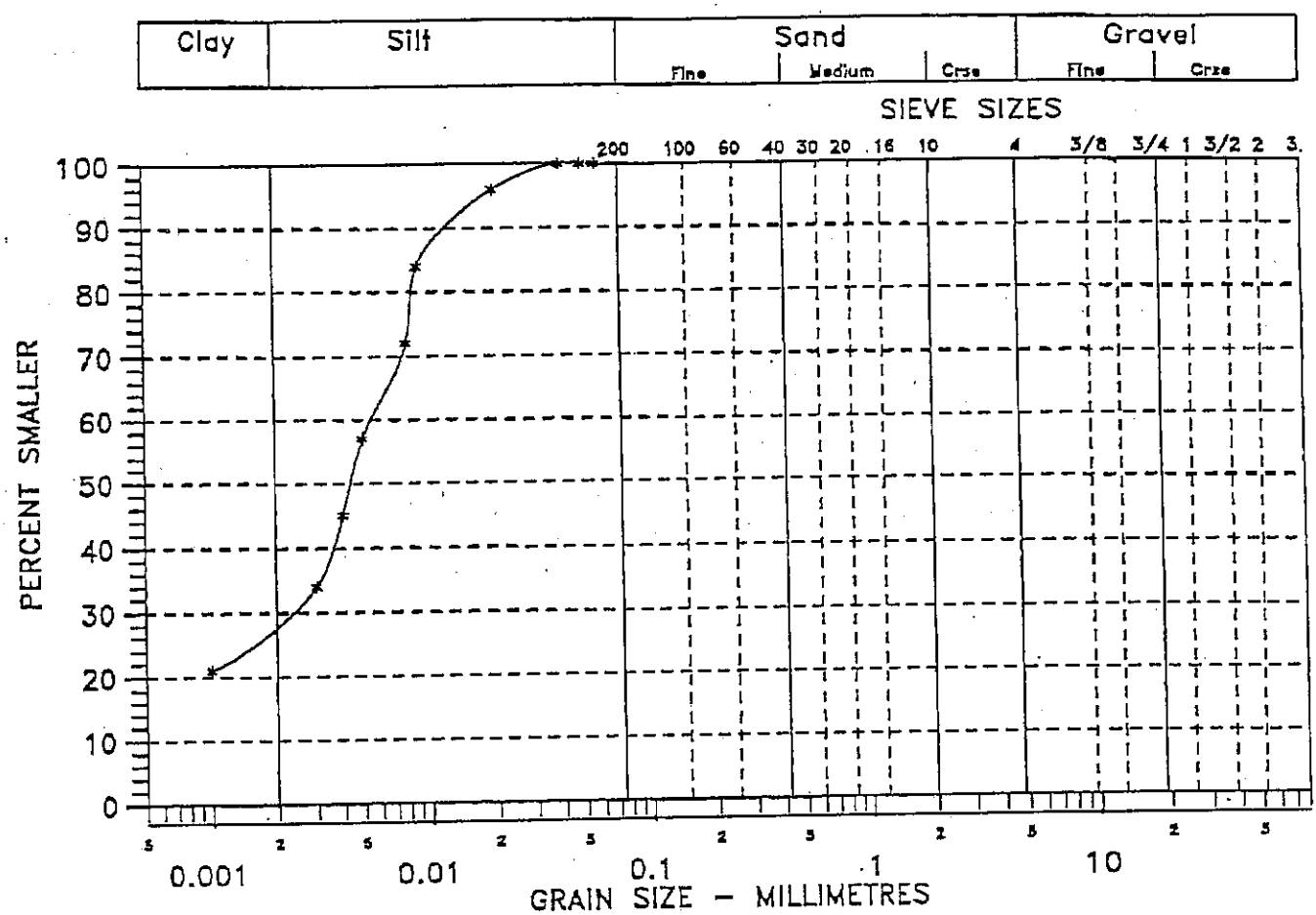
Test Hole Number: B-5
Sample Number: S-8
Depth: 25.0-26.5 feet
Sample Description:
Gravel: 0.0
Sand: 17.1
Silt: 82.9
Clay:



HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/14/92
Remarks: Gray-brown clayey SILT (ML)

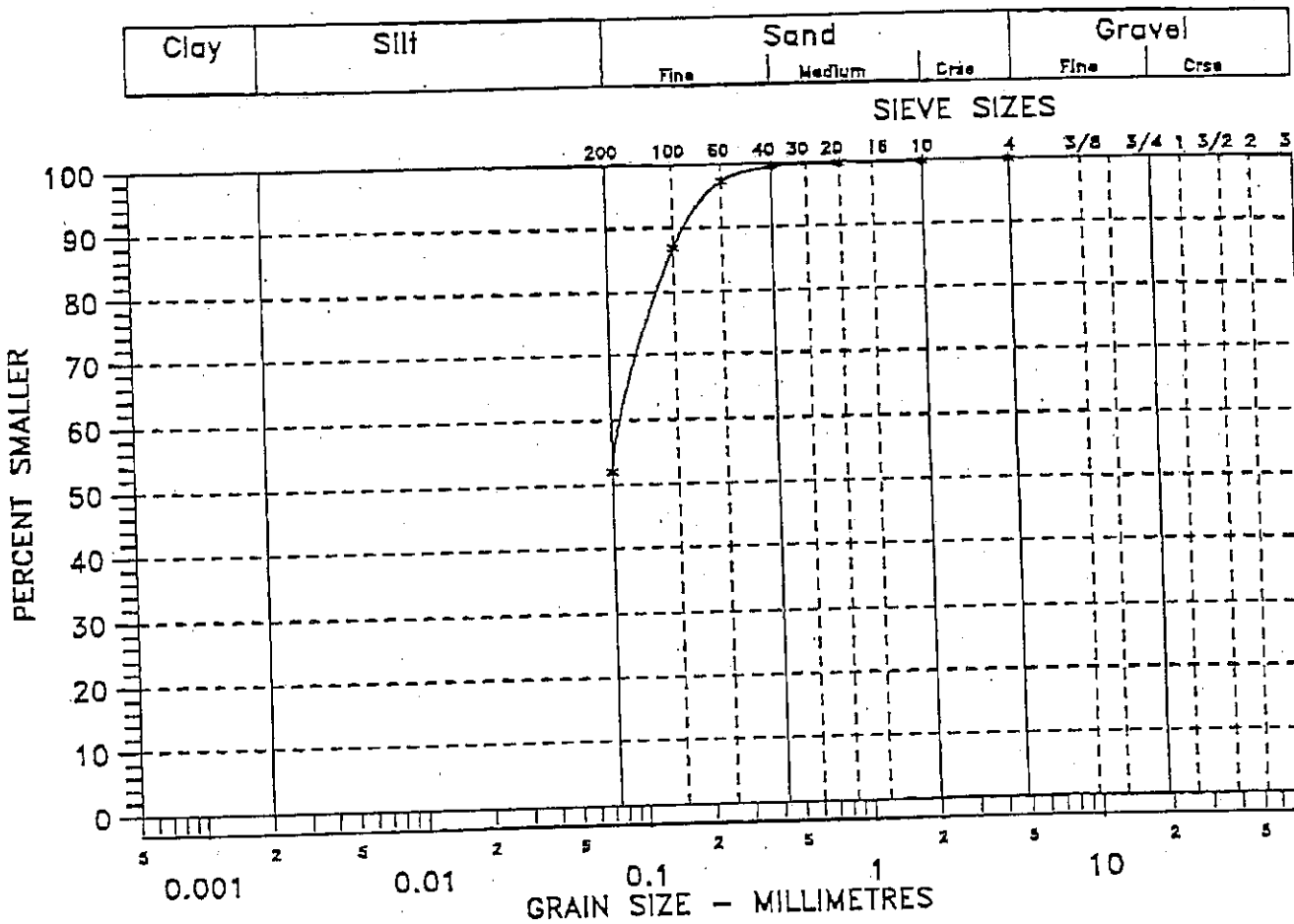
Test Hole Number: B-6
Sample Number: S-5
Depth: 20.0-21.5 feet
Sample Description:
Gravel: 0
Sand: 0
Silt: 73
Clay: 27



HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/18/92
Remarks: Olive gray SILT with trace of sand (ML)

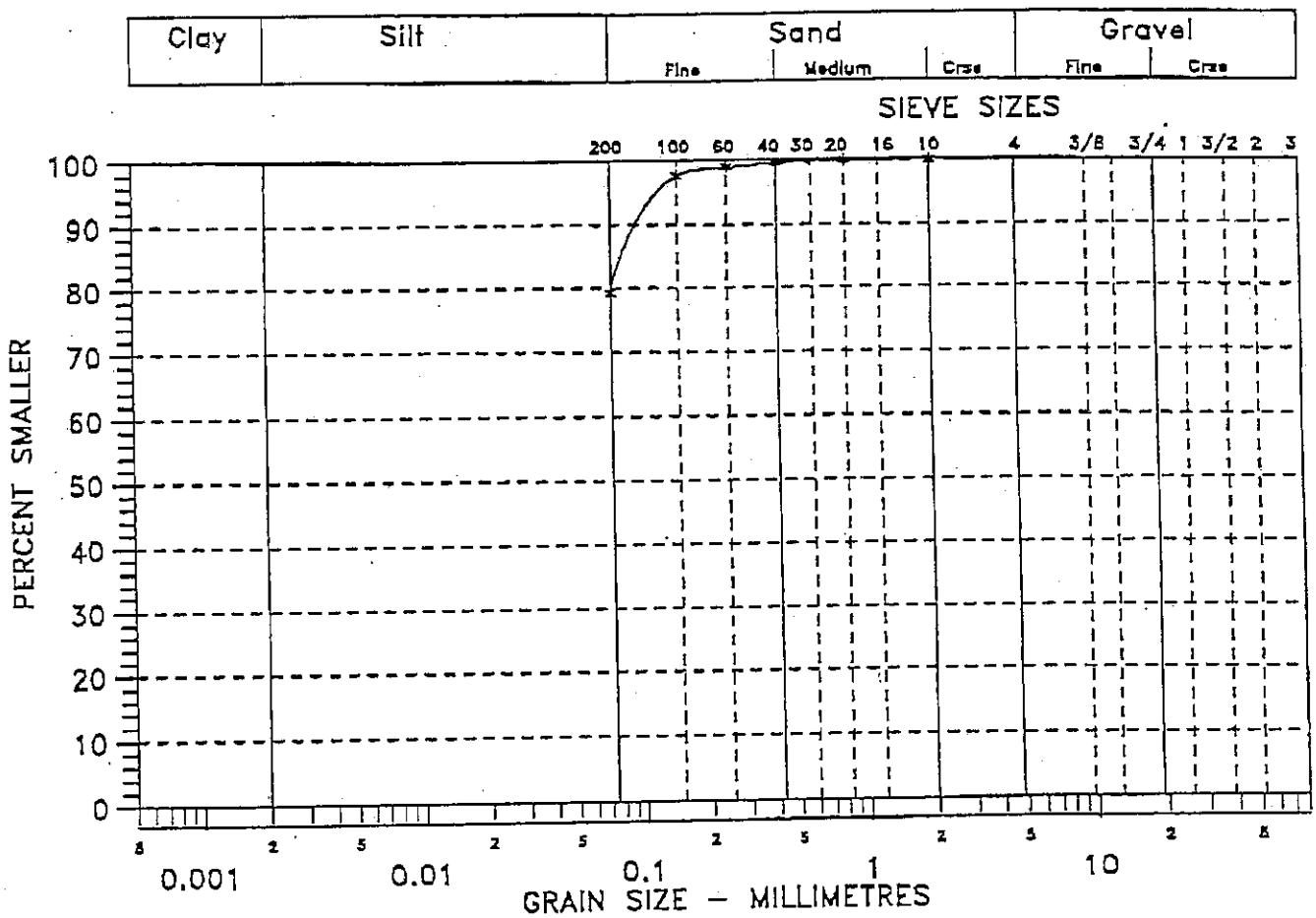
Test Hole Number: B-6
Sample Number: S-7
Depth: 30.0-31.5 feet
Sample Description:
Gravel: 0.0
Sand: 48.0
Silt: 52.0
Clay:



HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/17/92
Remarks: Olive gray sandy SILT (ML)

Test Hole Number: B-6
Sample Number: S-9
Depth: 40.0-41.5 feet
Sample Description:
Gravel: 0.0
Sand: 20.8
Silt: 79.2
Clay:

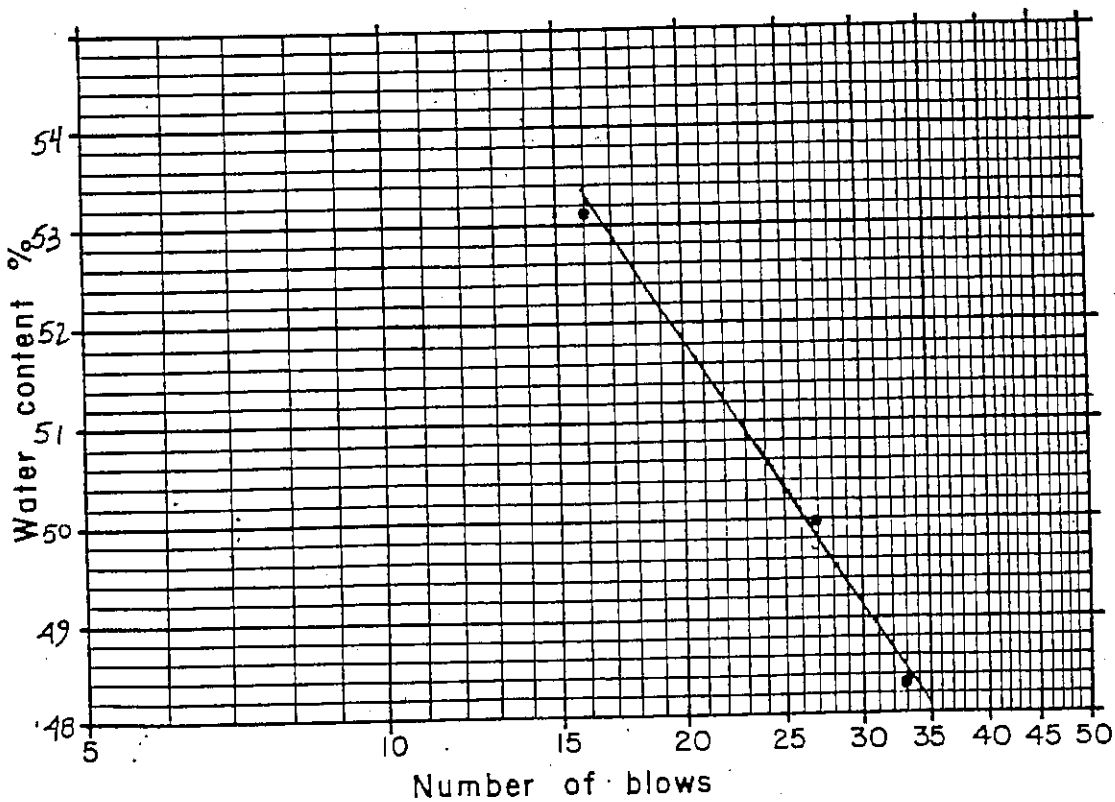


ATTERBERG LIMITS

FIGURE

Type of Test	LL	LL	LL	LL	Nat. MC
Container #					
Number of blows	33	27	16		
Wt. sample wet + tare	98.00	98.66	97.43		107.93
Wt. sample dry + tare	89.78	90.69	88.87		89.82
Weight of water	8.22	7.97	8.56		18.11
Tare	72.76	74.74	72.76		27.59
Wt. of dry soil	17.02	15.95	16.11		62.23
Water content %	48.3	50.0	53.1		29.1 %

Type of Test	PL	PL	Borehole #	B-6
Container #			Sample #	ST-2
Wt. sample wet + tare	88.21	89.87	Depth	7.0 - 9.0'
Wt. sample dry	84.75	86.51	Liquid limit	50.3
Wt. of water	3.46	3.36	Plastic limit	28.7
Tare	72.76	74.74	Plasiticity index	21.6
Weight of dry soil	11.99	11.77	Moisture content	
Water content	28.9	28.5	Liquidity index	



Sample Description: Light olive brown clayey SILT (MH)

Project No. 92019
Project SR-202

HONG WEST & ASSOCIATES

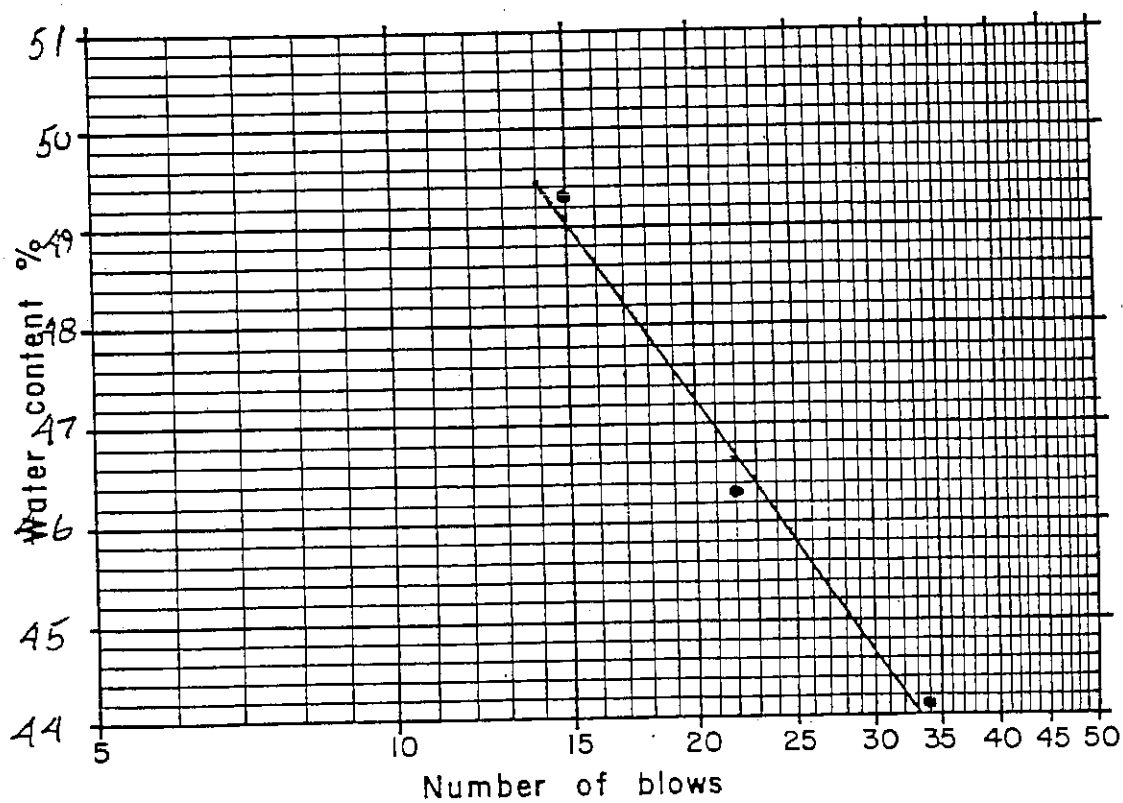
Date 2-20-92
By P.K.

ATTERBERG LIMITS

FIGURE

Type of Test	LL	LL	LL	LL	Nat. MC
Container #	7				
Number of blows	34	22	12		
Wt. sample wet + tare	70.36	95.49	92.30		
Wt. sample dry + tare	65.39	88.92	85.85		
Weight of water	4.97	6.57	6.45		
Tare	54.12	74.74	72.76		
Wt. of dry soil	11.27	14.18	13.09		
Water content %	44.1	46.3	49.3		

Type of Test	PL	PL	Borehole #	B-6
Container #			Sample #	S-3
Wt. sample wet + tare	89.87	89.22	Depth	10-11.5'
Wt. sample dry	86.64	85.63	Liquid limit	46.6
Wt. of water	3.23	3.59	Plastic limit	27.5
Tare	74.74	72.76	Plasiticity index	19.1
Weight of dry soil	11.90	12.87	Moisture content	
Water content	27.1	27.9	Liquidity index	



Sample Description: dark grayish brown clayey SILT (ML)

Project No. 92019

Project SP-202

HONG WEST & ASSOCIATES

Date 2-17-92

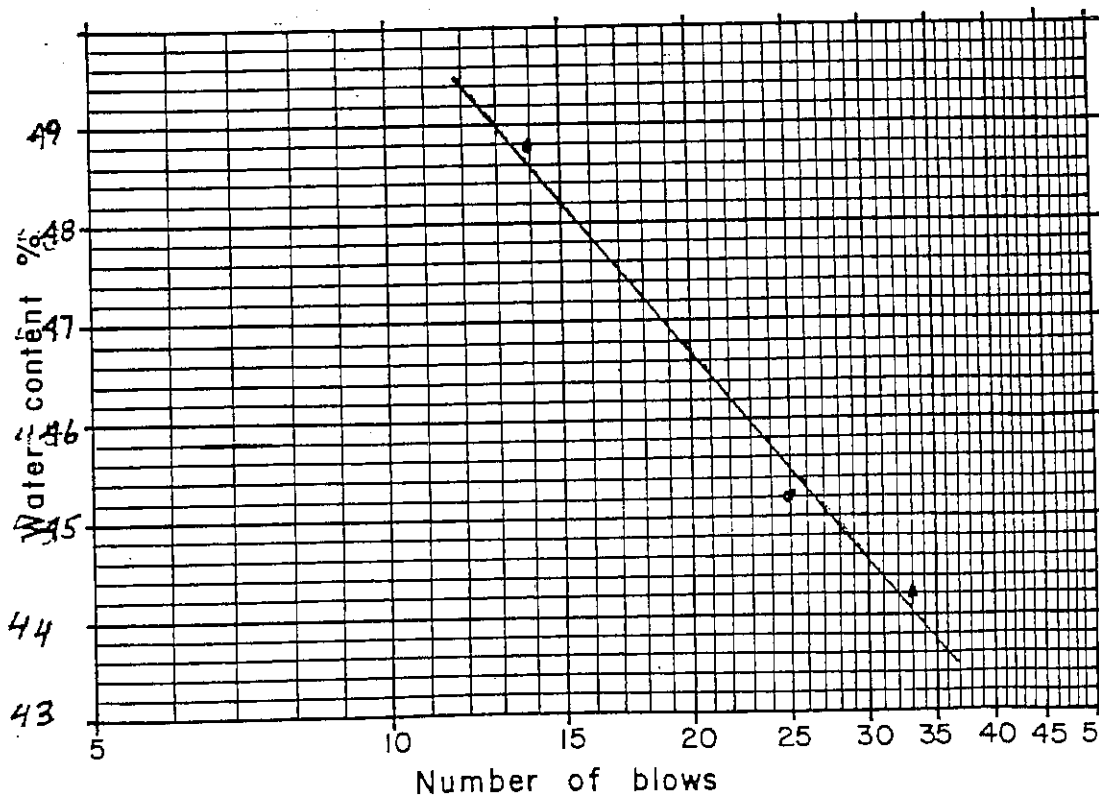
By PK

ATTERBERG LIMITS

FIGURE

Type of Test	LL	LL	LL	LL	Nat. MC
Container #	14	33	25		30%
Number of blows					
Wt. sample wet + tare	93.01	93.87	69.08		
Wt. sample dry + tare	87.02	87.40	63.63		
Weight of water	5.99	6.47	5.45		
Tare	74.74	72.76	51.58		
Wt. of dry soil	12.28	14.64	12.05		
Water content %	48.8	44.2	45.2		

Type of Test	PL	PL	Borehole #	B-6
Container #			Sample #	S-5
Wt. sample wet + tare	67.46	65.16	Depth	20-21.5
Wt. sample dry	64.61	62.16	Liquid limit	45.5
Wt. of water	2.85	3.00	Plastic limit	27.7
Tare	54.12	51.58	Plasiticity index	17.8
Weight of dry soil	10.49	10.58	Moisture content	
Water content	27.2	28.3	Liquidity index	



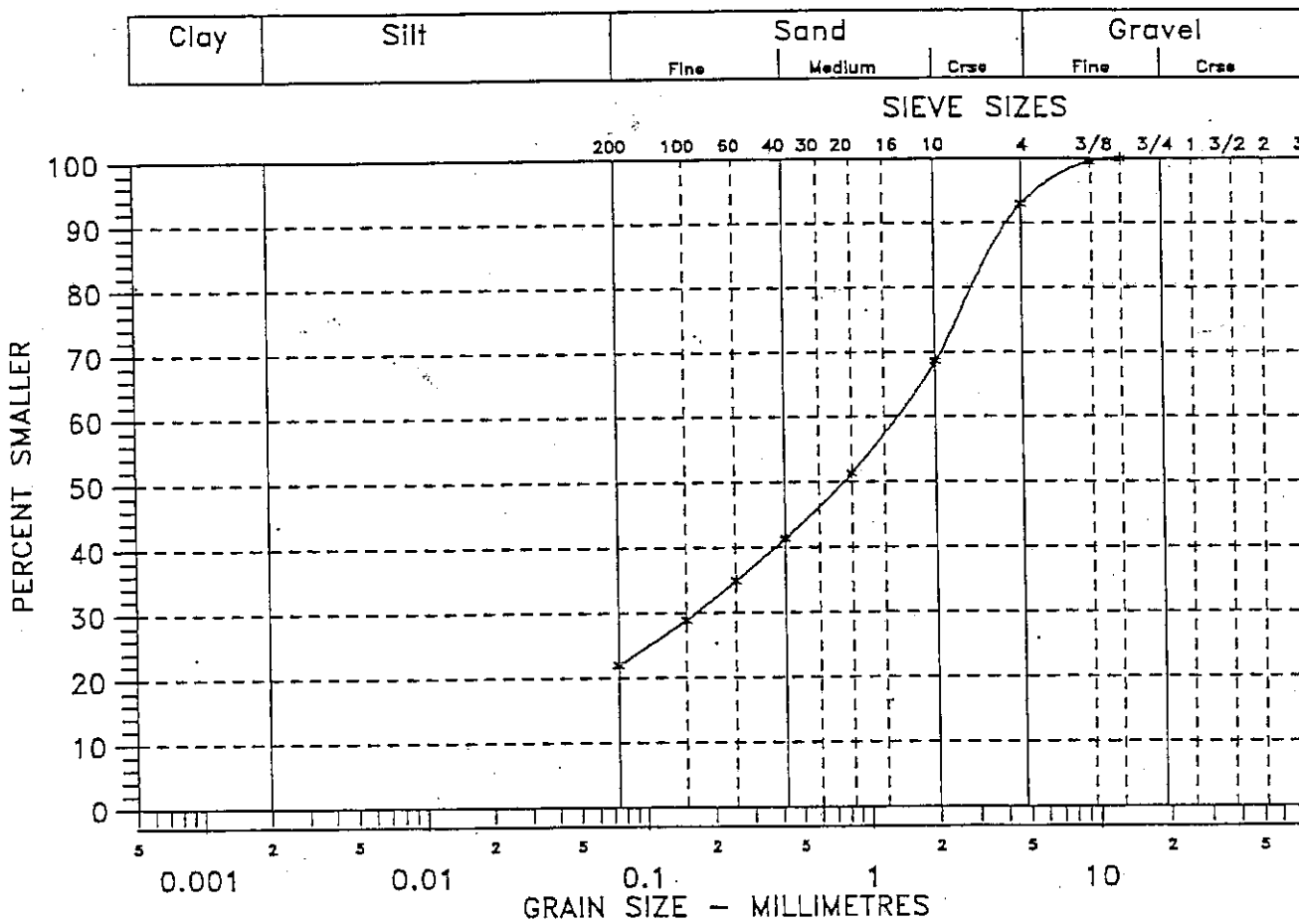
Sample Description: Glacial brown clayey SILT (ML)

Project No. 92019 HONG WEST & ASSOCIATES Date 2-18-92

HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/18/92
Remarks: Grayish brown silty SAND with some gravel (SM)

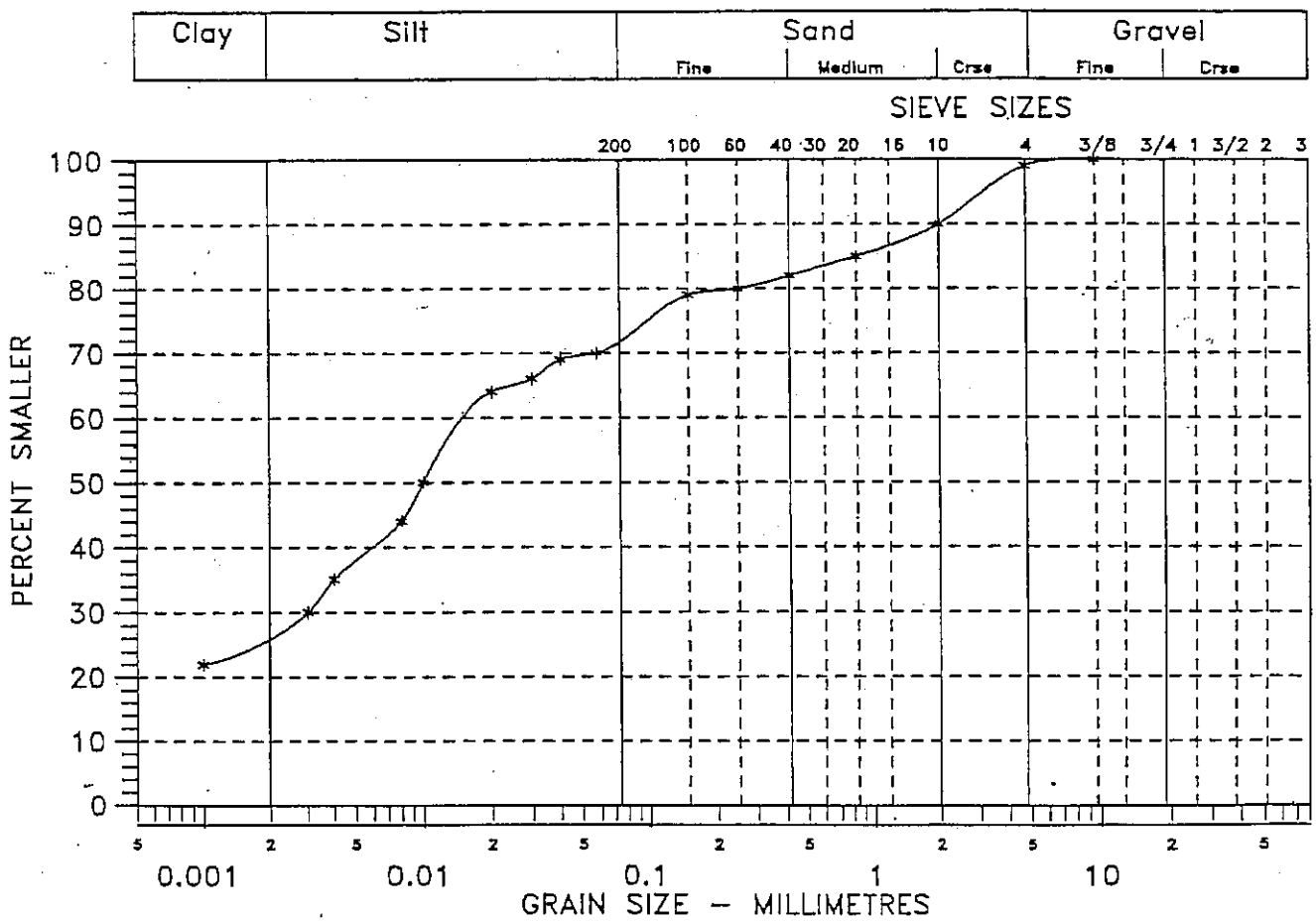
Test Hole Number: B-7
Sample Number: S-2
Depth: 10.0-11.0 feet
Sample Description:
Gravel: 7.0
Sand: 71.0
Silt: 22.0
Clay:



HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/14/92
Remarks: Dark gray sandy, clayey SILT with trace of gravel (ML)

Test Hole Number: B-8
Sample Number: S-5
Depth: 25.0-26.5 feet
Sample Description:
Gravel: 1
Sand: 21
Silt: 52
Clay: 26

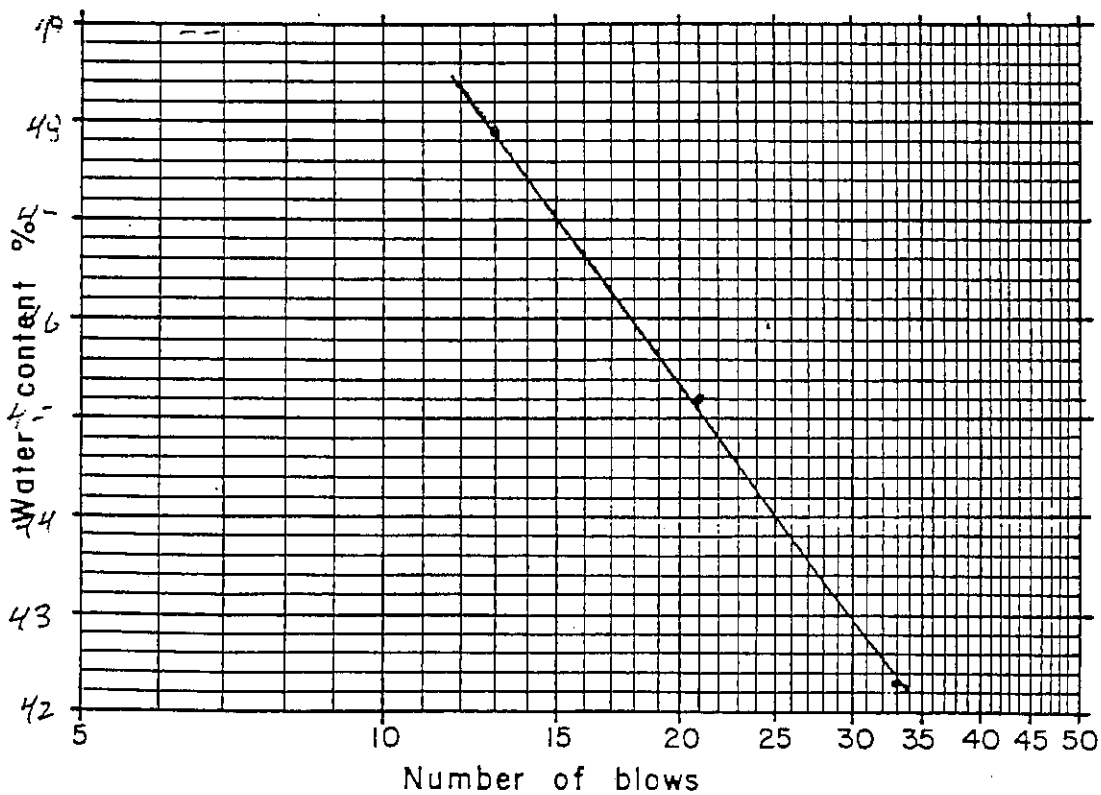


ATTERBERG LIMITS

FIGURE

Type of Test	LL	LL	LL	LL	Nat. MC
Container #					
Number of blows	33	21	13		
Wt. sample wet + tare	94.92	76.27	94.05		
Wt. sample dry + tare	88.92	69.38	87.15		
Weight of water	6	6.89	6.9		
Tare	74.74	54.12	72.76		
Wt. of dry soil	14.18	15.26	14.39		
Water content %	42.3	45.2	47.9		

Type of Test	PL	PL	Borehole #	B-8
Container #			Sample #	S-6
Wt. sample wet + tare	66.70	88.70	Depth	30.5-32'
Wt. sample dry	64.30	86.01	Liquid limit	44.0
Wt. of water	2.40	2.69	Plastic limit.	23.7
Tare	54.12	74.74	Plasiticity index	20.3
Weight of dry soil	10.18	11.27	Moisture content	
Water content	23.6	23.9	Liquidity index	



Sample Description: Dark gray silty lean CLAY (CL)

Project No. 92019
Project SR-202

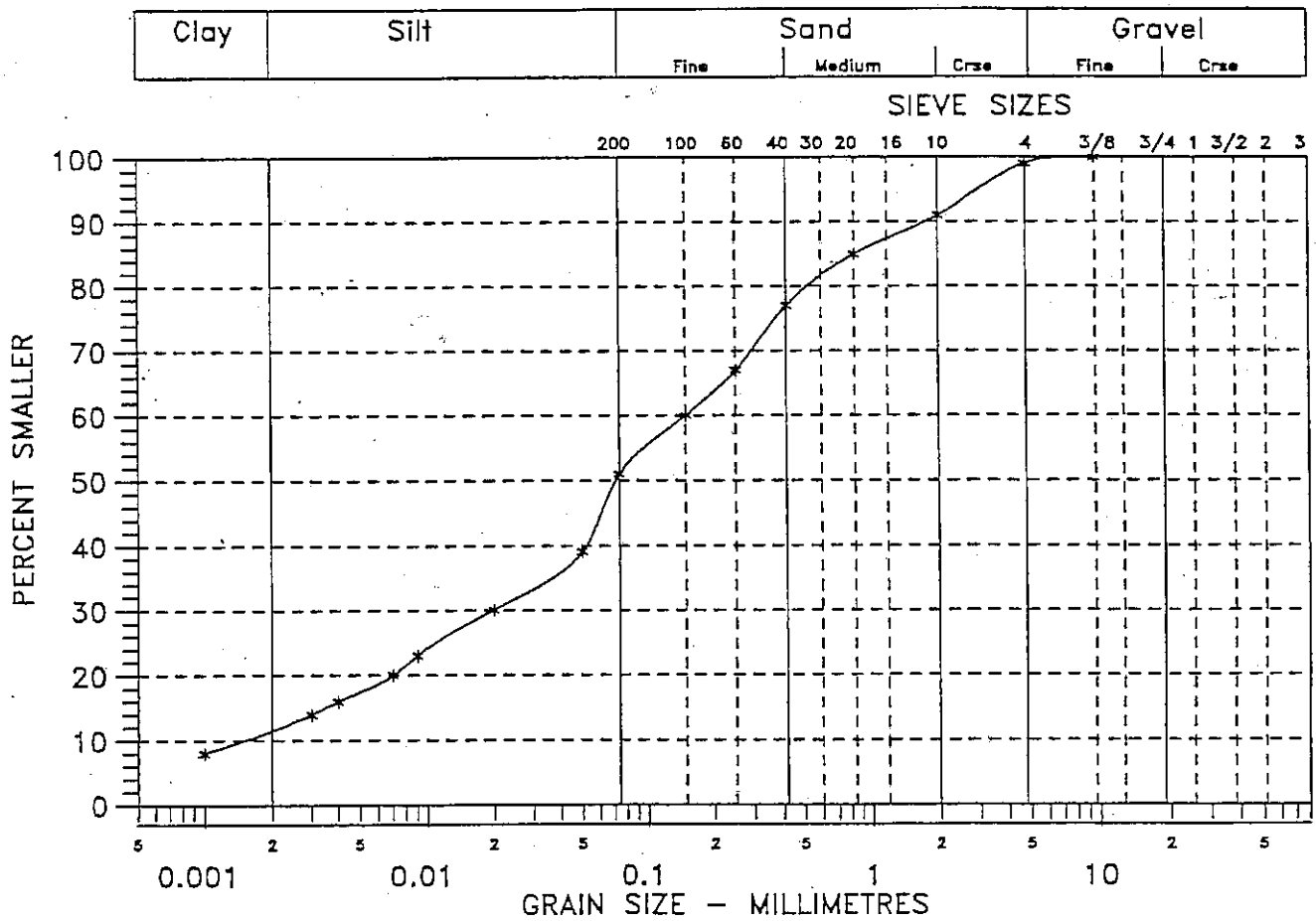
HONG WEST & ASSOCIATES

Date 2-18-92
By P.K.

HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/14/92
Remarks: Dark gray very silty, clayey SAND with trace of gravel (SM)

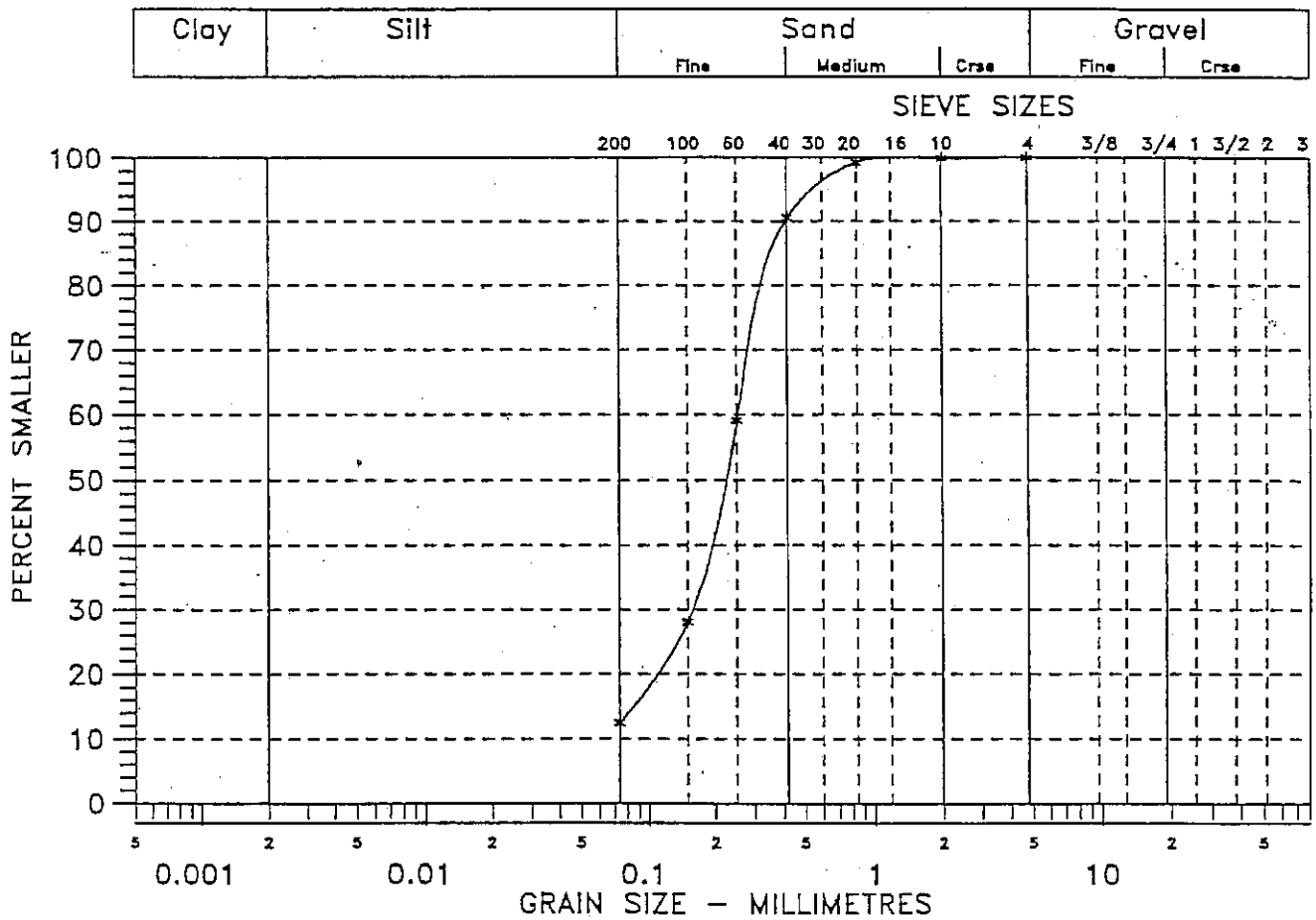
Test Hole Number: B-8
Sample Number: S-7
Depth: 35.0-36.5 feet
Sample Description:
Gravel: 2
Sand: 49
Silt: 37
Clay: 12



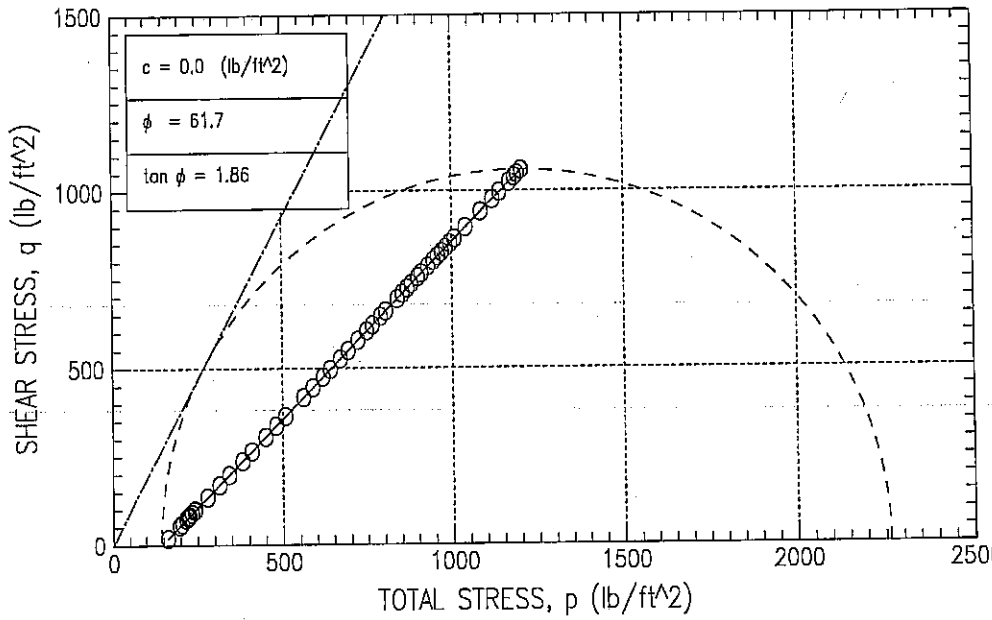
HONG WEST & ASSOCIATES
GRAIN SIZE DISTRIBUTION

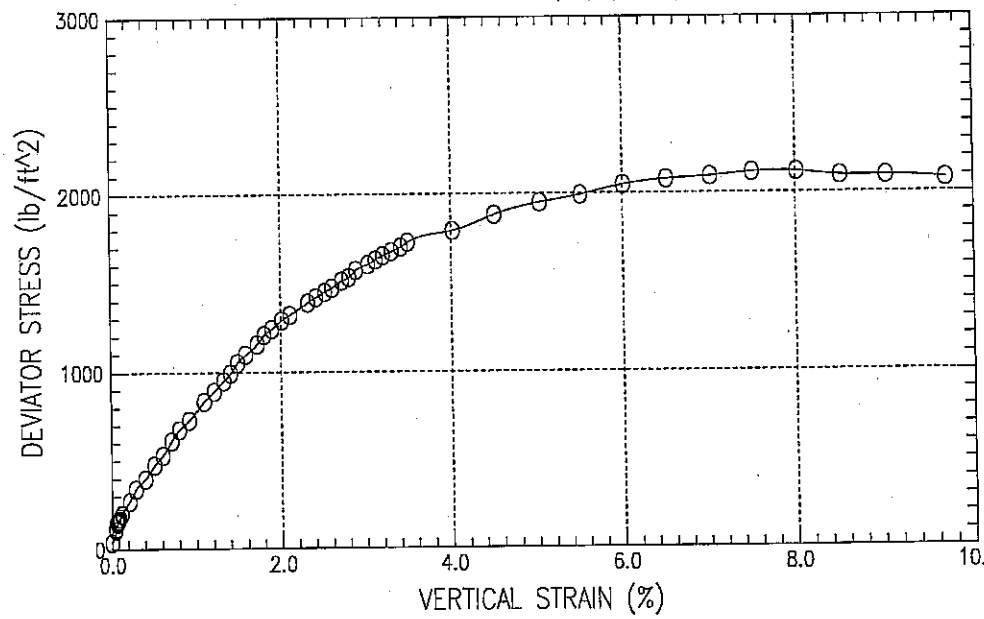
Project: SR-202
Client: CH2M Hill
Project Number: 92019
Date Tested: 2/17/92
Remarks: Gray fine, silty SAND (SM)

Test Hole Number: B-8
Sample Number: S-10
Depth: 50.0-51.5 feet
Sample Description:
Gravel: 0.0
Sand: 87.5
Silt: 12.5
Clay:



UNCONSOLIDATED UNDRAINED TRIAXIAL TEST





Washington State D.O.T.
Project Name : SR-520 TO SAHALEE WAY NE
Project No : OL-3498 Boring No : H-16-02 Sample No : S-2
Test Date : 8/13/02 Test No : 4472S2U Depth : 2.8 FT
Description : MOIST BLUEISH GRAY CLAY
Remarks :

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : SR-520 TO SAHALEE WAY NE
Location : SR-202
Project No. : OL-3498
Test No. : 4472S2U
Boring No. : H-16-02
Test Date : 8/13/02
Tested by : LHB
Sample No. : S-2
Depth : 2.8 FT
Checked by : DAW
Sample Type : SHELBY
Elevation :
Soil Description : MOIST BLUEISH GRAY CLAY
Remarks :

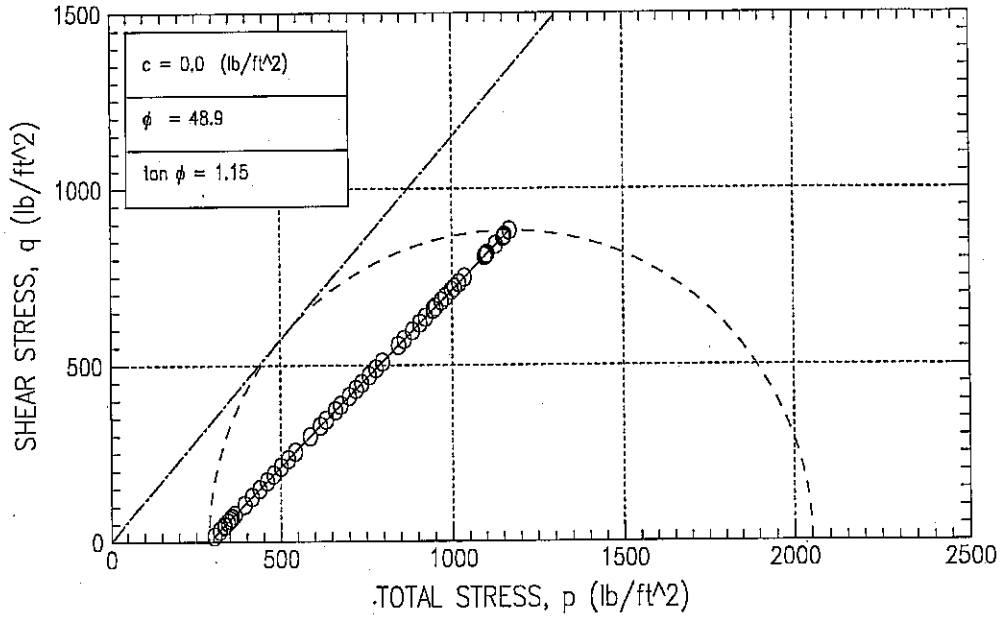
Liquid Limit : 0
Plastic Limit : 0
Specific Gravity : 2.65

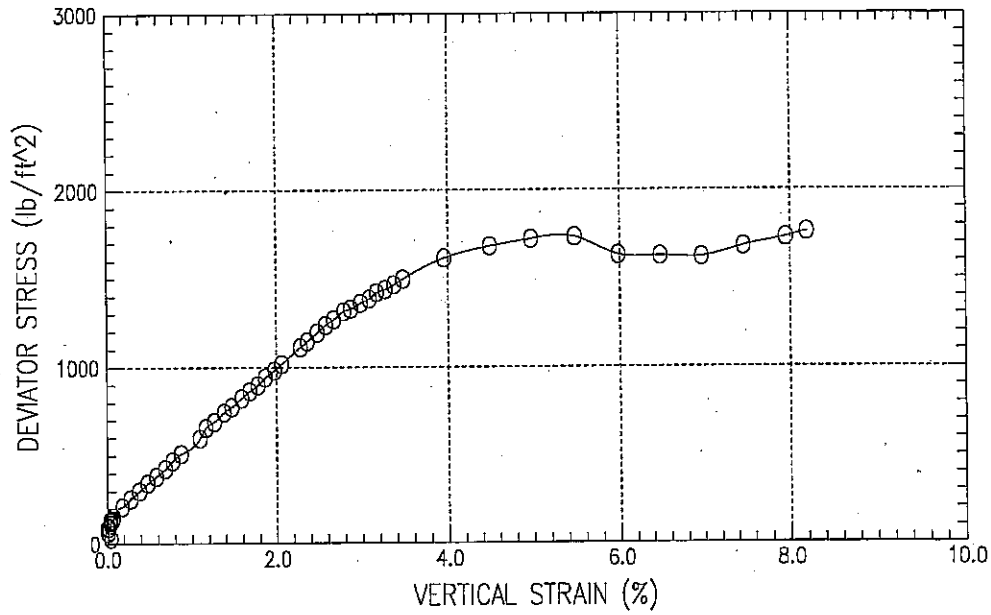
	WATER CONTENT BEFORE TEST	AFTER TEST
CONTAINER NO.		
WT CONTAINER + WET SOIL (gm)	1291.40	1291.40
WT CONTAINER + DRY SOIL (gm)	1043.90	1043.90
WT WATER (gm)	247.50	247.50
WT CONTAINER (gm)	85.40	85.40
WT DRY SOIL (gm)	958.50	958.50
WATER CONTENT (%)	25.82	25.82

	INITIAL	AT CONSOLIDATION
WATER CONTENT (%)	25.82	25.82
VOID RATIO	0.71	0.71
WET DENSITY (lb/ft^3)	122.02	122.02
DRY DENSITY (lb/ft^3)	96.98	96.98
DEGREE OF SATURATION (%)	97.04	97.04

Maximum Shear Stress = 1058.78 (lb/ft^2) at a Vertical Strain of 8.01 %

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST





Washington State D.O.T.
Project Name : SR-520 TO SAHALEE WAY NE
Project No : OL-3498 Boring No : H-16-02 Sample No : S-4
Test Date : 8/14/02 Test No : 4472S4U Depth : 7.8'
Description : MOIST VERY DARK GRAY SILT
Remarks :

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : SR-520 TO SAHALEE WAY NE
Location : SR-202
Project No. : OL-3498
Test No. : 4472S4U
Boring No. : H-16-02
Test Date : 8/14/02
Tested by : LHB
Sample No. : S-4
Depth : 7.8 FT
Checked by : DAW
Sample Type : SHELBY
Elevation :
Soil Description : MOIST VERY DARK GRAY SILT
Remarks :

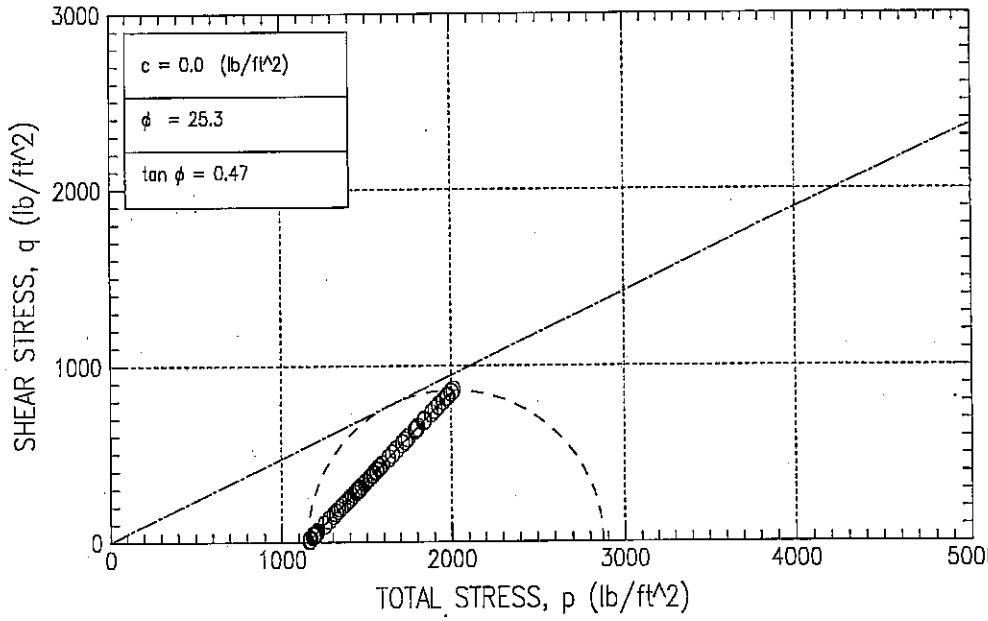
Liquid Limit : 0
Plastic Limit : 0
Specific Gravity : 2.65

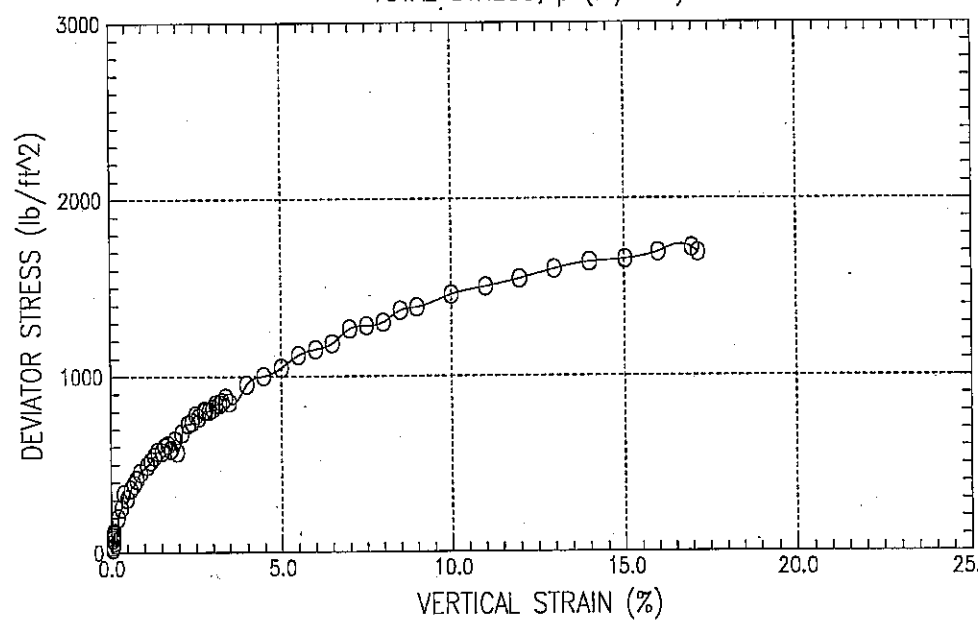
	WATER CONTENT BEFORE TEST	AFTER TEST
CONTAINER NO.		
WT CONTAINER + WET SOIL (gm)	1235.80	1235.80
WT CONTAINER + DRY SOIL (gm)	982.30	982.30
WT WATER (gm)	253.50	253.50
WT CONTAINER (gm)	82.20	82.20
WT DRY SOIL (gm)	900.10	900.10
WATER CONTENT (%)	28.16	28.16

	INITIAL	AT CONSOLIDATION
WATER CONTENT (%)	28.16	28.16
VOID RATIO	0.73	0.73
WET DENSITY (lb/ft^3)	122.27	122.27
DRY DENSITY (lb/ft^3)	95.40	95.40
DEGREE OF SATURATION (%)	101.77	101.77

Maximum Shear Stress = 865.92 (lb/ft^2) at a Vertical Strain of 8.20 %

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST





Washington State D.O.T.
Project Name : SR-520 TO SAHALEE WAY NE
Project No : OL-3498 Boring No : H-26-02 Sample No : S-7
Test Date : 12/3/02 Test No : 4572S7U Depth : 16.6 FT
Description : MOIST GRAY CLAY
Remarks :

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : SR-520 TO SAHALEE WAY NE
Project No. : OL-3498
Boring No. : H-26-02
Sample No. : S-7
Sample Type : SHELBY
Soil Description : MOIST GRAY CLAY
Remarks :

Location : SR-202
Test No. : 4572S7U
Test Date : 12/3/02
Depth : 16.6 FT
Elevation :

Tested by : LHB
Checked by : DAW

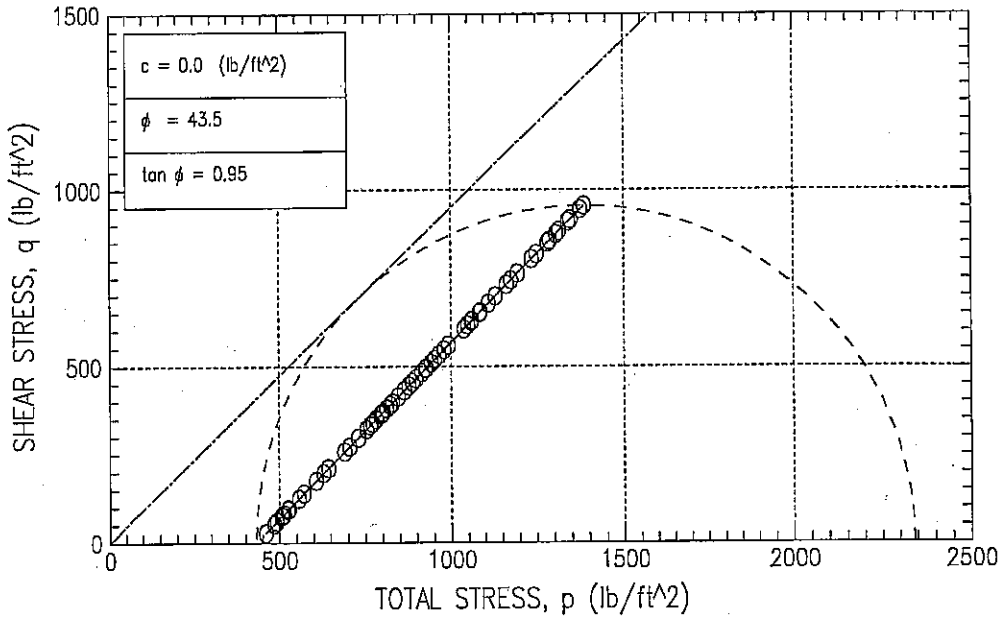
Liquid Limit : 34
Plastic Limit : 24
Specific Gravity : 2.65

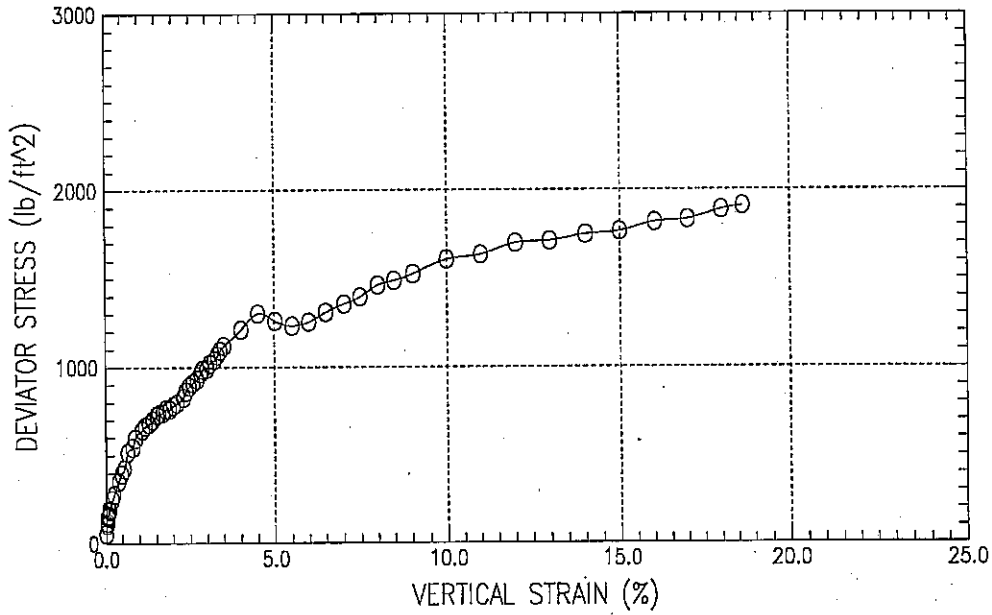
	WATER CONTENT BEFORE TEST	AFTER TEST
CONTAINER NO.		
WT CONTAINER + WET SOIL (gm)	1337.90	1337.90
WT CONTAINER + DRY SOIL (gm)	1071.20	1071.20
WT WATER (gm)	266.70	266.70
WT CONTAINER (gm)	199.80	199.80
WT DRY SOIL (gm)	871.40	871.40
WATER CONTENT (%)	30.61	30.61

	INITIAL	AT CONSOLIDATION
WATER CONTENT (%)	30.61	30.61
VOID RATIO	0.80	0.80
WET DENSITY (lb/ft^3)	119.92	119.92
DRY DENSITY (lb/ft^3)	91.82	91.82
DEGREE OF SATURATION (%)	101.27	101.27

Maximum Shear Stress = 860.41 (lb/ft^2) at a Vertical Strain of 16.99 %

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST





Washington State D.O.T.
Project Name : SR 202/SR 502 SAHALEE WY
Project No : OL-3498 Boring No : H-27-02 Sample No : U-3/C
Test Date : 5/8/02 Test No : 4372U3C Depth : 7.83 FT
Description : WET OLIVE BROWN SILT
Remarks :

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : SR 202/SR 502 SAHALEE WY Location : SR-202
Project No. : OL-3498 Test No. : 4372U3C
Boring No. : H-27-02 Test Date : 5/8/02 Tested by : LHB
Sample No. : U-3/C Depth : 7.83 FT Checked by : DW
Sample Type : WSDOT TUBE Elevation :
Soil Description : WET OLIVE BROWN SILT
Remarks :

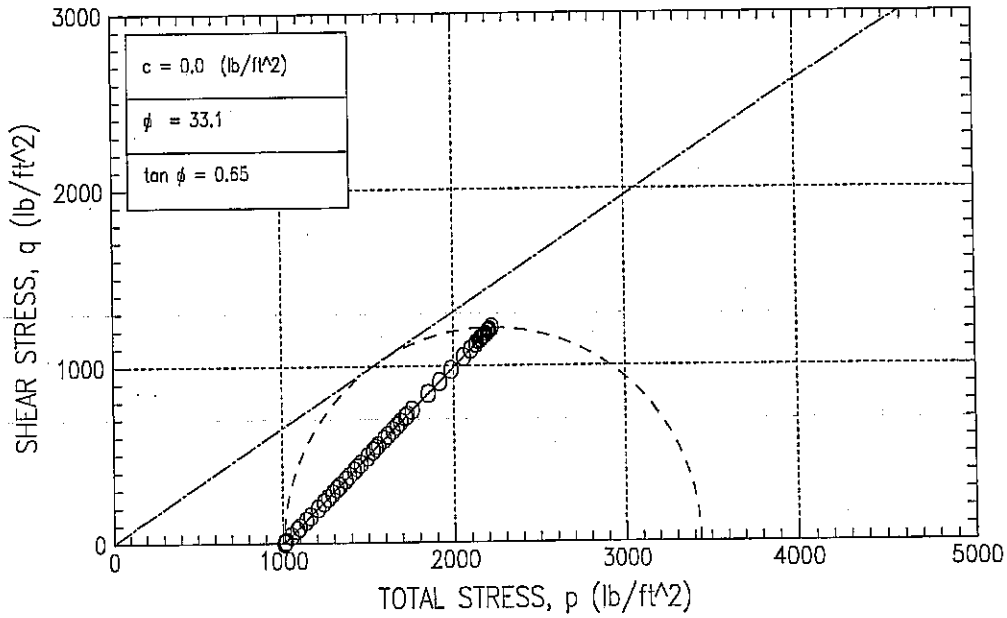
Liquid Limit : 0 Plastic Limit : 0 Specific Gravity : 2.65

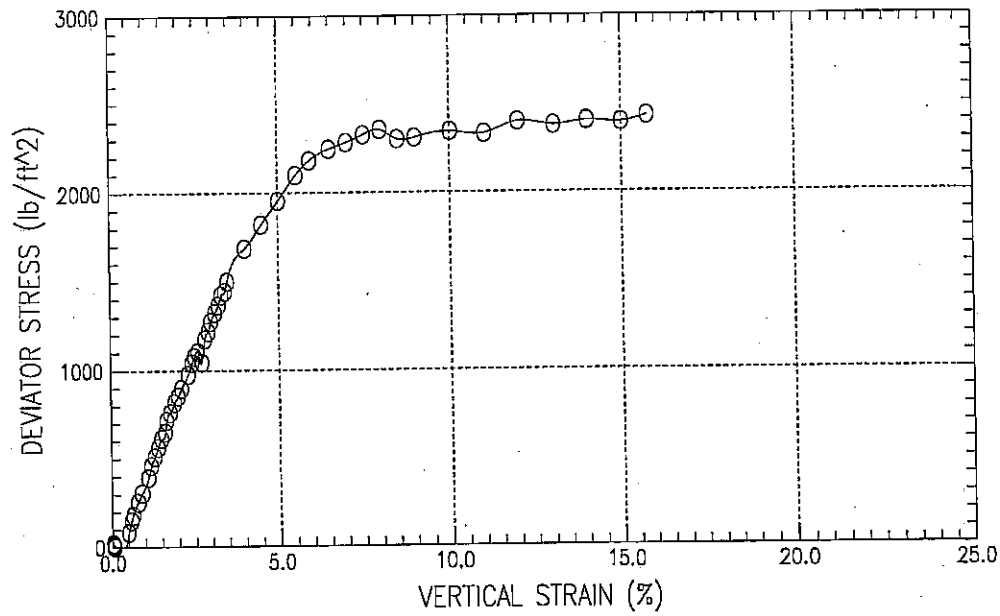
	WATER CONTENT BEFORE TEST	AFTER TEST
CONTAINER NO.		
WT CONTAINER + WET SOIL (gm)	447.10	447.10
WT CONTAINER + DRY SOIL (gm)	378.90	378.90
WT WATER (gm)	68.20	68.20
WT CONTAINER (gm)	85.40	85.40
WT DRY SOIL (gm)	293.50	293.50
WATER CONTENT (%)	23.24	23.24

	INITIAL	AT CONSOLIDATION
WATER CONTENT (%)	23.24	23.24
VOID RATIO	0.59	0.59
WET DENSITY (lb/ft^3)	128.36	128.36
DRY DENSITY (lb/ft^3)	104.16	104.16
DEGREE OF SATURATION (%)	104.80	104.80

Maximum Shear Stress = 954.21 (lb/ft^2) at a Vertical Strain of 18.63 %

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST





Washington State D.O.T.
Project Name : SR 202/SR 502 SAHALEE WY
Project No : OL-3498 Boring No : H-28-02 Sample No : S-3
Test Date : 5/28/02 Test No : 4374S3U Depth : 10.83 FT
Description : WET GRAY ELASTIC SILT
Remarks :

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : SR 202/SR 502 SAHALEE WY
Location : SR-202
Project No. : OL-3498
Test No. : 4374S3U
Boring No. : H-28-02
Test Date : 5/28/02
Tested by : LHB
Sample No. : S-3
Depth : 10.83 FT
Checked by : DW
Sample Type : SHELBY
Elevation :
Soil Description : WET ELASTIC SILT
Remarks :

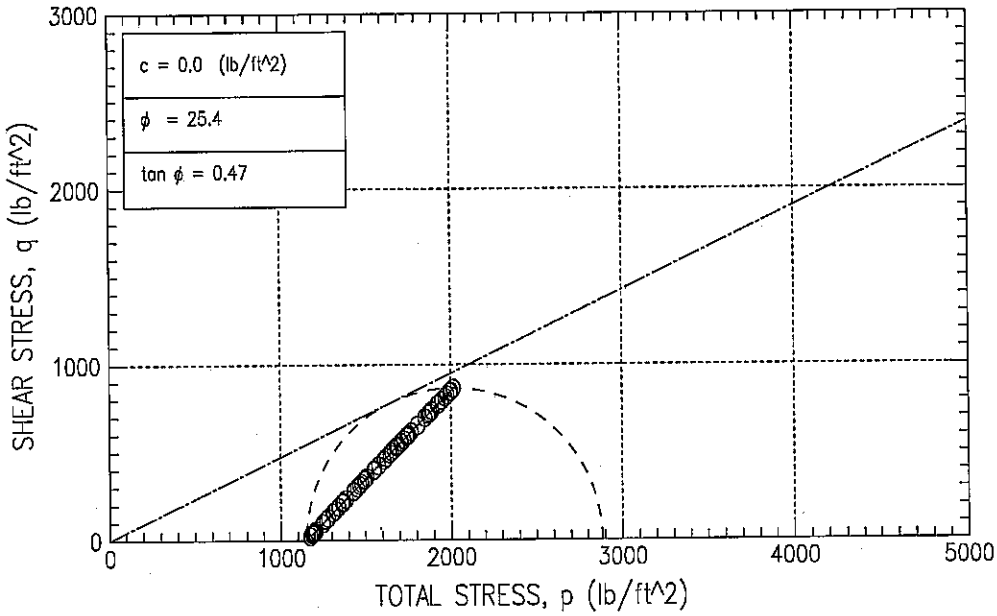
Liquid Limit : 85
Plastic Limit : 72
Specific Gravity : 2.65

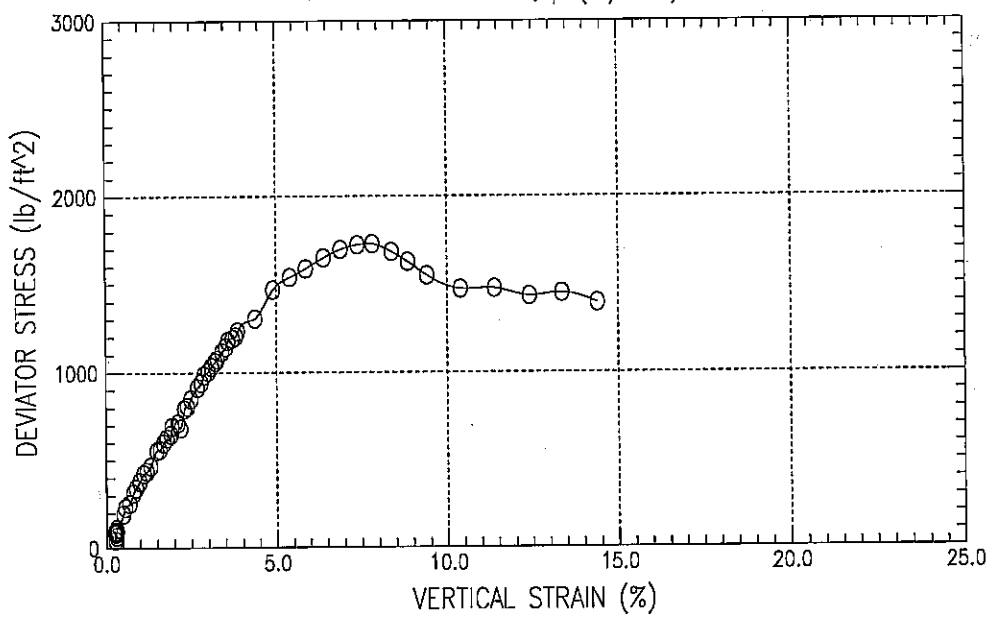
	WATER CONTENT BEFORE TEST	AFTER TEST
CONTAINER NO.		
WT CONTAINER + WET SOIL (gm)	356.50	356.50
WT CONTAINER + DRY SOIL (gm)	235.00	235.00
WT WATER (gm)	121.50	121.50
WT CONTAINER (gm)	85.60	85.60
WT DRY SOIL (gm)	149.40	149.40
WATER CONTENT (%)	81.33	81.33

	INITIAL	AT CONSOLIDATION
WATER CONTENT (%)	81.33	81.33
VOID RATIO	2.24	2.24
WET DENSITY (lb/ft^3)	92.51	92.51
DRY DENSITY (lb/ft^3)	51.02	51.02
DEGREE OF SATURATION (%)	96.16	96.16

Maximum Shear Stress = 1243.72 (lb/ft^2) at a Vertical Strain of 15.90 %

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST





Washington State D.O.T.
Project Name : SR 202/SR 502 SAHALEE WY
Project No : OL-3498 Boring No : H-29-02 Sample No.: S-4
Test Date : 6/17/02 Test No : 4375S4U Depth : 11.33 FT
Description : MOIST DARK GRAY SILT
Remarks :

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Project : SR 202/SR 502 SAHALEE WY
Location : SR-202
Project No. : OL-3498
Test No. : 4375S4U
Boring No. : H-29-02
Test Date : 6/17/02
Tested by : LHB
Sample No. : S-4
Depth : 11.33 FT
Checked by : DW
Sample Type : SHELBY
Elevation :
Soil Description : MOIST DARK GRAY SILT
Remarks :

Liquid Limit : 94
Plastic Limit : 0
Specific Gravity : 2.65

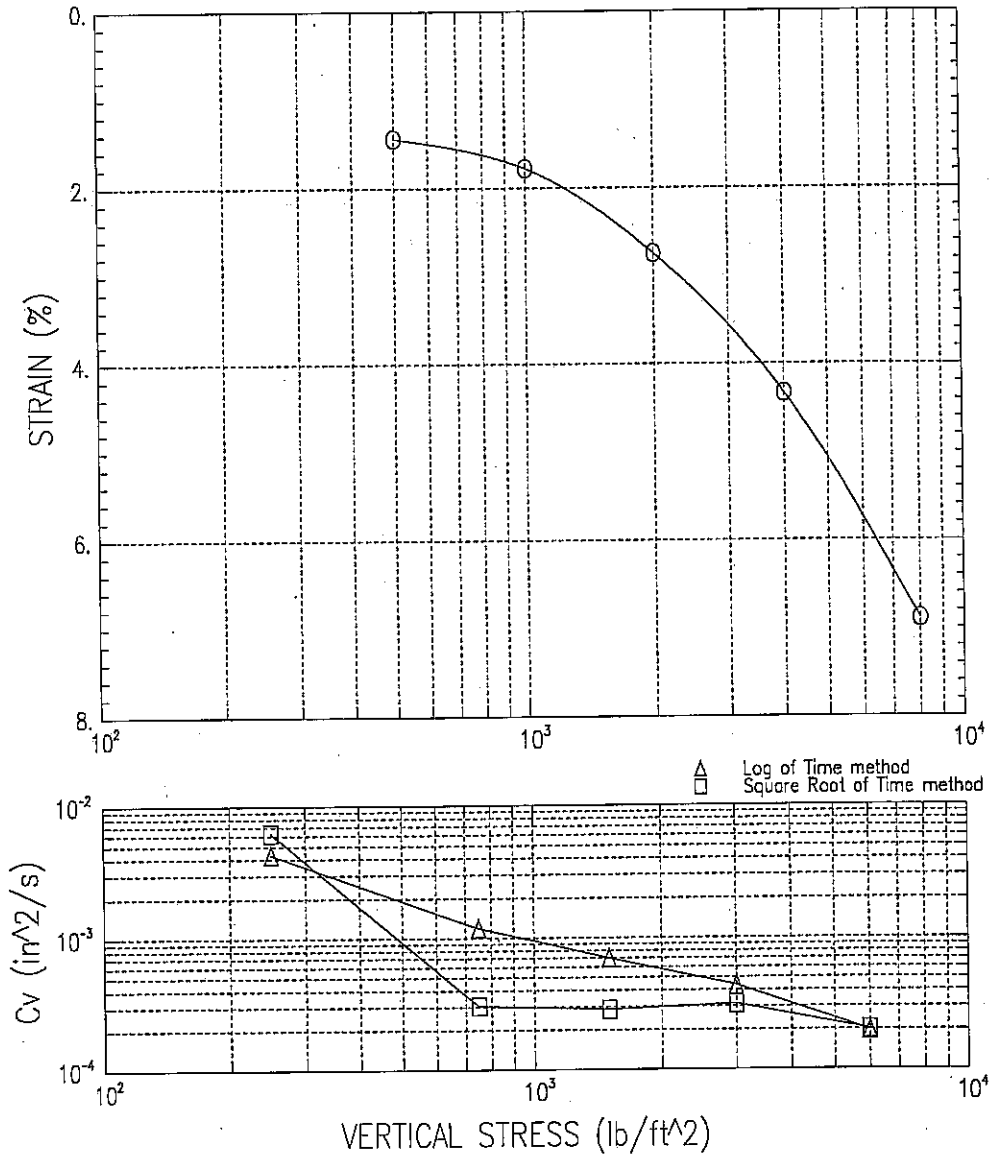
	WATER CONTENT BEFORE TEST	AFTER TEST
CONTAINER NO.		
WT CONTAINER + WET SOIL (gm)	355.50	355.50
WT CONTAINER + DRY SOIL (gm)	219.30	219.30
WT WATER (gm)	136.20	136.20
WT CONTAINER (gm)	82.00	82.00
WT DRY SOIL (gm)	137.30	137.30
WATER CONTENT (%)	99.20	99.20

	INITIAL	AT CONSOLIDATION
WATER CONTENT (%)	99.20	99.20
VOID RATIO	2.67	2.67
WET DENSITY (lb/ft^3)	89.77	89.77
DRY DENSITY (lb/ft^3)	45.07	45.07
DEGREE OF SATURATION (%)	98.49	98.49

Maximum Shear Stress = 864.52 (lb/ft^2) at a Vertical Strain of 7.83 %

CONSOLIDATION TEST

SUMMARY REPORT



Washington State D.O.T.
Project Name : SR-520 TO SAHALEE WAY NE
Project No : OL-3498 Boring No : H-16-02 Sample No : S-2
Test Date : 7/3/02 Test No : 4472S2C Depth : 3.2 FT
Description : MOIST MOTLED GRAY AND YELLOWISH BROWN CLAY
Remarks :

CONSOLIDATION TEST DATA

Project : SR-520 TO SAHALEE WAY NE
Location : SR-202
Project No.: OL-3498
Boring No.: H-16-02
Tested by : LHB
Checked by : DW
Sample No.: S-2
Test Date : 7/3/02
Depth : 3.2 FT
Test No. : 4472S2C
Sample Type: SHELBY

Soil Description : MOIST MOTLED GRAY AND YELLOWISH BROWN CLAY
Remarks :

	APPLIED PRESSURE (lb/ft^2)	FINAL DISPLACEMENT (in)	VOID RATIO	STRAIN AT END (%)	FITTING T50 TIME (min) SQ.RT.	LOG	COEFFICIENT OF CONSOLIDATION (in^2/s) SQ.RT.	LOG	AVE
1)	500.0	0.014	0.734	1.44	0.1	0.2	6.27E-003	4.30E-003	5.29E-003
2)	1000.0	0.018	0.728	1.78	2.6	0.7	3.05E-004	1.19E-003	7.46E-004
3)	2000.0	0.027	0.711	2.75	2.7	1.1	2.86E-004	7.00E-004	4.93E-004
4)	4000.0	0.043	0.684	4.33	2.4	1.8	3.14E-004	4.36E-004	3.75E-004
5)	8000.0	0.069	0.638	6.89	3.6	3.7	2.01E-004	1.97E-004	1.99E-004

CONSOLIDATION TEST DATA

Project : SR-520 TO SAHALEE WAY NE
Boring No.: H-16-02
Sample No.: S-2
Test No. : 4472S2C

Location : SR-202
Tested by : LHB
Test Date : 7/3/02
Sample Type: SHELBY

Project No.: OL-3498
Checked by : DW
Depth : 3.2 FT

Soil Description : MOIST MOTLED GRAY AND YELLOWISH BROWN CLAY
Remarks :

Specific Gravity : 2.65
Initial Void Ratio : 0.76
Final Void Ratio : 0.64

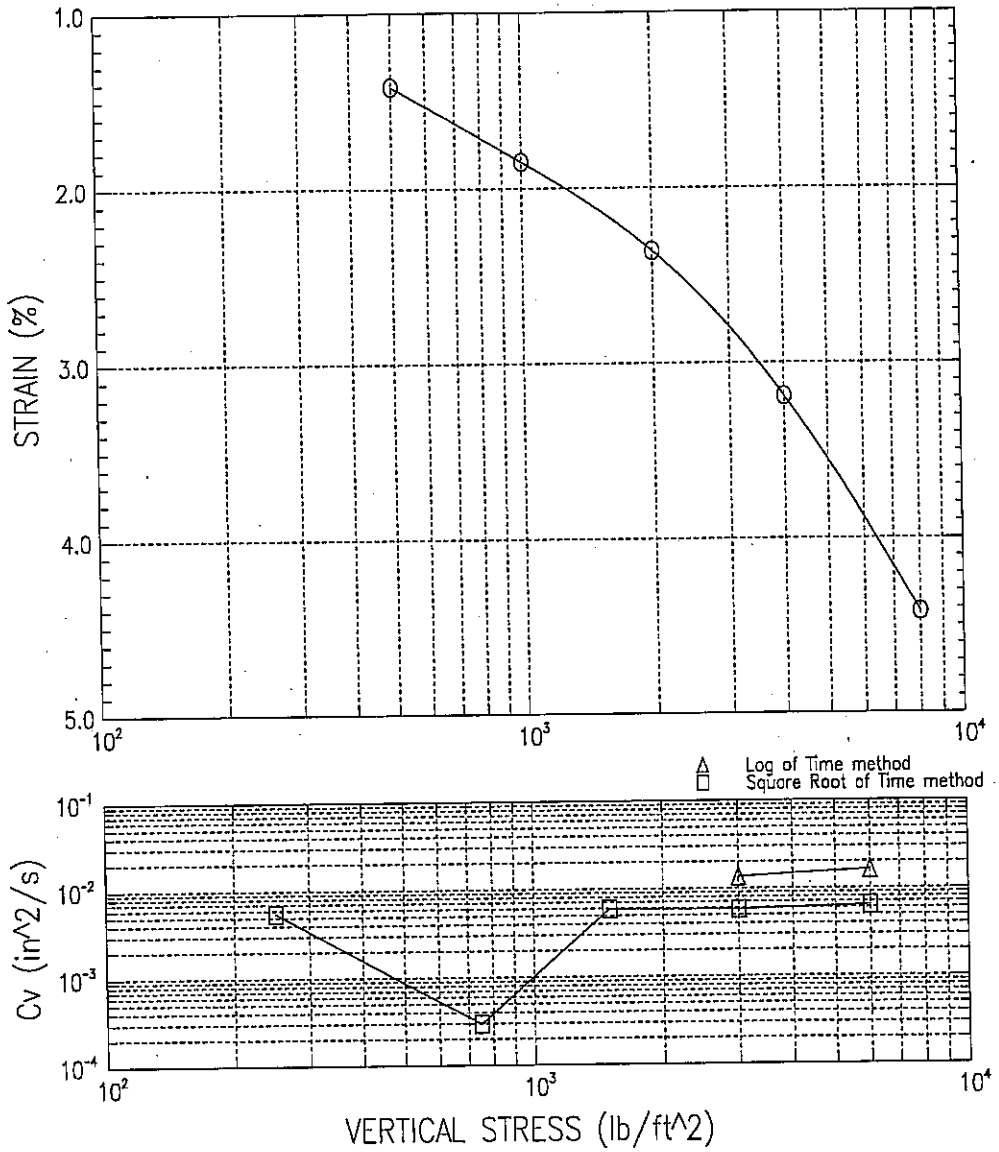
Liquid Limit : 0
Plastic Limit : 0
Plasticity Index : 0

Initial Height : 1.00 (in)
Sample Diameter : 2.50 (in)

	BEFORE CONSOLIDATION		AFTER CONSOLIDATION	
	TRIMMINGS	SPECIMEN + RING	SPECIMEN + RING	TRIMMINGS
CONTAINER NO.		RING	RING	
WT CONTAINER + WET SOIL (gm)	738.80	511.50	509.20	192.80
WT CONTAINER + DRY SOIL (gm)	596.90	475.94	475.94	159.60
WT CONTAINER (gm)	84.60	354.80	354.80	38.70
WT DRY SOIL (gm)	512.30	121.14	121.14	120.90
WATER CONTENT (%)	27.70	29.36	27.46	27.46
VOID RATIO	------	0.76	0.64	------
DEGREE OF SATURATION (%)	------	102.41	114.26	------
DRY DENSITY (lb/ft^3)	------	94.01	101.07	------

CONSOLIDATION TEST

SUMMARY REPORT



Washington State D.O.T.
Project Name : SR-520 TO SAHALEE WAY NE
Project No : OL-3498 Boring No : H-16-02 Sample No : S-4
Test Date : 7/5/02 Test No : 4472S4C Depth : 8.2 FT
Description : WET DARK GRAY SANDY SILT
Remarks :

CONSOLIDATION TEST DATA

Project : SR-520 TO SAHALEE WAY NE
Boring No.: H-16-02
Sample No.: S-4
Test No. : 4472S4C

Location : SR-202
Tested by : LHB
Test Date : 7/5/02
Sample Type: SHELBY

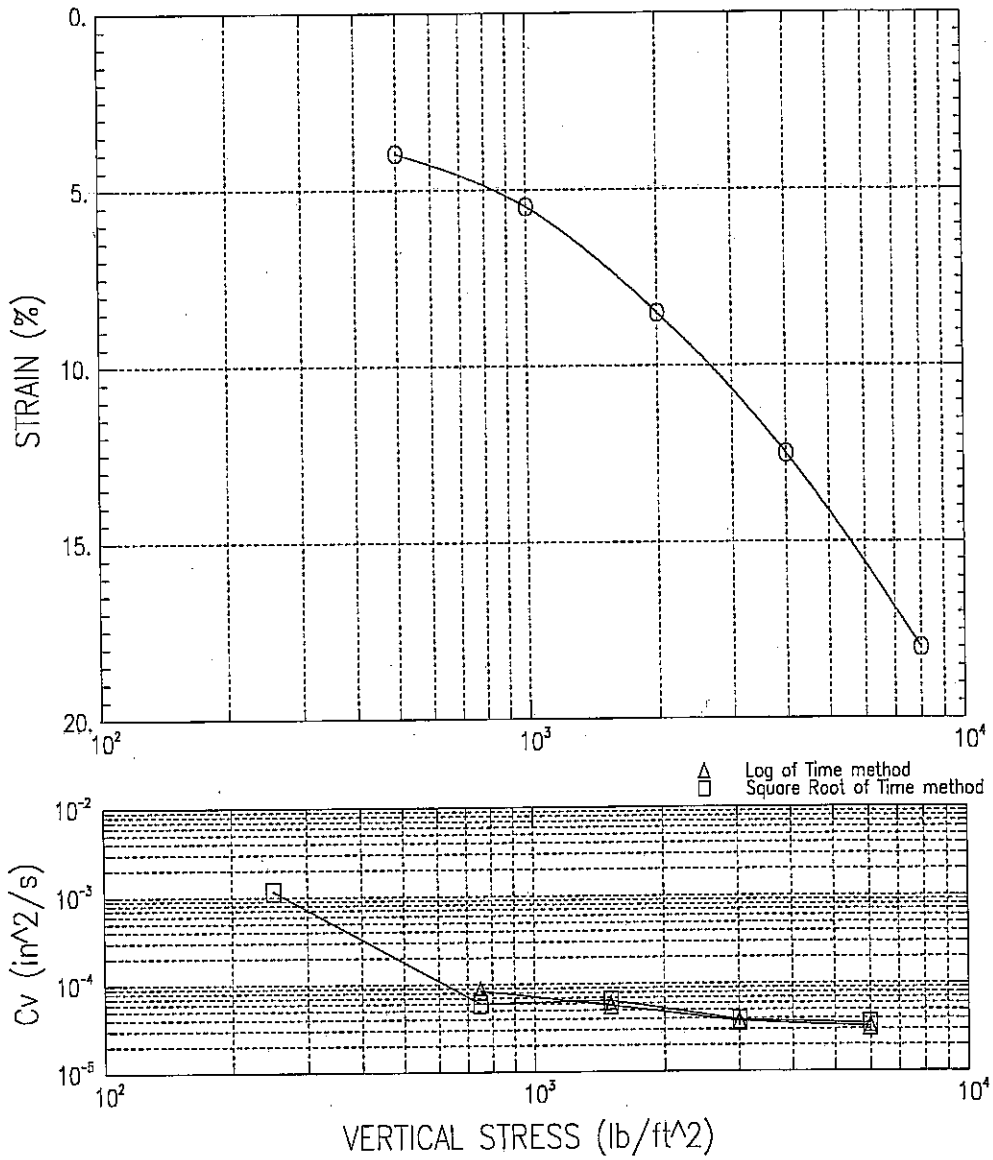
Project No.: OL-3498
Checked by : DW
Depth : 8.2 FT

Soil Description : WET DARK GRAY SANDY SILT
Remarks :

	APPLIED PRESSURE (lb/ft^2)	FINAL DISPLACEMENT (in)	VOID RATIO	STRAIN AT END (%)	FITTING T50 TIME (min) SQ.RT.	LOG	COEFFICIENT OF CONSOLIDATION (in^2/s) SQ.RT.	LOG	AVE
1)	500.0	0.014	-0.014	1.42	0.1	0.0	5.51E-003	0.00E+000	5.51E-003
2)	1000.0	0.019	-0.019	1.85	2.7	0.0	2.95E-004	0.00E+000	2.95E-004
3)	2000.0	0.024	-0.024	2.36	0.1	0.0	5.91E-003	0.00E+000	5.91E-003
4)	4000.0	0.032	-0.032	3.19	0.1	0.1	5.75E-003	1.36E-002	9.65E-003
5)	8000.0	0.044	-0.044	4.42	0.1	0.0	6.40E-003	1.62E-002	1.13E-002

CONSOLIDATION TEST

SUMMARY REPORT



Washington State D.O.T.
Project Name : SR-520 TO SAHALEE WAY NE
Project No : OL-3498 Boring No : H-36-02 Sample No : S-1
Test Date : 12/31/02 Test No : 4611S1C Depth : 6.7 FT
Description : MOIST DARK GRAY ELASTIC SILT WITH ORGANICS
Remarks :

CONSOLIDATION TEST DATA

Project : SR-520 TO SAHALEE WAY NE
Location : SR-202
Project No.: OL-3498
Boring No.: H-36-02
Tested by : LHB
Checked by : DAW
Sample No.: S-1
Test Date : 12/31/02
Depth : 6.7 FT
Test No. : 4611S1C
Sample Type: SHELBY

Soil Description : MOIST DARK GRAY ELASTIC SILT WITH ORGANICS
Remarks :

	APPLIED PRESSURE (lb/ft^2)	FINAL DISPLACEMENT (in)	VOID RATIO	STRAIN AT END (%)	FITTING T50 TIME (min) SQ.RT.	LOG	COEFFICIENT OF CONSOLIDATION (in^2/s) SQ.RT.	LOG	AVE
1)	500.0	0.030	1.866	3.97	0.4	0.0	1.16E-003	0.00E+000	1.16E-003
2)	1000.0	0.041	1.821	5.48	7.0	5.0	6.01E-005	8.47E-005	7.24E-005
3)	2000.0	0.064	1.730	8.50	6.2	7.0	6.49E-005	5.69E-005	6.09E-005
4)	4000.0	0.094	1.611	12.50	9.6	10.0	3.86E-005	3.70E-005	3.78E-005
5)	8000.0	0.135	1.447	18.01	9.5	10.3	3.48E-005	3.21E-005	3.34E-005

CONSOLIDATION TEST DATA

Project : SR-520 TO SAHALEE WAY NE
Boring No.: H-36-02
Sample No.: S-1
Test No. : 4611S1C

Location : SR-202
Tested by : LHB
Test Date : 12/31/02
Sample Type: SHELBY

Project No.: OL-3498
Checked by : DAW
Depth : 6.7 FT

Soil Description : MOIST DARK GRAY ELASTIC SILT WITH ORGANICS
Remarks :

Specific Gravity : 2.65
Initial Void Ratio : 1.98
Final Void Ratio : 1.45

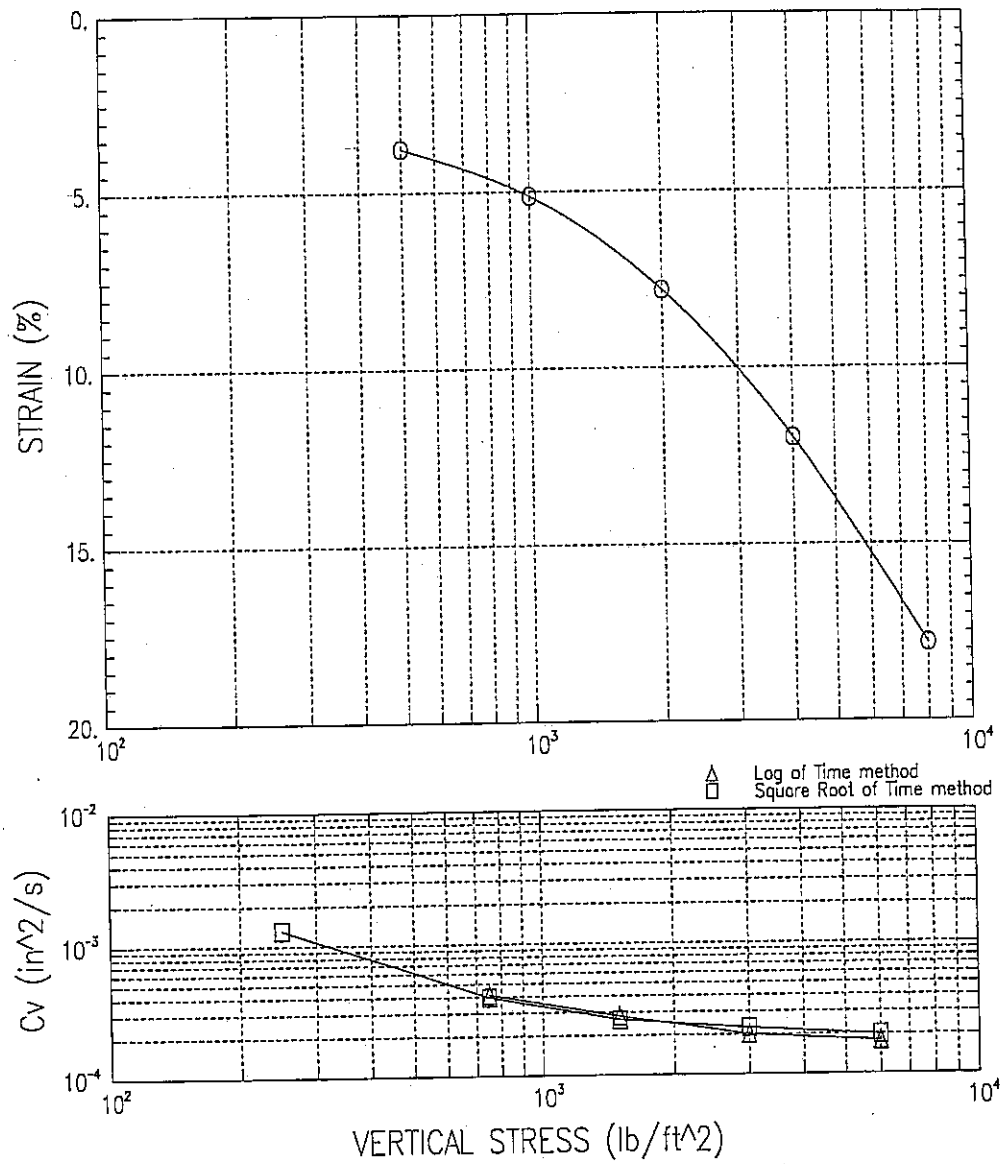
Liquid Limit : 68
Plastic Limit : 52
Plasticity Index : 16

Initial Height : 0.75 (in)
Sample Diameter : 2.88 (in)

	BEFORE CONSOLIDATION		AFTER CONSOLIDATION	
	TRIMMINGS	SPECIMEN + RING	SPECIMEN + RING	TRIMMINGS
CONTAINER NO.		RING	RING	
WT CONTAINER + WET SOIL (gm)	494.80	1472.80	1462.70	152.20
WT CONTAINER + DRY SOIL (gm)	319.80	1419.90	1419.90	109.40
WT CONTAINER (gm)	84.50	1348.80	1348.80	38.30
WT DRY SOIL (gm)	235.30	71.10	71.10	71.10
WATER CONTENT (%)	74.37	74.40	60.20	60.20
VOID RATIO	------	1.98	1.45	------
DEGREE OF SATURATION (%)	------	99.37	110.10	------
DRY DENSITY (lb/ft^3)	------	55.44	67.56	------

CONSOLIDATION TEST

SUMMARY REPORT



Washington State D.O.T.
Project Name : SAHALEE WAY NE
Project No : OL-3498 Boring No : H-28-02 Sample No : S-3
Test Date : 5/17/02 Test No : 4374S3C Depth : 11.17
Description : VERY DARK GRAY MOIST ELASTIC SILT
Remarks :

CONSOLIDATION TEST DATA

Project : SAHALEE WAY NE
Boring No.: H-28-02
Sample No.: S-3
Test No. : 4374S3C

Location : SR-202
Tested by : LHB
Test Date : 5/17/02
Sample Type: SHELBY

Project No.: OL-3498
Checked by : DW
Depth : 11.17

Soil Description : VERY DARK GRAY MOIST ELASTIC SILT
Remarks :

	APPLIED PRESSURE (lb/ft^2)	FINAL DISPLACEMENT (in)	VOID RATIO	STRAIN AT END (%)	FITTING T50 TIME (min) SQ.RT.	LOG	COEFFICIENT OF CONSOLIDATION (in^2/s) SQ.RT.	LOG	AVE
1)	500.0	0.024	5.708	3.78	0.2	0.0	1.31E-003	0.00E+000	1.31E-003
2)	1000.0	0.032	5.614	5.13	0.7	0.7	3.95E-004	4.14E-004	4.05E-004
3)	2000.0	0.049	5.428	7.79	1.1	1.0	2.63E-004	2.80E-004	2.72E-004
4)	4000.0	0.075	5.135	11.99	1.2	1.3	2.26E-004	2.01E-004	2.13E-004
5)	8000.0	0.111	4.730	17.81	1.2	1.3	1.98E-004	1.78E-004	1.88E-004

CONSOLIDATION TEST DATA

Project : SAHALEE WAY NE
Boring No.: H-28-02
Sample No.: S-3
Test No. : 4374S3C

Location : SR-202
Tested by : LHB
Test Date : 5/17/02
Sample Type: SHELBY

Project No.: OL-3498
Checked by : DW
Depth : 11.17

Soil Description : VERY DARK GRAY MOIST ELASTIC SILT
Remarks :

Specific Gravity : 2.65
Initial Void Ratio : 5.97
Final Void Ratio : 4.73

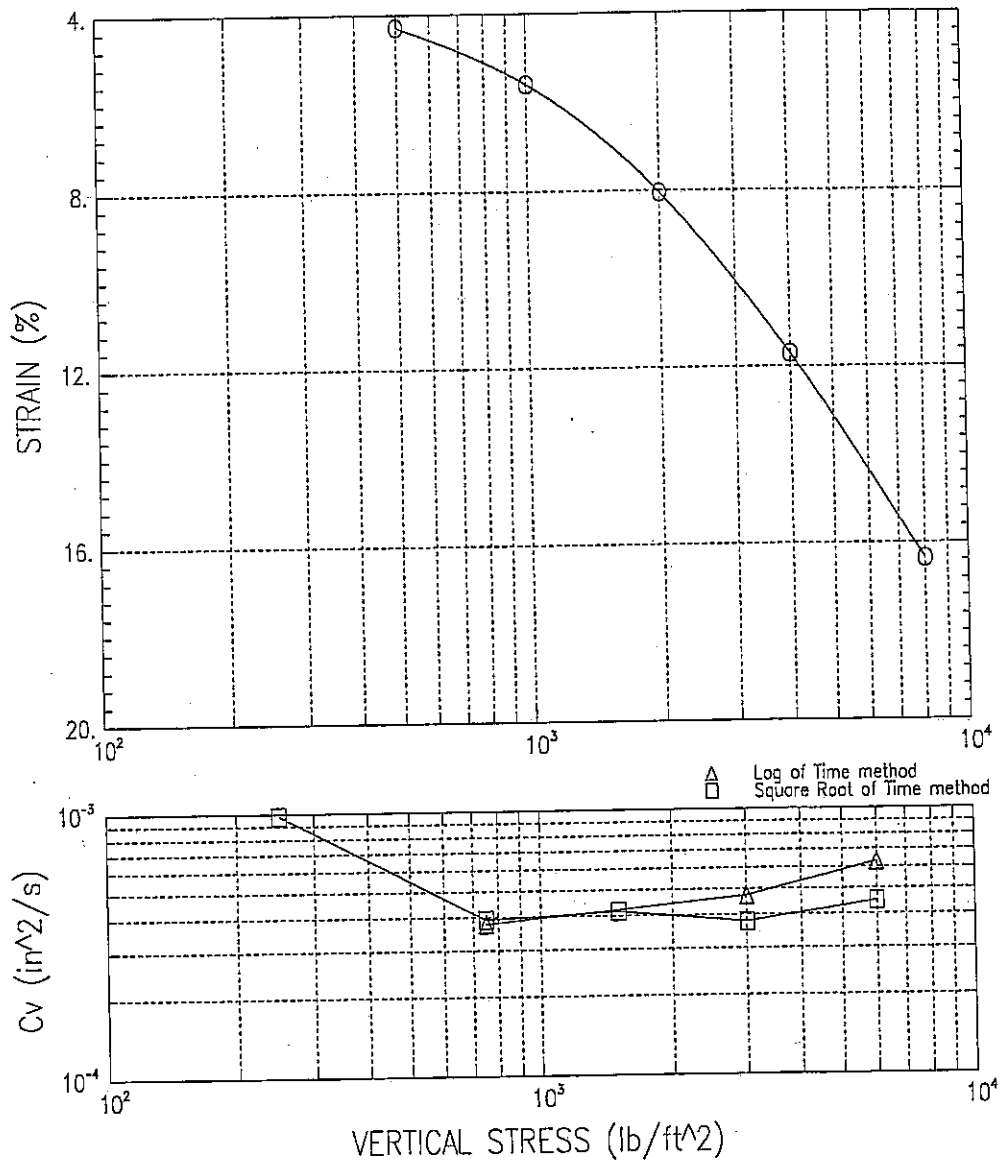
Liquid Limit : 74
Plastic Limit : 47
Plasticity Index : 27

Initial Height : 0.63 (in)
Sample Diameter : 2.88 (in)

	BEFORE CONSOLIDATION		AFTER CONSOLIDATION	
	TRIMMINGS	SPECIMEN + RING	SPECIMEN + RING	TRIMMINGS
CONTAINER NO.		RING	RING	
WT CONTAINER + WET SOIL (gm)	326.60	413.30	410.20	78.80
WT CONTAINER + DRY SOIL (gm)	232.50	395.26	395.26	63.90
WT CONTAINER (gm)	82.70	369.90	369.90	38.60
WT DRY SOIL (gm)	149.80	25.36	25.36	25.30
WATER CONTENT (%)	62.82	71.12	58.89	58.89
VOID RATIO	------	5.97	4.74	------
DEGREE OF SATURATION (%)	------	31.56	32.95	------
DRY DENSITY (lb/ft^3)	------	23.73	28.84	------

CONSOLIDATION TEST

SUMMARY REPORT



Washington State D.O.T.
Project Name : SAHALEE WAY NE
Project No : OL-3498 Boring No : H-28-02 Sample No : S-5
Test Date : 5/20/02 Test No : 4374S5C Depth : 16.17 FT
Description : MOIST GRAY SILT
Remarks :

CONSOLIDATION TEST DATA

Project : SAHALEE WAY NE
Boring No.: H-28-02
Sample No.: S-5
Test No. : 4374S5C

Location : SR-202
Tested by : LHB
Test Date : 5/20/02
Sample Type: SHELBY

Project No.: OL-3498
Checked by : DW
Depth : 16.17 FT

Soil Description : MOIST GRAY SILT
Remarks :

Specific Gravity : 2.65
Initial Void Ratio : 3.78
Final Void Ratio : 3.00

Liquid Limit : 44
Plastic Limit : 27
Plasticity Index : 17

Initial Height : 0.63 (in)
Sample Diameter : 2.88 (in)

	BEFORE CONSOLIDATION		AFTER CONSOLIDATION	
	TRIMMINGS	SPECIMEN + RING	SPECIMEN + RING	TRIMMINGS
CONTAINER NO.		RING	RING	
WT CONTAINER + WET SOIL (gm)	363.80	421.90	419.80	88.40
WT CONTAINER + DRY SOIL (gm)	284.80	406.90	406.90	75.50
WT CONTAINER (gm)	82.80	369.90	369.90	38.50
WT DRY SOIL (gm)	202.00	37.00	37.00	37.00
WATER CONTENT (%)	39.11	40.54	34.86	34.86
VOID RATIO	------	3.78	3.00	------
DEGREE OF SATURATION (%)	------	28.43	30.78	------
DRY DENSITY (lb/ft^3)	------	34.62	41.35	------

Thu Feb 20 10:14:39 2003

CONSOLIDATION TEST DATA

Project : SAHALEE WAY NE
Boring No.: H-28-02
Sample No.: S-5
Test No. : 4374S5C

Location : SR-202
Tested by : LHB
Test Date : 5/20/02
Sample Type: SHELBY

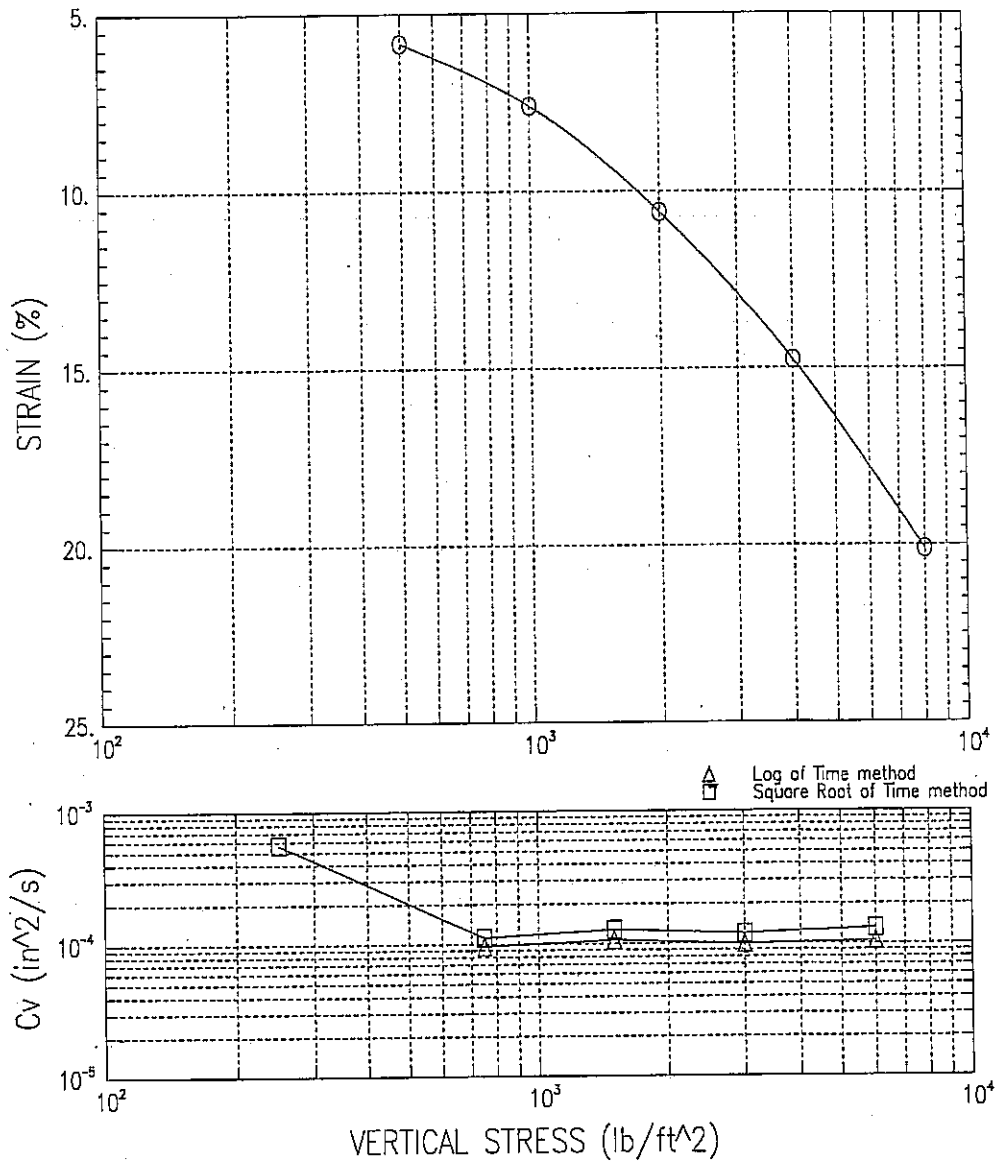
Project No.: OL-3498
Checked by : DW
Depth : 16.17 FT

Soil Description : MOIST GRAY SILT
Remarks :

	APPLIED PRESSURE (lb/ft^2)	FINAL DISPLACEMENT (in)	VOID RATIO	STRAIN AT END (%)	FITTING T50 TIME (min) SQ.RT.	LOG	COEFFICIENT OF CONSOLIDATION (in^2/s) SQ.RT.	LOG	AVE
1)	500.0	0.027	3.574	4.28	0.3	0.0	9.80E-004	0.00E+000	9.80E-004
2)	1000.0	0.035	3.511	5.59	0.7	0.8	3.92E-004	3.77E-004	3.85E-004
3)	2000.0	0.050	3.394	8.05	0.7	0.0	4.15E-004	0.00E+000	4.15E-004
4)	4000.0	0.073	3.219	11.71	0.7	0.6	3.77E-004	4.72E-004	4.25E-004
5)	8000.0	0.102	2.997	16.36	0.5	0.4	4.49E-004	6.29E-004	5.39E-004

CONSOLIDATION TEST

SUMMARY REPORT



Washington State D.O.T.
Project Name : SAHALEE WAY NE
Project No : OL-3498 Boring No : H-29-02 Sample No : S-4
Test Date : 5/22/02 Test No : 4375S4C Depth : 11.67 FT
Description : MOIST VERY DARK GRAY ELASTIC SILT
Remarks :

CONSOLIDATION TEST DATA

Project : SAHALEE WAY NE
Boring No.: H-29-02
Sample No.: S-4
Test No. : 4375S4C

Location : SR-202
Tested by : LHB
Test Date : 5/22/02
Sample Type: SHELBY

Project No.: OL-3498
Checked by : DW
Depth : 11.67 FT

Soil Description : MOIST VERY DARK GRAY ELASTIC SILT
Remarks :

	APPLIED PRESSURE (lb/ft^2)	FINAL DISPLACEMENT (in)	VOID RATIO	STRAIN AT END (%)	FITTING T50 TIME (min) SQ.RT.	LOG	COEFFICIENT OF CONSOLIDATION (in^2/s) SQ.RT.	LOG	AVE
1)	500.0	0.036	5.268	5.83	0.5	0.0	5.64E-004	0.00E+000	5.64E-004
2)	1000.0	0.048	5.150	7.60	2.5	2.9	1.12E-004	9.60E-005	1.04E-004
3)	2000.0	0.066	4.951	10.59	2.1	2.5	1.28E-004	1.07E-004	1.17E-004
4)	4000.0	0.092	4.673	14.76	2.1	2.5	1.19E-004	9.94E-005	1.09E-004
5)	8000.0	0.126	4.317	20.11	1.7	2.1	1.30E-004	1.04E-004	1.17E-004

CONSOLIDATION TEST DATA

Project : SAHALEE WAY NE
Boring No.: H-29-02
Sample No.: S-4
Test No. : 4375S4C

Location : SR-202
Tested by : LHB
Test Date : 5/22/02
Sample Type: SHELBY

Project No.: OL-3498
Checked by : DW
Depth : 11.67 FT

Soil Description : MOIST VERY DARK GRAY ELASTIC SILT
Remarks :

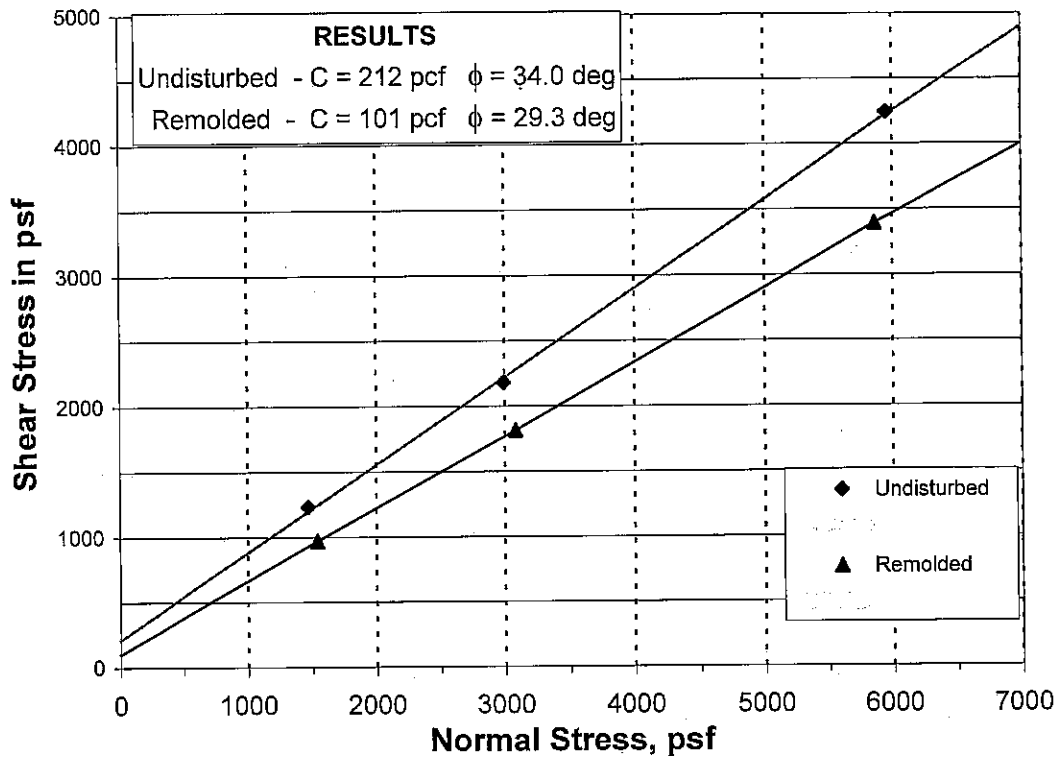
Specific Gravity : 2.65
Initial Void Ratio : 5.66
Final Void Ratio : 4.32

Liquid Limit : 73
Plastic Limit : 44
Plasticity Index : 29

Initial Height : 0.63 (in)
Sample Diameter : 2.88 (in)

	BEFORE CONSOLIDATION		AFTER CONSOLIDATION	
	TRIMMINGS	SPECIMEN + RING	SPECIMEN + RING	TRIMMINGS
CONTAINER NO.		RING	RING	
WT CONTAINER + WET SOIL (gm)	313.60	414.40	410.60	79.10
WT CONTAINER + DRY SOIL (gm)	226.10	396.47	396.47	65.00
WT CONTAINER (gm)	84.50	369.90	369.90	38.50
WT DRY SOIL (gm)	141.60	26.57	26.57	26.50
WATER CONTENT (%)	61.79	67.51	53.21	53.21
VOID RATIO	------	5.66	4.32	------
DEGREE OF SATURATION (%)	------	31.63	32.61	------
DRY DENSITY (lb/ft^3)	------	24.86	31.08	------

WASHINGTON STATE DOT
DIRECT SHEAR TEST REPORT



		Undisturbed Test Results			Remolded Test Results		
SAMPLE NO. :		1	2	3	1	2	3
INITIAL	Water Content, %	33.7	33.7	33.7	33.7	33.7	33.7
	Dry Density, pcf	86.9	87.2	88.0	86.7	87.2	88.0
	Saturation, %	98.8	99.6	101.7	98.5	99.6	101.7
	Void Ratio	0.905	0.898	0.879	0.907	0.898	0.879
	Diameter, inches	2.880	2.880	2.880	2.880	2.880	2.880
	Height, inches	0.731	0.762	0.745	0.731	0.762	0.745
CONSOLIDATED	Water Content, %	35.4	33.4	31.4	35.4	33.4	31.4
	Dry Density, pcf	85.4	85.7	86.2	85.3	85.7	88.0
	Saturation, %	100.2	94.9	90.6	100.0	94.9	90.6
	Void Ratio	0.937	0.931	0.919	0.940	0.931	0.919
	Diameter, inches	2.880	2.880	2.880	2.880	2.880	2.880
	Height, inches	0.743	0.775	0.761	0.743	0.775	0.761
	Normal Stress, psf	1470	2993	5957	1534	3126	5891
	Failure Stress, psf	1233	2182	4242	981	1817	3393
	Displacement, inches	0.13	0.29	0.23	0.17	0.16	0.21
	Strain Rate, %/min	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017

SAMPLE TYPE : SHELBY TUBE
DESCRIPTION : Moist Olive Silt

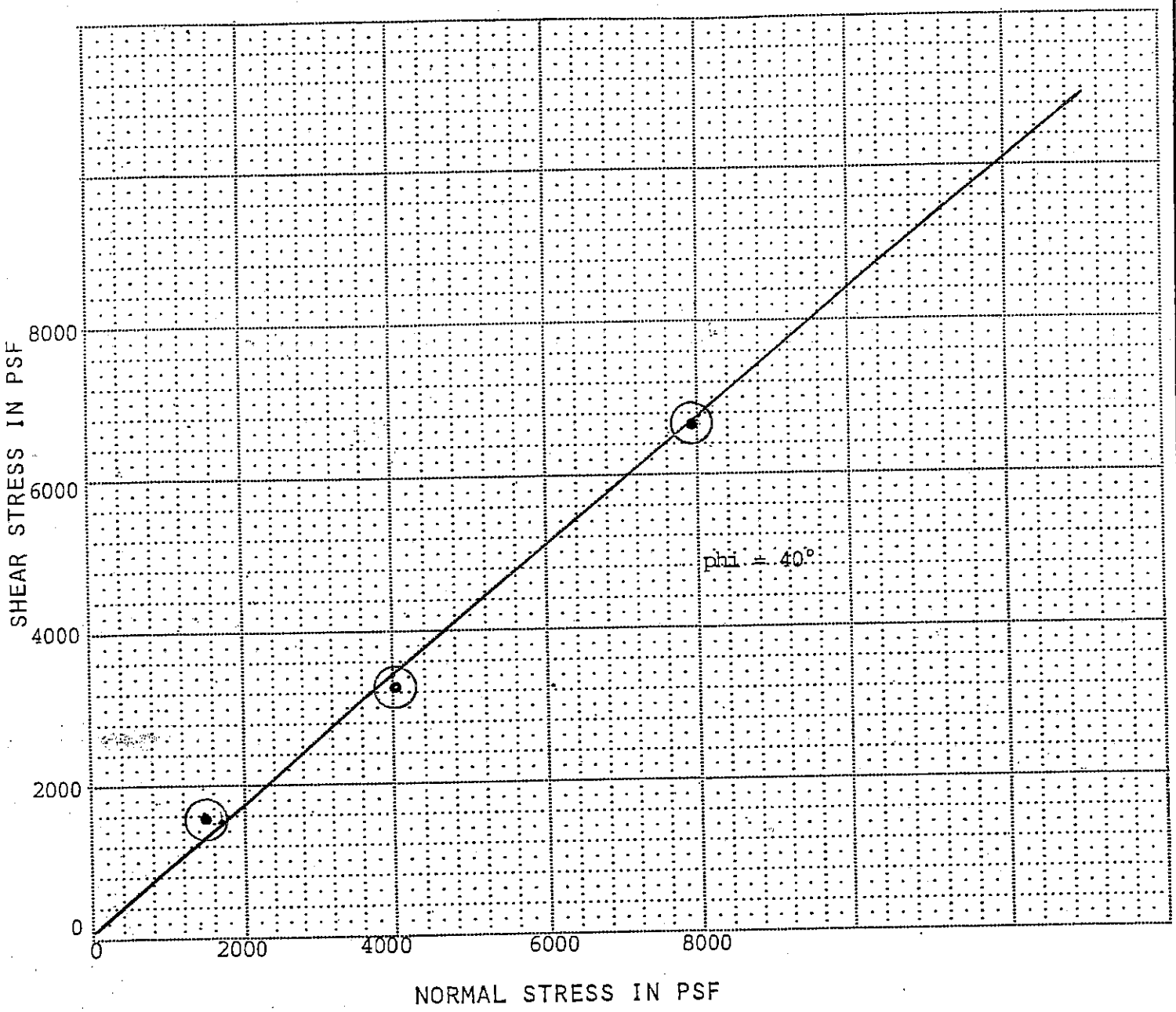
SPECIFIC GAVITY = 2.65

PROJECT : SR-202 - SR-520 to Sahalee Way NE

SAMPLE LOCATION : H-25-02
S-6
Depth = 14.0 -16.0 ft

PROJECT NUMBER : OL-3498 DATE : 8/2/2002

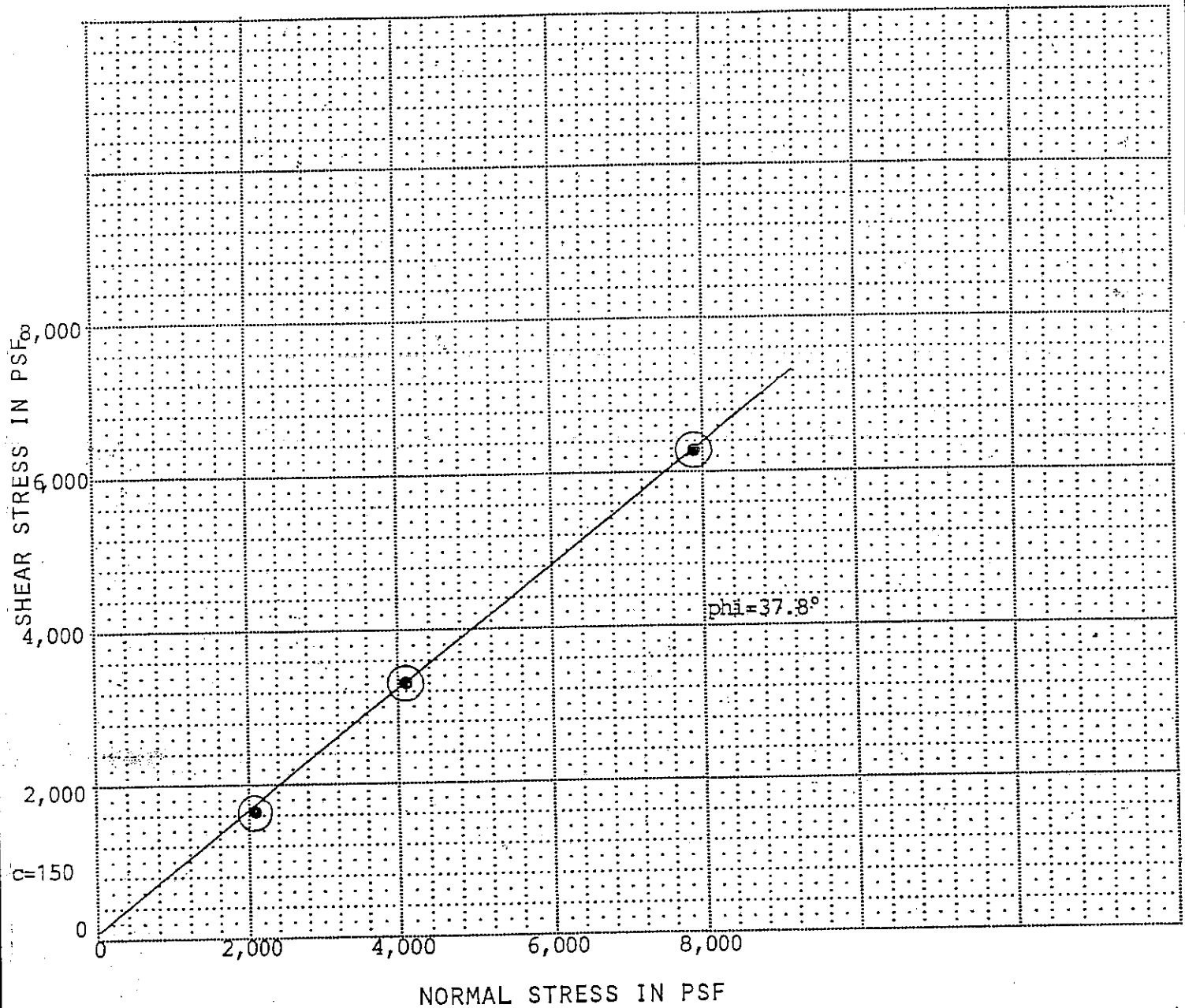
DIRECT SHEAR TEST RESULTS



HOLE NO.	DEPTH (FT)	WATER CONTENT%	DRY (PCF) DENSITY	NORMAL PSF PRESSURE	YIELD PSF STRESS	PEAK PSF STRESS	SOIL CLASSIFICATION
B-1: s-14		21.5	102.4	1776		1562	SP
B-1: s-14		21.9	102.1	4025		3259	SP
B-1: s-14		21.4	102.5	7882		6615	SP

HONG WEST & ASSOCIATES

DIRECT SHEAR TEST RESULTS

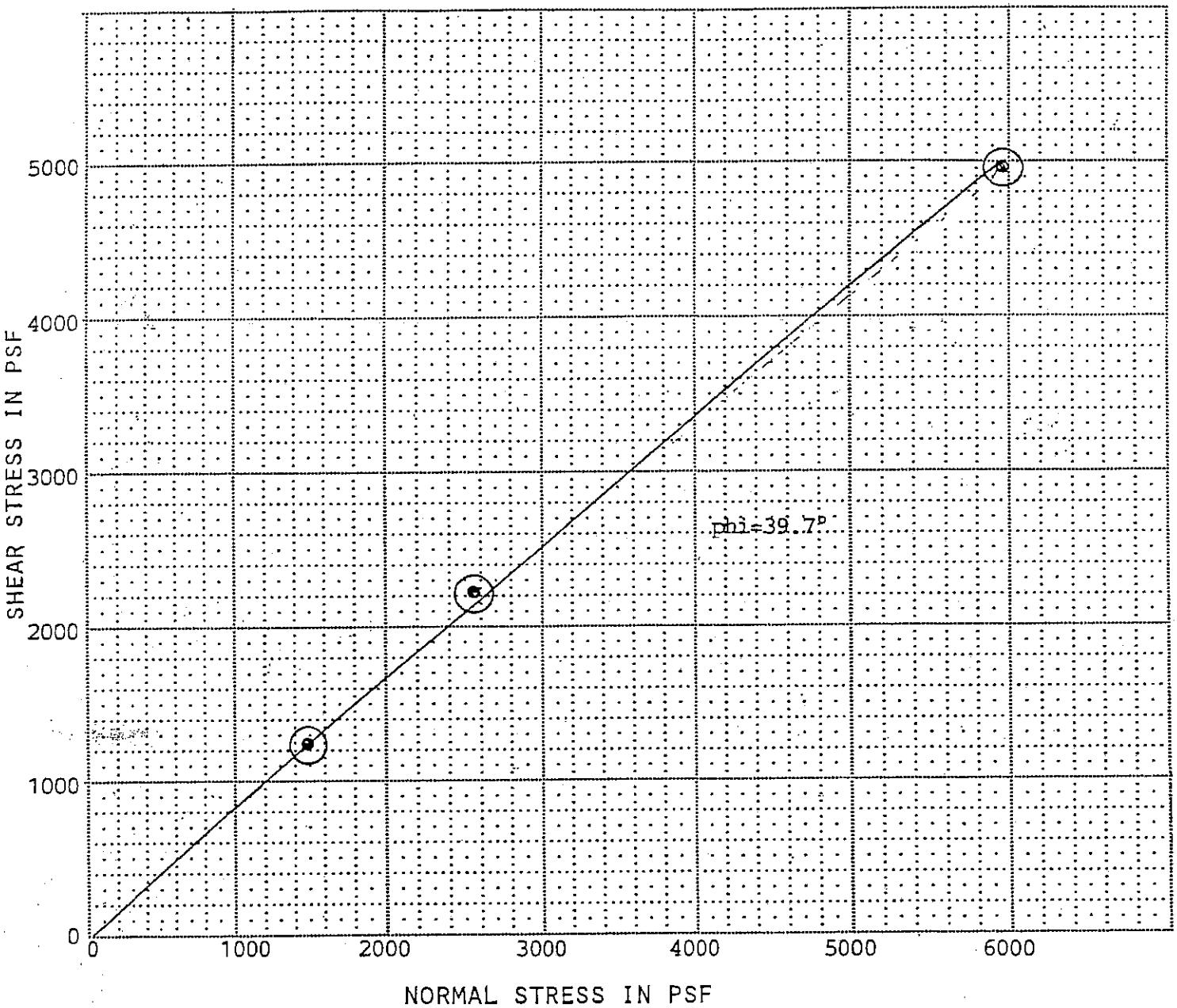


HOLE NO.	DEPTH (FT)	WATER CONTENT%	DRY (PCF) DENSITY	NORMAL PSF PRESSURE	YIELD PSF STRESS	PEAK PSF STRESS	SOIL CLASSIFICATION
B-6: S-9	40-41.5'	21%	101.4	2090		1810.2	(SM)
B-6: S-9	40-41.5'	20.9%	101.4	4025		3321.8	(SM)
B-6: S-9	40-41.5'	20.5%	102.0	7882		6269.6	(SM)

HONG WEST & ASSOCIATES

SR202 PROJET NUMBER 92019

DIRECT SHEAR TEST RESULTS



HOLE NO.	DEPTH (FT)	WATER CONTENT%	DRY (PCF) DENSITY	NORMAL PSF PRESSURE	YIELD PSF STRESS	PEAK PSF STRESS	SOIL CLASSIFICATION
B-8, S-10	50-51.5'	17.5	105.3	1462		1244.5	SP
B-8, S-10	50-51.5'	17.5	103.4	2768		2240.7	SP
B-8, S-10	50-51.5'	17.5	103.6	5949		4946.6	SP

HONG WEST & ASSOCIATES

Project	SR 520		
Project No.	e Way Additional Lanes		
Boring No.	SS-2-03		
Sample No.	1	depth	2'-3'
Station	116+40	Offset	195' Rt.

US Sieve (in / #)	Metric Sieve (mm)	Percent Passing
6	152.5	100
4	101.6	100
2	50.8	100
1 1/2	38.1	96
1 1/4	31.75	94
3/4	19.05	86
3/8	9.5	77
4	4.75	69
10	2	58
20	0.85	33
40	0.425	12
80	0.18	5
200	0.075	4.1

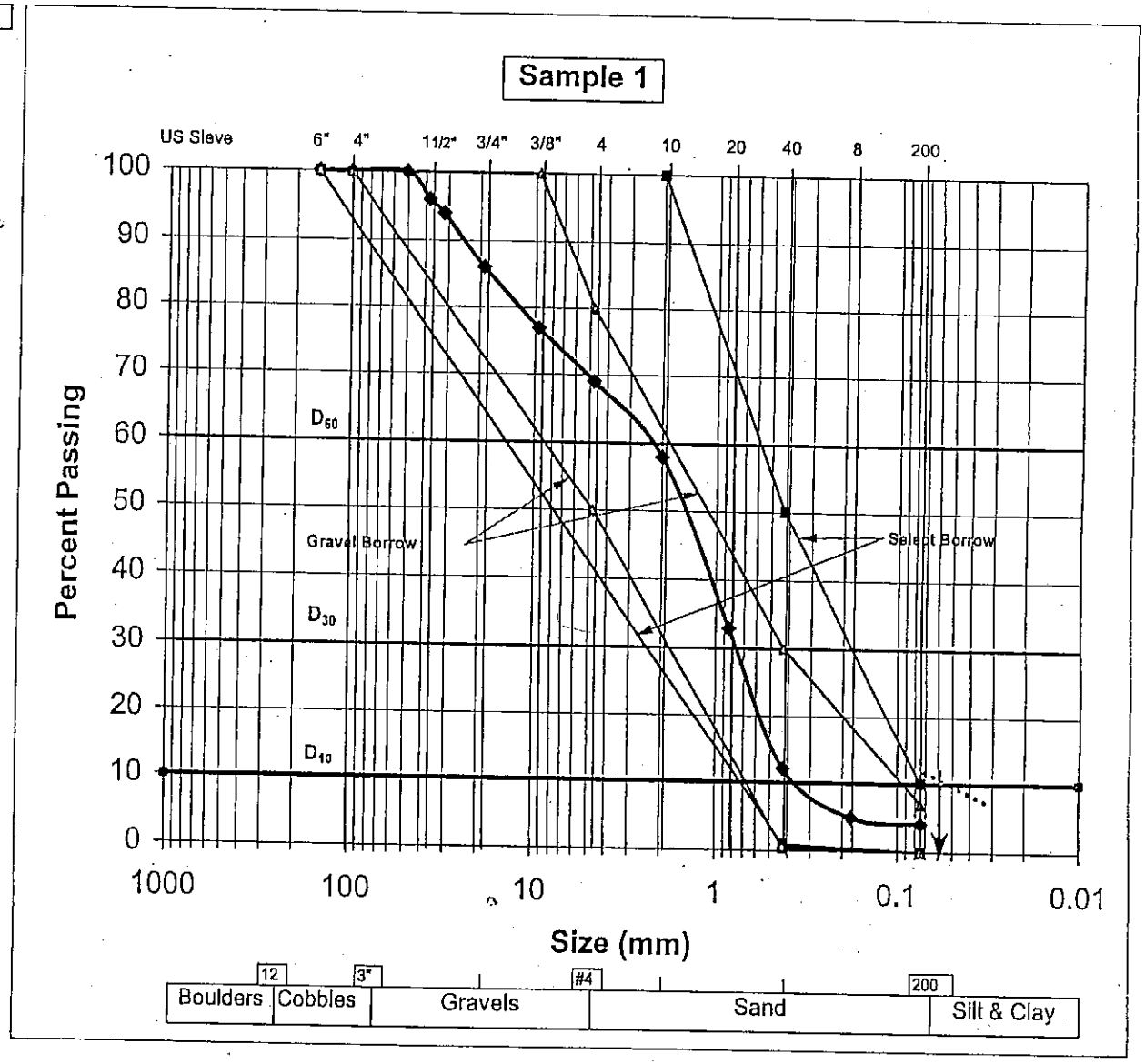
	D10 (mm)	WSDOT Recommended Infiltration Rate (in/hr)	WSDOT Recommended Infiltration Rate (cm/sec)
2001 DOE	0.300	6.3	4.42E-03
Silty Inflow, Lower Bound	0.300	1.9	1.32E-03
Filtered Inflow, Upper Bound	0.300	15.7	1.11E-02
98 WSDOT	0.300	5.6	3.97E-03
Average Value	0.300	7.9	5.61E-03

D60 (mm)	2.00
D30 (mm)	0.80
D10 (mm)	0.30

Coefficient of Uniformity	Cu =	6.67
Coefficient of Gradation	Cc =	1.07

Liquid Limit	LL =	
Plastic Limit	PL =	
Plasticity Index	PI =	

Soil Classification	SM



Project	SR 520		
Project No.	ee Way Additional Lanes		
Boring No.	SS-1-03		
Sample No.	1	depth	2'-3'
Station	115+65	Offset	60' Rt.

US Sieve (in / #)	Metric Sieve (mm)	Percent Passing
6	152.5	100
4	101.6	100
2	50.8	100
1 1/2	38.1	100
1 1/4	31.75	93
3/4	19.05	84
3/8	9.5	73
4	4.75	64
10	2	54
20	0.85	31
40	0.425	13
80	0.18	6
200	0.075	4.7

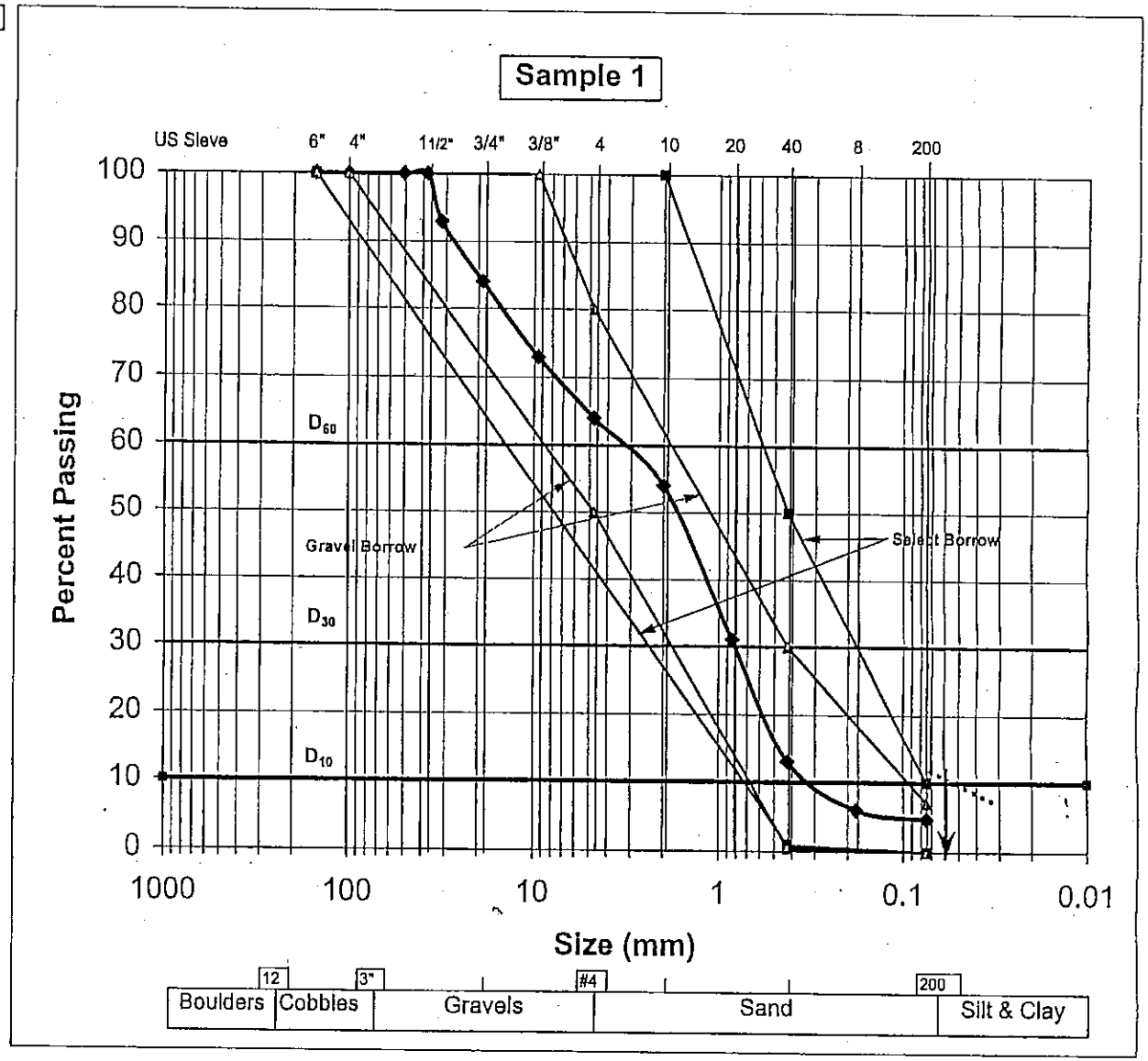
		WSDOT Recommanded	
	D10 (mm)	Infiltration Rate (in/hr)	Infiltration Rate (cm/sec)
2001 DOE	0.300	6.3	4.42E-03
Silty Inflow, Lower Bound	0.300	1.9	1.32E-03
Filtered Inflow, Upper Bound	0.300	15.7	1.11E-02
98 WSDOT	0.300	5.6	3.97E-03
Average Value	0.300	7.9	5.61E-03

D60 (mm)	3.00
D30 (mm)	0.80
D10 (mm)	0.30

Coefficient of Uniformity	Cu =	10.00
Coefficient of Gradation	Cc =	0.71

Liquid Limit	LL =	
Plastic Limit	PL =	
Plasticity Index	PI =	

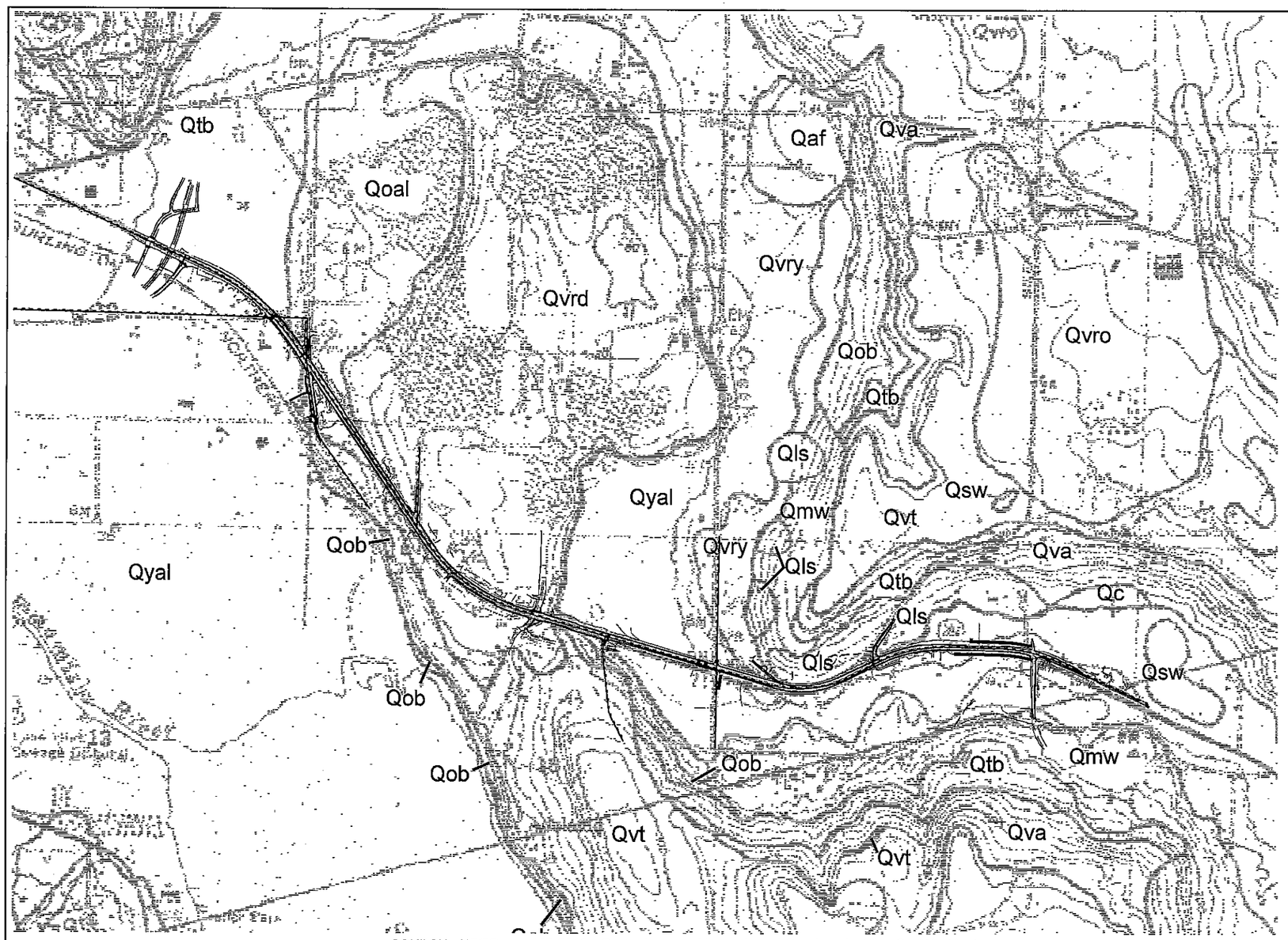
Soil Classification	SM



APPENDIX - D

Geology Figures

Figure D-1	Surficial Geology of Project Area
Figure D-2	Surficial Geology of Hillside
Figure D-3	Generalized Soil Cross-section at Station 217+00 Section A - A
Figure D-4	Generalized Soil Cross-section B - B



SOURCE: USGS map MF-2016; Geologic map of the redmond Quadrangle, King Co. Washington
by James P. Minard and Dereck B Buoth, 1988

Qyal ALLUVIUM (HOLOCENE)

Deposits in and among present streams; Organic-rich fine sand, silt, and clay. They are subject to seasonal flooding: Up to 39 feet thick.

Qoal OLDER ALLUVIUM (HOLOCENE)

Forms low terraces, low drainage divides or eroded base-of-slope accumumilations; Mostly well drained, oxidized, stream-laid sand and gravel ranges from 7 -33 feet in thickness.

Qsw SWAMP DEPOSITS (HOLOCENE)

Organic rich mud and weathered Till; 3 to 10 feet thick

Qls LANDSLIDE DEPOSITS (HOLOCENE)

Clay, silt, and gravel range from relative coherent blocks to intermixed debris

Qmw MASS WASTING DEPOSITS (HOLOCENE)

Areas of unstable ground on steep slopes; consists of in-situ weathering products, colluvium, deformed mass flowage products, small block slide, alluvium of small streams

Qvry YOUNGER RECESSIONAL OUTWASH (FRASER AGE)

Qvrd REDMOND DELTA RECESSIONAL OUTWASH (FRASER AGE)

Beds of sand and pebble to cobble-sized, alternate and dip steeply westward; more than 130 feet thick

Qvt TILL (FRASER AGE)

Non-sorted mixture of clay, silt, sand, pebbles, cobbles, and boulders in variable amounts; Genrally sandy, but locally contains much clay; Highly compacted; Approximately 5 to 45 feet thick

Qtb TRANSITIONAL BEDS (FRASER GLACIATION AND OLYMPIA INTERGLACIATION)

Glacial and non-glacial deposits underlying advance outwash deposits, consisting mostly of laminated or thin bedded to thick bedded blocky jointed clay and silty clay in the lower part, grading up into silt to very fine-grained massive sand in the upper part. Up to 220ft thick.

Qob OLYMPIA BEDS (OLYMPIA INTERGLACIATION

Mostly oxidized fine- to very coarse-grained, compact sand with minor thin silt-clay beds, Occasionally contains beds and lenses of sandy gravel to gravelly sand in the lower part; Up to 150 feet thick

JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

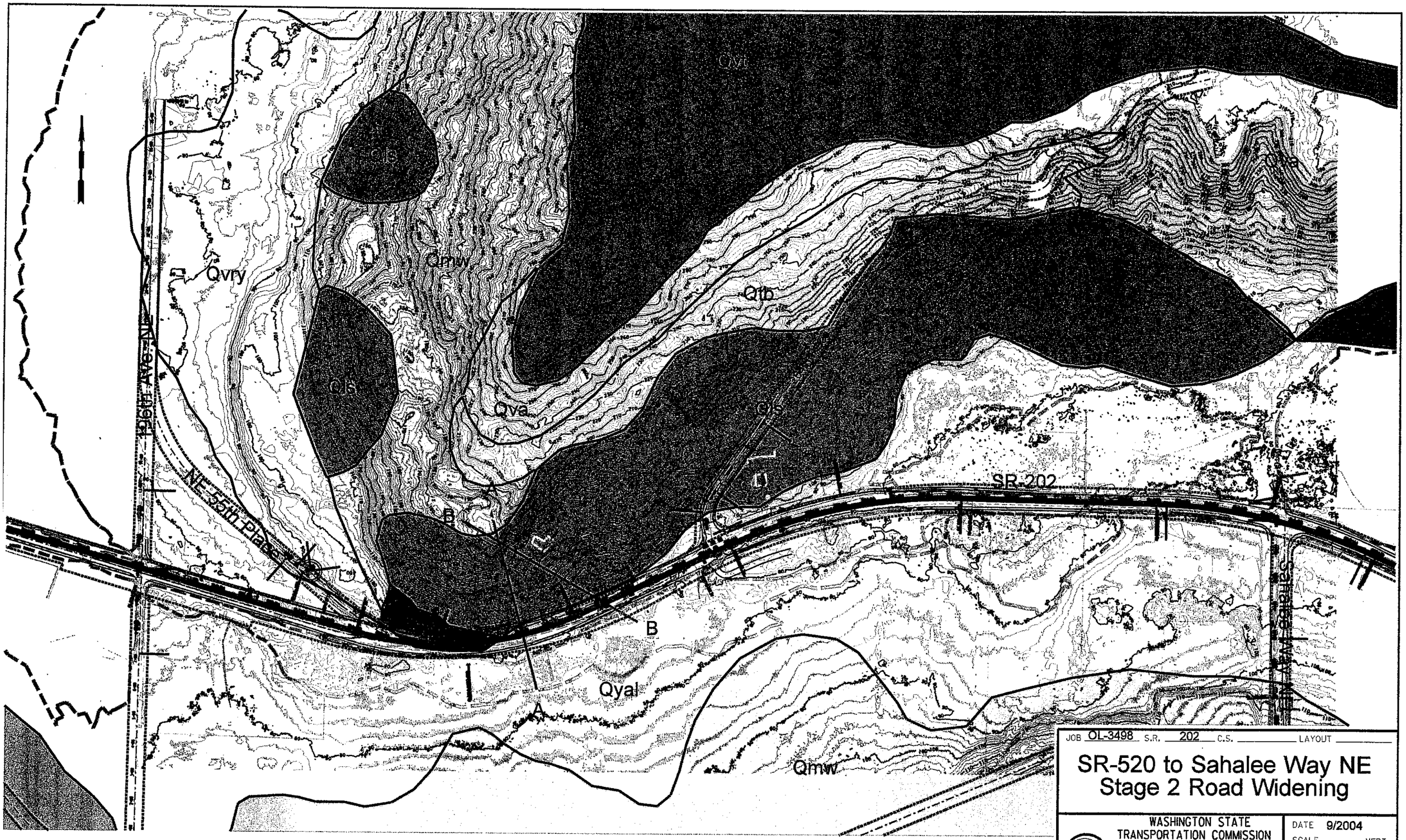
SR 520 TO SAHALEE WAY NE
STAGE 1 ROADWAY WIDENING

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 6/2004
SCALE 1"=1500' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure D-1: Surficial Geology of Project Area

...\3-12-03\geofig.dgn 10/28/2004 12:29:16 PM



JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR-520 to Sahalee Way NE
Stage 2 Road Widening

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 9/2004
SCALE 1"=300' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure D-2: Surficial Geology of Hillside

..\3-12-03\geocolors.dgn 09/27/2004 09:24:26 AM

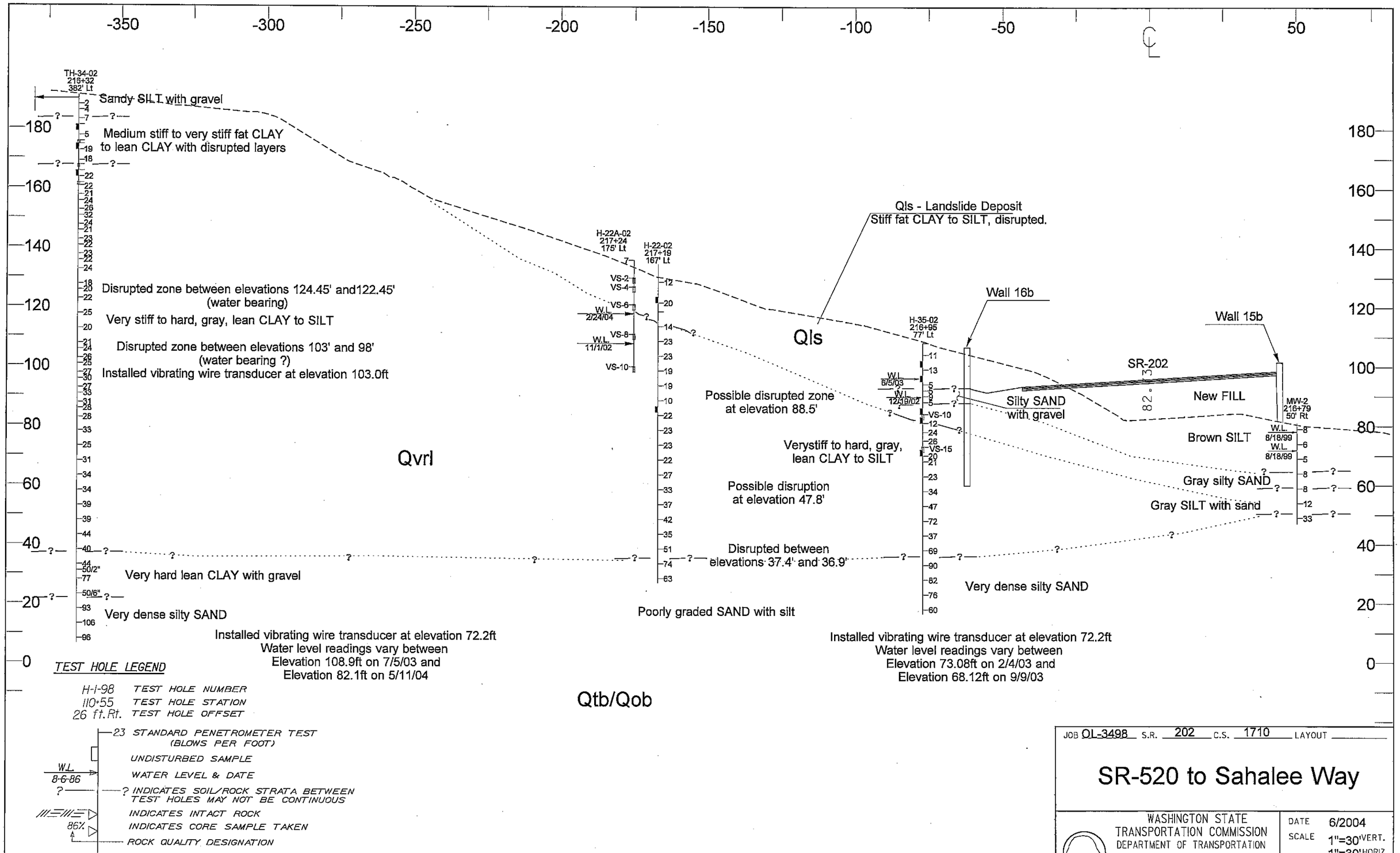


Figure D-3: Generalized Soil Cross-section A-A at Station 217+00

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR-520 to Sahalee Way

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 6/2004
SCALE 1"=30' VERT.
1"=30' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\217.dgn 11/08/2004 12:06:09 PM

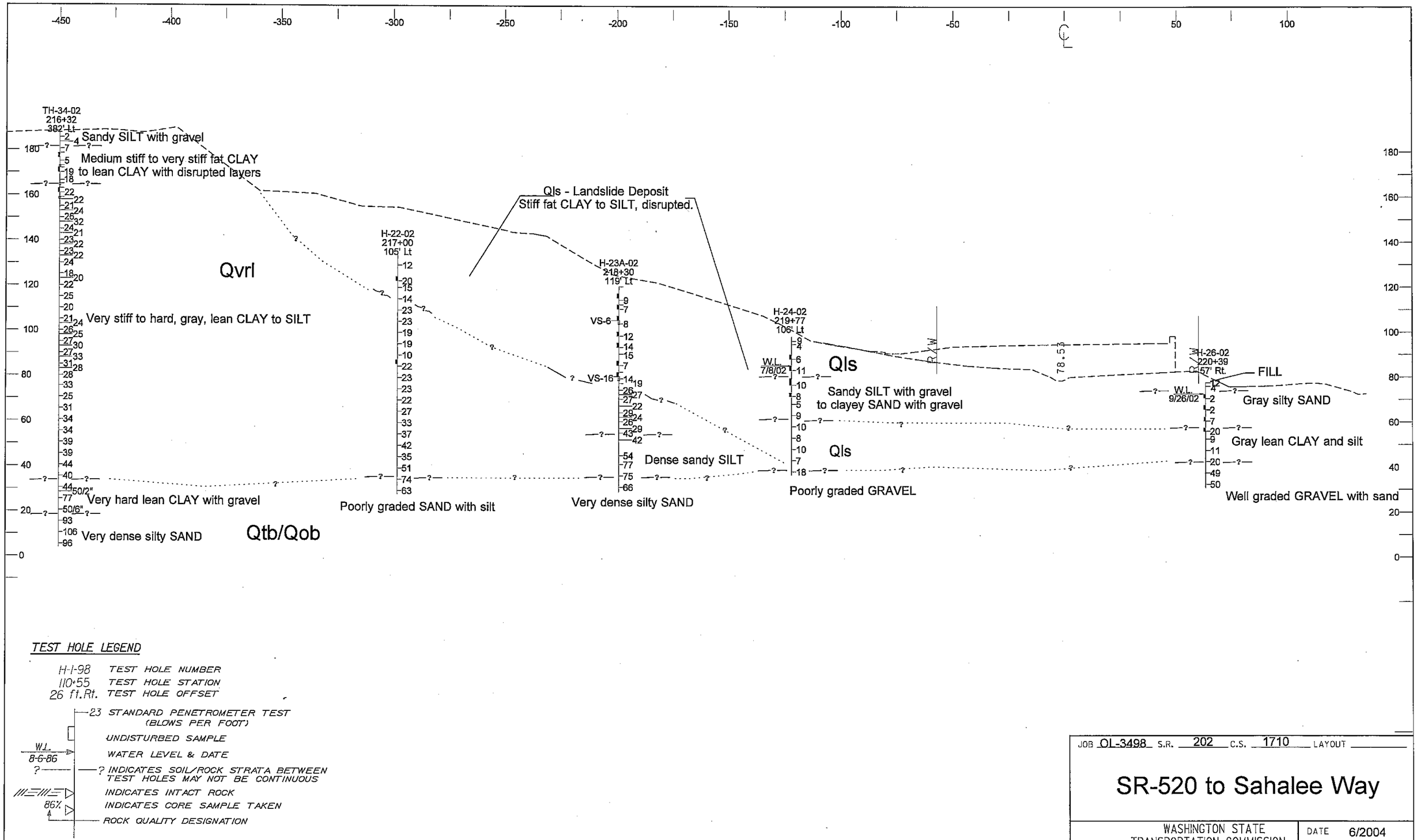


Figure D-4: Generalized Soil Cross-section B-B

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR-520 to Sahalee Way

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 6/2004
SCALE 1"=40' VERT. 1"=40' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\217.dgn 11/08/2004 12:07:18 PM

APPENDIX - E

GROUND WATER INFORMATION

Locations of Wetland Mitigation Areas

Figure E-1 Plan View and Test Hole Locations of Floodplain Mitigation Area Between Station 183+00 and Station 191+00, Left

Figure E-2 Plan View and Test Hole Locations for Turple Wetland Mitigation Site Between Station 204+00 and Station 211+00, Right

Figure E-3 Plan View and Test Hole Locations for Happy Valley Wetland Mitigation Site Between Station 234+00 and Station 244+00, Right

Summary of Water Level Readings

Stage 1

Table 1: Water Table Elevations in the vicinity of SR 520 and SR 202.

Table 2: Water Table Elevations in the vicinity of East Lake Sammamish Parkway NE.

Stage 2

Table 3: Water Table Elevations between East Lake Sammamish Parkway and 187th Ave NE.

Table 4: Water Table Elevations between 187th Ave NE and 192nd Dive NE – Right.

Table 5: Pond 1-A and Wetland Mitigation site between 187th Ave NE and 192nd Dive NE - Left

Table 6: Proposed Wetland Mitigation site between 192nd Drive NE and 196th Ave NE - Right

Table 7: Water Table Elevations between 192nd Dive NE and 196th Ave NE.

Table 8: Turple Wetland Mitigation Site between Stations 203+50 and 211+00 - Right

Table 9: Water Table Elevations between 196th Ave NE and NE 55th Place.

Table 10: Water Table Elevations between NE 55th Place and 204th Place NE.

Table 11: Water Table Elevations between 204th Place NE and Sahalee Way NE.

Table 12: Hillside between NE 55th Place and 204th Place NE – Left.

H-34-02 Vibrating Wire Piezometer Readings (– 85 ft depth)

H-34-02 Vibrating Wire Piezometer Readings (– 180 ft depth)

H-35-02 Vibrating Wire Piezometer Readings (– 89 ft depth)

Table 13: Happy Valley Wetland Mitigation Site between Stations 203+50 and 211+00 – Right.

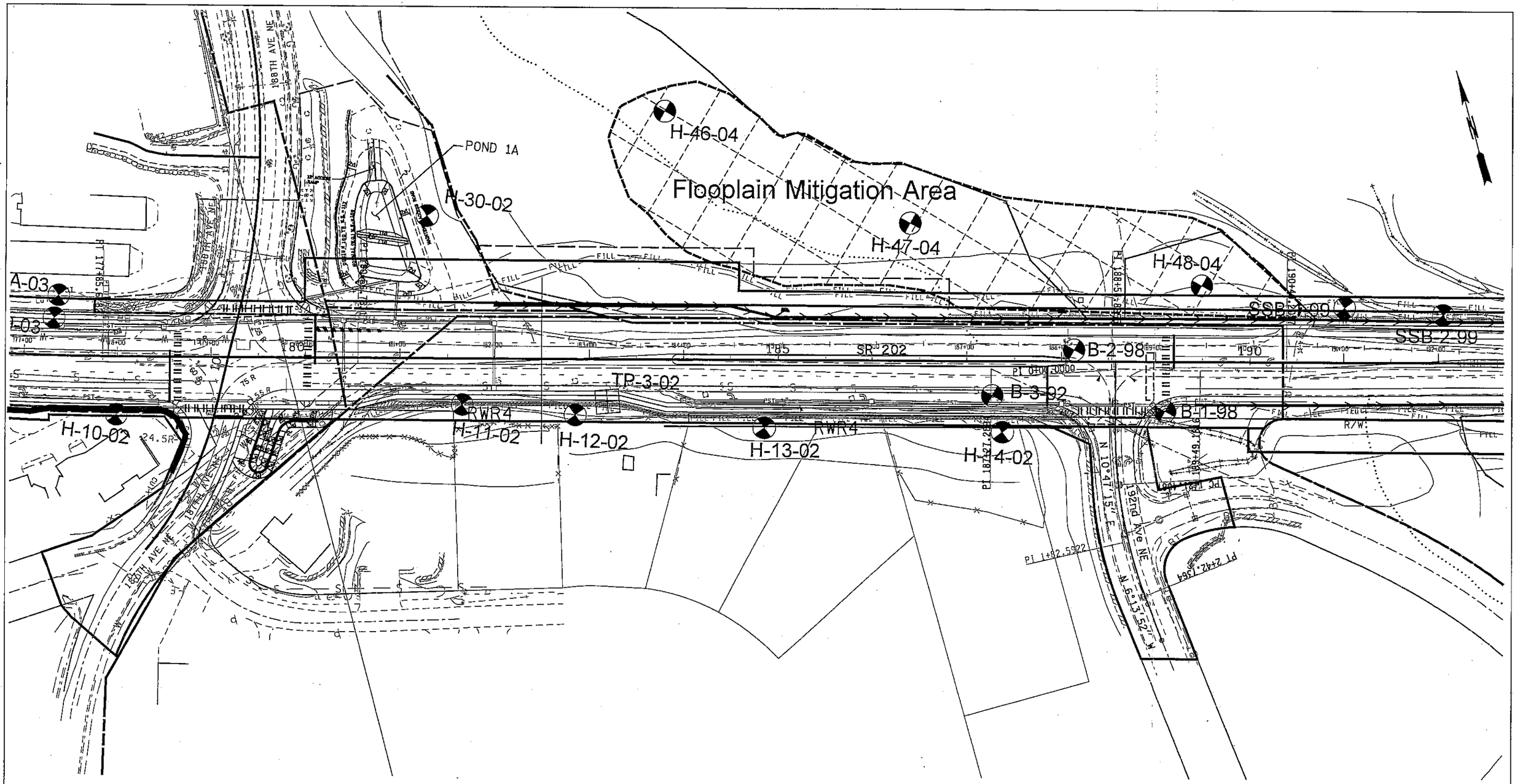


Figure E-1: Plan View with Tesl Hole Locations of the Floodplain Mitigation Area Between Sta. 183+00 and 191+00

JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 to Sahalee Way

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 5/2004
SCALE 1"=100' VERT. 1"=100' HORIZ.
SHEET ____ OF ____
DRAWN BY DWG

...\E and C\202floodplansheets.dgn 09/27/2004 02:48:22 PM

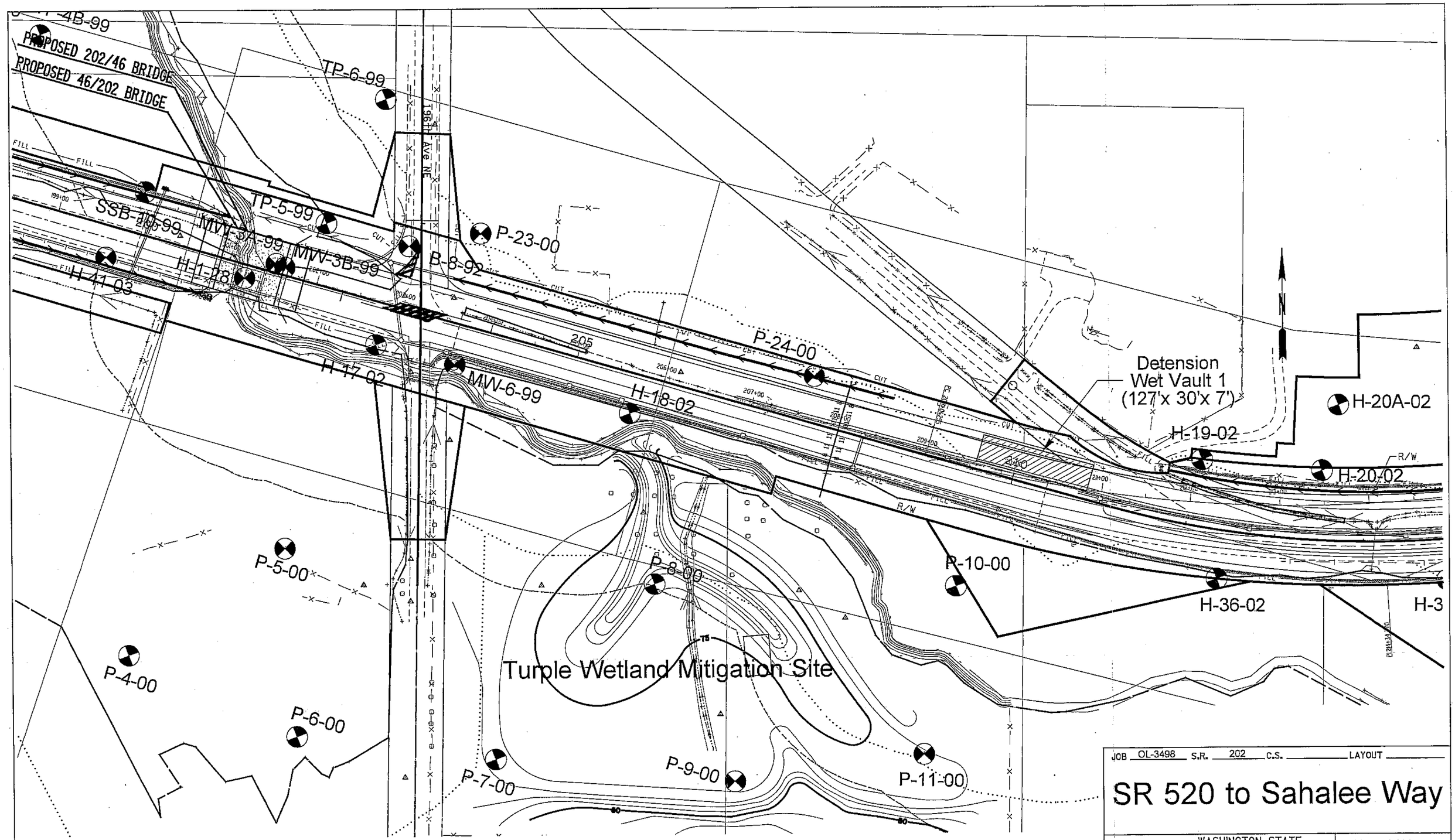


Figure E-2: Plan View with Tesl Hole Locations for Turple Wetland Mitigation Site

JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 to Sahalee Way

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 5/2004
SCALE 1"=100' VERT. 1"=100' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\E and C\202floodplansheets.dgn 09/27/2004 02:43:39 PM

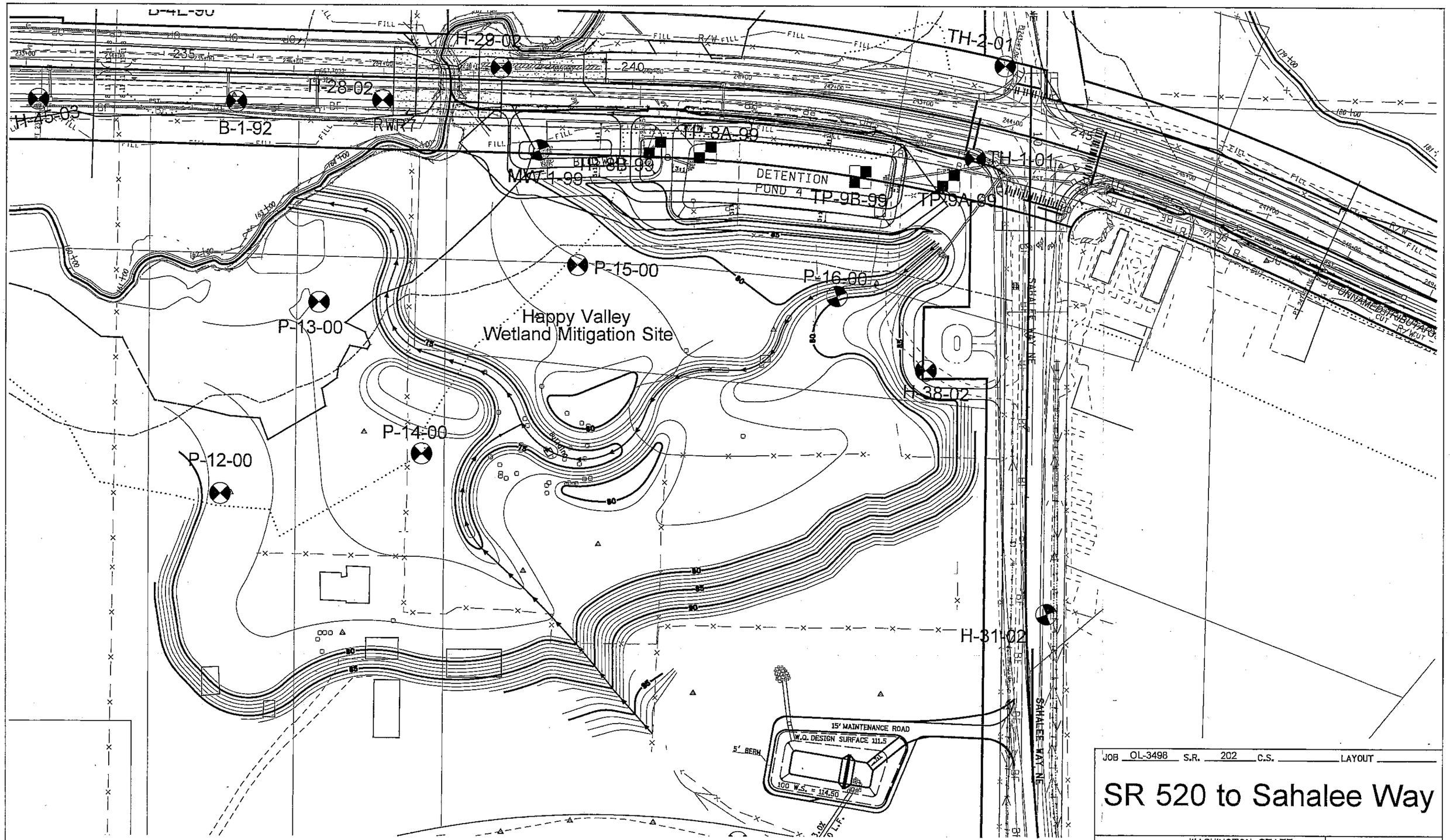


Figure E-3: Plan View with Tesl Hole Locations
for Happy Valley Wetland Mitigation Site

JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 to Sahalee Way

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION

MATERIALS BRANCH

T. E. BAKER MATERIALS ENGINEER

DATE 5/2004
SCALE 1"=100' VERT.
1"=100' HORIZ.
SHEET ____ OF ____
DRAWN BY DWG

...\E and C\202floodplansheets.dgn 09/27/2004 02:42:32 PM

STAGE 1

Table 1 *Water Table Elevations in the Vicinity of SR 520 and SR 202.*

Ground water is defined by five test holes at this site. Three test holes had open standpipe piezometer that was read periodically.

Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Year	Water Elev. (feet)		Date
H-15-69	113+20	60 Lt.	42.1		33.6		August 19, 1969
H-12-69	113+21	130 Lt.	40.9		32.9		August 14, 1969
C-20A-92	113+95	86 Rt.	47.8		32.4	High	July 30, 1992
					< 32.1	Low	November 24, 1992
Water level readings taken between March, 2002 to July, 2004							
BC1-01	114+79	151 Lt.	47.8	2002	35.5	High	April 23, 2002
					30.9	Low	August 13, 2002
BC2-01	115+52	147 Rt.	40.1	2002	34.9	High	April 23, 2002
					30.7	Low	August 13, 2002

Table 2 *Water Table Elevations in theVicinity of East Lake Sammamish Parkway NE.*

Ground water is defined by three test holes at this site. Water levels at the time of drilling are:

Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Water Elev. (feet)	Date
MW-5-99	136+00	70 Rt.	52.7	32.9	July 15, 1999
TP-1-99	137+81	150 Rt.	52.8	42.8	July 12, 1999
H-1-02	142+97	49 Rt.	50.9	45.9	March 13, 2002

STAGE 2

Table 3 *Water Table Elevations between East Lake Sammamish Parkway NE and 187th Ave NE.*

Ground water was observed in 8 of 22 test holes in this section. Two test holes had open standpipe piezometers.

Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Year	Water Elev. (feet)		Date
H-1-02	142+97	49 Rt.	50.9		45.9		March 12, 2002
H-3-02	153+00	45 Rt.	90.7		86.2		February 28, 2002
PP-4-03	156+89	53 Lt.	123.7		120.7		November 18, 2003
Water level readings taken between December, 2000 to July, 2004							
SL 3-01	159+35	111 Rt.	106.0	2002	92.1	High	January 23, 2002
				2001	84.7	Low	September 17, 2001
SL 2-01	160+23	121 Rt.	111.1	2000	99.7	High	December 14, 2000
		At or below elevation =			97.4	Low	January 16, 2001
H-7-02	166+31	47 Lt.	151.3		136.3		March 19, 2002
H-8-02	167+83	63 Lt.	157.2		142.2		July 16, 2002
PP-5-03	173+25	53 Lt.	155.3		151.8		November 18, 2003

Table 4 *Water Table Elevations between 187th Ave NE and 192nd Drive NE - Right.*

Ground water was observed in 3 of 5 test holes in this section. One test hole had open standpipe piezometer that was read occasionally.

Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Year	Water Elev. (feet)		Date
H-13-02	184+87	71 Rt.	121.9		112.9		June 18, 2002
H-14-02	187+37	74 Rt.	117.5		99.9		July 18, 2002
B-3-92	187+27	36 Rt.	96.5		77.8	High	December 18, 2002
					66.5	Low	January 23, 1992

Table 5 *Pond-1A and Wetland Mitigation Site between 187th Ave NE and 192nd Drive NE - Left.*

Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Year	Water Elev. (feet)		Date
Water level readings taken between June, 2002 to July, 2004							
H-30-02	181+24	144 Lt.	114.6	2002	102.7	High	January 16, 2004
					101.0	Low	November 1, 2002
Water level readings taken between May, 2004 to July, 2004							
H-46-04	183+80	236 Lt.	76.0	2004	69.2	High	June 23, 2004
					68.2	Low	May 12, 2004
H-47-04	186+41	146 Lt.	74.7	2004	69.2	High	June 23, 2004
					68.1	Low	May 12, 2004
H-48-04	189+47	76 Lt.	77.8	2004	70.2	High	May 12, 2004
					69.5	Low	June 23, 2004

Table 6 *Proposed Wetland Mitigation site between 192nd Drive NE and 196th Ave NE – Right.*

Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Year	Water Elev. (feet)		Date
Water level readings taken between March, 2000 to June, 2002							
P-4-00	201+08	451 Rt.	72.7	2002	73.6	High	April 23, 2002
				2001	71.2	Low	September 17, 2001
P-5-00	202+45	290 Rt.	71.1	2001	71.1	High	January 16, 2001
				2001	67.7	Low	September 17, 2001
P-6-00	203+14	488 Rt.	74.2	2000	74.5	High	April 5, 2000
				2000	72.4	Low	October 11, 2000

Table 7 *Water Table Elevations between 192nd Drive NE and 196th Ave NE.*

Ground water was observed in 18 of 21 test holes in this section. Two test holes had open standpipe piezometers.

Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Year	Water Elev. (feet)		Date
B-1-98	189+10	50 Rt.	91.0		88.0		September 17, 1998
SSB-1-99	191+02	59 Lt.	68.9		67.9		July 12, 1999
SSB-2-99	192+05	51 Lt.	65.9		64.9		July 15, 1999
H-15-02	193+00	21 Lt.	72.6		68.1		March 27, 2002
SSB-4-99	194+00	48 Lt.	67.7		66.7		July 21, 1999
H-40-03	195+60	37 Rt.	72.7		68.0		November 19, 2003
Water level readings taken between December, 2000 to July, 2004							
MW-4-99	196+24	179 Lt.	68.8	2001 2001	69.4 67.0	High Low	April 19, 2001 September 17, 2001
B-2W-90	196+50	70 Lt.	68.5		67.5		October 18, 1990
SSB-7-99	196+98	48 Lt.	69.1		67.6		July 22, 1999
TP-4A-99	197+71	176 Lt.	69.1		62.6		July 28, 1999
H-16-02	197+98	48 Lt.	69.1		68.6		June 19, 2002
TP-4B-99	198+27	182 Lt.	69.4		59.4		July 28, 1999
SSB-10-99	199+88	48 Lt.	69.0		68.0		July 29, 1999
Water level readings taken between August, 2000 to August, 2003							
MW-3-99	201+51	11 Lt.	70.5	2003 2002	71.3 68.9	High Low	February 11, 2003 July 10, 2002
TP-5-99	201+92	68 Lt.	70.4		69.1		August 12, 1999
H-17-02	202+83	46 Rt.	72.2		71.7		March 21, 2002
TP-6-99	202+19	218 Lt.	76.5		69.5		August 11, 1999
B-8-92	202+90	85 Lt.	70.1		67.1		January 27, 1992

Table 8 *Turple Wetland Mitigation Site between Stations 203+50 and 211+00 - Right.*

Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Year	Water Elev. (feet)		Date
MW-6-99	203+72	43 Rt.	72.9	2004	71.5	High	February 23, 2004
				2001	69.5	Low	September 17, 2001
MW-6B-99	203+73	43 Rt.	73.0	2004	71.6	High	March 27, 2002
				2001	69.5	Low	September 17, 2001
P-7-00	205+33	453 Rt.	78.5	2000	77.5	High	December 17, 2000
				2003	72.6	Low	September 23, 2003
P-8-00	206+50	216 Rt.	78.1	2000	77.3	High	April 5, 2000
				2001	73.5	Low	September 17, 2001
P-9-00	207+96	404 Rt.	81.6	2001	79.5	High	December 20, 2001
				2002	74.2	Low	November 1, 2002
P-10-00	209+72	128 Rt.	72.9	2002	73.3	High	January 23, 2002
				2002	69.8	Low	November 1, 2002
P-11-00	209+73	321 Rt.	78.1	2002	76.5	High	January 23, 2002
				2001	73.2	Low	September 17, 2001

Table 9 *Water Table Elevations between 196th AveNE and NE 55th Place.*

Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Year	Water Elev. (feet)	Date
P-23-00	203+60	120 Lt.	75.9		68.1	August 3, 2000
H-18-00	205+73	43 Rt.	72.9		71.9	March 26, 2002
P-24-00	207+60	70 Lt.	80.2		67.7	August 6, 2000

Table 10 *Water Table Elevations between NE 55th Place and 204th Place NE.*

Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Year	Water Elev. (feet)		Date
H-36-02	212+43	52 Rt.	74.2	2003	75.0	High	December 9, 2003
				2003	72.8	Low	September 23, 2003
H-37-02	214+87	45 Rt.	74.5		71.7		October 2, 2002
MW-2-99	216+79	50 Rt.	80.6	2004	77.5	High	February 23, 2004
				2002	73.0	Low	September 30, 2002
H-26-02	220+39	57 Rt.	77.4		72.4		September 26, 2002
TH-4-01	223+50	39 Lt.	82.2		73.6	High	April 23, 2002

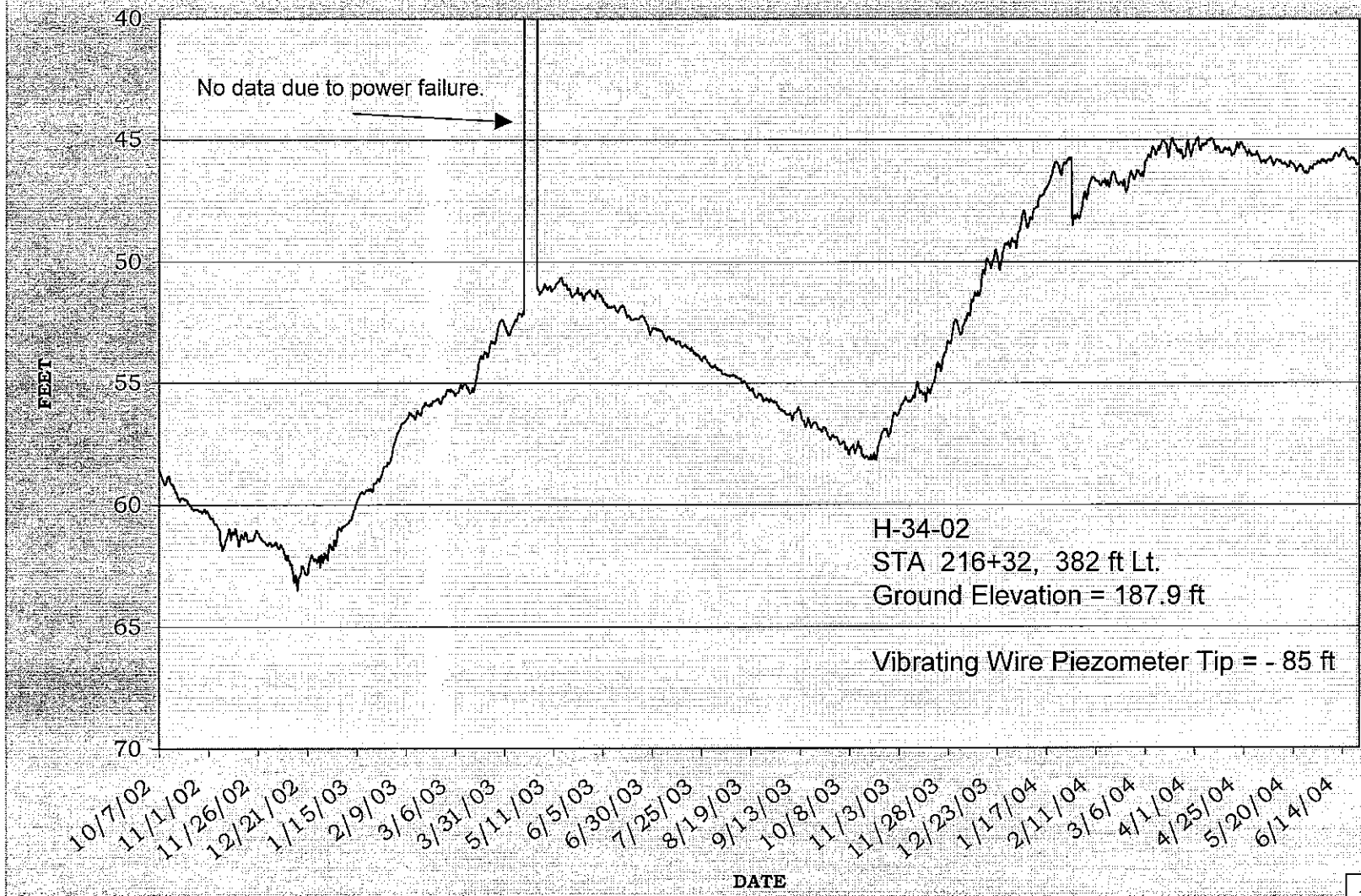
Table 11 *Water Table Elevations between 204th Place NE and Sahalee Way NE.*

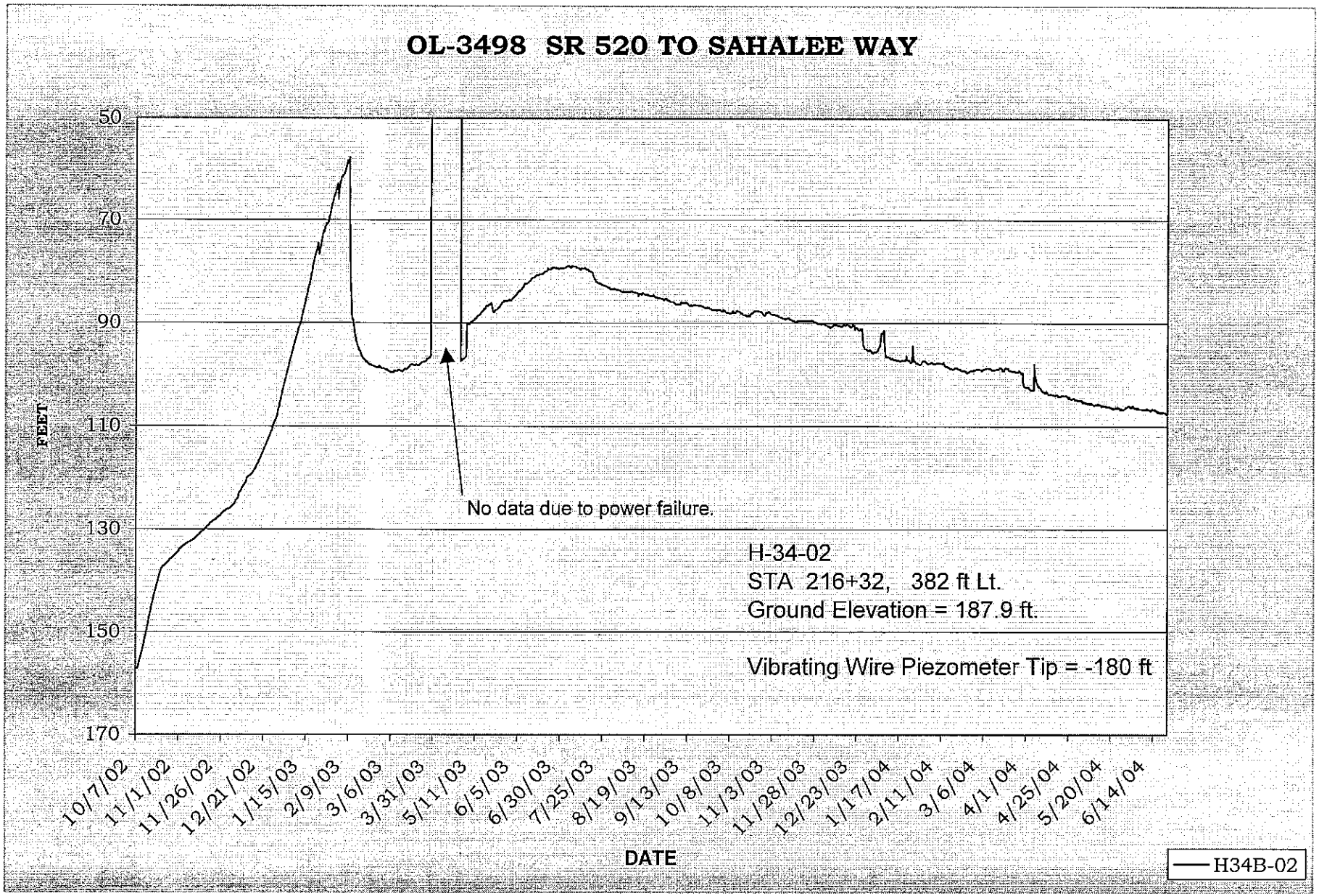
Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Year	Water Elev. (feet)		Date
B-5-92	224+50	55 Rt.	80.7		78.7		January 27, 1992
TH-3-01	225+01	27 Rt.	79.6		73.4		January 18, 2001
H-42-03	227+21	70 Lt.	93.1		76.1		December 17, 2004
H-43-02	229+00	76 Lt.	85.4	2004	78.3	High	January 16, 2004
				2003	76.1	Low	November 18, 2003
H-27-02	231+50	60 Lt.	77.2		75.7		April 9, 2002
H-45-03	233+38	35 Rt.	79.7		75.7		November 18, 2003
B-4E-90	235+00	100 Rt.	77		77		October 18, 1992
B-1-92	236+00	30 Rt.	82		76		January 27, 1992
H-28-02	237+23	26 Rt.	82.1		74.1		April 8, 2002
H-29-02	238+54	17 Lt	82.9		74.9		April 2, 2002
TH-1-01	243+91	40 Rt.	83.8		80.8		January 17, 2001
TH-2-01	244+00	70 Lt.	81.6		77.6		January 16, 2001

Table 12 *Hillside between NE 55th Place and 204th Place NE - Left.*

Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Year	Water Elev. (feet)		Date
H-19-02	212+07	74 Lt.	94.3		75.6		August 13, 2002
H-20-02	213+67	465 Lt.	82.0	2001	80.2	High	December 20, 2001
				2001	76.6	Low	August 28, 2001
H-20A-02	213+50	78 Lt.	109.6		95.6		August 13, 2002
H-21-02	215+92	66 Lt.	104.0	2001	77.3	High	February 23, 2004
				2001	75.4	Low	August 28, 2001
H-34-02	216+32	382 Lt.	187.9	2004	142.8	High	March 21, 2004
	Vibrating wire piezo. - 85 ft			2002	124.6	Low	December 16, 2002
	Vibrating wire piezo. - 180 ft			2003	108.5	High	June 27, 2003
				2004	80.4	Low	June 23, 2004
H-35-02	216+95	77 Lt.	108.1	2002	72.7	High	October 22, 2002
	Vibrating wire piezo. - 89 ft			2003	67.8	Low	September 6, 2003
H-35A-02	216+99	77 Lt.	108.1	2004	91.6	High	February 23, 2004
				2003	84.0	Low	September 23, 2003
H-22A-02	217+24	175 Lt.	136.4	2004	117.9	High	February 24, 2004
				2002	106.9	Low	November 1, 2002
H-23-02	218+58	73 Lt.	101.2	2004	88.0	High	February 23, 2004
				2003	77.0	Low	September 23, 2003
H-23A-02	218+30	119 Lt.	119.0	2004	88.0	High	February 23, 2004
H-24-02	219+77	106 Lt.	96.6	2004	91.6	High	February 23, 2004
				2003	84.0	Low	September 23, 2003
H-25A-02	221+35	92 Lt.	102.7	2004	90.2	High	February 24, 2004
				2003	77.1	Low	September 23, 2003

OL-3498 SR 520 TO SAHALEE WAY




OL-3498 SR 520 TO SAHALEE WAY
FEET
50
70
90
110
130
150
170
No data due to power failure.
H-34-02
STA 216+32, 382 ft Lt.
Ground Elevation = 187.9 ft.
Vibrating Wire Piezometer Tip = -180 ft
10/7/02
11/1/02
11/26/02
12/21/02
1/15/03
2/9/03
3/6/03
3/31/03
5/11/03
6/5/03
6/30/03
7/25/03
8/19/03
9/13/03
10/8/03
11/3/03
11/28/03
12/23/03
1/17/04
2/11/04
3/6/04
4/1/04
4/25/04
5/20/04
6/14/04
DATE
H34B-02

OL-3498 SR 520 TO SAHALEE WAY

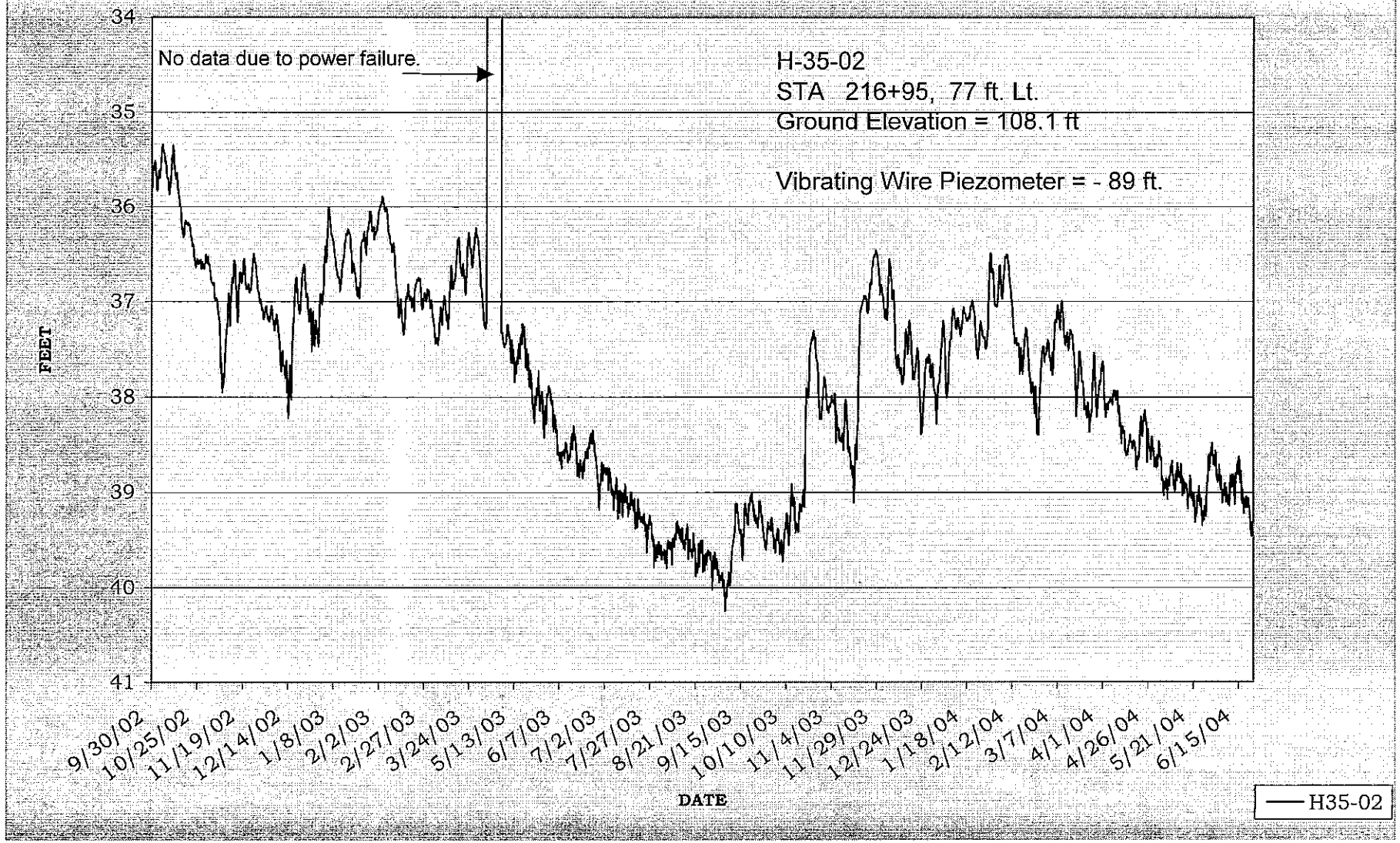


Table 13 *Happy Valley Wetland Mitigation Site between Stations 234+00 and 245+00 - Right.*

Test Hole No.	SR 202 Station	Offset (feet)	Ground Elev. (feet)	Year	Water Elev. (feet)		Date
MW-1-99	238+75	68 Rt.	78.7		75.6		August 13, 2002
MW-1A-99	238+96	75 Rt.	79.4		76.2		August 13, 2002
TP-8B-99	240+26	69 Rt.	84.5		77.5		August 4, 1999
TP-9B-99	242+67	80 Rt.	84.7		78.7		August 10, 1999
TH-1-01	243+91	40 Rt.	82		79		January 27,1992
Water level readings taken between April, 2000 and June, 2002							
P-12-00	235+55	465 Rt.	82.0	2001	80.2	High	December. 20, 2001
				2001	76.6	Low	August 28, 2001
P-13-00	236+59	250 Rt.	77.4	2001	78.5	High	December 20, 2001
				2001	75.4	Low	August 28, 2001
P-14-00	237+85	413 Rt.	87.9	2001	79.2	High	December 20, 2001
				2001	76.3	Low	August 28, 2001
P-15-00	239+43	202 Rt.	88.2	2001	79.1	High	December 20, 2001
				2001	75.9	Low	August 28, 2001
P-16-00	242+63	214 Rt.	87.7	2004	79.8	High	February 23, 2004
				2001	76.2	Low	August 28, 2001
Water level readings taken between July, 2002 and July, 2004							
H-33-02	237+42	861 Rt.	129.5	2002	87.1	High	July 30, 2002
				2003	78.5	Low	September 23, 2003
H-32-02	242+36	828 Rt.	119.0	2004	84.4	High	February 23, 2004
				2002	82.2	Low	December 18, 2002
H-38-02	243+94	280 Rt.	89.0	2002	79.4	High	December 18, 2002
				2003	76.9	Low	September 23, 2003
H-31-02	246+50	497 Rt.	101.4	2004	85.2	High	January 16, 2004
				2002	82.7	Low	September 30, 2002

APPENDIX - F

Bridge No. 202/46 Figures

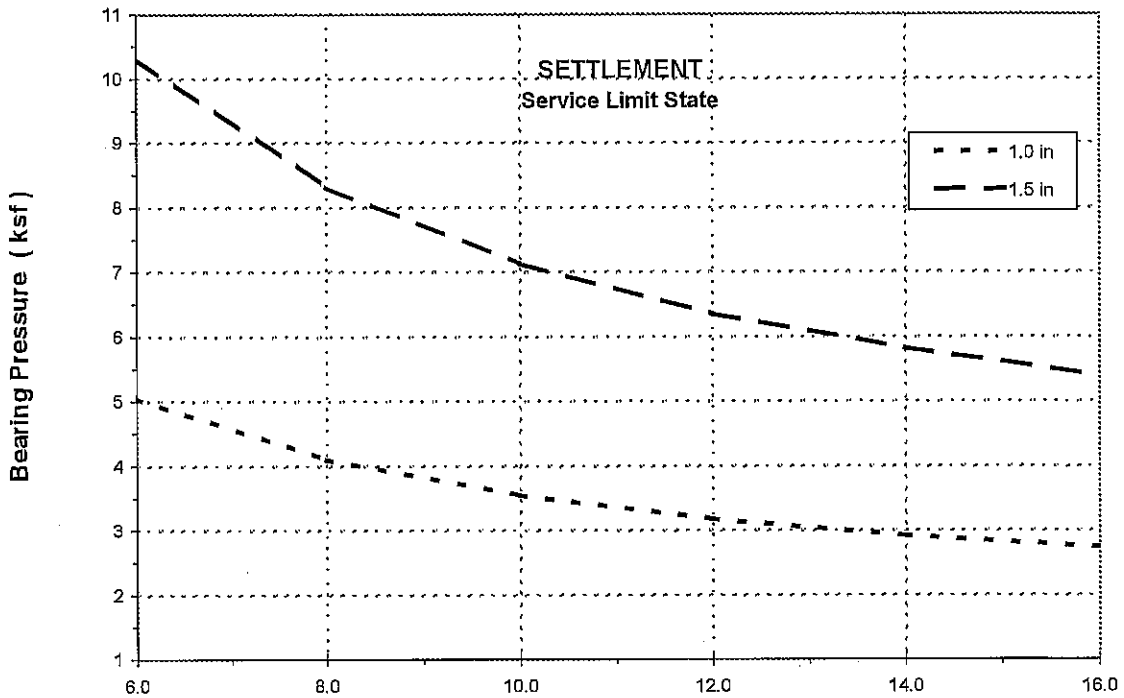
Figure F-1	Design Curves for Spread Footing Option
Figure F-2	Typical Earth Pressure Diagram for Walls A, B, C, and D
Figure F-3	Typical Section for MSE Walls A, B, C, and D
Figure F-4	Typical MSE Wall Drainage Detail

Bridge No. 202/47 Figures

Figure F-5	14" Diameter Cast-in-Place Pile
Figure F-6	16" Diameter Cast-in-Place Pile
Figure F-7	18" Diameter Cast-in-Place Pile
Figure F-8	24" Diameter Cast-in-Place Pile
Figure F-9	P-Y Curve Soil Data
Figure F-10	Typical Earth Pressure Diagram for Walls F, G, H, and J

Wet Vaults 1 and 2 Figures

Figure F-11	Typical Earth Pressure Diagram for Wet Vault 1 Station 209+54 to Station 210+85
Figure F-12	Typical Earth Pressure Diagram for Wet Vault 2 Station 226+20 to Station 228+25
Figure F-13	Pressure Diagram for Temporary Shoring Wall Station 226+20 to Station 228+25



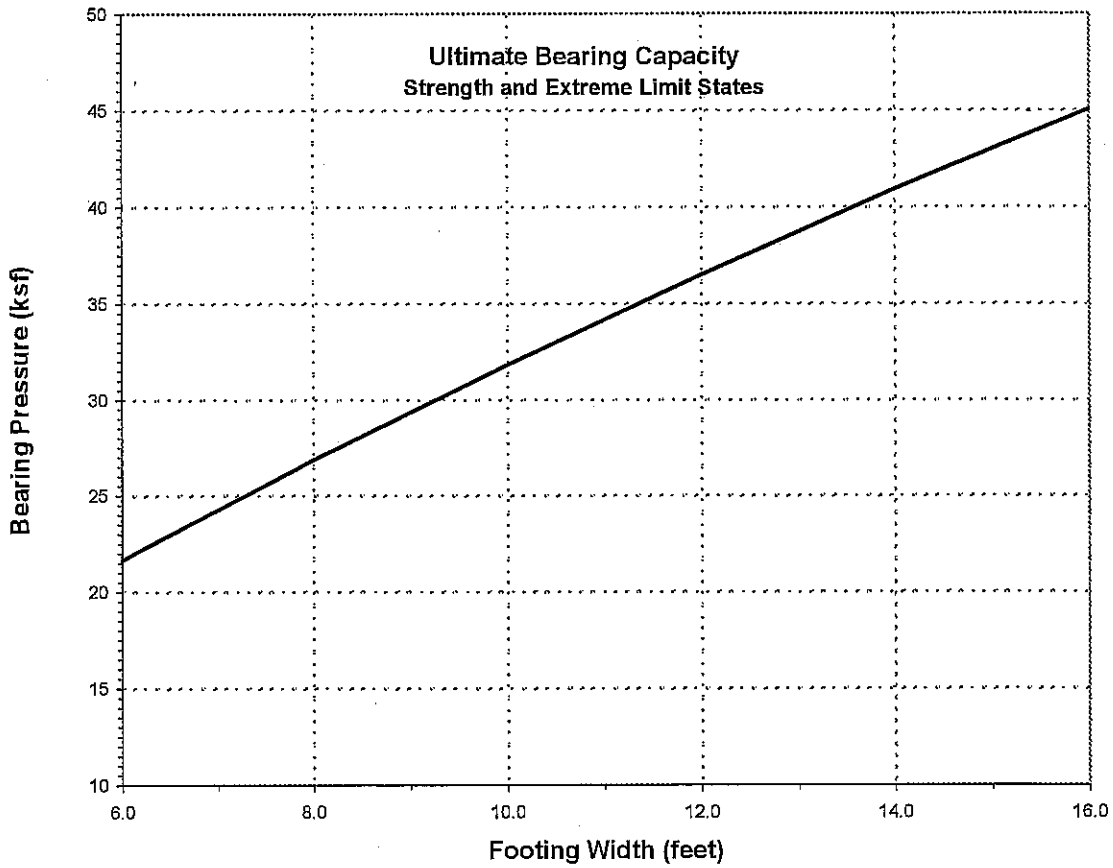


FIGURE F-1: Design Curves for Spread Footings

Bottom of footing and seal is assumed to be at Elevation 60 ft.

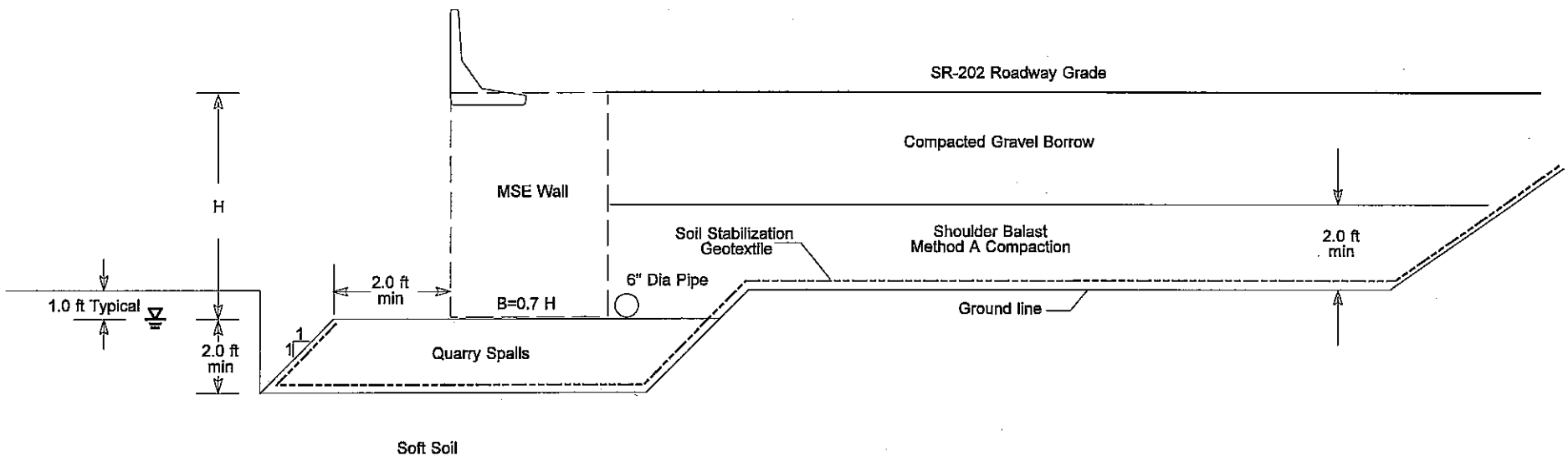


FIGURE F-3 TYPICAL SECTION FOR MSE WALL
WALLS A, B, C, AND D

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR-520 to Sahalee Way NE
M.P. 7.75 to 10.53

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE NOT TO SCALE VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\F\202_46 planpro.dgn 09/09/2004 01:42:07 PM

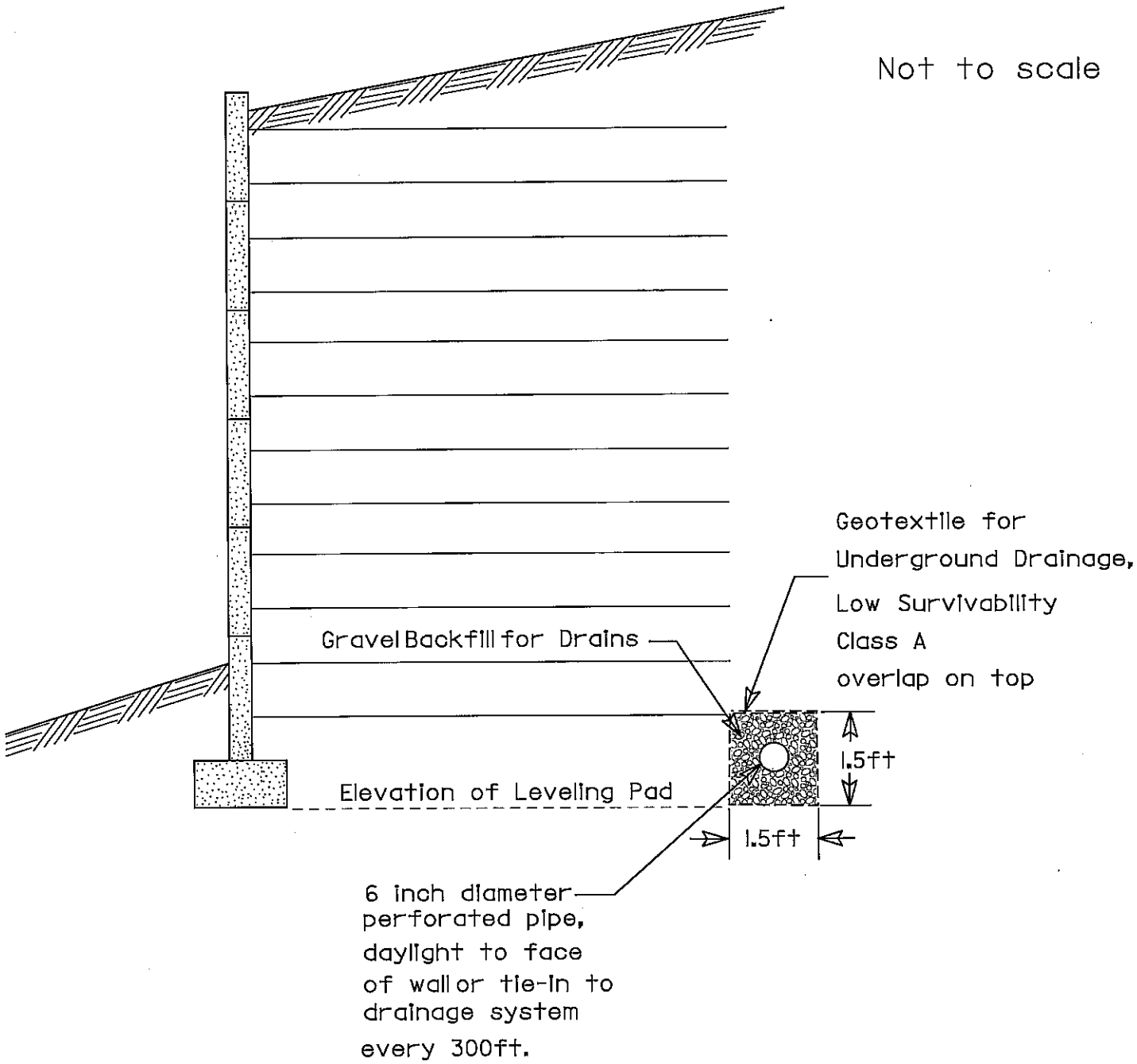


FIGURE F-4 MSE WALL DRAINAGE DETAIL

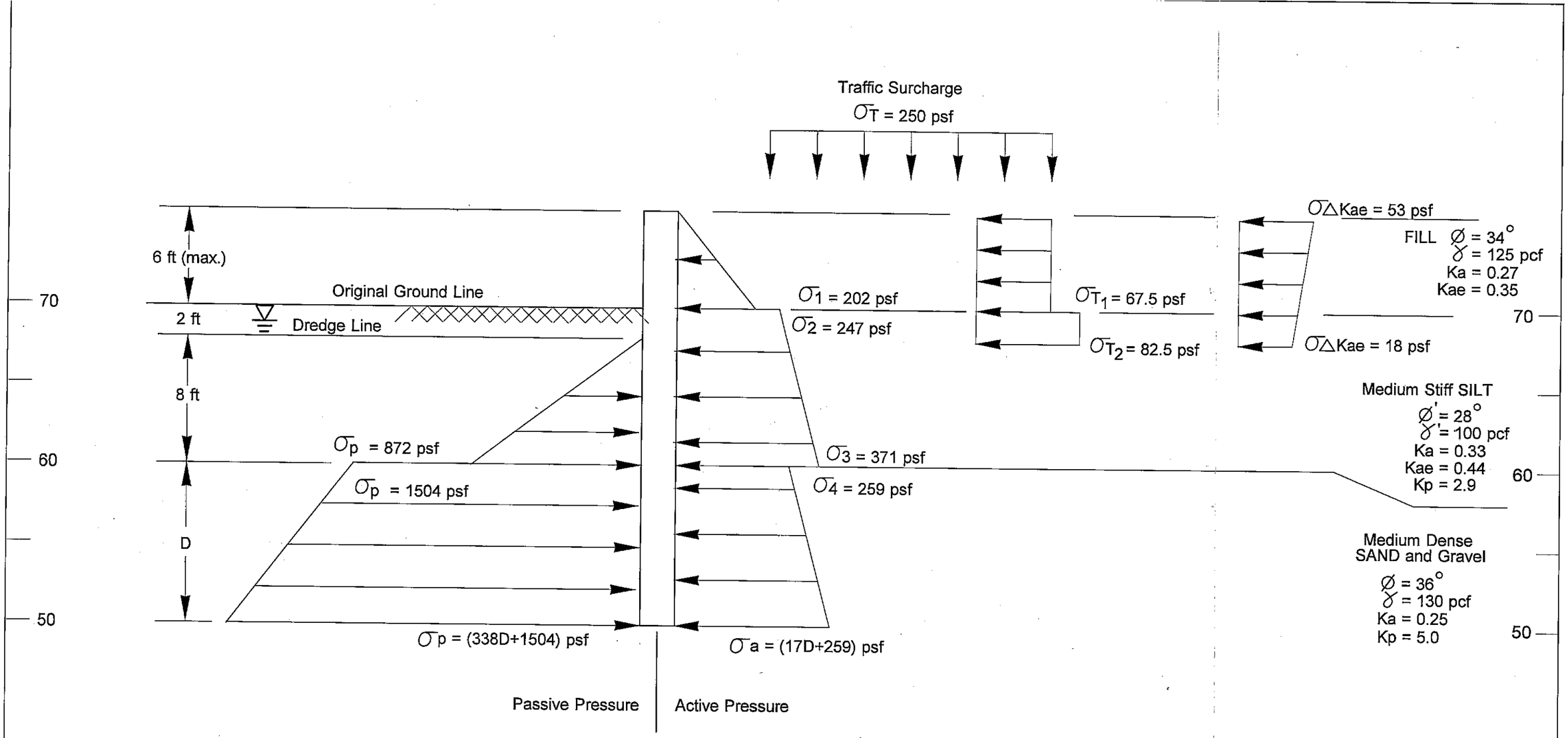
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR-520 to Sahalee Way NE
M.P. 7.75 to 10.53

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 12/2003
SCALE NOT TO SCALE VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\F\202_46 planpro.dgn 09/09/2004 01:44:19 PM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$, K_p includes a factor of safety of 1.5(K_p/1.5). Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3D.

3: $\Delta K_{ae} = (K_{ae} - K_a)$

Figure F-2: Typical Earth Pressure Diagram for Soldier Pile Wall A, B, C, and D

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR-520 to Sahalee Way NE
M.P. 7.75 to 10.53

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

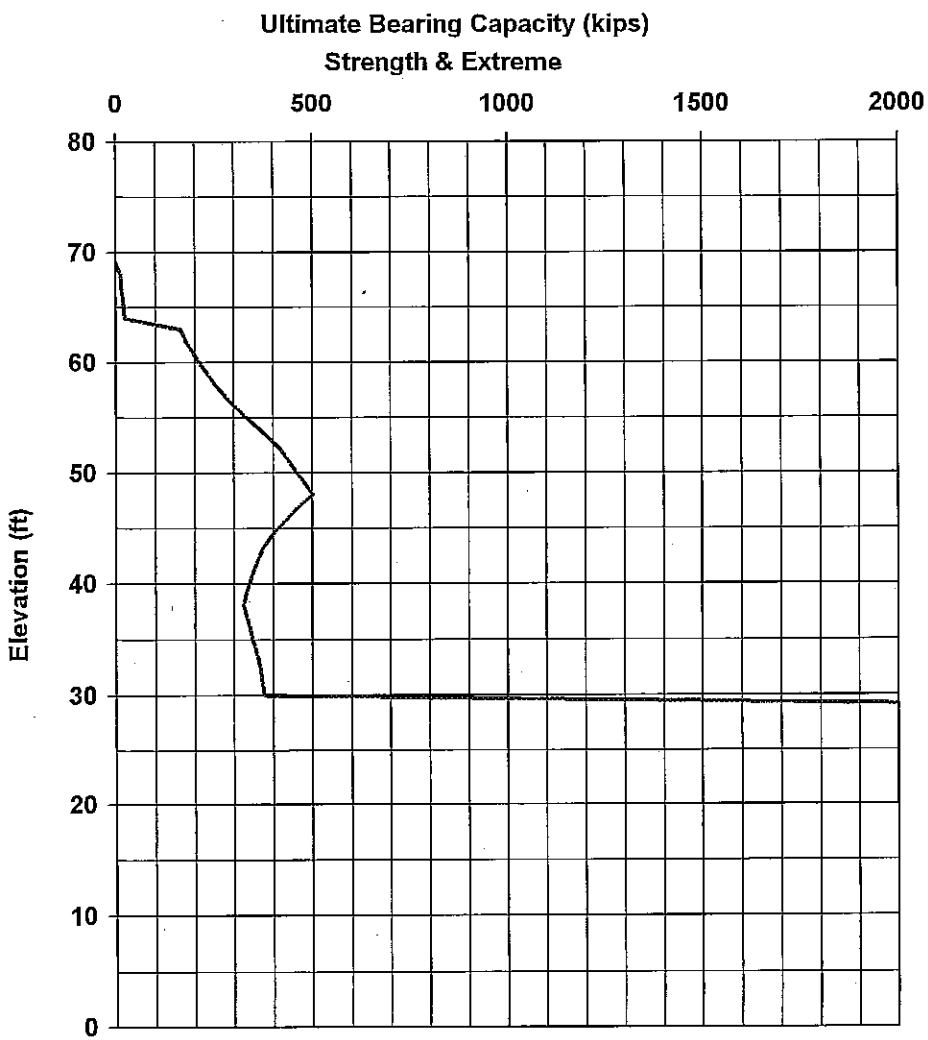
DATE 8/2004
SCALE N.T.S. VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\F\202_46 planpro.dgn 10/05/2004 12:29:13 PM

SR-202 - Evans Creek Br. No. 202/47 Replacement MP 10.14

Pile Capacity vs. Depth: Piers 1&2 Cast-in-Place Piles

Diameter 14 inches



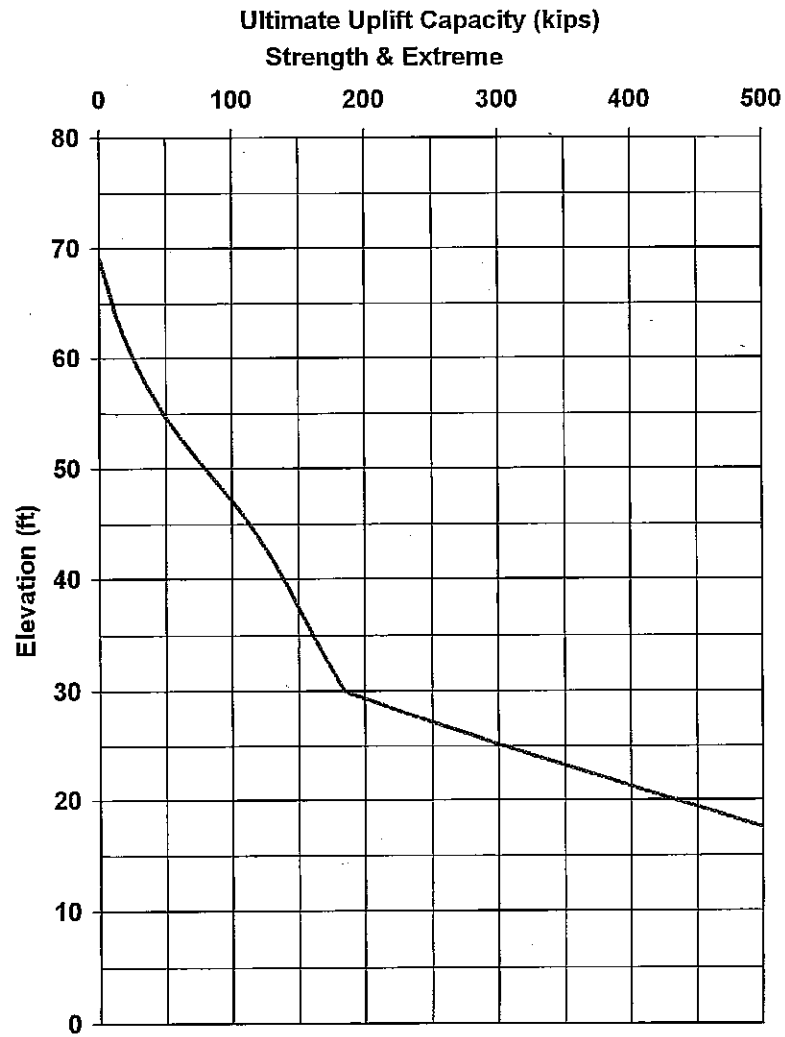
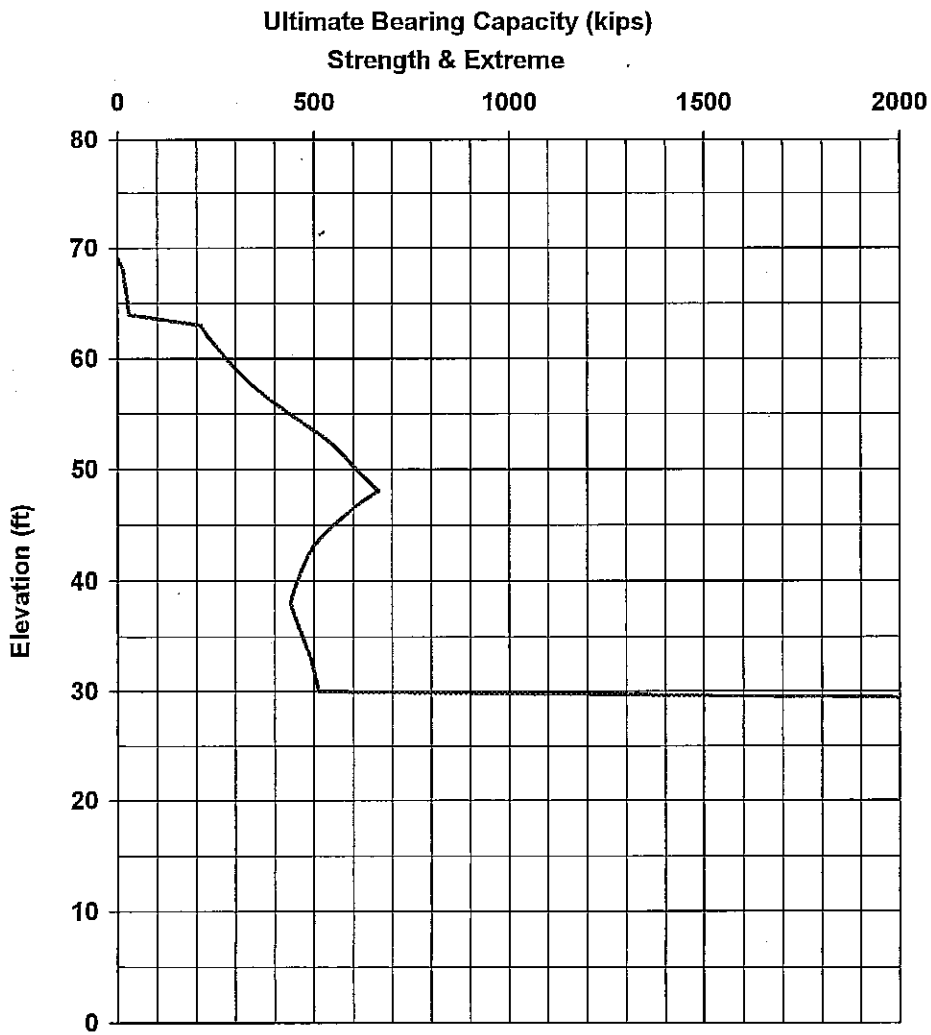


FIGURE F-5 : 14" Dia. Cast-in-place Pile

SR-202 - Evans Creek Br. No. 202/47 Replacement MP 10.14

Pile Capacity vs. Depth: Piers 1&2 Cast-in-Place Piles

Diameter 16 inches



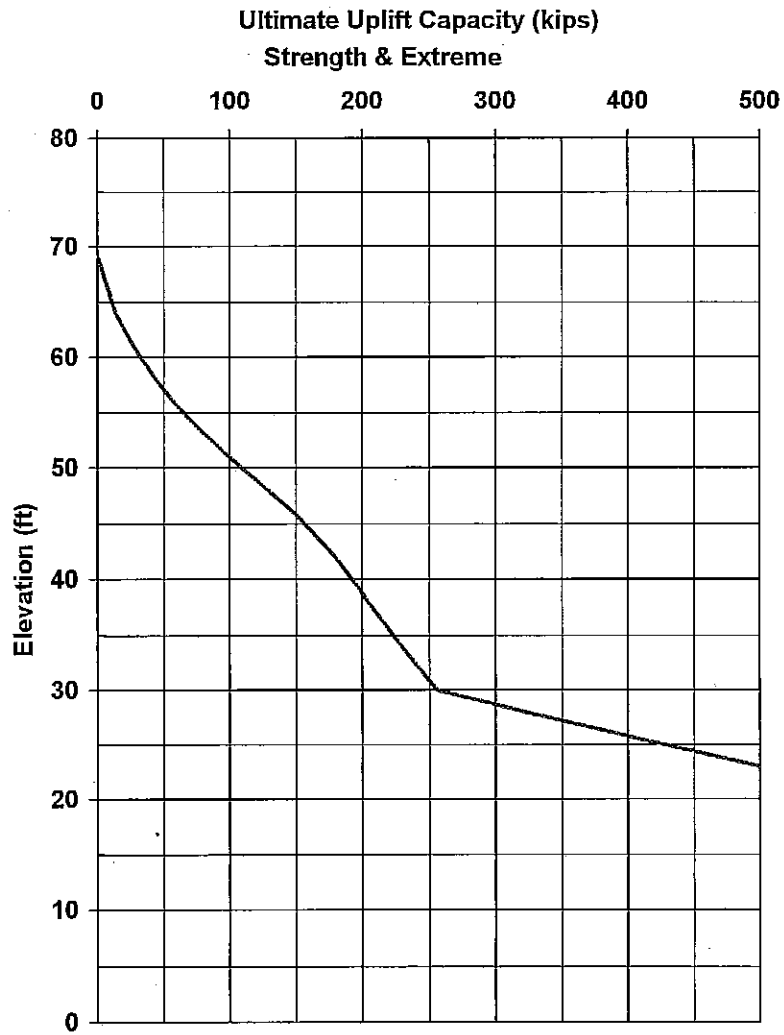
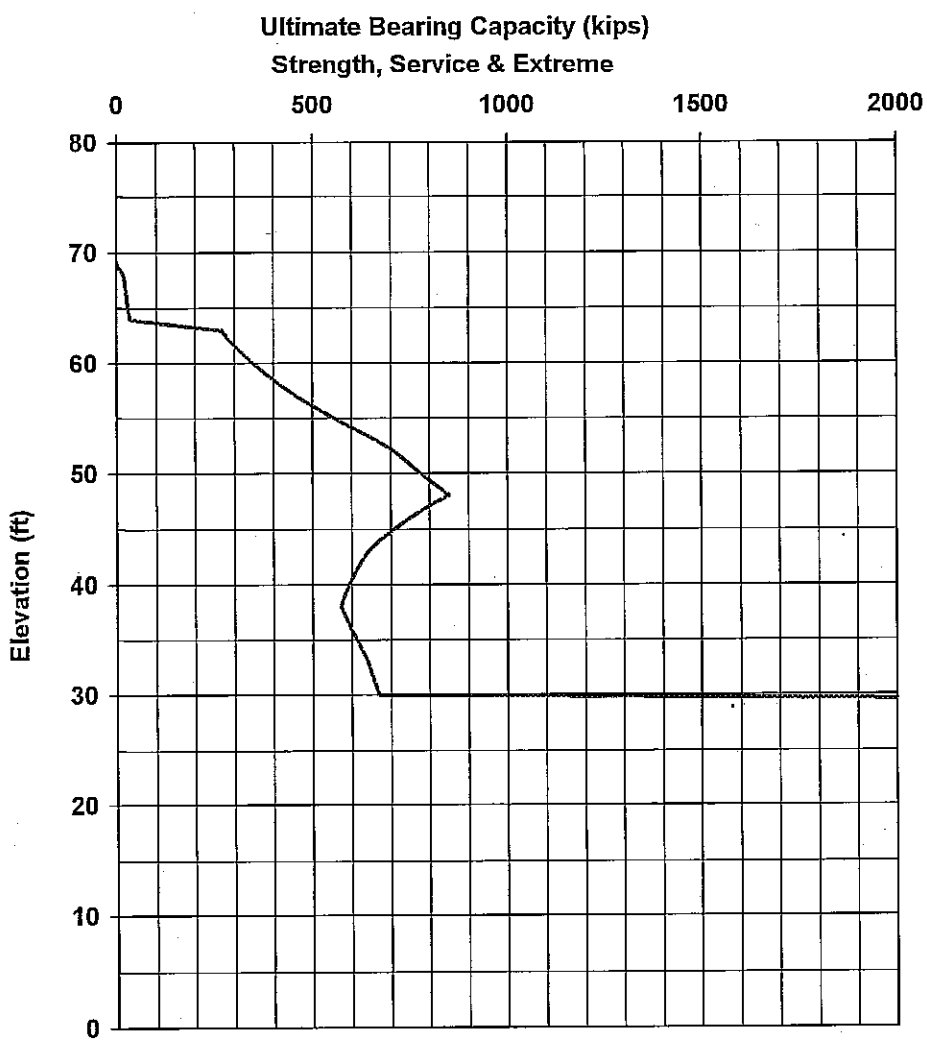


FIGURE F-6 : 16" Dia. Cast-in-place Pile

SR-202 - Evans Creek Br. No. 202/47 Replacement MP 10.14

Pile Capacity vs. Depth: Piers 1&2 Cast-in-Place Piles

Diameter 18 inches



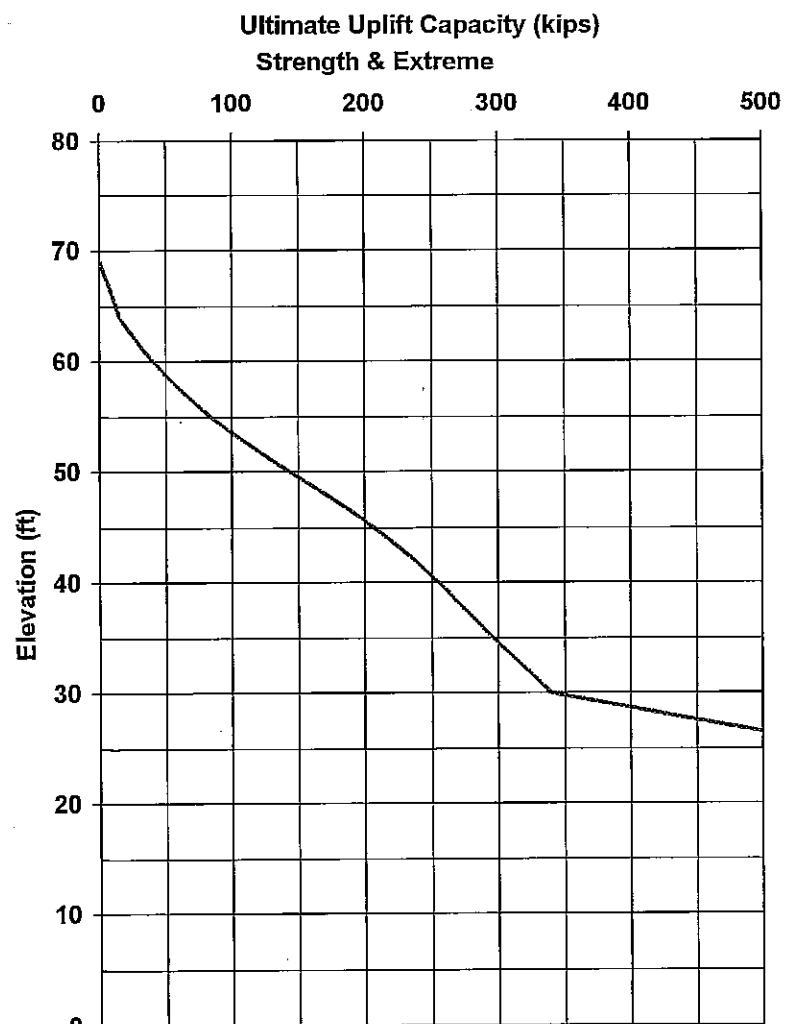
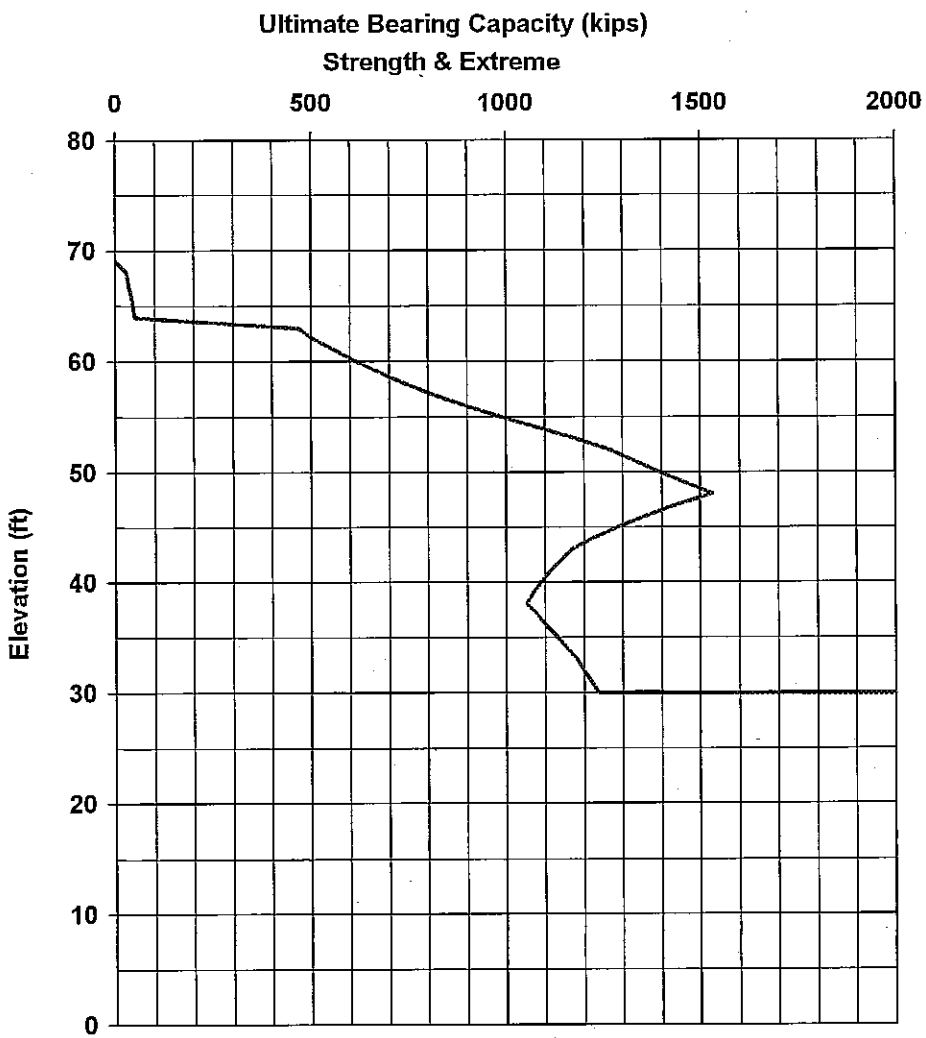


FIGURE F-7 : 18" Dia. Cast-in-place Pile

SR-202 - Evans Creek Br. No. 202/47 Replacement MP 10.14

Pile Capacity vs. Depth: Piers 1&2 Cast-in-Place Piles

Diameter 24 inches



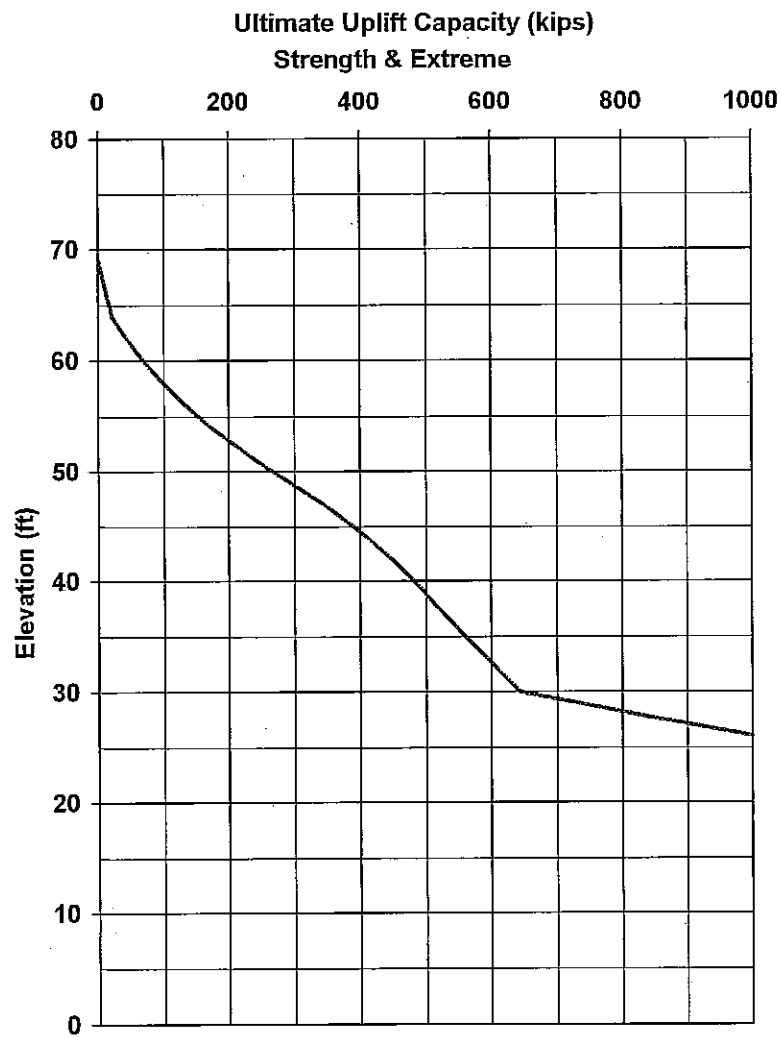


FIGURE F-8 : 24" Dia. Cast-in-place Pile

SR-202 Evens Creek Bridge 202/47 & Half Bridge
Bridge Replacement MP 10.14

P-Y CURVE SOIL DATA
for LPILE Program

Applies to Pier: 1,2 & 3

Ground Surface Elevation (ft): 87.7

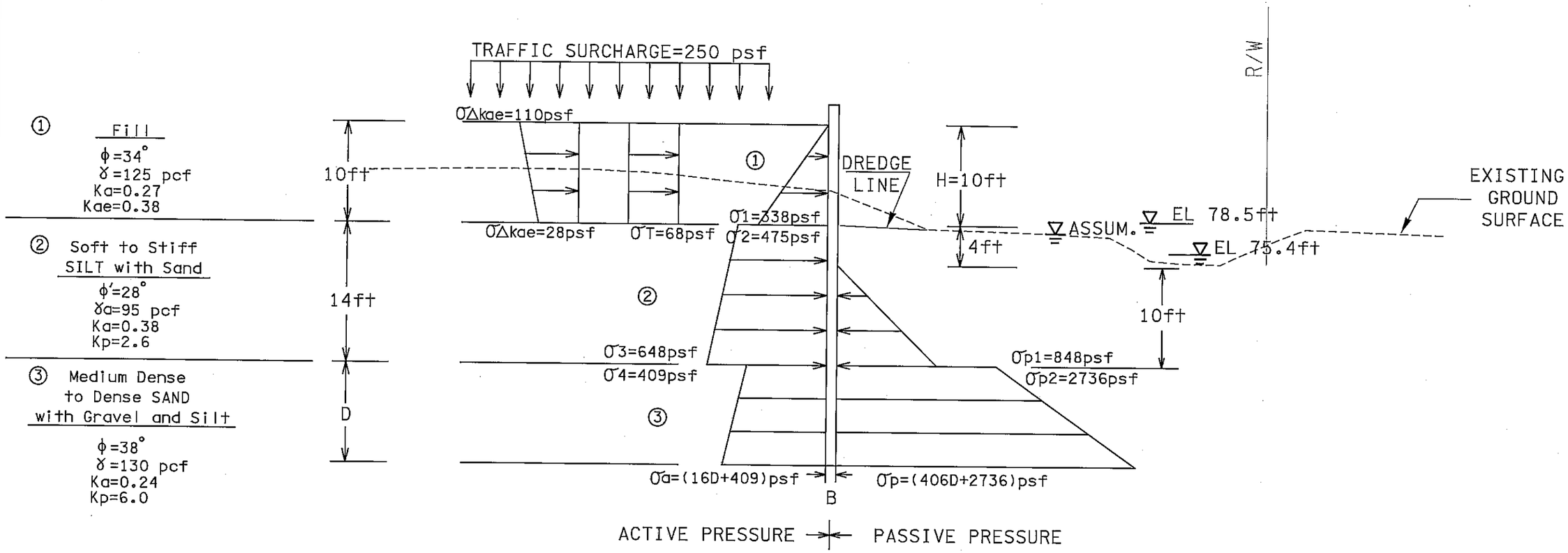
Soil Layer	Depth to Layer Bottom	Bottom of Layer Elevation	Soil Type	KSOIL	STATIC ANALYSIS Effective Unit Weight of Soil		Cohesion		Axial Strain ε_{50}	Friction Angle ϕ	Modulus of Subgrade Reaction k
	ft	ft			lb/in3	pcf	psi	psf	(%)	(deg)	pci
1	8	80.0	Sand	4	0.072	125				36	160
2	11	77.0	Sand	4	0.069	120				32	80
3	24	64.0	Soft Clay	1	0.019	33	5.79	835	2.5		
4	50	38.0	Sand	4	0.039	68				38	120
5	63	25.0	Sand	4	0.031	53				38	120
6	88	0.0	Sand	4	0.042	73				44	200

Applies to Piers: 1, 2 & 3

Ground Surface Elevation (ft): 87.7

Soil Layer	Depth to Layer Bottom	Bottom of Layer Elevation	Soil Type	KSOIL	DYNAMIC ANALYSIS Effective Unit Weight of Soil		Cohesion		Axial Strain ε_{50}	Friction Angle ϕ	Modulus of Subgrade Reaction k
	ft	ft			lb/in3	pcf	psi	psf	(%)	(deg)	pci
1	8	80.0	Sand	4	0.072	125				36	160
2	11	77.0	Sand	4	0.069	120				32	80
3	24	64.0	Soft Clay	1	0.019	33	1.04	150	2.5		
4	50	38.0	Sand	4	0.039	68				38	120
5	63	25.0	Sand	4	0.031	53				38	120
6	88	0.0	Sand	4	0.042	73				44	200

FIGURE F-9 : P-Y CURVE SOIL DATA



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$, K_p includes a factor of safety of 1.5(K_p/1.5). Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3D.

3: $\Delta K_{ae} = (K_{ae} - K_a)$

Figure F-10: Typical Earth Pressure Diagram for Soldier Pile Wall F, G, H, and J

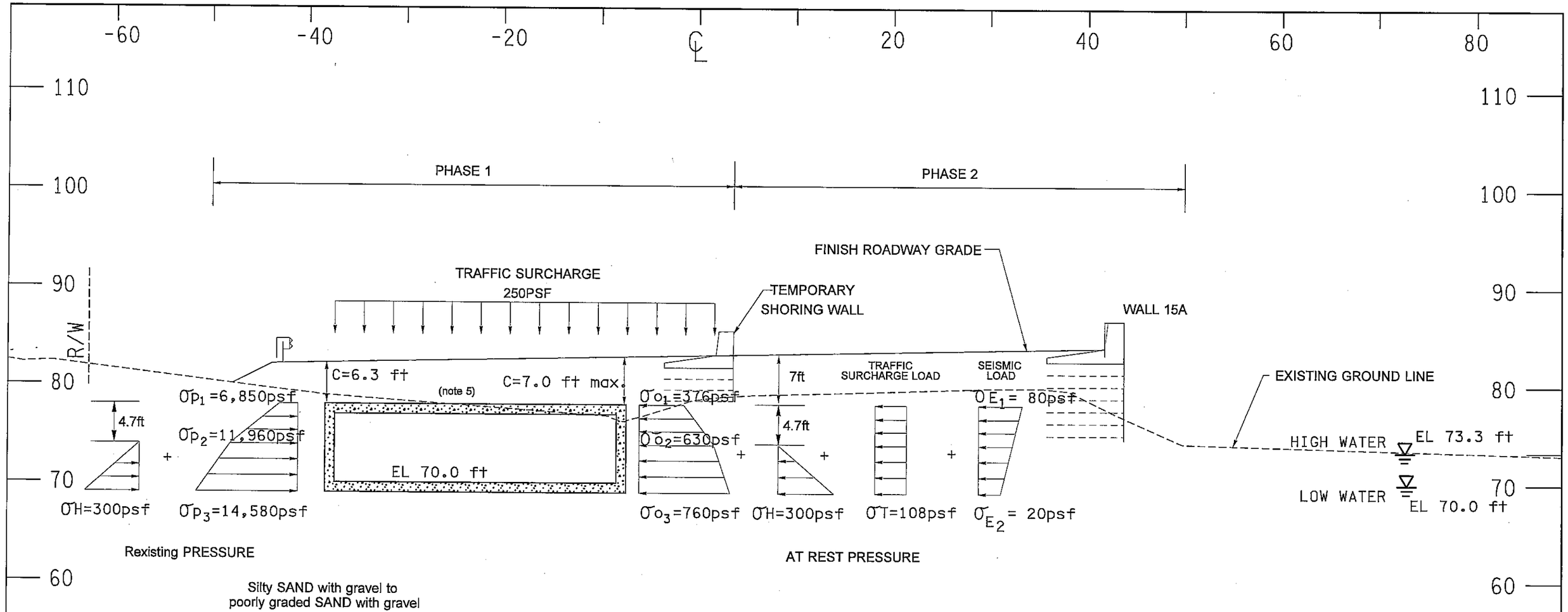
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY
BRIDGE 202/47 REPLACEMENT

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 8/2004
SCALE N.T.S. VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\F\202_46 planpro.dgn 10/20/2004 01:02:33 PM



Silty SAND with gravel to
poorly graded SAND with gravel

ϕ=35°
γ=125 pcf
Ko=0.43
Ka=0.27
Kp=8.7
ΔKae=0.10

NOTES:
1: At-rest pressure is given as $\sigma_o = K_o \gamma H$.
2: Rexisting pressure is given as $\sigma_p = K_p \gamma H$.
3: Traffic surcharge and cover surchargeis given as $\sigma_T = K_o(\gamma H)$
4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae}\ \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$
5: Cover surcharge varies between 3.0ft and 7.0ft.
6: Assumed top of vault to be at elevation 78ft and assumed bottom of vault to be at elevation 68.5ft.

JOB OL-3498 S.R. 202 C.S. 1710

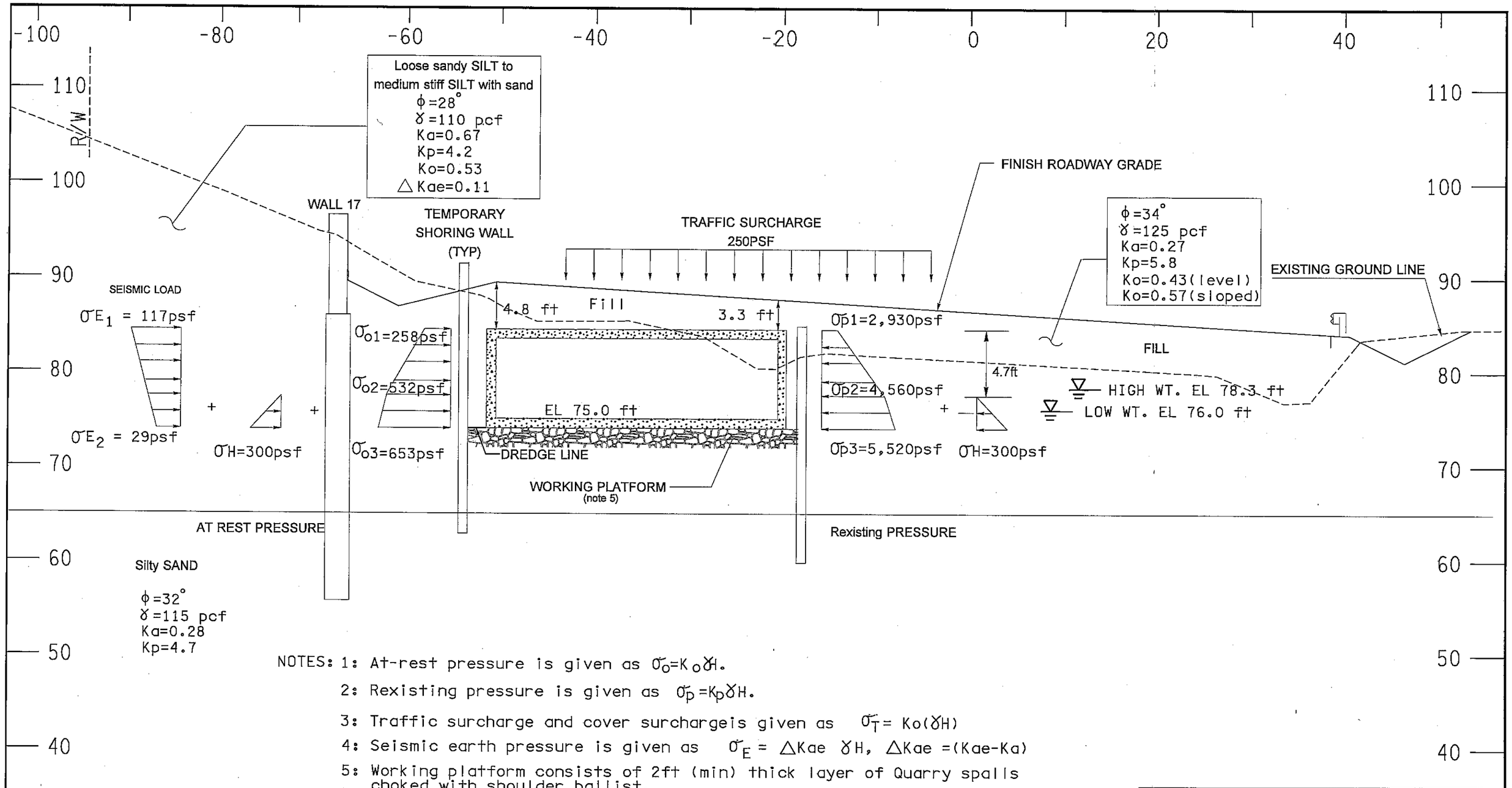
SR 520 TO SAHALEE WAY
WET VAULT 1

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure F-11: Typical Earth Pressure Diagram for Wet Vault 1
Sta 209+54 to 210+85

...\004-21-04\F\202_46 planpro.dgn 10/21/2004 01:35:30 PM



NOTES:
1: At-rest pressure is given as $\sigma_o = K_o \gamma H$.
2: Rexisting pressure is given as $\sigma_p = K_p \gamma H$.
3: Traffic surcharge and cover surchargeis given as $\sigma_T = K_o(\gamma H)$
4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae}\ \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$
5: Working platform consists of 2ft (min) thick layer of Quarry spalls choked with shoulder ballist.
6: Assumed top of vault to be at elevation 85ft and assumed bottom of vault to be at elevation 73.5ft.

Figure F-12: Typical Earth Pressure Diagram for Wet Vault 2
Sta 226+20 to 228+25

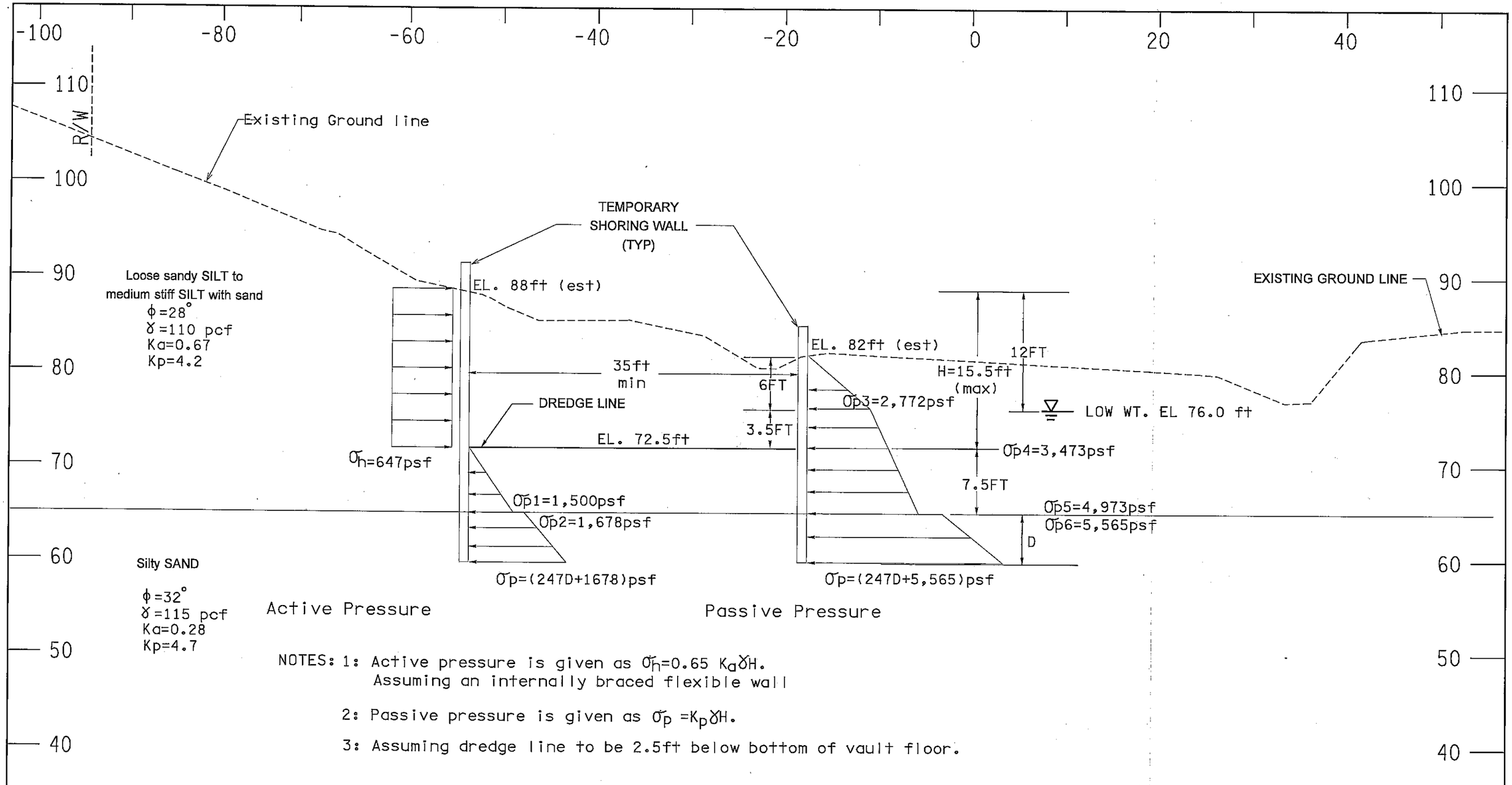
JOB OL-3498 S.R. 202 C.S. 1710

SR 520 TO SAHALEE WAY
WET VAULT 2

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\F\202_46 planpro.dgn 09/09/2004 03:00:16 PM



NOTES: 1: Active pressure is given as $\sigma_h = 0.65\ K_a \gamma H$.
Assuming an internally braced flexible wall

2: Passive pressure is given as $\sigma_p = K_p \gamma H$.

3: Assuming dredge line to be 2.5ft below bottom of vault floor.

JOB OL-3498 S.R. 202 C.S. 1710

SR 520 TO SAHALEE WAY
WET VAULT 2

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure F-13: Typical Earth pressure Diagram for
Temporary Shoring Wall Sta 226+20 to 228+25

...\004-21-04\F\202_46 planpro.dgn 09/09/2004 03:16:29 PM

APPENDIX - G

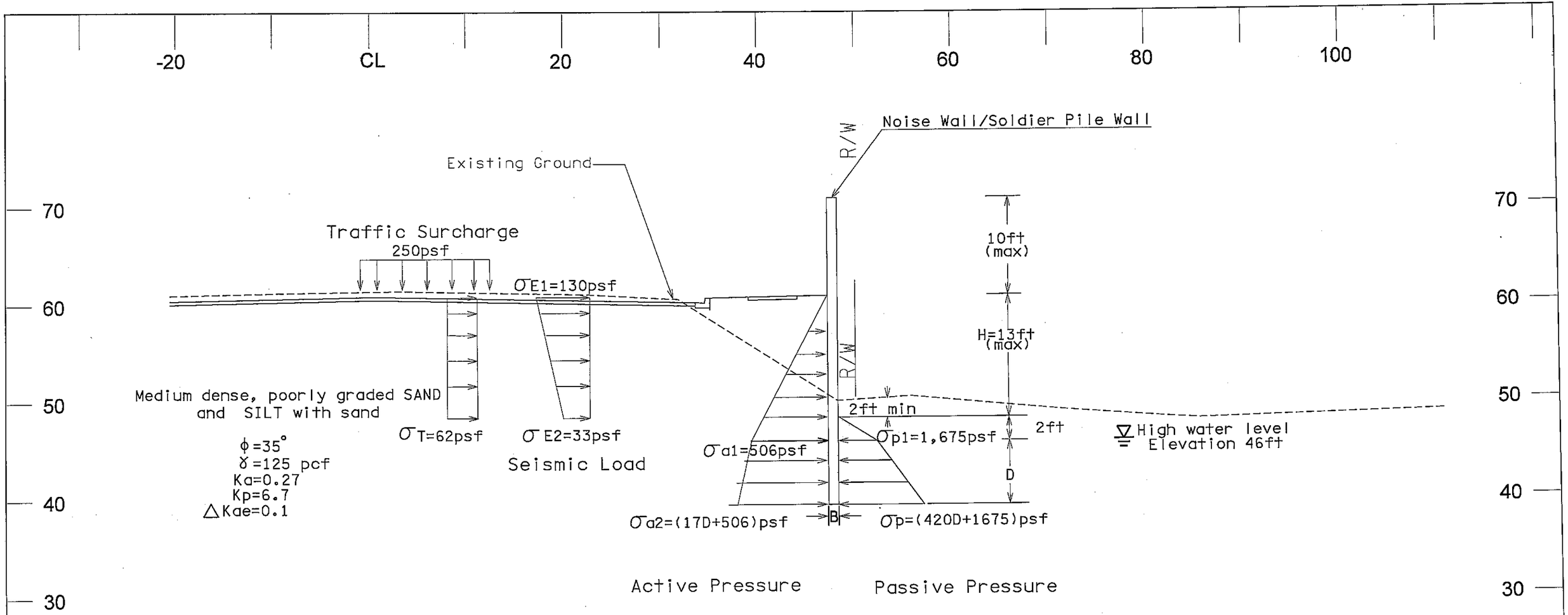
RETAINING WALL DESIGN FIGURES

Figure G-1	Typical Earth Pressure Diagram for Wall 1a – Sta. 143+31 to Sta. 144+30 (RT)
Figure G-2	Typical Earth Pressure Diagram for Wall 1a – Sta. 144+30 to Sta, 147+70 (RT)
Figure G-3	Typical Earth Pressure Diagram for Wall 1b (Alt. 1), Sta. 148+70 to Sta. 153+00
Figure G-4	Standard Wall or L-Wall Detail for Wall 1b (Alt. 2), Sta. 147+70 to Sta. 153+79
Figure G-5	Typical Rock Wall Section In Cut for Walls 3, 5 and 11
Figure G-6	Typical Earth Pressure Diagram for Wall 6 - Wall Sta. 13+60 to Sta. 15+50
Figure G-6A	Typical Rock Wall Section for Wall 6 (Alternative Design), Wall Sta. 13+60 to Sta. 15+50
Figure G-6B	Typical Rock Wall Section for Wall 6 Wall Sta. 10+00 to Sta. 13+60 and Wall Sta. 15+50 to Sta. 16+05
Figure G-7	Typical Rock Wall Section for Walls 7 and 8
Figure G-8	Typical Earth Pressure Diagram for Wall 8 – Sta. 160+27.5 to Sta, 164+40 (LT)
Figure G-9	Typical Earth Pressure Diagram for Wall 8 – Sta. 164+40 to Sta. 168+20 (LT)
Figure G-10	Typical Earth Pressure Diagram for Wall 9 – Sta. 161+80 to Sta. 165+55 (RT)
Figure G-11	Typical Earth Pressure Diagram for Wall 10 – Sta. 168+00 to Sta. 171+75 (RT)
Figure G-12	Typical Earth Pressure Diagram for Wall 10 – Sta. 177+00 to Sta. 178+60 (RT)
Figure G-13	Typical Earth Pressure Diagram for Wall 11 – Sta. 173+00 to Sta. 175+50 (LT)
Figure G-14	Typical Earth Pressure Diagram for Wall 11 – Sta. 175+50 to Sta. 177+60 (LT)
Figure G-15	Typical Earth Pressure Diagram for Wall 11 – Sta. 177+60 to Sta. 178+10 (LT)
Figure G-16	Typical Earth Pressure Diagram for Wall 12 – Wall Sta. 10+00 to Wall Sta. 10+76
Figure G-17	Typical Earth Pressure Diagram for Wall 12 – Wall Sta. 15+48 to Wall Sta. 16+89
Figure G-18	Wall 12 – Soil Nail Layout 12 – Wall Sta. 10+76 to Wall Sta. 12+07
Figure G-19	Wall 12 – Soil Nail Layout 12 – Wall Sta. 12+07 to Wall Sta. 13+47
Figure G-20	Wall 12 – Soil Nail Layout 12 – Wall Sta. 12+97 to Wall Sta. 14+37
Figure G-21	Wall 12 – Soil Nail Layout 12 – Wall Sta. 14+37 to Wall Sta. 15+48
Figure G-22	Wall 12 – Soil Nail Layout 12 – Wall Sta. 11+66 to Wall Sta. 12+78
Figure G-23	Wall 13 – Wall Sta. 10+00 to Wall Station 14+70

APPENDIX – G (Continued)

RETAINING WALL DESIGN FIGURES

Figure G-24	Typical Section for MSE Wall in Fill – Walls 13, 14, 18, 19, and 21
Figure G-25	MSE Wall Drainage Detail – Walls 13, 14, 18, 19, and 21
Figure G-26	Typical Section for MSE Wall for Wall 15
Figure G-27	Typical Section for MSE Wall, Wall 15 Sta. 210+50 to Wall Sta. 216+00
Figure G-28	Typical Earth Pressure Diagram for Wall 16a – Sta. 211+70 to Sta. 215+00 (LT)
Figure G-29	Typical Earth Pressure Diagram for Wall 16a – Sta. 215+00 to Sta. 218+00 (LT)
Figure G-30	Typical Earth Pressure Diagram for Wall 16b – Sta. 218+00 to Sta. 218+80 (LT
Figure G-31	Typical Earth Pressure Diagram for Wall 17 – Sta. 225+50 to Sta. 228+15 (LT)
Figure G-32	Typical Earth Pressure Diagram for Wall 20 – Sta. 238+30 to Sta. 239+45 (Assuming Active Pressure)
Figure G-33	Typical Earth Pressure Diagram for Wall 20 – Sta. 238+30 to Sta. 239+45 (Assuming At Rest Pressure Above the Scour Line)
Figure G-34	Temporary Geotextile Wall Section



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae} \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$

Figure G-1: Typical Earth Pressure Diagram for Wall 1A
SR-202 Station 143+31 to 144+30

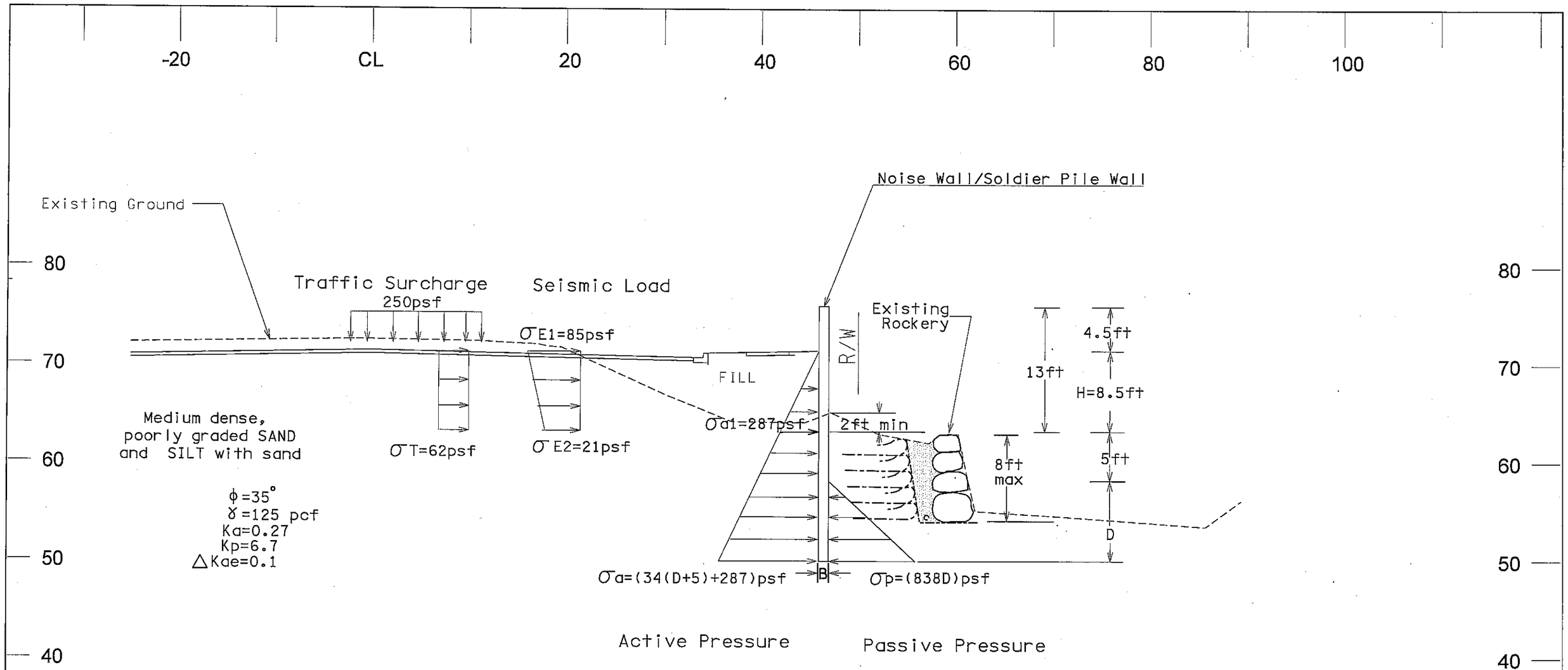
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 11:04:09 AM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae} \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$

Figure G-2: Typical Earth Pressure Diagram for Wall 1A
SR-202 Station 144+30 to 147+70

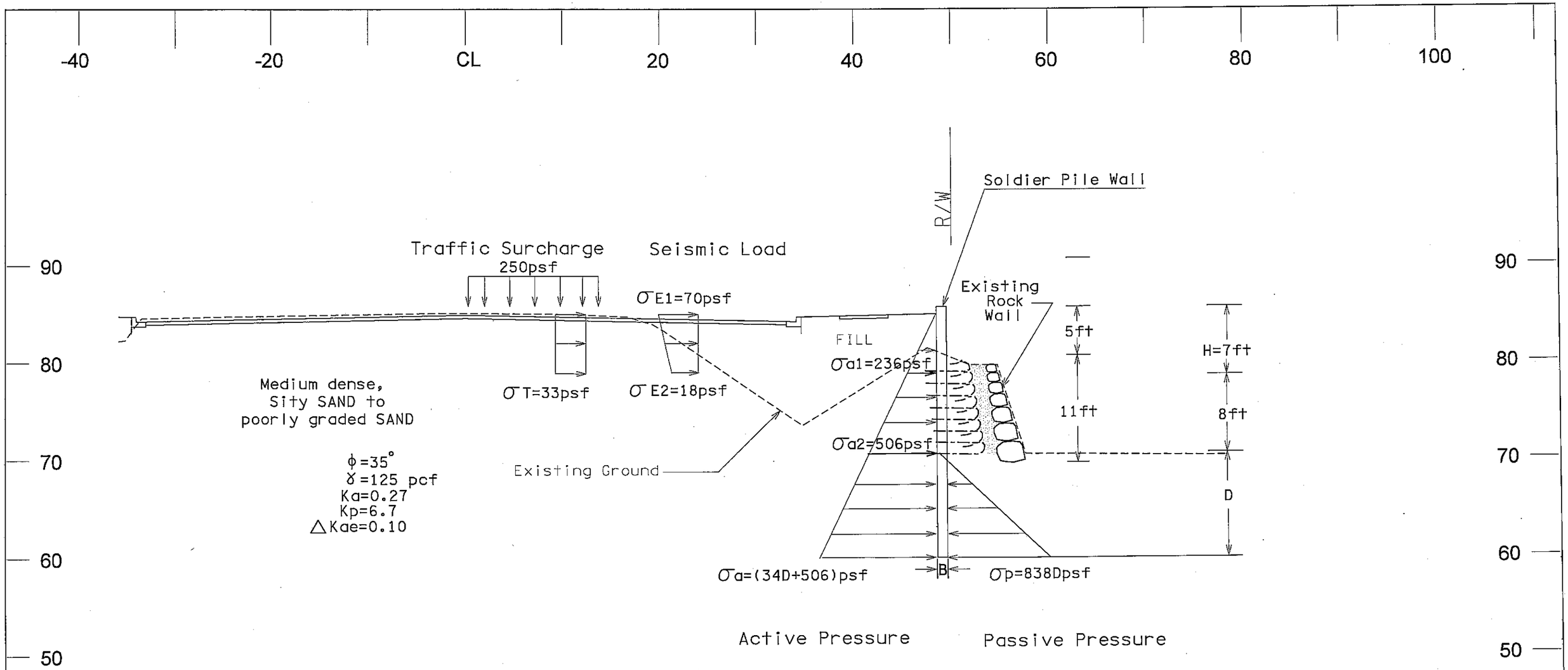
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 11:05:35 AM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae} \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$

Figure G-3: Typical Earth Pressure Diagram for Wall 1B (alterative 1)
SR-202 Station 147+70 to 153+79

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 11:09:56 AM

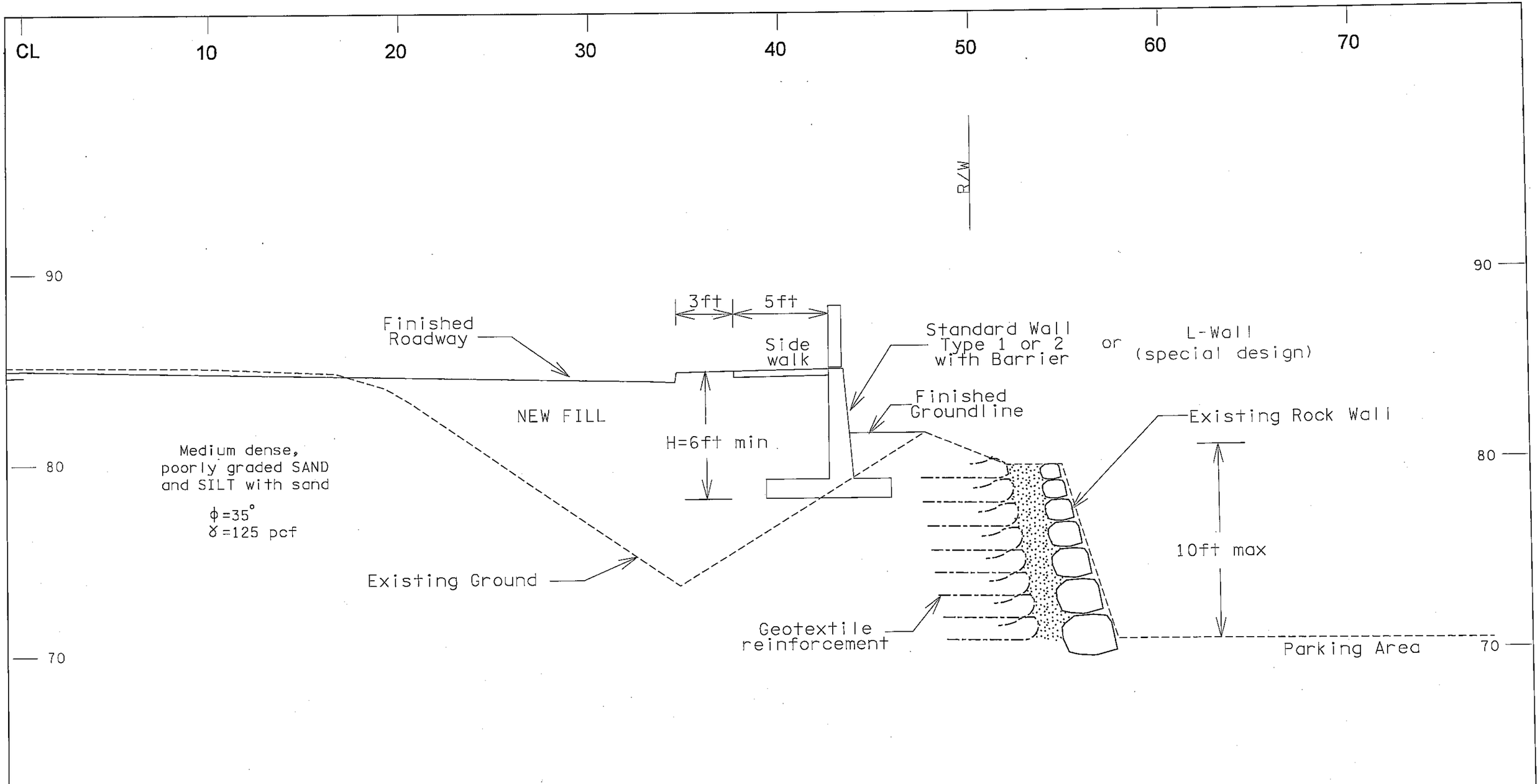


Figure G-4: Design Detail for Wall 1b (Alternative 2)
Station 147+70 to Station 153+79 Lt.

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 9/2004
SCALE 1"=5' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 10/29/2004 08:07:02 AM

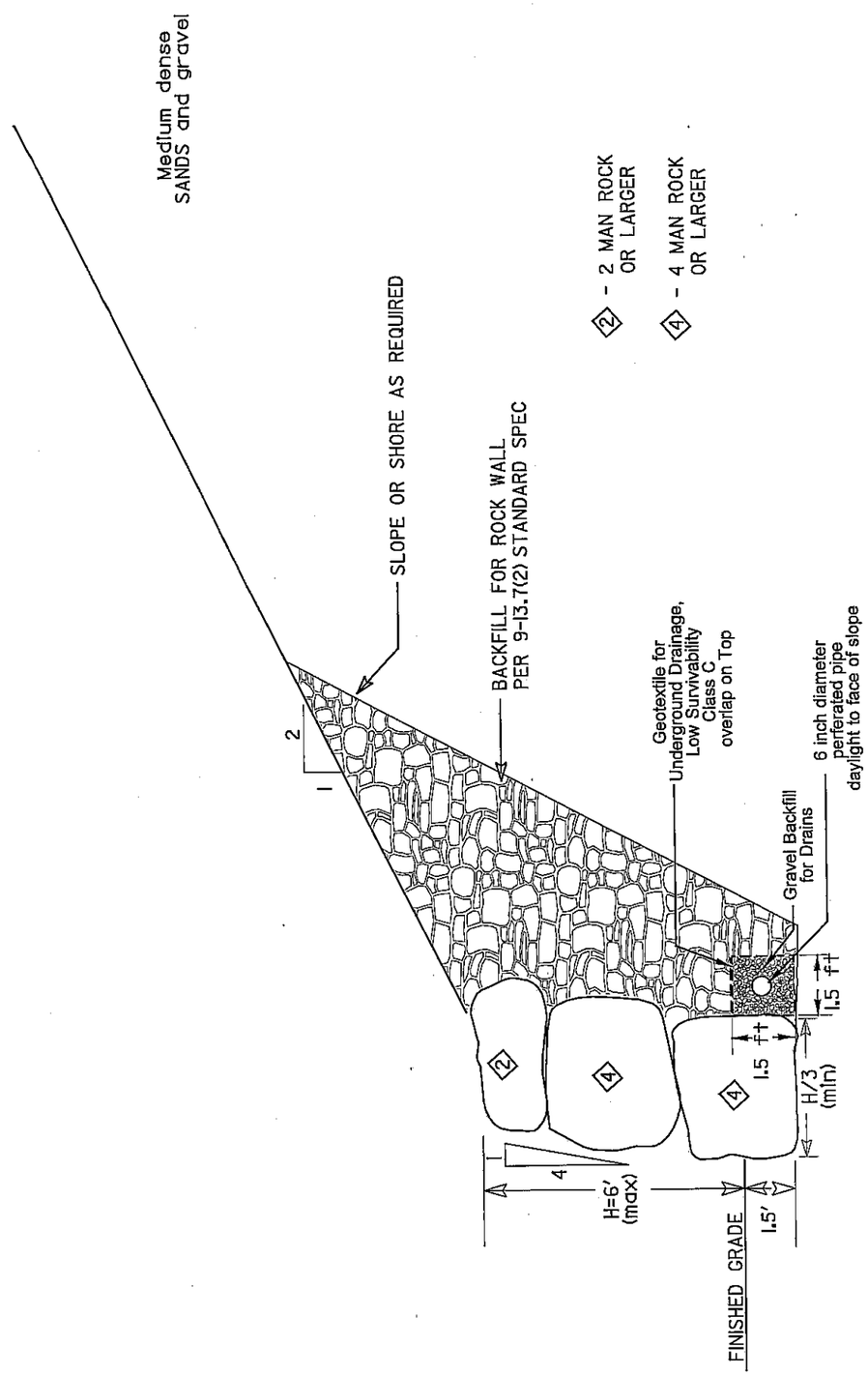


Figure G-5: Typical Rock Wall Section in Cut

Wall 2 Sta. 168+84 to 169+32 (47.5' Lt)
Wall 3 Sta. 169+99 to 170+47 (47.5' Lt)
Wall 4 Sta. 172+34 to 173+00 (47.5' Lt)
Wall 5 Sta. 150+65 to 153+10(47' Lt)
Wall 11 Sta. 173+00 to 175+41 (47.5' Lt)

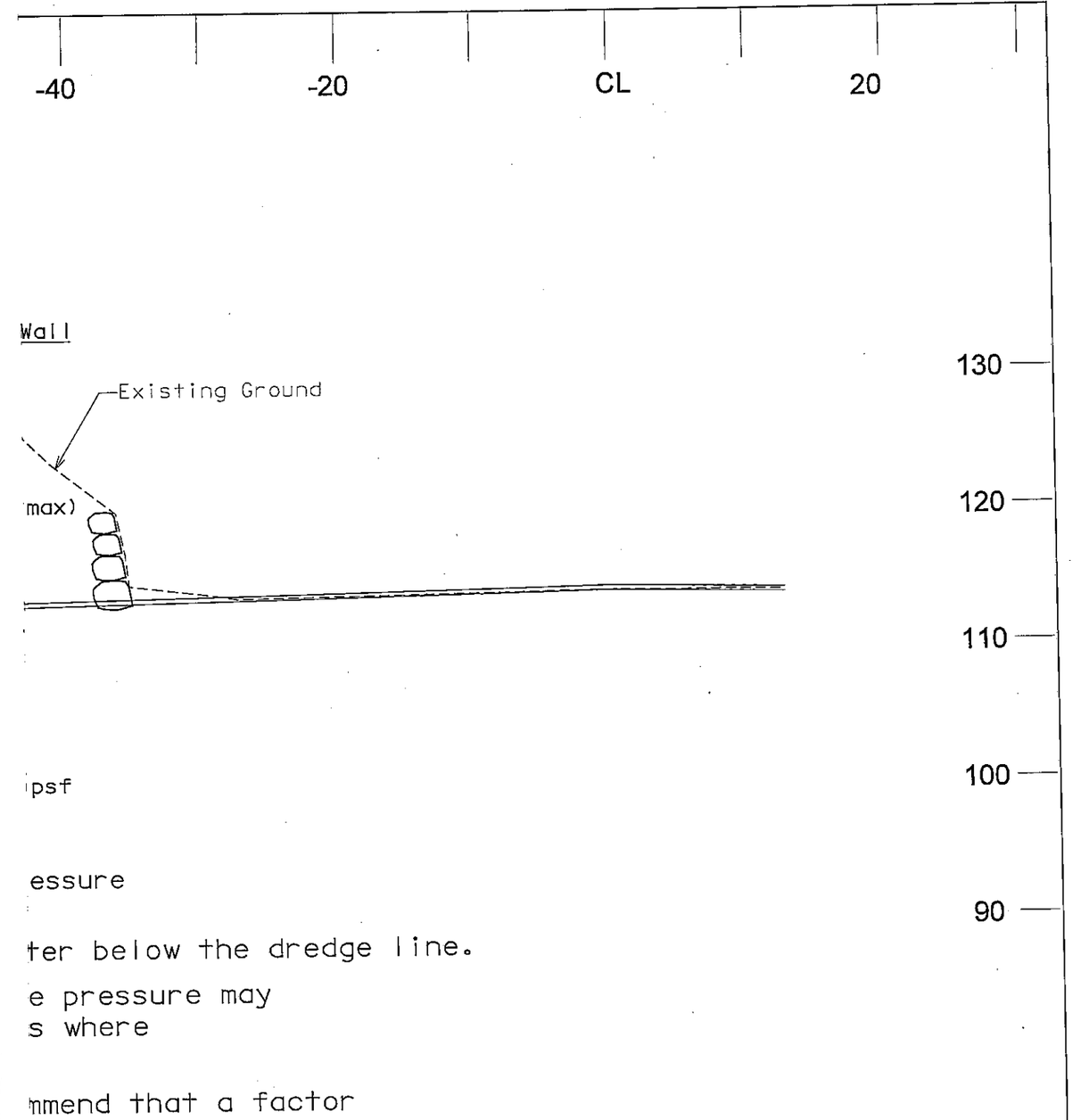
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE Not to Scale VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\6\vaultprofandEP.dgn 11/08/2004 04:12:47 PM



psf

essure

ter below the dredge line.

e pressure may
s where

mmend that a factor
(Kp/1.5)

ae γH, ΔKae =(Kae-Ka)

icient enough that

n for Wall 6

54.3

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

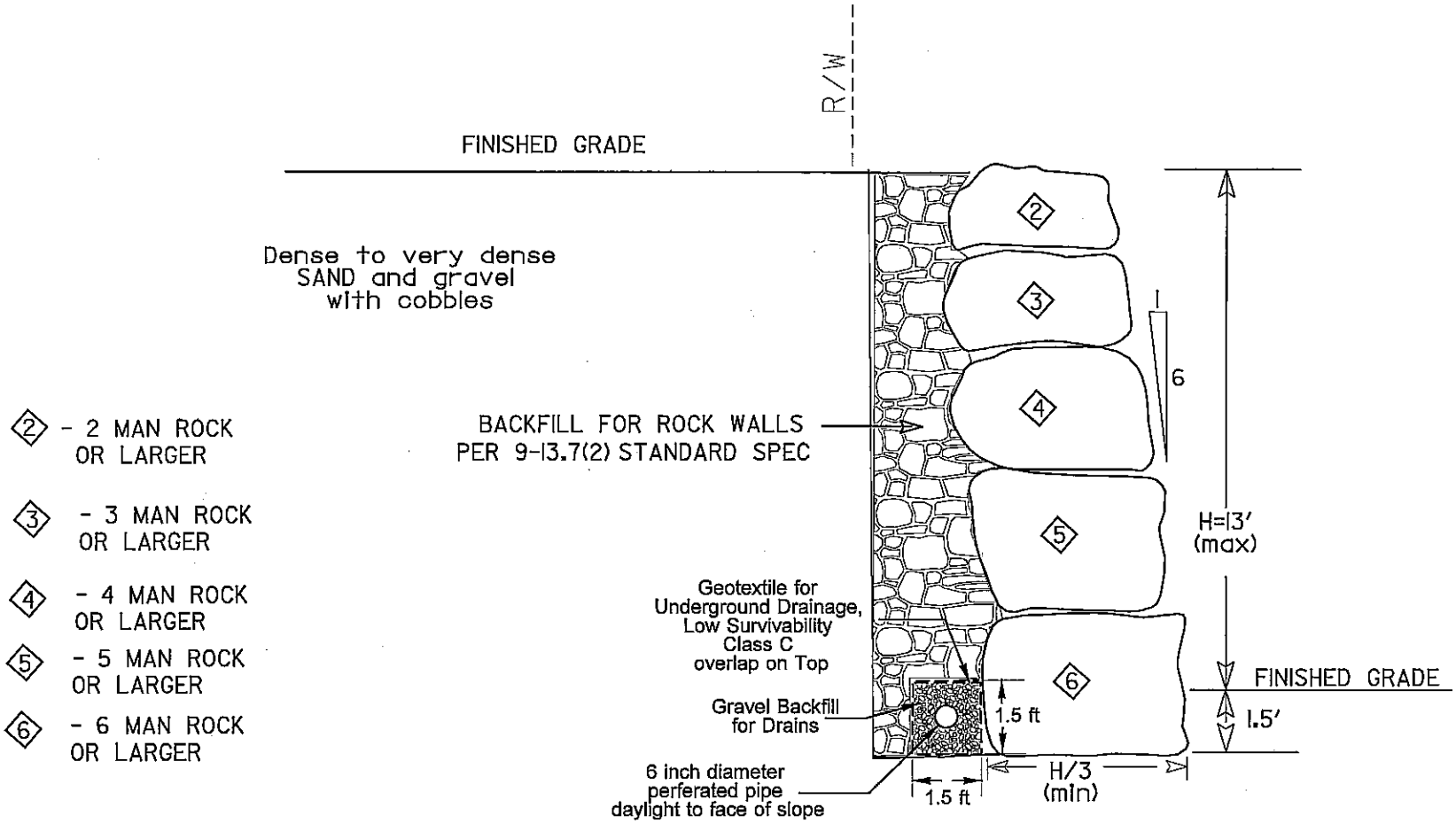


Figure G-6A: Typical Rock Wall Section for Wall 6
Wall Sta. 13+62.3 to 15+54.3

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE Not to Scale VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 10/21/2004 01:05:34 PM

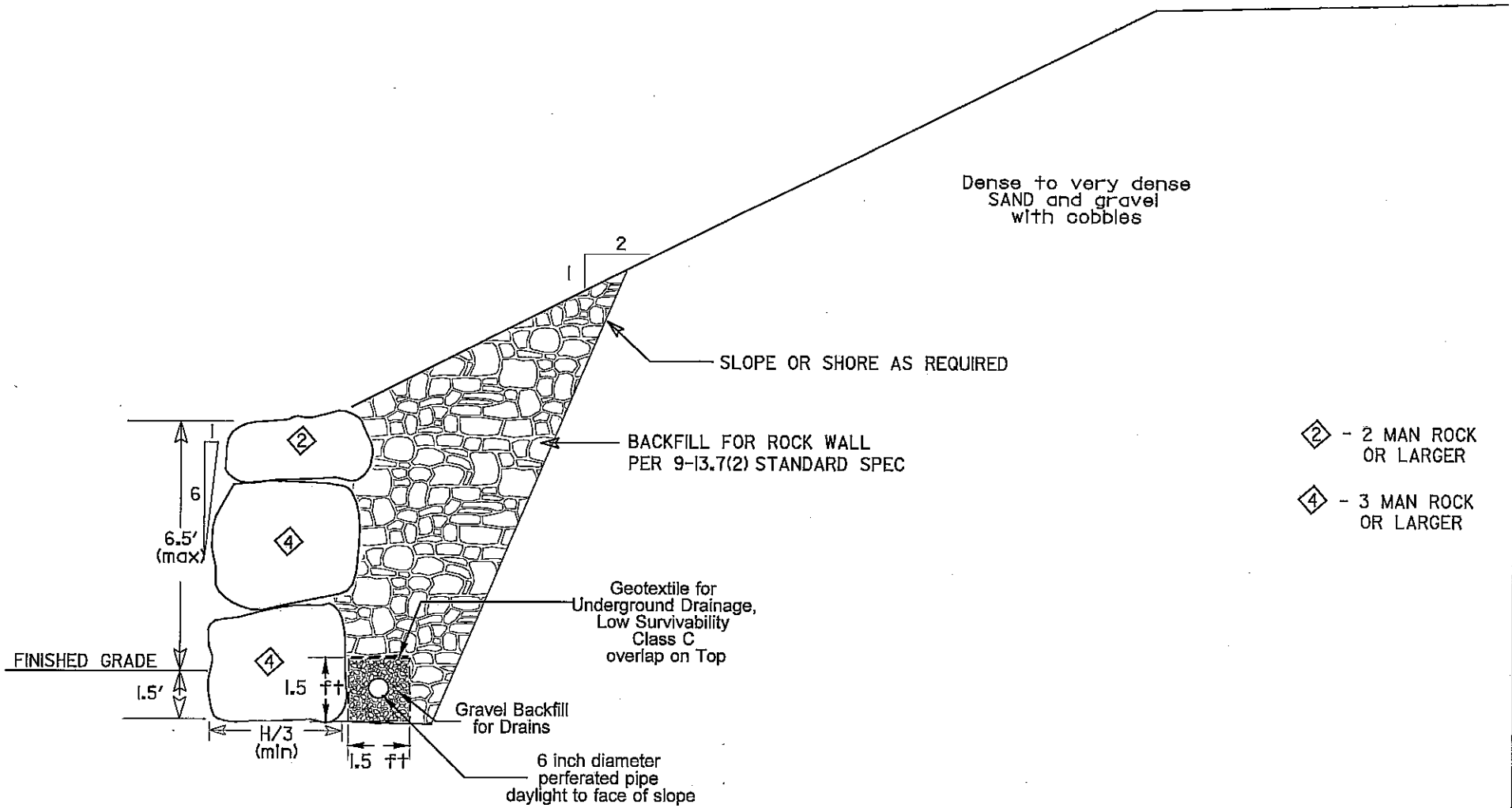


Figure G-6B: Typical Rock Wall Section for Wall 6
Wall Sta. 10+00 to 13+62.3
Wall Sta. 15+54.3 to 16+07

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE Not to Scale VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 10/27/2004 08:50:02 AM

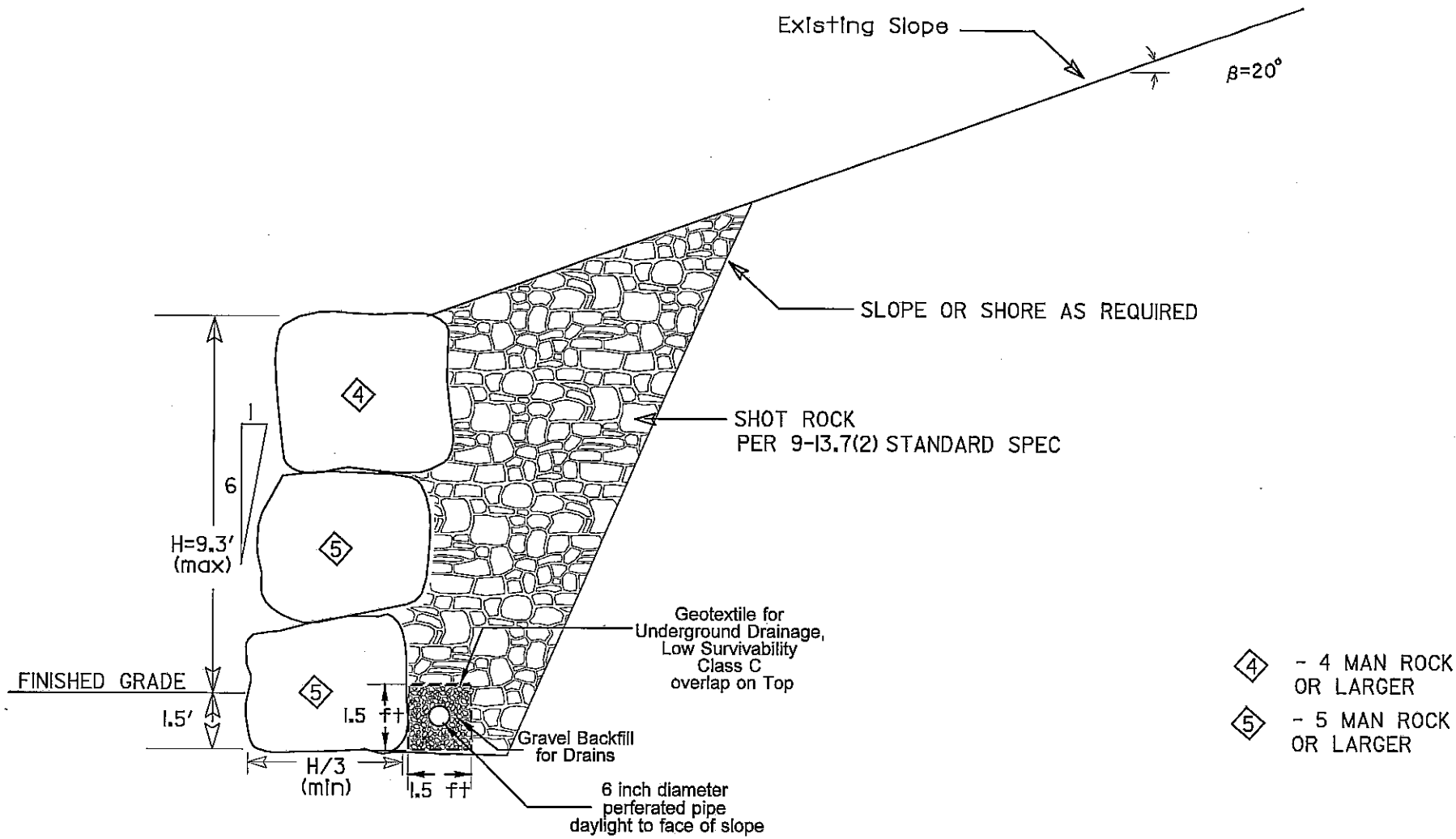


Figure G-7: Typical Rock Wall Section
Wall 7 185th Sta. 11+01 to 185th Sta. 13+50 (29.5' Rt.)
Wall 8 SR-202 Sta. 160+03.5 to SR-202 Sta. 160+27.5 (59.5' Lt)

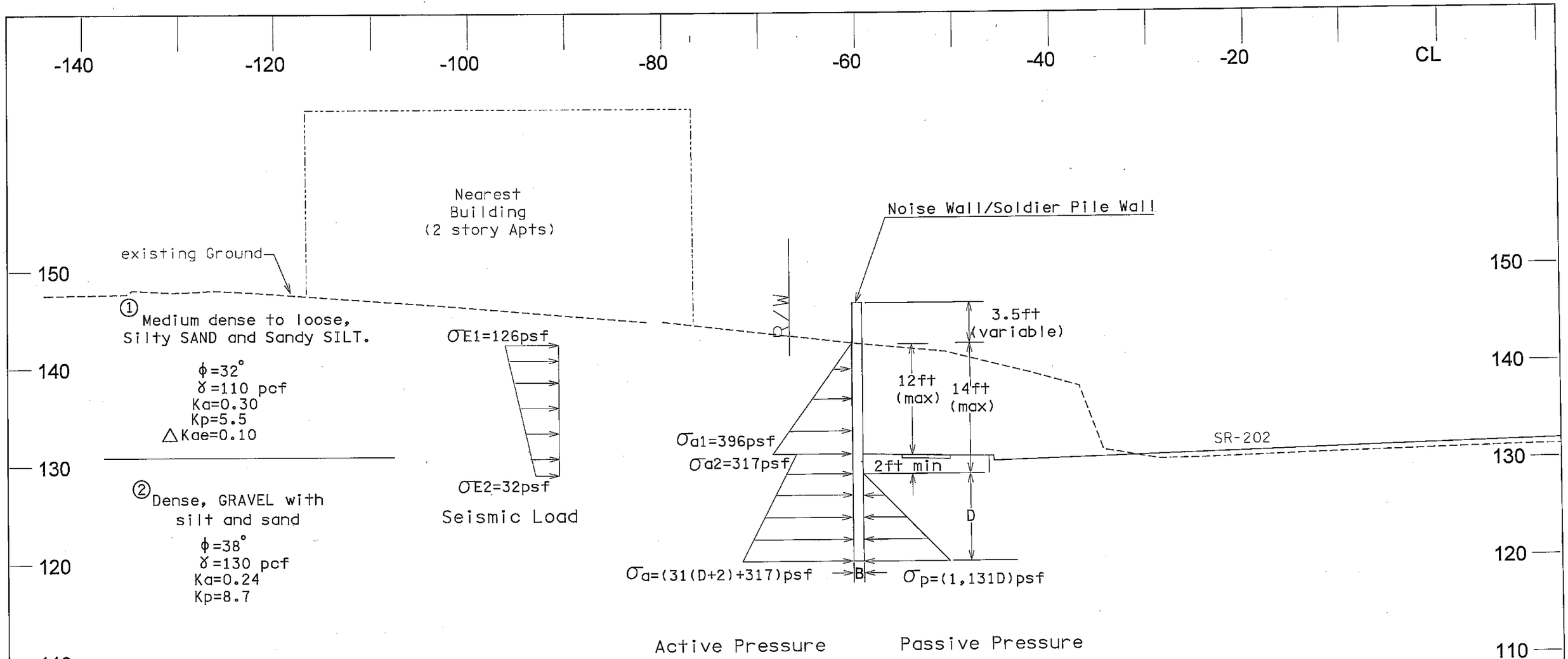
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE Not to Scale VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 10/27/2004 02:19:56 PM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae} \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$

5: The set-back on the existing building is sufficient enough that no additional load is applied to Wall 8.

Figure G-8: Typical Earth Pressure Diagram for Wall 8
SR-202 Sta. 160+27.5 to 164+40 (Lt.)

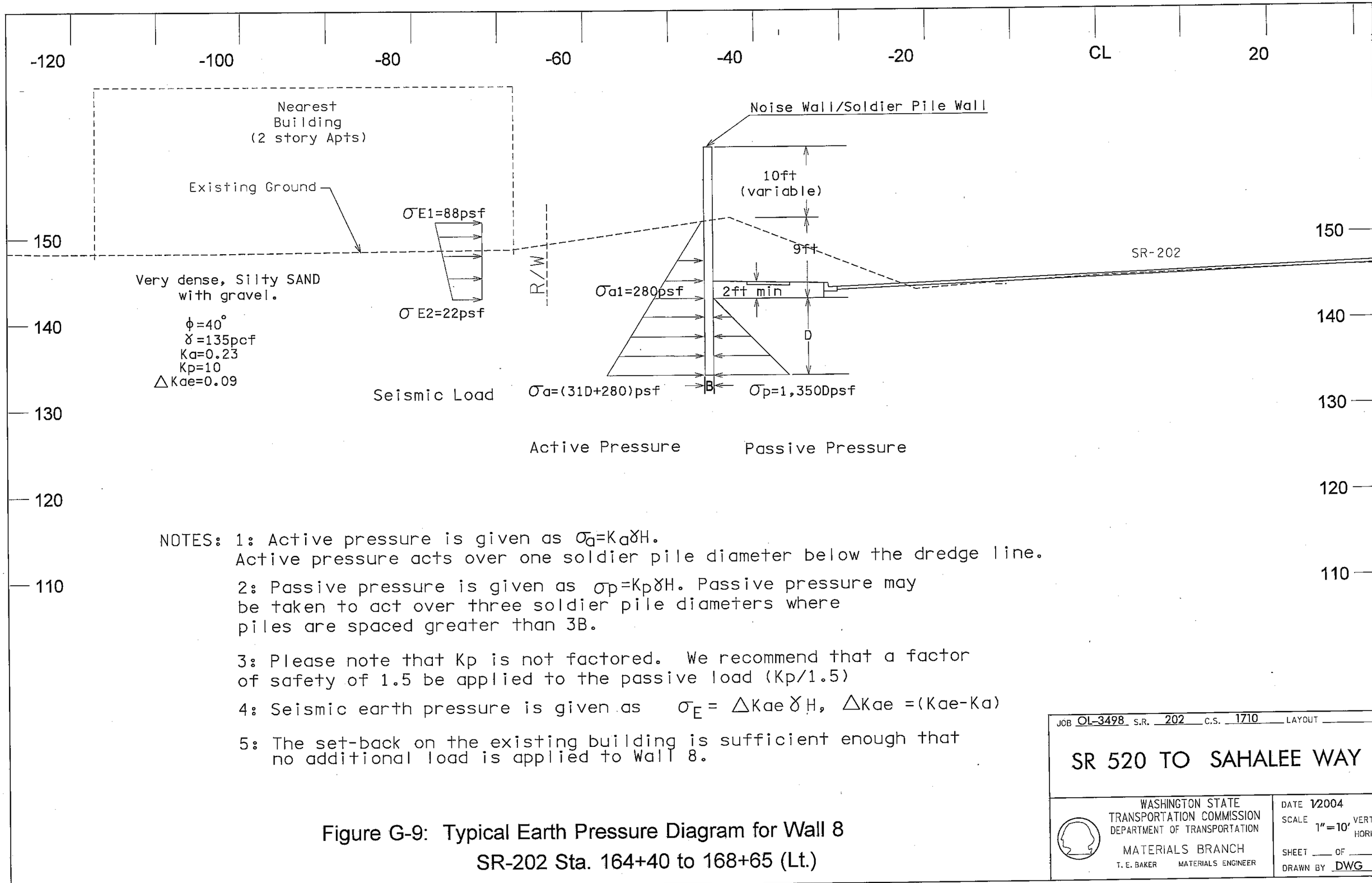
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 12:10:43 PM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae} \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$

5: The set-back on the existing building is sufficient enough that no additional load is applied to Wall 8.

Figure G-9: Typical Earth Pressure Diagram for Wall 8
SR-202 Sta. 164+40 to 168+65 (Lt.)

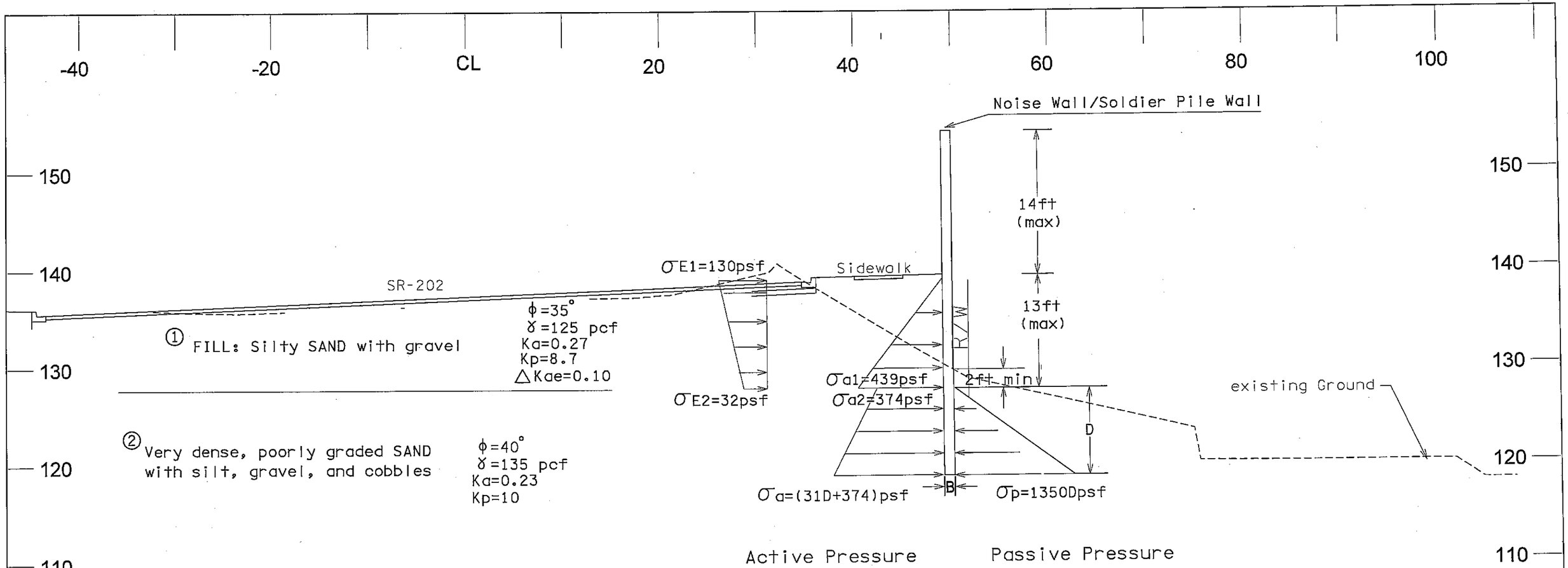
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 11:38:50 AM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae} \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$

Figure G-10: Typical Earth Pressure Diagram for Wall 9
SR-202 Sta. 161+80 to 165+55 (Rt.)

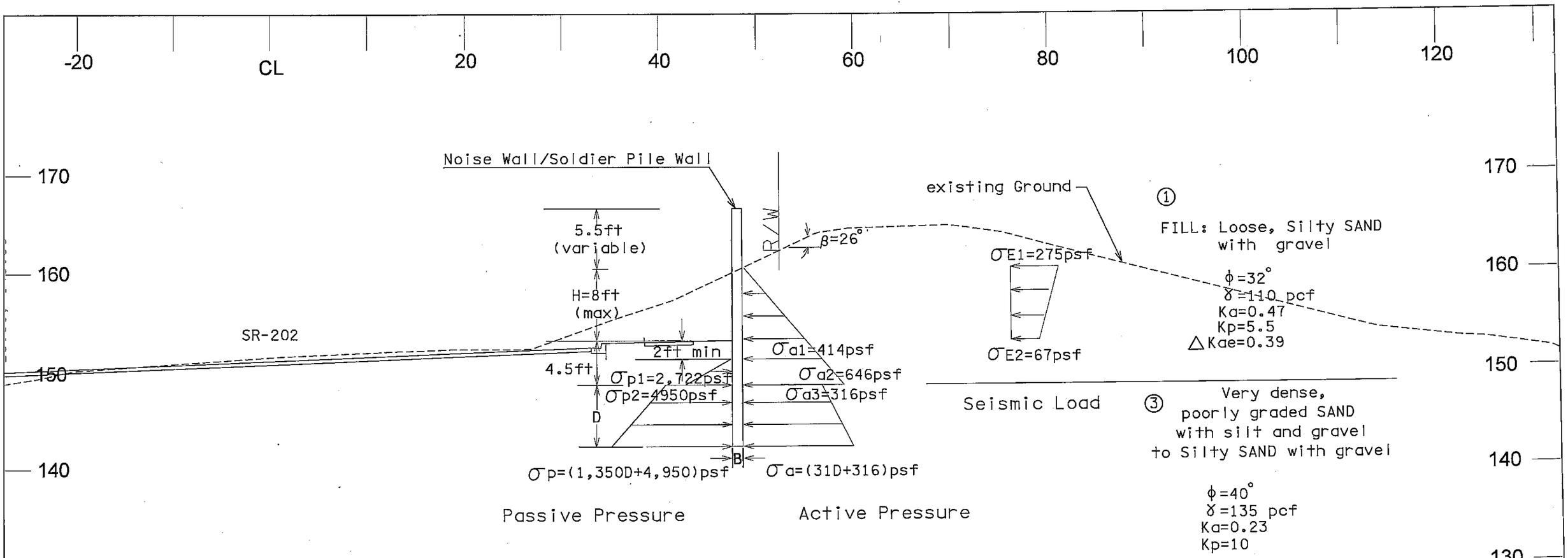
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 11:40:01 AM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae} \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

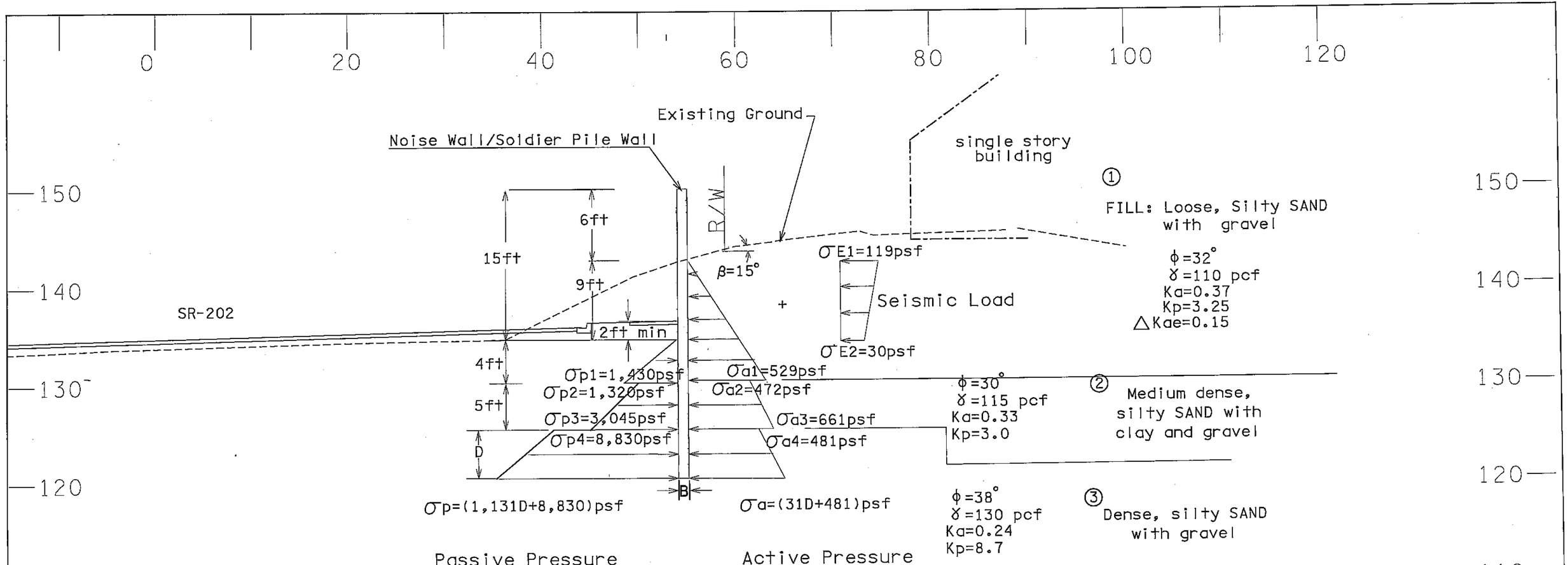
SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure G-11: Typical Earth Pressure Diagram for Wall 10
SR-202 Sta. 168+00 to 171+75 (Rt.)

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 11:40:56 AM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae} \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$

5: The set-back on the existing building is sufficient enough that no additional load is applied to Wall 10.

Figure G-12: Typical Earth Pressure Diagram for Wall 10
SR-202 Sta. 177+00 to 178+60 (Rt.)

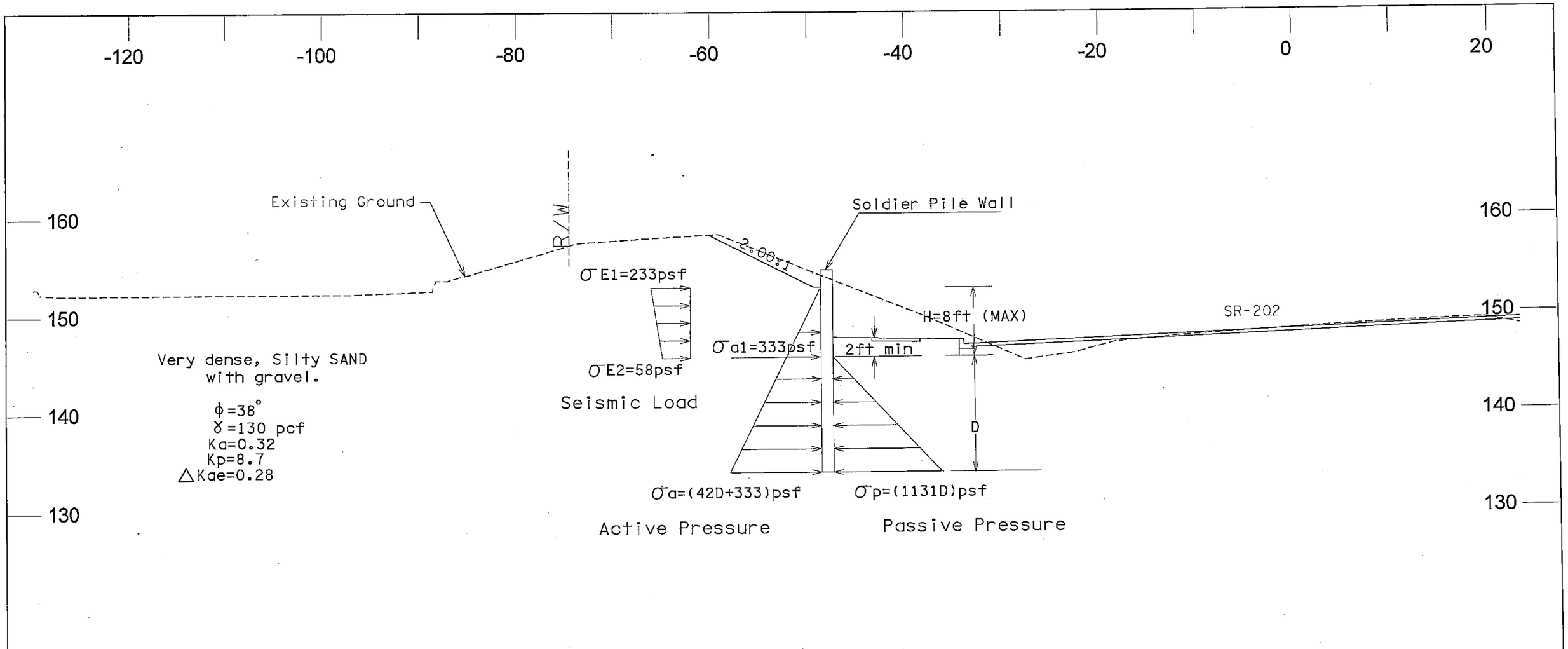
JOB 01-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 11:43:04 AM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae} \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$

Figure G-13: Typical Earth Pressure Diagram for Wall 11
SR-202 Sta. 173+00 to 175+50 (Lt.)

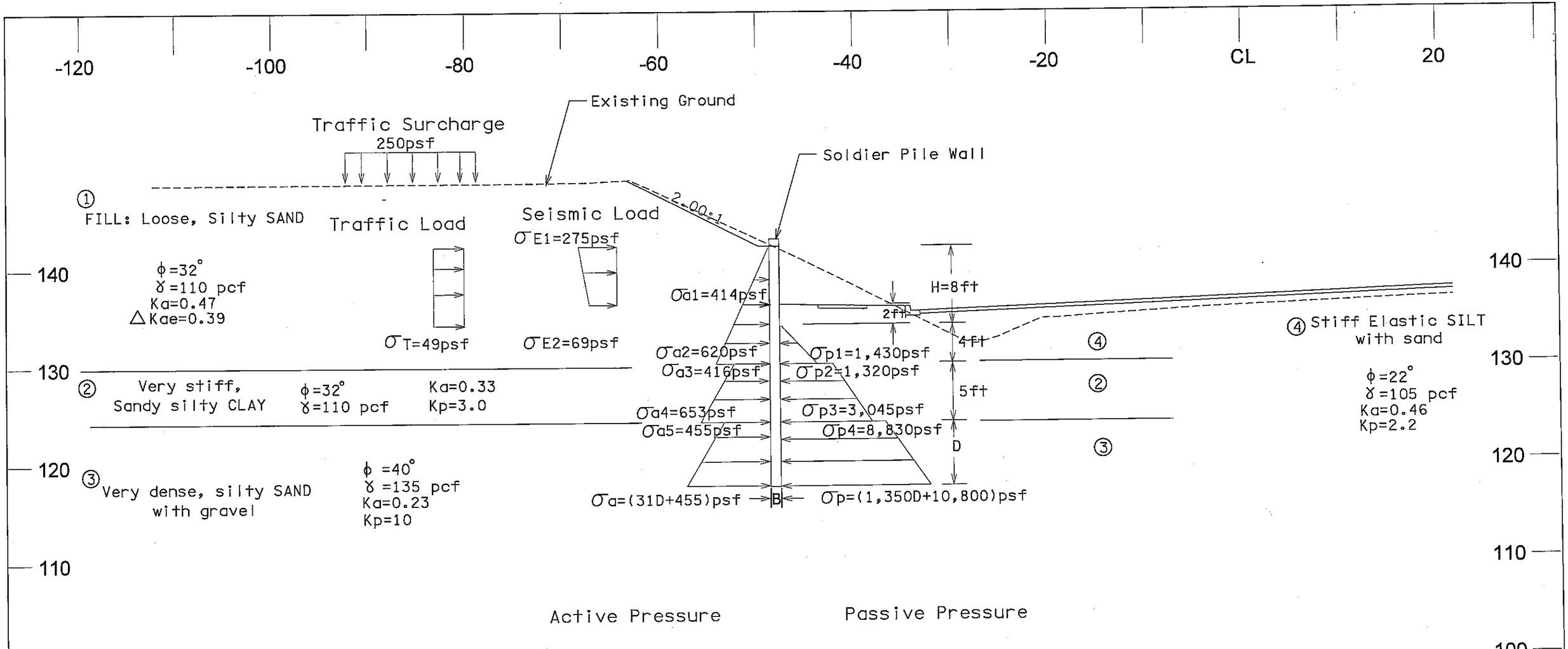
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 11:54:21 AM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae} \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$

Figure G-14: Typical Earth Pressure Diagram for Wall 11
SR-202 Sta. 175+50 to 177+60 (Lt.)

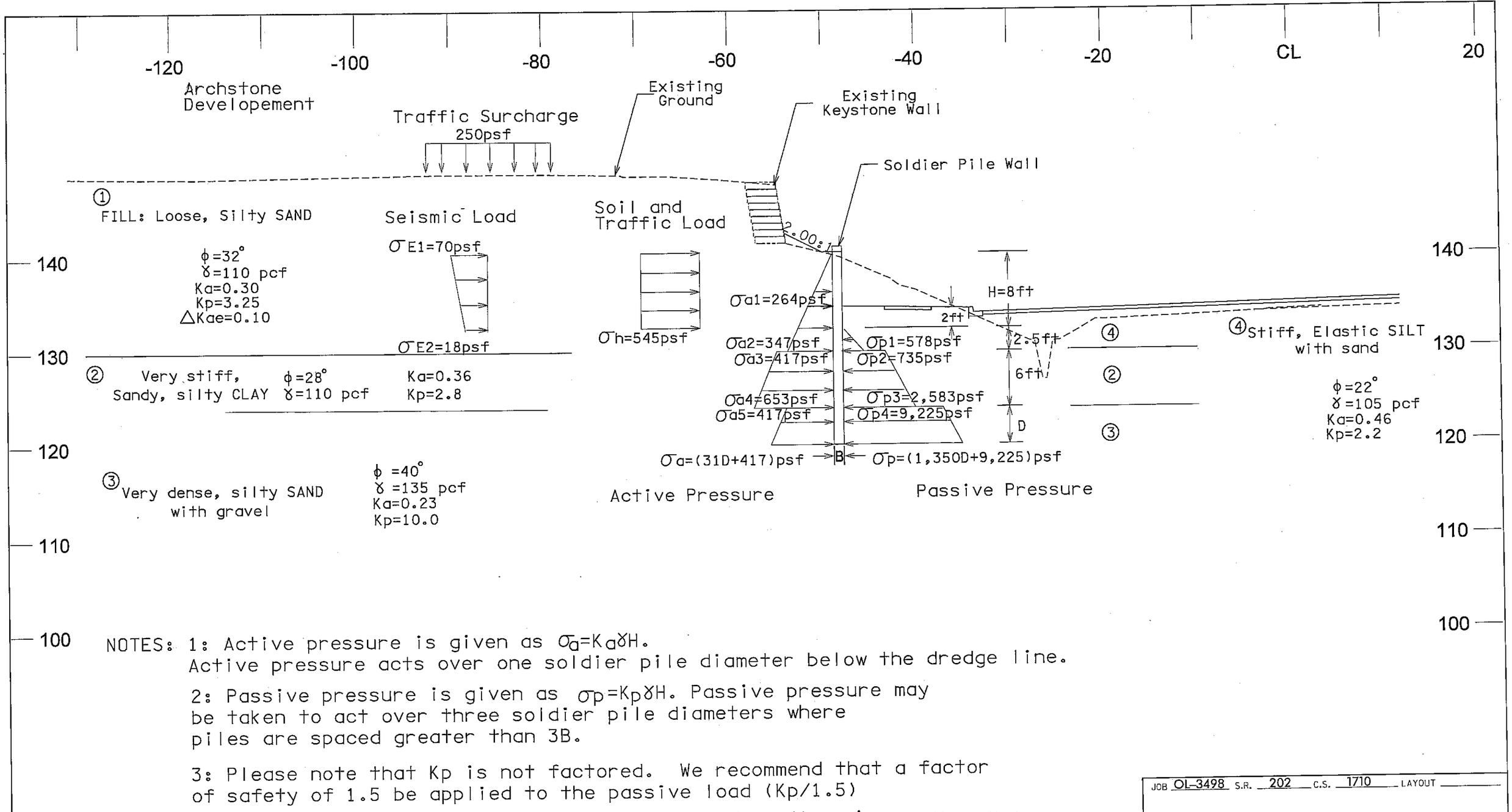
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 11:56:20 AM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae} \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$

Figure G-15: Typical Earth Pressure Diagram for Wall 11
SR-202 Sta. 177+60 to 178+10 (Lt.)

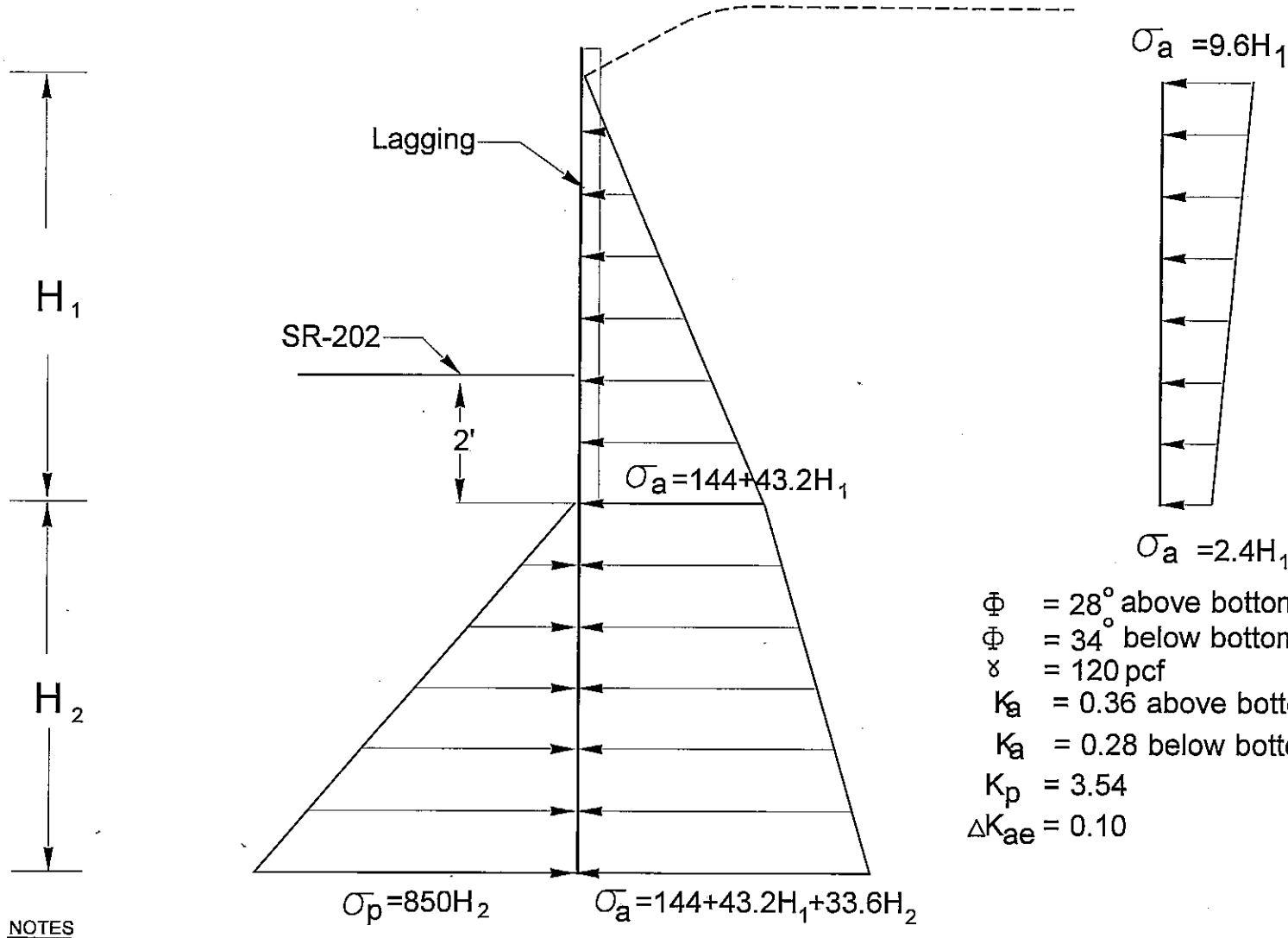
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 11:57:42 AM



Φ = 28° above bottom of lagging
Φ = 34° below bottom of lagging
γ = 120 pcf
K_a = 0.36 above bottom of lagging
K_a = 0.28 below bottom of lagging
K_p = 3.54
ΔK_{ae} = 0.10

NOTES

1: Active pressure below bottom of lagging acts over one pile width.
2: The passive pressure shown should be applied over one pile width.
3: $\sigma_p = 3K_p\gamma D/1.5$: The passive pressure assumes the pressure acts over 3 pile widths and includes a factor of safety of 1.5.
4: Ignore passive pressure below finished grade in front of the wall for a distance of 2 feet.
5: All pressures in pounds per square foot (psf).
6: Extend lagging 2 feet below finished grade in front of the wall.

Figure G-16:

Earth Pressure Diagram for Soldier Pile Walls
Wall Sta. 10+00 to 10+78

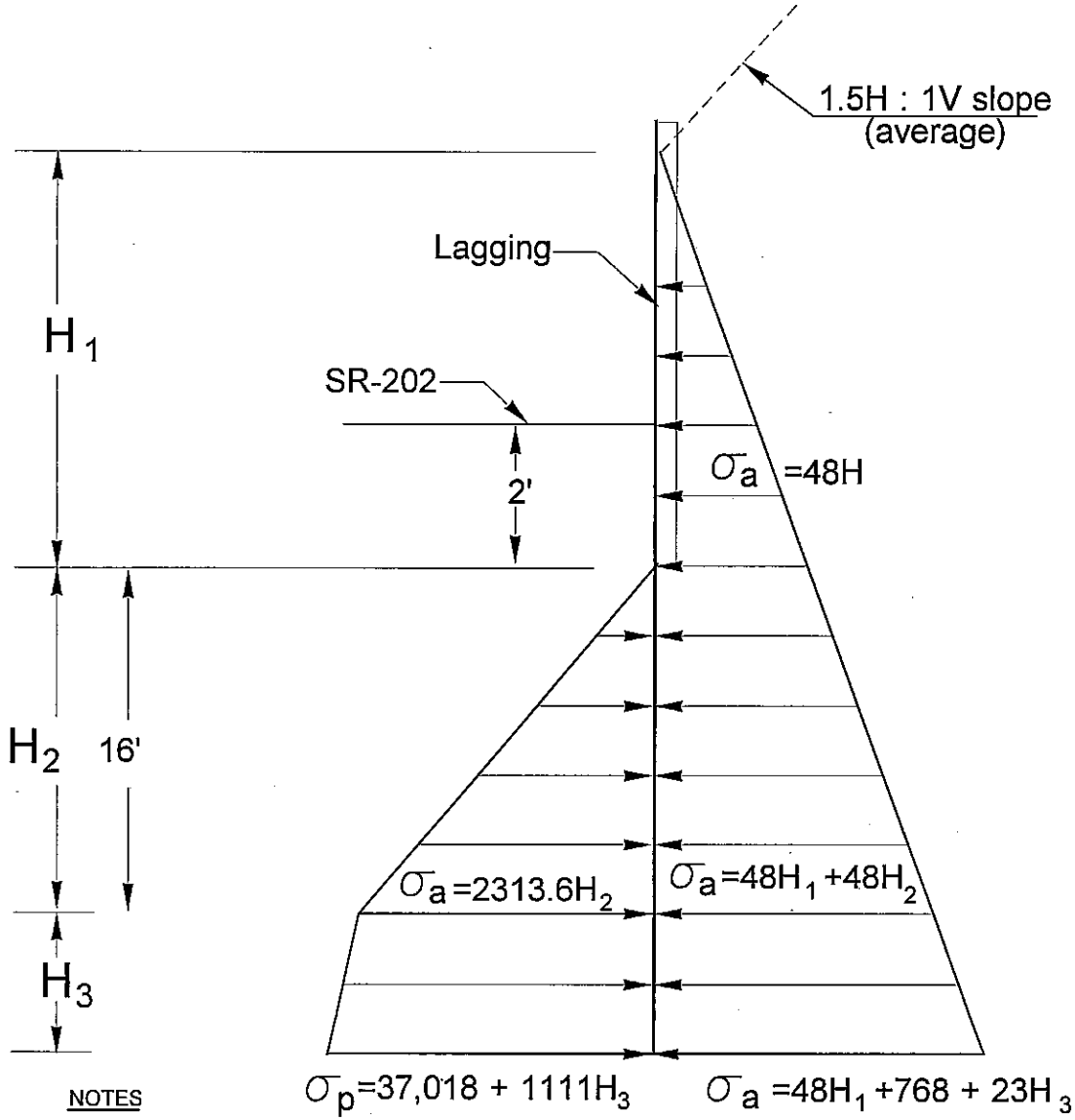
JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

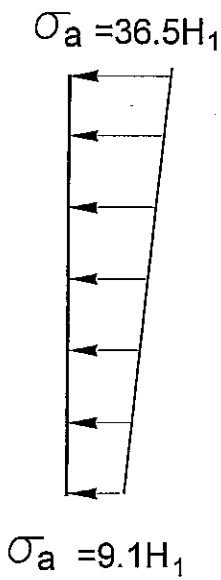
SR 520 TO SAHALEE WAY NE
ROADWAY WIDENING
WALL 12

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
D. C. JACKSON MATERIALS ENGINEER

DATE 6/2003
SCALE NOT TO SCALE VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 10/27/2004 02:16:12 PM





Φ = 38°
γ = 120 pcf
K_a = 0.40
K_p = 9.64
ΔK_{ae} = 0.38

NOTES

1: Active pressure below bottom of lagging acts over one pile width.
2: The passive pressure shown should be applied over one pile width.
3: σ_p=3KpγD/1.5:The passive pressure assumes the pressure acts over 3 pile widths and includes a factor of safety of 1.5.
4: Ignore passive pressure below finished grade in front of the wall for a distance of 2 feet.
5: All pressures in pounds per square foot (psf).
6: Extend lagging 2 feet below finished grade in front of the wall.

Figure G-17
Earth Pressure Diagram for Soldier Pile Walls
Wall Sta. 15+48 to 16+89

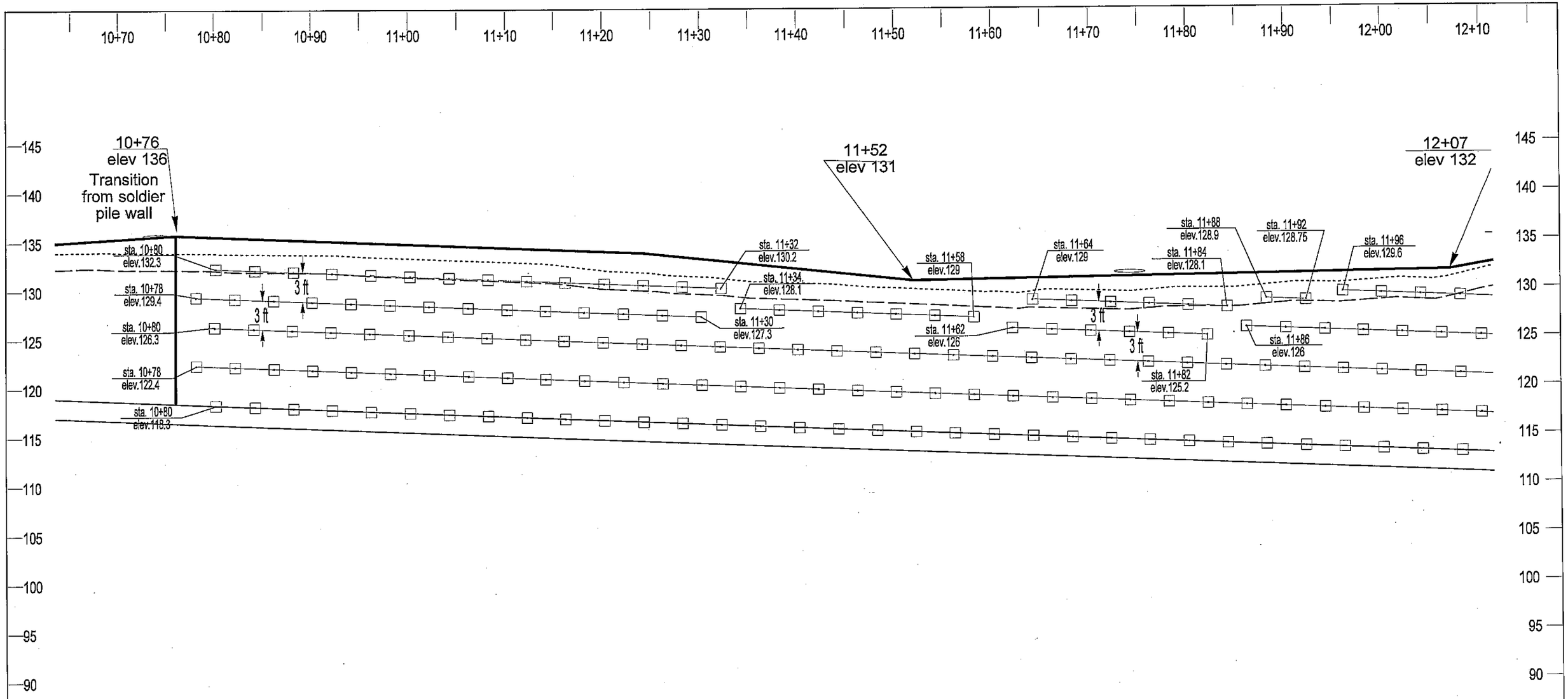
JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 TO SAHALEE WAY NE
ROADWAY WIDENING
WALL 12

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
D. C. JACKSON MATERIALS ENGINEER

DATE 6/2003
SCALE NOT TO SCALE VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 10/27/2004 02:14:40 PM



SOIL NAIL SCHEDULE STA 10+76 TO 12+07

Minimum Nail Length:	22 feet
Nail Declination:	15 degrees
Horizontal Nail Spacing:	4 feet
Minimum Steel Bar Size:	# 9
Allowable Design Load Transfer(DLT):	2000 lb./ft.

LEGEND

TOP OF WALL	———
FINAL GRADE-FRONT	———
EXISTING GRADE-BACK	- - - - -
EXISTING GRADE-FRONT	——— -

Figure G-18: Wall 12 Soil Nail Layout
Wall Sta. 10+76 to 12+07

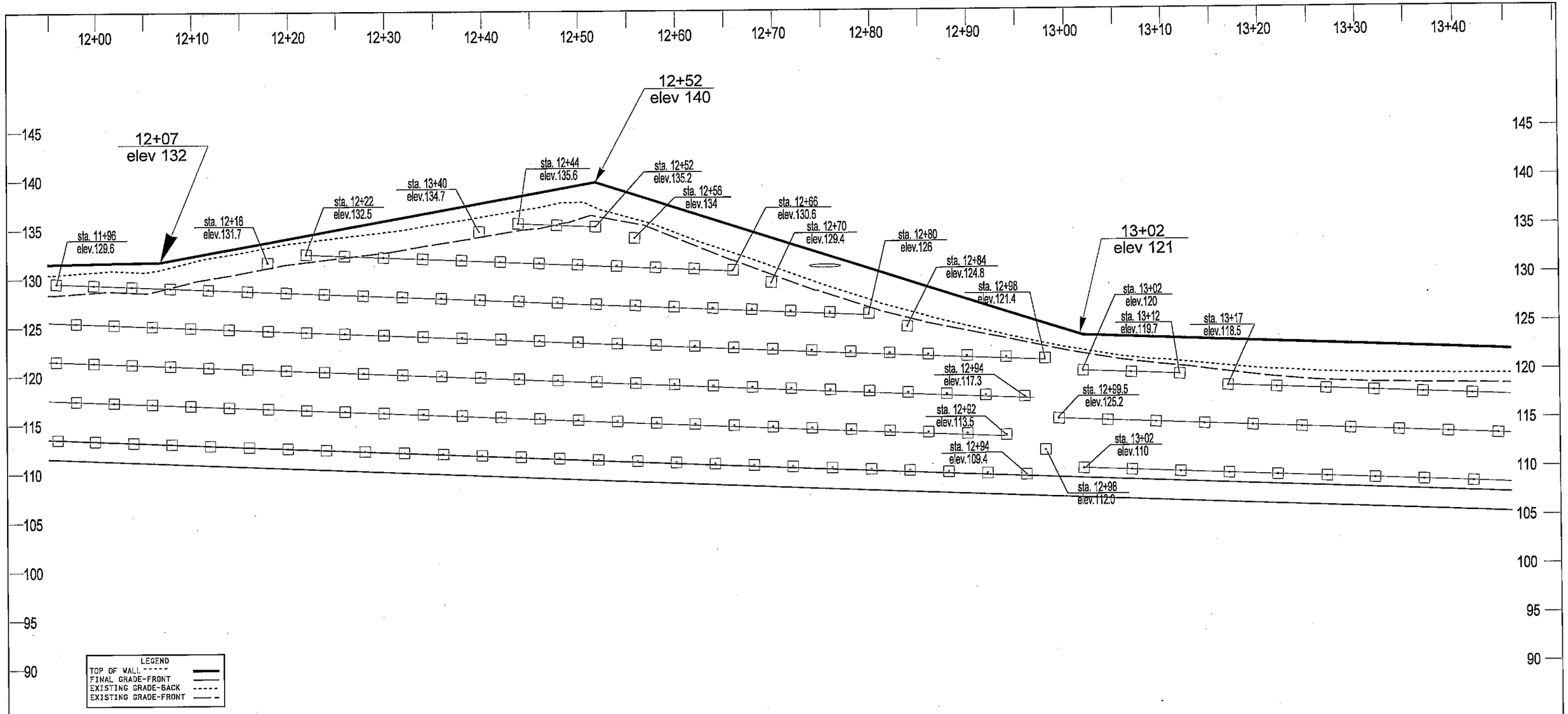
JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 TO SAHALEE WAY NE
ROADWAY WIDENING
WALL 12

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 4/2003
SCALE 1"=10'VERT.
1"=10'HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\G\WALL 12 nail layout.dgn 10/27/2004 02:24:45 PM



SOIL NAIL SCHEDULE STA 12+07 TO 12+57

Minimum Nail Length:	26 feet
Nail Declination:	15 degrees
Horizontal Nail Spacing:	4 feet
Minimum Steel Bar Size:	# 9
Allowable Design Load Transfer(DLT):	2000 lb./ft.

SOIL NAIL SCHEDULE STA 12+57 TO 12+97

Minimum Nail Length:	22 feet
Nail Declination:	15 degrees
Horizontal Nail Spacing:	4 feet
Minimum Steel Bar Size:	# 9
Allowable Design Load Transfer(DLT):	2000 lb./ft.

SOIL NAIL SCHEDULE STA 12+97 TO 14+52

Minimum Nail Length:	14 feet
Nail Declination:	15 degrees
Horizontal Nail Spacing:	5 feet
Minimum Steel Bar Size:	# 9
Allowable Design Load Transfer(DLT):	2000 lb./ft.

Figure G-19: Wall 12 Soil Nail Layout
Wall Sta. 12+07 to 13+47

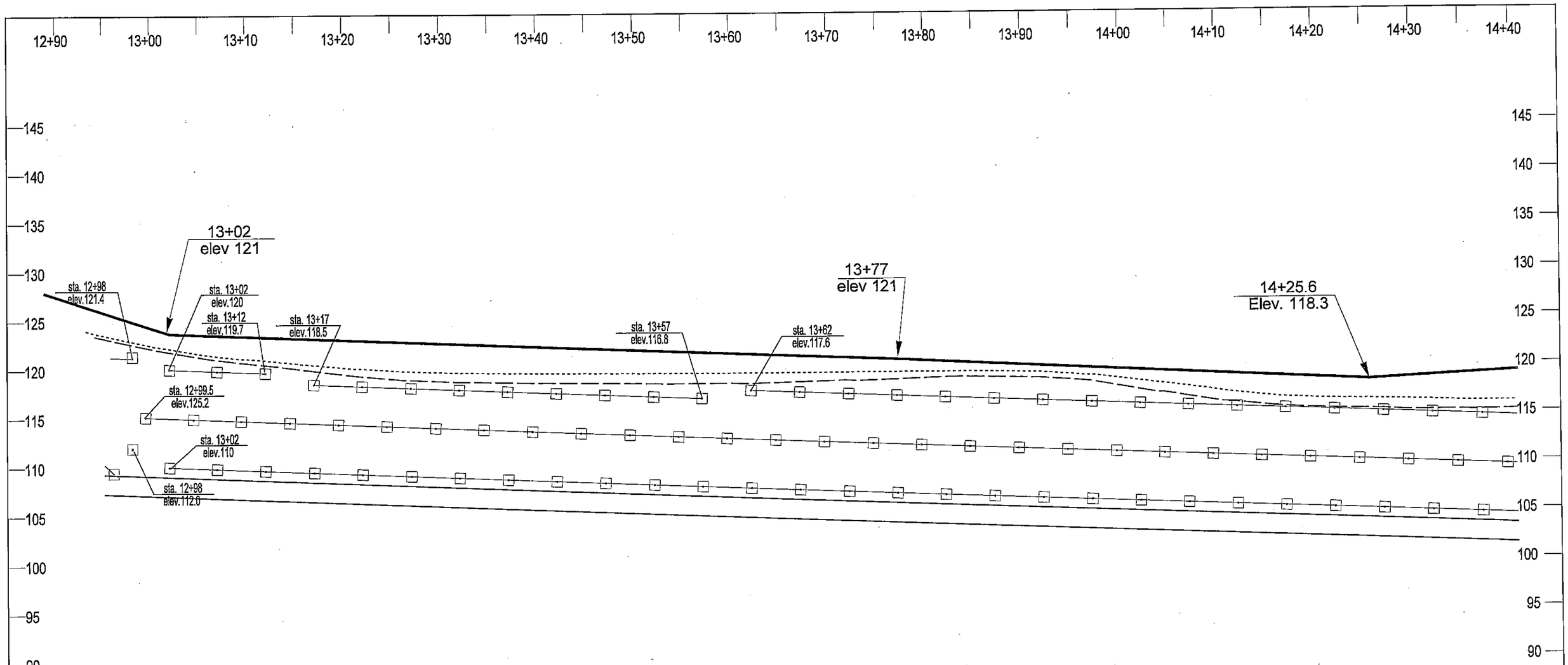
JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 TO SAHALEE WAY NE
ROADWAY WIDENING
WALL 12

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 4/2003
SCALE 1"=10' VERT.
1"=10' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\G\WALL 12 nail layout.dgn 10/27/2004 02:25:15 PM



LEGEND	
TOP OF WALL	———
FINAL GRADE-FRONT	———
EXISTING GRADE-BACK	- - - - -
EXISTING GRADE-FRONT	— — -

SOIL NAIL SCHEDULE STA 12+97 TO 14+52

Minimum Nail Length:	14 feet
Nail Declination:	15 degrees
Horizontal Nail Spacing:	5 feet
Minimum Steel Bar Size:	# 9
Allowable Design Load Transfer(DLT):	2000 lb./ft.

Figure G-20: Wall 12 Soil Nail Layout
Wall Sta. 12+97 to 14+37

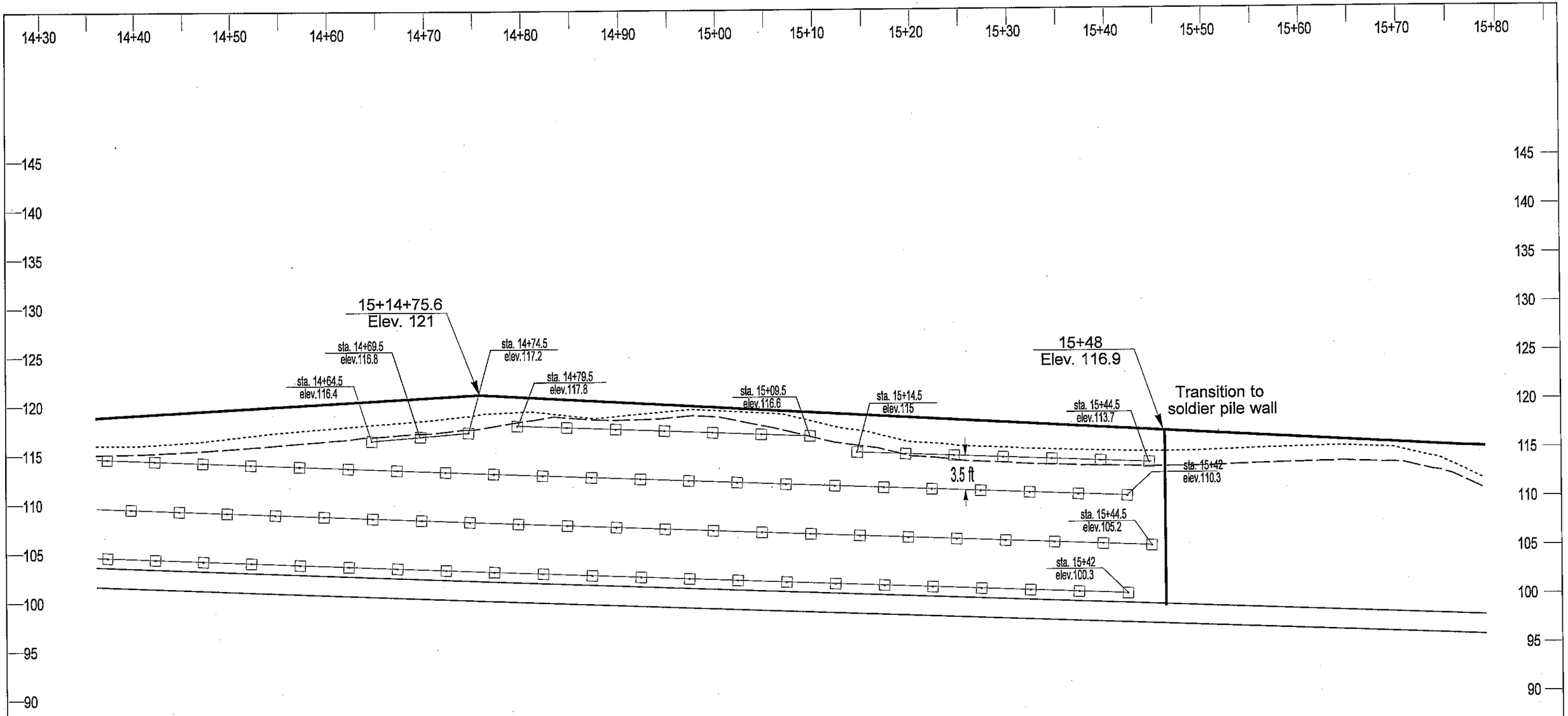
JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 TO SAHALEE WAY NE
ROADWAY WIDENING
WALL 12

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 4/2003
SCALE 1"=10' VERT.
1"=10' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\G\WALL 12 nail layout.dgn 10/27/2004 02:25:40 PM



SOIL NAIL SCHEDULE STA 12+97 TO 14+52

Minimum Nail Length:	14 feet
Nail Declination:	15 degrees
Horizontal Nail Spacing:	5 feet
Minimum Steel Bar Size:	# 9
Allowable Design Load Transfer(DLT):	2000 lb./ft.

SOIL NAIL SCHEDULE STA 14+52 TO 15+48

Minimum Nail Length:	18 feet
Nail Declination:	15 degrees
Horizontal Nail Spacing:	5 feet
Minimum Steel Bar Size:	# 9
Allowable Design Load Transfer(DLT):	2000 lb./ft.

LEGEND
TOP OF WALL
FINAL GRADE-FRONT
EXISTING GRADE-BACK
EXISTING GRADE-FRONT

JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 TO SAHALEE WAY NE
ROADWAY WIDENING
WALL 12

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 4/2003
SCALE 1"=10' VERT.
1"=10' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure G-21: Wall 12 Soil Nail Layout
Wall Sta. 14+37 to 15+48

...\G\WALL 12 nail layout.dgn 10/27/2004 02:26:03 PM

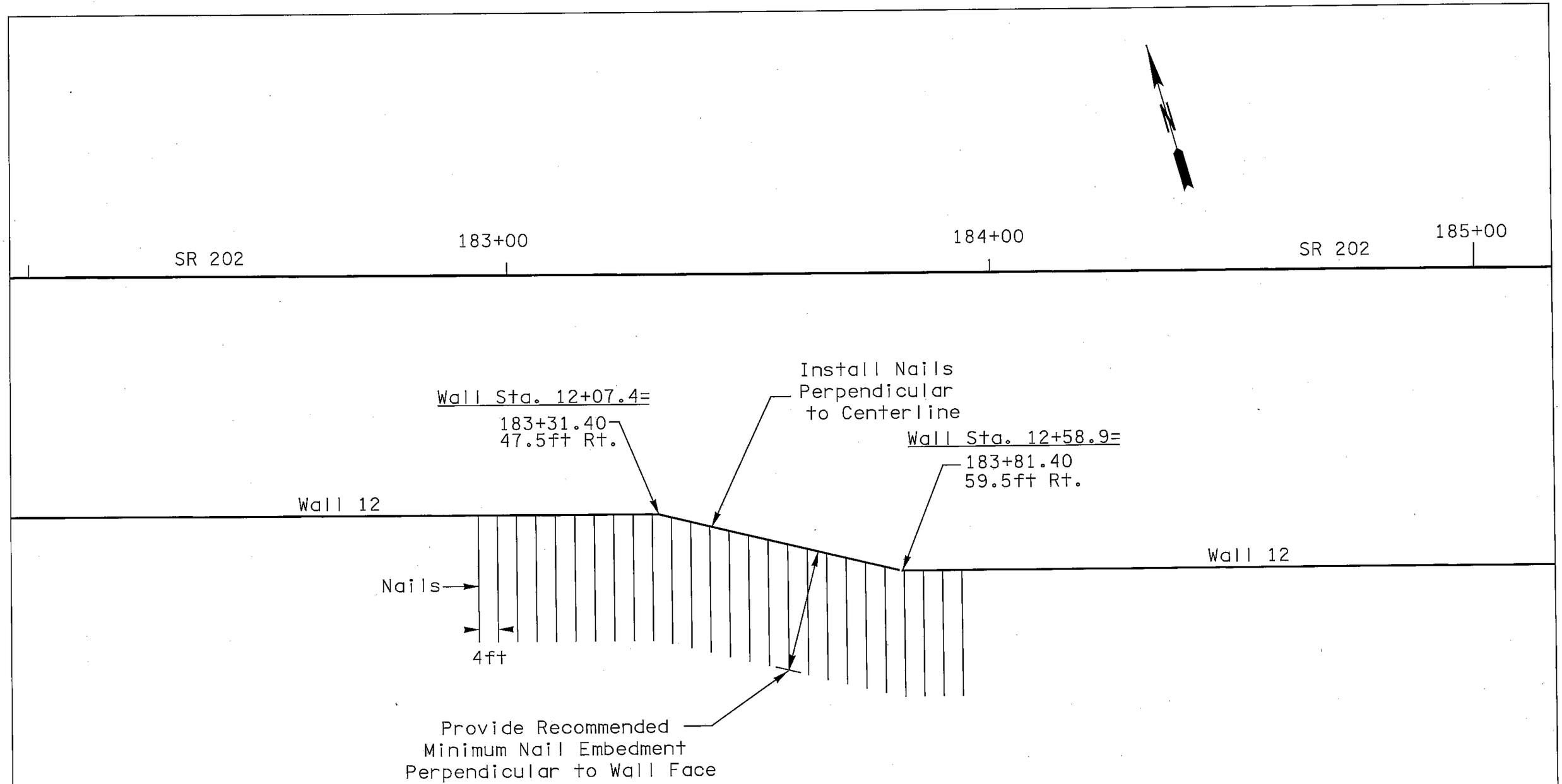


Figure G-22: Wall 12 Soil Nail Layout
Wall Sta. 11+66 to 12+78

JOB OL-3498 S.R. 202 C.S. _____ LAYOUT _____

SR 520 TO SAHALEE WAY NE
ROADWAY WIDENING
WALL 12

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 4/2003
SCALE 1"=20' VERT.
1"=20' HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\G\WALL 12 nail layout.dgn 10/27/2004 02:30:08 PM

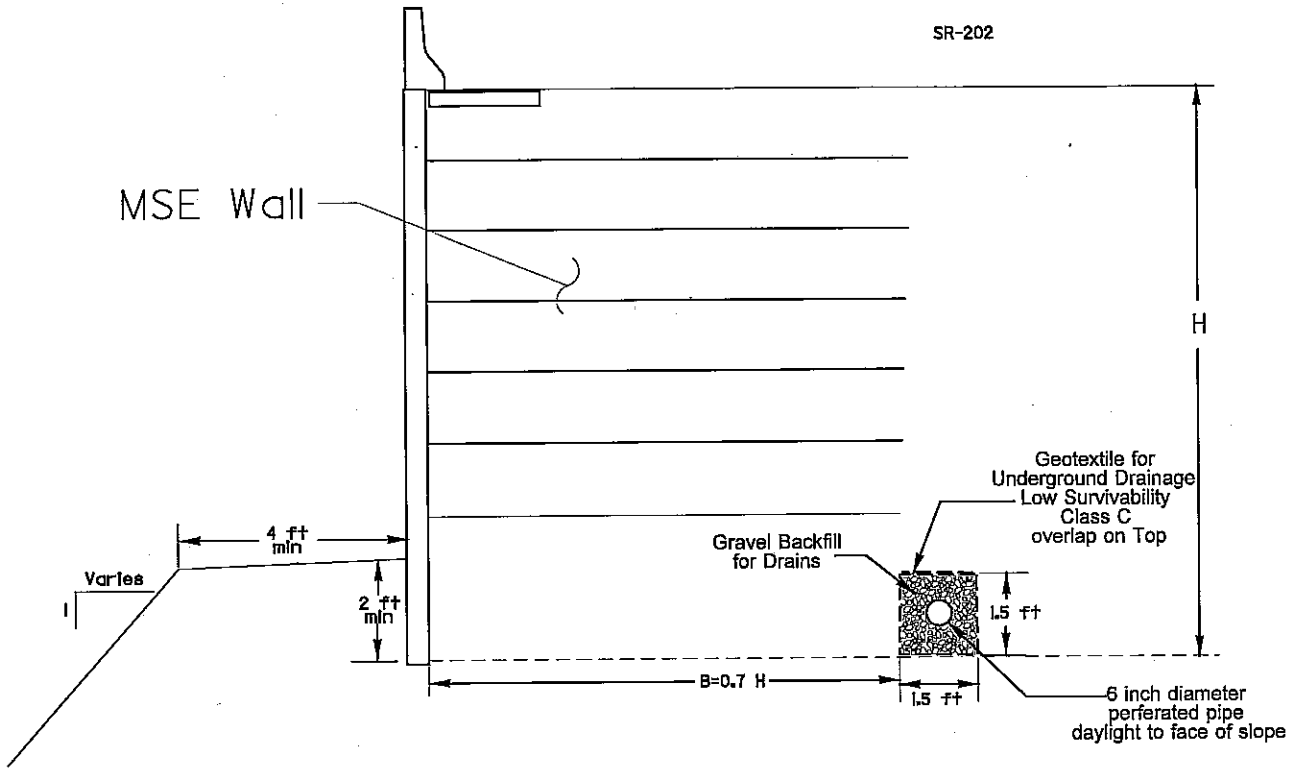


Figure G-23: Typical MSE Wall Section for Wall 13
Wall Sta. 10+00 to Sta. 14+70 (Lt.)

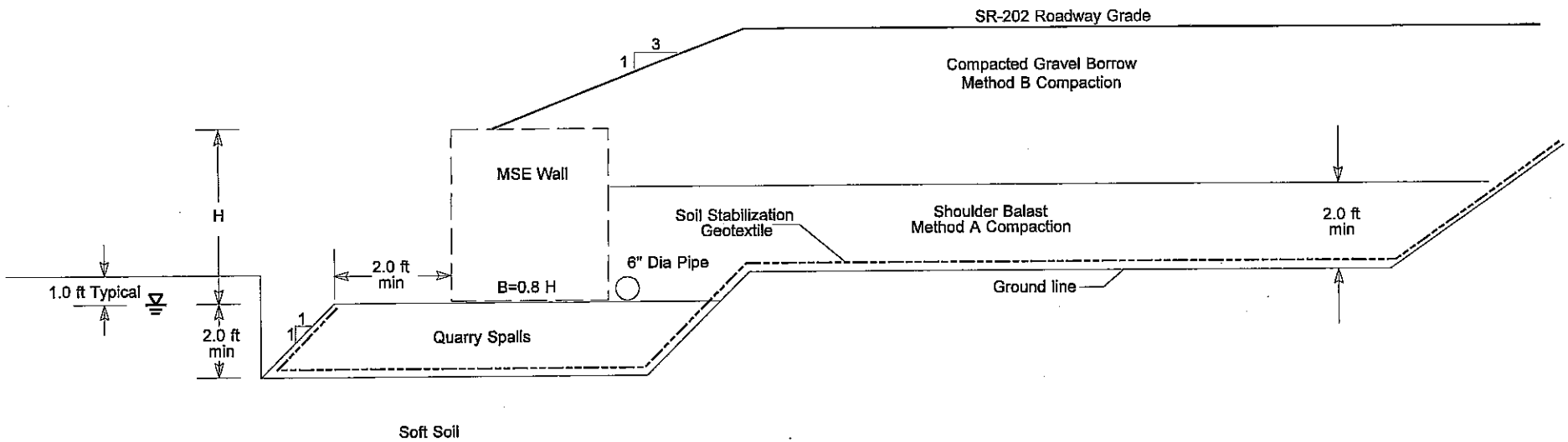
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE Not to Scale VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 10/28/2004 11:35:09 AM



NOTE: The drainage pipe needs to daylight through the MSE wall or at a sag (low) point or at a maximum 300 ft interval along the wall face

Figure G-24: Typical Section for MSE Wall in Fill

Wall 13 Sta. 14+70 to Sta. 23+95
Wall 14 Sta.10+00 to Sta. 19+55
Wall 18 Sta. 10+00 to Sta. 18+96
Wall 19 Sta. 10+00 to Sta. 14+18
Wall 21 Sta. 10+00 to Sta. 10+96

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY NE
ROADWAY WIDENING

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 9/2004
SCALE NOT TO SCALE VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 10/18/2004 06:49:57 AM

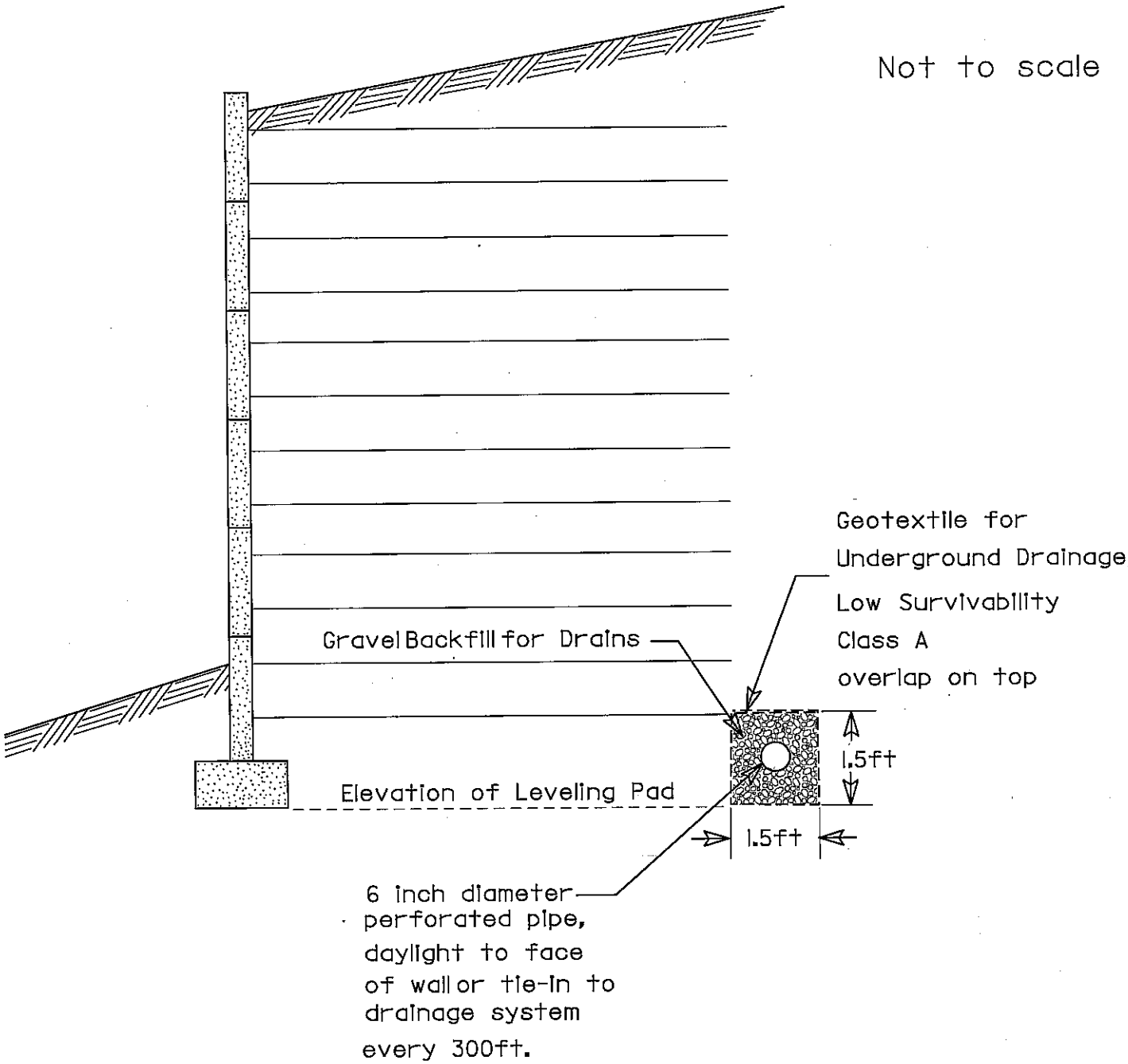


Figure G-25: MSE Wall Drainage Detail

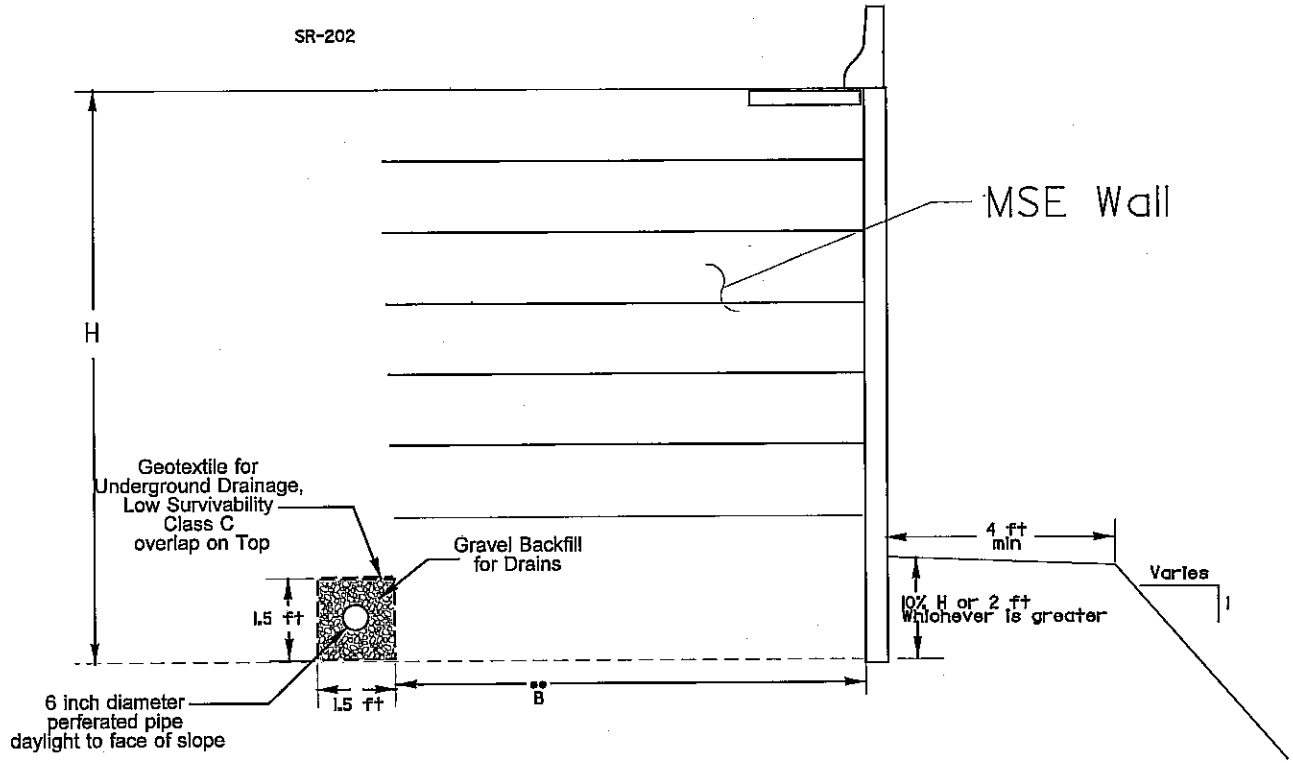
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY NE
ROADWAY WIDENING

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 9/2004
SCALE NOT TO SCALE VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 09/22/2004 01:29:09 PM



** - Wall Reinforcing Length

SR-202 Sta from	SR-202 Sta to	B, Min. Length ft.
203+50	210+46	0.7H
210+46	223+00	1.0H
223+00	223+65	0.7H

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

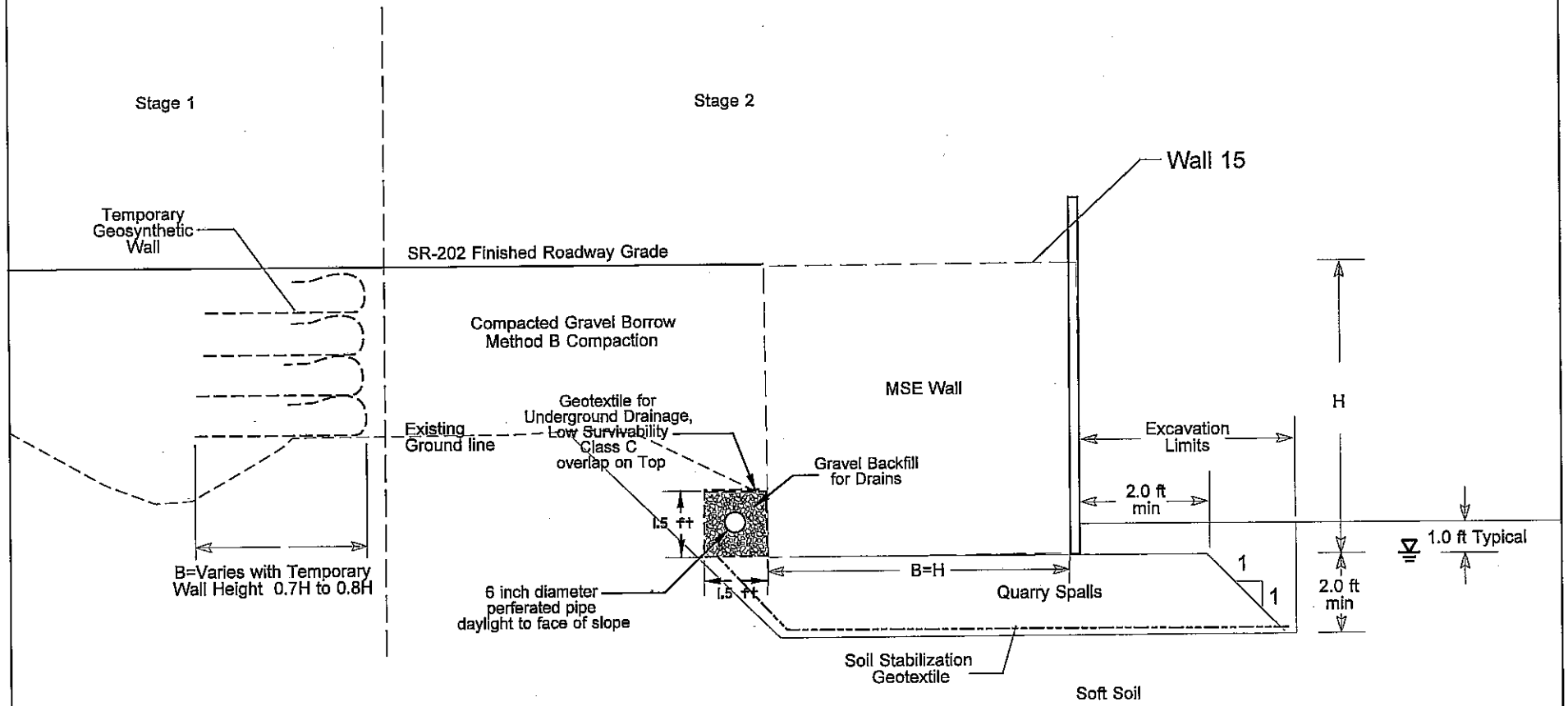
SR 520 TO SAHALEE WAY

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE Not to Scale VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure G-26: Typical MSE Wall Section for Wall 15
Sta. 203+70 to 223+65 (Rt)

...\004-21-04\G\vaultprofandEP.dgn 10/21/2004 01:50:37 PM



NOTE: The drainage pipe needs to daylight through the MSE wall or at a sag (low) point or at a maximum 300 ft interval along the wall face

Figure G-27: Typical Section for MSE Wall, Wall 15
Sta. 210+50 to Sta. 217+00 (Rt)

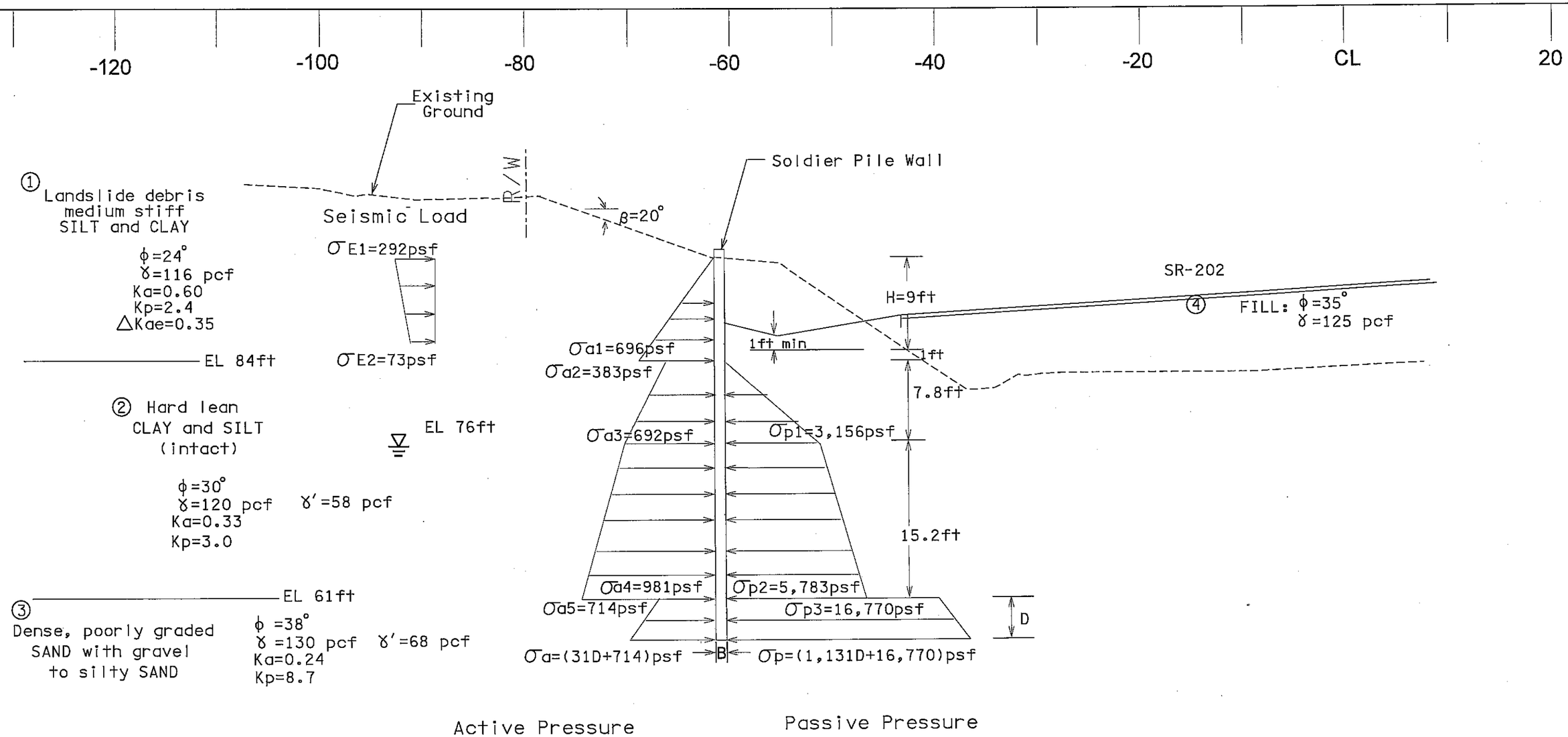
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY NE
ROADWAY WIDENING

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 9/2004
SCALE NOT TO SCALE VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\6\vaultprofandEP.dgn 10/21/2004 01:52:13 PM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: Seismic earth pressure is given as $\sigma_E = \Delta K_{ae} \gamma H$, $\Delta K_{ae} = (K_{ae} - K_a)$

Figure G-28: Typical Earth Pressure Diagram for Wall 16A
SR-202 Sta. 211+70 to 215+50(Lt.)

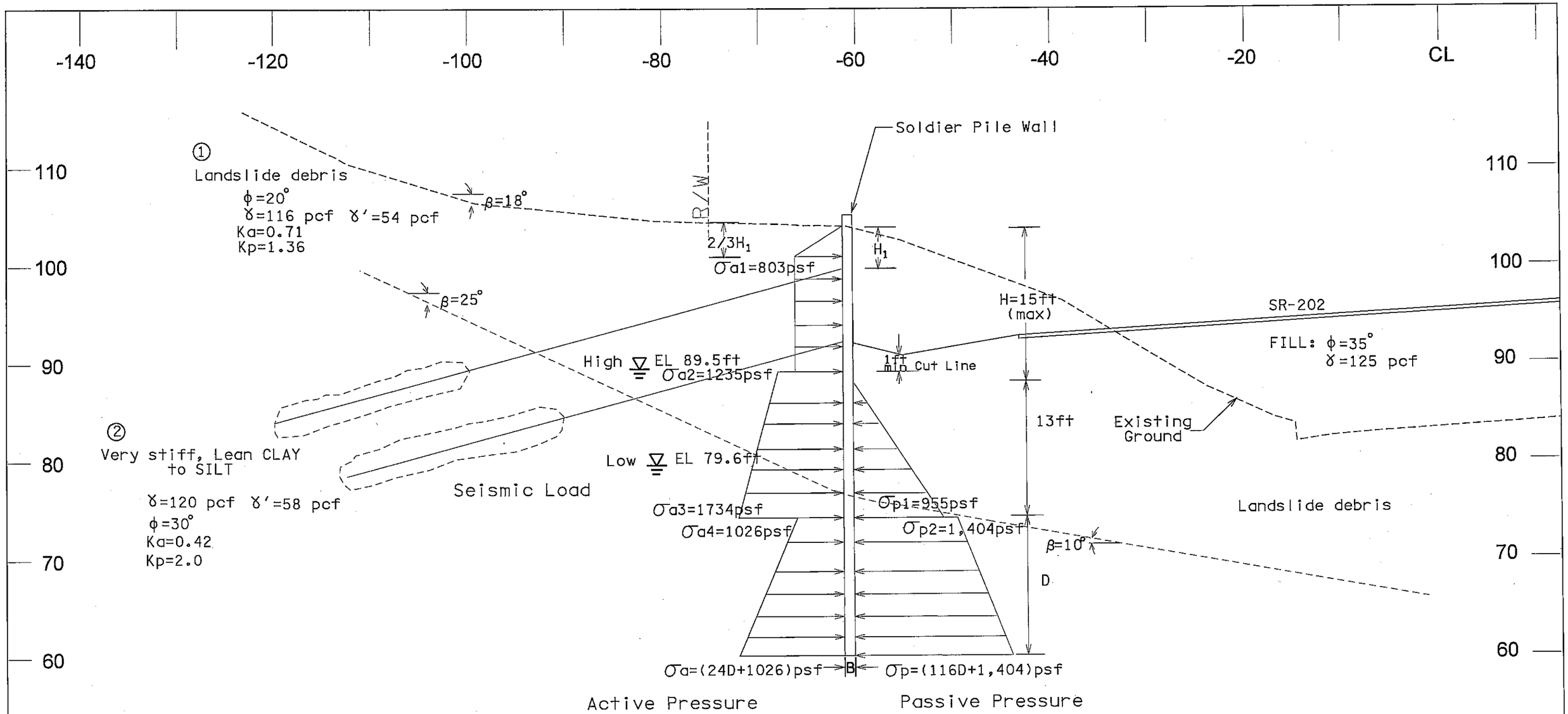
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 04:04:39 PM



NOTES: 1: Active pressure is given as $\sigma_a=0.65K_a\gamma H$ (above cut) and $\sigma_a=K_a\gamma H$ (below cut). Active pressure acts over one soldier pile diameter below the bottom of cut.

2: Passive pressure is given as $\sigma_p=K_p\gamma H$. Kp includes a factor of safety 1.5, (Kp/1.5). Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

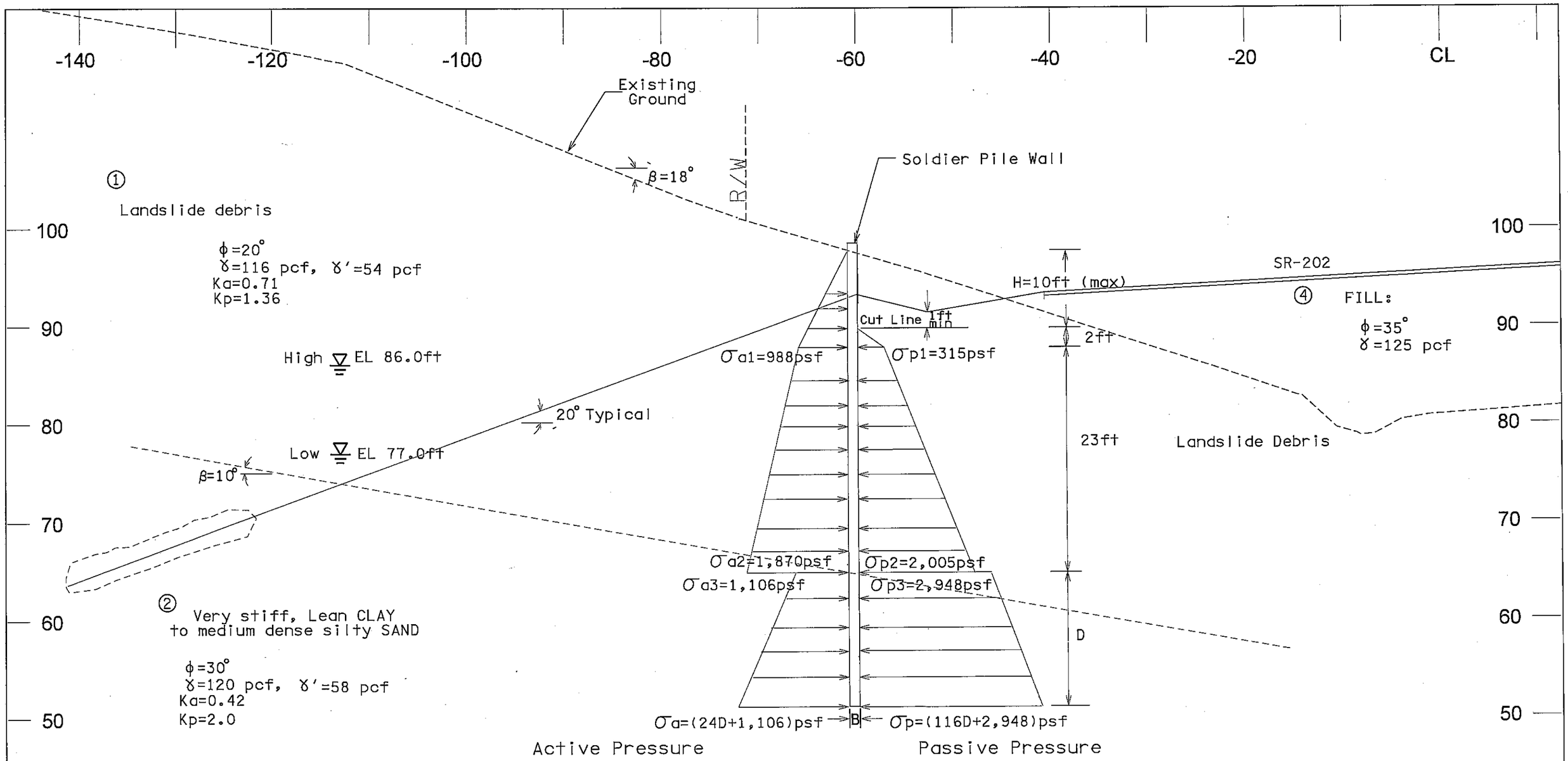
SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

Figure G-29: Typical Earth Pressure Diagram for Wall 16B
SR-202 Sta. 215+50 to 218+00 (Lt.)

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 04:04:32 PM



NOTES: 1: Active pressure is given as $\sigma_a = K_a \gamma H$.
Active pressure acts over one soldier pile diameter below the bottom of cut.

2: Passive pressure is given as $\sigma_p = K_p \gamma H$. Kp includes a factor of safety 1.5, (Kp/1.5). Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3B.

Figure G-30: Typical Earth Pressure Diagram for Wall 16B
SR-202 Sta. 218+00 to 218+80 (Lt.)

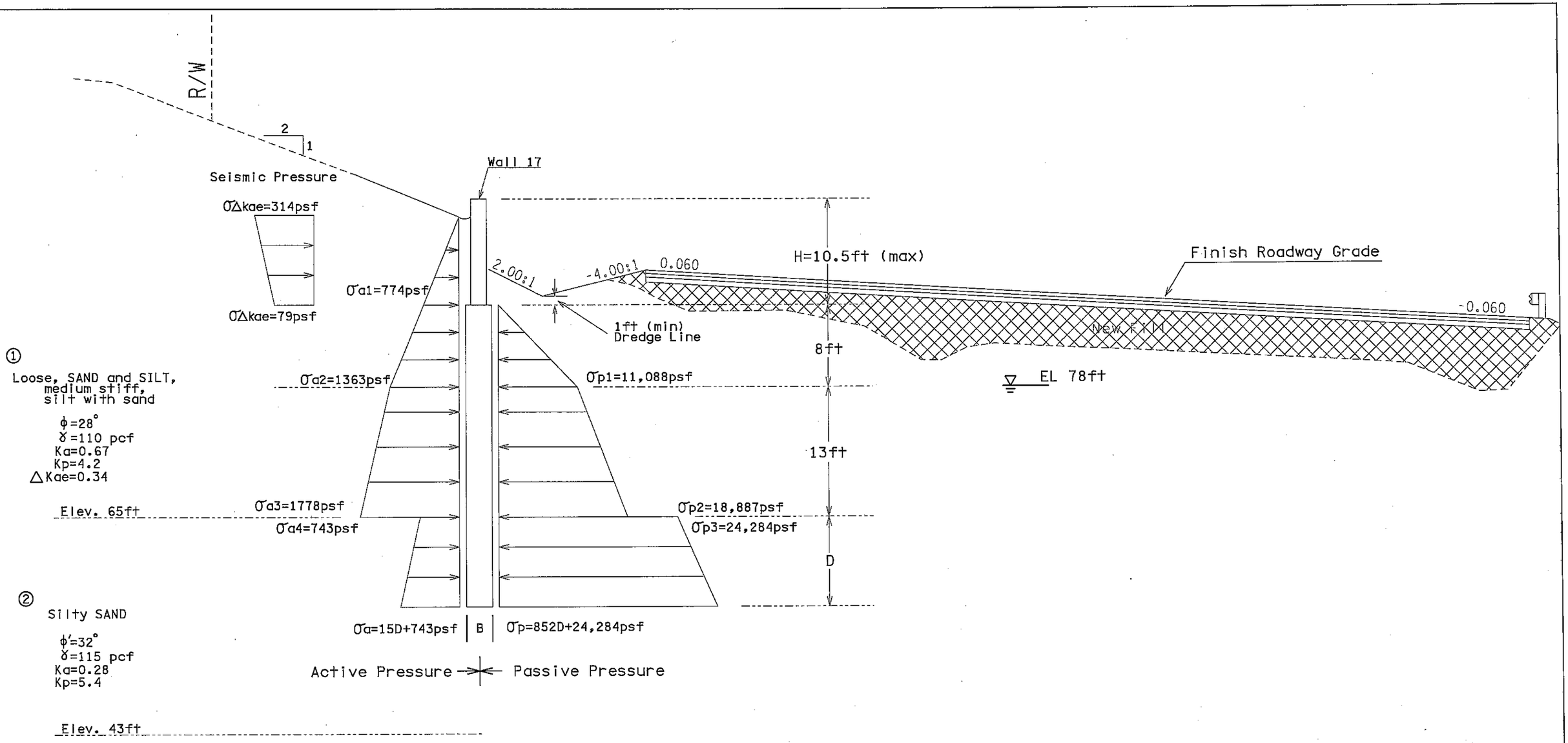
JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE 1"=10' VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 04:04:22 PM



①
Loose, SAND and SILT, medium stiff, silt with sand
$\phi=28^\circ$
$\gamma=110$ pcf
Ka=0.67
Kp=4.2
ΔKae=0.34

②
Silty SAND
$\phi'=32^\circ$
$\gamma=115$ pcf
Ka=0.28
Kp=5.4

③
Dense, SAND with gravel
$\phi=38^\circ$
$\gamma=130$ pcf
Ka=0.23
Kp=8.7

NOTES: 1: Active pressure is given as $\sigma_a=K_a\gamma H$.
Active pressure acts over one soldier pile diameter below the dredge line.

2: Passive pressure is given as $\sigma_p=3K_p\gamma H$. Passive pressure may be taken to act over three soldier pile diameters where piles are spaced greater than 3D.

3: Please note that Kp is not factored. We recommend that a factor of safety of 1.5 be applied to the passive load (Kp/1.5)

4: $\Delta K_{ae}=(K_{ae}-K_a)$

Figure G-31: Typical Earth Pressure Diagram for Wall 17
SR-202 Sta. 225+50 to 228+15 (Lt.)

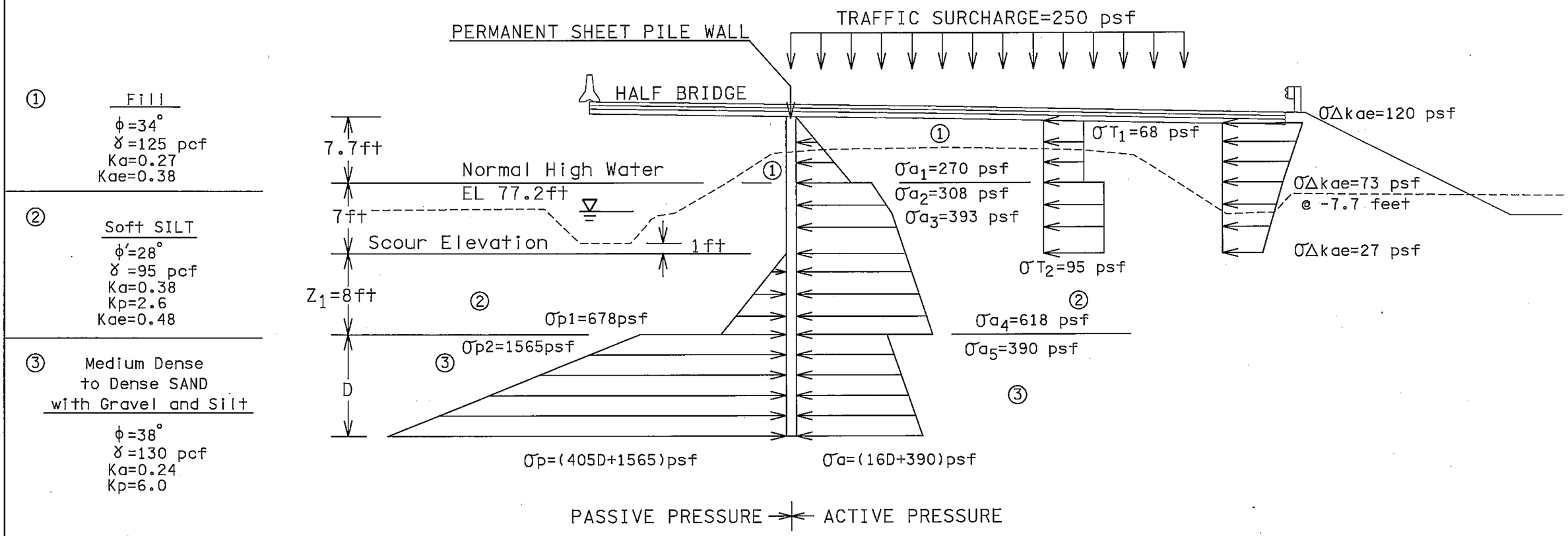
JOB DL-3498 S.R. 202 C.S. 1710

SR 520 TO SAHALEE WAY
WALL 17

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 1/2004
SCALE N.T.S. VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY W.M.

...\004-21-04\G\vaultprofandEP.dgn 11/08/2004 04:04:15 PM



NOTES: 1: Active pressure is given as $\sigma a = Ka\gamma H$.

2: Passive pressure is given as $\sigma p = Kp\gamma H$, Kp includes a factor of safety of 1.5(Kp/1.5).

3: $\Delta K_{ae} = (K_{ae} - K_a)$

Figure G-32: Typical Earth Pressure Diagram for Wall 20
SR-202 Sta. 238+30 to 239+45
(Assuming Active Pressure)

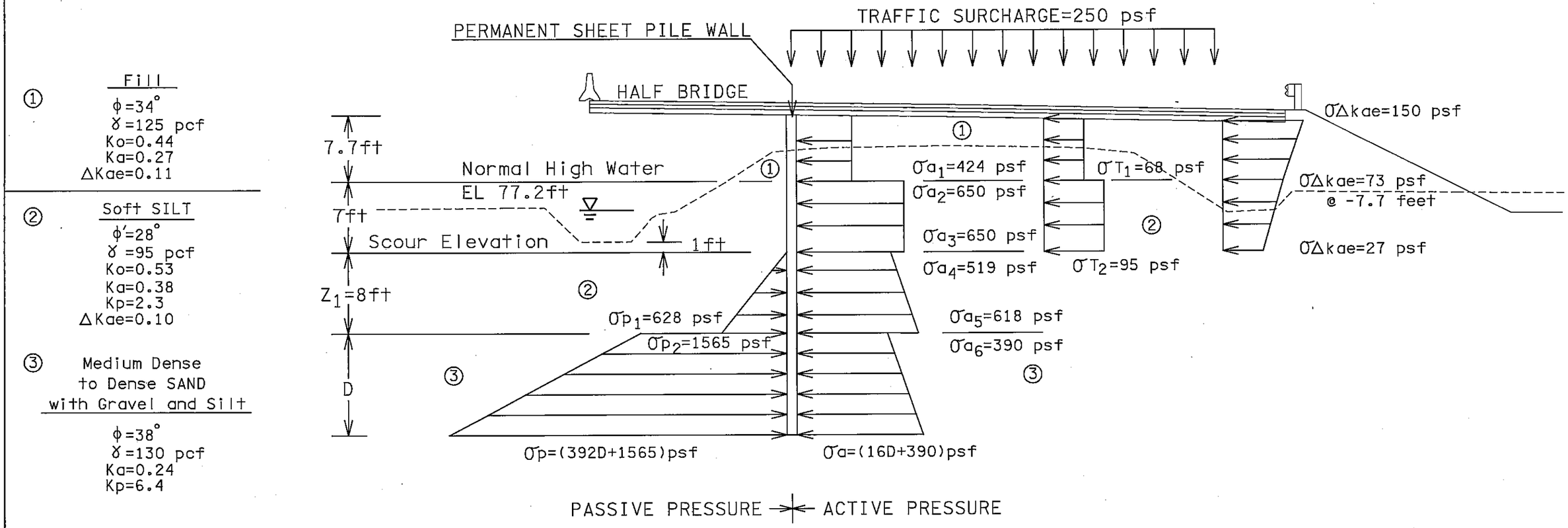
JOB OL-3498 S.R. 202 C.S. 1710

SR 520 TO SAHALEE WAY
BRIDGE 202/47 REPLACEMENT

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 2/2003
SCALE N.T.S. VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY W.M.

...\004-21-04\6\vaultprofandEP.dgn 09/22/2004 02:43:42 PM



NOTES:

1: At rest pressure above the assumed scour line is given as $\sigma_o = K_o \gamma H$.

2: Active pressure below the assumed scour line is given as $\sigma_a = K_a \gamma H$.

3: Passive pressure is given as $\sigma_p = K_p \gamma H$, Kp includes a factor of safety of 1.5(Kp/1.5).

4: $\Delta K_{ae} = (K_{ae} - K_a)$

Figure G-33: Typical Earth Pressure Diagram for Wall 20
SR-202 Sta. 238+30 to 239+45
(Assuming At Rest Pressure Above Scour Line)

JOB OL-3498 S.R. 202 C.S. 1710

SR 520 TO SAHALEE WAY
BRIDGE 202/47 REPLACEMENT

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 2/2003
SCALE N.T.S. VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY W.M.

...\004-21-04\G\vaultprofandEP.dgn 09/22/2004 02:45:38 PM

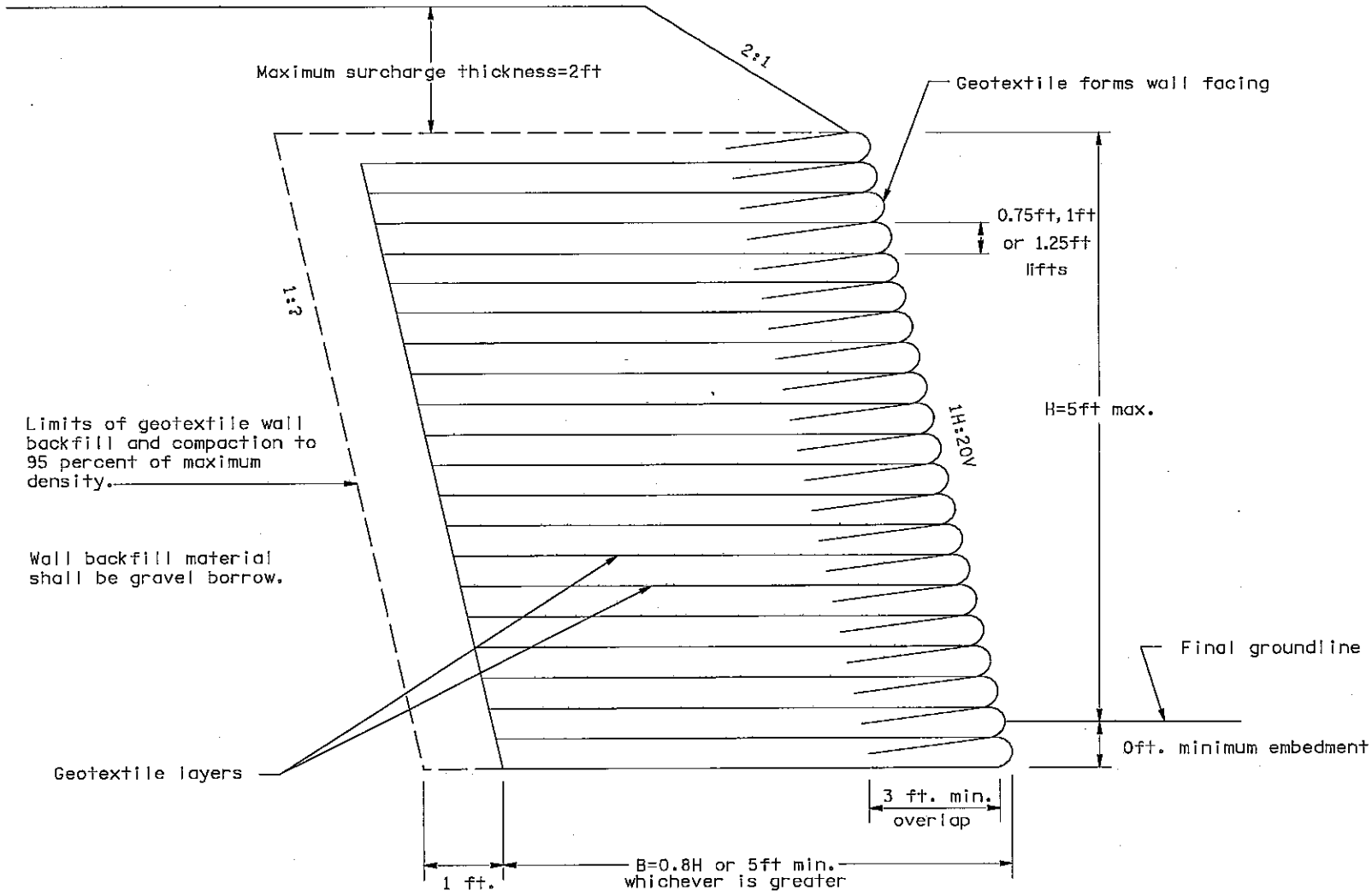


Figure G-34: Temporary Geotextile Wall Section

(See Special Provisions)

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY NE
ROADWAY WIDENING

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 9/2004
SCALE NOT TO SCALE VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 10/27/2004 02:19:27 PM

APPENDIX - H

SPECIAL PROVISIONS

Embankment Construction

- Settlement delay period
- Settlement Monitoring Hubs

Settlement Plate Special Provision

Settlement Indicating Devise

- Vibrating Wire Liquid Settlement Indicating Devise

(Associated GSPs)

Structural Earth Walls

- Welded Wire Face Structural Earth Wall Materials
- Construction Requirements
- Submittals

Geosynthetic Retaining Walls

- Materials

Shotcrete Facing

- Materials

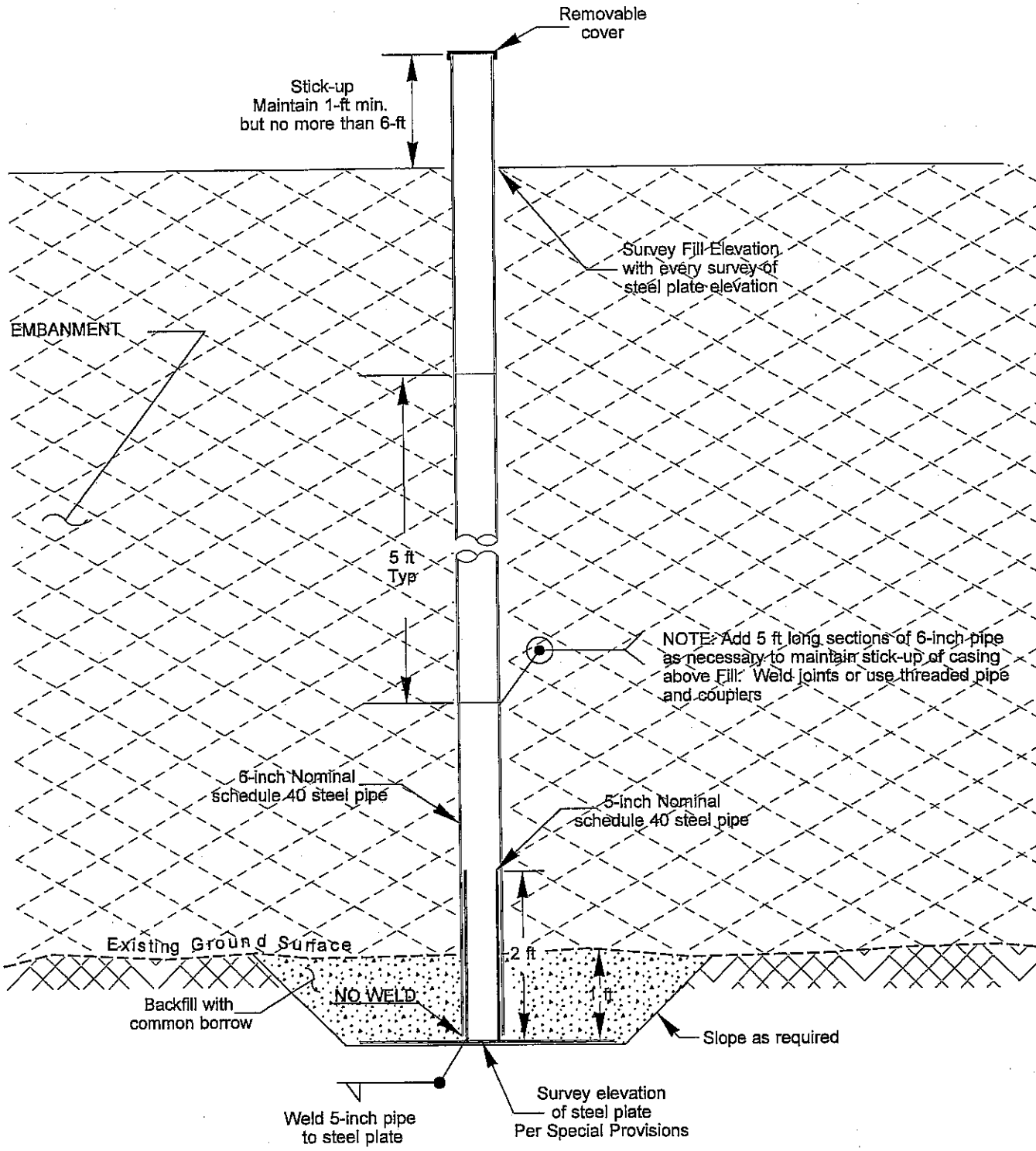


Figure H-1: Typical Settlement Plate Detail

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR-520 TO SAHALEE WAY NE
ROADWAY WIDENING

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 9/2004
SCALE NOT TO SCALE VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 09/22/2004 09:26:28 AM

SETTLEMENT INDICATING DEVICE

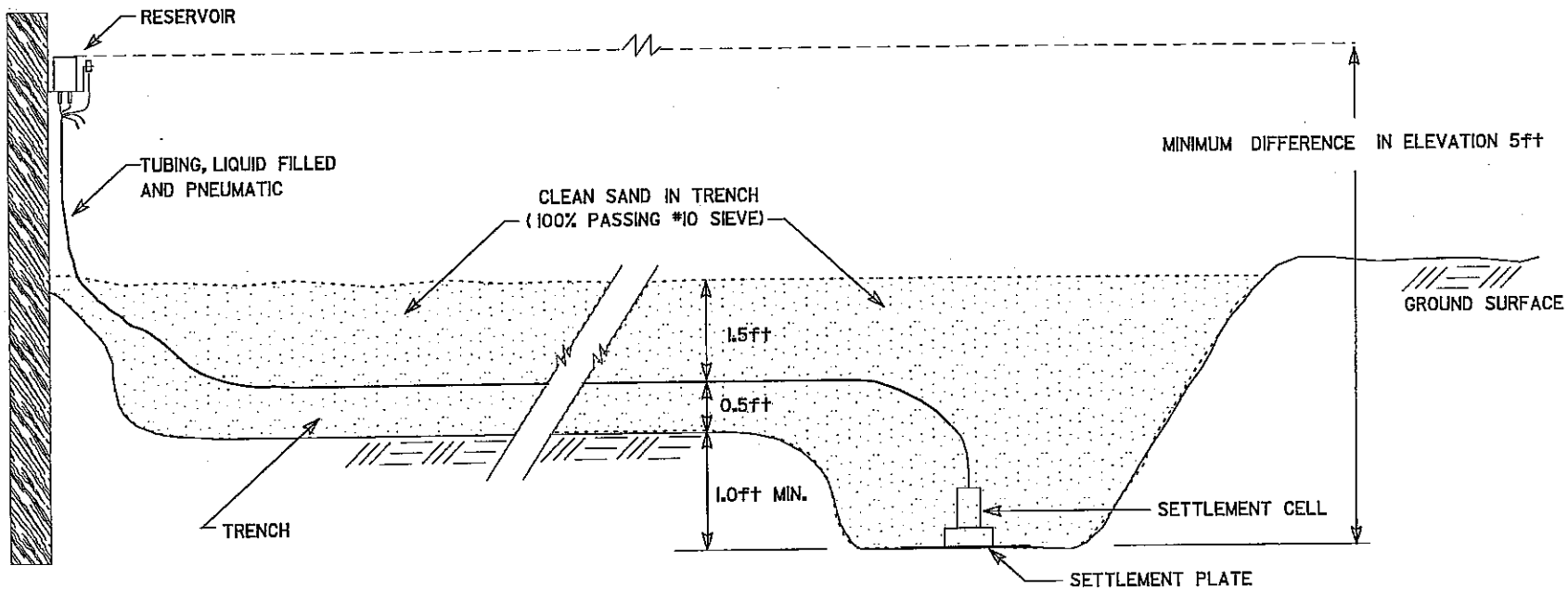


Figure H-2: Typical Settlement Indicating Device Detail

JOB OL-3498 S.R. 202 C.S. 1710 LAYOUT

SR 520 TO SAHALEE WAY NE
ROADWAY WIDENING

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
T. E. BAKER MATERIALS ENGINEER

DATE 9/2004
SCALE NOT TO SCALE VERT. HORIZ.
SHEET ___ OF ___
DRAWN BY DWG

...\004-21-04\G\vaultprofandEP.dgn 09/22/2004 09:23:34 AM

Embankment Construction

Earth Embankment Construction

Section 2-03.3(14)B is supplemented by the following:

(******)

The first 2 foot of embankment in the Pre-settlement and Geotextile Areas shall be constructed by Method in accordance with Section 2-03.3(14)C.

(******)

A minimum 9-month settlement delay period is required after the embankment areas have been built full height in the Pre-settlement Areas shown in the contract plans. The Contractor shall overbuild the embankment by 1-foot prior to the start of the settlement period. The 9-month settlement period will begin after the contractor has completed the following:

- Construction of the Stage 2 embankment and Wall 15B areas.
- Installation of the Settlement Monitoring Hubs.
- Initial survey of the Settlement Monitoring Hubs.

Settlement Monitoring Hubs shall be placed approximately 50 feet apart as shown in the contract plans. The Contractor shall survey the settlement monitoring hubs twice a week for a period of two weeks, the measurements shall be a minimum of 3 days apart during this period; once a week for the next 3 weeks; and then once every other week until the settlement is completed. The results shall be sent to the Engineer for evaluation. Surveying of the settlement monitoring hubs shall be to within +/- 0.01 inch of elevation. Settlement hubs damage by the contractor's activities will be replaced at the contractor's expense.

The Contractor shall not begin final grading and paving until notified by the Engineer.

SETTLEMENT PLATE

Description

1.01 Settlement Plates

A. This item of work shall consist of furnishing all materials, labor, tools, equipment, services, and incidentals necessary to install and monitor settlement plates under embankments.

Materials

2.01 Steel Plates

A. All steel plates shall be of steel base metal conforming to ASTM A 36, and shall be of ample strength to resist damage and deformation from transportation and handling, installation stresses, and all pressures and forces acting on the plates.

B. Where the minimum thickness of the plates is specified in the Plans, it is specified to satisfy structural design requirements only. The Contractor shall increase the plate thickness as necessary to satisfy the requirements of item A of this section.

2.02 Steel Pipe

A. Steel Pipe shall be schedule 40 (minimum) and have the nominal diameters shown in the plans.

B. The Steel Pipe shall have a round, regular inside diameter free of defects and obstructions, including all pipe joints, in order to permit the free, unobstructed passage of survey rods or measuring devices to the steel plate. The pipe shall be watertight, free from corrosion with clean internal and external faces. The steel pipe shall be fitted with a removable watertight cap at the top to prevent water and soil from entering the pipe and effecting measurement of the plate elevation.

Construction Requirements

3.01 Submittals

A. Certificate of Compliance
The Contractor, or the supplier as the Contractor's agent, shall furnish to the Engineer, a minimum of 14 calendar days prior to beginning construction, a Certificate of Compliance certifying that the materials comply with the applicable sections of these Specifications.

3.2 Locations of Settlement Plates

A. The Contractor shall install settlement plates in accordance with these Special Provisions at the following locations:

Device Number	Station	Offset	Zone of Influence
SP-1	214+00	47 ft Rt.	211+00 to 215+00
SP-2	217+00	47 ft Rt.	215+00 to 219+00
SP-3	220+00	45 ft Rt.	219+00 to 221+00
SP-4	223+00	45 ft Rt.	221+00 to 224+00

A. The location and installation of each settlement plate shall be approved by the Engineer.

B. Settlement plates shall be installed prior to beginning embankment construction within the zone of influence of the settlement plate.

3.03 Settlement Plate Fabrication and Installation

A. The 5-inch nominal steel pipe shall be field welded to the steel plate at its center. The weld shall be water tight and accepted based on visual inspection by the Engineer.

B. The settlement plates shall be placed 1-foot below the ground surface after clearing and grubbing operations have been completed.

C. The foundation for the settlement plates shall be graded level in an area equal to or exceeding the dimensions of the settlement plate as shown in the plans.

D. The settlement plate shall be installed level and the 5-inch pipe shall be vertical and plumb.

E. The 6-inch nominal steel pipe shall be placed over the 5-inch nominal pipe and the plate shall be backfilled with common borrow or sand to the surrounding ground surface elevation.

F. As embankment fill is placed, additional sections of 6-inch pipe shall be field welded or attached by threaded coupler to the previous 6-inch pipe to maintain the top of the pipe above the fill as shown in the plans. The pipe joints shall be water tight and accepted based on visual inspection by the Engineer.

G. A watertight removable cover shall be maintained on the top most section of 6-inch pipe.

H. Fill within a 5 ft radius of the settlement plate and pipe shall be compacted using hand tampers or another compacting device that has been approved by the Engineer.

I. The contractor shall take precautions to ensure that the settlement plate installation is not damaged during embankment construction and that the steel pipe remains plumb and vertical and provides unobstructed access to the settlement plate.

J. In the event of damage to any settlement plate installation, the Contractor shall immediately cease embankment construction with the zone of influence of the damaged unit until repairs have been made, or if repairs cannot be made, until another installation has been completed adjacent to the damaged unit. Repair or replacement of damaged units shall be at the Contractor's expense and completed with approval of the Engineer.

K. The state will not allow an extension of time or extra compensation for delay or expense incurred by the Contractor as a result of damage to, repair of, or replacement of any settlement plate installation.

3.04 Settlement Plate Monitoring

A. If the contract provides for Contractor surveying, the Contractor shall perform all monitoring operations described in this section. If Contractor surveying is not part of the contract, the State will monitor the settlement plates.

B. After the plate has been installed and the ground surface reestablished, its initial elevation shall be determined to within ±0.01 ft prior to beginning embankment construction.

C. The design of the settlement plate allows for the insertion of a leveling rod to the elevation of the settlement plate so that the plate's elevation can be directly determined by survey methods.

D. At the beginning of each shift and at the end of each shift, the elevation of the settlement plate and embankment fill adjacent to the steel pipe shall be surveyed to determine the settlement plate elevation and the elevation of the fill.

E. If the fill height is such that a leveling rod of sufficient length to reach the settlement plate is not available, the depth to the settlement plate from the top of the uppermost pipe section can be determined using a tape accurate to within ±0.01 ft, then the elevation of the top of the pipe determined.

F. Elevations of the settlement plate and fill shall be provided to the Engineer the day they are recorded and determined.

Measurement

Settlement plates will be measured by the unit for each plate installed.

Contractor Surveying to monitor Settlement Plates shall be incidental to the Settlement Plates and will be measured under Contractor Surveying

Payment

The unit contract price per each for "Settlement Plate", shall be full pay for furnishing, installing, monitoring, repairing, and replacing damaged installations, and maintaining in operation, for the life of the contract, each settlement plate.

SETTLEMENT INDICATING DEVICE

Description

The Contractor shall furnish and install a Vibrating Wire liquid settlement indicating device such as Model 52612420 (range 14m) distributed by Slope Indicator Company, 12123 Harbour Reach Drive, Mukilteo, WA 98275; Vibrating Wire Liquid Settlement System Model SSVW105 (range 17m) as distributed by RST Instruments Ltd., 200-2050 Hartley Ave., Coquitlam, BC, V3K 6W5, Canada; or an approved device that is equal. The settlement indicating device shall be supplied with all necessary wire cables to make it compatible with the State's furnished Model EDI-51V Vibrating Wire readout unit as distributed by Encardio Rite.

The settlement indicating device shall be capable of producing a settlement system accuracy of 0.2-inches when used with the State's readout unit, and shall be capable of measuring a total settlement of at least 5 ft.

Construction Requirements

The Contractor shall install the settlement indicating devices in accordance with these Special Provisions at the following locations:

Station	Offset	Zone of Influence
214+00	35 ft Rt.	211+00 to 215+00
217+00	35 ft Rt.	215+00 to 219+00
220+00	30 ft Rt.	219+00 to 221+00

The sensors, interconnecting tubing, and wire cables shall be installed in trenches a minimum of 18 inches below a sand drainage blanket. The tubing and wire shall be coiled to allow sufficient slack for horizontal or differential settlements.

The reservoir terminal installation shall be an easily accessible location safely away from the work areas and on stable ground. The exact location of the trench and the reservoir terminal shall be as staked by the Engineer.

After the initial installation has been completed, the settlement indicating system shall be tested. After the installation is approved by the Engineer, the trench shall be backfilled with clean sand (100% passing No. 10 sieve, not more than 10% passing the No. 200 sieve).

The settlement system shall be operable prior to beginning any embankment construction within the zone of influence.

In the event of damage to any settlement indicating device installation, the Contractor shall immediately cease embankment construction with the zone of influence of the damaged unit until repairs have been made, or if repairs cannot be made, until another installation has been completed adjacent to the damaged unit. Repair or replacement of damaged units shall be at the Contractor's expense.

The state will not allow an extension of time or extra compensation for delay or expense incurred by the Contractor as a result of damage to, repair of, or replacement of any settlement indicating device installation.

Measurement
Settlement indicating devices will be measured by the unit for each system installed.

Payment
The unit contract price per each for "Settlement indicating Device" shall be full pay for furnishing, installing, repairing, and replacing damaged installations, and maintaining in operation, for the life of the contract, each settlement indicating device.

SECTION 6-13, STRUCTURAL EARTH WALLS
April 5, 2004

(Associated GSPs)

STRUCTURAL EARTH WALLS

Materials
Section 6-13.2 is supplemented with the following:

(April 5, 2004)
Welded Wire Faced Structural Earth Wall Materials

Welded Wire Mats and Backing Mats

Welded wire fabric for welded wire mats and backing mats shall conform to AASHTO M 32, and shall be fabricated from smooth wire fabric conforming to AASHTO M 55.

Welded wire fabric wire size for backing mats shall be W2.1 minimum for wall face backing layers of 1'-6" maximum thickness, and shall be W2.9 minimum for wall face backing layers between 1'-6" and 2'-0". The minimum clear opening dimension of the backing mat shall not exceed the minimum particle size of the wall facing backfill as specified below.

Welded wire fabric for welded wire mats and backing mats shall be galvanized after fabrication in accordance with ASTM A 641 (two ounces minimum per square foot). All damage to the galvanizing shall be repaired with one coat of Formula A-9-73 paint conforming to Section 9-08.2.

Construction Geotextile for Wall Facing

Construction geotextile for wall facing shall conform to the requirements in Section 9-33.1 for Construction Geotextile for Underground Drainage, Moderate Survivability, Class A.

Backfill for Welded Wire Faced Structural Earth Wall

All backfill material within the structural earth wall reinforced zone shall be free draining, free from organic or otherwise deleterious material.

Backfill material within the reinforced zone, except for the wall facing backfill placed immediately behind the wall face, as shown in the Plans and the structural earth wall working drawings as approved by the Engineer, shall conform to Section 9-03.14(1).

The coarse, granular material used for the wall facing backfill placed immediately behind the wall face, as shown in the Plans, shall conform to the following gradation requirements:

1. The minimum particle size shall be no less than the width of the minimum opening dimension in the backing mat.

2. The maximum particle size shall be no greater than six inches.

All material within the structural earth wall reinforced zone shall be substantially free of shale or other soft, poor durability particles, and shall not contain recycled materials, such as glass, shredded tires, portland cement concrete rubble, or asphaltic concrete rubble. The material shall meet the following aggregate durability requirements:

Property	Test Method	Allowable Test Value
Los Angeles Wear, 500 rev.	AASHTO T 96	35 percent max.
Degradation	WSDOT Test Method 113	15 percent min.

All material within the structural earth wall reinforced zone shall meet the following chemical requirements:

Property	Test Method	Allowable Test Value
Resistivity	AASHTO T 288	3,000 ohm-cm, min.
pH	AASHTO T 289	5 to 10
Chlorides	AASHTO T 291	100 ppm max.
Sulfates	AASHTO T 290	200 ppm max.

If the resistivity of the backfill material equals or exceeds 5,000 ohm-cm, the specified chloride and sulfate limits may be waived.

Construction Requirements

Section 6-13.3 is supplemented with the following:

(April 5, 2004)

Welded Wire Faced Structural Earth Wall

Welded wire faced structural earth walls shall be constructed only with the Hilfiker Welded Wire Retaining Wall (WWW) system. Hilfiker is a registered trademark of Hilfiker Retaining Walls.

The Contractor shall make arrangements to purchase the welded wire mats, backing mats, facing elements, fasteners, construction geotextile for wall facing, and all necessary incidentals from the following source:

Hilfiker Retaining Walls
P. O. Box 2012
Eureka, CA 95501-2012
(707) 443-5093
FAX (707) 443-2891

Submittals

Section 6-13.3(2) is supplemented with the following:

(April 5, 2004)

The following geotechnical design parameters shall be used for the design of the structural earth wall(s):

Wall Name or No.: *** $$1$$ ***

Soil Properties	Wall Backfill	Retained Soil	Foundation Soil
Unit Weight (pcf)	***$$2$$***	***$$3$$***	***$$4$$***
Friction Angle (deg)	***$$5$$***	***$$6$$***	***$$7$$***
Cohesion (psf)	***$$8$$***	***$$9$$***	***$$10$$***

	AASHTO Load Group I	AASHTO Load Group VII
Allowable Bearing Capacity (tsf)	***$$11$$***	***$$12$$***
Acceleration Coefficient (g)	N/A	***$$13$$***

SECTION 6-14, GEOSYNTHETIC RETAINING WALLS
April 5, 2004

(Associated GSPs)

Materials

Geosynthetic Properties For Retaining Walls and Reinforced Slopes

Section 9-33.2(2) is supplemented with the following:

(April 5, 2004)

Geosynthetic Properties For Temporary Geosynthetic Retaining Walls
Wide strip geosynthetic strengths provided in Table 10 are minimum average roll values. The average test results for any sampled roll in a lot shall meet or exceed the values shown in the table. These wide strip strength requirements apply only in the geosynthetic direction perpendicular to the wall face. The test procedures specified in the table are in conformance with the most recently approved ASTM geosynthetic test procedures, except for geosynthetic sampling and specimen conditioning, which are in accordance with WSDOT Test Methods 914 and 915, respectively.

Table 10: Wide strip tensile strength required for the geosynthetic reinforcement used in geosynthetic retaining walls.

Wall Location	Vertical Spacing of Reinforcement Layers	Reinforcement Layer Distance from Top of Wall	Minimum Tensile Strength Based on ASTM D4595
$$1$$	***$$2$$***	***$$3$$***	***$$4$$***

ASTM D4595 shall be modified to address geogrids as follows: The minimum specimen width shall be 8 inches with a minimum gauge length of 4 inches. The gauge length shall be a minimum of two grid apertures long. The gauge length shall be in increments of whole grid apertures. For the purpose of calculating tensile strength, the specimen width shall be considered to be the distance between the outermost ribs of the specimen as measured at the midpoint of those ribs plus the average center to center spacing between ribs.

(April 5, 2004)
Geosynthetic Properties for Permanent Geosynthetic Retaining Walls

Table 9: Long-term tensile strength, T_{al}, required for the geosynthetic reinforcement used in geosynthetic retaining walls.

[3]Wall Location	Vertical Spacing of Reinforcement Layers	Reinforcement Layer Distance from Top of Wall	[1,2,3]Minimum Long-Term Tensile Strength, T_{al}
*** $$1$$ ***	*** $$2$$ ***	*** $$3$$ ***	*** $$4$$ ***

[1]These long-term tensile strength requirements apply only in the geosynthetic direction perpendicular to the wall face.

[2]T_{al} shall be determined in accordance with WSDOT Test Method 925.

[3]Walls *** $$5$$ *** are classified as Class *** $$6$$ *** structures.

SECTION 6-18, SHOTCRETE FACING
April 5, 2004

(Associated GSPs)

SHOTCRETE FACING

Materials

Section 6-18.2 is supplemented with the following:

(August 2, 2004)
Shotcrete Facing

Portland cement shall be Type II in accordance with Section 9-01.2(1).

Air entrainment shall be 6.0 percent, ± 1.5 percent.

Water for mixing and curing shall be clean and free from substances, which may be injurious to concrete or steel, and shall be free of elements which would cause staining.

Aggregate for shotcrete shall meet the following gradation requirements:

Sieve Size	Percent Passing by Weight
1/2 inch	100
3/8 inch	90 to 100
U.S. No. 4	70 to 85
U.S. No. 8	50 to 70
U.S. No. 16	35 to 55
U.S. No. 30	20 to 35
U.S. No. 50	8 to 20
U.S. No. 100	2 to 10
U.S. No. 200	0 to 2.5