APPENDIX B

Geotechnical Borings Results

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N-VALUE

COHESIONLESS SOILS			COHESIVE SOILS		
Density	N (blows/ft)	Approximate Relative Density(%)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	0 - 15	Very Soft	0 to 2	<250
Loose	4 to 10	15 - 35	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	35 - 65	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	65 - 85	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	85 - 100	Very Stiff	15 to 30	2000 - 4000
			Hard	over 30	>4000

USCS SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP DESCRIPTIONS	
Coarse Grained Soils	Gravel and Gravelly Soils	Clean Gravel (little or no fines)	GW	Well-graded GRAVEL
	More than 50% of Coarse Fraction Retained on No. 4 Sieve		GP	Poorly-graded GRAVEL
		Gravel with Fines (appreciable amount of fines)	GM	Silty GRAVEL
			GC	Clayey GRAVEL
More than 50% Retained on No. 200 Sieve Size	Sand and Sandy Soils	Clean Sand (little or no fines)	SW	Well-graded SAND
	50% or More of Coarse Fraction Passing No. 4 Sieve		SP	Poorly-graded SAND
		Sand with Fines (appreciable amount of fines)	SM	Silty SAND
			SC	Clayey SAND
Fine Grained Soils	Silt and Clay	Liquid Limit Less than 50%	ML	SILT
			CL	Lean CLAY
			OL	Organic SILT/Organic CLAY
50% or More Passing No. 200 Sieve Size	Silt and Clay	Liquid Limit 50% or More	MH	Elastic SILT
			CH	Fat CLAY
			OH	Organic SILT/Organic CLAY
Highly Organic Soils			PT	PEAT

TEST SYMBOLS

%F	Percent Fines
AL	Atterberg Limits: PL = Plastic Limit, LL = Liquid Limit
CBR	California Bearing Ratio
CN	Consolidation
DD	Dry Density (pcf)
DS	Direct Shear
GS	Grain Size Distribution
K	Permeability
MD	Moisture/Density Relationship (Proctor)
MR	Resilient Modulus
PID	Photoionization Device Reading
PP	Pocket Penetrometer Approx. Compressive Strength (tsf)
SG	Specific Gravity
TC	Triaxial Compression
TV	Torvane Approx. Shear Strength (tsf)
UC	Unconfined Compression

SAMPLE TYPE SYMBOLS

- 2.0" OD Split Spoon (SPT) (140 lb. hammer with 30 in. drop)
- Shelby Tube
- 3-1/4" OD Split Spoon with Brass Rings
- Small Bag Sample
- Large Bag (Bulk) Sample
- Core Run
- Non-standard Penetration Test (3.0" OD split spoon)

GROUNDWATER SYMBOLS

- Groundwater Level (measured at time of drilling)
- Groundwater Level (measured in well or open hole after water level stabilized)

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5 mm) to No. 200 (0.074 mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074mm)

COMPONENT PROPORTIONS

PROPORTION RANGE	DESCRIPTIVE TERMS
< 5%	Clean
5 - 12%	Slightly (Clayey, Silty, Sandy)
12 - 30%	Clayey, Silty, Sandy, Gravelly
30 - 50%	Very (Clayey, Silty, Sandy, Gravelly)
Components are arranged in order of increasing quantities.	

NOTES: Soil classifications presented on exploration logs are based on visual and laboratory observation.
Soil descriptions are presented in the following general order:

Density/consistency, color, modifier (if any) GROUP NAME, additions to group name (if any), moisture content. Proportion, gradation, and angularity of constituents, additional comments. (GEOLOGIC INTERPRETATION)

Please refer to the discussion in the report text as well as the exploration logs for a more complete description of subsurface conditions.

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
MOIST	Damp but no visible water.
WET	Visible free water, usually soil is below water table.

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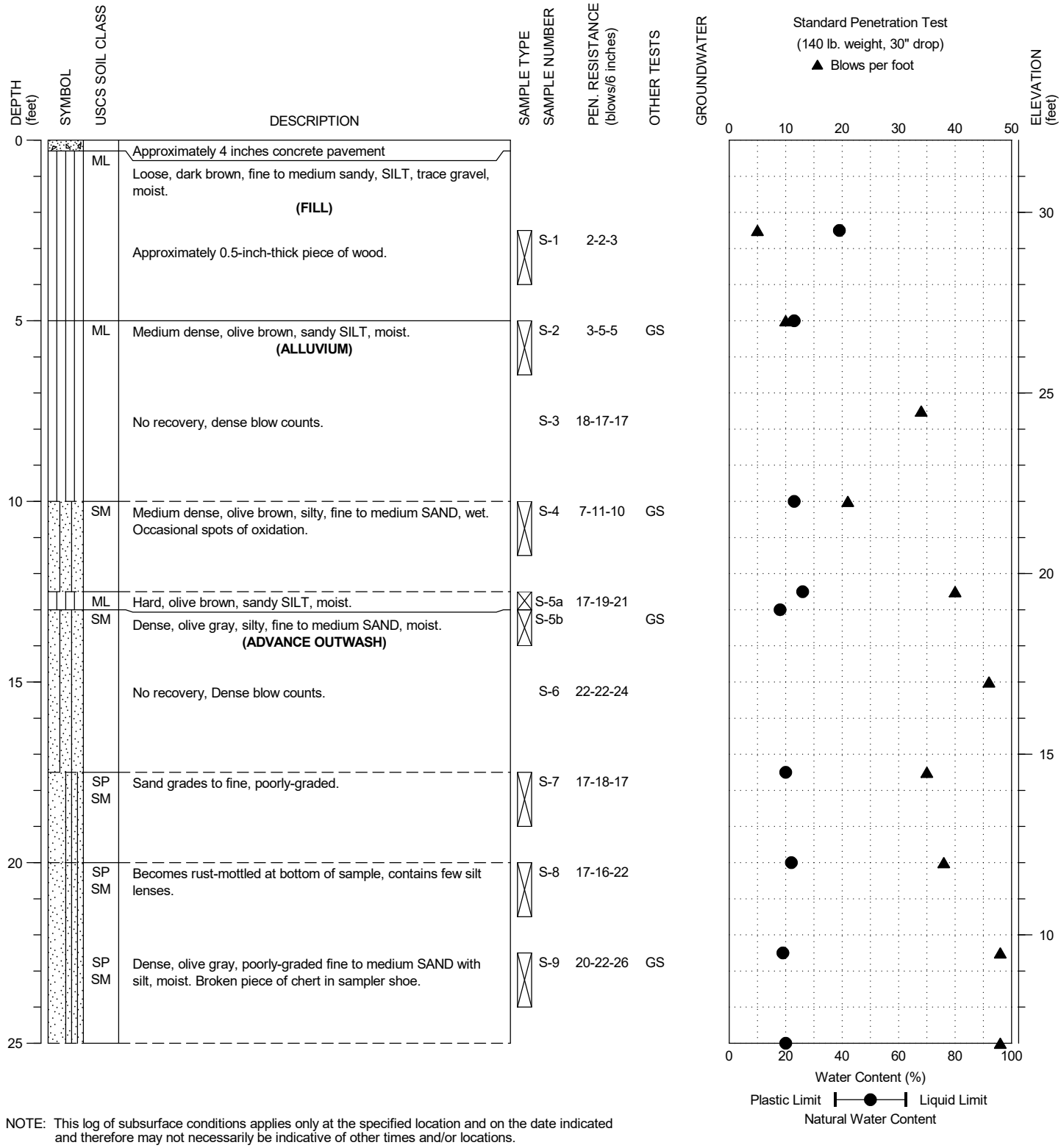
Sound Transit - SR-522 / NE 145th BRT - Phase 2
King County, Washington

LEGEND OF TERMS AND SYMBOLS USED ON EXPLORATION LOGS

PROJECT NO.: 2017-134-21 FIGURE: X-1

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Mud Rotary, Diedrich D120
SAMPLING METHOD: SPT w/Autohammer
LOCATION: See Figure 2

DATE STARTED: 7/6/2020
DATE COMPLETED: 7/6/2020
LOGGED BY: M.A. Benson
SURFACE ELEVATION: 32.0 ± feet



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

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Sound Transit - SR-522 / NE 145th BRT - Phase 2
King County, Washington

BORING: BH-8

PROJECT NO.: 2017-134-21 FIGURE: X-2

BORING-DSM 2017-134.GPJ 11/25/20

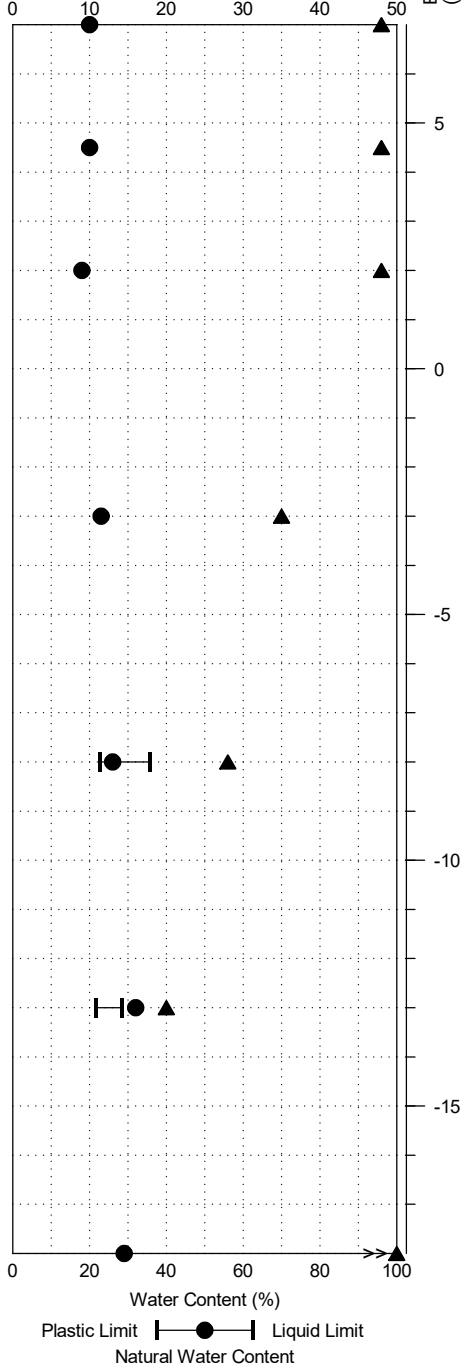
DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Mud Rotary, Diedrich D120
SAMPLING METHOD: SPT w/Autohammer
LOCATION: See Figure 2

DATE STARTED: 7/6/2020
DATE COMPLETED: 7/6/2020
LOGGED BY: M.A. Benson
SURFACE ELEVATION: 32.0 ± feet

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS
25		SP SM	Dense, olive gray, fine to coarse SAND with silt, poorly-graded, trace gravel, moist. Gravel fraction contains granitics.		S-10	23-23-25	
					S-11	17-24-24	
		SP SM	Same as above, grades to slightly silty, wet.				
30			Same as above.		S-12	20-23-25	
35		SM	Dense, olive gray, silty, fine to medium SAND, moist. Trace gravel, few silt lenses and rust banding. Becomes micaceous.		S-13	16-17-18	
40		CL	Very stiff, rust-mottled olive brown, slightly fine sandy, lean CLAY, moist. Non-plastic. **(GLACIOLACUSTRINE)**		S-14	10-12-16	AL
45		CL ML	Very stiff, olive-gray, silty CLAY, moist.		S-15	4-8-12	AL
50							

GROUNDWATER

Standard Penetration Test
(140 lb. weight, 30" drop)
▲ Blows per foot



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

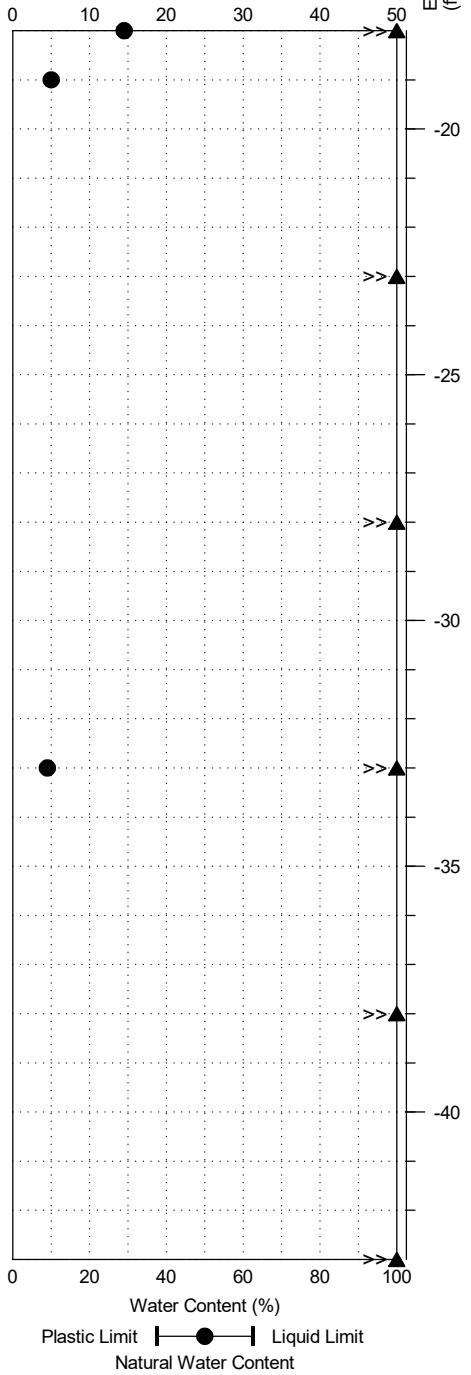
DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Mud Rotary, Diedrich D120
SAMPLING METHOD: SPT w/Autohammer
LOCATION: See Figure 2

DATE STARTED: 7/6/2020
DATE COMPLETED: 7/6/2020
LOGGED BY: M.A. Benson
SURFACE ELEVATION: 32.0 ± feet

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS
50		ML	Very dense, olive brown, SILT, moist.		S-16a	9-21-32	
		SM	Very dense, olive brown, silty SAND with gravel, moist. Drilling becomes rough and gravelly. **(GLACIOFLUVIAL)**		S-16b		
55		GP	Very dense, olive brown, very sandy GRAVEL, moist. Rough, gravelly drilling. Sampling bouncing on obstruction.		S-17	50/6"	
60			No recovery. Freshly fractured black gravel in sampler shoe.		S-18	50/6"	
65		SP SM	Very dense, olive gray, poorly-graded fine to coarse SAND with silt and gravel, moist. Sample fines up.		S-19	30-31-32	GS
70		GP	Very dense, slightly silty, very sandy, GRAVEL, wet.		S-20	50/6"	
75							

GROUNDWATER

Standard Penetration Test
(140 lb. weight, 30" drop)
▲ Blows per foot



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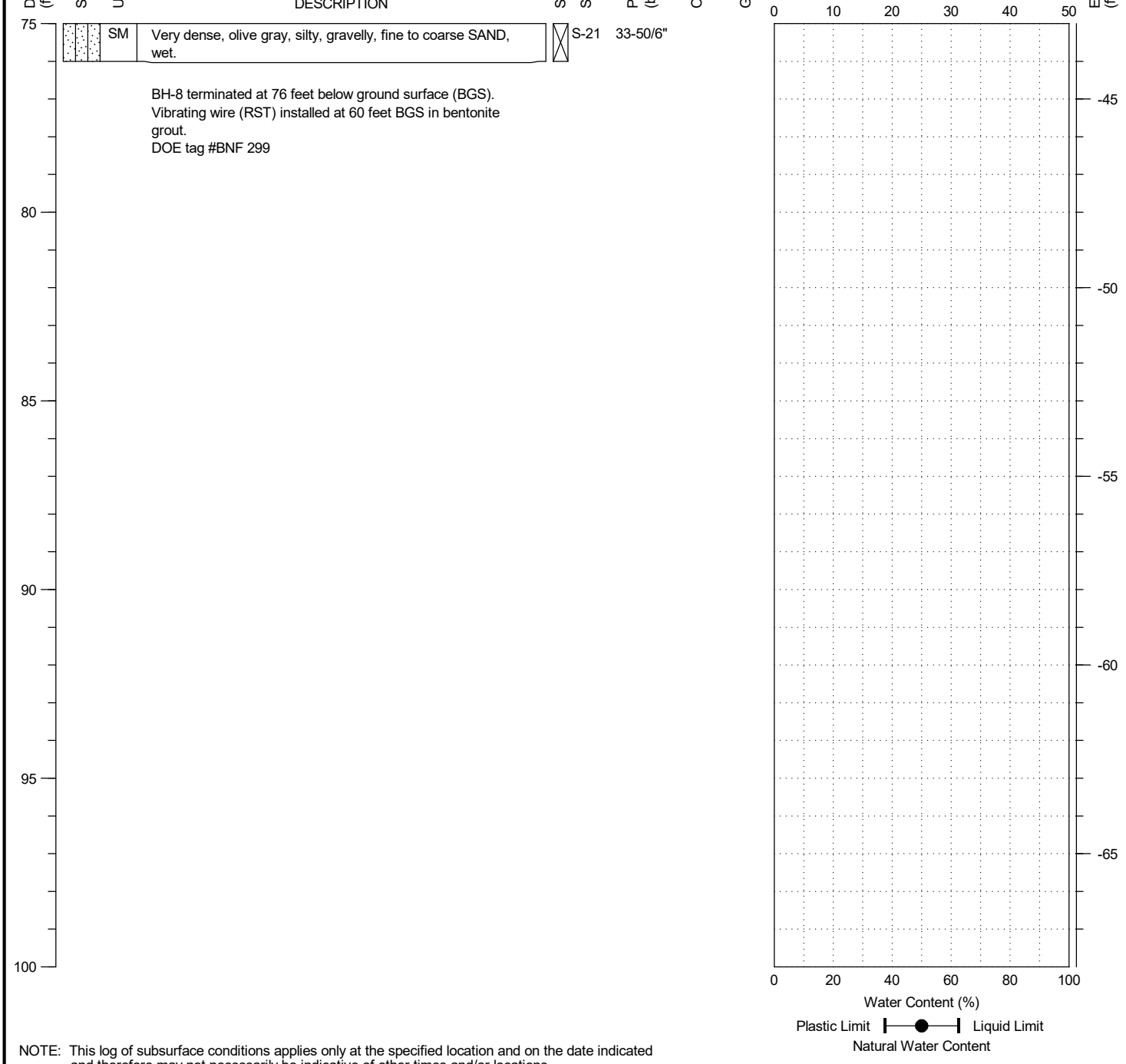
DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Mud Rotary, Diedrich D120
SAMPLING METHOD: SPT w/Autohammer
LOCATION: See Figure 2

DATE STARTED: 7/6/2020
DATE COMPLETED: 7/6/2020
LOGGED BY: M.A. Benson
SURFACE ELEVATION: 32.0 ± feet

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	GROUNDWATER
75		SM	Very dense, olive gray, silty, gravelly, fine to coarse SAND, wet.		S-21	33-50/6"		

BH-8 terminated at 76 feet below ground surface (BGS).
Vibrating wire (RST) installed at 60 feet BGS in bentonite grout.
DOE tag #BNF 299

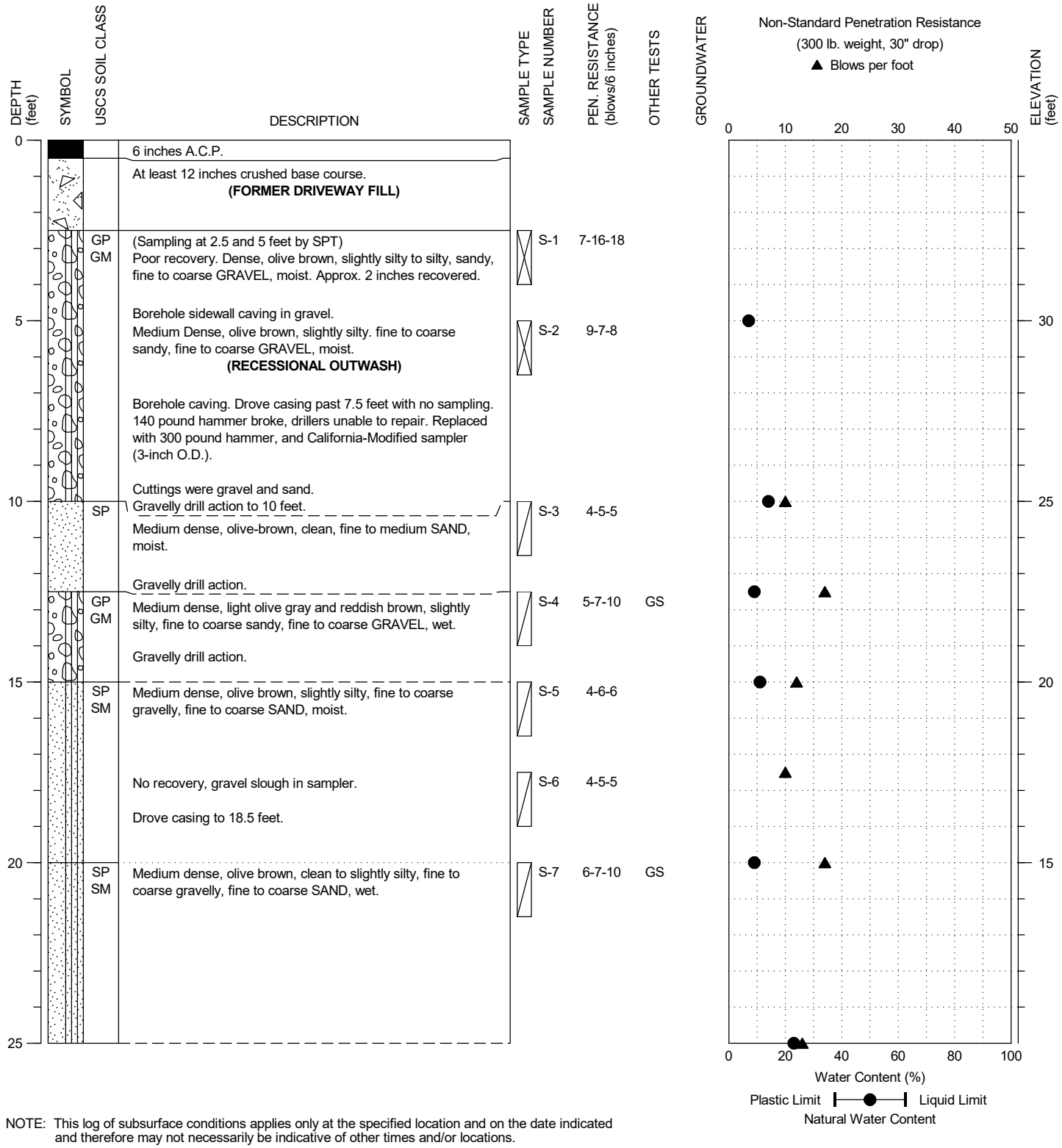
Standard Penetration Test
(140 lb. weight, 30" drop)
▲ Blows per foot



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Mud Rotary, Mobile B-58
SAMPLING METHOD: SPT w/Autohammer; Calif. w/ 300 lb/ Autohammer
LOCATION: See Figure 2

DATE STARTED: 4/20/2020
DATE COMPLETED: 4/21/2020
LOGGED BY: B. Thurber
SURFACE ELEVATION: 35.0 ± feet



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Sound Transit - SR-522 / NE 145th BRT - Phase 2
King County, Washington

BORING: BH-9

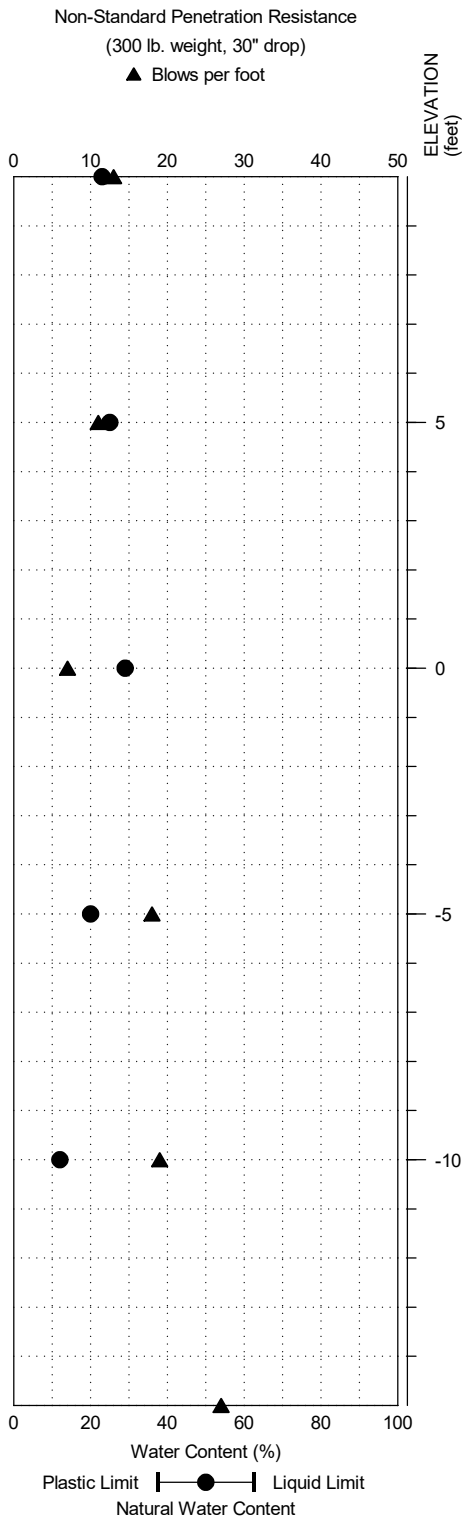
PROJECT NO.: 2017-134-21 FIGURE: X-3

BORING-DSM 2017-134.GPJ 11/25/20

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Mud Rotary, Mobile B-58
SAMPLING METHOD: SPT w/Autohammer; Calif. w/ 300 lb/ Autohammer
LOCATION: See Figure 2

DATE STARTED: 4/20/2020
DATE COMPLETED: 4/21/2020
LOGGED BY: B. Thurber
SURFACE ELEVATION: 35.0 ± feet

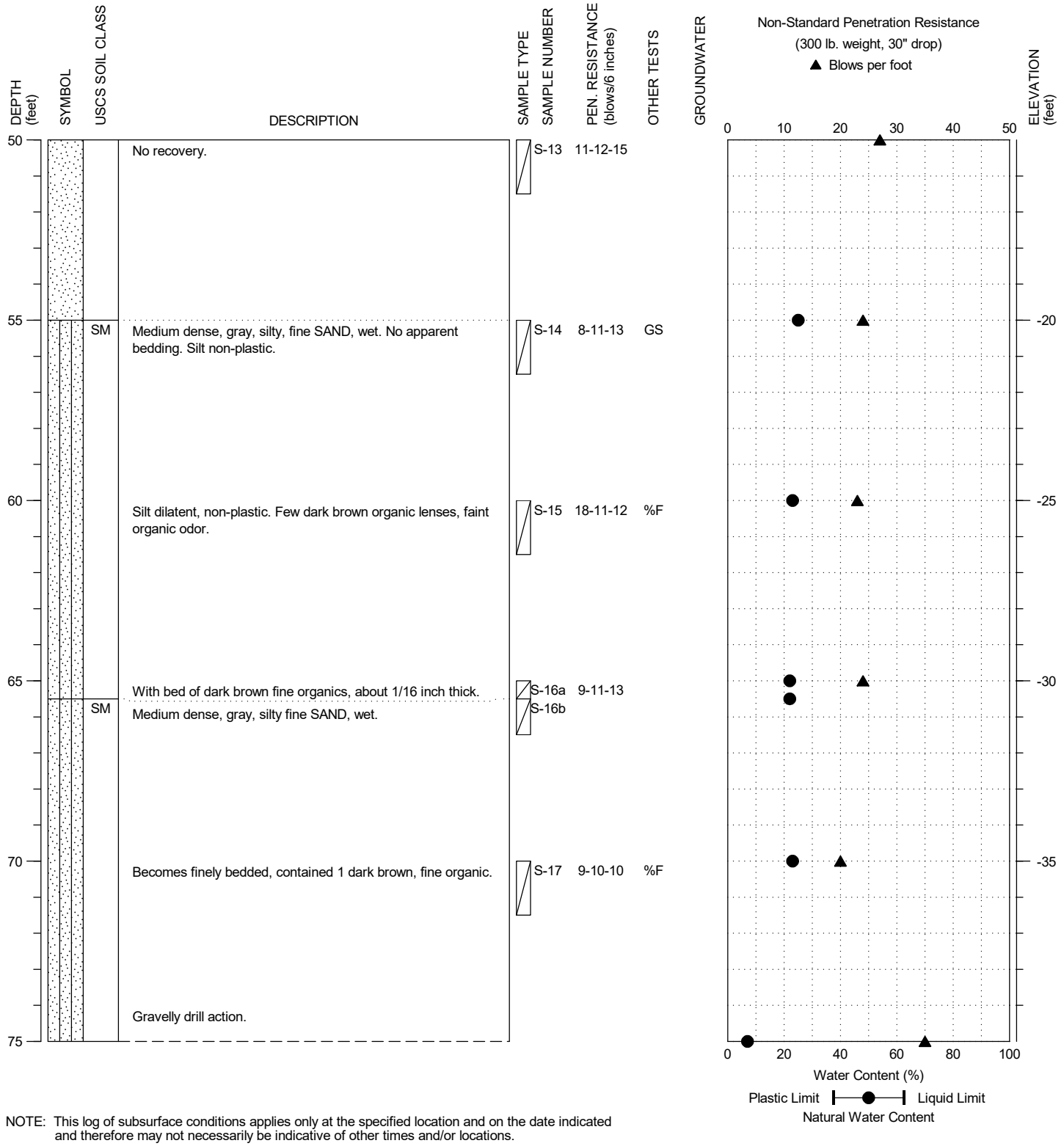
DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS
25		SP	Medium dense, olive-brown with faint rust banding, clean, fine to medium SAND, wet.		S-8	8-6-7	
30			Grades to gray.		S-9a	4-5-6	
					S-9b		
35		SP	Loose to medium dense, olive brown, clean, fine SAND, wet. Contained about 1-inch-thick layer of non-plastic silt, wet.		S-10	4-3-4	
			Driller reported harder drilling.				
40		SM	Medium dense, gray, very silty, fine SAND, wet. Oxidized greenish-gray and rust in upper 1 inch.		S-11	5-9-9	GS
45		SP	Medium dense, dark gray. clean. fine gravelly, medium to coarse SAND, wet.		S-12	7-8-11	%F
50							



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Mud Rotary, Mobile B-58
SAMPLING METHOD: SPT w/Autohammer; Calif. w/ 300 lb/ Autohammer
LOCATION: See Figure 2

DATE STARTED: 4/20/2020
DATE COMPLETED: 4/21/2020
LOGGED BY: B. Thurber
SURFACE ELEVATION: 35.0 ± feet



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

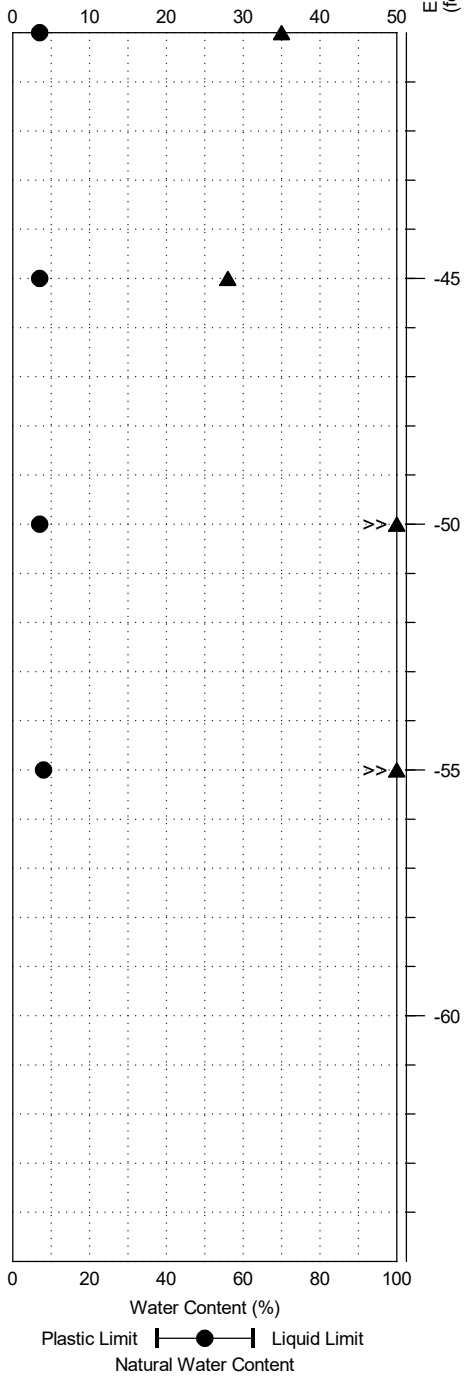
DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Mud Rotary, Mobile B-58
SAMPLING METHOD: SPT w/Autohammer; Calif. w/ 300 lb/ Autohammer
LOCATION: See Figure 2

DATE STARTED: 4/20/2020
DATE COMPLETED: 4/21/2020
LOGGED BY: B. Thurber
SURFACE ELEVATION: 35.0 ± feet

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS
75		GP	Dense, dark gray, fine to coarse sandy, fine to coarse GRAVEL, wet. Contains 3-inch-thick layer of slightly gravelly, fine to medium SAND. Potentially Cascadian provenance, based on lithology.		S-18	18-19-16	
80		GM	Medium dense, gray, silty, fine to coarse sandy, fine to coarse GRAVEL, moist. Gravelly drill action. Hammer bouncing at 85'.		S-19	11-13-15	%F
85		SM	Very dense, gray, silty, gravelly, SAND, moist, variability is gray coloring, but no apparent bedding. Cable broke, drill string resting on bottom of hole during repair. Partial hole collapse at 65 feet after pulling up and cleaning out bit. Gravelly drill action. Hydraulic fitting for break-out wrench broke. Drilling halted for the day at 90 feet. 4/21/2020 Prior to drilling drove additional 5 feet of casing to nearly 25 feet, and drilled out sloughed hole. Grades to speckles of olive-brown in top 2 inches.		S-20	22-36-50/5"	%F
90					S-21	36-50/4"	
95			BH-9 terminated at about 90.8 feet below ground surface (BGS). Groundwater observed during drilling from about 20 to 65.5 feet (wet soils). Vibrating wire (RST) installed to 58 feet BGS in bentonite grout. DOE tag# BNF 204				
100							

GROUNDWATER

Non-Standard Penetration Resistance
(300 lb. weight, 30" drop)
▲ Blows per foot



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GeoSciences Inc.

Sound Transit - SR-522 / NE 145th BRT - Phase 2
King County, Washington

BORING:
BH-9

PROJECT NO.: 2017-134-21 FIGURE: X-3

BORING-DSM 2017-134.GPJ 11/25/20

Project: CSI Brightwater Project Location: King and Snohomish Counties Contract Number: E83004E	**Log of Boring MW- 9** Sheet 1 of 2

Date(s) Drilled	11/27/01 - 11/28/01	Geotechnical Consultant	HWA GeoSciences Inc.	Logged By	JSS	Checked By	MLR/SEG
Drilling Method/ Rig Type	Mud Rotary/ Truck	Drilling Contractor	Holocene Drilling	Total Depth of Borehole	94.0 feet		
Drill Bit Size/Type	Tricone	Hammer Weight/Drop (lbs/in.)	300#, 30"	Ground Surface Elevation/Datum	39 feet / NAVD88		
Location	East lane of 44th Ave. NE	Coordinates	N. 47.75304 W. 122.28192	Elevation Source	Plan		

Elevation, feet	Depth, feet	SAMPLES Type	Number	Blows / 6 in. (N)	Recovery, %	Graphic Log	USCS	MATERIAL DESCRIPTION	Piezometer Schematic	Lab Tests	Moisture Content, %	REMARKS AND OTHER TESTS
	0						SM	Very loose, dark brown to brown, silty, fine gravelly, fine to medium SAND, wet. Organics include burnt wood fragments.				1/22/2002 0 ft
			S-1a S-1b	0 - 0 - 1 (1)	100 100			(ALLUVIUM, Qal)		M SA	23.2	Artesian Flow, Head not measured
	5						SM	Medium dense, dark yellowish brown, gravelly, silty, fine to medium SAND, wet. Layering of more and less oxidized lenses.				
-30			S-2	5 - 5 - 9 (14)	100							
	10											
			S-3a S-3b	8 - 9 - 12 (21)	200		SM	Medium dense, olive brown, silty, fine to medium SAND, wet.				
	15											
			S-4a S-4b	5 - 5 - 9 (14)	100 100		SM	Medium dense, olive brown to dark gray, interbedded silty fine to medium SAND, and very sandy SILT, wet.		M SA	23.8	
-20	20											
			S-5a S-5b	2 - 1 - 2 (3)	100 100		CL	Soft, dark gray, lean CLAY, moist.		M SA AL HA	31.2	
	25											
			S-6	4 - 7 - 9 (16)	100		SM	Medium dense, dark gray, silty, fine SAND, wet. Laminations of fine to medium SAND. Trace pieces of charcoal and wood fragments.				
-10	30						SM	Interbeds of medium stiff, olive brown, gravelly, fine sandy SILT to silty fine SAND and medium dense, gray, fine to medium SAND, wet. Laminated.				
			S-7a S-7b	5 - 10 - 12 (22)	100 100					M SA	25.6	
	35											
			S-8	5 - 6 - 3 (9)	100		SM	Stiff, olive brown, sandy, SILT to loose, olive brown, silty, fine SAND, wet		M SA	26.3	
0	40						SP-SM	Medium dense, olive brown, slighty silty to silty, fine to medium SAND, wet.				
			S-9	9 - 11 - 15 (26)	100			(GLACIAL FLUVIAL, Qvrf)				
	45							Driller reports thin layers of gravel.				
			S-10	8 - 12 - 15 (27)	100					M SA	19.1	
-10	50											

(Ver.1.1 Jan02RWSP-RWSP.GLB-RWSP.GDT) H:\GINTW\PROJECTS\99\5349K.GPJ 5/1/02

HWA GEOSCIENCES INC.

Figure: A-10.1

Project: CSI Brightwater
Project Location: King and Snohomish Counties
Contract Number: E83004E

Log of Boring MW- 9

Sheet 2 of 2

Elevation, feet	Depth, feet	SAMPLES Type	Number	Blows / 6 in. (N)	Recovery, %	Graphic Log	USCS	MATERIAL DESCRIPTION	Piezometer Schematic	Lab Tests	Moisture Content, %	REMARKS AND OTHER TESTS
	50											
			S-11	12 - 18 - 18 (36)	100		GP-GM	Dense, olive brown, silty, sandy, GRAVEL, moist. Large gravel in toe of sampler. (GLACIAL TILL, Qvtm)				
	55											
-20			S-12a S-12b	8 - 15 - 15 (30)	100 50		SM	Medium dense, gray, very silty, fine SAND, moist. Some organic material. Thin laminations of fine to medium SAND. (NONGLACIAL FLUVIAL, Qpnf)		M SA	21.9	
	60						ML	Medium dense to dense, olive gray to dark gray, sandy SILT to silty fine SAND, moist. Laminations of SILT (1-2 mm thick). (GLACIOLACUSTRINE, Qpgl)				
			S-13	10 - 11 - 15 (26)	100					M SA	23.6	
	65											
			S-14	7 - 12 - 18 (30)	100					M SA	19.8	
-30												
	70											
			S-15	15 - 21 - 28 (49)	100		SM	Dense to very dense, dark gray, silty fine SAND, wet. Laminations of fine to medium SAND. (GLACIAL FLUVIAL, Qpgf)		M SA	20.5	
	75											
			S-16	12 - 15 - 15 (30)	100		SP-SM	Dense, gray, clean to silty fine SAND, wet. Composed of thin beds of clean medium to fine sand and silty fine SAND.				
-40												
	80						ML	Hard to stiff, dark gray, very sandy SILT and dense to medium dense, dark gray, silty fine to clean medium SAND, wet. Interbedded and laminated. (GLACIOLACUSTRINE, Qpgl)				
			S-17	12 - 15 - 20 (35)	100					M SA	21.2	
	85											
-50			S-18	9 - 11 - 12 (23)	100							
	90											
			S-19	5 - 5 - 10 (15)	100					M SA	26.2	
	95							Bottom of boring at 94 feet. 2" piezometer installed to 90 feet. Vibrating wire piezometer installed at 40 feet.				
-60												
	100											
	105											

(Ver.1.1 Jan02RWSP-RWSP.GLB-RWSP.GDT) H:\GINTW\PROJECTS\9915349K.GPJ 5/1/02

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Figure: A-10.2