

503.227.1800 2000 SW First Avenue Suite 410 Portland, OR 97201

July 26, 2023

Jesse Winterowd Winterbrook Planning 610 SW Alder Street, Suite 810 Portland, OR 97205

Subject: Supplemental Information **Re:** Land Use Permitting

Dear Jesse:

This letter provides additional information regarding expansive soils within the property upon which the Portland Water Bureau Filtration Facility is proposed (the "Filtration Facility Site") and the Filtration Facility Site septic system in response to comments on those issues included in a memorandum prepared by True North Geotechnical dated June 28, 2023 (Exhibit E.21).

Expansive Soils at Filtration Facility

Delve Underground performed an extensive geotechnical exploration program, consisting of 16 deep soils borings at and adjacent to the proposed structures on the Filtration Facility Site with all relevant soil layers identified with recommendations for design and construction provided to the Portland Water Bureau and design team. The location map and detailed logs of these 16 borings (FF-B-201, 202, 204 through 209, 212, 214 through 217, FF-SC-203, 213 and 218) are included in the attachment of this letter. The conclusion provided in Exhibit A.81 that "Based on the geotechnical investigations and evaluation performed for the project, the site is suitable for the intended development and the risks from the geologic and seismic hazards are low and can be mitigated with appropriate foundations and site developments." remains valid.

"Fat Clay", if composed of high content of expansive minerals, can be prone to large volume changes (expansion and shrinkage) that are directly related to changes in water content. The effects of the expansive soils are typically limited to at-grade, light-weight structure foundations and slabs for which moisture contents of the soils fluctuate drastically between seasons and the loads of the structures are not sufficient to counterbalance the swelling pressure from the expansive soil.

During the planning and design phases, the geotechnical and geologic studies did not identify that the existing structures in the surrounding area of the Bull Run Filtration Program have experienced expansive soil issues.

In particular for the Bull Run Filtration Facility geotechnical study, the "Fat Clay" is identified to be located generally from 15' to 35' deep within the proposed Filtration Facility structures, except for FF-SC-203 located at the southeast corner of the Flocculation and Sedimentation Basin (at approximately 15 to 20 feet deep structure) where the "Fat Clay" was noted from ground surface to 30' deep. The "Fat Clay" is mainly in a moist condition.

"Fat Clay" will not affect the at-grade structures and shallow structures since it is well below their installation depths and the nature water content of the "Fat Clay" will not be affected. For deep structures (including the Flocculation and Sedimentation Basin), mat foundations will be situated on the "Fat Clay", however, the groundwater and moisture conditions are also not expected to change because no significant dewatering efforts are anticipated, the clayey subgrade will be protected by a thick crushed rock working mat during construction and by well-compacted backfill and low-permeability cap layer at the surface after the construction. Furthermore, the deep structures are also heavy water-holding structures and their loads (weights) will likely be more than the swelling pressure if "Fat Clay" expands.

Additionally, the pipeline components connected to the Filtration Facility are installed at depths ranging from 10 to 30 feet deep. Their construction will not affect the nature moisture contents of the "Fat Clay" (if encountered) with the similar reasons for the deep structures mentioned above. Also, these welded steel pipes are very strong and flexible, and are expected to accommodate the swelling pressure even if the "Fat Clay" were to expand.

Therefore, we do not expect that the "Fat Clay" layer is a concern for the Filtration Facility. This is the reason why expansive index testing was not performed during the geotechnical evaluation.

Septic System

Prior geotechnical engineering analysis (identified that the slope stability concern at the site is from shallow landslides occurring at or near the surface of the slope (Geohazard Zone). The risk for deep seated landslides (a much larger global failure extending to Sandy River) is low as indicated by a high factor of safety of greater than 1.5. The drain field is located approximately 70 to 80 feet from the edge of the Geohazard Zone. At this distance and combined with the clayey/silty soils it will not increase the groundwater conditions at the Geohazard Zone and negatively affect the stability of the slopes within the Geohazard Zone. For the deep seated failure scenario, because of the high factor of safety, infiltration from drain field will not impact the deep seated failure mode. Therefore, the drain field is not anticipated to have a negative effect to the site slope stability.

Sincerely,

Yuxin Lang Digitally signed by Yuxin Lang Date: 2023.07.27 17:01:14 -07'00'

Yuxin "Wolfe" Lang, PE, GE, P.Eng Principal Engineer

cc: File

Attachments

Bull Run Filtration Facility Geotechnical Data Report Site Plan Logs of Borings*:

- FF-B-201
- FF-B-202
- FF-B-204
- FF-B-205
- FF-B-206
- FF-B-207
- FF-B-208
- FF-B-209
- FF-B-212
- FF-B-214
- FF-B-215
- FF-B-216
- FF-B-217
- FF-SC-203
- FF-SC-213
- FF-SC-218

* Locations of these borings are highlighted in green in the site plan.



Log of Boring

Project	Num	iber	: 608	4.0								
Date(s) Drilled	04/	12/20)21 - (04/13/2021		Client	Port	land	Water Bureau	Final Depth 80.4 ft b	gs	
Coordinates	774	10379	.2 E,	661243.8 N	J	Geotechnical Consultant	Laca	imas (Consulting	Method/ Rig Type Mud Ro	tary/CME 800 Tra	ck
Surface Elevation	707	7.4 ft.				Drilling Contractor	Weste	rn State	s Soil Conservation, Inc.	Hole 5.00 in		
Location	Ca	rpen	ter La	ine Nurse	ry	Logged by/ Checked by	Susa	n Bed	narz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	■ PEN RES BLC 10 2 ○ WATE (MC) I ATTEF 20 4	NETRATION BISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/P 0 60 80	LISCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
703 5-	s	PT_ 1	100	2-3-5 (N=8)	C	5	····		Medium stiff, moist, or SILT (MH); high plastici Residual Soil of the S	ange-brown, ELASTIC ty. pringwater Formation	Grass-covered plowed field at ground surface.	
698 10-	s	РТ_ 2	100	4-4-4 (N=8)	• 0			MF	ł			
693 15	s	PT_ 3	100	4-6-9 (N=15)					Becomes stiff at 15.0	feet.	Lost 100 gallons of drilling mud at 15-20 feet likely due to clay "collar" blocking fluid	
688 20	s	PT_ 4	100	5-7-9 (N=16)					Becomes very stiff at	20.0 feet.	return. Stiffer drilling at 17 feet.	
683 25	s S	PT_ 5 PT_	100 100	4-7-10 (N=17) 4-6-9					Very stiff, moist, gray, c CLAY (CH); high plastici Residual Soil of the S <i>Becomes stiff at 25.0</i>	orange, and black, FAT ty. pringwater Formation feet.		
678	s	PT_ 7	100	(N=13) 5-9-11 (N=20)	F 4			СН	Becomes very stiff at	27.5 feet.	SPT_7: Oven Dried PI=50.1 (PL, LL = 25.7, 75.8).	
DE	rgro	oun	d	NOTES: Location and El Vertical Datum Coordinate Syst	evation Sou : Portland Ve tem: NAD 19	rce: PWB Surve ertical 983 StatePlane	y 5-13-: Oregon	2021 North FI	PS 3601 Feet	Boring	FF-B-201 t 1 of 3	

Log of Boring

Project	Num	ber: 6	084.0								
Date(s) Drilled	04/1	2/2021	- 04/13/2021		Client	Portla	nd W	Vater Bureau	Final Depth 80.4 ft b	gs	
Coordinates	774(379.2	E , 661243.8 I	N	Geotechnical Consultant	Lacan	nas C	onsulting	Method/ Rig Type Mud Ro	tary/CME 800 Tra	ck
Surface Elevation	707.	4 ft.			Drilling Contractor	Western	States	Soil Conservation, Inc.	Hole 5.00 in		
Location	Car	penter	Lane Nurse	ery	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	SAIVIPLE INUIVIBER RFCOVFRV (%)	BLOW COUNTS	■ PEN RES BLC 10 2 ○ WATE (MC) I ATTEF 20 4	NETRATION SISTANCE DWS/FT 20 30 40 H H H ER CONTEN RBERG LL/PL 40 60 80	USCS GRAPHIC	USCS	MATERIAL D	DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
673	SP SP SP	T_ 10 3 T_ 10 9	0 5-10-10 (N=20) 0 3-5-8 (N=13)		0		СН	Very stiff, moist, gray, c CLAY (CH); high plastici Residual Soil of the S <i>Becomes stiff at 32.5</i>	orange, and black, FAT ity. Springwater Formation feet.	Lost 300 gallons of drilling mud at 30 feet. Casing borehole to 10 feet stopped mud loss.	
668 40-	SP 1 SP 1 SP	$\begin{array}{c} T_{-} \\ 0 \\ T_{-} \\ 1 \\ T_{-} \\ 1 \\ 1 \\ \end{array}$	0 2-3-4 (N=7) 0 3-5-7 (N=12) 0 4-3-11 (N=14)		o H o		мн	Medium stiff, wet, gray and black, ELASTIC SILT plasticity, relict texture Sensitive Saprolite o Formation Becomes stiff at 37.5 Becomes not sensitiv	, orange, red, brown, with sand (MH); high sensitive. f the Springwater feet. e at 40.0 feet.	SPT_11: Oven Dried PI=11.5 (PL, LL = 33.0, 44.5).	
663 45	SP 1 SP 1	T_ 10 3 T_ 10 4	(N=14) 0 9-11-38 (N=49) 0 17-18-28 (N=46)	0			ML	Hard, moist, gray-brow low plasticity, fine to co texture. Less Weathered Spri Dense, moist to wet, g with cobbles (SM); fine coarse gravel, low plas	n, Sandy SILT (ML); oarse sand, relict ngwater Formation ray-brown, Silty SAND to coarse sand, few ticity fines.		
658 50 -	SP 1	T_ 10 5	0 29-41-36 (N=77)	0			SM	Becomes very dense at 50.0 feet.	and overconsolidated		
653 55 -	¥ SP 1	T_ 20 6	0 50/3" (Refusal)	0				Stiff, moist, gray and o	range, LEAN CLAY (CL);	Small cobbles from 55 to 60 feet.	
648							CL	Less Weathered Spri	ngwater Formation	soπer drilling at 59 feet.	
DE	rgro	/E	NOTES: Location and E Vertical Datum Coordinate Sys	levation Sou Portland V tem: NAD 1	ırce: PWB Survey ertical 983 StatePlane C	/ 5-13-202 Dregon No	21 orth FIP:	5 3601 Feet	Boring Shee	FF-B-201 t 2 of 3	

Log of Boring

Project I	Numbe	r: 608	54.0								
Date(s) Drilled	04/12/2	021 -	04/13/2021		Client]	Portla	nd W	Vater Bureau	Final Depth 80.4 ft b	gs	
Coordinates	774037	9.2 E,	661243.8 N	1	Geotechnical Consultant]	Lacam	1as C	onsulting	Method/ Rig Type Mud Ro	tary/CME 800 Tra	ck
Surface Elevation	707.4 ft	t .			Drilling Contractor	Vestern	States	Soil Conservation, Inc.	Hole 5.00 in		
Location	Carper	nter La	ane Nursei	ry	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 (10 2 (MC) ATTER 20 4 	NETRATION BISTANCE WS/FT 0 30 40 H H ER CONTENT RBERG LL/PL 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
	SPT_ 17	100	4-5-9 (N=14)		D.		CL	Stiff, moist, gray and or low plasticity. Less Weathered Sprin	range, LEAN CLAY (CL);	Harder drilling at 64	
643	SPT_ 18	120	15-22-50 /3" (Refusal)		0		SM	SAND (SM), fine to me plasticity fines. Less Weathered Sprin	and orange, slity dium sand, low ngwater Formation	feet. No cobbles from 65 to 70 feet.	
638	SPT_ 19	200	50/3" (Refusal)				SM	Very dense, moist, gray with gravel (SM); fine t coarse sand, low plasti Less Weathered Sprin	/-brown, Silty SAND o coarse gravel, fine to city fines. ngwater Formation		
633 75 -	SPT_ 20	132	50/3" (Refusal)				GP	Very dense, moist, gray GRAVEL with sand (GP) fine to coarse sand, tra Less Weathered Sprin	 <i>i</i>, Poorly Graded <i>i</i>, fine to coarse gravel, <i>i</i> ce low plasticity fines. <i>ngwater Formation</i> 	"Gravelly" drilling from 75 to 80 feet.	
628						þ°°C	SP-				
623	21 SPT_	119	50/5" (Refusal)				SM	Very dense, moist, red- SAND with silt (SP-SM) low plasticity fines. Less Weathered Sprin	gray Poorly Graded ; fine to medium sand, ngwater Formation	Borehole completed at 80.4 feet below ground surface (bgs). Boring backfilled with bentonite grout.	
618											
DE	LVI	nd	NOTES: Location and Ele Vertical Datum: Coordinate Syst	evation Sou Portland Ve em: NAD 19	rce: PWB Survey ertical 983 StatePlane O	5-13-202 regon No	21 orth FIPS	5 3601 Feet	Boring Shee	FF-B-201 t 3 of 3	

Log of Boring

Project	Numbe	er: 608	64.0		Client	n -	-		Final Depth	
Drilled	04/19/	2021 - (04/20/2021		Geotechnical	Portla	ind W	Vater Bureau	81.2 ft b	gs
Surface	77405	78.6 E,	661126.9 N	N	Consultant	Lacan	nas C	onsulting	Rig Type Mud Ro	tary/CME 55
Elevation	710.6 ±	ft.			Contractor	Western	States	Soil Conservation, Inc.	Diameter 5.00 in	
Location	Carpe	nter La	ane Nurse	ery	Checked by	Susan	Bedn	arz / Susan Bednarz	Type 140 lb / 3	30 in / Automatic
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBEF	RECOVERY (%)	BLOW COUNTS	■ PEN RES BLC 10 2 → → ○ WATE (MC) I ATTEF 20 4	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/PI 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS
706 5 701 10	SPT_1 SPT_2	_ 100 _ 100	1-3-3 (N=6) 2-4-5 (N=9)	• 0				Medium stiff, moist, or SILT (MH); high plastici Residual Soil of the S <i>Becomes stiff at 10.0</i>	ange-brown, ELASTIC ty. pringwater Formation	Flush-mount monument installed. VWP installed at 41 feet and grouted into borehole. S/N: 2113123 Plowed field at ground surface.
⁶⁹⁶ 15	SPT_3	_ 100	5-6-8 (N=14)				MH			
691 20	SH_4	4 50								SH_4 advanced at 400 psi form 20 to 20.5 feet and at 750 psi from 20.5 to
696	SPT_5	100	6-8-12 (N=20)	0				Becomes very stiff, or brown, and dark brow	ange-brown light vn at 22.5 feet.	20.83 feet.
25	SPT_6	100	5-8-11 (N=19)				СН	Very stiff, moist, orango (CH); high plasticity. Residual Soil of the S	e and gray, FAT CLAY	Too stiff for Shelby tube.
681	SPT 7	_ 100	5-6-10 (N=16))					
DE	rgrou	nd	NOTES: Location and E Vertical Datum Coordinate Sys	levation Sou : Portland Ve tem: NAD 19	rce: PWB Surve ertical 983 StatePlane (y 5-13-20 Dregon No	21 orth FIPS	5 3601 Feet	Boring	FF-B-202 t 1 of 3

Log of Boring

FF-B-202

Project	Numbe	r: 608	34.0						II -	D-202	
Date(s) Drilled	04/19/2	2021 -	04/20/2021	l	Client	Portla	and W	Vater Bureau	Final Depth 81.2 ft b	gs	
Coordinates	774057	′ 8.6 E,	661126.9 N	1	Geotechnical Consultant	Lacar	nas C	onsulting	Method/ Rig Type Mud Ro	tary/CME 55	
Surface Elevation	710.6 f	t.			Drilling Contractor	Westerr	1 States	Soil Conservation, Inc.	Hole 5.00 in		
Location	Carper	nter L	ane Nurse	ry	Logged by/ Checked by	Susan	ı Bedr	1arz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 (10 2 (10 2) WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 20 30 40 H H H ER CONTEN RBERG LL/P 40 60 80	USCS GRAPHIC	USCS	MATERIAL D	DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
676	SH_8 SPT_ 9	80	3-4-5 (N=9)	The second secon	0 1		СН	Very stiff, moist, orang (CH); high plasticity. Residual Soil of the S <i>Becomes stiff, gray a</i>	e and gray, FAT CLAY Springwater Formation nd red at 32.0 feet.		
35	SH_1 0	. 42					мн	Wet, orange-brown an (MH); with zones of FA plasticity, trace fine to sensitive.	id red, ELASTIC SILT	SH_10 advanced at 300 psi from 35 to 36 feet and at 350 psi from 36 to 37 feet.	
671 ₄₀	SPT_ 11	100	3-4-9 (N=13)		0		SM	Sensitive Saprolite o Formation Medium dense, wet, S plasticity, sensitive.	f the Springwater	Gravelly drilling at 38 feet. SPT_12: Oven Dried	
	SPT_ 12 SPT_ 13	100	(N=15) (N=53)	0	2			Formation Color becomes gray- gravel at 40.0 feet. Very dense moist, gray (SM); fine to coarse sa	<i>brown, trace fine</i> <i></i> brown, Silty SAND nd, trace fine to coarse	(PL, LL = 27.4, 32.0).	
⁶⁶⁶ 45	X SPT_ 14	73	32-50/5" (Refusal)	0				gravel, low plasticity fi Less Weathered Spri Grades to Silty SAND 45.0 feet.	nes. i ngwater Formation with gravel (SM) at		
661 50	SPT_ 15	30	22-32-50 /5" (Refusal)	0			SM	Becomes gray-brown SAND (SM) with trac	ו and orange, Silty e gravel at 50.0 feet.		
⁶⁵⁶ 55	SPT_ 16		30-50/6" (Refusal)	0						Chattering on gravel at 55 feet.	
651	-						CL	√Very stiff, moist, gray, l − plasticity. Less Weathered Spri	EAN CLAY (CL); low	Soft drilling at 59 feet.	
DE		Ξ	NOTES: Location and El	evation Sou	urce: PWB Surve	ey 5-13-20)21		Boring	FF-B-202	
unde	rgrou	nd	Vertical Datum: Coordinate Syst	Portland Ve tem: NAD 1	'ertical 983 StatePlane	Oregon N	lorth FIP:	'S 3601 Feet	Shee	et 2 of 3	

Log of Boring

FF-B-202 inal Depth Date(s) Client 04/19/2021 - 04/20/2021 **Portland Water Bureau** 81.2 ft bgs Drilled Coordinates Geotechnical /lethod/ 7740578.6 E, 661126.9 N Lacamas Consulting Mud Rotary/CME 55 Consultant Rig Type Surface Drilling Hole 710.6 ft. 5.00 in Western States Soil Conservation, Inc. levatior ontracto Diameter ocation _ogged by/ Hammer **Carpenter Lane Nursery** Susan Bednarz / Susan Bednarz 140 lb / 30 in / Automatic Checked by SAMPLE NUMBER PENETRATION BACKFILL/INSTALL. GRAPHIC (%) SAMPLE TYPE RESISTANCE WATER LEVEI DEPTH (FT) BLOW COUNTS BLOWS/FT ELEV. (FT RECOVERY REMARKS USCS 10 20 30 40 MATERIAL DESCRIPTION AND O WATER CONTENT USCS (TESTS (MC) ATTERBERG LL/PL 20 40 60 80 Very stiff, moist, gray, LEAN CLAY (CL); low 3-7-11 SPT 100 Ð plasticity. 17 (N=18) Less Weathered Springwater Formation CL Very dense, moist, gray-brown and orange, 646 65 Silty SAND (SM); fine to medium sand, trace SPT 18: 49.8% fines by ASTM D1140 100 19-19-42 gravel, low plasticity fines. SPT Less Weathered Springwater Formation 18 (N=61) 641 70 Chattering on gravel Becomes Silty SAND with gravel (SM); fine SPT 106 28-40-50 0 at 70 feet. to coarse sand at 70.0 feet. /5" 19 (Refusal) SM 636 75 🛨 SPT_ Cobbly and gravelly 168 50/3" Becomes Silty SAND with gravel and drilling 75 - 79 feet. 20 (Refusal) cobbles (SM) at 75.0 feet. 631 80 SPT 114 17-42-50 0 /2" 21 Borehole completed (Refusal) at 81.2 feet below ground surface (bgs). 626 85 621 NOTES: DEI



Location and Elevation Source: PWB Survey 5-13-2021 Vertical Datum: Portland Vertical Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet Boring FF-B-202 Sheet 3 of 3

Log of Boring

Project Date(s)	inur			4.0		Client	D 1	1	Valor Deres -	Final Depth		
Drilled Coordinates	04	40502)21 0 T	((0000 0 3	т	Geotechnical	Port		vater Bureau	80.4 ft b	gs	
Surface	77	40583 3 6 ft	.9 E,	660880.2 ľ	N	Consultant Drilling	Laca	imas C	onsulting	Rig Type Mud Ro	tary/CME 55	
Elevation Location		rnen	ter I a	ne Nurco	ťV	Contractor Logged by/	Weste S1162	n Rode	Sour Conservation, Inc.	Diameter 5.00 m Hammer 140 lb /	30 in / Automatic	
					PEN	Checked by				Туре		;
ELEV. (FT) WATER LEVEL DFPTH (FT)	SAMPLE TYPE	SAMPLE NUMBE	RECOVERY (%)	BLOW COUNTS	RES BLC 10 2 WATE (MC) ATTEF 20 4	SISTANCE DWS/FT 0 30 40 H H FR CONTEN RBERG LL/F 0 60 80		USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL
699 5		SPT_	95	2-5-5 (N=10)	• Þ				Stiff, moist, orange-bro (MH); high plasticity. Residual Soil of the S	wn, ELASTIC SILT	Plowed field at ground surface. SPT_1: Oven Dried PI=16.6 (PL, LL = 25.9, 42.5).	
694 ₁₀		SPT_ 2	100	4-6-8 (N=14)			·····	МН				
- 689 15		SPT_ 3	100	6-10-12 (N=22)	0				Very stiff, moist, gray a (CH); high plasticity. Residual Soil of the S	nd orange, FAT CLAY		
684 20		SPT_ 4	100	5-8-13 (N=21)		D		сн	Color changes to orai at 20.0 feet	nge-brown and gray		
670	X	SPT_ 5	100	5-8-11 (N=19)	F	•			Color changes to gray feet.	v and red at 22.5		
25		БРТ_ 6	100	2-2-2 (N=4)		0			Moisture become we to gray and orange-b Medium stiff, wet, oran ELASTIC SILT (MH) inte	t and color changes rown at 25.0 feet. nge, gray, and brown, rbedded with loose		
674		SPT_ 7	100	2-2-5 (N=7)		0	·····	SM	Silty SAND (SM); fine to plasticity fines, relict to Sensitive Saprolite of Formation	o coarse sand, high exture, sensitive. f the Springwater		
DE		VE		NOTES: Location and E	evation Sou	rce: PWB Surv	ey 5-13-	2021		Boring	FF-B-204	
unde	ergr	oun	d	Vertical Datum Coordinate Sys	: Portland Ve tem: NAD 19	ertical 983 StatePlane	Oregon	North FIP	S 3601 Feet	Shee	t 1 of 3	

Log of Boring

Project	INU	mber	: 608	64.0								
Date(s) Drilled	0	4/09/20)21			Client	Portla	ind W	Vater Bureau	80.4 ft b	gs	
Coordinates	7	740583	5.9 E,	660880.2 N	I	Geotechnical Consultant	Lacan	nas C	onsulting	Method/ Rig Type Mud Ro	otary/CME 55	
Surface Elevation	7	03.6 ft				Drilling Contractor	Western	States	Soil Conservation, Inc.	Hole 5.00 in		
Location	C	arpen	ter La	ane Nurse	ry	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	PEN RES BLC 10 2 	NETRATION SISTANCE DWS/FT 0 30 40 H H H RECONTEN RBERG LL/PL 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
-		SPT_ 8	100	2-2-2 (N=4)		0		SM	Loose, wet, orange, bro SAND (SM); fine to coa plasticity fines, relict te Sensitive Saprolite of Formation	own, and gray, Silty rse sand, high exture, sensitive. f the Springwater	1	
669 35		9 SPT_ 10	100	3-3-10 (N=13)	- 	U		МН	Stiff, wet, gray-brown, (MH); high plasticity, fir relict texture, sensitive Sensitive Saprolite of Formation	Sandy ELASTIC SILT ne to coarse sand, f the Springwater	Gravel at 34.0 feet. SPT_10: Oven Dried PI=4.9 (PL, LL = 24.9, 29.8).	
664 ₄₀		SPT_ 11 SPT_ 12	88 72	16-36-50 /4" (Refusal) 36-38-41 (N=79)	0			ML	Minor sensitivity and feet. Hard, wet, gray-brown, gravel (ML); low plastic gravel, fine to coarse sa Less Weathered Sprin Becomes moist at 40.	, Sandy SILT with ity, fine to coarse and. ngwater Formation O feet.	Harder drilling at 37.0 feet.	
⁶⁵⁹ 45		SPT_ 13	142	25-35-50 /0" (Refusal)	O			SM	Very dense, moist, gray with gravel (SM); fine t coarse sand, low plasti Less Weathered Sprin	/-brown, Silty SAND o coarse gravel, fine to city fines. ngwater Formation	SPT_13: 25.6% fines by ASTM D1140	
654 50		SPT_ 14	100	0-3-4 (N=7)		þ		ML	Medium stiff, moist, gr. (ML); low plasticity. Less Weathered Sprin	ay and orange, SILT	Soft drilling at 49.0 feet.	
649 55 - - - -		SPT_ 15	100	28-15-23 (N=38)		<u>]</u> ∎		MH	Hard, wet, gray and ora SILT (MH); high plastici trace fine to coarse gra sensitive. Sensitive Saprolite w Springwater Formation Hard, moist, gray-brow low plasticity, fine to co gravel, overconsolidate	ange, Sandy ELASTIC ty, fine to coarse sand, wel, relict texture, ithin Less Weathered n, Sandy SILT (ML); barse sand, trace ed.	Hard drilling at 54.0 feet. SPT_15: Oven Dried PI=12.9 (PL, LL = 39.2, 52.1). Large cobble at 59.0 feet	
044			_	NOTES:		: : :		E	Less weathered Sprin			////
unde	erg	rour	d	Location and Ele Vertical Datum: Coordinate Syst	evation Sou Portland Ve em: NAD 19	rce: PWB Survey ertical 983 StatePlane C	/ 5-13-20)regon N	21 orth FIP:	S 3601 Feet	Doring Shee	ГГ-Ď-2U4 t 2 of 3	

Log of Boring

Proj	ect	INU	Inpel	: 608	54.0							Einel Denth		
Date(s) Drilled		0	4/09/2	021			Client	Por	tla	nd V	Vater Bureau	80.4 ft b	gs	
Coordina	ates	7	74058	3.9 E,	660880.2 N	N	Geotechnical Consultant	Lac	am	ias C	onsulting	Method/ Rig Type Mud Ro	otary/CME 55	
Surface Elevatior	n	7	03.6 ft	•			Drilling Contractor	West	tern	States	Soil Conservation, Inc.	Hole 5.00 in		
Location		C	Carper	ter L	ane Nurse	ry	Logged by/ Checked by	Sus	an	Bedr	arz / Susan Bednarz	Hammer Type 140 lb /	30 in / Automatic	
ELEV. (FT) MATER LEVEL	DEPTH (FT)	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 10 30 40 H H H ER CONTEN RBERG LL/P 10 60 80		USCS GRAPHIC	USCS	MATERIAL D	DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
-	- - - - -		SPT_ 16	113	8-23-50/ 4" (Refusal)	0					Hard, moist, gray-brow low plasticity, fine to co gravel, overconsolidate Less Weathered Sprin	n, Sandy SILT (ML); parse sand, trace ed. ngwater Formation	Large cobble at 64.0	
639 - -	65 -		SPT_ 17	200	50/3" (Refusal)						feet.	una bouraers at 64.0	feet. Boulder from 66.0 to 68.0 feet.	
634	70 -		SPT_ 18	179	50/5" (Refusal)	0				ML	Becomes Sandy SILT v 70.0 feet.	with gravel (ML) at	Hard drilling from 70.0 to 75.0 feet.	
629	75		SPT_ 19	200	50/3" (Refusal)	0		····						
624	80-		SPT	138	50/5"	0								
619	85 -		20		(Refusal)								Borehole completed at 80.4 feet below ground surface (bgs).	
614	-													
un	de	rg	rour	E	NOTES: Location and El Vertical Datum Coordinate Sys	levation Sou : Portland V tem: NAD 1	irce: PWB Surve ertical 983 StatePlane	y 5-13 Oregoi	8-202 n No	21 orth FIP:	5 3601 Feet	Boring	FF-B-204 et 3 of 3	

Log of Boring

Project	Num	ber	: 608	34.0								0 200
Date(s) Drilled	05/	14/20)21 - (05/15/2021		Client	Р	ortla	ind W	Vater Bureau	Final Depth 80.7 ft bg	gs
Coordinates	774	0391	.6 E,	660838.9 N	J	Geotechnical Consultant	L	acan	nas C	onsulting	Method/ Rig Type Mud Ro	tary/CME 800 Track
Surface Elevation	692	2.3 ft.				Drilling Contractor	w	estern	States	Soil Conservation, Inc.	Hole 5.00 in	
Location	Ca	rpen	ter La	ane Nurse	ry	Logged by/ Checked by	S	usan	Bedn	arz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic
ELEV. (FT) WATER LEVEL DFPTH (FT)	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATIO SISTANCE DWS/FT 0 30 4(H H H ER CONTE RBERG LL 0 60 8(N E D ENT /PL D	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS
688 5		PT_ 1	100	2-4-4 (N=8)					мн	Medium stiff, moist, or SILT (MH); high plastici Residual Soil of the S	ange-brown, ELASTIC ty. pringwater Formation	Flush-mount monument installed. VWP installed at 20 feet and grouted into borehole. 350 kPa Rating S/N: 2113126 Grass-covered field at ground surface.
- 683 . 10	- - - - - - -	PT_ 2	100	3-5-5 (N=10)	• •					Becomes stiff at 10.0	feet.	
678 _ 15	s	PT_ 3	100	0-1-2 (N=3)		ц ц				Soft, wet, orange, gray, Sandy ELASTIC SILT (M to medium sand, relict Sensitive Saprolite or Formation	brown, and black, H); high plasticity, fine texture, sensitive. f the Springwater	SPT_3: Oven Dried PI=27.3 (PL, LL = 35.6, 62.9).
673 . 20	s S	PT_ 4 PT_	100 61	1-2-1 (N=3) 1-1-3		C))		МН	At 20.0 feet, become becomes fine to coar.	s gray-brown, sand se.	
668 25	x s	5 PT_ 6 PT_	100 22	(N=4) 1-2-8 (N=10) 26-21-25	•	Ю				Becomes stiff with tro 22.5 feet; color becor yellow. Dense, wet, gray, brow GRAVEL with sand and	ace gravel below mes gray-brown- 	SPT_6: Oven Dried PI=6.5 (PL, LL = 35.1, 41.6). Bouncing on gravel at 25 feet.
663		7		(N=46)					GM	pravei (broken), fine to plasticity fines, sensitiv Sensitive Saprolite o Formation Large cobbles from 2	medium sand, high re elastic silt matrix. f the Springwater 7.5 to 30.0 feet.	
DE		VE		NOTES: Location and El	evation Sou	rce: PWB Su	rvey 5	-13-20	21		Boring	FF-B-205
unde	ergr	oun	d	Vertical Datum Coordinate Syst	: Portland V tem: NAD 19	ertical 983 StatePlar	ne Ore	gon N	orth FIP:	5 3601 Feet	Shee	t 1 of 3

Log of Boring

	mber	: 608	54.0								200	
Date(s) Drilled 0	5/14/20)21 - (05/15/2021		Client	Port	tlar	nd W	ater Bureau	80.7 ft b	gs	
Coordinates 7	740391	.6 E,	660838.9 N	J	Geotechnical Consultant	Laca	ama	as C	onsulting	Method/ Rig Type Mud Ro	tary/CME 800 Tra	ck
Surface Elevation 6	92.3 ft				Drilling Contractor	Weste	ern S	States	Soil Conservation, Inc.	Hole 5.00 in		
Location C	arpen	ter La	ane Nurse	ry	Logged by/ Checked by	Susa	an I	Bedn	arz / Susan Bednarz	Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT) SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 0 30 40 H H ER CONTENT RBERG LL/PL 0 60 80			USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
659	SPT_ 8	120	26-50/4" (Refusal)	0					Very dense, moist, gray with gravel (SM); fine t coarse sand, low plastic Less Weathered Sprin	/-brown, Silty SAND o coarse gravel, fine to city fines. ngwater Formation	Hard, slow drilling in gravel from 30 to 39.5 feet.	
35	SPT_ 9	161	36-50/2" (Refusal)	0				SM				
653 40	SPT_ 10	100	1-7-10 (N=17)					CL	Very stiff, moist, gray, L plasticity. Less Weathered Sprin	EAN CLAY (CL); low	Softer drilling at 39.5 feet. Switched to 4-inch tricone bit below 40 feet.	
648 45	SPT_ 11	100	7-10-29 (N=39)	ŀ	⊖-] ■			мн	Hard, moist to wet, gra ELASTIC SILT (MH); high medium sand, relict tex Sensitive Saprolite w Springwater Formation	y and orange, Sandy n plasticity, fine to xture, sensitive. ithin Less Weathered n	SPT_11: Oven Dried PI=18.0 (PL, LL = 29.5, 47.5).	
643 50	SPT_ 12	109	19-25-50 /5" (Refusal)	0				ML	Hard, moist, light brow low plasticity, fine to co Less Weathered Sprin	n, Sandy SILT (ML); barse sand. ngwater Formation	Rod "chatter" indicates gravel at 48.5 feet.	
638 55 633	SPT_ 13	141	24-50/4" (Refusal)	0				SM	Very dense, moist, gray (SM); fine to coarse sar soil exhibits minor sens Less Weathered Sprin	r-brown, Silty SAND nd, low plasticity fines; sitivity. ngwater Formation		
DEI		-	NOTES:	ovation Cours		<u> </u>	2021	1	1	Boring	FF-B-205	
underg	rour	d	Vertical Datum: Coordinate Syst	evation Sou Portland Ve tem: NAD 19	ertical 983 StatePlane C)regon	Nor	th FIPS	3601 Feet	Shee	t 2 of 3	

Log of Boring

Project	читтре	1.000	04.U						Einal Dopth		
Date(s) Drilled	05/14/2	2021 -	05/15/2021		Client ·	Portla	nd W	Vater Bureau	Binal Depth 80.7 ft b	gs	
Coordinates	774039	1.6 E,	660838.9 N	V	Geotechnical · Consultant	Lacan	nas C	onsulting	Method/ Rig Type Mud Ro	otary/CME 800 Tra	ck
Surface Elevation	692.3 f	t.			Drilling Contractor	Western	States	Soil Conservation, Inc.	Hole 5.00 in		
Location	Carper	nter L	ane Nurse	ry	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Hammer Type 140 lb / S	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	■ PEN RES BLC 10 2 ○ WATE (MC) I ATTEF 20 4	NETRATION SISTANCE DWS/FT 20 30 40 H H H ER CONTENT RBERG LL/PL 40 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
628 65	SPT_ 14	31	50/5" (Refusal)					Very dense, moist, ligh SAND with gravel (SM) trace fine to coarse gra overconsolidated fines Less Weathered Spri	t brown and gray, Silty ; fine to coarse sand, wel, low plasticity, ngwater Formation	Rod "chatter" indicates gravel at 66 feet.	
623	SPT_ 15	171	35-50/4" (Refusal)	O							
. 70	SPT_ 16	212	48-50/2" (Refusal)	0			SM	No gravel at 70.0 fee Few coarse gravel at	t. 75.0 feet.	Lost drilling circulation and 50 gallons of drilling mud at 74 feet. SPT_17: 24.1% fines by ASTM D1140 Poor circulation; lost 100 gallons of	
613 80	SPT_ 17	94	16-39-50 /5" (Refusal) 41-50/3"	0						drilling mud between 75 and 80 feet. Mud loss may be due to squeezing clay or clay collar forming around drill rods preventing circulation return.	
608	18		(Refusal)							Borehole completed at 80.7 feet below ground surface (bgs).	
. 85											
			NOTES:								
unde	rgrou	nd	Location and El Vertical Datum Coordinate Sys	levation Sou : Portland V tem: NAD 1	ırce: PWB Survey 'ertical 983 StatePlane O	5-13-202 regon No	21 orth FIP:	S 3601 Feet	Boring Shee	FF-B-205 et 3 of 3	

Log of Boring

PIUJECI Data(a)	INU	mber	. 000	4.0		ol: i					Einal Denth		
Date(s) Drilled	0	4/15/20)21 - (04/16/2021		Client	Por	tlaı	nd W	later Bureau	80.3 ft b	gs	
Coordinates	7	74048 4	4.3 E, (660667.1 N	N	Geotechnical Consultant	Lac	am	as C	onsulting	Method/ Rig Type Mud Ro	tary/CME 800 Tra	ck
Surface Elevation	7	02.3 ft	•			Drilling Contractor	West	ern S	States	Soil Conservation, Inc.	Hole Diameter		
Location	C	arpen	ter La	ne Nurse	ry	Logged by/ Checked by	Sus	anl	Bedn	arz / Susan Bednarz	Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 (10 2) WATE (MC) ATTER 20 4 	ETRATION BISTANCE WS/FT 0 30 40 H H ER CONTEN RBERG LL/F 0 60 80		USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
698 5		SPT_ 1	100	1-2-3 (N=5)			·····			Medium stiff, moist, or SILT (MH); high plastici Residual Soil of the S	ange-brown, ELASTIC ty. pringwater Formation	Grass-covered plowed field at ground surface.	
693 10		SPT_ 2	100	2-2-3 (N=5)	.∎. ŀ∈	→ 1			MH				
688 . 15		SPT_ 3	100	4-5-9 (N=14)						Becomes stiff at 15.0	feet.		
683 20		SPT_ 4	100	12-5-6 (N=11)					СН	Stiff, moist, gray and or high plasticity. Residual Soil of the S	range, FAT CLAY (CH);		
678 25		SPT_ 5	100	1-1-2 (N=3)		₽—ƏI				Soft, wet, gray-brown-o SILT (MH); high plastici sand, relict texture, ser Sensitive Saprolite of Formation	orange, Sandy ELASTIC ty, fine to medium nsitive. f the Springwater	SPT_5: Oven Dried PI=28.8 (PL, LL = 36.4, 65.2).	
		SPT_ 6	100	2-1-2 (N=3)		0			MH	At 25.0 feet, becomes black; sand becomes	s brown, orange, and fine to coarse.		
673	X	SPT_ 7	100	2-2-3 (N=5)		O				At 27.5 feet, becomes orange and brown.	s medium stiff,	Rod "chatter" indicating gravel at	
DE	rg	rour	d	NOTES: Location and E Vertical Datum Coordinate Sys	levation Sou : Portland Ve tem: NAD 19	rce: PWB Survertical 983 StatePlane	ey 5-13 Oregor	-202 n Nor	1 rth FIPS	5 3601 Feet	Boring Shee	FF-B-206 t 1 of 3	

Log of Boring

Date(s)		4/15/20	021 - 0	04/16/2021		Client	Portl	and V	Vater Bureau	Final Depth 80.3 ft b	25	
Coordinates		740484	4.3 E.	660667.1 N	1	Geotechnical	Lacar	nas C	onsulting	Method/ Mud Ro	5~ tarv/CME 800 Tra	ck
Surface	7	'02.3 ft				Consultant Drilling Contractor	Westerr	states	Soil Conservation, Inc.	Rig Type Hole		
Location	(Carpen	ter La	ane Nurse	ry	Logged by/ Checked by	Susar	Bedr	arz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL	DEPTH (FT) SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 10 2 (MC) ATTEF 20 4 	NETRATION SISTANCE OWS/FT 0 30 40 H H H ER CONTENT RBERG LL/PL 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
- - - 668		SPT_ 8 SPT_ 9	100 100	6-12-8 (N=20) 3-4-8 (N=12)		• 0 0		МН	Very stiff, wet, gray-bro ELASTIC SILT (MH); hig coarse sand, relict text Sensitive Saprolite of Formation At 32.5 feet, becomes to coarse gravel.	own-orange, Sandy n plasticity, fine to ure, sensitive. f the Springwater s stiff with trace fine	29.5 feet.	
3	5	SPT_ 10 SPT_	100 100	5-16-12 (N=28) 21-24-28	Þ i O			ML	Very stiff, wet, light bro SILT (ML); low plasticity gravel, fine to coarse sa Less Weathered Spri Very dense, moist, ligh	own and gray, Sandy y, few fine to coarse and. ngwater Formation t brown and gray, Silty	SPT_10: Oven Dried PI=3.3 (PL, LL = 22.4, 25.7).	
663 . 40		11 SPT_ 12	100	(N=52) 14-29-31 (N=60)	O			SM	fine to coarse sand, low Less Weathered Spri Very dense, moist, ligh SAND (SM); fine to coa overconsolidated fines Less Weathered Spri	t brown and gray, Silty rse sand, low plasticity ngwater Formation ngwater Formation		
658 _ 4: -	5	SPT_ 13	100	0-2-2 (N=4)	•			CL	Soft, moist to wet, gray plasticity. Less Weathered Sprin	, LEAN CLAY (CL); low	Soft at 45 feet.	
653 50 -		SPT_ 14	100	2-3-5 (N=8)		0		MI	Medium stiff to hard, r brown, Sandy SILT (ML coarse sand, relict text Sensitive Saprolite w Springwater Formation	noist to wet, orange-); low plasticity, fine to ure, sensitive. ithin Less Weathered		
648 59 - - 643	5	SPT_ 15	100	9-17-40 (N=57)	Ę	7		SM	Very dense, wet, gray a with gravel (SM); fine t coarse sand, low plasti fines, weakly cementer Less Weathered Spri	and brown, Silty SAND o coarse gravel, fine to city overconsolidated d. ngwater Formation	SPT_15: Oven Dried PI=4.5 (PL, LL = 33.9, 38.4).	
D	EL	V	Ξ	NOTES: Location and El Vertical Datum:	evation Sou	rce: PWB Survey ertical	5-13-20)21		Boring	FF-B-206	<u>````</u>
und	erg	rour	ia	Coordinate Syst	em: NAD 19	983 StatePlane C	regon N	orth FIP	S 3601 Feet	Shee	t 2 of 3	

Log of Boring

FIUJECL	Numbe	1.000	04.V						Einel Dauth		
Date(s) Drilled	04/15/2	2021 -	04/16/2021		Client ·	Portla	nd W	Vater Bureau	Binal Depth 80.3 ft b	gs	
Coordinates	774048	34.3 E,	660667.1 N		Geotechnical - Consultant -	Lacan	nas C	onsulting	Method/ Rig Type Mud Ro	tary/CME 800 Tra	ck
Surface Elevation	702.3 f	t.			Drilling Contractor	Western	States	Soil Conservation, Inc.	Hole Diameter		
Location	Carpe	nter L	ane Nurser	y	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 	NETRATION SISTANCE DWS/FT 0 30 40 H H ER CONTENT RBERG LL/PL 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
638	SPT_ 16	146	50/5" (Refusal)	0			SM	Very dense, wet, gray a with gravel (SM); fine t coarse sand, low plasti fines, weakly cementer Less Weathered Sprin	and brown, Silty SAND to coarse gravel, fine to city overconsolidated d. ngwater Formation		
65	▼ SPT_ 17	100	50/3" (Refusal)	0				Very dense, wet, gray- SAND with silt and cob coarse sand, low plasti sensitivity. Less Weathered Spri	brown, Well Graded bles (SW-SM); fine to city fines, minor ngwater Formation		
633 70-	SPT_ 18	120	50/2" (Refusal)	0			SM-			Rod "chatter" at 71.5 feet on gravel and cobbles.	
628 75-	¥ SPT_ 19	127	50/5" (Refusal)	0			SM	Very dense, moist to w Silty SAND (SM): fine to plasticity fines, minor s Less Weathered Spri Trace gravel, weakly	et, gray and brown, o coarse sand, low sensitivity. ngwater Formation cemented at 80.0	Dense "gravelly" drilling from about 76 to 79 feet.	
80 -	▲ SPT_ 20	168	50/3" (Refusal)	0						Borehole completed at 80.3 feet below ground surface (bgs).	
618 85-						- - - -					
613											
DE	LV rgrou	End	NOTES: Location and Ele Vertical Datum: F Coordinate Syste	vation Sou Portland Ve em: NAD 19	rce: PWB Survey ertical 983 StatePlane O	1 5-13-20 regon No	1 21 orth FIP:	1 5 3601 Feet	Boring Shee	FF-B-206 t 3 of 3	<u> </u>

Log of Boring

	: 6084.0		Client				Final Depth		
Drilled 04/07/2	021		Geotechnical -	Portla	nd W	later Bureau	80.5 ft bg	gs	
5urface	2.1 E, 6607	86.2 N	Consultant	Lacam	as Co	onsulting	Rig Type Mud Ro	tary/CME 75	
Elevation 707.0 ft	•		Contractor	Western	States S	Soil Conservation, Inc.	Diameter 5.00 in		
Carpen	iter Lane N	Nursery	Checked by	Susan	Bedn	arz / Susan Bednarz	Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT) SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%) BLOW	SLUCION SLUCION SLUCION O WATE (MC) ATTEF 20 4	NETRATION SISTANCE DWS/FT 10 30 40 H H H ER CONTENT RBERG LL/PL 10 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
702 5 8 SPT_1 697 10 8 SPT_2 692 15 8 SPT_3 8 SPT_3 8 SPT_3 8 SPT_3 8 SPT_3 8 SPT_3 8 SPT_3 8 SPT_3 8 SPT_1 1 SPT_1 1 SPT_1 8 SPT_1 1 SPT_1 8 SPT_1 8 SPT_1 1 SPT_3 8 SPT_3 8 SPT_1 1 SPT_3 8 SPT_1 8 SPT_1 1 SPT_3 8 SPT_1 8 SPT_1 1 SPT_3 8 SPT_1 8 SPT_3 8 SPT_1 8 SPT_1 8 SPT_1 8 SPT_3 8 SPT_1 8 SPT_3 8 SPT_3	78 1-0 (N 100 3-4 (N 100 3-1 (N=	0-2 ■ (=2) 4-5 ■ ← =9) 5-6 ■ ○	> I		МН	Soft, moist, orange-bro (MH); high plasticity. Residual Soil of the S <i>Becomes stiff at 10 fe</i>	own, ELASTIC SILT	Dirt road at ground surface.	
687 20 SPT_ 4 SH_5	100 4-8 (N= 75	3-12 H =20)			СН	Very stiff, moist, gray a (CH); high plasticity. Residual Soil of the S <i>Becomes gray, orang</i> Soft, wet, brown, gray, SILT with sand (MH): h	nd orange, FAT CLAY Springwater Formation e, and red. and black, ELASTIC igh plasticity, fine	SH_5 advanced at 400 to 600 psi from 22.5 to 24.5 feet.	
682 25 SPT_ 6	100 2-: (N	2-2 =4)	0		МН	sand, relict texture, ser Sensitive Saprolite o Formation Loose, wet, gray-brown	nsitive. f the Springwater n, Silty SAND (SM); fine		
SH_7	66				SM	to coarse sand, high pl texture, sensitive. Sensitive Saprolite o Formation	asticity fines, relict f the Springwater	SH_/ advanced at 500 to 650 psi from 27.5 to 29.5 feet.	
DELV	NOTES Locatio	: on and Elevation Sou	rce: GPS (not sur	veyed)			Boring	FF-B-207	
undergrour	Nd Vertica Coordin	l Datum: Portland V nate System: NAD 1	ertical 983 StatePlane O	regon No	rth FIPS	5 3601 Feet	Shee	t 1 of 3	

Log of Boring

FF-B-207

Proje	ect I	Numbe	r: 608	34.0							0 201	
Date(s) Drilled		04/07/2	2021			Client	Portla	nd W	Vater Bureau	Final Depth 80.5 ft b	gs	
Coordinat	tes	774074	2.1 E,	660786.2 N	J	Geotechnical Consultant	Lacan	nas C	onsulting	Method/ Rig Type Mud Ro	tary/CME 75	
Surface Elevation		707.0 f	t.			Drilling Contractor	Western	States	Soil Conservation, Inc.	Hole 5.00 in		
Location		Carpe	nter L	ane Nurse	ry	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL	DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 (10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/PI 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
-		SPT_ 8 SH_9	100 75	1-1-5 (N=6)		0		SM	Loose, wet, gray-brown to coarse sand, high pla texture, sensitive. Sensitive Saprolite of Formation	n, Silty SAND (SM); fine asticity fines, relict f the Springwater	SH_9 advanced at 300 to 900 psi from 32.5 to 34.5 feet.	
672	35-	SPT_ 10	100	3-3-12 (N=15)	•	q		ML	Stiff, wet, gray, brown, SILT (ML); low plasticity relict texture, sensitive	and orange, Sandy y, fine to coarse sand, f the Springwater	SPT_10: Oven Dried PI=10.8 (PL, LL = 28.8, 39.6). Drilling action	
667	40	SPT_ 11 SPT_ 12	17 0	12-29-39 (N=68) 50/2" (Refusal)				GP	Formation Very dense, wet, gray-I GRAVEL (GP); fine to co to coarse sand, trace lo Less Weathered Spri	prown, Poorly Graded parse gravel, trace fine pw plasticity fines. ngwater Formation	indicates gravel at 36.5 feet.	
662	45	▼ SPT_ 13	100	50/4" (Refusal)	0			GP- GM	Very dense, moist, tan- GRAVEL with silt, sand, GM); fine to coarse gra sand, low plasticity fine Less Weathered Spri	gray, Poorly Graded and cobbles (GP- ivel, fine to coarse es, minor sensitivity. ngwater Formation	Drilling action indicates cobbles at 43 feet.	
657	50 -	SPT_ 14	100	10-15-20 (N=35)	IO-I			CL	Hard, moist, gray and c (CL); low plasticity, ove Less Weathered Spri	orange, LEAN CLAY rconsolidated. ngwater Formation	Soft drilling zone at 47.5 feet. No gravel from 50 to 55 feet. SPT_14: Oven Dried PI=16.4	
- 652 -	55	SPT_ 15	100	5-10-15 (N=25)		F-BO1		MH	Very stiff, moist, orange ELASTIC SILT (MH); hig coarse sand, sensitive. Sensitive Saprolite w Springwater Formation Hard, moist, gray and k (ML); low plasticity, fin gravel, overconsolidate	e-brown, Sandy n plasticity, fine to ithin Less Weathered <u>n</u> prown, Sandy SILT e to coarse sand, trace ed.	Drilling action indicates gravel at 57 feet.	
				NOTES:					Less weathered spri			<u>////</u>
un	der	rgrou	nd	Location and El Vertical Datum: Coordinate Syst	evation Sou : Portland V tem: NAD 19	irce: GPS (not su ertical 983 StatePlane (irveyed) Dregon No	orth FIP:	S 3601 Feet	Shee	t 2 of 3	

Log of Boring

Project		imper	: 608	\$4.0								
Date(s) Drilled	0	4/07/2	021			Client	Portla	nd V	Vater Bureau	Binal Depth 80.5 ft b	gs	
Coordinates	7	740742	2.1 E,	660786.2 N	N	Geotechnical Consultant	Lacan	nas C	onsulting	Method/ Rig Type Mud Ro	tary/CME 75	
Surface Elevation	7	'07.0 ft	•			Drilling Contractor	Western	States	Soil Conservation, Inc.	Hole 5.00 in		
Location	(Carpen	ter L	ane Nurse	ry	Logged by/ Checked by	Susan	Bedr	narz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 20 30 40 H H H ER CONTENT RBERG LL/PL 40 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
642 65		SPT_ 16 SPT_ 17	106	26-25-50 /5" (Refusal) 50/3" (Refusal)	0			GM	Hard, moist, gray and b (ML); low plasticity, fin gravel, overconsolidate Less Weathered Spri Becomes very hard, g trace gravel. Very dense, moist, gray with cobbles (GM); find fine to coarse sand, low Less Weathered Spri	brown, Sandy SILT e to coarse sand, trace ed. ngwater Formation <i>iray and brown, with</i> <i>j</i> -brown, Silty GRAVEL e to coarse gravel, few v plasticity fines. ngwater Formation	Cobbles below 62	
637 7(SPT_ 18	146	50/5" (Refusal)	0			SM	Very dense, moist, gray with gravel and cobble gravel, fine to coarse sa overconsolidated fines Less Weathered Sprin	/-brown, Silty SAND s (SM); fine to coarse and, low plasticity ngwater Formation	SPT_18: 23.9% fines by ASTM D1140	
632 75		SPT_ 19	181	50/5" (Refusal)	0				Hard moist gray-brow	n Sandy SIIT with		
627 80		SPT_	109	50/5"	0			ML	gravel and cobbles (ML gravel, fine to coarse sa overconsolidated fines Less Weathered Sprin	.); fine to coarse and, low plasticity ngwater Formation		
- - - 622 85 -		20		(Refusal)			· · ·				Borehole completed at 80.5 feet below ground surface (bgs).	
DE		V	E	NOTES: Location and El	evation Sou	irce: GPS (not sui	veyed)			Boring	FF-B-207	
unde	erg	rour	nd	Coordinate Syst	tem: NAD 1	983 StatePlane C	regon N	orth FIP	S 3601 Feet	Shee	t 3 of 3	

Log of Boring

Project	Number	r: 608	4.0								11-1	D-200	
Date(s) Drilled	04/06/2	021			Client	Por	rtla	nd W	later Bureau	Final Depth	81.5 ft bg	gs	
Coordinates	7741002	7.7 E,	660783.7 ľ	N	Geotechnical Consultant	Lac	cam	as C	onsulting	Method/ Rig Type	Mud Ro	tary/CME 75	
Surface Elevation	711.4 ft	•			Drilling Contractor	Wes	tern	States !	Soil Conservation, Inc.	Hole Diameter	6.00 in		
Location	Carpen	ter La	ne Nurse	ery	Logged by/ Checked by	Sus	san	Bedn	arz / Susan Bednarz	Hammer Type	140 lb / 3	0 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	■ PEN RES BLC 10 2 ○ WATE (MC) I ATTEF 20 4	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/F 0 60 80		USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTI	ION	REMARKS AND TESTS	BACKFILL/INSTALL.
707 5-	SPT_1 SPT_2	100	2-3-4 (N=7) 2-2-3 (N=5)))			МН	Medium stiff, moist, or SILT (MH); high plastici Residual Soil of the S	ange-brow ty. pringwate	m, ELASTIC	Borehole instrumented with a 2" ID standpipe piezometer with 010 slot and 10/20 sand; flush-mount monument at surface. Well ID #: L14170 Start Card #:1051383 Grass at ground surface.	
697 15-	SPT_ 3	100	3-5-7 (N=12)	• 0					Becomes stiff at 15 fe	et.			
692 20-	SPT_ 4	100	6-9-13 (N=22)		•				Very stiff, moist, orange CLAY (CH); high plastici Residual Soil of the S	e, black, ar ty. pringwate	nd gray, FAT r Formation		
687 25 682	SPT_ 5 SPT_ 6 SPT_ 7	100 100	5-8-11 (N=19) 3-5-7 (N=12) 2-2-3 (N=5)		D O I O	+		СН	Becomes stiff, gray, o Medium stiff, wet, gray yellow, and brown, ELA (MH); high plasticity, fil relict texture, sensitive Sensitive Saprolite of Formation	range, and , black, ora .STIC SILT v ne to medi f the Sprin	I red. ange, vith sand ium sand, gwater	SPT_7: Oven Dried PI=39.6 (PL, LL = 36.9, 76.5).	
DE		=	NOTES:					1		R	oring	FF-B-208	<u>. – †.</u>
unde	rgrour	nd	Location and E Vertical Datum Coordinate Sys	ievation Sou : Portland Ve tem: NAD 19	rce: PWB Surve ertical 983 StatePlane	ey 5-13 Orego	5-202 on No	rth FIPS	5 3601 Feet	D	Sheet	t 1 of 3	

Log of Boring

Date(s)	Indumber	500	94.0		Client				Final Depth	00	
Drilled	04/06/2	021				Portla	and W	Vater Bureau	81.5 ft b	gs	
Coordinates	774100	7.7 E,	660783.7 N	N	Geotechnical Consultant	Lacan	nas C	onsulting	Rig Type Mud Ro	tary/CME 75	
Surface Elevation	711.4 ft	•			Drilling Contractor	Western	1 States	Soil Conservation, Inc.	Hole Diameter 6.00 in		
Location	Carper	ter La	ane Nurse	ry	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE NUMBER	RECOVERY (%)	BLOW	■ PEI RES BLC 10 2 ○ WATE (MC) I ATTEF 20 4	NETRATION SISTANCE DWS/FT 20 30 40 H H H ER CONTEN RBERG LL/P 40 60 80	ビーゴー USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
-	SPT_ 8	100	0-1-3 (N=4)		0		SM	Very loose, wet, brown black, Silty SAND (SM); high plasticity fines, rel Sensitive Saprolite of Formation	n, gray, orange, and fine to coarse sand, lict texture, sensitive. f the Springwater		
677 35	SPT_ 9 SPT_	100	1-5-7 (N=12) 2-3-6		Ho		МН	Stiff, wet, gray-brown, (MH); high plasticity, fi relict texture, sensitive Sensitive Saprolite o	Sandy ELASTIC SILT ne to medium sand, f the Springwater	SPT_10: Oven Dried PI=3.6	
672	10 SPT_ 11	50	(N=9) 7-11-14 (N=25)	0	•		ML	Formation Trace fine to coarse g Very stiff, wet, gray-bro sand (ML); low plasticit gravel, fine to coarse sa	<i>wavel at 35 feet.</i> wwn, Gravelly SILT with ty, fine to coarse and.	(PL, LL = 37.6, 41.2).	
40	SPT_ 12	100	3-26-19 (N=45)	Ō			SM	Less Weathered Spri Dense, moist, gray and SAND with cobbles (SM low plasticity fines, min Less Weathered Spri	ngwater Formation orange-brown, Silty (1); fine to coarse sand, nor sensitivity. ngwater Formation	Hard, "cobbly" drilling from 40 to 50 feet. Cobbles of 4-5" diameter.	
667 45	x SPT_ 13	50	50/3" (Refusal)				SP	Very dense, wet, gray, with cobbles (SP); fine decomposed cobble. Less Weathered Spri	Poorly Graded SAND to coarse sand, ngwater Formation		
662 50	SPT_ 14	100	50/1" (Refusal)				GP	Very dense, Poorly Gra cobbles (GP). Less Weathered Spri	ded GRAVEL with		
657 55	SPT_	100	7-10-17		⊃ ■		CL	Very stiff, moist, gray a (CL); low plasticity. Less Weathered Spri	nd orange, LEAN CLAY	to 55 feet.	
652			(IN=27)				SM	Very dense, moist beco brown, Silty SAND with coarse sand, trace fine plasticity fines, oxidize Less Weathered Spri	oming wet, orange- n cobbles (SM); fine to to coarse gravel, low d. ngwater Formation	"Gravelly" drilling below 58 feet; hard and soft layered.	
DE		Ξ	NOTES: Location and El	evation Sou	Irce: PWB Surve	ey 5-13-20	21		Boring	FF-B-208	
unde	ergrour	nd	Vertical Datum Coordinate Syst	: Portland V tem: NAD 1	'ertical 983 StatePlane	Oregon N	orth FIP:	S 3601 Feet	Shee	t 2 of 3	

Log of Boring

Project	Inde	500	54.0						Einel Dauth		
Date(s) Drilled	04/06/2	021			Client	Portla	and V	Vater Bureau	Final Depth 81.5 ft	bgs	
Coordinates	774100	7.7 E,	660783.7 N	J	Geotechnical Consultant	Lacar	nas C	Consulting	Method/ Rig Type Mud R	lotary/CME 75	
Surface Elevation	711.4 ft	t.			Drilling Contractor	Westerr	1 States	Soil Conservation, Inc.	Hole 6.00 in		
Location	Carper	nter L	ane Nurse	ry	Logged by/ Checked by	Susan	ı Bedr	narz / Susan Bednarz	Hammer Type 140 lb	/ 30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	■ PEN RES BLC 10 2 → ○ WATE (MC) I ATTEF 20 4	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/P 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
647 65	SPT_ 16	144	18-50/3" (Refusal) 29-50/5" (Refusal)	0	0		SM	Very dense, moist becc brown, Silty SAND with coarse sand, trace fine plasticity fines, oxidized Less Weathered Spri <i>Becomes red-gray an</i> <i>overconsolidated at 6</i>	oming wet, orange- n cobbles (SM); fine to to coarse gravel, low d. ngwater Formation d orange, 65 feet.	Cobbles are larger below 65 feet.	
642 70	SPT_ 18	120	24-39-50 /3" (Refusal)	0			ML	Hard, moist to wet, gra with cobbles (ML); low coarse sand, few fine to overconsolidated. Less Weathered Spri Very dense, moist to w	ay-brown, Sandy SILT plasticity, fine to o coarse gravel, ngwater Formation ret, gray-brown, Silty		
637 75	SPT_ 19	133	19-50/3" (Refusal)	0			SM	SAND with gravel and o coarse gravel, fine to co overconsolidated fines Less Weathered Spri	cobbles (SM); fine to oarse sand, non-plast ngwater Formation	Easier drilling below 75 feet; cobbles and gravel still present.	
632 80	SPT_	100	20-24-20	0			ML	plasticity, few fine to co gravel. Less Weathered Sprin	ngwater Formation		
627 85						····				Borehole completed at 81.5 feet below ground surface (bgs).	
622	-										
022	1		NOTES:								
DE		E	Location and El Vertical Datum:	evation Sou Portland V	irce: PWB Surve ertical	y 5-13-20	021		Boring	5 FF-B-208	
unde	rgroui	Id	Coordinate Syst	em: NAD 19	983 StatePlane	Oregon N	orth FIP	S 3601 Feet	She	eet 3 of 3	

Log of Boring

Project	Numbe	er: 608	4.0										
Date(s) Drilled	04/04/	2021			Client	Р	ortla	nd W	Vater Bureau	Final Depth	30.3 ft bg	gs	
Coordinates	77412	15.4 E,	660653.9 N	N	Geotechnical Consultant	L	acan	nas C	onsulting	Method/ Rig Type	Mud Ro	tary/CME 75	
Surface Elevation	713.2	ft.			Drilling Contractor	W	estern	States	Soil Conservation, Inc.	Hole Diameter	5.00 in		
Location	Carpe	enter La	ane Nurse	ry	Logged by/ Checked by	S	usan	Bedn	arz / Susan Bednarz	Hammer Type 1	140 lb / 3	0 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	■ PEN RES BLC 10 2 → ○ WATE (MC) I ATTEF 20 4	NETRATIC SISTANCE DWS/FT 0 30 4 H H H ER CONTI RBERG LL 0 60 8	DN E ENT _/PL 0	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	٧	REMARKS AND TESTS	BACKFILL/INSTALL.
-709									Medium stiff, moist, or SILT (MH); high plastici Residual Soil of the S	ange-brown, ty. pringwater F	ELASTIC ormation	Flush-mount monument installed. VWP installed at 31 feet and grouted into borehole. S/N: 2113125 Plowed field at	
-704	SPT_1	_ 100	2-2-4 (N=6)	C)			мн				ground surface.	
699	SPT_2	_ 100	3-3-4 (N=7)		D								
	SPT_3	_ 100	5-8-10 (N=18)						Becomes very stiff, or black at 15.0 feet. Very stiff, moist, gray a	ange-brown d nd orange, FA	and T CLAY		
694 20	SPT_4	_ 100	5-7-9 (N=16)		D			СН	Residual Soil of the S	pringwater F	ormation		
689 . 25	SPT 5 SPT	_ 100 _ 100	3-7-9 (N=16) 3-5-7		р О				Becomes stiff at 25.0	feet.			
684	6 SPT 7	_ 100	(N=12) 2-3-3 (N=6)		⊢– ⊖I			МН	Medium stiff, wet, orar gray, Sandy ELASTIC SII fine to medium sand, r Sensitive Saprolite of Formation	nge, dark brow T (MH); high elict texture, f the Springw	vn, and plasticity, sensitive. ater	SPT_7: Oven Dried PI=28.8 (PL, LL = 34.9, 63.7).	
DE	ELV	E	NOTES: Location and E	levation Sou	rce: PWB Su	irvey 5	-13-20	21		Bo	ring	FF-B-209	
unde	ergrou	Ind	Vertical Datum Coordinate Sys	: Portland Ve tem: NAD 19	ertical 983 StatePla	ine Ore	egon N	orth FIPS	5 3601 Feet		Sheet	: 1 of 3	

Log of Boring

Project		r: 608	54.0							Einal Danth		
Date(s) Drilled	04/04/2	2021			Client	Po	rtla	nd W	Vater Bureau	80.3 ft b	ogs	
Coordinates	774121	l 5.4 E,	660653.9 N	J	Geotechnical Consultant	La	cam	as C	onsulting	Method/ Rig Type Mud R	otary/CME 75	
Surface Elevation	713.2 f	it.			Drilling Contractor	Wes	tern	States	Soil Conservation, Inc.	Hole 5.00 in		
Location	Carpe	nter L	ane Nurse	ry	Logged by/ Checked by	Su	san	Bedn	arz / Susan Bednarz	Hammer Type 140 lb /	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 (10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/F 0 60 80	 ЛТ ?L	USCS GRAPHIC	NSCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
-	SPT_ 8	100	2-2-3 (N=5)		O			MH	Medium stiff, wet, orar gray, Sandy ELASTIC SII fine to medium sand, r Sensitive Saprolite or Formation	nge, dark brown, and .T (MH); high plasticity elict texture, sensitive f the Springwater	, SPT_9: Oven Dried	
679 . 35	SPT_ 9	100	4-7-4 (N=11)		q t			ML	<i>Trace gravel at 30.0 f</i> Stiff, wet, gray with min with cobbles (ML); low	<i>eet</i> nor orange, Sandy SILT plasticity, fine to	PI=2.1 (PL, LL = 34.0, 36.1). "Cobbly" drilling from 33 to 49 5	
-	SPT_ 10	100	6-8-11 (N=19)	0				ML	coarse sand, trace fine texture, sensitive. Sensitive Saprolite of	to coarse gravel, relict f the Springwater	feet.	
674 . 40	SPT_ 11	100	15-20-38 (N=58) 13-15-30	0					Very stiff, gray-brown a with gravel and cobble fine to coarse gravel, fi relict texture.	and orange, Sandy SILT s (ML); low plasticity, ne to coarse sand, ngwater Formation		
669 . 45	12 12 SPT_	100	(N=45) 39-50/3"	0				SM	Very dense, moist, gray with cobbles (SM); fine fine to coarse gravel, lo plastic fines. Less Weathered Spri Becomes dense, grav trace at 40.0 feet.	y-brown, Silty SAND e to coarse sand, few ow plasticity to non- ngwater Formation el content grades to	Slightly softer drilling at 43 feet.	
664	13		(Refusal)					SM	Very dense, moist, gray with gravel and cobble gravel, fine to coarse sa overconsolidated fines Less Weathered Spri	y-brown, Silty SAND s (SM); fine to coarse and, low plasticity ngwater Formation	'	
. 50	SPT_ 14	100	4-11-9 (N=20)	0				CL	Very stiff, moist, gray, c LEAN CLAY (CL); low pla Less Weathered Sprin Large cobble from 49	orange, and brown, asticity. ngwater Formation 9.0 to 49.5 feet.	feet.	
659 55 -	SPT_ 15	100	12-8-8 (N=16)		0			MH	Very stiff, wet, light bro ELASTIC SILT with sand fine to coarse sand, tra sensitive. Sensitive Saprolite w Springwater Formation	own and orange, (MH); low plasticity, ice fine gravel, rithin Less Weathered n	"Soft" from 54 to 64 feet; lower sensitive soil zone.	
004							\prod					
DE	ergrou	End	NOTES: Location and El Vertical Datum Coordinate Syst	evation Sou : Portland V tem: NAD 1!	rce: PWB Surve ertical 983 StatePlane	ey 5-1 Orego	3-202 on No	21 orth FIPS	5 3601 Feet	Boring Shee	FF-B-209 et 2 of 3	

Log of Boring

Proje	ct Ni	impei	r: 608	34.0							11	D Z ()	
Date(s) Drilled	(04/04/2	021			Client	Por	tla	nd W	/ater Bureau	Final Depth 80.3 ft b	gs	
Coordinate	s 7	74121	5.4 E,	660653.9 N	V	Geotechnical Consultant	Lac	am	as C	onsulting	Method/ Rig Type Mud Ro	otary/CME 75	
Surface Elevation	5	713.2 ft	t .			Drilling Contractor	West	ern S	States	Soil Conservation, Inc.	Hole 5.00 in		
Location	(Carper	nter L	ane Nurse	ry	Logged by/ Checked by	Sus	an	Bedn	arz / Susan Bednarz	Hammer Type 140 lb /	30 in / Automatic	
ELEV. (FT) WATER LEVEL	DEPTH (FT) SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATION BISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/P 0 60 80		USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
649		SPT_ 16	100	13-12-37 (N=49)					МН	Hard, moist, gray-brow ELASTIC SILT (MH); hig coarse sand, trace fine sensitivity. Sensitive Saprolite w Springwater Formation	n-orange, Sandy n plasticity, fine to gravel, minor ithin Less Weathered	"Cobbly" drilling	
. (65	SPT_ 17	128	22-36-50 /2" (Refusal)	0				SM	with cobbles (SM); fine fine to coarse gravel, lo overconsolidated fines Less Weathered Sprin 6" diameter cobble an	 brown, Silty SAND to coarse sand, few pw plasticity ngwater Formation t 66.0 feet. 	from 64 to 70 feet.	
644	70	SPT_ 18	64	36-39-50 /0" (Refusal)	Q				ML	Hard, moist, light brow with gravel and cobble fine to coarse gravel, fi overconsolidated. Less Weathered Sprin Cobble at 69.0 feet.	n-gray, Sandy SILT s (ML); low plasticity, ne to coarse sand, ngwater Formation	Hard, slow drilling from 70 to 75; no cobbles.	
639	75 🛨	SPT_ 19	232	50/3" (Refusal)	0				SM	Very dense, moist, ligh SAND (SM); fine to coa overconsolidated fines Less Weathered Sprin Large cobble/small be	t brown-gray, Silty rse sand, low plasticity ngwater Formation oulder from 77.0 to		
634 8	30	SPT	227	50/4"	0					Few fine to coarse gro	avel below 80.0 feet.	78.	
- 629 - 8	35	20		(Refusal)			· · · · · · · · · · · · · · · · · · ·					Borehole completed at 80.3 feet below ground surface (bgs).	
624				NOTES:							Boring	FF-R-209	
und	derg	grour	nd	Vertical Datum Coordinate Sys	: Portland Ve tem: NAD 19	ertical 983 StatePlane	y 5-13 Dregor	-202 n No	⊥ rth FIPS	5 3601 Feet	Shee	t 3 of 3	

Log of Boring

	Nun	nper	: 608	4.0		Client					Einal Depth	
Drilled	04/	20/20)21 - (04/21/2021		Cooteshnil	Por	rtla	nd W	later Bureau	80.2 ft b	gs
Coordinates	774	10516	5.2 E,	660449.2 N	V	Geotecnnical Consultant	Lac	am	as C	onsulting	Rig Type Mud Rota	ry/CME 55 Track Mounted
Elevation	711	1.3 ft.	•			Contractor	West	tern	States	Soil Conservation, Inc.	Diameter 5.00 in	
Location	Ca	rpen	ter La	ne Nurse	ry	Logged by/ Checked by	Sus	san	Bedn	arz / Susan Bednarz	Type 140 lb / 3	30 in / Automatic
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	■ PEN RES BLC 10 2 → ○ WATE (MC) I ATTEF 20 4	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/F 0 60 80	1 	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS
707							·····			Medium stiff, moist, or SILT (MH); high plastici Residual Soil of the S	ange-brown, ELASTIC ty. pringwater Formation	Flush-mount monument installed. VWP installed at 28.5 feet and grouted into borehole. S/N: 2113122 Plowed field at
702	S	PT_ 1	95	2-3-5 (N=8)	C				МН			ground surface.
10	s	PT_ 2	100	3-4-6 (N=10)	. C	>				Becomes stiff at 10.0	feet.	
697 15	s	PT_ 3	100	15-7-11 (N=18)	()					Very stiff, moist, red-br high plasticity. Residual Soil of the S	own, FAT CLAY (CH);	
692 20		H_4	114						СН	0		SH_4 advanced at 600 psi from 20 to 21 feet and at 800 psi to refusal at 21 to 21.3 feet.
- 687 25	S	H_5	54							Becomes stiff at 25.0	nn at 22.5 jeet. feet	SH_5 advanced at 500 psi from 22.5 to 23.5 feet and at 700
	s	PT_ 6	100	4-5-6 (N=11)	• •					Medium stiff, wet, orar black, Sandy ELASTIC S plasticity, fine to coarse sensitive.	nge-brown, gray, and ILT (MH); high e sand, relict texture,	psi from 23.5 to 24.5 feet.
682	S	PT_ 7	100	2-2-3 (N=5)		 			MH	Sensitive Saprolite of Formation Becomes orange and	f the Springwater gray at 27.5 feet.	
DE	ergr	oun	d	NOTES: Location and El Vertical Datum Coordinate Syst	evation Sou : Portland Ve tem: NAD 19	rce: PWB Surv ertical 983 StatePlane	ey 5-13 e Orego	3-202 on No	1 rth FIPS	5 3601 Feet	Boring	FF-B-212 t 1 of 3

Log of Boring

Project Number:	6084.0	alt i			Einal Depth		
Drilled 04/20/202	.1 - 04/21/2021	Client]	Portland W	later Bureau	80.2 ft bg	gs	
^{Coordinates} 7740516.2	2 E, 660449.2 N	Geotechnical Consultant	Lacamas C	onsulting	Method/ Rig Type Mud Rotar	y/CME 55 Track Moun	ted
Surface 711.3 ft.		Drilling Contractor	Western States	Soil Conservation, Inc.	Hole 5.00 in		
Location Carpente	er Lane Nursery	Logged by/ Checked by	Susan Bedn	arz / Susan Bednarz	Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT) SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%) BLOW BLOW COUNTS COUNTS COUNTS COUNTS	ENETRATION ESISTANCE OWS/FT 20 30 40 + + + + ER CONTENT) RBERG LL/PL 40 60 80	USCS GRAPHIC USCS GRAPHIC	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
677 35 671 35 671 1	.00 .00 2-2-3 (N=5)	I → 0	МН	Medium stiff, wet, orar black, Sandy ELASTIC S plasticity, fine to coarse sensitive. Sensitive Saprolite or Formation Grades to ELASTIC SIL 32.0 feet, becomes givellow.	nge-brown, gray, and ILT (MH); high e sand, relict texture, f the Springwater T with sand (MH) at ray, brown, and	SH_8 advanced at 400 psi from 30 to 31 feet and at 500 psi from 31 to 32 feet. SPT_9: Oven Dried PI=12.5 (PL, LL = 34.3, 46.8). SH 10 advanced at	
672	.00 2-5-11 (N=16)	0		Grades to Sandy ELAS 35.0 feet, becomes gr Becomes very stiff, gr green, and black, wit gravel at 36.75 feet.	STIC SILT (MH) at ray-brown. ray-brown, red, h trace fine to coarse	450 psi from 35 to 36 feet and at 450 to 750 from 36 to 36.75 feet.	
SPT_ 1 12 SPT_ 1	.00 5-8-18 (N=26) .00 5-37-50/ 0	1H	•	Very stiff, moist, gray-b (ML); low plasticity, fin Less Weathered Spri Becomes hard, moist, 42.5 feet.	rown, Sandy SILT e to coarse sand. ngwater Formation , with few gravel at	PI=3.8 (PL, LL = 31.7, 35.5).	
667 45 45 5PT_1 14	.49 (Refusal) 31-50/2" ○ (Refusal)		SM	Cobble at 44.0 feet. Very dense, moist to w SAND (SM); fine to coa coarse gravel, low plas Less Weathered Sprin	et, gray-brown, Silty rse sand, trace fine to ticity fines. ngwater Formation	Rod chatter on gravel below 45 feet.	
662 50 SPT_ 1 15	.00 11-4-4	0	MH	Becomes gray, orang <u>feet.</u> Medium stiff, moist, lig ELASTIC SILT (MH); higl Sensitive Saprolite w Springwater Formation	e, and brown at 50.0 th brown and orange, n plasticity, sensitive. ithin Less Weathered n	Softer drilling from 50 to 55 feet.	
55 55 16 552	.00 3-3-10	Ho	MH	Stiff, moist to wet, gray ELASTIC SILT (MH); higl coarse sand, relict clast Sensitive Saprolite w Springwater Formation	r-light brown, Sandy n plasticity, fine to tic texture, sensitive. rithin Less Weathered n	SPT_16: Oven Dried PI=5.3 (PL, LL = 43.2, 48.5).	
	NOTES:				D		
DELVE	Location and Elevation Sc	ource: PWB Survey	5-13-2021		Boring	FF-B-212	
underground	Coordinate System: NAD	1983 StatePlane O	regon North FIPS	3601 Feet	Shee	t 2 of 3	

Log of Boring

Project	Numbe	1.000	54.0						Einal Denth		
Date(s) Drilled	04/20/2	021 -	04/21/2021		Client	Portla	nd V	Vater Bureau	80.2 ft b	egs	
Coordinates	774051	6.2 E,	660449.2 N	N	Geotechnical Consultant	Lacan	nas C	onsulting	Method/ Rig Type Mud Rota	ry/CME 55 Track Moun	ted
Surface Elevation	711.3 f	t.			Drilling Contractor	Western	States	Soil Conservation, Inc.	Hole 5.00 in		
Location	Carper	nter L	ane Nurse	ry	Logged by/ Checked by	Susan	Bedr	arz / Susan Bednarz	Hammer Type 140 lb /	30 in / Automatic	
ELEV. (FT) WATER LEVEL DFPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	■ PEN RES BLC 10 2 → → ○ WATE (MC) I ATTEF 20 4	NETRATION SISTANCE DWS/FT 20 30 40 H H H ER CONTENT RBERG LL/PL 40 60 80	USCS GRAPHIC	USCS	MATERIAL D	DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
647	SPT_ 17	17	15-20-17 (N=37)				GM	Dense, wet, gray-brow sand (GM); fine to coar coarse sand, low plasti Less Weathered Spri	n, Silty GRAVEL with rse gravel, fine to city fines. ngwater Formation		
. 65	SPT_ 18	123	38-50/3" (Refusal)	Ō				Very dense, moist to w (SM); fine to medium s fines, relict texture. Less Weathered Spri	ret, gray, Silty SAND sand, low plasticity ngwater Formation		
642 . 70	SPT_ 19	100	50/4" (Refusal)				SM	Becomes moist, no re 70.0 feet.	lict texture below	Stiff drilling with some gravel from 70 to 75 feet.	
637 . 75	SPT_ 20	100	50/3" (Refusal)							"Concrete"-like drilling at approximately 78 feet; likely mudflow deposit.	
632	-						1	Non alastia finas hala			
<u>80</u> 627 85	<u>SPT</u> 21	47	<u>50/2"</u> (Refusal)					Non-plastic fines belo	ow 80.0 jeet.	Borehole completed at 80.2 feet below ground surface (bgs).	
622	-										
DF		=	NOTES: Location and El	levation Sou	Irce: PWB Survey	5-13-20	21		Boring	FF-B-212	
unde	rgrou	nd	Vertical Datum Coordinate Sys	: Portland V tem: NAD 1	, ertical 983 StatePlane C	regon No	orth FIP:	S 3601 Feet	Shee	et 3 of 3	

Log of Boring

Proje	ct Nu	umber	r: 608	4.0							11-	0 411	
Date(s) Drilled	0	5/07/2	021			Client	Р	ortla	nd W	later Bureau	Final Depth 80.1 ft b	gs	
Coordinates	⁵ 7	741171	1.8 E,	660494.8 I	N	Geotechnical Consultant	L	acan	nas C	onsulting	Method/ Rig Type Mud Rota	ry/CME 55 Track Moun	nted
Surface Elevation	7	'14.4 ft	•			Drilling Contractor	W	estern	States	Soil Conservation, Inc.	Hole 5.00 in		
Location	(Carpen	ter La	ne Nurse	ery	Logged by/ Checked by	S	usan	Bedn	arz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL	DEPTH (FT) SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATIC SISTANCE DWS/FT 0 30 4 H H ER CONTI RBERG LL 0 60 8	DN = 0 ENT _/PL 60	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
-710	5	SPT_ 1	100	2-1-3 (N=4)		2				Soft, moist, orange-brc (MH); high plasticity. Residual Soil of the S	own, ELASTIC SILT	Plowed field at ground surface.	
-705 -705 - 1	0	SPT_ 2	100	2-3-4 (N=7)	■ Fe	≻-1			МН	Becomes medium stij	ff at 10.0 feet.		
-700 -700 1	5	SPT_ 3	100	4-6-7 (N=13)	•0					Becomes stiff at 15.0	feet.		
695 2	20	SPT_ 4	100	5-8-9 (N=17)						Very stiff, moist, gray-b CLAY (CH); high plastici Residual Soil of the S	prown and orange, FAT ity. Springwater Formation		
690		SPT_ 5	100	4-6-10 (N=16)	•	0			СН	Becomes gray, orang feet.	e, and red at 22.5		
2	25	SPT_ 6	100	4-6-8 (N=14)						Becomes stiff, gray an feet. Soft, wet, brown and o	nd orange at 25.0 range, Sandy ELASTIC		
685		SPT_ 7	100	3-2-2 (N=4)		O			мн	SILT (MH); high plastici sand, relict texture, ser Sensitive Saprolite of Formation	ty, fine to medium nsitive. f the Springwater		
	EI	V	Ξ	NOTES: Location and F	levation Sou	rce: PWB Su	urvev 5	-13-202	21		Boring	FF-B-214	
und	lerg	rour	nd	Vertical Datum Coordinate Sys	: Portland Votem: NAD 19	ertical 983 StatePla	ine Ore	gon No	orth FIPS	5 3601 Feet	Shee	t 1 of 3	

Log of Boring

	608	4.0		Climat				Einal Denth		
Drilled 05/07/202	21			Client	Portla	nd W	Vater Bureau	80.1 ft b	gs	
Coordinates 7741171.	8 E, 6	660494.8 N		Geotechnical Consultant	Lacan	nas C	onsulting	Method/ Rig Type Mud Rotar	y/CME 55 Track Moun	ıted
Surface 714.4 ft.				Drilling Contractor	Western	States	Soil Conservation, Inc.	Hole 5.00 in		
Location Carpent	er La	ne Nurser	y	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT) SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	PEN RES BLC 10 2 WATE (MC) ATTER 20 4	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTENT RBERG LL/PL 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
SPT_ 8 SPT_ 680 35	100 100	2-3-4 (N=7) 2-3-5 (N=8)		•		SM	Loose, wet, orange-bro Silty SAND (SM); fine to plasticity fines, relict cl sensitive. Sensitive Saprolite or Formation Becomes gray-orange gravel (SM) at 32.0 fe	own, gray, and black, o coarse sand, high astic texture, f the Springwater e, Silty SAND with	SPT_8: Oven Dried PI=15.2 (PL, LL = 36.5, 51.7). SPT_9: 42.1% fines by ASTM D1140 Gravelly drilling at 32.5 feet.	
675	100 100	10-15-22 (N=37) 17-17-31 (N=48)	0	•		SM	Dense, moist, gray-bro gravel (SM); fine to coa coarse sand, low plasti cemented. Less Weathered Spri	wn, Silty SAND with arse gravel, fine to city fines, weakly ngwater Formation	SPT_10: Oven Dried PI=1.1 (PL, LL = 24.6, 25.7). SPT_11: 27.1% fines by ASTM D1140	
40 SPT_ 12 670	144	15-50/3" (Refusal)	Ŏ			SM	Very dense, moist, gray with boulders (SM); fin fine gravel, low plastici Less Weathered Spri Boulder from 41.0 to 4 Less Weathered Spri Very dense, moist to w	y-brown, Silty SAND te to coarse sand, few ty fines. ngwater Formation 3.0 feet. ngwater Formation ret, gray-brown,	Bouncing on boulder from 41 to 43 feet. Softer drilling at 43 feet.	
665	120	6-19-50/ 3" (Refusal)	0			SM	fine to coarse sand, fev plasticity fines. Less Weathered Spri	ngwater Formation		
50 SPT_1	100	3-3-11 (N=14)		0			Medium dense, wet, b fine to medium sand, h sensitive. Sensitive Saprolite w Springwater Formation	rown, Silty SAND (SM); nigh plasticity fines, rithin Less Weathered n		
55 SPT_ 15	22	7-7-7 (N=14)				SM				
	1	NOTES:								<u> </u>
DELVE	L	Location and Elev	vation Sou	rce: PWB Survey	5-13-202	21		Boring	FF-B-214	
underground	d	Coordinate Syste	m: NAD 19	983 StatePlane C	regon No	orth FIPS	5 3601 Feet	Shee	t 2 of 3	

Log of Boring

Project	Nu	mber	: 608	34.0						East Darah		
Date(s) Drilled	0	5/07/2	021			Client	Portl	and V	Vater Bureau	80.1 ft b	gs	
Coordinates	7	741171	1.8 E,	660494.8 N	J	Geotechnical Consultant	Laca	mas C	onsulting	Method/ Rig Type Mud Rotar	ry/CME 55 Track Moun	ted
Surface Elevation	7	14.4 ft	•			Drilling Contractor	Wester	n States	Soil Conservation, Inc.	Hole 5.00 in		
Location	C	arpen	ter La	ane Nurse	ry	Logged by/ Checked by	Susa	n Bedı	narz / Susan Bednarz	Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/F 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
650 65		SPT_ 16	100	10-13-14 (N=27)	Ð	-19		SM	Medium dense, wet, b fine to medium sand, l Less Weathered Spri Becomes gray-brown trace fine gravel at 6	rown, Silty SAND (SM); ow plasticity fines. ngwater Formation and orange with 0.0 feet.	SPT_16: Oven Dried PI=NP (PL, LL = 29.7, NP).	
- 00 - - - -	-	17	0	(Refusal)					Very dense, wet, dark GRAVEL (GP). Less Weathered Spri	gray, Poorly Graded ngwater Formation	65 to 70 feet.	
70	· · · ·	SPT_ 18	100	50/1" (Refusal)				GP			Chattering on gravel at 70 feet.	
640 75		SPT_ 19	68	50/3" (Refusal)				GP-	Very dense, wet, gray, with silt and sand (GP- coarse sand, low plasti Less Weathered Spri	Poorly Graded GRAVEL GC); fine gravel, fine to city fines. ngwater Formation		
	-	SPT_ 20	212	50/1" (Refusal)			····	<u>SM</u>	Very dense, moist, red fine to coarse sand, lov Less Weathered Spri	-gray, Silty SAND (SM); w plasticity fines. ngwater Formation	Borehole completed at 80.1 feet below ground surface (bgs).	
630 . 85	-											
625]											
DE	erg	V	nd	NOTES: Location and El Vertical Datum: Coordinate Syst	evation Sou Portland V tem: NAD 19	rce: PWB Surv ertical 983 StatePlane	ey 5-13-2 Oregon M	021 North FIP	S 3601 Feet	Boring Shee	FF-B-214 t 3 of 3	

Log of Boring

Date(s)	. inumbe	500	94.0		Client				Final Depth			
Drilled	04/29/2	2021 - (04/30/2021		Cretter in the	Portla	and V	Vater Bureau	80).3 ft bg	gs	
Coordinates	774137	7.9 E,	660488.4 N	N	Geotechnical Consultant	Lacar	nas C	onsulting	Rig Type M	ud Rotar	y/CME 55 Track Mou	nted
Surface Elevation	717.1 f	t.			Drilling Contractor	Western	n States	Soil Conservation, Inc.	Diameter 5.	00 in		
Location	Carper	nter La	ane Nurse	ry	Logged by/ Checked by	Susar	n Bedr	arz / Susan Bednarz	Hammer Type 14	0 lb / 3	0 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/P 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	DESCRIPTION		REMARKS AND TESTS	BACKFILL/INSTALL.
- - -713 - 5	SPT_1	100	1-2-1 (N=3)					Soft, moist, orange-bro (MH); high plasticity. Residual Soil of the S	own, ELASTIC SII	LT mation	Plowed field at ground surface.	
-708 - 10 -	SPT_2	100	2-2-2 (N=4)		0	····	мн	Becomes soft at 10.0	feet.			
703 - 15 -	SPT_3	100	2-3-7 (N=10)	• 0				Becomes stiff at 15.0	feet.			
- 698 - 20 -	SPT_4	100	4-5-5 (N=10)	∎ F€	>1			Stiff, moist, gray and or high plasticity. Residual Soil of the S	ange, FAT CLAY	(CH);		
693	SPT_5	100	4-6-7 (N=13)	■ O			СН					
- 20	SPT_ 6	100	4-6-8 (N=14)					Very loose, wet, orang	e-brown, Silty S	SAND		
688	SPT_ 7	100	5-4-4 (N=8)				SM	fines, relict clastic text Sensitive Saprolite o Formation	ure, sensitive. f the Springwat	er		
DE	ELV	Ξ	NOTES: Location and E	levation Sou	rce: PWB Surve	ey 5-13-20)21		Bor	ing	FF-B-215	
unde	ergrou	nd	Vertical Datum Coordinate Sys	: Portland Vetem: NAD 19	ertical 983 StatePlane	Oregon N	lorth FIP	S 3601 Feet		Sheet	t 1 of 3	

Log of Boring

Project Date(s)	. INU	mper	: 608	4.U		Client	_	- -		Final Depth		
Drilled	04	1/29/20)21 - (04/30/2021		Cootochnia-1	Portla	ind W	Vater Bureau	80.3 ft b	gs	
Cuordinates	72	741377	7.9 E,	660488.4 N	V	Consultant	Lacan	nas C	onsulting	Rig Type Mud Rota	ry/CME 55 Track Moun	ted
Surrace Elevation	73	17.1 ft	•			Contractor	Western	States	Soil Conservation, Inc.	Diameter 5.00 in		
Location	C	arpen	ter La	ane Nurse	ry	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTENT RBERG LL/PL 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
-		SPT_ 8	100	1-1-3 (N=4)		 0			Very loose, wet, orange (SM); fine to coarse sau fines, relict clastic textu Sensitive Saprolite or Formation	e-brown, Silty SAND nd, high plasticity ure, sensitive. f the Springwater	SPT_8: 48.3% fines by ASTM D1140 SPT_8: Oven Dried PI=16.8 (0L_U = 24.8, 51.6)	
683 - 35		SPT_ 9	100	1-2-4 (N=6)		0		SM	Becomes loose, gray- gravel at 32.5 feet.	brown, with trace	(PL, LL = 34.8, 51.0).	
-		SPT_ 10	100	3-4-12 (N=16)		0			Becomes medium dei	nse at 35.0 feet.	Chatter on gravel	
678 40		SPT_ 11	100	8-7-17 (N=24)	(D 		SM	Medium dense, moist, SAND (SM); fine to coa fines, relict clastic texto Less Weathered Spri	gray-brown, Silty rse sand, low plasticity ure. ngwater Formation	below 37.5 feet.	
673		SPT_ 12	128	12-12-50 /2" (Refusal)	¢			ML	Hard, wet when worke SILT (ML); low plasticity trace fine to coarse gra texture. Less Weathered Sprin	d, gray-brown, Sandy y, fine to coarse sand, wel, relict clastic ngwater Formation	42.5 feet. SPT_12: Oven Dried PI=3.6 (PL, LL = 29.0, 32.6). Gravel from 43.5 to 45 feet.	
45	-	SPT_ 13	0	50/0" (Refusal)					Boulder from 45.0 to 4 Less Weathered Spri	7.0 feet. ngwater Formation	Boulder from 45 to 47 feet.	
- 668 - 50		SPT_ 14	100	7-8-16 (N=24)	0	•		GP CL	Less Weathered Spri Very stiff, moist, orang (CL); low plasticity. Less Weathered Spri	ngwater Formation e-brown, LEAN CLAY ngwater Formation	Soft drilling at 48 feet.	
663	-								Medium dense, wet, o brown, Silty SAND (SM trace gravel, low plastic texture, sensitive.	range-brown and dark); fine to coarse sand, city fines, relict clastic		
. 55		SPT_ 15	100	2-6-10 (N=16)		0		SM	Sensitive Saprolite w Springwater Formation Very stiff, wet when we and red, Sandy SILT (M to coarse sand, relict of sensitive.	ithin Less Weathered porked, brown, gray, L); low plasticity, fine lastic texture,		
658	-							ML	Sensitive Saprolite w Springwater Formation	n Less Weathered		
DE		V		NOTES: Location and El	evation Sou	rce: PWB Survey	r 5-13-20	21		Boring	FF-B-215	
unde	erg	rour	d	Vertical Datum: Coordinate Syst	: Portland Ve tem: NAD 19	ertical 983 StatePlane C)regon No	orth FIP:	S 3601 Feet	Shee	t 2 of 3	

Log of Boring

FF-B-215 inal Depth Date(s) Client 04/29/2021 - 04/30/2021 **Portland Water Bureau** 80.3 ft bgs Drilled Coordinates Geotechnical /lethod/ 7741377.9 E, 660488.4 N Lacamas Consulting Mud Rotary/CME 55 Track Mounted onsultant Rig Type Drilling Surface Hole 717.1 ft. 5.00 in Western States Soil Conservation, Inc. levatior Diameter ontracto ocation .ogged by/ Hammer 140 lb / 30 in / Automatic **Carpenter Lane Nursery** Susan Bednarz / Susan Bednarz SAMPLE NUMBER PENETRATION BACKFILL/INSTALL. GRAPHIC (%) SAMPLE TYPE RESISTANCE WATER LEVEI DEPTH (FT) BLOW COUNTS BLOWS/FT <u>el</u>ev. (Ft RECOVERY REMARKS USCS 10 20 30 40 MATERIAL DESCRIPTION AND O WATER CONTENT USCS (TESTS (MC) ATTERBERG LL/PL 20 40 60 80 Very stiff, moist to wet, brown, gray, and red, SPT 16: Oven Dried SPT 100 6-8-18 ELASTIC SILT (MH); high plasticity, fine to PI=4.8 16 (N=26) MH coarse sand, relict clastic texture, sensitive. (PL, LL = 35.2, 40.0). Sensitive Saprolite within Less Weathered Springwater Formation Gravel at 63 feet. Very dense, moist, gray-red, Silty SAND with 653 gravel (SM); fine to coarse gravel, fine to 65 📩 SPT coarse sand, low plasticity overconsolidated 132 50/3" fines, moderately cemented. 17 (Refusal) Less Weathered Springwater Formation 648 70 SPT_ Layered hard and 50/5" 201 Becomes gray-brown at 70.0 feet. less hard drilling 18 (Refusal) from 70 to 75 feet. SM 643 75 SPT_ Very dense, gravelly 50/5" 198 Becomes Silty SAND (SM) at 75.0 feet. drilling from 75 to 19 (Refusal) 80 feet. 638 Becomes red-brown, SIIty SAND with 80 x SPT gravel (SM) at 80.0 feet. 50/3" 168 20 (Refusal) Borehole completed at 80.3 feet below ground surface (bgs). 633 85 628 NOTES: Boring FF-B-215 DE Location and Elevation Source: PWB Survey 5-13-2021

Vertical Datum: Portland Vertical underground Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet

Sheet 3 of 3

Log of Boring

Project	Nu	mber	: 608	4.0		Client					Final Depth			
Drilled	04	4/21/20	021			Casteshairal	Port	land	W	ater Bureau	Mathed/	80.3 ft bg	gs	
Coordinates	7	740768	8.6 E, (660320.0 N	J	Geotechnical Consultant Drilling	Laca	imas	С	onsulting	ivietnod/ Rig Type Hole	Mud Rotar	y/CME 55 Track Mou	inted
Elevation	7	15.5 ft	•			Contractor	Weste	rn Stat	es S	Soil Conservation, Inc.	Diameter	5.00 in		
Location	- C	arpen	ter La	ne Nurse	ry	Logged by/ Checked by	Susa	n Be	dna	arz / Susan Bednarz	Hammer Type	140 lb / 3	0 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	■ PEN RES BLC 10 2 → ○ WATE (MC) I ATTEF 20 4	IETRATION SISTANCE DWS/FT 0 30 40 H H ER CONTEN RBERG LL/P 0 60 80	USCS GRAPHIC		0.000	MATERIAL D	ESCRIPTIO	DN	REMARKS AND TESTS	BACKFILL/INSTALL.
-711 -5		SPT_ 1	100	2-3-4 (N=7)						Medium stiff, moist, re (MH); high plasticity. Residual Soil of the S	d-brown, El	ASTIC SILT	Dirt road at ground surface.	
-706 -706 10		SPT_ 2	100	3-3-5 (N=8)	• 0		·····	М	н	Becomes medium stij 10.0 feet.	f, orange-bi	rown at		
-701 -701 - 15 -		SPT_ 3	100	4-5-7 (N=12)	• 0		·····			Becomes stiff at 15.0	feet.			
696 20		SPT_ 4	100	4-5-8 (N=13)						Very stiff, moist, gray, F plasticity, interlayered	AT CLAY (CF with orange	 I); high and dark		
691		SPT_ 5	100	6-8-10 (N=18)	•					Brown, LEAN CLAY (CL) Residual Soil of the S	; low plastic pringwater	rty. Formation		
25		SPT_ 6	100	5-7-10 (N=17)				CI	H					
686		SPT_ 7	100	4-6-10 (N=16)	Þ					Not interlayered with 27.5 feet.	lean clay b	elow		
DE	erg	rour	nd	NOTES: Location and El Vertical Datum Coordinate Sys	evation Sou : Portland Ve tem: NAD 19	rce: PWB Surve ertical 983 StatePlane	ey 5-13-2 Oregon	2021 North I	FIPS	3601 Feet	В	oring Sheet	FF-B-216 t 1 of 3	

Log of Boring

Date(s)	Numbe	r: 608	34.0		Client	n :*			Final Depth		
Drilled Coordinates	04/21/2	2021			Geotechnical	Portl	and V	Vater Bureau	80.3 ft b	gs	
Surface	774076	8.6 E,	660320.0 N	1	Consultant	Laca	mas C	onsulting	Rig Type Mud Rotan	ry/CME 55 Track Mour	ited
Elevation	715.5 t	t.			Contractor	Wester	n States	Soil Conservation, Inc.	Diameter 5.00 in		
	Carper	nter L	ane Nurse	ry	Checked by	Susa	n Bedr	narz / Susan Bednarz	Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	■ Per RES BLC 10 2 (MC) MATE (MC) ATTEF 20 4	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/PL 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
- - -	SPT_	100	3-1-3 (N=4)		0		СН	Very stiff, moist, gray, F plasticity Residual Soil of the S	AT CLAY (CH); high		
681 35	SPT_ 9	100	2-2-2 (N=4)		I−−− D		МН	Soft, wet, orange and g SILT (MH); high plastici relict clastic texture, se Sensitive Saprolite o Formation	gray, Sandy ELASTIC ty, fine to coarse sand, ensitive. f the Springwater	SPT_9: Oven Dried PI=23.0 (PL, LL = 40.2, 63.2).	
- - -	SPT_ 10	100	1-2-3 (N=5)		0			Becomes orange-gra feet. Becomes medium stij black at 35.0 feet.	y-dark brown at 32.5 ff, gray-brown and		
676 40	SPT_ 11	100	2-3-8 (N=11)		0		SM	Medium dense, wet, g (SM); fine to coarse sat high plasticity fines, re sensitive.	ray-brown, Silty SAND nd, trace fine gravel, lict clastic texture,	Gravelly drilling at 39 feet.	
	SPT_ 12	0	8-11-13 (N=24)					Sensitive Saprolite o Formation	f the Springwater		
671 45	SPT_ 13	100	7-18-49 (N=67)	O			· · ·	Very dense, moist to w SAND with cobbles (SN trace fine to coarse gra fines.	et, gray-brown, Silty 1); fine to coarse sand, wel, low plasticity	Cobbles and gravel	
	SPT_ 14	120	26-33-50 /3" (Refusal)	0			SM	Less Weathered Spri	ngwater Formation	from 45 to 50 feet.	
666 50	SPT_ 15	100	25-39-36 (N=75)	O				Very dense, moist, gray with cobbles (SM); fine gravel, low plasticity ov Less Weathered Spri	y-brown, Silty SAND e to coarse sand, trace verconsolidated fines. ngwater Formation		
661 55	X SPT_ 16	114	50/3" (Refusal)					Becomes moderately feet.	cemented at 55.0	Colored all the C	
656	-						CL	Very stiff, moist, gray, L plasticity. Less Weathered Spri	EAN CLAY (CL); low	57 to 65 feet.	
DE		=	NOTES:	i :	: : : :	<u>V / /</u>	021	1	Boring	FF-B-216	<u>1///`</u>
unde	rgrou	nd	Vertical Datum Coordinate Syst	Portland V em: NAD 1	ertical 983 StatePlane ()regon l	North FIP	S 3601 Feet	Shee	t 2 of 3	

Log of Boring

	umpe	r: 608	54.0		climat				Einal Denth		
Date(s) Drilled	04/21/2	021			Client	Portla	nd V	Vater Bureau	80.3 ft b	ogs	
Coordinates	774076	8.6 E,	660320.0 N	N	Geotechnical Consultant	Lacan	nas C	onsulting	Method/ Rig Type Mud Rota	ary/CME 55 Track Mour	ited
Surface Elevation	715.5 ft	t .			Drilling Contractor	Western	States	Soil Conservation, Inc.	Diameter 5.00 in		
Location	Carper	nter L	ane Nurse	ry	Logged by/ Checked by	Susan	Bedr	arz / Susan Bednarz	Type 140 lb /	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 20 30 40 H H H ER CONTEN RBERG LL/PI 40 60 80	USCS GRAPHIC	USCS	MATERIAL D	DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
	SPT_ 17	100	8-10-19 (N=29)	0			CL	Very stiff, moist, gray, L plasticity. Less Weathered Spri	EAN CLAY (CL); low		
651 65	SPT_ 18	100	8-16-17 (N=33)		0		SM	Dense, wet, gray, yello Silty SAND (SM); fine to plasticity fines, relict cl sensitive. Sensitive Saprolite w Springwater Formation Dense, moist, gray, yell Silty SAND (SM); fine t	w, red, and brown, o coarse sand, high lastic texture, rithin Less Weathered n low, red, and brown, o coarse sand low,	Harder drilling at 69	
646 70	SPT_ 19	160	50/5" (Refusal)	0			SM	plasticity fines. Less Weathered Spri Very dense, moist, gray with gravel (SM); fine t coarse sand, low plasti Less Weathered Spri	ngwater Formation y-brown, Silty SAND to coarse gravel, fine to city fines. ngwater Formation	feet.	
641 75	SPT_ 20	186	47-50/1" (Refusal)	0			SM	Very dense, moist, gray (SM); fine to coarse sa fines, moderately ceme Less Weathered Spri	y-brown, Silty SAND nd, overconsolidated ented. ngwater Formation		
636			= c (c)!								
631 85	21	+114	(Refusal)			····				Borehole completed at 80.3 feet below ground surface (bgs).	
626											
DE			NOTES:			UE 12 20	21		Boring	FF-R-216	<u> </u>
under	grour	nd	Vertical Datum Coordinate Sys	: Portland V tem: NAD 19	ertical 983 StatePlane (y 5-13-20 Dregon N	orth FIP:	S 3601 Feet	She	et 3 of 3	

Log of Boring

P roject N Date(s)			4.0		Client	Deat		To have David a second	Final Depth	
Drilled Coordinates	04/22/20	J21 - (04/23/2021	т	Geotechnical	Portla	nd W	ater Bureau	80.0 ft b	
Surface	7740994	1.U E, (660223.3 N	N	Consultant Drilling	Lacam	ias C	onsulting	Rig Type Mud Ro	tary/CME 800 Track
Elevation Location	719.5 ft	• • • • • • •	no NI	447.7	Contractor Logged by/	Western	States	Soil Conservation, Inc.	Diameter 5.00 in Hammer 140 lb / 2	0 in / Artomatia
		ter La	ine Nurse			Susan	Bean	arz / Susan Bednarz	Type 140 ID / 3	So in / Automatic
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE NUMBE	RECOVERY (%)	BLOW COUNTS	 RES BLC 10 2 10 2 WATE (MC) ATTEF 20 4 	BISTANCE DWS/FT 0 30 40 H H ER CONTEN RBERG LL/P 0 60 80	USCS GRAPHIC	nscs	MATERIAL D	ESCRIPTION	REMARKS AND TESTS BACKFILL/INSTALL
-715 5 -710 10	SPT_ 1	100	2-2-4 (N=6)					Medium stiff, moist, re (MH); high plasticity. Residual Soil of the S	d-brown, ELASTIC SILT	Flush-mount monument installed. VWP installed at 38 feet and grouted into borehole. S/N: 2113124 Plowed field at ground surface.
705 15	SPT_ 2 SPT_ 3	100	3-5-6 (N=11) 3-4-8 (N=12)		D		МН	Becomes stiff at 10.0	jeet.	
700 20	SPT_ 4	100	4-4-8 (N=12) 4-6-9	■ 0 ■ 0						
695 25	5 SH_6	128	(N=15)				СН	Stiff, moist, orange and high plasticity. Residual Soil of the S Becomes gray, orange trace fine to coarse so Becomes very stiff at	gray, FAT CLAY (CH); pringwater Formation e, and black with and at 25.0 feet. 27.5 feet.	SH_6 advanced at 450 psi from 25 to 26 feet and at 800 psi from 26 to 26.5 feet.
690	SPT_ 7	100	6-8-10 (N=18))				,	
DE			NOTES: Location and El	evation Sou	rce: PWB Surve	y 5-13-202	21		Boring	FF-B-217
under	grour	nd	Vertical Datum Coordinate Syst	: Portland Ve tem: NAD 19	ertical 983 StatePlane	Oregon No	orth FIPS	5 3601 Feet	Shee	t 1 of 3

Log of Boring

Project	number	300	54.0									
Date(s) Drilled	04/22/2	021 -	04/23/2021		Client	Por	tlaı	nd W	later Bureau	Final Depth 80.0 ft b	gs	
Coordinates	7740994	4.0 E,	660223.3 N	1	Geotechnical Consultant	Lac	am	as C	onsulting	Method/ Rig Type Mud Ro	tary/CME 800 Trac	ck
Surface Elevation	719.5 ft	•			Drilling Contractor	West	ern S	States	Soil Conservation, Inc.	Hole 5.00 in		
Location	Carpen	ter La	ane Nurse	ry	Logged by/ Checked by	Sus	an 1	Bedn	arz / Susan Bednarz	Hammer Type 140 lb / 3	30 in / Automatic	
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE OWS/FT 0 30 40 H H H ER CONTEN RBERG LL/P 0 60 80			USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
685	SH_8 SPT_ 9	84 100	2-4-6 (N=10)		0			CH MH	Stiff, moist, orange and high plasticity. Residual Soil of the S <i>Becomes gray and re</i> Stiff, wet, gray, red, and SILT (MH); high plastici Sensitive Saprolite o	I gray, FAT CLAY (CH); pringwater Formation d at 30.0 feet. / d light brown, ELASTIC ty, sensitive. f the Springwater	SH_8 advanced at 500 psi from 30 to 31 feet and at 750 psi from 21 to 32 feet.	
680	SH_1 0 SPT_ 11	116 100	2-3-6 (N=9)	•	.н.о	···· ····		MH	Formation Stiff, wet, orange-brow ELASTIC SILT (MH); higl coarse sand, sensitive. Sensitive Saprolite of Formation	n and gray, Sandy n plasticity, fine to f the Springwater	SH_10 advanced at 350 psi from 35 to 36 feet and at 600 psi from 36 to 37 feet. SPT_11: Oven Dried PI=4.7 (PI_1L = 41 5, 46 2)	
40	SH_1 2 SPT_ 13	212 100	8-10-13 (N=23)	q		···· ····		ML	Very stiff, moist, gray-b SILT (ML); low plasticity Less Weathered Spri	rown and red, Sandy y, fine to coarse sand. ngwater Formation	SH_12 advanced at 800 psi for 1". SPT_13: Oven Dried PI=3.7	
675 45	SPT_ 14	55 123	13-17-12 (N=29) 25-50/3"	0			· · · · · · · · · · · · · · · · · · ·	SM	(SM); fine to medium s low plasticity fines, reli sensitive.	and, trace fine gravel, ct clastic texture,	(PL, LL = 34.2, 37.9). Gravelly drilling at 42.5 feet. Cobbles	
670 ₅₀	15 • SPT_ 16	159	(Refusal) 27-50/1" (Refusal)	0				SM	Very dense, wet, gray-I gravel and cobbles (SN to medium sand, low p texture. Less Weathered Spri No cobbles below 48.	orown, Silty SAND with I); coarse gravel, fine Ilasticity fines, relict ngwater Formation <i>0 feet.</i>	Gravelly drilling from 50 to 57 feet.	
665 55	▼ SPT_ 17	200	50/3" (Refusal)	0				CL	Becomes Silty SAND (55.0 feet; overconsol moderately cemented Hard, moist, light gray, plasticity, overconsolid Less Weathered Spri	'SM); few gravel at idated fines, d LEAN CLAY (CL); low ated. ngwater Formation	Clayey drilling at 57 feet.	
660							\square					
DE	LVI rgrour	nd	NOTES: Location and Ele Vertical Datum: Coordinate Syst	evation Sou Portland Ve em: NAD 19	rce: PWB Surve ertical 983 StatePlane	y 5-13 Oregor	-202 n Noi	1 rth FIPS	5 3601 Feet	Boring Shee	FF-B-217 t 2 of 3	

Log of Boring

Project N	Indenni	: 608	54.U					– –				
Date(s) Drilled	04/22/2	021 - (04/23/2021		Client	Portl	and V	Vater Bureau	Final Depth 80.0 ft bgs			
Coordinates	7740994	4.0 E,	660223.3 N	N	Geotechnical Consultant	Lacar	mas C	Consulting	Method/ Rig Type Mud Rc	^{od/} Mud Rotary/CME 800 Track		
Surface Elevation	719.5 ft	•			Drilling Contractor	Wester	n States	Soil Conservation, Inc.	Hole 5.00 in			
Location	Carper	ter La	ane Nurse	ry	Logged by/ Checked by	Susar	n Bedı	narz / Susan Bednarz	Hammer Type 140 lb /	30 in / Automatic		
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE 17PE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	■ PEN RES BLC 10 2 ○ WATE (MC) I ATTEF 20 4	NETRATION SISTANCE DWS/FT 20 30 40 H H H ER CONTEN RBERG LL/PL 20 60 80	USCS GRAPHIC	USCS	MATERIAL D	DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.	
	SPT_ 18	100	7-14-21 (N=35)	0			CL	Hard, moist, light gray, plasticity, overconsolid Less Weathered Spri	LEAN CLAY (CL); low lated. ngwater Formation			
655 65	SPT_ 19	156	9-50/3" (Refusal)		0		SM	Very dense, moist and Cobbles (SM); fine to r high plasticity and low clastic texture, sensitiv Sensitive Saprolite w Springwater Formatio Two cobbles at 67.0 j	wet, Silty SAND with nedium sand, layered plasticity fines, relict re. rithin Less Weathered n feet.	- Gravels at 64.5 feet.		
	SPT_ 20	128	21-41-50 /2" (Refusal)	Ō				Very dense, moist, grawith Gravel (SM); fine to coarse sand, low pla overconsolidated fines Less Weathered Spri	y-brown, Silty SAND to coarse gravel, fine asticity , weakly cemented. ngwater Formation	Hard cemented drilling from 70 to 75 feet.		
645 75 <u>-</u>	SPT_ 21	227	50/4" (Refusal)	0			SM			Hard gravels from 75 to 80 feet.		
640												
635 85	SPT_ 22	0	50/0" (Refusal)							Borehole completed at 80 feet below ground surface (bgs).		
630												
DE	grour	nd	NOTES: Location and El Vertical Datum Coordinate Syst	evation Sou : Portland V tem: NAD 1	irce: PWB Survey ertical 983 StatePlane (y 5-13-20 Dregon N	021 North FIP	'S 3601 Feet	Boring Shee	FF-B-217 et 3 of 3		

Log of Boring

Date(s)	05/03/20	. 008	9 4. U		Client	Portl	and W	Vater Bureau	Final Depth 80.0 ft bgs			
Drilled Coordinates	7740510).5 E.	661024.3 N	N	Geotechnical	Lacar	$\frac{110}{100}$	onsulting	Method/			
Surface	706.8 ft			•	Consultant Drilling Contractor	Western	states	Soil Conservation, Inc.	Hole Diameter 6.00 in	g/ I rack Mounted Geoprobe 8150	1.5	
Location	Carpen	ter La	ane Nurse	ery	Logged by/ Checked by	Susan	Bedr	arz / Susan Bednarz	Hammer N/A			
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 10 2 (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/P 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.	
702 5	C_1	100 100		0				Moist, orange-brown, I high plasticity. Residual Soil of the S	ELASTIC SILT (MH);	Borehole instrumented with a 2" ID standpipe piezometer with 010 slot and 10/20 sand; flush-mount monument at surface. Well ID #: L142278		
697 ₁₀	C_2 GS_2	100 87		0		····	мн			Start Card #:1051771 Driller used water to reduce friction on drill casing during installation.		
692 ₁₅	C_3	87 100		(D							
	C_4	97										
687 ₂₀	C_5	100 100		0				feet Moist, gray and brown plasticity. Residual Soil of the S	, FAT CLAY (CH); high	Fat clay swelling; sample recovery over 100% from 20 to 30 feet.		
682 ₂₅		103					СН	Becomes gray, red, al 25.0 feet.	nd orange below			
	C_6	127 100			⊢러		мн	Moist, orange-brown, ELASTIC SILT (MH); high medium sand, relict ter Sensitive Saprolite of Formation	gray, and black, Sandy h plasticity, fine to xture, sensitive. f the Springwater	GS_6: Oven Dried PI=21.4		
DE	LV	nd	NOTES: Location and E Vertical Datum Coordinate Sys	levation Sou : Portland V tem: NAD 19	rce: PWB Surve ertical 983 StatePlane	y 5-13-20 Oregon N	021 orth FIP:	5 3601 Feet	Boring	FF-SC-203 et 1 of 3		

Log of Boring

FF-SC-203

	number	: 608	4.0		Client							
Drilled	05/03/20)21			Client	Portla	nd W	Vater Bureau	80.0 ft bgs			
Coordinates	7740510).5 E,	661024.3 N	N	Geotechnical Consultant	Lacam	nas C	onsulting	Method/ Rig Type	Sonic Drilling/	Track Mounted Geoprobe 8150	LS
Surface Elevation	706.8 ft	•			Drilling Contractor	Western	States	Soil Conservation, Inc.	Hole Diameter	6.00 in		
Location	Carpen	ter La	ane Nurse	ry	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Hammer Type	N/A		
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE IYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 0 30 40 H H ER CONTENT RBERG LL/PL 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPT	ION	REMARKS AND TESTS	BACKFILL/INSTALL.
672 35	GS_7 C_7	200 100			0		CH MH SM	Moist, gray and orange plasticity. Sensitive Saprolite o Formation Wet, brown, gray, and SILT (MH), high plastici relict clastic texture, se Sensitive Saprolite o	f the Sprin yellow, Sa ty, fine to msitive. f the Sprin	Y (CH); high ngwater ndy ELASTIC coarse sand, ngwater	(PL, LL = 37.9, 59.3). Driller did not use water to drill from 30 to 40 feet. Clay swells up into	
	C_8	100			2		SM	Wet, brown, gray, and with gravel (SM); fine t coarse sand, high plast Sensitive Saprolite o Formation	yellow, Sil o coarse g icity fines f the Sprir	ty SAND gravel, fine to , sensitive.	Sonic drilling disturbs relict clastic	
667 40	GS_8 GS_9 C_9	100 100		сH	0		SM	Wet, gray-brown, Silty coarse sand, few fine t plasticity fines, sensitiv Sensitive Saprolite o Formation Wet, gray-brown, Silty (SM): fine to coarse sai	SAND (SM o coarse g re. f the Sprir SAND wit	1); fine to gravel, high ngwater h gravel	GS_9: Oven Dried PI=2.2 (PL, LL = 26.4, 28.6).	
662 ₄₅	C_10	108					SM	Less Weathered Spri Two 4-5" diameter cob 43 feet. (Broken by dril Less Weathered Spri Moist, gray-brown, Silt (SM); fine to coarse sal gravel low plasticity fi	ngwater F bles betw ling.) ngwater F y SAND w nd, trace f	ormation // reen 42 and // formation // ith cobbles fine to coarse	Swelling of overconsolidated clayey soil rubbing on casing likely contributing to	
657 ₅₀	GS_1 0 C_11	100 103		0			SM	Less Weathered Spri <u>6</u> " diameter cobble a Moist, gray-brown, Silt (SM); fine to coarse gra sand, low plasticity fine moderately cemented. Less Weathered Spri	ngwater F t 44.5 feet y SAND w avel, fine t es, weakly ngwater F	formation the gravel to coarse to formation	Less Weathered Springwater Formation. Hard drilling at 50 feet; very difficult to advance casing to 50 feet.	
652 ₅₅	GS_1 1 C_12	100 108		Fəl			CL	At 50.0 feet becomes orange-brown. Moist to wet, gray and (CL); low plasticity, ove Less Weathered Spri Moist to wet, gray and (ML); low plasticity, fin	gray-brow orange, L rconsolida ngwater F orange, S e to medi	wn and EAN CLAY ated. Formation andy SILT		
DE			NOTES: Location and El	levation Sou	rce: PWB Survey	5-13-202	ML	Less Weathered Spri	ngwater F B	ormation oring F	F-SC-203	

underground Vertical Datum: Portland Vertical Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet

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Log of Boring

Project	Number	500	54.0									
Date(s) Drilled	05/03/2	021			Client]	Portla	nd W	Vater Bureau	80.0 ft bgs			
Coordinates	774051	0.5 E,	661024.3 ľ	N	Geotechnical Consultant	Lacam	nas C	onsulting	Method/ Rig Type	Sonic Drilling/	Track Mounted Geoprobe 8150 l	LS
Surface Elevation	706.8 ft	t .			Drilling Contractor	Western	States	Soil Conservation, Inc.	Hole Diameter	6.00 in		
Location	Carper	nter L	ane Nurse	ery	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Hammer Type	N/A		
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 20 30 40 H H H ER CONTENT RBERG LL/PL 20 60 80	USCS GRAPHIC	USCS	MATERIAL D	DESCRIPT	TION	REMARKS AND TESTS	BACKFILL/INSTALL.
	C_13	100					SM	Moist, orange, brown, (SM); fine to coarse sal gravel, high plasticity fi texture, sensitive. Sensitive Saprolite w Springwater Formation	and gray, nd, few fii ines, relict vithin Less	Silty SAND ne to coarse t clastic S Weathered		
642 ₆₅	C_14	100		0			SM	Moist, gray-brown and with gravel and cobble gravel, fine to coarse sa fines, weakly to moder oxidized, weathered. Less Weathered Spri 6" diameter andesite	l orange, S s (SM); fir and, low p rately cem ngwater I cobble at	Silty SAND the to coarse clasticity thented, Formation the 65.0 feet.		
637 ₇₀	C_15	70					SM	Moist, orange-brown b SAND (SM); fine to coa coarse gravel, low plas moderately cemented, zones. Less Weathered Spri	pecoming irse sand, ticity fines oxidized, ngwater f	gray, Silty few fine to s, weakly to /weathered		
632 ₇₅	GS_1 3 C_16	100 100		0			SM	Moist, gray becoming I Silty SAND with gravel gravel, fine to coarse si fines, weakly to moder Less Weathered Spri Dry zone from 79.0 to dessignted by sonig d	brown and (SM); fine and, low p rately cem ngwater F o 80.0 fee rilling.	d orange, e to coarse blasticity eented. Formation		
627 ₈₀ 622 ₈₅									, <i>, , , , , , , , , , , , , , , , , , </i>		Borehole completed at 80 feet below ground surface (bgs).	
DE	LV rgrour	End	NOTES: Location and E Vertical Datum Coordinate Sys	levation Sou Portland Vestem: NAD 19	irce: PWB Survey ertical 983 StatePlane O	5-13-202 regon No	21 21 prth FIP:	S 3601 Feet	B	oring I	FF-SC-203 t 3 of 3	

Log of Boring

Date(s) Drilled	05/04/2	021			Client	Portla	nd W	Vater Bureau	Final Depth 80.0 ft bgs			
Coordinates	774091	8.7 E,	660489.4 N	N	Geotechnical Consultant	Lacan	nas C	onsulting	Method/ Rig Type Sonic Drilling/Track Mounted Geoprobe 8150 LS			
Surface Elevation	713.9 ft				Drilling Contractor	Western	States	Soil Conservation, Inc.	Hole Diameter 6.00 in	· · · · · · · · · · · · · · · · · · ·	-	
Location	Carper	ter La	ane Nurse	ery	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Hammer N/A			
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEI RES BLC 10 2 (MC) ATTER 20 4 	NETRATION SISTANCE DWS/FT 10 30 40 H H H ER CONTEN RBERG LL/P 10 60 80	USCS GRAPHIC	USCS	MATERIAL D	DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.	
709 5	C_1 GS_1	100 100		10-	-1			Moist, orange-brown, plasticity. Residual Soil of the S	FAT CLAY (CH); high	Installed drill casing to 20 feet.		
	C_2	80										
704 10	GS_2	100		0								
699 15	C_3	100 100		0			СН			Driller requires		
694 20	C_4	100 100		0				Becomes gray and br	rown at 20.0 feet.	water to drill due to squeezing clay and high friction. 20 - 21 feet: soil is wet from drilling		
689 25	C_5 GS_5	100 105		0						water.		
	C_6	102			0		SM	Wet, orange-brown, gr SAND (SM); fine to coa plasticity fines, relict to Sensitive Saprolite o Formation	ray, and brown, Silty arse sand, high exture, sensitive. f the Springwater			
DE		E	NOTES: Location and F	levation Sou	rce: USGS Topo	Map	1		Boring I	F-SC-213		
unde	rgrour	nd	Vertical Datum Coordinate Sys	: Portland V tem: NAD 1	ertical 983 StatePlane	Oregon No	orth FIP:	5 3601 Feet	Shee	t 1 of 3		

Log of Boring

FF-SC-213

	-1.		Final Depth			
Date(s) Drilled 05/04/2021	Client Portland	Water Bureau	80.0 ft bgs			
^{Coordinates} 7740918.7 E, 660489.4 N	Geotechnical Consultant Lacamas	Consulting	Method/ Rig Type Sonic Drilling/	Track Mounted Geoprobe 8150 I	LS	
Surface 713.9 ft.	Drilling Contractor Western State	s Soil Conservation, Inc.	Hole 6.00 in			
Location Carpenter Lane Nursery	Logged by/ Checked by Susan Bed	narz / Susan Bednarz	Hammer N/A			
ELEV. (FT) WATER LEVEL DEPTH (FT) SAMPLE TYPE SAMPLE NUMBER RECOVERY (%) BLOW COUNTS COUNTS COUNTS	ETRATION IISTANCE WS/FT 0 30 40 R CONTENT BERG LL/PL 0 60 80	MATERIAL D	ESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.	
C_7 100 GS_7 100 679 35	I ○ SIV	Wet, orange-brown, gr. SAND (SM); fine to coa plasticity fines, relict te Sensitive Saprolite of Formation Below 30.0 feet becor red, gray, and yellow. Scattered gravel belo Wet, gray-brown, Silty boulders (SM); fine to o	ay, and brown, Silty rse sand, high exture, sensitive. f the Springwater <i>mes orange-brown,</i> <i>w 32.5 feet.</i> SAND with gravel and coarse gravel, fine to	Soil texture disturbed by auger bit used to retain soil in sonic core barrel. GS_7: Oven Dried PI=19.3 (PL, LL = 36.9, 56.2). 35 to 36 feet; soil is wet from drilling.		
C_8 107 GS_8 100 674 40	SIV	coarse sand, high plast texture, sensitive. Sensitive Saprolite of Formation Weathered boulder fro broken by drilling.	icity fines, relict f the Springwater im 36.0 to 37.0 feet;	Hard drilling from 36 to 37 feet.		
C_9 100 GS_9 100 ○	SI∨	Moist, gray-brown, Silt and boulders (SM); fine to coarse sand, low pla texture.	y SAND with gravel to coarse gravel, fine sticity fines, relict			
C_10 100		(SM); fine to coarse gra sand, low plasticity fine cemented, minor oxida Less Weathered Spri Moist, gray-brown, Silt and cobbles (SM); fine to coarse sand, low pla	y SAND with graver avel, fine to coarse es, moderately ation. ngwater Formation y SAND with gravel to coarse gravel fine sticity fines,	Switzbad to 10 fact		
C_11 100	SI∨	1 moderately cemented. Less Weathered Sprin One 4" diameter cobb Trace cobbles at 50.0 One 5" diameter cobb	ngwater Formation ble at 45.5 feet. feet. ble at 52.0 feet.	runs at 50 feet.		
659 55 GS_1 100 0 100	-1 MI	One 3.5" diameter co Moist, gray-brown, SILT trace gravel, overconso Less Weathered Sprin Moist, gray-brown, Silt	bble at 54.6 feet. (ML); low plasticity, lidated. ngwater Formation y SAND with gravel			
C_12	SIV	sand, low plasticity fine Sensitive Saprolite w Springwater Formation	ithin Less Weathered			
DELVE Location and Elevation Sour	ce: USGS Topo Map		Boring F	F-SC-213	[

Vertical Datum: Portland Vertical Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet

underground

Sheet 2 of 3

Log of Boring

Final Depth 80.0 ft bgs

Date(s) Drilled	05/04/2	021			^{Client} I	Portla	nd N	Vater Bureau	Final Depth 80.0 ft bgs			
Coordinates	7740918	8.7 E,	660489.4 1	N	Geotechnical Consultant	Lacam	ias C	onsulting	Method/ Rig Type	Sonic Drilling/	Track Mounted Geoprobe 8150 l	LS
Surface Elevation	713.9 ft				Drilling Contractor	Vestern	States	Soil Conservation, Inc.	Hole Diameter	6.00 in		
Location	Carpen	iter L	ane Nurse	ery	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Hammer Type	N/A		
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 	VETRATION SISTANCE DWS/FT 20 30 40 H H H ER CONTENT RBERG LL/PL 40 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTIC	ON	REMARKS AND TESTS	BACKFILL/INSTALL.
649 65 644 70	C_13 C_13 C_14 GS_1 1	100 100 100		0 0			SM	Moist, brown, Silty SAN cobbles (SM); fine to co coarse sand, low plastic fines, weakly cemented Less Weathered Sprin One 4" diameter cobb At 65.0 feet, becomes moderately cemented One 6" diameter brok feet. One 3.5" cobble at 67 One 3.5" diameter co At 70.0 feet becomes gray, uncemented to	ID with grav parse gravel city overcor d. ngwater Fo ble at 63.6 f s weakly to d. c. 7.0 feet. bble at 69.5 gray-browi weakly cer	vel and I, fine to Isolidated rmation feet. at 65.0 5 feet. n and hented.		
639 75	C_15 C_16 GS-1 2	100 100 100		0			SM	One large broken cob 12" diameter broken, from 75.0 to 76.0 fee Moist, gray-brown and with gravel, cobbles, ar to coarse sand, low pla moderately cemented. Less Weathered Spri One 4" diameter cobl	bble at 74.5 weathered red-gray, Si nd boulders isticity fines ngwater Fo ble at 77.0 f	feet. boulder ilty SAND (SM); fine weakly to rmation feet.		
6 29 85											Borehole completed at 80 feet below ground surface (bgs).	
DE		E	NOTES: Location and E	levation Sou	urce: USGS Topo N	Лар			Bo	oring F	F-SC-213	
unde	rgrour	nd	Vertical Datum Coordinate Sys	: Portland Ve stem: NAD 1	'ertical 983 StatePlane Oเ	regon No	orth FIPS	5 3601 Feet		Sheet	t 3 of 3	

Log of Boring

Date(s)	05/05/2	021	, v		Client	Portl	and W	ater Bureau	Final Depth 80.0 ft bgs			
Coordinates	774120	8.6 E.	660246.6	N	Geotechnical	Lacar	nas C	onsulting	Method/	Sonia Deillin-P	J-	15
Surface	719.6 ft			•	Consultant Drilling	Westerr	States	Soil Conservation Inc	Rig Type Hole	6.00 in	Track Mounted Geoprobe 8150	15
Location	Carpen	ter La	ane Nurse	erv	Logged by/	Susan	Bedn	arz / Susan Bednarz	Hammer	N/A		
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 10 2 (MC) ATTER 20 4 	NETRATION SISTANCE OWS/FT 0 30 40 H H H ER CONTEN RBERG LL/PI 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTI	ON	REMARKS AND TESTS	BACKFILL/INSTALL.
715	C_1 GS_1	100 87		0				Moist, orange-brown, F high plasticity. Residual Soil of the S <i>Becomes brown to or</i> <i>feet.</i>	ELASTIC SIL pringwate ange-brow	T (MH); r Formation n at 5.0		
-710 10-	GS_2	100		0								
705 15	C_3 ₩ GS_3	100 100		4 -	-1		МН					
700 20	C_4	100 100		0				Becomes orange-brow feet.	vn and bla	ck at 20.0	Driller used water below 20 feet. Swelling clay from	
695 25	C_5	115 100		0				Moist, gray, orange, an high plasticity.	d red, FAT	CLAY (CH);	20 to 30 feet; driller removed extra 9" before core box photo was taken.	
- - - - 690	C_6 GS_6	100 120		0			СН	Residual Soil of the S	pringwate	r Formation		
DE	rgrour	nd	NOTES: Location and E Vertical Datum Coordinate Sys	levation Sou : Portland Ve tem: NAD 19	rce: PWB Surve ertical 983 StatePlane (y 5-13-20 Dregon N	2 021 orth FIPS	5 3601 Feet	Вс	oring F	F-SC-218 t 1 of 3	

Log of Boring

Project	INUN	nper	: 608	4.0									
Date(s) Drilled	05/	/05/20)21			Client	Portla	nd V	Vater Bureau	Final Depth 80.0 ft bgs			
Coordinates	774	41208	6.6 E,	660246.6 N	N	Geotechnical Consultant	Lacan	nas C	onsulting	Method/ Rig Type Sonic Drilling	/Track Mounted Geoprobe 8150	LS	
Surface Elevation	719	9.6 ft.	,			Drilling Contractor	Western	States	Soil Conservation, Inc.	Hole 6.00 in			
Location	Ca	rpen	ter La	ne Nurse	ery	Logged by/ Checked by	Susan	Bedr	arz / Susan Bednarz	Hammer N/A			
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	 PEN RES BLC 10 2 WATE (MC) ATTEF 20 4 	NETRATION SISTANCE DWS/FT 0 30 40 H H H ER CONTEN RBERG LL/P 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.	
- - - 685 - 35		C_7 6S_7	100 100			⊢ ∎ 0		СН	Moist, gray, orange, an high plasticity. Residual Soil of the S Wet, gray, orange, and SILT (MH); high plastici few fine to coarse grav Sensitive Saprolite o Formation Wet, gray-brown, Silty	d red, FAT CLAY (CH); Springwater Formation brown, Sandy ELASTIC ty, fine to coarse sand, el, sensitive. f the Springwater SAND with gravel and	C_7 30 to 35 feet: three attempts required to capture sample. Sample is very disturbed. Very soft drilling from 30 to 40 feet; Small amount of		
680 40		C_8 6S_8	80 100			Ō		SM MH	cobbles (SM); fine to co coarse sand, low plasti Sensitive Saprolite of Formation One 3.5" diameter co Wet, gray-brown, Sand high plasticity, fine to r	oarse gravel, fine to city fines, sensitive. f the Springwater bble at 39.5 feet. y ELASTIC SILT (MH); nedium sand,	added water. GS_7: Oven Dried PI=13.8 (PL, LL = 38.1, 51.9).		
-		C_9	103					SM	sensitive. Sensitive Saprolite of Formation Moist to wet, gray-brow	f the Springwater wn and orange, Silty			
675 45		5_9 5_10	100					SM	coarse gravel, low plast coarse gravel, low plast Less Weathered Spri Moist, gray-brown, Silt and cobbles (SM); fine plasticity fines, modera Less Weathered Spri	rse sand, rew fine to ticity fines. ngwater Formation y SAND with gravel to coarse sand, low ately cemented. ngwater Formation			
670 50		2_11	100					GM	At 45.0 feet becomes orange, no cementati cemented, oxidized. One 3.5" diameter co Two 4" diameter cob and 51.0 feet.	gray-brown and ion to moderately bble at 46.0 feet. bles between 50.0 orange, Silty GRAVEL			
665 55		2_12	100					CL	with sand and cobbles gravel, fine to coarse sa fines, weakly to moder minor oxidation. Less Weathered Spri One 6" diameter cobl Moist, gray and orange plasticity. Less Weathered Spri	(GM); fine to coarse and, low plasticity rately cemented, ngwater Formation ble at 53.0 feet. e, LEAN CLAY (CL); low ngwater Formation			
DF			-	NOTES:	levation Sou		v 5-12-20	21	· · · · · · · · · · · · · · · · · · ·	Boring	FF-SC-218	<u> </u>	
unde	ergr	oun	d	Vertical Datum Coordinate Syst	: Portland V tem: NAD 19	ertical 983 StatePlane	Oregon N	orth FIP:	S 3601 Feet	Shee	et 2 of 3		

Log of Boring

	Number	. 000	94.0						Final Depth			
Date(s) Drilled	05/05/2	021			Client	Portla	nd W	Vater Bureau	Final Depth 80.0 ft bgs			
Coordinates	7741208	8.6 E,	660246.6 N	N	Geotechnical Consultant	Lacan	1as C	onsulting	Method/ Rig Type 5	onic Drilling/	Track Mounted Geoprobe 8150	LS
Surface Elevation	719.6 ft	•			Drilling Contractor V	Vestern	States	Soil Conservation, Inc.	Hole Diameter	6.00 in		
Location	Carpen	ter La	ane Nurse	ery	Logged by/ Checked by	Susan	Bedn	arz / Susan Bednarz	Hammer] Type]	N/A		
ELEV. (FT) WATER LEVEL DEPTH (FT)	SAMPLE TYPE SAMPLE NUMBER	RECOVERY (%)	BLOW COUNTS	PEN RES BLC 10 2 WATE (MC) ATTEF 20 4	NETRATION SISTANCE DWS/FT 0 30 40 H H ER CONTENT RBERG LL/PL 0 60 80	USCS GRAPHIC	USCS	MATERIAL D	ESCRIPTIO	N	REMARKS AND TESTS	BACKFILL/INSTALL.
655 65-	GS_1 0 C_13	100		F	-q		SM	Moist, orange-brown a with gravel and cobble gravel, fine to coarse sa fines, sensitive. Sensitive Saprolite w Springwater Formation One 4" diameter coble Minor sensitivity from	nd gray, Silty s (SM); fine to and, low plast rithin Less We n ble at 60.0 fee a 62.0 to 65.0	SAND o coarse icity eathered et.	GS_10: Oven Dried PI=2.0 (PL, LL = 34.0, 36.0).	
650 -0	GS_1 1 C_14	100 100		0			SM	Moist, orange, brown, with gravel and cobble gravel, fine to coarse sa fines, weakly to moder Less Weathered Sprin One 5+" diameter col	and gray, Silty s (SM); fine to and, low plast ately cement ngwater Forn bble at 67.5 fe	SAND Coarse icity ed. hation eet.		
	C_15	103					SM	Moist, gray-brown, Silt (SM); fine to coarse gra sand, low plasticity fine moderately cemented. Less Weathered Sprin	y SAND with g avel, fine to co es, weakly to ngwater Forn	gravel barse	1 E' diamotor	
640 640	GS_1 2 C_16	100 103		0			SM	Moist, gray-brown, Silt and boulders (SM); find to coarse sand, low pla moderately cemented. Less Weathered Sprin 1.5' diameter andesit to 79.0 feet; broken of	y SAND with g to coarse gra sticity fines, w ngwater Form the boulder from luring coring.	gravel avel, fine veakly to nation m 77.5	andesite boulder from 77.5 to 79 feet; broken during coring.	
											Borehole completed at 80 feet below ground surface (bgs).	
635 <u>85</u> -												
630												
DE	LV rgrour	nd	NOTES: Location and El Vertical Datum Coordinate Sys	levation Sou : Portland V tem: NAD 19	rrce: PWB Survey ertical 983 StatePlane Oi	5-13-202 regon No	21 orth FIP:	S 3601 Feet	Bor	ring F	F-SC-218 t 3 of 3	