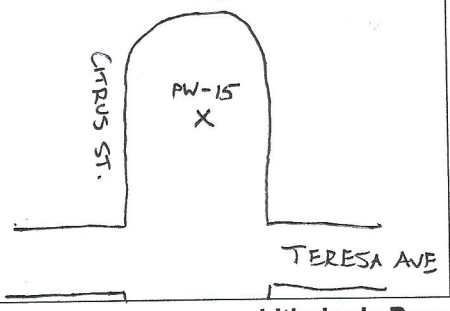
ENSAFE

Client: UTC
Project #: 19635
Purpose: PW-15 Install
Project: UTC RFF
Location: Colton, CA

Sketch of Boring Location



Location ID: PW-15
10/04/16 - 0720 Page 1 of 9
Start Date/Time:
End Date/Time:
548'
Total Depth:
Sample Method:
Drill Equip: Mud Rotary
Drilling Co.: Cascade
Geologist: R. Torres

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description, ASTM D 2488-06)
						ML	0	Air Knife Clearance from 0-10'
							1	
							2	
							3	
							4	
							5	Silt. Silt @ 100%. Trace gravel, fine. Damp. Soft. Dark yellowish brown (10YR 3/4)
							6	
							7	
							8	
							9	
						SW	10	Sand. Sand @ 90%, well graded. Gravel @ 10%, fine-coarse, sub round-sub angular. Damp. Loose. Dark yellowish brown (10YR 3/4)
							11	
							12	
							13	
							14	
							15	
							16	
							17	
							18	
							19	

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

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Location ID: PW-15
Start Date/Time: 10-04-16 / 0720
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End Date/Time:
Total Depth: 548'
Sample Method:
Drill Equip:
Drilling Co.: Cascade
Geologist: R. Torres

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))
						SW	20	Well graded sand. Sand @ 90%, Gravel @ 10%, fine-coarse, sub r. sub ang. Trace cobbles up to 8". Damp. Loose
							21	DK. yell br. (10YR 4/3)
							22	
							23	
							24	
							25	
							26	
							27	
							28	
							29	
							30	Well graded sand w/ gravel. Sand @ 80%. Gravel @ 20%, fine-coarse, sub r. sub ang. Trace cobbles up to 8". Damp. Loose,
							31	DK yell br. (10YR 4/3)
							32	
							33	
							34	
							35	
							36	
							37	
							38	
							39	

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

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Sketch of Boring Location

Location ID: PW-15

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Start Date/Time:

End Date/Time:

Total Depth: 548'

Sample Method:

Drill Equip:

Drilling Co.: Cascade

Geologist: R. Torres

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))
						SW	40	Well-graded sand w/ gravel. Sand @ 75%, fine-coarse. Gravel @ 15%, fine-coarse.
							41	
							42	
							43	
							44	
							45	
							46	
							47	
							48	
							49	
							50	Well-graded sand. Sand @ 95%, fine-coarse. Gravel @ 5%, fine coarse. DK. grayish br. (4/2)(2.5Y)
							51	
							52	
							53	
							54	
							55	
							56	
							57	
							58	
							59	

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

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Location: Colton, CA

Sketch of Boring Location

Location ID: PW-15

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Start Date/Time:

End Date/Time:

548' Total Depth:

Sample Method:

Drill Equip:

Drilling Co.: Cascade

Geologist: R. Torres

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description, ASTM D 2488-06)
						SW	60	Well-graded sand w/ gravel. Sand @ 60%, fine-coarse. Gravel @ 35%, fine-coarse, mostly angular → some cobbles probably. Gravel has red, orange, black, & white color. Silt @ 5%. DK. grayish br. (2.5Y 4/2)
							61	
							62	
							63	
							64	
							65	
							66	
							67	
							68	
							69	
						GW-GM	70	Well-graded gravel w/ silt & sand. Gravel @ 50%, fine-coarse, sub angular (some cobbles probably). Sand @ 35%, fine-coarse. Silt @ 15%. DK. grayish br. (2.5Y 5/2)
							71	
							72	
							73	
							74	
							75	
							76	
							77	
							78	
							79	

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

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Location: Colton, CA

Sketch of Boring Location

Location ID: PW-15

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Start Date/Time:

End Date/Time:

Total Depth: 548'

Sample Method:

Drill Equip:

Drilling Co.: Cascade

Geologist: R. Torres

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description, ASTM D 2488-06)
						SW-SM	0	80' Well-graded sand w/ silt & gravel. Sand @ 55%, fine-coarse. Gravel @ 30%, sub r. sub angular, Silt @ 15%. DK. grayish br. (2.5Y 4/2).
						GW-GM	2	90' Well-graded gravel w/ silt & sand. Gravel @ 75%, fine-coarse, angular, likely drilling through cobbles. Sand @ 15%, fine-coarse. Silt @ 10%. Gravel has ~~red~~ brown, ~~orange~~, tan, black, white, red, & orange color. DK. gr. br. (2.5Y 4/2)
							5	100' SAA. Increase in size of gravel/rock pieces.
							6	110' SAA. Decrease in size of gravel fragments
				10-06-16		GW-GM	8	120' Increase in sand to 20%. Gravel to 70%.
				10-07-16		GW	9	130' Well-graded gravel. Gravel @ 100%, fine-coarse, angular. Likely drilling through cobbles. Gravel has gray, white, black, red, & orange color.
							1	135' Well-graded gravel w/ sand. Gravel @ 55%, fine-coarse, sub angular to angular. Sand @ 45%, fine-coarse. Olive br. (2.5Y 4/3)
						CL	4	140' Gravelly lean clay. Clay @ 60%. Gravel @ 35%, fine-coarse, sub angular to angular. Sand @ 5%, coarse. Olive br. (2.5Y 4/3)
						SW	6	150' Well-graded sand w/ gravel. Sand @ 85%, fine-coarse. Gravel @ 15%, fine, sub r. sub ang. Olive br. (2.5Y 4/3)
						GW	8	160' Well graded gravel w/ sand. Gravel @ 80%, fine-coarse, sub angular to angular. Gravel has gray, black, white, red, & orange color. Sand @ 20%, fine-coarse. Olive br. (2.5Y 4/3)

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

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Project:

Location: Colton, CA

Sketch of Boring Location

Location ID: PW-15

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Start Date/Time:

End Date/Time:

Total Depth: 548'

Sample Method:

Drill Equip:

Drilling Co.: Cascade

Geologist: R. Torres

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description, ASTM D 2488-06)
						SW	0	170' Well graded sand with gravel. ~40% coarse sand. ~20% fine sand. ~40% fine gravel. Trace coarse gravel. Gravel is sub round, sub ang. Olive br. (2.5Y 4/3)
							1	
							2	180' Well graded sand. ~~w/ gravel~~. ~55% coarse sand. ~35% fine sand. Gravel @ 10%, fine, sub r. sub ang. Olive br. (2.5Y 4/3)
							3	
							4	
						SP	5	190' Poorly graded sand. Coarse sand @ 90%. Fine gravel @ 10%, sub angular. Olive br. (2.5Y 4/3)
							6	
						GP	7	200' Poorly graded gravel. Gravel @ 90%, fine, sub angular to angular. Fine-coarse sand @ 10%. Gravel has black, white, brown, gray, and orange color.
							8	
							9	
						SW	0	210' Well-graded sand w/ gravel. Coarse sand @ 55%. Fine sand @ 30%. Gravel @ 15%, fine-coarse, sub r. sub angular. Olive br. (2.5Y 4/3)
							1	
				10-7-16			2	220' ~~Fine~~ SAA. Coarse sand to 40%. ~~Fine~~ gravel to 30%, fine-coarse.
							3	
				10-10-16			4	230' Well graded sand w/ gravel. Coarse sand @ 45%. Fine sand @ 30%. Fine gravel @ 25%, sub r. sub angular. Olive br. (2.5Y 4/3)
							5	
							6	240' SAA. Coarse sand to 55%. Fine sand to 20%. Trace silt.
							7	
							8	250' SAA. Coarse sand to 45%. Fine sand to 30%.
							9	260' SAA. Coarse sand to 55%. Fine sand to 20%. Driller thinks some cobbles are here.

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

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Project:

Location: Colton, CA

Sketch of Boring Location

Location ID: PW-15

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Start Date/Time:

End Date/Time:

Total Depth: 548'

Sample Method:

Drill Equip:

Drilling Co.: Cascade

Geologist: R. Torres

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description, ASTM D 2488-06)
						SW	0	270' Well graded sand. Coarse sand @ 60%. Fine sand @ 30%. Fine gravel, sub ang to angular @ 5%. Silt @ 5%. Olive br. (2.5Y 4/3)
							1	
							2	
				10-10-16				280' SAA
							3	
				10-11-16				290' Well-graded sand w/ gravel. Coarse sand @ 50%. Fine sand @ 25%. Gravel, fine, angular @ 25%. Likely drilling through cobbles. Gravel is black, gray, white, brown, and red. Olive br. (2.5Y 4/3).
							4	
							5	
							6	300' Well graded sand. Coarse sand @ 60%. Fine sand @ 30%. Gravel @ 5%, fine, sub angular. Silt @ 5%. Olive br. (2.5Y 4/3)
							7	
							8	
							9	310' SAA. Coarse sand to 50%. Fine sand to 40%. Gravel is angular.
							0	320' SAA. Coarse sand to 60%. Fine sand to 30%. Drilling is tough. Angular gravel/sand is possibly from large cobbles.
							1	
							2	
							3	330' SAA
							4	
				10-11-16				340' SAA
							5	
				10-12-16		SM	6	350' Silty sand. Coarse sand @ 40%. Fine sand @ 30%. Silt @ 30%. Trace fine gravel. Light ol. br (2.5Y 5/3) ~0.3 ft/min
							7	
							8	360' Silty sand. Coarse sand @ 55%. Fine sand @ 30%. Silt @ 15%. Light ol. br. (2.5Y 5/3). ~ 0.25 ft/min
							9	

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

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Location: Colton, CA

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Location ID: PW-15

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Start Date/Time:
End Date/Time:
Total Depth: 548'
Sample Method:
Drill Equip:
Drilling Co.: Cascade
Geologist: R. Torres

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description, ASTM D 2488-06)
						SW	0	370' Well graded sand. Coarse sand @ 50%. Fine sand @ 50%. Trace fine gravel. Coarse sand has black, gray, white, & orange color. Trace silt. Light ol. br. (2.5Y 5/3) ~0.25 ft/min
							1	
							2	380' SAA. ~0.22 ft/min
							3	
							4	390' SAA. ~0.2 ft/min
							5	
						SP	6	400' Poorly graded sand. Medium sand @ 50%. Fine sand @ 50%. Trace coarse sand. Light ol. br. (2.5Y 5/3) ~0.15 ft/min
							7	
							8	410' SAA ~0.15 ft/min
				10-12-16		SW	9	420' Well graded sand. Coarse sand @ 10%. Medium sand @ 45%. Fine sand @ 40%. Silt @ 10%. Trace fine gravel. Ol. br. (2.5Y ~~5/4~~ 4/3). ~0.15 ft/min
							0	
							1	
				10-13-16		SW-SM	2	430' Well graded sand with silt. Med/Coarse sand @ 45%. Fine sand @ 35%. Silt @ 10%. Gravel, fine, angular at 10%. Ol. br. (2.5Y 4/3)
							3	
							4	
						SW	5	440' Well graded sand with gravel. Med/Coarse sand @ 45% Fine sand @ 30%. Gravel, fine, sub ang. to ang @ 25%. Ol. br. (2.5Y 4/3) ~0.3 ft/min
							6	
							7	450' Well graded sand. Med/Coarse sand @ 50%. Fine sand @ 45%. Gravel, fine, sub ang. to ang @ 5%. Ol. br. (2.5Y 4/3) ~0.25 ft/min
							8	
							9	

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

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Total Depth: 548'
Sample Method:
Drill Equip:
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Geologist: R. Torres

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))
						SW	0	460' Well graded sand. Med/Coarse sand @ 45%. Fine sand @ 50%. Silt @ 5%. Trace fine gravel, angular. Tough drilling. Ol. br. (2.5Y 4/3). ~0.14 ft/min
							1	
							2	
							3	470' Well graded sand. Med/Coarse sand @ 30%. Fine sand @ 65%. Fine gravel, sub angular to angular @ 5%. Light ol br. (2.5y 5/3). ~0.22 ft/min
							4	
							5	480' Well graded sand. Med/Coarse sand @ 35%. Fine sand @ 60%. Fine gravel, sub ang. to ang. @ 5%. Light ol. br. (2.5Y 5/3). ~0.25 ft/min
							6	
							7	490' SAA. ~0.3 ft/min
							8	
				10-13-16			9	500' Well graded sand. Med/Coarse sand @ 30%. Fine sand @ 70%. Light ol br. (2.5Y 5/3). ~0.25 ft/min
							0	
				10-14-16			1	510' Well graded sand. Med/Coarse sand @ 40%. Fine sand @ 60%. Light ol br. (2.5Y 5/3). ~0.25 ft/min
							2	
						CL	3	520' Lean clay with sand. Lean clay @ 70%. Sand @ 15%, fine-coarse. Silt @ 5%. Fine gravel @ 10%, angular. Light ol. br. (2.5Y 5/3). ~0.25 ft/min
							4	
							5	530' Lean clay w/ sand. Lean clay @ 80%. Sand @ 10%, fine-coarse. Silt @ 5%. Gravel @ 5%, fine, angular - sub ang. Light ol. br. (2.5Y 5/3). ~0.4 ft/min
							6	
							7	
							8	540' Lean clay. Lean clay @ 90%. Fine sand @ 10%. Trace silt. Light ol. br. (2.5Y 5/3). ~0.4 ft/min
							9	548' SAA

T.D. = 548' bgs

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			