



# Boring Log

Sheet: 1 of 8

Date Started: 03/31/2022 Surface Elevation: 504.57 ft amsl  
Date Completed: 04/20/2022 Northing (NAD83): 2101089.85  
Drilling Co.: ABC LIOVIN Easting (NAD83): 7616510.53 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 143.1 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Terra Sonic Truck Mount Borehole Diameter: 10-12 inches Location: PG&E Topock, Needles California  
Driller Name: Eddie Ramos Depth to First Water: 80.5 ft bgs  
Drilling Asst: J. Candelaria / F. Perez Sampling Method: 7 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: Grant Willford Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☒ Yes ☐ No

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid				
1	4.5	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SM	<div><div></div><div></div><div></div></div>	(0-2 ft) Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine to coarse, angular to subround; little silt; little granules, angular to subround; little small cobbles, angular to subround; little small to very large pebbles, angular to subround; trace clay; poorly sorted; dry.	(0.0 - 4.5') Air-knifed for utility clearance refusal at approximately 4.5 ft bgs due to encountering bedrock. Logged from air-knife cuttings.	(0.0 - 4.5') No drilling fluid used				
2				Alluvium Deposits	SM	<div><div></div><div></div><div></div></div>	(2-4.5 ft) Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine to very coarse, angular to subround; little small to very large pebbles, angular to subround; little small to large cobbles, angular to subround; little silt; little granules, angular to subround; trace clay; poorly sorted; dry; coarser grained composed of mixed lithology.						
3													
4													
5	0						NR	<div><div></div><div></div><div></div></div>	(4.5-7 ft) No Recovery.	(4.5 - 20.0') Advancing 12 inch conductor casing 4.5-20 ft bgs (5.0 - 7.0') Core fell out of core barrel into hopper. (7.0 - 15.0') Rough drilling	(4.5 - 20.0') 600 gallons of water used; 500 gallons of water recovered; 100 gallons of water lost		
6													
7													
8	8					Weathered Bedrock - conglomerate	N/A	<div><div></div><div></div><div></div></div>	(7-36 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; highly weathered; hard; massive; some competent rock fragments observed, 1-2.5 inches in length; moderately to highly friable; dry; NOTE: Core sample appeared mostly pulverized drilling process.				
9				<div><div></div><div></div><div></div></div>									
10				<div><div></div><div></div><div></div></div>									
11				<div><div></div><div></div><div></div></div>									
12				<div><div></div><div></div><div></div></div>									
13				<div><div></div><div></div><div></div></div>									
14				<div><div></div><div></div><div></div></div>									
15				<div><div></div><div></div><div></div></div>									
16	2							<div><div></div><div></div><div></div></div>		(15.0 - 17.0') Rough drilling			
17								<div><div></div><div></div><div></div></div>					
18	5							<div><div></div><div></div><div></div></div>		(17.0 - 22.0') Very rough drilling			
19								<div><div></div><div></div><div></div></div>					
20								<div><div></div><div></div><div></div></div>					

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during development, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Date Started:	03/31/2022	Surface Elevation:	504.57 ft amsl	Boring No.: <u>ER-1</u>
Date Completed:	04/20/2022	Northing (NAD83):	2101089.85	
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616510.53	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	143.1 ft bgs	Project: Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Borehole Diameter:	10-12 inches	Location: PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	80.5 ft bgs	
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	7 inch x 10 ft. Core Barrel	Project Number: 30126255
Logger:	Grant Willford	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	5					X X X X	(7-36 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; highly weathered; hard; massive; some competent rock fragments observed, 1-2.5 inches in length; moderately to highly friable; dry; NOTE: Core sample appeared mostly pulverized drilling process.		
22						X X X X	(22 ft) Observed some competent rock fragments within the mostly friable conglomerate.	(22.0 - 27.0') Very rough drilling	(22.0 - 27.0') No drilling fluid used
23						X X X X			
24						X X X X			
25	5					X X X X			
26						X X X X			
27						X X X X			
28				Weathered Bedrock - conglomerate	N/A	X X X X		(27.0 - 32.0') Rough drilling	(27.0 - 32.0') No drilling fluid used
29						X X X X			
30	5	No Sieve Samples Collected	No Groundwater Samples Collected			X X X X			
31						X X X X		(30.0') 10-inch diameter drill casing became locked up. Advanced 12-inch diameter conductor casing to free the 10-inch drill casing.	(30.0') No drilling fluid used
32						X X X X			
33						X X X X			(32.0 - 36.0') No drilling fluid used
34						X X X X			
35	5					X X X X		(32.0 - 36.0') Rough drilling	
36						X X X X			
37				Competent Bedrock - conglomerate	N/A	X X X X	(36-57 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; massive; some competent rock fragments observed, 1 to 3 inches in length; less friable and more difficult to break; some friable rock fragments within the competent rock observed; dry; NOTE: Core sample appeared mostly pulverized drilling process.	(36.0 - 37.0') Very rough drilling; drill rate slowed significantly.	(36.0 - 37.0') No drilling fluid used
38						X X X X		(37.0 - 42.0') Drilling conditions changed from rough to normal at discrete depths	(37.0 - 42.0') No drilling fluid used
39	5					X X X X			
40						X X X X			

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# Boring Log

Sheet: 4 of 8

Date Started: 03/31/2022 Surface Elevation: 504.57 ft amsl  
Date Completed: 04/20/2022 Northing (NAD83): 2101089.85  
Drilling Co.: ABC LIOVIN Easting (NAD83): 7616510.53 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 143.1 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Terra Sonic Truck Mount Borehole Diameter: 10-12 inches Location: PG&E Topock, Needles California  
Driller Name: Eddie Ramos Depth to First Water: 80.5 ft bgs  
Drilling Asst: J. Candelaria / F. Perez Sampling Method: 7 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: Grant Willford Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☒ Yes ☐ No

**Boring No.: ER-1**

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	5	ER-1-SS-47-67 4/5/2022 11:38		Weathered Bedrock - conglomerate	N/A	x x x x	(57-74 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; highly weathered; hard; massive; some competent rock fragments observed, 1-2.5 inches in length; moderately to highly friable; dry; NOTE: Core sample appeared mostly pulverized drilling process.	(62.0 - 67.0') Smooth drilling	(62.0 - 67.0') No drilling fluid used
62						x x x x			
63						x x x x			
64	5					x x x x			
65		ER-1-SS-67-87 4/5/2022 12:05	No Groundwater Samples Collected	Weathered Bedrock - conglomerate	N/A	x x x x	(74-81 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; massive; some competent rock fragments observed, 1-3 inches in length; difficult to break; some friable rock fragments within the competent rock observed; dry; NOTE: Core sample appeared mostly pulverized drilling process.	(67.0 - 74.0') Smooth drilling	(67.0 - 74.0') No drilling fluid used
66						x x x x			
67						x x x x			
68						x x x x			
69						x x x x			
70	7					x x x x			
71						x x x x			
72						x x x x			
73						x x x x			
74						x x x x			
75	3	ER-1-SS-67-87 4/5/2022 12:05	No Groundwater Samples Collected	Competent Bedrock - conglomerate	N/A	x x x x	(74-81 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; massive; some competent rock fragments observed, 1-3 inches in length; difficult to break; some friable rock fragments within the competent rock observed; dry; NOTE: Core sample appeared mostly pulverized drilling process.	(74.0 - 77.0') Rough drilling	(74.0 - 77.0') No drilling fluid used
76						x x x x			
77						x x x x			
78						x x x x			
79	5					x x x x			
80						x x x x			

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# Boring Log

Sheet: 5 of 8

Date Started: 03/31/2022 Surface Elevation: 504.57 ft amsl  
Date Completed: 04/20/2022 Northing (NAD83): 2101089.85  
Drilling Co.: ABC LIOVIN Easting (NAD83): 7616510.53 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 143.1 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Terra Sonic Truck Mount Borehole Diameter: 10-12 inches Location: PG&E Topock, Needles California  
Driller Name: Eddie Ramos Depth to First Water: 80.5 ft bgs  
Drilling Asst: J. Candelaria / F. Perez Sampling Method: 7 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: Grant Willford Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☒ Yes ☐ No

Boring No.: ER-1

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid	
81	5	ER-1-SS-67-87 4/5/2022 12:05		Competent Bedrock - conglomerate	N/A	x x x x	(80.5 ft) Rock fragments are moist.			
82				Competent Bedrock - conglomerate	N/A	x x x x	(81-82.5 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; fresh; hard; massive; dry; NOTE: Solid rock core.			
83	5									(82.5-97 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; massive; some competent rock fragments observed, 1-3 inches in length, difficult to break; some friable rock fragments within the competent rock observed; dry; NOTE: Core appeared sample mostly pulverized drilling process.
84										
85										
86	5	ER-1-SS-87-97 4/5/2022 12:58	No Groundwater Samples Collected	Competent Bedrock - conglomerate	N/A		(92-97 ft) Conglomerate becoming more competent, increase in the size of the rock fragments 2-4 inches.			
87										
88										
89										
90										
91	5									
92										
93										
94										
95										
96	2.5	No Sieve Samples Collected			NR		(97-99.5 ft) No Recovery. NOTE: See drilling notes.			
97										
98										
99										
100										
					N/A	x x x x				

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# Boring Log

Sheet: 6 of 8

Date Started:	03/31/2022	Surface Elevation:	504.57 ft amsl	<b>Boring No.: ER-1</b>	
Date Completed:	04/20/2022	Northing (NAD83):	2101089.85		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616510.53	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	143.1 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	80.5 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	7 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	2.5					x x x x	(99.5-143.1 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; massive; some competent rock fragments observed, 1-3 inches in length; difficult to break; some friable rock fragments within the competent rock observed; rock fragments moist to dry; NOTE: Core sample appeared mostly pulverized drilling process.		
102						x x x x			
103						x x x x			
104						x x x x			
105	3.5					x x x x			
106						x x x x			
107						x x x x			
108						x x x x			
109						x x x x			
110	3.5	No Sieve Samples Collected	No Groundwater Samples Collected	Competent Bedrock - conglomerate	N/A	x x x x			
111						x x x x			
112						x x x x			
113						x x x x			
114						x x x x			
115	4					x x x x			
116						x x x x			
117						x x x x			
118						x x x x			
119	5					x x x x			
120						x x x x			

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TOPOCK SOIL BORING LOG \\ARCADIS0655\SHAREPOINT\COM\SS\DA\WWWROOT\TEAMS\PG&E\TOPOCK\CONSTRUCTION\SHARED DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\09 2022-10-13\GINT PROJECT\GPJ GINT DATA TEMPLATE.GDT 10/13/22



# Boring Log

Sheet: 7 of 8

Date Started:	03/31/2022	Surface Elevation:	504.57 ft amsl	Boring No.: <b>ER-1</b>	
Date Completed:	04/20/2022	Northing (NAD83):	2101089.85		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616510.53	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	143.1 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	80.5 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	7 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	5					x x x x	(99.5-143.1 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; massive; some competent rock fragments observed, 1-3 inches in length; difficult to break; some friable rock fragments within the competent rock observed; rock fragments moist to dry; NOTE: Core sample appeared mostly pulverized drilling process.		
122						x x x x		(122.0 - 127.0') Very rough drilling	(122.0 - 127.0') No drilling fluid used
123						x x x x			
124						x x x x			
125	5					x x x x			
126						x x x x			
127						x x x x			
128						x x x x		(127.0 - 137.0') Normal drilling; rough drilling in discrete intervals.	(127.0 - 137.0') No drilling fluid used
129						x x x x			
130	5	No Sieve Samples Collected	No Groundwater Samples Collected	Competent Bedrock - conglomerate	N/A	x x x x			
131						x x x x			
132						x x x x			
133						x x x x			
134						x x x x			
135	5					x x x x			
136						x x x x			
137						x x x x			
138						x x x x		(137.0 - 143.0') Very rough drilling	(137.0 - 143.0') No drilling fluid used
139	6					x x x x			
140						x x x x			

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TOPOCK SOIL BORING LOG \\ARCADIS0865\SHAREPOINT\COM\SS\DA\WWWROOT\TEAMS\PG&E\TOPOCK\CONSTRUCTION\SHARED DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\09 2022-10-13\GINT PROJECT\GPJ GINT DATA TEMPLATE.GDT 10/13/22





# Boring Log

Sheet: 8 of 8

Date Started:	03/31/2022	Surface Elevation:	504.57 ft amsl	<b>Boring No.: ER-1</b>	
Date Completed:	04/20/2022	Northing (NAD83):	2101089.85		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616510.53	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	143.1 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	80.5 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	7 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141	6	No Sieve Samples Collected	No Groundwater Samples Collected	Competent Bedrock - conglomerate	N/A	x x	(99.5-143.1 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; massive; some competent rock fragments observed, 1-3 inches in length; difficult to break; some friable rock fragments within the competent rock observed; rock fragments moist to dry; NOTE: Core sample appeared mostly pulverized drilling process.		
142									
143									
144							End of Boring at 143.1 ft bgs.		
145									
146									
147									
148									
149									
150									
151									
152									
153									
154									
155									
156									
157									
158									
159									
160									

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TOPOCK SOIL BORING LOG \ARCADIS\065 SHAREPOINT.COM\SS\DA\WWWROOT\TEAMS\PG&E\TOPOCK\CONSTRUCTION\SHARED DOCUMENTS\PHASE II DRILLING\06 FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\99 2022-10-13\GINT PROJECT\GPI GINT DATA TEMPLATE.GDT 10/13/22





# Well Construction Log

Sheet: 1 of 8

Date Started:	04/20/2022	Surface Elevation:	504.57 ft amsl	Well ID: ER-1
Date Completed:	05/10/2022	Shallow Well Elevation:	503.83 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101089.85	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616510.53	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	10-12 inches	
Logger:	Grant Willford	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/1/2022	
Total Depth:	143.1 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
1		Alluvium Deposits	SM		(0.0 - 1.0') Temporary Surface Completion		(0.0 - 1.0') 7 bags Note: 2.5 x 2.5 ft. concrete pad with 18 inch diameter lockable vault, High Sped 4,500 PSI Concrete.
2					(1.0 - 2.0') Cemex #2/16 (16x30) Lapis Lustre Sand		Note: Cemex #2/16 Lapis Lustre Sand extended into skirt of vault.
3		Alluvium Deposits	SM		(0.7 - 45.3') 6" Sch. 80 PVC Casing		
4					(2.0 - 5.7') Native Material		Note: Native material used to back fill was from the SPY.
5							
6			NR				
7							
8							
9							
10	No Groundwater Samples Collected						
11							
12							
13							
14		Weathered Bedrock - conglomerate	N/A		(5.7 - 39.0') Portland Cement 5% Bentonite Type I, II, and V with Hydrogel	(5.7 - 39.0') 116.1 Gallons	(5.7 - 39.0') 150 Gallons (129%) Note: Used >20% of the calculated volume due to potential voids that formed during drilling.
15							
16							
17							
18							
19							
20							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured post development and approximate static measured during drilling, respectively.

TOPOCK WELL COMPLETION DETAILS IARCADIS030366.SHAPEPOINT.COM@SSLIDAVWWWROOTITEAMSPGETOPOCKCONSTRUCTIONSHARED DOCUMENTS\PHASE II DRILLING\06 FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\39 2022-10-13\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 10/13/22



# Well Construction Log

Sheet: 2 of 8

Date Started:	04/20/2022	Surface Elevation:	504.57 ft amsl	Well ID: ER-1
Date Completed:	05/10/2022	Shallow Well Elevation:	503.83 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101089.85	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616510.53	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	10-12 inches	
Logger:	Grant Willford	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/1/2022	
Total Depth:	143.1 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
21	No Groundwater Samples Collected	Weathered Bedrock - conglomerate	N/A	xxxxxx	(0.7 - 45.3') 6" Sch. 80 PVC Casing	(5.7 - 39.0') 116.1 Gallons	(5.7 - 39.0') 150 Gallons (129%) Note: Used >20% of the calculated volume due to potential voids that formed during drilling.
22							
23							
24							
25					(24.5 - 25.5') SS Centralizer		
26							
27							
28							
29							
30					(5.7 - 39.0') Portland Cement 5% Bentonite Type I, II, and V with Hydrogel		
31							
32							
33							
34							
35							
36							
37							
38		Competent Bedrock - conglomerate	N/A	xxxxxx			
39							
40						(39.0 - 43.4') 3.5 bags	(39.0 - 43.4') 3 bags (86%)

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured post development and approximate static measured during drilling, respectively.

TOPOCK WELL COMPLETION DETAILS I\ARCADIS\B030366.SHAREPOINT.COM\SS\DATA\WWWROOT\TEAMSPGETOPOCKCONSTRUCTION\PHASE II\DRILLING\06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\39 2022-10-13\GINT PROJECT GPJ GINT DATA TEMPLATE.GDT 10/13/22



# Well Construction Log

Sheet: 3 of 8

Date Started:	04/20/2022	Surface Elevation:	504.57 ft amsl	Well ID: ER-1
Date Completed:	05/10/2022	Shallow Well Elevation:	503.83 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101089.85	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616510.53	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	10-12 inches	
Logger:	Grant Willford	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/1/2022	
Total Depth:	143.1 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
41	No Groundwater Samples Collected	Competent Bedrock - conglomerate	N/A	XXXXXX	(0.7 - 45.3') 6" Sch. 80 PVC Casing (40.5 - 41.5') SS Centralizer (39.0 - 43.4') Cemex #0/30 (30x50) Lapis Lustre Sand	(39.0 - 43.4') 3.5 bags	(39.0 - 43.4') 3 bags (86%)
42							
43							
44					(43.4 - 44.0') Enviroplug Medium Chips	(43.4 - 44.0') 0.3 bags	(43.4 - 44.0') 0.5 bags (167%) Note: Hydrated bentonite with approximately 5 gallons of fresh water. Used >20% of the calculated volume due to potential voids that formed during drilling.
45							
46					(45.3 - 136.2') 6" 0.02-Slot 316L SS Wire Wrap Screen		
47							
48							
49							
50							
51	No Groundwater Samples Collected	Weathered Bedrock - conglomerate	N/A	XXXXXX	(44.0 - 143.1') Cemex #2/16 (16x30) Lapis Lustre Sand	(44.0 - 143.1') 79.9 bags	(44.0 - 143.1') 85.5 bags (107%) Note: Filter pack swabbed for approximately 5 minutes in 20 ft. lifts for a total of approximately 20 minutes prior to the installation of the well seal.
52							
53							
54							
55							
56							
57							
58							
59							
60							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured post development and approximate static measured during drilling, respectively.



# Well Construction Log

Sheet: 4 of 8

Date Started:	04/20/2022	Surface Elevation:	504.57 ft amsl	Well ID: ER-1
Date Completed:	05/10/2022	Shallow Well Elevation:	503.83 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101089.85	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616510.53	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	10-12 inches	
Logger:	Grant Willford	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/1/2022	
Total Depth:	143.1 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
61	No Groundwater Samples Collected	Weathered Bedrock - conglomerate	N/A	xxxxxx	(45.3 - 136.2') 6" 0.02-Slot 316L SS Wire Wrap Screen	(44.0 - 143.1') 79.9 bags	(44.0 - 143.1') 85.5 bags (107%) Note: Filter pack swabbed for approximately 5 minutes in 20 ft. lifts for a total of approximately 20 minutes prior to the installation of the well seal.
62				xxxxxx			
63				xxxxxx			
64				xxxxxx			
65				xxxxxx			
66				xxxxxx			
67				xxxxxx			
68				xxxxxx			
69				xxxxxx			
70				xxxxxx	(44.0 - 143.1') Cemex #2/16 (16x30) Lapis Lustre Sand		
71		Competent Bedrock - conglomerate	N/A	xxxxxx			
72				xxxxxx			
73				xxxxxx			
74				xxxxxx			
75				xxxxxx			
76				xxxxxx			
77				xxxxxx			
78				xxxxxx			
79				xxxxxx			
80				xxxxxx			

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured post development and approximate static measured during drilling, respectively.

TOPOCK WELL COMPLETION DETAILS | ARCADIS | 05/10/2022 | 10:13:22 | GINT DATA TEMPLATE.GDT | 10/13/22



# Well Construction Log

Sheet: 5 of 8

Date Started:	04/20/2022	Surface Elevation:	504.57 ft amsl	Well ID: ER-1
Date Completed:	05/10/2022	Shallow Well Elevation:	503.83 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101089.85	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616510.53	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	10-12 inches	
Logger:	Grant Willford	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/1/2022	
Total Depth:	143.1 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
81		Competent Bedrock - conglomerate	N/A	xxxxx	(45.3 - 136.2') 6" 0.02-Slot 316L SS Wire Wrap Screen		
82		Competent Bedrock - conglomerate	N/A	xxxxx			
83				xxxxx			
84				xxxxx			
85				xxxxx			
86				xxxxx			
87				xxxxx			
88				xxxxx			
89				xxxxx			
90	No Groundwater Samples Collected	Competent Bedrock - conglomerate	N/A	xxxxx	(44.0 - 143.1') Cemex #2/16 (16x30) Lapis Lustre Sand	(44.0 - 143.1') 79.9 bags	(44.0 - 143.1') 85.5 bags (107%) Note: Filter pack swabbed for approximately 5 minutes in 20 ft. lifts for a total of approximately 20 minutes prior to the installation of the well seal.
91				xxxxx			
92				xxxxx			
93				xxxxx			
94				xxxxx			
95				xxxxx			
96				xxxxx			
97				xxxxx			
98			NR	xxxxx			
99				xxxxx			
100			N/A	xxxxx			

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured post development and approximate static measured during drilling, respectively.

TOPOCK WELL COMPLETION DETAILS IARCADIS030366.SHAPEPOINT.COM@SSLIDAVWWWROOTITEAMSPGETOPOCKCONSTRUCTIONSHARED DOCUMENTS\PHASE II DRILLING\06 FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\39 2022-10-13\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 10/13/22



# Well Construction Log

Sheet: 6 of 8

Date Started:	04/20/2022	Surface Elevation:	504.57 ft amsl	Well ID: ER-1
Date Completed:	05/10/2022	Shallow Well Elevation:	503.83 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101089.85	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616510.53	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	10-12 inches	
Logger:	Grant Willford	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/1/2022	
Total Depth:	143.1 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
101				x x x x x	(45.3 - 136.2') 6" 0.02-Slot 316L SS Wire Wrap Screen		
102				x x x x x			
103				x x x x x			
104				x x x x x			
105				x x x x x			
106				x x x x x			
107				x x x x x			
108				x x x x x			
109				x x x x x			
110	No Groundwater Samples Collected	Competent Bedrock - conglomerate	N/A	x x x x x	(44.0 - 143.1') Cemex #2/16 (16x30) Lapis Lustre Sand	(44.0 - 143.1') 79.9 bags	(44.0 - 143.1') 85.5 bags (107%) Note: Filter pack swabbed for approximately 5 minutes in 20 ft. lifts for a total of approximately 20 minutes prior to the installation of the well seal.
111				x x x x x			
112				x x x x x			
113				x x x x x			
114				x x x x x			
115				x x x x x			
116				x x x x x			
117				x x x x x			
118				x x x x x			
119				x x x x x			
120				x x x x x			

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured post development and approximate static measured during drilling, respectively.

TOPOCK WELL COMPLETION DETAILS | ARCADIS030368.SHAREPOINT.COM@SSLIDAVWWWROOTITEAMSPGETPOCKCONSTRUCTIONSHARED DOCUMENTS\PHASE II DRILLING\06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\39 2022-10-13\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 10/13/22





# Well Construction Log

Sheet: 7 of 8

Date Started:	04/20/2022	Surface Elevation:	504.57 ft amsl	Well ID: ER-1
Date Completed:	05/10/2022	Shallow Well Elevation:	503.83 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101089.85	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616510.53	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	10-12 inches	
Logger:	Grant Willford	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/1/2022	
Total Depth:	143.1 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
121	No Groundwater Samples Collected	Competent Bedrock - conglomerate	N/A	xxxxxx	(45.3 - 136.2') 6" 0.02-Slot 316L SS Wire Wrap Screen	(44.0 - 143.1') 79.9 bags	(44.0 - 143.1') 85.5 bags (107%) Note: Filter pack swabbed for approximately 5 minutes in 20 ft. lifts for a total of approximately 20 minutes prior to the installation of the well seal.
122				xxxxxx			
123				xxxxxx			
124				xxxxxx			
125				xxxxxx			
126				xxxxxx			
127				xxxxxx			
128				xxxxxx			
129				xxxxxx			
130				xxxxxx	(44.0 - 143.1') Cemex #2/16 (16x30) Lapis Lustre Sand		
131				xxxxxx			
132				xxxxxx			
133				xxxxxx			
134				xxxxxx			
135				xxxxxx			
136				xxxxxx			
137				xxxxxx			
138				xxxxxx	(136.2 - 141.6') 6" Sch 40 PVC Sump and SS End Cap		
139				xxxxxx	(138.0 - 139.0') SS Centralizer		
140				xxxxxx			

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured post development and approximate static measured during drilling, respectively.

TOPOCK WELL COMPLETION DETAILS | ARCADIS | 30126255 | 05/10/2022 | 10:13Z | GINT DATA TEMPLATE.GDT | 10/13/22





# Well Construction Log

Sheet: 8 of 8

Date Started:	04/20/2022	Surface Elevation:	504.57 ft amsl	Well ID: ER-1
Date Completed:	05/10/2022	Shallow Well Elevation:	503.83 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101089.85	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616510.53	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	10-12 inches	
Logger:	Grant Willford	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/1/2022	
Total Depth:	143.1 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details			Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
141	No Groundwater Samples Collected	Competent Bedrock - conglomerate	N/A	xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx	<div><div>(44.0 - 143.1') Cemex #2/16 (16x30) Lapis Lustre Sand</div></div>	<div><div></div><div></div></div>	(136.2 - 141.6') 6" Sch 40 PVC Sump and SS End Cap	(44.0 - 143.1') 79.9 bags	(44.0 - 143.1') 85.5 bags (107%) Note: Filter pack swabbed for approximately 5 minutes in 20 ft. lifts for a total of approximately 20 minutes prior to the installation of the well seal.
142									
143									
144	<div>Draft 10/12/22</div>								
145									
146									
147									
148									
149									
150									
151									
152									
153									
154									
155									
156									
157									
158									
159									
160									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured post development and approximate static measured during drilling, respectively.

TOPOCK WELL COMPLETION DETAILS | ARCADIS030366.SHAREPOINT.COM@SSLIDAVWWWROOTITEAMSPGETOPOCKCONSTRUCTIONSHARED DOCUMENTS\PHASE II DRILLING06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\09 2022-10-13\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 10/13/22



# Boring Log

Sheet: 1 of 8

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl	<b>Boring No.: ER-2</b>	
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1				Fill	SM		(0-1.5 ft) Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine to very coarse grained, angular to subround; little silt; little small to very large pebbles, angular to subangular; little granules, angular to subangular; trace small cobbles, angular; trace clay; dry.		
2									
3									
4									
5	5.5			Weathered Bedrock - Conglomerate	N/A		(1.5-7 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; some competent rock fragments observed, 1-4 inches in length; most fragments are weak and friable; dry; NOTE: Core sample mostly pulverized by drilling process.		
6									
7									
8									
9									
10	5	No Sieve Samples Collected	No Groundwater Samples Collected				(7-22 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.	(7.0 - 50.0') Rough drilling	(7.0 - 50.0') No drilling fluid used
11									
12									
13									
14	5			Weathered Bedrock - Conglomerate	N/A				
15									
16									
17									
18									
19	5								
20									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during pre-development, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

TOPOCK SOIL BORING LOG \\ARCADIS0365\SHAREPOINT\COM\SS\DAV\WWWROOT\TEAMS\PG&E\TOPOCK\CONSTRUCTION\SHARED DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\00 NEW PHASE 2 GINT FILES\02 2022-08-08 GINT PROJECT GPJ GINT DATA TEMPLATE.GDT 8/8/22

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl	<b>Boring No.: ER-2</b>	
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	5			Weathered Bedrock - Conglomerate	N/A	x x x x	(7-22 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
22					NR	X	(22-23 ft) No Recovery; see Drilling Notes.		
23						x x x x	(23-50 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
24	4					x x x x			
25						x x x x			
26						x x x x			
27						x x x x			
28						x x x x			
29	5	No Sieve Samples Collected	No Groundwater Samples Collected			x x x x			
30						x x x x			
31						x x x x			
32				Weathered Bedrock - Conglomerate	N/A	x x x x			
33						x x x x			
34	5					x x x x			
35						x x x x			
36						x x x x			
37						x x x x			
38	6					x x x x			
39						x x x x			
40						x x x x			

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during pre-development, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 3 of 8

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl	Boring No.: <b>ER-2</b>	
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41	6					x x x x	(23-50 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
42						x x x x			
43						x x x x			
44						x x x x			
45	4			Weathered Bedrock - Conglomerate	N/A	x x x x			
46						x x x x			
47						x x x x			
48						x x x x			
49						x x x x			
50	5	No Sieve Samples Collected	No Groundwater Samples Collected			x x x x			
51						x x x x	(50-72 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.	(50.0 - 52.0') Drilling becoming significantly rougher.	(50.0 - 52.0') No drilling fluid used
52						x x x x			
53						x x x x		(52.0 - 64.0') Rough drilling	(52.0 - 64.0') No drilling fluid used
54						x x x x			
55	5			Weathered Bedrock - Conglomerate	N/A	x x x x			
56						x x x x			
57						x x x x			
58						x x x x			
59	5					x x x x			
60						x x x x			

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during pre-development, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

TOPOCK SOIL BORING LOG \\ARCADIS0365\SHAREPOINT\COM\SS\DA\WWWROOT\TEAMS\PG&E\TOPOCK\CONSTRUCTION\SHARED DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2\DRILLING\06 FIELD DOCUMENTATION\02 GINT DATA TEMPLATE.GDT 8/8/22



# Boring Log

Sheet: 4 of 8

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl	<b>Boring No.: ER-2</b>	
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	5					x x x x	(50-72 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
62						x x x x	(60 ft) Observed slight moisture on rock fragment.		
63						x x x x			
64						x x x x			
65	5					x x x x		(64.0 - 67.0') Drilling becoming significantly rougher.	(64.0 - 67.0') No drilling fluid used
66				Weathered Bedrock - Conglomerate	N/A	x x x x			
67						x x x x			
68						x x x x		(67.0 - 105.0') Rough drilling	(67.0 - 105.0') No drilling fluid used
69						x x x x			
70	5	No Sieve Samples Collected	No Groundwater Samples Collected			x x x x			
71						x x x x			
72						x x x x			
73				Weathered Bedrock - Conglomerate	N/A	X	(72-73.5 ft) No Recovery; see Drilling Notes.	(72.0 - 77.0') Top portion of drill run fell out of core barrel during extraction onto drill deck/soil hopper.	(72.0 - 77.0') No drilling fluid used
74						x x x x	(73.5-82 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
75	3.5					x x x x	(74-74.3 ft) Rock fragments are moist.		
76						x x x x			
77				Weathered Bedrock - Conglomerate	N/A	x x x x			
78						x x x x			
79	5					x x x x			
80						x x x x			

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered during drilling and approximate static measured during pre-development, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

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# Boring Log

Sheet: 5 of 8

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl	<b>Boring No.: ER-2</b>	
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	5			Weathered Bedrock - Conglomerate	N/A	x x x x	(73.5-82 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
82							(82-84.5 ft) No Recovery; see Drilling Notes.	(82.0 - 87.0') Top portion of drill run fell out of core barrel during extraction onto drill deck/soil hopper.	(82.0 - 87.0') No drilling fluid used
83				Weathered Bedrock - Conglomerate	NR				
84	2.5								
85						x x x x	(84.5-117 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
86						x x x x			
87						x x x x			
88						x x x x			
89	5	No Sieve Samples Collected	No Groundwater Samples Collected			x x x x			
90						x x x x			
91						x x x x			
92				Weathered Bedrock - Conglomerate	N/A	x x x x			
93						x x x x			
94	5					x x x x	(94 ft) Slight increase in competent rock fragments.		
95						x x x x			
96						x x x x			
97						x x x x			
98	6					x x x x		(97.0 - 127.0') Began using water to advance in 6-inch casing.	(97.0 - 127.0') 500 gallons of water used; 450 gallons of water recovered; 50 gallons of water lost
99						x x x x			
100						x x x x			

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Date Started:	<u>03/31/2022</u>	Surface Elevation:	<u>506.35 ft amsl</u>	<b>Boring No.: <u>ER-2</u></b>
Date Completed:	<u>05/08/2022</u>	Northing (NAD83):	<u>2101009.50</u>	
Drilling Co.:	<u>ABC LIOVIN</u>	Easting (NAD83):	<u>7616642.75</u>	Client: <u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>146 ft bgs</u>	Project: <u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Terra Sonic Truck Mounted</u>	Borehole Diameter:	<u>8-12 inches</u>	Location: <u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Eddie Ramos</u>	Depth to First Water:	<u>60.0 ft bgs</u>	
Drilling Asst:	<u>J. Candelaria / F. Perez</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>30126255</u>
Logger:	<u>Grant Willford</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	6	No Sieve Samples Collected	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A	x x x x	(84.5-117 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process. ----- (100.7-101 ft) Rock fragments are moist.		
102						x x x x			
103						x x x x			
104	x x x x								
105	x x x x								
106	x x x x								
107	x x x x								
108	x x x x								
109	x x x x								
110	x x x x								
111	x x x x								
112	x x x x								
113	x x x x								
114	x x x x								
115	x x x x								
116	x x x x								
117	x x x x								
118	6								
119						X			
120						X			

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# Boring Log

Sheet: 7 of 8

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl	Boring No.: <b>ER-2</b>	
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	6					x x x x	(120-127 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.		
122						x x x x	(120.01-122 ft) Rock fragments are moist.		
123						x x x x			
124				Weathered Bedrock - Conglomerate	N/A	x x x x		(123.0 - 127.0') Drilling becoming significantly rougher. Core fell out of core barrel took two attempts to recover.	(123.0 - 127.0') No drilling fluid used
125	4					x x x x			
126						x x x x			
127						x x x x			
128					NR	X	(127-129.4 ft) No Recovery; see Drilling Notes.	(127.0 - 132.0') Top portion of drill run fell out of core barrel during extraction onto drill deck/soil hopper.	(127.0 - 132.0') No drilling fluid used
129	2.6	No Sieve Samples Collected	No Groundwater Samples Collected			X			(127.0 - 137.0') 500 gallons of water used; 400 gallons of water recovered; 100 gallons of water lost
130						x x x x	(129.4-145 ft) Sedimentary Rock - Conglomerate; reddish brown (2.5YR 5/4); microcrystalline to coarse grained, angular; hard; very intensely fractured; massive; most fragments observed are weak and friable with a few competent rock fragments; dry; NOTE: Core sample mostly pulverized by drilling process.	(127.0 - 137.0') Drilled with water to advance 6-inch casing.	
131						x x x x			
132						x x x x			
133						x x x x			
134	5			Weathered Bedrock - Conglomerate	N/A	x x x x			
135						x x x x			
136						x x x x			
137						x x x x			
138	8					x x x x		(137.0 - 145.0') Drilled with water to advance 6-inch casing.	(137.0 - 145.0') 300 gallons of water used; 200 gallons of water recovered; 100 gallons of water lost
139						x x x x			
140						x x x x			

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# Boring Log

Sheet: 8 of 8

Date Started:	03/31/2022	Surface Elevation:	506.35 ft amsl	<b>Boring No.: ER-2</b>	
Date Completed:	05/08/2022	Northing (NAD83):	2101009.50		
Drilling Co.:	ABC LIOVIN	Easting (NAD83):	7616642.75	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Terra Sonic Truck Mounted	Borehole Diameter:	8-12 inches	Location:	PG&E Topock, Needles California
Driller Name:	Eddie Ramos	Depth to First Water:	60.0 ft bgs		
Drilling Asst:	J. Candelaria / F. Perez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141	8	No Sieve Samples Collected	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A	x x			

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# Well Construction Log

Sheet: 1 of 8

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	Well ID: ER-2
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches	
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022	
Total Depth:	146 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
1	No Groundwater Samples Collected	Fill	SM		(0.0 - 1.0') Temporary Surface Completion	(0.0 - 36.0') 12" Diameter Borehole	(0.0 - 1.0') 7 bags Note: 2.5 x 2.5 ft. concrete pad with 18 inch diameter lockable vault, High Sped 4,500 PSI Concrete.
2					(1.0 - 2.0') Cemex #2/16 (16x30) Lapis Lustre Sand		Note: Cemex #2/16 (16x30) Lapis Lustre Sand extended into skirt of vault.
3		Weathered Bedrock - Conglomerate	N/A		(2.0 - 5.0') Navite Material		Note: Material used to back fill was from the SPY.
4					(0.3 - 47.1') 6" Sch. 80 PVC Casing		
5							
6							
7		Weathered Bedrock - Conglomerate	N/A				(5.0 - 39.6') 175 gallons (126%) Note: Grout seal, used >20% of the caculated voume due to potential voids that formed during drilling and grout migration.
8							
9							
10							
11							
12							
13					(5.0 - 39.6') Portland Cement 5% Bentonite Type I, II, and V with Hydrogel		
14							
15							
16							
17							
18							
19							
20							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured during development and approximate static measured during drilling, respectively.

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# Well Construction Log

Sheet: 2 of 8

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	Well ID: ER-2
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches	
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022	
Total Depth:	146 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
21	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A	XXXXXX	(0.3 - 47.1') 6" Sch. 80 PVC Casing		
22				XXXXXX			
23			NR	XXXXXX			
24				XXXXXX			
25				XXXXXX	(24.5 - 25.5') SS Centralizer		
26				XXXXXX			
27				XXXXXX			
28				XXXXXX			
29				XXXXXX			
30				XXXXXX	(5.0 - 39.6') Portland Cement 5% Bentonite Type I, II, and V with Hydrogel	(5.0 - 39.6') 139.4 gallons	(5.0 - 39.6') 175 gallons (126%) Note: Grout seal, used >20% of the caculated voume due to potential voids that formed during drilling and grout migration.
31		Weathered Bedrock - Conglomerate	N/A	XXXXXX			
32				XXXXXX			
33				XXXXXX			
34				XXXXXX			
35				XXXXXX			
36				XXXXXX			
37				XXXXXX	(36.0 - 145.0') 10.75" Diameter Borehole		
38				XXXXXX			
39				XXXXXX			
40				XXXXXX		(39.6 - 45.2')	(39.6 - 45.2') 4 bags (89%)

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# Well Construction Log

Sheet: 4 of 8

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	Well ID: ER-2
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches	
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022	
Total Depth:	146 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
61	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A	x x x x x	(47.1 - 138.0') 6" 0.02-Slot 316 SS Wire Wrap Screen		
62				x x x x x			
63				x x x x x			
64				x x x x x			
65				x x x x x			
66				x x x x x			
67				x x x x x			
68				x x x x x			
69				x x x x x			
70				x x x x x	(45.7 - 146.0') Cemex #2/16 (16x30) Lapis Lustre Sand	(45.7 - 146.0') 80.9 bags	(45.7 - 146.0') 83 bags (103%) Note: Filter pack. Ran dummy tool and swabbed filter pack for approximately 20 minutes prior to the installation of the bentonite/transition sand seal. Grain-size analysis of the filter pack sand showed a higher percentage of fine-grained sand.
71				x x x x x			
72				x x x x x			
73		Weathered Bedrock - Conglomerate	N/A	X			
74				x x x x x			
75				x x x x x			
76				x x x x x			
77		Weathered Bedrock - Conglomerate	N/A	x x x x x			
78				x x x x x			
79				x x x x x			
80				x x x x x			

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured during development and approximate static measured during drilling, respectively.

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# Well Construction Log

Sheet: 5 of 8

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	Well ID: ER-2
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches	
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022	
Total Depth:	146 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
81	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A	XXXXXX	(47.1 - 138.0') 6" 0.02-Slot 316 SS Wire Wrap Screen	(45.7 - 146.0') 80.9 bags	(45.7 - 146.0') 83 bags (103%) Note: Filter pack. Ran dummy tool and swabbed filter pack for approximately 20 minutes prior to the installation of the bentonite/transition sand seal. Grain-size analysis of the filter pack sand showed a higher percentage of fine-grained sand.
82				XXXXXX			
83		Weathered Bedrock - Conglomerate	NR	XXXXXX			
84				XXXXXX			
85				XXXXXX			
86				XXXXXX			
87				XXXXXX			
88				XXXXXX			
89				XXXXXX			
90				XXXXXX	(45.7 - 146.0') Cemex #2/16 (16x30) Lapis Lustre Sand		
91				XXXXXX			
92		Weathered Bedrock - Conglomerate	N/A	XXXXXX			
93				XXXXXX			
94				XXXXXX			
95				XXXXXX			
96				XXXXXX			
97				XXXXXX			
98				XXXXXX			
99				XXXXXX			
100				XXXXXX			

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured during development and approximate static measured during drilling, respectively.

TOPOCK WELL COMPLETION DETAILS | VARCADIS030366.SHAREPOINT.COM@SSLIDAVWWWROOTITEAMSPGETOPOCKCONSTRUCTIONSHARED DOCUMENTS\PHASE II DRILLING\06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\27 2022-06-08\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 8/8/22





# Well Construction Log

Sheet: 6 of 8

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	Well ID: ER-2
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches	
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022	
Total Depth:	146 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
101				xxxxxx	(47.1 - 138.0') 6" 0.02-Slot 316 SS Wire Wrap Screen		
102				xxxxxx			
103				xxxxxx			
104				xxxxxx			
105				xxxxxx			
106				xxxxxx			
107				xxxxxx			
108				xxxxxx			
109		Weathered Bedrock - Conglomerate	N/A	xxxxxx			
110	No Groundwater Samples Collected			xxxxxx	(45.7 - 146.0') Cemex #2/16 (16x30) Lapis Lustre Sand	(45.7 - 146.0') 80.9 bags	(45.7 - 146.0') 83 bags (103%) Note: Filter pack. Ran dummy tool and swabbed filter pack for approximately 20 minutes prior to the installation of the bentonite/transition sand seal. Grain-size analysis of the filter pack sand showed a higher percentage of fine-grained sand.
111				xxxxxx			
112				xxxxxx			
113				xxxxxx			
114				xxxxxx			
115				xxxxxx			
116				xxxxxx			
117				xxxxxx			
118			NR	XXXXXX			
119				XXXXXX			
120				XXXXXX			

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TOPOCK WELL COMPLETION DETAILS IARCADIS030366.SHAREPOINT.COM@SSLIDAVWWWROOTITEAMSPGETOPOCKCONSTRUCTIONSHARED DOCUMENTS\PHASE II DRILLING\06 FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\27 2022-08-08\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 8/8/22



# Well Construction Log

Sheet: 7 of 8

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	Well ID: ER-2
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches	
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022	
Total Depth:	146 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
121	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A	x x x x	(47.1 - 138.0') 6" 0.02-Slot 316 SS Wire Wrap Screen		
122				x x x x			
123				x x x x			
124				x x x x			
125				x x x x			
126				x x x x			
127		NR	NR	X			
128							
129		Weathered Bedrock - Conglomerate	N/A	x x x x	(45.7 - 146.0') Cemex #2/16 (16x30) Lapis Lustre Sand	(45.7 - 146.0') 80.9 bags	(45.7 - 146.0') 83 bags (103%) Note: Filter pack. Ran dummy tool and swabbed filter pack for approximately 20 minutes prior to the installation of the bentonite/transition sand seal. Grain-size analysis of the filter pack sand showed a higher percentage of fine-grained sand.
130				x x x x			
131				x x x x			
132				x x x x			
133				x x x x			
134				x x x x			
135				x x x x			
136				x x x x			
137				x x x x	(136.2 - 137.2') PVC Well Bung (Plug)		(136.2 - 137.2') Note: Well bung was installed on 6/8/22 to reduce additional filterpack from entering the well from potential damage to the sump.
138				x x x x			(137.2 - 143.4') Note: Filter pack sand and sediment in the bottom of the well, due to potential damage to the sump or a higher percentage of fines in the filter pack material.
139				x x x x	(137.2 - 143.4') Cemex #2/16 (16x30) Lapis Lustre Sand and sediment.		
140				x x x x			

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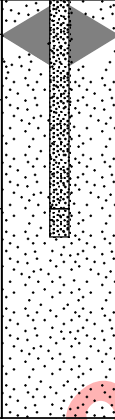
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# Well Construction Log

Sheet: 8 of 8

Date Started:	05/08/2022	Surface Elevation:	506.35 ft amsl	Well ID: ER-2
Date Completed:	05/10/2022	Shallow Well Elevation:	506.02 ft amsl	
Drilling Co.:	ABC LIOVIN	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2101009.50	Project: Final GW Remedy Phase 2A
Driller Name:	Eddie Ramos	Easting (NAD83):	7616642.75	Location: PG&E Topock, Needles California
Drilling Asst:	J. Candelaria / F. Perez	Borehole Diameter:	8-12 inches	
Logger:	Alexis McIntyre	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	6/28/2022	
Total Depth:	146 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details		Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
141	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A	x	(140.0 - 141.0') SS Centralizer		(45.7 - 146.0') 80.9 bags	(45.7 - 146.0') 83 bags (103%) Note: Filter pack. Ran dummy tool and swabbed filter pack for approximately 20 minutes prior to the installation of the bentonite/transition sand seal. Grain-size analysis of the filter pack sand showed a higher percentage of fine-grained sand.  (137.2 - 143.4') Note: Filter pack sand and sediment in the bottom of the well, due to potential damage to the sump or a higher percentage of fines in the filter pack material.
142				x	(45.7 - 146.0') Cemex #2/16			
143				x	(16x30) Lapis Lustre Sand			
144				x	(137.2 - 143.4') Cemex #2/16			
145				x	(16x30) Lapis Lustre Sand and sediment.			
146				x	(138.0 - 143.4') Sump and 316 SS End Cap			
147					(145.0 - 146.0') 8" Diameter Borehole			
148								
149								
150								
151								
152								
153								
154								
155								
156								
157								
158								
159								
160								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, Notes: solid blue and hollow blue water table marks represent depth to water (ft. bgs.) static water measured during development and approximate static measured during drilling, respectively.



# Boring Log

Sheet: 1 of 10

Date Started:	03/31/2022	Surface Elevation:	554.11 ft amsl	Boring No.: <b>FW-02A</b>
Date Completed:	04/26/2022	Northing (NAD83):	2100450.05	
Drilling Co.:	Cascade	Easting (NAD83):	7614666.44	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	182 ft bgs	Project: Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	6-7 inches	Location: PG&E Topock, Needles California
Driller Name:	Steve Vasquez	Depth to First Water:	93.0 ft bgs	
Drilling Asst:	John Whitman / John Colon	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: 30126255
Logger:	David Cornell	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> TBD	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1							(0-10 ft) Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); dark brown (7.5YR 3/3); very fine to very coarse grained, subangular to subround; little small to very large pebbles, angular to subangular; little small to large cobbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; dry.	(0.0 - 5.0') Air-knifed for utility clearance on 3/31/22.	(0.0 - 5.0') No drilling fluid used
2									
3									
4									
5	10			Topock - Alluvium Deposits	SW-SM				
6									
7									
8									
9									
10		No Sieve Samples Collected	No Groundwater Samples Collected						
11							(10-17 ft) Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (7.5YR 3/3); very fine to very coarse grained, subangular to subround; little small to very large pebbles, angular to subangular; little small to large cobbles, angular to subangular; little silt; trace granules, subangular to subround; trace clay; dry.		
12									
13	7			Topock - Alluvium Deposits	SM-SW				
14									
15									
16									
17									
18				Topock - Alluvium Deposits	SM-SW		(17-19 ft) Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (7.5YR 3/3); dark brown (7.5YR 3/3); very fine to very coarse grained, subangular to subround; little small to large pebbles, angular to subangular; little silt; trace small to large cobbles, angular to subangular; trace granules, angular to subangular; trace clay; dry to moist.		
19	10								
20				Topock - Alluvium Deposits	SM				

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# Boring Log

Sheet: 2 of 10

Date Started:	<u>03/31/2022</u>	Surface Elevation:	<u>554.11 ft amsl</u>	<b>Boring No.: <u>FW-02A</u></b>	
Date Completed:	<u>04/26/2022</u>	Northing (NAD83):	<u>2100450.05</u>		
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7614666.44</u>	Client:	<u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>182 ft bgs</u>	Project:	<u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>6-7 inches</u>	Location:	<u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Steve Vasquez</u>	Depth to First Water:	<u>93.0 ft bgs</u>		
Drilling Asst:	<u>John Whitman / John Colon</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number:	<u>30126255</u>
Logger:	<u>David Cornell</u>	Sampling Interval:	<u>Continuous</u>		
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> TBD		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	10			Topock - Alluvium Deposits	SM		(19-27 ft) Topock - Alluvium Deposits; Silty sand with gravel (SM); very dark gray (7.5YR 3/1); fine to very coarse grained, angular to subangular; little silt; little small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; trace granules, angular to subangular; trace clay, dry to moist.	(25.0 - 27.0') Rough drilling	(25.0 - 27.0') No drilling fluid used
22									
23									
24									
25									
26	10	No Sieve Samples Collected	No Groundwater Samples Collected	Topock - Alluvium Deposits	SM-SW		(27-37 ft) Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); very dark gray (7.5YR 3/1), little dark brown (7.5YR 3/3); very fine to very coarse grained, angular to subangular; little small to very large pebbles, angular to subangular; little silt; trace small to large cobbles, angular to subangular; trace granules, angular to subangular; trace clay; dry to moist.	(31.0 - 37.0') Rough drilling	(31.0 - 37.0') No drilling fluid used
27									
28									
29									
30									
31									
32									
33									
34									
35									
36	10			Topock - Alluvium Deposits	SM		(37-47 ft) Topock - Alluvium Deposits; Silty sand with gravel (SM); very dark gray (7.5YR 3/1), little dark brown (7.5YR 3/3); fine to coarse grained, angular to subangular; little silt; little small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; trace granules, angular to subangular; trace clay; dry to moist.	(37.0 - 42.0') Rough drilling	(37.0 - 42.0') No drilling fluid used
37									
38									
39									
40									

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# Boring Log

Sheet: 3 of 10

Date Started:	<u>03/31/2022</u>	Surface Elevation:	<u>554.11 ft amsl</u>	<b>Boring No.: <u>FW-02A</u></b>	
Date Completed:	<u>04/26/2022</u>	Northing (NAD83):	<u>2100450.05</u>		
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7614666.44</u>	Client:	<u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>182 ft bgs</u>	Project:	<u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>6-7 inches</u>	Location:	<u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Steve Vasquez</u>	Depth to First Water:	<u>93.0 ft bgs</u>		
Drilling Asst:	<u>John Whitman / John Colon</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number:	<u>30126255</u>
Logger:	<u>David Cornell</u>	Sampling Interval:	<u>Continuous</u>		
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> TBD		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41	10			Topock - Alluvium Deposits	SM		(37-47 ft) Topock - Alluvium Deposits; Silty sand with gravel (SM); very dark gray (7.5YR 3/1), little dark brown (7.5YR 3/3); fine to coarse grained, angular to subangular; little silt; little small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; trace granules, angular to subangular; trace clay; dry to moist.		
42									
43									
44									
45									
46	10	No Sieve Samples Collected	No Groundwater Samples Collected	Topock - Alluvium Deposits	SM-SW		(47-57 ft) Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); dark brown (7.5YR 3/3), little very dark gray (7.5YR 3/1); very fine to very coarse grained, angular to subangular; little small to very large pebbles, angular to subangular; little silt; trace small to large cobbles, angular to subangular; trace granules, angular to subangular; trace clay; dry to moist.		
47									
48									
49									
50									
51									
52									
53									
54									
55									
56	10			Topock - Alluvium Deposits	SW-SM		(57-67 ft) Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); dark brown (7.5YR 3/2); very fine to very coarse grained, angular to subangular; little silt; trace granules, angular to subangular; trace small to large cobbles, angular to subangular; trace small to very large pebbles, angular to subangular; trace clay; dry to moist.	(54.0 - 57.0') Rough drilling	(54.0 - 57.0') No drilling fluid used
57									
58									
59									
60									

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# Boring Log

Sheet: 4 of 10

Date Started:	<u>03/31/2022</u>	Surface Elevation:	<u>554.11 ft amsl</u>	<b>Boring No.: <u>FW-02A</u></b>	
Date Completed:	<u>04/26/2022</u>	Northing (NAD83):	<u>2100450.05</u>		
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7614666.44</u>	Client:	<u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>182 ft bgs</u>	Project:	<u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>6-7 inches</u>	Location:	<u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Steve Vasquez</u>	Depth to First Water:	<u>93.0 ft bgs</u>		
Drilling Asst:	<u>John Whitman / John Colon</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number:	<u>30126255</u>
Logger:	<u>David Cornell</u>	Sampling Interval:	<u>Continuous</u>		
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> TBD		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	10			Topock - Alluvium Deposits	SW-SM		(57-67 ft) Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); dark brown (7.5YR 3/2); very fine to very coarse grained, angular to subangular; little silt; trace granules, angular to subangular; trace small to large cobbles, angular to subangular; trace small to very large pebbles, angular to subangular; trace clay; dry to moist.	(64.0 - 66.0') Drill rods chattering	(64.0 - 66.0') No drilling fluid used
62							(60.5-61 ft) Lens of brown (7.5YR 4/2); silt and clay; low to moderate plasticity ; little very fine to medium grained sand; trace granules and small pebbles; moist.		
63									
64									
65	10	No Sieve Samples Collected	No Groundwater Samples Collected	Topock - Alluvium Deposits	SW-SM		(67-68.5 ft) Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (7.5YR 4/2); very fine to very coarse grained, subangular to subround; little small to very large pebbles, angular to subround; little granules, angular to subangular; little silt; little clay; trace small to large cobbles, angular to subround; moist.		
66									
67				Topock - Alluvium Deposits	ML		(68.5-70 ft) Topock - Alluvium Deposits; Sandy silt (ML); brown (7.5YR 4/2); no plasticity, no dilatancy; some clay, low to medium plasticity, no dilatancy; little very fine to medium sand, angular to subround; trace granules, angular to subround; trace small to large pebbles, angular to subround; medium stiff; moist.		
68									
69				Topock - Alluvium Deposits	SW		(70-77 ft) Topock - Alluvium Deposits; Well graded sand with gravel (SW); brown (7.5YR (4/4); fine to coarse grained, angular to subround; little granules, angular to subround; little small to very large pebbles, angular to subround; trace small to large cobbles, angular to subround; trace silt; trace clay; dry to moist.		
70									
71									
72									
73	10			Topock - Alluvium Deposits	SW		(77-87 ft) Topock - Alluvium Deposits; Well graded sand with gravel (SW); brown (7.5YR (4/3); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; trace silt; trace clay; dry to moist.		
74									
75									
76									
77	10			Topock - Alluvium Deposits	SW				
78									
79									
80									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



Date Started:	03/31/2022	Surface Elevation:	554.11 ft amsl	<b>Boring No.: FW-02A</b>
Date Completed:	04/26/2022	Northing (NAD83):	2100450.05	
Drilling Co.:	Cascade	Easting (NAD83):	7614666.44	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	182 ft bgs	Project: Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	6-7 inches	Location: PG&E Topock, Needles California
Driller Name:	Steve Vasquez	Depth to First Water:	93.0 ft bgs	
Drilling Asst:	John Whitman / John Colon	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: 30126255
Logger:	David Cornell	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> TBD	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	10	No Sieve Samples Collected	No Groundwater Samples Collected	Topock - Alluvium Deposits	SW		(77-87 ft) Topock - Alluvium Deposits; Well graded sand with gravel (SW); brown (7.5YR 4/3); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; trace silt; trace clay; dry to moist.		
82									
83									
84									
85									
86	6	No Sieve Samples Collected	No Sample (Interval did not produce) 4/21/2022 08:55	Topock - Alluvium Deposits	SW		(86-87 ft) Decrease in pebble content.	(88.0 - 93.0') Difficult drilling and core retrieval.	(88.0 - 93.0') No drilling fluid used
87									
88							(87-88 ft) Topock - Alluvium Deposits; Well graded sand with gravel (SW); dark brown (7.5YR 3/4); fine to coarse grained, subangular to subround; little granules, angular to subround; little small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subround; trace silt; trace clay; dry to moist.		
89									
90							(88-93 ft) Topock - Alluvium Deposits; Poorly graded sand (SP); dark brown (7.5YR 3/4); very fine to medium grained, subangular to subround; trace granules, angular to subangular; trace silt; trace small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; dry to moist. NOTE: Drilling may have pulverized sample.		
91	4	FW-02A-SS-93.5-97 4/25/2022 12:30	No Sample (Interval did not produce) 4/21/2022 08:55	Topock - Alluvium Deposits	SW			(90.0 - 93.0') Rough drilling	(90.0 - 93.0') No drilling fluid used
92									
93									
94							(93-93.5 ft) Topock - Alluvium Deposits; Well graded (SW); brown (7.5YR 4/2); fine to coarse grained, subangular to subround; trace silt; trace clay; wet.		
95							(93.5-97 ft) Topock - Alluvium Deposits; Well graded sand with gravel (SW); dark brown (7.5YR 3/4); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little granules, angular to subround; little small to large cobbles, angular to subangular; trace silt; trace clay; dry to moist.		
96	10	FW-02A-SS-97-102 4/25/2022 12:35		Topock - Competent Bedrock - Metadiorite	N/A		(96-97 ft) Potentially pulverized Metadiorite.		
97									
98									
99									
100							(97-107 ft) Topock - Competent Bedrock - Metadiorite; very dark grayish green (5GY 3/2); pulverized by drilling process.		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 6 of 10

Date Started:	03/31/2022	Surface Elevation:	554.11 ft amsl	Boring No.: <b>FW-02A</b>
Date Completed:	04/26/2022	Northing (NAD83):	2100450.05	
Drilling Co.:	Cascade	Easting (NAD83):	7614666.44	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	182 ft bgs	Project: Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	6-7 inches	Location: PG&E Topock, Needles California
Driller Name:	Steve Vasquez	Depth to First Water:	93.0 ft bgs	
Drilling Asst:	John Whitman / John Colon	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: 30126255
Logger:	David Cornell	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> TBD	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	10	FW-02A-SS-97-102 4/25/2022 12:35		Topock - Competent Bedrock - Metadiorite	N/A		(97-107 ft) Topock - Competent Bedrock - Metadiorite; very dark grayish green (5GY 3/2); pulverized by drilling process.		
102									
103									
104									
105		FW-02A-SS-102-107 4/25/2022 12:40							
106									
107									
108	5	FW-02A-SS-107-112 4/25/2022 12:45	No Sample (Interval did not produce) 4/21/2022 16:36	Topock - Competent Bedrock - Metadiorite	N/A		(107-112 ft) Topock - Competent Bedrock - Metadiorite; very dark grayish green (5GY 3/2); pulverized by drilling process.		
109									
110									
111									
112									
113	5	FW-02A-SS-112-117 4/25/2022 12:50		Topock - Competent Bedrock - Metadiorite	N/A		(112-117 ft) Topock - Competent Bedrock - Metadiorite; very dark grayish green (5GY 3/2); pulverized by drilling process.		
114									
115									
116									
117							(116-116.5 ft) Pulverized rock becoming slightly pink in color; potentially weathered conglomerate.		
118	5	FW-02A-SS-117-122 4/25/2022 12:55	FW-02A-VAS-117-122 ( $<0.025$ ppb) 4/22/2022 12:19	Topock - Competent Bedrock - Metadiorite	N/A		(117-122 ft) Topock - Competent Bedrock - Metadiorite; very dark grayish green (5GY 3/2); pulverized by drilling process.		
119									
120									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

TOPOCK SOIL BORING LOG C:\USERS\SMCGRANE\ONE DRIVE - ARCADIS\SHARED DOCUMENTS\PHASE I\DRILLING\06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\08 2022-06-16\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 6/16/22

Date Started:	<u>03/31/2022</u>	Surface Elevation:	<u>554.11 ft amsl</u>	<b>Boring No.: <u>FW-02A</u></b>
Date Completed:	<u>04/26/2022</u>	Northing (NAD83):	<u>2100450.05</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7614666.44</u>	Client: <u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>182 ft bgs</u>	Project: <u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>6-7 inches</u>	Location: <u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Steve Vasquez</u>	Depth to First Water:	<u>93.0 ft bgs</u>	
Drilling Asst:	<u>John Whitman / John Colon</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>30126255</u>
Logger:	<u>David Cornell</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> TBD	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	5	FW-02A-SS-117-122 4/25/2022 12:55	FW-02A-VAS-117-122 ( $<0.025$ ppb) 4/22/2022 12:19	Topock - Competent Bedrock - Metadiorite	N/A		(117-122 ft) Topock - Competent Bedrock - Metadiorite; very dark grayish green (5GY 3/2); pulverized by drilling process.		
122									
123									
124	5	FW-02A-SS-122-127 4/25/2022 13:00		Topock - Competent Bedrock - Metadiorite	N/A		(122-127 ft) Topock - Competent Bedrock - Metadiorite; very dark greenish gray (5G 3/2); pulverized by drilling process.	(122.0 - 127.0') Rough drilling	(122.0 - 127.0') No drilling fluid used
125									
126									
127									
128		FW-02A-SS-127-130 4/25/2022 13:05	FW-02A-VAS-127-132 ( $<0.025$ ppb) 4/23/2022 09:50	Topock - Weathered Bedrock - Conglomerate	N/A	x x x x	(127-130 ft) Topock - Weathered Bedrock - Conglomerate; dark yellowish brown (10YR 3/6); pulverized by drilling process; potentially weathered based on drilling observations.	(127.0 - 132.0') Rough drilling	(127.0 - 132.0') No drilling fluid used
129	5					x x x x			
130						x x x x			
131		FW-02A-SS-130-132 4/25/2022 13:10		Topock - Weathered Bedrock - Metadiorite	N/A	x x x x	(130-132 ft) Topock - Weathered Bedrock - Metadiorite; very dark greenish gray (5G 3/2); pulverized by drilling process.		
132						x x x x			
133						x x x x			
134	5	FW-02A-SS-132-136.5 4/25/2022 13:15		Topock - Weathered Bedrock - Conglomerate	N/A	x x x x	(132-136.5 ft) Topock - Weathered Bedrock - Conglomerate; dark yellowish brown (10YR 3/6); fragmented by drilling process.	(132.0 - 137.0') Rough drilling	(132.0 - 137.0') No drilling fluid used
135						x x x x			
136						x x x x			
137				Topock - Weathered Bedrock - Metadiorite	N/A	x x x x	(136.5-137 ft) Topock - Weathered Bedrock - Metadiorite; dark grayish olive (10Y 4/2); pulverized by drilling process; potentially weathered based on drilling observations.		
138	5	FW-02A-SS-136.5-142 4/25/2022 13:20	FW-02A-VAS-137-142 ( $<0.025$ ppb) 4/23/2022 15:44	Topock - Weathered Bedrock - Metadiorite	N/A	x x x x	(137-142 ft) Topock - Weathered Bedrock - Metadiorite; dark grayish olive (10Y 4/2); pulverized by drilling process; potentially weathered based on drilling observations.		
139						x x x x			
140						x x x x			

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Date Started:	<u>03/31/2022</u>	Surface Elevation:	<u>554.11 ft amsl</u>	<b>Boring No.: <u>FW-02A</u></b>
Date Completed:	<u>04/26/2022</u>	Northing (NAD83):	<u>2100450.05</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7614666.44</u>	Client: <u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>182 ft bgs</u>	Project: <u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>6-7 inches</u>	Location: <u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Steve Vasquez</u>	Depth to First Water:	<u>93.0 ft bgs</u>	
Drilling Asst:	<u>John Whitman / John Colon</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>30126255</u>
Logger:	<u>David Cornell</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> TBD	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141	5	FW-02A-SS-136.5-142 4/25/2022 13:20	FW-02A-VAS-137-142 ( $<0.025$ ppb) 4/23/2022 15:44	Topock - Weathered Bedrock - Metadiorite	N/A		(137-142 ft) Topock - Weathered Bedrock - Metadiorite; dark grayish olive (10Y 4/2); pulverized by drilling process; potentially weathered based on drilling observations.		
142									
143									
144		FW-02A-SS-142-147 4/25/2022 13:25					(142-152 ft) Topock - Weathered Bedrock - Metadiorite; olive gray (5Y 4/2) with dark yellowish brown (10YR 3/4); pulverized by drilling process; potentially weathered based on drilling observations.		
145									
146									
147	10			Topock - Weathered Bedrock - Metadiorite	N/A				
148									
149		FW-02A-SS-147-152 4/25/2022 13:30	FW-02A-VAS-147-152 ( $<0.025$ ppb) 4/24/2022 12:20					(149.0 - 152.0') Soft drilling	(149.0 - 152.0') No drilling fluid used
150									
151									
152									
153							(152-162 ft) Topock - Weathered Bedrock - Metadiorite; olive gray (5Y 4/2) with dark yellowish olive (10YR 3/4); pulverized by drilling process; potentially weathered based on drilling observations.	(152.0 - 162.0') Soft drilling	(152.0 - 162.0') No drilling fluid used
154		FW-02A-SS-152-157 4/25/2022 13:35		Topock - Weathered Bedrock - Metadiorite	N/A				
155									
156	10								
157									
158		FW-02A-SS-157-162 4/25/2022 13:40	FW-02A-VAS-157-162 ( $<0.025$ ppb) 4/25/2022 10:25						
159									
160									

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Date Started:	03/31/2022	Surface Elevation:	554.11 ft amsl	<b>Boring No.: FW-02A</b>
Date Completed:	04/26/2022	Northing (NAD83):	2100450.05	
Drilling Co.:	Cascade	Easting (NAD83):	7614666.44	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	182 ft bgs	Project: Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	6-7 inches	Location: PG&E Topock, Needles California
Driller Name:	Steve Vasquez	Depth to First Water:	93.0 ft bgs	
Drilling Asst:	John Whitman / John Colon	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: 30126255
Logger:	David Cornell	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> TBD	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
161	10	FW-02A-SS-157-162 4/25/2022 13:40	FW-02A-VAS-157-162 ( $<0.025$ ppb) 4/25/2022 10:25	Topock - Weathered Bedrock - Metadiorite	N/A		(152-162 ft) Topock - Weathered Bedrock - Metadiorite; olive gray (5Y 4/2) with dark yellowish olive (10YR 3/4); pulverized by drilling process; potentially weathered based on drilling observations.		
162									
163									
164									
165									
166									
167	10			Topock - Weathered Bedrock - Conglomerate	N/A		(162-172 ft) Topock - Weathered Bedrock - Conglomerate; dark yellowish brown (10YR 3/4); weathered.  (167-169 ft) Metadiorite fragments pulverized by drilling process.		
168									
169			FW-02A-VAS-167-172 ( $<0.13$ ppb) 4/25/2022 15:50						
170		No Sieve Samples Collected							
171									
172									
173							(172-177 ft) Topock - Weathered Bedrock - Conglomerate; brown (10YR 4/3); weathered.	(172.0 - 177.5') Hard drilling	(172.0 - 177.5') No drilling fluid used
174				Topock - Weathered Bedrock - Conglomerate	N/A				
175									
176	10								
177									
178			FW-02A-VAS-177-182 (34 ppb) 4/26/2022 10:55	Topock - Weathered Bedrock - Metadiorite	N/A		(177-181 ft) Topock - Weathered Bedrock - Metadiorite; olive gray (5Y 5/2); pulverized by drilling process; potentially weathered based on drilling observations.	(177.5 - 180.5') Soft drilling	(177.5 - 180.5') No drilling fluid used
179									
180									

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# Boring Log

Sheet: 10 of 10

Date Started:	03/31/2022	Surface Elevation:	554.11 ft amsl	<b>Boring No.: FW-02A</b>	
Date Completed:	04/26/2022	Northing (NAD83):	2100450.05		
Drilling Co.:	Cascade	Easting (NAD83):	7614666.44	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	182 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	6-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Steve Vasquez	Depth to First Water:	93.0 ft bgs		
Drilling Asst:	John Whitman / John Colon	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	David Cornell	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> TBD		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
181	10	No Sieve Samples Collected	FW-02A-VAS-177-182 (34 ppb) 4/26/2022 10:55	Topock - Weathered Bedrock - Conglomerate	N/A		(177-181 ft) Topock - Weathered Bedrock - Metadiorite; olive gray (5Y 5/2); pulverized by drilling process; potentially weathered based on drilling observations.	(180.5 - 182.0') Hard drilling	(180.5 - 182.0') No drilling fluid used
182					N/A		(181-182 ft) Topock - Weathered Bedrock - Conglomerate; brown (10YR 4/3); weathered.		
183							End of Boring at 182 ft bgs.		
184									
185									
186									
187									
188									
189									
190									
191									
192									
193									
194									
195									
196									
197									
198									
199									
200									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.





# Boring Log

Sheet: 1 of 10

Date Started: 03/31/2022 Surface Elevation: 554.11 ft amsl  
Date Completed: 04/26/2022 Northing (NAD83): 2100450.05  
Drilling Co.: Cascade Easting (NAD83): 7614666.44 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 182 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Boart Longyear drill head Borehole Diameter: 6-7 inches Location: PG&E Topock, Needles California  
Driller Name: Steve Vasquez Depth to First Water: 93.0 ft bgs  
Drilling Asst: John Whitman / John Colon Sampling Method: 4 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: David Cornell Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☐ Yes ☒ No

**Boring No.: FW-02A Pilot**

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1	10	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SW-SM		(0-10 ft) Well graded sand with silt and gravel (SW-SM); dark brown (7.5YR 3/3); very fine to very coarse grained, subangular to subround; little small to very large pebbles, angular to subangular; little small to large cobbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; dry.	(0.0 - 5.0') Air-knifed for utility clearance on 3/31/22.	(0.0 - 5.0') No drilling fluid used
2									
3									
4									
5									
6									
7									
8									
9									
10									
11	7	No Sieve Samples Collected	No Groundwater Samples Collected	Topock - Alluvium Deposits	SM-SW		(10-17 ft) Well graded sand with silt and gravel (SW-SM); brown (7.5YR 3/3); very fine to very coarse grained, subangular to subround; little small to very large pebbles, angular to subangular; little small to large cobbles, angular to subangular; little silt; trace granules, subangular to subround; trace clay; dry.	(0.0 - 5.0') Air-knifed for utility clearance on 3/31/22.	(0.0 - 5.0') No drilling fluid used
12									
13									
14									
15									
16									
17									
18									
19									
20									
	10	No Sieve Samples Collected	No Groundwater Samples Collected	Topock - Alluvium Deposits	SM-SW		(17-19 ft) Well graded sand with silt and gravel (SW-SM); brown (7.5YR 3/3); dark brown (7.5YR 3/3); very fine to very coarse grained, subangular to subround; little small to large pebbles, angular to subangular; little silt; trace small to large cobbles, angular to subangular; trace granules, angular to subangular; trace clay; dry to moist.	(0.0 - 5.0') Air-knifed for utility clearance on 3/31/22.	(0.0 - 5.0') No drilling fluid used
				Topock - Alluvium Deposits	SM				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.





# Boring Log

Sheet: 2 of 10

Date Started: 03/31/2022 Surface Elevation: 554.11 ft amsl  
Date Completed: 04/26/2022 Northing (NAD83): 2100450.05  
Drilling Co.: Cascade Easting (NAD83): 7614666.44 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 182 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Boart Longyear drill head Borehole Diameter: 6-7 inches Location: PG&E Topock, Needles California  
Driller Name: Steve Vasquez Depth to First Water: 93.0 ft bgs  
Drilling Asst: John Whitman / John Colon Sampling Method: 4 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: David Cornell Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☐ Yes ☒ No

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	10			Topock - Alluvium Deposits	SM		(19-27 ft) Silty sand with gravel (SM); very dark gray (7.5YR 3/1); fine to very coarse grained, angular to subangular; little silt; little small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; trace granules, angular to subangular; trace clay, dry to moist.		
22									
23									
24									
25									
26	10	No Sieve Samples Collected	No Groundwater Samples Collected	Topock - Alluvium Deposits	SM-SW		(27-37 ft) Well graded sand with silt and gravel (SW-SM); very dark gray (7.5YR 3/1), little dark brown (7.5YR 3/3); very fine to very coarse grained, angular to subangular; little small to very large pebbles, angular to subangular; little silt; trace small to large cobbles, angular to subangular; trace granules, angular to subangular; trace clay, dry to moist.	(25.0 - 27.0') Rough drilling	(25.0 - 27.0') No drilling fluid used
27									
28									
29									
30									
31									
32									
33									
34									
35									
36	10			Topock - Alluvium Deposits	SM		(37-47 ft) Silty sand with gravel (SM); very dark gray (7.5YR 3/1), little dark brown (7.5YR 3/3); fine to coarse grained, angular to subangular; little silt; little small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; trace granules, angular to subangular; trace clay, dry to moist.	(37.0 - 42.0') Rough drilling	(37.0 - 42.0') No drilling fluid used
37									
38									
39									
40									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 3 of 10

Date Started: 03/31/2022 Surface Elevation: 554.11 ft amsl  
Date Completed: 04/26/2022 Northing (NAD83): 2100450.05  
Drilling Co.: Cascade Easting (NAD83): 7614666.44 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 182 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Boart Longyear drill head Borehole Diameter: 6-7 inches Location: PG&E Topock, Needles California  
Driller Name: Steve Vasquez Depth to First Water: 93.0 ft bgs  
Drilling Asst: John Whitman / John Colon Sampling Method: 4 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: David Cornell Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☐ Yes ☒ No

**Boring No.: FW-02A Pilot**

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41	10			Topock - Alluvium Deposits	SM		(37-47 ft) Silty sand with gravel (SM); very dark gray (7.5YR 3/1), little dark brown (7.5YR 3/3); fine to coarse grained, angular to subangular; little silt; little small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; trace granules, angular to subangular; trace clay; dry to moist.		
42									
43									
44									
45									
46	10	No Sieve Samples Collected	No Groundwater Samples Collected	Topock - Alluvium Deposits	SM-SW		(47-57 ft) Well graded sand with silt and gravel (SW-SM); dark brown (7.5YR 3/3), little very dark gray (7.5YR 3/1); very fine to very coarse grained, angular to subangular; little small to very large pebbles, angular to subangular; little silt; trace small to large cobbles, angular to subangular; trace granules, angular to subangular; trace clay; dry to moist.		
47									
48									
49									
50									
51									
52									
53									
54									
55									
56	10			Topock - Alluvium Deposits	SW-SM		(57-67 ft) Well graded sand with silt and gravel (SW-SM); dark brown (7.5YR 3/2); very fine to very coarse grained, angular to subangular; little silt; trace granules, angular to subangular; trace small to large cobbles, angular to subangular; trace small to very large pebbles, angular to subangular; trace clay; dry to moist.	(54.0 - 57.0') Rough drilling	(54.0 - 57.0') No drilling fluid used
57									
58									
59									
60									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 4 of 10

Date Started: 03/31/2022 Surface Elevation: 554.11 ft amsl  
Date Completed: 04/26/2022 Northing (NAD83): 2100450.05  
Drilling Co.: Cascade Easting (NAD83): 7614666.44 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 182 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Boart Longyear drill head Borehole Diameter: 6-7 inches Location: PG&E Topock, Needles California  
Driller Name: Steve Vasquez Depth to First Water: 93.0 ft bgs  
Drilling Asst: John Whitman / John Colon Sampling Method: 4 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: David Cornell Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☐ Yes ☒ No

**Boring No.: FW-02A Pilot**

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	10			Topock - Alluvium Deposits	SW-SM		(57-67 ft) Well graded sand with silt and gravel (SW-SM); dark brown (7.5YR 3/2); very fine to very coarse grained, angular to subangular; little silt; trace granules, angular to subangular; trace small to large cobbles, angular to subangular; trace small to very large pebbles, angular to subangular; trace clay; dry to moist. (60.5-61 ft) Lens of brown (7.5YR 4/2); silt and clay; low to moderate plasticity; little very fine to medium grained sand; trace granules and small pebbles; moist.		
62									
63									
64									
65	10	No Sieve Samples Collected	No Groundwater Samples Collected	Topock - Alluvium Deposits	SW-SM		(67-68.5 ft) Well graded sand with silt and gravel (SW-SM); brown (7.5YR 4/2); very fine to very coarse grained, subangular to subround; little small to very large pebbles, angular to subround; little granules, angular to subangular; little silt; little clay; trace small to large cobbles, angular to subround; moist.	(64.0 - 66.0') Drill rods chattering	(64.0 - 66.0') No drilling fluid used
66									
67				Topock - Alluvium Deposits	ML		(68.5-70 ft) Sandy silt (ML); brown (7.5YR 4/2); no plasticity, no dilatancy; some clay, low to medium plasticity, no dilatancy; little very fine to medium sand, angular to subround; trace granules, angular to subround; trace small to large pebbles, angular to subround; medium stiff, moist.		
68									
69				Topock - Alluvium Deposits	SW		(70-77 ft) Well graded sand with gravel (SW); brown (7.5YR (4/4); fine to coarse grained, angular to subround; little granules, angular to subround; little small to very large pebbles, angular to subround; trace small to large cobbles, angular to subround; trace silt; trace clay; dry to moist.		
70									
71									
72									
73									
74									
75									
76									
77									
78	10			Topock - Alluvium Deposits	SW		(77-87 ft) Well graded sand with gravel (SW); brown (7.5YR (4/3); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; trace silt; trace clay; dry to moist.		
79									
80									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Date Started:	<u>03/31/2022</u>	Surface Elevation:	<u>554.11 ft amsl</u>	<b>Boring No.: <u>FW-02A Pilot</u></b>
Date Completed:	<u>04/26/2022</u>	Northing (NAD83):	<u>2100450.05</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7614666.44</u>	Client: <u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>182 ft bgs</u>	Project: <u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>6-7 inches</u>	Location: <u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Steve Vasquez</u>	Depth to First Water:	<u>93.0 ft bgs</u>	
Drilling Asst:	<u>John Whitman / John Colon</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>30126255</u>
Logger:	<u>David Cornell</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	10	No Sieve Samples Collected	No Groundwater Samples Collected	Topock - Alluvium Deposits	SW		(77-87 ft) Well graded sand with gravel (SW); brown (7.5YR 4/3); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; trace silt; trace clay; dry to moist.		
82									
83									
84									
85									
86	6	No Sieve Samples Collected	No Groundwater Samples Collected	Topock - Alluvium Deposits	SW		(86-87 ft) Decrease in pebble content.		
87									
88							(87-88 ft) Well graded sand with gravel (SW); dark brown (7.5YR 3/4); fine to coarse grained, subangular to subround; little granules, angular to subround; little small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subround; trace silt; trace clay; dry to moist.	(88.0 - 93.0') Difficult drilling and core retrieval.	(88.0 - 93.0') No drilling fluid used
89							(88-93 ft) Poorly graded sand (SP); dark brown (7.5YR 3/4); very fine to medium grained, subangular to subround; trace granules, angular to subangular; trace silt; trace small to very large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; dry to moist. NOTE: Drilling may have pulverized sample.		
90									
91	4	FW-02A-SS-93.5-97 4/25/2022 12:30	No Sample (92-97 interval did not produce) 4/21/2022 08:55	Topock - Alluvium Deposits	SW				
92									
93							(93-93.5 ft) Well graded (SW); brown (7.5YR 4/2); fine to coarse grained, subangular to subround; trace silt; trace clay; wet.		
94							(93.5-97 ft) Well graded sand with gravel (SW); dark brown (7.5YR 3/4); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little granules, angular to subround; little small to large cobbles, angular to subangular; trace silt; trace clay; dry to moist.		
95									
96	10	FW-02A-SS-97-102 4/25/2022 12:35		Topock - Competent Bedrock - Metadiorite	N/A		(96-97 ft) Potentially pulverized Metadiorite.		
97									
98							(97-107 ft) Metamorphic Rock; very dark grayish green (5GY 3/2); pulverized by drilling process.		
99									
100									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 6 of 10

Date Started:	03/31/2022	Surface Elevation:	554.11 ft amsl	<b>Boring No.: FW-02A Pilot</b>	
Date Completed:	04/26/2022	Northing (NAD83):	2100450.05		
Drilling Co.:	Cascade	Easting (NAD83):	7614666.44	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	182 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	6-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Steve Vasquez	Depth to First Water:	93.0 ft bgs		
Drilling Asst:	John Whitman / John Colon	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	David Cornell	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	10	FW-02A-SS-97-102 4/25/2022 12:35		Topock - Competent Bedrock - Metadiorite	N/A		(97-107 ft) Metamorphic Rock; very dark grayish green (5GY 3/2); pulverized by drilling process.	v	
102									
103									
104									
105	5	FW-02A-SS-102-107 4/25/2022 12:40		Topock - Competent Bedrock - Metadiorite	N/A			(105.0 - 107.0') Soft drilling	(105.0 - 107.0') No drilling fluid used
106									
107									
108									
109	5	FW-02A-SS-107-112 4/25/2022 12:45	No Sample (107-112 interval did not produce) 4/21/2022 16:36	Topock - Competent Bedrock - Metadiorite	N/A		(107-112 ft) Metamorphic Rock; very dark grayish green (5GY 3/2); pulverized by drilling process.		
110									
111									
112									
113	5	FW-02A-SS-112-117 4/25/2022 12:50		Topock - Competent Bedrock - Metadiorite	N/A		(112-117 ft) Metamorphic Rock; very dark grayish green (5GY 3/2); pulverized by drilling process.		
114									
115									
116									
117	5			Topock - Competent Bedrock - Metadiorite	N/A		(116-116.5 ft) Pulverized rock becoming slightly pink in color; potentially weathered conglomerate.		
118		FW-02A-SS-117-122 4/25/2022 12:55	FW-02A-VAS-117-122 ( $<0.025$ ppb) 4/22/2022 12:19				(117-122 ft) Metamorphic Rock; very dark grayish green (5GY 3/2); pulverized by drilling process.		
119									
120									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

TOPOCK SOIL BORING LOG I:\ARCADIS\0365 SHAREPOINT.COM\SS\DA\WWWROOT\TEAMS\PG&amp;E\TOPOCK\CONSTRUCTION\SHARED DOCUMENTS\PHASE II DRILLING\06 FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\38 2022-10-12\GINT PROJECT\GPJ GINT DATA TEMPLATE.GDT 10/1/2022





# Boring Log

Sheet: 7 of 10

Date Started: 03/31/2022 Surface Elevation: 554.11 ft amsl  
Date Completed: 04/26/2022 Northing (NAD83): 2100450.05  
Drilling Co.: Cascade Easting (NAD83): 7614666.44 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 182 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Boart Longyear drill head Borehole Diameter: 6-7 inches Location: PG&E Topock, Needles California  
Driller Name: Steve Vasquez Depth to First Water: 93.0 ft bgs  
Drilling Asst: John Whitman / John Colon Sampling Method: 4 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: David Cornell Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☐ Yes ☒ No

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	5			Topock - Competent Bedrock - Metadiorite	N/A		(117-122 ft) Metamorphic Rock; very dark grayish green (5GY 3/2); pulverized by drilling process.		
122									
123									
124	5	FW-02A-SS-122-127 4/25/2022 13:00		Topock - Competent Bedrock - Metadiorite	N/A		(122-127 ft) Metamorphic Rock; very dark greenish gray (5G 3/2); pulverized by drilling process.	(122.0 - 127.0') Rough drilling	(122.0 - 127.0') No drilling fluid used
125									
126									
127									
128		FW-02A-SS-127-130 4/25/2022 13:05		Topock - Weathered Bedrock - Conglomerate	N/A	x x x x	(127-130 ft) Sedimentary Rock; dark yellowish brown (10YR 3/6); pulverized by drilling process; potentially weathered based on drilling observations.	(127.0 - 132.0') Rough drilling	(127.0 - 132.0') No drilling fluid used
129	5		FW-02A-VAS-127-132 (<0.025 ppb) 4/23/2022 09:50			x x x x			
130		FW-02A-SS-130-132 4/25/2022 13:10		Topock - Weathered Bedrock - Metadiorite	N/A		(130-132 ft) Metamorphic Rock; very dark greenish gray (5G 3/2); pulverized by drilling process.		
131									
132									
133									
134	5	FW-02A-SS-132-136.5 4/25/2022 13:15		Topock - Weathered Bedrock - Conglomerate	N/A	x x x x	(132-136.5 ft) Sedimentary Rock; dark yellowish brown (10YR 3/6); fragmented by drilling process.	(132.0 - 137.0') Rough drilling	(132.0 - 137.0') No drilling fluid used
135									
136									
137				Topock - Weathered Bedrock - Metadiorite	N/A		(136.5-137 ft) Metamorphic Rock; dark grayish olive (10Y 4/2); pulverized by drilling process; potentially weathered based on drilling observations.		
138	5	FW-02A-SS-136.5-142 4/25/2022 13:20	FW-02A-VAS-137-142 (<0.025 ppb) 4/23/2022 15:44	Topock - Weathered Bedrock - Metadiorite	N/A		(137-142 ft) Metamorphic Rock; dark grayish olive (10Y 4/2); pulverized by drilling process; potentially weathered based on drilling observations.		
139									
140									

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# Boring Log

Sheet: 8 of 10

Date Started: 03/31/2022 Surface Elevation: 554.11 ft amsl  
Date Completed: 04/26/2022 Northing (NAD83): 2100450.05  
Drilling Co.: Cascade Easting (NAD83): 7614666.44 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 182 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Boart Longyear drill head Borehole Diameter: 6-7 inches Location: PG&E Topock, Needles California  
Driller Name: Steve Vasquez Depth to First Water: 93.0 ft bgs  
Drilling Asst: John Whitman / John Colon Sampling Method: 4 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: David Cornell Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☐ Yes ☒ No

**Boring No.: FW-02A Pilot**

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141	5			Topock - Weathered Bedrock - Metadiorite	N/A		(137-142 ft) Metamorphic Rock; dark grayish olive (10Y 4/2); pulverized by drilling process; potentially weathered based on drilling observations.		
142									
143									
144									
145		FW-02A-SS-142-147 4/25/2022 13:25							
146									
147	10			Topock - Weathered Bedrock - Metadiorite	N/A				
148									
149		FW-02A-SS-147-152 4/25/2022 13:30	FW-02A-VAS-147-152 ( $<0.025$ ppb) 4/24/2022 12:20					(149.0 - 152.0') Soft drilling	(149.0 - 152.0') No drilling fluid used
150									
151									
152									
153									
154		FW-02A-SS-152-157 4/25/2022 13:35							
155									
156	10			Topock - Weathered Bedrock - Metadiorite	N/A				
157									
158		FW-02A-SS-157-162 4/25/2022 13:40	FW-02A-VAS-157-162 ( $<0.025$ ppb) 4/25/2022 10:25						
159									
160									

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Date Started:	<u>03/31/2022</u>	Surface Elevation:	<u>554.11 ft amsl</u>	<b>Boring No.: <u>FW-02A Pilot</u></b>
Date Completed:	<u>04/26/2022</u>	Northing (NAD83):	<u>2100450.05</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7614666.44</u>	Client: <u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>182 ft bgs</u>	Project: <u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>6-7 inches</u>	Location: <u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Steve Vasquez</u>	Depth to First Water:	<u>93.0 ft bgs</u>	
Drilling Asst:	<u>John Whitman / John Colon</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>30126255</u>
Logger:	<u>David Cornell</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
161	10			Topock - Weathered Bedrock - Metadiorite	N/A		(152-162 ft) Metamorphic Rock; olive gray (5Y 4/2) with dark yellowish olive (10YR 3/4); pulverized by drilling process; potentially weathered based on drilling observations.		
162									
163									
164									
165									
166									
167	10			Topock - Weathered Bedrock - Conglomerate	N/A		(162-172 ft) Sedimentary Rock; dark yellowish brown (10YR 3/4); weathered.  (167-169 ft) Metadiorite fragments pulverized by drilling process.		
168									
169									
170									
171									
172									
173									
174									
175									
176	10			Topock - Weathered Bedrock - Conglomerate	N/A		(172-177 ft) Sedimentary Rock; brown (10YR 4/3); weathered.	(172.0 - 177.5') Hard drilling	(172.0 - 177.5') No drilling fluid used
177									
178									
179									
180									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 10 of 10

Date Started:	03/31/2022	Surface Elevation:	554.11 ft amsl	<b>Boring No.: FW-02A Pilot</b>	
Date Completed:	04/26/2022	Northing (NAD83):	2100450.05		
Drilling Co.:	Cascade	Easting (NAD83):	7614666.44	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	182 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	6-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Steve Vasquez	Depth to First Water:	93.0 ft bgs		
Drilling Asst:	John Whitman / John Colon	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	David Cornell	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
181	10	No Sieve Samples Collected	FW-02A-VAS-177-182 (34 ppb) 4/26/2022 10:55	Topock - Weathered Bedrock - Conglomerate	N/A		(177-181 ft) Metamorphic Rock; olive gray (5Y 5/2); pulverized by drilling process; potentially weathered based on drilling observations.	(180.5 - 182.0') Hard drilling	(180.5 - 182.0') No drilling fluid used
182					N/A		(181-182 ft) Sedimentary Rock; brown (10YR 4/3); weathered.		
183							End of Boring at 182 ft bgs.		
184									
185									
186									
187									
188									
189									
190									
191									
192									
193									
194									
195									
196									
197									
198									
199									
200									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Final - Revised 7/19/22

TOPOCK SOIL BORING LOG \VARCADIS\0655 SHAREPOINT.COM\SS\DAV\WWWROOT\TEAMS\PG&E\TOPOCK\CONSTRUCTION\SHARED DOCUMENTS\PHASE II DRILLING\06 FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\38 2022-10-12\GINT PROJECT\GPI GINT DATA TEMPLATE.GDT 10/1/2022



# Boring Log

Sheet: 1 of 8

Date Started:	08/20/2022	Surface Elevation:	551.67 ft amsl	<b>Boring No.: FW-02B Pilot</b>	
Date Completed:	09/01/2022	Northing (NAD83):	2100637.96		
Drilling Co.:	Cascade	Easting (NAD83):	7614544.74	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	142 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-8 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	102.0 ft bgs		
Drilling Asst:	LA / IS / DH	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	J. Anderson / L. Milando	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1	2	No Sieve Samples Collected	No Groundwater Samples Collected	Fluvial Deposits	SW		(0-2 ft) Well graded sand with gravel (SW); light gray (10YR 7/2); very fine to very coarse grained, subangular to subround; trace granules, subangular; trace small to very large pebbles, subangular; poorly sorted; dry; NOTE: sample disturbed from air-knifing activities.	(0.0 - 5.0') Air-knifed for utility clearance sediments not logged.	(0.0 - 5.0') No drilling fluid used
2						(2-8 ft) No Recovery			
3									
4									
5									
6									
7									
8									
9	2.5			Fluvial Deposits	SW		(8-10.5 ft) Well graded sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; little small to very large pebbles, subangular; trace silt; trace granules, subangular; trace clay; poorly sorted; dry.	(8.0 - 17.0') Soft drilling, core sample lost down hole, core barrel is pushing loose sand into the formation instead of the core barrel.	(8.0 - 17.0') No drilling fluid used
10							(10.5-17 ft) No Recovery		
11									
12									
13									
14					NR				
15									
16									
17	4.5			Fluvial Deposits	SW		(17-28.5 ft) Well graded sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; little small to very large pebbles, subangular; trace silt; trace granules, subangular; trace clay; poorly sorted; dry. (17.5-19.5 ft) Increase in the percentage of coarser grained sediments.	(17.0 - 22.0') Core barrel snagged on the drill casing and the drill casing advanced approximately 0.5-1 ft. Potential void	(17.0 - 22.0') No drilling fluid used
18									
19									
20									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 2 of 8

Date Started:	08/20/2022	Surface Elevation:	551.67 ft amsl	<b>Boring No.: FW-02B Pilot</b>	
Date Completed:	09/01/2022	Northing (NAD83):	2100637.96		
Drilling Co.:	Cascade	Easting (NAD83):	7614544.74	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	142 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-8 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	102.0 ft bgs		
Drilling Asst:	LA / IS / DH	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	J. Anderson / L. Milano	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	4.5						(17-28.5 ft) Well graded sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; little small to very large pebbles, subangular; trace silt; trace granules, subangular; trace clay; poorly sorted; dry.	forming or extremely soft sand.	
22									
23									
24				Fluvial Deposits	SW		(24 ft) Increase in the percentage of coarser grained sediment and granules with depth. Lower percentage of silt percentage with depth.		
25									
26									
27	7								
28									
29									
30		No Sieve Samples Collected	No Groundwater Samples Collected	Fluvial Deposits	SW		(28.5-31 ft) Well graded sand with gravel (SW); light gray (10YR 7/2); very fine to very coarse grained, subangular to subround; little small to very large pebbles, subangular to subround; trace granules, subangular; trace silt; dry; pebbles composed of metadiorite; granule and pebble size decreases with depth; percentage of sand decreases with depth; friable caliche cementation.		
31									
32							(31-37 ft) Well graded sand with gravel (SW); light gray (10YR 7/2); very fine to coarse grained, subangular to subround; little small to very large pebbles, subangular; trace granules, subangular; trace silt; poorly sorted; dry; larger pebbles are composed of metadiorite.		
33								(32.0 - 107.0') Rough drilling, potential boulder at approximately 32 ft bgs.	(32.0 - 107.0') No drilling fluid used
34	4.5			Alluvium Deposits	SW				
35									
36									
37									
38									
39	7.5			Alluvium Deposits	SW-SM		(37-39.5 ft) Well graded sand with silt (SW-SM); light gray (10YR 7/2); very fine to coarse grained, subangular to subround; trace silt; trace small pebbles, subround; trace granules, subangular; dry; strong HCl reaction; friable caliche cementation.		
40									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 3 of 8

Date Started: 08/20/2022 Surface Elevation: 551.67 ft amsl  
Date Completed: 09/01/2022 Northing (NAD83): 2100637.96  
Drilling Co.: Cascade Easting (NAD83): 7614544.74 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 142 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Boart Longyear drill head Borehole Diameter: 4-8 inches Location: PG&E Topock, Needles California  
Driller Name: Matt Arnold Depth to First Water: 102.0 ft bgs  
Drilling Asst: LA / IS / DH Sampling Method: 4 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: J. Anderson / L. Milano Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☒ Yes ☐ No

**Boring No.: FW-02B Pilot**

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid	
41	7.5	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SW		(39.5-46.5 ft) Well graded sand with gravel (SW); light brownish gray (10YR 6/2), and light gray (10YR 7/1); very fine to very coarse grained, subangular to subround; little granules, subangular; trace small pebbles, subangular; trace silt; poorly sorted; dry; strong HCl reaction; strong caliche cementation.			
42										
43										
44										
45										
46										
47	5			Alluvium Deposits	SW-SM		(46.5-47.5 ft) Well graded sand with silt (SW-SM); light gray (10YR 7/1); fine to very coarse grained, subangular to subround; little silt; trace granules, subangular to subround; trace small pebbles, subangular; poorly sorted; dry; moderate HCl reaction; moderate caliche cementation.			
48				Alluvium Deposits	SW-SM		(47.5-49 ft) Well graded sand with silt and gravel (SW-SM); pale orange yellow (10YR 8/2), and light gray (10YR 7/1); fine to very coarse grained, subangular to subround; little small to large pebbles, subangular to subround; little silt; trace granules, subangular to subround; poorly sorted; dry; moderate HCl reaction; moderate caliche cementation.			
49				Alluvium Deposits	SW-SM					(49-50.5 ft) Well graded sand with silt and gravel (SW-SM); pale orange yellow (10YR 8/2), and light gray (10YR 7/1); fine to very coarse grained, subangular to subround; little small to large pebbles, subangular to subround; trace silt; trace granules, subangular to subround; trace clay; poorly sorted; dry; moderate HCl reaction; moderate caliche cementation.
50										(49-50.5 ft) Decrease in silt to approximately 1% silt, and increase the amount moderate caliche cementation.
51										
52	3			Alluvium Deposits	SW		(50.5-57 ft) Well graded sand with gravel (SW); light gray (10YR 7/2); very fine to coarse grained, subangular to subround; little small to medium pebbles, subangular to subround; little granules, subangular to subround; trace silt; trace clay; poorly sorted; dry; moderate HCl reaction; weak caliche cementation.			
53										
54										
55	8			Alluvium Deposits	SW		(57-57.5 ft) Well graded sand with gravel (SW); light gray (10YR 7/2); very fine to coarse grained, subangular to subround; little small to medium pebbles, subangular to subround; little granules, subangular to subround; trace silt; trace clay; poorly sorted; dry; moderate HCl reaction; weak caliche cementation.			
56										
57										
58										
59										
60										

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

TOPOCK SOIL BORING LOG \\ARCADIS0365\SHAREPOINT.COM\SS\DA\WWWROOT\TEAMS\PG&amp;E\TOPOCK\CONSTRUCTION\SHARED DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\08 2022-10-12\GINT PROJECT GPJ GINT DATA TEMPLATE.GDT 10/12/2022







# Boring Log

Sheet: 5 of 8

Date Started:	08/20/2022	Surface Elevation:	551.67 ft amsl	<b>Boring No.: FW-02B Pilot</b>	
Date Completed:	09/01/2022	Northing (NAD83):	2100637.96		
Drilling Co.:	Cascade	Easting (NAD83):	7614544.74	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	142 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-8 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	102.0 ft bgs		
Drilling Asst:	LA / IS / DH	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	J. Anderson / L. Milando	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	8	No Sieve Samples Collected		Alluvium Deposits	SW-SM		(77.5-83 ft) Well graded sand with silt and gravel (SW-SM); yellowish brown (10YR 5/4); very fine to very coarse grained, subangular to subround; little silt; little small to large pebbles, subangular; trace granules, subangular to subround; trace clay; poorly sorted; dry; moderate HCl reaction; weak caliche cementation.		
82									
83									
84									
85	3.8	FW-02B-SS-90-92.5 8/25/2022 16:05	No Groundwater Samples Collected	Alluvium Deposits	SW		(83-92.5 ft) Well graded sand (SW); light gray (10YR 7/2); very fine to very coarse grained, subangular to subround; trace granules, subangular to subround; trace small to medium pebbles, subangular to subround; trace silt; poorly sorted; dry; moderate HCl reaction; strong caliche cementation; increase in the percentage of finer grained sand and silt with depth.		
86									
87									
88									
89	3.9	FW-02B-SS-92.5-96 8/25/2022 16:10		Alluvium Deposits	SW-SM		(92.5-99 ft) Well graded sand with silt and gravel (SW-SM); light gray (10YR 7/2); very fine to very coarse grained, subangular to subround; little granules, angular to subangular; little small to medium pebbles, subangular to subround; little silt; poorly sorted; dry; trace metadiorite pebbles; approximately 25% of the core has moderate caliche cementation.		
90									
91									
92									
93	3.7	FW-02B-SS-96-99 8/25/2022 16:15	FW-02B-VAS-97-102 (<0.025 ppb) 8/24/2022 11:12	Alluvium Deposits	SW			(97.0 - 102.0') VAS interval had to be resampled due to the Cr (VI) inadvertently not field filtered.	(97.0 - 102.0') No drilling fluid used
94									
95									
96									
97									
98									
99									
100									

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# Boring Log

Sheet: 6 of 8

Date Started: 08/20/2022 Surface Elevation: 551.67 ft amsl  
Date Completed: 09/01/2022 Northing (NAD83): 2100637.96  
Drilling Co.: Cascade Easting (NAD83): 7614544.74 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 142 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Boart Longyear drill head Borehole Diameter: 4-8 inches Location: PG&E Topock, Needles California  
Driller Name: Matt Arnold Depth to First Water: 102.0 ft bgs  
Drilling Asst: LA / IS / DH Sampling Method: 4 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: J. Anderson / L. Milando Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☒ Yes ☐ No

**Boring No.: FW-02B Pilot**

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	3.7	FW-02B-SS-99-104 8/25/2022 16:20		Alluvium Deposits	SW		(99-104 ft) Well graded sand with gravel (SW); light gray (10YR 7/2), some brown (10YR 5/3); very fine to very coarse grained, subangular to subround; little granules, subangular to subround; trace small to medium pebbles, subangular; trace clay; poorly sorted; dry to moist; moderate caliche cementation; sizes of cemented sediment fragments decreased with depth; the percentage of coarse grained sand increases with depth. (102) Increase in the percentage of metadiorite pebbles.		
102									
103									
104	3.5	FW-02B-SS-104-108 8/25/2022 16:25		Alluvium Deposits	SW		(104-108 ft) Well graded sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; little small to large pebbles, subangular to subround; trace granules, subangular to subround; trace silt; trace clay; poorly sorted; moist.		
105									
106									
107									
108								(107.0 - 112.0') Bottom of borehole collapsed before sample screen was deployed, tripped back in to clear it out and advance the 6-inch casing to 107 feet bgs. VAS interval had to be resampled due to the Cr	(107.0 - 112.0') No drilling fluid used
109	3.6	FW-02B-SS-108-112 8/25/2022 16:30	FW-02B-VAS-107-112 ( $<0.025$ ppb) 8/24/2022 09:15	Alluvium Deposits	SW-SM		(108-112 ft) Well graded sand with silt and gravel (SW-SM); brown (10YR 5/3), some light yellowish brown (10YR 6/4); very fine to very coarse grained, subangular to subround; little silt; trace small to medium pebbles, subangular to subround; trace granules, subangular to subround; trace clay; poorly sorted; moist; majority of the core has moderate caliche cementation.		
110									
111									
112								(VI) inadvertently not field filtered.	(112.0 - 122.0') No drilling fluid used
113		FW-02B-SS-112-115 8/25/2022 16:35		Alluvium Deposits	SM		(112-115 ft) Silty sand (SM); brown (10YR 5/3); very fine to coarse grained, subangular to subround; little silt; trace granules, subangular to subround; trace small to medium pebbles, subangular to subround; trace clay; poorly sorted; moist.		
114								(112.0 - 122.0') Tight drilling, went back down to clear it out and the rig overheated.	
115									
116	5	FW-02B-SS-115-119.5 8/25/2022 16:40		Alluvium Deposits	SW		(115-119 ft) Well graded sand (SW); light yellowish brown (10YR 6/4), and brown (10YR 5/3); very fine to coarse grained, subangular to subround; trace granules, subangular to subround; trace silt; trace small to medium pebbles, subangular to subround; trace clay; poorly sorted; moist; moderate caliche cementation; cemented sediments and metadiorite pebbles were medium to large in size.		
117									
118			FW-02B-VAS-117-122 (7.8 ppb) 8/30/2022 11:14						
119									
120				Alluvium Deposits	SW-SM				

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TOPOCK SOIL BORING LOG | V:\CARDIS\0365\SHAREPOINT.COM\SS\DA\WWWROOT\TEAMS\PG&amp;E\TOPOCK\CONSTRUCTION\SHARED DOCUMENTS\PHASE II DRILLING\06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\38 2022-10-12\GINT PROJECT\GPI GINT DATA TEMPLATE.GDT - 10/1/2022

Date Started:	08/20/2022	Surface Elevation:	551.67 ft amsl	<b>Boring No.: FW-02B Pilot</b>	
Date Completed:	09/01/2022	Northing (NAD83):	2100637.96		
Drilling Co.:	Cascade	Easting (NAD83):	7614544.74	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	142 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-8 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	102.0 ft bgs		
Drilling Asst:	LA / IS / DH	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	J. Anderson / L. Milando	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	5	FW-02B-SS-119.5-122.8/25/2022 16:45		Alluvium Deposits	SW-SM		(119-122 ft) Well graded sand with silt (SW-SM); brown (10YR 5/3); very fine to coarse grained, subangular to subround; little silt; trace clay, trace granules, subround; trace small to medium pebbles, subround; poorly sorted; moist to wet.		
122									
123				Alluvium Deposits	SM		(122-124.5 ft) Silty sand (SM); dark grayish brown (2.5Y 4/2), and reddish yellow (7.5YR 7/6); very fine to coarse grained, subangular to subround; some silt; trace small to medium pebbles, angular to subangular; trace clay; poorly sorted; dry to moist.	(122.0') Drilling with the 6-inch casing getting tight. Drillers retracted approximately 70 feet of drill casing to ream the hole to assist with advancing drill casing.	(122.0') No drilling fluid used
124									
125		FW-02B-SS-122-127.5 9/1/2022 15:30		Alluvium Deposits	SW-SM		(124.5-126.5 ft) Well graded sand with silt (SW-SM); dark grayish brown (2.5Y 4/2), and reddish yellow (7.5YR 7/6); very fine to coarse grained, subangular to subround; little silt; trace small to medium pebbles, angular to subangular; trace clay; poorly sorted; dry to moist; blocky structure; moderate HCl reaction.		
126									
127	6.8			Alluvium Deposits	SM		(126.5-127.5 ft) Silty sand with gravel (SM); dark grayish brown (2.5Y 4/2), and reddish yellow (7.5YR 7/6); very fine to very coarse grained, subangular to subround; some silt; little small pebbles, subangular to subround; trace granules, subangular to subround; trace clay; poorly sorted; dry to moist; blocky structure; moderate HCl reaction.		
128									
129		FW-02B-SS-127.5-131 9/1/2022 15:35	FW-02B-VAS-127-132 (36 ppb) 8/31/2022 11:00	Alluvium Deposits	SW		(127.5-131 ft) Well graded sand with gravel (SW); dark grayish brown (2.5Y 4/2), and reddish yellow (7.5YR 7/6); very fine to very coarse grained, subangular to subround; little granules, subangular to subround; trace small to medium pebbles, subangular to subround; trace silt; poorly sorted; dry to moist; blocky structure; moderate HCl reaction.		
130									
131									
132		FW-02B-SS-131-132 9/1/2022 15:40		Alluvium Deposits	SM		(131-132 ft) Silty sand (SM); dark grayish brown (2.5Y 4/2), and reddish yellow (7.5YR 7/6); very fine to very coarse grained, subangular to subround; some silt; trace small pebbles, subangular; trace granules, subangular; trace clay; poorly sorted; dry to moist; blocky structure; moderate HCl reaction.		
133									
134				Weathered Bedrock - Conglomerate	N/A		(132-135 ft) Sedimentary Rock - Conglomerate; brown (7.5YR 5/4); fine grained to medium grained; highly weathered; soft, wet.	(132.0 - 134.5') Poor recovery	(132.0 - 134.5') No drilling fluid used
135									
136	7.2	No Sieve Samples Collected	FW-02B-VAS-135-137 (Sample results disregraded as water not likely representative of aquifer and is considered not water bearing interval) 9/1/2022 09:22	Competent Bedrock - Conglomerate	N/A		(135-139.5 ft) Sedimentary Rock - Conglomerate; brown (7.5YR 5/4); fine grained to medium grained; moderately weathered; medium hard; friable; wet, moisture in pockets; pulverized by drilling process. (135.5-139.5 ft) Moist to dry.	(135.0 - 142.0') Rough drilling, drill rig started to overheat. (135.5') The 6-inch diameter casing stick in the formation, had to vibrate to free it and retack to approximately 118 ft bgs.	(135.0 - 142.0') No drilling fluid used (135.5') No drilling fluid used
137									
138									
139									
140					N/A				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 8 of 8

Date Started:	08/20/2022	Surface Elevation:	551.67 ft amsl	<b>Boring No.: FW-02B Pilot</b>	
Date Completed:	09/01/2022	Northing (NAD83):	2100637.96		
Drilling Co.:	Cascade	Easting (NAD83):	7614544.74	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	142 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-8 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	102.0 ft bgs		
Drilling Asst:	LA / IS / DH	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	J. Anderson / L. Milando	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141	7.2	No Sieve Samples Collected		Competent Bedrock - Conglomerate	N/A	x x	(139.5-142 ft) Sedimentary Rock - Conglomerate; brown (7.5YR 5/4); fine grained to medium grained; slightly weathered; medium hard; friable; dry to moist; moisture in pockets; pulverized by drilling method.		
142							End of Boring at 142 ft bgs.		
143									
144									
145									
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Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 1 of 14

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1				Fill	N/A		(0-1.5 ft) Backfill used to grade drilling pad.	(0.0 - 1.5') Air-knifed for utility clearance. Logged from air-knifing observations.	(0.0 - 1.5') No drilling fluid used
2				Fill	N/A		(1.5-4.5 ft) Boulders, cobbles and pebbles supported in a sandy matrix.	(1.5 - 4.5') Air-knifed for utility clearance. Logged from air-knifing observations.	(1.5 - 4.5') No drilling fluid used
3									
4									
5	9.5			Fluvial Deposits	SM		(4.5-9 ft) Silty sand material that sloughed into hole creating large void.	(4.5 - 9.0') Air-knifed for utility clearance. Logged from air knifing observations. Water added to help with sands sloughing into hole.	(4.5 - 9.0') 20 gallons of water used; 0 gallons of water recovered; 20 gallons of water lost
6									
7									
8									
9					NR		(9-9.5 ft) No Recovery.	(9.0 - 12.0') Completed air-knifing on 4/1/22.	(9.0 - 12.0') 20 gallons of water used; 0 gallons of water recovered; 20 gallons of water lost
10		No Sieve Samples Collected	No Groundwater Samples Collected	Fluvial Deposits	SW		(9.5-10.5 ft) Well graded sand with gravel (SW); very pale brown (10YR 7/3); very fine to coarse grained, subangular to subround; little granules, subangular to round; little small to very large pebbles, subangular to subround; dry. NOTE: Sample was disturbed due to air-knifing.	(9.5 - 17.0') Normal drilling	(9.5 - 17.0') No drilling fluid used
11				Fluvial Deposits	SP		(10.5-15 ft) Poorly graded sand (SP); very pale brown (10YR 7/3); fine to medium grained, trace very fine and coarse grained, subangular to subround; trace small to large pebbles, subround to round; trace granules, subangular to round; moist; NOTE: Top 1.5 ft disturbed by air-knifing.		
12	5.5								
13				Fluvial Deposits	SW		(15-15.5 ft) Well graded sand with gravel (SW); light brownish gray (10YR 6/2); fine to very coarse grained, angular to subround; and small to very large, angular to subround; little granules, subangular to subround; dry.		
14									
15				Fluvial Deposits	SW		(15.5-23 ft) Well graded sand with gravel (SW); very pale brown (10YR 7/3); very fine to coarse grained, subangular to subround; little granules, subangular to subround; trace silt; trace clay; dry.	(17.0 - 37.0') Soft drilling	(17.0 - 37.0') No drilling fluid used
16									
17									
18	7								
19									
20									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.





# Boring Log

Sheet: 2 of 14

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21				Fluvial Deposits	SW		(15.5-23 ft) Well graded sand with gravel (SW); very pale brown (10YR 7/3); very fine to coarse grained, subangular to subround; little granules, subangular to round; little small to very large pebbles, subangular to subround; trace silt; trace clay; dry.		
22									
23				Fluvial Deposits	SM		(23-24 ft) Silty sand (SM); light gray (10YR 7/2); very fine to fine grained, subangular to subround; little silt; trace clay; dry.		
24									
25				Fluvial Deposits	SW-SM		(24-27 ft) Well graded sand with silt and gravel (SW-SM); light gray (10YR 7/2); very fine to very coarse grained, subangular to round; some small to large pebbles, subangular to round; little granules, subangular to round; little silt; trace clay; dry.		
26									
27							(27-34.5 ft) No Recovery		
28									
29	7								
30		No Sieve Samples Collected	No Groundwater Samples Collected						
31					NR				
32									
33									
34									
35									
36	2.5								
37									
38				Fluvial Deposits	SM		(34.5-40 ft) Silty sand with gravel (SM); light gray (10YR 7/2); very fine to fine grained, subangular to subround; little silt; little small to large pebbles, subangular to subround; trace granules, subangular to subround; trace clay; dry.	(37.0 - 40.0') Soft drilling	(37.0 - 40.0') No drilling fluid used
39	8								
40									

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











# Boring Log

Sheet: 3 of 14

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid			
41	8	No Sieve Samples Collected	No Groundwater Samples Collected	Fluvial Deposits	CL		(40-41 ft) Lean clay with sand (CL); weak red (7.5R 5/3); medium plasticity, slow dilatancy; little silt; little very fine to very coarse grained sand, subangular to subround; trace granules, angular to subround; trace small to large pebbles, angular to subround; medium stiff; dry; NOTE: Compliance notified about presence of clay.	(41.0 - 47.0') Hard drilling	(41.0 - 47.0') No drilling fluid used			
42				Fluvial Deposits	SC		(41-42 ft) Clayey sand (SC); light yellowish brown (10YR 6/4); very fine to fine grained, subangular to subround; some clay; little silt; dry to moist; nodules and lens of Lean clay (CL); medium plasticity, slow dilatancy; throughout unit. NOTE: Compliance notified about presence of clay.					
43				Fluvial Deposits	CH		(42-44 ft) Fat clay (CH); reddish brown (5YR 4/3); high plasticity, no dilatancy; little silt; very stiff; moist. NOTE: Compliance notified about presence of clay.					
44				Fluvial Deposits	CL		(44-45 ft) Lean clay (CL); weak red (7.5R 5/3); low to medium plasticity, slow dilatancy; some silt; little very fine grained sand, subangular to subround; soft; dry; NOTE: Compliance notified about presence of clay.					
45				Fluvial Deposits	SM		(45-47 ft) Silty sand (SM); weak red (7.5R 5/2); very fine to very coarse grained, subangular to subround; some silt; little clay; dry.					
46	8			No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SW		(47-55 ft) Well graded sand with gravel (SW); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; some small to large pebbles, angular to subround; little granules, angular to subround; little silt; dry.	(47.0 - 57.0') Hard drilling	(47.0 - 57.0') No drilling fluid used	
47												
48												
49												
50												
51		9	No Sieve Samples Collected			No Groundwater Samples Collected	Alluvium Deposits	CL		(55-56 ft) Sandy lean clay (CL); brown (10YR 5/3); low plasticity, rapid dilatancy; some silt; little very fine to very coarse grained sand, angular to subround; trace granules, angular to subround; trace small to large pebbles, angular to subround; medium stiff; dry; NOTE: Compliance notified about presence of clay.	(57.0 - 67.0') Hard drilling	(57.0 - 67.0') No drilling fluid used
52												
53												
54												
55												
56	9	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SM		(56-65 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little silt; little granules, angular to subround; little clay; dry; trace clay nodules.	(57.0 - 67.0') Hard drilling	(57.0 - 67.0') No drilling fluid used			
57												
58												
59												
60												

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 4 of 14

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	9			Alluvium Deposits	SM		(56-65 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little silt; little granules, angular to subround; little clay; dry; trace clay nodules.		
62							(64.5-65 ft) Moist		
63				Alluvium Deposits	ML		(65-66 ft) Sandy silt with gravel (ML); grayish brown (10YR 5/2); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little small to large pebbles, angular to subround; little clay; trace granules, angular to subround; soft to stiff; dry; trace clay nodules.		
64							(66-72 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little clay; dry; trace clay nodules.		
65	7.5	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SW		(67-72 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little clay; dry; trace clay nodules.	(67.0 - 77.0') Hard drilling	(67.0 - 77.0') No drilling fluid used
66							(69.5-70 ft) Moist		
67				Alluvium Deposits	SW		(70.5-71.5 ft) Moist		
68							(72-77 ft) Well grade sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little granules, angular to subround; trace silt; trace clay; dry.		
69	7.6			Alluvium Deposits	SM		(74 ft) Large cobble	(77.0 - 87.0') Hard drilling	(77.0 - 87.0') No drilling fluid used
70							(77-82 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little granules, angular to subround; little silt; little clay; dry.		
71				Alluvium Deposits	SM				
72									
73									
74									
75									
76									
77									
78									
79									
80									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 5 of 14

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	7.6			Alluvium Deposits	SM		(77-82 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little granules, angular to subround; little silt; little clay; dry. (80-81 ft) Moist		
82				Alluvium Deposits	SC		(82-85 ft) Clayey sand with gravel (SC); light yellowish brown (10YR 6/4); very fine to very coarse grained, angular to subround; some clay; little small to very large pebbles, angular to subround; little silt; trace granules, angular to subround; dry.		
83				Alluvium Deposits	SW-SM		(85-87 ft) Well graded sand with silt and gravel (SW-SM); grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little granules, angular to subround; little silt; trace clay; dry.		
84	7.8	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SC		(87-89.5 ft) Clayey sand with gravel (SC); brown (10YR 5/3); very fine to very coarse grained, angular to subround; some small to very large pebbles, angular to subround; little clay; little silt; little granules, angular to subround; dry; nodules of hard clay within unit.	(87.0 - 97.0') Hard drilling	(87.0 - 97.0') No drilling fluid used
85				Alluvium Deposits	CL		(89.5-91 ft) Gravelly lean clay with sand (CL); brown (10YR 5/3); low to medium plasticity, slow dilatancy; some small to very large pebbles, angular to subround; little silt; little very fine to very coarse grained sand, angular to subround; trace granules, angular to subround; very stiff; dry; nodules of hard clay within unit.		
86				Alluvium Deposits	SM		(91-92 ft) Silty sand with gravel (SM); brown (10YR 5/3); very fine to very coarse grained, angular to subround; some small to very large pebbles, angular to subround; little silt; little clay; trace granules, angular to subround; dry; nodules of hard clay within unit.		
87				Alluvium Deposits	CL		(92-93 ft) Gravelly lean clay with sand (CL); brown (10YR 5/3); low to medium plasticity, slow dilatancy; some small to very large pebbles, angular to subround; little silt; little very fine to very coarse grained sand, angular to subround; trace granules, angular to subround; very stiff; dry; nodules of hard clay within unit.		
88				Alluvium Deposits	SM		(93-97 ft) Silty sand with gravel (SM); brown (10YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little silt; little clay; trace granules, angular to subround; dry; nodules of hard clay within unit.		
89				Alluvium Deposits	SC		(97-102 ft) Clayey sand with gravel (SC); brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; some clay; little silt; little small to large pebbles, angular to subround; trace granules, angular to subround; dry; nodules of hard clay within unit.		
90	7.6			Alluvium Deposits	SC		(97-102 ft) Clayey sand with gravel (SC); brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; some clay; little silt; little small to large pebbles, angular to subround; trace granules, angular to subround; dry; nodules of hard clay within unit.	(97.0 - 107.0') Hard drilling	(97.0 - 107.0') No drilling fluid used
91				Alluvium Deposits	SC		(97-102 ft) Clayey sand with gravel (SC); brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; some clay; little silt; little small to large pebbles, angular to subround; trace granules, angular to subround; dry; nodules of hard clay within unit.		
92									
93									
94									
95									
96									
97									
98									
99									
100									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 6 of 14

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	7.6			Alluvium Deposits	SC		(97-102 ft) Clayey sand with gravel (SC); brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; some clay; little silt; little small to large pebbles, angular to subround; trace granules, angular to subround; dry; nodules of hard clay within unit.		
102				Alluvium Deposits	SW-SM		(102-107 ft) Well grade sand with silt and gravel (SW-SM); brown (10YR 5/3); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subround; little granules, angular to subround; little silt; trace clay; dry.		
103									
104									
105	8.1	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SC		(107-109.5 ft) Clayey sand with gravel (SC); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; some clay; some silt; little small to medium pebbles, angular to subround; trace granules, angular to subangular; dry to moist.	(107.0 - 117.0') Hard drilling	(107.0 - 117.0') No drilling fluid used
106				Alluvium Deposits	SC		(109-112 ft) Moist		
107				Alluvium Deposits	SC		(109.5-110.5 ft) Clayey sand (SC); brown (10YR 5/3); very fine to very coarse grained, angular to subround; some clay; little silt; trace granules, angular to subangular; moist.		
108				Alluvium Deposits	SC		(110.5-112 ft) Clayey sand with gravel (SC); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; some clay; some silt; little small to medium pebbles, angular to subround; trace granules, angular to subangular; dry to moist.		
109				Alluvium Deposits	SM		(112-114 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, subangular to subround; some silt; some clay; little small to medium pebbles, angular to subround; trace granules, angular to subangular; moist.		
110				Alluvium Deposits	SM		(114-119 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, subangular to subround; some silt; little clay; little small to medium pebbles, angular to subround; trace granules, angular to subangular; dry.		
111									
112									
113	7.8			Alluvium Deposits	CL		(119-120 ft) Lean clay with sand (CL); brown (7.5YR 5/3); medium plasticity, slow dilatancy; some silt; little very fine to very coarse grained sand, subangular to subround; trace granules, subangular	(117.0 - 127.0') Hard drilling	(117.0 - 127.0') No drilling fluid used
114									
115									
116									
117									
118									
119									
120									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.






Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	7.8			Alluvium Deposits	SM		to subround; trace small to medium pebbles, subangular to subround; very stiff; moist. (120-125.5 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, subangular to subround; some silt; little clay; little small to medium pebbles, angular to subround; trace granules, angular to subangular; dry.		
122									
123									
124									
125	6.9	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	ML		(125.5-127 ft) Silt with sand (ML); brown (7.5YR 5/3); and clay; no plasticity, rapid dilatancy; little very fine to very coarse grained sand, subangular to subround; trace granules, subangular to subround; trace small to medium pebbles, subangular to subround; stiff; dry.		
126									
127				Alluvium Deposits	ML		(127-130 ft) Sandy silt (ML); grayish brown (10YR 5/2); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, subangular to subround; little clay; little small to very large pebbles, angular to subround; trace granules, angular to subangular; very soft; dry.	(127.0 - 137.0') Hard drilling	(127.0 - 137.0') No drilling fluid used
128									
129				Alluvium Deposits	SM		(130-132 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little small to very large pebbles, angular to subround; little clay; trace granules, angular to subangular; dry.		
130									
131	3.7			Alluvium Deposits	SW-SC		(132-135 ft) Well graded sand with clay and gravel (SW-SC); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; little small to large pebbles, angular to subround; little clay; trace silt; trace granules, angular to subangular; dry.		
132									
133				Alluvium Deposits	SM		(135-137 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; little small to very large pebbles, angular to subround; little granules, angular to subangular; little silt; little clay; dry.		
134									
135				Alluvium Deposits	SM		(137-147 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little small to very large pebbles, angular to subround; little clay; trace granules, angular to subangular; dry; nodules of hard clay within unit.	(137.0 - 142.0') Hard drilling	(137.0 - 142.0') No drilling fluid used
136									
137									
138									
139									
140									

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Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid	
141	3.7	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SM		(137-147 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little small to very large pebbles, angular to subround; little clay; trace granules, angular to subangular; dry; nodules of hard clay within unit.	(142.0 - 152.0') Hard drilling	(142.0 - 152.0') No drilling fluid used	
142	(143 ft) 2-inch lens with some clay, low-medium plasticity, rapid dilatancy.									
143										
144										
145										
146										
147	7.8			Alluvium Deposits	SM		(147-152 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; little silt; little clay; trace granules, angular to subangular; dry; nodules of hard clay within unit.			
148										
149										
150										
151										
152										
153	7.3	Alluvium Deposits	ML		(152-152.5 ft) Sandy silt (ML); grayish brown (10YR 5/2); low plasticity, rapid dilatancy; some clay; some very fine to very coarse grained sand, angular to subround; trace granules, angular to subangular; trace small to medium pebbles, angular to subangular; medium stiff; moist.	(152.0 - 162.0') Hard drilling	(152.0 - 162.0') No drilling fluid used			
154		Alluvium Deposits	SM		(152.5-154.5 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, subangular to subround; some silt; little small to very large pebbles, angular to subround; little clay; trace granules, angular to subangular; dry; nodules of hard clay within unit.					
155		Alluvium Deposits	SM		(154.5-164 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little small to large pebbles, angular to subangular; trace granules, angular to subangular; dry; nodules of hard clay within unit.					
156										
157										
158										
159										
160										

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Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs	
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: 30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
161	7.3	TCS-1-SS-159-164 4/13/2022 14:30	No Groundwater Samples Collected	Alluvium Deposits	SM		(154.5-164 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little small to large pebbles, angular to subangular; trace granules, angular to subangular; dry; nodules of hard clay within unit.		
162								(162.0 - 170.0') Hard drilling	(162.0 - 170.0') No drilling fluid used
163									
164									
165	6.5	TCS-1-SS-164-170 4/13/2022 15:10	TCS-1-VAS-164-169 (1100 ppb) 4/3/2022 10:50	Alluvium Deposits	SM		(164-165 ft) Silty sand with gravel (SM); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; little silt; little clay; trace granules, subangular to subround; trace small pebbles, subangular to subround; wet.		
166				Alluvium Deposits	SM		(165-166 ft) Silty sand with gravel (SM); brown (7.5YR 5/2); very fine to very coarse grained, subangular to subround; some silt; little small to medium pebbles, angular to subangular; little clay; trace granules, angular to subround; dry.		
167				Alluvium Deposits	SM		(166-167 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little clay; trace granules, subangular to subround; trace small to medium pebbles, subangular to subround; wet.		
168				Alluvium Deposits	SM		(167-167.5 ft) Silty sand (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; some silt; little clay; trace granules, subangular to subround; trace small to medium pebbles, subangular to subround; dry.		
169				Alluvium Deposits	SM		(167.5-170 ft) Silty sand (SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; little silt; little clay; trace granules, subangular to subround; trace small to medium pebbles, subangular to subround; wet.		
170				Alluvium Deposits	ML		(170-171 ft) Silt with sand (ML); brown (7.5YR 5/3); and clay; low to medium plasticity, rapid dilatancy; little very fine to very coarse grained sand, angular to subround; trace granules, angular to subround; trace small pebbles, angular to subround; medium stiff; dry to moist.	(170.0 - 177.0') Hard drilling	(170.0 - 177.0') No drilling fluid used
171							(171-182 ft) Sandy silt (ML); brown (10YR 5/3); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little clay; trace granules, angular to subround; trace small to medium pebbles, angular to subround; medium stiff; dry to moist.		
172									
173	5	TCS-1-SS-170-176 4/13/2022 15:18		Alluvium Deposits	ML		(175-179.5 ft) Moist		
174									
175									
176									
177									
178	7.6	TCS-1-SS-176-182 4/13/2022 15:25						(177.0 - 187.0') Normal drilling	(177.0 - 187.0') No drilling fluid used
179									
180									

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Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
181	7.6	TCS-1-SS-182-187 4/13/2022 15:33		Alluvium Deposits	ML		(171-182 ft) Sandy silt (ML); brown (10YR 5/3); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little clay; trace granules, angular to subround; trace small to medium pebbles, angular to subround; medium stiff; dry to moist. (181-182 ft) Moist		
182									
183									
184									
185	3.7	TCS-1-SS-187-192 4/13/2022 15:39		Alluvium Deposits	SM		(182-194.5 ft) Silty sand (SM); brown (10YR 5/3); very fine to very coarse grained, angular to subround, and silt; no plasticity, rapid dilatancy; little clay; trace granules, angular to subangular; trace small to medium pebbles, angular to subround; medium stiff to very stiff; moist.		
186									
187									
188								(187.0 - 192.0') Normal drilling	(187.0 - 192.0') No drilling fluid used
189	4.9	TCS-1-SS-192-197 4/13/2022 15:45	TCS-1-VAS-192-197 ( $<0.025$ ppb) 4/4/2022 09:45	Alluvium Deposits	SW		(194.5-195 ft) Well graded sand (SW); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; trace granules, angular to subround; trace small pebbles, subangular to subround; trace silt; trace clay; wet.		
190				Alluvium Deposits	ML		(195-196.5 ft) Sandy silt (ML); brown (10YR 5/3); no plasticity, rapid dilatancy; and very fine to very coarse grained sand, angular to subround; trace small to medium pebbles, angular to subround; trace granules, angular to subangular; trace clay; medium stiff to very stiff; dry to moist.		
191				Alluvium Deposits	SW-SM		(196.5-197 ft) Well graded sand with silt and gravel (SW-SM); brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; little silt; trace small to medium pebbles, subangular to subround; trace granules, angular to subround; trace clay; wet.		
192								(192.0 - 197.0') Normal drilling	(192.0 - 197.0') No drilling fluid used
193	7.2	TCS-1-SS-197-200.5 4/13/2022 15:48		Alluvium Deposits	ML		(197-200.5 ft) Sandy silt with gravel (ML); brown (10YR 5/3); low plasticity, rapid dilatancy; some clay; some very fine to very coarse grained sand, angular to subround; little small pebbles, angular to subangular; trace granules, angular to subangular; moist.		
194									
195									
196								(197.0 - 206.0') Normal drilling	(197.0 - 206.0') No drilling fluid used
197									
198									
199									
200									

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# Boring Log

Sheet: 11 of 14

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
201	7.2	TCS-1-SS-200.5-205.5 4/13/2022 15:51		Alluvium Deposits	ML		(200.5-202 ft) Sandy silt with gravel (ML); brown (7.5YR 5/3); no plasticity, rapid dilatancy; little very fine to very coarse grained sand, subangular to subround; little clay; little small to large pebbles, angular to subround; trace granules, subangular to subround; medium stiff; moist.		
202					ML				
203					ML		(202-206 ft) Sandy silt (ML); brown (10YR 5/3); no plasticity, rapid dilatancy; little very fine to very coarse grained sand, subangular to subround; little clay; trace granules, subangular to subround; trace small to large pebbles, angular to subround; medium stiff; moist.		
204					ML				
205	8.8	TCS-1-SS-205.5-211 4/13/2022 15:54		Alluvium Deposits	ML		(206-207.5 ft) Sandy silt with gravel (ML); brown (7.5YR 5/3); no plasticity, rapid dilatancy; some clay; little very fine to very coarse grained sand, subangular to subround; little small to large pebbles, angular to subround; trace granules, subangular to subround; medium stiff; moist.	(206.0 - 217.0') Normal drilling	(206.0 - 217.0') No drilling fluid used
206					ML				
207					ML		(207.5-214 ft) Sandy silt with gravel (ML); brown (7.5YR 5/3); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, subangular to subround; little clay; trace granules, subangular to subround; trace small to medium pebbles, angular to subround; medium stiff; dry to moist.		
208					ML		(209 ft) Color change to brown (10YR 5/3).		
209					ML				
210					ML				
211					ML				
212					ML				
213	8.5	TCS-1-SS-211-217 4/13/2022 15:57		Alluvium Deposits	SM		(214-217 ft) Silty sand with gravel (SM); reddish brown (5YR 4/4); very fine to very coarse grained, subangular to subround; some silt; little small to very large pebbles, subangular to round; little clay; trace granules, subangular to subround; moist.	(217.0 - 227.0') Normal drilling	(217.0 - 227.0') No drilling fluid used
214					SM				
215					SM				
216					SM				
217					SM				
218					SM				
219					SM				
220					SM				
218	8.5	TCS-1-SS-217-221 4/13/2022 16:00		Alluvium Deposits	ML		(217-220 ft) Sandy silt with gravel (ML); reddish brown (5YR 4/4); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, subangular to subround; some clay; little small to large pebbles, angular to subround; trace granules, subangular to subround; medium stiff; moist.	(217.0 - 227.0') Normal drilling	(217.0 - 227.0') No drilling fluid used
219					ML				

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Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
221	8.5	TCS-1-SS-221-227 4/13/2022 16:03	TCS-1-VAS-221-226 ( $<0.025$ ppb) 4/5/2022 10:45	Alluvium Deposits	ML		(220-221 ft) Sandy silt with gravel (ML); reddish brown (5YR 4/3); no plasticity, rapid dilatancy; some very fine to very coarse grained sand, subangular to subround; little clay; trace granules, angular to subround; trace small to medium pebbles, angular to subangular; medium stiff; moist to wet.		
222				Alluvium Deposits	SM		(221-225 ft) Silty sand with gravel (SM); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subround; little silt; little small to large pebbles, angular to subround; little granules, angular to subround; little clay; wet.		
223									
224									
225									
226	Alluvium Deposits	SW		(225-225.5 ft) Well grade sand with gravel (SW); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subround; little granules, angular to subround; little small to large pebbles, angular to subround; trace silt; trace clay; wet.					
227	Alluvium Deposits	SM		(225.5-227 ft) Silty sand with gravel (SM); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subround; little silt; little small to large pebbles, angular to subround; little granules, angular to subround; little clay; wet.					
228	7	TCS-1-SS-227-230 4/14/2022 07:50		Alluvium Deposits	ML		(227-230 ft) Sandy silt with gravel (ML); dark reddish gray (5YR 4/2); low plasticity, rapid dilatancy; little very fine to very coarse grained sand, angular to subround; little small to medium pebbles, subangular to subround; little clay; trace granules, angular to subround; medium stiff; moist.	(227.0 - 230.0') Normal drilling	(227.0 - 230.0') No drilling fluid used
229									
230									
231		Alluvium Deposits		SM		(230-232 ft) Silty sand with gravel (SM); very dark gray (5YR 3/1); very fine to very coarse grained, subangular to subround; some silt; little clay; little small to large pebbles, angular to subround; trace granules, angular to subround; moist.	(230.0 - 235.0') Hard drilling	(230.0 - 235.0') No drilling fluid used	
232		Alluvium Deposits		ML		(232-234 ft) Sandy silt with gravel (ML); dark reddish gray (5YR 4/2); low plasticity, rapid dilatancy; little very fine to very coarse grained sand, angular to subround; little small to medium pebbles, subangular to subround; little clay; trace granules, angular to subround; medium stiff; moist.			
233									
234	Alluvium Deposits	SM		(234-235 ft) Silty sand with gravel (SM); very dark gray (5YR 3/1); very fine to very coarse grained, subangular to subround; some silt; little clay; little small to large pebbles, angular to subround; trace granules, angular to subround; moist.					
235	8.7	TCS-1-SS-235-240 4/14/2022 08:00		Alluvium Deposits	ML		(235-237 ft) Gravelly silt with sand (ML); grayish brown (10YR 5/2); low plasticity, rapid dilatancy; some clay; little small to medium pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subround; trace granules, angular to subangular; medium stiff; moist.	(235.0 - 245.0') Hard drilling	(235.0 - 245.0') No drilling fluid used
236				Alluvium Deposits	ML		(237-245 ft) Sandy silt with gravel (ML); brown (7.5YR 5/2); low plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little clay; little small to medium pebbles, subangular to subround; trace granules, angular to subround; medium stiff; moist.		
237									
238									
239									
240									

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Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
241	8.7	TCS-1-SS-240-245 4/14/2022 08:04		Alluvium Deposits	ML		(237-245 ft) Sandy silt with gravel (ML); brown (7.5YR 5/2); low plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little clay; little small to medium pebbles, subangular to subround; trace granules, angular to subround; medium stiff; moist.		
242									
243									
244									
245	9	TCS-1-SS-245-251.5 4/14/2022 08:08		Alluvium Deposits	ML		(245-251.5 ft) Sandy silt with gravel (ML); reddish brown (5YR 4/3); low plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little clay; trace granules, angular to subround; trace small to medium pebbles, subangular to subround; moist.	(245.0 - 257.0') Hard drilling	(245.0 - 257.0') No drilling fluid used
246									
247									
248									
249									
250									
251									
252		TCS-1-SS-251.5-257 4/14/2022 08:13		Alluvium Deposits	SM		(251.5-253 ft) Silty sand (SM); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subround; some silt; little clay; trace granules, angular to subround; trace small to medium pebbles, subangular to subround; dry.		
253				Alluvium Deposits	ML		(253-254.5 ft) Gravelly silt with sand (ML); red (2.5YR 4/6); low plasticity, rapid dilatancy; little small to large pebbles, angular to subangular; little clay; little very fine to very coarse grained sand, angular to subround; trace granules, angular to subround; moist.		
254				Alluvium Deposits	SM		(254.5-257 ft) Silty sand with gravel (SM); reddish brown (5YR 4/4); very fine to very coarse grained, angular to subround; little small to medium pebbles, subangular to subround; little silt; little clay; trace granules, angular to subround; wet.		
255				Alluvium Deposits	SM				
256		TCS-1-VAS-254-259 ( $<0.13$ ppb) 4/7/2022 11:40		Alluvium Deposits	SM		(257-268.5 ft) Silty sand (SM); reddish brown (5YR 4/4); very fine to very coarse grained, subangular to subround; some silt; some clay; trace granules, angular to subangular; trace small to medium pebbles, angular to subangular; moist to wet.	(257.0 - 262.0') Hard drilling	(257.0 - 262.0') No drilling fluid used
257									
258									
259									
260	3.8	TCS-1-SS-257-263 4/14/2022 08:18		Alluvium Deposits	SM				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.





# Boring Log

Sheet: 14 of 14

Date Started:	03/31/2022	Surface Elevation:	622.31 ft amsl	<b>Boring No.: TCS-1 Pilot</b>	
Date Completed:	04/13/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	167.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
261	3.8	TCS-1-SS-257-263 4/14/2022 08:18					(257-268.5 ft) Silty sand (SM); reddish brown (5YR 4/4); very fine to very coarse grained, subangular to subround; some silt; some clay; trace granules, angular to subangular; trace small to medium pebbles, angular to subangular; moist to wet.		
262							(262-268.5 ft) Wet	(262.0 - 275.0') Normal drilling	(262.0 - 275.0') No drilling fluid used
263									
264				Alluvium Deposits	SM				
265									
266		TCS-1-SS-263-268.5 4/14/2022 08:23							
267									
268			TCS-1-VAS-266-271 ( $<0.13$ ppb) 4/13/2022 09:40						
269	9.8						(268.5-273.5 ft) Sedimentary Rock; reddish brown (5YR 4/4); fine grained to medium grained, subangular to subround; highly weathered; soft; moist.		
270									
271				Weathered Bedrock - Conglomerate					
272									
273									
274		No Sieve Samples Collected					(273.5-277 ft) Sedimentary Rock; reddish brown (5YR 4/4); fine grained; moderately weathered; soft; friable; pulverized by drilling process; moist to dry.		
275									
276			No Groundwater Samples Collected	Competent Bedrock - Conglomerate			(275 ft) NOTE: Color change to 2.5YR 4/4 - reddish brown.	(275.0 - 280.0') Hard drilling	(275.0 - 280.0') No drilling fluid used
277									
278	4.5								
279				Competent Bedrock - Conglomerate			(277-280 ft) Sedimentary Rock; reddish brown (5YR 4/4); fine grained to medium grained, subangular to subround; moderately weathered; soft; friable; pulverized by drilling process; dry.		
280							End of Boring at 280 ft bgs		

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N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft.  
bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the  
result of potential compaction of sediments in the core bag.



Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	167.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details		Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
1	No Groundwater Samples Collected	Fill	N/A		(0.0 - 0.5') Steel plate	(0.0 - 38.0') 7" Diameter Borehole		Note: Steel plate used to mark pilot borehole
2		Fill	N/A		(0.5 - 4.0') Cemex #60 (40x70) Lapis Lustre Sand		(0.5 - 4.0') 2.1 bags	(0.5 - 4.0') 3 bags (143%) Note: Surface sand seal, used >20% of the calculated volume due to potential voids that formed during drilling.
3								
4								
5					(4.0 - 5.0') Cemex #3 (8x20) Lapis Lustre Sand		(4.0 - 5.0') 0.5 bags	(4.0 - 5.0') 0.5 bags (100%) Note: Surface sand seal
6		Fluvial Deposits	SM					
7								
8								
9			NR					
10		Fluvial Deposits	SW					
11								
12		Fluvial Deposits	SP		(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand		(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
13								
14								
15		Fluvial Deposits	SW					
16								
17								
18		Fluvial Deposits	SW					
19								
20								

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Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	167.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
21		Fluvial Deposits	SW				
22							
23		Fluvial Deposits	SM				
24							
25		Fluvial Deposits	SW-SM				
26							
27							
28							
29							
30	No Groundwater Samples Collected				(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
31			NR				
32							
33							
34							
35							
36							
37		Fluvial Deposits	SM				
38					(38.0 - 274.0') 6" Diameter Borehole		
39							
40							



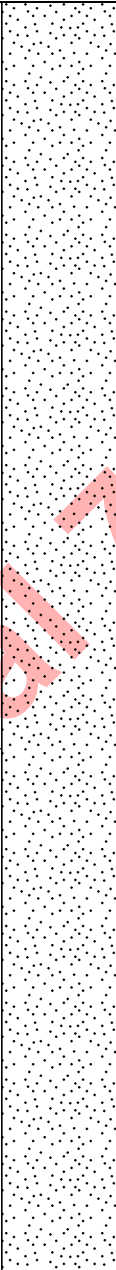





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Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	167.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
41		Fluvial Deposits	CL				
42		Fluvial Deposits	SC				
43		Fluvial Deposits	CH				
44		Fluvial Deposits	CL				
45		Fluvial Deposits	SM				
46		Fluvial Deposits	SM				
47							
48							
49							
50	No Groundwater Samples Collected				(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
51		Alluvium Deposits	SW				
52							
53							
54							
55							
56		Alluvium Deposits	CL				
57							
58		Alluvium Deposits	SM				
59							
60							

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Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details		Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
61	No Groundwater Samples Collected	Alluvium Deposits	SM				(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
62								
63								
64		Alluvium Deposits	ML					
65								
66								
67		Alluvium Deposits	SW					
68								
69								
70								
71		Alluvium Deposits	SW					
72								
73								
74								
75	Alluvium Deposits	SW						
76								
77								
78								
79	Alluvium Deposits	SM						
80								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
81	No Groundwater Samples Collected	Alluvium Deposits	SM		(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
82							
83		Alluvium Deposits	SC				
84							
85							
86		Alluvium Deposits	SW-SM				
87							
88		Alluvium Deposits	SC				
89							
90		Alluvium Deposits	CL				
91		Alluvium Deposits	SM				
92		Alluvium Deposits	CL				
93							
94							
95		Alluvium Deposits	SM				
96							
97							
98							
99		Alluvium Deposits	SC				
100							

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Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	167.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
101	No Groundwater Samples Collected	Alluvium Deposits	SC		(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
102							
103							
104		Alluvium Deposits	SW-SM				
105							
106							
107							
108		Alluvium Deposits	SC				
109							
110		Alluvium Deposits	SC				
111		Alluvium Deposits	SC				
112							
113		Alluvium Deposits	SM				
114							
115							
116		Alluvium Deposits	SM				
117							
118							
119							
120		Alluvium Deposits	CL				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.



Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	167.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
121	No Groundwater Samples Collected	Alluvium Deposits	SM		(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
122							
123							
124							
125							
126		Alluvium Deposits	ML				
127							
128		Alluvium Deposits	ML				
129							
130							
131		Alluvium Deposits	SM				
132							
133		Alluvium Deposits	SW-SC				
134							
135							
136		Alluvium Deposits	SM				
137							
138							
139		Alluvium Deposits	SM				
140							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details		Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
141	No Groundwater Samples Collected	Alluvium Deposits	SM					
142								
143								
144								
145								
146								
147								
148		Alluvium Deposits	SM					
149								
150								
151								
152		Alluvium Deposits	ML					
153	Alluvium Deposits	SM						
154								
155	Alluvium Deposits	SM						
156								
157								
158								
159								
160								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	167.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
161	No Groundwater Samples Collected	Alluvium Deposits	SM				
162							
163							
164							
165	TCS-1-VAS-164-169 (1100) 4/3/2022 10:50	Alluvium Deposits	SM				
166		Alluvium Deposits	SM				
167		Alluvium Deposits	SM				
168		Alluvium Deposits	SM				
169		Alluvium Deposits	SM				
170		Alluvium Deposits	ML		(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
171							
172							
173							
174							
175		Alluvium Deposits	ML				
176							
177							
178							
179							
180							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	167.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
181		Alluvium Deposits	ML				
182							
183							
184							
185							
186							
187							
188		Alluvium Deposits	SM				
189							
190					(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
191							
192							
193							
194	TCS-1-VAS-192-197-EB (<0.025) 4/4/2022 09:45						
195		Alluvium Deposits	SW				
196		Alluvium Deposits	ML				
197		Alluvium Deposits	SW-SM				
198							
199		Alluvium Deposits	ML				
200							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot	
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
201		Alluvium Deposits	ML				
202							
203							
204		Alluvium Deposits	ML				
205							
206							
207		Alluvium Deposits	ML				
208							
209							
210		Alluvium Deposits	ML		(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
211							
212							
213							
214							
215		Alluvium Deposits	SM				
216							
217							
218		Alluvium Deposits	ML				
219							
220							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot	
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19		
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	167.5 ft bgs		
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
221		Alluvium Deposits	ML				
222							
223	TCS-1-VAS-221-226 (<0.025) 4/5/2022 10:45	Alluvium Deposits	SM				
224							
225		Alluvium Deposits	SW				
226		Alluvium Deposits	SM				
227							
228		Alluvium Deposits	ML				
229							
230					(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
231		Alluvium Deposits	SM				
232							
233		Alluvium Deposits	ML				
234							
235		Alluvium Deposits	SM				
236		Alluvium Deposits	ML				
237							
238		Alluvium Deposits	ML				
239							
240							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.



Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	167.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
241							
242							
243		Alluvium Deposits	ML				
244							
245							
246							
247							
248		Alluvium Deposits	ML				
249							
250					(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
251							
252		Alluvium Deposits	SM				
253							
254		Alluvium Deposits	ML				
255							
256	TCS-1-VAS-254-259 (<0.13) 4/7/2022 11:40	Alluvium Deposits	SM				
257							
258							
259		Alluvium Deposits	SM				
260							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Date Started:	04/13/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1 Pilot
Date Completed:	04/14/2022	Northing (NAD83):	2101167.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615165.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	280 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	167.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
261							
262							
263							
264		Alluvium Deposits	SM		(5.0 - 267.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 267.0') 108.7 bags	(5.0 - 267.0') 117 bags (108%) Note: Backfill sand
265							
266							
267							
268	TCS-1-VAS-266-271-EB ( $<0.13$ ) 4/13/2022 09:20						
269		Weathered Bedrock - Conglomerate					
270							
271							
272					(267.0 - 277.0') Cemex #3 (8x20) Lapis Lustre Sand	(267.0 - 277.0') 2.1 bags	(267.0 - 277.0') 3 bags (143%) Note: Indicator sand, used >20% of the calculated volume due to potential voids that formed during drilling.
273							
274							
275	No Groundwater Samples Collected	Competent Bedrock - Conglomerate			(274.0 - 280.0') 4" Diameter Rathole		
276							
277							
278		Competent Bedrock - Conglomerate			(277.0 - 280.0') Formation Collapse/Settling of Material in the Casing		
279							
280							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.



# Well Construction Log

Sheet: 1 of 15

Date Started: 06/24/2022 Surface Elevation: 622.31 ft amsl Well ID: TCS-1  
Date Completed: 07/09/2022 Shallow Well Elevation: N/A  
Drilling Co.: Cascade Deep Well Elevation: N/A Client: PG&E  
Drilling Method: Dual Rotary Northing (NAD83): 2101167.19 Project: Final GW Remedy Phase 2A  
Driller Name: J Saldana / A Lamon Easting (NAD83): 7615165.89 Location: PG&E Topock, Needles California  
Drilling Asst: A Amezcua / D Aldona Borehole Diameter: 15.5-18 inches  
Logger: Ellen Redner Static Water Level: See Log for Depths Project Number: 30126255  
Editor: Sean McGrane Development End Date: 8/24/2022  
Total Depth: 280.2 ft bgs Well Completion: ☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details		Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
1	No Groundwater Samples Collected	Fill	N/A		(0.0 - 4.0') Well Vault			Note: Well vault dimensions 4x5 feet by 4 feet deep.
2		Fill	N/A					
3					(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing			
4								
5		Fluvial Deposits	SM		(4.0 - 14.8') Portland Cement Grout with up to 6% bentonite hydrogel		(4.0 - 14.8') 91.3 gallons	(4.0 - 14.8') 143 gallons (157%) Note: Grout seal fourth lift, used >20% of the calculated volume due to potential grout migration and voids forming during drilling. Added 2 bags of bentonite chips (Holeplug 3/8", 50 lb. bags each) at 8.9 ft. bgs to fill potential void. Bentonite chips brought material up to 7.9 ft. bgs.
6								
7					(14.8 - 92.7') Portland Cement Grout with up to 6% bentonite hydrogel		(14.8 - 92.7') 658.7 gallons	(14.8 - 92.7') 741.5 gallons (113%) Note: Grout seal third lift
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.



# Well Construction Log

Sheet: 2 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezcuita / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
21	No Groundwater Samples Collected	Fluvial Deposits	SW		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing		
22							
23		Fluvial Deposits	SM				
24							
25		Fluvial Deposits	SW-SM				
26	No Groundwater Samples Collected						
27							
28							
29							
30							
31			NR		(14.8 - 92.7') Portland Cement Grout with up to 6% bentonite hydrogel	(14.8 - 92.7') 658.7 gallons	(14.8 - 92.7') 741.5 gallons (113%) Note: Grout seal third lift
32							
33							
34							
35							
36							
37		Fluvial Deposits	SM				
38							
39							
40							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.



# Well Construction Log

Sheet: 3 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezcuita / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
41	No Groundwater Samples Collected	Fluvial Deposits	CL		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing		
42		Fluvial Deposits	SC				
43		Fluvial Deposits	CH				
44		Fluvial Deposits	CL				
45		Fluvial Deposits	SM				
46		Alluvium Deposits	SW		(14.8 - 92.7') Portland Cement Grout with up to 6% bentonite hydrogel	(14.8 - 92.7') 658.7 gallons	(14.8 - 92.7') 741.5 gallons (113%) Note: Grout seal third lift
47							
48							
49							
50							
51		Alluvium Deposits	CL				
52							
53		Alluvium Deposits	SM				
54							
55							
56							
57							
58							
59							
60							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.



# Well Construction Log

Sheet: 4 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezcuita / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
61	No Groundwater Samples Collected	Alluvium Deposits	SM		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing	(14.8 - 92.7') 658.7 gallons	(14.8 - 92.7') 741.5 gallons (113%) Note: Grout seal third lift
62							
63		Alluvium Deposits	ML				
64							
65		Alluvium Deposits	SW				
66							
67							
68							
69		Alluvium Deposits	SW				
70					(14.8 - 92.7') Portland Cement Grout with up to 6% bentonite hydrogel		
71							
72							
73	No Groundwater Samples Collected	Alluvium Deposits	SW			(14.8 - 92.7') 658.7 gallons	(14.8 - 92.7') 741.5 gallons (113%) Note: Grout seal third lift
74							
75							
76							
77		Alluvium Deposits	SM				
78							
79							
80							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

TOPOCK WELL COMPLETION DETAILS IARCADIS0368.SHAPEPOINT.COM@SSLIDAVWWWROOTITEAMSPGETPOCKCONSTRUCTIONSHARED DOCUMENTS\PHASE II DRILLING\06 FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\40 2022-10-18\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 10/18/22





# Well Construction Log

Sheet: 5 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezcuita / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
81	No Groundwater Samples Collected	Alluvium Deposits	SM		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing		
82							
83		Alluvium Deposits	SC				
84							
85							
86		Alluvium Deposits	SW-SM		(14.8 - 92.7') Portland Cement Grout with up to 6% bentonite hydrogel	(14.8 - 92.7') 658.7 gallons	(14.8 - 92.7') 741.5 gallons (113%) Note: Grout seal third lift
87							
88		Alluvium Deposits	SC				
89							
90		Alluvium Deposits	CL				
91		Alluvium Deposits	SM				
92		Alluvium Deposits	CL				
93							
94							
95		Alluvium Deposits	SM				
96					(92.7 - 136.8') Portland Cement Grout with up to 6% bentonite hydrogel	(92.7 - 136.8') 356.6 gallons	(92.7 - 136.8') 646 gallons (181%) Note: Grout seal second lift, used >20% of the calculated volume due to potential grout migration and voids forming during drilling.
97							
98		Alluvium Deposits	SC				
99							
100							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

TOPOCK WELL COMPLETION DETAILS IARCADIS030368 SHAREPOINT.COM@SSLIDAVWWWROOTITEAMSPGETPOCKCONSTRUCTIONSHARED DOCUMENTS\PHASE II DRILLING\06 FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\02 GINT DATA TEMPLATE.GDT 10/18/22



# Well Construction Log

Sheet: 6 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezcuita / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
101	No Groundwater Samples Collected	Alluvium Deposits	SC		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing		
102		Alluvium Deposits	SW-SM				
103							
104							
105							
106							
107							
108		Alluvium Deposits	SC				
109							
110		Alluvium Deposits	SC		(92.7 - 136.8') Portland Cement Grout with up to 6% bentonite hydrogel	(92.7 - 136.8') 356.6 gallons	(92.7 - 136.8') 646 gallons (181%) Note: Grout seal second lift, used >20% of the calculated volume due to potential grout migration and voids forming during drilling.
111		Alluvium Deposits	SC				
112							
113		Alluvium Deposits	SM				
114							
115							
116		Alluvium Deposits	SM				
117							
118							
119							
120		Alluvium Deposits	CL				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

TOPOCK WELL COMPLETION DETAILS IARCADIS030366.SHAPEPOINT.COM@SSLIDAVWWWROOTITEAMSPGETPOCKCONSTRUCTIONSHARED DOCUMENTS\PHASE II DRILLING\06 FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\40 2022-10-18\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 10/18/22



# Well Construction Log

Sheet: 7 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
121	No Groundwater Samples Collected	Alluvium Deposits	SM		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing		
122							
123		Alluvium Deposits	ML				
124							
125		Alluvium Deposits	ML		(92.7 - 136.8') Portland Cement Grout with up to 6% bentonite hydrogel	(92.7 - 136.8') 356.6 gallons	(92.7 - 136.8') 646 gallons (181%) Note: Grout seal second lift, used >20% of the calculated volume due to potential grout migration and voids forming during drilling.
126							
127		Alluvium Deposits	SM				
128							
129		Alluvium Deposits	SW-SC		(131.0 - 278.0') 16" Diameter Borehole		
130							
131		Alluvium Deposits	SM				
132		Alluvium Deposits	SM				
133		Alluvium Deposits	SM				
134		Alluvium Deposits	SM				
135		Alluvium Deposits	SM				
136		Alluvium Deposits	SM				
137		Alluvium Deposits	SM				
138		Alluvium Deposits	SM		(136.8 - 156.5') Portland Cement Grout with up to 6% bentonite hydrogel	(136.8 - 156.5') 111.9 gallons	(136.8 - 156.5') 123.5 gallons (110%) Note: Grout seal first lift
139		Alluvium Deposits	SM				
140		Alluvium Deposits	SM				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.



# Well Construction Log

Sheet: 8 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezcuita / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
141	No Groundwater Samples Collected	Alluvium Deposits	SM		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing		
142							
143							
144							
145							
146							
147							
148		Alluvium Deposits	SM		(136.8 - 156.5') Portland Cement Grout with up to 6% bentonite hydrogel	(136.8 - 156.5') 111.9 gallons	(136.8 - 156.5') 123.5 gallons (110%) Note: Grout seal first lift
149							
150							
151		Alluvium Deposits	ML				
152							
153		Alluvium Deposits	SM				
154							
155		Alluvium Deposits	SM				
156							
157					(156.5 - 157.9') Wyoming Bentonite Chips - Holeplug 3/8"	(156.5 - 157.9') 1.5 bags	(156.5 - 157.9') 2 bags (133%) Note: Bentonite seal, used >20% of the calculated volume due to potential voids that formed during drilling.
158							
159					(157.9 - 160.9') Cemex #60 Mesh (40x70) Lapis Lustre Sand	(157.9 - 160.9') 4.6 bags	(157.9 - 160.9') 5 bags (109%) Note: Transition sand
160							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

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# Well Construction Log

Sheet: 9 of 15

Date Started: 06/24/2022 Surface Elevation: 622.31 ft amsl Well ID: TCS-1  
Date Completed: 07/09/2022 Shallow Well Elevation: N/A  
Drilling Co.: Cascade Deep Well Elevation: N/A Client: PG&E  
Drilling Method: Dual Rotary Northing (NAD83): 2101167.19 Project: Final GW Remedy Phase 2A  
Driller Name: J Saldana / A Lamon Easting (NAD83): 7615165.89 Location: PG&E Topock, Needles California  
Drilling Asst: A Amezcua / D Aldona Borehole Diameter: 15.5-18 inches  
Logger: Ellen Redner Static Water Level: See Log for Depths Project Number: 30126255  
Editor: Sean McGrane Development End Date: 8/24/2022  
Total Depth: 280.2 ft bgs Well Completion: ☐ Flush ☐ Stick-up ☒ To Be Completed in Well Vault

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
161	No Groundwater Samples Collected	Alluvium Deposits	SM		(3.5 - 170.4') 10" SHUR-GRIP SDR17 PVC Casing	(157.9 - 160.9') 4.6 bags	(157.9 - 160.9') 5 bags (109%) Note: Transition sand
162							
163							
164							
165	TCS-1-VAS-164-169 (1100 ppb) 4/3/2022 10:50	Alluvium Deposits	SM				
166		Alluvium Deposits	SM				
167		Alluvium Deposits	SM				
168		Alluvium Deposits	SM				
169		Alluvium Deposits	SM				
170		Alluvium Deposits	ML		(170.4 - 190.6') 10" 18-Slot 316L SS Wire Wrap Screen Screen		
171							
172							
173					(160.9 - 192.9') Cemex #1/20 Mesh (20x40) Lapis Lustre Sand		
174							
175							
176		Alluvium Deposits	ML				
177							
178							
179							
180							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

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# Well Construction Log

Sheet: 10 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
181		Alluvium Deposits	ML		(170.4 - 190.6') 10" 18-Slot 316L SS Wire Wrap Screen Screen		
182							
183							
184							
185							
186							
187					(160.9 - 192.9') Cemex #1/20 Mesh (20x40) Lapis Lustre Sand	(160.9 - 192.9') 48.6 bags	(160.9 - 192.9') 72.3 bags (149%) Note: Filter pack, used >20% of the calculated volume due to potential voids that formed during drilling. Swabbed the filter pack for approximately 30 minutes prior to the installation of the bentonite seal. Approximately 4.7 bags of sand passed through the screen during swabbing was subtracted from the actual volume installed.
188		Alluvium Deposits	SM				
189							
190							
191					(190.6 - 214.1') 10" SHUR-GRIP SDR17 PVC Casing		
192							
193							
194	TCS-1-VAS-192-197 (<0.025 ppb) 4/4/2022 09:45				(192.9 - 194.2') Cemex #60 Mesh (40x70) Lapis Lustre Sand	(192.9 - 194.2') 2 bags	(192.9 - 194.2') 3 bags (150%) Note: Transition sand, used >20% of the calculated volume due to potential voids that formed during drilling.
195		Alluvium Deposits	SW				
196		Alluvium Deposits	ML				
197		Alluvium Deposits	SW-SM				
198					(194.2 - 204.5') Pel-Plug Bentonite Pellets 3/8" TR30	(194.2 - 204.5') 12.5 buckets	(194.2 - 204.5') 20 buckets (160%) Note: Intermediate seal, used >20% of the calculated volume due to potential voids that formed during drilling.
199		Alluvium Deposits	ML				
200							

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# Well Construction Log

Sheet: 11 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezcuita / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
201		Alluvium Deposits	ML		(190.6 - 214.1') 10" SHUR-GRIP SDR17 PVC Casing		
202			ML		(194.2 - 204.5') Pel-Plug Bentonite Pellets 3/8" TR30	(194.2 - 204.5') 12.5 buckets	(194.2 - 204.5') 20 buckets (160%) Note: Intermediate seal, used >20% of the calculated volume due to potential voids that formed during drilling.
203		Alluvium Deposits	ML		(204.5 - 205.5') Cemex #60 Mesh (40x70) Lapis Lustre Sand	(204.5 - 205.5') 1.5 bags	(204.5 - 205.5') 5 bags (333%) Note: Transition sand, used >20% of the calculated volume due to potential voids that formed during drilling.
204			ML				
205		Alluvium Deposits	ML				
206			ML				
207		Alluvium Deposits	ML				
208			ML				
209		Alluvium Deposits	ML				
210			ML				
211		Alluvium Deposits	ML				
212			ML				
213		Alluvium Deposits	ML		(205.5 - 279.0') Cemex #1/20 Mesh (20x40) Lapis Lustre Sand	(205.5 - 279.0') 117.8 bags	(205.5 - 279.0') 170.6 bags (145%) Note: Filter pack, used >20% of the calculated volume due to potential voids that formed during drilling. Swabbed the filter pack for approximately 30 minutes and ran prealignment "dummy tool" prior to installation of the intermediate seal. Approximately 3.4 bgs of sand passed through the screen during swabbing and was subtracted from the actual volume installed.
214			ML				
215		Alluvium Deposits	SM		(214.1 - 268.9') 10.8" 18-Slot 316L SS Wire Wrap Screen Screen		
216			SM				
217		Alluvium Deposits	ML				
218			ML				
219		Alluvium Deposits	ML				
220			ML				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.



# Well Construction Log

Sheet: 12 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezcuita / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
221	TCS-1-VAS-221-226 ( $<0.025$ ppb) 4/5/2022 10:45	Alluvium Deposits	ML		(214.1 - 268.9') 10.8" 18-Slot 316L SS Wire Wrap Screen Screen		
222							
223		Alluvium Deposits	SM				
224							
225		Alluvium Deposits	SW				
226		Alluvium Deposits	SM				
227							
228		Alluvium Deposits	ML				
229							
230					(205.5 - 279.0') Cemex #1/20 Mesh (20x40) Lapis Lustre Sand	(205.5 - 279.0') 117.8 bags	(205.5 - 279.0') 170.6 bags (145%) Note: Filter pack, used $>20\%$ of the calculated volume due to potential voids that formed during drilling. Swabbed the filter pack for approximately 30 minutes and ran prealignment "dummy tool" prior to installation of the intermediate seal. Approximately 3.4 bgs of sand passed through the screen during swabbing and was subtracted from the actual volume installed.
231		Alluvium Deposits	SM				
232							
233		Alluvium Deposits	ML				
234							
235		Alluvium Deposits	SM				
236		Alluvium Deposits	ML				
237							
238		Alluvium Deposits	ML				
239							
240							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

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# Well Construction Log

Sheet: 13 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezcuita / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
241		Alluvium Deposits	ML		(214.1 - 268.9') 10.8" 18-Slot 316L SS Wire Wrap Screen Screen		
242							
243							
244							
245							
246		Alluvium Deposits	ML				
247							
248							
249							
250					(205.5 - 279.0') Cemex #1/20 Mesh (20x40) Lapis Lustre Sand	(205.5 - 279.0') 117.8 bags	(205.5 - 279.0') 170.6 bags (145%) Note: Filter pack, used >20% of the calculated volume due to potential voids that formed during drilling. Swabbed the filter pack for approximately 30 minutes and ran prealignment "dummy tool" prior to installation of the intermediate seal. Approximately 3.4 bgs of sand passed through the screen during swabbing and was subtracted from the actual volume installed.
251							
252		Alluvium Deposits	SM				
253							
254		Alluvium Deposits	ML				
255							
256	TCS-1-VAS-254-259 (<0.13 ppb) 4/7/2022 11:40	Alluvium Deposits	SM				
257							
258							
259		Alluvium Deposits	SM				
260							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

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# Well Construction Log

Sheet: 14 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezcua / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
261							
262							
263							
264		Alluvium Deposits	SM				
265							
266							
267							
268	TCS-1-VAS-266-271 ( $<0.13$ ppb) 4/13/2022 09:40						
269							
270					(205.5 - 279.0') Cemex #1/20 Mesh (20x40) Lapis Lustre Sand	(205.5 - 279.0') 117.8 bags	(205.5 - 279.0') 170.6 bags (145%) Note: Filter pack, used $>20\%$ of the calculated volume due to potential voids that formed during drilling. Swabbed the filter pack for approximately 30 minutes and ran prealignment "dummy tool" prior to installation of the intermediate seal. Approximately 3.4 bgs of sand passed through the screen during swabbing and was subtracted from the actual volume installed.
271		Weathered Bedrock - Conglomerate					
272					(268.85 - 274.01') 10" SHUR-GRIP SDR17 PVC Sump and SS End Cap		
273							
274							
275	No Groundwater Samples Collected	Competent Bedrock - Conglomerate					
276							
277							
278							
279		Competent Bedrock - Conglomerate					
280					(279.0 - 280.2') Native sediments		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.



# Well Construction Log

Sheet: 15 of 15

Date Started:	06/24/2022	Surface Elevation:	622.31 ft amsl	Well ID: TCS-1
Date Completed:	07/09/2022	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	2101167.19	Project: Final GW Remedy Phase 2A
Driller Name:	J Saldana / A Lamon	Easting (NAD83):	7615165.89	Location: PG&E Topock, Needles California
Drilling Asst:	A Amezquita / D Aldona	Borehole Diameter:	15.5-18 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	8/24/2022	
Total Depth:	280.2 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input checked="" type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
				x x x	SS		
281							
282							
283							
284							
285							
286							
287							
288							
289							
290							
291							
292							
293							
294							
295							
296							
297							
298							
299							
300							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) collected during the specific capacity test from the upper and lower screen intervals, respectively.

Date Started:	04/01/2022	Surface Elevation:	587.37 ft amsl	<b>Boring No.: TCS-2 Pilot</b>	
Date Completed:	04/24/2022	Northing (NAD83):	2100921.24		
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	129.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1	1.5			Fluvial Deposits	SW		(0-1.5 ft) Well graded sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; some small to very large pebbles, subangular to subround; little granules, subangular to subround; trace silt; trace clay; dry. NOTE: Material was excavated with air-knife and placed back in the excavation, sample is disturbed.	(0.0 - 10.0') Air-knifed for utility clearance on 4/1/22, excavated material put back in hole.	(0.0 - 10.0') No drilling fluid used
2							(1.5-7.0 ft) No Recovery.		
3									
4									
5	6.8	No Sieve Samples Collected	No Groundwater Samples Collected		NR				
6									
7									
8				Fluvial Deposits	SW		(7.0-10 ft) Well graded sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; some small to very large pebbles, subangular to subround; little granules, subangular to subround; trace silt; trace clay; dry. NOTE: Material was excavated with air-knife and placed back in the excavation, sample is disturbed.		
9									
10				Fluvial Deposits	SP		(10-12.5 ft) Poorly graded sand with gravel (SP); brown (10YR 5/3); very fine to fine grained, little medium to very coarse grained, subangular to subround; little granules, subangular to subround; little small to large pebbles, subangular to subround; trace silt; trace clay; dry.		
11									
12									
13	7.3			Fluvial Deposits	SM		(12.5-17 ft) Silty sand with gravel (SM); yellowish brown (10YR 5/4); very fine to very coarse grained, subangular to subround; some small to very large pebbles, subangular to subround; little silt; little granules, subangular to subround; little clay; dry.	(10.0 - 17.0') Soft drilling	(10.0 - 17.0') No drilling fluid used
14									
15									
16							(15.5-17 ft) Very large pebbles; potentially from a boulder pulverized by drilling; light brownish gray (10YR 6/2).		
17									
18				Alluvium Deposits	SW		(17-24.5 ft) Well graded sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; some small to very large pebbles, subangular to subround; little granules, subangular to subround; trace silt; trace clay; dry.		
19									
20									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



Date Started:	<u>04/01/2022</u>	Surface Elevation:	<u>587.37 ft amsl</u>	<b>Boring No.: <u>TCS-2 Pilot</u></b>
Date Completed:	<u>04/24/2022</u>	Northing (NAD83):	<u>2100921.24</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7615150.98</u>	Client: <u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>232 ft bgs</u>	Project: <u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>4-7 inches</u>	Location: <u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Matt Arnold</u>	Depth to First Water:	<u>129.5 ft bgs</u>	
Drilling Asst:	<u>D Hoepfner / R West</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>30126255</u>
Logger:	<u>Ellen Redner</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	7.3			Alluvium Deposits	SW		(17-24.5 ft) Well graded sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; some small to very large pebbles, subangular to subround; little granules, subangular to subround; trace silt; trace clay; dry.	(20.0 - 27.0') Normal drilling	(20.0 - 27.0') No drilling fluid used
22				Alluvium Deposits	SP		(24.5-26 ft) Poorly graded sand with gravel (SP); brown (10YR 5/3); very fine to medium grained, little coarse to very coarse grained, subangular to subround; little granules, subangular to subround; little small to large pebbles, subangular to subround; trace silt; trace clay; dry.		
23				Alluvium Deposits	ML		(26-27 ft) Sandy silt (ML); brown (7.5YR 5/3); medium plasticity, slow dilatancy; little very fine to very coarse grained sand, subangular to subround; little clay; trace granules, subangular to subround; trace small to large pebbles, subangular to subround; soft to medium stiff; moist.		
24	7.5	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SM		(27-31 ft) Silty sand (SM); brown (7.5YR 5/3); very fine grained, subangular to subround; some silt; trace granules, subangular to subround; trace clay; moist.	(27.0 - 37.0') Normal drilling	(27.0 - 37.0') No drilling fluid used
25				Alluvium Deposits	SW		(31-31.5 ft) Well graded sand (SW); brown (10YR 5/3); very fine to very coarse grained; trace granules, subangular to subround; trace small to medium pebbles, subangular to subround; trace silt; dry.		
26				Alluvium Deposits	SM		(31.5-32.5 ft) Silty sand (SM); brown (7.5YR 5/3); very fine grained, subangular to subround; some silt; trace granules, subangular to subround; trace clay; moist; rapid dilatancy.		
27				Alluvium Deposits	SW-SC		(32.5-33 ft) Well graded sand with clay (SW-SC); brown (10YR 5/3); very fine to very coarse grained; little clay; trace small to medium pebbles, subangular to subround; trace silt; trace granules, subangular to subround; dry; trace clay nodules.		
28				Alluvium Deposits	SM		(33-35.5 ft) Silty sand (SM); brown (7.5YR 5/3); very fine grained, subangular to subround; some silt; some clay; trace granules, subangular to subround; moist; rapid dilatancy.		
29				Alluvium Deposits	SW		(35.5-36.5 ft) Well graded sand (SW); brown (10YR 5/3); very fine to very coarse grained; trace granules, subangular to subround; trace small to medium pebbles, subangular to subround; trace silt; trace clay; dry.		
30	8.2			Alluvium Deposits	SW		(36.5-48 ft) Well graded sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; little granules, subangular to subround; little small to very large pebbles, subangular to subround; trace silt; trace clay; dry.	(37.0 - 47.0') Normal drilling	(37.0 - 47.0') No drilling fluid used
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 3 of 12

Date Started:	04/01/2022	Surface Elevation:	587.37 ft amsl	<b>Boring No.: TCS-2 Pilot</b>	
Date Completed:	04/24/2022	Northing (NAD83):	2100921.24		
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	129.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41	8.2			Alluvium Deposits	SW		(36.5-48 ft) Well graded sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; little granules, subangular to subround; little small to very large pebbles, subangular to subround; trace silt; trace clay; dry.		
42							(41.7 ft) Small cobble		
43									
44									
45									
46	8.2	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SW			(47.0 - 57.0') Rough drilling	(47.0 - 57.0') No drilling fluid used
47									
48							(48-48.5 ft) Silty sand with gravel (SM); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; little small to very large pebbles, angular to subround; little granules, subangular to subround; little silt; trace clay; dry.		
49							(48.5-52 ft) Well graded sand with gravel (SW); brown (10YR 5/3); very fine to very coarse grained, subangular to subround; little granules, subangular to subround; little small to very large pebbles, subangular to subround; trace silt; trace clay; dry.		
50									
51	8.2			Alluvium Deposits	SM		(52-57 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2) with brown (7.5YR 5/3); very fine to very coarse grained, subangular to subround; little silt; little small to large pebbles, angular to subround; little clay; trace granules, angular to subround; dry; silts and clays nodules within unit.		
52									
53									
54									
55									
56	5.6			Alluvium Deposits	SM		(57-63 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, subangular to subround; some silt; little small to large pebbles, angular to subround; trace granules, angular to subround; trace clay; dry; silt and clay nodules within unit.	(57.0 - 64.5') Rough and hard drilling	(57.0 - 64.5') No drilling fluid used
57									
58									
59									
60									

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TOPOCK SOIL BORING LOG C:\USERS\SMCGRANE\ONE DRIVE - ARCADIS\SHARED DOCUMENTS\PHASE II DRILLING\06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\2022-07-08\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/8/22



# Boring Log

Sheet: 4 of 12

Date Started:	04/01/2022	Surface Elevation:	587.37 ft amsl	<b>Boring No.: TCS-2 Pilot</b>	
Date Completed:	04/24/2022	Northing (NAD83):	2100921.24		
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	129.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	5.6			Alluvium Deposits	SM		(57-63 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2); very fine to very coarse grained, subangular to subround; some silt; little small to large pebbles, angular to subround; trace granules, angular to subround; trace clay; dry; silt and clay nodules within unit.		
62							(62-63 ft) Boulder; pulverized by drilling process.		
63				Alluvium Deposits	SM		(63-64.5 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2) with brown (7.5YR 5/2); very fine to fine grained, little medium to very coarse grained, subangular to subround; some silt; little small to medium pebbles, angular to subround; little clay; trace granules, angular to subround; dry.		
64	9.5	No Sieve Samples Collected	No Groundwater Samples Collected					(64.5 - 77.0') Rough drilling	(64.5 - 77.0') No drilling fluid used
65				Alluvium Deposits	SW-SM		(64.5-68.5 ft) Well graded sand with silt and gravel (SW-SM); brown (10YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; dry.		
66									
67									
68									
69				Alluvium Deposits	SM		(68.5-69.5 ft) Silty sand with gravel (SM); brown (10YR 5/3) with brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; little silt; little small to very large pebbles, angular to subangular; trace granules, angular to subangular; trace clay; dry to moist; silt and clay nodules within unit.		
70	7.1							(77.0 - 87.0') Rough drilling	(77.0 - 87.0') No drilling fluid used
71				Alluvium Deposits	SW-SM		(69.5-77 ft) Well graded sand with silt and gravel (SW-SM); brown (10YR 5/3) with brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; dry to moist; silt and clay nodules within unit.		
72									
73									
74									
75	7.1								
76									
77									
78	7.1			Alluvium Deposits	SW-SM		(77-83 ft) Well graded sand with silt and gravel (SW-SM); grayish brown (10YR 5/2) with brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; dry to moist; silt and clay nodules within unit.		
79									
80									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 5 of 12

Date Started:	<u>04/01/2022</u>	Surface Elevation:	<u>587.37 ft amsl</u>	<b>Boring No.: <u>TCS-2 Pilot</u></b>	
Date Completed:	<u>04/24/2022</u>	Northing (NAD83):	<u>2100921.24</u>		
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7615150.98</u>	Client:	<u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>232 ft bgs</u>	Project:	<u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>4-7 inches</u>	Location:	<u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Matt Arnold</u>	Depth to First Water:	<u>129.5 ft bgs</u>		
Drilling Asst:	<u>D Hoepfner / R West</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number:	<u>30126255</u>
Logger:	<u>Ellen Redner</u>	Sampling Interval:	<u>Continuous</u>		
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	7.1			Alluvium Deposits	SW-SM		(77-83 ft) Well graded sand with silt and gravel (SW-SM); grayish brown (10YR 5/2) with brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; dry to moist; silt and clay nodules within unit.		
82							(82-83 ft) Small cobbles pulverized by drilling process.		
83				Alluvium Deposits	SM		(83-85.5 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2) with brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; dry to moist; silt and clay nodules within unit.		
84				Alluvium Deposits	ML		(85.5-87 ft) Sandy silt with gravel (ML); brown (10YR 5/3); low plasticity, rapid dilatancy; some clay; little very fine to very coarse grained sand, angular to subround; little small to large pebbles, angular to subangular; trace granules, angular to subangular; medium stiff to hard; dry.		
85				Alluvium Deposits	SM		(87-89 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2) with brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; dry to moist; silt and clay nodules within unit.	(87.0 - 97.0') Rough drilling	(87.0 - 97.0') No drilling fluid used
86				Alluvium Deposits	SW-SM		(89-96 ft) Well graded sand with silt and gravel (SW-SM); grayish brown (10YR 5/2) with brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; dry to moist; silt and clay nodules within unit.		
87	8.2			Alluvium Deposits	ML		(96-97 ft) Sandy silt (ML); brown (10YR 5/3); low plasticity, rapid dilatancy; some very fine to fine grained sand, little medium to very coarse grained sand, angular to subround; little clay; trace granules, angular to subangular; medium stiff to hard; dry.		
88				Alluvium Deposits	SW		(97-99.5 ft) Well graded sand with gravel (SW); grayish brown (10YR 5/2) with brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; trace granules, angular to subangular; trace silt; trace clay; dry to moist; silt and clay nodules within unit.	(97.0 - 107.0') Rough drilling	(97.0 - 107.0') No drilling fluid used
89				Alluvium	SM		(99.5-100 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2);		
90	7.3			Alluvium Deposits	ML		(96-97 ft) Sandy silt (ML); brown (10YR 5/3); low plasticity, rapid dilatancy; some very fine to fine grained sand, little medium to very coarse grained sand, angular to subround; little clay; trace granules, angular to subangular; medium stiff to hard; dry.		
91				Alluvium Deposits	SW		(97-99.5 ft) Well graded sand with gravel (SW); grayish brown (10YR 5/2) with brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; trace granules, angular to subangular; trace silt; trace clay; dry to moist; silt and clay nodules within unit.		
92				Alluvium	SM		(99.5-100 ft) Silty sand with gravel (SM); grayish brown (10YR 5/2);		

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# Boring Log

Sheet: 6 of 12

Date Started: 04/01/2022 Surface Elevation: 587.37 ft amsl  
Date Completed: 04/24/2022 Northing (NAD83): 2100921.24  
Drilling Co.: Cascade Easting (NAD83): 7615150.98 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 232 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Boart Longyear drill head Borehole Diameter: 4-7 inches Location: PG&E Topock, Needles California  
Driller Name: Matt Arnold Depth to First Water: 129.5 ft bgs  
Drilling Asst: D Hoeppner / R West Sampling Method: 4 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: Ellen Redner Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☒ Yes ☐ No

**Boring No.: TCS-2 Pilot**

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	7.3			Deposits	SW		very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; dry; silt and clay nodules within unit.		
102				Alluvium Deposits			(100-102.5 ft) Well graded sand with gravel (SW); brown (7.5YR 5/2) with grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; trace granules, angular to subangular; trace silt; trace clay; dry to moist; silt and clay nodules within unit.		
103				Alluvium Deposits	SM		(102.5-107 ft) Silty sand with gravel (SM); brown (7.5YR 5/2) with grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; dry; silt and clay nodules within unit.		
104							(102.7 ft) Small cobble		
105									
106	7.6	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SM		(107-112 ft) Silty sand with gravel (SM); brown (7.5YR 5/2) with grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little silt; little small to large pebbles, angular to subangular; trace granules, angular to subround; trace clay; moist; silt and clay nodules within unit.	(107.0 - 117.0') Rough drilling, stopped drilling for day on 4/15/22 due to moist core and potential for water table to be close for first VAS collection.	(107.0 - 117.0') No drilling fluid used
107									
108				Alluvium Deposits	SM		(112-116.5 ft) Silty sand with gravel (SM); brown (7.5YR 5/2) with grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; some silt; little small to large pebbles, angular to subround; trace granules, subangular to subround; trace clay; moist; silt and clay nodules and lens within unit.		
109									
110									
111	3.5			Alluvium Deposits	SM		(116.5-117 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to fine grained, little medium to very coarse grained, subangular to subround; some silt; little small to large pebbles, angular to subangular; little clay, trace granules, angular to subround; moist; rapid dilatancy.	(117.0 - 122.0') Rough drilling	(117.0 - 122.0') No drilling fluid used
112				Alluvium Deposits	SM		(117-122 ft) Silty sand with gravel (SM); brown (7.5YR 5/2) with grayish brown (10YR 5/2); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little silt; trace granules, subangular to subround; trace clay; trace small cobbles, subround; dry to moist; silt and clay nodules and lens within unit.		
113									
114									
115									
116									
117									
118									
119									
120									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.





# Boring Log

Sheet: 7 of 12

Date Started:	04/01/2022	Surface Elevation:	587.37 ft amsl	<b>Boring No.: TCS-2 Pilot</b>	
Date Completed:	04/24/2022	Northing (NAD83):	2100921.24		
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	129.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	3.5			Alluvium Deposits	SM		(117.5-119.5 ft) Dry to moist (119.5-120.5 ft) Moist (120.5-121.5 ft) Dry to moist (121.5-122 ft) Moist		
122									
123		No Sieve Samples Collected							
124									
125	3.5		No Groundwater Samples Collected	Alluvium Deposits	SM		(122-126.5 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little silt; trace granules, subangular to subround; trace clay; trace small cobbles, subround; dry to moist; silt and clay nodules and lens within unit.  (125-125.5 ft) Moist (125.5-126 ft) Dry to moist (126-126.5 ft) Moist	(122.0 - 127.0') Normal drilling	(122.0 - 127.0') No drilling fluid used
126									
127									
128									
129	3.6	TCS-2-SS-126.5-131 4/25/2022 09:00	No Sample (127-132 Interval did not produce) 4/19/2022						
130				Alluvium Deposits	SM		(126.5-134 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little silt; trace granules, subangular to subround; trace clay; moist to wet; silt and clay nodules and lens within unit.  (129.5-134 ft) Wet	(127.0 - 132.0') Normal drilling	(127.0 - 132.0') No drilling fluid used
131									
132									
133		TCS-2-SS-131-134 4/25/2022 09:05							
134			TCS-2-VAS-131-136 (4300 ppb) 4/19/2022 15:10						
135	4.5			Alluvium Deposits	SM		(134-137 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little silt; trace granules, subangular to subround; trace clay; dry to moist; silt and clay nodules and lens within unit. (135.5 ft) Moist	(132.0 - 137.0') Normal drilling	(132.0 - 137.0') No drilling fluid used
136									
137		TCS-2-SS-134-139.5 4/25/2022 09:10							
138				Alluvium Deposits	SM		(137-139.5 ft) Silty sand with gravel (SM); yellowish brown (10YR 5/4); very fine to very coarse grained, angular to subround; little silt; little small to very large pebbles, angular to subround; little clay; trace granules, subangular to subround; dry to moist; silt and clay nodules and lens within unit.	(137.0 - 147.0') Rough drilling	(137.0 - 147.0') No drilling fluid used
139	8								
140				Alluvium	SM		(139 ft) Moist		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

TOPOCK SOIL BORING LOG C:\USERS\SMCGRANE\ONE DRIVE - ARCADIS\SHARED DOCUMENTS\PHASE I\DRILLING\06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\2022-07-08\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/8/22

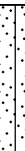







Date Started:	<u>04/01/2022</u>	Surface Elevation:	<u>587.37 ft amsl</u>	<b>Boring No.: <u>TCS-2 Pilot</u></b>
Date Completed:	<u>04/24/2022</u>	Northing (NAD83):	<u>2100921.24</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7615150.98</u>	Client: <u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>232 ft bgs</u>	Project: <u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>4-7 inches</u>	Location: <u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Matt Arnold</u>	Depth to First Water:	<u>129.5 ft bgs</u>	
Drilling Asst:	<u>D Hoepfner / R West</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>30126255</u>
Logger:	<u>Ellen Redner</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid			
141	8	TCS-2-SS-139.5-144.5 4/25/2022 09:15		Deposits	SM		(139.5-142 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little silt; trace granules, subangular to subround; trace clay; dry to moist; silt and clay nodules and lens within unit. (140 ft) Moist					
142				Alluvium Deposits								
143				Alluvium Deposits						SW-SM		(142-144.5 ft) Well graded sand with silt and gravel (SW-SM); brown (10YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; moist; silt and clay nodules and lens within unit. (143-144.5 ft) Moist
144				Alluvium Deposits						SM		
145	TCS-2-SS-144.5-148.5 4/25/2022 09:20		Alluvium Deposits	SM	(144.5-145.5 ft) Silty sand with gravel (SM); brown (10YR 5/3) with brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; little silt; little small to very large pebbles, angular to subangular; little clay; trace granules, angular to subangular; dry; silt and clay nodules and lens within unit. (145.5-148.5 ft) Silty sand with gravel (SM); yellowish brown (10YR 5/4) with brown (7.5YR 5/4); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; wet; silt and clay nodules and lens within unit. (147 ft) Color change to brown (10YR 5/3) with brown (7.5YR 5/3).							
146			Alluvium Deposits									
147			Alluvium Deposits									
148			3.8			TCS-2-VAS-147-152 ( $<0.025$ ppb) 4/20/2022 11:15		Alluvium Deposits	SM	(148.5-150 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); with brown (10YR 5/3) very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, angular to subangular; little clay; trace granules, angular to subangular; wet; silt and clay nodules and lens within unit. (150-151.5 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); with brown (10YR 5/3) very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, angular to subangular; trace granules, angular to subangular; trace clay; wet; silt and clay nodules and lens within unit. (151.5-152 ft) Silty sand with gravel (SM); brown (10YR 5/3); with brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; little small to large pebbles, angular to subangular; little silt; trace granules, angular to subangular; trace clay; wet; silt and clay nodules and lens within unit.		
149	Alluvium Deposits											
150	Alluvium Deposits											
151	Alluvium Deposits	SM			(152-158 ft) Silty sand with gravel (SM); brown (10YR 5/3); with brown (7.5YR 5/3); very fine to fine grained, little medium to very coarse grained, angular to subround; some silt; little small to large pebbles, angular to subangular; little clay; trace granules, angular to subangular; moist to wet; rapid dilatancy; silt and clay nodules and lens with in unit. (152.5-153 ft) Wet (153-154 ft) Moist to wet (154-156 ft) Wet (156-158 ft) Moist to wet							
152	12	TCS-2-SS-153-158 4/25/2022 09:30				Alluvium Deposits	SM					
153												
154												
155												
156					Alluvium Deposits	SM	(158-160 ft) Silty sand with gravel (SM); brown (10YR 5/3); with brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, angular to subangular; little clay; little granules, angular to subangular; trace small cobble, subangular; wet; rapid dilatancy; silt and clay nodules and lens within unit. (159-159.5 ft) Moist to Wet	(147.0 - 152.0') Normal drilling	(147.0 - 152.0') No drilling fluid used			
157												
158												
159												
160								(152.0 - 157.0') Rough drilling	(152.0 - 157.0') No drilling fluid used			
								(157.0 - 159.0') Very hard drilling	(157.0 - 159.0') No drilling fluid used			
								(159.0 - 167.0') hard drilling	(159.0 - 167.0') No drilling fluid			

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Date Started:	<u>04/01/2022</u>	Surface Elevation:	<u>587.37 ft amsl</u>	<b>Boring No.: <u>TCS-2 Pilot</u></b>
Date Completed:	<u>04/24/2022</u>	Northing (NAD83):	<u>2100921.24</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7615150.98</u>	Client: <u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>232 ft bgs</u>	Project: <u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>4-7 inches</u>	Location: <u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Matt Arnold</u>	Depth to First Water:	<u>129.5 ft bgs</u>	
Drilling Asst:	<u>D Hoepfner / R West</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>30126255</u>
Logger:	<u>Ellen Redner</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
161	12	TCS-2-SS-158-163.5 4/25/2022 09:35	TCS-2-VAS-161.5-166.5 ( $<0.025$ ppb) 4/21/2022 09:45	Alluvium Deposits	ML		(159.5-160 ft) Wet (160-163.5 ft) Sandy silt with gravel (ML); brown (7.5YR 5/3); low plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little small to very large pebbles, angular to subangular; little clay; little granules, angular to subangular; trace small cobbles, subangular; soft; moist to wet; rapid dilatancy; silt and clay nodules and lens within unit.		used
162							(162.5-163.5 ft) Wet		
163		TCS-2-SS-163.5-167 4/25/2022 09:40		Alluvium Deposits	SM		(163.5-164.5 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; some silt; little small to large pebbles, angular to subround; little granules, angular to subangular; little clay; wet; silt and clay nodules and lens within unit.		
164							Alluvium Deposits		
165	7.4	TCS-2-SS-167-172.5 4/25/2022 09:45		Alluvium Deposits	SM			(167-168 ft) Silty sand with gravel (SM); brown (7.5YR 4/3); very fine to very coarse grained, angular to subround; some silt; little small to large pebbles, angular to subround; little clay; trace granules, angular to subangular; moist; silt and clay nodules and lens within unit.	
166							Alluvium Deposits	ML	
167		7.7		TCS-2-SS-172.5-179 4/25/2022 09:50	Alluvium Deposits	SM			
168							Alluvium Deposits	SW-SM	
169	Alluvium Deposits		SM		(179-180 ft) Silty sand with gravel (SM); reddish brown (5YR 5/3); very fine to very coarse grained, angular to subround; some silt; little small to large pebbles, angular to subround; little clay; trace				
170									
171									
172									
173									
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176									
177									
178									
179									
180									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 10 of 12

Date Started:	<u>04/01/2022</u>	Surface Elevation:	<u>587.37 ft amsl</u>	<b>Boring No.: <u>TCS-2 Pilot</u></b>	
Date Completed:	<u>04/24/2022</u>	Northing (NAD83):	<u>2100921.24</u>		
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7615150.98</u>	Client:	<u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>232 ft bgs</u>	Project:	<u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>4-7 inches</u>	Location:	<u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Matt Arnold</u>	Depth to First Water:	<u>129.5 ft bgs</u>		
Drilling Asst:	<u>D Hoepfner / R West</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number:	<u>30126255</u>
Logger:	<u>Ellen Redner</u>	Sampling Interval:	<u>Continuous</u>		
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
181	7.7	TCS-2-SS-179-182 4/25/2022 09:55	TCS-2-VAS-181-186 (<0.025 ppb) 4/21/2022 14:45	Alluvium Deposits	SW-SM		granules, angular to subangular; wet; rapid dilatancy; silt and clay nodules within unit. (180-182 ft) Well graded sand with silt and gravel (SW-SM); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subround; little granules, angular to subangular; little silt; trace small to large pebbles, angular to subround; trace clay; wet; trace silt and clay nodules within unit.		
182		Alluvium Deposits		ML		(182-183.5 ft) Sandy silt with gravel (ML); reddish brown (5YR 5/4); low to medium plasticity, rapid dilatancy; little very fine to very coarse grained sand, angular to subround; little small to large pebbles, angular to subround; little clay; trace granules, angular to subangular; soft; wet.			
183		Alluvium Deposits		SM		(183.5-184.5 ft) Silty sand with gravel (SM); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subround; little silt; little granules, angular to subangular; trace small to large pebbles, angular to subround; trace clay; wet; trace silt and clay nodules within unit.			
184		Alluvium Deposits		SM		(184.5-185 ft) Silty sand with gravel (SM); brown (7.5YR 4/4); very fine to very coarse grained, angular to subround; some silt; little small to large pebbles, angular to subround; little granules, angular to subangular; trace clay; soft; wet; rapid dilatancy.			
185		Alluvium Deposits		SM		(185-187 ft) Silty sand with gravel (SM); brown (7.5YR 4/4); very fine to very coarse grained, subangular to subround; little silt; little granules, angular to subangular; trace small to large pebbles, angular to subround; trace clay; wet; silt and clay nodules within unit; NOTE: Silt and clay observed to be concentrated located along the outer edges of the core sample.			
186	7.4	TCS-2-SS-184.5-190 4/25/2022 10:05		Alluvium Deposits	SM		(187-188 ft) Silty sand with gravel (SM); brown (7.5YR 5/2); very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, subangular to subround; little clay; trace granules, angular to subround; soft; wet; rapid dilatancy.	(187.0 - 197.0') Normal drilling	(187.0 - 197.0') No drilling fluid used
187				Alluvium Deposits	SM		(188-190 ft) Silty sand with gravel (SM); brown (7.5YR 4/3); very fine to very coarse grained, subangular to subround; little small to very large pebbles, subangular to subround; little silt; trace granules, subangular to subround; trace clay; wet; silt and clay nodules within unit; NOTE: Silt and clay observed to be concentrated located along the outer edges of the core sample.		
188				Alluvium Deposits	SM		(190-192 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, subangular to subround; little clay; trace granules, angular to subround; soft; wet; rapid dilatancy.		
189		TCS-2-SS-190-196 4/25/2022 10:10		Alluvium Deposits	SM		(192-195 ft) Silty sand with gravel (SM); brown (7.5YR 4/3); very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, subangular to subround; little clay; trace granules, angular to subround; soft; wet; rapid dilatancy.		
190				Alluvium Deposits	SM		(195-196 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, subangular to subround; little clay; trace granules, angular to subround; soft; wet; rapid dilatancy.		
191				Alluvium Deposits	SM		(196-197 ft) Silty sand with gravel (SM); brown (7.5YR 4/4); very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, subangular to subround; little clay; trace granules, angular to subround; soft; wet; rapid dilatancy.		
192				Alluvium Deposits	ML		(197-199 ft) Sandy silt with gravel (ML); brown (7.5YR 4/3); low plasticity, rapid dilatancy; some very fine to very coarse grained sand, angular to subround; little small to very large pebbles, subangular to subround; little clay; trace granules, subangular to subround; soft; wet.		
193	8.6	TCS-2-SS-196-199 4/25/2022 10:15		Alluvium Deposits	SM			(197.0 - 207.0') Normal drilling	(197.0 - 207.0') No drilling fluid used
194				Alluvium Deposits	SM				
195				Alluvium Deposits	SM				
196									
197									
198									
199									
200									

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Date Started:	<u>04/01/2022</u>	Surface Elevation:	<u>587.37 ft amsl</u>	<b>Boring No.: <u>TCS-2 Pilot</u></b>
Date Completed:	<u>04/24/2022</u>	Northing (NAD83):	<u>2100921.24</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7615150.98</u>	Client: <u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>232 ft bgs</u>	Project: <u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>4-7 inches</u>	Location: <u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Matt Arnold</u>	Depth to First Water:	<u>129.5 ft bgs</u>	
Drilling Asst:	<u>D Hoepfner / R West</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>30126255</u>
Logger:	<u>Ellen Redner</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
201	8.6	TCS-2-SS-199-205 4/25/2022 10:20	TCS-2-VAS-202-207 (2300 ppb) 4/22/2022 11:50	Alluvium Deposits	SM		(199-202 ft) Silty sand with gravel (SM); brown (7.5YR 4/4); very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, subangular to subround; little clay; trace granules, angular to subround; soft; wet; rapid dilatancy.		
202				Alluvium Deposits	SM		(202-202.5 ft) Silty sand with gravel (SM); brown (7.5YR 4/3); very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, subangular to subround; little granules, angular to subround; trace clay; wet; rapid dilatancy.		
203				Alluvium Deposits	SM		(202.5-210 ft) Silty sand with gravel (SM); brown (7.5YR 4/4); very fine to very coarse grained, angular to subround; some silt, little small to very large pebbles, subangular to subround; little granules, angular to subround; little clay; soft; wet; rapid dilatancy; NOTE: Majority of silt and clay observed in large nodules.		
204									
205									
206	8	TCS-2-SS-205-210 4/25/2022 10:25		Alluvium Deposits	SM			(207.0 - 217.0') Normal drilling	(207.0 - 217.0') No drilling fluid used
207									
208		TCS-2-SS-210-216.5 4/25/2022 10:30	TCS-2-VAS-211.5-216.5 (120 ppb) 4/23/2022 09:00	Alluvium Deposits	SM		(210-214 ft) Silty sand with gravel (SM); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, subangular to subround; little granules, subangular to subround; trace clay; trace small cobble, subangular; wet; rapid dilatancy.		
209									
210									
211									
212		TCS-2-SS-216.5-219.5 4/25/2022 10:35		Alluvium Deposits	SM		(214-216.5 ft) Silty sand with gravel (SM); reddish brown (5YR 4/4); very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, subangular to subround; little granules, angular to subround; trace clay; soft; wet; rapid dilatancy; NOTE: Majority of silt and clay observed in large nodules.		
213									
214		TCS-2-SS-216.5-219.5 4/25/2022 10:35		Alluvium Deposits	ML		(216.5-217 ft) Gravelly silt with sand (ML); reddish brown (5YR 4/4); no plasticity, rapid dilatancy; some small to very large pebbles, subangular to subround; little very fine to very coarse grained sand, subangular to subround; little clay; trace granules, subangular to subround; soft; wet.	(217.0 - 224.0') Normal drilling	(217.0 - 224.0') No drilling fluid used
215									
216									
217									
218	12.3	TCS-2-SS-216.5-219.5 4/25/2022 10:35		Alluvium Deposits	SM		(217-219 ft) Silty sand with gravel (SM); dark reddish gray (5YR 4/2); very fine to very coarse grained, angular to subround; some silt; little small to very large pebbles, subangular to subround; little granules, subangular to subround; little clay; wet; rapid dilatancy.		
219									
220							(219-219.5 ft) Sandy silt with gravel (ML); reddish brown (5YR 4/4); no plasticity, rapid dilatancy; some very fine to very coarse grained		

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# Boring Log

Sheet: 12 of 12

Date Started:	04/01/2022	Surface Elevation:	587.37 ft amsl	<b>Boring No.: TCS-2 Pilot</b>	
Date Completed:	04/24/2022	Northing (NAD83):	2100921.24		
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	129.5 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	Ellen Redner	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
221		TCS-2-SS-219.5-223 4/25/2022 10:40	TCS-2-VAS-220-225 (<0.13 ppb) 4/22/2022 15:10	Alluvium Deposits	SM		sand, subangular to subround; little small to very large pebbles, subangular to subround; little clay; trace granules, subangular to subround; soft; wet. (219.5-223 ft) Silty sand with gravel (SM); dark reddish gray (5YR 4/2); very fine to very coarse grained, angular to subround; some silt; little clay; little granules, subangular to subround; little small to very large pebbles, subangular to subround; poorly sorted; wet; rapid dilatancy.		
222									
223									
224									
225				Weathered Bedrock - Conglomerate	N/A		(223-227 ft) Sedimentary Rock; reddish brown (5YR 5/4); fine grained to coarse grained, angular; highly weathered; medium hard; friable; pulverized by drilling process; dry to moist.	(224.0 - 232.0') Very hard drilling	(224.0 - 232.0') No drilling fluid used
226	12.3								
227		No Sieve Samples Collected	No Groundwater Samples Collected						
228									
229				Competent Bedrock - Conglomerate	N/A		(227-232 ft) Sedimentary Rock; reddish brown (5YR 5/4); fine grained to coarse grained, angular; moderately weathered; medium hard; friable; pulverized by drilling process; dry.		
230									
231									
232									
End of Boring at 232 ft bgs.									
233									
234									
235									
236									
237									
238									
239									
240									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Date Started:	04/24/2022	Surface Elevation:	587.37 ft amsl	Well ID: TCS-2 Pilot
Date Completed:	04/27/2022	Northing (NAD83):	2100921.24	
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	129.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
1		Fluvial Deposits	SW		(0.0 - 0.5') Steel plate		Note: Steel plate used to mark pilot borehole
2					(0.5 - 4.5') Cemex #60 (40x70) Lapis Lustre Sand	(0.5 - 4.5') 2.1 bags	(0.5 - 4.5') 3 bags (143%) Note: Surface sand seal, used >20% of the calculated volume due to potential voids that formed during drilling.
3							
4			NR		(4.5 - 5.0') Cemex #2/12 Mesh (12x20) Lapis Lustre Sand	(4.5 - 5.0') 0.5 bags	(4.5 - 5.0') 0.5 bags (100%) Note: Surface sand seal
5							
6							
7							
8		Fluvial Deposits	SW				
9							
10	No Groundwater Samples Collected						
11		Fluvial Deposits	SP				
12							
13					(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand
14							
15		Fluvial Deposits	SM				
16							
17							
18							
19		Alluvium Deposits	SW				
20							

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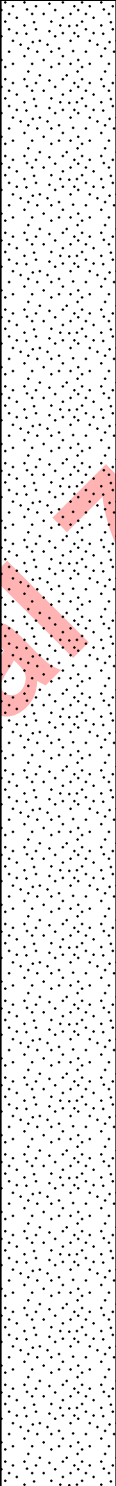






Date Started:	04/24/2022	Surface Elevation:	587.37 ft amsl	Well ID: TCS-2 Pilot
Date Completed:	04/27/2022	Northing (NAD83):	2100921.24	
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	129.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details			Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
21	No Groundwater Samples Collected	Alluvium Deposits	SW		<div>(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand</div>	<div>(28.0 - 224.0') 6" Diameter Borehole</div>	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand	
22									
23									
24									
25		Alluvium Deposits	SP						
26		Alluvium Deposits	ML						
27		Alluvium Deposits	SM						
28									
29									
30									
31		Alluvium Deposits	SW						
32		Alluvium Deposits	SM						
33		Alluvium Deposits	SW-SC						
34	Alluvium Deposits	SM							
35									
36	Alluvium Deposits	SW							
37	Alluvium Deposits	SW							
38									
39									
40									

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Date Started:	04/24/2022	Surface Elevation:	587.37 ft amsl	Well ID: TCS-2 Pilot
Date Completed:	04/27/2022	Northing (NAD83):	2100921.24	
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	129.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details		Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
41	No Groundwater Samples Collected	Alluvium Deposits	SW			<p>(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand</p>	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand
42								
43								
44								
45								
46								
47								
48		Alluvium Deposits	SM					
49		Alluvium Deposits	SW					
50								
51								
52		Alluvium Deposits	SM					
53								
54								
55								
56	Alluvium Deposits	SM						
57								
58								
59								
60								

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Date Started:	04/24/2022	Surface Elevation:	587.37 ft amsl	Well ID: TCS-2 Pilot
Date Completed:	04/27/2022	Northing (NAD83):	2100921.24	
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	129.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
61	No Groundwater Samples Collected	Alluvium Deposits	SM		(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand
62							
63							
64		Alluvium Deposits	SM				
65							
66		Alluvium Deposits	SW-SM				
67							
68	No Groundwater Samples Collected				(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand
69		Alluvium Deposits	SM				
70							
71							
72							
73		Alluvium Deposits	SW-SM				
74							
75	No Groundwater Samples Collected				(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand
76							
77							
78		Alluvium Deposits	SW-SM				
79							
80							
80							

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Date Started:	04/24/2022	Surface Elevation:	587.37 ft amsl	Well ID: TCS-2 Pilot
Date Completed:	04/27/2022	Northing (NAD83):	2100921.24	
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	129.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
81	No Groundwater Samples Collected	Alluvium Deposits	SW-SM		(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand
82							
83							
84		Alluvium Deposits	SM				
85							
86		Alluvium Deposits	ML				
87							
88		Alluvium Deposits	SM				
89							
90							
91							
92		Alluvium Deposits	SW-SM				
93							
94							
95							
96							
97		Alluvium Deposits	ML				
98		Alluvium Deposits	SW				
99							
100		Alluvium Deposits	SM				

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Date Started:	04/24/2022	Surface Elevation:	587.37 ft amsl	Well ID: TCS-2 Pilot
Date Completed:	04/27/2022	Northing (NAD83):	2100921.24	
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	129.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
101	No Groundwater Samples Collected	Alluvium Deposits	SW				
102							
103							
104							
105		Alluvium Deposits	SM				
106							
107							
108							
109		Alluvium Deposits	SM				
110							
111	(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand						
112							
113							
114							
115							
116							
117		Alluvium Deposits	SM				
118							
119		Alluvium Deposits	SM				
120							

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Date Started:	04/24/2022	Surface Elevation:	587.37 ft amsl	Well ID: TCS-2 Pilot
Date Completed:	04/27/2022	Northing (NAD83):	2100921.24	
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	129.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
121	No Groundwater Samples Collected	Alluvium Deposits	SM				
122							
123							
124		Alluvium Deposits	SM				
125							
126	No Sample (127-132 Interval did not produce) 4/19/2022						
127							
128							
129		Alluvium Deposits	SM				
130					(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand
131	TCS-2-VAS-131-136 (4300 ppb) 4/19/2022 15:10						
132							
133							
134							
135		Alluvium Deposits	SM				
136							
137							
138		Alluvium Deposits	SM				
139							
140		Alluvium Deposits	SM				

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Date Started:	04/24/2022	Surface Elevation:	587.37 ft amsl	Well ID: TCS-2 Pilot
Date Completed:	04/27/2022	Northing (NAD83):	2100921.24	
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	129.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
141		Alluvium Deposits	SM				
142							
143		Alluvium Deposits	SW-SM				
144							
145		Alluvium Deposits	SM				
146							
147		Alluvium Deposits	SM				
148							
149	TCS-2-VAS-147-152 (<0.025 ppb) 4/20/2022 11:15	Alluvium Deposits	SM				
150					(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand
151		Alluvium Deposits	SM				
152		Alluvium Deposits	SM				
153							
154							
155		Alluvium Deposits	SM				
156							
157							
158							
159		Alluvium Deposits	SM				
160							

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Date Started:	04/24/2022	Surface Elevation:	587.37 ft amsl	Well ID: TCS-2 Pilot
Date Completed:	04/27/2022	Northing (NAD83):	2100921.24	
Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	129.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
161							
162		Alluvium Deposits	ML				
163							
164	TCS-2-VAS-161.5-166.5 (<0.025 ppb) 4/21/2022 09:45	Alluvium Deposits	SM				
165							
166		Alluvium Deposits	ML				
167							
168		Alluvium Deposits	SM				
169							
170		Alluvium Deposits	ML		(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand
171							
172							
173							
174		Alluvium Deposits	SM				
175							
176							
177							
178		Alluvium Deposits	SW-SM				
179							
180		Alluvium Deposits	SM				

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Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	129.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
181	TCS-2-VAS-181-186 ( $<0.025$ ppb) 4/21/2022 14:45	Alluvium Deposits	SW-SM				
182		Alluvium Deposits	ML				
183		Alluvium Deposits	SM				
184		Alluvium Deposits	SM				
185		Alluvium Deposits	SM				
186		Alluvium Deposits	SM				
187		Alluvium Deposits	SM				
188		Alluvium Deposits	SM				
189		Alluvium Deposits	SM				
190		Alluvium Deposits	SM		(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand
191		Alluvium Deposits	SM				
192		Alluvium Deposits	SM				
193		Alluvium Deposits	SM				
194		Alluvium Deposits	SM				
195		Alluvium Deposits	SM				
196		Alluvium Deposits	SM				
197		Alluvium Deposits	SM				
198		Alluvium Deposits	ML				
199		Alluvium Deposits	SM				
200		Alluvium Deposits	SM				

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Drilling Co.:	Cascade	Easting (NAD83):	7615150.98	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	129.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
201		Alluvium Deposits	SM				
202		Alluvium Deposits	SM				
203							
204	TCS-2-VAS-202-207 (2300 ppb) 4/22/2022 11:50						
205							
206		Alluvium Deposits	SM				
207							
208							
209							
210					(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand
211							
212		Alluvium Deposits	SM				
213							
214	TCS-2-VAS-211.5-216.5 (120 ppb) 4/23/2022 09:00						
215		Alluvium Deposits	SM				
216							
217		Alluvium Deposits	ML				
218		Alluvium Deposits	SM				
219		Alluvium Deposits	ML				
220			SM				

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Drilling Method:	Sonic Drilling	Total Depth:	232 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	129.5 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details		Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
221	TCS-2-VAS-220-225 ( $<0.13$ ppb) 4/22/2022 15:10	Alluvium Deposits	SM	<div><div></div><div></div><div></div></div>	(5.0 - 221.5') Cemex 8 Mesh (8x16) Lapis Lustre Sand	<div><div></div><div></div><div></div></div>	(5.0 - 221.5') 88.2 bags	(5.0 - 221.5') 98 bags (111%) Note: Backfill sand
222								
223		Weathered Bedrock - Conglomerate	N/A	<div><div></div><div></div><div></div></div>				
224								
225	No Groundwater Samples Collected	Competent Bedrock - Conglomerate	N/A	<div><div></div><div></div><div></div></div>	(221.5 - 232.0') Cemex #2/12 Mesh (12x20) Lapis Lustre Sand	<div><div></div><div></div><div></div></div>	(221.5 - 232.0') 2.4 bags	(221.5 - 232.0') 3 bags (125%) Note: Indicator sand, used $>20\%$ of the calculated volume due to potential voids that formed during drilling.
226								
227								
228								
229								
230								
231								
232								

233
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237
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239
240

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.



# Boring Log

Sheet: 1 of 7

Date Started:	03/15/2022	Surface Elevation:	538.84 ft amsl	Boring No.: <b>TWB-1 Pilot</b>
Date Completed:	03/30/2022	Northing (NAD83):	2100941.12	
Drilling Co.:	Cascade	Easting (NAD83):	7615929.94	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	129.5 ft bgs	Project: Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	82.0 ft bgs	
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: 30126255
Logger:	S McGrane / G Willford	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid			
1	5.2	No Sieve Samples Collected	No Groundwater Samples Collected	Fill	N/A		(0-0.5 ft) Grading for the drill pad.	(0.0 - 5.2') Air knifed for utility clearance. Logged soils disturbed.	(0.0 - 5.2') No drilling fluid used			
2				Alluvium Deposits	SM		(0.5-3 ft) Silty sand with gravel (SM); brown (7.5YR 5/4); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; little silt; little granules, angular to subround; trace clay; dry; NOTE: Logged from air-knife cuttings.					
3				Alluvium Deposits	SW-SM		(3-5 ft) Well-graded sand with silt and gravel (SW-SM); brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little granules, angular to subround; little silt; trace clay; dry; NOTE: Logged from air-knife cuttings.					
4	2			Alluvium Deposits	SW-SM		(5-7 ft) Well-graded sand with silt and gravel (SW-SM); brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular to subround; little granules, angular to subround; little silt; dry.					
5				7.8	Alluvium Deposits	SM				(7-11.75 ft) Silty sand with gravel (SM); brown (7.5YR 5/4); very fine to very coarse grained, angular to subround; some small to very large pebbles, angular to subangular; little granules, angular to subround; trace small cobbles, subangular; little silt; trace clay; dry.		
6					Alluvium Deposits	GW-GM				(11.75-14 ft) Well-graded gravel with silt and sand (GW-GM); brown (7.5YR 4/3); small to very large pebbles, little granules, angular to subangular; and very fine to very coarse grained sand, angular to subround; little silt; dry.		
7	Alluvium Deposits				ML		(14-15.5 ft) Sandy silt with gravel (ML); brown (10YR 5/3); low plasticity, no dilatancy; and very fine to very coarse grained sand, angular to subround; little small to large pebbles, angular to subangular; little granules, angular to subround; very soft; dry.					
8	1.5			Alluvium Deposits	SW-SM		(15.5-17 ft) Well-graded sand with silt and gravel (SW-SM); brown (10YR 5/3); very fine to very coarse grained, angular to subround; little small to very large pebbles, angular; little granules, angular to subround; little silt; trace clay; dry.			(15.0') Hard drilling had to trip back in to collect 15 to 17 ft. bgs.	(15.0') No drilling fluid used	
9				8.8	Alluvium Deposits	SW-SM				(17-19.5 ft) Well-graded sand with silt and gravel (SW-SM); brown (10YR 5/3); very fine to very coarse grained, angular to subround; some small to very large pebbles, angular to subangular; little granules, angular to subangular; trace small cobbles, subangular; little silt; trace clay; dry.	(17.0 - 27.0') Hard drilling	(17.0 - 27.0') No drilling fluid used
10					Alluvium	SM						
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.





# Boring Log

Sheet: 2 of 7

Date Started:	03/15/2022	Surface Elevation:	538.84 ft amsl	<b>Boring No.: TWB-1 Pilot</b>	
Date Completed:	03/30/2022	Northing (NAD83):	2100941.12		
Drilling Co.:	Cascade	Easting (NAD83):	7615929.94	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	129.5 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	82.0 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	S McGrane / G Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	8.8			Deposits	SM		(19.5-22 ft) Silty sand with gravel (SM); yellowish brown (10YR 5/4); very fine to very coarse grained, angular to subround; some small to very large pebbles, angular to subangular; little granules, angular to subangular; little silt; dry.		
22				Alluvium Deposits			(22-27 ft) Silty sand with gravel (SM); brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; some granules, angular to subangular; some small to very large pebbles, angular to subangular; little silt; dry; NOTE: Cementation with white matrix, potentially caliche.		
23									
24				Alluvium Deposits			(25 ft) Trace small cobble; subangular.		
25	7	No Sieve Samples Collected	No Groundwater Samples Collected		SM			(32.0 - 37.0') hard drilling	(32.0 - 37.0') No drilling fluid used
26									
27				Alluvium Deposits			(27-29 ft) Silty sand with gravel (SM); brown (7.5YR 4/4); very fine to very coarse grained, angular to subround; some granules, angular to subround; some small to very large pebbles, angular to subangular; little silt; dry; NOTE: Some sediments moderately cemented with white matrix, potentially caliche.		
28									
29				Alluvium Deposits			(29-33 ft) Silty sand with gravel (SM); brown (7.5YR 4/3); very fine to very coarse grained, angular to subround; some granules, angular to subround; little small to very large pebbles, subangular to subround; little silt; dry; NOTE: Some cementation with white matrix, potentially caliche.		
30									
31	2.9			Alluvium Deposits	SM		(33-37 ft) Silty sand with gravel (SM); brown (7.5YR 4/3); very fine to medium grained, some coarse to very coarse grained sand, angular to subround; some silt; some small to large pebbles, subangular to subround; trace granules, angular to subround; dry.		
32									
33				Alluvium Deposits			(34.5 ft) Trace very large pebble; angular.		
34									
35					SM		(36 ft) Rip up clasts of weakly cemented sand with white matrix, potentially caliche.		
36									
37									
38				Alluvium Deposits			(37-40.5 ft) Silty sand with gravel (SM); brown (7.5YR 4/4); very fine to very coarse grained, angular to subround; some granules, angular to subround; little small to very large pebbles, angular to subround; little silt; dry; NOTE: Some weak cementation with white matrix, potentially caliche.		
39					SM				
40									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 3 of 7

Date Started:	03/15/2022	Surface Elevation:	538.84 ft amsl	Boring No.: <b>TWB-1 Pilot</b>	
Date Completed:	03/30/2022	Northing (NAD83):	2100941.12		
Drilling Co.:	Cascade	Easting (NAD83):	7615929.94	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	129.5 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	82.0 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	S McGrane / G Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41	2.9			Alluvium Deposits	SM		(40.5-42 ft) Silty sand with gravel (SM); brown (7.5YR 4/4); very fine to medium grained, and very fine to very coarse grained sand, angular to subround; and silt; little small to large pebbles, angular to subround; little granules, angular to subround; dry; NOTE: Some sands weakly cemented with white matrix, potentially caliche.		
42				Alluvium Deposits	SM		(42-48.75 ft) Well-graded sand with silt and gravel (SW-SM); brown (7.5YR 4/4); very fine to very coarse grained, angular to subround; some granules, angular to subround; some small to very large pebbles, angular to subround; little silt; trace clay; dry; NOTE: Some weak cementation with white matrix, potentially caliche.		
43				Alluvium Deposits	SM				
44				Alluvium Deposits	SM				
45				Alluvium Deposits	SM				
46	5.5			Alluvium Deposits	SM				
47				Alluvium Deposits	SM				
48				Alluvium Deposits	SM			(47.0 - 50.0') Soft drilling	(47.0 - 50.0') No drilling fluid used
49				Alluvium Deposits	SW		(48.75-50 ft) Well-graded sand with gravel (SW); brown (7.5YR 4/3); very fine to very coarse grained, angular to subround; some granules, angular to subround; some small to large pebbles, angular to subangular; trace silt; trace clay; dry.		
50		No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SM		(50-52 ft) Silty sand with gravel (SM); brown (7.5YR 4/3); very fine to medium grained, some coarse to very coarse grained sand, subangular to subround; and silt; little granules, subangular to subround; little small pebbles, subangular to subround; trace clay; dry; NOTE: Some weak cementation with white matrix, potentially caliche.		
51				Alluvium Deposits	SM				
52				Alluvium Deposits	SM		(52-54.5 ft) Silty sand with gravel (SM); brown (7.5YR 4/4); very fine to medium grained, some coarse to very coarse grained sand, subangular to subround; and silt; little small to medium pebbles, angular to subround; trace granules, angular to subround; trace clay; dry; NOTE: Some weak cementation with white matrix, potentially caliche.	(53.0 - 57.0') Hard drilling	(53.0 - 57.0') No drilling fluid used
53	6.2			Alluvium Deposits	SM				
54				Alluvium Deposits	SW-SM		(54.5-57 ft) Well-graded sand with silt and gravel (SW-SM); brown (7.5YR 5/3); very fine to very coarse grained, angular to subround; some small to very large pebbles, angular to subangular; little granules, angular to subround; little silt; trace clay; trace small cobbles, angular; dry; NOTE: Trace weak cementation with white matrix, potentially caliche.		
55				Alluvium Deposits	SW-SM				
56				Alluvium Deposits	SW-SM				
57				Alluvium Deposits	SW-SM		(57-62 ft) Well-graded sand with silt and gravel (SW-SM); brown (7.5YR 4/4); very fine to very coarse grained, angular to subround; some small to very large pebbles, angular to subround; little granules, angular to subround; little silt; trace clay; trace small cobbles, angular; dry.	(57.0 - 77.0') Normal drilling	(57.0 - 77.0') No drilling fluid used
58	7.7			Alluvium Deposits	SW-SM				
59				Alluvium Deposits	SW-SM				
60				Alluvium Deposits	SW-SM				

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# Boring Log

Sheet: 4 of 7

Date Started:	03/15/2022	Surface Elevation:	538.84 ft amsl	<b>Boring No.: TWB-1 Pilot</b>	
Date Completed:	03/30/2022	Northing (NAD83):	2100941.12		
Drilling Co.:	Cascade	Easting (NAD83):	7615929.94	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	129.5 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	82.0 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	S McGrane / G Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	7.7			Alluvium Deposits	SW-SM		(57-62 ft) Well-graded sand with silt and gravel (SW-SM); brown (7.5YR 4/4); very fine to very coarse grained, angular to subround; some small to very large pebbles, angular to subround; little granules, angular to subround; little silt; trace clay; trace small cobbles, angular; dry.		
62				Alluvium Deposits	SM		(62-63.5 ft) Silty sand with gravel (SM); brown (7.5YR 4/4); very fine to very coarse grained, angular to subround; some granules, angular to subround; little small to very large pebbles, angular to subround; little silt; trace clay; dry; NOTE: Some weak cementation with white matrix, potentially caliche.		
63				Alluvium Deposits	SW		(63.5-64.5 ft) Well-graded sand with gravel (SW); reddish brown (5YR 4/4); very fine to very coarse grained, angular to subround; some granules, angular to subround; some small to large pebbles, trace very large pebbles, angular angular to subround; trace silt; trace clay; dry.		
64				Alluvium Deposits	SM		(64.5-67 ft) Silty sand with gravel (SM); reddish yellow (5YR 6/6); very fine to very coarse grained, angular to subround; some small to very large pebbles, angular to subround; little granules, angular to subround; little silt; trace clay; dry; NOTE: Trace weak cementation with white matrix, potentially caliche.		
65	7	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SM		(67-70.5 ft) Silty sand with gravel (SM); brown (7.5YR 5/4); very fine to very coarse grained, angular to subround; little silt; little small to very large pebbles, angular to subround; little granules, angular to subround; trace clay; trace small cobbles, angular; dry.		
66				Alluvium Deposits	SW-SM		(70-72 ft) Well-graded sand with silt and gravel (SW-SM); reddish brown (5YR 4/4); very fine to very coarse grained, angular to subround; some granules, angular to subround; some small to large pebbles, angular to subround; little silt; trace clay; dry; NOTE: Some moderate cementation with white matrix, potentially caliche.		
67				Alluvium Deposits	SC		(71-72 ft) Clayey sand with gravel (SC); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subround; little granules, angular to subround; little small to large pebbles, angular to subround; little clay; trace silt; dry.		
68				Alluvium Deposits	SM		(72-74.5 ft) Silty sand with gravel (SM); reddish brown (5YR 4/4); very fine to very coarse grained, angular to subround; some small to very large pebbles, angular to subround; little granules, angular to subround; little silt; trace clay; trace small cobbles, angular; dry.		
69				Alluvium Deposits	SW-SM		(74.5-77 ft) Well-graded sand with silt and gravel (SW-SM); reddish brown (5YR 4/4); very fine to very coarse grained, angular to subround; some granules, angular to subround; some small to very large pebbles, angular to subround; trace silt; trace clay; trace small cobbles, subangular; dry.		
70				Alluvium Deposits	SM		(77-83 ft) Silty sand with gravel (SM); dark reddish gray (5YR 4/2); very fine to very coarse grained, angular to subround; some large to very large pebbles, angular to subround; little granules, angular to subround; little silt; little clay; trace small cobbles, angular; moist.	(77.0') Driller stated he things they drilled trough a boulder.	(77.0') No drilling fluid used
71	6.3	TWB-1-SS-77-83 3/31/2022 15:45							
72									
73									
74									
75									
76									
77									
78									
79									
80									

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# Boring Log

Sheet: 5 of 7

Date Started:	03/15/2022	Surface Elevation:	538.84 ft amsl	<b>Boring No.: TWB-1 Pilot</b>	
Date Completed:	03/30/2022	Northing (NAD83):	2100941.12		
Drilling Co.:	Cascade	Easting (NAD83):	7615929.94	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	129.5 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	82.0 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	S McGrane / G Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81			No Groundwater Samples Collected	Alluvium Deposits	SM		(77-83 ft) Silty sand with gravel (SM); dark reddish gray (5YR 4/2); very fine to very coarse grained, angular to subround; some large to very large pebbles, angular to subround; little granules, angular to subround; little silt; little clay; trace small cobbles, angular; moist.		
82							(82 ft) Wet to moist		
83	6.3	TWB-1-SS-83-84.5 3/31/2022 15:40	TWB-1-VAS-82-87 (870 ppb) 3/18/2022 10:51	Alluvium Deposits	SM		(83-84.5 ft) Silty sand with gravel (SM); dark reddish gray (5YR 4/2); very fine to very coarse grained, angular to subround; some granules, angular to subround; little silt; little small to very large pebbles, angular to subround; moist to wet; NOTE: Some moderate cementation white matrix, potentially caliche.		
84							(84.5-89.5 ft) Silty sand with gravel (SM); reddish brown (5YR 4/3); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to very large pebbles, angular to subangular; little silt; trace clay; moist to wet.		
85									
86									
87		TWB-1-SS-84.5-89.5 3/31/2022 15:35		Alluvium Deposits	SM		(87 ft) Moist to wet.	(87.0 - 97.0') Hard drilling	(87.0 - 97.0') 30 gallons of water used; 0 gallons of water recovered; 30 gallons of water lost
88									
89			TWB-1-VAS-87-92 (<0.025 ppb) 3/20/2022 08:50						
90							(89.5-97 ft) Sedimentary Rock; reddish brown (5YR 5/4); fine grained to coarse grained; angular; friable; dry. NOTE: Rock pulverized into mostly powder by the sonic drilling methodology.		
91									
92	7.3								
93		TWB-1-SS-89.5-97 3/31/2022 15:30		Competent Bedrock - Conglomerate	N/A				
94									
95									
96									
97									
98		TWB-1-SS-97-98 3/31/2022 15:25		Alluvium Deposits	SP-SM		(97-98 ft) Poorly graded sand with silt (SP-SM); very fine to medium grained, angular to subround; little silt; trace clay; well sorted; wet; 5YR 5/4 - reddish brown; Topock Alluvium.	(97.0 - 102.0') Core barrel got stuck had to use water and run casing over core barrel. Lost core sample down hole, tripped back in	(97.0 - 102.0') 50 gallons of water used; 0 gallons of water recovered; 50 gallons of water lost
99	8	TWB-1-SS-98-99.5 3/31/2022 15:20	TWB-1-VAS-97-102 (1200 ppb) 3/20/2022 16:26	Alluvium Deposits	SM		(98-99.5 ft) Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to very large pebbles, angular to subangular; little silt; wet.		
100					N/A				

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# Boring Log

Sheet: 6 of 7

Date Started:	03/15/2022	Surface Elevation:	538.84 ft amsl	<b>Boring No.: TWB-1 Pilot</b>	
Date Completed:	03/30/2022	Northing (NAD83):	2100941.12		
Drilling Co.:	Cascade	Easting (NAD83):	7615929.94	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	129.5 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	82.0 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	S McGrane / G Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101						x x x x	(99.5-106 ft) Sedimentary Rock; reddish brown (5YR 5/4); fine grained to coarse grained, angular; highly weathered; moist; NOTE: Very dark gray to black staining.	to recover, core disturbed.	
102						x x x x			
103	8	TWB-1-SS-99.5-106 3/31/2022 15:15		Weathered Bedrock - Conglomerate	N/A	x x x x		(102.0 - 106.0') Drilled to 106 ft bgs to plug the core barrel and retrieve the 97 to 102 sample.	(102.0 - 106.0') No drilling fluid used
104						x x x x			
105						x x x x			
106						x x x x			
107						x x x x	(106-110 ft) Sedimentary Rock; reddish brown (5YR 5/4); fine grained to coarse grained, angular; moderately weathered; moist; NOTE: Rock clasts within conglomerate composed of mixed lithology.	(106.0 - 110.0') Very hard drilling could not advance a full 10 ft.	(106.0 - 110.0') No drilling fluid used
108	4	TWB-1-SS-106-110 3/31/2022 15:10		Weathered Bedrock - Conglomerate	N/A	x x x x			
109						x x x x			
110						x x x x			
111						x x x x	(110-119 ft) Sedimentary Rock; reddish brown (5YR 5/4); fine grained to coarse grained, angular; friable; dry; NOTE: Rock clasts within conglomerate composed of mixed lithology.		
112						x x x x			
113						x x x x			
114	5	TWB-1-VAS-110-115 (4300 ppb) 3/21/2022 11:16		Competent Bedrock - Conglomerate	N/A	x x x x			
115						x x x x			
116						x x x x			
117						x x x x			
118	1.5					x x x x		(117.0') Depth 6-inch diameter casing was drilled 4-inch diameter rathole to 127 ft bgs. 6-inch diameter casing	(117.0') No drilling fluid used
119						x x x x			(117.1 - 119.0') No drilling fluid used
120	6.5			Weathered Bedrock - Conglomerate	N/A	x x x x			(119.0 - 124.5') No drilling fluid

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



Date Started:	<u>03/15/2022</u>	Surface Elevation:	<u>538.84 ft amsl</u>	<b>Boring No.: <u>TWB-1 Pilot</u></b>
Date Completed:	<u>03/30/2022</u>	Northing (NAD83):	<u>2100941.12</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7615929.94</u>	Client: <u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>129.5 ft bgs</u>	Project: <u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>4-7 inches</u>	Location: <u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Matt Arnold</u>	Depth to First Water:	<u>82.0 ft bgs</u>	
Drilling Asst:	<u>D Hoepfner / R West</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>30126255</u>
Logger:	<u>S McGrane / G Willford</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid		
121	6.5	TWB-1-SS-119-123.25 3/31/2022 15:00		Weathered Bedrock - Conglomerate	N/A	x x x x	(119-123.25 ft) Sedimentary Rock; reddish brown (5YR 5/4); fine grained to coarse grained, angular; moderately weathered; moist; NOTE: Rock clasts within conglomerate composed of mixed lithology.	advanced to 127 ft. bgs on 3/30/22.	used		
122						x x x x		(117.1 - 119.0') Auger bit locked up cut run short.			
123		x x x x	(119.0 - 124.5') Very hard drilling								
124		TWB-1-VAS-122-127 (1700 ppb) 3/21/2022 16:26	Competent Bedrock - Conglomerate	N/A	x x x x	(123.25-129 ft) Sedimentary Rock; reddish brown (5YR 5/4); fine grained to coarse grained, angular; medium hard; friable; dry; NOTE: Rock clasts within conglomerate composed of mixed lithology.		(124.5 - 127.0') Drilling smoother. Casing remained in place from 3/22 until resumed on 3/30/22.	(124.5 - 127.0') No drilling fluid used		
125					x x x x						
126					TWB-1-SS-123.25-129 3/31/2022 14:55						x x x x
127	x x x x										
128	2	No Groundwater Samples Collected				x x x x					
129						x x x x					

End of Boring at 129.5 ft bgs.

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# Well Construction Log

Sheet: 1 of 7

Date Started:	03/31/2022	Surface Elevation:	538.84 ft amsl	Well ID: TWB-1 Temp
Date Completed:	03/31/2022	Shallow Well Elevation:	538.34 ft amsl	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2100941.12	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Easting (NAD83):	7615929.94	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Borehole Diameter:	4-7 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	4/27/2022	
Total Depth:	129.5 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
1	No Groundwater Samples Collected	Fill	N/A		(0.0 - 1.0') Temporary well vault		Note: 12-inch diameter vault
2		Alluvium Deposits	SM		(0.3 - 76.7') 2" Sch. 80 PVC Casing		
3							
4		Alluvium Deposits	SW-SM				
5							
6		Alluvium Deposits	SW-SM				
7							
8							
9		Alluvium Deposits	SM		(8.0 - 127.0') 6" Diameter Borehole		
10							
11					(1.0 - 70.5') Cemex #60 (40x70) Lapis Lustre Sand	(1.0 - 70.5') 23.5 bags	(1.0 - 70.5') 27 bags (115%) Note: Temporary sand seal
12		Alluvium Deposits	GW-GM				
13							
14		Alluvium Deposits	ML				
15							
16		Alluvium Deposits	SW-SM				
17							
18		Alluvium Deposits	SW-SM				
19							
20		Alluvium	SM				

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# Well Construction Log

Sheet: 2 of 7

Date Started:	03/31/2022	Surface Elevation:	538.84 ft amsl	Well ID: TWB-1 Temp
Date Completed:	03/31/2022	Shallow Well Elevation:	538.34 ft amsl	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2100941.12	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Easting (NAD83):	7615929.94	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Borehole Diameter:	4-7 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	4/27/2022	
Total Depth:	129.5 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
21	No Groundwater Samples Collected	Deposits	SM		(0.3 - 76.7') 2" Sch. 80 PVC Casing		
22		Alluvium Deposits					
23		Alluvium Deposits	SM				
24							
25							
26	No Groundwater Samples Collected	Alluvium Deposits	SM				
27							
28		Alluvium Deposits	SM				
29							
30							
31	No Groundwater Samples Collected	Alluvium Deposits	SM		(1.0 - 70.5') Cemex #60 (40x70) Lapis Lustre Sand		(1.0 - 70.5') 27 bags (115%) Note: Temporary sand seal
32							
33		Alluvium Deposits	SM				
34							
35							
36	No Groundwater Samples Collected	Alluvium Deposits	SM				
37							
38		Alluvium Deposits	SM				
39							
40							

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# Well Construction Log

Sheet: 3 of 7

Date Started:	03/31/2022	Surface Elevation:	538.84 ft amsl	Well ID: TWB-1 Temp
Date Completed:	03/31/2022	Shallow Well Elevation:	538.34 ft amsl	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2100941.12	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Easting (NAD83):	7615929.94	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Borehole Diameter:	4-7 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	4/27/2022	
Total Depth:	129.5 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
41	No Groundwater Samples Collected	Alluvium Deposits	SM		(0.3 - 76.7') 2" Sch. 80 PVC Casing		
42		Alluvium Deposits	SM				
43		Alluvium Deposits	SM				
44		Alluvium Deposits	SM				
45		Alluvium Deposits	SM				
46		Alluvium Deposits	SM				
47		Alluvium Deposits	SM				
48		Alluvium Deposits	SM				
49		Alluvium Deposits	SW		(1.0 - 70.5') Cemex #60 (40x70) Lapis Lustre Sand	(1.0 - 70.5') 23.5 bags	(1.0 - 70.5') 27 bags (115%) Note: Temporary sand seal
50		Alluvium Deposits	SM				
51		Alluvium Deposits	SM				
52		Alluvium Deposits	SM				
53		Alluvium Deposits	SM				
54		Alluvium Deposits	SM				
55		Alluvium Deposits	SW-SM				
56		Alluvium Deposits	SW-SM				
57		Alluvium Deposits	SW-SM				
58		Alluvium Deposits	SW-SM				
59		Alluvium Deposits	SW-SM				
60							

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# Well Construction Log

Sheet: 4 of 7

Date Started:	03/31/2022	Surface Elevation:	538.84 ft amsl	Well ID: TWB-1 Temp
Date Completed:	03/31/2022	Shallow Well Elevation:	538.34 ft amsl	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2100941.12	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Easting (NAD83):	7615929.94	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Borehole Diameter:	4-7 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	4/27/2022	
Total Depth:	129.5 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
61	No Groundwater Samples Collected	Alluvium Deposits	SW-SM		(0.3 - 76.7') 2" Sch. 80 PVC Casing		
62		Alluvium Deposits	SM				
63		Alluvium Deposits	SW				
64		Alluvium Deposits	SM		(1.0 - 70.5') Cemex #60 (40x70) Lapis Lustre Sand	(1.0 - 70.5') 23.5 bags	(1.0 - 70.5') 27 bags (115%) Note: Temporary sand seal
65		Alluvium Deposits	SM				
66		Alluvium Deposits	SM				
67		Alluvium Deposits	SM				
68		Alluvium Deposits	SM				
69		Alluvium Deposits	SW-SM				
70		Alluvium Deposits	SC		(70.5 - 72.0') Holeplug 3/8" Bentonite Chips	(70.5 - 72.0') 0.4 bags	(70.5 - 72.0') 0.5 bags (125%) Note: Benotnite seal
71		Alluvium Deposits	SM				
72		Alluvium Deposits	SW-SM		(72.0 - 129.5') Cemex #3 (8x20) Lapis Lustre Sand	(72.0 - 129.5') 18.2 bags	(72.0 - 129.5') 27.5 bags (151%) Note: Filter pack, used >20% of the calculated volume due to potential voids forming during drilling.
73		Alluvium Deposits	SM		(76.7 - 126.7') 2" 0.02-Slot Sch. 80 PVC Screen		
74		Alluvium Deposits	SM				
75		Alluvium Deposits	SW-SM				
76		Alluvium Deposits	SM				
77		Alluvium Deposits	SW-SM				
78		Alluvium Deposits	SM				
79		Alluvium Deposits	SM				
80		Alluvium Deposits	SM				

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# Well Construction Log

Sheet: 5 of 7

Date Started:	03/31/2022	Surface Elevation:	538.84 ft amsl	Well ID: TWB-1 Temp
Date Completed:	03/31/2022	Shallow Well Elevation:	538.34 ft amsl	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2100941.12	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Easting (NAD83):	7615929.94	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Borehole Diameter:	4-7 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	4/27/2022	
Total Depth:	129.5 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
81	No Groundwater Samples Collected	Alluvium Deposits	SM		(76.7 - 126.7') 2" 0.02-Slot Sch. 80 PVC Screen		
82							
83		Alluvium Deposits	SM				
84	TWB-1-VAS-82-87 (870 ppb) 3/18/2022 10:51						
85							
86		Alluvium Deposits	SM				
87							
88							
89	TWB-1-VAS-87-92 (<0.025 ppb) 3/20/2022 08:50						
90					(72.0 - 129.5') Cemex #3 (8x20) Lapis Lustre Sand	(72.0 - 129.5') 18.2 bags	(72.0 - 129.5') 27.5 bags (151%) Note: Filter pack, used >20% of the calculated volume due to potential voids forming during drilling.
91							
92							
93		Competent Bedrock - Conglomerate	N/A				
94							
95							
96							
97							
98	TWB-1-VAS-97-102 (1200 ppb) 3/20/2022 16:26	Alluvium Deposits	SP-SM				
99		Alluvium Deposits	SM				
100			N/A				

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# Well Construction Log

Sheet: 6 of 7

Date Started:	03/31/2022	Surface Elevation:	538.84 ft amsl	Well ID: TWB-1 Temp
Date Completed:	03/31/2022	Shallow Well Elevation:	538.34 ft amsl	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2100941.12	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Easting (NAD83):	7615929.94	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Borehole Diameter:	4-7 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	4/27/2022	
Total Depth:	129.5 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
101				xxxxx	(76.7 - 126.7') 2" 0.02-Slot Sch. 80 PVC Screen		
102				xxxxx			
103		Weathered Bedrock - Conglomerate	N/A	xxxxx			
104				xxxxx			
105				xxxxx			
106				xxxxx			
107				xxxxx			
108		Weathered Bedrock - Conglomerate	N/A	xxxxx			
109				xxxxx			
110				xxxxx	(72.0 - 129.5') Cemex #3 (8x20) Lapis Lustre Sand	(72.0 - 129.5') 18.2 bags	(72.0 - 129.5') 27.5 bags (151%) Note: Filter pack, used >20% of the calculated volume due to potential voids forming during drilling.
111				xxxxx			
112	TWB-1-VAS- 110-115 (4300 ppb) 3/21/2022 11:16			xxxxx			
113				xxxxx			
114				xxxxx			
115		Competent Bedrock - Conglomerate	N/A	xxxxx			
116				xxxxx			
117				xxxxx			
118				xxxxx			
119				xxxxx			
120		Weathered Bedrock - Conglomerate	N/A	xxxxx			

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# Well Construction Log

Sheet: 7 of 7

Date Started:	03/31/2022	Surface Elevation:	538.84 ft amsl	Well ID: TWB-1 Temp
Date Completed:	03/31/2022	Shallow Well Elevation:	538.34 ft amsl	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	2100941.12	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Easting (NAD83):	7615929.94	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Borehole Diameter:	4-7 inches	
Logger:	Ellen Redner	Static Water Level:	See Log for Depths	Project Number: 30126255
Editor:	Sean McGrane	Development End Date:	4/27/2022	
Total Depth:	129.5 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up <input type="checkbox"/> To Be Completed in Well Vault	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
121		Weathered Bedrock - Conglomerate	N/A	XXXXXX	(76.7 - 126.7') 2" 0.02-Slot Sch. 80 PVC Screen		
122							
123		Competent Bedrock - Conglomerate	N/A	XXXXXX			
124	TWB-1-VAS-122-127 (1700 ppb) 3/21/2022 16:26				(72.0 - 129.5') Cemex #3 (8x20) Lapis Lustre Sand	(72.0 - 129.5') 18.2 bags	(72.0 - 129.5') 27.5 bags (151%) Note: Filter pack, used >20% of the calculated volume due to potential voids forming during drilling.
125							
126							
127					(126.1 - 129.0') SS End Cap		
128	No Groundwater Samples Collected						
129					(127.0 - 129.0') 4" Diameter Rathole		
130							
131							
132							
133							
134							
135							
136							
137							
138							
139							
140							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, SS = Stainless Steel, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Hollow blue water table marks represent depth to water (ft. bgs.) measured post development.

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# Boring Log

Sheet: 1 of 6

Date Started:	03/20/2022	Surface Elevation:	537.23 ft amsl	<b>Boring No.: TWB-2 Pilot</b>	
Date Completed:	03/29/2022	Northing (NAD83):	2100953.17		
Drilling Co.:	Cascade	Easting (NAD83):	7616017.20	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	102 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	93.2 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	S McGrane / G Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1							(0-19.5 ft) Silty sand with gravel (SM); brown (7.5YR 5/4); very fine to very coarse grained, angular to subround; little granules, angular to subangular; little small to large pebbles, angular to subangular; little silt; trace clay; dry; NOTE: Pebbles component composed of mixed lithology, mostly metadiorite.	(0.0 - 5.0') Air-knifed for utility clearance on 3/20/22. Samples collected for logging at approximately 1 ft., 3 ft., and 5 ft. bgs.	(0.0 - 5.0') No drilling fluid used
2									
3									
4									
5									
6	2								
7									
8									
9								(8.0 - 17.0') Smooth drilling	(8.0 - 17.0') No drilling fluid used
10		No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SM				
11									
12									
13	7								
14									
15									
16									
17									
18									
19	7								
20				Alluvium	SM				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue water table marks represent depth to water (ft. bgs.) measured during the first VAS interval, depth to water could not be determined from soil cores. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

TOPOCK SOIL BORING LOG C:\USERS\SMCGRANE\ONEEDRIVE - ARCADIS\SHARED DOCUMENTS\PHASE I\DRILLING\06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\21 2022-07-09\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/19/22



# Boring Log

Sheet: 2 of 6

Date Started:	03/20/2022	Surface Elevation:	537.23 ft amsl	Boring No.: <b>TWB-2 Pilot</b>
Date Completed:	03/29/2022	Northing (NAD83):	2100953.17	
Drilling Co.:	Cascade	Easting (NAD83):	7616017.20	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	102 ft bgs	Project: Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	93.2 ft bgs	
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: 30126255
Logger:	S McGrane / G Willford	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid	
21	7	No Sieve Samples Collected	No Groundwater Samples Collected	Deposits	SM		(19.5-27 ft) Silty sand with gravel (SM); brown (7.5YR 5/4); very fine to very coarse grained, angular to subangular; little small to large pebbles, angular to subangular; little granules, angular to subangular; trace small cobbles, angular; little silt; trace clay; dry; NOTE: Pebbles component composed of mixed lithology.			
22										
23										
24				(23.0 - 24.0') Rough drilling				(23.0 - 24.0') No drilling fluid used		
25										
26										
27										
28	3.5			Alluvium Deposits	SM		(27-29 ft) Silty sand (SM); brown (7.5YR 5/4); very fine to very coarse grained, angular to subangular; little silt; trace granules, angular to subangular; trace small to medium pebbles, angular to subangular; trace clay; dry.	(27.0 - 32.0') Rough drilling drill rod broke.	(27.0 - 32.0') No drilling fluid used	
29										
30				Alluvium Deposits	SM		(29-45 ft) Silty sand with gravel (SM); brown (7.5YR 5/4); very fine to very coarse grained, angular to subangular; little small to large pebbles, angular to subangular; little granules, angular to subangular; trace small cobbles, angular; little silt; trace clay; dry; NOTE: Gravel component composed of mixed lithology.	(29.0 - 32.0') Hard drilling	(29.0 - 32.0') No drilling fluid used	
31										
32										
33	(32.0 - 37.0') Rough drilling							(32.0 - 37.0') No drilling fluid used		
34	4									
35										
36										
37										
38	7.9								(37.0 - 47.0') Rough drilling	(37.0 - 47.0') No drilling fluid used
39										
40										



Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue water table marks represent depth to water (ft. bgs.) measured during the first VAS interval, depth to water could not be determined from soil cores. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 3 of 6

Date Started:	03/20/2022	Surface Elevation:	537.23 ft amsl	<b>Boring No.: TWB-2 Pilot</b>	
Date Completed:	03/29/2022	Northing (NAD83):	2100953.17		
Drilling Co.:	Cascade	Easting (NAD83):	7616017.20	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	102 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	93.2 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	S McGrane / G Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid		
41	7.9	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SM		(29-45 ft) Silty sand with gravel (SM); brown (7.5YR 5/4); very fine to very coarse grained, angular to subangular; little small to large pebbles, angular to subangular; little granules, angular to subangular; trace small cobbles, angular; little silt; trace clay; dry; NOTE: Gravel component composed of mixed lithology.				
42											
43											
44											
45											
46						Alluvium Deposits	SM		(45-64 ft) Silty sand with gravel (SM); brown (7.5YR 5/4) little greenish gray (5GY 6/1); very fine to very coarse grained, angular to subangular; little small to large pebbles, angular to subangular; little granules, angular to subangular; trace small cobbles, angular; little silt; trace clay; weak cementation; dry; NOTE: Gravel component composed of mixed lithology.	(47.0 - 54.0') Rough drilling	(47.0 - 54.0') No drilling fluid used
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue water table marks represent depth to water (ft. bgs.) measured during the first VAS interval, depth to water could not be determined from soil cores. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

TOPOCK SOIL BORING LOG C:\USERS\SMCGRANE\ONE\DRIVE - ARCADIS\SHARED DOCUMENTS\PHASE I\DRILLING\06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\21 2022-07-09\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/9/22



# Boring Log

Sheet: 4 of 6

Date Started:	03/20/2022	Surface Elevation:	537.23 ft amsl	<b>Boring No.: <u>TWB-2 Pilot</u></b>	
Date Completed:	03/29/2022	Northing (NAD83):	2100953.17		
Drilling Co.:	Cascade	Easting (NAD83):	7616017.20	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	102 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold	Depth to First Water:	93.2 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	S McGrane / G Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	8			Alluvium Deposits	SM		(45-64 ft) Silty sand with gravel (SM); brown (7.5YR 5/4) little greenish gray (5GY 6/1); very fine to very coarse grained, angular to subangular; little small to large pebbles, angular to subangular; little granules, angular to subangular; trace small cobbles, angular; little silt; trace clay; weak cementation; dry; NOTE: Gravel component composed of mixed lithology.		
62				Alluvium Deposits	SM		(64-65 ft) Silty sand with gravel (SM); light reddish brown (5YR 6/4); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to medium pebbles, angular to subangular; little silt; trace clay; dry.	(64.0 - 67.0') Rough drilling, 1 ft. of slough was included in the core bag sample.	(64.0 - 67.0') No drilling fluid used
63				Alluvium Deposits	SM		(65-69 ft) Silty sand with gravel (SM); light brown (7.5YR 6/4); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to medium pebbles, angular to subangular; little silt; trace clay; dry.		
64	4			Alluvium Deposits	SM		(69-69.5 ft) Silty sand with gravel (SM); very dark gray (7.5YR 3/1); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to medium pebbles, angular to subangular; little silt; trace clay; dry.	(67.0 - 77.0') Rough drilling	(67.0 - 77.0') No drilling fluid used
65				Alluvium Deposits	SM		(69.5-74.5 ft) Silty sand with gravel (SM); light brown (7.5YR 6/4); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to medium pebbles, angular to subangular; little silt; trace clay; dry.		
66				Alluvium Deposits	SM		(74.5-76.25 ft) Sedimentary Rock; light reddish brown (2.5YR 6/4); fine grained to coarse grained, angular; highly weathered; massive; rock clasts within matrix composed of mixed lithology; friable; dry; NOTE: Rock pulverized into mostly powder by the sonic drilling methodology.		
67	7			Weathered Bedrock - Conglomerate	N/A		(76.25-102 ft) Sedimentary Rock; light reddish brown (2.5YR 6/4); fine grained to coarse grained, angular; slightly weathered; hard; massive; rock clasts within matrix composed of mixed lithology; some rock fragments 1.5 to 3 inches in length; friable; dry . NOTE: Rock pulverized into mostly powder by the sonic drilling methodology.	(77.0 - 87.0') Very hard drilling, core barrel locked up in hole, had to flush casing over it to free the barrel.	(77.0 - 87.0') 280 gallons of water used; 250 gallons of water recovered; 30 gallons of water lost
68				Competent Bedrock - Conglomerate	N/A				
69				Competent Bedrock - Conglomerate	N/A				
70	7			Competent Bedrock - Conglomerate	N/A				
71				Competent Bedrock - Conglomerate	N/A				
72				Competent Bedrock - Conglomerate	N/A				
73	7			Competent Bedrock - Conglomerate	N/A				
74				Competent Bedrock - Conglomerate	N/A				
75				Competent Bedrock - Conglomerate	N/A				
76	7			Competent Bedrock - Conglomerate	N/A				
77				Competent Bedrock - Conglomerate	N/A				
78				Competent Bedrock - Conglomerate	N/A				
79	7			Competent Bedrock - Conglomerate	N/A				
80				Competent Bedrock - Conglomerate	N/A				
				Competent Bedrock - Conglomerate	N/A				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue water table marks represent depth to water (ft. bgs.) measured during the first VAS interval, depth to water could not be determined from soil cores. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Date Started:	<u>03/20/2022</u>	Surface Elevation:	<u>537.23 ft amsl</u>	<b>Boring No.: <u>TWB-2 Pilot</u></b>
Date Completed:	<u>03/29/2022</u>	Northing (NAD83):	<u>2100953.17</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7616017.20</u>	Client: <u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>102 ft bgs</u>	Project: <u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>4-7 inches</u>	Location: <u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Matt Arnold</u>	Depth to First Water:	<u>93.2 ft bgs</u>	
Drilling Asst:	<u>D Hoepfner / R West</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>30126255</u>
Logger:	<u>S McGrane / G Willford</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid				
81	7	No Sieve Samples Collected	No Groundwater Samples Collected	Competent Bedrock - Conglomerate	N/A	x x x x	(76.25-102 ft) Sedimentary Rock; light reddish brown (2.5YR 6/4); fine grained to coarse grained, angular; slightly weathered; hard; massive; rock clasts within matrix composed of mixed lithology; some rock fragments 1.5 to 3 inches in length; friable; dry . NOTE: Rock pulverized into mostly powder by the sonic drilling methodology.						
82			x x x x										
83			x x x x										
84			x x x x										
85			x x x x										
86	4		No Sample (85-90 water was not representative of aquifer) 3/24/2022							x x x x		(87.0 - 92.0') Rough drilling	(87.0 - 92.0') No drilling fluid used
87										x x x x			
88										x x x x			
89										x x x x			
90										x x x x			
91	3.5					x x x x		(92.0 - 97.0') Rough drilling	(92.0 - 97.0') No drilling fluid used				
92						x x x x							
93						x x x x							
94						x x x x							
95						x x x x							
96	3.9					x x x x							
97						x x x x							
98						x x x x							
99						x x x x							
100						x x x x							
			TWB-2- VAS-97-102 ( 3/29/2022 10:01			x x x x							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue water table marks represent depth to water (ft. bgs.) measured during the first VAS interval, depth to water could not be determined from soil cores. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



Date Started:	<u>03/20/2022</u>	Surface Elevation:	<u>537.23 ft amsl</u>	<b>Boring No.: <u>TWB-2 Pilot</u></b>
Date Completed:	<u>03/29/2022</u>	Northing (NAD83):	<u>2100953.17</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7616017.20</u>	Client: <u>PG&amp;E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>102 ft bgs</u>	Project: <u>Final GW Remedy Phase 2A</u>
Drill Rig Type:	<u>Boart Longyear drill head</u>	Borehole Diameter:	<u>4-7 inches</u>	Location: <u>PG&amp;E Topock, Needles California</u>
Driller Name:	<u>Matt Arnold</u>	Depth to First Water:	<u>93.2 ft bgs</u>	
Drilling Asst:	<u>D Hoepfner / R West</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>30126255</u>
Logger:	<u>S McGrane / G Willford</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101  102	3.9	No Sieve Samples Collected		Competent Bedrock - Conglomerate	N/A	x x	(76.25-102 ft) Sedimentary Rock; light reddish brown (2.5YR 6/4); fine grained to coarse grained, angular; slightly weathered; hard; massive; rock clasts within matrix composed of mixed lithology; some rock fragments 1.5 to 3 inches in length; friable; dry . NOTE: Rock pulverized into mostly powder by the sonic drilling methodology.		

Sample ID	Geol Form	USC Co	USC Cla	Soil Description
	Competent Bedrock - Conglomerate	N/A	x x	(76.25-102 ft) Sedimentary Rock; light reddish b fine grained to coarse grained, angular; slightly massive; rock clasts within matrix composed of some rock fragments 1.5 to 3 inches in length; f Rock pulverized into mostly powder by the sonic methodology.
				End of Boring at 102 ft bgs.

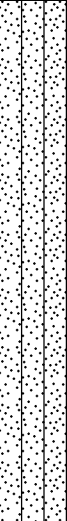
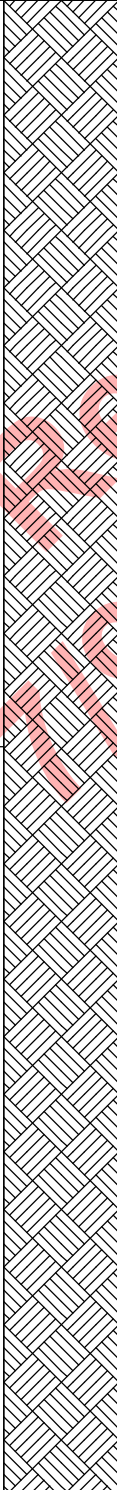
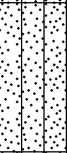
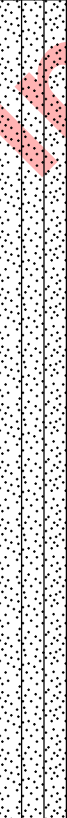
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue water table marks represent depth to water (ft. bgs.) measured during the first VAS interval, depth to water could not be determined from soil cores. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

Date Started:	03/29/2022	Surface Elevation:	537.23 ft amsl	Well ID: TWB-2 Pilot
Date Completed:	03/31/2022	Northing (NAD83):	2100953.17	
Drilling Co.:	Cascade	Easting (NAD83):	7616017.20	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	102 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	93.2 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
1					(0.0 - 8.0') 7" Diameter Borehole		
2					(0.0 - 4.0') Native material from SPY		Note: Backfill material
3							
4							
5							
6							
7					(4.0 - 10.0') Portland Type I, II and V w/ up to 6% Bentonite	(4.0 - 10.0') 10.9 gallons	(4.0 - 10.0') 13 gallons (119%) Note: Grout seal
8							
9					(8.0 - 98.0') 6" Diameter Borehole		
10	No Groundwater Samples Collected	Alluvium Deposits	SM				
11							
12							
13							
14							
15					(10.0 - 60.0') Portland Type I, II and V w/ up to 6% Bentonite	(10.0 - 60.0') 73.4 gallons	(10.0 - 60.0') 100 gallons (136%) Note: Grout seal, used >20% of the calculated volume due to potential grout migration and voids forming during drilling.
16							
17							
18							
19							
20		Alluvium Deposits	SM				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue water table marks represent depth to water (ft. bgs.) measured during the first VAS interval, depth to water could not be determined from soil cores. Granular backfill material was removed during overdrilling of the pilot borehole.

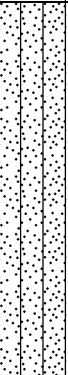
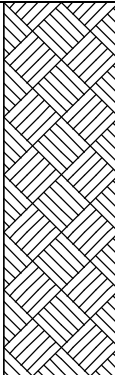
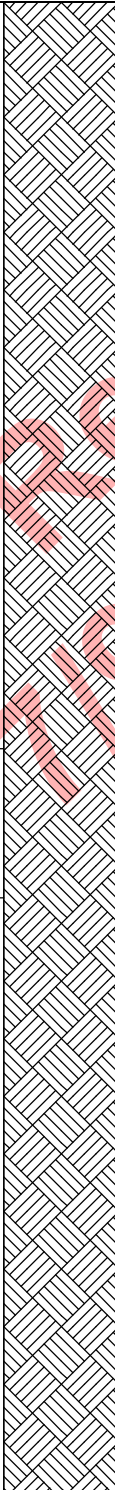
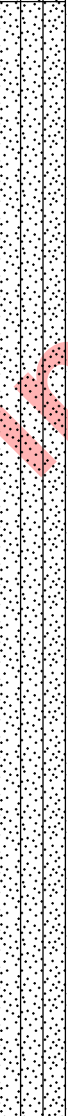
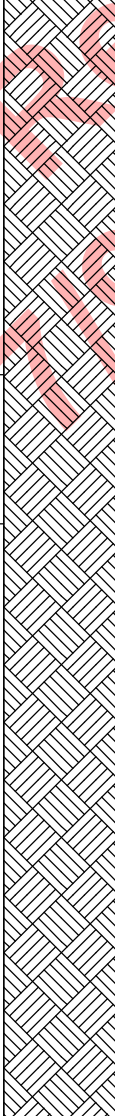
Date Started:	03/29/2022	Surface Elevation:	537.23 ft amsl	Well ID: TWB-2 Pilot
Date Completed:	03/31/2022	Northing (NAD83):	2100953.17	
Drilling Co.:	Cascade	Easting (NAD83):	7616017.20	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	102 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	93.2 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details		Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
21	No Groundwater Samples Collected	Alluvium Deposits	SM		 (10.0 - 60.0') Portland Type I, II and V w/ up to 6% Bentonite		(10.0 - 60.0') 73.4 gallons	(10.0 - 60.0') 100 gallons (136%) Note: Grout seal, used >20% of the calculated volume due to potential grout migration and voids forming during drilling.
22								
23								
24								
25								
26								
27		Alluvium Deposits	SM					
28								
29		Alluvium Deposits	SM					
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue water table marks represent depth to water (ft. bgs.) measured during the first VAS interval, depth to water could not be determined from soil cores. Granular backfill material was removed during overdrilling of the pilot borehole.

TOPOCK TEMP ABANDONMENT LOG C:\USERS\MCGRANE\ONE DRIVE - ARCADIS\SHARED DOCUMENTS\PHASE 1\DRILLING\06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\21 2022-07-09\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/9/22

Date Started:	03/29/2022	Surface Elevation:	537.23 ft amsl	Well ID: TWB-2 Pilot
Date Completed:	03/31/2022	Northing (NAD83):	2100953.17	
Drilling Co.:	Cascade	Easting (NAD83):	7616017.20	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	102 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	93.2 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details		Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume		
41	No Groundwater Samples Collected	Alluvium Deposits	SM				(10.0 - 60.0') 73.4 gallons			
42										
43										
44										
45										
46		Alluvium Deposits	SM					(10.0 - 60.0') 73.4 gallons	(10.0 - 60.0') 100 gallons (136%) Note: Grout seal, used >20% of the calculated volume due to potential grout migration and voids forming during drilling.	
47										
48										
49										
50									(10.0 - 60.0') Portland Type I, II and V w/ up to 6% Bentonite	
51										
52									(44.0 - 94.0')	
53										
54										
55										
56										
57										
58										
59										
60										

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue water table marks represent depth to water (ft. bgs.) measured during the first VAS interval, depth to water could not be determined from soil cores. Granular backfill material was removed during overdrilling of the pilot borehole.

TOPOCK TEMP ABANDONMENT LOG C:\USERS\MCGRANE\ONE DRIVE - ARCADIS\SHARED DOCUMENTS\PHASE 2 GINT FILES\00 NEW PHASE 2 GINT FILES\21 2022-07-09\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/9/22

Date Started:	03/29/2022	Surface Elevation:	537.23 ft amsl	Well ID: TWB-2 Pilot
Date Completed:	03/31/2022	Northing (NAD83):	2100953.17	
Drilling Co.:	Cascade	Easting (NAD83):	7616017.20	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	102 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	93.2 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
61	No Groundwater Samples Collected	Alluvium Deposits	SM		(60.0 - 102.0') Portland Cement Type I, II and V w/ up to 6% Bentonite mixed with saline water	(60.0 - 102.0') 58.4 gallons	(60.0 - 102.0') 50 gallons (86%) Note: Grout seal.
62							
63							
64		Alluvium Deposits	SM				
65					(44.0 - 94.0')		Note: The formation locked the drill casing at approximately 94 ft. bgs. 50 feet of 6-inch diameter drill casing was cemented in place from approximately 44 ft. bgs to 94 ft. bgs.
66		Alluvium Deposits	SM				
67							
68							
69		Alluvium Deposits	SM				
70							
71							
72		Alluvium Deposits	SM				
73							
74							
75		Weathered Bedrock - Conglomerate	N/A				
76							
77							
78		Competent Bedrock - Conglomerate	N/A				
79							
80							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue water table marks represent depth to water (ft. bgs.) measured during the first VAS interval, depth to water could not be determined from soil cores. Granular backfill material was removed during overdrilling of the pilot borehole.

Date Started:	03/29/2022	Surface Elevation:	537.23 ft amsl	Well ID: TWB-2 Pilot
Date Completed:	03/31/2022	Northing (NAD83):	2100953.17	
Drilling Co.:	Cascade	Easting (NAD83):	7616017.20	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	102 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	93.2 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
81	No Groundwater Samples Collected			xxxxxx			
82							
83							
84							
85	No Sample (85-90 water was not representative of aquifer) 3/24/2022	Competent Bedrock - Conglomerate	N/A	xxxxxx	(44.0 - 94.0')		Note: The formation locked the drill casing at approximately 94 ft. bgs. 50 feet of 6-inch diameter drill casing was cemented in place from approximately 44 ft. bgs to 94 ft. bgs.
86							
87							
88							
89							
90	TWB-2-VAS-97-102 (<0.025 ppb) 3/29/2022 10:01			xxxxxx	(60.0 - 102.0') Portland Cement Type I, II and V w/ up to 6% Bentonite mixed with saline water	(60.0 - 102.0') 58.4 gallons	(60.0 - 102.0') 50 gallons (86%) Note: Grout seal.
91							
92							
93							
94							
95							
96							
97							
98							
99							
100					(98.0 - 102.0') 4" Diameter Rathole		


Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue water table marks represent depth to water (ft. bgs.) measured during the first VAS interval, depth to water could not be determined from soil cores. Granular backfill material was removed during overdrilling of the pilot borehole.





Date Started:	03/29/2022	Surface Elevation:	537.23 ft amsl	Well ID: TWB-2 Pilot
Date Completed:	03/31/2022	Northing (NAD83):	2100953.17	
Drilling Co.:	Cascade	Easting (NAD83):	7616017.20	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	102 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	93.2 ft bgs	
Logger:	Ellen Redner	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
101-  102		Competent Bedrock - Conglomerate	N/A	X X	(60.0 - 102.0') Portland Cement Type I, II and V w/ up to 6% Bentonite mixed with saline water	(60.0 - 102.0') 58.4 gallons	(60.0 - 102.0') 50 gallons (86%) Note: Grout seal.

erate		x x x x x x x x x x x x x x x	to 6% Bentonite mixed with saline water		58.4 gallon
-------	--	---	---	---	-------------

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue water table marks represent depth to water (ft. bgs.) measured during the first VAS interval, depth to water could not be determined from soil cores. Granular backfill material was removed during overdrilling of the pilot borehole.







# Boring Log

Sheet: 1 of 5

Date Started: 05/05/2022 Surface Elevation: 504.81 ft amsl  
Date Completed: 05/08/2022 Northing (NAD83): 2101174.43  
Drilling Co.: Cascade Easting (NAD83): 7615744.89 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 88 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Boart Longyear drill head Borehole Diameter: 4-7 inches Location: PG&E Topock, Needles California  
Driller Name: Matt Arnold / Jose Hernandez Depth to First Water: 47.0 ft bgs  
Drilling Asst: D Hoepfner / R West Sampling Method: 4 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: David Cornell Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☒ Yes ☐ No

**Boring No.: TWB-3 Pilot**

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid				
1	6	No Sieve Samples Collected	No Groundwater Samples Collected	Fill	SM		(0-4.5 ft) Silty sand with gravel (SM); very dark brown (10YR 2/2); very fine to very coarse grained; angular to subangular; little silt; little small to large pebbles; angular to subangular; trace granules, angular to subangular; dry to moist.	(0.0 - 7.0') Fill used to build drill pad.	(0.0 - 7.0') No drilling fluid used				
2													
3													
4													
5													
6	5			Fill	SM		(4.5-7 ft) Silty sand with gravel (SM); brown (10YR 5/3); very fine to very coarse grained, angular to subangular; little silt; trace granules, angular to subangular; trace small to large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; dry.			(7.0 - 12.0') Air-knifed for utility clearance on 4/23/22 prior to construction of the drill pad.	(7.0 - 12.0') No drilling fluid used		
7													
8	5			Alluvium Deposits	SW-SM		(7-17 ft) Well graded sand with silt and gravel (SW-SM); brown (10YR 5/3); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to large pebbles, angular to subangular; little silt; trace small to large cobbles, angular to subangular; dry.					(19.0 - 26.0') Hard drilling	(19.0 - 26.0') No drilling fluid used
9													
10													
11													
12													
13													
14													
15													
16													
17		4	Alluvium Deposits				SW		(17-21 ft) Well graded sand and gravel (SW); brown (10YR 5/3); very fine to very coarse grained, angular to subangular; little small to large pebbles, angular to subangular; trace granules, angular to subangular; trace small to large cobbles, angular to subangular; trace silt; trace clay; dry.	(19.0 - 26.0') Hard drilling	(19.0 - 26.0') No drilling fluid used		
18													
19													
20													

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 2 of 5

Date Started:	05/05/2022	Surface Elevation:	504.81 ft amsl	<b>Boring No.: TWB-3 Pilot</b>	
Date Completed:	05/08/2022	Northing (NAD83):	2101174.43		
Drilling Co.:	Cascade	Easting (NAD83):	7615744.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	88 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold / Jose Hernandez	Depth to First Water:	47.0 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	David Cornell	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	4			Alluvium Deposits	SW				
22							(21-26 ft) Well graded sand and gravel (SW); brown (10YR 5/3); very fine to very coarse grained, angular to subangular; little small to large pebbles, angular to subangular; trace granules, angular to subangular; trace small to large cobbles, angular to subangular; trace silt; trace clay; dry.		
23									
24	5			Alluvium Deposits	SW				
25									
26									
27							(26-32 ft) Well graded sand and gravel (SW); dark yellowish brown (10YR 3/4); very fine to very coarse grained, angular to subangular; little small to large pebbles, angular to subangular; trace granules, angular to subangular; trace small to large cobbles, angular to subangular; trace clay; dry.		
28									
29	6			Alluvium Deposits	SW				
30		No Sieve Samples Collected	No Groundwater Samples Collected						
31									
32									
33							(32-37 ft) Well graded sand and gravel (SW); dark yellowish brown (10YR 3/4); very fine to very coarse grained, angular to subangular; trace small to large pebbles, angular to subangular; trace granules, angular to subangular; trace small to large cobbles, angular to subangular; trace silt; trace clay; dry.	(32.0 - 37.0') In and out of hard drilling	(32.0 - 37.0') No drilling fluid used
34	5			Alluvium Deposits	SW				
35									
36									
37									
38							(37-47 ft) Well graded sand and gravel (SW); dark yellowish brown (10YR 4/3) with brown (10YR 3/6); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; trace silt; dry.		
39	10			Alluvium Deposits	SW				
40									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.

TOPOCK SOIL BORING LOG C:\USERS\SMCGRANE\ONE\DRIVE - ARCADIS\SHARED DOCUMENTS\PHASE II\DRILLING\06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\21 2022-07-09\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 7/8/22



# Boring Log

Sheet: 3 of 5

Date Started: 05/05/2022 Surface Elevation: 504.81 ft amsl  
Date Completed: 05/08/2022 Northing (NAD83): 2101174.43  
Drilling Co.: Cascade Easting (NAD83): 7615744.89 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 88 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Boart Longyear drill head Borehole Diameter: 4-7 inches Location: PG&E Topock, Needles California  
Driller Name: Matt Arnold / Jose Hernandez Depth to First Water: 47.0 ft bgs  
Drilling Asst: D Hoepfner / R West Sampling Method: 4 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: David Cornell Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☒ Yes ☐ No

**Boring No.: TWB-3 Pilot**

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid	
41	10	No Sieve Samples Collected	No Groundwater Samples Collected	Alluvium Deposits	SW		(37-47 ft) Well graded sand and gravel (SW); dark yellowish brown (10YR 4/3) with brown (10YR 3/6); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to large pebbles, angular to subangular; trace small to large cobbles, angular to subangular; trace silt; dry.			
42		TWB-3-SS-42-47 5/9/2022 09:10					(42.0 - 47.0') Rough drilling	(42.0 - 47.0') 5 gallons of water used; 0 gallons of water recovered; 5 gallons of water lost		
43										
44										
45										
46										
47	10	TWB-3-SS-47-52 5/9/2022 09:20	TWB-3-VAS-47-52 (<0.025 ppb) 5/6/2022 11:15	Alluvium Deposits	SM		(47-57 ft) Silty sand with gravel (SM); brown (10YR 4/3) with dark yellowish brown (10YR 4/4); very fine to medium grained, angular to subangular; little silt; little small to large pebbles, angular to subangular; little granules, angular to subangular; trace small to large cobbles, angular to subangular; trace clay; moist to wet.	▼ (47.0 - 52.0') Set sample screen for VAS after drilling to 62 ft. bgs and tagging water at ~48.7 ft bgs.	(47.0 - 52.0') No drilling fluid used	
48										
49										
50										
51										
52		TWB-3-SS-52-57 5/9/2022 09:30						(57-62 ft) Well graded sand with silt and gravel (SW-SM); strong brown (7.5YR 4/6); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to large pebbles, angular to subangular; little silt; trace small to large cobbles, angular to subangular; trace clay; wet.	(51.0 - 52.0') Rough drilling	(51.0 - 52.0') No drilling fluid used
53										
54										
55										
56										
57	5	TWB-3-SS-57-62 5/9/2022 09:40	TWB-3-VAS-57-62 (6.6 ppb) 5/6/2022 14:20	Alluvium Deposits	SW-SM					
58										
59										
60										

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 4 of 5

Date Started: 05/05/2022 Surface Elevation: 504.81 ft amsl  
Date Completed: 05/08/2022 Northing (NAD83): 2101174.43  
Drilling Co.: Cascade Easting (NAD83): 7615744.89 Client: PG&E  
Drilling Method: Sonic Drilling Total Depth: 88 ft bgs Project: Final GW Remedy Phase 2A  
Drill Rig Type: Boart Longyear drill head Borehole Diameter: 4-7 inches Location: PG&E Topock, Needles California  
Driller Name: Matt Arnold / Jose Hernandez Depth to First Water: 47.0 ft bgs  
Drilling Asst: D Hoepfner / R West Sampling Method: 4 inch x 10 ft. Core Barrel Project Number: 30126255  
Logger: David Cornell Sampling Interval: Continuous  
Editor: Sean McGrane Converted to Well: ☒ Yes ☐ No

**Boring No.: TWB-3 Pilot**

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	5			Alluvium Deposits	SW-SM		(57-62 ft) Well graded sand with silt and gravel (SW-SM); strong brown (7.5YR 4/6); very fine to very coarse grained, angular to subangular; little granules, angular to subangular; little small to large pebbles, angular to subangular; little silt; trace small to large cobbles, angular to subangular; trace clay; wet.		
62									
63									
64		TWB-3-SS-62-67 5/9/2022 09:50							
65									
66									
67	10			Alluvium Deposits	ML		(62-72 ft) Sandy silt with gravel (ML); strong brown (7.5YR 4/6); no plasticity, no dilatancy; little very fine to medium grained sand, angular to subangular; little clay; little small to large pebbles, angular to subangular; trace granules, angular to subangular; trace small to large cobbles, angular to subangular; stiff; moist.	(62.0 - 72.0') Rough drilling	(62.0 - 72.0') No drilling fluid used
68									
69		TWB-3-SS-67-72 5/9/2022 10:00	TWB-3-VAS-67-72 ( $<0.025$ ppb) 5/7/2022 11:15						
70									
71									
72									
73									
74		TWB-3-SS-72-77 5/9/2022 10:10		Alluvium Deposits	ML		(72-79 ft) Sandy silt with gravel (ML); strong brown (7.5YR 4/6) with dark brown (10YR 3/3); no plasticity, no dilatancy; little very fine to medium grained sand, angular to subangular; little clay; little small to large pebbles, angular to subangular; trace granules, angular to subangular; trace small to large cobbles, angular to subangular; stiff; moist.		
75									
76	10							(75.0 - 76.0') Rough drilling	(75.0 - 76.0') No drilling fluid used
77									
78		TWB-3-SS-77-79 5/9/2022 10:20	TWB-3-VAS-76-81 ( $<0.13$ ppb) 5/8/2022 11:25						
79									
80				Competent Bedrock - Conglomerate	N/A	x x x x x x x x x x x x x x x x	(79-82 ft) Sedimentary Rock; dark brown (7.5YR 3/4); friable; dry; containing fragments of metadiorite.	(79.0 - 82.0') Hard drilling potentially	(79.0 - 82.0') No drilling fluid used

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



# Boring Log

Sheet: 5 of 5

Date Started:	05/05/2022	Surface Elevation:	504.81 ft amsl	<b>Boring No.: TWB-3 Pilot</b>	
Date Completed:	05/08/2022	Northing (NAD83):	2101174.43		
Drilling Co.:	Cascade	Easting (NAD83):	7615744.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	88 ft bgs	Project:	Final GW Remedy Phase 2A
Drill Rig Type:	Boart Longyear drill head	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Driller Name:	Matt Arnold / Jose Hernandez	Depth to First Water:	47.0 ft bgs		
Drilling Asst:	D Hoepfner / R West	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	30126255
Logger:	David Cornell	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (ft)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	10			Competent Bedrock - Conglomerate	N/A	x x x x x	(79-82 ft) Sedimentary Rock; dark brown (7.5YR 3/4); friable; dry; containing fragments of metadiorite.	bedrock.	
82						x x x x x			
83						x x x x x			
84		No Sieve Samples Collected	No Groundwater Samples Collected	Weathered Bedrock - Conglomerate	N/A	x x x x x	(82-88 ft) Sedimentary Rock; dark brown (7.5YR 3/4); dry to moist; friable, pulverized from the drilling process.	(82.0 - 88.0') Consistently hard drilling.	(82.0 - 88.0') No drilling fluid used
85	4.5					x x x x x			
86						x x x x x			
87						x x x x x			
88						x x x x x			
89							End of Boring at 88 ft bgs.		
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Apparent partial recoveries can be the result of potential compaction of sediments in the core bag.



Date Started:	05/08/2022	Surface Elevation:	504.81 ft amsl	Well ID: TWB-3 Pilot
Date Completed:	05/09/2022	Northing (NAD83):	2101174.43	
Drilling Co.:	Cascade	Easting (NAD83):	7615744.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	88 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold / Jose Hernandez	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	47.0 ft bgs	
Logger:	David Cornell	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details		Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
1					(0.0 - 0.5') Steel Plate	(0.0 - 18.0') 7" Borehole		Note: Steel plate used to mark pilot borehole
2		Topock - Fill	SM		(0.5 - 5.0') Cemex #0/30 Mesh (30x50) Lapis Lustre Sand		(0.5 - 5.0') 2.7 bags	(0.5 - 5.0') 3 bags (111%) Note: Surface sand seal
3								
4								
5		Topock - Fill	SM					
6								
7								
8								
9								
10	No Groundwater Samples Collected							
11								
12		Topock - Alluvium Deposits	SW-SM		(5.0 - 78.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand		(5.0 - 78.0') 30.5 bags	(5.0 - 78.0') 53 bags (174%) Note: Backfill sand. Used >20% of the calculated volume due to a potential void below approximately 5 ft. bgs.
13								
14								
15								
16								
17								
18		Topock - Alluvium Deposits	SW			(18.0 - 82.0') 6" Borehole		
19								
20								


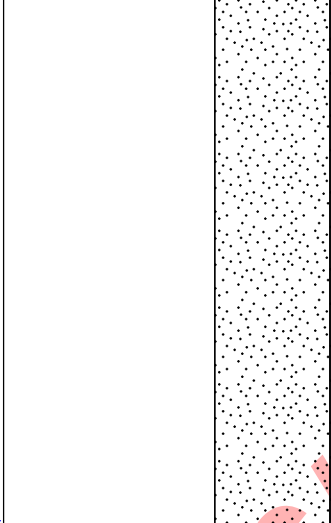
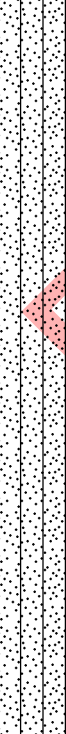
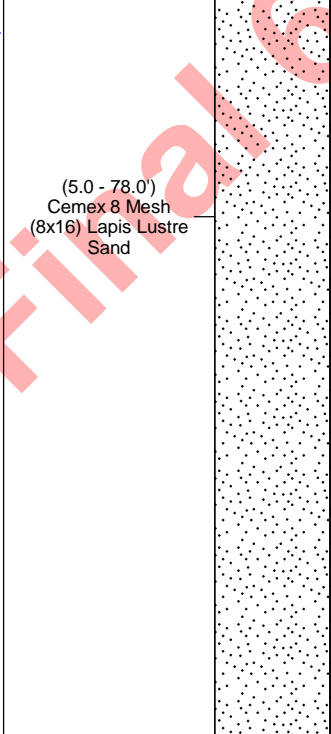

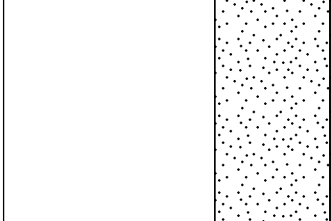
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, NR = No Recovery, N/A = Not Applicable, GW = groundwater, ppb = parts per billion, Notes: Solid blue and hollow blue water table marks represent depth to water (ft. bgs.) first encountered from logging and depth to water measured during the first VAS interval, respectively. Granular backfill material was removed during overdrilling of the pilot borehole.

Date Started:	05/08/2022	Surface Elevation:	504.81 ft amsl	Well ID: TWB-3 Pilot
Date Completed:	05/09/2022	Northing (NAD83):	2101174.43	
Drilling Co.:	Cascade	Easting (NAD83):	7615744.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	88 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold / Jose Hernandez	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoeppner / R West	Depth to First Water:	47.0 ft bgs	
Logger:	David Cornell	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details			Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
21	No Groundwater Samples Collected	Topock - Alluvium Deposits	SW				(18.0 - 82.0') 6" Borehole	(5.0 - 78.0') 30.5 bags	(5.0 - 78.0') 53 bags (174%) Note: Backfill sand. Used >20% of the calculated volume due to a potential void below approximately 5 ft. bgs.
22		Topock - Alluvium Deposits	SW						
23									
24									
25									
26									
27		Topock - Alluvium Deposits	SW						
28									
29									
30									
31									
32		Topock - Alluvium Deposits	SW						
33									
34									
35									
36									
37		Topock - Alluvium Deposits	SW						
38									
39									
40									

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Drilling Asst:	D Hoeppner / R West	Depth to First Water:	47.0 ft bgs	
Logger:	David Cornell	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
41	No Groundwater Samples Collected	Topock - Alluvium Deposits	SW			(18.0 - 82.0') 6" Borehole	
42							
43							
44							
45							
46							
47	TWB-3-VAS-47-52 (<0.025 ppb) 5/6/2022 11:15	Topock - Alluvium Deposits	SM			(5.0 - 78.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 78.0') 30.5 bags
48							
49							
50							
51							
52							
53	TWB-3-VAS-57-62 (6.6 ppb) 5/6/2022 14:20	Topock - Alluvium Deposits	SW-SM				(5.0 - 78.0') 53 bags (174%) Note: Backfill sand. Used >20% of the calculated volume due to a potential void below approximately 5 ft. bgs.
54							
55							
56							
57							
58							
59							
60							

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Date Started:	05/08/2022	Surface Elevation:	504.81 ft amsl	Well ID: TWB-3 Pilot	
Date Completed:	05/09/2022	Northing (NAD83):	2101174.43		
Drilling Co.:	Cascade	Easting (NAD83):	7615744.89	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	88 ft bgs	Project:	Final GW Remedy Phase 2A
Driller Name:	Matt Arnold / Jose Hernandez	Borehole Diameter:	4-7 inches	Location:	PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	47.0 ft bgs		
Logger:	David Cornell	Editor:	Sean McGrane	Project Number:	30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details	Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume
61	TWB-3-VAS-57-62 (6.6 ppb) 5/6/2022 14:20	Topock - Alluvium Deposits	SW-SM		(18.0 - 82.0') 6" Borehole		
62							
63							
64							
65							
66							
67		Topock - Alluvium Deposits	ML				
68							
69	TWB-3-VAS-67-72 (<0.025 ppb) 5/7/2022 11:15				(5.0 - 78.0') Cemex 8 Mesh (8x16) Lapis Lustre Sand	(5.0 - 78.0') 30.5 bags	(5.0 - 78.0') 53 bags (174%) Note: Backfill sand. Used >20% of the calculated volume due to a potential void below approximately 5 ft. bgs.
70							
71							
72							
73							
74							
75		Topock - Alluvium Deposits	ML				
76							
77							
78	TWB-3-VAS-76-81 (<0.13 ppb) 5/8/2022 11:25						
79							
80			N/A		(78.0 - 88.0') Cemex #2/12 Mesh (12x20) Lapis Lustre Sand	(78.0 - 88.0') 2.6 bags	(78.0 - 88.0') 2.5 bags (96%) Note: Indicator sand

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Date Started:	05/08/2022	Surface Elevation:	504.81 ft amsl	Well ID: TWB-3 Pilot
Date Completed:	05/09/2022	Northing (NAD83):	2101174.43	
Drilling Co.:	Cascade	Easting (NAD83):	7615744.89	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	88 ft bgs	Project: Final GW Remedy Phase 2A
Driller Name:	Matt Arnold / Jose Hernandez	Borehole Diameter:	4-7 inches	Location: PG&E Topock, Needles California
Drilling Asst:	D Hoepfner / R West	Depth to First Water:	47.0 ft bgs	
Logger:	David Cornell	Editor:	Sean McGrane	Project Number: 30126255

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Construction Details			Calculated Material Volumes	Material Volumes Installed Note: percentages are the actual volume vs the calculated volume				
81	No Groundwater Samples Collected	Topock - Competent Bedrock - Conglomerate	N/A	xxxxxx	<div>(78.0 - 88.0') Cemex #2/12 Mesh (12x20) Lapis Lustre Sand</div>	<div>(18.0 - 82.0') 6" Borehole</div> <div>(82.0 - 88.0') 4" Borehole</div>	<div>(78.0 - 88.0') 2.6 bags</div>	<div>(78.0 - 88.0') 2.5 bags (96%) Note: Indicator sand</div>					
82		Topock - Weathered Bedrock - Conglomerate	N/A	xxxxxx									
83				xxxxxx									
84				xxxxxx									
85				xxxxxx									
86				xxxxxx									
87				xxxxxx									
88				xxxxxx									
89													
90													
91													
92													
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95													
96													
97													
98													
99													
100													

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TOPOCK TEMP ABANDONMENT LOG C:\USERS\MCGRANE\ONE DRIVE - ARCADIS\SHARED DOCUMENTS\PHASE 1\DRILLING\06 - FIELD DOCUMENTATION\02 GINT FILES\00 NEW PHASE 2 GINT FILES\08 2022-06-16\GINT PROJECT.GPJ GINT DATA TEMPLATE.GDT 6/16/22