



APTIM  
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March 7, 2023

Mr. Aaron Galer  
Senior Environmental Specialist  
Bargath LLC  
295 Chipeta Way #1  
Salt Lake City, UT 84108-1285

RE: Site Investigation Report  
Cottonwood Compressor Station

Dear Mr. Galer:

Aptim Environmental & Infrastructure, LLC. presents this site investigation letter report for the Cottonwood compressor station. This report presents the results of soil and groundwater investigation actions completed.

## **Background**

During installation of cathodic protection borings at the site, hydrocarbon impacts were observed to the west of the compressor building. While the cathodic protection borings were advanced to 30 feet below grade, the extent of impacts vertically and horizontally was not known. Investigation activities were completed with the objective of defining the extent of hydrocarbon impacts.

## **Scope of Work**

Soil borings were advanced at the site. The locations of soil borings are presented on **Figure 1**. One Call was contacted prior to drilling to have public utilities identified. At each location, further utility clearance was completed by potholing to a depth of ten feet below grade.

At each location and a select background location away from operations, APTIM advanced hand auger borings to a depth of three feet below grade with soil samples collected for analysis. Soil borings were advanced to depths ranging from 45 to 70 feet below grade. At each location, soils were logged for lithology and field screened for evidence of hydrocarbon contamination. One soil sample was collected from every 10 ft interval for laboratory analysis.

Evidence of groundwater was noted in three borings and monitoring wells installed. Following installation, water was measured in two of the wells. Groundwater samples were collected from these two wells for laboratory analysis.

Analytical parameters included full 915-1 analysis of VOCs, EC, SAR, and pH in the top sample only and VOCs, PAHs, volatile and extractable TPH, and metals in all soil intervals. Groundwater analytical parameters included full 915-1 analysis of VOCs, chloride, TDS and sulfate.

## Results

Soil profile observations indicate heterogeneous layers of infilled gravel, cobbles, clays, sandstones, and shales. No lithology consistency was observed between borings. **Figure 2** presents a cross section of the soil profiles from north to south. Generally, no signs of moisture were observed until depths greater than 50 feet below grade.

**Table 1** presents the soil analytical results. Generally, the most significant hydrocarbon concentrations observed were observed in SB03, 04 and 06 located near and along the former dump lines to the west of the compressor building. Note that the highest concentrations were identified at depths greater than 50 feet and may be associated with groundwater.

Upon monitoring well completion, only MW-2 and MW-3 contained groundwater at depths from 57 to 60 feet below grade (**Table 2**). As MW-1 did not contain water, no survey was completed and therefore, no groundwater flow determined. Low concentrations of hydrocarbons were noted in both MW-2 and MW-3 (**Table 3**).

From a soil delineation perspective:

- Soils below 50' are likely within the water table or some historic smear zone
- Soils are delineated to the north with SB07
- Soils are delineated to northwest with SB08
- Soils are delineated to the west with SB01 and SB05 (minor concentrations in SB01 and at the water table in SB05)
- Soils are delineated to the south with SB09 (minor concentrations at the water table in SB09)
- Soils are delineated to the southeast with SB10 (minor concentrations at the water table in SB10)

Groundwater delineation is not complete.

## Recommendations

Based upon the incomplete delineation of groundwater, additional groundwater monitoring wells are recommended to the south, southeast, and southwest. Proposed locations of the new wells are presented on **Figure 3**. Wells will be installed with construction similar to the prior two wells. Following installation, wells will be developed, surveyed, and sampled to determine if groundwater delineation is complete.



If you have any questions or comments, please contact me at (720) 554-8198.

Sincerely,

A handwritten signature in black ink, appearing to read "David Way", is positioned above the printed name.

David Way  
Vice President

Aptim Environmental & Infrastructure, LLC.

Please Reply To: David Way

Phone: 720.554.8198

E-Mail Address: [david.way@aptim.com](mailto:david.way@aptim.com)

#### Attachments

Figure 1 - Site Map

Figure 2 – Cross Section

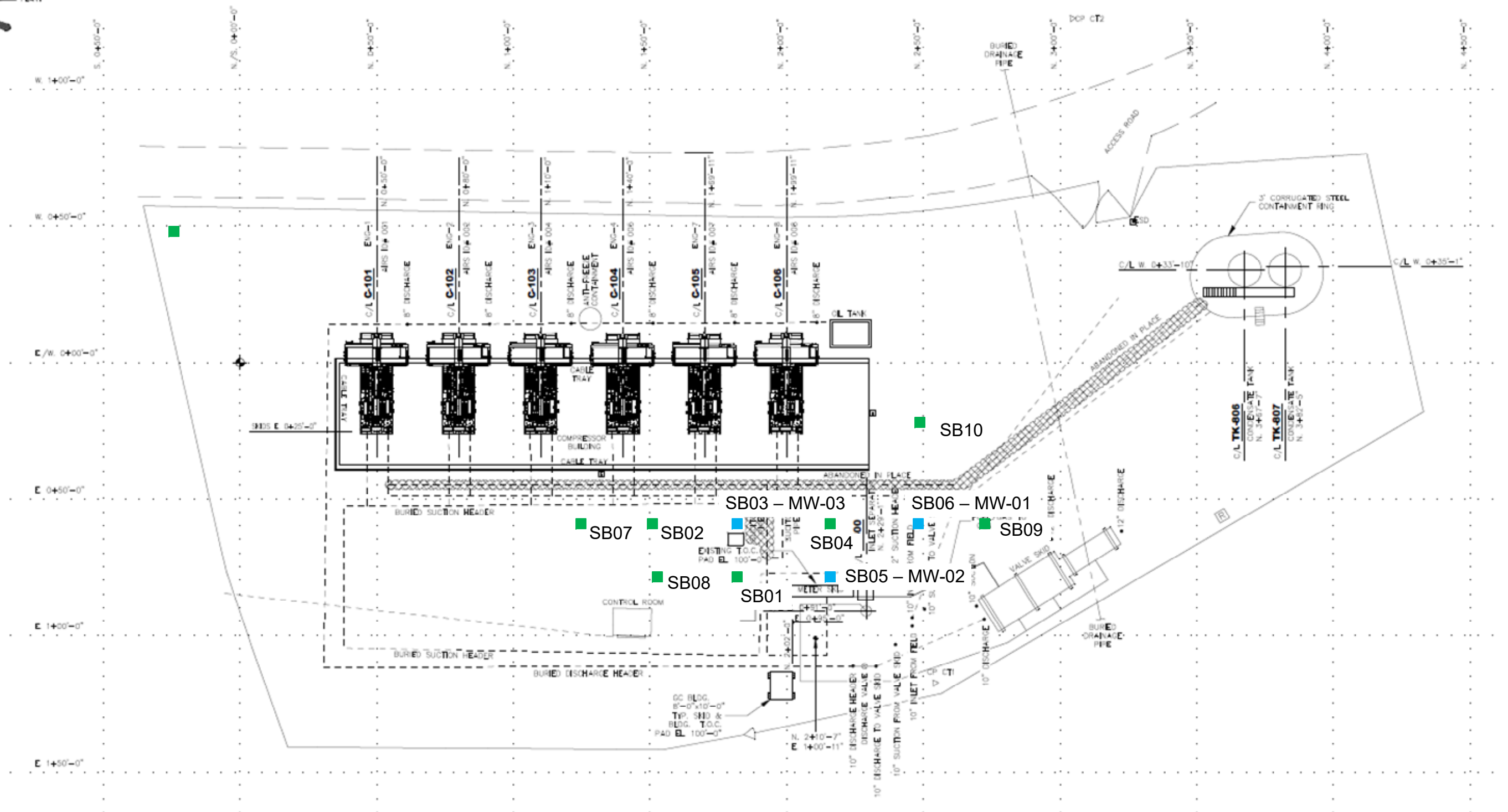
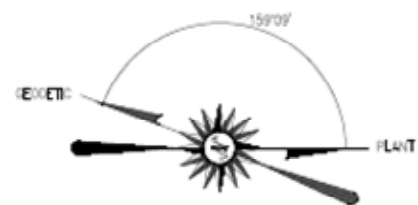
Figure 3 – Proposed Monitoring Wells

Table 1 – Soil Analytical Results

Table 2 – Liquid Levels

Table 3 – Groundwater Analytical Results

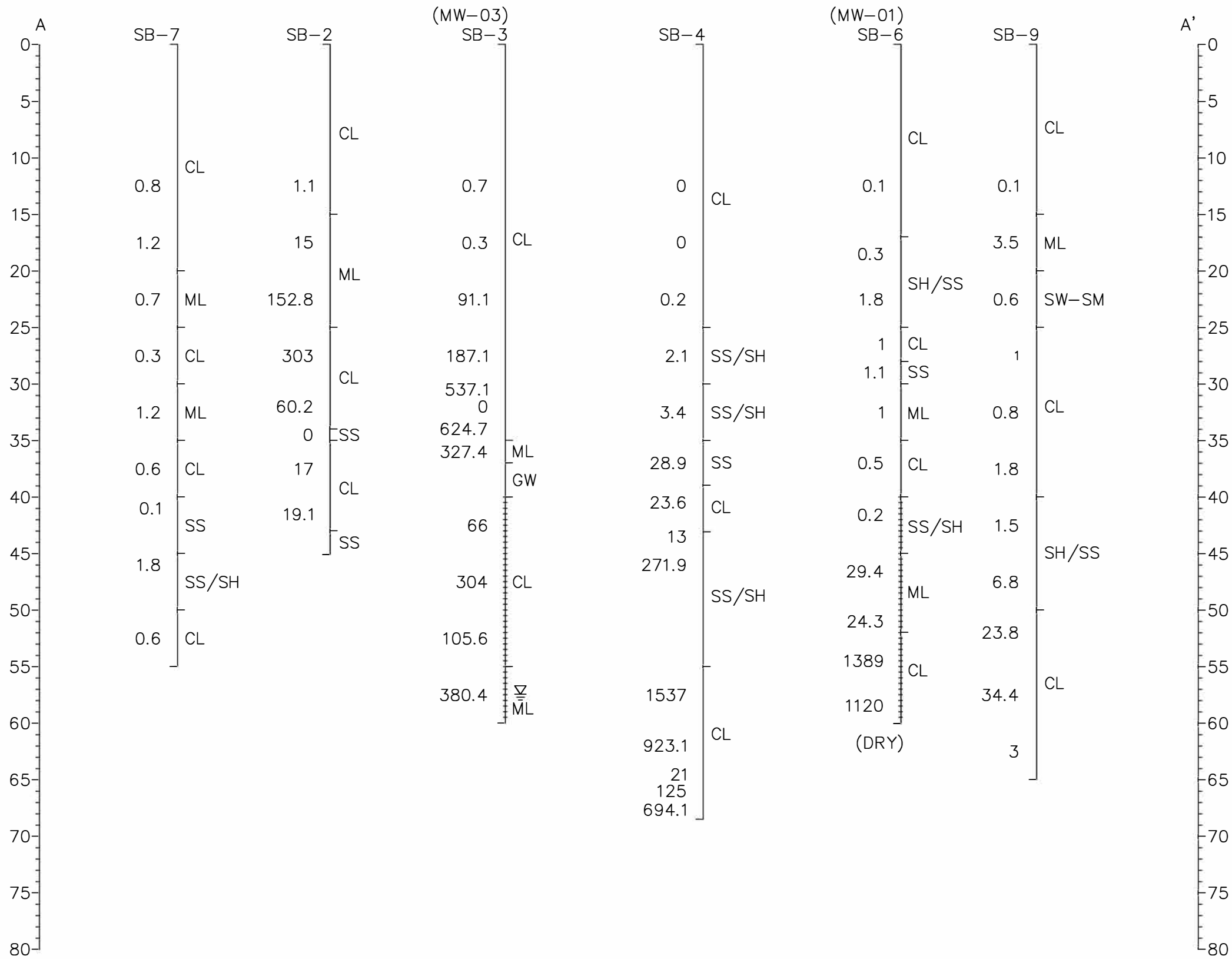
Well Logs



- Monitoring Well
- Soil Boring

File: N:\GISKeyProjects\Williams Cottonwood\Cross Section0223.dwg    Layout: A-A'    User: Jill.Deitchler    Feb 23, 2023    10:33am

VERTICAL SCALE IN FEET



2872 N RIDGE ROAD, SUITE 102B  
WICHITA, KANSAS 67205

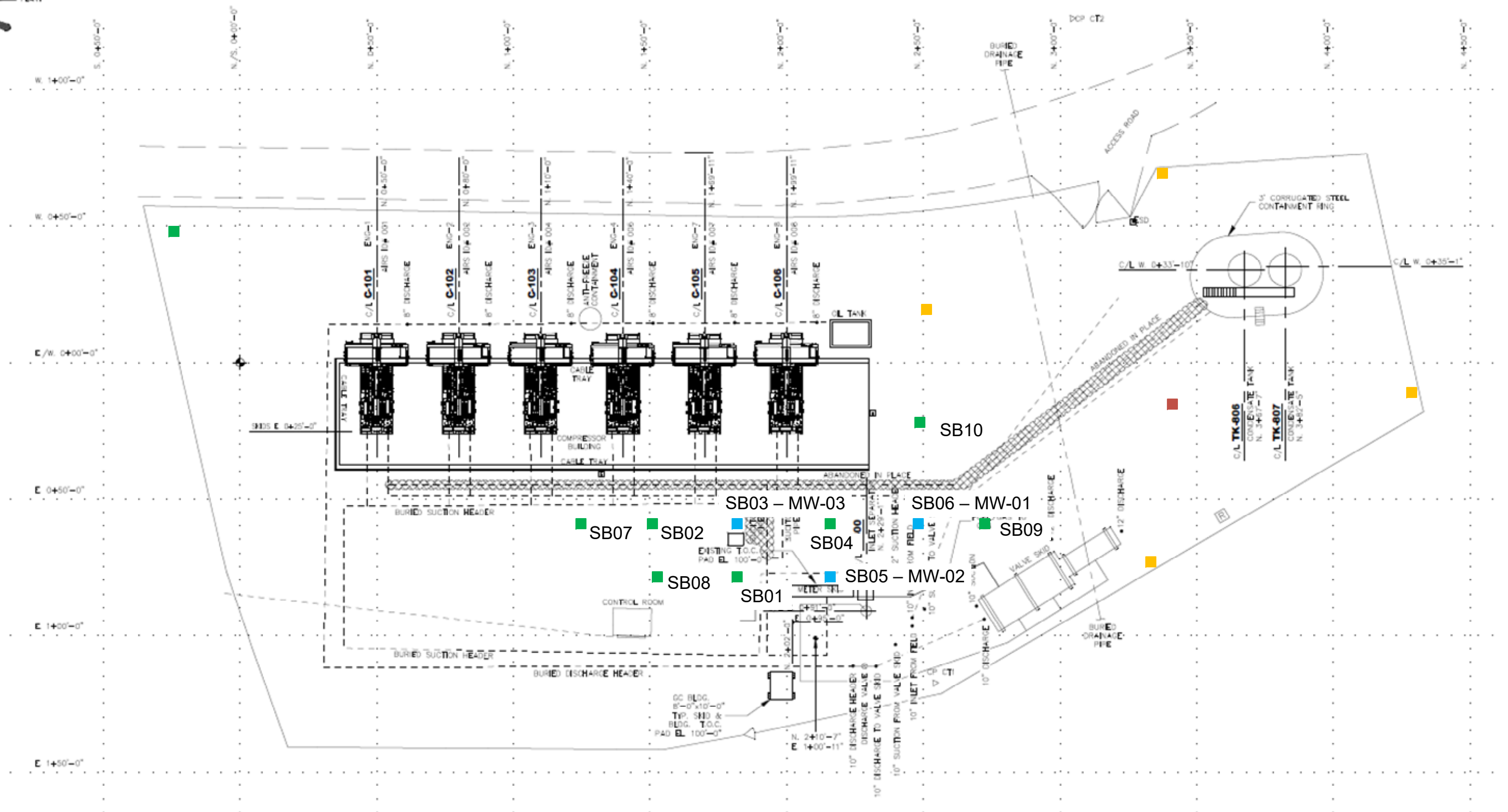
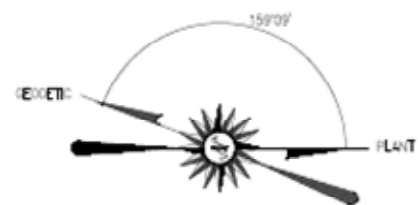
TITLE: **CROSS-SECTION A-A'**

**LEGEND**  
CL LEAN CLAYS  
ML SILTS  
SW-SM WELL GRADED SANDS WITH SILT  
GW WELL GRADED GRAVEL AND SANDS  
SS/SH SANDSTONE AND SHALE

▽ GROUNDWATER ELEVATION  
0.8 PID (PPM)

HORIZONTAL SCALE:  
0 50 100  
FEET

DWN: JD	DES.: JD	PROJECT NO.:
FILE NAME: Cross Section0223	APPD.:	FIGURE NO.:
DATE: 11/08/22	REV.:	2



- Monitoring Well
- Soil Boring
- Proposed Monitoring Well
- Contingent Proposed Monitoring Well

Bargath, LLC	
Figure 3 Cottonwood CS Proposed Monitoring Wells	
	<small>APTIM Environmental &amp; Infrastructure, LLC. 5690 DTC Boulevard, Suite 600 Greenwood Village, CO 80111</small>

Table 1

Bargath LLC - Cottonwood CS  
Soil Data

	Sample Location			Background	SB-01	SB-01	SB-01	SB-01	SB-01	SB-02	SB-02	SB-02	SB-02	SB-02
	Sample Depth (Feet)			3'	0-1'	15-20'	25-30'	30-38'	45-50'	0-1'	15-20'	25-30'	30-35'	40-45'
	Date Sampled			1/28/2023	1/3/23	1/12/23	1/12/23	1/12/23	1/24/23	1/3/23	1/10/23	1/10/23	1/10/23	1/10/23
Contaminant of Concern	Table 915-1 Soil Screening Standards	Table 915-1 Soil to Groundwater Standards	Units											
Organic Compounds in Soil														
DRO	N/A	N/A	mg/kg	NA	<23	38	22J	310	87	14J	76	29	57	57
GRO	N/A	N/A	mg/kg	NA	<7.0	<5.1	<5.3	<5.5	<2.8	<6.9	<5.8	200	140	42
Total Petroleum Hydrocarbon (DRO+GRO)	500	500	mg/kg	NA	<7.0	38	22	310	87	14	76	229	197	99
Benzene	1.2	0.0026	mg/kg	NA	0.0024J	0.0023J	0.0018J	0.0067	0.0027J	0.0022J	<0.035	0.20J	0.11	0.078
Ethylbenzene	5.8	0.78	mg/kg	NA	0.0026J	0.0026J	0.0033J	0.0047J	0.0043J	0.0025J	0.023	1.2	0.47	0.13
Toluene	490	0.69	mg/kg	NA	0.0059	0.0055	0.0069	0.0120	0.0086	0.0057	0.330	6.7	1.6	0.076
Xylenes (Total)	58	9.9	mg/kg	NA	<0.0050	<0.0044	0.0025J	0.024	0.0048J	<0.0047	0.520	16	5.1	1.8
1,2,4-trimethylbenzene	30	0.0081	mg/kg	NA	<0.0050	<0.0044	<0.0053	<0.0051	<0.0057	<0.0047	<0.035	<0.33	0.11	0.098
1,3,5-trimethylbenzene	27	0.0087	mg/kg	NA	<0.0050	<0.0044	<0.0053	<0.0051	<0.0057	<0.0047	<0.120	<1.1	0.14	0.13
Acenaphthene	360	0.55	mg/kg	NA	<0.0049	<0.0048	<0.0048	<0.0047	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Anthracene	1800	5.8	mg/kg	NA	<0.0049	<0.0048	<0.0048	<0.0047	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Benzo(A)anthracene	1.1	0.011	mg/kg	NA	<0.0049	<0.0048	<0.0048	<0.0047	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Benzo(B)fluoranthene	1.1	0.30	mg/kg	NA	<0.0049	<0.0048	<0.0048	<0.0047	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Benzo(K)fluoranthene	11	2.9	mg/kg	NA	<0.0049	<0.0048	<0.0048	<0.0047	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Benzo(A)pyrene	0.11	0.24	mg/kg	NA	<0.0049	0.0076	<0.0048	<0.0047	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Chrysene	110	9.0	mg/kg	NA	<0.0049	<0.0048	<0.0048	<0.0047	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Dibenzo(A,H)anthracene	0.11	0.096	mg/kg	NA	<0.0049	<0.0048	<0.0048	<0.0047	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Fluoranthene	240	8.9	mg/kg	NA	<0.0049	<0.0048	<0.0048	<0.0047	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Fluorene	240	5.4	mg/kg	NA	<0.0049	<0.0048	<0.0048	<0.0047	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Indeno(1,2,3-cd)pyrene	1.1	0.98	mg/kg	NA	<0.0049	<0.0048	<0.0048	<0.0047	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Naphthalene	2.0	0.0038	mg/kg	NA	<0.0049	<0.0048	<0.0048	0.0070	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
1-methylnaphthalene	18.0	0.0060	mg/kg	NA	<0.0049	<0.0048	<0.0048	0.012	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
2-methylnaphthalene	24.0	0.0190	mg/kg	NA	<0.0049	<0.0048	<0.0048	0.058	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Pyrene	180	1.3	mg/kg	NA	<0.0049	<0.0048	<0.0048	<0.0047	<0.0047	<0.0048	<0.0044	<0.0047	<0.0047	<0.0049
Inorganics in Soil														
Electrical Conductivity	<4		mmhos/cm	5.5	1.7	NA	NA	NA	NA	5.6	NA	NA	NA	NA
Sodium Absorption Ratio	<6		Unitless	1.2	6.4	NA	NA	NA	NA	6.7	NA	NA	NA	NA
pH	6-8.3		Unitless	8.21	9.55	NA	NA	NA	NA	8.83	NA	NA	NA	NA
Percent Moisture			Unitless	11	17	14	15	13	13	14	8.5	14	12	15
Metals in Soil														
Arsenic	0.68	0.29	mg/kg	5.5	8.2	9.4	9.9	13	10	13	14	13	11	8.9
Barium total	15000	82	mg/kg	190	280	250	230	310	210	280	350	350	310	240
Boron	2.0	N/A	mg/L	0.91	2.1	1.1	0.73	0.66	0.35J	1.8	0.42J	0.37J	0.34J	0.42J
Cadmium	71	0.38	mg/kg	0.34	0.55	0.49	0.46	0.47	0.78	0.55	0.86	0.40	0.48	0.45
Chromium (VI)	0.30	0.00067	mg/kg	<1.1	<1.2	<1.2	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.2
Copper	3100	46	mg/kg	11	10	11	12	11	15	14	13	15	12	12
Lead	400	14	mg/kg	12	12	13	14	13	18	22	15	16	13	12
Nickel	1500	26	mg/kg	11	11	13	13	9.9	16	13	11	13	11	12
Selenium	390	0.26	mg/kg	<0.32	0.41	0.30J	0.44	0.54	<0.34	0.73	0.31	0.30	0.31J	0.36
Silver	390	0.80	mg/kg	0.054J	0.044J	0.045J	0.054J	0.050J	0.051J	0.064J	0.057J	0.063J	0.058J	<0.32
Zinc	23000	370	mg/kg	78	40	43	45	32	60	51	40	44	41	40

ND - Non Detect

NS - Not Sampled

Exceeds COGCC Table 915-1 Standard

ppmv - Parts per million by volume

mmhos/cm - Millimhos per centimeter



Table 1

Bargath LLC - Cottonwood CS  
Soil Data

Contaminant of Concern	Sample Location			SB-03	SB-03	SB-03	SB-03	SB-03	SB-03	SB-04	SB-04	SB-04	SB-04	SB-04	SB-04	SB-04
	Sample Depth (Feet)			0-1'	15-20'	25-30'	33-35'	45-50'	55-60'	0-1'	15-20'	25-30'	35-39'	45-47'	55-60'	60-64'
	Date Sampled			1/3/23	1/27/23	1/27/23	1/27/23	1/27/23	1/28/23	1/3/23	1/26/23	1/27/23	1/27/23	1/27/23	1/27/23	1/27/23
	Table 915-1 Soil Screening Standards	Table 915-1 Soil to Groundwater Standards	Units													
<b>Organic Compounds in Soil</b>																
DRO	N/A	N/A	mg/kg	15J	<22	40	130	72	37	19J	24	96	110	170	83	620
GRO	N/A	N/A	mg/kg	<7.7	<6.1	840	1,100	260	890	<6.8	<4.9	<5.9	18	260	1,900	670
Total Petroleum Hydrocarbon (DRO+GRO)	500	500	mg/kg	15	<22	880	1,230	332	927	19	24	96	128	430	1,983	1,290
Benzene	1.2	0.0026	mg/kg	0.0020J	<0.036	1.3	2.1	0.27	0.26	0.0021J	0.0018J	0.0018J	<0.027	0.11	2.8	<0.17
Ethylbenzene	5.8	0.78	mg/kg	0.0023J	<0.036	5.5	6.5	1.0	3.0	0.0026J	0.0024J	0.0033J	0.013J	0.89	7.7	3.2
Toluene	490	0.69	mg/kg	0.0054	0.074	30	32	0.13	0.11	0.0059	0.0056	0.0066	<0.027	0.039	11	<0.17
Xylenes (Total)	58	9.9	mg/kg	<0.0044	0.11	82	95	9.7	28	<0.0022	0.0030J	0.0041J	<0.080	7.4	110	43
1,2,4-trimethylbenzene	30	0.0081	mg/kg	<0.0044	<0.036	7.4	11	5.1	7.9	<0.0050	<0.0045	<0.0051	<0.027	3.0	15	5.6
1,3,5-trimethylbenzene	27	0.0087	mg/kg	<0.0044	<0.12	8.8	13	6.0	9.7	<0.0050	<0.0045	<0.0051	<0.088	3.5	19	6.4
Acenaphthene	360	0.55	mg/kg	<0.0047	<0.0046	<0.0050	<0.0047	<0.0048	<0.0052	<0.0045	<0.0046	<0.0046	<0.0045	<0.0047	<0.0052	<0.0051
Anthracene	1800	5.8	mg/kg	<0.0047	<0.0046	<0.0050	<0.0047	<0.0048	<0.0052	<0.0045	<0.0046	<0.0046	<0.0045	<0.0047	<0.0052	<0.0051
Benzo(A)anthracene	1.1	0.011	mg/kg	<0.0047	<0.0046	<0.0050	<0.0047	<0.0048	<0.0052	<0.0045	<0.0046	<0.0046	<0.0045	<0.0047	<0.0052	<0.0051
Benzo(B)fluoranthene	1.1	0.30	mg/kg	<0.0047	<0.0046	<0.0050	<0.0047	<0.0048	<0.0052	<0.0045	<0.0046	<0.0046	<0.0045	<0.0047	<0.0052	<0.0051
Benzo(K)fluoranthene	11	2.9	mg/kg	<0.0047	<0.0046	<0.0050	<0.0047	<0.0048	<0.0052	<0.0045	<0.0046	<0.0046	<0.0045	<0.0047	<0.0052	<0.0051
Benzo(A)pyrene	0.11	0.24	mg/kg	<0.0047	<0.0046	<0.0050	<0.0047	<0.0048	<0.0052	<0.0045	<0.0046	0.0045J	0.0036J	<0.0047	<0.0052	<0.0051
Chrysene	110	9.0	mg/kg	<0.0047	<0.0046	<0.0050	<0.0047	<0.0048	<0.0052	<0.0045	<0.0046	<0.0046	<0.0045	<0.0047	<0.0052	<0.0051
Dibenz(A,H)anthracene	0.11	0.096	mg/kg	<0.0047	<0.0046	<0.0050	<0.0047	<0.0048	<0.0052	<0.0045	<0.0046	<0.0046	0.0038J	<0.0047	<0.0052	<0.0051
Fluoranthene	240	8.9	mg/kg	<0.0047	<0.0046	<0.0050	<0.0047	<0.0048	<0.0052	<0.0045	<0.0046	<0.0046	<0.0045	<0.0047	<0.0052	<0.0051
Fluorene	240	5.4	mg/kg	<0.0047	<0.0046	<0.0050	<0.0047	<0.0048	<0.0052	<0.0045	<0.0046	<0.0046	<0.0045	<0.0047	<0.0052	<0.0051
Indeno(1,2,3-cd)pyrene	1.1	0.98	mg/kg	<0.0047	<0.0046	<0.0050	<0.0047	<0.0048	<0.0052	<0.0045	<0.0046	<0.0046	<0.0045	<0.0047	<0.0052	<0.0051
Naphthalene	2.0	0.0038	mg/kg	<0.0047	<0.0046	<0.0050	0.054	0.053	0.046	<0.0045	<0.0046	<0.0046	<0.0045	0.14	0.14	0.91
1-methylnaphthalene	18.0	0.0060	mg/kg	<0.0047	<0.0046	<0.0050	0.027	0.014	0.0096	<0.0045	<0.0046	<0.0046	<0.0045	0.039	0.061	0.031
2-methylnaphthalene	24.0	0.0190	mg/kg	<0.0047	<0.0046	<0.0050	0.071	0.036	0.022	<0.0045	<0.0046	<0.0046	<0.0045	0.11	0.17	0.082
Pyrene	180	1.3	mg/kg	<0.0047	<0.0046	<0.0050	<0.0047	<0.0048	<0.0052	<0.0045	<0.0046	<0.0046	<0.0045	<0.0047	<0.0052	<0.0051
<b>Inorganics in Soil</b>																
Electrical Conductivity	<4		mmhos/cm	2.8	NA	NA	NA	NA	NA	3.3	NA	NA	NA	NA	NA	NA
Sodium Absorption Ratio	<6		Unitless	6.8	NA	NA	NA	NA	NA	6.7	NA	NA	NA	NA	NA	NA
pH	6-8.3		Unitless	8.76	NA	NA	NA	NA	NA	8.3	NA	NA	NA	NA	NA	NA
Percent Moisture			Unitless	13	12	17	11	18	21	12	10	11	10	12	20	7.4
<b>Metals in Soil</b>																
Arsenic	0.68	0.29	mg/kg	8.2	5.9	7.9	14	15	14	8.4	7.9	13	12	9.6	11	3.9
Barium total	15000	82	mg/kg	270	77	280	360	470	490	270	250	180	280	390	360	86
Boron	2.0	N/A	mg/L	1.8	0.32	0.56	0.45	0.33J	0.29J	1.8	0.31	0.31J	0.39J	0.32J	0.33J	0.10J
Cadmium	71	0.38	mg/kg	1.0	0.45	0.39	0.38	0.3	0.2	0.37	0.42	0.32	0.43	0.42	0.42	0.086J
Chromium (VI)	0.30	0.0067	mg/kg	<1.1	<1.1	<1.2	<1.1	<1.1	<1.3	<1.1	<1.1	<1.1	<1.1	<1.1	<1.2	<1.1
Copper	3100	46	mg/kg	10	4.9	13	12	23	11	11	9.6	10	12	9.8	11	4.5
Lead	400	14	mg/kg	13	6.9	12	13	14	23	12	11	11	13	11	13	6.4
Nickel	1500	26	mg/kg	11	5.1	11	11	11	9	12	10	9.6	10	9.1	22	8.9
Selenium	390	0.26	mg/kg	0.43	<0.29	0.34J	0.31J	0.39	0.62	0.38	<0.33	0.32J	<0.31	<0.30	<0.37	<0.29
Silver	390	0.80	mg/kg	0.045J	<0.29	<0.34	0.051J	0.079J	0.12J	<0.35	0.048J	0.049J	0.047J	0.052J	<0.37	<0.29
Zinc	23000	370	mg/kg	40	35	72	74	63	81	38	36	32	34	33	45	20

ND - Non Detect

NS - Not Sampled

Exceeds COGCC Table 915-1 Standard

ppmv - Parts per million by volume

mmhos/cm - Millimhos per centimeter



Table 1

Bargath LLC - Cottonwood CS  
Soil Data

Contaminant of Concern	Sample Location			SB-05	SB-05	SB-05	SB-05	SB-05	SB-05	SB-05	SB-05	SB-06	SB-06	SB-06	SB-06	SB-06	SB-06	SB-07	SB-07
	Sample Depth (Feet)			0-1'	15-18'	20-25'	35-40'	45-50'	55-60'	62-65'	0-1'	15-20'	20-25'	30-35'	45-50'	52-57'	57-61'	0-1'	15-20'
	Date Sampled			1/4/23	1/26/23	1/26/23	1/26/23	1/26/23	1/26/23	1/26/23	1/4/23	1/10/23	1/10/23	1/10/23	1/10/23	1/10/23	1/10/23	1/11/23	1/11/23
Table 915-1 Soil Screening Standards	Table 915-1 Soil to Groundwater Standards	Units																	
<b>Organic Compounds in Soil</b>																			
DRO	N/A	N/A	mg/kg	<23	64	121	58	170	80	230	121	76	86	94	55	110	150	131	44
GRO	N/A	N/A	mg/kg	<6.7	<5.4	<5.3	<5.5	3.5	63	52	<7.8	13	19	19	41	2,800	2,000	<5.3	<5.1
Total Petroleum Hydrocarbon (DRO+GRO)	500	500	mg/kg	<23	64	121	58	174	143	282	12	89	105	103	96	2,910	2,150	13	44
Benzene	1.2	0.0026	mg/kg	0.0020J	0.0017J	0.0025J	0.0027J	<0.036	<0.037	0.041	0.0023J	0.10	0.11	0.076	0.12	2.3	1.0	0.0031J	0.0023J
Ethylbenzene	5.8	0.78	mg/kg	0.0019J	<0.0020J	0.0025J	0.0018J	<0.036	<0.037	<0.041	0.0023J	0.19	0.22	0.21	0.27	11	5.4	0.0039J	0.0031J
Toluene	490	0.69	mg/kg	0.0044J	<0.0044J	0.0053	0.0049J	<0.036	<0.037	0.28	0.0056	0.10	0.14	0.10	0.066	0.78	0.19	0.0084	0.0068
Xylenes (Total)	58	9.9	mg/kg	<0.0050	<0.0047	<0.0045	<0.0054	<0.036	<0.110	0.099J	<0.0049	2.5	2.8	2.8	2.0	160	76	0.0029J	0.0025J
1,2,4-trimethylbenzene	30	0.0081	mg/kg	<0.0050	<0.0047	<0.0045	<0.0054	<0.110	<0.037	<0.041	<0.0049	0.094	0.13	0.16	0.68	26	16	<0.0052	<0.0053
1,3,5-trimethylbenzene	27	0.0087	mg/kg	<0.0050	<0.0047	<0.0045	<0.0054	<0.120	0.094J	<0.140	<0.0049	0.121	0.15	0.19	0.96	31	20	<0.0052	<0.0053
Acenaphthene	360	0.55	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	<0.0046	<0.022	<0.022	<0.0048	<0.0043
Anthracene	1800	5.8	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	<0.0046	<0.022	<0.022	<0.0048	<0.0043
Benzo(A)anthracene	1.1	0.011	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	<0.0046	<0.022	<0.022	<0.0048	<0.0043
Benzo(B)fluoranthene	1.1	0.30	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	<0.0046	<0.022	<0.022	<0.0048	<0.0043
Benzo(K)fluoranthene	11	2.9	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	<0.0046	<0.022	<0.022	<0.0048	<0.0043
Benzo(A)pyrene	0.11	0.24	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	<0.0046	<0.022	<0.022	<0.0048	<0.0043
Chrysene	110	9.0	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	<0.0046	<0.022	<0.022	<0.0048	<0.0043
Dibenz(A,H)anthracene	0.11	0.096	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	<0.0046	<0.022	<0.022	<0.0048	<0.0043
Fluoranthene	240	8.9	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	<0.0046	<0.022	<0.022	<0.0048	<0.0043
Fluorene	240	5.4	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	<0.0046	<0.022	<0.022	<0.0048	<0.0043
Indeno(1,2,3-cd)pyrene	1.1	0.98	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	<0.0046	<0.022	<0.022	<0.0048	<0.0043
Naphthalene	2.0	0.0038	mg/kg	<0.0048	<0.0048	0.0080	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	0.017	0.19	0.10	<0.0048	<0.0043
1-methylnaphthalene	18.0	0.0060	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	0.0034J	<0.0045	<0.0045	0.018	0.098	0.090	<0.0048	<0.0043
2-methylnaphthalene	24.0	0.0190	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	0.016	<0.0048	<0.0045	<0.0045	<0.0045	0.020	0.17	0.15	<0.0048	<0.0043
Pyrene	180	1.3	mg/kg	<0.0048	<0.0048	<0.0048	<0.0046	<0.0047	<0.0048	<0.0053	<0.0048	<0.0045	<0.0045	<0.0045	<0.0046	<0.022	<0.022	<0.0048	<0.0043
<b>Inorganics in Soil</b>																			
Electrical Conductivity	<4		mmhos/cm	2.5	NA	NA	NA	NA	NA	NA	2.6	NA	NA	NA	NA	NA	NA	2.30	NA
Sodium Absorption Ratio	<6		Unitless	8.3	NA	NA	NA	NA	NA	NA	6.8	NA	NA	NA	NA	NA	NA	6.1	NA
pH	6-8.3		Unitless	9.3	NA	NA	NA	NA	NA	NA	9.1	NA	NA	NA	NA	NA	NA	9.3	NA
Percent Moisture			Unitless	15	13	15	14	12	15	22	14	8.7	8.2	7.2	10	18	18	15	5.4
<b>Metals in Soil</b>																			
Arsenic	0.68	0.29	mg/kg	8.1	11	11	13	13	15.0	14	11	13	12	11	6.0	13	33	11	14
Barium total	15000	82	mg/kg	240	450	240	260	360	270	300	130	300	330	360	450	320	340	270	250
Boron	2.0	N/A	mg/L	2.4	0.96	0.48	0.51	0.27J	0.28J	0.49J	2.3	0.31J	0.28J	0.32J	0.23J	0.33J	0.33J	1.50	0.34J
Cadmium	71	0.38	mg/kg	0.34	0.32	0.33	0.33	0.35	0.68	0.22	0.33	0.49	0.64	0.35	0.53	0.40	0.46	0.37	0.37
Chromium (VI)	0.30	0.00067	mg/kg	<1.1	<1.1	<1.1	<1.1	<1.1	<1.2	<1.2	<1.2	<1.0	<1.1	<1.0	<1.1	<1.2	<1.2	<1.1	<1.0
Copper	3100	46	mg/kg	11	11	11	18	11	806	27	8.3	11	12	12	6.4	16	13	12	12
Lead	400	14	mg/kg	12	11	11	14	12	11	18	9.0	12	13	12	9.2	17	19	17	13
Nickel	1500	26	mg/kg	11	10	10	12	10	9.8	24	9.6	9.6	9.5	9.1	8.1	14	13	11	11
Selenium	390	0.26	mg/kg	0.41	<0.29	0.31	<0.32	<0.29	<0.34	<0.32	0.32	<0.34	0.26J	0.32	<0.30	0.32J	0.42	0.46	<0.28
Silver	390	0.80	mg/kg	0.045J	0.049J	<0.30	0.062J	0.046J	<0.34	0.067J	<0.31	0.052J	0.062J	0.060J	0.045J	0.058J	<0.34	0.12J	0.057J
Zinc	23000	370	mg/kg	39	32	37	42	33	30	53	40	35	32	31	27	42	39	37	43

ND - Non Detect

NS - Not Sampled

Exceeds COGCC Table 915-1 Standard

ppmv - Parts per million by volume

mmhos/cm - Millimhos per centimeter

Table 1

Bargath LLC - Cottonwood CS  
Soil Data

	Sample Location			SB-07	SB-07	SB-07	SB-07	SB-08	SB-08	SB-08	SB-08	SB-08	SB-08
	Sample Depth (Feet)			25-30'	30-35'	40-47'	50-55'	0-1'	15-20'	25-30'	35-40'	45-50'	50-52'
	Date Sampled			1/11/23	1/11/23	1/11/23	1/11/23	1/12/23	1/24/23	1/24/23	1/24/23	1/24/23	1/24/23
Contaminant of Concern	Table 915-1 Soil Screening Standards	Table 915-1 Soil to Groundwater Standards	Units										
Organic Compounds in Soil													
DRO	N/A	N/A	mg/kg	12J	21J	70	240	10J	47	<23	34	140	59
GRO	N/A	N/A	mg/kg	<5.4	<5.5	<5.6	<7.1	<5.3	<5.6	<7.0	<7.7	<5.9	<3.0
Total Petroleum Hydrocarbon (DRO+GRO)	500	500	mg/kg	12	21	70	240	10	47	<23	34	140	59
Benzene	1.2	0.0026	mg/kg	0.0021J	<0.033	0.0026J	0.0019J	0.0020J	0.0020J	0.0024J	0.0028J	0.0018J	<0.038
Ethylbenzene	5.8	0.78	mg/kg	0.0024J	<0.033	0.0023J	0.0037J	0.0018J	0.0035J	0.0021J	0.0049J	0.0057	<0.038
Toluene	490	0.69	mg/kg	0.0051	<0.033	0.0050J	0.0065	0.0043J	0.0067	0.0050	0.0088	0.0093	<0.038
Xylenes (Total)	58	9.9	mg/kg	<0.0046	<0.098	<0.0050	0.0028J	<0.0046	0.0036J	<0.0048	0.0040J	0.0046J	<0.11
1,2,4-trimethylbenzene	30	0.0081	mg/kg	<0.0046	<0.033	<0.0050	<0.0058	<0.0046	<0.0049	<0.0048	<0.0054	<0.0056	<0.038
1,3,5-trimethylbenzene	27	0.0087	mg/kg	<0.0046	<0.11	<0.0050	<0.0058	<0.0046	<0.0049	<0.0048	<0.0054	<0.0056	<0.13
Acenaphthene	360	0.55	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Anthracene	1800	5.8	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Benzo(A)anthracene	1.1	0.011	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Benzo(B)fluoranthene	1.1	0.30	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Benzo(K)fluoranthene	11	2.9	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Benzo(A)pyrene	0.11	0.24	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Chrysene	110	9.0	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Dibenzo(A,H)anthracene	0.11	0.096	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Fluoranthene	240	8.9	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Fluorene	240	5.4	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Indeno(1,2,3-cd)pyrene	1.1	0.98	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Naphthalene	2.0	0.0038	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
1-methylnaphthalene	18.0	0.0060	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
2-methylnaphthalene	24.0	0.0190	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Pyrene	180	1.3	mg/kg	<0.0047	<0.0048	<0.0047	<0.0051	<0.0049	<0.0046	<0.0048	<0.0045	<0.030	<0.0047
Inorganics in Soil													
Electrical Conductivity	<4		mmhos/cm	NA	NA	NA	NA	1.1	NA	NA	NA	NA	NA
Sodium Absorption Ratio	<6		Unitless	NA	NA	NA	NA	6.9	NA	NA	NA	NA	NA
pH	6-8.3		Unitless	NA	NA	NA	NA	9.54	NA	NA	NA	NA	NA
Percent Moisture			Unitless	14	12	12	18	16	11	14	10	11	12
Metals in Soil													
Arsenic	0.68	0.29	mg/kg	8.4	8.0	14	25	9.1	16	6.2	9.2	7.0	8.1
Barium total	15000	82	mg/L	240	230	290	380	240	260	270	310	410	250
Boron	2.0	N/A	mg/L	1.2	0.95	0.26J	0.046	1.0	0.38J	0.44J	0.53	0.91	1.1
Cadmium	71	0.38	mg/kg	0.52	0.45	0.39	0.38	0.42	0.55J	0.47J	0.63J	0.37	0.60
Chromium (VI)	0.30	0.00067	mg/kg	<1.1	<1.1	<1.1	<1.2	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Copper	3100	46	mg/kg	11	11	14	22	13	21	9.4	9.8	13	10
Lead	400	14	mg/kg	13	13	14	21	12	16	11	11	11	10
Nickel	1500	26	mg/kg	12	13	10	13	12	11	11	11	10	9.4
Selenium	390	0.26	mg/kg	0.28J	0.31J	0.31J	0.42	0.36	<0.34	0.47	0.32	<0.30	<0.31
Silver	390	0.80	mg/kg	0.053J	0.044J	0.060J	0.075J	<0.34	0.049J	<0.34	<0.30	0.061J	0.046J
Zinc	23000	370	mg/kg	40	43	34	46	43	45	39	37	32	30

ND - Non Detect

NS - Not Sampled

Exceeds COGCC Table 915-1 Standard

ppmv - Parts per million by volume

mmhos/cm - Millimhos per centimeter

Table 1

Bargath LLC - Cottonwood CS  
Soil Data

	Sample Location			SB-09	SB-09	SB-09	SB-09	SB-09	SB-09	SB-09	SB-10	SB-10	SB-10	SB-10	SB-10	SB-10	SB-10	
	Sample Depth (Feet)			0-1'	15-20'	25-29'	35-40'	40-50'	55-60'	60-65'	0-1'	15-20'	25-30'	30-35'	45-50'	55-60'	60-65'	
	Date Sampled			1/12/23	1/25/23	1/25/23	1/25/23	1/25/23	1/25/23	1/25/23	1/12/23	1/24/23	1/24/23	1/24/23	1/24/23	1/24/23	1/25/23	
Contaminant of Concern	Table 915-1 Soil Screening Standards	Table 915-1 Soil to Groundwater Standards	Units															
Organic Compounds in Soil																		
DRO	N/A	N/A	mg/kg	33	42	16J	100	87	34	<23	28	18J	47	85	11J	<25	<23	
GRO	N/A	N/A	mg/kg	<5.7	<5.2	<2.0	<5.9	<5.5	48	2.8	<6.2	<6.3	<7.0	<6.0	28	280	<5.3	
Total Petroleum Hydrocarbon (DRO+GRO)	500	500	mg/kg	33	42	16J	100	87	82	2.8	28	18J	47	85	39	280	<23	
Benzene	1.2	0.0026	mg/kg	0.0015J	0.0021J	0.0025J	0.0017J	<0.032	0.22	0.17	0.0016J	0.0038J	0.0035J	0.0035J	<0.025	0.41	<0.031	
Ethylbenzene	5.8	0.78	mg/kg	0.0014J	0.0018J	0.0025J	0.0028J	<0.032	0.30	0.054	0.0013J	0.0028J	0.0032J	0.0026J	0.10	0.17	<0.031	
Toluene	490	0.69	mg/kg	0.0033J	0.012	0.0059	0.0063	0.24	<0.030	<0.035	0.0033J	0.0053	0.0060	0.0050	<0.025	<0.035	<0.031	
Xylenes (Total)	58	9.9	mg/kg	<0.0043	0.0087	0.0022J	0.0026J	0.39	1.8	0.51	<0.0047	0.0078	0.0057	0.0061	1.7	6.4	<0.093	
1,2,4-trimethylbenzene	30	0.0081	mg/kg	<0.0043	<0.0052	<0.0046	<0.0054	<0.032	0.72	0.13	<0.0047	<0.0053	<0.0052	<0.0050	0.38	1.2	<0.031	
1,3,5-trimethylbenzene	27	0.0087	mg/kg	<0.0043	<0.0052	<0.0046	<0.0054	<0.11	0.99	0.20	<0.0047	<0.0053	<0.0052	<0.0050	0.48	1.6	<0.10	
Acenaphthene	360	0.55	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Anthracene	1800	5.8	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Benzo(A)anthracene	1.1	0.011	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Benzo(B)fluoranthene	1.1	0.30	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Benzo(K)fluoranthene	11	2.9	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Benzo(A)pyrene	0.11	0.24	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Chrysene	110	9.0	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Dibenzo(A,H)anthracene	0.11	0.096	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Fluoranthene	240	8.9	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Fluorene	240	5.4	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Indeno(1,2,3-cd)pyrene	1.1	0.98	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Naphthalene	2.0	0.0038	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	0.0086	<0.0049	
1-methylnaphthalene	18.0	0.0060	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
2-methylnaphthalene	24.0	0.0190	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Pyrene	180	1.3	mg/kg	<0.0048	<0.0045	<0.0045	<0.0045	<0.0045	<0.0046	<0.0050	<0.0047	<0.0046	<0.0050	<0.0046	<0.0051	<0.0051	<0.0049	
Inorganics in Soil																		
Electrical Conductivity	<4		mmhos/cm	1.7	NA	NA	NA	NA	NA	NA	2.6	NA	NA	NA	NA	NA	NA	
Sodium Absorption Ratio	<6		Unitless	4.4	NA	NA	NA	NA	NA	NA	11	NA	NA	NA	NA	NA	NA	
pH	6-8.3		Unitless	8.91	NA	NA	NA	NA	NA	NA	9.12	NA	NA	NA	NA	NA	NA	
Percent Moisture			Unitless	13	11	10	8.6	9.4	15	17	12	11	16	10	19	19	15	
Metals in Soil																		
Arsenic	0.68	0.29	mg/kg	6.7	7.5	8.8	9.8	9.9	5.7	3.0	6.9	5.8	9.8	15	14	4.2	2.5	
Barium total	15000	82	mg/L	240	210	200	350	280	270	220	220	190	240	220	320	260	170	
Boron	2.0	N/A	mg/L	0.75	1.2	1.3	0.42J	0.51	0.71	0.73	1.2	0.86	1.3	0.47	1.2	0.54	0.69	
Cadmium	71	0.38	mg/kg	0.39	0.35	0.41	0.35	0.53	0.39	0.43	0.34	0.36	0.43	0.38	0.39	0.42	0.41	
Chromium (VI)	0.30	0.00067	mg/kg	<1.2	1.2	1.6	1.0J	1.6	<1.2	3.4	<1.1	<1.1	1.2	1.3	<1.2	2.7	<1.2	
Copper	3100	46	mg/kg	11	8.3	10	11	11	9.0	9.3	11	8.9	11	11	14	8.3	9.5	
Lead	400	14	mg/kg	12	10	12	10	12	13	13	11	9.0	12	12	14	11	12	
Nickel	1500	26	mg/kg	11	9.2	11	8.6	9.6	12	16	11	9.1	11	9.4	14	12	15	
Selenium	390	0.26	mg/kg	0.32J	<0.31	<0.32	0.28J	<0.30	0.42	<0.32	0.37	<0.32	<0.32	0.39	<0.38	0.36	<0.32	
Silver	390	0.80	mg/kg	0.051J	0.044J	0.048J	0.066J	0.058J	<0.34	<0.32	0.047J	0.043J	0.061J	0.070J	<0.38	<0.32	<0.32	
Zinc	23000	370	mg/kg	39	29	39	32	34	40	52	38	30	38	28	42	42	50	

ND - Non Detect

NS - Not Sampled

Exceeds COGCC Table 915-1 Standard

ppmv - Parts per million by volume

mmhos/cm - Millimhos per centimeter

Table 2  
Bargath LLC - Cottonwood CS  
Comprehensive Liquid Level Data

Well ID	NORTHING (M)	EASTING (M)	Ground Elevation (ft AMSL)	Top of Casing Elevation (ft AMSL)	Date	Depth to Groundwater (Ft from TOC)	Depth to Product (ft below TOC)	Product Thickness (ft)	Corrected GW Elevation (ft AMSL) (1)
MW-1					1/29/2023	DRY @ 59.85			
MW-2					1/29/2023	60.33			-60.33
MW-3					1/29/2023	57.48			-57.48

Table 3  
Bargath LLC - Cottonwood CS  
Comprehensive Groundwater Analytical Summary

		COGCC Table 915-1 Concentration Levels	5 µg/L	1000 µg/L	700 µg/L	10,000 µg/L	67 µg/L	67 µg/L	140 µg/L	250 mg/l or <1.25 X Background	<1.25 X Background	250 mg/l or <1.25 X Background
Sample Location	Media	Sampling Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	1,2,4-Trimethylbenzene (µg/L)	1,3,5-Trimethylbenzene (µg/L)	Naphthalene (µg/L)	Chloride (mg/L)	TDS (mg/L)	Sulfate (mg/L)
MW01	Groundwater	1/29/2023	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
MW02	Groundwater	1/29/2023	7.2	14	<1.0	13	<1.0	<1.0	<5.0	36.9	1100	300
MW03	Groundwater	1/29/2023	190	7.1	90	700	67	80	<5.0	43.9	890	58

**Note:**

J - Indicates an estimated value below laboratory reporting limit

NS = Not Sampled

µg/L - Micrograms per Liter

mg/L - Milligrams per Liter

ND - Not detected at or concentrations were below laboratory reporting limit

Above COGCC Table 915-1 Concentration Level



Project Name: Williams-Cottonwood CS		Coordinate X:	Site/well ID: SB-1
Project Number: 631029767		Coordinate Y:	Date Started: 1/12/2023
Location: Rulison, CO		Static Water Level:	Blank Casing:
Logged By: Craig Taylor		Measuring Point:	Type: PVC dia:
Contractor: GDI Drilling		Total Depth: 50'	fm: to:
Drilling Method: CME 55-Hollow Stem		Borehole Dia: 8.25 in OD	Screens:
Remarks: 12 " diameter HydroVac hole to 10'. Sidewall sample taken 0-1'. 8.25 in OD HSA with a 2.25 in OD continuous split-spoon samples from 10' - TD.			type: Slotted size: dia:
			fm: to:
			Annular Fill:
			type: fm: to:
			type: fm: to:
			type: fm: to:
			Completed Depth:


Depth	Well Construction	Water Level	% Recovery	PID (ppm)	Blow Count	USCS Code	Graphic Log	Material Description
0			0					0-10': Hydrovaced to 10'. Sandy Clay and Med to large gravel and cobbles.
10			10		50>5"			10'-10.5': Sandstone, light gray. Augured to 12'. Then 3' SS sample.
15			0		HSA			12'-15': Silty Clay, non-plastic, dry, 10yr (5/6) yellowish brown with med sized mudstone and claystone gravel, increasing soft silt with depth and moist.
20				1.5	10,15,20,47 14,7			15'-20': Silty Sand w/ some Clay and small to med sandstone gravel, semi-plastic to non-plastic with depth. 7.5yr (5/6) strong brown, moist.
25			50	1.7	9,8,13,12 9,9,8 9,14,7			20'-24': Silty Sandy clay w/ some small gravel, non-plastic, 10yr (4/6) dark yellowish brown. Dry 24'-25' FG semi-plastic clay with sandstone and dark gray to black shale and claystone. Dry
30			80	0.3	6,5,5,4 4,4,6 9,14,17			25'-30': Silty Clay, w/ some small to med size shale and claystone gravel. FG Sandstone, lightgray, loose and crumbly @ 27.5'-28'. 29'-30': Sandy Clay, crumbly, dry, w/ some small gravel. Semi -stiff Clay 7.5yr (4/3) brown @ 30'. Dry
35			60	0.8	9,11,9,5 5,7,9 9,8,7			30'-34.2': Silty Clay, soft, semi-plastic, 10yr (4/6) dark yellowish brown, moist, w/ thin mudstone layers. Graded to light gray sandstone and dark gray to black shale with depth. Dry at depth
40			50	5.1	5,23,13,17 31,50>5"			35'-38': Clay, soft, 10yr (4/6) dark yellowish brown, w/ some med sized gravel. Hard dark gray sandstone 37'- 38'. Dry Augured from 38'-38.5, then SS.
45					11,26,28			Shale, very dark brown and black, dark gray sandstone.
50			60	0.1	48,49,20,23 43,50>6"			LG soft Sandstone, to Silty Clay, loose, non-plastic 10yr (4/4) dark yellowish brown. LG sandstone @ 43' light tan-brown. Dry
			0		HSA			Sandstone dark gray, Augured from 43'-45'.
			80	0.6	17,21,36,37 49,37,28 31,43,49			45'-50': Silty Sand w/ dark gray Sandstone and dark brown-black shale. Dry




Project Name: Williams-Cottonwood CS		Site/well ID: SB-2
Project Number: 631029767		Date Started: 1/9/2023
Location: Rulison, CO	Coordinate X:	Blank Casing:
Logged By: Craig Taylor	Coordinate Y:	Type: PVC dia:
Contractor: GDI Drilling	Static Water Level:	fm: to:
Drilling Method: CME 55-Hollow Stem	Measuring Point:	Screens:
	Total Depth: 45.1'	type: Slotted size: dia:
	Borehole Dia: 8.25 in OD	fm: to:
Remarks: 12 " diameter HydroVac hole to 10'. Sidewall sample taken 0-1'. 8.25 in OD HSA with a 2.25 in OD continuous split-spoon samples from 10' - TD.		Annular Fill:
		type: fm: to:
		type: fm: to:
		type: fm: to:
		Completed Depth:


Depth	Well Construction	Water Level	% Recovery	PID (ppm)	Blow Count	USCS Code	Graphic Log	Material Description
5			0					0-10': Hydrovaced to 10'. Sandy Clay and Med to large gravel and cobbles.
10			60	1.1	6,10,21,24 13,15,15 12,22,27			10'-15': Silty Sandy Clay, non-plastic, dry, 10yr (6/6) brownish yellow, with med sized poorly sorted mudstone and claystone gravel.Dry
15			60	15	18,20,30,70 25,28,23 21 25,16			15'-20': Silty Sand w/ some Clay and small to med poorly sorted gravel. 10yr(4/3) brown. Dry
20			60	152.8	12,11,10,8 10,8,6 25,42,24			20'-22': Silts and Sands light tan brown, with increaseing poorly sorted gravel with depth.Dry 22'-25': Same as above but w/ black staining and slight HC odor, and sand lense @ 25'. Dry
25			80	303	8,6,6,6 8,9,10 8,11,12			25'-30': Silty Sandy Clay, soft, dark gray to black staining and HC odor. Damp.
30			80	60.2	5,6,11,7 15,14,31 50>2"			30'-34.2': Silty Clay (2.5yr(4/1)) dark gray, with some small poorly sorted gravel, moist, staining and slight HC odor. grades to a light gray silty sand with depth.
35			0	0	HSA			Sandstone
40			90	17	10,7,7,6 13,7,12 15,19,16			35'-40': Silty Sandy Clay (2.5yr(3/3)) dark olive brown to light gray. Some poorly sorted coarse sand and small gravel. Grades to a light olive brown with depth.Dry
45			80	19.1	5,30,15,13 13,15,50>4"			40'-42': Silty Clay, semi-stiff, (10yr(5/4)) yellowish brown. 42'-43.4':Silt Sandy Clay, soft, loose, dark gray to black staining and HC odor. Silt lense @ 42'.
			0		HSA			43.4'-45': Dark gray Sandstone. HSA to 45'.
50								45'-45.1': Sandstone dark gray.



							Site/well ID: SB-3 (MW-03)	
Project Name: Williams-Cottonwood CS							Date Started: 1/27/2023	
Project Number: 631029767							Blank Casing:	
Location: Rulison, CO							Type: PVC dia: 2"	
Logged By: Craig Taylor							fm: 0' to: 40'	
Contractor: GDI Drilling							Screens:	
Drilling Method: CME 55-Hollow Stem							type: Slotted size: 0.010" dia: 2"	
Remarks: 12 " diameter HydroVac hole to 10'. Sidewall sample taken 0-1'. 8.25 in OD HSA with a 2.25 in OD continuous split-spoon samles from 10' - TD.							fm: 40' to: 60'	
							Annular Fill:	
							type: Cement fm: 0' to: 2'	
							type: Bentonite fm: 2' to: 38'	
							type: Silica Sand fm: 38' to: 60'	
							Completed Depth: 60'	
Depth	Well Construction	Water Level	% Recovery	PID (ppm)	Blow Count	USCS Code	Graphic Log	Material Description
5			0					0-10': Hydrovaced to 10'. Sandy Clay and Med to large gravel and cobbles.
10			70	0.7	2,8,5,10 13,13,11 12,11			10'-15': Sandy Silty Clay, loose, crumbly, dry, (10yr(3/6))dark yellowish brown. With some poorly sorted small to med shale and sandstone gravels.
15			70	0.3	6,17,24,43 42,24,25 22,29,20			15'-20': Silty Clay (10yr(3/6)) dark yellowish brown, with coarse grained sand and small gravel. Increasing med to large Sandstone and shale gravel w/ depth. Dry
20			80	91.1	12,15,13,11 12,13,18 16,7,7			20'-22': Sandy Clay (10yr(4/6)) dark yellowish brown, w/ small poorly sorted gravels. 22'-25': Same as above but w/ dark black to gray staining and HC odor. Grades to light gray with depth.
25			90	187.1	4,2,2,2 4,5,7 10,7,10			25'-29': Silty Clay, soft, olive gray, grades to light gray with depth. w/ some coarse grained sand and small gravel. 29'-30': Dark black staining and HC odor.
30			5	537.1	3,50>6"			30'-31': Silty Clay, soft, moist, black staining and strong HC odor. 31'-33': Sandstone dark gray
35			0	0	HSA			33'-35': Silty Clay, soft, moist, black staining and strong HC odor, w/ some small gravels.
40			90	624.7	17,23,25,30			35'- 37.2': Sandy w/ some clay and small gravels, greenish gray to olive green, HC
45			40	327.4	17,20,30,36 50,>2"			37.2'-40': HSA, gravels and cobbles
50			0		HSA			40'-45': Silty Clay (10yr(5/4)) yellowish brown, with small to med gravel, sandstone @ 42, no staining, slight HC odor.
55			60	66	18,42,25,20 42,26,28 35,34,38			45'-50': Sandy Clay w/ black staining, shale and sandstone med to large gravel. HC odor. Pinkish red sandstone @ 50'. Dry
60			80	304	11,38,20,40 34,36,31 36,41,50>6"			50'-54': Clay, soft, dark gray to black, staining, w/ some coarse grained sand and small gravels. moist
65			90	105.6	18,17,15,16 18,19,18 50>5"			55'-60': Sandy Silt, Soft, w/ some Clay, black to dark gray staining, HC odor, w/ some coarse grained sand and small gravels. Sandstone @ 60'
			60	380.4	12,12,11,12 12,17,12 13,16,22			60.1': No Recovery, HSA refusal
			0		50>1"			

<div><div><div><div></div><div>APTIM</div></div></div></div>							Site/well ID: SB-4	
							Date Started: 1/26/2023	
Project Name: Williams-Cottonwood CS			Coordinate X:				Blank Casing:	
Project Number: 631029767			Coordinate Y:				Type: PVC dia:	
Location: Rulison, CO			Static Water Level:				fm: to:	
Logged By: Craig Taylor			Measuring Point:				Screens:	
Contractor: GDI Drilling			Total Depth: 68.5'				type: Slotted size: dia:	
Drilling Method: CME 55-Hollow Stem			Borehole Dia: 8.25 in OD				fm: to:	
Remarks: 12 " diameter HydroVac hole to 10'. Sidewall sample taken 0-1'. 8.25 in OD HSA with a 2.25 in OD continuous split-spoon samles from 10' - TD.							Annular Fill:	
							type: fm: to:	
							type: fm: to:	
							type: fm: to:	
							Completed Depth:	
Depth	Well Construction	Water Level	% Recovery	PID (ppm)	Blow Count	USCS Code	Graphic Log	Material Description
5			0					0-10': Hydrovaced to 10'. Sandy Clay and Med to large gravel and cobbles.
10			50	0	1,2,3,4 3,4,10 14,13,14			10'-15': Silty Clay, soft, (10yr(4/6)) dark yellowish brown.w/ sparce coarse sand. Sandstone and coarse sand and small gravel from 14'-15'. Dry
15			70	0	3,7,12,12 19,25,43 33,43,38			15'-20': Silty Clay (10yr(3/6)) dark yellowish brown, with coarse grained sand and small gravel.Increasing med to large Sandstone and shale gravel w/ depth, (10yr(5/6)) yellowish brown. Dry
20			50	0.2	19,21,27,27 27,25,23 23,20,19			20'-25':Silty Clay (10yr(5/6)) yellowish brown, w/ dark gray Shale and Sandstone gravels. Grades to Sandy Clay w/ some course sands and small gravel, light tan to brown.
25			70	2.1	8,11,8,14 27,28,31 34,27,22			25'-27.5': Mudstone and siltstone large gravel, dark gray w/ some Silty Clay, soft, crumbly, dry, (10yr(3/3)) dark brown. Dry 27'-27.5': FG Sandstone, dark gray. 27.5'-30': Sandy clay w/ small gravel, w/ light tan-brown siltstone @ 30'. Dry
30			60	3.4	14,27,28,30 31,27,25 31,50>6"			30'-34.6: Sandstone , light to dark gray, w/ Shale dark gray to brown, more silty clay (10yr(5/6)) yellowish brown with depth. Sandstone @ 34'. Dry
35			50	28.9	37,24,27,25 21,8,16 31,27,50>5"			35'-39': Standstone light to dark gray, w/ some silty sand, soft. Sandstone, dark gray, soft and crumbly. Grades to silt w/some clay (10yr(3/6)) dark yellowish brown, and some small gravel
40			0		HSA			HSA: 39'-40'
40			10	23.6	47,48,50>6"			40'-41.6': Silty Clay, soft, semi-plastic, (10yr(4/6)) dark yellowish brown. Sandstone @ 41',dark gray.
40			0		HSA			41.6'-43'- HSA
45			10	13	38,50>2"			43'-43.8': FG silt/sandstone,staining, dark gray to black. HSA to 45', soft auguring, soft crumbly sandstone.
45			0		HSA			
45			50	271.9	31,19,47,48 50>4"			45'-47.4': Sandstones and shale, w/ some Silty Clay, loose, dark gray staining and HC odor.
50			0		HSA			HSA: 47.4'-50'
50			0		50>2"			No Recovery, Hard Rock
50			0		HSA			HSA: 50.2'-53'
55			0		2,3,7,8			No Recovery, Black Staining on spoon. Sandy Clay, soft, wet/saturated?
60			90	1537	4,11,10,18 21,14,11 16,30,24			55'-60': Silty Clay w/ FG Sand and small gravel, soft, Dark gray staining w/ heavy black staining @ 59'. Grades to stiff Clay, semi plastic w/ small gravel w/ depth, dark gray staining and HC odor. Moist
65			90	923.1	5,5,7,10 15,17,21 27,32,32			60'-64': Sandy Clay, soft, moist, light to dark gray staining, strong HC Odor. 64'-65': Clay, stiff, w/small gravel, (10yr(4/6)) dark yellowish brown, no staining, crumbly, non-plastic. Dry
65			80	125	7,11,15,15			65'-67':Clay,stiff,plastic, (10yr(4/6)) dark yellowish brown.Grades to a Silty Clay, loose, light gray brown.
70			70	694.1	27,26,50>5"			67'-68.5': Clay, stiff, no staining, (10yr(4/6)) dark yellowish brown.Grades to Sand,loose, dark black staining. HC odor. well rounded small gravel.Dry

							Site/well ID: SB-5 (MW-02)	
							Date Started: 1/26/2023	
Project Name: Williams-Cottonwood CS			Coordinate X:			Blank Casing:		
Project Number: 631029767			Coordinate Y:			Type: PVC dia: 2"		
Location: Rulison, CO			Static Water Level: 60.38			fm: 0' to: 55'		
Logged By: Craig Taylor			Measuring Point:			Screens:		
Contractor: GDI Drilling			Total Depth: 71.6'			type: Slotted size: 0.010" dia: 2"		
Drilling Method: CME 55-Hollow Stem			Borehole Dia: 8.25 in OD			fm: 55' to: 70'		
Remarks: 12 " diameter HydroVac hole to 10'. Sidewall sample taken 0-1'. 8.25 in OD HSA with a 2.25 in OD continuous split-spoon samles from 10' - TD.						Annular Fill:		
						type: Cement fm: 0' to: 2'		
						type: Bentonite fm: 2' to: 53'		
						type: Silica Sand fm: 53' to: 70'		
						Completed Depth: 70'		
Depth	Well Construction	Water Level	% Recovery	PID (ppm)	Blow Count	USCS Code	Graphic Log	Material Description
5			0					0-10': Hydrovaced to 10'. Sandy Clay and Med to large gravel and cobbles.
10			80	0	3,6,6,7 3,5,5 13,21,22			10'-15': Silty Sand w/ small gravel, (10yr(4/6)) dark yellowish brown. Grades to more crumbly Clay and sandstone, mudstone gravel w/ depth.Dry
15			50	0.6	3,3,10,14 36, 50>6"			15'-17.9': Sandstone light gray @ 15', Silt w/ some Clay (10yr(4/6)) dark yellowish brown, w/ some coarse sand and small gravel.Dry
20			0		HSA			17.9'-20': HSA
25			70	0	3,2,3,3 5,5,5 11,13,13			20'-25':Silty Clay, soft, (10yr(3/6)) dark yellowish brown. Grades to Sandy Silty Clay w/ depth, sparce small gravel. Sandstone, dary gray and thinly laminated claystone/shale dark brown @25'.Dry
30			10	No PID	6,3,4,4 4,4,5 8,6,9			25'-30': Only 10% recovery, rock plugged spoon. Shale, dark black-brown.
35			60	0	3,4,4,5 8,7,10 27,25,22			30'-35': Silty Clay, soft, semi-plastic, (10yr(4/6)) dark yellowish brown. Increasing small gravel and coarse sand w/ depth. 34'-35' Sandstone dark gray, w/ some silty sand @35'. Dry
40			80	1.2	13,18,32,35 15,9,13 49,22,26			35'-40': Silty Clay, semi-plastic, (10yr(4/6)) dark yellowish brown. Sand clay lenses w/ depth,non-plastic, sparce small-med shale gravel and dark gray Sandstone @ 40'. Dry
45			70	2	12,18,21,17 12,18,35 45,28,21			40'-45': Sandy Clay, (10yr(4/6)) dark yellowish brown, with claystone and sandstone gravel. Grades to a silty clay, semi-plastic with depth. Sandstone light gray, and Quartzite pinkish red, with dark gray shale at depth.Dry
50			70	17.7	15,18,27,27 25,21,20 21,23,19			45'-50': FG Sandy Clay, dark gray to black staining, slight HC odor, w/ sparce small to med sandstone and claystone gravel. Soft cumblly coarse grained Sandstone @ 50', dark gray staining.Dry
55			70	25.9	13,9,15,28 23,21,16 26,22,22			50'-52': Coarse grained Sandstone, soft, crumbly, dark gray to black staining, HC odor.Dry 52'-55' Silty Sandy Clay, soft, black staining, HC odor, with trace small gravel and coarse grained sand.moist Sandstone light gray and claystone dark brown @ 55'.
60			70	26.9	12,21,16,13 21,32,40 41, 50>5"			55'-59.5': Silty Clay, plastic, dark gray and black staining, Slight HC odor, moist, w/ small to med sandstone and shale gravel. Sandstone dark gray, hard @ 59'. Dry
65			50	46.4	21,14,6,11 10,11,15 21,22,30			60'-65': Silty Clay, soft, semi plastic, dark gray to black staining, HC odor, w/ black shale and dark gray FG Sandstone, hard @ 65'.
70			60	16.1	10,11,11,12 10,15,19 27,30,35			65'-68': Clay w/ claystone and shale, (10yr(2/2)) very dark brown. 68'-70': Silty Clay, stiff, non-plastic, crumbly, (10yr(5/6)) yellowish brown. Black staining @ 70'.
75			5	1.7	50>3" 50>3"			70'-70.3: Course grained Sand. 70.3'-71.3': HSA 71.3'-71.6': Gravel, Quartzite pinkish red, Granite pinkish purple, and well rounded small gravel.

<div></div>							Site/well ID: SB-6 (MW-01)	
							Date Started: 1/10/2023	
Project Name: Williams-Cottonwood CS			Coordinate X:				Blank Casing:	
Project Number: 631029767			Coordinate Y:				Type: PVC dia: 2"	
Location: Rulison, CO			Static Water Level: Dry				fm: 0 to: 40'	
Logged By: Craig Taylor			Measuring Point:				Screens:	
Contractor: GDI Drilling			Total Depth: 61.1'				type: Slotted size: 0.010" dia: 2"	
Drilling Method: CME 55-Hollow Stem			Borehole Dia: 8.25 in OD				fm: 40' to: 60'	
Remarks: 12 " diameter HydroVac hole to 10'. Sidewall sample taken 0-1'. 8.25 in OD HSA with a 2.25 in OD continuous split-spoon samples from 10' - TD.							Annular Fill:	
							type: Cement fm: 0 to: 2'	
							type: Bentonite fm: 2' to: 38'	
							type: Silica Sand fm: 38' to: 60'	
							Completed Depth: 60'	
Depth	Well Construction	Water Level	% Recovery	PID (ppm)	Blow Count	USCS Code	Graphic Log	Material Description
5			0					0-10': Hydrovaced to 10'. Sandy Clay and Med to large gravel and cobbles.
10			50	0.1	3,4,8,9 13,50,50>3"			10'-13.3': Silty Clay (10yr(4/4)) dark yellowish brown, semi-stiff, moist, w/ small gravel. Dry @ depth.
15			5		50>1"			15'-15.1': Shale, dark gray-black
			0		HSA			15.1'-16': HSA
20			60	0.3	10,14,21,27 25,25,33,39			16'-20': Gravels, Shale, Sandstone, w/ some clay.
25			80	1.8	30,31,46,43 44,33,31 33,50>6"			20'-24.6': Sandstone, light to dark gray w/ dark gray Shale, and light gray Sandstone @ depth. Dry
30			50	1	20,28,20,14 36,50>5"			25'-28': Silty Clay, soft, semi-plastic, w/ Sandstone light gray, and shale dark gray-black.
35			40	1.1	15,11,20,1 2			28'-30': Sandstone light gray, w/ coarse grained sandstone, soft, crumbly @ depth.
40			90	1	7,9,13,28 23,21,23 18,18,29			30'-35': Silt w/ FG Sand and some clay, (10yr(5/6)) yellowish brown. Sandstone dark gray gravel increase w/ depth.
45			80	0.5	18,18,22,34 49,21,16 50>6"			35'-39': Silty Clay, (10yr(3/6)) dark yellowish brown, w/ sparse coarse sand and small sandstone gravel.
50			0		HSA			
55			60	0.2	35,27,26,25 35,50>4"			40'-43': Sandstone, dark gray, w/ dark brown reddish shale and some silty Clay (10yr(2/2)) very dark brown.
			5		38, 50>5"			43'-44': Sandstone, Dark gray.
			0		HSA			
			70	29.4	19,27,44,40 25,43,50>2"			45'-48.2': Silt w/ course grained Sand, light tan to brownish gray. @47' Sandy Silt w/ small gravel, dark gray, staining, HC odor.
			0		HSA			
			60	24.3	21,33,35,37			50'-52': Sandy Silt w/ Sandstone gravel, light gray. FG Sandy Clay @49' w/ HC odor and dark greenish gray staining.
			90	1389	5,6,12,16 15,16,15,14 19,20			52'-55': Silty Clay, soft, moist, black staining, HC odor.
								55'-57': Same as Above, but dry.
60			80	1120	7,27,15,8 20,17,20,19 50>1"			57'-61.1': Silty Clay, soft, dary gray, staining, HC odor, moist. Some sparse small gravel @ 59'. Silty FG sand, soft, moist, light gray, HC odor.



<div> <div>APTIM</div> <div> <div>Project Name: Williams-Cottonwood CS</div> <div>Project Number: 631029767</div> <div>Location: Rulison, CO</div> <div>Logged By: Craig Taylor</div> <div>Contractor: GDI Drilling</div> <div>Drilling Method: CME 55-Hollow Stem</div> </div> </div>							<div> <div>Site/well ID: SB-7</div> <div>Date Started: 1/11/2023</div> </div>	
<div> <div>Coordinate X:</div> <div>Coordinate Y:</div> <div>Static Water Level:</div> <div>Measuring Point:</div> <div>Total Depth: 55'</div> <div>Borehole Dia: 8.25 in OD</div> </div>							<div> <div>Blank Casing:</div> <div>Type: PVC dia:</div> <div>fm: to:</div> <div>Screens:</div> <div>type: Slotted size: dia:</div> <div>fm: to:</div> </div>	
<div> <div>Remarks: 12 " diameter HydroVac hole to 10'. Sidewall sample taken 0-1'. 8.25 in OD HSA with a 2.25 in OD continuous split-spoon samples from 10' - TD.</div> </div>							<div> <div>Annular Fill:</div> <div>type: fm: to:</div> <div>type: fm: to:</div> <div>type: fm: to:</div> </div>	
							Completed Depth:	
Depth	Well Construction	Water Level	% Recovery	PID (ppm)	Blow Count	USCS Code	Graphic Log	Material Description
5			0					0-10': Hydrovaced to 10'. Sandy Clay and Med to large gravel and cobbles.
10			50	0.8	10,43,19,20 25,33,18 20,10,5			10'-15': Silty Clay, (10yr(5/8)) yellowish brown, w/ sparse small gravel, dry. Increasing coarse grained Sandy Clay W/ depth, grades to (10yr(4/6)) dark yellowish brown. Dry
15			80	1.2	11,39,30,44 37,44,30 33,40,47			15'-20': FG Sandy Clay, (10yr(6/8)) Brownish yellow,w/ small to med Sandstone gravel.Dry
20			80	0.7	12,11,8,3 5,8,10 23,27,15			20'-25': Silt w/ some Clay, non-plastic, soft, moist, (10yr(3/4)) dark yellowish brown. Claystone and Shale @ depth, dark gray to black.Dry
25			100	0.3	3,4,4,5 10,11,14 15,17,11			25'-30': Clay,Soft, moist, plastic, (10yr(4/6)) dark yellowish brown. Increasing gravel and stiffness with depth.
30			80	1.2	8,9,11,15 13,6,5 14,11, 15			30'-35':Silty Sand w/ sparse small gravel (10yr(4/6)) dark yellowish brown, Increasing Clay with depth (7.5yr(4/6)) strong brown, soft, plastic.moist
35			80	0.6	7,9,9,9 23,27,35 50>5"			35'-39': FG Sandy Clay, w/ sparse small to med gravel,(7.5yr(4/6)) strong brown. Increasing Silty Clay, soft, w/ depth. Sandstone @ 39'.Dry
40			0		HSA			40'-42.2': Small to med gravel w/ sand and sparce clay, Sandstone @ 42'.Dry
45			50	0.1	17,18,21,34 50>2"			42.2'-45': HAS, hard auguring.
50			0		HSA			45'-47.3':Silty Sand w/some Clay, Shale and Sandstone @ 47'.Dry
55			40	1.8	23,27,31,49 50>3"			47.3'-50': HSA
			0		HSA			50'-55': Silty Clay, soft, w/ coarse grained sand and small gravel at depth.
			100	0.6	9,7,3,5 11,13,20 27,25,28			



Project Name: Williams-Cottonwood CS		Site/well ID: SB-8
Project Number: 631029767		Date Started: 1/24/2023
Location: Rulison, CO	Coordinate X:	Blank Casing:
Logged By: Craig Taylor	Coordinate Y:	Type: PVC dia:
Contractor: GDI Drilling	Static Water Level:	fm: to:
Drilling Method: CME 55-Hollow Stem	Measuring Point:	Screens:
	Total Depth: 52'	type: Slotted size: dia:
	Borehole Dia: 8.25 in OD	fm: to:
Remarks: 12 " diameter HydroVac hole to 10'. Sidewall sample taken 0-1'. 8.25 in OD HSA with a 2.25 in OD continuous split-spoon samples from 10' - TD.		Annular Fill:
		type: fm: to:
		type: fm: to:
		type: fm: to:
Completed Depth:		

Depth	Well Construction	Water Level	% Recovery	PID (ppm)	Blow Count	USCS Code	Graphic Log	Material Description
5			0					0-10': Hydrovaced to 10'. Sandy Clay and Med to large gravel and cobbles.
10			50	0.4	5,5,6,5 3,2,2 15,15,14			10'-15': Silty Clay, soft, w/ small gravel, (10yr(4/6)) dark yellowish brown.moist
15			60	3.4	12,15,40,15 30,21,18 20,15,18			15'-20': Sandstone, soft, light gray @ 15'-16'. Silty Clay (7.5yr(5/8)) strong brown w/ sparce small FG Sandstone gravel. Grades to a Sandy Clay (10yr(4/6)) w/ depth. Dry
20			60	0	3,5,7,2 4,3,5 12,15,14			20'-25': Silty Clay, soft, wet, (10yr(5/6)) yellowish brown, w/ dark gray small shale gravel.Dry
25			70	0.6	5,2,2,4 5,6,7 5,9,11			25'-30': Clay, soft, semi-plastic, (10yr(4/6)) dark yellowish brown, w/ sparce FG small gravel. Grades to FG Sandy Clay w/ depth, moist. Shale dark brown to black @30'.
30			65	0.4	4,4,4,5 6,6,7 9,11,14			30'-35': FG Sandy Clay, semi-plastic, (10yr(4/6)) dark yellowish brown, w/ small gravel. Grades to Silty Clay w/ depth.Moist
35			90	0.4	6,4,6,11 27,38,30 38,50>6"			35'-39.6': Sandy Clay, semi-plastic, (10yr(4/6)) dark yellowish brown, w/ small to med gravel. Coarse grained Sandstone, soft, crumbly @ 37.5'. Grades to Silt w/ some Clay @ depth, light tan to brown.Dry
40			80	0.6	26,36,35,22 30,30,28 23,24,30			40'-45': Silt w/ FG Sand and Sandstone gravel, some sparce Clay, light tan to yellowish brown. Increasing Clay, semi-stiff (10yr(4/4)) dark yellowish brown w/ depth. Small to med Sandstone, Shale, gravel @ 45'.
45			60	1.7	16,27,29,40 30,20,21 50>3"			45'-48.9': FG Sand w/ small to med gravel and sparce Clay. Increasing Clay (10yr(5/8)) yellowish brown, semi-plastic, w/depth. Dark gray to black shale @ 49'. Dry
50			0		HSA			
			70	7.3	22,21,35, 50>6"			50'-52': Silty Clay, (10yr(4/6)) dark yellowish brown, semi-stiff, w/ Shale gravel @52'. Dry
55								

<div><div><div></div><div>APTIM</div></div></div>							Site/well ID: SB-9	
							Date Started: 1/25/2023	
Project Name: Williams-Cottonwood CS			Coordinate X:				Blank Casing:	
Project Number: 631029767			Coordinate Y:				Type: PVC dia:	
Location: Rulison, CO			Static Water Level:				fm: to:	
Logged By: Craig Taylor			Measuring Point:				Screens:	
Contractor: GDI Drilling			Total Depth: 65'				type: Slotted size: dia:	
Drilling Method:CME 55-Hollow Stem			Borehole Dia: 8.25 in OD				fm: to:	
Remarks: 12 " diameter HydroVac hole to 10'. Sidewall sample taken 0-1'. 8.25 in OD HSA with a 2.25 in OD continuous split-spoon samles from 10' - TD.							Annular Fill:	
							type: fm: to:	
							type: fm: to:	
							Completed Depth:	
Depth	Well Construction	Water Level	% Recovery	PID (ppm)	Blow Count	USCS Code	Graphic Log	Material Description
5			0					0-10': Hydrovaced to 10'. Sandy Clay and Med to large gravel and cobbles.
10			90	0.1	2,5,3,5 5,3,4 7,8,8			10'-15': Silty Clay, non-plastic, (10yr(4/6)) dark yellowish brown. Increasing FG loose Silty Sand w/ sparse small gravel w/ depth.Dry
15			80	3.5	4,6,6,8 31,27,43 39,45,24			15'-20': Silt w/ some Clay, loose, crumbly and sparse small gravel, (10yr(4/6)) dark yellowish brown. 17'-17.5': Coarse grained Sandstone, soft, crumbly, light brown-yellowish. 18'-20': Sandstone dark gray. Dry
20			85	0.6	9,6,11,9 7,8,12 7,6,7			20'-25': FG Sand and Silt, loose, (10yr(3/6)) dark yellowish brown, w/ sparse small gravel. Increasing Clay w/ depth, soft, semi-plastic.Dry
25			60	1	5,10,7,7 11,27,25 50>5"			25'-29': Silty Clay, semi-plastic, (10yr(4/6)) dark yellowish brown, w/ sparse coarse grained Sand and small gravel. Sandstone dark gray, hard, @ 29'.
30			0		HSA			
35			70	0.8	4,4,8,16 18,12,18 14,13,17			30'-35': Silty Clay, non-plastic, (10yr(4/6)) dark yellowish brown, w/ sparse small Shale and Sandstone gravel.Dry
40			60	1.8	22,42,20,20 20,19,18 27,21,44			35'-40': Silty Clay (10yr(4/4)) dark yellowish brown, w/ large Sandstone and shale gravel.Increases in Clay content w/ depth, and FG Sandstone, light gray @40'.Dry
45			70	1.5	31,48,49,40 24,19,20 27,24,23			40'-45': Dark gray Shale and Sandstone. Increasing Silty Clay (10yr(5/6)) yellowish brown, soft, loose, w/ small to med gravel @ depth. Dry
50			80	6.8	21,23,21,17 15,18,30 39,39,34			45'-50': Course grained Sand and gravel, dark gray Shale and Sandstone. Some Silty Clay, non-plastic,(10yr(5/6))yellowish brown, w/ med gravel @ depth.Dry
55			70	23.8	51,49,31,17 31,18,30 50>3"			50'-53.9': Silty Clay, non-plastic, (10yr 5/6)) yellowish brown. 52'-53.9 Course grained Sandstone, soft, crumbly, dark gray and purpleish, slight staining, olive greenish gray, and HC odor.Dry
			0		HSA			
60			60	34.4	22,17,10,9 13,13,14 19,19,21			55'-60': Silty Clay, non-plastic, semi-stiff, dark gray to olive green gray, slight staining and HC odor. Sparce small gravel. Dry
65			80	3	5,6,9,13 19,20,23 32,35,47			60'-65': Silty Clay, soft, loose, light gray and yellowish orange. Increasing Stiff Clay w/ silt lenses (2.5yr(4/2)) dark grayish brown w/ depth.



<div><div><div></div><div>APTIM</div></div></div>							Site/well ID: SB-10 Date Started: 1/24/2023	
Project Name: Williams-Cottonwood CS			Coordinate X:				Blank Casing:	
Project Number: 631029767			Coordinate Y:				Type: PVC dia:	
Location: Rulison, CO			Static Water Level:				fm: to:	
Logged By: Craig Taylor			Measuring Point:				Screens:	
Contractor: GDI Drilling			Total Depth: 65'				type: Slotted size: dia:	
Drilling Method:CME 55-Hollow Stem			Borehole Dia: 8.25 in OD				fm: to:	
Remarks: 12 " diameter HydroVac hole to 10'. Sidewall sample taken 0-1'. 8.25 in OD HSA with a 2.25 in OD continuous split-spoon samles from 10' - TD.							Annular Fill:	
							type: fm: to:	
							type: fm: to:	
							type: fm: to:	
							Completed Depth:	
Depth	Well Construction	Water Level	% Recovery	PID (ppm)	Blow Count	USCS Code	Graphic Log	Material Description
5			0					0-10': Hydrovaced to 10'. Sandy Clay and Med to large gravel and cobbles.
10			50	0	4,6,7,7 8,7,5 8,10,7			10'-15': FG Sandy Clay, non-plastic, (10yr(4/6)) dark yellowish brown, w/ small gravel. Increasing Sandy Silt w/ sparse Clay and thinly laminated Shale dark brown @ depth.
15			50	0.8	5,5,5,12 18,16,18 18,17,14			15'-20': Silty Sand (10yr(4/6)) dark yellowish brown, w/ sparse Clay, Shale and Sandstone gravel.Dry
20			60	0.4	7,12,9,5 7,5,5 6,9,15			20'-25': Coarse grained Sandstone, soft, crumbly,light brown to yellowish. 21'-24': Silty Clay, soft, non plastic stiffens w/ depth, (10yr(5/6)) yellowish brown.Dry
25			90	1.1	4,3,5,5 8,7,24 19,9,10			25'-30': Silty Clay, semi-plastic, (7.5yr(4/6)) strong brown, w/ sparse small gravel. Silt @ 27'-28'. Softy Claystone, flaky, dark brown @ 28'-29'.Dry
30			80	1	10,16,10,13 10,14,27 28,50>6"			30'-34.6': FG Sandy Clay, (7.5yr(4/6)) strong brown, w/ med dark gray to black shale and dark gray FG Sandstone. Dry
35			50	1.2	19,23,43,22 24,50>6"			35'-38': FG Sandstone, dark to light gray.Dry
40			0		HSA			
45			100	2.8	16,20,19,21 20,20,17 20,21,30			40'-45': Sand w/ small gravel and sparce Clay, (7.5yr(5/6)) strong brown, incresing Silt content and Sandstone gravel w/ depth.Dry
50			90	18	12,7,7,11 22,14,10 16,17,12			45'-49': Silty Clay, (7.5yr(5/8)) strong brown,w/ small to med grael and light gray soft Sandstone. 49'-50': Sandy Clay, soft, light olive green gray, slight HC odor and staining. Mosit
55			60	480	3,4,8,8 8,9,13 19,18,17			50'-55': Silty Clay, soft, semi-plastic dark gray to black staining, HC odor. Gravel lense @54'-54.5'. Moist
60			90	694.1	5,7,9,9 15,15,17 22,21,23			55'-60': Silty Clay, semi-plastic, med stiff, (7.5yr(4/6)) strong brown, HC odor and slight staining. Some silt lenses. Wet
65			100	2.6	6,10,12,14 21,24,27 32,35,43			60'-65': Silty Clay, soft, semi-plastic (10yr(4/4)) dark yellowish brown 60'-60.5'. Clay, stiff, hard, plastic, (10yr(5/6)) yellowish brown from 60.5'-65'. Silt lense @ 62'-62.5'. Dry