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2 January 2025

Guttersen State CC #20-12

Remediation #31548

Operator #100322

This Supplemental Site Investigation Report has been prepared by Environmental Resources Management, Inc. (ERM), on behalf of Chevron, for the Guttersen State CC #20-12 Site (Remediation #31548). As detailed in the third quarter 2024 Supplemental Site Investigation and Remediation Workplan Document #403908319 (Form 27) submitted by Eagle Environmental Consulting, Inc. (Eagle), and received by the Colorado Energy and Carbon Management Commission (ECMC) on 23 September 2024, soil sample FL01-A@2' exceeded the ECMC Table 915-1 regulatory standards for pH, arsenic, barium, and lead; and samples FL01-E@3' and FL01-F@3' reported exceedances for arsenic. These exceedances of the ECMC regulatory standards required further action to delineate and assess residual pH, arsenic, barium, and lead at the Site.

On 24 September 2024, ERM performed shallow delineation and background soil sampling via hand auger around the former flowline in three areas (FL-01, FL-02, and FL-03) as depicted on **Figure 1**. The analytical results from the September 2024 Site investigation activities are summarized in the following sections and presented on **Table 1** and **Table 2**.

SITE INVESTIGATION ACTIVITIES

SOIL SAMPLING

ERM advanced 12 delineation soil borings within the former operations boundary and six background borings at the Guttersen State CC #20-12 Site.

Four delineation soil borings (FL-01-N, FL-01-S, FL-01-E, and FL-01-W) were advanced around the northern section of the flowline to delineate for pH, arsenic, barium, and lead exceedances reported in sample FL01-A@2'. Samples were collected at 1-, 2-, and 4-foot bgs intervals at each respective boring location.

Four delineation soil borings (FL-02-N, FL-02-S, FL-02-E, and FL-02-W) were advanced further south around the flowline to delineate arsenic exceedances reported in sample FL01-F@3'. Samples were collected at 1-, 3-, and 5-foot bgs intervals at each respective boring location.

Four delineation soil borings were advanced at the southernmost section the flowline (FL-03-N, FL-03-S, FL-03-E, and FL-03-W) to delineate arsenic exceedances reported in sample FL01-E@3'. Samples were collected at the 1-, 3-, and 5-foot bgs intervals at each respective boring location.

Six soil borings (BG-01 through BG-06) were advanced to serve as nearby, non-impacted sampling locations to evaluate background concentrations of target analytes. Samples were collected at 2-foot bgs interval at all background sampling locations. Sample locations and relevant features are depicted on **Figure 1**.

A total of 42 soil samples, 36 delineation and 6 background samples, were submitted to Summit Scientific Laboratory, an accredited laboratory located in Golden, Colorado, for analysis of arsenic by EPA Method 6020B. 12 soil delineation samples associated with the northern section of the flowline (FL01-A@2') and 6 background samples were submitted for additional analysis of pH by EPA Method 9045D, barium by EPA Method 6020B, and lead by EPA Method 6020B. The six background samples were submitted for analysis of selenium by EPA Method 6020B.

RESULTS

Analytical results for pH are summarized in **Table 1** and analytical results for metals sampled are summarized in **Table 2**. The laboratory analytical report is included in **Attachment A**. Sampling locations and corresponding analytical results for the 24 September 2024 sampling event are illustrated on **Figure 1**.

Upon receipt of laboratory analytical results, data were reviewed for general quality assurance and quality control measures. The following notable observations and data qualifiers were associated with this data set:

- Soil samples at the time of laboratory receipt were 8.6 degrees Celsius (°C), outside the acceptable range of 0 to 6°C. The samples were delivered on the same day as sampling, put on bagged ice, and were observed to be actively cooling.
- All sample bottles were received intact, and the samples were analyzed within their respective hold times.
- No data qualifier codes were flagged in the analytical results.

Laboratory analytical results reported exceedances of ECMC Table 915-1 regulatory standards for pH soil reclamation and arsenic residential soil screening levels (SSL) in five of the 18 soil samples submitted for pH analysis, and all 42 samples analyzed for arsenic. Barium, lead, and selenium were all below their respective ECMC regulatory standards.

FLOWLINE DELINEATION SAMPLES

- Flowline delineation borings exceed the ECMC Table 915-1 pH range of 6.0 to 8.3 standard units (SU) in five of the 12 samples. The analytical results for pH range from 7.6 to 8.4 SUs.
- Flowline delineation borings exceed the ECMC Table 915-1 Residential SSL arsenic value of 0.68 milligrams per kilogram (mg/kg) in all 12 samples. The laboratory-reported analytical results for arsenic range from 0.979 to 1.81 mg/kg.
- Flowline delineation borings do not exceed the respective ECMC Table 915- Residential SSLs for barium (15,000 mg/kg) or lead (400 mg/kg). The laboratory-reported analytical results for barium range from 29.6 to 54.2 mg/kg, and for lead range from 3.31 to 6.08 mg/kg.

BACKGROUND SAMPLES

- Background borings do not exceed the ECMC Table 915-1 pH range of 6.0 to 8.3 SUs in the six samples collected. The analytical results for pH range from 6.9 to 8.3 SUs.
- Background borings exceed the ECMC Table 915-1 Residential SSL arsenic value of 0.68 mg/kg in all six samples. The analytical results for arsenic range from 1.06 to 1.50 mg/kg.
- Background samples were not reported exceed the ECMC Table 915-1 protection of groundwater SSLs in the six background samples analyzed for barium (28 mg/kg), lead (14 mg/kg), and selenium (0.26 mg/kg).

SOIL SUITABILITY FOR RECLAMATION STATUS

The analytical results for pH in soil samples collected from delineation borings associated with the Guttersen State CC #20-12 flowline exceed the ECMC Table 915-1 pH range of 6.0 to 8.3 SUs in five of the 12 samples.

The analytical results for arsenic in soil samples collected from delineation borings for the Guttersen State CC #20-12 flowline exceed the ECMC Table 915-1 value of <6.0 SUs in all 42 samples, including the six background samples. However, when compared to the maximum background arsenic value (1.50 mg/kg) of samples collected from the nearby background soil borings this event, multiplied by 1.25 (1.88 mg/kg), all delineation sample results are found to be within a statistically similar range of arsenic values.

ERM reviewed historical documentation which indicates groundwater is not within 20-feet of the ground surface. While the Groundwater Protection SSL seems non-applicable for the Site, the analytical results further suggest that no further sampling of metals at this Site is warranted.

ERM recommends conducting further assessment of onsite samples for pH and arsenic concentrations related to background samples from non-impacted portions of the Site to applicability for Soil Reclamation in 1st Quarter 2025.



TABLES

Table 1
SUMMARY OF SOIL SUITABILITY FOR RECLAMATION CHEMISTRY DATA
OPERATOR: 100322
Guttersen State CC #20-12, Weld County, Colorado
REM# 31548

Analyte			pH (Standard Units)
Colorado ECMC Table 915-1 Limits			6.0-8.3
Maximum Background Concentration			8.3
Mean Background Concentration			7.4
Sample ID	Sample Date	Depth (ft bgs)	Sample Result
Background Samples			
BG-01	09/24/2024	2	8.3
BG-02	09/24/2024	2	7.8
BG-03	09/24/2024	2	7.3
BG-04	09/24/2024	2	7.2
BG-05	09/24/2024	2	7.0
BG-06	09/24/2024	2	6.9
Delineation Boring Samples			
FL-01-E	09/24/2024	1	8.4
FL-01-E	09/24/2024	2	8.3
FL-01-E	09/24/2024	4	8.1
FL-01-N	09/24/2024	1	8.4
FL-01-N	09/24/2024	2	8.4
FL-01-N	09/24/2024	4	8.4
FL-01-S	09/24/2024	1	8.2
FL-01-S	09/24/2024	2	8.4
FL-01-S	09/24/2024	4	7.6
FL-01-W	09/24/2024	1	7.9
FL-01-W	09/24/2024	2	7.9
FL-01-W	09/24/2024	4	7.8
Notes: Bold and blue analytical result values exceed the ECMC Table 915-1 limit(s) ECMC = Colorado Energy and Carbon Management Commission ft bgs = feet below ground surface NA = not analyzed pH = pH Standard Units			

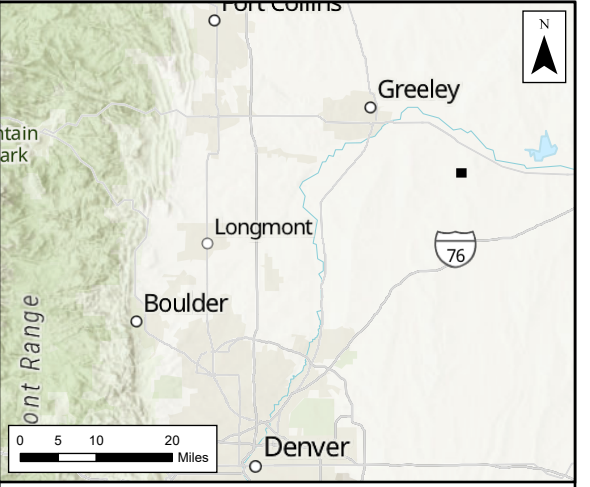
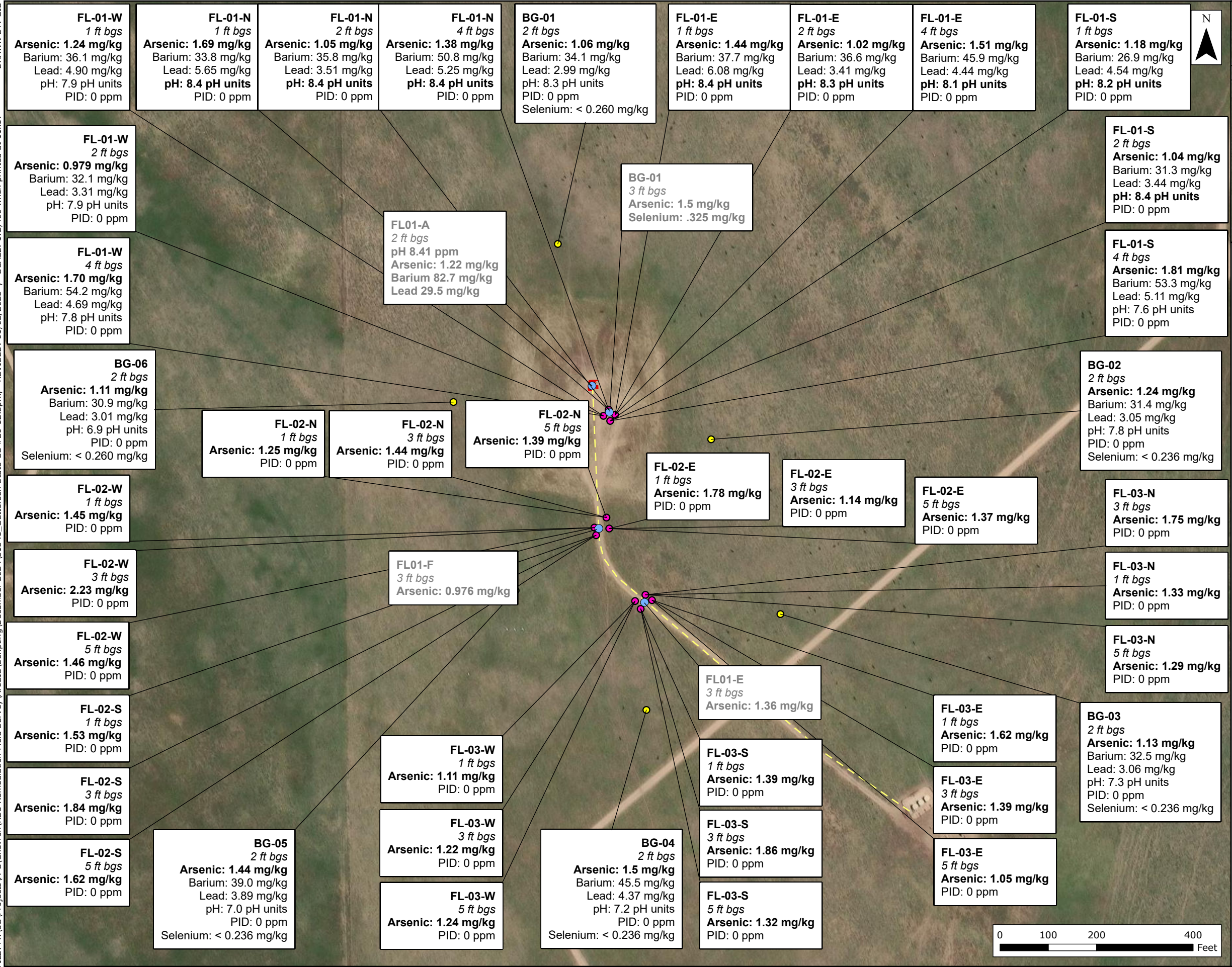
Table 2
SUMMARY OF METALS IN SOIL CHEMISTRY DATA
OPERATOR: 100322
Guttersen State CC #20-12, Weld County, Colorado
REM# 31548

Analyte			Arsenic (mg/kg)	Barium (mg/kg)	Lead (mg/kg)	Selenium (mg/kg)
Colorado ECMC Table 915-1 Limits (Protection of Groundwater SSL)			0.29	82	14	0.26
Colorado ECMC Table 915-1 Limits (Residential SSL)			0.68	15000	400	390
Maximum Background Concentration			1.50	45.5	4.37	0.26
Maximum Background Concentration X 1.25			1.88	56.9	5.46	--
Sample ID	Sample Date	Depth (ft bgs)	Sample Results			
Background Samples						
BG-01	09/24/2024	2	1.06	34.1	2.99	< 0.260
BG-02	09/24/2024	2	1.24	31.4	3.05	< 0.236
BG-03	09/24/2024	2	1.13	32.5	3.06	< 0.236
BG-04	09/24/2024	2	1.50	45.5	4.37	< 0.260
BG-05	09/24/2024	2	1.44	39.0	3.89	< 0.260
BG-06	09/24/2024	2	1.11	30.9	3.01	< 0.260
Delineation Boring Samples						
FL-01-E	09/24/2024	1	1.44	37.7	6.08	NA
FL-01-E	09/24/2024	2	1.02	36.6	3.41	NA
FL-01-E	09/24/2024	4	1.51	45.9	4.44	NA
FL-01-N	09/24/2024	1	1.69	33.8	5.65	NA
FL-01-N	09/24/2024	2	1.05	35.8	3.51	NA
FL-01-N	09/24/2024	4	1.38	50.8	5.25	NA
FL-01-S	09/24/2024	1	1.18	29.6	4.54	NA
FL-01-S	09/24/2024	2	1.04	31.3	3.44	NA
FL-01-S	09/24/2024	4	1.81	53.3	5.11	NA
FL-01-W	09/24/2024	1	1.24	36.1	4.90	NA
FL-01-W	09/24/2024	2	0.979	32.1	3.31	NA
FL-01-W	09/24/2024	4	1.70	54.2	4.69	NA
FL-02-E	09/24/2024	1	1.78	NA	NA	NA
FL-02-E	09/24/2024	3	1.14	NA	NA	NA
FL-02-E	09/24/2024	5	1.37	NA	NA	NA
FL-02-N	09/24/2024	1	1.25	NA	NA	NA
FL-02-N	09/24/2024	3	1.44	NA	NA	NA
FL-02-N	09/24/2024	5	1.39	NA	NA	NA
FL-02-S	09/24/2024	1	1.53	NA	NA	NA
FL-02-S	09/24/2024	3	1.84	NA	NA	NA
FL-02-S	09/24/2024	5	1.62	NA	NA	NA
FL-02-W	09/24/2024	1	1.45	NA	NA	NA
FL-02-W	09/24/2024	3	2.23	NA	NA	NA
FL-02-W	09/24/2024	5	1.46	NA	NA	NA
FL-03-E	09/24/2024	1	1.62	NA	NA	NA
FL-03-E	09/24/2024	3	1.39	NA	NA	NA
FL-03-E	09/24/2024	5	1.05	NA	NA	NA
FL-03-N	09/24/2024	1	1.75	NA	NA	NA
FL-03-N	09/24/2024	3	1.33	NA	NA	NA
FL-03-N	09/24/2024	5	1.29	NA	NA	NA
FL-03-S	09/24/2024	1	1.39	NA	NA	NA
FL-03-S	09/24/2024	3	1.86	NA	NA	NA
FL-03-S	09/24/2024	5	1.32	NA	NA	NA
FL-03-W	09/24/2024	1	1.11	NA	NA	NA
FL-03-W	09/24/2024	3	1.22	NA	NA	NA
FL-03-W	09/24/2024	5	1.24	NA	NA	NA
Notes:						
Bold and pink analytical results values exceed the ECMC Table 915-1 limit(s) (Residential SSL)						
Bold and blue analytical results values exceed the Colorado ECMC Table 915-1 limit(s) (Protection of Groundwater SSL)						
ECMC = Colorado Energy and Carbon Management Commission						
ft bgs = feet below ground surface						
mg/kg = milligrams per kilogram						



FIGURES

DRAWN BY: GIS
 FILE: M:\US\Projects\VA-Chevron\RBURemediationFieldSurvey\ArcGIS\Scripting\December 2024\31548_Guttersen State CC #20-12.aprx, REVISED: 01/02/2025, SCALE: 1:2,400 when printed at 11x17



Legend

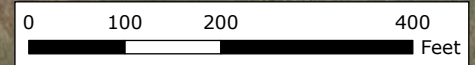
- Former Flowline
- Former Wellhead
- Former Sample Location
- Background
- Flowline Delineation
- Wellhead Delineation

Notes:

Bold values exceed the ECMC criteria for soil suitability.

PID = Photo Ionization Detector
 mg/kg = milligrams per kilogram
 ppm = parts per million
 ECMC = Energy and Carbon Management Commission
 ECMC Table 915-1 limit(s)
 pH: 6.0 - 8.3 pH Units
 Lead: 14 mg/kg
 Arsenic: .29 mg/kg
 Barium: 82 mg/kg
 Selenium: .26 mg/kg

Figure 1
Soils Analytical Data
24 September 2024
Guttersen State CC #20-12
REM #31548
Operator: 100322
 RBU Remediation Field Survey
 Chevron
 Weld County, Colorado



Source: Esri - World Aerial Map; NAD 1983 2011 StatePlane Colorado North FIPS 0501 Ft US



ATTACHMENT A LABORATORY ANALYTICAL REPORT