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Colorado Springs, Colorado 80916
(719) 597-2116
Terracon.com

January 16, 2024

Colorado Springs Utilities
1521 Hancock Expressway
Colorado Springs, Colorado 80903

Attn: Mr. Brad Pritekel

RE: Coal Combustion Residual (CRR) Landfill Annual (2023) Inspection
Clear Spring Ranch
Fountain, Colorado
Terracon Project No. 23155030

Dear Mr. Pritekel:

Terracon Consultants, Inc. (Terracon) is pleased to present this report of the Coal Combustion Residual (CCR) Landfill Annual (2023) Inspection services provided for the Clear Spring Ranch CCR landfill. Our services were provided in general accordance with the Colorado Springs Utilities (UTILITIES) Work Order 175203 received January 16, 2024.

1.0 Project Information

1.1 Site Location

Item	Description
Location	The CCR Landfill at Clear Spring Ranch in Fountain, Colorado
Existing Improvements	An existing and active landfill containing non-volatile fly ash, bottom ash, waste salt / fly ash mixture, spent sandblasting media, flue gas desulfurization waste, sediment from the Martin Drake Power Plant's Storm Water Ponds, and ash derived from the co-combustion of biosolids, woody biomass, or other related solid fuels. The total capacity of the 75-acre landfill is 5,220,600 cubic yards (CY). As of December 19, 2023, there is a net volume of 3,824,100 CY contained within the Landfill. This includes an estimated 556,750 cubic yards of bottom ash and about 3,267,350 cubic yards of fly ash currently in the landfill.
Import/Export Activity for 2023 (Provided by UTILITIES)	Fly Ash and Bottom Ash in 2023: ▪ Nixon Fly Ash: 22,488 tons ▪ Nixon Bottom Ash: 3,236 tons

Item	Description
	▪ Bottom Ash Removed from Landfill: 0 tons
Existing Topography	The active landfill has a relatively flat top with side slopes of about 3H:1V (Horizontal:Vertical) or flatter.

1.2 Background

The Clear Spring Ranch CCR Landfill is subject to the Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals (CCR) from Electric Utilities rule published by the Environmental Protection Agency in the Code of Federal Regulations - 40 CFR Parts 257 and 261, dated April 17, 2015.

In accordance with these regulations, UTILITIES must inspect the CCR landfill in accordance with the following requirements:

257.84 *(b) Annual inspections by a qualified professional engineer.*

(1) Existing and new CCR landfills and any lateral expansion of a CCR landfill must be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:

(i) A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., the results of inspections by a qualified person, and results of previous annual inspections); and

(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.

(2) Inspection report. The qualified professional engineer must prepare a report following each inspection that addresses the following:

(i) Any changes in geometry of the structure since the previous annual inspection;

(ii) The approximate volume of CCR contained in the unit at the time of the inspection;

(iii) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit; and

(iv) Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.

The source of materials approved for placement in the CCR landfill include:

- Non-volatile fly ash, bottom ash, waste salt / fly ash mixture, spent sandblasting media, flue gas desulfurization (scrubber) waste, sediment from the Martin Drake Power Plant's Storm Water and Process Water Ponds, and ash derived from the co-combustion of biosolids, woody biomass, or other related solids fuels

We understand that the disposal of these materials at the CCR landfill are currently approved by El Paso County and the Colorado Department of Public Health and Environment (CDPHE).

2.0 Scope of Services

The following sections provide an overview of the work scope performed by Terracon.

2.1 Annual Inspection

Terracon's previous annual inspections of the CCR landfill included a review of available information regarding the status and condition of the CCR landfill and files provided by UTILITIES including results of previous inspections, land surveys, and CCR production and sales. Although not specifically required in Section 257.84b, previous geotechnical studies of the CCR landfill, performed by others, included subsurface explorations, laboratory testing, and slope stability analyses.

For our 2023 annual inspection, we performed our services in accordance with Section 257.84b and included the following activities:

- Visual observations of the CCR unit by a professional geotechnical engineer to identify signs of distress or malfunction of the CCR unit.
- Observations of existing or potential structural weakness associated with the slope stability or erosion of the CCR unit in addition to existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit.
- Noted changes in geometry of the CCR structure since the 2022 annual inspection.
- Estimate the approximate volume of CCR at the time of the inspection based on surface information provided by UTILITIES, delivery quantities and sales.
- Review the CSR CCR Landfill weekly inspection Checklists dated between January 4, 2023 and December 27, 2023. The weekly inspection logs switched from paper copies to a paperless system (eLogger) starting October 25, 2023.

3.0 CCR Landfill Inspection Results

The results of our 2023 annual inspection are discussed below. Selected photographs taken during the inspection and follow up inspection are included on the attached

photograph log. Our services included a desktop review of the 2023 Volumetric Survey provided by UTILITIES, as well as site observations.

3.1 2023 Annual Observation of the CCR Landfill Structure Geometry

Historical Information

The CCR landfill has been active since the late 1970's and is currently being used for disposal of relatively dry ash. We were provided with the design drawing, "East Expansion of Ash Landfill", dated March 29, 2008 that indicates the intended final geometry of the landfill (height and slope gradients). The acceptable slope gradients of 3H:1V are also based on the stability analyses presented in the November 17, 2009, Ash Landfill Slope Stability Investigation for the Clear Spring Ranch Facility, prepared by Kleinfelder.

Based on the Ash Landfill 2023 Volumetric Survey, dated December 19, 2023, the landfill varies from about 30 feet above the surrounding ground surface within the Bottom Ash area to the west and about 50 to 70 feet high at the eastern terminus. The lowest elevation at the toe of the landfill slope appears to be at the southeast corner at El. 5446. The highest elevation at the crest of the landfill also appears to be at the southeast corner of the landfill at El. 5526. The side slopes are generally at a gradient of about 3H:1V.

Site Observations

Terracon visited the site on October 26, 2023 for our annual observations of the CCR landfill surface features. The purpose of our visits included observations for erosion control measures for slopes and the perimeter road, isolated or surficial slope instability, proper soil cap thicknesses and competency, as well as understanding landfill earthwork and grading activities.

The current majority of the top of the landfill was relatively flat and sloped gently down gradient to the west (300 H:1V). The surface reportedly consisted of an approximate 1-foot-thick interim cover. The landfill has the capacity to increase approximately 13 feet in height. The far southeast corner of the landfill is the only area approaching the final waste grade. Overall, the landfill ground surface was covered with a sparse to moderate amount of native vegetation.

The side slopes of the landfill also had an approximate 1-foot-thick soil cap. Most of the perimeter sloped surfaces were sparse to moderately vegetated with dried-out, 6-inch to 3-foot-high vegetation.

During our initial site visit, we observed a significant amount of erosion rills and gullies along two areas of the southern slope. Most of the erosion features were about 6 to 10 inches deep. The areas of erosion rills were located at the south facing slope surface in the southeast area of the fly ash portion of the landfill (see Photo Nos. 13 to 17 and 24 to 28 in the attached Photo Location Diagram and Photography Log). In addition, we observed one of the two culverts at Photo No. 67 to be completely filled with sediment and the other partially filled with sediment.

We also observed the primary and secondary containment berms at the base of the slopes and the far side of the perimeter road to be intact and approximately 12 to 18 inches in height.

Both the erosion rills and the sediment filled culverts noted above were subsequently repaired, see Section 3.5 for details.

3.2 Approximate Volume of the CCR

Based on the provided Volumetric Surveys, the provided annual Net Volumes of the Ash Landfill are:

- 2013: 3,535,900 cubic yards
- 2014: 3,539,100 cubic yards
- 2015: 3,563,000 cubic yards
- 2016: 3,578,600 cubic yards
- 2017: 3,679,600 cubic yards
- 2018: 3,690,200 cubic yards
- 2019: 3,769,700 cubic yards
- 2020: 3,737,000 cubic yards
- 2021: 3,802,500 cubic yards
- 2022: 3,824,000 cubic yards
- 2023: 3,824,100 cubic yards

3.3 Observations of Existing or Potential Structural Weakness

Visual evidence of apparent existing and potential structural weaknesses was not observed.

3.4 Slope Stability Analysis

Slope stability analyses was beyond the scope of our services. Kleinfelder performed slope stability analyses as part of a November 17, 2009 study. The lowest presented slope stability analyses factor of safety was 2.6. The January 29, 2009 State of Colorado letter indicated the slope stability analysis was acceptable. Furthermore, the State of Colorado letter indicated "in its present condition as well as proposed final

configuration, the ash landfill is at a low risk to be impacted by slope stability issues." No apparent signs of global slope instability were observed during our site visit.

3.5 Recommendations

Based on our October 26, 2023 observations, we recommended to UTILITIES representatives the following mitigation of slopes and berms.

- Two areas along the south facing slope developed localized areas with rills extending up to 10 inches through the 12-inch soil cap. These areas should be regraded to establish a uniform 12-inch soil cap.
- The two culverts near Photo No. 67 were mostly clogged with sediment from previous storm events. We recommended the culverts be cleaned to remove the sediment.

On December 21, 2023, Terracon completed a second site visit and observed portions of the southern slope had been regraded to fill gullies, however there still remained areas with 6 to 10-inch deep gullies (see Photo Nos. 77 to 79, 80 and 81). In addition, the previously mentioned Culvert was still filled with sediment (see Photo No. 85). The remaining south slopes were mitigated near the end of December as shown in Photo Nos. 86 to 90 provided by UTILITIES representatives. The culverts were cleaned of sediment on January 2, 2024 as shown in Photo Nos. 91 to 94 also provided by UTILITIES representatives.

Throughout the course of 2023, the Weekly Inspection Checklists were authored by eight separate Qualified Inspectors. In general, the Weekly Inspection Checklists were performed every seven days. The Weekly Inspection Checklists indicated deficiencies of erosion rills on the south, east, and north slope face, sediment clogged culverts, and breached primary containment berms, in subsequent weekly checklists repairs were noted.

Continued observations of the landfill should occur by UTILITIES throughout the year, with particular attention to the erosion features along the slopes. Routine maintenance should be conducted, when necessary, to maintain the soil cover. We understand the grading activities are typically accomplished by tracking a bulldozer up and down the slopes. In addition, we recommended the soil berms adjacent to roadway and at the crest of the slope be repaired for continuity, as necessary.

4.0 General Comments

The observations and recommendations presented in this letter are based upon the data and information discussed in this report. This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No

warranties, either express or implied, are intended or made. Site safety and excavation support are the responsibility of others.

In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

Sincerely,
Terracon

Nick M. Novotny, P.G., C.E.G.
Geotechnical Group Manager

Ryan W. Feist, P.E.
Senior Principal

Attachments: Site Location Diagram
Photograph Location Diagram 10.26.23
Photograph Location Diagram 12.21.23
Photograph Location Diagram 12.27.23 and 01.02.24
Photography Log 10.26.23
Photography Log 12.21.23
Photography Log 12.27.23
Photography Log 01.02.24

Site Location

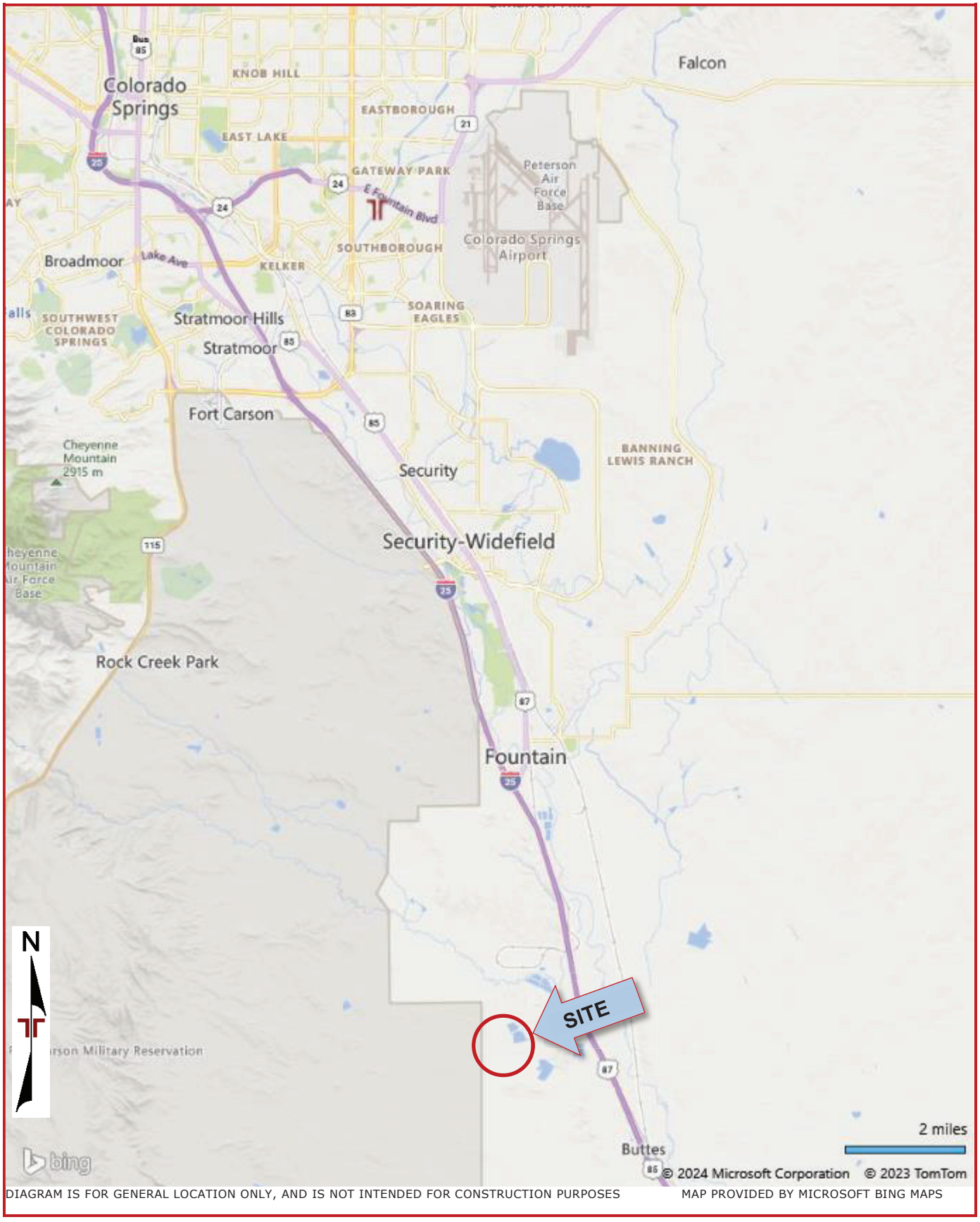
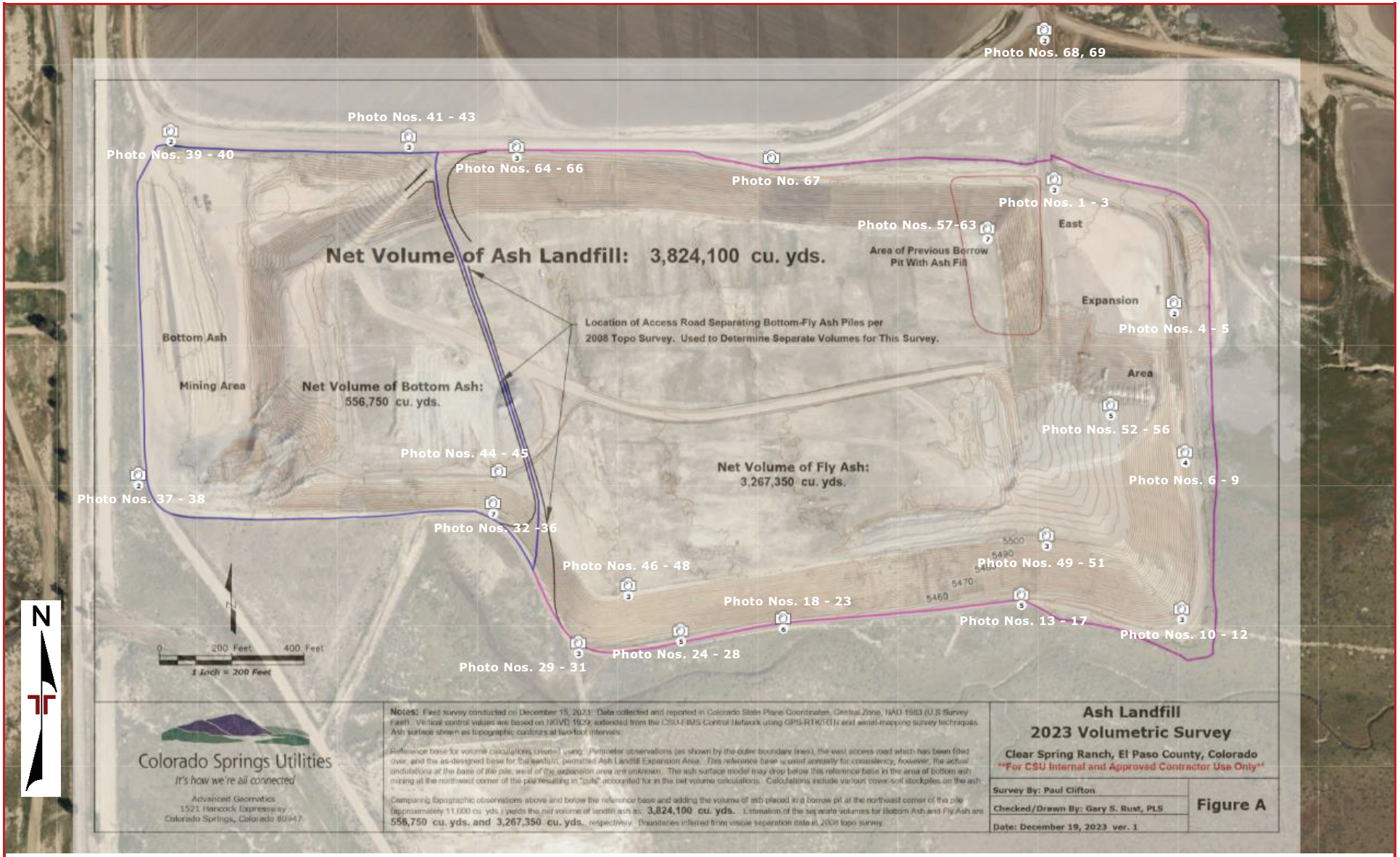


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Photo Location Diagram for 10.26.23



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MAP PROVIDED BY MICROSOFT BING MAPS

Photo Location Diagram for 12.21.23

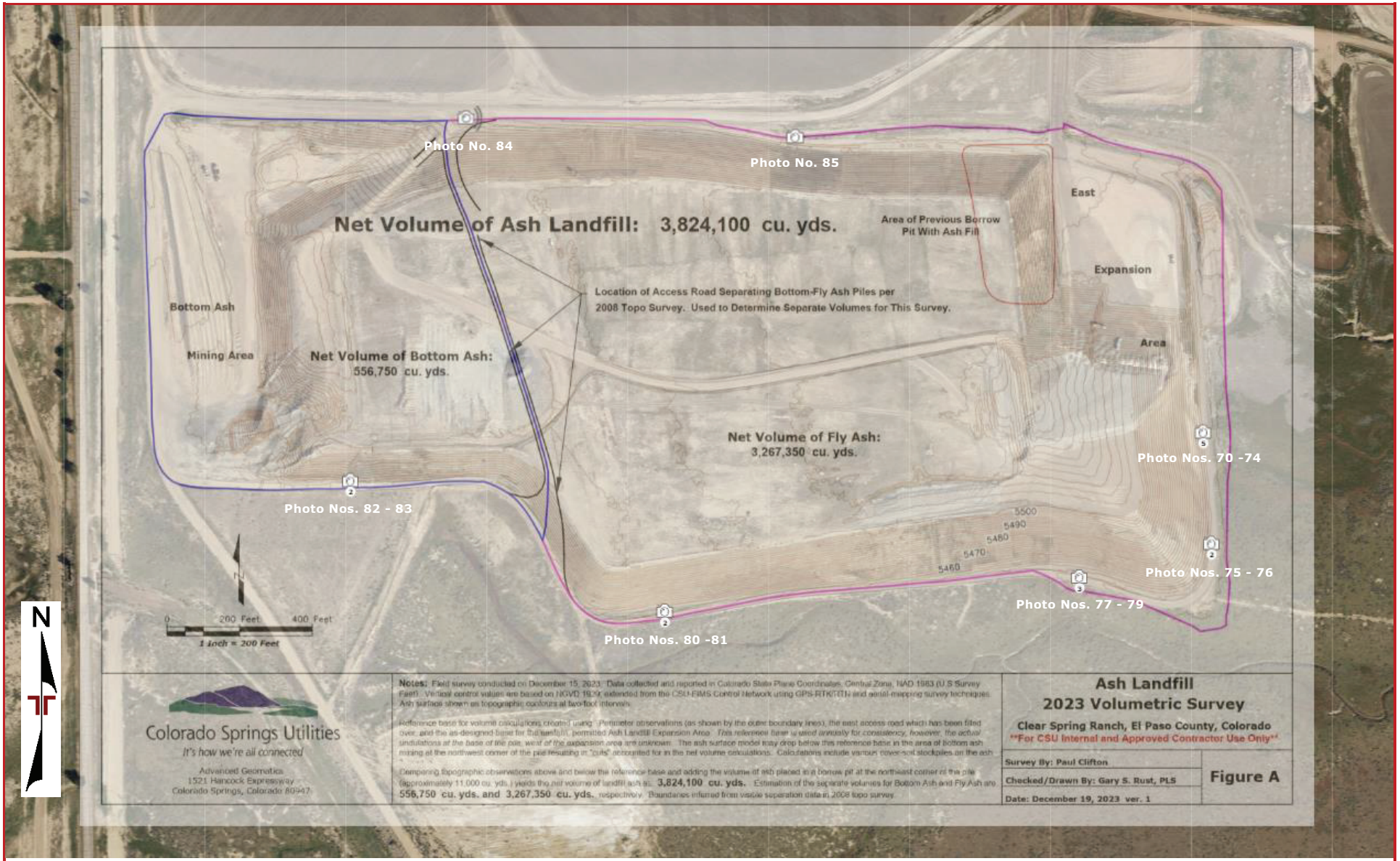

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Photo Location Diagram for 12.27.23 and 01.02.24

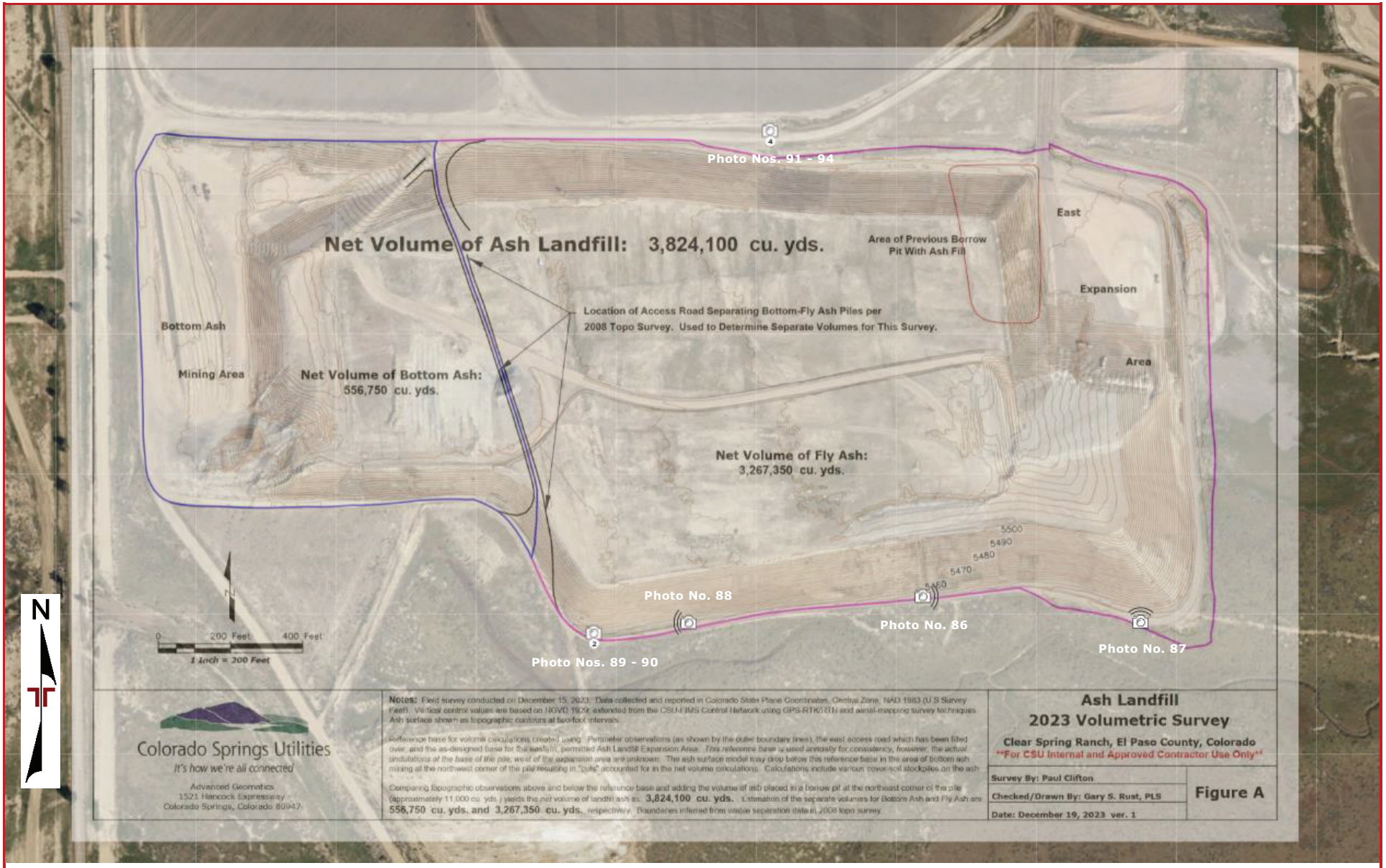

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Photography Log 10.26.23

Photo No. 1, 10.26.23 Observations

Direction: SW. Lat: 38.6095 Long: -104.7092

Photo No. 2, 10.26.23 Observations

Direction: NW. Lat: 38.6095 Long: -104.7092

Photo No. 3, 10.26.23 Observations

Direction: S. Lat: 38.6095 Long: -104.7092

Photo No. 4, 10.26.23 Observations

Direction: N. Lat: 38.6086 Long: -104.7080

Photo No. 5, 10.26.23 Observations

Direction: S. Lat: 38.6086 Long: -104.7080

Photo No. 6, 10.26.23 Observations

Direction: N. Lat: 38.6075 Long: -104.7079

Photo No. 7, 10.26.23 Observations

Direction: NW. Lat: 38.6075 Long: -104.7079

Photo No. 8, 10.26.23 Observations

Direction: SW. Lat: 38.6075 Long: -104.7079

Photo No. 9, 10.26.23 Observations

Direction: S. Lat: 38.6074 Long: -104.7079

Photo No. 10, 10.26.23 Observations

Direction: NW. Lat: 38.6063 Long: -104.7079

Photo No. 11, 10.26.23 Observations

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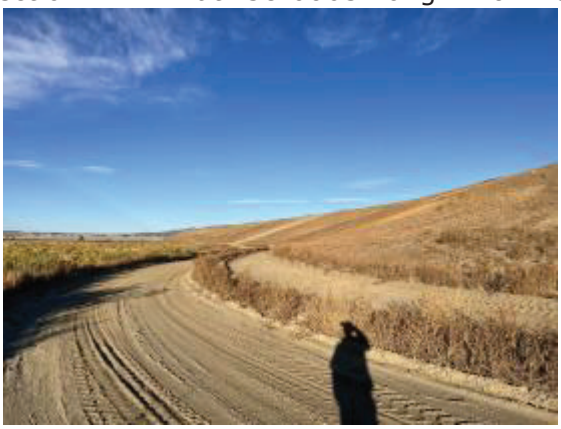

Photo No. 12, 10.26.23 Observations

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Photo No. 13, 10.26.23 Observations

Direction: E. Lat: 38.6064 Long: -104.7095

Photo No. 14, 10.26.23 Observations

Direction: E. Lat: 38.6063 Long: -104.7095

Photo No. 15, 10.26.23 Observations

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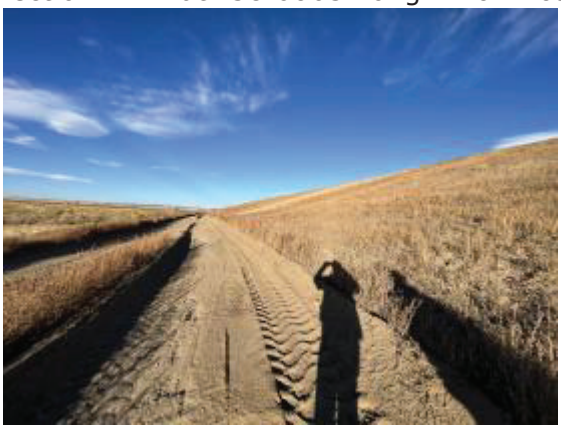

Photo No. 16, 10.26.23 Observations

Direction: W. Lat: 38.6064 Long: -104.7095

Photo No. 17, 10.26.23 Observations

Direction: W. Lat: 38.6063 Long: -104.7096

Photo No. 18, 10.26.23 Observations

Direction: NE. Lat: 38.6062 Long: -104.7118

Photo No. 19, 10.26.23 Observations

Direction: NE. Lat: 38.6062 Long: -104.7118

Photo No. 20, 10.26.23 Observations

Direction: NW. Lat: 38.6062 Long: -104.7118

Photo No. 21, 10.26.23 Observations

Direction: W. Lat: 38.6062 Long: -104.7118

Photo No. 22, 10.26.23 Observations

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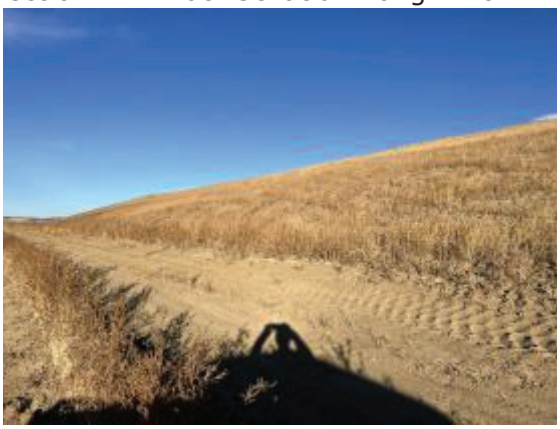

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Photo No. 24, 10.26.23 Observations

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Photo No. 25, 10.26.23 Observations

Direction: NE. Lat: 38.6060 Long: -104.7128

Photo No. 26, 10.26.23 Observations

Direction: N. Lat: 38.6062 Long: -104.7129

Photo No. 27, 10.26.23 Observations

Direction: N. Lat: 38.6061 Long: -104.7128

Photo No. 28, 10.26.23 Observations

Direction: N. Lat: 38.6061 Long: -104.7127

Photo No. 29, 10.26.23 Observations

Direction: E. Lat: 38.6060 Long: -104.7138

Photo No. 30, 10.26.23 Observations

Direction: N. Lat: 38.6060 Long: -104.7138

Photo No. 31, 10.26.23 Observations

Direction: N. Lat: 38.6061 Long: -104.7139

Photo No. 32, 10.26.23 Observations

Direction: SE. Lat: 38.6070 Long: -104.7147

Photo No. 33, 10.26.23 Observations

Direction: E. Lat: 38.6070 Long: -104.7147

Photo No. 34, 10.26.23 Observations

Direction: NE. Lat: 38.6070 Long: -104.7147

Photo No. 35, 10.26.23 Observations

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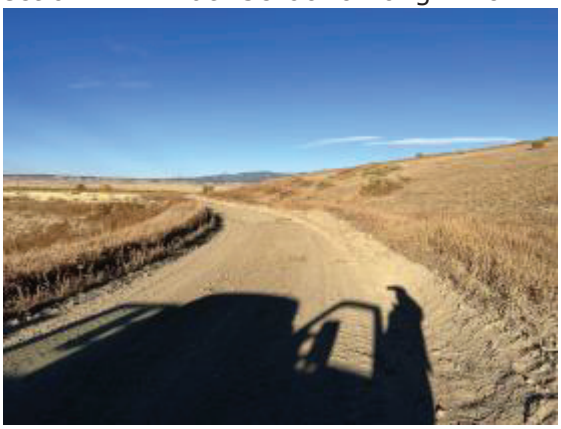

Photo No. 36, 10.26.23 Observations

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Photo No. 37, 10.26.23 Observations

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Photo No. 38, 10.26.23 Observations

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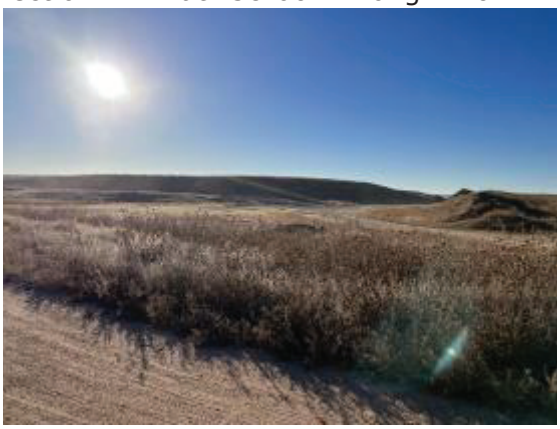

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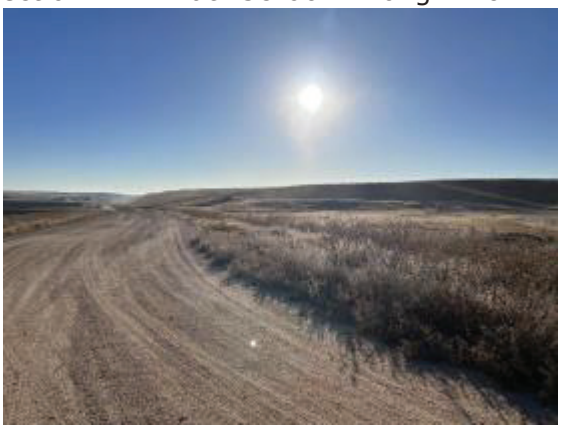

Photo No. 40, 10.26.23 Observations

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Photo No. 41, 10.26.23 Observations

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Photo No. 42, 10.26.23 Observations

Direction: S. Lat: 38.6099 Long: -104.7155

Photo No. 43, 10.26.23 Observations

Direction: SE. Lat: 38.6099 Long: -104.7155

Photo No. 44, 10.26.23 Observations

Direction: W. Lat: 38.6073 Long: -104.7145

Photo No. 45, 10.26.23 Observations

Direction: SE. Lat: 38.6073 Long: -104.7145

Photo No. 46, 10.26.23 Observations

Direction: SW. Lat: 38.6064 Long: -104.7133

Photo No. 47, 10.26.23 Observations

Direction: S. Lat: 38.6064 Long: -104.7133

Photo No. 48, 10.26.23 Observations

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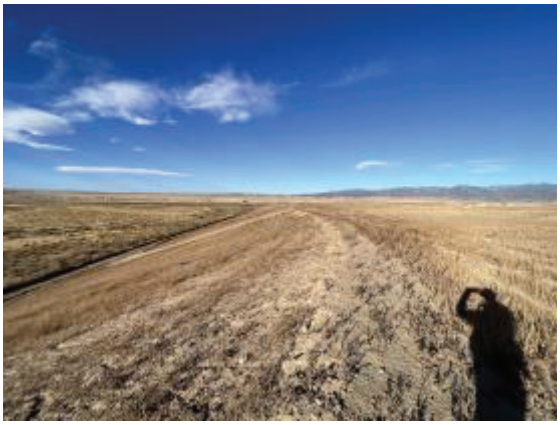

Photo No. 49, 10.26.23 Observations

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Photo No. 50,10.26.23 Observations

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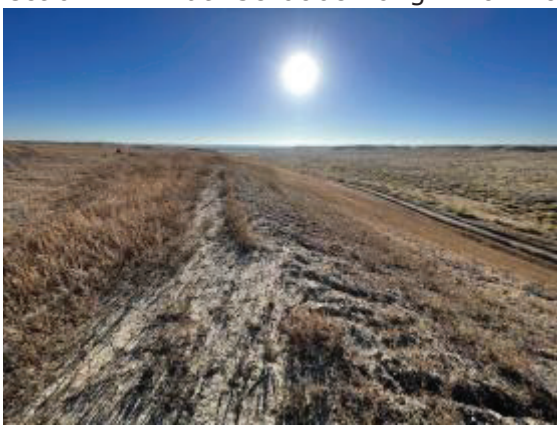

Photo No. 51, 10.26.23 Observations

Direction: SE. Lat: 38.6068 Long: -104.7092

Photo No. 52, 10.26.23 Observations

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Photo No. 53, 10.26.23 Observations

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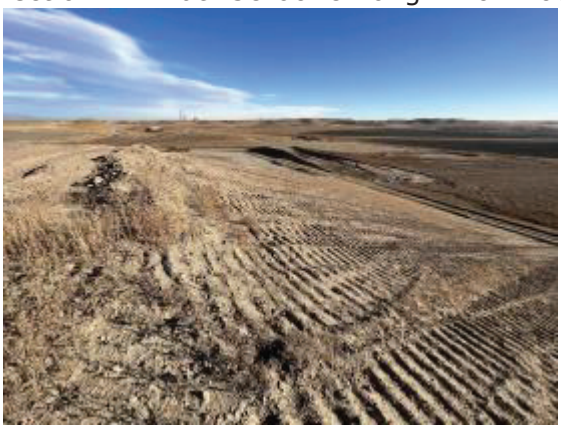

Photo No. 54, 10.26.23 Observations

Direction: NE. Lat: 38.6078 Long: -104.7086

Photo No. 55, 10.26.23 Observations

Direction: N. Lat: 38.6079 Long: -104.7086

Photo No. 56, 10.26.23 Observations

Direction: NW. Lat: 38.6079 Long: -104.7086

Photo No. 57, 10.26.23 Observations

Direction: SE. Lat: 38.6092 Long: -104.7098

Photo No. 58, 10.26.23 Observations

Direction: NE. Lat: 38.6092 Long: -104.7098

Photo No. 59, 10.26.23 Observations

Direction: N. Lat: 38.6092 Long: -104.7098

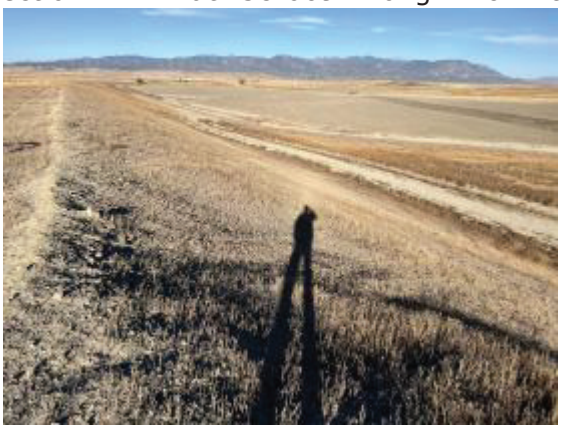

Photo No. 60, 10.26.23 Observations

Direction: NW. Lat: 38.6092 Long: -104.7098

Photo No. 61, 10.26.23 Observations

Direction: NW. Lat: 38.6092 Long: -104.7098

Photo No. 62, 10.26.23 Observations

Direction: NW. Lat: 38.6092 Long: -104.7098

Photo No. 63, 10.26.23 Observations

Direction: W. Lat: 38.6092 Long: -104.7099

Photo No. 64, 10.26.23 Observations

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Photo No. 65, 10.26.23 Observations

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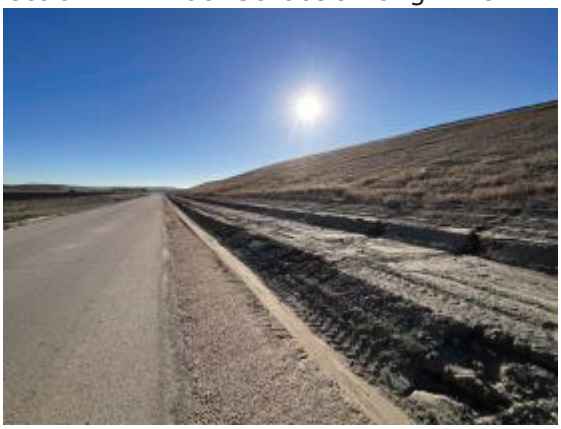

Photo No. 66, 210.26.23 Observations

Direction: E. Lat: 38.6098 Long: -104.7144

Photo No. 67, 10.26.23 Observations

Direction: N. Lat: 38.6097 Long: -104.7119

Photo No. 68, 10.26.23 Observations

Direction: SW. Lat: 38.6107 Long: -104.7093

Photo No. 69, 10.26.23 Observations

Direction: S. Lat: 38.6107 Long: -104.7093

Photography Log 12.21.23

Photo No. 70, 12.21.2023 Observations

Direction: SW. Lat: 38.6074 Long: -104.7078

Photo No. 71, 12.21.2023 Observations

Direction: W. Lat: 38.6074 Long: -104.7078

Photo No. 72, 12.21.2023 Observations

Direction: NW. Lat: 38.6074 Long: -104.7078

Photo No. 73, 12.21.2023 Observations

Direction: NW. Lat: 38.6074 Long: -104.7078

Photo No. 74, 12.21.2023 Observations

Direction: S. Lat: 38.6074 Long: -104.7078

Photo No. 75, 12.21.2023 Observations

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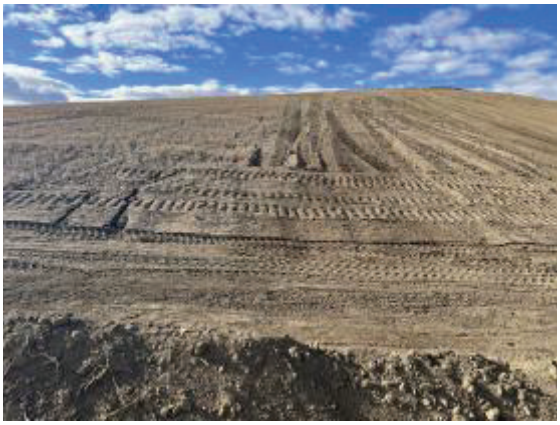

Photo No. 76, 12.21.2023 Observations

Direction: W. Lat: 38.6065 Long: -104.7077

Photo No. 77, 12.21.2023 Observations

Direction: N. Lat: 38.6063 Long: -104.7090

Photo No. 78, 12.21.2023 Observations

Direction: NE. Lat: 38.6063 Long: -104.7090

Photo No. 79, 12.21.2023 Observations

Direction: NW. Lat: 38.6063 Long: -104.7090

Photo No. 80, 12.21.2023 Observations

Direction: NW. Lat: 38.6060 Long: -104.7131

Photo No. 81, 12.21.2023 Observations

Direction: N. Lat: 38.6060 Long: -104.7131

Photo No. 82, 12.21.2023 Observations

Direction: E. Lat: 38.6070 Long: -104.7161

Photo No. 83, 12.21.2023 Observations

Direction: W. Lat: 38.6070 Long: -104.7161

Photo No. 84, 12.21.2023 Observations

Direction: E. Lat: 38.6098 Long: -104.7150

Photo No. 85, 12.21.2023 Observations

Direction: N. Lat: 38.6096 Long: -104.7118

Photography Log 12.27.23

Photo No. 86, 12.27.2023 Observations

Direction: E. Lat: 38.6063 Long: -104.7104

Photo No. 87, 12.27.2023 Observations

Direction: N. Lat: 38.6061 Long: -104.7083

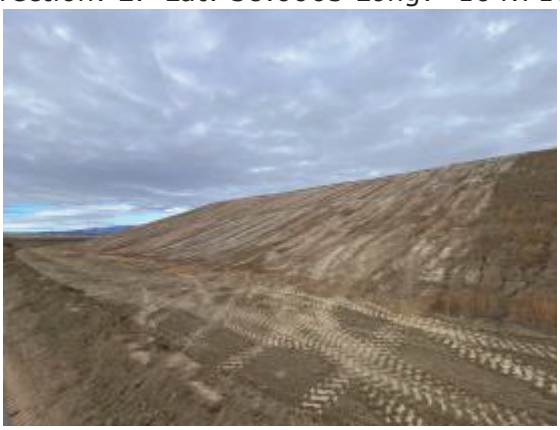

Photo No. 88, 12.27.2023 Observations

Direction: W. Lat: 38.6061 Long: -104.7127

Photo No. 89, 12.27.2023 Observations

Direction: NE. Lat: 38.6060 Long: -104.7137

Photo No. 90, 12.27.2023 Observations

Direction: NE. Lat: 38.6060 Long: -104.7136

Photography Log 01.02.24

Photo No. 91, 01.02.2024 Observations

Direction: N. Lat: 38.6096 Long: -104.7118

Photo No. 92, 01.02.2024 Observations

Direction: S. Lat: 38.6099 Long: -104.7119

Photo No. 93, 01.02.2024 Observations

Direction: S. Lat: 38.6099 Long: -104.7119

Photo No. 94, 01.02.2024 Observations

Direction: S. Lat: 38.6100 Long: -104.7121