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January 14, 2025

Colorado Springs Utilities
1521 Hancock Expressway
Colorado Springs, Colorado 80903

Attn: Mr. Michael Spain

RE: Coal Combustion Residual (CRR) Landfill Annual (2024) Inspection
Clear Spring Ranch
Fountain, Colorado
Terracon Project No. 23155030

Dear Mr. Spain:

Terracon Consultants, Inc. (Terracon) is pleased to present this report of the Coal Combustion Residual (CCR) Landfill Annual (2024) Inspection services provided for the Clear Spring Ranch CCR landfill. Our services were provided in general accordance with the Colorado Springs Utilities (UTILITIES) Purchase Order 201916734 received October 18, 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 23, 2024, there is a net volume of 3,849,750 CY contained within the Landfill. This includes an estimated 553,430 cubic yards of bottom ash and about 3,296,320 cubic yards of fly ash currently in the landfill.
Import/Export Activity for 2024 (Provided by UTILITIES)	Fly Ash and Bottom Ash in 2024: ▪ Nixon Fly Ash: 28,970 cubic yards ▪ Nixon Bottom Ash: 0 cubic yards ▪ Bottom Ash Removed from Landfill: -3,320 cubic yards

Item	Description
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 2024 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 2023 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 3, 2024 and December 25, 2024.

3.0 CCR Landfill Inspection Results

The results of our 2024 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 2024 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 2024 Volumetric Survey, dated December 23, 2024, the landfill varies from about 20 to 30 feet above the surrounding ground surface within the Bottom Ash area to the west and about 50 to 75 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 eastern portion of the landfill at El. 5524. The side slopes are generally at a gradient of about 3H:1V.

Site Observations

Terracon visited the site on November 13, 2024 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 on November 13, 2024, the majority of the site was covered in a few inches of snow, resulting in limited visibility of the slope. Therefore, no significant amount of erosion rills and/or gullies were observed at that time, and a follow-up inspection was scheduled to document these areas. A localized separation of the primary containment berm at the base of the slope along the southern perimeter road was observed (see Photo Nos. 14 and 15 in the attached Photo Location Diagram and Photography Log). The containment berms outside of this localized area were observed to be intact and approximately 12 to 18 inches in height. In addition, the two culverts at the northern end of the landfill were observed to be partially silted (see Photo Nos. 21 to 23 in the attached Photo Location Diagram and Photography Log). In this condition, the culverts will have a reduced flow capacity.

In our subsequent inspection performed on December 3, 2024, we observed erosion rills and gullies located at the south and east facing slope surfaces in the southeast and eastern area of the fly ash portion of the landfill (see Photo Nos. 31 to 32 and 34 to 41 in the attached Photo Location Diagram and Photography Log). Most of the erosion features were about 6 to 10 inches deep. In addition, the localized separation of the primary containment berm at the southern portion of the site had been repaired, however, a second separation of the primary containment berm at the base of the slope along the northern perimeter road was observed (see Photo Nos. 42 to 43 and 45 to 49 in the attached Photo Location Diagram and Photography Log).

Both the erosion rills and the separations of the primary containment berm 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
- 2024: 3,849,750 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 November 13th and December 3rd, 2024 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.
- Two areas along the south and north facing slope developed localized separations within the primary containment berm. These areas should be repaired to re-establish the separation berms to approximately 12 to 18 inches in height, without separations.
- The two culverts near Photo Nos. 21 to 23 were partially clogged with sediment to about a quarter of their diameter from previous storm events. We note that the culverts will have a reduced flow capacity recommend the culverts be cleaned to remove the sediment.

On December 17, 2024, Terracon completed a third site visit and observed portions of the southern and eastern slope had been regraded to fill gullies (see Photo Nos. 51 to 57 in the attached Photo Location Diagram and Photography Log). In addition, the previously mentioned primary berm separations had also been repaired, as shown in Photo Nos. 58 to 62 in the attached Photo Location Diagram and Photography Log. The cleaning of the two culverts on the north side of the landfill was still in process at the time this report was prepared.

Throughout the course of 2024, the Weekly Inspection Checklists were authored by four 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

COLORADO REGISTERED
RYAN W. FEIST
37787
PROFESSIONAL ENGINEER

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

Ryan W. Feist, P.E.
Senior Principal

Attachments:
Site Location Diagram
Photograph Location Diagram 11.13.2024
Photograph Location Diagram 12.03.24
Photograph Location Diagram 12.17.24
Photography Log 11.13.2024
Photography Log 12.03.24
Photography Log 12.17.24

Photo Location Diagram for 11.13.2024

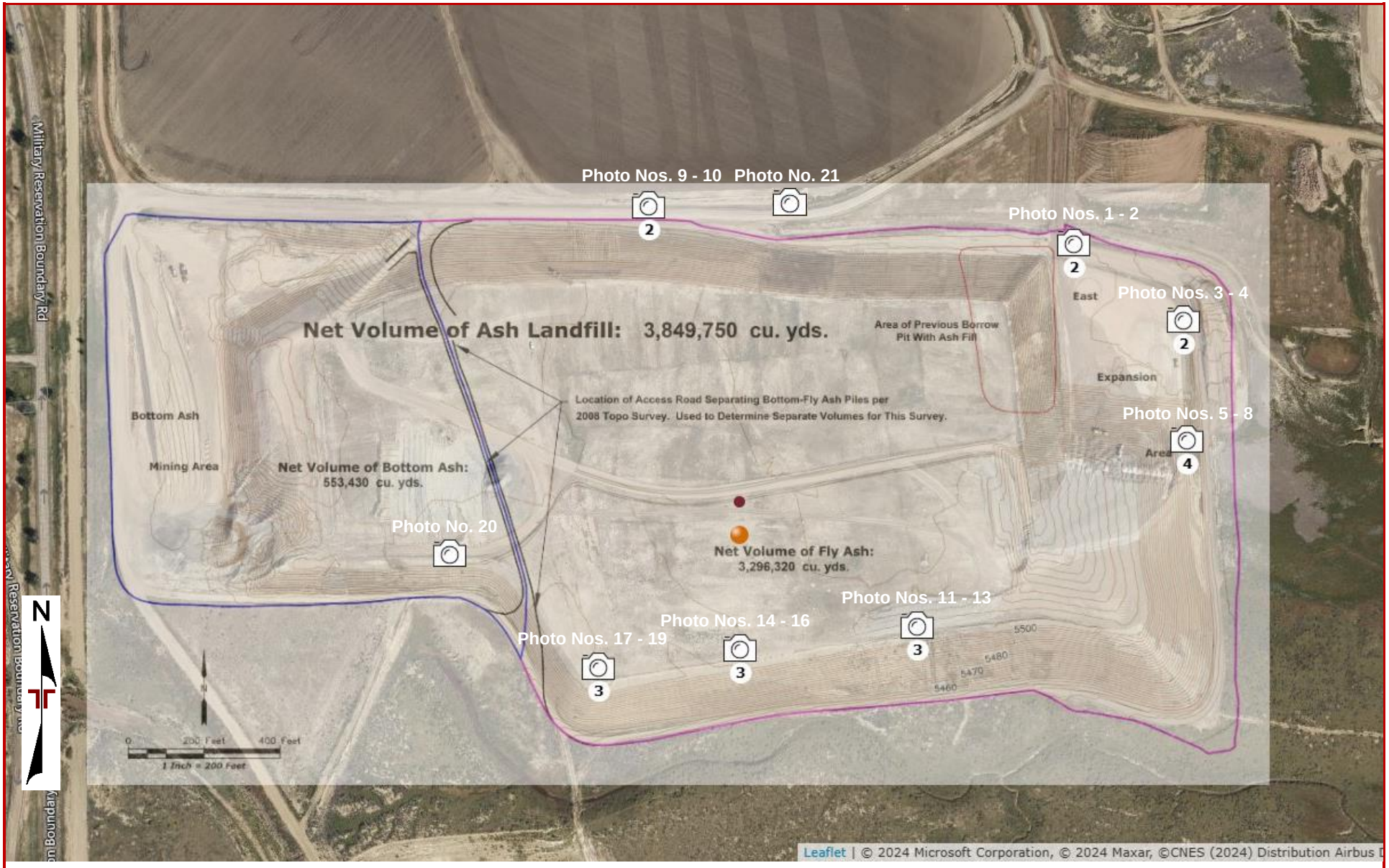

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Photo Location Diagram for 12.03.2024

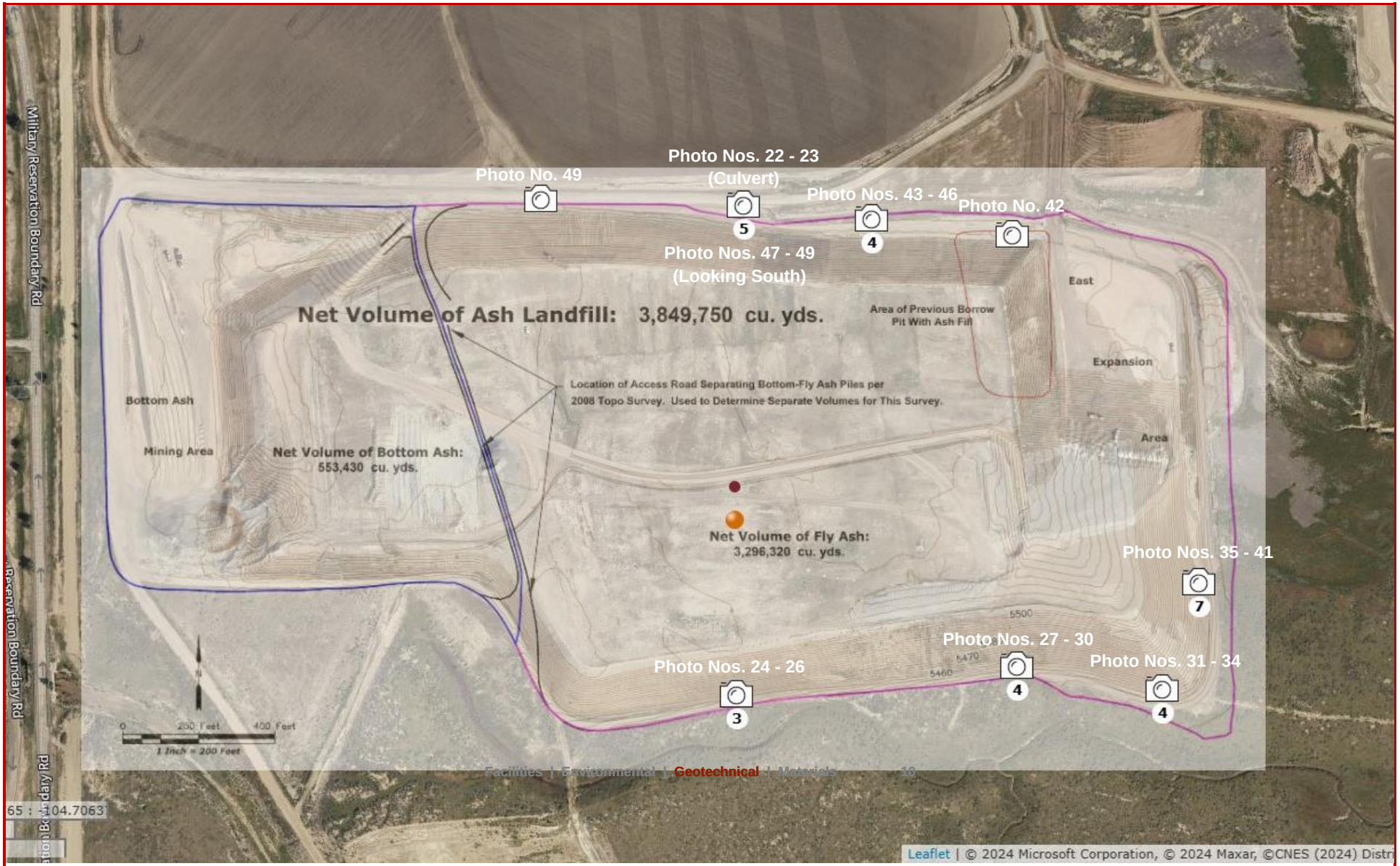

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Photo Location Diagram for 12.17.2024

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

MAP PROVIDED BY MICROSOFT BING MAPS

Photography Log 11.13.24


Photo No. 1, 11.13.24 Observations


Photo No. 2, 11.13.2024 Observations


Photo No. 3, 11.13.2024 Observations


Photo No. 4, 11.13.2024 Observations


Photo No. 5, 11.13.2024 Observations


Photo No. 6, 11.13.2024 Observations


Photo No. 7, 11.13.2024 Observations


Photo No. 8, 11.13.2024 Observations


Photo No. 9, 11.13.2024 Observations


Photo No. 10, 11.13.2024 Observations


Photo No. 11, 11.13.2024 Observations


Photo No. 12, 11.13.2024 Observations

Photo No. 13, 11.13.2024 Observations

Photo No. 14, 11.13.2024 Observations

Photo No. 15, 11.13.2024 Observations

Photo No. 16, 11.13.2024 Observations

Photo No. 17, 11.13.2024 Observations

Photo No. 18, 11.13.2024 Observations

Photo No. 19, 11.13.2024 Observations

Photo No. 20, 11.13.2024 Observations

Photo No. 21, 11.13.2024 Observations

Photography Log 12.03.2024


Photo No. 22, 12.03.2024 Observations


Photo No. 23, 12.03.2024 Observations


Photo No. 24, 12.03.2024 Observations


Photo No. 25, 12.03.2024 Observations


Photo No. 26, 12.03.2024 Observations


Photo No. 27, 12.03.2024 Observations


Photo No. 28, 12.03.2024 Observations


Photo No. 29, 12.03.2024 Observations


Photo No. 30, 12.03.2024 Observations


Photo No. 31, 12.03.2024 Observations


Photo No. 32, 12.03.2024 Observations


Photo No. 33, 12.03.2024 Observations


Photo No. 34, 12.03.2024 Observations


Photo No. 35, 12.03.2024 Observations


Photo No. 36, 12.03.2024 Observations


Photo No. 37, 12.03.2024 Observations


Photo No. 38, 12.03.2024 Observations


Photo No. 39, 12.03.2024 Observations


Photo No. 40, 12.03.2024 Observations


Photo No. 41, 12.03.2024 Observations


Photo No. 42, 12.03.2024 Observations


Photo No. 43, 12.03.2024 Observations


Photo No. 44, 12.03.2024 Observations


Photo No. 45, 12.03.2024 Observations

Photo No. 46, 12.03.2024 Observations

Photo No. 47, 12.03.2024 Observations

Photo No. 48, 12.03.2024 Observations

Photo No. 49, 12.03.2024 Observations

Photography Log 12.17.2024

Photo No. 50, 12.17.2024 Observations

Photo No. 51, 12.17.2024 Observations

Photo No. 52, 12.17.2024 Observations

Photo No. 53, 12.17.2024 Observations

Photo No. 54, 12.17.2024 Observations

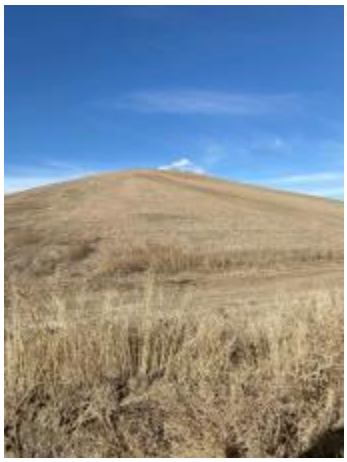

Photo No. 55, 12.17.2024 Observations

Photo No. 56, 12.17.2024 Observations

Photo No. 57, 12.17.2024 Observations

Photo No. 58, 12.17.2024 Observations

Photo No. 59, 12.17.2024 Observations

Photo No. 60, 12.17.2024 Observations

Photo No. 61, 12.17.2024 Observations

Photo No. 62, 12.17.2024 Observations