AECOM Environment

Submitted to:
Platte River Power Authority
Ft. Collins, CO

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Platte River Power Authority
Rawhide Station

Annual Ash Monofill Inspection Report – January 2024

Inspection Completed by:

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Colorado PE 0047622
Expires 10/31/2025

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Acronyms

%	percent
2007 ER&OP	Revised Design and Operation Plan Addendum
AECOM	AECOM Technical Services, Inc.
amsl	above mean sea level
BAT	bottom ash transfer
CCR	Coal Combustion Residual
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
cy	cubic yards
EDOP	Engineering Design and Operations Plan
ER&OP	Engineering Report and Operational Plan
H:V	horizontal:vertical
Platte River	Platte River Power Authority
Rawhide	Rawhide Energy Station Unit 1
RCRA	Resource Conservation and Recovery Act
RSW	residual solid waste
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

1.0 Introduction

1.1 Objective

Per the Coal Combustion Residual (CCR) Rule published by the United States Environmental Protection Agency (USEPA) and entered into the Federal Register on April 17, 2015 (40 Code of Federal Regulations [CFR] 257.84(b)), existing and new CCR landfills (including any lateral expansion of a CCR landfill) are required to be inspected annually by a qualified professional engineer to establish that the CCR unit is in good condition and that the design, construction, operation, and maintenance conform to standard engineering practices for this type of facility. The inspection includes review of documentation and weekly reports indicating the condition of the facility and a visual inspection of the CCR unit.

The CCR Rule is a self-implementing rule which regulates the handling and disposal of CCRs as non-hazardous solid waste under Subtitle D of the Resource Conservation and Recovery Act (RCRA). The context of 40 CFR 257.84(b) is in compliance with Federal USEPA Regulations, as they existed as of December 19, 2014.

The objective of this report prepared by AECOM Technical Services, Inc. (AECOM), on behalf of Platte River Power Authority (Platte River) is to present the results of the annual inspection of the CCR landfill at the Rawhide Energy Station Unit 1 (Rawhide), conducted in December 2023 per the CCR Rule established by the USEPA.

1.2 Outline of Rule Requirements

In accordance with the USEPA Final CCR Rule, Platte River is required to complete an annual inspection "to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards." The minimum requirements, as per §257.84(b) of the USEPA Final CCR Rule include the following:

- Review of available status and condition information including operational records and previous inspections;
- Visual inspection for signs of distress or malfunction; and
- Preparation of the landfill inspection report.

The inspection conducted in December 2023 is described within Section 3 of this report. Annual inspections have been performed by AECOM since 2016 to address the items listed below, pursuant to §257.84(b)(2) of the USEPA Final CCR Rule:

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

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

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

1.3 Facility Description

The CCR landfill (ash monofill or monofill) at Rawhide is a residual solid waste (RSW) landfill located in Larimer County, Colorado. The solid waste disposal site at Rawhide is located near the northwest corner of the property as shown on **Figure 1-1**. In March 1981, Platte River obtained a Certificate of Designation for the Northeast ¼ of Section 6 Township 10 North Range 68 West, and the Southern ½ of Section 31 Township 11 North Range 68 West.

Overall, Rawhide encompasses approximately 4,560 acres. In addition to the plant buildings, the major feature of the facility is 500-acre Hamilton Reservoir which contains approximately 13,600 acre-feet of water. The power block area contains the boiler and turbine buildings, air quality control equipment, and administrative offices. A rail spur along the northern edge of the site connects Rawhide with Burlington Northern Santa Fe Railway mainline and is used to deliver coal and construction materials for plant operations.

Six thermal generating units are located at Rawhide. Units A, B, C, D, and F are fueled by natural gas, and Unit 1 is fueled by coal which produces the CCR solid wastes contained in the monofill. The coal used in Rawhide Unit 1 operation comes from the Powder River Basin in Wyoming.

CCR waste from Unit 1 operations is disposed of in an ash monofill comprised of three cells, described in this report as Cell 1 and Cell 2. **Figure 1-2** shows the location and general area of the ash monofill. Cell 1 was filled from the south to the north between 1984 and 2007 and operated under the procedures and methods outlined within the following two documents:

1. Engineering Report and Operational Plan (ER&OP) for the Solid Waste Disposal Facility (PRPA, 1980) hereinafter referred to as the 1980 ER&OP.
2. Addendum to Engineering Report and Operational Plan (ER&OP) for the Solid Waste Disposal Facility (Rawhide, 1997) hereinafter referred to as the 1997 ER&OP Addendum.

Cell 1 is capped and no longer in use but has not undergone official closure under the Colorado Department of Public Health and Environment (CDPHE), Hazardous Materials and Waste Management Division, Colorado Code of Regulations (also CCR) 1007-2, Part 1 Section 3.5. On January 25, 2008, the CDPHE Hazardous Materials and Waste Management Division approved a request to modify the 1980 ER&OP (CDPHE, 2008). The modification allowed the facility to expand the current footprint of waste management for the monofill immediately to the west and adjoining Cell 1, into the area of current CCR disposal operations designated as Cell 2. A copy of the approval is included as **Attachment 2**. Similar to Cell 1, CCR waste placement in Cell 2 started behind a containment dike and is progressively moving north. Cell 2 is operated in accordance with the same two documents as Cell 1, in addition to a Revised Design and Operations Plan for the Solid Waste Disposal Facility (Smith Geotechnical, 2007) hereinafter referred to as the 2007 ER&OP Addendum.

A new Engineering Design and Operations Plan (EDOP) – Revision 4 (AECOM, 2021a) for Cell 2 was approved by CDPHE on December 21, 2021. This new EDOP provided the basis for the construction and operation of a new engineered cell referred to as Cell 2B. Cell 2B was constructed in 2022 and 2023 and includes a bottom liner and a leachate collection system. The portion of Cell 2 that was in operation prior to the 2023 construction of Cell 2B will be referred to as Cell 2A going forward.

Rawhide is owned and operated by Platte River. Platte River may be contacted as follows:

Platte River Power Authority
2000 East Horsetooth Road
Fort Collins, CO 80525
Attn: Christopher Wood
970-266-7906

1.4 Solid Waste Stream

According to the 1980 ER&OP, more than 99 percent (%) of the solid wastes generated at Rawhide are a result of the combustion of coal and the cleaning of the flue gas produced by the combustion. The removal of sulfur dioxide and fly ash are required to comply with USEPA and CDPHE emission standards. Approximately 80% of the solid waste produced at Rawhide comes from the operation of the air quality control system. Bottom ash accounts for approximately 20% of the solid waste. The bottom ash produced in the combustion process is collected in the bottom of the boiler. As of November 2018, a submerged grind conveyor system has been used to handle bottom ash, which is hauled directly to the ash monofill. Previously the bottom ash was hydraulically sluiced to the bottom ash transfer (BAT) impoundments. The BAT impoundments were closed in Summer-Fall 2020. As part of the closure, the remaining bottom ash in the BAT impoundments was transferred directly to the ash monofill. The remaining 0.1% of the solid wastes placed in the monofill is comprised of phosphorous sludges and inorganic construction materials. In 2019, the Stormwater Pond just north of the BAT impoundments was cleaned out for the first time since its construction. It is estimated that approximately 625 cubic yards (cy) of coal fines sediment was cleaned out and deposited in the monofill. With this recent cleaning it can be estimated that approximately 600 to 700 cy of coal fines are generated by the adjoining coal unloading operations every 35 years.

The quantities of each segment of the waste stream, taken from the 1980 ER&OP, are estimated in **Table 1-1** below. Figure 3 in **Attachment 3** (appended from the 1980 ER&OP) provides an illustration of the solid waste stream and waste management.

Table 1-1. Estimated Solid Waste Quantities[(1)]

	Average Daily		Maximum Daily		Average Annual		Average Plant Life		
	Ton	Acre-feet	Ton	Acre-feet	Ton	Acre-feet	Ton	Acre-feet	
Flue Gas Combustion Waste	175	0.11	262	0.16	64,000	39.2	2,240,000	1,370	82%
Bottom Ash	38	0.02	58	0.04	14,000	8.6	490,000	300	18%
Phosphorous Solids	-	-	-	-	-	0.23	2	8	<1%
Construction Materials	-	-	-	-	-	-	10,000	4	<1%
Total	**213**	**0.13**	**320**	**0.02**	**78,000**	**48.08**	**2,299,002**	**1,682**	**100%**

Notes:

(1) 1980 ED&OP, Table 1 "Estimated Solid Waste Quantities"

- Approximately 82% flue gas residuals (75% fly ash, 4.7% unreacted slaked lime, 2.3% unslaked lime, and 0.8% inert matter);
- 17.9% bottom ash (mostly sand- and gravel-sized ash from the combustion process); and

- 0.1% phosphorus sludge (from tertiary treatment of the plant cooling water, plus inert construction waste).

The 2007 ER&OP Addendum indicated that the CCR waste stream was to be comprised of products of coal combustion, flue gas cleaning wastes, phosphorous sludge, and construction wastes from the continued development and construction of Rawhide (Smith Geotechnical, 2007). The monofill expansion (Cell 2) was to continue to be used for the disposal of approved waste products from current operations.

According to CDPHE, the ash monofill is a non-hazardous solid waste landfill under Subtitle D of the RCRA. The wastes deposited in Cells 1 and 2 are not combustible; therefore, there are no plans for providing fire hydrants or other fire control measures in the disposal area. Also, the wastes are odorless and do not create rodent or insect issues since the wastes have no caloric value.

1.5 Facility Design and Components

1.5.1 Siting

This section describes the siting considerations with respect to the geology and hydrogeology at the Unit 1 plant and at the monofill.

Geology

The geologic setting at Rawhide lies on the high plains immediately east of the Colorado Front Range, where soil and bedrock units are incised by drainage from nearby mountains to the West, forming small, relatively minor valley and ridge topographic expressions. Elevations within the project area range from about 5,580 to 5,805 feet above mean sea level (amsl). The most distinctive topographic feature at Rawhide is a broad basin that occupies the center of the site and extends from northwest to southeast. Smooth ridges and rounded bluffs surround this basin and mark the transition to uplands that are 50 to 70 feet higher. It is within this basin that the site for the Rawhide monofill disposal area was selected. Hamilton Reservoir occupies the lower portion of this valley to the south.

According to the United States Geological Survey (USGS) geologic map, bedrock at Rawhide consists of Cretaceous units including the Upper Pierre Shale Formation. Specifically, the majority of the Rawhide site lies on the Upper Pierre Shale Formation transition zone, the eastern extent of which transitions to the Lower Fox Hills Sandstone downslope and east of the Rawhide site. The Pierre Shale transition zone is described as shale with interbedded sandstones. The portions 600 feet below the contact with the Fox Hills sandstone are mapped by the USGS as being the most permeable within the unit, yielding 5 to 15 gallons per minute in wells (Hershey and Schneider, 1972). The Fox Hills Sandstone is described as a pale yellow, massive, silty, fine-grained sandstone with lenticular black shale partings, but is not present at the surface on the Rawhide site.

The bedrock at the site is mapped as dipping east-southeast toward Hamilton Reservoir. The geologic map indicates bedrock bedding in the area striking roughly north to south with shallow dips of 5 to 10 degrees to the east. Several faults are recorded in the area surrounding Rawhide: the Rawhide Fault approximately 5 miles to the north, the Round Butte Fault approximately 4 miles northwest, and an unnamed fault about 1 mile north of the site. None of these faults are considered potentially active or have been associated with recent seismic events. According to the Uniform Building Code Seismic Zone Map, the Rawhide site is in Zone 1, an area of overall minor seismicity.

Overburden soils at the site are mapped as Pleistocene pediment deposits consisting of arkosic sands and gravel with minor amounts of red clay. More recently, relatively thin soils mantling the pediment deposits and bedrock in the area are likely wind-blown silts and clays.

The original geotechnical investigation for Rawhide was conducted by Black and Veatch Consulting Engineers in 1978-1979 (Black and Veatch Consulting Engineers [Black and Veatch], 1979). During the investigation three borings were drilled within or near the area of the monofill (B-94, B-95, and B-96). Boring B-95 encountered sands with varying silt and clay content in the upper 10 feet and claystone bedrock (very weathered shale) below. Borings B-94 and B-96 were completed to the west and east of the proposed monofill, respectively. At those locations, sands with varying silt and clay content were observed to depths of 23 and 50 feet and were underlain by weathered shale bedrock.

An additional investigation was performed by Smith Geotechnical in 2007, to classify soils and provide engineering recommendations for the footprint area of Cell 2. The investigation consisted of drilling and sampling seven borings. Subsurface information collected in the Smith Geotechnical report summarizes the soil and bedrock as follows: A layer of clay was encountered in all borings from the ground surface to a maximum depth of 8 feet below grade. The clay was tan, moist, stiff to very stiff, and plastic. Claystone was encountered in all borings under the overburden clay at depths ranging from 3 to approximately 20 feet below grade. The claystone was generally tan, moist, soft, and completely to severely weathered.

Relevant soil borings in the area of the monofill from the 1980 ER&OP and 2007 ER&OP Addendum documents are included in **Attachments 1** and **3**. Figure 1 in **Attachment 3** indicates areas where the borings were advanced in the monofill from both of these earlier investigations. Two new monitoring wells were installed along the southern boundary of the monofill during an investigation conducted in January and February 2016. Those wells were installed as part of a broad investigation performed to further the understanding of shallow groundwater characteristics at the monofill and at the location of the BAT impoundments. Two new groundwater monitoring wells were installed at the ash monofill in December 2018. Monitoring well ASH-06 was installed upgradient of the ash monofill to provide additional background data while monitoring well ASH-07 was installed downgradient of the ash monofill to further characterize the extent of Statistically Significant Increases. One additional groundwater monitoring well was installed at the ash monofill on April 24, 2019. Monitoring well ASH-08 was installed downgradient of the ash monofill to further characterize the extent of constituents in this area.

Hydrogeology

The hydrogeology at Rawhide is discussed in the 1980 ER&OP and in the “Final Report Investigation of the Groundwater Monitoring Program for the Bottom Ash Disposal Site” (Lidstone and Anderson, Inc., 1989). According to the 1980 ER&OP, the hydrogeology of the Rawhide site was originally investigated by drilling and installing 21 monitoring wells. Data from the wells indicated that a groundwater table exists within the Pierre Shale bedrock below the site and in surficial deposits along Coal Creek. The report explained depth to groundwater varied across the Rawhide site from 11 to 67 feet and follows a general gradient to the south-southeast. The shallow water table, as explained in the 1980 ER&OP, was determined to be recharged by infiltration from precipitation and surface runoff.

Groundwater was not encountered in any of the borings drilled in the Cell 2 footprint by Smith Geotechnical in 2007.

Lidstone and Anderson (1989) concluded that sufficient data was collected on the groundwater beneath the Rawhide site to determine a mound has formed in the shallow fractured Pierre Shale Aquifer in the vicinity of Hamilton Reservoir. After a review of available documents on the current water levels within the area, AECOM concluded that the monofill is hydraulically upgradient of any groundwater mound that may be created by Hamilton Reservoir, and groundwater mounding associated with Hamilton Reservoir would not affect the overall performance of the monofill disposal site.

1.5.2 Subgrade, Liner, and Leachate Collection

Six piezometers were installed in December 2018 per CDPHE’s guidance in order to gain a better understanding of the depth to groundwater below the existing ground surface of the future Cell 2

footprint. The future development of Cell 2 will be designed with a minimum vertical separation distance of 5 feet from the uppermost water bearing zone to be in compliance with CCR regulations as detailed in 40 CFR 257.102. The depth to the uppermost water bearing zone within the footprint of the future Cell 2, as measured from December 2018 to November 2019, varied from approximately 4 to 37 feet below ground surface. PZ-1 was abandoned in October 2020 due to advancement of the active face of Cell 2. Piezometers PZ-2 and PZ-6 were abandoned in July 2022 due to planned construction activities associated with engineered liner system for future Cell 2 Piezometers PZ-3 through PZ-5 remain in place for future monitoring. In 2023, the depth to the uppermost water bearing zone measured with the footprint of Cell 2B in piezometers PZ-2 through PZ-5 varied from approximately 20 to 34 feet below ground surface.

According to the 1980 ER&OP, Cell 1 of the monofill was constructed by removing and stockpiling the existing topsoil over one to two acres at a time (approximately one year's waste generation at that time) then placing the CCR wastes directly on the exposed subgrade. The 1980 ER&OP did not require construction of a separate compacted earthen liner or a geocomposite liner. The 1980 ER&OP did recommend that approximately 13 acres on the east side of Cell 1 receive an 18-inch-thick partial liner above an elevation of 5,740 feet to limit leachate movement southeastward along the dip of the bedrock. No evidence of the construction of this partial liner was identified in the documents reviewed by AECOM.

Per the 1980 ER&OP, based on the premises that "groundwater resources associated with the overall plant site are minor," the general dip of the shale bedrock toward the southeast; low permeability of the waste material; and high evapotranspiration and diversion of limited precipitation around the monofill, "leachate from the landfill will be insignificant." The 1980 ER&OP continues to explain, "Precipitation that falls on temporarily uncovered wastes in active fill areas will run off and be collected behind the temporary earth dike and held for evaporation." Any leachate that did leave the monofill was thought to be captured by the downstream cooling water dam and reservoir which is constructed down to bedrock and designed to minimize seepage.

According to the 2007 ER&OP Addendum for Cell 2, that portion of the monofill is constructed similarly to Cell 1 by removing/stockpiling the existing topsoil over one to two acres at a time for use during reclamation activities. After clearing the topsoil, the active area is filled to approximately 21 feet above the existing grade with solid waste material. After filling and compacting the one to two-acre section, a two-foot-thick earthen cover will be placed over the waste material. The cover material will be moisture conditioned, compacted, and reseeded.

A March 12, 2010 letter from CDPHE approved the Construction Quality Assessment Report for Cell 2 and is included as **Attachment 4** (CDPHE, 2010).

Groundwater protection for Cell 2 was based on similar premises and remedial actions for Cell 1 and includes limiting leachate produced through the use of soil cover and diversion away from the monofill; low permeability of the waste material, high evapotranspiration rates; stormwater diversion; and groundwater protection provided by the down-gradient Hamilton Reservoir. Due to the combination of these safeguards, the 2007 ER&OP Addendum determined the leachate resulting from the Cell 2 monofill material will be insignificant. The existing portion of Cell 2 was constructed in accordance with the currently approved 1980 ER&OP and the 2007 ER&OP Addendum. Cell 2B was constructed in 2022 and 2023 in accordance with the procedures specified in the new EDOP– Revision 4 dated December 16, 2021 (AECOM, 2021a) and approved by CDPHE on December 21, 2021.

1.5.3 Material Placement and Final Slopes

The 1980 ER&OP indicated that CCR waste was to be placed typically 21 feet above grade, starting behind a compacted starter dike and moving northward. The ash was to be hauled and unloaded in a wetted condition to reduce fugitive dust, then placed in lifts and compacted. Figure 11 in **Attachment 3**

shows the solid waste disposal fill sequence for Cell 1. Table 1-2 from the 1980 ER&OP provides the landfill volumetric and reclamation schedule for Cell 1.

Table 1-2. Cell 1 Landfill and Reclamation Schedule

Section Number	Section Area (acres)	Section Volume* (acre-feet)	Start of Fill Date (year)	Annual Filled & Reclaimed Area (acres)
1	9.8	200	1984**	2.3
2	18.7	425	1988	2.1
3	15.8	500	1997	1.5
4	17.6	545	2007	1.5
Totals	**61.9**	**1,670**	--	**--**

Notes:

*Volume capacity was based on mounding the material to an approximate height of 21 feet above level fill where required using 4:1 side slopes.

**Construction wastes were actually placed in this section beginning in 1980.

The 2007 ER&OP Addendum retained the general placement features of the 1980 plan. To avoid disrupting the views of neighbors, Section 4 of Cell 1 was not fully filled prior to beginning placement in Section 1A of Cell 2. Figure 2 in **Attachment 1** shows the solid waste disposal fill sequence for Cell 2. Table 1-3 from the 2007 ER&OP Addendum provides the landfill volumetric and reclamation schedule for Cell 2. The schedule for Cell 2 found in Table 1-3 of the 2007 ER&OP addendum is superseded by the schedule specified in the EDOP Revision 4 dated December 16, 2021 (AECOM, 2021a) and approved by CDPHE on December 21, 2021. The approximate total waste of the ash monofill, defined as the three-dimensional gross volume of the landfill available for waste disposal, is as follows based on estimate volumes provided in the 2021 EDOP revision 4(AECOM 2021a):

- Cell 1: 1,710,000 cy – already filled according to Platte River operational records.
- Cell 2A: 740,000 cy – already filled as of December 2018 according to Platte River operational records.
- Cell 2A: 257,600 cy – placed between December 2018 and July 2021, which includes 120,155 cy of material placed during BAT Impoundment Closure.
- Cell 2A: 56,820 cy – placed in 2022 prior to construction of Cell 2B.
- Cell 2B: 14,347 cy - placed in 2023 after construction completion.
- Cell 2B: 319,975 cy – remaining to be filled.
- Total Ash Monofill: 3,098,742 cy

These capacities represent the volume of waste.

An estimate of the average quantity of waste disposed in the Ash Monofill per year has been calculated from Platte River's operational records to be approximately 63,800 cy. However, it is anticipated that the annual waste disposal will decrease due to a higher volume of material going to beneficial reuse operations. The design of Cell 2B is for 316,903 cy over an estimated Cell 2B life span of approximately 5 to 8 years. This equates to approximately 60,000 to 40,000 cy of waste placed in Cell 2B per year.

The 2007 ER&OP Addendum lists the following equipment and their respective uses for solid material placement in Cell 2:

- **Dump Trucks** – These trucks will be used for transporting the solid waste to the disposal area.
- **Compactor Tractor and Blade** – This tractor will be used for moving and compacting waste after dumping.
- **Water Spray Truck** – This truck is for applying water to waste prior to compaction and wetting the haul roads to prevent fugitive dust emissions.
- **Scraper** – This will be used for removal of topsoil prior to waste disposal and for depositing topsoil during reclamation.
- **Medium Size Farm Tractor** – This tractor will be used to mix the ash and water prior to compaction. The tractor will also be used to seed and fertilize reclaimed areas.
- **Portable Irrigation Equipment** – This equipment is for use in establishing the vegetative cover after reclamation.

Revised ash disposal and equipment protocols are proposed in the new EDOP– Revision 4 (AECOM, 2021a) dated December 16, 2021 and approved by CDPHE on December 21, 2021.

Per Ms. Courtney Stewart (Platte River), the CCR disposed of at the Rawhide monofill is currently transported from the combustion area by loading off-road haul trucks that transport the CCR to the working area of the monofill. The plant combustion/generation system generally runs 24 hours a day, seven days a week. Disposal operations have been modified to daily disposal of fly ash and bottom ash (the BAT impoundments are no longer being used and were closed in Summer/Fall 2020). A revised summary of the volume of CCR contained in the monofill, prepared by Platte River from their records, is appended as **Attachment 5**. In 2023 fly ash generated from Unit 1 was primarily sold for beneficial reuse; therefore, significantly less fly ash was placed in the monofill than was anticipated.

1.5.4 Final Cover

For Cell 1, the 1980 ER&OP noted that after each section was filled, a 2-foot-thick earthen cover was to be placed, compacted, and seeded. Finished surface grades were reported to be four horizontal to one vertical (4H:1V) in the north-south direction. The 2007 ER&OP Addendum retained the final covering and grade features of the 1980 plan. Figure 12 (**Attachment 1**) and Figure 3 (**Attachment 1**) provide typical landfill north-south cross sections from the 1980 ER&OP and the 2007 ER&OP Addendum, respectively.

The cover over the existing Cell 2A was constructed in accordance with the currently approved 1980 ER&OP, the 1997 ER&OP Addendum, and the 2007 ER&OP Addendum. Cell 2B will be constructed in accordance with the procedures specified in new EDOP – Revision 4 dated December 16, 2021 (AECOM, 2021a) and approved by CDPHE on December 21, 2021.

1.5.5 Stormwater Management

The 1980 ER&OP suggested that precipitation runoff would be limited by excavation of a capture trench on the upgradient (north) side of the active face of Cell 1 to divert storm water around the landfill, with the main Hamilton Reservoir as the down-gradient destination. It is not known whether such a capture trench was constructed.

As noted within the 2007 ER&OP Addendum, to prevent damage from stormwater runoff, a diversion channel along the west toe of Cell 1 was constructed along the western edge of the monofill expansion (AECOM observed that a wide stormwater swale exists on the west perimeter of Cell 2). According to the 2007 ER&OP Addendum, the west diversion channel was designed to pass the 100-year, 24-hour

storm flows from the areas upstream of the monofill. The diversion channel is a permanent fixture of the monofill and will remain after the final closure.

A further discussion of stormwater management is provided within the Solid Waste Disposal Facility Run-on and Run-off Control System Plan (AECOM, 2021c), which was prepared to meet the requirements of 40 CFR 257.81.

2.0 Review of Existing Information

In accordance with the USEPA Final CCR Rule §257.84(b)(i), Patrick Clem (a qualified professional engineer with AECOM) completed "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)."

2.1 CCR Unit Documents and Operating Records

Below is a list of documents reviewed with respect to the ash monofill:

- Geotechnical Analysis Report, Platte River Power Authority Rawhide Project (Black and Veatch, 1979)
- Engineering Report and Operational Plan for the Solid Waste Disposal Facility, Rawhide Energy Project (PRPA, 1980)
- Investigation of the Ground-Water Monitoring Program for the Bottom Ash Disposal Site ,Lidstone and Anderson, Inc., 1989)
- Addendum to Engineering Report and Operation Plan for the Solid Waste Disposal Facility (Rawhide, 1997)
- Geotechnical Investigation for Platte River Power Authority Rawhide Simple Cycle (Smith Geotechnical, 2001)
- Subsurface Investigation (CGRS, Inc., 2001)
- Groundwater Monitoring Report (CGRS, Inc., 2002)
- Revised Design and Operations Plan for the Solid Waste Disposal Facility, Rawhide Energy Station (Smith Geotechnical, 2007)
- Approval of Modification to Engineered Design and Operations Plan, Rawhide Energy Station Coal Ash Disposal Facility (CDPHE, 2008)
- Approval of Construction Quality Assurance Report, Rawhide Energy Station Coal Ash Disposal Facility (CDPHE, 2010)
- Fugitive Dust Control, Compliance Monitoring, and Documentation for Fugitive Particulate Emission Sources (PRPA, 2017)
- CCR Landfill Weekly Inspection Report (PRPA, 2018)
- Platte River Power Authority – Rawhide Station Annual Ash Monofill Inspection Report – January 2021 (AECOM, 2021b)
- Platte River Power Authority – Rawhide Station Annual Ash Monofill Inspection Report – January 2022 (AECOM, 2022)
- Platte River Power Authority – Rawhide Station Annual Ash Monofill Inspection Report – January 2023 (AECOM, 2023)
- Platte River Power Authority – Rawhide Residual Solid Waste Ash Monofill Stability Evaluation (AECOM 2016a)
- Solid Waste Disposal Facility Run-on and Run-off Control System Plan, Platte River Power Authority (AECOM 2016c).
- Monofill Annual Volume Summary, 1998-2023 (Platte River file information (PRPA, 2023)

3.0 Annual Inspection Summary

The annual inspection was conducted on Thursday, December 7, 2023 starting at 9:00 a.m. Mountain Standard Time outside of the Rawhide administrative offices. The weather was sunny and approximately 50 degrees Fahrenheit. No snow cover was observed during the inspection visit.

Personnel in attendance for the inspection included:

Patrick Clem, PE (CO), AECOM

Jeremy Hurshman, PG (WY), AECOM

The completed federal CCR annual inspection form used during the inspection is appended as **Attachment 6**. A sample weekly inspection form used by Platte River is appended as **Attachment 7**. A photo log for the December 2023 inspection is included as **Attachment 8**.

3.1 Strategy and Route

The general strategy and route of the inspection included a general walkover of Cell 1, continued onto Cell 2A and to the new Cell 2B. The walk across Cell 1 started at the south containment dike, proceeded north along the east slope, then west across the crest, then south along the west slope. The walk across Cell 2A started at the north, proceeded to the south containment dike, then proceeded north to the connection of the former active face of Cell 2A and the new Cell 2B. The overall inspection started and concluded at the south end of Cell 1.

The new Cell 2B connects to the former working face of Cell 2A approximately 1,000 feet north of the starter dike. The active face of Cell 2B was observed to have a bottom liner and leachate collection system installed with a protective cover on top of the liner. The newly constructed Cell 2B was observed during the inspection.

3.2 Facility Conditions

In general, the ash monofill at Cell 2B is well organized and maintained. Ash is being placed in the new Cell 2B by placing piles of ash and pushing them over the protective cover of the liner using tracked equipment. Access ramps into Cell 2B have been constructed using ash CCR material. It is noted that once the ash is spread in the cell and exposed to weather, part of the ash surface crusts over due to the cementitious properties of the fly ash. This serves to limit wind-blown ash.

No significant observations associated with the CCR regulations were noted. Additional evaluation is in progress per the CCR regulations, relative to groundwater quality adjacent to the monofill. Some minor stormwater management and housekeeping items to the protective cover of Cell 1 and completed portion of Cell 2A were noted and are discussed below:

- The starter dike at Cell 1 and Cell 2 appeared to be in good condition with occasional small animal burrows (1 to 2-inch diameter) in the upper 8 to 12 inches of the ground surface in isolated areas. The cover slopes of Cell 1 and Cell 2 appear to be in good condition with occasional animal burrows in isolated areas (Photo 6 of **Attachment 8**). One large burrow (6- to 8-inch diameter) was observed on the east slope of Cell 1, approximately 500 feet north of PRS-02 (Photo 1 of **Attachment 8**). Additionally, small amounts of exposed ash were observed on the north slope of Cell 1, approximately 500 fee northwest of PRS-02 (Photo 2 of **Attachment 8**). Access roads over the starter dikes and around the monofill perimeter are maintained with gravel surfacing and have storm water drainage swales, preventing direct runoff onto the face of the starter dike.

- There are no current erosion concerns stemming from the sparse vegetation. In the 2022 "Rawhide Station Annual Ash Monofill Inspection Report" (AECOM, 2023), sparse vegetation was noted 800 feet north of PRS-02 midway up the east slope of Cell 1. It was noted during this annual inspection that this area had improved vegetative cover. Rabbit brush plants were observed at the north end of the cover to Cell 1 scattered within vegetative grasses (Photo 7 of **Attachment 8**). Brush size averages 2-3 feet in diameter.

- Limited vegetation between tufts of grass was noted on the eastern slope of Cell 1, approximately 4,500 feet north of ASH-03 (Photo 3 of **Attachment 8**).
- An erosion rill, approximately 12 inches wide by three to four inches deep) was observed on the west-facing slope of Cell 2B in the protective liner cover, approximately 1,000 ft south-southeast of ASH-06 (Photo 4 of **Attachment 8**). The rill in the protective cover was corrected in late 2023 by Platte River and ash has been placed over the protective cover in this area to eliminate future erosion into the protective cover by run-off into the cell.
- Stormwater culverts were inspected and considered to be in good working conditions (Photo 9 of **Attachment 8**).

Per the 1980 ER&OP "The moistened wastes hauled to the disposal area will be spread into layers 6 to 8 inches thick and then thoroughly wetted by a sprayer truck. Complete mixing of the solid waste and water will be accomplished by a soil mixer before it is rolled and compacted." AECOM was advised that the fly ash is thoroughly moistened at the point of collection before transport to the monofill, so lack of additional wetting at the point of placement is not considered to be significant. Although the method of compaction (dozing from a working face versus compaction in lifts per the 1980 ER&OP), the relatively gentle finished grades and results of an April 2016 stability analysis by AECOM (AECOM, 2016a) indicate that the alternate method of placement is acceptable (see Section 3.3 below).

3.3 Geometry of Monofill

As required by §257.84(b)(2)(i), other than encapsulating the finished west slope of Cell 1 by in-progress Cell 2, no changes in finished geometry were noted from those reported in previous documentation reviewed by AECOM. The 1980 ER&OP and 2007 ER&OP Addendum indicate that the general finished slope configuration should be at 4H:1V. This appears to be the case in the north-south direction where the slopes vary from 10H:1V or flatter, up to 4H:1V. On the eastern side of Cell 1, the eastern slope was measured at approximately 3:1H:V in localized areas around a high-voltage transmission line pole. This is steeper than what was recommended in the 1980 ER&OP, although the slopes appeared to be performing well and showed no signs of distress.

The April 2016 slope stability analysis (AECOM, 2016a) was performed on the eastern side of Cell 1 and through the starter dike and finished portion of Cell 2. It was concluded that the slopes have adequate safety for the static case, although some minor slope maintenance might be required after a seismic event. The facility slopes and benches appeared well graded and maintained. AECOM observed that the finished cover of Cell 1 (and the completed portion of Cell 2) are graded in a manner that discourages surface ponding and minimizes infiltration through the cover. A primary run-off swale is present along the west perimeter of Cell 2 and appears to discharge from the completed top surface of Cell 2 through a steel pipe near the southwest corner, extending under the access road and to the front of the containment dike, allowing surface water from the seeded cover of Cell 2 to move by overland flow downstream to Hamilton Reservoir.

3.4 Approximate Volume

According to information from Platte River, the total volume of CCR in the monofill as of December 31, 2022, was 2,750,161 cy. According to Platte River data, 15,262 tons of combined fly ash and bottom ash and other waste from lime, sulfate, and activated carbon usage from ongoing operations were deposited in the monofill from January 1 through December 31, 2023. At a density equivalent of

1.0125 tons/cy, it is estimated that the monofill will contain 2,750,161 + (15,262/1.0125) or 2,276,235 cy of CCR as of December 31, 2023 per CCR Regulation Section §257.84(b)(2)(ii) (see **Attachment 5** for details). Beginning in 2006, fly ash sales were incorporated into the CCR calculations of waste placed into the CCR monofill. Beginning in 2019, lime, sulfate, and activated carbon usage were included into the CCR monofill waste calculations due to operational changes and upgrades. In 2021, residual solids from the wastewater treatment tank and solids from the plant floor drains were placed in the monofill and will continue to be placed in the monofill every two years. In 2021, this volume was estimated to be approximately 8,400 cy.

3.5 Structural Inspection

There was no observed structural weakness of the CCR monofill unit, nor any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit, per CCR Regulation Section §257.84(b)(2)(iii).

3.6 Additional Changes

The ash monofill and appurtenant structures (culverts and power poles) did not show any signs of major distress or malfunction, per CCR Regulation §257.84(b)(1)(ii). AECOM did not observe any other changes which may affect the stability or operation of the monofill per CCR Regulation §257.84(b)(2)(iv). Annual checking of the monofill culverts for obstruction, and cleaning as necessary, may be considered to be added to the Operations and Maintenance schedule.

4.0 Conclusions and Recommendations

As noted in the CCR Rule §257.84(b)(5), "If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken."

Deficiencies or releases identified during the inspection and items identified during the document review regarded as "potential" deficiencies are discussed in Section 4.2 below.

As mentioned previously, the future progress of Cell 2B will be constructed in accordance with the procedures specified in the EDOP Revision 4 dated December 16, 2021 (AECOM, 2021a) and approved by CDPHE on December 21, 2021.

4.1 Recommendations Other Than Normal Maintenance

Recommendations other than normal regular maintenance items were noted, including:

- One larger burrow (6- to 8-inch diameter) was observed on the north slope of Cell 1. There does not appear to be an increase in larger burrows from the previous inspection. However, it is recommended that this be monitored and if the numbers of burrows proliferate, removal steps may be required. The number of small burrow areas on the east face of Cell 1 does not appear to be increasing from previous inspections and the areas should be monitored and removal steps may be required. There does not appear to be erosional concerns surrounding the burrows at this time, but areas should continue to be monitored.
- Perform periodic cleanout of the two culverts just south of Cells 1 and 2.
- Remove ash debris observed in the road berm located on the north end of Cell 1 and place in Cell 2B.

4.2 Deficiencies Discovered

No significant deficiencies were noted as part of this annual inspection or document review.

4.3 Corrective Measures Taken

The erosional rill observed in the protective liner cover on the west face of Cell 2B had corrective action performed by Platte River in December 2023. No other corrective measures for significant deficiencies were noted that need to be taken by Platte River as part of this annual inspection.

5.0 References

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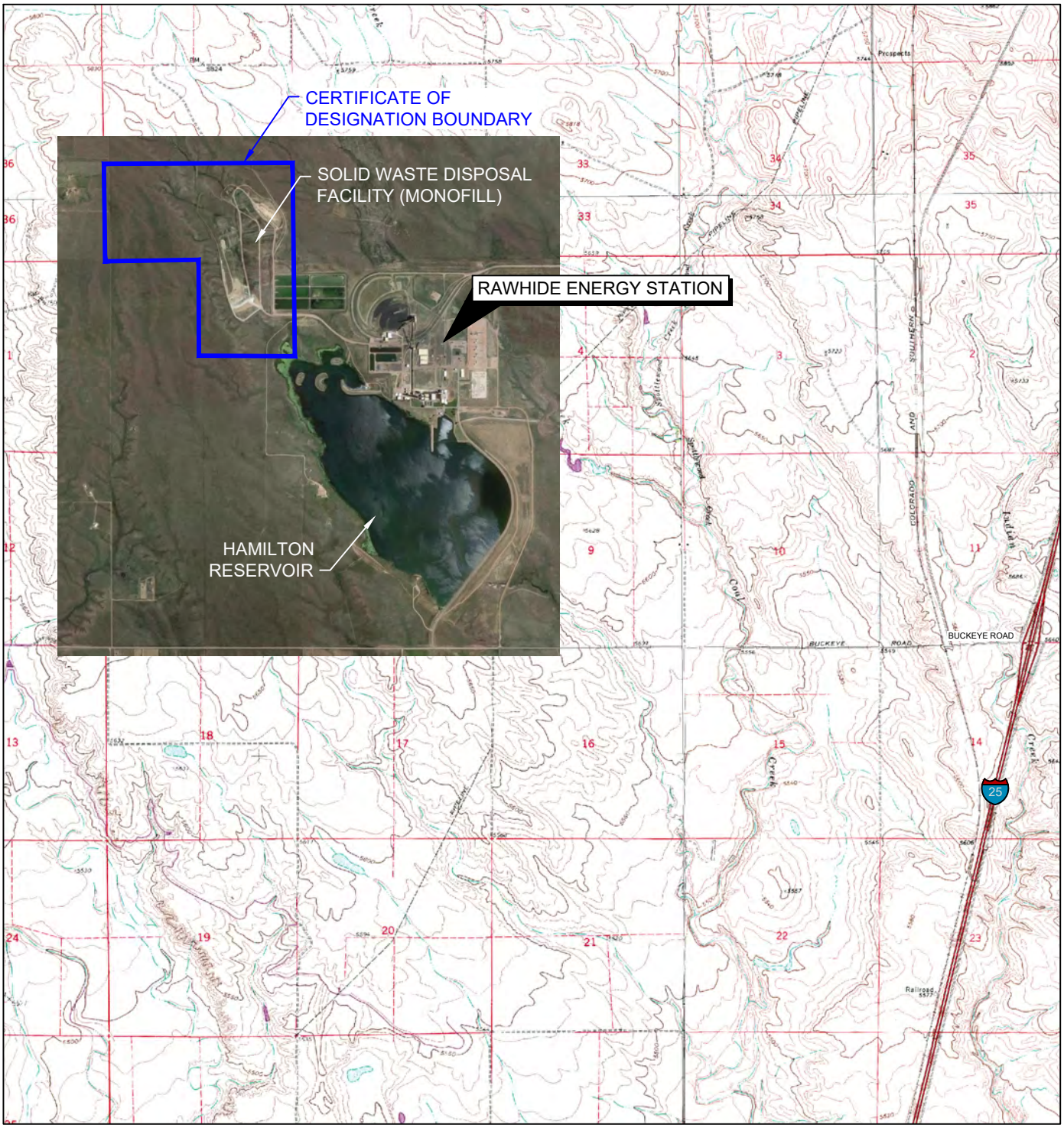
Figures



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Project Management Initials: Designer: ES Checked: CL Approved: ED ANSI A 8.5" x 11"

Annual Ash Monofill Inspection
Rawhide Energy Station
Platte River Power Authority, Wellington, CO
Project No.: 60646728 Date: 1/14/20

SITE LOCATION MAP

AECOM

Figure: 1-1

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NOTE:
1. EXISTING GRADES AND AERIAL IMAGERY IS FROM A SURVEY PROVIDED BY ASCENT GEOMATICS SOLUTIONS, DATED AUGUST 31, 2018. SURVEY WAS CONDUCTED ON PLANT COORDINATE SYSTEM USING US SURVEY FOOT.
2. HORIZONTAL DATUM IS NAD83 STATE PLANE COLORADO NORTH, US FT. VERTICAL DATUM IS FEET ABOVE MEAN SEA LEVEL.

LEGEND

- EXISTING GROUND CONTOURS
- 5700 MAJOR CONTOUR (10')
- MINOR CONTOUR (2')
- EXISTING ACCESS ROAD
- OE EXISTING OVERHEAD ELECTRIC LINE
- EXISTING DRAINAGE CHANNEL
- EXISTING CELL LIMITS
- EXISTING CULVERT
- MONITORING WELL
- PIEZOMETER

N

150 0 300
1"=300'

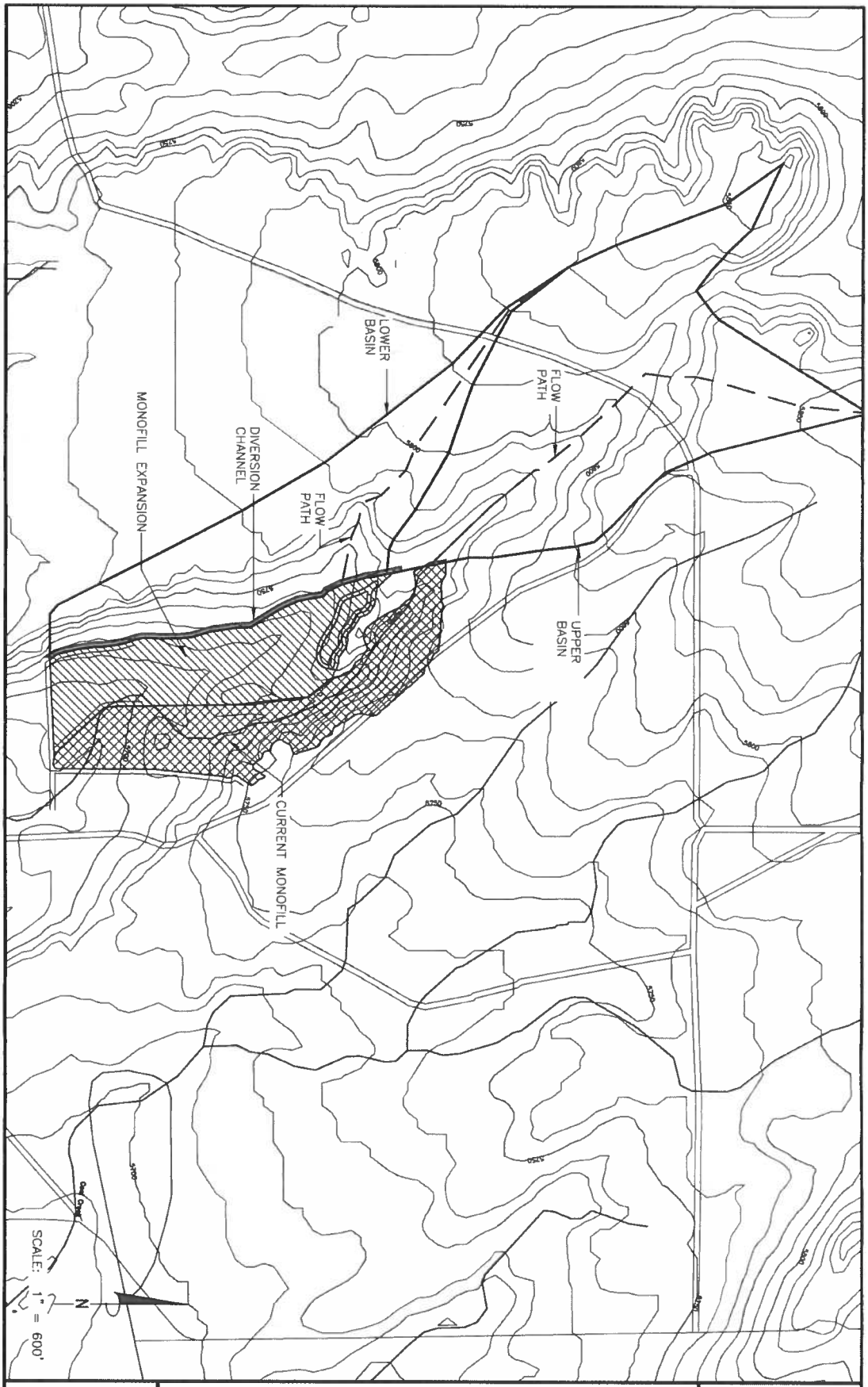
Annual Ash Monofill Inspection
Rawhide Energy Station
Platte River Power Authority, Wellington, CO
Project No.: 60721672 Date: 01/17/2024

SOLID WASTE DISPOSAL FACILITY
CURRENT CONDITIONS

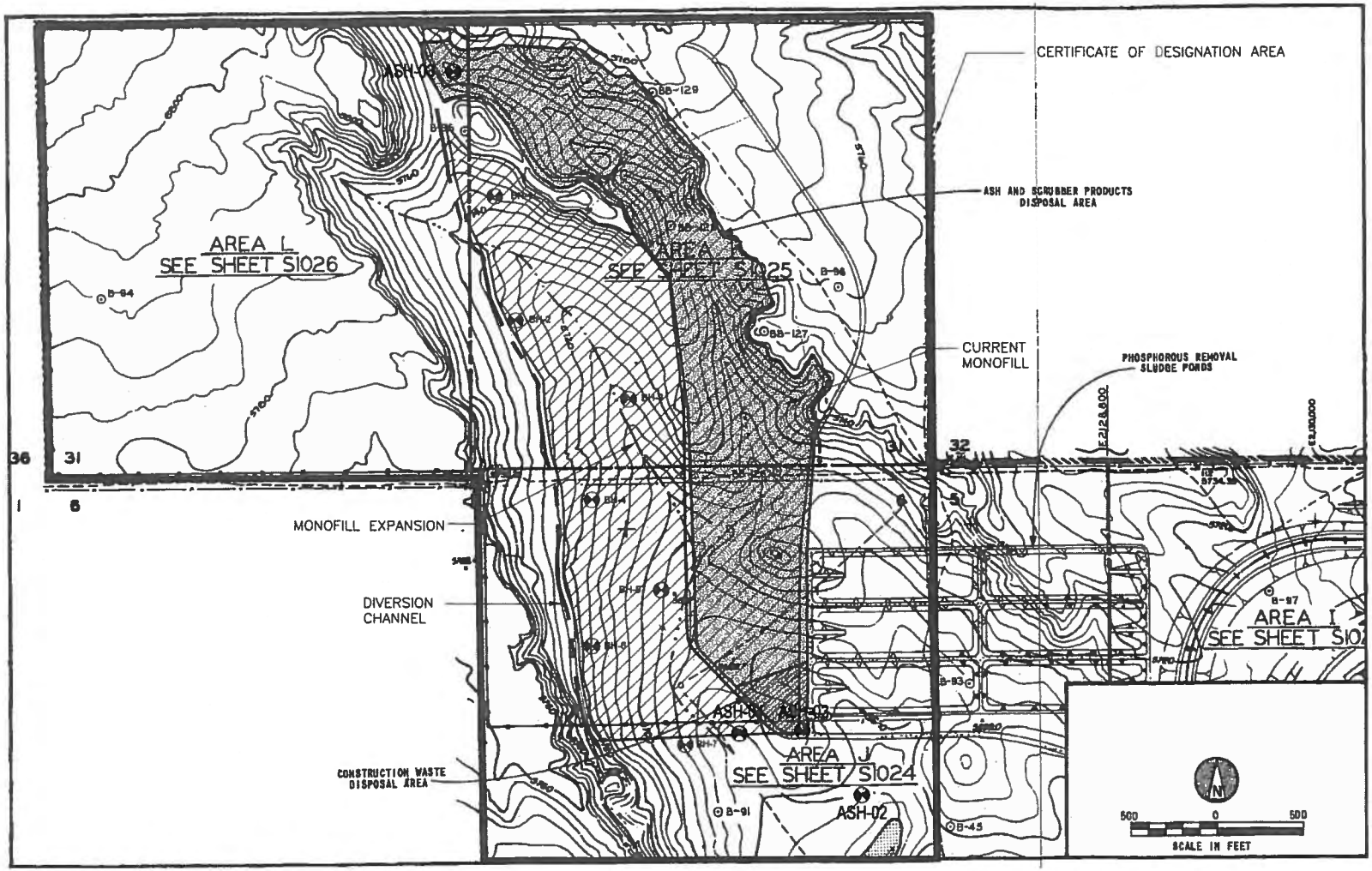
AECOM

Figure: 1-2

Attachment 1
Revised Design and Operations Plan for the Solid Waste Disposal Facility, Rawhide Energy Station, November 2007 (selected figures)



Project: 07.028	**FIGURE A.1**	Smith Geotechnical ENGINEERING CONSULTANTS
Date: November 2007	**MONOFILL EXPANSION BASINS**	

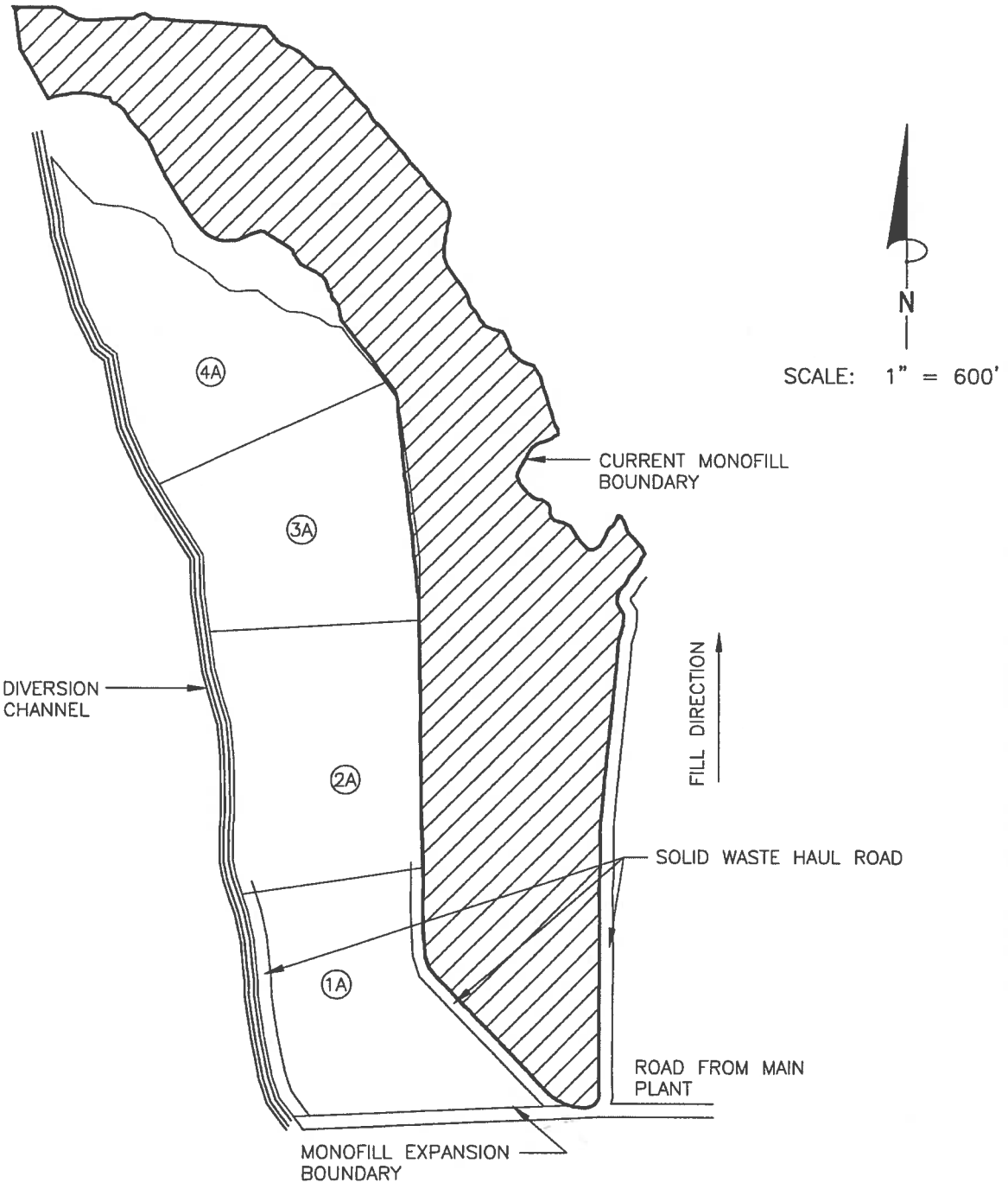


Job No	60431998
Prepared By	JMC
Date	4/19/16

SUBSURFACE BORING LOCATIONS FOR CELL 2

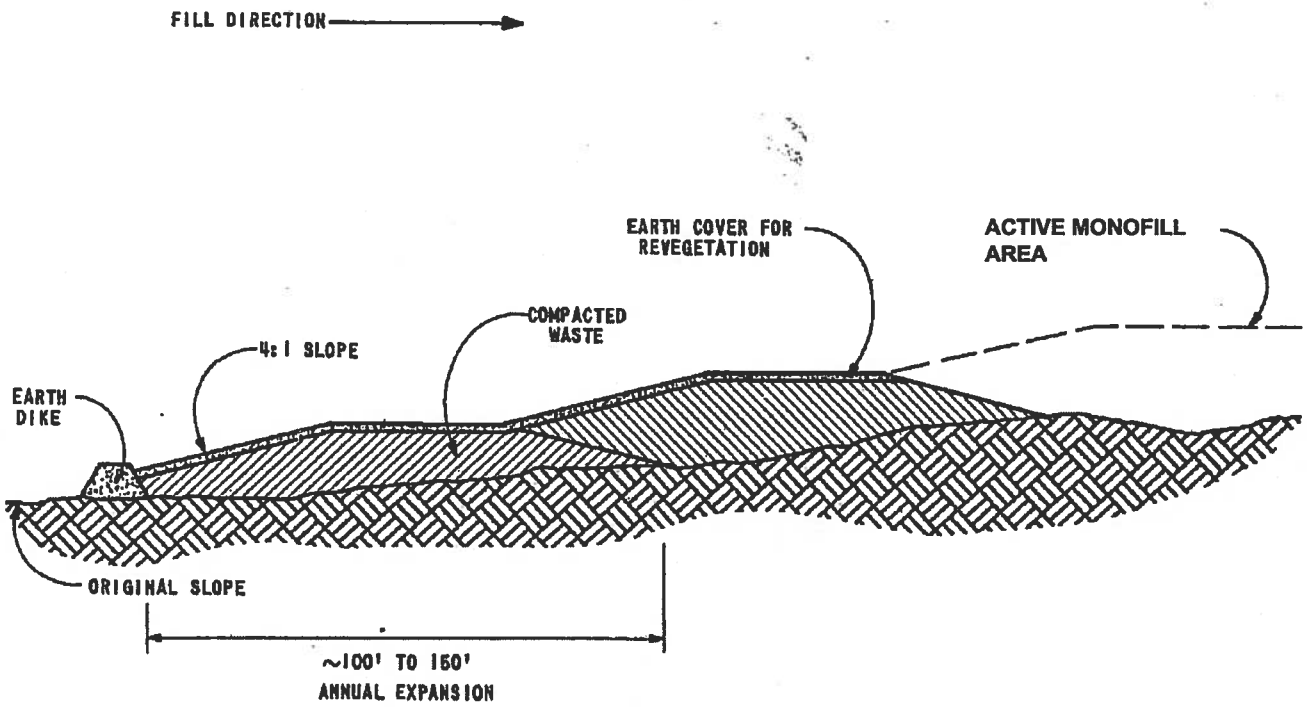
Reference Smith Geotechnical 2007 Figure 1

FIG. 1.3



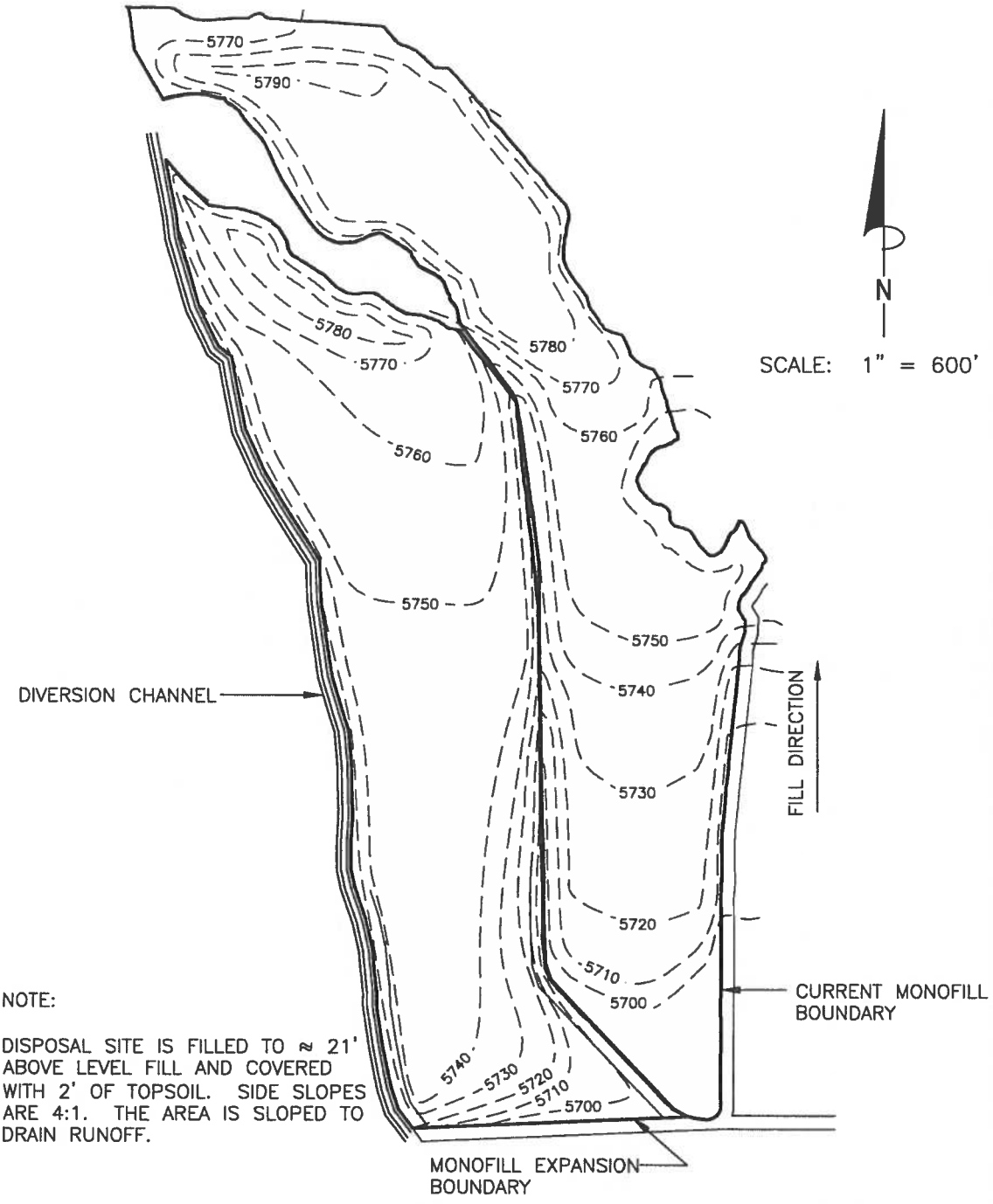
(REFERENCE PLATTE RIVER 1980 FIGURE 11)

Project: 07.028	**FIGURE 2** **SOLID WASTE DISPOSAL SITE FILL SEQUENCE**	Smith Geotechnical ENGINEERING CONSULTANTS
Date: November 2007		



(REFERENCE PLATTE RIVER 1980 FIGURE 12)

Project: 07.028 **Date: November 2007**	**FIGURE 3** **FILLING AND RECLAMATION OPERATION, TYPICAL NORTH-SOUTH CROSS SECTION**	Smith Geotechnical ENGINEERING CONSULTANTS



(REFERENCE PLATTE RIVER 1980 FIGURE 13)

Project: 07.028	**FIGURE 4**	Smith Geotechnical
Date: November 2007	**SOLID WASTE DISPOSAL SITE FINAL CONTOURS**	ENGINEERING CONSULTANTS

Smith Geotechnical
ENGINEERING CONSULTANTS

BORING LOG

BORING NO. BH-1

PROJECT	JOB NO.	SHEET	OF
Rawhide Ash Landfill	07.028	1	1
CLIENT	**FIELD ENGINEER**		
PRPA	Kent Flowers		
DRILLING COMPANY	**DRILL RIG**		
High Plains Drilling	CME-55 Buggy with 4"CFA		
LOCATION / **ELEVATION**	**DATE**		
Grade	07/18/07		

DEPTH (Feet)	LOG	DESCRIPTION OF MATERIAL	BLOWS/6 IN. INCREMENTS (PER FOOT)	REC.	REMARKS
0		TOPSOIL:			
		CLAY: tan, damp, very stiff, plastic, with fine grained sand	9/17 (26)	4	
5		CLAYSTONE: tan moist, very soft, complete weathering, plastic	50 for 12" (>50)	4	
10		CLAYSTONE: tan moist, very soft, very severe weathering, plastic	50 for 8" (>50)	4	
		EOH:			
15					
20					
25					
30					

Smith Geotechnical
ENGINEERING CONSULTANTS

BORING LOG

BORING NO. BH-2

PROJECT		JOB NO.	SHEET	OF
Rawhide Ash Landfill		07.028	1	1
CLIENT		FIELD ENGINEER		
PRPA		Kent Flowers		
DRILLING COMPANY		DRILL RIG		
High Plains Drilling		CME-55 Buggy with 4"CFA		
LOCATION	ELEVATION	DATE		
	Grade	07/18/07		

DEPTH (Feet)	LOG	DESCRIPTION OF MATERIAL	BLOWS/6 IN. INCREMENTS (PER FOOT)	REC.	REMARKS
0		TOPSOIL:			
5		CLAYSTONE: tan moist, very soft, complete weathering, plastic	10 / 16 (26)	4	
10		CLAYSTONE: tan, moist, soft. very severe weathering. plastic	50 for 11" (>50)	4	
		EOH:			
15					
20					
25					
30					

Smith Geotechnical
ENGINEERING CONSULTANTS

BORING LOG

BORING NO. BH-3

PROJECT	JOB NO.	SHEET	OF
Rawhide Ash Landfill	07.028	1	1
CLIENT	FIELD ENGINEER		
PRPA	Kent Flowers		
DRILLING COMPANY	DRILL RIG		
High Plains Drilling	CME-55 Buggy with 4"CFA		
LOCATION / ELEVATION: Grade	DATE: 07/18/07		

DEPTH (Feet)	LOG	DESCRIPTION OF MATERIAL	BLOWS/6 IN. INCREMENTS (PER FOOT)	REC.	REMARKS
0		TOPSOIL:			
		CLAY: tan, damp, very stiff, plastic, with fine grained sand	8/9 (17)	4	
5		CLAY: tan, damp, plastic, very stiff, with fine grained sand	9/11 (20)	4	
10		CLAYSTONE: tan, moist, very soft, very severe weathering, plastic	50 for 12" (>50)	4	
		EOH:			
15					
20					
25					
30					

Smith Geotechnical
ENGINEERING CONSULTANTS

BORING LOG

BORING NO. BH-4

PROJECT	JOB NO.	SHEET	OF
Rawhide Ash Landfill	07.028	1	1
CLIENT	**FIELD ENGINEER**		
PRPA	Kent Flowers		
DRILLING COMPANY	**DRILL RIG**		
High Plains Drilling	CME-55 Buggy with 4"CFA		
LOCATION / **ELEVATION**	**DATE**		
Grade	07/18/07		

DEPTH (Feet)	LOG	DESCRIPTION OF MATERIAL	BLOWS/6 IN. INCREMENTS (PER FOOT)	REC.	REMARKS
0		TOPSOIL:			
5		CLAY: tan, damp, stiff, plastic, with fine grained sand	6/4 (10)	4	
10		CLAYSTONE: tan, moist, very soft, complete weathering, plastic EOH:	14/15 (29)	4	
15		CLAYSTONE: tan, moist, soft very severe weathering, plastic EOH:	50 for 7" (>50)	4	
20					
25					
30					

Smith Geotechnical
ENGINEERING CONSULTANTS

BORING LOG

BORING NO. BH-5

PROJECT	JOB NO.	SHEET	OF
Rawhide Ash Landfill	07.028	1	1
CLIENT	**FIELD ENGINEER**		
PRPA	Kent Flowers		
DRILLING COMPANY	**DRILL RIG**		
High Plains Drilling	CME-55 Buggy with 4"CFA		
LOCATION / **ELEVATION**	**DATE**		
Grade	07/18/07		

DEPTH (Feet)	LOG	DESCRIPTION OF MATERIAL	BLOWS/6 IN. INCREMENTS (PER FOOT)	REC.	REMARKS
0		TOPSOIL:			
5		CLAYSTONE: tan, moist, very soft, complete weathering, plastic	11/18 (29)	4	
10		CLAYSTONE: tan, moist, soft, very severe weathering, plastic	50 for 11" (>50)	4	
		EOH: EOH:			
15					
20					
25					
30					

Smith Geotechnical
ENGINEERING CONSULTANTS

BORING LOG

BORING NO. BH-6

PROJECT	JOB NO.	SHEET	OF
Rawhide Ash Landfill	07.028	1	1
CLIENT	**FIELD ENGINEER**		
PRPA	Kent Flowers		
DRILLING COMPANY	**DRILL RIG**		
High Plains Drilling	CME-55 Buggy with 4"CFA		
LOCATION / **ELEVATION**	**DATE**		
Grade	07/18/07		

DEPTH (Feet)	LOG	DESCRIPTION OF MATERIAL	BLOWS/6 IN. INCREMENTS (PER FOOT)	REC.	REMARKS
0		TOPSOIL:			
		CLAY: tan moist, stiff, plastic, with fine grained sand	5/8 (13)	4	
5					
		CLAYSTONE: tan, moist, very soft, very severe weathering, plastic	50 for 12" (>50)	4	
10		EOH:			
15					
20					
25					
30					

Smith Geotechnical
ENGINEERING CONSULTANTS

BORING LOG

BORING NO. BH-7

PROJECT	JOB NO.	SHEET	OF
Rawhide Ash Landfill	07.028	1	1

CLIENT	FIELD ENGINEER
PRPA	Kent Flowers

DRILLING COMPANY	DRILL RIG
High Plains Drilling	CME-55 Buggy with 4"CFA

LOCATION	ELEVATION	DATE
	Grade	07/18/07

DEPTH (Feet)	LOG	DESCRIPTION OF MATERIAL	BLOWS/6 IN. INCREMENTS (PER FOOT)	REC.	REMARKS
0		TOPSOIL:			
		CLAY: tan moist, very stiff, plastic, with fine grained sand	9/8 (17)	4	
5		CLAY: tan moist, very stiff, plastic, with fine grained sand	9/10 (19)	4	
10		CLAYSTONE: tan, moist, very soft, complete weathering, plastic	11/19 (30)	4	
15		CLAYSTONE: tan, moist, soft, very severe weathering, plastic	50 for 9"	4	
		EOH:			
20					
25					
30					

Attachment 2
CDPHE Approval of Modification to Engineered Design and Operations Plan, Rawhide Energy Station Coal Ash Disposal Facility, January 25, 2008

STATE OF COLORADO

Bill Ritter, Jr., Governor
James B. Martin, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
TDD Line (303) 691-7700
Located in Glendale, Colorado

http://www.cdphe.state.co.us

Laboratory Services Division
8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090

Colorado Department
of Public Health
and Environment

CERTIFIED MAIL #7005 1820 0000 3213 5517
Return Receipt Requested

January 25, 2008

Mr. Christopher R. Wood
Platte Rover Power Authority
2000 E. Horsetooth Road
Fort Collins, Colorado 80525

RE: Approval of Modification to Engineered Design and Operations Plan
Rawhide Energy Station Coal Ash Disposal Facility
Larimer County, Colorado
SW/LAR/RAW 2.2

Dear Mr. Wood:

Thank you for providing the Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division ("the Division") with your request to modify the Engineered Design and Operations Plan ("EDOP") for the Rawhide Energy Station Coal Ash Disposal facility in Larimer County, Colorado ("the facility"). The EDOP was submitted to the Division under the requirements of the "Regulations Pertaining to Solid Wastes Sites and Facilities" (6 CCR 1007-2, "the Regulations") and the Section 30-20-100 *et. seq.* of the Colorado Revised Statutes ("Colorado Solid Waste Act," "the Act.").

The proposed EDOP modification would allow the facility to expand the current footprint of waste management area for the facility's landfill to the west of the current waste disposal site. The expansion of approximately 60.91 acres would allow for the facility to begin management of wastes in the remainder of the entire permitted site area of 122.91 acres, as approved in the facility's Certificate of Designation granted by Larimer County. The expansion would include construction of a permanent surface water diversion canal to the western border of the proposed waste pile expansion. This diversion canal was originally proposed and approved in the original EDOP and will be constructed adjacent to the waste. The expansion is proposed to begin at the south of the permitted area, working its way to the north of the facility. Borehole sample data in support of the proposed expansion indicate that soil and ground water conditions in the area are similar to those observed in the current waste management area.

Based on the information provided, the Division approves the modified EDOP as submitted. This EDOP modification incorporates by reference the Department's January 24, 2008 approved waiver for explosive gas monitoring at the site. As required under Section 3.2.7 of the Regulations, you must provide the Division and the local governing body having jurisdiction (Larimer County Commissioners) with a report documenting that the design construction for the expansion of the facility has been completed in accordance with the approved EDOP ("Construction Quality Assurance report," "CQA report") prior to accepting and managing waste in each proposed expansion module identified in the EDOP. The CQA report must be signed by a Colorado registered professional engineer and reviewed and approved by the Department. In addition, any financial assurance established for the facility must be adjusted to take into account the increase in acreage size where wastes are being managed. This information must be submitted in the facility's next financial assurance update due to the Division.

In closing, please note the Department is authorized to bill for its review of technical submittals pursuant to 30-20-109(2)(b). An invoice for the Division's review of the above referenced document will be transmitted under separate cover.

If you have any additional questions or concerns, please contact me at (303) 692-3347, or by e-mail at caren.johannes@state.co.us.

Sincerely,

Caren Johannes
Solid Waste Unit
Solid and Hazardous Waste Program

cc: Larimer County Commissioners
Mr. Rich Grossmann, Larimer County Department of Health and Environment

C:\CASWstuff\rawhide\edopmod_fin.doc

STATE OF COLORADO

Bill Ritter, Jr., Governor
James B. Martin, Executive Director

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8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090

Colorado Department
of Public Health
and Environment

January 24, 2008

Mr. Christopher R. Wood
Platte Rover Power Authority
2000 E. Horsetooth Road
Fort Collins, Colorado 80525

RE: Waiver Request for Explosive Gas Monitoring
Design and Operations Plan, Coal Ash Disposal Facility
Rawhide Energy Station, Larimer County, Colorado
SW/LAR/RAW 2.5

Dear Mr. Wood:

Thank you for providing the Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division ("the Division") with your wavier request to delete requirements for explosive gas monitoring at the Rawhide Energy Station Coal Ash Disposal facility in Larimer County, Colorado ("the facility"). This request was made based on the non-putrescent nature of the material being disposed at the facility (waste bottom ash, phosphorus sludge and inorganic construction wastes) as per the facility's Design and Operations Plan and Certificate of Designation.

Based on the information provided, the Division approves the waiver as submitted. This waiver shall be incorporated into the facility's Design and Operation Plan. At any time the facility no longer meets the waiver criteria, the waiver is void and ceases to exist. We have consulted with Larimer County on our approval of the waiver. If you have any additional questions or concerns, please contact me at (303) 692-3347, or by e-mail at caren.johannes@state.co.us.

Sincerely,

Caren Johannes
Solid Waste Unit
Solid and Hazardous Waste Program

cc: Mr. Rich Grossmann, Larimer County Department of Health and Environment
Larimer County Commissioners

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Attachment 3
Engineering Report and Operational Plan for the Solid Waste Disposal Facility, Rawhide Energy Project, December 1980 (selected figures)

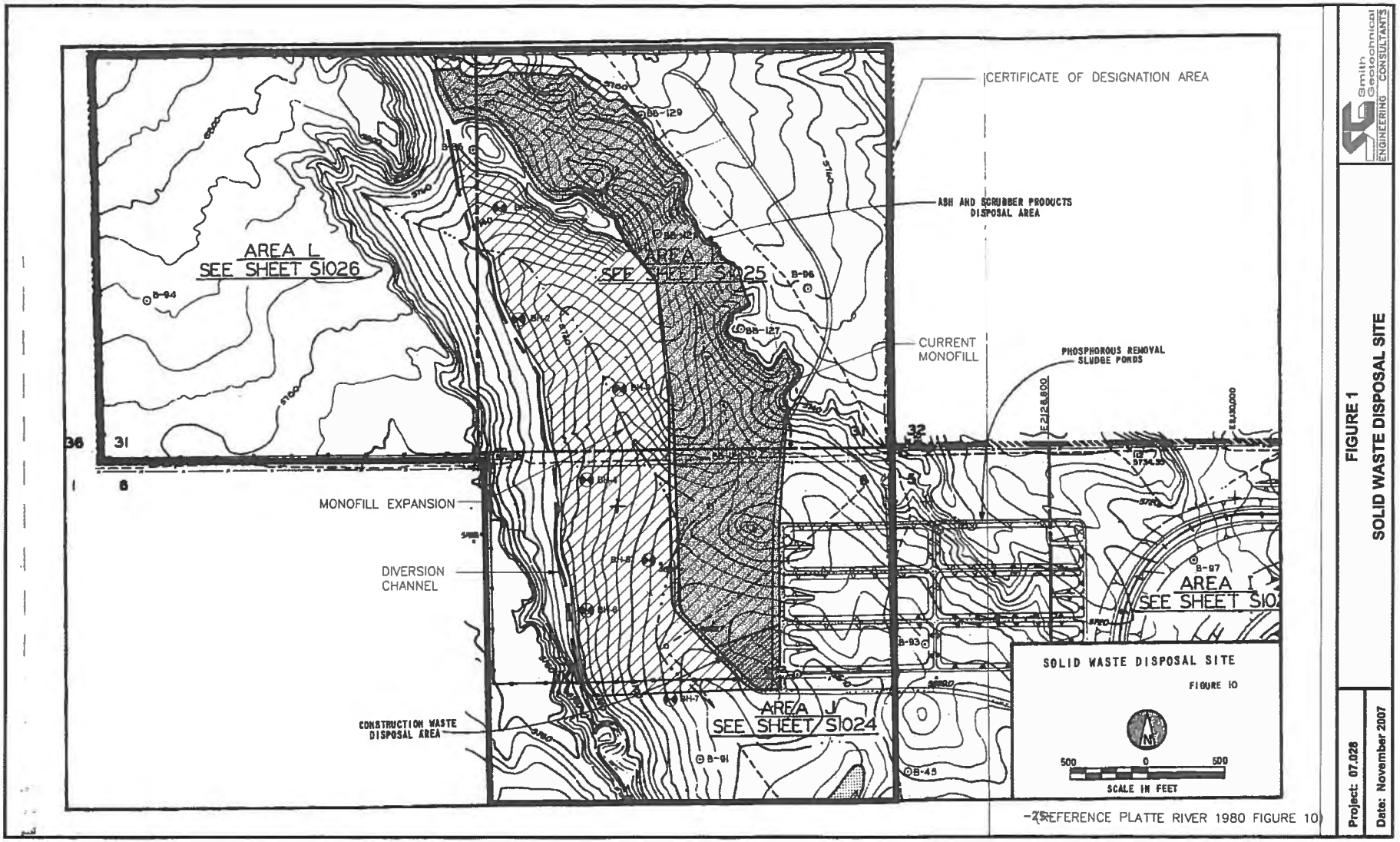
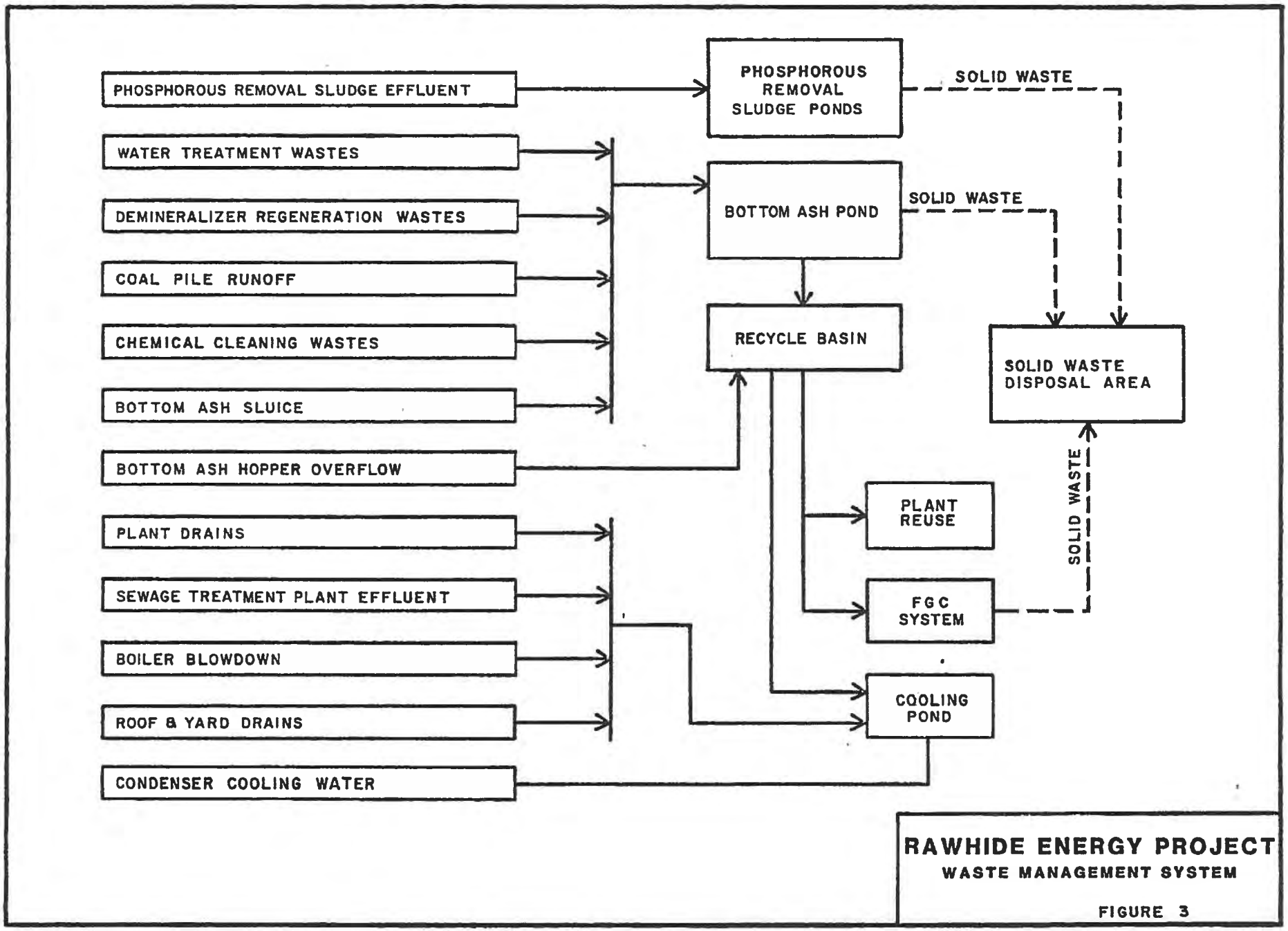
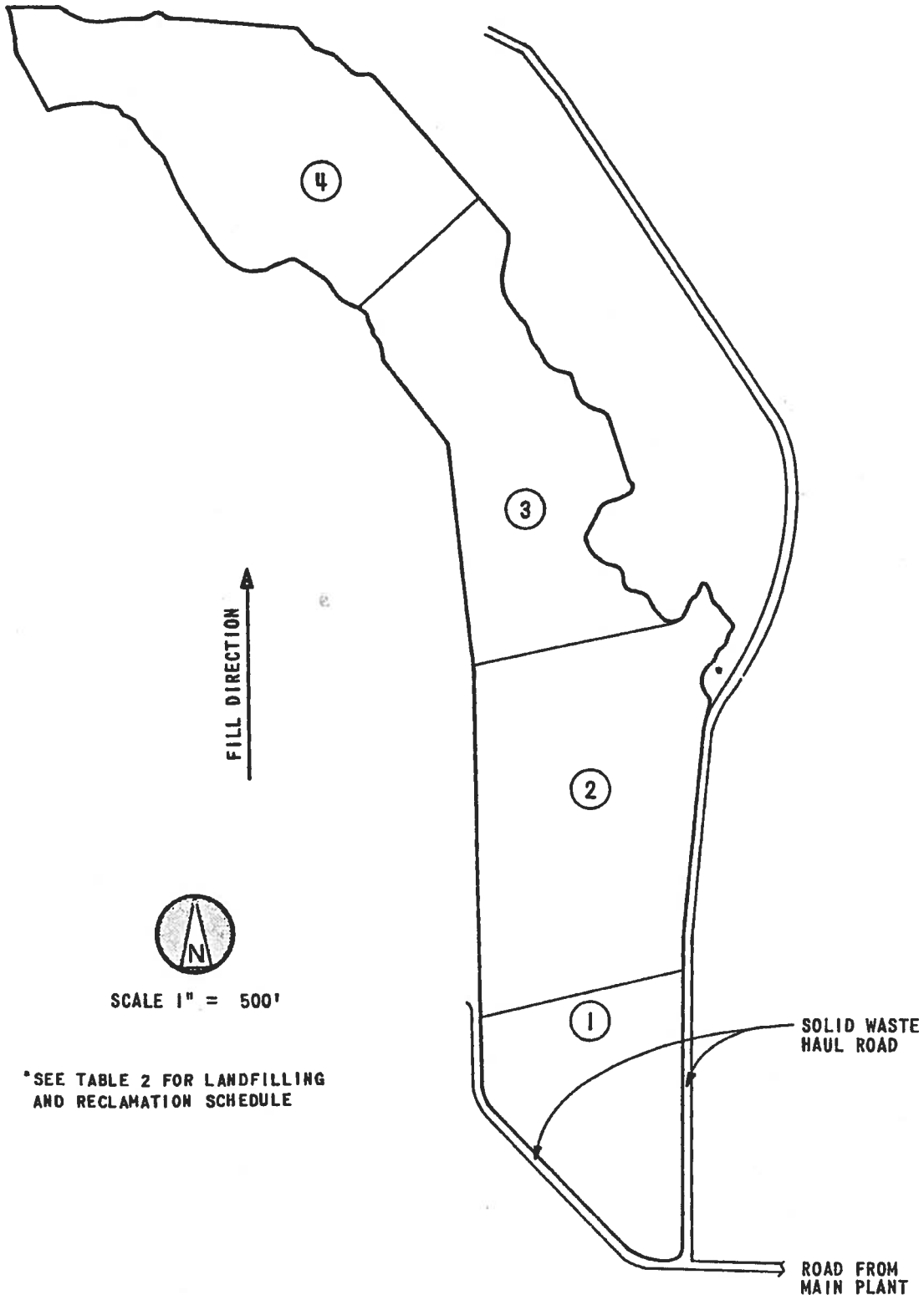


FIGURE 1
SOLID WASTE DISPOSAL SITE

Smith Geotechnical ENGINEERING CONSULTANTS

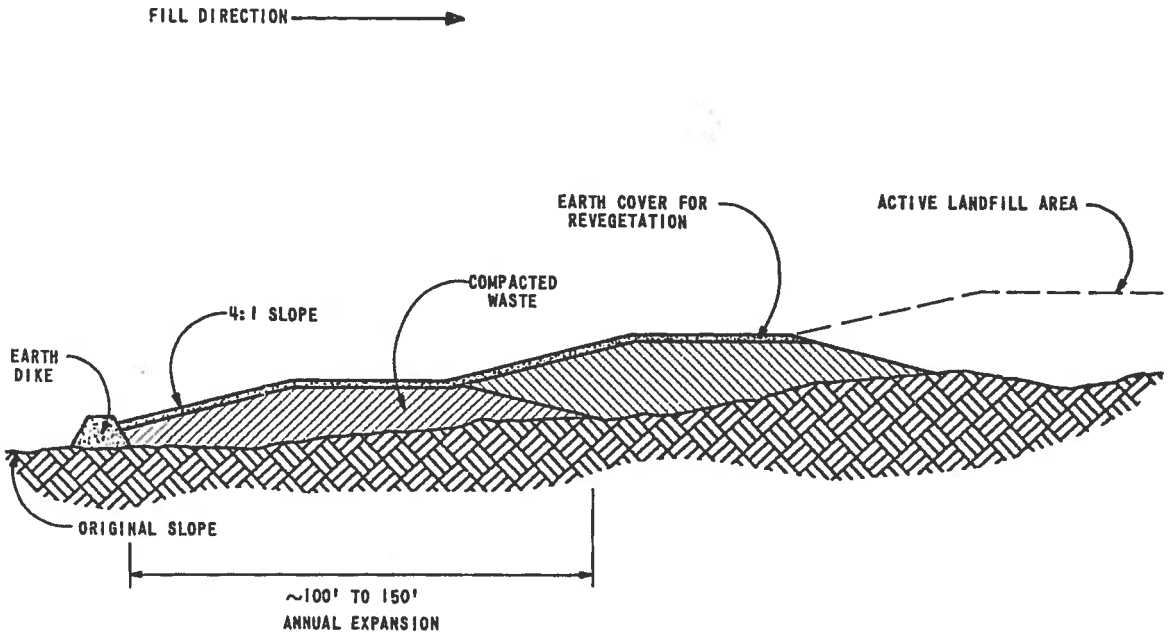
Project: 07.028
Date: November 2007


PHOSPHOROUS REMOVAL SLUDGE EFFLUENT
WATER TREATMENT WASTES
DEMINERALIZER REGENERATION WASTES
COAL PILE RUNOFF
CHEMICAL CLEANING WASTES
BOTTOM ASH SLUICE
BOTTOM ASH HOPPER OVERFLOW
PLANT DRAINS
SEWAGE TREATMENT PLANT EFFLUENT
BOILER BLOWDOWN
ROOF & YARD DRAINS
CONDENSER COOLING WATER
PHOSPHOROUS REMOVAL SLUDGE PONDS
BOTTOM ASH POND
RECYCLE BASIN
SOLID WASTE
SOLID WASTE
SOLID WASTE DISPOSAL AREA
SOLID WASTE
PLANT REUSE
FGC SYSTEM
COOLING POND
RAWHIDE ENERGY PROJECT
WASTE MANAGEMENT SYSTEM
FIGURE 3



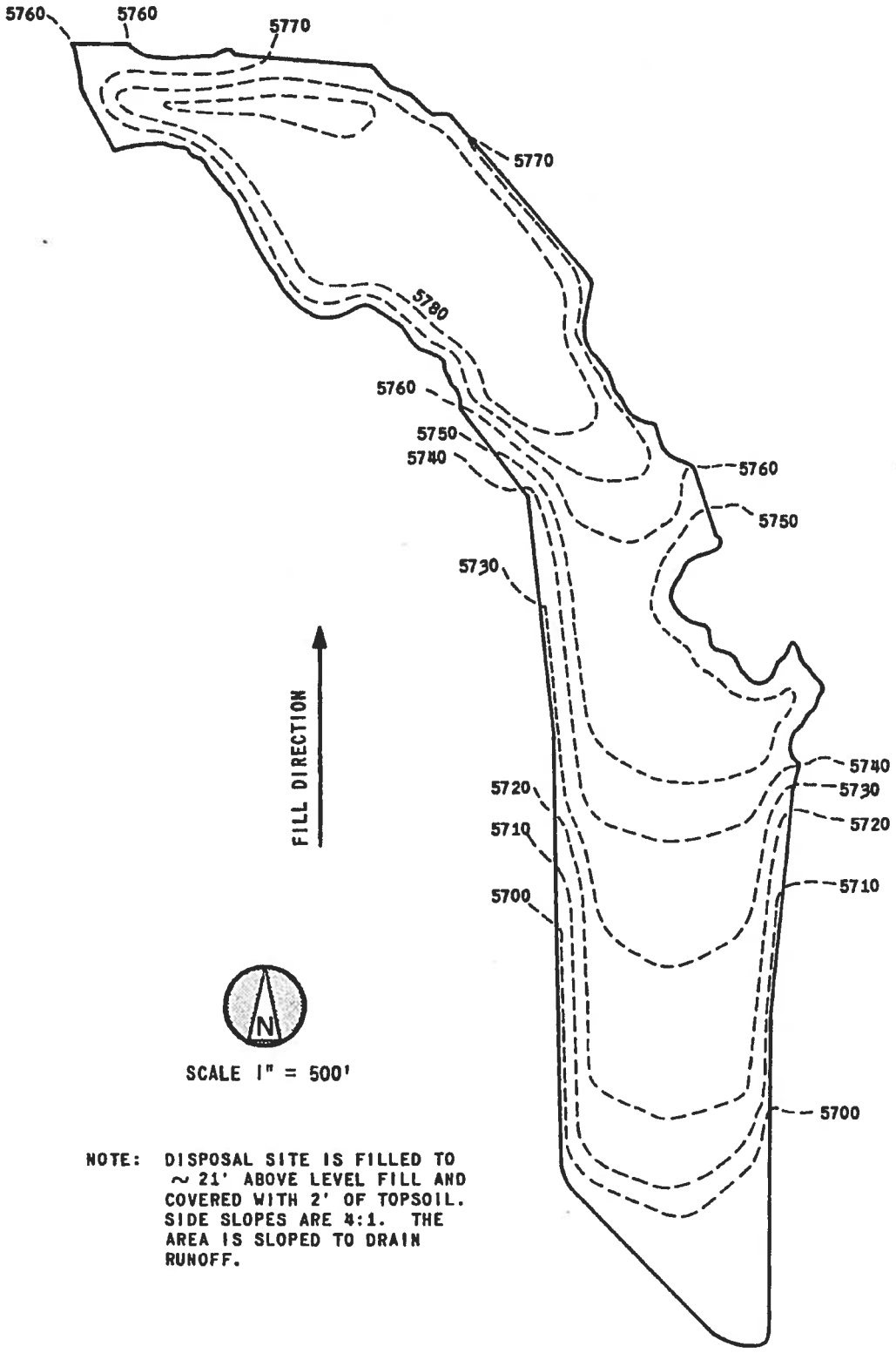
SOLID WASTE DISPOSAL SITE FILL SEQUENCE * (CELL 1)

FIGURE II



LANDFILL AND RECLAMATION OPERATION
TYPICAL NORTH-SOUTH CROSS SECTION

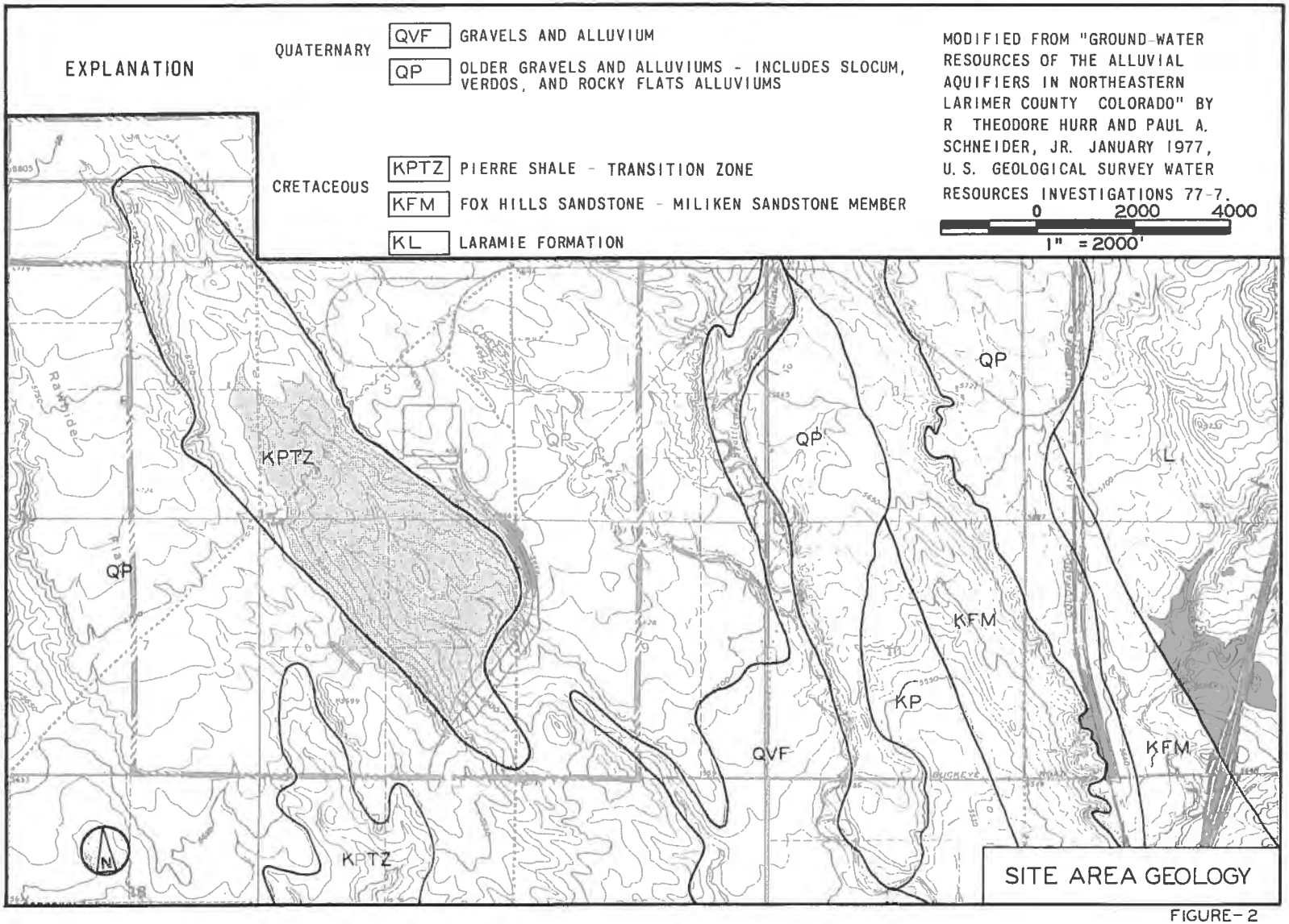
FIGURE 12



NOTE: DISPOSAL SITE IS FILLED TO ~ 21' ABOVE LEVEL FILL AND COVERED WITH 2' OF TOPSOIL. SIDE SLOPES ARE 4:1. THE AREA IS SLOPED TO DRAIN RUNOFF.

SOLID WASTE DISPOSAL SITE
FINAL CONTOURS (CELL 1)

FIGURE 13



REVISED 2/26/79

FIGURE-2

LOG OF BORING

BLACK & VEATCH
Consulting Engineers

BORING NO. B-92

CLIENT	PROJECT NO.	SHEET OF
Platte River Power Authority	7750	1 2

PROJECT	LOCATION	ELEVATION
Rawhide Energy Project	N-558,940 E-2,127,170	5681.3

DRILLING CONTRACTOR	DRILL RIG TYPE AND NO.	DRILLER
Hogan & Olhausen, Inc.	C.M.E. 55	C. Dearmore

DIRECTION AND INCLINATION OF HOLE	DATE	INSPECTOR
Vertical	2-17-78	L. Almaleh

DEPTH IN FEET	LOG	CLASSIFICATION OF MATERIAL (DESCRIPTION)	ELEV. FT., MSL	SAMPLER & BIT	BLOWS/6 IN. INCREMENTS (PER FOOT)	SAMPLE RECOVERY	PENETROMETER READING, TSF	REMARKS
5		SILTY CLAY; tan-yellow, stiff, trace fine sand, moist, v calcareous (CL) (severely to completely weathered shale)		2" SB	15-20-22 (42)	0.8		Boring advanced w/4" diameter solid-stem auger
10		SHALE; sev wx, olv, sft, sandy, fossiliferous	5670.3					
		Continued on next page						Boring continued w/NWM double tube core barrel w/diamond bit using water as drilling fluid

FIGURE 205

LOG OF BORING

BLACK & VEATCH
Consulting Engineers

BORING NO. B-92

PROJECT	PROJECT NO.	SHEET OF
Rawhide Energy Project	7750	2 2

DEPTH IN FEET	LOG	UNIT	CLASSIFICATION OF MATERIAL (DESCRIPTION)	ELEV. FT., MSL	SAMPLE OR RUN	N	% REC / % RQD	REMARKS
15		PIERRE SHALE	SHALE; weathered, olive green and gray, iron oxide stained, soft to medium, sandy, occasionally fossiliferous, calcareous in part		R-1		100/15	
					R-2		100/8	
				5661.9				20° joint
20			SHALE; gray, medium to moderately hard, silty, occasionally sandy, occasional thin fossiliferous zones, calcareous in part		R-3 C.L.0.4'		92/0	
25					R-4 C.L.0.1'		98/60	20% circulation loss during Run 4
30					R-5 C.L.0.2'		96/37	30% circulation loss during Run 5
				5647.9				
35								Bottom of boring @ 33.4'

P-ST-019A

FIGURE 206

LOG OF BORING

BLACK & VEATCH
Consulting Engineers

BORING NO. B-94

CLIENT	PROJECT NO.	SHEET OF
Platte River Power Authority	7750	1 1

PROJECT	LOCATION	ELEVATION
Rawhide Energy Project	N-561,410 E-2,122,980	5794.5

DRILLING CONTRACTOR	DRILL RIG TYPE AND NO.	DRILLER
Hogan & Olhausen, Inc.	C.M.E. 55	C. Dearmore

DIRECTION AND INCLINATION OF HOLE	DATE	INSPECTOR
Vertical	2-16-78	L. Almaleh

DEPTH IN FEET	LOG	CLASSIFICATION OF MATERIAL (DESCRIPTION)	ELEV. FT., MSL	SAMPLER & BIT	BLOWS/6 IN. INCREMENTS (PER FOOT)	SAMPLE RECOVERY	PENETROMETER READING, TSF	REMARKS
5		CLAYEY SAND; tan, medium dense, moist, very calcareous (SC)		2" SB	6-5-8 (14)	0.9		Boring advanced w/4" diameter solid-stem auger
10		SILTY SAND; tan, dense, coarse to fine-grained, little to some fine gravel, moist, calc (SM)		2" SB	7-18-19 (37)	1.3		
15		SAND; light pale brown, medium dense to dense, trace of fine gravel, little silt, calcareous (SW-SM)		2" SB	10-13-15 (28)	1.4		
20		reddish-brown, less fines		2" SB	13-23-10 (33)	1.4		
		SAND; orng, med, fn-grnd, sm slt, mst, lmnt stng (SP-SM)	5775.6	3" TW		0.3		
25		SANDY SHALE; sev wx, olv, soft, sm slt, sm cl, mst	5770.0	3" TW		0.5	45+	Bottom of boring @ 24.5'

P-ST-016A

FIGURE 208

LOG OF BORING

BLACK & VEATCH
Consulting Engineers

BORING NO. B-95

CLIENT	PROJECT NO.	SHEET OF
Platte River Power Authority	7750	1 2

PROJECT	LOCATION	ELEVATION
Rawhide Energy Project	N-562,320 E-2,125,100	5772.0

DRILLING CONTRACTOR	DRILL RIG TYPE AND NO.	DRILLER
Hogan & Olhausen, Inc.	C.M.E. 55	C. Dearmore

DIRECTION AND INCLINATION OF HOLE	DATE	INSPECTOR
Vertical	2-15-78	L. Almaleh

DEPTH IN FEET	LOG	CLASSIFICATION OF MATERIAL (DESCRIPTION)	ELEV. FT., MSL	SAMPLER & BIT	BLOWS/6 IN. INCREMENTS (PER FOOT)	SAMPLE RECOVERY	PENETROMETER READING, TSF	REMARKS
5		SILTY SAND; crs to fn-grnd, tan to white, medium dense, trace fine gravel, moist, calcareous (SM-SC)		2" SB	3-7-7 (14)	1.2		Boring advanced w/4" diameter solid-stem auger
		clay content increasing		2" SB	7-4-4 (8)	1.2		
10		alternating layers of SM and SC		2" SB	10-14-19 (33)			
15		SHALE; severely to com weathered, gray-green, little silt, moist, calcareous	5756.6					
		Continued on next page						Boring continued w/NWM double tube core barrel w/diamond bit using water as drilling fluid

FIGURE 209

LOG OF BORING

BLACK & VEATCH
Consulting Engineers

BORING NO. B-95

PROJECT	PROJECT NO.	SHEET OF
Rawhide Energy Project	7750	2 2

DEPTH IN FEET	LOG	UNIT	CLASSIFICATION OF MATERIAL (DESCRIPTION)	ELEV. FT., MSL	SAMPLE OR RUN	N	% REC / % RQD	REMARKS
20		PIERRE SHALE	SHALE; severely weathered, olive green and gray, soft to medium, silty, sandy, iron oxide stained		R-1 C.L.1.0'		69/0	
					R-2		100/0	5° joint 20° joint
25					R-3		100/38	approximate 5 gallon water loss during Run 3
					R-4 C.L.0.4'		43/0	
30					R-5 C.L.0.6'		70/15	50% circulation loss from 31.1' to 34.0'
				5740.9				
			SHALE; slightly weathered, gray, medium to moderately hard, silty, sandy, fossiliferous, calcareous in part		R-6		100/66	
35					R-7 C.L.0.9'		64/40	
				5733.4				
40								Bottom of boring @ 38.6'

FIGURE 210

P-ST-019A

LOG OF BORING

BLACK & VEATCH
Consulting Engineers

BORING NO. B-96

CLIENT	PROJECT NO.	SHEET OF
Platte River Power Authority	7750	1 2

PROJECT	LOCATION	ELEVATION
Rawhide Energy Project	N-561,410 E-2,127,270	5761.5

DRILLING CONTRACTOR	DRILL RIG TYPE AND NO.	DRILLER
Hogan & Olhausen, Inc.	C.M.E. 55	C. Dearmore

DIRECTION AND INCLINATION OF HOLE	DATE	INSPECTOR
Vertical	2-17-78	L. Almaleh

DEPTH IN FEET	CLASSIFICATION OF MATERIAL (DESCRIPTION)	ELEV. FT., MSL	SAMPLER & BIT	BLOWS/6 IN. INCREMENTS (PER FOOT)	SAMPLE RECOVERY	PENETROMETER READING, TSF	REMARKS
0	SAND; white, medium dense, coarse to fine-grained, little to some silt, little fine gravel, moist, very calcareous (SM)		2" SB	5-5-12 (17)	1.2		Boring advanced w/4" diameter solid-stem auger
5	(SP-SM)		2" SB	12-19-25 (44)	1.5		
10			3" TW		2.1	2.5	
15	medium dense, trace to some fine gravel (SP-SM) a layer of silt (ML) at ≈ 16'		2" SB	5-10-12 (22)	1.2		
20	SAND; light brown, dense, coarse to fine-grained, some fine gravel, trace silt (SW-SM)		2" SB	18-25-25 (50)	1.4		
25	becoming very dense		2" SB	20-38-35 (73)	1.5		
30			2" SB	30-40-25 (65)	1.5		
35	Continued on next page						

FIGURE 211

LOG OF BORING

BLACK & VEATCH
Consulting Engineers

BORING NO. B-96

PROJECT	PROJECT NO.	SHEET OF
Rawhide Energy Project	7750	2 2

DEPTH IN FEET	LOG	CLASSIFICATION OF MATERIAL (DESCRIPTION)	ELEV. FT., MSL	SAMPLER & BIT	BLOWS/6IN. INCREMENTS (PER FOOT)	SAMPLE RECOVERY	PENETROMETER READING, TSF	REMARKS
		reddish-tan, little silt		2" SB	25-37-33 (70)	1.5		
40		trace fine gravel, trace clay (SW)		2" SB	21-50-45 (95)	1.5		
45				2" SB	32-43-45 (88)	1.5		
50		SHALE; sev wx, olv-grn, sft ltl fn snd, mst, v fsl	5710.1	3" TW		1.0	4.5	
								Bottom of boring @ 51.4'
55								

P-ST-017A

FIGURE 212

BLACK & VEATCH
CONSULTING ENGINEERS

LOG OF BORING

BORING NO. BB-126

CLIENT	PROJECT NO.	ELEVATION	SHEET OF
Platte River Power Authority	7750	5711.0	1 1

PROJECT	LOCATION	DATE: START FINISH
Rawhide Energy Project	N-560,330 E-2,126,870	6/1/79 6/1/79

DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE	LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
0						Silty Clay; dark grayish-brown; firm; moist; trace roots; trace gravel (topsoil)		CL	Boring drilled w/6" diameter hollow-stem auger
1									
2								CL	
3						Sandy Clay; pale yellow; firm; dry; highly calc; trace gravel			
4			49					SC	
5						Clayey Sand; light olive-brown; dense; fine to coarse grained; dry; numerous gravel; highly calcareous			
6									
7							5704.5		
8						Shale; silty; olive; severely ironstained; highly weathered		PIERRE SHALE	
9			58						
10									
11									
12									Boring continued w/NX split tube core barrel w/carbide insert bit using water as drilling fluid
13			57/7.5"			grading dark olive-gray; less ironstaining; moderately weathered			
14									
15									
16									
17	88	0				highly calcareous grading olive			
18									
19							5691.6		
20									Bottom of boring at 19.4'
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									

P-ST-036A

FIGURE _____

BLACK & VEATCH
CONSULTING ENGINEERS

LOG OF BORING

BORING NO. BB-127

CLIENT	PROJECT NO.	ELEVATION	SHEET OF
Platte River Power Authority	7750	5751.0	1 1

PROJECT	LOCATION	DATE: START FINISH
Rawhide Energy Project	N-561,120 E-2,126,800	6/1/79 6/1/79

DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE	LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
0						Sandy Clay; dark brown; firm; slightly moist; trace roots; numerous gravel (Topsoil)		CL	Boring drilled w/6" diameter hollow-stem auger
3			23			Clayey Sand; pink; medium dense; fine grained; dry; calcareous; trace fine gravel		SC	
6			39			Gravelly Sand; pink; dense; fine to coarse grained; very slightly moist; calcareous		SP	
10						Sandy Gravel; light brown		GP	
12			25			Clay; light yellowish-brown; very stiff; very slightly moist; highly calcareous	5733.0	CL	
18			32			Shale; silty; sandy; olive; slightly calcareous; ironstained throughout; highly weathered		PIERRE SHALE	
24			180			grading olive gray			
29			155			grading dark olive gray; moderately weathered			
33			50/3"			grading dark gray; slightly weathered			Boring continued w/NX split tube core barrel w/carbide insert bit using water as drilling fluid
36	100	100				grading very dark gray; thick bedded; fresh below 34.0'	5712.1		
39									Bottom of boring at 38.9'

P-ST-036A

FIGURE _____

BLACK & VEATCH
CONSULTING ENGINEERS

LOG OF BORING

BORING NO. BB-128

CLIENT	PROJECT NO.	ELEVATION	SHEET OF
Platte River Power Authority	7750	5731.7	1 1

PROJECT	LOCATION	DATE: START FINISH
Rawhide Energy Project	N-561,760 E-2,126,250	6/4/79 6/4/79

DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE	LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
0						Silty Clay; brown; soft; dry; trace roots; some sand (Topsoil)		CL	Boring drilled w/6" diameter hollow-stem auger
2						Sandy Clay; yel-br; firm; dry; trace gravel; highly calcareous		CL	
5						Silty Clay; olive; stiff; dry; some sand; calcareous (Residual Shale)	5725.7	CL	
8			94			Shale; silty; sandy; olive-gray; ironstained throughout; highly weathered		PIERRE SHALE	
14			106			grading moderately weathered			Boring continued w/NX split tube core barrel w/carbide insert bit using water as drilling fluid
19			127			grading olive-gray & dark gray banded; medium bedded; calcareous vertical ironstained fracture at 20.4'-21.0'			
20	93	31				grading dark gray; slightly weathered; occ anhydrite partings	5707.3		Bottom of boring at 24.4'
40									

P-ST-036A

FIGURE

BLACK & VEATCH
CONSULTING ENGINEERS

LOG OF BORING

BORING NO. BB-129

CLIENT	PROJECT NO.	ELEVATION	SHEET OF
Platte River Power Authority	7750	5777.0	1 2

PROJECT	LOCATION	DATE: START FINISH
Rawhide Energy Project	N-562,510 E-2,126,150	6/4/79 6/4/79

DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE	LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
0						Sandy Clay; dark brown; firm; trace roots; some gravel (Topsoil)		CL	Boring drilled w/6" diameter hollow-stem auger
1						Sandy Gravel; light brown; medium dense		GP	
2						Sand; brown; dense; fine to coarse grained; dry; numerous gravel; calcareous		SP	
3			45						
4									
5									
6						Silt; very pale brown; very stiff; dry; highly calcareous		ML	
7									
8			28						
9									
10									
11									
12						Sand; light brown; medium dense; fine to medium grained; dry; calcareous; trace gravel; some clay		SP	
13			48						
14									
15									
16									
17						grading fine to coarse grained; numerous gravel; trace silt			
18			54						
19									
20									
21									
22									
23									
24			52						
25									
26									
27									
28						Sandy Clay; hard; yellowish-brown; very slightly moist; calcareous; trace fine gravel		CL	
29			31						
30									
31						Sand; light brown; dense; fine to coarse grained; dry; numerous gravel; calcareous		SP	
32									
33			32						
34							5742.9		
35						Sandy Clay; brownish-yellow; very stiff; very slightly moist; calc			
36						grading moist		CL	
37									
38									
39			24			grading silty; light olive-gray			
40						Continued on next page			

P-ST-036A

FIGURE _____

BLACK & VEATCH
CONSULTING ENGINEERS

LOG OF BORING

BORING NO. BB-129

CLIENT	PROJECT NO.	ELEVATION	SHEET OF
Platte River Power Authority	7750	5777.0	2 2

PROJECT	LOCATION	DATE: START	FINISH
Rawhide Energy Project	N-562,510 E-2,126,150	6/4/79	6/4/79

DEPTH (FEET)	PERCENT RECOVERY	RQD	SPT N VALUE	SAMPLE	LOG	CLASSIFICATION	ELEVATION (FEET)	UNIT	REMARKS
40									
1									
2									
3			15			trace gravel		CL	
4									
5									
6							5730.5		
7						Shale; silty; sandy; olive-gray; medium bedded; ironstained throughout; highly weathered			Boring cont'd w/NX split tube core barrel w/carbide insert bit using water as drilling fluid
8									
9			137/9"						
50									
1									
2	71	71				fractures at intervals of < 0.1' calcareous			
3						below 51.2'grading dark gray & olive mottled; moderately weathered			
4							5722.6	PIERRE SHALE	
5									Bottom of boring at 54.4'
6									
7									
8									
9									
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
0									

P-ST-036A

FIGURE _____

Attachment 4
CDPHE Approval of Construction Quality Assurance Report, Rawhide Energy Station Coal Ash Disposal Facility, March 12, 2010

STATE OF COLORADO

Bill Ritter, Jr., Governor
James B. Martin, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
TDD Line (303) 691-7700
Located in Glendale, Colorado

http://www.cdphe.state.co.us

Laboratory Services Division
8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090

Colorado Department
of Public Health
and Environment

March 12, 2010

Mr. Christopher R. Wood
Platte Rover Power Authority
2000 E. Horsetooth Road
Fort Collins, Colorado 80525

RE: Approval of Construction Quality Assurance Report
Rawhide Energy Station Coal Ash Disposal Facility
Larimer County, Colorado
SW/LAR/RAW 2.3

Dear Mr. Wood:

Thank you for providing the Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division ("the Division") with the Construction Quality Assurance Report for the Monofill Expansion Project ("the CQA Report") for the Rawhide Energy Station Coal Ash Disposal facility in Larimer County, Colorado ("the facility"). The CQA Report was submitted to the Division under the requirements of the "Regulations Pertaining to Solid Wastes Sites and Facilities" (6 CCR 1007-2, "the Regulations") and the Section 30-20-100 *et. seq.* of the Colorado Revised Statutes ("Colorado Solid Waste Act," "the Act"). The CQA Report as reviewed by the Division included both the November 2009 report on the expansion project received by the Division January 5, 2010 and the "as-built" drawings requested from the facility February 8, 2010 and received by the Division on February 16, 2010.

The CQA Report provides a description of final construction and engineered drawings of the cell expansion conducted at the facility in September and October 2009. The report also includes information concerning the redesign of the drainage swale for the expansion at the facility to divert and control storm water drainage from the monofill for the 100-year, 24-hour event and construction of an embankment berm at the southern end of the monofill expansion to contain drainage from a 25-year, 24-hour event. The drainage swale was reconfigured as a trapezoidal channel with a base width of 30 feet and a maximum grade of 1.25 percent from its original design of base width 10 feet and maximum grade

of 0.5 percent. The report states that the original dimensions for the swale, when overlaid on the topographic map for the expansion area, would have caused erosion problems for the monofill.

Based on our review, the Division approves the CQA Report as submitted. Please ensure that financial assurance documents for the facility are adjusted to take into account the increase in area where wastes are being managed.

In closing, please note the Department is authorized to bill for its review of technical submittals pursuant to 30-20-109(2)(b). An invoice for the Division's review of the above referenced document will be transmitted under separate cover.

If you have any additional questions or concerns, please contact me at (303) 692-3347, or by e-mail at caren.johannes@state.co.us.

Sincerely,

Caren Johannes
Solid Waste Unit
Solid and Hazardous Waste Program

cc: Larimer County Commissioners
Mr. Rich Grossmann, Larimer County Department of Health and Environment

C:\CASWstuff\rawhide\RawhideCQA_exp.doc

Attachment 5
Summary of CCR Monofill Volume

Rawhide Energy Station
Annual Waste Summary

YEAR #	YEAR	Lime Used	Sulfate Collected	Activated Carbon Used	Wastewater Treatment Tank Residuals	Fly Ash Sales	Fly Ash Waste	Bottom Ash Waste	BAT Closure	Total CCR Monofill Waste	Section #	East & West Monofill Waste Accumulation		Cumulative with Topsoil @ 2 feet	West Monofill Waste Accumulation		Cumulative with Topsoil @ 2 feet
		(tons)	(tons)	(tons)	(tons)	(tons)	(tons)	(tons)	(tons)	(tons)		(cubic yds) [1]	(acre feet)	(acre feet)	(cubic yds) [1]	(acre feet)	(acre feet)
1	1984	2,950.0	2,544.0				32,818.0	4,821.9		37,639.9	1	37,175.2	23.0	27.6			
2	1985	6,006.0	7,848.7				59,902.0	8,126.0		68,028.0	1	104,363.3	64.7	69.3			
3	1986	4,375.5	6,133.5				53,495.4	7,585.9		61,081.3	1	164,690.5	102.1	106.7			
4	1987	4,384.5	6,266.6				59,587.9	8,635.9		68,223.8	1	232,072.0	143.8	148.4			
5	1988	5,800.0	8,108.1				70,164.6	9,927.6		80,092.2	2	311,175.4	192.9	197.5			
6	1989	4,926.0	7,505.7				62,657.0	8,863.3		71,520.3	2	381,812.7	236.7	240.9			
7	1990	4,660.0	6,860.8				61,660.2	8,848.1		70,508.3	2	451,450.6	279.8	284.0			
8	1991	3,970.0	6,425.0				54,832.3	7,841.9		62,674.2	2	513,351.0	318.2	322.4			
9	1992	4,174.0	6,367.1				57,662.4	8,315.5		65,977.9	2	578,514.3	358.6	362.8			
10	1993	5,725.0	7,865.5				68,607.5	9,708.9		78,316.4	2	655,863.8	406.5	410.7			
11	1994	4,578.0	5,923.8				58,120.7	8,403.3		66,524.0	2	721,566.5	447.3	451.5			
12	1995	3,961.8	4,780.1				54,257.5	8,032.2		62,289.6	2	783,087.1	485.4	489.6			
13	1996	4,337.6	5,368.2				61,666.8	9,169.6		70,836.4	2	853,049.0	528.7	532.9			
14	1997	4,214.1	5,246.2				58,838.0	8,713.7		67,551.8	2	919,766.8	570.1	574.3			
15	1998	5,122.1	5,878.9				58,472.4	8,377.3		66,849.7	3	985,791.1	611.0	615.2			
16	1999	5,599.7	6,518.5				70,115.3	10,234.8		80,350.1	3	1,065,149.2	660.2	663.2			
17	2000	4,098.6	5,196.0				54,911.1	8,050.0		62,961.1	3	1,127,333.0	698.8	701.8			
18	2001	5,738.1	6,513.4				68,526.4	9,930.9		78,457.2	3	1,204,821.6	746.8	749.8			
19	2002	5,381.4	6,802.3				65,465.9	9,402.7		74,868.6	3	1,278,765.9	792.6	795.6			
20	2003	5,402.4	6,896.2				70,595.5	10,287.7		80,883.2	3	1,358,650.6	842.1	845.1			
21	2004	4,879.4	6,807.6				72,293.7	10,695.3		82,989.0	3	1,440,615.0	892.9	895.9			
22	2005	4,298.5	5,007.1				60,262.7	8,992.4		69,255.1	3	1,509,015.1	935.3	938.3			
23	2006	4,814.7	6,528.3			804.8	69,283.0	10,224.7		78,702.9	3	1,586,746.4	983.5	986.5			
24	2007	5,177.8	7,347.4			1,227.9	72,482.3	10,580.7		81,835.1	3	1,667,571.1	1,033.6	1,036.6			
25	2008	4,300.8	6,234.1			1,476.1	62,593.9	9,186.9		70,304.6	1A	1,737,007.8	1,076.7	1,081.1	69,436.7	43.0	47.4
26	2009	5,025.8	8,044.3			12,226.5	73,032.6	10,581.6		71,387.7	1A	1,807,514.2	1,120.4	1,124.8	139,943.1	86.7	91.1
27	2010	4,750.5	7,554.2			5,583.2	72,323.0	6,668.7		73,408.5	1A	1,880,016.4	1,165.3	1,169.7	212,445.3	131.7	136.1
28	2011	4,745.9	7,400.3			11,008.4	72,177.5	6,670.1		67,839.2	1A	1,947,018.1	1,206.8	1,211.2	279,447.0	173.2	177.6
29	2012	4,237.8	6,560.0			9,572.2	66,126.1	6,147.6		62,701.6	1A	2,008,945.6	1,245.2	1,249.6	341,374.5	211.6	216.0
30	2013	4,548.5	6,692.3	69.1		17,763.9	72,439.2	6,792.2		61,467.4	1A	2,069,654.2	1,282.8	1,287.2	402,083.0	249.2	253.6
31	2014	4,942.5	6,829.9	89.1		8,954.3	73,317.9	6,828.5		71,192.1	1A	2,139,967.4	1,326.4	1,330.8	472,396.3	292.8	297.2
32	2015	4,661.7	5,803.1	82.4		9,326.5	66,283.1	6,192.9		63,149.5	2A	2,202,337.3	1,365.1	1,369.3	534,766.2	331.5	335.7
33	2016	4,924.1	6,741.1	98.2		8,611.2	73,418.9	6,850.6		71,658.3	2A	2,273,110.9	1,409.0	1,413.2	605,539.8	375.3	379.5
34	2017	4,854.0	7,020.2	119.4		8,484.7	72,603.4	6,734.4		70,853.1	2A	2,343,089.3	1,452.3	1,456.5	675,518.2	418.7	422.9
35	2018	4,182.6	5,589.8	108.4		11,771.5	61,876.5	5,777.3		55,882.4	2A	2,398,281.8	1,486.5	1,490.7	730,710.6	452.9	457.1
36	2019	4,199.2	5,591.3	130.1		20,313.3	52,055.7	18,057.9		59,721.0	2A	2,457,265.5	1,523.1	1,527.3	789,694.3	489.5	493.7
37	2020	4,296.0	5,427.4	130.5		12,189.4	50,879.7	17,582.5	121,656.9	187,783.6	2A	2,642,730.8	1,638.1	1,642.3	975,159.7	604.4	608.6
38	2021	3,274.9	4,942.8	118.4	8400.0	14,286.8	42,536.3	14,657.2		51,242.8	2A	2,693,341.0	1,669.4	1,673.6	1,025,769.9	635.8	640.0
39	2022	3,323.5	5,826.0	128.8		17,795.7	49,016.8	17,030.8		57,530.2	2A	2,750,161.0	1,704.6	1,708.8	1,082,589.9	671.0	675.2
40	2023	2,306.0	4,102.9	89.0		33,572.0	31,584.6	10,751.5		15,262.0	2A	2,765,234.6	1,714.0	1,718.2	1,097,663.4	680.4	684.6
Mean		4,578.7	6,277.5	105.8	8,400.0	11,387.1	61,723.6	9,257.0	121,656.9	67,746.7	Mean	70,877.4	43.9	44.0	73,269.3	45.4	45.7
Maximum		6,006.0	8,108.1	130.5	8,400.0	33,572.0	73,418.9	18,057.9	121,656.9	187,783.6	1984-07 Mean	69,482.1	43.1	43.2			
Limits/PTE		8,400	-	2,000	-	-	148,650	24,750	-	173,400							
Totals		183,149	251,099	1,163	8,400	204,968	2,468,944	370,281	121,657	2,799,800							

Notes: Bottom Ash Waste = (Coal Burned x % Bottom Ash). Assumes 70% Fly Ash and 30% Bottom Ash with dry sluice system.
[1] Assume 1.0125 tons per cubic yard

Notes:
Total CCR waste for 2020 includes 120,155 cyds from BAT Impoundment decommissioning (reference: BAT Construction Completion Certification Report, AECOM, December 17, 2020).
Fly Ash Sales waste stream (removal) factored into Total CCR Monofill Waste beginning in 2006
Lime Used, Sulfate Collected, and Activated Carbon Used waste stream factored into Total CCR Monofill Waste beginning in 2019
Wastewater Treatment Tank Residuals and plant floor drain solids started being sent to Monofill in 2021. Waste stream to be placed every other year in Monofill.

Attachment 6
Federal CCR Annual Inspection Form

Federal CCR Annual Inspection Form

Station: PRRA - Rawhide CCR Unit: Ash Monofill

Date: 12/7/2023 Inspector(s): P. Clem / J. Hurshman

Weather Conditions: sunny, 50°F, breezy Ground Conditions: clear ground, no snow

Purpose of Inspection: Per the CCR Rule published by the USEPA and entered into the federal register on April 17, 2015, existing and new CCR landfills are required to be inspected annually by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR facility is in good condition and conforms to standard engineering practices for this type of facility.
Please refer to the attached figure to mark location of any identified conditions.

CCR UNIT FEATURE	Yes	No	NA	Location ID # or map identifier
CCR Placement				
1) Is waste being handled or placed differently than standard station practices?		X		
Bench Conditions				
2) Any signs of surface cracking?		X		
3) Any signs of depressions or sunken areas?		X		
Slope Conditions				
4) Any signs of surface cracking?		X		
5) Any signs of surface movement? If yes, please categorize		X		
5a) Sloughing (sliding of materials in sheets)		--		
5b) Sliding		--		
5c) Sinking		--		
6) Any signs of erosion rills greater than 3 inches?	X			near slope of protective cover, west facing near water face
7) Any signs of erosion gullies greater than 6 inches?		X		
8) Any signs of holes or animal burrows?	X			Cell 1 cover east slopes, north end cell 1
Haul Road Conditions				
9) Any obstructions?		X		
10) Any noticeable damage? If yes, please categorize		X		
10a) Rutting		--		
10b) Sinking		--		
10c) Pot holes		--		
Erosion Controls				
11) Any areas of active construction lacking erosion controls (silt fence)?	X			Top of new Cell 2B, west face near protective cover
12) Any signs that existing erosion controls are not properly functioning?		X		
13) Any evidence of insufficient vegetative cover?	X			Occasional sparse cover on Cell 1 east slope, Cell 2 top slope between active face and starter dike.
Liner System Conditions (prior to CCR placement or during active liner construction)				
14) Any damage to liner protective cover?		X		
15) Any damage to liner system observed?		X		

Federal CCR Annual Inspection Form - CCR Landfills

Station: PRRA - Rawhide CCR Unit: Ash Monofill Date: 12/7/2023

CCR UNIT FEATURE	Yes	No	NA	Location ID # or map identifier
Leachate Collection/Detection System				
16) Any signs of obstruction to leachate collection/detection pipe outlets?		x		
17) Any signs of obstruction to leachate flow(s) to storage lagoon(s)?		x		
Surface Water Controls (Diversion Channels/Collection Channels/Sedimentation Ponds)				
18) Any signs of uncontrolled run-on to the landfill?		x		
19) Any signs of uncontrolled run-off from the landfill		x		
20) Any signs of obstruction in surface water conveyance channels?		x		
21) Any cracking or separation in surface water conveyance channels?		x		
22) Any signs of heaving or sinking of surface water conveyance channels?		x		
23) Any signs of obstruction in culverts, drop boxes, or sumps?		x		
24) Any signs of sedimentation pond malfunction (excessive sediment buildup)?			x	no pond
25) Any signs of excessive sedimentation pond water loss (leaking)?			x	no pond
26) Any signs of obstruction to sedimentation pond outlet structure (in pond)?			x	no pond
27) Any signs of obstruction to sedimentation pond effluent discharge?			x	no pond
Fugitive Dust Controls				
28) Any evidence that fugitive dust controls are not being used?		x		Dust flies when dumping
Other				
29) Any nontypical operations occurring at facility? If yes, please describe.		x		

Additional Comments: Cell 1 and new cell 2 connection area (south end) recently revegetated. Good growth in re-vegetation area of Cell 2 and Cell 1/2 connection

Individual Completing Form: Patrick Clem (Print) Patrick M. Clem (Signature)

Attachment 7
Sample Platte River Weekly Inspection Form

CCR Landfill
Weekly Inspection Report

Name of CCR Landfill: Rawhide Ash Monofill
Qualified Inspector: Courtney Stewart
Date: 1/11/2024 **Time:** 8:45 AM
Owner: Platte River Power Authority
Weather: Partly cloudy
Operator: Platte River Power Authority

I. Perimeter Slope

1. How would you describe the vegetation on the crest and side slopes? (Check all that apply)

___ Recently Mowed
___ Overgrown (Greater than 6-in.)
x Good Cover
___ Sparse
___ Paved
___ Gravel

Other (describe):

2. Are there any areas of hydrophilic (lush, water-loving) vegetation? ___ Yes x No
If 'Yes', describe (size, location, severity, etc.)

3. Are there any trees or other undesired vegetation on the slope? ___ Yes x No
If 'Yes', describe (type of vegetation, size, location, etc.)

4. Is there an access ramp up the side slope or a road around the perimeter slope? x Yes ___ No
If 'Yes', describe (good condition, numerous cracks, newly paved, stone uniformly distributed, etc.) Ramp is in good condition and is a dirt road which is free from cracks.

5. Are there any depressions, ruts, or holes on the access ramp or road? ___ Yes x No
If 'Yes', describe (size, location, etc.)

6. Are there any cracks, sloughs, bulges, or indications of slope distress? ___ Yes x No
If 'Yes', describe (length and width, location and direction of cracking, slough, or distress, etc.)

7. Do any wet areas indicate seepage through the slope? ___ Yes x No
If 'Yes', describe (size, location, etc.)

8. Are there any active seeps (flowing water) from the slope of the slope? ___ Yes x No
If 'Yes', describe (size, location, flow quantity and color, etc.)

9. Are there any active seeps or wet areas at the toe of the slope? ___ Yes x No
If 'Yes', describe (size, location, etc.)

10. Other observations on the perimeter slope (changes since last inspection, etc.):

II. Stormwater Conveyance

1. Is stormwater being properly diverted by the existing infrastructure? x Yes ___ No

CCR Landfill
Weekly Inspection Report

Name of CCR Landfill: Rawhide Ash Monofill **Qualified Inspector:** Courtney Stewart
Date: 1/11/2024 **Time:** 8:45 AM

If 'Yes', describe (size, location, etc.) No stormwater to divert as of recent, but stormwater infrastructure is in good condition. There is a diversion berm along the upstream western perimeter of the site that prevents stormwater run-on.

2. Is the stormwater infrastructure in good condition? x Yes ___ No

If 'No', describe (Is there any erosion in or around the structures, signs of leakage or movement, etc.?).

III. Landfill Conditions

1. Describe operations in the landfill (disposal, reclamation, general operational activities):
Landfill operations include the disposal of coal ash residuals, and minimizing dust potential. This includes disposing of moist ash residuals, covering the waste to reduce wind erosion, and water truck spraying of haul truck routes and active face for dust control.

2. Are any stormwater controls obstructed? ___ Yes x No
If 'Yes', describe (type of debris, reason for obstruction, etc.)

3. Are there indications of erosion on the landfill slopes? ___ Yes x No
If 'Yes', describe what type and its condition (rill, gully, dimensions, etc.)

4. Do conditions exist that may require additional dust controls? ___ Yes x No
If 'Yes', describe (location, appropriate dust control measures, etc.)

5. Other observations around the landfill (changes since last inspection, etc.):

IV. Repairs, Maintenance, Action Items

1. Has any routine maintenance been conducted since the last inspection? ___ Yes x No
If 'Yes', describe.

2. Have any repairs been made since the last inspection? ___ Yes x No
If 'Yes', describe.

CCR Landfill
Weekly Inspection Report

Name of CCR Landfill: Rawhide Ash Monofill **Qualified Inspector:** Courtney Stewart
Date: 1/11/2024 **Time:** 8:45 AM

3. Are there any areas of potential concern? ___ Yes x No
If 'Yes', describe.

4. Has this inspection identified any need for repair or maintenance? ___ Yes x No
If 'Yes', describe and state the urgency of maintenance. "Urgent" for maintenance that should be conducted as soon as possible, "Moderate" for maintenance that should be conducted within three months, and "Not Urgent" for maintenance that can be conducted in a year.

V. Photographs

Photographs can be taken of notable features. List of photographs:

	Location	Direction of Photo	Description
i.			
ii.			
iii.			
iv.			
v.			
vi.			
vii.			
viii.			
ix.			
x.			

Attachment 8
Photo Log of Inspection

Attachment 8
Photo Log of Ash Monofill Inspection December 7, 2023

Photo #1: Large animal burrow, approximately 500 ft north of PRS-02 on east face of Cell 1.

Attachment 8
Photo Log of Ash Monofill Inspection December 7, 2023

Photo #2: Minor exposed ash in berm on north end of cell 1 near roadway.

Attachment 8
Photo Log of Ash Monofill Inspection December 7, 2023

Photo #3: Limited vegetation between tufts of grass, approximately 4,500 ft north of ASH-03 of east face of cell 1.

Attachment 8
Photo Log of Ash Monofill Inspection December 7, 2023

Photo #4: Drainage/erosion rill forming in protective cover on the west face of cell 2B near connection with cell #1 and cell 2A.

Attachment 8
Photo Log of Ash Monofill Inspection December 7, 2023

Photo #5: Good vegetative cover of east face of cell #1 looking north.

Attachment 8
Photo Log of Ash Monofill Inspection December 7, 2023

Photo #6: Small animal burrows in cell #1 cover east slope near wye in east road.

Attachment 8
Photo Log of Ash Monofill Inspection December 7, 2023

Photo #7: Larger rabbit brush growing on north end of cell #1 mixed with grasses. Photo looking south along west face of cell #1.

Attachment 8
Photo Log of Ash Monofill Inspection December 7, 2023

Photo #8: Toe of cell 2A. Good vegetative cover. Looking west.

Attachment 8
Photo Log of Ash Monofill Inspection December 7, 2023

Photo #9: Colvert under roadway on west side of cell 2A. Clear of obstructions.

Attachment 8
Photo Log of Ash Monofill Inspection December 7, 2023

Photo #10: Ash placement in newly constructed cell 2B. Looking Southwest.

Attachment 8
Photo Log of Ash Monofill Inspection December 7, 2023

Photo #11: Placement of CCR over top of protective cover in cell 2B. Looking East. Good vegetative cover on cell #1 above newly constructed cell 2B.

Attachment 8
Photo Log of Ash Monofill Inspection December 7, 2023

Photo #12: Small erosional rills starting to form in protective cover of cell 2B. Looking west.