



# Amended Written Post-Closure Plan

---

Comanche Station - Active CCR Landfill

*Public Service Company of Colorado  
Denver Colorado*

October 17, 2016

June 20, 2022 - Revision 1

August 19, 2022 – Revision 1.1

## Table of Contents

---

1.0	General Information.....	1
2.0	Monitoring and Maintenance §257.104(d)(1) .....	1
2.1	Integrity of Final Cover §257.104(b)(1) .....	4
2.2	Integrity of Leachate Collection and Removal System §257.104(b)(2) .....	4
2.3	Integrity of Groundwater Monitoring System §257.104(b)(3).....	5
2.4	Post-Closure Groundwater Monitoring §257.104(b)(3).....	5
3.0	Post-Closure Site Contact 257.104(d)(1)(ii) .....	6
4.0	Post-Closure Use §257.104(d)(1)(iii) .....	6
5.0	Schedule of Closure Activities.....	7
6.0	Qualified Professional Engineer Certification §257.104(d)(4).....	8

## List of Tables

---

Table 1.	Current Personnel Responsibilities.....	6
Table 2.	Schedule of Closure Activities.....	7

## List of Figures

---

Figure 1.	Comanche Power Station .....	3
-----------	------------------------------	---

## Appendices

---

Appendix A.	Final Cover Drawings .....	A
Appendix B.	Post-Closure Inspection Checklist.....	B



## Table of Abbreviations and Acronyms

---

Abbreviation	Definition
ADF	Ash Disposal Facility
amsl	above mean sea level
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
PSCo	Public Service Company of Colorado

## 1.0 General Information

Comanche Station is a 1,450-megawatt coal-fired steam turbine power plant owned and operated by Public Service Company of Colorado (PSCo), an Xcel Energy company. The Station is located at 2005 Lime Road, Pueblo, Colorado, approximately 3 miles south of Colorado Highway 50 in Pueblo County, Colorado.

The Station's Ash Disposal Facility (ADF) is located on the southwest corner of the Comanche property (see **Figure 1**). The land surface elevations range from approximately 4,830 feet above mean sea level (amsl) in the southwest and northwest corners of the Site to approximately 4,800 feet amsl in the southeast corner of the Site.

The ADF is an active, coal combustion residuals (CCR) disposal unit that began construction and operation in 1987 and has remained in continuous operation since that time. The ADF is operated under an Engineering Design and Operations Plan developed pursuant to Colorado Department of Health and Environment Solid Waste Regulations.

The ADF was originally permitted as an approximately 280-acre engineered ash monofill consisting of eight disposal cells. With the final coal unit ceasing operations planned for no later than the end of 2034, the updated ADF configuration will consist of only three disposal cells encompassing 94-acres, which is sufficient to handle future disposal requirements given the reduced coal generation lifespan. Approximately 13.0 acres of the ADF will be used for surface water control structures, access roads, and borrow area. The wastes accepted at the ADF consist primarily of coal ash (fly ash and bottom ash), with smaller quantities of water treatment sludge, process water pond sediment, coal impurities, and excavation soils. Cell 2 East is the current (2022) active disposal area.

In accordance with 40 Code of Federal Regulations (CFR) §257 Disposal of Coal Combustion Residuals From Electrical Utilities (CCR Rule) 40 CFR §257.104(d), PSCo is required to publish a written post closure plan that describes the maintenance and monitoring for the landfill throughout the 30-year post closure care period.

This plan fulfills the requirements of 40 CFR §257.104(d) that requires:

- (i) A description of the required monitoring and maintenance activities and the frequency at which activities will be performed;
- (ii) The name address, telephone number and e-mail address of the person or office to contact about the facility during the post-closure care period; and
- (iii) A description of the planned uses of the property during the post-closure period.

## 2.0 Monitoring and Maintenance §257.104(d)(1)

Per 40 CFR 257 §102(d)(1)(i), the final cover will have a grade that promotes surface water run-off and minimizes erosion. The slope of the final cover on the top of the ADF will be no less than 5% and the final cover side slopes will be no greater than 25% (4 horizontal feet to 1 vertical foot). A 5% slope will be sufficient to convey any precipitation runoff from the top of the ADF to downchute conveyance structures located at the perimeter of the ADF. Small swales along the tops and sidewalls of the ADF will direct precipitation runoff to the downchute conveyance structures. These

design elements are intended to minimize to the maximum extent feasible, post-closure saturation of final cover soils and the potential for sloughing of the final cover system as required by 40 CFR 257 §102(d)(1)(i) - (iii).

The ADF will be monitored and maintained during post closure as a single CCR unit. Stormwater ponds, drainage swales, and downchute channels were sized to contain the 25-year, 24-hour storm precipitation event and control the 100-year, 24-hour storm peak discharge. The stormwater design calculations were completed by Tetra Tech, submitted in the January 2018 Engineering Design and Operations Plan (EDOP), and approved by the Colorado Department of Public Health and the Environment (CDPHE). The post-closure care will be conducted for a minimum of 30 years after final closure. During the post-closure period, inspections will occur every 6 months and after every 5-year, 24-hour precipitation event (or 1.5 inches in 24 hours) to ensure effectiveness of the final cover. The inspections will include, at a minimum, evaluation of settlement, subsidence, erosion, or other events to prevent run-on and run-off from eroding and damaging the final cover, as well as surface-water drainage, and site security features. Site access roads will also be inspected and maintained to promote drainage and reduce erosion. Deficiencies identified during the inspections will be corrected within a timeframe commensurate with the significance of the deficiencies. For minor settlement, subsidence, or erosion deficiencies, corrections to the final cover system will be completed within two weeks of initial identification. However, if more significant deficiencies are identified, a plan to correct the deficiency will be developed within one month of initial identification and will include a schedule for completion of the corrective action; in most cases, corrective action is expected to be complete within two months of plan development. While the plan is being developed, the condition will be evaluated to determine if any interim measures are necessary and implemented as appropriate.

The Post Closure Inspection Checklist provided in Appendix B shall be utilized to document the inspections of the final cover system, the leachate collection and removal system, and the groundwater monitoring system as described in Sections 2.1, 2.2, and 2.3.



Figure 1. Comanche Power Station – CCR Landfill

## 2.1 Integrity of Final Cover §257.104(b)(1)

The final cover system for Cell 1 will consist of an 18-inch soil cover having permeability equal to or less than  $2 \times 10^{-7}$  cm/sec. The remaining cells will consist of a 60-mil HDPE geomembrane, overlain by an 8-oz nonwoven geotextile fabric, overlain by an 18-inch common fill layer, overlain by a 6-inch topsoil layer. A potential alternate cover system may be utilized after completion of appropriate demonstrations and Colorado Department of Public Health and Environment (CDPHE) approval. The potential alternate cover system will consist of a 50-mil LLDPE geomembrane, overlain by an engineered turf which is infilled with 1-inch of sand. Details of the final cover systems are included in Appendix A.

The final cover will be evaluated during the inspections, looking for evidence of the following items:

- Settlement and subsidence;
- Surface erosion;
- Vegetative damage;
- Cracks or desiccation; and
- Biotic intrusion of the cap (burrowing rodents or animals).

Visual inspections for subsidence can include walking the cover after a major rainstorm or the beginning of snowmelt and thaw and looking for puddles or ponding.

Repair of the capping system in damaged areas will include as applicable:

- Replacing soils by type;
- Replacing cover soil; and
- Reestablishing vegetation.

Visual inspection of the storm water/drainage system will include the following areas as applicable:

- Culverts
- Ditches
- Monitoring/discharge structures
- Other drainage control structures

Inspection will identify any accelerated erosion in a particular area and differential settling of drainage control structures. Inspections will also look for sedimentation, clogs or obstructions, deterioration, and vegetative intrusion.

Damaged drainage control structures will be repaired, replaced, or restored to original conditions. If drainage structures become plugged or silt filled, they will be cleaned by water jetting or similar means, re-graded and vegetated, as necessary to maintain drainage capacity.

Annual maintenance requirements may be affected by weather, the maturity of vegetation and other variables. The level of maintenance required is expected to decrease with time as the vegetative support system becomes established.

## 2.2 Integrity of Leachate Collection and Removal System §257.104(b)(2)

The leachate-collection and removal system was constructed concurrently with construction of Cell 2E to collect leachate from Cells 2 and 3. The system was designed and intended to be operated to maintain less than a 30-centimeter depth of leachate over the liner system, consistent with the requirements of 40 CFR §257.70. All leachate collection pipes within the lined area are constructed on top of the approved liner system except where penetrations through internal or external berms are required. Solid pipe is installed for any portion not placed over the liner system. Pipe

penetrations through the liner system are sealed. The leachate sump consists of a concrete tank sized such that 80% of full capacity is capable of containing approximately 20 days of leachate storage between pumping to allow flexibility in operations. During landfill operations, leachate was observed and collected primarily after precipitation events after new sections of liner had been constructed but did not yet have compacted ash placed over the entire lined area. Due to the nature of the compacted ash which has a very low permeability and after installation of the geomembrane final cover, post closure leachate generation is expected to be minimal. However, the leachate sump will be checked during inspections and will be pumped if needed to maintain capacity. Any leachate that is removed will be properly handled and disposed at a permitted treatment or disposal facility.

During-post closure, the leachate-collection system will be operated to allow the system to function as designed. The leachate collection system will be visually inspected for the following:

- Blockage of pipes and clean-outs;
- Carriage to leachate pumping facilities; and,
- Leaks or cracks in collection/retention structures.

Leachate collection pipes will be inspected for blockages and damages. Clogged leachate collection piping will be cleaned by water jetting or similar means. Damaged leachate collection system components will be repaired and/or replaced, as necessary.

## 2.3 Integrity of Groundwater Monitoring System §257.104(b)(3)

The groundwater monitoring wells will be visually inspected for the following at each post-closure sampling event:

- Erosion or biotic intrusion around the base;
- Damage to locking well caps;
- Integrity of well seals; and
- Integrity of any well markers or protective structures.
- Integrity of the well casing

If erosion is observed at groundwater monitoring wells such that the concrete pad or well integrity may be adversely affected, the areas will be filled with compatible soil materials graded to drain and covered with vegetative growth. Damaged well caps, concrete pads, and well seals will be repaired and/or replaced. If a well casing appears to be blocked such that it cannot be properly monitored, it will be evaluated to determine and correct the cause, or repair or replace, as necessary.

At the conclusion of the post-closure monitoring period, all monitoring wells will be properly abandoned in accordance with the applicable regulatory requirements.

## 2.4 Post-Closure Groundwater Monitoring §257.104(b)(3)

Consistent with the requirements of 40 CFR §257.90 through 257.98, PSCo has installed and is operating a site-specific groundwater monitoring system and prepared associated plans. The groundwater monitoring system, sampling, analytical analysis, and reporting procedures are described in the Groundwater Monitoring System (GMS) and Groundwater Sampling and Analysis (GSA) Plan, as posted to the facility Operating Record.

All sampling, packaging, shipping, testing, and reporting during the post-closure care period will be in accordance with the GMS and GSA Plans and the applicable requirements of 40 CFR §257.90 through 257.98.



### 3.0 Post-Closure Site Contact 257.104(d)(1)(ii)

Comanche Station ADF is owned and operated by PSCo, 1800 Larimer Street, Denver, Colorado 80202. **Table 1** lists personnel associated with this site with the responsibility for post-closure care monitoring and maintenance.

Name (Department)	Telephone	E-mail	Address
Jennifer McCarter (Environmental Services)	303-294-2228	Jennifer.McCarter@xcelenergy.com	1800 Larimer St., Suite 1300, Denver, CO 80202

### 4.0 Post-Closure Use §257.104(d)(1)(iii)

In accordance with 40 CFR §257.104(d)(1)(iii) the post-closure plan must provide a description of the planned uses of the property during the post-closure period.

Comanche Station will continue to be owned by PSCo and used for utility operations, but there is no current post-closure use planned for the Comanche ADF. However, any future proposed use of the area of the closed ADF will not disturb the integrity of the final cover, liner, or any other component of the containment system or the function of the monitoring systems unless necessary to comply with the requirements of 40 CFR §257, or if demonstrated that such disturbance will not increase the potential threat to human health or the environment in accordance with 40 CFR §257.104(d)(3). The ADF is located entirely on the fenced and secured property owned by PSCo, and a deed notation will be recorded on the property in accordance with 40 CFR §257.102(h)(i).

This amendment, dated August 19, 2022, was completed to update the initial post-closure plan dated October 17, 2016. Upon completion of the post-closure period, estimated to occur in 2067, a notification will be submitted to CDPHE no later than 60 days following the completion of the post-closure care period in accordance with 40 CFR §257.104(e). The notification will be certified by a Colorado-Registered Professional Engineer verifying that post-closure care has been completed. The completed notification will be placed within the operating record and placed on publicly accessible website.

## 5.0 Schedule of Closure Activities

Final closure is expected to be completed in 2037 and the ADF will be monitored and maintained during post closure as a single CCR unit. (See **Table 2**).

<b>Table 2. Schedule of Closure Activities</b>		
<b>Plans</b>	<b>Initial</b>	<b>Revised</b>
Written Closure Plan	October 17, 2016	June 20, 2022
Written Post-Closure Plan	October 17, 2016	June 20, 2022
State Closure Plan	September 8, 2017	2022/2023
<b>Task</b>	<b>Cell Start Date</b>	<b>Cell Fill Date</b>
Cell 1	1987	2019 (interim grade/intermediate cover)
Cell 2 East	2018	2024 (interim grade/intermediate cover)
Cell 2 West	2024	2032 (interim grade/intermediate cover)
Cell 3*	Year 2032	Year 2037* (final waste grade)
Final Closure Procurement	2036	2037
Final Closure	2037	2037
State CQA Report Approval	2037	2037
Closure Notification	2037	2037
Deed Notice	2037	2037
Annual Inspections	Annually	Annually until 2037
Fugitive Dust Plan Updates	Annually	Annually until 2037
Post Closure Inspections	Every 6 months and after every 5-year 24-hour precipitation event (or 1.5 inches in 24 hours)	Year 2067 (minimum)
Post Closure Maintenance	Year 2037	Year 2067 (minimum)

\* Note: There are currently two proposed plant closure dates in front of the Colorado Public Utilities Commission for approval: 12/31/2034 and 1/1/2031, neither of which have been decided. We are using the 2034 date as our estimate until a decision is made. An additional three years beyond the cessation of ash production on-site has been conservatively added to the schedule. This is to account for disposal of materials in the ADF associated with plant decommissioning activities such as removal of coal pile residuals and on-site impoundment waste.

## 6.0 Qualified Professional Engineer Certification §257.104(d)(4)

In accordance with 40 CFR §257.104(d)(4), the owner or operator of the CCR unit must obtain a written certification from a qualified professional engineer that the initial and any amendment of the written post closure plan meets the requirements of this section.

I, Brent J. Learch, being a registered Professional Engineer, in accordance with the Colorado State Board of Licensure for Architects, Professional Engineers, and Professional Land Surveyors, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this written Post-Closure Plan dated August 19, 2022, was conducted in accordance with the requirements of 40 CFR §257.104(d)(4), is true and correct, and was prepared in accordance with recognized and generally accepted good engineering practices.

SIGNATURE:



Colorado PE 0056841

DATE:

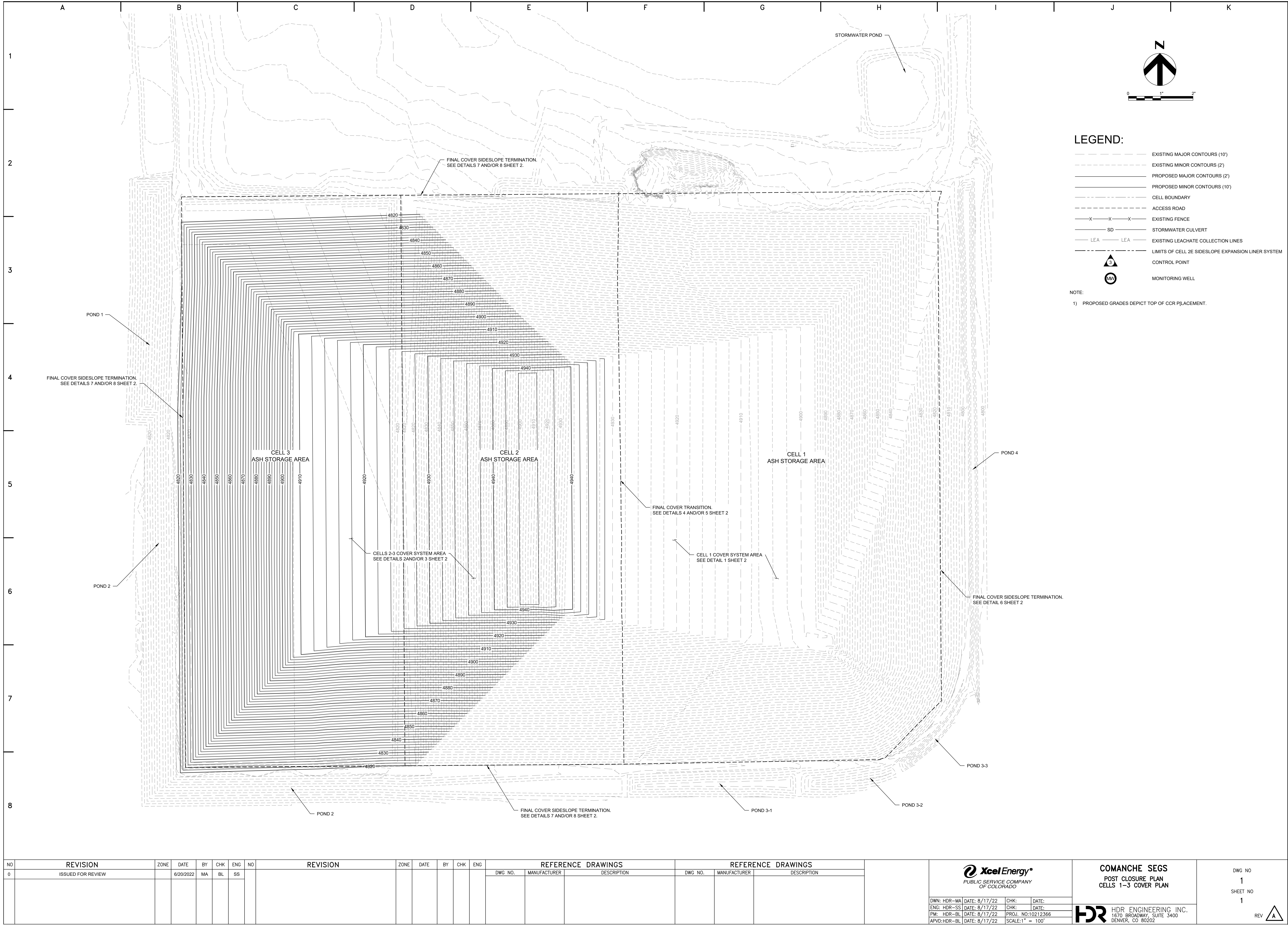
August 19, 2022

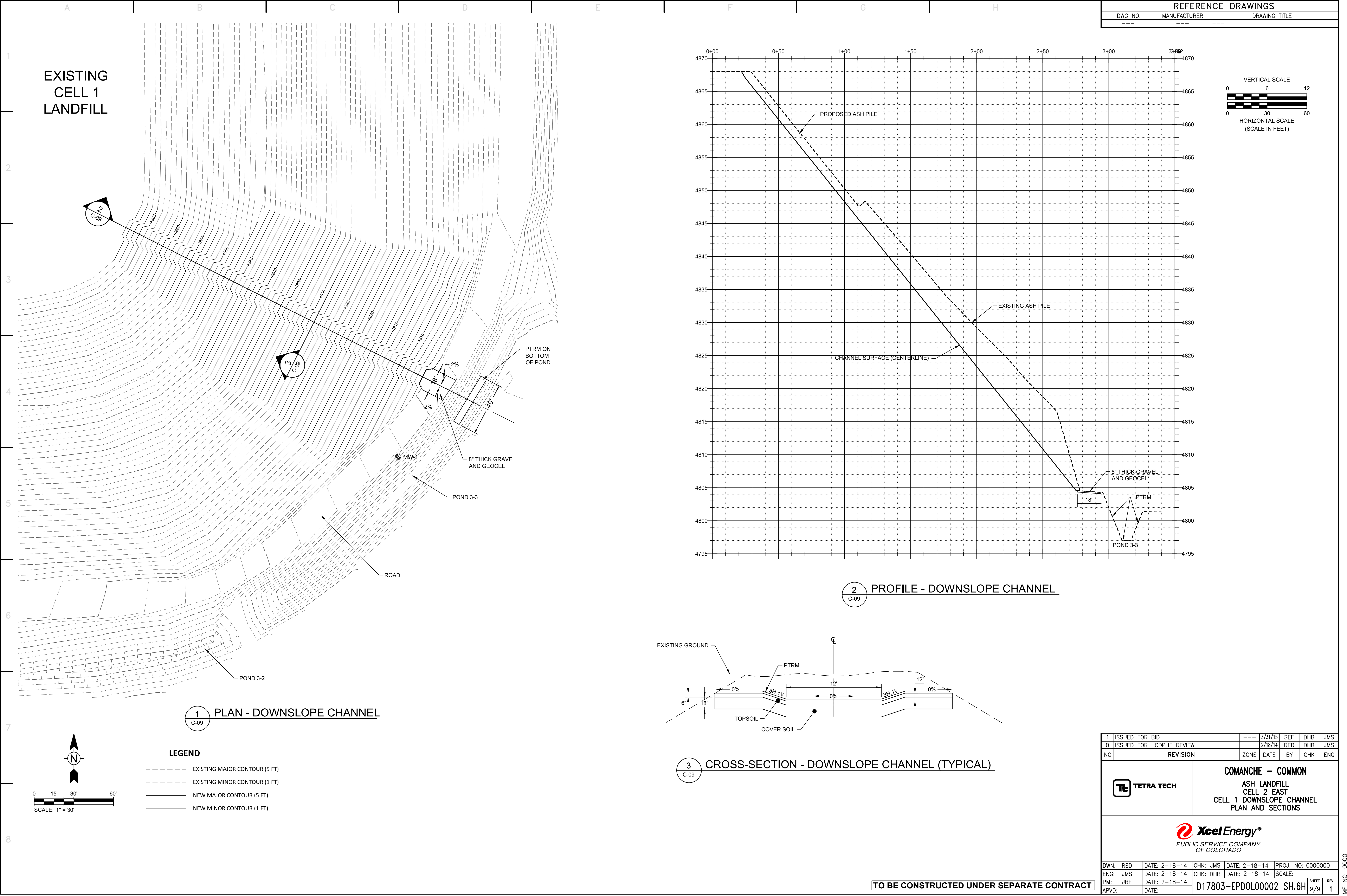
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

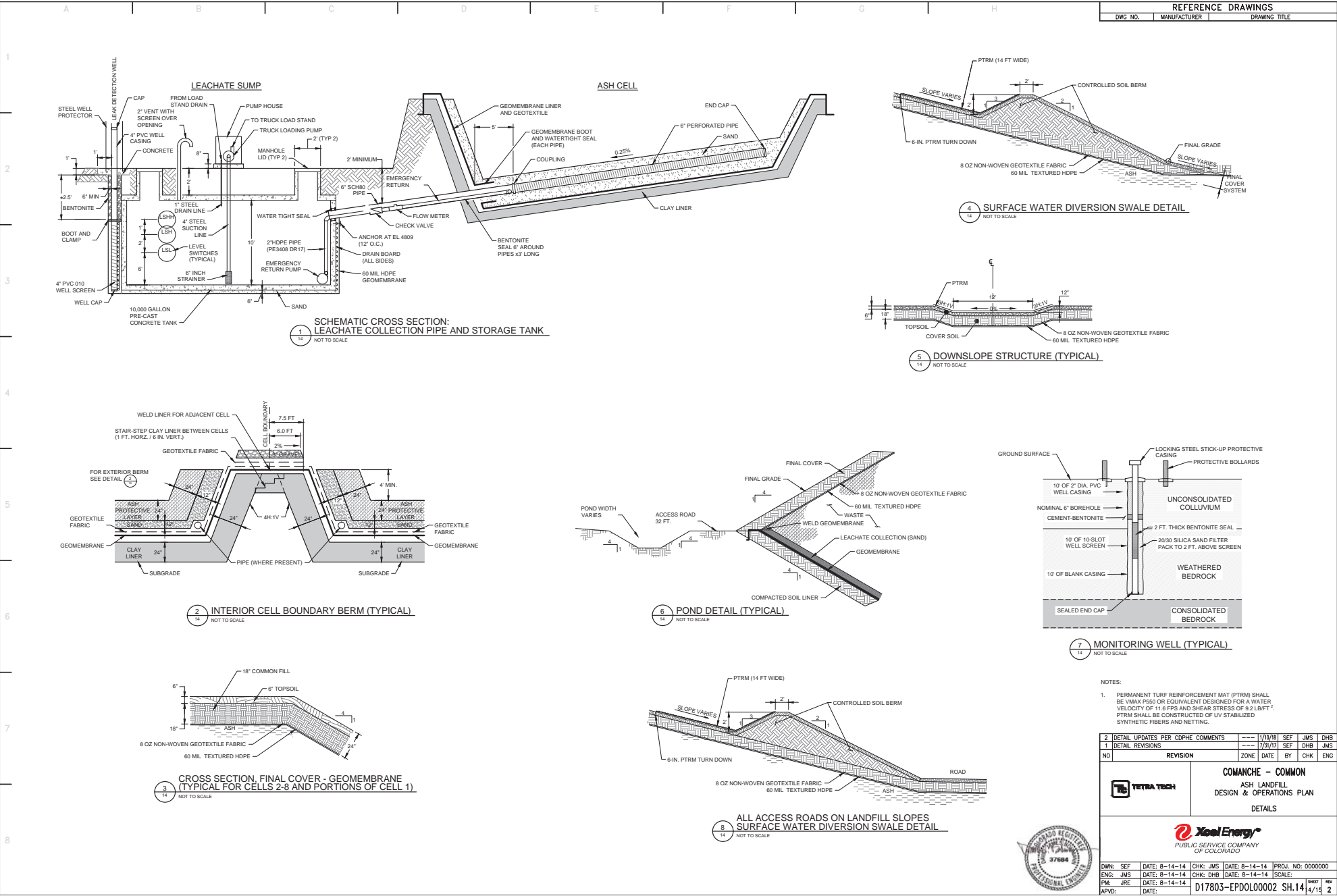
Quinn V. Kilty  
Manager, Environmental Services

## **Appendix A**

### Final Cover Drawings

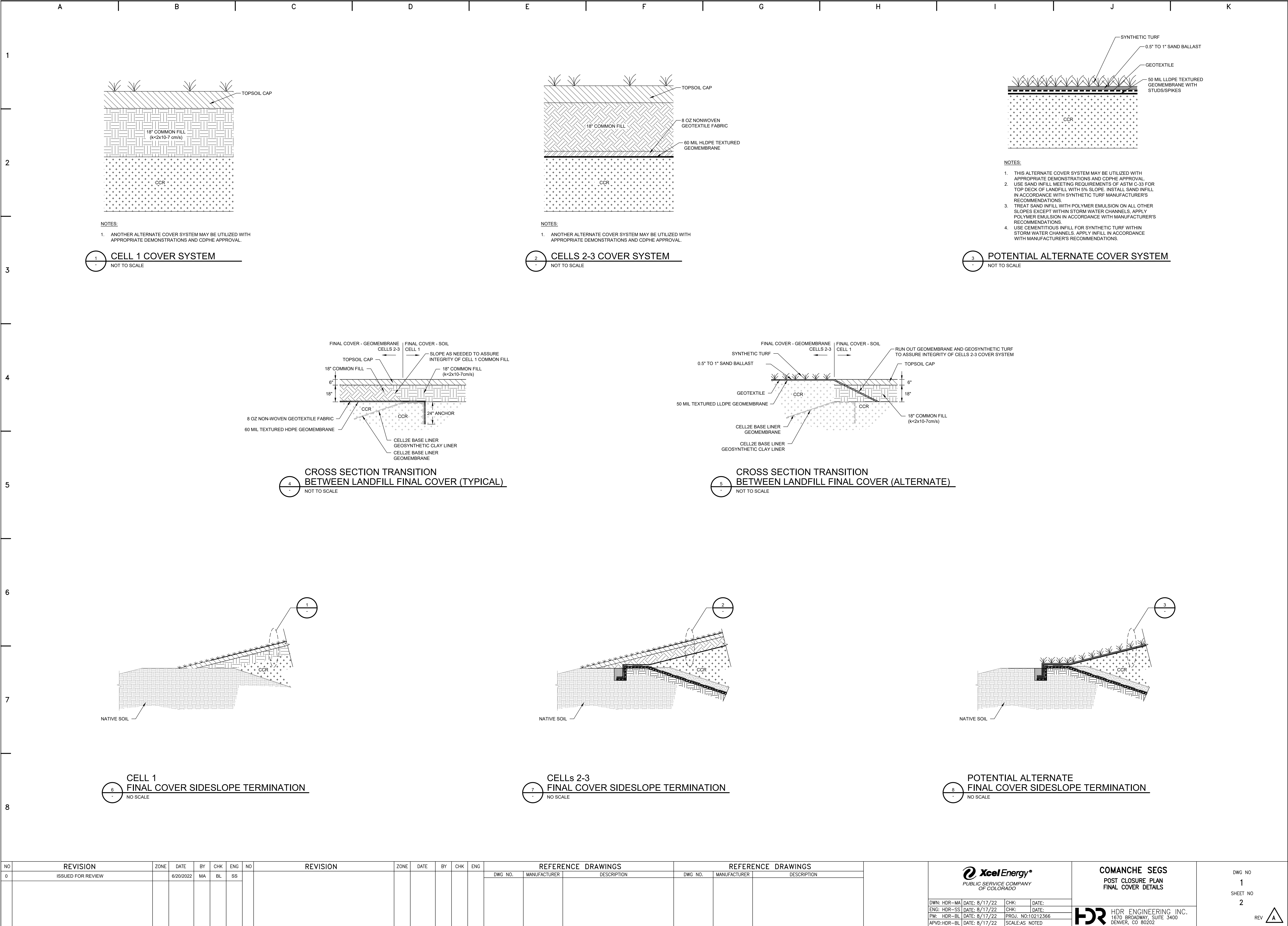






DWN:	SEF	DATE:	8-14-14	CHK:	JMS	DATE:	8-14-14	PROJ. NO:	0000000
ENG:	JMS	DATE:	8-14-14	CHK:	DHB	DATE:	8-14-14	SCALE:	
PM:	JRE	DATE:	8-14-14						
APVD:		DATE:							
D17803-EPDOL0002 SH.14									3/14 2

0000



## **Appendix B**

### Post-Closure Inspection Checklist

## POST-CLOSURE INSPECTION CHECKLIST

Location: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Weather: \_\_\_\_\_

Completed By: \_\_\_\_\_

	<u>Yes</u>	<u>No</u>
I. Security Control Devices:		
Are security control devices in place and functioning?	<input type="checkbox"/>	<input type="checkbox"/>
Are all warning signs prominent and legible?	<input type="checkbox"/>	<input type="checkbox"/>
Are there any signs of unauthorized entry on the site?	<input type="checkbox"/>	<input type="checkbox"/>
II. Final Cover System:		
Is the final cover free of erosion and depressions?	<input type="checkbox"/>	<input type="checkbox"/>
Is there leachate seeping from the final cover? (If yes, make note of location on comment section below.)	<input type="checkbox"/>	<input type="checkbox"/>
Is the vegetative cover continuous and in good condition, free of bare spots?	<input type="checkbox"/>	<input type="checkbox"/>
Does the site require mowing? (If yes, mow grass to a maximum height of 6 inches and note in comment section below.)	<input type="checkbox"/>	<input type="checkbox"/>
Is there ponding of water on final cover system?	<input type="checkbox"/>	<input type="checkbox"/>
Are downchute channels operating correctly?	<input type="checkbox"/>	<input type="checkbox"/>
Are drainage swales operating correctly?	<input type="checkbox"/>	<input type="checkbox"/>
Are sediment basins operating correctly?	<input type="checkbox"/>	<input type="checkbox"/>
Are run-on/run-off control structures operating correctly?	<input type="checkbox"/>	<input type="checkbox"/>
III. Groundwater Monitoring Wells:		
Is the casing upright and unobstructed?	<input type="checkbox"/>	<input type="checkbox"/>
Is the out casing secure and locked?	<input type="checkbox"/>	<input type="checkbox"/>
Is the ID tag present and legible?	<input type="checkbox"/>	<input type="checkbox"/>
IV. Leachate Collection and Removal System:		
Are pumps working properly?	<input type="checkbox"/>	<input type="checkbox"/>
Are there any leaks in the piping or storage tank?	<input type="checkbox"/>	<input type="checkbox"/>
Are the leachate controls working properly?	<input type="checkbox"/>	<input type="checkbox"/>
VI. Miscellaneous:		
Are site access roads maintained and promoting drainage?	<input type="checkbox"/>	<input type="checkbox"/>

### POST-CLOSURE INSPECTION CHECKLIST - COMMENTS

Please use the section below to comment on any areas not covered above, areas of concern, or areas needing immediate attention.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.