

**CCR POST-CLOSURE PLAN
SANDOW 5 GENERATING PLANT
AX LANDFILL CELLS 1, 2 AND 2A
ROCKDALE, TEXAS**

October 2016

Prepared for:

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Prepared by:

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PBW Project No. 5196D

PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by Pastor, Behling & Wheeler, LLC 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 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 hereby certify that this Post-Closure Plan has been prepared in accordance with the requirements of Section 257.104 of the CCR Rule.



Patrick J. Behling 10/05/16
Patrick J. Behling, P.E.
Principal Engineer
PASTOR, BEHLING & WHEELER, LLC

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1.0 INTRODUCTION

Luminant Generation Company, LLC (Luminant) operates the Sandow 5 Generating Plant located approximately 7 miles southwest of Rockdale in Milam County, Texas (Figure 1). Unit No. 5 is an approximately 581-megawatt, lignite-fired electric generation unit that was placed into service in 2009. Coal Combustion Residuals (CCR) including fly ash and bed ash are generated as part of Unit No. 5 operation. CCR is currently managed in the AX Landfill located approximately 7,500 feet south of Unit No. 5.

The CCR Rule (40 CFR 257 Subpart D - *Standards for the Receipt of Coal Combustion Residuals in Landfills and Surface Impoundments*) has been promulgated by EPA to regulate the management and disposal of CCRs as solid waste under Resource Conservation and Recovery Act (RCRA) Subtitle D. The final CCR Rule was published in the Federal Register on April 17, 2015. The effective date of the CCR Rule was October 19, 2015.

The CCR Rule establishes national operating criteria for existing CCR surface impoundments and landfills, including development of post-closure plans (PCP) for all CCR impoundments and landfills. Pastor, Behling & Wheeler, LLC (PBW) was retained by Luminant to develop this post-closure plan for the AX Landfill.

1.1 CCR Landfill Post-Closure Care Requirements

Section 257.104 of the CCR Rule specifies the post-closure care requirements for existing CCR landfills that have been closed in accordance with Section 257.102 of the Rule. Following closure of the landfill, the owner/operator must conduct post-closure care for the unit, consisting of at least the following:

- Maintaining the integrity and effectiveness of the final cover system, including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover; and
- Maintaining the groundwater monitoring system for the unit and monitoring the groundwater in accordance with the requirements of Sections 257.90 through 257.98 of the CCR Rule.

Post-closure care must be conducted for 30 years after the CCR landfill has been closed. If at the end of the 30-year post-closure care period, groundwater assessment monitoring is being performed at the unit in

accordance with Section 257.95 of the CCR Rule, post-closure care of the unit must continue until the unit has returned to groundwater detection monitoring under Section 257.95.

Once the post-closure care period has been completed, the owner/operator of the CCR landfill must prepare a notification verifying that post-closure care has been completed. The notification must include certification by a qualified professional engineer verifying that post-closure care has been completed in accordance with the written closure plan for the unit. The notification must be placed in the facility operating record within 60 days of the completion of post-closure care.

Section 257.104(d) of the CCR Rule specifies that a written post-closure plan must be prepared for each existing CCR landfill that describes the post-closure care activities for the unit. The post-closure plan must include, at a minimum, the following information:

- A description of the required post-closure monitoring and maintenance activities and the frequency at which these activities will be performed;
- The name, address, telephone number, and email address of the person or office to contact about the facility during the post-closure care period; and
- A description of the planned uses of the closed unit property during the post-closure period. Post-closure use of the property must not disturb the integrity of the final cover, liner, or any other component of the unit containment system, or the function of the monitoring systems.

If the owner/operator of the unit desires to disturb any of the components of the closure during the post-closure care period, a qualified professional engineer must certify that the disturbance of the final cover, liner, or other component of the containment system, including any removal of CCR, will not increase the potential threat to human health or the environment. The certification must be placed in the facility operating record and the Texas Commission on Environmental Quality (TCEQ) must be notified.

The landfill PCP must be certified by a qualified professional engineer and must document how the PCP has been designed and constructed to comply with the requirements of Section 257.104.

In accordance with 257.104(d)(2) of the CCR Rule, the initial PCP for an existing CCR landfill must be completed and placed in the facility operating record no later than October 17, 2016. The PCP must be amended whenever:

- There is a change in the operation of the landfill that would substantially affect the written post-closure plan in effect; or

- After post-closure activities have commenced, unanticipated events necessitate a revision of the written post-closure plan.

The PCP must be amended at least 60 days prior to a planned change in the operation of the facility or CCR landfill, or no later than 60 days after an unanticipated event requires the need to revise an existing PCP. If the PCP is revised after post-closure activities have commenced for a CCR landfill, the PCP must be amended no later than 30 days following the triggering event. The owner or operator of the CCR landfill must obtain a written certification from a qualified professional engineer that the initial and any amendment of the PCP plan meets the requirements of Section 257.104 of the CCR Rule.

1.2 Sandow 5 Units Subject to Post-Closure Plan Requirements

The AX Landfill is the only waste management unit associated with Sandow 5 that meets the definition of a CCR Landfill. AX Landfill Cells 1, 2 and 2A are collectively considered an “existing landfill” under 40 CFR 257.53.

This PCP was prepared for the AX Landfill. In accordance with 40 CFR 257.104 of the CCR Rule, the PCP must be amended when future landfill units or lateral expansions of the AX Landfill are constructed at Sandow 5.

1.3 Description of AX Landfill Cells 1, 2 and 2A

The AX Landfill consists of Cells 1, 2 and 2A and covers an area of approximately 148.9 acres. The AX Landfill is located approximately 7,500 feet south of Sandow 5 on reclaimed mine land that is leased by Luminant from Alcoa (Figure 2). A site plan for the AX Landfill is shown on Figure 3. The AX Landfill was registered with the TCEQ as a Class 2 Non-hazardous Waste Landfill in 2008, and the registration was updated in 2015 (PBW, 2008; PBW 2015). The landfill is used to manage fly ash and bed ash generated from Unit No. 5. Fly ash and bed ash are transported to the landfill in trucks and placed in the landfill as dry material.

AX Landfill Cells 1, 2 and 2A are lined landfill cells. Construction of Cell 1 was completed in July 2013 and construction of Cells 2 and 2A was initiated in May 2015. Cell 2 was completed in October 2015 and Cell 2A was completed in July 2016. Placement of Unit No. 5 CCR began in Cell 1 in May 2015 and Cell 2 in September 2016. As of the completion date of this plan, CCR has not been placed in Cell 2A.

The AX Landfill is constructed partially above and partially below grade and are surrounded by engineered earthen dikes that extend approximately 10 to 15 feet above surrounding grade. Smaller interior earthen dikes separate Cells 1, 2 and 2A from each other. A geosynthetic liner system, consisting of a 30 mil thick Geomembrane Supported Geosynthetic Clay Liner (GSGCL) installed on top of 2 feet of soil exhibiting a minimum hydraulic conductivity of 5×10^{-5} cm/sec, has been installed in the landfill cells. The liner system is installed across the bottom of each cell, extends across the interior dikes, and extends up the inside sides of the perimeter dikes. The liner system is covered with an approximately 18-inch thick layer of protective soil to prevent damage to the liner during landfill operations. The base of each landfill cell is sloped toward a collection area for runoff from active landfill areas at the downgradient edge of the cell.

CCR will be placed within the engineered earthen dikes that surround Cells 1, 2 and 2A. CCR levels at the embankment start approximately 2 feet below the top of the embankment and the material is sloped upward at approximately 4 (Horizontal) to 1 (Vertical) to an approximate height of 40 feet above the top of the embankment. The material then slopes upward from the top of the 4:1 sloped tier at 3 to 5 percent and reaches a peak elevation of approximately El. 586 near the center of the landfill.

As described in the CCR Closure Plan prepared for the AX Landfill, Luminant plans to close the AX Landfill in accordance with Section 257.102(d) of the CCR Rule by leaving CCR in-place and constructing a final cover system over the CCR located within the landfill (PBW, 2016). The proposed final grading plan for the final cover system is illustrated in Figure 3. Additional details regarding the final cover system are described in the CCR Closure Plan (PBW, 2016).

2.0 POST-CLOSURE INSPECTION AND MAINTENANCE PLAN

Monitoring and maintenance activities will be performed to maintain the integrity and effectiveness of the final cover system as specified in 40 CFR 257.104(b)(1). During the post-closure monitoring and maintenance period at the site, the final cover of the closed CCR unit will be inspected at the frequency indicated in Table 1 below:

Table 1 – Post-Closure Care Maintenance

Post-Closure Care Maintenance Item	Frequency of Inspections	Types of Deficiency Conditions to be looked for during inspections
Final Cover Condition	Annually	Inspection for vegetation, erosion, settlement, ponding water, and functionality and the surface water drainage system
Vegetation	Annually	Erosion rills and depressions, vegetative stress
Drainage structures	Annually	Sediment and debris build up, component damage, blockages, erosion, ponding of water in non-designated areas, excessive vegetative growth

Each monitoring and maintenance activity will be documented and include the date, components and items monitored, name of the individual performing the monitoring/maintenance, a description of the deficiencies observed (if any), maintenance/repairs performed (if any), and related information.

At a minimum, maintenance will be performed as needed prior to the next scheduled inspection.

3.0 GROUNDWATER MONITORING

As specified in 40 CFR 257.104(b)(3), groundwater monitoring activities will continue throughout the post-closure care period in accordance with 40 CFR 257.90 through 40 CFR 257.98. All groundwater monitoring wells that are part of the groundwater monitoring network will be monitored and maintained during the post-closure care period in accordance with the Groundwater Sampling and Analysis Plan, which will be finalized and placed in the Operating Record by October 17, 2017.

If at the end of the 30-year post-closure care period, groundwater assessment monitoring is being performed at the unit in accordance with 40 CFR 257.95, post-closure care of the unit must continue until the unit has returned to groundwater detection monitoring under 40 CFR 257.95.

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4.0 FACILITY CONTACT INFORMATION

Table 2: Contact Information

Name	Luminant - Environmental Services
Address	1601 Bryan St., Dallas, Texas 75201
Telephone Number	214-875-8654
Email	CCRPostClosurePlan@Luminant.com

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5.0 POST-CLOSURE LAND USE

Post-closure use of the property will not disturb the integrity of the final cover, liner system, or any other component of the containment system, or function of the monitoring system in accordance with §257.104(d)(1)(iii) unless necessary to comply with the maintenance requirements of this subpart or as otherwise provided as allowed under this subpart.

Post-closure land use is anticipated to be undeveloped/unchanged and the area will be deed recorded and deed restricted to prevent disturbance of the closed waste management unit.

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6.0 NOTIFICATION OF COMPLETION OF POST-CLOSURE CARE PERIOD

No later than 60 days following completion of the post-closure care period, a certification will be prepared by a qualified professional engineer verifying that the post-closure care has been completed in accordance with this Post-Closure Plan.

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7.0 REFERENCES

Pastor, Behling & Wheeler, LLC (PBW), 2016. CCR Closure Plan – Sandow 5 Generating Plant, AX Landfill Cells 1, 2 and 2A, Rockdale, Texas, October.

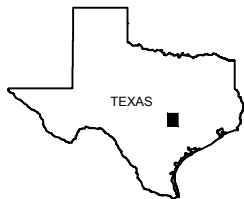
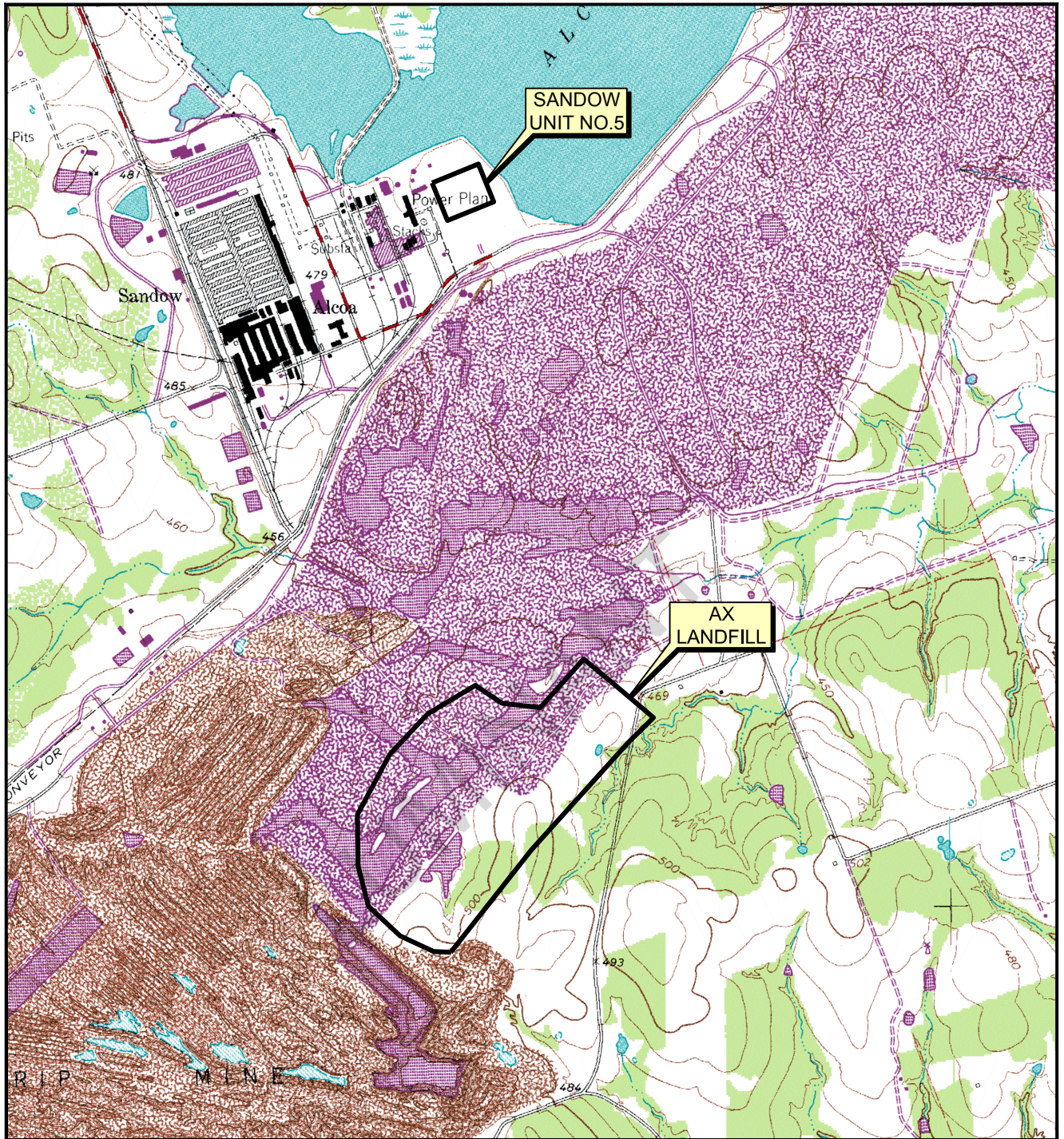
PBW, 2015. Update to TCEQ Notification – AX Area Landfill, Sandow Steam Electric Station Unit 5, February 3.

PBW, 2008. *TCEQ Registration Package – AX Area Landfill, Rockdale, Texas*, June 4.

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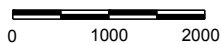
Figures



QUADRANGLE LOCATION



Scale in Feet



LUMINANT GENERATION COMPANY, LLC
SANDOW UNIT NO.5

Figure 1

**AX LANDFILL
LOCATION MAP**

PROJECT: 5196D

BY: ADJ

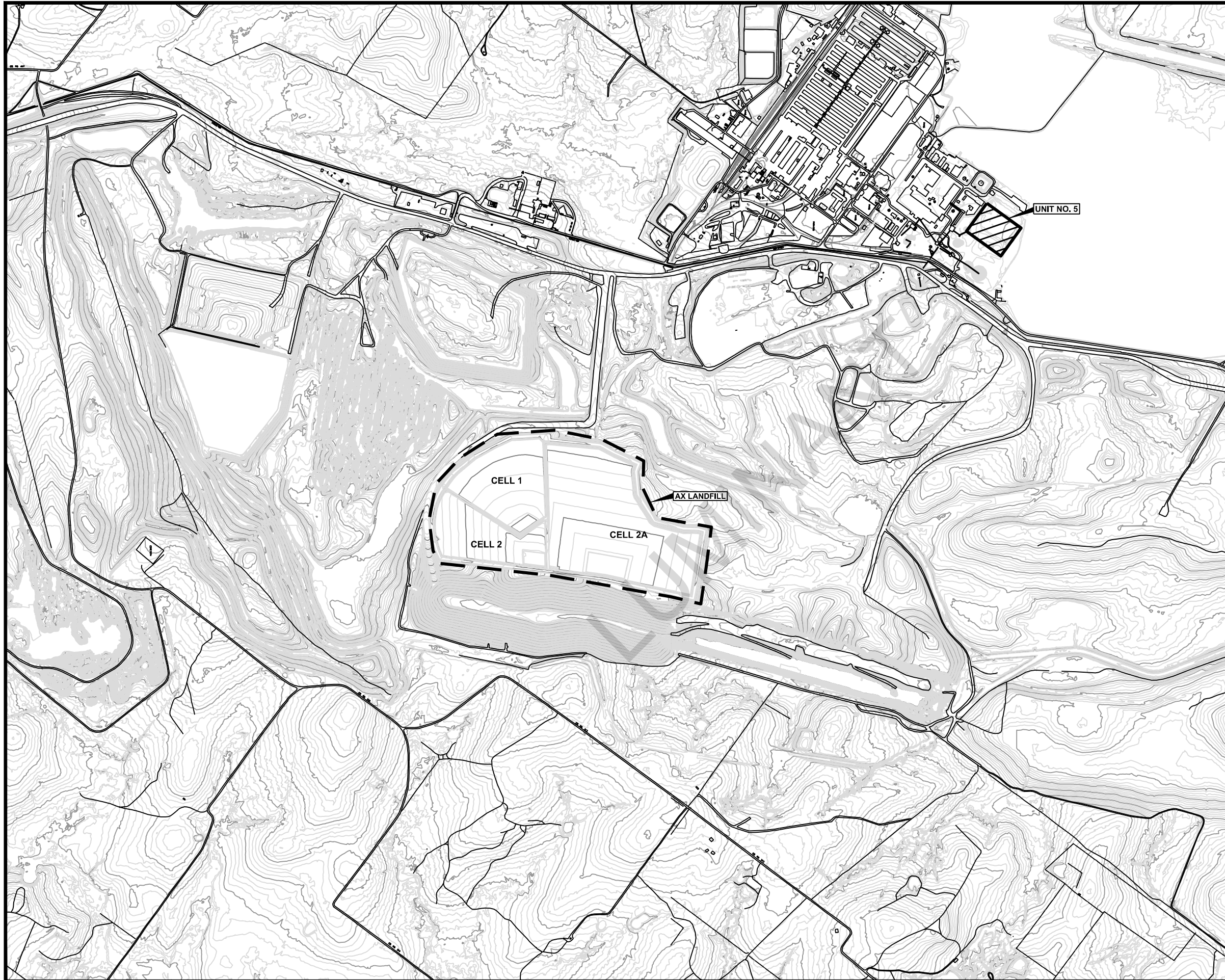
REVISIONS

DATE: SEP., 2016

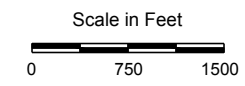
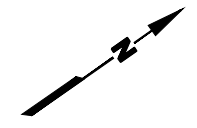
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CONSULTING ENGINEERS AND SCIENTISTS

SOURCE:
Base map from www.tnris.gov, Alcoa Lake, TX 7.5 min. USGS quadrangle dated 1963,
revised 1988.



NOTE:
 EXISTING GRADE CONTOURS OUTSIDE OF CELLS 1, 2
 AND 2A ARE CIRCA 2006 AND ARE SHOWN FOR
 REFERENCE ONLY. CONTOURS DO NOT NECESSARILY
 REFLECT EXISTING CONDITIONS.

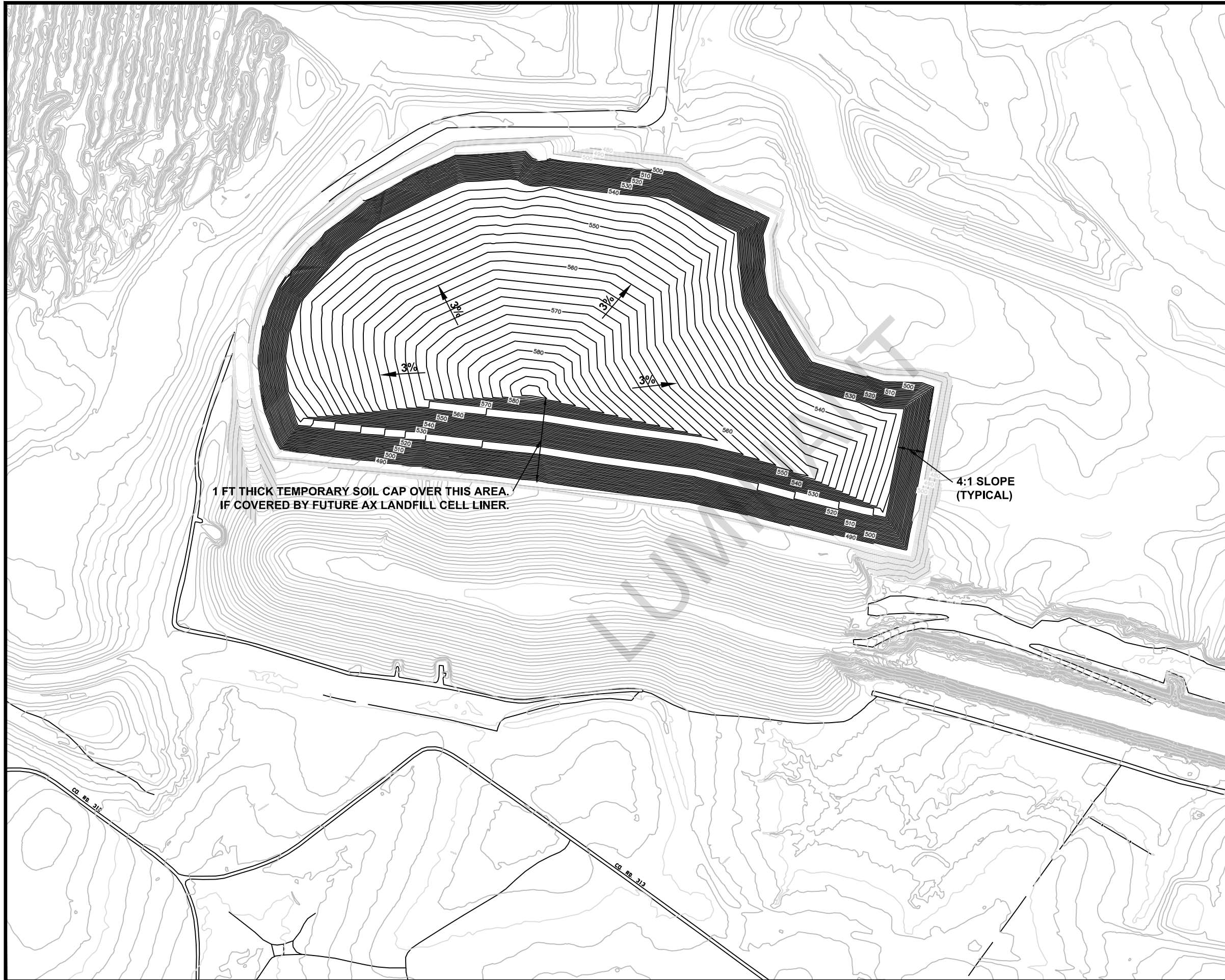


LUMINANT GENERATION COMPANY, LLC
 SANDOW UNIT NO.5

Figure 2
AX LANDFILL
SITE VICINITY MAP

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- NOTES:**
- 1) EXISTING GRADE CONTOURS OUTSIDE OF CELLS 1, 2 AND 2A ARE CIRCA 2006 AND ARE SHOWN FOR REFERENCE ONLY. CONTOURS DO NOT NECESSARILY REFLECT EXISTING CONDITIONS.
 - 2) STORM WATER LET-DOWN STRUCTURE AND DIVERSION BERM LOCATIONS NOT SHOWN.

LUMINANT GENERATION COMPANY, LLC

SANDOW UNIT NO.5

Figure 3

**AX LANDFILL
PROPOSED CAP GRADING PLAN**

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