

**CCR POST-CLOSURE PLAN
MARTIN LAKE STEAM ELECTRIC STATION
A-1 AREA LANDFILL
PANOLA COUNTY, TEXAS**

October 2016

Prepared for:

LUMINANT GENERATION COMPANY, LLC
1601 Bryan Street (EP-27)
Dallas, Texas 75201

Prepared by:

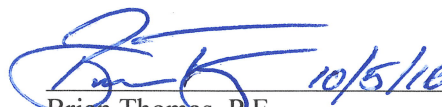
PASTOR, BEHLING & WHEELER, LLC
5416 Plaza Drive
Texarkana, Texas 75503
Texas Engineering Firm No. 4760

PBW Project No. 5196B

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.





Brian Thomas, P.E.
Principal Engineer
PASTOR, BEHLING & WHEELER, LLC

LUMINANT

TABLE OF CONTENTS

	<u>Page</u>
PROFESSIONAL CERTIFICATION	i
LIST OF FIGURES	iii
1.0 INTRODUCTION	1
1.1 CCR Impoundment Post-Closure Care Requirements	1
1.2 MLSES Units Subject to PCP Requirements	3
1.3 Description of the A-1 Area Landfill	3
2.0 POST-CLOSURE INSPECTION AND MAINTENANCE PLAN	5
3.0 GROUNDWATER MONITORING	6
4.0 FACILITY CONTACT INFORMATION	7
5.0 POST-CLOSURE LAND USE	8
6.0 NOTIFICATION OF COMPLETION OF POST-CLOSURE CARE PERIOD	9
7.0 REFERENCES	10

LUMINANT

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>
1	Site Location Map
2	Site Vicinity Map
3	Proposed Final Cover Grading Plan

LUMINANT

1.0 INTRODUCTION

Luminant Generation Company, LLC (Luminant) owns and operates the Martin Lake Steam Electric Station (MLSES) located approximately five miles southwest of Tatum in Rusk County, Texas. The power plant and related support areas occupy approximately 700 acres on a peninsula on the southwest side of Martin Lake (Figure 1). The MLSES consists of three coal/lignite-fired units with a combined operating capacity of approximately 2,250 megawatts. Coal Combustion Residuals (CCR) including fly ash, bottom ash, gypsum are generated as part of MLSES unit operation. The CCRs are transported off-site for beneficial use by third-parties, are managed by Luminant on-site at Permanent Disposal Pond No. 5 (PDP-5) or are disposed at Luminant's A-1 Area Landfill.

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 PCP for the A-1 Area Landfill, which is located approximately 2.5 miles southwest of the MLSES within a reclaimed section of the Luminant Beckville Mine.

1.1 CCR Impoundment 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 40 CFR 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 40 CFR 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 40 CFR 257.95 of the CCR Rule, post-closure care of the unit must continue until the unit has returned to groundwater detection monitoring under 40 CFR 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.

40 CFR 257.104(d) of the CCR Rule specifies that a written PCP must be prepared for each existing CCR unit that describes the post-closure care activities for the unit. The PCP 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 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 40 CFR 257.104.

In accordance with 40 CFR 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 PCP in effect; or
- After post-closure activities have commenced, unanticipated events necessitate a revision of the written PCP.

The PCP must be amended at least 60 days prior to a planned change in the operation of the facility or CCR unit, 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 unit, the PCP must be amended no later than 30 days following the triggering event. 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 PCP plan meets the requirements of 40 CFR 257.104 of the CCR Rule.

1.2 MLSES Units Subject to PCP Requirements

The CCR Rule defines coal combustion residuals such as fly ash, bottom ash, boiler slag, flue gas desulfurization (FGD) materials (gypsum), and related solids generated from burning coal for the purpose of generating electricity by electric utilities and independent power producers. The PCP requirements of the CCR Rule apply to existing and new CCR landfills that dispose or otherwise engage in solid waste management of CCR.

The only CCR unit at the MLSES that meets the definition of an existing CCR landfill is the A-1 Area Landfill. The A-1 Area Landfill is considered an “existing CCR landfill” under 40 CFR 257.53, since:

- Continuous construction of the A-1 Area Landfill commenced prior to October 19, 2015; and
- The landfill received CCR before and after October 19, 2015

This PCP was prepared for the A-1 Area Landfill at the MLSES. 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 A-1 Area Landfill are constructed at the MLSES.

1.3 Description of the A-1 Area Landfill

The A-1 Area Landfill is located approximately 2.5 miles southeast of the MLSES (Figure 2). The A-1 Area Landfill is the only dry disposal facility for CCR generated at the MLSES. The registered boundary of the landfill covers an area of approximately 986 acres and is located within a reclaimed section of the Luminant Beckville Mine. The A-1 Area Landfill is surrounded by and underlain by spoil material that

was previously excavated during lignite mining operations. The A-1 Area Landfill is registered with the Texas Commission on Environmental Quality under SWR31277 (WMU002) and began receiving CCR in 1980.

The active portion of the A-1 Area Landfill is surrounded by earthen embankments constructed of mine spoil. Prior to placement of CCRs, a 1-foot thick compacted clay bottom liner is constructed over prepared subgrade (clay-rich mine spoil 70-100 feet in thickness). Hence, the bottom liner consists of clay scarified and re-compacted to achieve the design specification of 95 percent of maximum density and an in-place permeability of 1×10^{-7} cm/sec or less. Specifications for the construction of the perimeter embankments include placement of a 3-foot thick compacted clay liner on the interior slope of the embankment, which was specified not to exceed a 3:1 (horizontal:vertical) sideslope. Approximately 450-acres of the A-1 Area landfill has been closed by placement of a 3-foot thick compacted clay cap with a minimum 2-foot thick vegetative cover layer. Progressive capping/closure of the A-1 Area Landfill is performed as placement of CCR reaches the target cap subgrade elevations.

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.

LUMINANT

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

LUMINANT

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.

LUMINANT

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.

LUMINANT

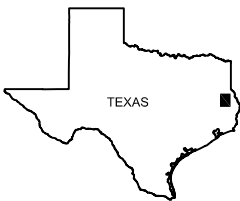
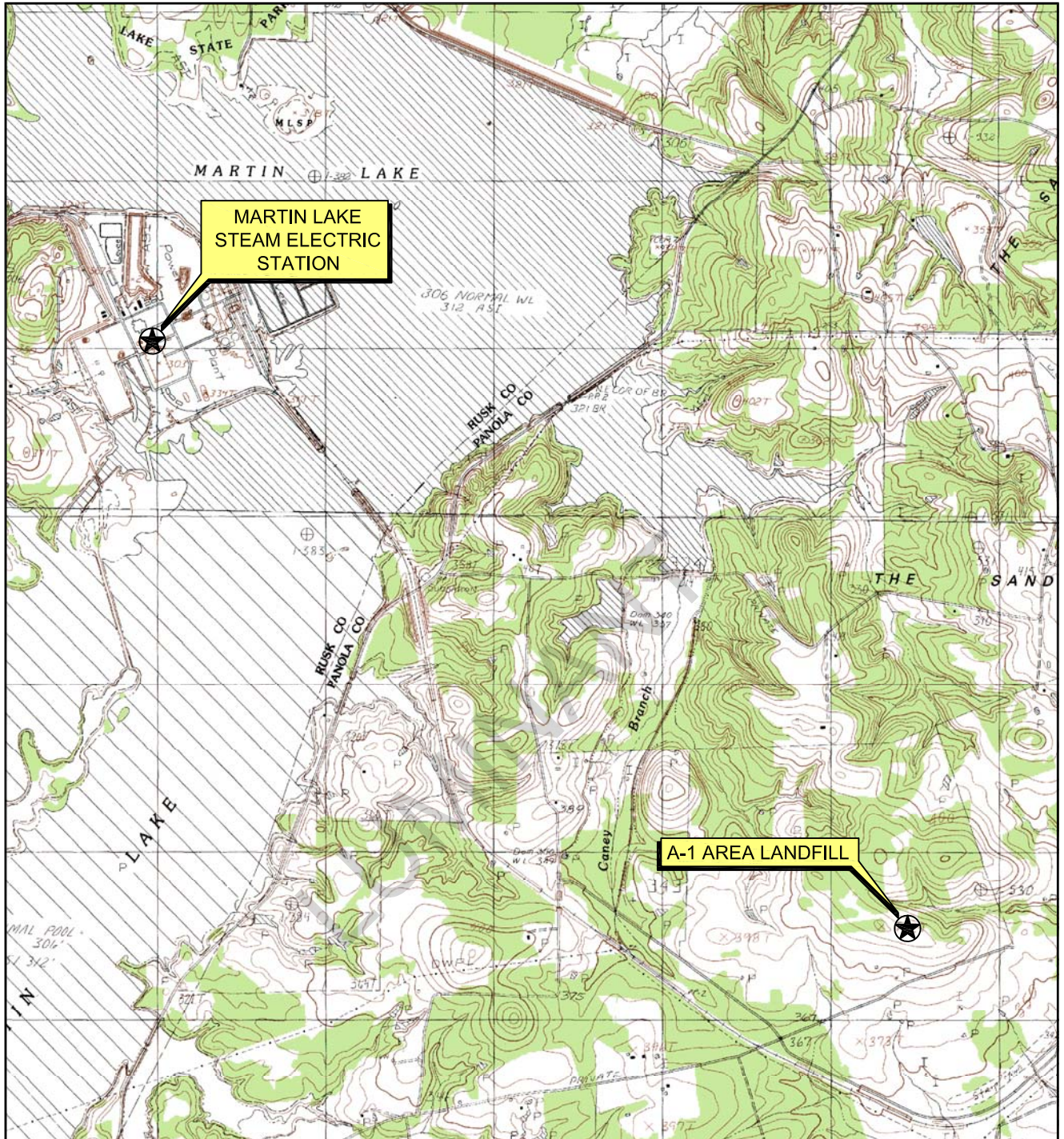
7.0 REFERENCES

- McCulley, Frick & Gillman, Inc (MFG), 1991. *Hydrogeologic/Geotechnical Evaluation A-1 Expansion Area*. November.
- United States Geological Survey (U.S.G.S.), 1983, *7.5-Minute Series Topographic Map, Fair Play, TX Quadrangle*.
- Pastor, Behling & Wheeler, LLC. , 2016. *Annual CCR Unit Inspection Report, Luminant – Martin Lake Steam Electric Station Ash Pond Area, Permanent Disposal Pond No.5 & A-1 Area Landfill, Rusk and Panola County, Texas*, January 16.
- Pastor, Behling, & Wheeler, LLC (PBW), 2016A. *CCR Closure Plan – Martin Lake Electric Station A-1 Area Landfill, Panola County, Texas*. October.

LUMINANT

LUMINANT

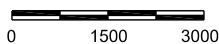
Figures



QUADRANGLE LOCATION



Scale in Feet



LUMINANT GENERATION COMPANY, LLC
MARTIN LAKE STEAM ELECTRIC STATION

Figure 1

SITE LOCATION MAP

PROJECT: 5196B

BY: AJD

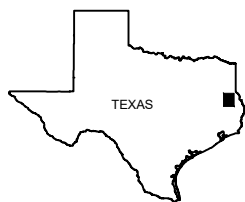
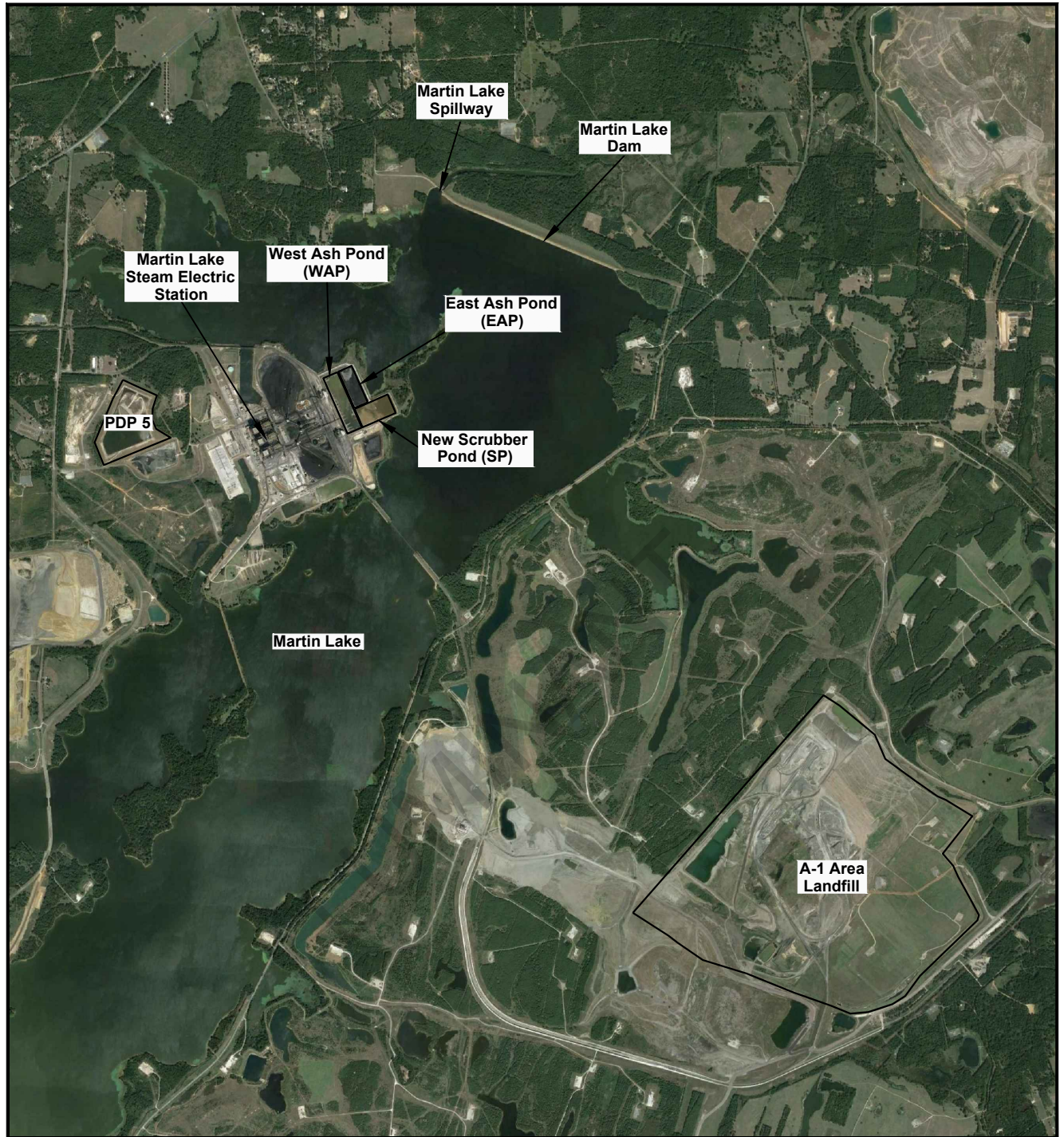
REVISIONS

DATE: SEPT., 2016

CHECKED: BDT

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

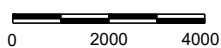
SOURCE:
Base map from www.tnris.gov, Tatum, TX 7.5 min. USGS quadrangle dated 1983.



PHOTOGRAPH LOCATION



Scale in Feet



LUMINANT GENERATION COMPANY, LLC
MARTIN LAKE STEAM ELECTRIC STATION

Figure 2

SITE VICINITY MAP

PROJECT: 5196B

BY: AJD

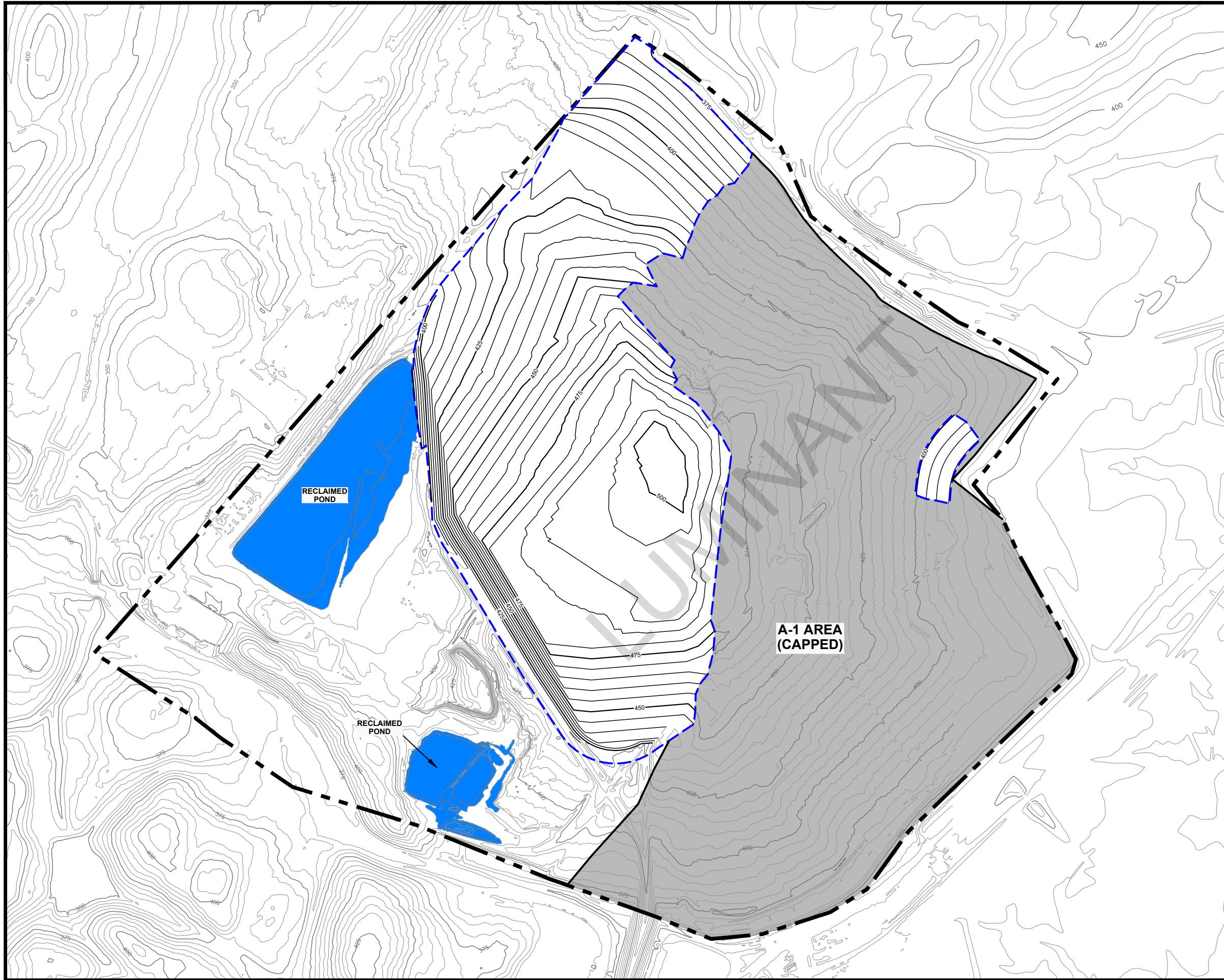
REVISIONS

DATE: SEPT., 2016

CHECKED: BDT

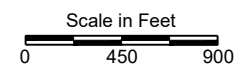
PASTOR, BEHLING & WHEELER, LLC
 CONSULTING ENGINEERS AND SCIENTISTS

SOURCE:
 Imagery from Google Earth, photography dated October 1, 2015.



EXPLANATION

- Landfill Registration Boundary
- Existing Grade Contour
5 ft Interval
- Existing Grade Contour
25 ft Interval
- Proposed Finished Grade Contour
5 ft Interval
- Proposed Finished Grade Contour
25 ft Interval
- - - Proposed Limits of CAP
- █ Capped Area (Existing)



LUMINANT GENERATION COMPANY, LLC
MARTIN LAKE STEAM ELECTRIC STATION

Figure 3
**PROPOSED
FINAL COVER GRADING PLAN**

PROJECT: 5196B	BY: AJD	REVISIONS
DATE: SEPT., 2016	CHECKED: BDT	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS