

**ENGINEERING REPORT**

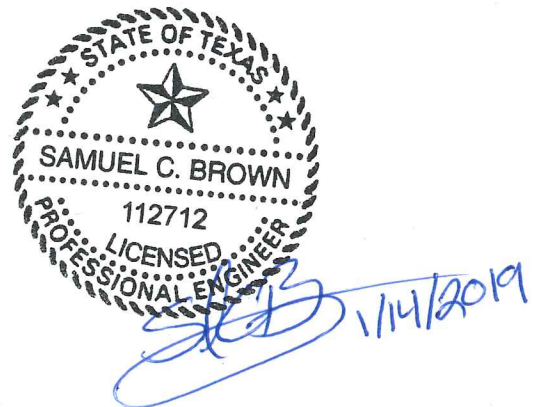
**FOR**

**ANNUAL CCR LANDFILL INSPECTION  
40 CFR §257.84(b)**

**FAYETTE POWER PROJECT  
COMBUSTION BY-PRODUCTS LANDFILL**

**PREPARED FOR  
LCRA  
FAYETTE POWER PROJECT**

**PREPARED BY  
LCRA ENGINEERING SERVICES  
January 14, 2019**



This document is certified under the authority of the engineer whose seal appears above. **IT IS NOT TO BE USED FOR PERMITTING, BIDDING, OR CONSTRUCTION PURPOSES.**

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## 1.0 BACKGROUND

This report is intended to ensure that the design, construction, operation and maintenance of the Fayette Power Project (FPP) Combustion By-products Landfill (CBL) is consistent with recognized and generally accepted good engineering standards in accordance with the Environmental Protection Agency's Coal Combustion Residual (CCR) rules under 40 CFR Part 257. More specifically this report meets the requirements of 40 CFR §257.84(b) Annual inspections by a qualified professional engineer.

As required by 40 CFR §257.84(b), this inspection report documents the annual inspection of the CBL, located at 6549 Power Plant Road, La Grange, Texas 78945. The CBL is registered by the Texas Commission on Environmental Quality (TCEQ) as an on-site nonhazardous industrial waste landfill (TCEQ Registration No. 31575) and as an on-site waste management unit (Notice of Waste Registration No. MU013) at the FPP.

The CBL and associated support facilities are located in the southwest portion of the FPP, south of the power plant and north of the Missouri-Kansas-Texas railroad line (Appendix A). LCRA deed recorded a 123-acre tract located within the FPP site for disposal of Class 2 nonhazardous industrial waste. To date, an approximately 30-acre area has been developed as Cell 1 and a 7.9 acre area has been developed as cell 2D. In a 2013 Notification Revision to TCEQ, LCRA raised the maximum elevation of the CBL from approximately 430 feet above mean sea level (ft-amsl) to 470 ft-amsl and added Cell 2D. The support facilities for the CBL currently include the CBL Cell 2D Pond contained within cell 2D which collects its contact water, the CBL Runoff Pond which collects the CBL Cell 1 contact water, the associated drainage channel that routes contact water from the CBL Cell 1 to the Runoff Pond, and two stormwater drainage channels that route clean non-contact stormwater off-site.

In accordance with 40 CFR §257.84(b)(3), the 2018 annual inspection was performed, document review was conducted, and this report has been prepared to document this work.

## 2.0 DOCUMENT REVIEW

Pertinent record documents reviewed as part of the development of past inspections reports were reviewed for updates since the “ENGINEERING REPORT FOR ANNUAL CCR LANDFILL INSPECTION 40 CFR §257.84(b), FAYETTE POWER PROJECT COMBUSTION BY-PRODUCTS LANDFILL” (2017 Report) was issued on January 12, 2018. This review was intended to capture any revisions or updates to the previously reviewed record documents and addition of new record documents related to design, construction, operation, and maintenance of the CBL. In addition to the 2017 Report there were two (2) new documents produced in 2018 that have been posted to the Publicly Accessible Internet Site as required by 40 Code of Federal Regulations § 257.107. These include:

1. “COAL COMBUSTION RESIDUAL LANDFILL - ANNUAL GROUNDWATER MONITORING REPORT – Calendar Year 2017” Issued on January 31, 2018 by LCRA, in compliance with 40 CFR §257.90(e).
2. “Annual Coal Combustion Residuals (CCR) Fugitive Dust Control Report – 2018” dated November 28, 2018, by Waste Management National Services, in compliance with 40 CFR §257.80(c).

All documents reviewed were found to ensure adherence to recognized and generally accepted good engineering standards.

The weekly inspections were performed for this facility in calendar year 2018 as required under 40 CFR §257.84(a). These weekly inspection reports for the period from January 1, 2018 through December 31, 2018 were reviewed.

Review of these documents did not result in findings indicating the CBL design, construction, operations or maintenance activities would result in potential structural weakness of the CBL as currently configured.

## 3.0 LANDFILL GEOMETRY & VOLUME

This is the fourth annual inspection report as required under 40 CFR §257.84(b)(2) with the 2015 report serving as a baseline for changes in geometry of the structure and approximate CCR volume.

An aerial survey was conducted on October 17, 2018 and did not show a change in the landfill impounding structure geometry from the October 10, 2016 survey. This was also confirmed during the field inspection. An approximate layout of the impounding structures is included in Appendix B.

Per 40 CFR §257.84(b)(2)(ii), the CCR volume as of the October 17, 2018 survey is approximately 1,384,373 cubic yards.

## 4.0 INSPECTION OF IMPOUNDING STRUCTURES

Inspection of the Fayette Power Project's Combustion Byproducts Landfill was conducted by Mr. Nathan M. Gullo, P.E. and Mr. Samuel C. Brown, P.E. on the morning of December 12, 2018 beginning at 08:45 and concluding at 10:15 hours. The weather was cloudy with temperatures in the high 50's at the time of inspection. The CBL location had received precipitation amounts of 5.23 inches over the previous 30 days and 42.82 inches since the 2017 inspection. Precipitation data was provided from the LCRA Hydromet rain gauge number 563400 located at the FPP site.

### 4.1 LANDFILL CELL 1 WESTERN EMBANKMENT SLOPE

**Clay Embankment w/ 1 ft. Vertical to 3 ft. Horizontal slope**

**Approximate Length: 350 ft.**

**Approximate Max Impoundment Height: 20 ft. @ 410 ft-amsl**

General Condition:  **Good**  Fair  Poor

Problems Noted:  None  Poor Grass Cover  Trees or Brush  Animal Burrows or Damage

**Standing Water /Ponding**  Wet Areas  Erosion  Depressions  Rutting  Cracks  Bulges

Misalignment  Sinkhole  Other:

**Comments:**

(1) Overall, grass cover was in good condition at the time of inspection with an approximate height of 12-inches and very good cover. There were no visual signs of active animal activity or past history of such. The slopes are visually in alignment with the 3:1 design and no visual evidence of structural issues was observed.

(2) Standing water and an active leak was observed on the upstream side of the water meter located at the beginning of the western embankment on the inside of the CBL (See Photo 1). Water was actively leaking from the male adaptor on the upstream side of the union for the water meter. This should be repaired to prevent standing water and ground saturation.

### 4.2 LANDFILL NORTHERN EMBANKMENT SLOPE

**Clay Embankment w/ 1 ft. Vertical to 3 ft. Horizontal slope**

**Approximate Length: 1,300 ft.**

**Approximate Max Impoundment Height: 35 ft. @ 420 ft-amsl**

General Condition:  **Good**  Fair  Poor

Problems Noted:  **None**  Poor Grass Cover  Trees or Brush  Animal Burrows or Damage

Standing Water /Ponding  Wet Areas  Erosion  Depressions  Rutting  Cracks  Bulges

Misalignment  Sinkhole  Other:

**Comments:**

(1) Overall, grass cover was in good condition at the time of inspection with an approximate height of 12 to 18-inches and very good cover. Mowing was started on the west end but had only progressed approximately 50 yards to the east along the bottom third of the embankment. There were no visual signs of active animal activity or past history of such. The slopes are visually in alignment with the 3:1 design and no visual evidence of structural issues was observed.

### 4.3 LANDFILL CELL 1 EASTERN EMBANKMENT SLOPE

**Clay Embankment w/ 1 ft. Vertical to 3 ft. Horizontal slope**

**Approximate Length: 550 ft.**

**Approximate Max Impoundment Height: 30 ft. @ 420 ft-amsl**

General Condition:  **Good**  Fair  Poor

Problems Noted:  **None**  Poor Grass Cover  Trees or Brush  Animal Burrows or Damage

Standing Water /Ponding  Wet Areas  Erosion  Depressions  Rutting  Cracks  Bulges

Misalignment  Sinkhole  Other:

**Comments:**

(1) Overall grass cover was in good condition at the time of inspection with an approximate height of 12 to 18-inches and very good cover. There were no visual signs of active animal activity or past history of such. The slopes are visually in alignment with the 3:1 design and no visual evidence of structural issues was observed.

### 4.4 CELL 1 TOP TEMPORARY CAP

**Clay Cap with Topsoil & Grass Vegetation**

**Approximate Length: 1,000 ft.**

**Approximate Width: 120 ft.**

General Condition:  **Good**  Fair  Poor

Problems Noted:  **None**  Poor Grass Cover  Trees or Brush  Animal Burrows or Damage

Standing Water /Ponding  Wet Areas  Erosion  Depressions  Rutting  Cracks  Bulges

Misalignment  Sinkhole  Other:

**Comments:**

(1) Overall grass cover was recently mowed and in good visual condition at the time of inspection with an approximate height of 3-inches and very good cover. No visible evidence of erosion or structural issues was observed.

### 4.5 VISIBLE LINERS

**Clay & Synthetic Liners**

General Condition:  **Good**  Fair  Poor

Problems Noted:  None  Tears  Damage  Trees or Brush  Animal Activity  Erosion

Depressions  Rutting  Cracks  **Bulges**  **Other: Water Under HDPE Liner**

**Comments:**

(1) Water was noted under the Cell 2D Pond during the August 2, 2018 weekly inspection report. The site was visited on August 16, 2018 along with FPP staff and LCRA Environmental staff to investigate the finding. There appeared to be water under the liner as reported based on movement of the liner when walking on it down at the water surface elevation. This was observed by tapping on the liner with one foot resulting in a clapping sound. This sound was made as the liner interacted with the water surface below. The areas with water under them also had a different feel when applying force with one foot on the solid slope and one foot on the liner surface with water under it. This may be described as more spongy, like the feel when pressing on water filled bladder. From these observations, it was assumed the maximum water surface elevation below the liner was constant around the entire pond at the time of this site visit. The elevation appeared to be equal to the pond's water surface elevation. The same condition was again observed during the December 16, 2018 inspection (See photo 2).

It was recommended after the August inspection to contact the design engineer, liner installer and manufacturer, to inform them of the current condition and consult with them on additional opinions of possible cause, recommendations, and any need for repairs. After review of the original design contract and liner installation warranty information, it was determined that the only warranty remaining was associated with liner material. Therefore, LCRA is in the process of having a liner repair company evaluate the liner system.

The design records for the Cell 2D Pond were reviewed based on the observed conditions. It should be noted that the Cell 2D Pond liner design incorporates a two component liner system with a low permeability soil liner overlain by a synthetic high density polyethylene liner. It was noted in the design documents that; “The functions of the two liner components are complementary.” and “The HDPE geomembrane is non-porous, but may have an occasional very small hole not detected through construction quality assurance. The underlying compacted soil layer is porous, but has a low permeability and impedes flow through any geomembrane hole. When used together in a composite liner, the two materials greatly diminish the potential for liner leakage compared to the potential for leakage through a geomembrane liner or a compacted soil liner alone.” Therefore, if the HDPE geomembrane has developed a leak, the design intent is for the water under the HDPE geomembrane to be contained within the clay liner component.

#### **4.6 RUN-ON/RUN-OFF FACILITIES**

##### **Open Channels, Culverts, CBL Pond & Cell 2D Pond**

General Condition:  **Good**  Fair  Poor

Problems Noted:  **None**  Poor Grass Cover  Trees or Brush  Animal Burrows or Damage

Excessive Sediment Buildup  Blockage  Erosion  Depressions  Rutting  Cracks

Freeboard Exceeded  Misalignment  Sinkhole  Other:

##### **Comments:**

(1) The minor damage identified in the 2017 Inspection Report at one of the corrugated metal drainage culverts which convey non-contact runoff from the closed northern slope section beneath the Austin Loop plant road has been repaired (See Photo 3).

(2) Damage identified in the 2017 Inspection Report at the two roadway crossing corrugated metal drainage culverts, which convey contact runoff from Existing Cell 1 to the Existing Runoff Retention Pond near the intersection of Future Subcell 2A, 2B and Existing Subcell 2D has been repaired (See Photo 4). The upstream side of this culvert was silted in to approximately half the pipe on the right entrance and approximately three fourths the pipe on the left entrance. These should be maintained clear to ensure full culvert design capacity (see Photo 5).



## 5.0 CONCLUSIONS

The FPP CBL structure was in good condition at the time of this inspection and does not appear to have an actual or potential structural weakness nor any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CBL. The operation and maintenance of the landfill is currently contracted to a landfill manager believed to have good competency with a plan in place to meet the 40 CFR Part 257 requirements for operation of the facility consistent with recognized and generally acceptable good engineering standards.

The CBL is designed, constructed, operated, and maintained consistent with recognized and generally accepted good engineering standards.

## 6.0 RECOMMENDATIONS

The following recommendations are made based on the document review and the December 12, 2018 inspection:

### 6.1 OUTSTANDING RECOMMENDATIONS

- Item 2017-001, It was identified during the 2018 inspection that the damaged inlet sections of corrugated metal drainage culverts which convey non-contact runoff from the northern embankment section beneath the plant road have been repaired. This item was noted as completed in the weekly inspection report dated March 28, 2018.

**This item has been completed and will be removed from future reports.**

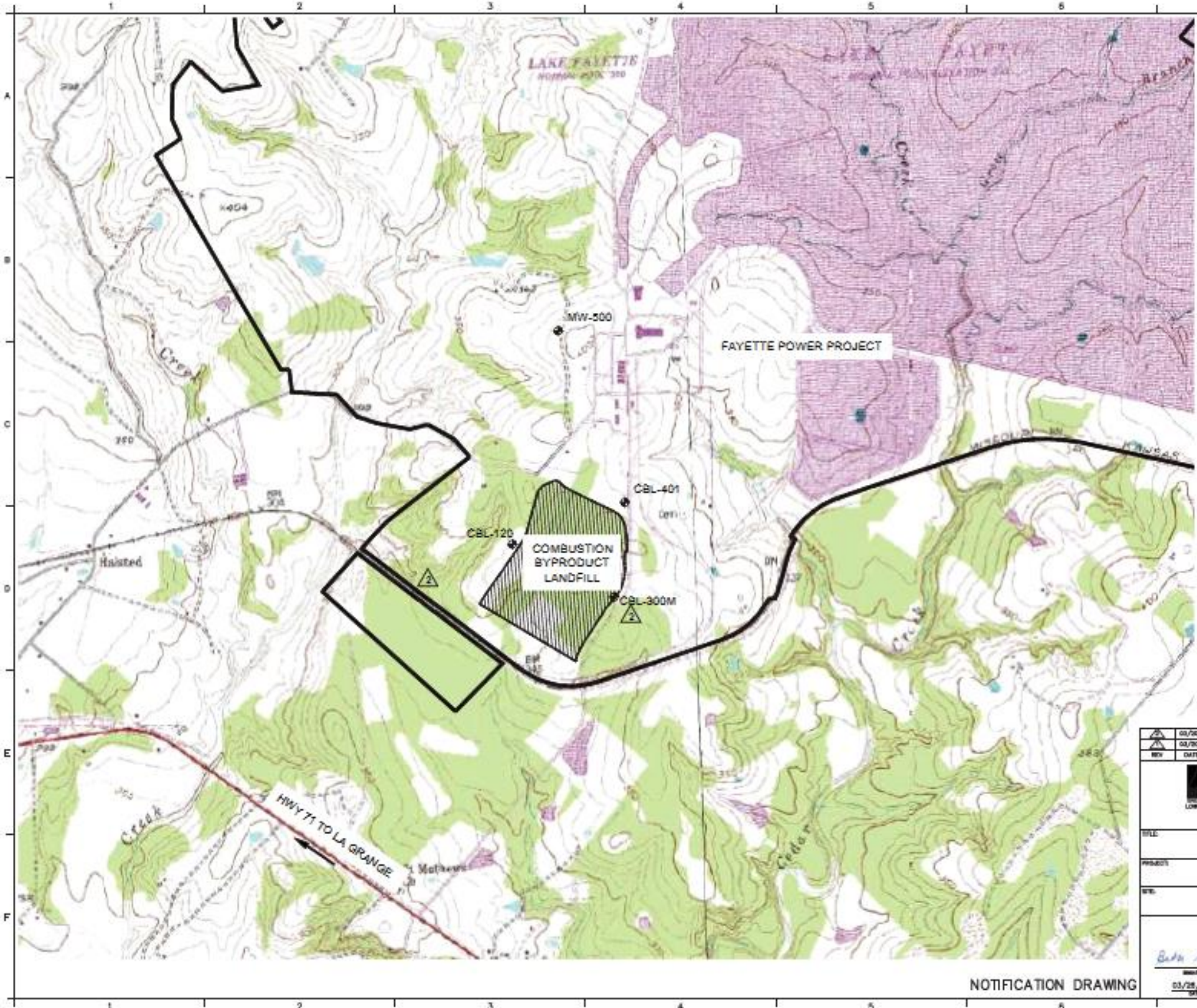
- Item 2017-002, It was identified during the 2018 inspection that repairs have been made to the damaged corrugated metal drainage culvert ends near the intersection of Future Subcell 2A, 2B and Existing Subcell 2D, which convey contact runoff via the Runoff Channel from Existing Cell 1 beneath the access road to the Existing Runoff Retention Pond.

**This item has been completed and will be removed from future reports.**

## 6.2 NEW RECOMMENDATIONS

- Item 2018-001, Repair the active leak observed on the upstream side of the water meter located at the beginning of the western embankment on the inside of the CBL to prevent standing water and ground saturation.
- Item 2018-002, Contact the design engineer, liner installer and liner manufacturer, to inform them of the current condition of the Cell 2D HDPE liner and consult with them on additional opinions of possible cause, recommendations, and any need for repairs.
- Item 2018-003, Clear waste material from in front of the two roadway crossing corrugated metal drainage culverts, which convey contact runoff from Existing Cell 1 to the Existing Runoff Retention Pond near the intersection of Future Subcell 2A, 2B and Existing Subcell 2D. These should be maintained regularly to ensure full culvert design capacity.

**APPENDIX A**  
**FPP COMBUSTION BY-PRODUCTS LANDFILL**  
**LOCATION DRAWING**



**LEGEND**

— FAYETTE POWER PLANT PROPERTY BOUNDARY

● MW-500 GROUNDWATER MONITORING WELL

NOTE:  
 BASE MAP SOURCE: UNITED STATES GEOLOGIC SURVEY (USGS),  
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 FAYETTEVILLE, TEXAS 1408 REVISED 1985

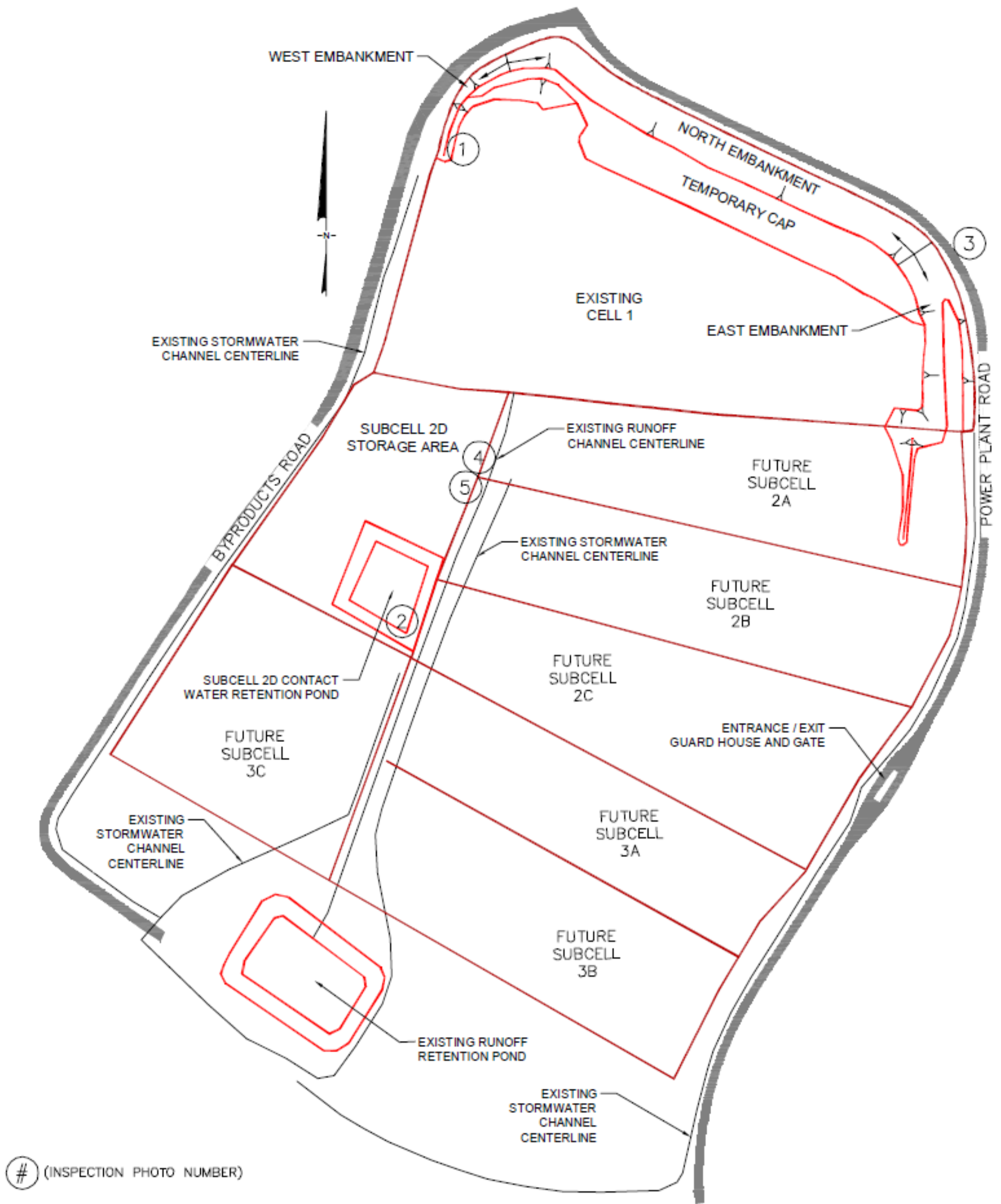
S:\Projects\2013\130325\130325.dwg PLOTTED: 03/28/2013 10:41:00 AM

03/20/14	REVISED PROPERTY BOUNDARY & MONITORING WELL NAME (NOT LIMITED BY NOTIFICATION)	SH	SC
03/20/13	REVISED TOTAL NUMBER OF DRAINAGE	JJV	SC
REV	DATE DESCRIPTION	DRN	APP
TITLE: OVERALL SITE PLAN			
PROJECT: REVISION TO NOTIFICATION			
SITE: FAYETTE POWER PROJECT COMBUSTION BYPRODUCT LANDFILL			
	DRAWN BY: MJZ CHECKED BY: MJZ REVISION BY: SC APPROVED BY: SC	DATE: MARCH 2013 PROJECT NO: TEL0225.02 PLO: 022502900 DRAWING NO.: 1 of 9	

NOTIFICATION DRAWING

**APPENDIX B**  
**FPP COMBUSTION BY-PRODUCTS LANDFILL**  
**INSPECTION DRAWING**

# FPP COMBUSTION BY-PRODUCTS LANDFILL INSPECTION DRAWING



# **APPENDIX C**

## **INSPECTION PHOTOS**



**PHOTO 1 – View of leaking water meter upstream side of the West Embankment (12-12-2018)**



**PHOTO 2 – View of Cell 2D Pond HDPE liner looking west at the Northeast corner (8-16-2018)**





**PHOTO 3 – View of repaired North Embankment culverts looking Northeast (12-12-2018)**



**PHOTO 4 – View of repaired Cell 1 stormwater channel culverts looking Northeast (12-12-2018)**



**PHOTO 5 – View of Cell 1 Stormwater Channel culverts looking Southeast (12-12-2018)**