

# Cell 2 Composite Liner Design Certification

**SWEPCO – John W. Turk, Jr. Power Plant**

**Class 3N Landfill**

**Permit No. 0311-S3N-R1**

**AFIN: 29-00506**

July 16, 2018

Project No. 35177127



*A unit of American Electric Power*

**Prepared for:**

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**Prepared by:**

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**Terracon**

Environmental



Facilities



Geotechnical



Materials

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## 1.0 Objective

The purpose of this Liner and Leachate Design Certification Report is to evaluate compliance with the requirements of 257.70 for the liner and leachate collection design at the SWEPCO – John W. Turk, Jr Power Plant Class 3N Landfill (Permit No. 0311-S3N-R1) facility. Southwestern Electric Power Company (SWEPCO) is a unit of American Electric Power (AEP).

## 2.0 Background Information

### 2.1 Facility Location Description

Southwestern Electric Power Company owns and operates a coal-fired power plant (John W. Turk, Jr. Power Plant) with a Class 3 Non-Commercial (3N) solid waste facility (Class 3N Landfill) associated with the Power Plant. The site is located approximately 2.2 miles north of Fulton (Hempstead County), Arkansas. The Power Plant produces up to 600 Megawatts (MW) of electrical power utilizing western subbituminous coal. The Class 3N Landfill is used for disposal of fly ash, bottom ash, and other byproducts from the coal-fired Power Plant. The waste materials are non-hazardous and non-putrescible. (FIGURE 1 & 2)

### 2.2 Cell 2 Design Criteria for New CCR Lateral Expansion (§ 257.70)

The Turk Class 3N Landfill consists of 5 cells (FIGURE 3). All 5 Cells consist of a composite liner system and leachate collection and removal system (FIGURE 4 & 5). As per § 257.70 (a)&(d), all new CCR landfills and any lateral expansions must be designed, constructed, operated, and maintained with a composite liner system and a leachate collection and removal system.

#### 2.2.1 Composite Liner System Requirements (§ 257.70 (b) (1-4))

The Cell 2 composite liner system consists of a 60 mil HDPE geomembrane that is installed above a 2-foot clay liner system that has a hydraulic conductivity of no more than  $1 \times 10^{-7}$  cm/sec. The liner system will be constructed past the limits of waste placement so that the surrounding earth will not be likely to be in contact with CCR or leachate (2011 Permit Application, Volume 3, Appendix B Design Drawings, Terracon Consultants Inc., February 2011)<sup>1</sup>. The HDPE geomembrane protects the clay liner from being in contact with the waste. The composite liner system was modeled for slope stability in the previously mentioned Volume 3, Appendix E Landfill Stability Calculations<sup>1</sup>. The liner system was also modeled for settlement in Volume 3, Appendix D Landfill Settlement Calculations. The liner system design complies with the requirements of 257.70(b) and this information can be found in the 2011 Permit Application, Volume 3, Appendix B Design Drawings, Appendix D Landfill Settlement Calculations, and Appendix E Landfill Stability Calculations.

### **2.2.2 Leachate Collection and Removal System (§ 257.70 (d) (1-3))**

The Cell 2 leachate collection and removal system consists of a double sided geocomposite above the 60-mil HPDE liner. On-site soil will be used for protective cover. Chimney drains will be installed into the protective cover to allow the leachate access to the double-sided geocomposite. The collection piping will also be made from HDPE material. The collection system was designed according to § 257.70 (d) (1-3) and this information can be found in the **2011 Permit Application, Volume 3, Appendix B Design Drawings, Appendix F Leachate Generation Study, Appendix G Leachate Collection Piping Components Calculation, and Appendix H Leachate Collection Pond Capacity Calculations** and the **2015 Minor Modification Application, Attachment C Help Model Comparison, Attachment D Revised Permit Drawings, and Attachment E Slope Stability Analysis Report<sup>2</sup>**.

## **3.0 Summary and PE Certification**



### **3.1 Summary**

Southwestern Electric Power Company owns and operates a coal-fired power plant (John W. Turk, Jr. Power Plant) with a Class 3 Non-Commercial (3N) solid waste facility (Class 3N Landfill) associated with the Power Plant. The facility consists of a permitted approximately 73-acre disposal area. The facility meets the requirements of 40 CFR 257.70 Design Criteria for new CCR Landfills and any lateral expansion of a CCR landfill.

### **3.2 Limitations**

The findings and conclusions resulting from this investigation are based upon information derived from the on-site activities and other services performed under the scope of work as described in this report; such information is subject to change over time if additional information is obtained. Please note that Terracon does not warrant the work of laboratories, regulatory agencies or other third parties supplying information used in the preparation of the report.

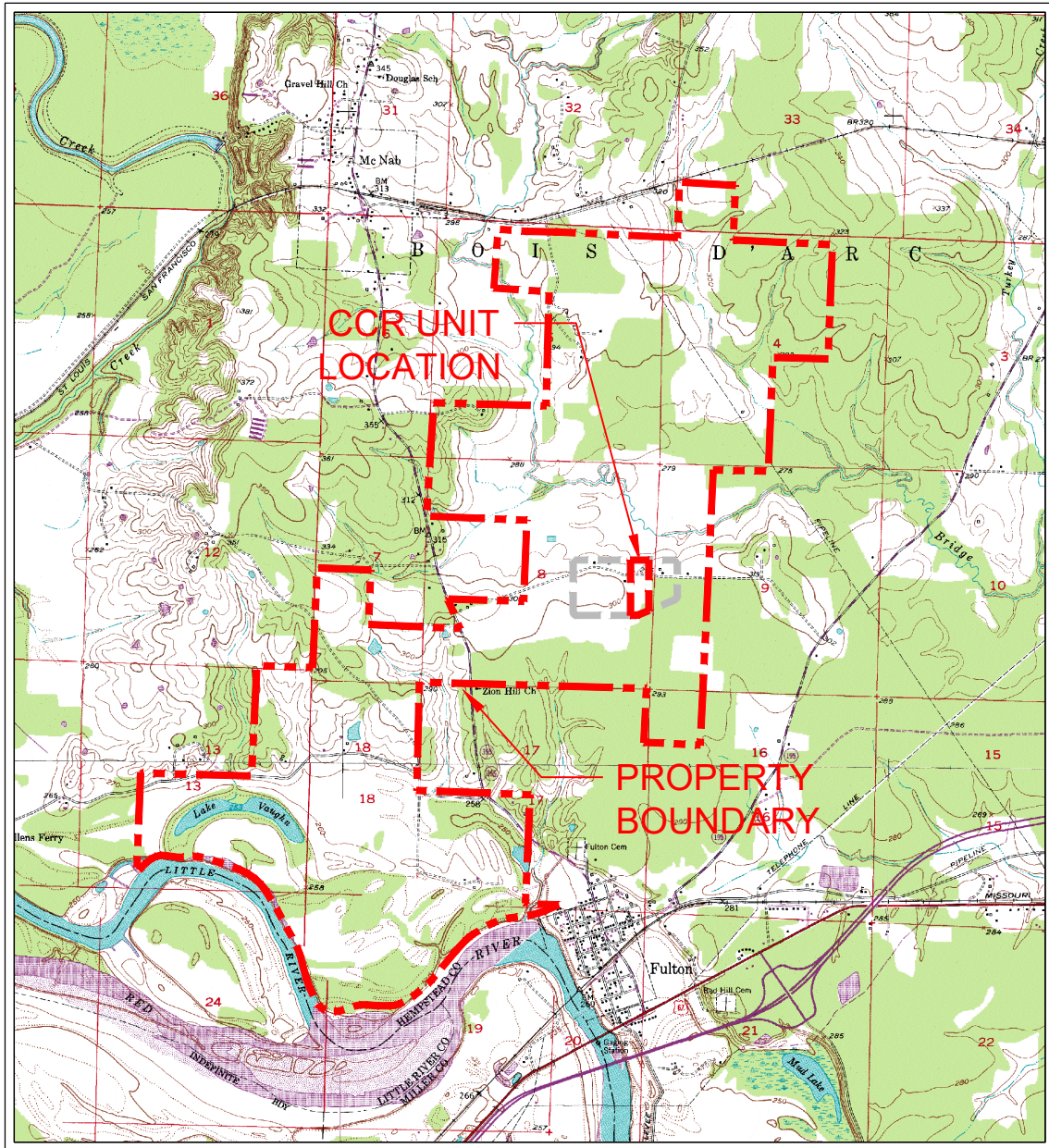
**3.3 PE Certification**

|   |                                |   |
|---|--------------------------------|---|
| Name:<br><i>David M<sup>c</sup> McCormick</i> | Date:<br><i>7.16.18</i>        | <br><br>Stamp |
| Company:<br><i>Terracon</i>                   | Expiration Date:<br>12/31/2019 |   |

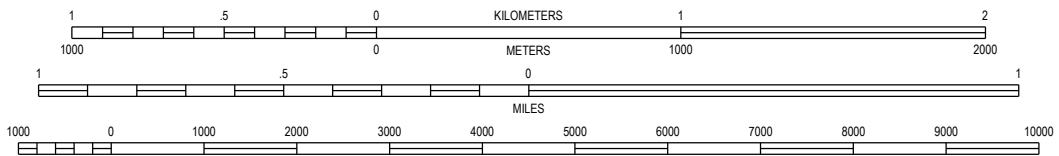
**Bibliography**

1. 2011 Permit Application, Volume 3, Design Basis/Design Analysis, Class 3N Landfill, Terracon Consultants Inc., January 2011.
2. 2015 Minor Modification Application, Terracon Consultants Inc., December 2015.






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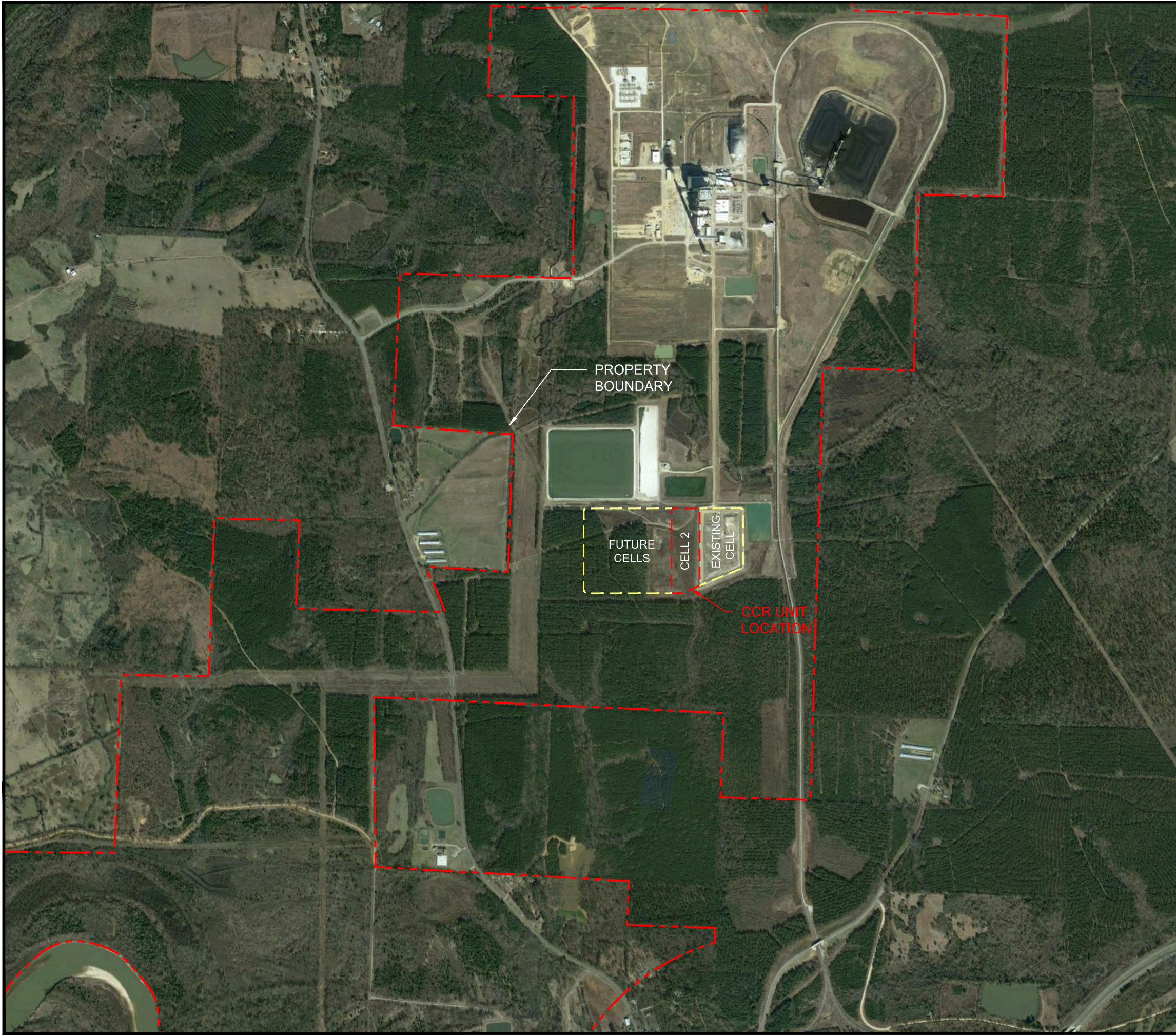


CONTOUR INTERVAL 10 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929

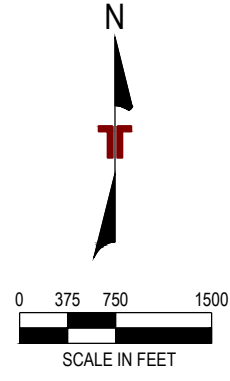
FULTON / MCNAB  
QUADRANGLES  
1951 - Revised 1970 & 1975  
7.5 MINUTE SERIES (TOPOGRAPHIC)



|                      |                                 |   |   |          |
|----------------------|---------------------------------|---|---|----------|
| Project Mngr:<br>DCM | Project No.<br>216-002-35177127 | <br>Consulting Engineers and Scientists<br>25809 I-30 SOUTH BRYANT, AR 72022<br>PH. (501) 847-9292 FAX. (501) 847-9210 | SITE LOCATION MAP                           | FIG. No. |
| Drawn By:<br>TLB     | Scale:<br>AS SHOWN              |   | CELL 2 COMPOSITE LINER DESIGN CERTIFICATION | 1        |
| Checked By:<br>TLB   | File No.<br>501                 |   | AMERICAN ELECTRIC POWER                     |          |
| Approved By:<br>DCM  | Date:<br>07/02/2018             |   | JOHN W. TURK, JR. POWER PLANT               |          |
|                      |                                 |   | FULTON ARKANSAS                             |          |



NOTE:  
FUTURE CELLS ARE NOT PART  
OF THE CURRENT CCR UNIT.



| REV. | DATE | BY | DESCRIPTION |
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**PLANT & CCR UNIT LOCATION MAP**

CELL 2 COMPOSITE LINER DETAIL CERTIFICATION

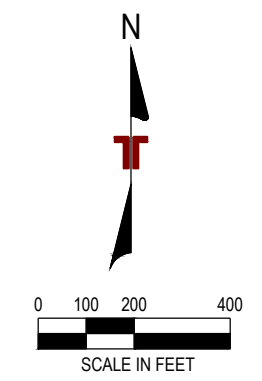
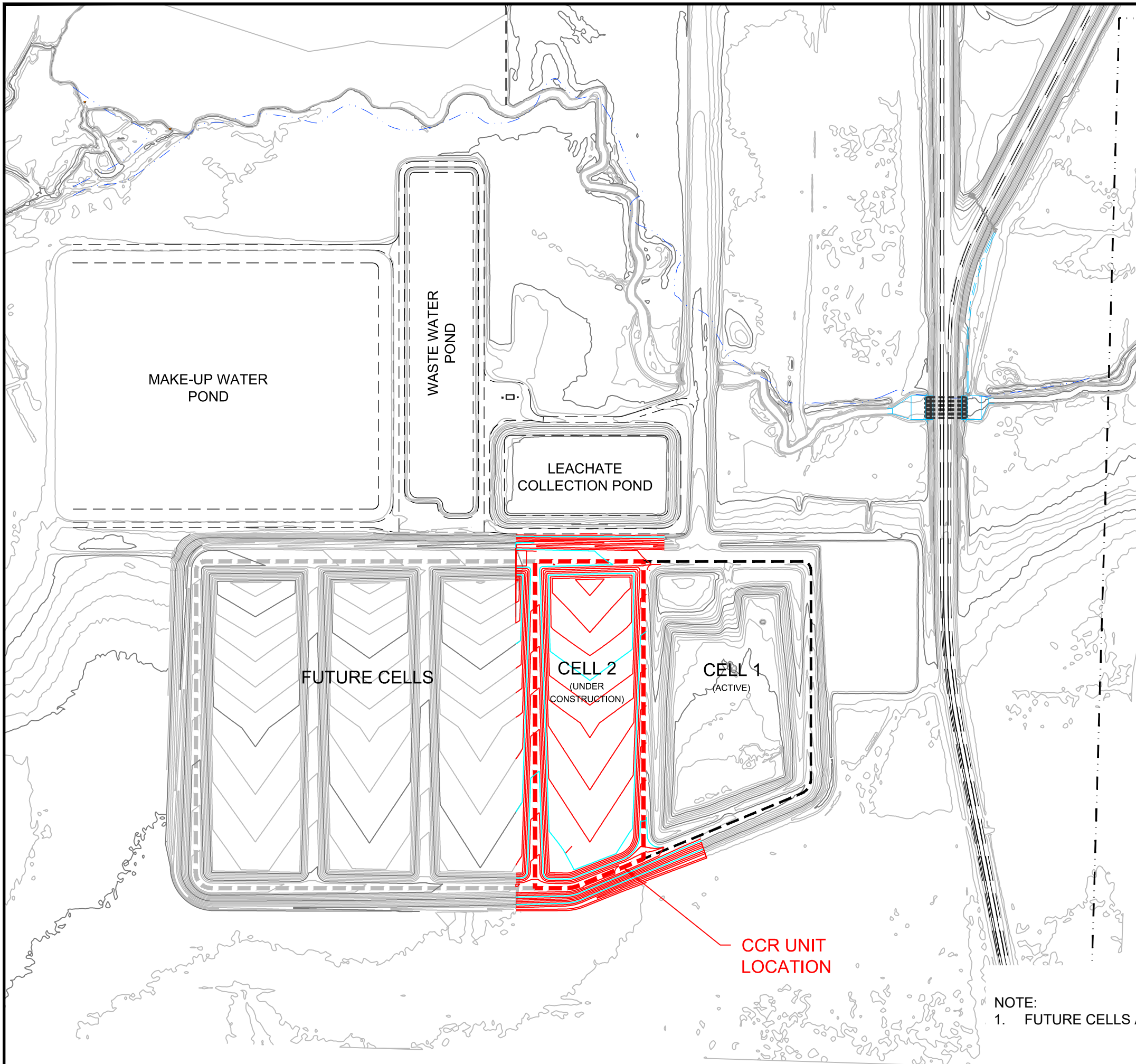
**AMERICAN ELECTRIC POWER**

JOHN W. TURK, JR. POWER PLANT

FULTON ARKANSAS

**FIGURE 2**

|              |                  |
|--------------|------------------|
| DESIGNED BY: | DCM              |
| DRAWN BY:    | TLB              |
| APPVD. BY:   | DCM              |
| SCALE:       | SEE BARSCALE     |
| DATE:        | 07/02/2018       |
| JOB NO.:     | 216-002-35177127 |
| ACAD NO.:    | 502              |
| SHEET NO.:   | 2 OF 5           |



- LEGEND:**
- PROPERTY BOUNDARY
  - - - CCR UNIT BOUNDARY
  - - - EXISTING CELL BOUNDARY
  - - - FUTURE CELL BOUNDARY

**NOTE:**  
 1. FUTURE CELLS ARE NOT PART OF THE CURRENT CCR UNIT.

**FIGURE 3**

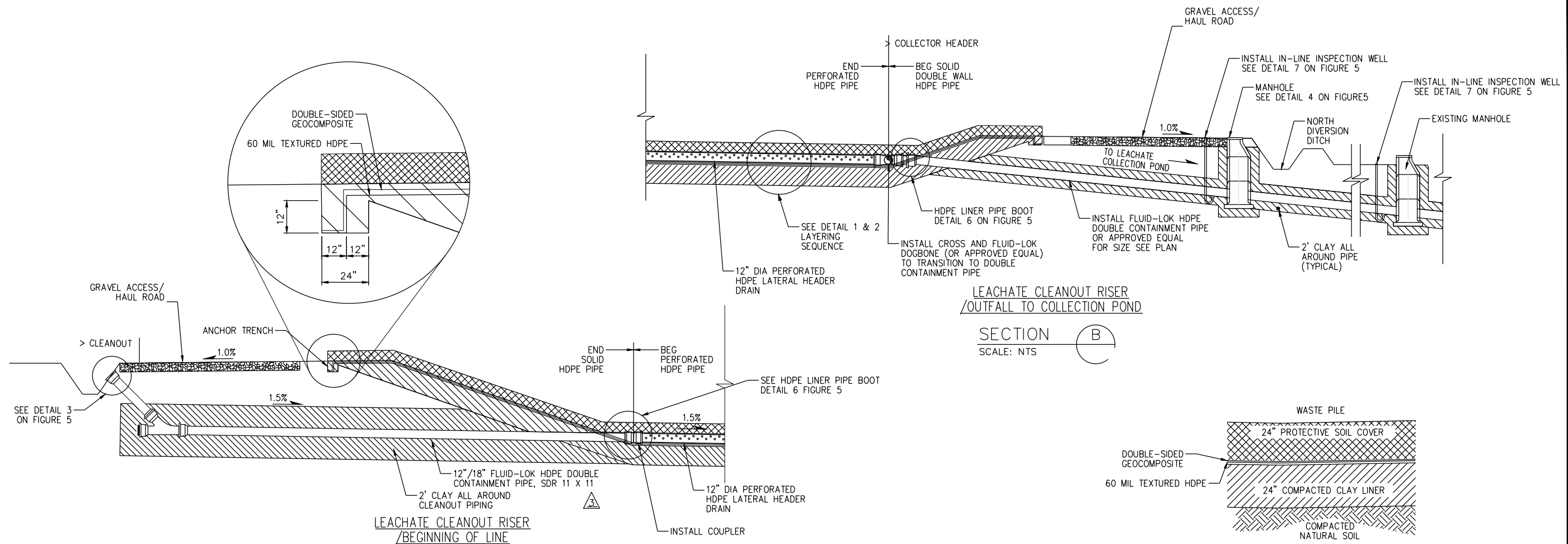
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| DESIGNED BY: | TLB              |
| DRAWN BY:    | TLB              |
| APPVD. BY:   | DCM              |
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| DATE:        | 07/02/2018       |
| JOB NO.:     | 216-002-35177127 |
| ACAD NO.:    | 503              |
| SHEET NO.:   | 3 OF 5           |

**SITE LAYOUT MAP**  
 CELL 2 COMPOSITE LINER DESIGN CERTIFICATION  
**AMERICAN ELECTRIC POWER**  
 JOHN W. TURK, JR. POWER PLANT  
 FULTON ARKANSAS

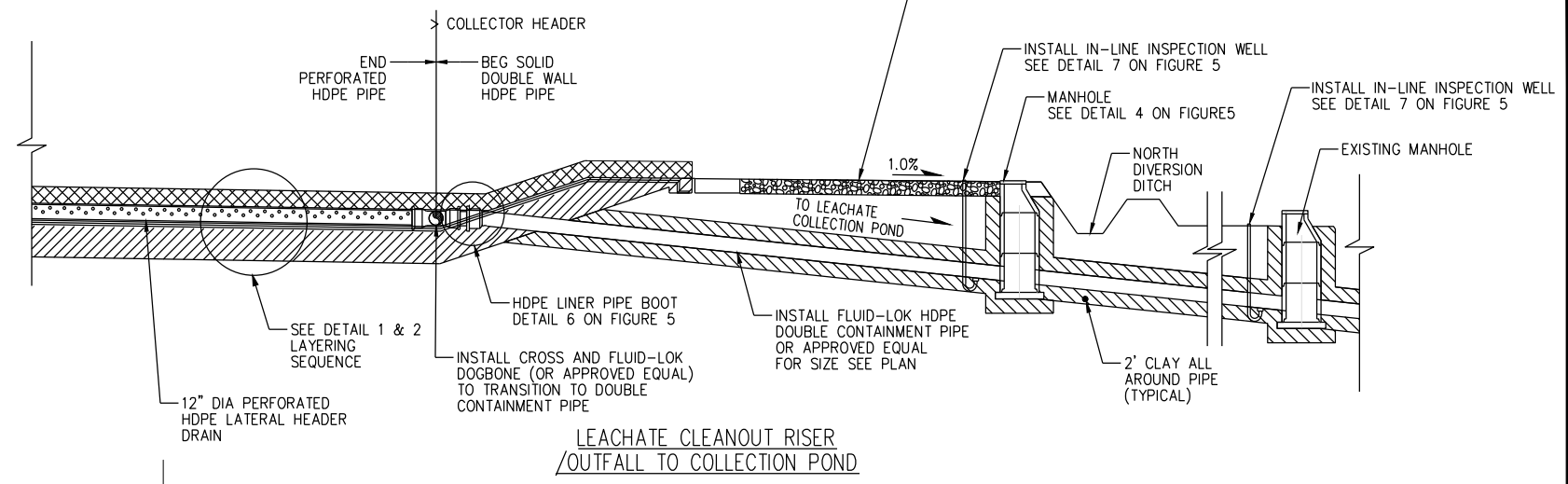
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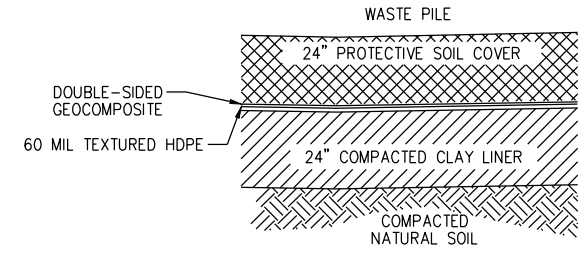




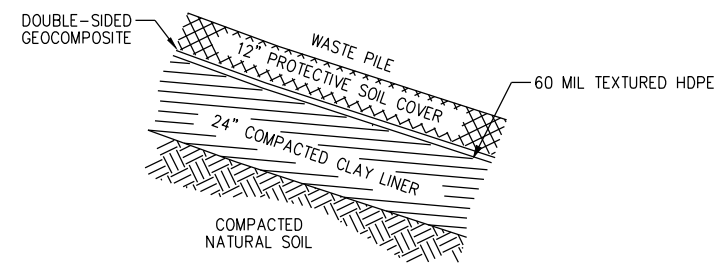
SECTION A  
SCALE: NTS



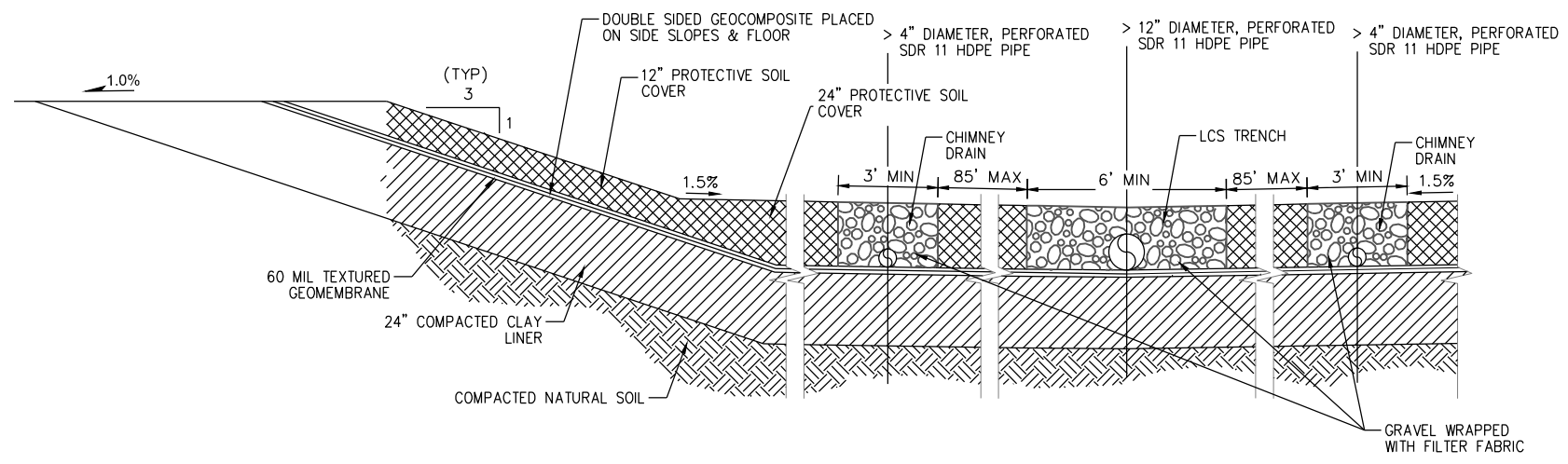
SECTION B  
SCALE: NTS



DETAIL 1  
SCALE: NTS



DETAIL 2  
SCALE: NTS

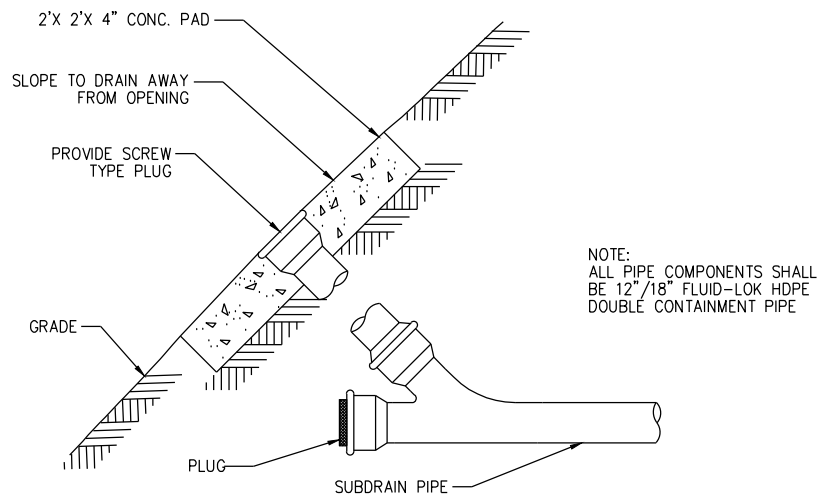


SECTION C  
SCALE: NTS

NOTES:

1. REFER TO SPECIFICATION TABLES IN THE CQA PLAN. ALL MATERIALS WILL BE INSTALLED ACCORDING TO THE CQA PLAN.
2. MAXIMUM CHIMNEY DRAIN SPACING WILL BE 85FT SEPARATION.
3. REFER TO DETAIL 5 ON FIGURE 5 FOR PIPE PERFORATION SPECIFICATIONS.
4. SECTION A, B, & C : FILTER FABRIC (WOVEN OR NON-WOVEN WITH APPARENT OPENING SIZE EQUAL TO #40 SIEVE).
5. CHIMNEY DRAINS WILL BE UTILIZED IF ON-SITE MATERIAL OR BOTTOM ASH FROM THE FACILITY IS USED FOR PROTECTIVE COVER.

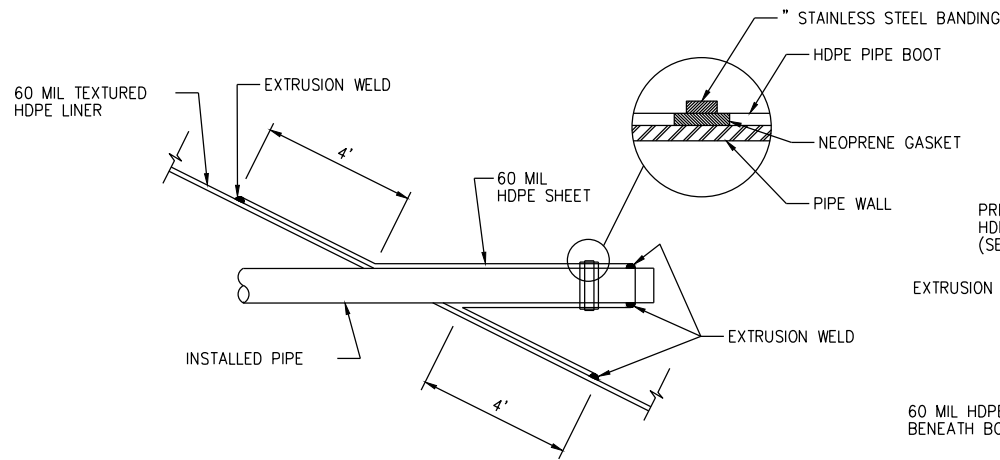
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NOTE:  
ALL PIPE COMPONENTS SHALL  
BE 12"/18" FLUID-LOK HDPE  
DOUBLE CONTAINMENT PIPE

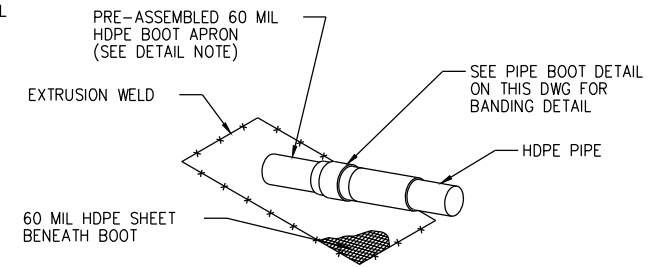
TYPICAL CLEANOUT FOR NON-PAVED AREAS

DETAIL 3  
SCALE: NTS



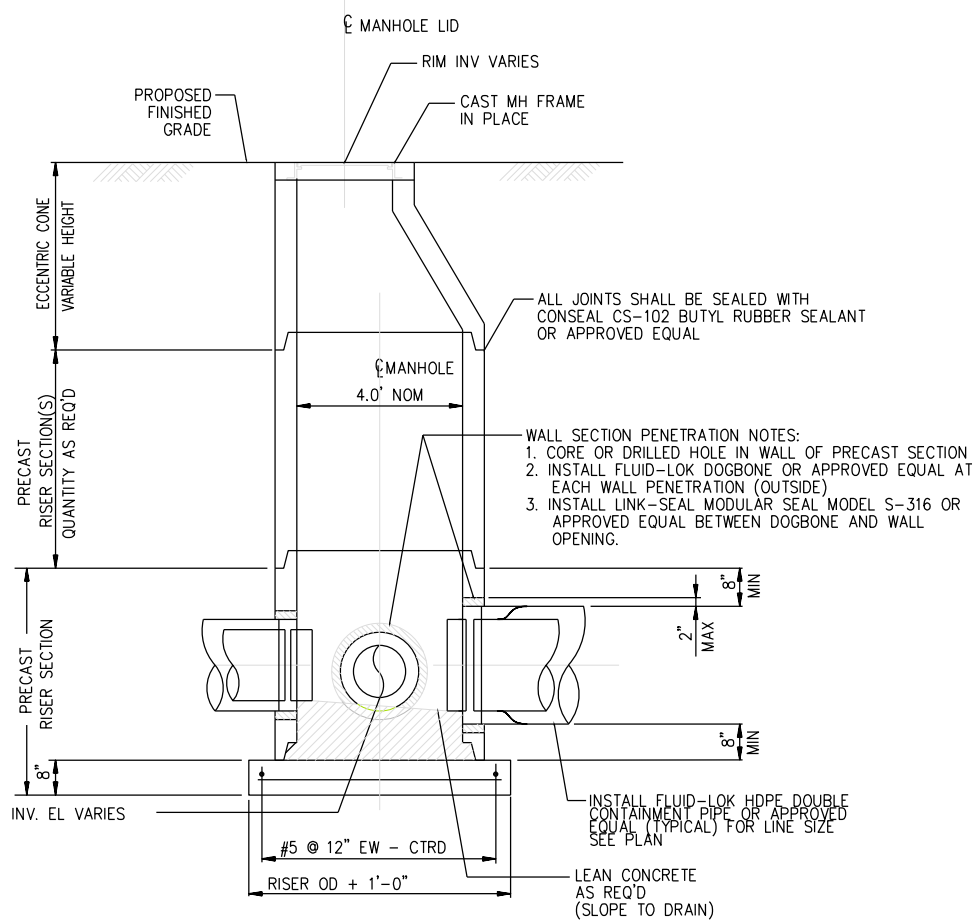
HDPE LINER PIPE BOOT DETAIL - PROFILE VIEW

DETAIL 6  
SCALE: NTS



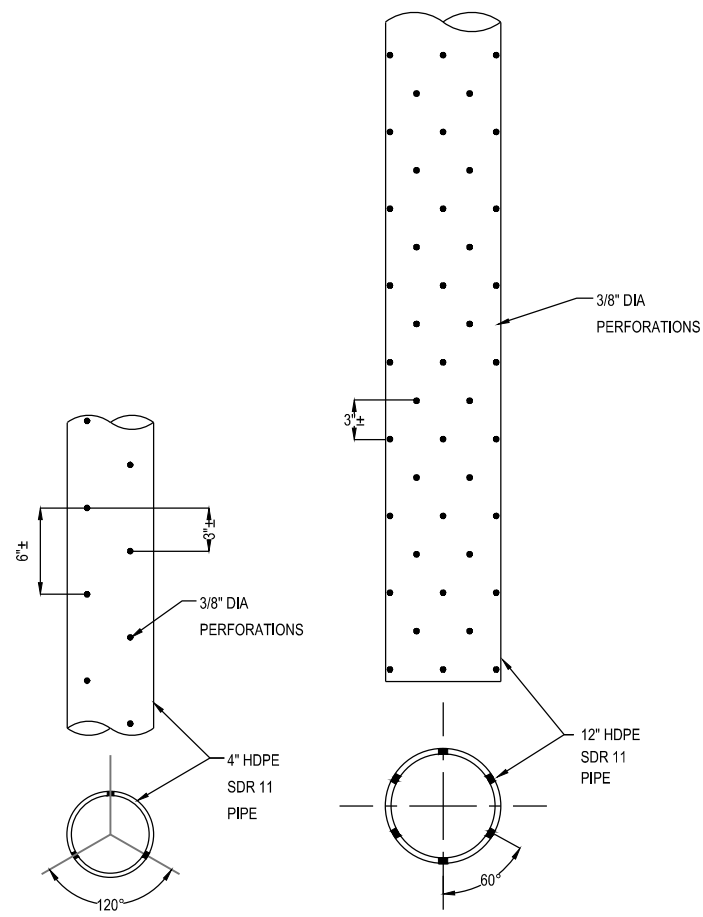
PIPE BOOT DETAIL - ISOMETRIC VIEW

NOTE:  
CONTRACTOR SHALL PROVIDE  
PRE-ASSEMBLED AND TESTED/  
CERTIFIED PIPE BOOTS FOR  
EACH PIPE PENETRATION AS  
PER THE SPECIFICATIONS



TYPICAL PRECAST MANHOLE

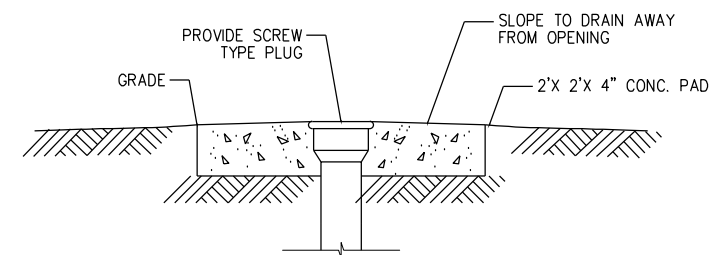
DETAIL 4  
SCALE: NTS



NOTE:  
PERFORATIONS BUILT TO  
MANUFACTURER STANDARD.

LEACHATE PIPE PERFORATION LOCATION (TYPICAL)

DETAIL 5  
SCALE: NTS



INSPECTION WELL RISER - TYPICAL

DETAIL 7  
SCALE: NTS

NOTES:

1. REFER TO SPECIFICATION TABLES IN THE COA PLAN FOR MATERIAL SPECIFICATIONS. ALL MATERIALS WILL BE INSTALLED ACCORDING TO THE COA PLAN.

**FIGURE 5**

|              |                 |
|--------------|-----------------|
| DESIGNED BY: | DCM             |
| DRAWN BY:    | TUB             |
| APPROV. BY:  | DCM             |
| SCALE:       | N.T.S.          |
| DATE:        | 07/02/2018      |
| JOB NO.:     | 216-002-3517127 |
| ACAD NO.:    | 504             |
| SHEET NO.:   | 5 OF 5          |

**TYPICAL DETAILS 2**

CELL 2 COMPOSITE LINER DESIGN CERTIFICATION

**AMERICAN ELECTRIC POWER**

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