TANGIPAHOA PARISH GOVERNMENT
Office of Environmental Services

Tangipahoa Parish Regional Solid Waste Facility

CELL 16 CONSTRUCTION
INSTALLATION OF GEOSYNTHETIC MATERIALS

STATE OF LOUISIANA
RICARDO C. DE ABREU
License No. 31257
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

Questions or comments please contact:

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Fourrier & de Abreu Engineers, L.L.C.
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Ms. Donna Domiano
Tangipahoa Parish Purchasing Agent
Tangipahoa Parish Government
985-748-3211

December 29, 2023

NOTICE TO BIDDERS

NOTICE IS HEREBY GIVEN THAT SEALED BIDS WILL BE RECEIVED BY THE TANGIPAHOA PARISH GOVERNMENT UNTIL **THURSDAY, FEBRUARY 15, 2024, AT 10:00 A.M.** IN THE TPC CHAMBERS, COURTHOUSE ANNEX, 206 E. MULBERRY STREET, AMITE, LOUISIANA ON THE FOLLOWING:

CELL 16 CONSTRUCTION
INSTALLATION OF GEOSYNTHETIC MATERIALS
TANGIPAHOA PARISH REGIONAL SOLID WASTE FACILITY

THEN AND THERE BIDS WILL BE OPENED AND READ ALOUD. BIDS RECEIVED AFTER THE SPECIFIED TIME AND DATE WILL NOT BE OPENED OR RECOGNIZED.

A MANDATORY PRE-BID CONFERENCE FOR THIS PROJECT WILL BE HELD ON THURSDAY, FEBRUARY 1, 2024 AT 10:00 A.M. IN THE TANGIPAHOA PARISH GOVERNMENT ANNEX OFFICE, 206 E. MULBERRY STREET, AMITE, LOUISIANA.

TANGIPAHOA PARISH GOVERNMENT BID DOCUMENTS ARE POSTED ON www.centralbidding.com

THE TANGIPAHOA PARISH GOVERNMENT RESERVES THE RIGHT TO REJECT BIDS IN ACCORDANCE WITH THE LAW.

S/DONNA DOMIANO
PURCHASING AGENT

DAILY STAR
PLEASE PUBLISH JANUARY 16, 23 & 30, 2024

TANGIPAHOA PARISH REGIONAL SOLID WASTE FACILITY
CELL 16 CONSTRUCTION
INSTALLATION OF GEOSYNTHETIC MATERIALS

PROJECT REQUIREMENTS AND INSTRUCTIONS TO BIDDERS

The Tangipahoa Parish Government (herein called the "Owner") will be accepting sealed bids from contractors to supply and install geosynthetic and other materials as part of the construction of Cell 16 at the Tangipahoa Parish Regional Solid Waste Facility, located in Independence, Louisiana. Drawings, specifications, and additional requirements for installation are attached.

Mandatory Pre-Bid Conference

A mandatory pre-bid conference will be held on the advertised date in the Tangipahoa Parish Government Annex Office (Burgess Building). All questions regarding this project shall be directed to the Tangipahoa Parish Government officers and their engineers during the mandatory pre-bid conference.

Bid Preparation and Delivery

All bids must be made on the required bid proposal forms (Attachment A). All blank spaces for individual bid prices and total bid price must be filled in, in ink or typewritten, and the bid proposal forms must be fully completed and executed when submitted. Quantities cannot be altered in the bid proposal forms. Only one copy of the bid proposal forms is required.

When purchasing materials for this project, the Contractor will be authorized to act as an authorized purchasing agent of the Parish and qualify for the respective tax exemptions. Therefore, sales taxes should not be included in the bid prices.

Each bid must be accompanied by a bid bond payable to the Owner for 5% of the total amount of the bid.

Each bid must be delivered in a sealed envelope. Each sealed envelope containing a bid must be plainly marked on the outside as “CELL 16 CONSTRUCTION - INSTALLATION OF GEOSYNTHETIC MATERIALS”. Bidder shall certify that he holds an active license by displaying his license number on the bid envelope. Therefore, the envelope shall bear on the outside the bidder’s name, address, and Louisiana Contractor License Number. To bid and perform

work covered by these documents, the Contractor must be licensed under Classification III-Heavy Construction, or Classification IV-Municipal and Public Works Construction, or under the Specialty Classification, Coverings and Linings.

Sealed bids shall be received by the Tangipahoa Parish Government at the Courthouse Annex, 206 E. Mulberry Street, Amite, Louisiana (mailing address: P.O. Box 215, Amite, Louisiana 70422), until the advertised time and date of the bid opening. Alternatively, bids can be submitted electronically through centralbidding.com.

The Owner may waive any informalities or minor defects or reject any and all bids, in accordance with the Law. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified or in a form other than that described above shall not be considered. No bidder may withdraw a bid within 45 days after the actual date of the opening thereof.

The Owner may make investigations as deemed necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the Agreement and to complete the work contemplated therein. A conditional or qualified bid will not be accepted.

Upon award of the project and upon request by the Owner, Contractor shall submit detailed specification datasheets and information for the proposed materials to be furnished by the Contractor for the project.

Engineer's Opinion of Cost

Engineer's opinion of cost for this project is $2,500,000 to $2,800,000.

Bidder Qualifications

In determining the ability of the bidder of performing the work for this project, the following items may be verified prior of awarding the Contract:

1. Bidder's experience in the installation of the same types of geosynthetics utilized in this project.

2. If manufacturer(s) of geosynthetic materials have a certification or accreditation program, or a similar program, Bidder's certification or accreditation to install the geosynthetic materials by the manufacturer(s) of the materials.

3. Bidder's performance in projects with similar or greater complexity to the project.

4. Experience of Bidder's Geosynthetics Installation Supervisor in projects similar or with greater complexity and size to this project.

5. Bidder's professional references.

6. Additional qualifications depending on the specific product. Please refer to the Technical Specifications section.

Additional Conditions

All applicable laws, ordinances, rules, and regulations, including applicable Federal, State and Local Laws, shall apply to the bid process and contract throughout.

Bidders must fully acquaint themselves with the work by examination of the site and review of the drawings and technical specifications, including all addenda. Bidders are responsible for verifying the quantities presented in the Bid Form and notifying the Engineer and Owner of any variances or discrepancies prior to bidding. After bids have been submitted, the bidder shall not assert that there was a misunderstanding concerning the quantities of work or of the nature of the work to be done. The deadline for submissions of questions to the Engineer is 10:00 A.M. on the seventh calendar day after the mandatory pre-bid conference, unless extended in writing by the Owner.

The drawings and technical specifications contain the provisions required for the construction of the project. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Contractor or relieve the Contractor from fulfilling any of the conditions of the contract.

Prospective bidders can inspect the site individually by contacting Mr. Donnie Colona, Field Landfill Director for the Tangipahoa Parish Regional Solid Waste Facility, at (985) 878-4403.

Award and Notice to Proceed

Award, if made, will be to the lowest responsive and responsible bidder within the available funds for the project. All applicable laws, ordinances, and rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the bid process and contract throughout.

The Notice to Proceed for Materials will be issued within thirty (30) days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed for Materials cannot be issued within such period, the time may be extended by mutual agreement between the Owner and Contractor. If the Notice to Proceed for Materials has not been issued within the thirty (30) day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

A performance bond and payment bond in the value of 50% of the contract price will be required upon awarding of the contract. The performance bond shall be issued by a corporation duly authorized as a surety company to transact business in the State of Louisiana.

Time for Completion and Liquidated Damages

Time is of the essence. Bidder agrees to have the liner (HDPE Geomembrane/GCL/Drainage Geocomposite) material delivered to the site no later than sixty (60) calendar days after the Notice to Proceed for Materials is submitted to Contractor. Payment for HDPE geomembrane/GCL and drainage geocomposite materials will be processed upon successful delivery of those products to the site, inspection of materials by the Owner and Engineer (including certifications), and receipt of the Contractor's invoice by the Owner and Engineer.

Bidder agrees to commence work for this project within twenty (20) calendar days after receipt of the Notice to Proceed for Installation/Construction. Bidder shall fully complete the work within sixty (60) calendar days after commencement of the work, excluding weather delays in accordance with the weather delay conditions presented in the following paragraphs.

For weather delays, an extension of Contract Time will be granted for any measurable rain days in excess of the monthly average as recorded by the National Weather Service for the project area. The Contractor's superintendent shall meet on a daily basis with the QA/QC

Technician to keep a daily log of the adverse rain days (inclement weather delays). If Contractor wishes to make a claim for additional contract time due to inclement weather that affects Contractor's construction or installation activities, said Claim shall only be for days where measurable precipitation (not trace amounts) preventing Contractor from performing any work in the project, as determined by the Engineer and the Owner.

At the first week of each month, Contractor shall submit to Engineer his claim for additional contract time due to inclement weather for the previous month.

Liquidated damages will be assessed to the contractor at a rate of $1,000/day in case the contractor does not complete the project in accordance with the project's specifications or to the Owner's satisfaction.

Acceptance of Work and Clear Lien Certificate

Upon satisfactory completion of the work and compliance by the Contractor with all terms of this contract, the Contractor shall notify the Owner of this completion and request that a final inspection of the work be conducted. Provided the work has been completed to the satisfaction of the Owner, within ten days from the date of inspection, a letter of acceptance of the work will be issued to the Contractor by the Owner. It shall be the responsibility of the Contractor to record the aforementioned letter of acceptance at the office of the Clerk of Court, Tangipahoa Parish, Louisiana, and submit a recorded copy to the Owner.

At the end of forty-five (45) calendar days from the date of recording of the letter of acceptance, it shall also be the responsibility of the Contractor to deliver to the Owner a "no lien certificate" secured from a person in the office of the Clerk of Court, Tangipahoa Parish, authorized to issue such a certificate. This "no lien certificate" shall certify that there are no liens or claims recorded at the Tangipahoa Parish Courthouse which would affect this contract.

After the deliverance of the "no lien certificate" as described above, the Owner shall prepare or cause to be prepared a final estimate of the final amount due to the Contractor on this contract. The final estimate will be prepared on the month immediately succeeding the month in which the "no lien certificate" is issued.

All prior estimates and payments shall be subject to correction in the final estimate and payment. Until the "no lien certificate" is delivered as described above, the Owner may withhold at least the amount of any lienable claims against the Contractor, pending the result of any legal actions against the Contractor.

Attachments

Attachment A – Bid Proposal Forms
Attachment B – Technical Specifications
Attachment C – Construction Quality Assurance (CQA) Plan
Attachment D – Drawings

Attachment A
Bid Proposal Forms

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: Tangipahoa Parish Government
206 E. Mulberry Street
Amite, LA 70422

BID FOR: Tangipahoa Parish Regional Solid Waste Facility
Cell 16 Construction – Installation of Geosynthetics Materials

The undersigned bidder hereby declares and represents that she/he: a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: Fourrier & de Abreu Engineers, LLC and dated: December 29, 2023.

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____ .

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:

_____ Dollars ($ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

N/A _____ Dollars ($ _____)

Alternate No. 2 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

N/A _____ Dollars ($ _____)

Alternate No. 3 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

N/A _____ Dollars ($ _____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

_____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

THE FOLLOWING ITEMS ARE TO BE INCLUDED WITH THE SUBMISSION OF THIS LOUISIANA UNIFORM PUBLIC WORK BID FORM:

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

**** A CORPORATE RESOLUTION OR WRITTEN EVIDENCE** of the authority of the person signing the bid for the public work as prescribed by LA R.S. 38:2212(B)(5).

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA R.S. 38:2218(A) attached to and made a part of this bid.

LOUISIANA UNIFORM PUBLIC WORK BID FORM
UNIT PRICE FORM

TO: Tangipahoa Parish Government
206 E. Mulberry Street
Amite, LA 70422

BID FOR: Tangipahoa Parish Regional Solid Waste Facility
Cell 16 Construction – Installation of Geosynthetics Materials

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___**Mobilization/Demobilization**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
1	**1**	**Lump Sum**		

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___ **Double-Sided Textured HDPE Geomembrane (60-mil) AND GCL – Supply and Install**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
2	**565,000***	**ft.^{2}**		

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___ **Geocomposite Drainage Media (Slopes) – Supply and Install**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
3	**100,000***	**ft.^{2}**		

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___ **Leachate Collection Pipes for Leachate Collection Trenches and Cleanout Risers (6-inch Diameter Perforated/Solid HDPE SDR-17; Includes All Necessary Connections, Tees, and Elbows) – Supply and Install**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
4	**3,000**	**ft.**		

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___ **Leachate Collection Pipes for Leachate Collection Risers (10-inch Diameter Perforated/Solid HDPE SDR-17; Includes All Necessary Connections, Tees, and Elbows) - Supply and Install**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
5	**200**	**ft.**		

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___ **Geotextile (12-oz/sq.yd.) for Leachate Collection System– Supply and Install**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
6	**42,000**	**ft.^{2}**		

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___ **Gravel for Leachate Collection Trenches and Sumps (Placement only)**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
7	**450**	**yd.^{3}**		

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___ **Leachate Force Main from Headwalls to Cell 15 Tie-In – Installation of 6-inch Diameter HDPE SDR-11 Line Connecting all Cell 16 Headwalls to Cell 15 Tie-In (All Connection Lines, Tees, Flanges, and Elbows included) - See Dammon Engineering, Inc. Drawing No. M101 – Supply and Install**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
8	**610**	**ft.**		

All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the Owner.
*** Quantities are estimated as a three-dimensional area and include anchor trenches.**

LOUISIANA UNIFORM PUBLIC WORK BID FORM
UNIT PRICE FORM

TO: Tangipahoa Parish Government
206 E. Mulberry Street
Amite, LA 70422

BID FOR: Tangipahoa Parish Regional Solid Waste Facility
Cell 16 Construction – Installation of Geosynthetics Materials
2/2

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___ **Contact Stormwater Force Main from Headwalls to Cell 15 Tie-In – Installation of 6-inch Diameter HDPE SDR-11 Line (All Connection Lines, Tees, Flanges and Elbows Included. Installed in Same Trench as Leachate Force Main) – See Dammon Engineering, Inc. Drawing No. M101 – Supply and Install**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
9	**610**	**ft.**		

DESCRIPTION:	☑ Base Bid or ❑ Alt.# **Compressed Air Line from Compressor to Cell 16 Headwalls – Installation of 2-inch Diameter HDPE SDR-11 (All Connection Lines, Tees, and Elbows Included) – See Dammon Engineering, Inc. Drawing No. M101 – Supply and Install**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
10	**610**	**ft.**		

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___ **Electrical System – Work Included: Supply and install Pump Control Systems, Panels, Conduits, Wiring, Connections, etc. as Required for a Complete and Operational System that Runs Below Grade and to the Headwalls as Shown on Dammon Engineering, Inc. Drawing Nos. M103 and E101.**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
11	**1**	**Lump Sum**		

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___ **Diaphragm Pumps with Connections, Piping, Hoses, Liquid Level Detectors, Air Solenoids, Air Regulators, etc. w/Filters as shown on Dammon Drawing Nos. M102 and M103 – 2" Drain Pipes from Headwall to Sump Included – Supply and Install**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
12	**3**	**Unit**		

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___**Concrete Headwalls with Control Panels for Leachate Pumps – Supply and Construct**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
13	**3**	**Unit**		

DESCRIPTION:	☑ Base Bid or ❑ Alt.# ___ **Stormwater Management**			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*
14	**1**	**Lump Sum**		

All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the Owner.

BID BOND

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That_____of_____, as Principal, and_____, as Surety, are held and firmly bound unto the Tangipahoa Parish Government (Obligee), in the full and just sum of five (5%) percent of the total amount of this proposal, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

Tangipahoa Parish Regional Solid Waste Facility – Cell 16 Construction – Installation of Geosynthetic Materials

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

_____	_____
PRINCIPAL (BIDDER)	SURETY
BY: _____	BY: _____
AUTHORIZED OFFICER-OWNER-PARTNER	AGENT OR ATTORNEY-IN-FACT(SEAL)

AFFIDAVIT

STATE OF LOUISIANA

PARISH/COUNTY OF TANGIPAHOA

BEFORE ME, the undersigned authority, duly commissioned and qualified within and for the state and parish or county aforesaid, personally came and appeared_____ _____representing_____ _____.

Who, being by me first duly sworn deposed and said that he or she has read and signed this Affidavit and he/she does hereby attest, under oath, as follows:

(1) That affiant and his or her firm is registered and participates in a status verification system to verify that all employees in the State of Louisiana are legal citizens of the United States or are legal aliens;

(2) That affiant and his or her firm will continue, during the term of any contract with the Tangipahoa Parish Government, to utilize a status verification system to verify the legal status of all new employees in the State of Louisiana; and

(3) That affiant and his or her firm will require all subcontractors to submit to them and/or their employer a sworn Affidavit verifying compliance with paragraphs (1) and (2) of this Affidavit.

Prospective bidder or representative to sign and type or print name below signature.

_____
Affiant Signature

_____
Printed Name

SWORN TO AND SUBSCRIBED BEFORE ME THIS ____ day of_____,20__.

_____
Notary Public

ATTESTATION CLAUSE REQUIRED BY
LA. R.S. 38:2227 (PAST CRIMINAL CONVICTIONS OF BIDDERS)

Sworn statements shall be submitted in the form of an affidavit as indicated below, executed and sworn to by the bidder before persons authorized by laws of the State to administer oaths. The original of such sworn statement shall be submitted by the successful bidder before the Award of Contract. The award of Contract shall be within (___) calendar days of the bid opening.

State Project Number: _____ (if applicable)

Name of Project: _____

Parish:_____

(an individual)
(a partnership)
_____ (a corporation)
certify that:

Appearer, as a Bidder on the above-entitled Public Works Project, does hereby attest that:

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to, any of the following state crimes or equivalent federal crimes:

(a) Public bribery (R.S. 14:118)
(b) Corrupt influencing (R.S. 14:120)
(c) Extortion (R.S. 14:66)
(d) Money laundering (R.S. 14:23)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (R.S. 14:67)
(b) Identity Theft (R.S. 14:67.20)
(c) Theft of a business record (R.S. 14:67.20)
(d) False accounting (R.S. 14:70)
(e) Issuing worthless checks (R.S. 14:71)
(f) Bank fraud (R.S. 14:71.1)
(g) Forgery (R.S. 14:72)
(h) Contractors; misapplication of payments (R.S. 14:202)
(i) Malfeasance in office (R.S. 14:134)

_____ Name of Bidder

_____ Name of Authorized Signatory of Bidder

_____ Date

_____ Title of Authorized Signatory of Bidder

WITNESSES:

_____ Signature of Authorized Signatory Bidder

_____

_____

Parish or county _____

State of _____

Subscribed and sworn to before me this _____ day of_____, 20____.

_____ NOTARY PUBLIC (signature)

_____ NOTARY PUBLIC (printed name)

_____ NOTARY PUBLIC NUMBER

_____ EXPIRATION DATE

Attachment B
Technical Specifications

TECHNICAL SPECIFICATIONS

- **Project Description**
- **Section 02276 - Gravel for Leachate Collection System**
- **Section 02660 - HDPE Geomembrane Liner**
- **Section 02661 - Geosynthetic Clay Liner (GCL)**
- **Section 02662 - Geocomposite Drainage Media**
- **Section 02712 - Geotextile for Leachate Collection Trench**
- **Section 02722 - Leachate Collection Piping**

TANGIPAHOA PARISH REGIONAL SOLID WASTE FACILITY
CELL 16 CONSTRUCTION
INSTALLATION OF GEOSYNTHETIC MATERIALS

PROJECT DESCRIPTION

1. INTRODUCTION

This document presents the description of the activities to be developed for installation of geosynthetic and other materials as part of the construction of a new solid waste disposal cell (Cell 16) at the Tangipahoa Parish Regional Solid Waste Facility. Drawing 1 shows the location of Cell 16 at the landfill site. The scope of work herein applies only to installation of geosynthetic and other materials at Cell 16. The contractor will also be responsible for placing gravel material in the leachate collection trenches and sumps (in accordance with the drawings and specifications), and supply and install mechanical and electrical equipment.

Currently the Owner is finalizing the construction of the clay liner for Cell 16. Clay liner construction is not part of this contract.

The installation project consists of supplying and installing in accordance with the attached technical specifications the following materials:

- Double-sided textured HDPE/GCL liner (factory-bonded or independent components);
- Geotextiles;
- HDPE piping for Leachate Collection System (LCS);
- Gravel placement for the LCS (Owner will supply gravel);
- HDPE piping for leachate force mains (and all necessary connections);
- Diaphragm pumps (3) for leachate risers;
- All components of the leachate collection/removal system (including liquid level detectors at each leachate riser);
- Headwalls (along with 2” drain pipe to sump);
- Electrical system and electrical conduits; and
- Compressed air conduits.

Details of those materials are presented on the attached drawings and specifications. In addition, this project includes the installation of the connectors (fittings, pipes, and mechanical connections) for the leachate collection and pumping system in accordance with

the attached drawings and specifications. Contractor shall also be responsible for the construction of the headwalls and installation of electrical components. Pumps shall be purchased and installed by Contractor. Contractor will also be responsible for placing the gravel material for the leachate collection system (trenches). All materials for installation and construction shall also be provided by the Contractor (with exception of gravel; placement only).

Since earthwork construction for the cell by the Owner may occur concomitantly with work to be provided by the Contractor, it is the Contractor's responsibility to coordinate the work with the Owner to avoid any interreferences and delays.

In the execution of this project, the Contractor shall have all equipment in good condition. Any leakage (e.g., oil, fuel, grease, coolant, etc.) must be removed by the Contractor to the satisfaction of the Owner or Engineer.

The description of the necessary activities for the installation of geosynthetics at Cell 16 is presented in the following sections.

2. LINER AND LEACHATE COLLECTION SYSTEM

The liner configuration will consist of a double-sided textured 60-mil HDPE geomembrane/geosynthetic clay liner (GCL) over at least 1 ft of compacted soil material (clay) with hydraulic conductivity (permeability) equal or less than 1 x 10^{-7} cm/sec. Owner is responsible for construction and maintenance of the clay liner. Depressions in the clay liner caused by Contractor's equipment that are more than 0.5 inches in depth are prohibited and shall be repaired by the Contractor.

The HDPE geomembrane liner shall be textured on both sides (i.e. double-sided textured). The GCL shall be reinforced on slopes (except if the GCL is factory-bonded to the HDPE geomembrane). The HDPE geomembrane can be independent or factory-bonded to the GCL. The geomembrane/GCL shall be installed in such a sequence as to prevent ponding and pre-hydration of the GCL inside the cell due to inclement weather. Stormwater management shall be the responsibility of the Contractor (please refer to Section 7). Geomembrane/GCL panels (whether factory-bonded or independent) shall be installed and welded in accordance with the manufacturer's specifications.

The final configuration of the liner (top of liner) is presented on Drawing 3.

Contractor shall be responsible for installation of geosynthetics for the leachate collection system (LCS). Leachate collection pipes (6-inch perforated SDR-17 HDPE pipe) shall be installed to collect the leachate at the cell floor. The leachate collection pipe shall be installed in trenches (see Drawing 4) and wrapped in a geotextile. The trench will be filled with gravel bedding material wrapped in a geotextile. Owner will be responsible for excavating the leachate collection trenches and supplying the gravel bedding material. Contractor will be responsible for placing the gravel bedding material and completing leachate collection trenches by wrapping the gravel with geotextile. Sumps will be excavated in the lowest points of the cell by the Owner and shall be filled with gravel wrapped in geotextile. For more details refer to Drawing 4 and the technical specifications.

Sand access roads may be constructed by Owner parallel and alongside the leachate collection trenches to help installation of the leachate collection system. Upon construction of the sand access roads, Contractor may use the sand access roads to install the 12 oz./yd^2 geotextile into the leachate collection trenches and allow it to drape over the sand access road. This will preclude potential damage to the geomembrane liner from gravel. The access road shall then be used to install gravel bedding material to the leachate trenches. Damage caused by inadequate gravel placement shall be repaired by Contractor at the expense of Contractor.

On the internal slopes, a geocomposite drainage media comprised of a geonet between non-woven geofabrics shall be furnished and installed by the Contractor. This geocomposite shall have a minimum transmissivity of 1 x 10^{-4} m^2/sec under unit gradient and applied normal stress of 5,000 psf.

Owner will be responsible for excavating and covering the anchor trenches for geosynthetics.

3. LEACHATE AND CONTACT STORMWATER FORCE MAINS

Please refer to Attachment D for the details and plans regarding the leachate removal system.

The three new headwalls shall consist of a 6-inch diameter leachate force main and connect to the existing leachate conveyance system via the stub-out located near the northwest corner of active Cell 15. All connections shall be made of HDPE SDR-11.

An independent force main shall be furnished and installed by the Contractor within the same trench for the removal of contact stormwater from inside the cell. The contact stormwater force main shall be comprised of 6-inch SDR-17 HDPE pipe. The new stormwater

force main shall tie into the existing stormwater conveyance system via the stub-out located near the northwest corner of active Cell 15. A 6-inch valve/camlock/extension shall be furnished and installed by the contractor at all Cell 16 headwalls. Please refer to Drawing M101 for the force mains location and the location and details of the tie-in.

Owner will excavate and cover the trenches where the force mains will be installed. Force mains will be buried to an approximate depth of 2 to 3 feet.

The force mains shall be pressure-tested by Contractor. Force mains shall be pressure tested in accordance with the manufacturer's specifications.

4. FITTINGS, PIPES, AND MECHANICAL CONNECTIONS AT HEADWALLS

Three headwalls shall be constructed by the Contractor at the top of the North berm at the location of the three leachate collection risers. Details and locations for the headwalls are presented in Drawings M101 and M102.

Fittings, pipes, and mechanical connections for the leachate pumping system shall be furnished and installed by the Contractor. Fittings, pipes, and mechanical connections for the leachate pumping system to be utilized at each headwall are detailed in Drawings M102 and M103.

Leachate collection risers shall be comprised of 10-inch diameter HDPE SDR-17 pipes.

5. LEACHATE WET WELL

Leachate from active Cells 13 through Cell 15 is currently pumped via the existing diaphragm pumps located at the headwalls for those cells. The leachate force main for the Cell 16 leachate collection system as well as the compressed air conveyance system shall tie into the wet well system via the stub-out located at the northwest corner of Cell 15 (reference Drawing 2).

6. WARRANTY AND MATERIALS DELIVERY

A minimum of one-year warranty shall be provided for all materials and labor for this project.

Materials delivered to the site will be off-loaded by the Owner.

7. STORMWATER MANAGEMENT

Stormwater management shall be the responsibility of the Contractor until all geosynthetics materials have been installed at Cell 16 to the satisfaction of the Engineer and Owner. At that time, a letter will be issued by the Engineer to the Contractor stating that stormwater management at Cell 16 is no longer the responsibility of the Contractor. Owner will be responsible for management of stormwater in the trenches for force mains during the entire duration of the project.

SECTION 02276

GRAVEL FOR LEACHATE COLLECTION SYSTEM

1. SCOPE

The following specifications set forth the requirements for gravel to be used in the leachate collection system. Granular materials shall be naturally produced by disintegration of rock and shall be sufficiently free of organic material, mica, loam, clay and other deleterious substances and be thoroughly suitable for the purpose for which it is intended. All particles shall be siliceous with less than 5% by weight of carbonates.

2. GRAVEL MATERIAL AND PLACEMENT

Gravel material will be provided by the Owner at no cost to the Contractor for Contractor placement as indicated in this and other documents of this bid package. Gravel for trench and sumps shall be rounded or sub-rounded with no angular particles and shall have an approximate gradation as follows and as close as practicable:

TABLE 1
REQUIRED GRADATION FOR GRAVEL

Sieve Size/Number	Percent Passing by Weight
1-1/2 inch	100
1 inch	90 to 100
3/4 inch	35 to 85
1/2 inch	25 to 60
No. 4	0 to 10
No. 8	0 to 5
No. 200	0 to 1

Calcium carbonate or limestone particles shall not exceed five percent by weight nor organic particles one percent by weight in the gravel material. The gravel shall be tested in accordance with ASTM C136 or D422. Gravel for the leachate system shall exhibit a permeability not less than 1×10^{-2} cm/sec.

Gravel installed at the leachate collection trench and sumps shall be installed to the size and shape specified. Care shall be taken during gravel placement to avoid damaging or shifting the pipes. Geotextile material shall be used to wrap the gravel pack surrounding the leachate pipes. The location and configuration for the use of the geotextile is shown on the construction drawings.

3. UNIT PRICES

3.1. Method of Measurement

Unit of measure is the installed in-place cubic yard. The basis of measurement will be the volume as computed by the Engineer based on the Drawings (Engineered Quantities). Measurement will be limited to the dimensions and limits shown on the Drawings, and no payment will be made for additional gravel placed by the Contractor at the leachate collection system or in any other places, unless approved by the Engineer in writing, previously to placement by Contractor.

3.2. Basis of Payment

Paid for at the contract unit prices per in-place cubic yard in accordance with the Unit Price Bid Form and as defined in Section 3.1 above. Payment covers all items listed in this Section and associated drawings. Contractor is responsible for verifying the in-place quantities presented in the Bid Forms and notifying the Engineer and Owner of any variances or discrepancies prior to bidding.

4. CONTRACT DOCUMENTS

Where request for bid or other contract documents differ from those requirements herein, the bid or other contract documents shall govern.

END OF SECTION 02276

SECTION 02660

HDPE GEOMEMBRANE LINER

1. SCOPE

The scope of this document consists of furnishing all labor, equipment, materials etc. necessary to properly install a high-density polyethylene geomembrane as shown on plan drawings and as described herein. The technical requirements of this specification shall apply also to the HDPE geomembrane liners factory-bonded to a Geosynthetic Clay Liner (GCL).

2. SUBMITTALS, HANDLING, AND WARRANTY

2.1. General

Prior to installation of the geomembrane material, the following production data shall be furnished in writing to the Engineer:

A. Resin Data:
   (1) Certification stating that the resin meets the specification requirements shall be submitted prior to installation of geomembrane.

   (2) Certification stating all resin is from the same Manufacturer shall be submitted prior to installation of any geomembrane.

   (3) Copy of Quality Assurance/Quality Control certificates issued by the Manufacturer and resin supplier(s) shall be submitted after delivery of the geomembrane to the job site.

B. Geomembrane Roll:
   (1) Certification stating geomembrane meets the Specification requirements shall be submitted prior to installation of geomembrane.

   (2) Statement certifying no reclaimed polymer has been added to resin shall be submitted prior to installation of geomembrane.

(3) Geomembrane delivery, storage, handling and installation instructions shall be submitted prior to material delivery.

(4) Copy of quality control certificates issued by Manufacturer shall be furnished upon delivery of the geomembrane.

(5) Extrudate resins and/or rod shall be certified that all extrudate is from one Manufacturer, is the same resin type, and was obtained from the same resin supplier as the resin used to manufacture the geomembrane rolls.

C. Installation layout drawings: Installation layout drawings shall be submitted prior to installation of geomembrane. Submit drawings shall show panel layout, indicating all seams, and details. These drawings shall be approved prior to installing the geomembrane. This approval will be for concept only and actual panel placement will be determined by job site conditions. Deviations from these drawings shall be documented by the Contractor on "as-built" drawings.

D. Contractor's Geosynthetics Field Installation Quality Assurance Plan.

E. Certification of Acceptance of Geomembrane Subsurface by Contractor. Each area to be covered by the geomembrane system shall have a certificate of acceptance signed by the installation supervisor prior to the start of installation. Beginning installation shall mean acceptance and approval of existing surface condition.

F. To be submitted to the Engineer upon completion of installation:

- Certificate stating the geomembrane has been installed in accordance with the Contract Documents.
- Manufacturer's standard warranty and the Contractor's installation warranties which have been agreed to by the Owner or Engineer.
- Quality Assurance documentation recorded during installation.

- "As-built" marked-up drawing(s) (hardcopy(ies), pdf, and AutoCad electronic file(s)) showing panel lay-out, panel numbers, location of patches, location of destructive tests performed, and locations where extrusion welds were performed.

No installation will commence or proceed without approval of submittal data by the Engineer.

2.2. HDPE Geomembrane Manufacturer Company Qualifications

(1) The manufacturer company shall each have manufactured at least 4,000,000 square feet in HDPE geomembrane for other projects;

(2) The manufacturer representative shall have worked on at least three projects similar in size and complexity to the project described in the Contract Documents.

2.3. Delivery, Storage, and Handling

Conform to the manufacturer's requirements to prevent damage to geomembrane.

2.3.1. Delivery

A. Deliver materials to the site only after the Engineer approves required submittals.

B. Separate damaged rolls from undamaged rolls and store at locations designated by the Owner until proper disposition of material is determined by Owner.

C. Store on level prepared surface supported above mud and standing water. Contractor or supplier shall be responsible for long term (up to 2 years) storage.

D. Stack per Manufacturer's recommendation, and at the direction of the Owner.

2.3.2. On Site Handling. Use appropriate handling equipment to load, move, or deploy geomembrane rolls. Appropriate handling equipment includes slings,

spreader bars or an equipment bucket which has been properly protected.

2.3.3. Damaged Geomembrane:

A. Geomembrane damage shall be documented by Contractor.

B. Damaged geomembrane shall be repaired by Contractor, if possible, in accordance with these Specifications, or shall be replaced at no cost or time delay to the Owner.

2.4 Warranty

Manufacturer's and Contractor's warranties for material and workmanship shall be provided. The warranties shall warrant both the quality of the material and workmanship for at least one year after acceptance.

3. PRODUCTS

3.1. Geomembrane

3.1.1. Geomembrane shall be a textured HDPE at all locations, except at the temporary embankment locations. If used at the temporary embankment locations (as rain-flaps), the temporary HDPE geomembrane utilized may be smooth.

3.1.2. Resin

A. Shall be virgin material with no more than 10% rework, first quality, compounded and manufactured specifically for producing HDPE geomembrane. If rework is used, it must be a similar HDPE as the parent material. No post-consumer resin (PCR) of any type shall be added to the formulation.

B. Resin types shall not be intermixed.

C. Resin shall meet the following additional requirements:

TABLE 1
HDPE RESIN REQUIREMENTS

Test	Test Designation	Minimum Frequency Requirements	Limit
Density (gm/cm^3)	ASTM D792 (B) or ASTM D1505	1/200,000 lb	>= 0.932
Melt Index	ASTM D1238 Condition E	1/180,000 lb	<= 1.0 g /10 minutes (1)

(1) per resin batch: test data shall be supplied to the Engineer prior to his acceptance. Failing tests may be adjusted at the Engineer's sole determination.

3.1.3. Geomembrane Rolls

A. Shall not exceed a combined maximum total of one percent by weight of additives other than carbon black.

B. Shall use raw materials or finished materials produced in the United States. Material from other sources may be used with prior approval by the Engineer.

C. Geomembrane shall be supplied in rolls free of holes, pinholes, bubbles, blisters, excessive contamination by foreign matter, and nicks and cuts on roll edges. Each roll shall be identified with labels indicating number, thickness, length, width, and Manufacturer.

D. Factory Inspection: All liner sheets produced at the factory shall be inspected prior to shipment for compliance with the physical appearance requirements listed in previous section and be tested by an acceptable method of inspecting for pinholes (i.e., spark tester). If pinholes are located, identified, and indicated during manufacturing, these pinholes may be corrected during installation. Manufacturer shall certify and provide documentation that spark tester has been calibrated to meet these requirements.

3.1.4. Contractor shall provide testing certificates from manufacturer with the testing frequency required by this specification. In addition to the specifications set on this document, HDPE geomembranes shall meet all requirements, including minimum physical properties and frequency of testing as presented on the latest version of the **GRI Test Method GM-13 of the Geosynthetics Research Institute**.

4. INSTALLATION

4.1. Surface Acceptance

Prior to placement and deployment of the geomembrane, an inspection of the subgrade surface shall be performed by Contractor and Owner (or Owner's representative) to verify that all areas to be lined are smooth, free of all foreign and organic material, sharp objects, or debris of any kind. These surfaces shall provide a firm, unyielding foundation with no sharp changes or abrupt breaks in grade. Excessive moisture or standing water shall not be allowed. No synthetic liner shall be placed in an area that has been softened by precipitation.

It is the responsibility of the Contractor to verify that the surface on which the synthetic liner or cover will be installed is prepared in accordance with the plans and specifications. Even after the Contractor and Owner have inspected and accepted the surface, Contractor continues to be responsible for its condition and for its subsequent condition. Any deterioration of condition shall be repaired at Contractor's cost, or back charge by Owner (at Owner's discretion).

4.2. Deployment

1. Each panel shall be assigned a simple and logical identifying code. The coding system shall be subject to approval by the Engineer and shall be determined at the job site.

2. The geomembrane shall be visually inspected during deployment for imperfections and any faulty or suspect areas shall be marked for repair.

3. Deployment of the geomembrane panels shall conform to the following requirements:

A. Unroll geomembrane panels using methods that will not damage, stretch or crimp the geomembrane and that will protect the underlying subgrade surface from damage (i.e., Spreader Bar-Protected Equipment Bucket).

B. Place ballast on geomembrane to prevent uplift due to wind, while not damaging the geomembrane. Sandbags may be used.

C. Personnel walking on the geomembrane shall not engage in activities or wear shoes that could damage the geomembrane.

D. Do not allow vehicular traffic directly on geomembrane. ATV's are acceptable if wheel contact pressure is less than six psi.

E. Equipment shall not damage geomembrane by handling, trafficking, leakage of hydrocarbons or any other means. The geomembrane shall be protected in areas of heavy traffic by placing compatible protective cover over the geomembrane.

4. Sufficient material shall be provided to allow for geomembrane shrinkage and contraction.

5. Perforation of geomembranes for deployment will not be accepted, unless the portions of the geomembrane that was perforated are discarded and, therefore, not used in cell liner.

4.3. Field Seams

1. Seam location shall meet the following requirements:

A. Orient seams parallel to line of slope, i.e., up-and-down the slope and not across the slope.

B. Minimize number of field seams in corners, odd-shaped geometric locations and outside corners.

C. Slope seams (panels) shall extend a minimum of five feet from toe of slope into bottom area or as presented in the drawings.

D. Use a sequential seam numbering system compatible with panel numbering system that is agreeable to Engineer and Contractor.

Welding and testing of the HDPE geomembrane will be required even if the HDPE geomembrane is bonded to a geosynthetic clay liner (GCL). Installation of the bonded HDPE geomembrane/GCL shall follow the manufacturer's installation quality assurance manual and guidance. The bonded liners shall be installed also in accordance with the Geosynthetic Clay Liner Specification.

TABLE 2
60-MIL HDPE GEOMEMBRANE SEAM TESTING

Test	Method	Requirement	Frequency
Shear Strength* (lb/in) Lab Test	ASTM D6392	>=120	1/500 lf
Elongation at Break (%) Lab Test	ASTM D6392	>=50%	1/500 lf
Peel Strength* (lb/in) Lab Test	ASTM D6392	>=91 >=78 (extrusion)	1/500 lf
Peel Separation (%) Lab Test	ASTM D6392	>=25%	1/500 lf
Vacuum Box or Air Pressure Test Field Test	ASTM D6392	Pass	Continuously

* Values listed for shear and peel strengths are for 4 out of 5 test specimens; the 5th specimen can be as low as 80% of the listed values

Field tests shall be performed by the installer at the Contractor's expense. Locations for collecting destructive samples of field seams shall be determined at the CQA Technician's discretion. The installer shall cut the samples from the liner and, after identified, shall be shipped to the Engineer or to the lab assigned by the Engineer for testing, at the Owner's expense.

4.4. Anchor Trench

1. The anchor trench will be excavated by the Owner to the line, grade, and width shown on the construction drawings, prior to liner system placement. The CQA Technician shall verify that the anchor trench has been constructed according to the construction drawings.

2. Slightly rounded corners shall be provided in the trench where the geomembrane adjoins the trench so as to avoid sharp bends in the geomembrane.

3. The anchor trench will be backfilled and compacted by the Owner. Trench backfill material shall be placed in eight-inch thick loose lifts and compacted by wheel rolling with light, rubber-tired or other light compaction equipment or other compactor approved by the Engineer.

4. At no time shall construction equipment come into direct contact with the geomembrane. If damage occurs, it shall be repaired by the Contractor prior to the completion of backfilling.

5. RECORD DOCUMENTS

5.1. Manufacturer Documents

Contractor shall provide the Engineer all material information and test documents for the raw materials and with all the information and tests for the finished product(s).

5.2. Contractor Documents

Contractor shall provide the Engineer an as-built drawing showing the location of all seams and joins (hardcopy(ies), pdf, and AutoCad electronic file(s)).

Contractor is responsible for obtaining and verifying all appropriate specifications prior to submitting the various prices requested by the bid or proposal invitation.

6. UNIT PRICES

6.1. Method of Measurement

Unit of measure for the HDPE geoemembrane/GCL component(s) is the installed in-place square feet. The basis of measurement will be the area as computed by the Engineer based on the Drawings (Engineered Quantities). Measurement will be limited to the dimensions and limits shown on the Drawings, and no payment will be made for additional geomembrane installed by the Contractor at any other locations, unless approved by the Engineer in writing, previously to installation by Contractor.

The HDPE geomembrane/GCL unit price shall cover all materials, transportation, manufacturer's testing, manufacturer's quality assurance and quality control, and all on-site storage.

Allowance will be made for the HDPE geomembrane/GCL in anchor trenches (quantity already included in the Unit Price Bid Form). No allowances will be made for waste, overlap, or materials used for the convenience of the installation contractor.

6.2. Basis of Payment

Paid for at the contract unit prices per square foot, in accordance with the Unit Price Bid Form and as defined in Section 6.1 above. Payment covers all items listed in this document, other related documents, and associated drawings. Contractor is responsible for verifying the quantities presented in the Bid Forms and notifying the Engineer of any variances or discrepancies prior to bidding.

7. CONTRACT DOCUMENTS

Where request for bid or other contract documents differ from those requirements herein, the bid or other contract documents shall govern.

END OF SECTION 02660

SECTION 02661
GEOSYNTHETIC CLAY LINER

1. SCOPE

This specification covers the requirements for the furnishing and installation of the geosynthetic clay liner. All materials used shall meet the requirements of this specification. The geosynthetic clay liner (GCL) may or may not be factory-bonded to the HDPE geomembrane liner. The specification for the HDPE is set forth in a separate specification document.

2. DEFINITION

For the purposes of this specification guideline, the following terms are defined below:

Geosynthetic Clay Liner (GCL). A manufactured hydraulic barrier consisting of clay bonded to a layer of geosynthetic material.

Geomembrane. An essentially impermeable geosynthetic composed of one or more geosynthetic HDPE sheets.

Geotextile. Any permeable textile used with foundation, the soil, or any other geotechnical engineering related material as an integral part of the project, structure, or system.

Overlap. Where two adjacent GCL panels contact, the distance measured perpendicular from the overlying edge of one panel to the underlying edge of the other.

3. SUBMITTALS

3.1. General

A. Before the installation of GCL, the Contractor shall furnish the following information:

1. Detailed description of the proposed plan for placement of the GCL panels over the area of installation. A plan view of the project is provided in the construction drawings.

2. GCL manufacturer's QC Plan for documenting compliance with Section 4 of this document.

3. The Contractor shall furnish a detailed narrative and plan for the preservation of the completed GCL against wind, rain, and water until the GCL is in its final location and accepted by the Engineer.

B. At the Engineer's or Owner's request the Contractor shall furnish:

1. A representative sample of the GCL.

2. A project reference list for the GCL consisting of the principal details of at least five projects.

C. Upon shipment, the Vendor shall furnish to the Engineer the GCL manufacturer's Quality Control (QC) certifications to verify that the materials supplied for the project are in accordance with the requirements of this specification.

D. As installation proceeds, the Contractor shall submit certificates of subgrade acceptance for each area that is covered by the GCL. The certificates shall be signed by the Contractor and the CQA Inspector.

3.2. Qualifications

A. GCL Manufacturer must have produced at least 4 million square feet of GCL from the plant where the GCL for this project is manufactured.

B. The manufacturer representative shall have worked in at least three projects similar in size and complexity to the project described in the Contract Documents.

3.3. Construction Quality Assurance (CQA)

A. The Owner will hire CQA services to verify that GCL installation is being conducted according to drawings and this document.

B. Additional testing of the GCL, as necessary to support the CQA effort, shall be performed by a third-party laboratory retained by the Owner.

4. PRODUCTS

4.1. Materials

A. The GCL shall consist of a layer of natural Wyoming sodium bentonite clay or similar, and shall comply with all criteria listed in this Specification. The GCL unit may or may not be an HDPE with a bentonite bonded to the HDPE.

B. Reinforced GCL must be used on slopes, unless the GCL is factory-bonded to the HDPE geomembrane. Unreinforced GCL may be used on flat areas of the site i.e., with slopes not exceeding approximately 5H:1V in steepness.

C. The GCL shall have approximately 0.75 pounds of bentonite per square foot. The Vendor shall state where the bentonite was mined.

D. The minimum acceptable dimensions of full-size GCL panels shall be 100 feet or greater in length and at least 12 feet in width.

E. Required physical properties and frequency of testing for GCL is presented on Table 1.

TABLE 1
PHYSICAL PROPERTIES AND FREQUENCY OF TESTING FOR
GEOSYNTHETIC CLAY LINER

GEOSYNTHETIC CLAY LINER			
Test	**Method**	**Requirement**	**Frequency**
BENTONITE PROPERTIES			
Swell Index (mL/2g)	ASTM D5890	≥ 24	1/100,000 lbs
Fluid Loss (mL)	ASTM D5891	≤ 18	1/100,000 lbs
Moisture Content (%)	ASTM D2216	25-30 (typical)	1/100,000 lbs
GCL PROPERTIES			
Bentonite - Mass/Area (lb/ft^2)(1)	ASTM D5993	≥ 0.75	1/5,000 yd^2
Permeability (cm/sec)	ASTM D5887	≤ 5×10^{-9}	1/30,000 yd^2
Index Flux ($cm^3/sec\text{-}cm^2$)	ASTM D5887	≤ 1×10^{-6}	1/30,000 yd^2

(1) Minimum Average Roll Value (MARV).
(2) Additional conditions may apply, in accordance with GRI-GCL3 specifications.

4.2. Product Quality Documentation

The GCL manufacturer shall provide the Engineer with manufacturing QC certifications for each shipment of GCL. The certifications shall be signed by a responsible party employed by the GCL manufacturer and shall include:

A. Certificates of analysis for the bentonite clay used in GCL production demonstrating the parameters: swell index and fluid loss.

B Manufacturer's test data for finished GCL product(s) of bentonite mass per area, GCL permeability, etc. demonstrating compliance with the index parameters presented on Table 1.

C. GCL lot and roll numbers supplied for the project (with corresponding shipping information).

4.3. Product Labeling

Prior to shipment, the GCL manufacturer shall label each roll, identifying:

A. Product identification information (Manufacturer's name and address, brand product code).

B. Lot number and roll number.

C. Roll length, width and weight.

4.4. Packaging

A. The GCL shall be wound around a rigid core whose diameter is sufficient to facilitate handling. The core is not necessarily intended to support the roll for lifting but should be sufficiently strong to prevent collapse during transit.

B. All rolls shall be labeled and bagged in packaging that is resistant to photo-degradation by ultraviolet (UV) light.

4.5. Accessory Bentonite.

The granular (powder) bentonite or bentonite sealing compound used for seaming, penetration sealing, and repairs shall be made from the same natural Wyoming sodium bentonite or similar as used in the GCL and shall be as recommended by the GCL manufacturer.

5. INSTALLATION

5.1. Shipping and Handling

A. The manufacturer or vendor shall wrap the rolls of GCL with a protective cover prior to shipping. The cover shall be moisture and water tight. The wrap shall be such that it will endure outdoor exposure for three years without deterioration or adverse moisturizing of the bentonite.

B. The manufacturer assumes responsibility for initial transport loading of the GCL. Shipping will be the responsibility of the party paying the freight; but not

the Owner. Unloading, on-site handling and storage of the GCL are the responsibility of the Manufacturer, Contractor or other designated party; but not the Owner.

C. A visual inspection of each roll should be made during unloading to identify if any packaging has been damaged. Rolls with damaged packaging should be marked and set aside for further inspection. The packaging and/or GCL shall be repaired prior to being placed in storage.

D. The party responsible for unloading the GCL should contact the Manufacturer prior to shipment to ascertain the appropriateness of the proposed unloading methods and equipment.

5.2. Storage

A. Storage of the GCL rolls shall be the responsibility of the Contractor. A dedicated storage area shall be selected at the job site that is away from high traffic areas and is level, dry and well-drained.

B. Rolls should be stored in a manner that prevents sliding or rolling from the stacks and may be accomplished by the use of chock blocks or by use of the dunnage shipped between rolls. Rolls should be stacked at a height no higher than that at which the lifting apparatus can be safely handled (typically no higher than four).

C. All stored GCL materials and the accessory bentonite must be covered with a plastic sheet or tarpaulin until their use for installation.

D. The integrity and legibility of the labels shall be preserved during storage.

5.3. GCL Placement

A. Unreinforced GCL shall be placed on the flatter areas of the site; reinforced GCL shall be placed on the more steeply sloped areas. These flatter and steeper areas are defined in Section 4 of this specification. The Contractor and Owner shall review and agree upon which GCL shall be placed on these areas, in accordance with Section 4, prior to installation.

B. GCL rolls should be delivered to the working area of the site in their original packaging. Immediately prior to deployment, the packaging should be carefully removed without damaging the GCL. The orientation of the GCL (i.e., which side faces up) should be in accordance with the Owner's or Engineer's requirements and/or recommendations.

C. Equipment which could damage the GCL shall not be allowed to travel directly on it. If the installation equipment causes rutting of the subgrade or clay liner, the subgrade or clay liner must be restored to its originally accepted condition by the Contractor before placement continues.

D. Care must be taken to minimize the extent to which the GCL is dragged across the subgrade in order to avoid damage to the bottom surface of the GCL. A temporary geosynthetic subgrade covering commonly known as a slip sheet or rub sheet may be used to reduce friction damage during placement. Perforation of GCL panels for deployment will not be allowed, unless the damaged/perforated of the GCL is discarded and, therefore, not used as liner.

E. The GCL shall be placed so that seams are parallel to the direction of the slope, that is, down slope. Seams should be located at least three feet from the toe and crest of slopes steeper than 4H:1V.

F. All GCL panels should lie flat on the underlying surface, with no wrinkles or folds, especially at the exposed edges of the panels.

G. The Contractor shall provide a detailed plan and narrative on how the GCL construction and roll laying will be protected from wind, water, and rain until the final lay and its fastening is completed and accepted by the Owner or his agent.

5.4. Anchorage

As directed by the project drawings and specifications, the end of the GCL roll shall be placed in an anchor trench at the top of the slope or an equivalent runout design shall be utilized. When utilizing an anchor trench design, the front edge (i.e., towards the slope) of the trench should be rounded so as to eliminate any sharp corners. Loose soil should be removed from the floor of the trench. The Contractor shall be responsible for removing any loose material. The GCL should cover the entire trench floor but not the rear trench wall.

5.5 Seaming

A. The GCL seams are constructed by overlapping their adjacent edges. Care should be taken to assure that the overlap zone is not contaminated with loose soil or other debris. Supplemental bentonite may be required, and it will be the Contractor's responsibility to furnish and place the bentonite.

B. The minimum dimension of the longitudinal overlap shall be 12 inches. If moisture content of the GCL is greater than the typical value as presented on Table 1 (located in Section 4.1), longitudinal overlap shall be increased to 18 inches. End-of-roll overlapped seams should be similarly constructed, but the minimum overlap should measure 24 inches. The perpendicular roll overlap shall be a minimum of 24 inches with no joints or seams within five feet of the end of a perpendicular overlap.

C. Adjoining GCL rolls (end to end) along the roll width should be shingled down in the direction of the slope, with the upper portion of the top GCL overlapping the lower portion of the GCL by a minimum of 24 inches across the roll width. This shingled installation will minimize the potential for runoff flow to enter the overlap zone.

D. Bentonite-additioned seams are constructed between the overlapping adjacent panels described above. The underlying edge of the longitudinal overlap is exposed and then a continuous bead of granular sodium bentonite is applied along a zone defined by the edge of the underlying panel. A similar bead of granular sodium bentonite is applied at the end-of-roll overlap. The bentonite shall be applied at a minimum application rate of one quarter pound per lineal foot.

E. Welding of the HDPE geomembrane is required even if the GCL is bonded to the geomembrane.

5.6. Detail Work

A. The GCL shall be sealed around penetrations and embedded structures, if any.

B. Cutting the GCL should be performed using a sharp utility knife, scissors, or cutting machine.

5.7. Damage Repair

A. Each roll shall be inspected for damage resulting from construction.

B. If the GCL is damaged (torn, punctured, perforated, etc.) during installation, it may be possible to repair it by cutting a patch to fit over the damaged area. The patch shall be obtained from a new GCL roll and shall be cut to size such that a minimum overlap of 12 inches is achieved around all of the damaged area. Dry bentonite or bentonite mastic should be applied around the damaged area prior to placement of the patch. Perforation of GCL panels for deployment will not be allowed, unless the damaged/perforated of the GCL is discarded and, therefore, not used as liner.

5.8. Sandbagging

After placement, GCL panels must be secure in place by the use of sandbags. Sandbags shall be placed in a 15-foot by 15-foot direction, or more frequently if required for stability, throughout the entire area including all slopes.

6. UNIT PRICES

6.1. Method of Measurement

Unit of measure for the HDPE geoemembrane/GCL component(s) is the installed in-place square feet. The basis of measurement will be the area as computed by the Engineer based on the Drawings (Engineered Quantities). Measurement will be limited to the dimensions and limits shown on the Drawings, and no payment will be made for additional geomembrane installed by the Contractor at any other locations, unless approved by the Engineer in writing, previously to installation by Contractor.

The HDPE geomembrane/GCL unit price shall cover all materials, transportation, manufacturer's testing, manufacturer's quality assurance and quality control, and all on-site storage.

Allowance will be made for the HDPE geomembrane/GCL in anchor trenches (quantity already included in the Unit Price Bid Form). No allowances will be made for waste, overlap, or materials used for the convenience of the installation contractor.

6.2. Basis of Payment

Paid for at the contract unit prices per square foot, in accordance with the Unit Price Bid Form and as defined in Section 6.1 above. Payment covers all items listed in this document, other related documents, and associated drawings. Contractor is responsible for verifying the quantities presented in the Bid Forms and notifying the Engineer of any variances or discrepancies prior to bidding.

7. CONTRACT DOCUMENTS

Where request for bid or other contract documents differ from those requirements herein, the bid or other contract documents shall govern.

END OF SECTION 02661

SECTION 02662

GEOCOMPOSITE DRAINAGE MEDIA

1. SCOPE

This document covers the work necessary to furnish all labor, equipment, and materials necessary for the geocomposite drainage media (geotextile(s) and geosynthetic core) layer at the site, as specified herein, and as shown on the Drawings, and as required by the Engineer and Owner. The various project drawings may specify additional or other conditions and parameters.

2. SUBMITTALS

2.1. General

A. Prior to transporting any materials to the site, the Contractor shall submit the following documentation on the geocomposite drainage media composite to the Engineer:

1. One 11" x 14" sample of the geocomposite drainage media to be used on the project.

2. A copy of the product specification sheet listing all test methods and property values.

3. Copies of quality control certificates issued by the raw material supplier.

4. Results of tests conducted to verify the quality of the resin and other raw materials used to manufacture the geocomposite drainage media rolls assigned to this project.

B. The Contractor shall submit to the Engineer the following information on the geotextile material used:

1. Copies of quality control certificates issued by the geotextile manufacturer. The certificates should include roll number and identification.

2. The quality control certificates shall include:

   - roll numbers, lot or batch numbers, and identification; and

   - results of quality control tests, including descriptions of test methods used.

3. The geotextile shall be approximately 8 ounce per square yard material with properties as shown on the attachment to this specification.

4. The Contractor or manufacturer shall provide to the Engineer data on ultra-violet sun exposure durability.

5. Geotextile shall be non-woven fabric. Geotextiles shall meet the requirements as shown on Table 1.

C. The Contractor shall submit to the Engineer the following information on the geocomposite production:

1. Manufacturing quality control certificates signed by responsible parties employed by the Manufacturer.

2. The quality control certificates shall include:

   - roll numbers and identification;

   - results of quality control tests, including descriptions of test methods used.

3. The quality control testing as performed by the manufacturer.

TABLE 1
PHYSICAL PROPERTIES AND FREQUENCY OF TESTING FOR GEOTEXTILES USED ON GEOCOMPOSITE DRAINAGE MEDIA

Property	Frequency	Value	Test Method
Fabric Weight (oz./sq.yd.)	90,000 sq.ft.	≥ 8	ASTM D 5261
Apparent Opening Size (mm)	540,000 sq.ft.	0.149 - 0.210*	ASTM D 4751
Grab Strength (lb)	90,000 sq.ft.	≥180	ASTM D 4632 or ASTM D 5034
Trapezoidal Tear (lb)	90,000 sq.ft.	≥85	ASTM D 4533
Permittivity (sec^{-1})	540,000 sq.ft.	≥1.5	ASTM D 4491
Puncture Strength (lb)	90,000 sq.ft.	≥110	ASTM D 4833

* Range, not MARV. All others, MARV

2.2. Qualifications

The Contractor shall provide the services of a Manufacturer who shall meet the following qualifications. The Contractor shall, however, accept and retain full responsibility for all materials and shall be held responsible for any defects.

The Geocomposite Drainage Media Manufacturer shall be responsible for the production and delivery of material and shall be a well-established firm with more than ten years of experience in the manufacture of Geocomposite Drainage Media. The Manufacturer shall submit his Quality Control Plan or Summary to the Engineer listing:

A. Certified minimum property values of the proposed geocomposite drainage media with the tests used to determine those properties including the frequencies at which the tests shall be performed.

B. Production capacity available and projected delivery dates for this project.

Prior to confirmation of any contractual agreements, the potential Manufacturer shall provide the Engineer with the written information that corresponds to the information required.

2.3. Warranty

The Manufacturer shall furnish the Owner with a written warranty against defects in the materials. The Contractor shall furnish the Owner with a written warranty against defects in workmanship.

3. PRODUCTS

3.1. Geocomposite Drainage Media

The geosynthetic core of the drainage media shall be manufactured by extruding to form a drainage net or grid structure. The geocomposite drainage media shall have a thickness of at least 0.10 inch (100 mils) and a transmissivity of at least $1.0x10^{-4}$ m^2/sec under 5,000 psf normal load with a hydraulic gradient of 1.0. The Contractor shall supply the product having properties that are in accordance with the required properties or equivalent.

Properties identified shall be tested in strict accordance with the guidelines identified in Table 2 of this Section.

The geocomposite drainage media shall be composed of a geotextile thermally bonded to a geosynthetic core.

3.2. Manufacturing Quality Control

3.2.1. The geocomposite drainage media shall be manufactured in accordance with the requirements set forth in Section 3.1 of this document.

3.2.2. The geocomposite drainage media shall be tested by the Manufacturer or Vendor according to the test methods and frequencies listed on Table 2 of this Section.

TABLE 2
PHYSICAL PROPERTIES AND FREQUENCY OF TESTING FOR GEOCOMPOSITE DRAINAGE MEDIA

CHARACTERISTICS	TEST METHOD	UNITS	FREQUENCY
Resin Tests			
POLYMER DENSITY	ASTM D1505	g/cm	Once per Lot
MELT FLOW INDEX	ASTM D1238	g/10 min	Once per Lot
Geonet Tests			
THICKNESS	ASTM D5199	mm	50,000 ft^2
CARBON BLACK CONTENT	ASTM D1603	%	50,000 ft^2
TENSILE STRENGTH	ASTM D5035	lbs/in	50,000 ft^2
Geocomposite Tests			
PLY ADHESION	ASTM D413 or ASTM D5035	lbs/in	50,000 ft^2
TRANSMISSIVITY	ASTM D 4716	m^2/sec	540,000 ft^2

Minimum Average Roll Values (MARV) are acceptable, when applicable.

3.3. Labeling

3.3.1. The geocomposite shall be supplied in rolls wrapped in heavy cloth or plastic protective covers (not paper or cardboard) and labeled with the following information:

- Manufacturer's name;
- Product identification;
- Roll number; and
- Roll dimensions.

3.3.2. The protective roll cover and labels shall be such that they will endure outdoor exposure for three (3) years without deterioration.

3.4. Transportation

Transportation of the geocomposite drainage media shall be the responsibility of the Contractor. The transporter shall be liable for all damages to the materials incurred prior to and during transportation to the site. Contractor shall be responsible for unloading and storing the material at the site or by arrangement with the Owner.

4. SITE CONSTRUCTION

All the at-site geocomposite drainage media construction shall be performed in accordance with the following sections and the applicable quality control and quality assurance programs and policies.

4.1. Familiarization

Prior to implementing any of the work described in this Section, the Contractor shall become thoroughly familiar with all portions of the work falling within this Section.

Prior to implementing any of the work in this Section, the Contractor shall carefully inspect the installed work of all other Sections and verify in writing that all work is complete to the point where the installation of this Section may properly commence without adverse impact.

If the Contractor has any concerns regarding the installed work of other Sections, he shall notify the Owner in writing within six hours.

4.2. Conformance Testing

A. Upon delivery to the site, a sample of the geocomposite drainage media may be removed by the Engineer and sent to the laboratory for testing to insure conformance to these Specifications.

B. Any geocomposite drainage media not certified in accordance with this Specification, or that conformance testing indicates do not comply with any paragraphs of this Section, shall be rejected and replaced, with new material, by the Contractor or Manufacturer at no additional cost to the Owner.

4.3. Handling and Placement

A. The Contractor is responsible for the cleanliness of the geosynthetic materials that underlay the geocomposite drainage media prior to laying the geocomposite drainage media materials. After the geocomposite drainage media has been installed, seamed, tested and approved by the Owner or Engineer, the surface shall be clean and free of excess dirt and debris.

B. The Contractor shall handle all geocomposite drainage media in such a manner as to assure it is not damaged in any way. Precautions shall also be taken to prevent damage to underlying layers during placement of the geocomposite drainage media.

C. The geocomposite drainage media roll should be installed in the direction of the slope, i.e., seams up-and-down the slope rather than across the face of the slope.

D. The project contains slopes, and special care shall be taken so that only full-length rolls are used at the top of slopes. Prior to placement of the geocomposite drainage media, the sand bags or weights holding the GCL/HDPE shall be moved.

E. All geocomposite drainage media shall be weighted with sandbags or the equivalent. Such sandbags shall be installed during placement and shall remain for the Owner's subsequent use and removal. Sandbags shall be placed in a 15-foot by 15-foot direction, or more frequently if required for stability, throughout the entire area including all slopes.

F. If necessary, the geocomposite drainage media shall be finally positioned and adjusted after being unrolled to minimize wrinkles.

G. The project includes an anchor trench at the top of the side slopes. The geocomposite drainage media shall be properly anchored to resist sliding. Anchor trench compacting equipment shall not come into direct contact with the geocomposite drainage media.

4.4. Seams and Overlaps

A. Each component of the geocomposite drainage media (geotextile(s) and geosynthetic core) will be secured or seamed to the like component at overlaps.

B. Geocomposite Drainage Media Core Component

1. Adjacent edges of geosynthetic core along the length of the geocomposite drainage media should be overlapped 2-3 inches. These overlaps shall be joined by tying the cores together with white or yellow plastic fasteners or polymeric braid. These ties shall be spaced at a maximum of every 5 feet along the overlay length.

2. Adjoining geocomposite drainage media rolls (end to end) along the roll width should be shingled down in the direction of the slope, with the upper portion of the top geocomposite overlapping the lower portion of the geocomposite by a minimum of 12 inches across the roll width. Geosynthetic core should be tied every 12 inches across the roll width and every six inches in the anchor trench or as specified by the Engineer.

C. Geotextile Component

1. The bottom layer of geotextile shall be overlapped by at least two inches.

2. The top layers of geotextiles shall be sewn together, or at the discretion of the Engineer may be heat bonded together. Geotextiles shall be overlapped a minimum of four inches prior to seaming or heat bonding. The seam shall be a two-thread, double-lock stitch, or a double row of single-thread, chain stitch. If heat bonding is to be used, care must be taken to avoid burn through of the geotextile. It is important that the geotextiles be joined continuously along to the roll as prevent any soil particle migration into the core flow channels.

4.5. Repairs

A. Each roll shall be inspected for damage resulting from construction.
B. Any rips, tears or damaged areas on the deployed geocomposite drainage

media shall be removed and patched by placing a patch extending 12 inches beyond the edges of the damaged area. The patch shall be secured to the original geocomposite drainage media material by tying every six inches with approved tying devices. If the hole or tear width across the roll is more than 50 percent of the width of the roll, the damaged area shall be cut out and the two portions of the geonet shall be joined as explained in the above paragraph.

5. UNIT PRICES

5.1. Method of Measurement

Unit of measure is the installed in-place square feet. The basis of measurement will be the area as computed by the Engineer based on the Drawings (Engineered Quantities). Measurement will be limited to the dimensions and limits shown on the Drawings, and no payment will be made for additional geocomposite drainage media installed by the Contractor at any other locations, unless approved by the Engineer in writing, previously to installation by Contractor.

The geocomposite drainage media unit price shall cover all materials, transportation, manufacturer's testing, manufacturer's quality assurance and quality control, and all on-site storage. Allowance will be made for the geocomposite drainage media in anchor trenches (quantity already included in the Unit Price Bid Form). No allowances will be made for waste, overlap, or materials used for the convenience of the installation contractor.

5.2. Basis of Payment

Paid for at the contract unit prices per installed square foot, in accordance with the Unit Price Bid Form and as defined in Section 5.1 above. Payment covers all items listed in this Section, other related sections, and associated drawings. Contractor is responsible for verifying the quantities presented in the Bid Forms and notifying the Engineer of any variances or discrepancies prior to bidding.

6. CONTRACT DOCUMENTS

Where request for bid or other contract documents differ from those requirements herein, the bid or other contract documents shall govern.

END OF SECTION 02662

SECTION 02712

GEOTEXTILE FOR LEACHATE COLLECTION TRENCH

1. SCOPE

The scope of this document consists of the furnishing of all material, labor, equipment, etc. to properly install geotextile in conformance with plan drawings and as described herein. This specification shall be applicable for the geotextile components of the leachate collection system utilized in this project.

2. MATERIALS

Geotextiles shall be non-woven fabric, as required in the plans and specifications. Geotextiles shall meet the requirements of Table 1. Any exceptions to the properties requirements shall be requested in writing to the Engineer.

TABLE 1
PHYSICAL PROPERTIES AND FREQUENCY OF TESTING FOR GEOTEXTILES

Property	Frequency	Value	Test Method
Fabric Weight (oz./sq.yd.)	90,000 sq.ft.	≥ 8*	ASTM D5261
Apparent Opening Size (mm)	540,000 sq.ft.	0.149 - 0.210**	ASTM 4751
Grab Strength (lb)	90,000 sq.ft.	≥180	ASTM D4632 or ASTM D5034
Trapezoidal Tear (lb)	90,000 sq.ft.	≥85	ASTM D4533
Permittivity (sec^{-1})	540,000 sq.ft.	≥1.5	ASTM D4491
Puncture Strength (lb)	90,000 sq.ft.	≥110	ASTM D4833

* ≥12 oz./sq.yd. for geotextile over geomembrane (external wrap)
** Range, not MARV. All others, MARV

Before starting installation, the Contractor shall submit to the Engineer the following information on the geotextile material used for approval:

1. Copies of quality control certificates issued by the geotextile manufacturer.

2. The quality control certificate shall include:

   a. Roll numbers, lot or batch numbers, and identification;

   b. Results of quality control tests, including descriptions of test methods used and frequencies. The use of Minimum Average Roll Values (MARV), when applicable, is acceptable.

3. The Contractor shall provide to the Engineer data on ultra-violet sun exposure durability.

3. INSTALLATION

3.1. Handling and Placement

All geotextile or geotextile component materials shall be handled in a manner to assure they are not damaged. The following special handling requirements shall be adhered to:

A. On slopes, the geotextile or geotextile component material shall be securely anchored in the anchor trench and then rolled down the slope in such a manner as to continually keep the geotextile sheet in sufficient tension to preclude folds and wrinkles.

B. All geotextiles or geotextile component materials shall be weighted with sandbags or equivalent during construction. The weight items shall be on approximately 15 ft. by 15 ft. centers, or more frequently if necessary for stability.

C. Geotextiles or geotextile component materials shall be cut using an approved cutter. If the material is being cut in-place, special care must be taken to protect other geosynthetic materials from damage; in place cutting methods must be approved by the Engineer.

D. Care shall be taken not to entrap stones, excessive dust, or moisture that could damage the geomembrane, or generate clogging of drains or filters.

3.2. Seams and Overlaps

A. Geotextiles shall be seamed if used as a separate material layer, unless shown otherwise in the Drawings.

B. On slopes steeper than 4 horizontal to 1 vertical, geotextiles shall be continuously sewn or fastened along the entire length of the seam. The method of sewing or fastening must be approved by the Engineer prior to use. Geotextiles or geotextile component materials shall be overlapped a minimum of four inches prior to seaming.

3.3. Repairs

Any holes or tears in the geotextile or geotextile component materials shall be repaired as follows:

A. On slopes, a patch made from the same geotextile or geotextile component material shall be seamed into place. Should any tear exceed 25% of the width of the roll, that roll shall be removed from the slope and replaced. The method and location of the repair shall not encumber the flow of water or leachate.

B. On horizontal areas, a patch made from the same geotextile or geotextile component material shall be spot-seamed in-place with a minimum of 24 inches overlap in all directions. The method and location of repair shall not encumber the flow or water or leachate.

4. UNIT PRICES

4.1. Method of Measurement

Unit of measure for geotextiles (12 oz./sq.yd. in trenches and sumps) is the installed in-place square feet. The basis of measurement will be the area as computed by the Engineer based on the Drawings (Engineered Quantities). Measurement will be limited to the dimensions and limits shown on the Drawings, and no payment will be made for additional geotextile installed by the Contractor at any other locations, unless approved by the Engineer in

writing, previously to installation by Contractor.

The geotextile unit price shall cover all materials, transportation, manufacturer's testing, manufacturer's quality assurance and quality control, and all on-site storage.

No allowances will be made for waste, overlap, or materials used for the convenience of the installation contractor.

4.2. Basis of Payment

Paid for at the contract unit prices per square foot, in accordance with the Unit Price Bid Form and as defined in Section 4.1 above. Payment covers all items listed in this Section, other related sections, and associated drawings. Contractor is responsible for verifying the quantities presented in the Bid Forms and notifying the Engineer of any variances or discrepancies prior to bidding.

5. CONTRACT DOCUMENTS

Where request for bid or other contract documents differ from those requirements herein, the bid or other contract documents shall govern.

END OF SECTION 02712

SECTION 02722

LEACHATE COLLECTION PIPING

1. SCOPE

This specification outlines the materials requirements of the leachate collection pipe to be installed at the leachate collection trenches. Generally, the pipe material is SDR-11 or/and SDR-17 HDPE unless otherwise stated on the drawings. Additional leachate pipe requirements and specifications are set forth on the construction drawings. Piping for leachate and contact stormwater force mains is not part of this Section. Pipe for leachate force main shall follow the specifications presented on drawings.

2. MATERIALS

HDPE pipes to be installed at the leachate collection trenches shall meet the requirements of Table 1.

TABLE 1
TYPICAL PHYSICAL PROPERTIES OF HDPE PIPE

Test	Method	Requirement
Density (gm/cm^3) - HDPE	ASTM D1505	> =0.93
Flow Rate (g/10 mins)	ASTM D1238	8.5
Tensile Strength at Ultimate (psi)	ASTM D638	5,000
Tensile Strength at Yield (psi)	ASTM D638	3,500
Ultimate Elongation (%)	ASTM D638	>=800
Flexural Modulus 2% Secant (psi)	ASTM D790	136,000

Manufacturer's batch tests will be accepted by the Engineer. Installation of pipe, including joining, shall follow the manufacturer's specifications.

3. MATERIAL VERIFICATION

3.1. Sampling and Documentation

The CQA Technician will inventory, sample, and document all materials as they arrive on site. Contractor shall supply to the Engineer, all certifications for the tests presented on Table 1.

3.2. Testing Types and Frequency

The types of tests and frequencies of each test are shown on Table 1.

4. CONSTRUCTION CONTROL

The CQA Technician will maintain visual inspection during all phases of the leachate collection system construction. All construction shall be performed in accordance with the construction drawings.

A. Leachate pipe installation will be checked for type, location, elevation, and orientation of the perforations.

B. The installation of other items such as geosynthetic drainage medium, geotextile, joints, connections, welding, pipe placement, pipe backfilling, and other items associated with the leachate pipe and leachate pipe installation shall be in accordance with plans and specifications, and shall be documented.

5. UNIT PRICES

5.1. Method of Measurement – Leachate Collection Trenches

Pipes to be used at the leachate collection trenches shall have its price included as part of the "Leachate Collection Pipes for Leachate Collection Trenches" bid item. The unit of measure is the installed linear foot of pipe. The basis of measurement will be the linear footage of the pipes as computed by the Engineer based on the Drawings (Engineered Quantities). Measurement will be limited to the dimensions and limits shown on the Drawings, and no payment will be made for additional pipe placed by the Contractor at the leachate collection system or in any other places, unless approved by the Engineer in writing, previously to placement by Contractor.

5.2. Method of Measurement – Leachate Collection Sumps

Pipes to be used at the leachate collection sumps shall have its price included as part of the "Leachate Collection Riser" bid item. The unit of measure is the installed linear foot of pipe. The basis of measurement will be the linear footage of the pipes as computed by the Engineer based on the Drawings (Engineered Quantities). Measurement will be limited to the dimensions and limits shown on the Drawings, and no payment will be made for additional pipe placed by the Contractor at the leachate collection system or in any other places, unless approved by the Engineer in writing, previously to placement by Contractor.

5.3. Basis of Payment

Paid for as part of the contract unit prices per installed linear foot, in accordance with the Unit Price Bid Form and as defined in Sections 5.1 and 5.2 above. Payment covers all items listed in this Section, other related sections, and associated drawings. Contractor is responsible for verifying the quantities presented in the Bid Forms and notifying the Engineer and Owner of any variances or discrepancies prior to bidding.

6. CONTRACT DOCUMENTS

Where request for bid or other contract documents differ from those requirements herein, the bid or other contract documents shall govern.

END OF SECTION 02722

Attachment C
Construction Quality Assurance (CQA) Plan

CONSTRUCTION QUALITY ASSURANCE PLAN
FOR LINER AND COVER CONSTRUCTION AND MAINTENANCE

CONSTRUCTION QUALITY ASSURANCE PLAN FOR LINER AND COVER CONSTRUCTION AND MAINTENANCE

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CONSTRUCTION QUALITY ASSURANCE PLAN FOR LINER AND COVER CONSTRUCTION AND MAINTENANCE

1. GENERAL

1.1. Introduction

The purpose of this document is to present a Quality Assurance and Quality Control Plan (QA/QC Plan) for the Tangipahoa Parish Regional Solid Waste Facility (Tangipahoa RSWF) in accordance with LAC 33:VII.711.B.5.a to assure that the liners and covers used in facility operations are designed, constructed, installed, and maintained properly. Hereafter, the term "liner" shall refer to both "liner and cover," where appropriate. The QA/QC Plan describes procedures for the installation and maintenance of the soil and geosynthetic components used in the composite liner system as specified by the facility design plans.

This QA/QC Plan addresses quality assurance and quality control in the following context. Quality Assurance (QA) refers to means and actions employed to assure conformity of the liner system production and installation with the project specific design specifications and regulatory requirements. Quality Control (QC) refers only to those actions taken to assure that materials and workmanship meet the requirements of the project plans and specifications. Quality control is provided by the manufacturers, suppliers, contractors, and installers of the various components of the liner system.

The overall goal of this QA/QC Plan is to assure all liners used in the facility operations are inspected by or under the direction of a professional engineer, registered in the state Louisiana, with the appropriate expertise. This QA/QC Plan contains the programs for both QC testing and inspection and QA analyses and certification.

1.2. QA/QC Responsibilities

The identification of the responsibilities associated with the ownership, design, supply, manufacture, installation, and quality assurance of the waste cell(s) construction, including but not limited to the clay liner and composite liner system, is essential for meeting project specifications and regulatory requirements. The definitions and responsibilities of typical parties involved in cell design construction, installation, and maintenance are outlined below:

1.2.1. Owner

Owner and operator of the solid waste facility. For this plan the term “Owner” refers to the Tangipahoa RSWF and the Tangipahoa Parish Government.

1.2.2. Owner's Project Manager

The official representative of the Owner. In this QA/QC Plan, the term “Owner's Project Manager” shall mean a duly authorized employee or representative of the Owner and shall apply or be interchangeable with the term “Construction Coordinator.” Generally this person is the Landfill Manager.

1.2.3. Design Engineer

An individual or firm with appropriate Louisiana professional engineering licenses and registration responsible for the design, drawings, plans, and specifications of the soil and geosynthetic liner systems. The person shall be a professional engineer registered in the state of Louisiana, with the appropriate expertise.

1.2.4. Geosynthetic Manufacturer(s)

The firm(s) responsible for the manufacturing of the various synthetic liner system components.

1.2.5. Contractor(s)

General term referring to the firm(s) responsible for the construction of the clay liner or the firm(s) responsible for field handling, storing, deploying, seaming, temporary restraining, and all other aspects of the geosynthetic components of the liner system (or both). The Parish or Tangipahoa RSWF employees may be the Contractor for part or all of the waste cell components, at the Landfill Manager’s determination.

1.2.6. Soil Quality Assurance Laboratory

The firm(s) responsible for conducting the appropriate laboratory tests on any soils samples taken from the site and from off-site borrow sources. Said laboratory shall be LDEQ accredited.

1.2.7. Geosynthetics Quality Assurance Laboratory

The firm(s) responsible for conducting the appropriate laboratory tests on samples of geosynthetics at the site or taken from the site. The Manufacturer's laboratory may be this Laboratory at the Landfill Manager's determination.

1.2.8. Construction Quality Assurance (CQA) Consultant

The firm(s) or person(s) responsible for observing, testing, and documenting activities related to construction quality control and quality assurance during the installation of the soil and geosynthetic liner systems.

1.2.9. CQA Project Manager

The CQA Project Manager refers to duly authorized employee(s) or representative(s) of the CQA Consultant or of the Owner in charge of the CQA activities.

1.2.10. CQA Engineer

The individual employed by the CQA Consultant responsible for the supervision of CQA on-site personnel, testing, observing, and documentation activities. The CQA Engineer is also responsible for the preparation of the documentation report and files.

1.2.11. CQA Technician

The individual(s) responsible for documenting, testing, and observation of cell construction activities. The CQA Technician is an employee or designated agent of the CQA Consultant or of the Owner.

Typically, the responsibilities of each party involved in the installation and maintenance of the composite liner system are established through regular meetings. These meetings are held both during pre-construction and construction phases of the liner installation and maintenance procedures. The description of each meeting is given below:

1.2.12. Preconstruction Meeting

A preconstruction meeting may be held at the site prior to the beginning of liner system installation if deemed necessary by the Owner. Typically, participants in the meeting shall be the Owner's Project Manager, the CQA Consultant, and the Design Engineer.

The purpose of the preconstruction meeting is to review the requirements of the Site Specific QA/QC Plan and develop a site-specific addendum, if required; review design requirements, construction drawings, and specifications; review the responsibilities of each party and the lines of authority and communication; review the time schedule; and, review health and safety requirements and site rules. The meeting shall be documented by a person designated by the Owner at the beginning of the meeting, and written minutes shall be transmitted to all parties.

1.2.13. Daily or Weekly Progress Meetings

A daily or weekly progress meeting may be held on-site. The meeting shall discuss current progress, planned construction activities, issues requiring resolution, and any new business or revisions to the work. The meeting may be attended by Owner's Project Manager, the CQA Engineer or Technician (or both), the Contractor's superintendent, and any other concerned parties.

1.2.14. Problem or Deficiency Identification and Corrective Action Meeting

The CQA Consultant or his representative(s) is required to inform the Contractors in a timely manner, of any difference between the interpretation of the plans and specifications by the Contractors versus the CQA Owner's interpretation. In addition, any actual suspected work deficiencies shall be brought to the Owner's Project Manager's attention.

A special meeting shall be held if a problem or deficiency is present. At a minimum, meeting participants may be the Contractors, the Owner's Project Manager, the CQA Engineer, and the CQA Technician. If the problem involves a possible design or specification modification, the Design Engineer should also be present. The purpose of this meeting is to define and resolve the problem and work deficiency as follows:

1) define and discuss the problem or deficiency;
2) review alternative solutions; and
3) implement an action plan to resolve the problem or deficiency.

Design or specification change (or both) shall be made only with the written approval of the Owner's Project Manager and the Design Engineer. These design changes shall take the form of an addendum to the specifications or this document (or both), and shall be in accordance with the provisions of Sections 1.6.3 and 1.6.5 of this CQA Plan.

Resolution of all problems or deficiencies shall be in accordance with LAC 33.711.B.5 to assure that liners used in facility operations are designed, constructed, installed, and maintained properly.

1.3. Documentation

An effective construction QA/QC Plan depends largely on recognition of all construction activities that should be monitored and on assigning responsibilities for the monitoring of each activity. The CQA Consultant will document that all QA/QC requirements have been satisfactorily addressed. The CQA Consultant shall provide the Owner's Project Manager with signed descriptive remarks, data sheets, and checklists to verify that required monitoring activities have been carried out. The CQA Consultant, through the CQA Technician, shall also maintain at the job site a complete file of all documents which comprise the QA program, this QA/QC Plan, checklists, test procedures, daily logs, and other pertinent documents. Documentation shall be provided through daily field reports, laboratory testing reports, weekly progress reports, record drawings, and the final QA documentation, as follows:

1.3.1. Daily Field Reports

The CQA Technician will prepare a Daily Field Report (DFR). If more than one CQA Technician is present on a discrete portion of the project, the lead Technician shall prepare a DFR from information on individual technician's daily field logs. The report shall include the description, location and quantity of work performed, the results and locations of all tests and surveys performed, the locations and types of samples secured for laboratory testing, any observed discrepancies or deviation from the specifications (each test will be clearly marked “Pass” or “Fail”), the record of all pertinent verbal communications with Contractor, Owner's Project Manager or other personnel, weather and site conditions, and official visitors (regulatory agencies, etc.).

Each DFR will be signed by the CQA Technician (or lead Technician, as appropriate) or the approval agent. Daily Field Reports shall be prepared in one original and two copies. One copy shall be delivered to the Owner's Project Manager, one retained by the CQA Technician, and the original delivered to the CQA Consultant or his authorized representative. No reports will be made available to any third party without written authorization appropriately distributed by the Owner's Project Manager.

1.3.2. Summary Progress Report

The CQA Technician (or lead Technician) shall prepare a weekly summary progress report or at the time established at the preconstruction meeting. The summary progress report may consist of (but not limited to) daily overview of construction activities, failing test results and retest results, new personnel on site, weather conditions, installed material quantities, problems and resolutions encountered, major construction activities started, and major construction activities completed.

1.3.3. Final Construction Documentation Report

Following the completion of construction activities, the CQA Engineer shall prepare a final certification report covering the installation and testing of the soil and geosynthetic liner system. This report shall include summaries of all construction activities, observations and test data sheets including sample location plans, construction problems and solutions, deviations from design and material specifications, record drawings, and certification statements sealed and signed by a Professional Engineer registered in the State of Louisiana, with the appropriate expertise.

1.4. Oral Communication

1.4.1. Communication with the Owner

These communications shall include, but not be limited to, notice of major violations of or deviations from the specifications where immediate remedial action is indicated, interim results of tests when requested by the Owner, and other major problems or anticipated delays which may have an adverse effect on cost and/or scheduling.

Such communications will be confirmed in writing as soon as practicable. Serious problems or emergency situations will also be communicated to the CQA Consultant.

1.4.2. Communication with the Contractor

Reports and communications to the Contractor's superintendent will be limited to the results of QC tests (numerical value, whether passed or failed, probable reason for failure such as excessive moisture, lift thickness, and improper material type, etc). Under no circumstances (other than extreme emergencies involving possible severe injury or property damage) will any CQA Technician give any instruction to Contractor

personnel or take any action which could be construed as supervising or directing Contractor's operations, procedures or methods.

1.5. Communications with Other Parties

Except as noted below, no communication concerning the work will be made to any persons other than the Owner, the CQA Consultant, Contractor's superintendents, or approved agent of the Owner without the express written permission of the Owner.

1.5.1. Regulatory Agencies

Representatives of the USEPA and/or LDEQ may visit the site and request information. Responses to such requests should include all factual data requested: test results, site conditions, status of project, etc. Any requests for opinions or information of a general nature should be referred to the Owner's Project Manager and/or the CQA Consultant. Subject to the above, assistance and cooperation should be given to regulatory personnel to the greatest degree possible.

1.5.2. Third Parties

No communications shall be made with third parties without the approval by and presence of the Owner.

1.6. Control of Plan and Specifications

1.6.1. CQA Engineer's Set

Prior to commencement of the project, the CQA Consultant shall obtain from the Owner's Project Manager a full set of the plans and specifications for the project. This set will be kept in his office, and he will update this set with any revisions. He will check the plans and specifications, including revisions, against the QC plans and specifications. Any discrepancies will be brought to the attention of the CQA Engineer and all CQA Technician and Owner's Project Manager. When plans and specifications are not available from any previous work, the CQA Engineer will develop plans and narrative as needed. Any change must be approved by the Design Engineer, or, if such a change would affect a permit condition, the LDEQ. See Sections 1.6.3 and 1.6.5 of this CQA Plan.

1.6.2. Field Set

The CQA Consultant will assure that an up-to-date set of the plans and specifications is maintained at the site.

1.6.3. Changes by Designer

Modifications to the plans and specifications may be made by the Design Engineer from time-to-time during operations or the closure process. However, only changes within the scope of the LDEQ permit shall be made. Such modifications shall be in writing or verbally; in the latter case, written verification must be received within one week. The contact person for such modifications is the CQA Consultant. Should any modifications be received by CQA personnel other than the CQA Consultant, the receiving person must make a written record and notify the CQA Consultant within 24 hours after becoming aware of them.

1.6.4. Field Changes

Except under emergency conditions, where life or property are in immediate danger, no CQA personnel are authorized to change the plans and/or specifications. Any field changes proposed by CQA personnel must be brought to the CQA Consultants attention, approved by the CQA Consultant, and approved again by the Design Engineer and the Owner's Project Manager before they are implemented. Such approval may be in writing or verbal. If verbal, they are to be confirmed in writing by the Owner using the procedure mentioned above. Only changes within the scope of the LDEQ permit shall be made.

1.6.5. Out of Permit Changes

Changes to be made that are out of scope of the LDEQ permit will require a formal LDEQ Permit Modification - major modification or minor modification. Said changes must be discussed with LDEQ personnel then the change applied for. The LDEQ change may take 4 to 12 weeks to obtain. The Owner and his agents will be responsible for obtaining this modification change. No such changed work shall be done prior to LDEQ approval in writing.

1.7. Sampling and Testing Control

1.7.1. Documentation

The location of every test or sampling point must be fully documented to the degree that any knowledgeable person could re-establish the location. Date and time of the action shall be included. Horizontal location shall be specified by the method in use for this work at the facility (e.g., grid coordinates, seam number and distance from specified end, etc.). Where elevation is also important (e.g., lift number), it shall be included. Each test or sample shall be assigned a unique number.

1.7.2. Control

Any sample to be sent off-site shall be under chain-of-custody control. The control sheet shall include the pertinent data in Section 1.3.1 in addition to the instructions for testing, if appropriate.

2. SURVEYING

2.1. General

Field surveys are required for layout, determination of excavation depth, liner thickness, quantity take-off, and checking slopes. This work will be performed under the general supervision of a professional engineer or a land surveyor, registered in the state of Louisiana. The CQA Technician (or lead CQA Technician, if appropriate) is responsible for coordinating surveys.

2.2. Accuracy

Layout of all facilities shall be tied into the coordinate system. Horizontal layout shall consist of a closed loop (either on itself or to a known coordinate point) with an error of closure not greater than 1:1000. Level surveys and cross-section surveys shall begin and be tied back into established bench marks. Turning points should be solid objects with readings taken to the nearest 0.01 ft. Error of closure of level surveys should not exceed 0.03 ft. Individual elevation determinations (cross-sections and thickness) shall be taken to the nearest 0.01 ft.

2.3. Frequency

2.3.1. Layout

Horizontal control lines should be laid out well in advance of construction operations and must be coordinated with the Contractor. Offset lines are desirable to minimize the need for re-surveying during construction.

2.3.2. Excavation Depth

This survey shall be made upon completion of each excavated area to determine bottom elevation. This survey shall be made on the same spacings as given in Section 2.3.3. In the case of excavations for buffer material, a more detailed grid may be necessary to allow accurate determinations of volume. Special instructions for such cases will be issued by the Design Engineer through the CQA Consultant.

2.3.3. Component Thicknesses

This survey consists of cross-sections made upon completion of each component of liner or cover construction. The section taken upon completion of the excavation will serve as the base for the clay liner, and the section taken on the clay surface will serve as the base for the next component and so on until construction has been completed. The survey grid spacing should not exceed 50 feet. On side slopes, each section will include at least the crest, toe, and one intermediate location even if fewer points would satisfy the 50-foot spacing requirement. All such surveys shall be made before-and-after each component and at the same horizontal points.

2.4. Documentation

All survey data will be recorded in standard field books. If surveying is performed with a "Total Station" computer type instrument, all field data must be printed in a final form before the survey is considered complete. If surveying is performed with a Global Positioning System (GPS), all data must be documented and printed for the file record. Notes shall include date, section surveyed, weather conditions, and names of members of survey party. Surveys shall be plotted when required, to facilitate determination of compliance with specification requirements.

3. RECOMPACTED SOIL LINER/COVER

3.1. Material Acceptance

3.1.1. New Material

A New Material is one for which approval has not been granted in writing by the CQA Consultant. The stockpile for any New Material must be thoroughly characterized. The location of any New Material source or stockpile shall be described in adequate detail. A composite sample must be prepared and tested for Atterberg Limits (ASTM D4318), Percent Passing the No. 200 Sieve (ASTM D1140) or Particle Size Analysis (ASTM D422), Moisture/Density Relationship (ASTM D698); and, a permeability test series shall be performed. The results of permeability tests on field-compacted samples may be used at the discretion of the CQA Consultant. The CQA Technician shall secure a 50-pound bag sample of any New Material at least seven days prior to its intended use. A New Material can be accepted if it can develop the required permeability within the moisture-compaction range as specified in Table CQA-1. No New Material can be used until it has been approved by the CQA Consultant. If this approval is verbal, it must be confirmed in writing within three working days.

3.1.2. Approved Material

An Approved Material is one for which approval has been previously granted in writing by the CQA Consultant. A material which is substantially the same as an Approved Material can be allowed at the discretion of the CQA Technician. For this purpose, the proposed material shall be tested for Atterberg Limits (ASTM D4318) and Percent Passing the No. 200 Sieve (ASTM D1140). If the Liquid Limit, Plasticity Index and Percent Passing the No. 200 Sieve all meet the requirements presented in Table CQA-1 (as appropriate) and are all within the range of 90% to 110% those for an Approved Material, the CQA Technician can authorize use of the material. Should the material fall outside the range given above, it is considered a New Material. CQA Technician's authorization does not constitute a change in the characteristics of an Approved Material.

3.2. Material Verification

3.2.1. Sampling and Documentation

Samples for the various tests required on compacted soil under Section 3.2.3 or 3.3, as appropriate, shall be secured at the frequencies given for each test type on Table CQA-1. These samples may be secured from the in-place fill and can be for more than one test. The locations where any material samples are obtained must be clearly identified by the CQA Technician. The Sample Control Sheet (chain-of-custody) is required for each sample. It shall indicate the sample number, source, unit, unit component and lift number, etc. Laboratory personnel will sign for the sample on the Sample Control Sheet whenever a sample is transferred to a laboratory and not tested by the CQA Technician.

3.2.2. Test Types and Frequencies

The types of tests and the frequency with which each test is to be performed on each component involving compacted soil are contained on Table CQA-1. Variances from Atterberg limits and grain size may be granted by the CQA Consultant, provided that: 1) no more than 5% of the samples fall outside the specified range, 2) such occurances are not concentrated in any one lift or area, and 3) the samples conform to their appropriate permeability requirements. The CQA Consultant may also grant variances from the permeability requirements, provided that: 1) no more than 5% of the samples fall beyond the specified limit, 2) no accepted sample exhibits a permeability exceeding the standard by a factor of more than 1.5, and 3) the arithmetic average of all samples (including the variants) meets the permeability standard.

3.2.3. Test Pad Option

The Owner/Operator may elect to construct one or more test pads to verify that his materials and procedures will produce the required vertical permeability for barrier soils (compacted clay liner, intermediate cover layer, protective soil layers). In such a case, the test pad will be constructed using the proposed material and procedures, to the requirements, and using the CQA program in these specifications and Plan. The test pad(s) will be at least as thick as the proposed barrier unit(s) and have an area such that the equipment reaches full speed and there is adequate clearance (12 feet minimum) between a field test and the top edge of the pad.

In addition to the normal CQA testing, the pad may be tested using the Sealed, Double-Ring Infiltrometer (ASTM D5093) and/or a five-test group of the Two-Stage Borehole Test (ASTM D6391). If the field test program meets the permeability requirement, the laboratory permeability test frequency specified for that barrier component can be reduced to one-half the values on Table CQA-1.

3.3. Construction Control

3.3.1. Visual Inspection

The CQA Technician shall maintain visual inspection of all liner material placement, processing, and compaction. He shall specifically observe for the presence of roots, sticks, stones, or other deleterious matter, and for clod size. All of these items shall conform to the Specifications or the CQA Technician shall record the discrepancy in his DFR, bring it to the Contractor's attention, and record it in the appropriate DFR when the discrepancy is corrected.

3.3.2. Lift Thickness

The CQA Technician shall verify the loose lift thickness as specified on Table CQA-1. This shall be done by making a shovel hole through the loose material, but shall not damage any underlying liner. The depth shall be measured from a straightedge across the hole, and to the nearest ½ inch. Upon completion of the measurement, the hole shall be refilled. If the measured deviation in thickness exceeds 10% of the specified value, the area shall be considered as “FAIL.” Should there be a smaller deficiency, the CQA Technician may immediately retest at two locations within 10 feet of the original test. If the average of the three tests is a “PASS,” the area shall be considered as “PASS,” and no further action is necessary. Otherwise, the area shall be brought into conformity. All locations shall be recorded and clearly identified (e.g., grid point and lift number).

3.3.3. Field Moisture/Density Testing

3.3.3.1. *Frequency and Documentation*. Field moisture and density tests will be performed at a frequency at least equal to that given on Table CQA-1. The minimum test locations will be determined on a random basis as prescribed by the CQA Consultant. Each test must be referenced to site/cell grid coordinates and lift number. All tests shall be recorded. Failing tests shall be specifically tracked until the failed area is reworked and retested satisfactorily. Each test must meet both the required moisture and density

criteria as indicated in Table CQA-1 to "Pass." Every test must be specifically marked "Pass" or "Fail."

3.3.3.2. *Procedure*. Allowable test procedures are tabulated below; all are ASTM methods:

Method	Density	Moisture
Nuclear	D2922	D3017
Sand Cone	D1556	D2216
Drive Cylinder	D2937	D2216
Balloon	D2167	D2216

All holes made into compacted liner material must be backfilled. Dry bentonite pellets or crumbles shall be tamped lightly into the hole, then wetted. The hole shall then be covered with moist liner soil and tamped.

3.3.3.3. *Action in Case of Failure*

Failure. If the test yields a compaction more than 1.0 percentage point below that required by the Specifications or if its moisture content is more than 1.0 percentage point outside the range given in the Specifications, it is a failure. Such areas shall be reworked and retested until satisfactory results are obtained. The CQA Technician shall promptly inform the Owner's Project Manager and the Contractor of all failing tests.

Marginal Test. If a test is closer to the Specifications than the limits stated above but not a clear "Pass," the CQA Technician may, at his discretion, follow the Marginal Test procedure. Three more field moisture/density tests shall be performed within a three-foot radius of the marginal test. If all of these tests and the average of these three plus the marginal test pass on both moisture and density, the combined test is considered to "Pass." Otherwise, the test is a "Fail," and Section 3.3.3.3 (Failure) above applies. The CQA Technician shall clearly record combined tests.

3.3.3.4. *Calibration (Nuclear Tests)*. The laboratory calibration given in ASTM D2922 and ASTM D3017 shall be performed at least every other year. Checks using

the Calibration Block shall be made at the beginning and end of each shift.

At least one moisture content per day shall be conducted according to ASTM D2216 on a sample secured from a field moisture/density test location. The sample shall be referenced to this field test. In addition, the CQA Consultant shall check the moisture and density results from each permeability and strength test against the data from the corresponding field density test. The CQA Consultant shall determine the correction factor for the Nuclear Gauge from this data. This correction factor must be used by the CQA Technician until changed by the CQA Consultant.

3.3.3.5. *Proctor Compaction Tests*. A Standard Proctor Test (ASTM D698) will be available for each Approved Material (Section 3.1.2). Additional Standard Proctor Tests will be performed as necessary to meet the frequency requirements of Table CQA-1. The sampling dates and locations for these tests will be at the discretion of the CQA Technician (Lead CQA Technician, if present) or CQA Consultant. Samples shall be identified and controlled following Section 3.2.1. Each Proctor shall have a minimum of four moisture-density points. The material from each Standard Proctor test shall also be tested for Atterberg limits (ASTM D4318), and percent passing the No. 200 sieve (ASTM D1140). The full particle size analysis (ASTM D422) may be required at the discretion of the CQA Consultant.

3.3.4. Permeability Tests

3.3.4.1. *Frequency and Documentation*. Samples for permeability tests shall be secured at a frequency not less than that given on Table CQA-1. The minimum sampling locations will be determined on a random basis as prescribed by the CQA Consultant. Each sample location will be in close proximity to a field moisture/density test; that test number will be recorded on the Sample Control Sheet. The sample will further be identified by site grid and lift number.

3.3.4.2. *Sampling Methodology*. The permeability samples shall be taken at a location no closer to the field moisture and density test hole than six inches, nor further than 12 inches. All loose surface material shall be removed prior to sampling. The samples shall be taken using the three-inch drive cylinder method (ASTM D2937), except that field weighing is not required. The permeability sample shall be the full size of the ring for at least two inches in

length and have axis perpendicular to the face of the compacted clay for parallel lift construction. However, in no case shall a sampler be driven to within three inches of a geomembrane. Block samples may be taken with subsequent trimming performed in the laboratory. The CQA Technician shall check the sample for obvious defects caused by sampling. Any defective or short sample shall be discarded and a new sample taken no closer to the previous location than six inches but still complying with the above. The hole(s) shall be backfilled with bentonite pellets or crumbles in accordance with Section 3.3.3.2.

The sample shall be trimmed so that none protrudes from the drive cylinder. It shall then be capped, placed into a plastic bag, which shall be indelibly marked with the same information as required for the Sample Control Sheet. It shall be returned to the laboratory under Sample Control as soon as possible.

3.3.4.3. *Testing*. The samples shall be tested according to the methodology specified on Tables CQA-1. In addition to permeability, each sample shall be tested for dry density, moisture content (ASTM D2216), Atterberg limits (ASTM D4318), and percent passing the No. 200 sieve (ASTM D1140). The full particle size analysis (ASTM D422) may be required at the CQA Consultant's discretion.

3.3.4.4. *Nonconformity.* Any discrepancies must be handled directly by the CQA Consultant. The laboratory technician shall keep the CQA Consultant informed of the status of all permeability testing. If a sample fails, the CQA Consultant shall immediately inform the CQA Consultant, the on-site CQA Technician, and the Owner's Project Manager by telephone, confirming with a memo as soon as practicable. The area to be reworked shall be determined by the CQA Consultant and proposed to the Owner's Project Manager. Such area shall be reworked, and then retested for moisture/density (Section 3.3.3) and for permeability following Section 3.3.4.

3.3.5. Overall Component Thickness

3.3.5.1. *Compacted Soil Liner*. The thickness shall be determined by before-and-after surveys in conformance with Sections 2.3.2 and 2.3.3. The thickness of sloped components shall be determined perpendicular to the slope face.

3.3.5.2. *Soil Components of Cover*. If necessary, the thickness of each soil component shall be determined by hand boring or excavation on a grid as described in Section 2.3.3, except that the spacing shall not exceed 100 feet. All resulting holes shall be backfilled with bentonite pellets or crumbles.

3.3.5.3. *Variances*. The CQA Consultant may grant variances from the thickness requirements provided that: 1) the point is not deficient by more than 0.1 feet, 2) no more than 5% of points are deficient, 3) these points are not concentrated in one area, and 4) the average thickness (including the deficient points) meets or exceeds the specified value.

4. SYNTHETIC LINER

4.1. Material Acceptance

4.1.1. New Material

A new material is any material delivered to the site with approved manufacturer verification data sheets and bill of lading, but which has not been previously approved by the CQA Consultant. The CQA Technician shall inventory all materials as they are received on site. Any noticeable defects of the delivered material will be documented and suspect rolls segregated. Any materials without approved manufacturer verification will also be segregated.

4.1.2. Approved Material

An Approved Material is one which has been previously approved (in writing) by the CQA Consultant. The CQA Consultant shall review all manufacturer verification tests for specified minimum material properties and frequency of such tests before written approval is given. Confirmatory tests, which may be the manufacturer's tests, are also required prior to material approval. It is the intent herein that the manufacturer's QC and manufacturing tests will be used in lieu of confirmatory materials testing by the Owner or his agent.

4.2. Material Verification

4.2.1. Sampling and Documentation

The CQA Technician will inventory, sample, and document all materials when they are delivered on site. Each roll of material will be sampled and the sample archived for the duration of the project. Additional confirmatory tests may be performed on the samples obtained.

4.2.2. Test Types and Frequencies

Test types and frequency for synthetic liners shall closely follow the most recent version of the specifications issued by the Geosynthetic Research Institute. At the discretion of the Design Engineer, test types of frequencies can be modified. Such modifications shall be presented in written to the CQA Consultant.

4.3. Construction Control

4.3.1. Visual Inspection

The CQA Technician shall maintain visual inspection during all phases of liner deployment. During deployment, oversight and documentation will follow the guidelines listed below:

- Overlap of panels will be measured every 25 feet prior to seaming;
- All scratches, punctures, tears and crimps will be documented and repaired;
- All seaming will be continuously inspected and documented as vacuum and/or air pressure tests. Seams on the slopes shall run up and down the slopes not across the slopes;
- No personnel working on the synthetic liner shall smoke, wear damaging shoes, or engage in other activities that could damage the synthetic liner;
- The method used to unroll the synthetic liner shall not cause scratches or crimps in the synthetic liner and shall not damage the supporting soil or underlying surface;

- All necessary steps will be taken to minimize the wrinkles. The number of wrinkles shall be identified as to location and submitted for approval;

- Adequate loading (e.g. sand bags, or similar items that will not damage the synthetic liner) shall be placed to prevent uplift by wind; and,

- As-built drawings will be made by the Contractor and verified by the CQA Technician during construction of the liner. Construction drawings shall include at least the locations of all welded seams, patches, caps, destructive test locations, and panel numbers.

4.3.2. Seam Testing

~~See Section 5 for bonded HDPE/GCL products. The references to welding within this Section refer to non bonded products~~.

4.3.2.1. *Field Test Welds*. Field test welds are a performance test for the welder and his welding equipment. Such testing will be required each day welding is performed, with a minimum of the beginning and end of each shift for all welders and their machines. Section 4.3.2.2 addresses the procedures for performing field test welds. Each test will be documented on a specific test form and in the DFR.

4.3.2.2. *Non-Destructive Testing*. All non-destructive seam testing will be continuously performed and documented on all welded seams, patches and repairs. The following paragraphs address both test procedures for vacuum and air pressure testing and retest procedures.

- Visual Inspection: The CQA Technician shall verify that the seam area is clean and ready for welding. He shall also observe the welding operation for continuity, bond, specified welding sequence, sand bagging, etc. The CQA Technician shall verify that no adhesives are used, even for holding edges in place temporarily.

- Air Pressure Testing: Seal both ends of the seam to be tested. Insert needle or other approved pressure feed device into the sealed channel. Inflate the test channel. Inflate the test channel to pressure of 30 psi, close valve, and observe initial pressure after approximately two minutes.

Initial pressure settings are read after a two-minute "relaxing period" ends and the initial pressure is determined. If the pressure does not stabilize, locate the faulty area and repair it in accordance with this section. Observe and record the air pressure five minutes after "relaxing period" ends and initial pressure setting is determined. The difference of the initial pressure and final pressure should be less than three psi.

At the conclusion of the pressure test, the end of the seam opposite the pressure gauge is cut. A decrease in gauge pressure must be observed or the air channel will be considered "blocked" and the test will have to be repeated after the blockage is corrected.

Remove needle or other approved pressure feed device and seal hole by extrusion welding.

- Vacuum Box Welding: The procedure shall conform to ASTM D4437. A biodegradable soap solution is first applied to the seam section (approximately three feet long) to be tested. The vacuum box suction tester is placed over that section of seam. Any leakage which shows as bubbles in the soap solution constitutes a failure. Each Vacuum Box Test shall overlap the previous test by at least three inches. The absolute pressure in the box shall be maintained 10 to 15 seconds at two to four psi (four to eight inches of mercury) during the test.

In the event of a non-complying Air Pressure or Vacuum Box Testing (or both), the following retest procedure shall be followed:

- Air Pressure Testing:

  A. Check Seam and rerun test.

  B. If non-compliance with specified maximum pressure differential re-occurs, the seam may be divided in half, and each half pressure-tested to locate the leak. This is totally dependent upon the length of the seam.

  C. Alternate to (B), would be to remove the overlap (if any) left by the wedge welder and vacuum test the entire seam in accordance with the Vacuum Box Test procedure described above.

D. If the leak is located by either pressure or vacuum test, it shall be repaired by extrusion welding and vacuum tested until the section passes.

- Vacuum Testing:

A. Check seam and rerun test.

B. Mark all areas where soap bubbles appear.

C. Repair areas of non-conformance by patching or capping by extrusion welding with a minimum overlap of four inches.

D. Retest all repaired areas in accordance with the Vacuum Box Test procedure described above.

4.3.2.3. *Destructive Testing*. Destructive samples will be obtained from the welded production seams at a minimum frequency of one sample per 500 lineal feet of seam but not less than one sample per day. The following paragraphs discuss the procedures for sampling, testing and repairing destructive samples, and areas of sampling. Acceptance criteria shall follow the most recent version of the specifications for geomembrane seams (GM19) issued by the Geosynthetic Research Institute.

- Frequency of Sampling/Testing: Actual production welded samples of the synthetic liner shall be obtained at intervals not exceeding 500 lineal feet of seam, but not less than one daily. All areas of destructive testing shall be patched, repaired, and then tested in accordance with Section 4.3.2.2.

- Sampling: Field weld samples shall be at least one foot wide and two feet long. The seam shall be roughly centered in the sample. The samples shall be secured with a sharp knife, taking care not to damage any underlying component.

- Retest Procedure: In the event of a non-complying peel or shear test, the following procedure shall be followed:

A. If a production sample fails the strength criteria, additional samples

shall be obtained ten feet from the failure in both directions along the seam following the procedures mentioned in this subsection for sampling and testing.

B. Should these additional samples fail, the procedure in A should be repeated until the failing area is delineated.

C. After the failing seam area has been delineated, the entire failed area shall be capped. After capping, the capped seam shall be tested by Vacuum Box Testing. If no leaks are encountered, the capped area is considered acceptable.

5. GEOSYNTHETIC CLAY LINER (GCL)

5.1. Material Acceptance

5.1.1. New Material

A new material is any material delivered to the site with approved manufacturer verification data sheets and bill of lading, but which has not been previously approved by the CQA Consultant. The CQA Technician shall inventory all materials as they are received on site. Any noticeable defects of the delivered material will be documented and suspect rolls segregated. Any materials without approved manufacturer verification will also be segregated.

5.1.2. Approved Material

An Approved Material is one which has been previously approved (in writing) by the CQA Consultant. The CQA Consultant shall review all manufacturer verification tests for specified minimum material properties and frequency of such tests before written approval is given. Confirmatory tests, which may be the manufacturer's tests, are also required prior to material approval. It is the intent herein that the manufacturer's QC and manufacturing tests will be used in lieu of confirmatory materials testing by the Owner of his agent.

5.2. Material Verification

5.2.1. Sampling and Documentation

The CQA Technician will inventory, sample, and document all materials when they are delivered on site. Each roll of material will be sampled and the sample archived for the duration of the project. Confirmatory tests may be performed on the samples obtained.

5.2.2. Test Types and Frequencies

Test types and frequency for GCL shall closely follow the most recent version of the specifications issued by the Geosynthetic Research Institute. At the discretion of the Design Engineer, test types of frequencies can be modified. Such modifications shall be presented in written to the CQA Consultant.

5.3. Construction Control

Installation of GCL shall include a generous 12-inch overlap of adjacent panels. Panels shall be installed down a slope in the direction of flow, not along a slope perpendicular to flow. The GCL may have a HDPE geomembrane bonded to its top. ~~If the HDPE geomembrane is bonded to the GCL no welding of the HDPE is required. However, if the HDPE geomembrane is not bonded to the GCL~~, The geomembrane shall be welded and tested in accordance with Section 4 of this document and the project specifications.

5.3.1. Visual Inspection

The CQA Technician shall maintain visual inspection during all phases of liner deployment. During deployment, oversight and documentation will follow the guidelines listed below:

- Overlap of panels will be measured every 25 feet;
- All punctures, tears, perforations and crimps will be documented and repaired;
- All seaming, when applicable, will be continuously inspected and documented;
- No personnel working on the GCL shall smoke, wear damaging shoes, or engage in other activities that could damage the synthetic liner;

- The method used to unroll the GCL shall not cause tears or crimps in the liner and shall not damage the supporting soil or underlying surface. A rub sheet may be used to reduce friction damage during placement;

- All necessary steps will be taken to minimize the wrinkles. The number of wrinkles shall be identified as to location and submitted for approval;

- Adequate loading (e.g. sand bags, or similar items that will not damage the synthetic liner) shall be placed to reduce uplift by wind; and,

- As-built drawings will be made by the Contractor and verified by the CQA Technician during construction of the liner. Construction drawings shall include at least the locations of all seams, patches, caps, test locations, and panel numbers.

5.3.2. Seams

GCL seams are constructed by overlapping adjacent edges. Care should be taken to ensure that the overlap area does not contain loose soil. Seams at the ends of GCL panels should be shingled in the direction of the slope to prevent runoff from entering the seam. Bentonite enhanced seams, when required, are constructed by exposing the underlying edge and applying a continuous bead of granular sodium bentonite along the exposed edge and the overlying GCL.

5.3.3. Repairs

If the GCL is damaged during installation, repairs may be made by cutting a patch to cover the damaged area. The patch should be cut so as to provide a minimum overlap of 12 inches around the entire damaged area. Use a sharp utility knife to cut the GCL. Frequent blade changes may be required to keep a sharp knife blade and thereby avoid damage to the GCL. Dry bentonite or a bentonite mastic may be applied around the damaged area prior to placing the patch. An adhesive may be desired to ensure that the patch is not displaced during subsequent cover material placement.

6. LEACHATE COLLECTION SYSTEM

6.1. Material Acceptance

6.1.1. New Material

The materials for this component of the liner system consist of sand, leachate pipe, gravel, geonet, geocomposite and geotextile. The pipe, geonet, geocomposite, and geotextile will be inventoried by the CQA Technician upon arrival on site. The manufacturer's verification data sheet will be reviewed upon delivery. The sand and gravel will be sampled and tested prior to use.

6.1.2. Approved Material

An Approved Material is one for which approval has been previously granted in writing by the CQA Consultant. The CQA Technician shall review all manufacturer's verification test for the pipe, geonet, geocomposite, and geotextile. The CQA Technician shall also review the gradation test for the gravel to assure minimum specifications are met. The sand will be tested at the Soil Quality Assurance Laboratory for permeability. This will be performed prior to approval.

6.2. Material Verification

6.2.1. Sampling and Documentation

The CQA Technician will inventory, sample, and document all materials as they arrive on site. Archive samples will be maintained for each roll of geonet, geocomposite, and geotextile and each bundle of pipe for the duration of the project. Gravel and sand samples will be archived at the Soil Quality Assurance Laboratory after testing.

6.2.2. Test Types and Frequencies

Test types and frequency for geonet, geocomposite, and geotextiles shall closely follow the most recent version of the specifications issued by the Geosynthetic Research Institute. At the discretion of the Design Engineer, test types of frequencies can be modified. Such modifications shall be presented in written to the CQA Consultant.

6.3. Construction Control

6.3.1. Visual Inspection

The CQA Technician shall maintain visual inspection during all phases of the leachate collection system construction. All construction will be performed in accordance with the specifications and construction drawings. Daily documentation will be recorded on the DFRs.

6.3.1.1. *Sand*. The drainage sand layer, when used, will be checked for type and thickness; it will also be sampled and tested to meet the following standards:

- The sand shall be free of any metals, roots, tree stumps, concrete, construction debris, or any other organic matter or deleterious material.

- The drainage sand shall have a minimum permeability of 1×10^{-2} cm/sec based on falling head permeability testing in accordance with EM 1110-2-1906, Appendix VII, or other acceptable procedure. Permeability tests shall be performed on sand samples in a frequency of one test for every 5 acres.

- The drainage layer sand shall be classified as SW or SP in accordance with the Unified Soil Classification System (U.S.C.S) and shall not be gap graded. As guidance, the material shall contain less than five percent (by dry weight) passing the No. 200 sieve with 100 percent (by dry weight) passing the 3/4-inch sieve, no more than 60 percent (by dry weight) passing the No. 10 sieve, and no more than 10 percent (by dry weight) passing the No. 20 sieve. However, the minimum permeability of 1×10^{-2} cm/sec governs over the gradation discussed above.

6.3.1.2. *Pipe*. Leachate pipe installation will be checked for type, location, elevations, and orientations of the perforations.

6.3.1.3. *Gravel.* The gravel pack placement around the leachate pipe, when used, will be inspected and documented for size. There are no specific dry density or moisture content requirements for the placement. The gravel pack shall be constructed in such a manner that the finished product is dense and compact, and neither damages nor shifts the pipe. The gravel will be sampled and tested as outlined in Table CQA-2.

6.3.1.4. *Geotextile*. Installation of the geotextile shall be performed in accordance with plans and specifications. For the gravel pack, the material will be placed so that the wrap overlap is at least 12 inches, or as specified in the construction drawing. The wrap overlap will be observed and reported on the DFRs.

7. CLOSURE TURF^{tm} (OR EQUIVALENT) FINAL COVER SYSTEM

The installation of the Closure Turf^{tm} (or equivalent final cover system) is addressed in this section. This cover system consists of:

- 12-inch minimum interim earthen material over waste material;
- 50-mil LLDPE structured drainage geomembrane (Agru Super Gripnet®, or equivalent);
- Synthetic turf component consisting to two woven geotextiles tufted with artificial grass; and
- One-half inch of sand, anchoring the turf to the surface of the landfill.

Alternative manufacturers of the synthetic materials may be used as long as materials conform to specifications presented on Tables CQA-3 and CQA-4. At the discretion of the Design Engineer, test types of frequencies can be modified. Such modifications shall be presented in written to the CQA Consultant.

7.1. Material Acceptance

7.1.1. New Material

The materials for this system consist of sand, synthetic turf, and LLDPE structured drainage geomembrane. The materials will be inventoried by the CQA Technician upon arrival on site. The manufacturer's verification data sheet will be reviewed upon delivery.

7.1.2. Approved Material

An Approved Material is one for which approval has been previously granted in writing by the CQA Consultant. The CQA Technician shall review all manufacturer's verification tests for the components including the gradation test for the sand to assure that the minimum specifications are met.

7.2. Material Verification

The CQA Technician will inventory, sample, and document all materials as they arrive on site. Archive samples will be maintained for each roll of geosynthetic liner, and synthetic turf, or at the discretion of the CQA Engineer. The manufacturer's QC and manufacturing test data may be used in lieu of materials testing by the Owner or his agent.

7.3. Construction Control

7.3.1. Visual Inspection

The CQA Technician shall maintain visual inspection during construction of the final cover system. All construction will be performed in accordance with the specifications and construction drawings. Daily documentation will be recorded on the DFRs.

7.3.1.1. *Subgrade*. The subgrade surface should be free of large stones or any object that would penetrate or otherwise compromise the geosynthetic layers of the cover system.

7.3.1.2. *Geomembrane*. During deployment, oversight and documentation will follow the guidelines listed below.

- Five-inch overlap of panels will be confirmed prior to seaming;
- All scratches, punctures, tears and crimps will be documented and repaired;
- All seaming will be continuously inspected and documented as air pressure tests. Seams on the slopes shall run up and down the slopes not across the slopes;

- No personnel working on the synthetic liner shall smoke, wear damaging shoes, or engage in other activities that could damage the synthetic liner;

- The method used to unroll the synthetic liner shall not cause scratches or crimps in the synthetic liner and shall not damage the supporting soil or underlying surface;

- All necessary steps will be taken to minimize the wrinkles. The number of wrinkles shall be identified as to location and submitted for approval;

- Adequate loading (e.g. sand bags, or similar items that will not damage the synthetic liner) shall be placed to prevent uplift by wind during the construction process; and,

- As-built drawings will be made by the Contractor and verified by the CQA Technician during construction of the liner. Construction drawings shall include at least the locations of all welded seams, patches, destructive test locations, and panel numbers.

7.3.1.3. *Synthetic Turf*. Observations shall be made to ensure that the synthetic turf consists of two woven lower geotextiles tufted with 1-1/4 inch long yarns. The manufacturer shall confirm a material weight of at least 19 oz./sq.yd.

Seaming operations shall be monitored for overlap, seam quality and completion. Sand bags or similar type anchors may be used along the edges of panels to prevent uplift during installation.

7.3.1.4. *Sand*. The sand layer will be checked for type and thickness:

- The sand shall be free of any metals, roots, tree stumps, concrete, construction debris, or any other organic matter or deleterious material.

- The sand ballast will be classified as SP/SW in accordance with the U.S.C.S. The material shall have gradation of approximately ten percent coarse and ten percent fine sands, or as approved by the Design Engineer.

7.3.2. Seam Testing

This section addresses seam testing requirements of the 50-mil LLDPE structured drainage geomembrane (Agru Super Gripnet®, or equivalent).

7.3.2.1. *Field Test Welds*. Field test welds are a performance test for the welder and his welding equipment. Such testing will be required each day welding is performed, with a minimum of the beginning and end of each shift for all welders and their machines. Section 7.3.2.3 addresses the procedures for performing field test welds. Each test will be documented on a specific test form and in the DFR.

7.3.2.2. *Non-Destructive Testing*. All non-destructive seam testing will be continuously performed and documented on all welded seams.

- Visual Inspection: The CQA Technician shall verify that the seam area is clean and ready for welding. He shall also observe the welding operation for continuity, bond, specified welding sequence, sand bagging, etc. The CQA Technician shall verify that no adhesives are used, even for holding edges in place temporarily.

- Air Pressure Testing: Inflate the test channel to pressure of 30 psi, close valve, and observe pressure drop for five minutes. The difference of the initial pressure and final pressure should be less than three psi. If the pressure does not stabilize or seam does not meet this criterion, locate the faulty area and patch it using extrusion welding.

7.3.2.3. *Destructive Testing*. Destructive samples will be obtained from the welded production seams. The following paragraphs discuss the procedures for sampling, testing, and repairing destructive samples. Testing frequency and acceptance criteria shall follow Tables CQA-3 and CQA-4.

- Frequency of Sampling/Testing: Actual production welded samples of the synthetic liner shall be obtained at intervals not exceeding 500 linear feet of seam, but not less than one daily. The samples shall be tested for shear and peel strength.

- Sampling: Field weld samples shall be at least one foot wide and two feet long. The seam shall be roughly centered in the sample. The samples shall be carefully secured with a sharp knife.

- Repairing: All areas of destructive testing shall be patched using extrusion welding. Prior to extrusion welding the spikes of the drainage layer shall be grinded down to allow for better contact between the sheets.

8. EXPOSED GEOMEMBRANE FINAL COVER SYSTEM

The installation of the exposed geomembrane final cover system is addressed in this section. The cover system is as follows:

- 12-inch minimum interim earthen material over waste material; and

- 60-mil HDPE geomembrane.

Test types and frequency for exposed geomembranes shall closely follow the most recent version of the specifications issued by the Geosynthetic Research Institute. At the discretion of the Design Engineer, test types of frequencies can be modified. Such modifications shall be presented in written to the CQA Consultant.

8.1. Material Acceptance

8.1.1. New Material

The materials for this system consist of HDPE geomembrane. The geomembrane will be inventoried by the CQA Technician upon arrival on site. The manufacturer's verification data sheet will be reviewed upon delivery.

8.1.2. Approved Material

An Approved Material is one for which approval has been previously granted in writing by the CQA Consultant. The CQA Technician shall review all manufacturer's verification tests for the geomembrane.

8.2. Material Verification

The CQA Technician will inventory, sample, and document all geomembrane as it arrives on site. Archive samples will be maintained for each roll of geomembrane liner or at the discretion of the CQA Engineer. The manufacturer's QC and manufacturing test data will be used in lieu of materials testing by the Owner or his agent.

8.3. Construction Control

8.3.1. Visual Inspection

The CQA Technician shall maintain visual inspection during construction of the final cover system. All construction will be performed in accordance with the specifications and construction drawings. Daily documentation will be recorded on the DFRs.

8.3.1.1. *Subgrade*. The subgrade surface should be free of large stones or any object that would penetrate or otherwise compromise the geomembrane layer of the cover system.

8.3.1.2. *Geomembrane*. During deployment, oversight and documentation will follow the guidelines listed below.

- Five-inch overlap of panels will be confirmed prior to seaming;
- All scratches, punctures, tears and crimps will be documented and repaired;
- All seaming will be continuously inspected and documented as air pressure tests. Seams on the slopes shall run up and down the slopes not across the slopes;
- No personnel working on the synthetic liner shall smoke, wear damaging shoes, or engage in other activities that could damage the synthetic liner;
- The method used to unroll the synthetic liner shall not cause scratches or crimps in the synthetic liner and shall not damage the supporting soil or underlying surface;

- All necessary steps will be taken to minimize the wrinkles. The number of wrinkles shall be identified as to location and submitted for approval;

- Adequate loading (e.g. sand bags, or similar items that will not damage the synthetic liner) shall be placed to prevent uplift by wind during the construction process; and,

- As-built drawings will be made by the Contractor and verified by the CQA Technician during construction of the liner. Construction drawings shall include at least the locations of all welded seams, patches, destructive test locations, and panel numbers.

8.3.2. Seam Testing

This section addresses seam testing requirements of the 60-mil HDPE geomembrane.

8.3.2.1. *Field Test Welds*. Field test welds are a performance test for the welder and his welding equipment. Such testing will be required each day welding is performed, with a minimum of the beginning and end of each shift for all welders and their machines. Section 8.3.2.3 addresses the procedures for performing field test welds. Each test will be documented on a specific test form and in the DFR.

8.3.2.2. *Non-Destructive Testing*. All non-destructive seam testing will be continuously performed and documented on all welded seams.

- Visual Inspection: The CQA Technician shall verify that the seam area is clean and ready for welding. He shall also observe the welding operation for continuity, bond, specified welding sequence, sand bagging, etc. The CQA Technician shall verify that no adhesives are used, even for holding edges in place temporarily.

- Air Pressure Testing: Inflate the test channel to pressure of 30 psi, close valve, and observe pressure drop for five minutes. The difference of the initial pressure and final pressure should be less than three psi. If the pressure does not stabilize or seam does not meet this criterion, locate the faulty area and patch it using extrusion welding.

8.3.2.3. *Destructive Testing*. Destructive samples will be obtained from the welded production seams. The following paragraphs discuss the procedures for sampling, testing, and repairing destructive samples. Acceptance criteria shall follow the most recent version of the specifications for geomembrane seams (GM19) issued by the Geosynthetic Research Institute.

- Frequency of Sampling/Testing: Actual production welded samples of the synthetic liner shall be obtained at intervals not exceeding 500 linear feet of seam, but not less than one daily. The samples shall be tested for shear and peel strength.

- Sampling: Field weld samples shall be at least one foot wide and two feet long. The seam shall be roughly centered in the sample. The samples shall be carefully secured with a sharp knife.

- Repairing: All areas of destructive testing shall be patched using extrusion welding.

TABLES

TABLE CQA-1
COMPACTED CLAY LINER AND FINAL COVER SOIL COMPONENTS
SPECIFICATIONS AND TESTING FREQUENCIES

#

#

Test	Method	Requirement	Frequency cu yd[(1)]	Frequency sq ft[(1)]
Standard Proctor Compaction with Atterberg Limits	ASTM D698 ASTM D4318	N/A	6,500[(2)]	351,000[(2)]
In-Place Dry Density	ASTM D2922[(5)]	$\gamma d \geq 92\% \gamma d_{max}$[(3)]	46	2,500
Water Content at Compaction	ASTM D3017[(5)]	0 to 3 > W_{opt}[(3)] (cover) 0 to 8 > w_{opt}[(3)] (bottom)	46	2,500
Atterberg Limits (Loose Fills)	ASTM D4318	LL ≥ 30, PI ≥ 15	3,000	162,000
Grain Size	ASTM D422 or ASTM D1140	≥ 50% - #200	6,500	351,000
Permeability with Grain Size and Atterberg Limits	ASTM D5084 or EPA 9100D ASTM D 1140 ASTM D 4318	≤ 1.0 x 10^{-7} cm/sec	806	43,560 (1 acre/lift)
Lift Thickness	Direct Measurement	≤ 8" loose; ≤ 6" compacted[(4)]	N/A	N/A

#

[(1)] Per lift (conversions calculated based upon 6" lift thickness).
[(2)] At least one test per every 5 point liquid limit variation.
[(3)] As determined by standard Proctor compaction test for appropriate soil type, or, saturation >85%.
[(4)] Unless alternatives approved by geotechnical engineer.
[(5)] See alternate methods in Section 3.3.3.2.

TABLE CQA-2
GRAVEL FOR LEACHATE COLLECTION SYSTEM
SPECIFICATIONS AND TESTING FREQUENCIES

GRAVEL[1] **(SAMPLE EVERY 500 CUBIC YARDS: TEST ASTM D422 or C136)**	
U.S. Standard Sieve Opening	**Percent Passing [2]**
1 ½"	100
1"	90 - 100
3/4"	35 - 85
1/2"	25 - 60
No. 4	0 - 10
No. 8	0 - 5
No. 200	0 - 1

[1] Actual gradation should be able to produce permeability $\geq 1x10^{-2}$ cm/sec.
[2] As close as practicable and at the discretion of the Design Engineer.

TABLE CQA-3
STRUCTURED LLDPE GEOMEMBRANE COMPONENT OF CLOSURE TURF^{tm} OR EQUIVALENT SPECIFICATIONS AND TESTING FREQUENCIES

Responsible Party	Type of Test		Standard Test Method	Frequency of Testing
Resin Manufacturer	Resin	Density	ASTM D 1505	Per manufacturer quality control and every resin lot
		Melt Flow Index	ASTM D 1238 (90/2.16 and 190/21.6)	
	Resin/Compound Quality Evaluation		Per manufacturer's quality control specifications	Per manufacturer's quality control specifications
Geomembrane Manufacturer	Manufacturer's Quality Control		Testing per GRI Standard, GRI Test Method GM17 for 50 mil LLDPE[1]	
Conformance Testing by 3rd Party Independent Laboratory*	Thickness[2]		ASTM D 5994	Per manufacturer quality control requirements and every resin lot
	Drainage Stud Height		GRI GM12	
	Friction Spike Height		GRI GM12	
	Specific Gravity/Density		ASTM D 792, Method B	
	Carbon Black Content		ASTM D 4218	
	Carbon Black Dispersion		ASTM D 5596[3]	
	Tensile Properties		ASTM D 6693 Type IV Specimen	
3rd Party CQA	Destructive Seam Field Testing[4]	Shear & Peel	ASTM D 6392	Various for field, lab, and archive
Contractor	Non-Destructive Seam Field Testing	Air Pressure	GRI GM6	All dual-track fusion weld seams
		Vacuum	ASTM D 4437	All non-air pressure tested seams when possible
		Other		Concurrence of State

*Conformance Testing may or may not be performed at the discretion of the Owner or/and Engineer

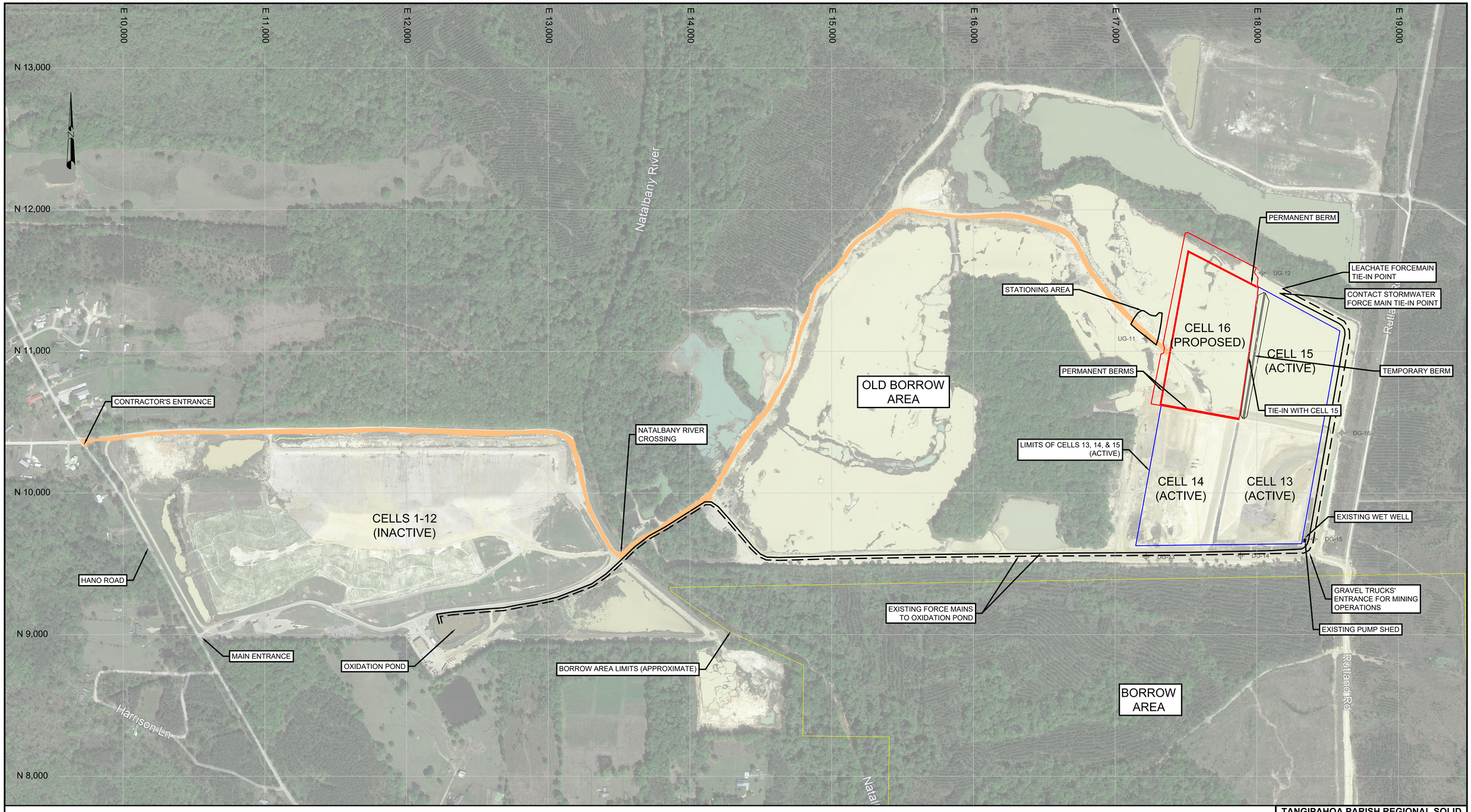
[1] UV Resistance testing not required for geomembrane, which is to be immediately covered.
[2] Field thickness measurements for each panel must be conducted. Use ASTM D 5994 and perform 1 series of measurements among the leading edge of each panel, with individual measurements no greater than 5 feet apart. No single measurement will be less than the required nominal thickness in order for the panel to be acceptable.
[3] Only near spherical agglomerates for 10 views: 9 views in category 1 or 2, and 1 view in category 3.
[4] Break elongation calculated using 2-inch initial gauge length.
[5] Passing criteria for seams are listed in Table CQA-4.

TABLE CQA-4
STRUCTURED LLDPE GEOMEMBRANE COMPONENT OF CLOSURE TURF^{tm} OR EQUIVALENT PASSING CRITERIA

Property	Test Method	Minimum Required Property
Thickness, mils Minimum average Lowest individual reading Lowest individual of 8 of 10 readings	ASTM D 5994	 47.5 42.5 45
Density, g/cc (maximum)	ASTM D 792, Method B	0.939
Drainage Stud Height (min. ave.)	GRI GM12	145
Friction Spike Height (min. ave.)	GRI GM12	175
Tensile Properties[1] Break Strength, lb/in (min. ave.) Break Elongation, % (min. ave.)	ASTM D 6693, Type IV	 105 300
Tear Resistance, lb (min. ave.)	ASTM D 1004	30
Puncture Resistance, lb (min. ave.)	ASTM D 4833	55
Break Resistance Strain, % (min)	ASTM D 5617	30
Carbon Black Content[2], %	ASTM D 1603	2.0 – 3.0
Oxidative Induction Time (OIT) (min. ave.) Standard OIT, minutes	ASTM D 3895	100
Carbon Black Dispersion[3], Category	ASTM D 5596	1 or 2 and 3
Oven Aging at 85ºC Standard OIT – % retained after 90 days or High Pressure OIT – % retained after 90 days	ASTM D 5721 ASTM D 3895 ASTM D 5885	 35 60
Seam Properties Shear Strength, lb/in Peel Strength, lb/in	ASTM D 6392	 100 78 (65,Extrusion Weld)

[1] Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction. Break elongation is calculated using a gauge length of 2.0 inches.
[2] Other methods such as ASTM D 4218 or microwave methods are acceptable if an appropriate correlation can be established.
[3] Only near spherical agglomerates for 10 views: 9 views in Category 1 or 2, and 1 view in Category 3.
[4] The condition of the test should be 20 hr UV cycle at 75ºC followed by 4 hr. condensation at 60ºC.
[5] UV resistance is based on percent retained value regardless of the original HP-OIT value.

Attachment D
Drawings



NOTES:
1. Drawing is only schematic and intends to show the approximate location of Cell 16 in the site. This drawing shall not be used for estimating distances, areas, volumes, or any quantities.
2. The Natalbany River Crossing must be utilized to access the Cell 16 construction area from the access road to the north of Cells 1-12 and the access road to the north of the old Borrow Area.

REFERENCES:
1. Figure 25-32 of Permit Modification No. 4 to Permit P-0127R2, by Fourrier & de Abreu Engineers, LLC dated 02-28-17.
2. Aerial imagery by Google Earth dated March 19, 2019.

0 300
(feet)
SCALE: 1" = 300'

STATE OF LOUISIANA
RICARDO C. DE ABREU
License No. 31257
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
12-14-2023

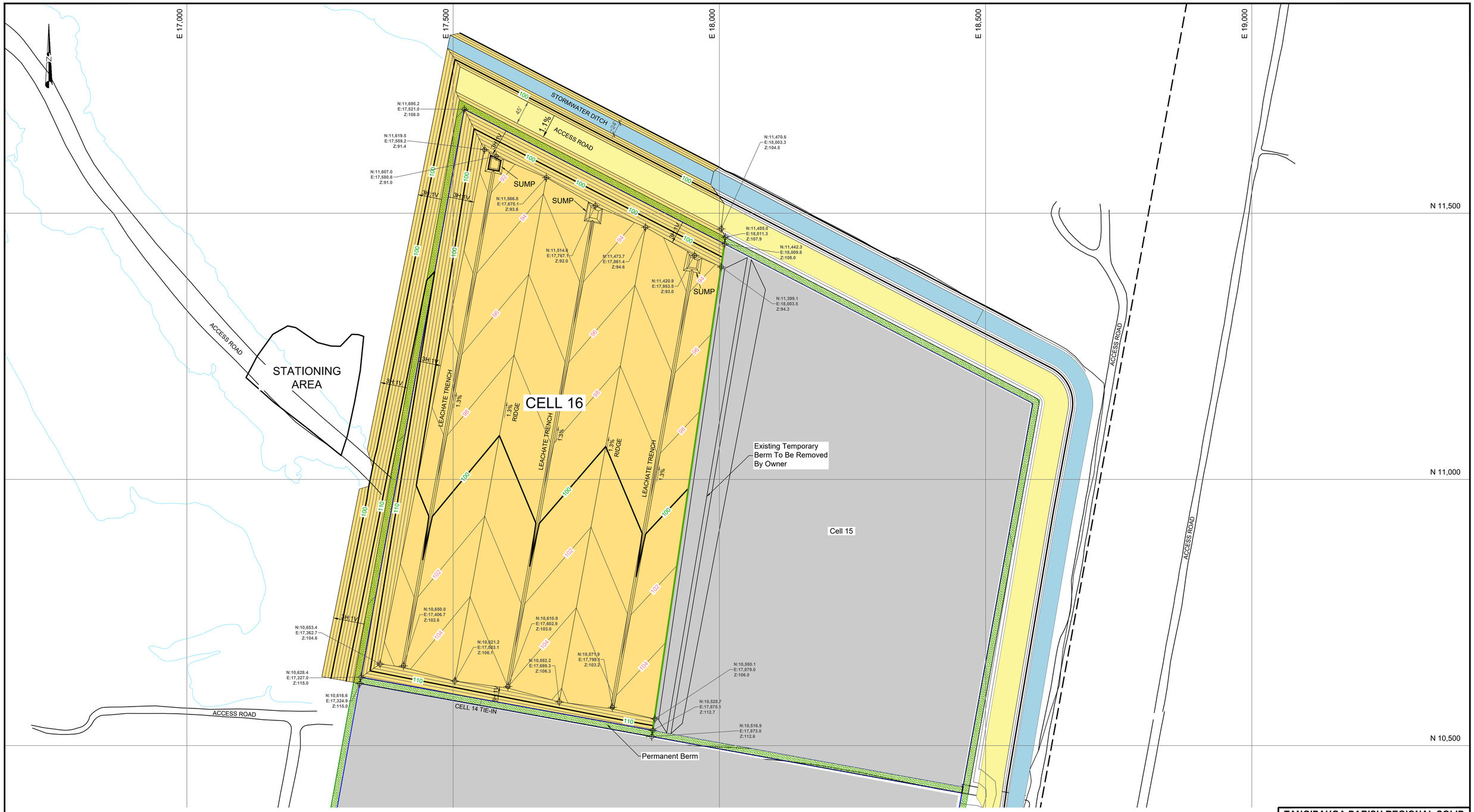
LEGEND
- CELL 16 PROJECT AREA
- LIMITS OF CELLS 13, 14, & 15 (ACTIVE)
- BORROW AREA LIMITS (APPROXIMATE)
- EXISTING CONTACT STORMWATER FORCE MAIN
- EXISTING LEACHATE FORCE MAIN
- GROUNDWATER MONITORING WELL (DO NOT DISTURB)

TANGIPAHOA PARISH REGIONAL SOLID WASTE FACILITY
INDEPENDENCE, LOUISIANA
for
TANGIPAHOA PARISH GOVERNMENT
AMITE, LOUISIANA

Fourrier & de Abreu Engineers, L.L.C.
Environmental and Civil Engineering
10995 COURSEY BLVD
BATON ROUGE, LA 70816
PHONE: 225-677-7950
contact@fdaengineers.com
www.fdaengineers.com

CELL 16 LOCATION

Project Engineer:	Project No.:	Date:	Drawing No.:
R. de Abreu	TAN-068	12/14/2023	1



NOTES:
1. Elevations in ft, NVGD.
2. Coordinates according to facility's coordinate system.

REFERENCE:
1. Figure 25-34 of Permit Modification No. 4 to Permit P-0127R2 by Fourrier & de Abreu Engineers, L.L.C. dated 02-28-2017.

0 80
(feet)
SCALE: 1" = 80'

Legend:
- Subgrade Area To Be Graded (By Owner)
- Cell 13-15 Active Landfill Area
- Water Line
- Property Line

STATE OF LOUISIANA
RICARDO C. DE ABREU
License No. 31257
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
12-13-2023

TANGIPAHOA PARISH REGIONAL SOLID WASTE FACILITY
INDEPENDENCE, LOUISIANA
for
TANGIPAHOA PARISH GOVERNMENT
AMITE, LOUISIANA

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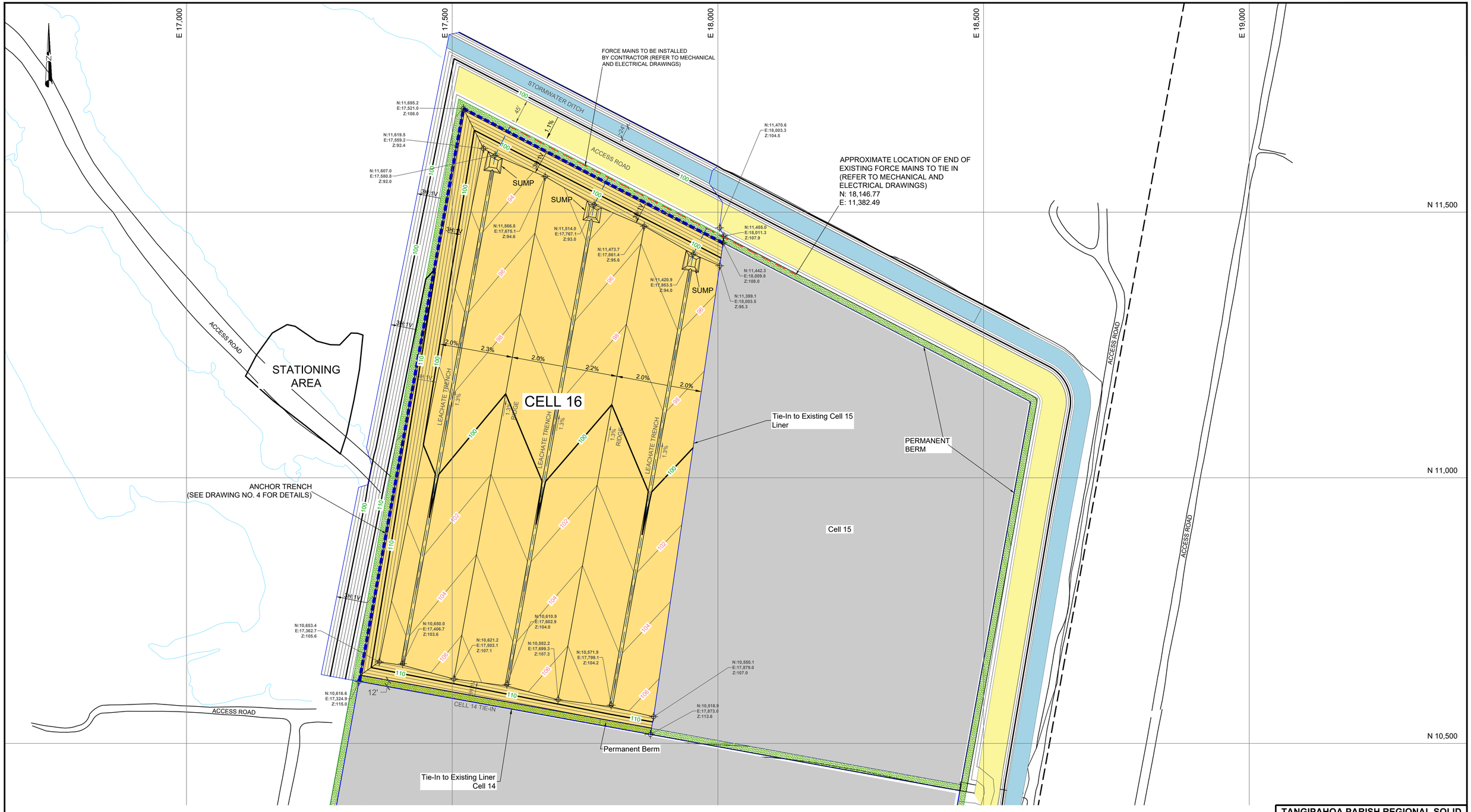
CELL 16
FINAL SUBGRADE CONFIGURATION

Project Engineer:	Project No.:	Date:	Drawing No.:
R. de Abreu	TAN-068	12/13/2023	2

Fig 2 Cell 16 - Subgrade.dwg 12/28/2023 4:24 PM



NOTES:
1. Elevations in ft, NVGD.
2. Coordinates according to facility's coordinate system.
3. All anchor trenches will be excavated and backfilled by owner. Please refer to details on Drawing No. 4.
4. Please refer to drawing No. 4 for Sump Details.

REFERENCE:
1. Figure 25-34 of Permit Modification No. 4 to Permit P-0127R2 by Fourrier & de Abreu Engineers, L.L.C. dated 02-28-2017.

0 80
(feet)
SCALE: 1" = 80'

STATE OF LOUISIANA
RICARDO C. DE ABREU
License No. 31257
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
12-13-2023

Legend:
- Compacted Clay Liner Area (By Owner)
- Cell 13-15 Active Landfill Area
- Water Line
- Property Line
- Leachate Collection Line

TANGIPAHOA PARISH REGIONAL SOLID WASTE FACILITY
INDEPENDENCE, LOUISIANA
for
TANGIPAHOA PARISH GOVERNMENT
AMITE, LOUISIANA

Fourrier & de Abreu Engineers, L.L.C.
Environmental and Civil Engineering
10995 COURSEY BLVD
BATON ROUGE, LA 70816
PHONE: 225-677-7950
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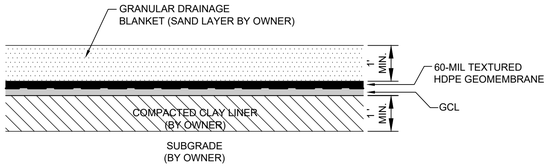
CELL 16
TOP OF LINER CONFIGURATION

Project Engineer:	Project No.:	Date:	Drawing No.:
R. de Abreu	TAN-068	12/13/2023	3

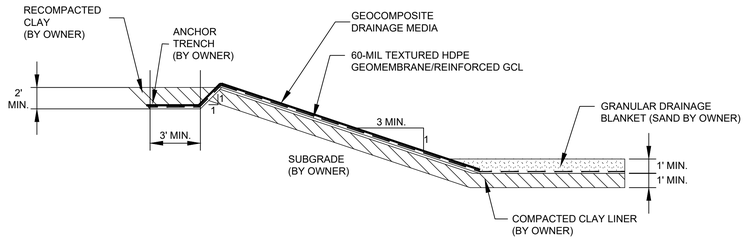
Fig 3 Cell 16 - Clay Liner.dwg 12/28/2023 4:25 PM



LINER/LEACHATE COLLECTION SYSTEM DETAIL - CELL FLOOR

1

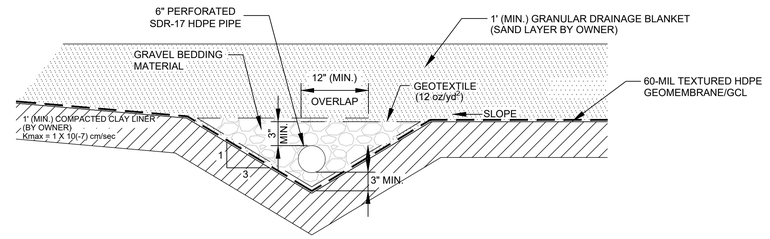
NOT TO SCALE



LINER/LEACHATE COLLECTION SYSTEM DETAIL - NORTH AND WEST SLOPES

2

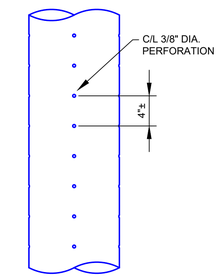
NOT TO SCALE

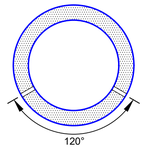


LEACHATE COLLECTION TRENCH

3

NOT TO SCALE

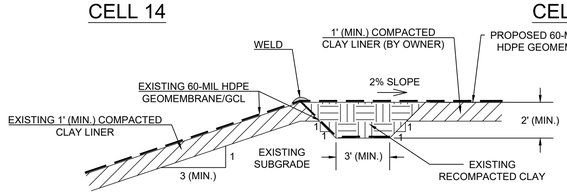




LEACHATE COLLECTION AND HEADER PIPES

4

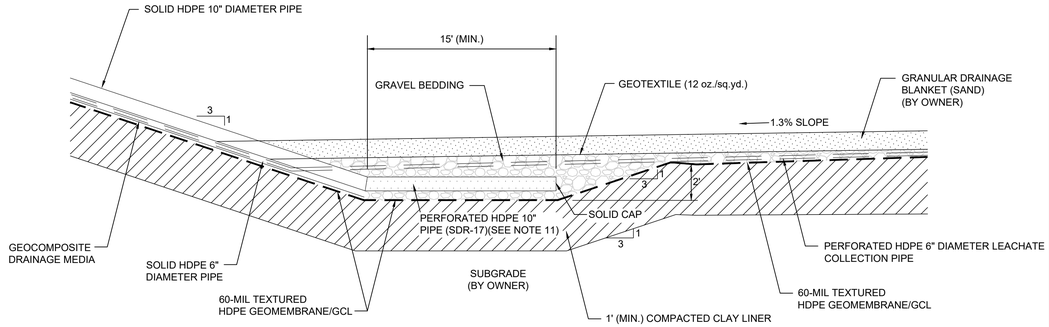
NOT TO SCALE



TIE-IN AREA DETAIL (PERMANENT BERM) - SOUTH SLOPE (CELLS 14/16)

5

NOT TO SCALE



SUMP DETAIL

6

NOT TO SCALE

NOTES:

1. One-foot granular drainage blanket (sand) shall have minimum hydraulic conductivity equal to 1 x 10(-2) cm/sec. The granular drainage blanket will be installed by the Owner.

2. Leachate collection pipes at the bottom of the cell shall be 6" diameter, perforated, SDR-17 HDPE pipe. Pipes shall be perforated generally as shown in Detail 4.

3. GCL may be used as a single component or bonded to the HDPE geomembrane.

4. The GCL and the HDPE geomembrane shall be installed down the slope, in the direction of flow, not across the slope. The GCL shall have a minimum overlap of 12 inches (or 18 inches if GCL moisture content is greater than typical as required in the specifications). Twenty-four-inch overlap shall be used for tie-ins overlaps and ends. Welding is required for HDPE geomembrane panels. Welding of geomembrane is required even if the HDPE geomembrane is factory-bonded to the GCL.

5. GCL shall have a minimum 0.75 lbs. of bentonite per square foot.

6. If the HDPE geomembrane/GCL components used on the North, South, and West slopes are not factory-bonded, then reinforced GCL shall be utilized on those locations.

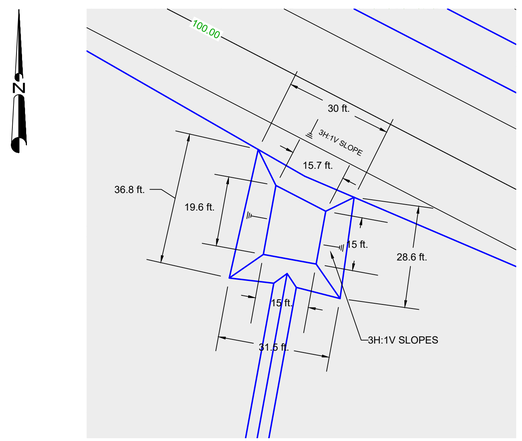
7. Completed geotextile shall be tied with a plastic band prior to final placement.

8. Minimum anchorage for geosynthetics is two feet, except if shown otherwise in the drawings.

9. Geocomposite drainage media is comprised of a geonet sandwiched between geofabrics (non-woven). Geocomposite drainage media shall have a minimum transmissivity of 1.0 x 10(-4) m^2/sec at i = 1.0, 5000 psf.

10. Anchor trenches will be excavated and backfilled by Owner.

11. Perforations for HDPE 10-inch diameter pipes at the sumps shall be 3/8" in diameter arranged in 3 rows spaced 6 inches apart and staggered 3 inches from perforations in adjacent rows. Perforated 10-inch pipe shall be wrapped in geotextile (8 oz./sq. yd.). Minimum of 3 inches of gravel shall be placed under the pipe.



TYPICAL PLAN VIEW FOR SUMPS

0 20
(feet)
SCALE: 1" = 20'

STATE OF LOUISIANA
RICARDO C. DE ABREU
License No. 31257
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
12-13-2023

TANGIPAHOA PARISH REGIONAL SOLID WASTE FACILITY
INDEPENDENCE, LOUISIANA
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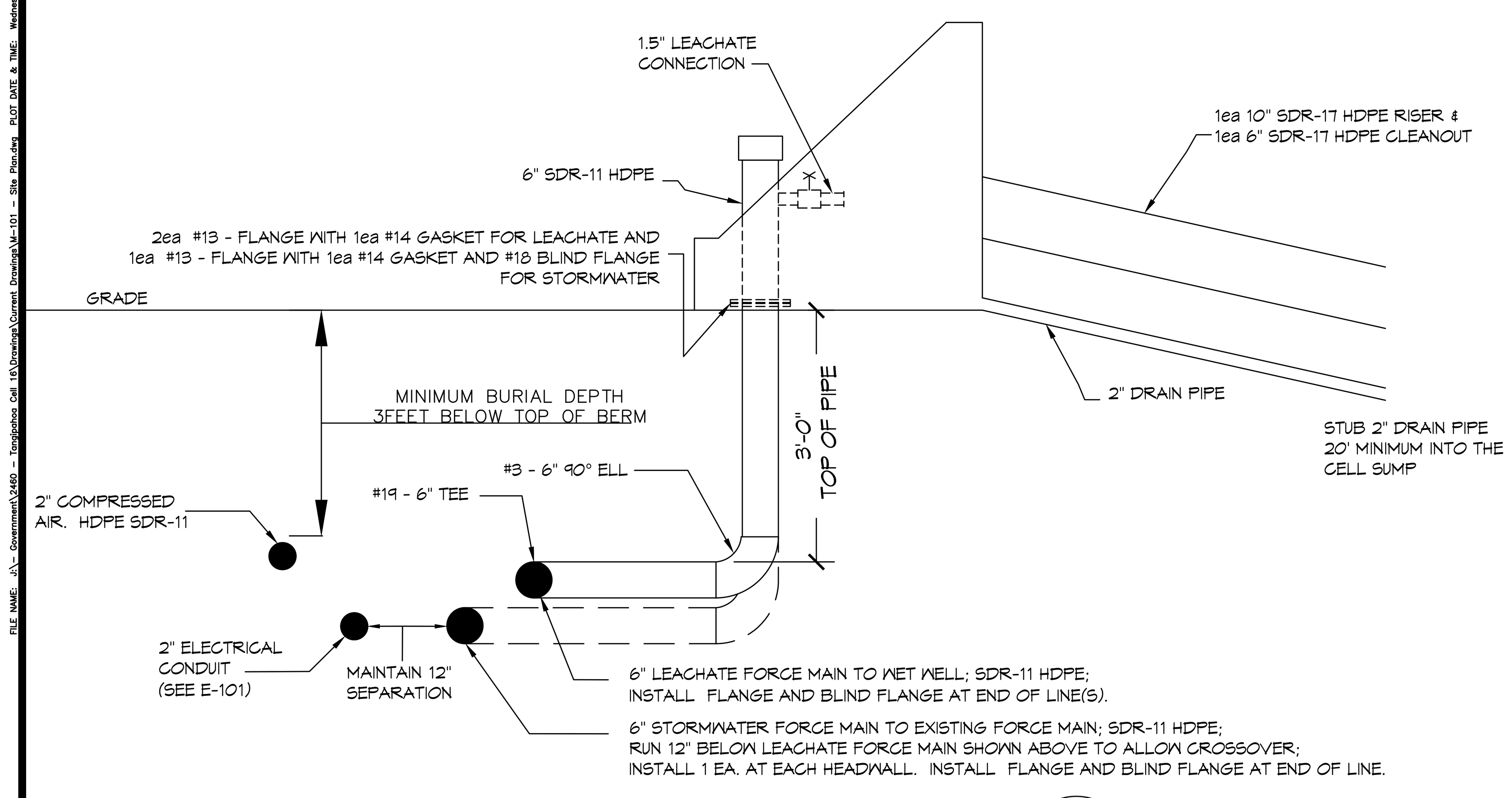
CELL 16
GENERAL DETAILS

Project Engineer:	Project No.:	Date:	Drawing No.:
R. de Abreu	TAN-068	12/13/2023	4



TYPICAL CELL HEADWALL 2 M101 M101
N.T.S.

GENERAL NOTES:

1. PROVIDE ALL LABOR, MATERIAL AND EQUIPMENT FOR A COMPLETE OPERATING SYSTEM. THE SYSTEM SHALL INCLUDE PIPING, VALVES, FITTINGS, AND SUPPORTS WITHOUT ANY RESTRICTIONS TO VOLUME. CONTRACTOR TO CONSTRUCT NEW RISERS WITH CONNECTORS FOR RAIN WATER PUMPS AT EACH HEADWALL.

2. CONTRACTOR SHALL PROVIDE LISTED EQUIPMENT FROM MANUFACTURE LISTED OR EQUAL.

3. ALL WORK AND MATERIAL SHALL CONFORM STRICTLY TO THE LATEST LOCAL, CITY, PARISH, STATE, DEQ AND NATIONAL GOVERNING CODES.

4. CONTRACTOR INSTALLING HDPE PIPE SHALL BE CERTIFIED BY THE MANUFACTURER TO INSTALL HDPE PIPING.

5. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING UTILITY LOCATIONS, ELEVATIONS AND SIZES PRIOR TO COMMENCING ANY WORK. CONTRACTOR SHALL PAY NECESSARY FEES FOR PERMITTING.

6. CONTRACTOR IS RESPONSIBLE TO VERIFY THE EXISTING INVERTS AND SET NEW INVERTS OF FORCE MAIN AND LEACHATE RISER PIPES.

7. FITTINGS SHALL BE MANUFACTURED FROM A HDPE, SDR-11 (HIGH DENSITY POLYETHYLENE) COMPOUND PER ANSI B-16.40, ASTM D2513 DOT PART 192 AND MANUFACTURED IN ACCORDANCE WITH ISO 9002. ALL FITTINGS SHALL BE PRODUCED TO SCHEDULE 80 DIMENSIONS. PRODUCTS SHALL BE PRESSURE RATED FOR A MINIMUM OF 160 PSI USING QUALITY ASSURANCE TEST REQUIREMENTS OF THESE STANDARDS WITH REGARD TO DIMENSIONS, WORKMANSHIP, BURST PRESSURE, FLATTENING RESISTANCE AND END PRODUCT QUALITY. ALL VALVE DIAPHRAGMS AND SEATS SHALL BE PTFE; VALVE O-RINGS SHALL BE EPDM OR VITON® AS APPLICABLE. ALL VALVE UNION NUTS SHALL HAVE BUTTRESS STYLE THREADS. ALL VALVE COMPONENTS SHALL BE REPLACEABLE. ALL SYSTEM COMPONENTS SHALL BE MANUFACTURED BY AN ISO CERTIFIED MANUFACTURER.

8. HDPE SDR 17 PIPE MATERIAL USED FOR THE MANUFACTURING OF POLYETHYLENE PIPE SHALL BE PE 3408 HIGH DENSITY POLYETHYLENE (HDPE), MEETING THE ASTM D3350 CELL CLASSIFICATION 345464C. POLYETHYLENE PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH AWWA C906, CONSISTENTLY MEETING AND/OR EXCEEDING THE QUALITY ASSURANCE TEST REQUIREMENTS OF THIS STANDARD WITH REGARD TO PRESSURE RATING, MATERIAL, WORKMANSHIP, BURST PRESSURE, FLATTENING, IMPACT RESISTANCE, AND EXTRUSION QUALITY. PRESSURE RATINGS FOR SDR-17 PIPE SHALL BE A MINIMUM OF 100 PSI (PE3408) OR 125 PSI (PE4710) FOR PIPE SIZES 4" TO 14", IPS (IRON PIPE SIZE). THE PIPE SHALL BE MANUFACTURED IN THE USA, USING DOMESTIC MATERIALS, BY A CERTIFIED HDPE MANUFACTURER. ALL PIPES SHALL BE STORED INDOORS AFTER PRODUCTION AT THE MANUFACTURING SITE UNTIL SHIPPED FROM FACTORY.

9. BUTT FUSION SHALL BE USED TO JOIN INDIVIDUAL LENGTHS OF PIPE IN THE FOLLOWING SEQUENCE.
   A. SECURE COMPONENTS TO BE JOINED WITH CLAMPING DEVICE(S).
   B. FACE PIPE ENDS TO MEET MANUFACTURERS SPECIFICATIONS, USING A ROTATING PLANNER BLOCK.
   C. PROPERLY ALIGN PIPE.
   D. HEAT ENDS OF PIPE TO MANUFACTURER'S RECOMMENDATION AND BRING TOGETHER AT RECOMMENDED FORCE USING A HYDRAULIC MACHINE THAT WILL APPLY MANUFACTURER'S SPECIFIED FORCE, FOR THE PIPE SIZE.
   E. HOLD PRESSURE ON PIPE JOINT FOR TIME SUFFICIENT TO DEVELOP THE REQUIRED STRENGTH, AS RECOMMENDED BY THE MANUFACTURER.
   F. REMOVE THE INTERIOR BEAD, USING MANUFACTURER'S RECOMMENDED EQUIPMENT.
   G. ALL JOINTS SHALL BE INSTALLED SUCH THAT THE CONNECTION OF PIPE SECTION SHALL BE WATERTIGHT AND FORM A CONTINUOUS LINE FREE FROM IRREGULARITIES IN THE FLOW LINE.

10. TRENCH WIDTH SHALL BE IN ACCORDANCE WITH ASTM D2321 AND SHALL BE SUFFICIENT TO ENSURE WORKING ROOM TO PROPERLY AND SAFELY PLACE AND COMPACT HAUNCHING AND OTHER BACKFILL MATERIALS. TRENCH WIDTH SHALL INCLUDE SUFFICIENT AREA FOR HDPE FORCE MAIN AND ELECTRICAL CONDUITS WITH A MINIMUM SEPARATION OF 12". MINIMUM BACKFILL DEPTH SHALL NOT BE LESS THAN 36" WHERE VEHICULAR TRAFFIC CAN BE PRESENT AND 24" WHERE WASHOUT OCCURS.

11. TEST ALL PIPING AT REQUIRED PRESSURE.

12. THE DRAWINGS INDICATE SIZE AND GENERAL LOCATION OF WORK. SCALE DIMENSIONS SHALL NOT BE USED. THE EXACT LOCATION AND LOCATION OF ALL RISERS SHALL BE DETERMINED BY ACTUAL CONDITIONS IN THE FIELD.

13. ALL FORCE MAINS AND PIPING NOT SHOWN FOR CLARITY, ALL LOCATIONS FIELD VERIFIED.

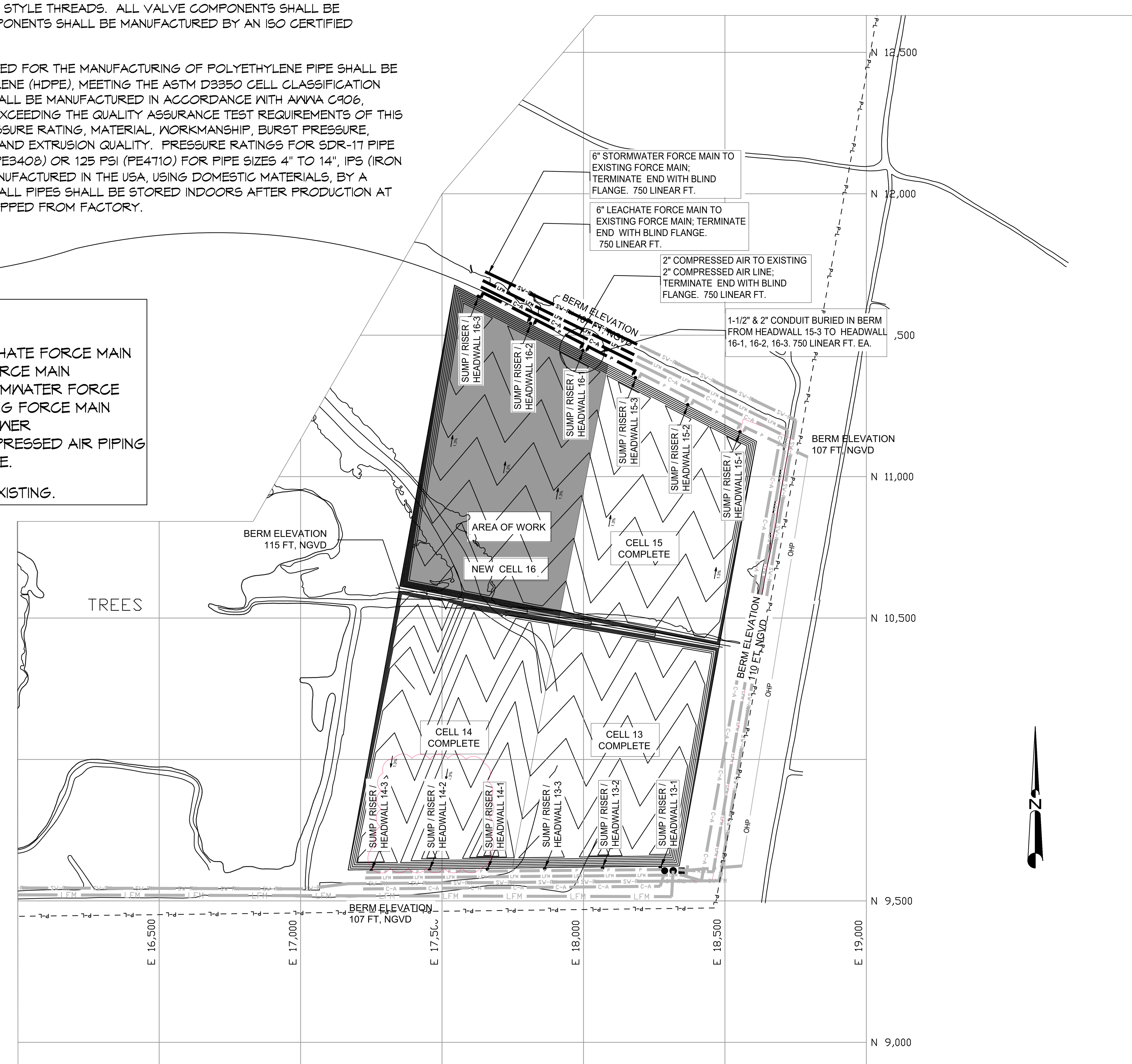
GENERAL CONSTRUCTION NOTES

1. ALL MATERIALS AND WORK, INCIDENTAL TO THE CONSTRUCTION OF THIS PROJECT, SHALL CONFORM TO ALL GOVERNING CODES, AND REGULATIONS OF AGENCIES IN AUTHORITY.
2. CONTRACTOR SHALL PROVIDE ALL PUBLIC PROTECTIONS NECESSARY AS REQUIRED BY LAW.
3. THE DRAWINGS, SPECIFICATIONS AND ANY SUBSEQUENTLY ISSUED ADDENDA, AMENDMENTS OR SUCH CHANGE ORDERS APPROVED BY THE OWNER AND THE CONTRACTOR ARE PART OF THESE CONTRACT DOCUMENTS.
4. CONTRACTOR SHALL WARRANT ALL WORK FOR ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION UNLESS SPECIFICALLY DIRECTED IN OTHER DRAWINGS, SPECIFICATIONS OR SUBSEQUENTLY ISSUED ADDENDA OR AMENDMENTS.
5. **DO NOT SCALE DRAWINGS.** CONSULT WITH THE ENGINEER REGARDING ANY ITEMS IN THE CONTRACT DOCUMENTS THAT REQUIRE CLARIFICATION.
6. TRASH SHALL BE REMOVED FROM THE SITE NOT LESS THAN TWICE MONTHLY.
7. THE GENERAL CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO COMMENCING WORK AND REPORT ANY AND ALL DISCREPANCIES TO THE ARCHITECT.
8. CONTRACTOR VEHICLES AND EQUIPMENT NECESSARY FOR CONSTRUCTION MAY BE PARKED ON THE SITE. OTHER VEHICLES PARKED ON THE SITE REQUIRE THE OWNER'S PERMISSION.
9. NAMING A CERTAIN BRAND, MAKE OR MANUFACTURER IS TO DESIGNATE THE GENERAL STYLE, TYPE, CHARACTER AND QUALITY STANDARD OF THE PRODUCT DESIRED. SUBSTITUTION REQUESTS MUST BE SUBMITTED PRIOR TO BIDDING.
10. ALL MATERIALS/EQUIPMENT SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. WORK NOT CONSISTENT WITH MANUFACTURER'S RECOMMENDATIONS WILL BE REJECTED BY OWNER/ARCHITECT.

LEGEND

—LFM—	6" SDR-11 LEACHATE FORCE MAIN TO EXISTING FORCE MAIN
—SV-FM—	6" SDR-11 STORMWATER FORCE MAIN TO EXISTING FORCE MAIN
—P—	ELECTRICAL POWER
—C-A—	2" SDR-11 COMPRESSED AIR PIPING TO EXISTING LINE.

NOTE: LIGHT COLOR LINES ARE EXISTING.



SITE PLAN 1 M101 M101

NOTE: NAMING A CERTAIN BRAND, MAKE OR MANUFACTURER IS TO DESIGNATE THE GENERAL STYLE, TYPE, CHARACTER AND QUALITY STANDARD OF THE PRODUCT DESIRED. SUBSTITUTION REQUESTS MUST BE SUBMITTED PRIOR TO BIDDING.

DAMMON ENGINEERING, INC.
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info@dammonengineering.com
PH: 985.649.5832

#	DESCRIPTION	DATE
REVISIONS		

STATE OF LOUISIANA — BRIAN A. MISTICH — License No. 30187 — PROFESSIONAL ENGINEER — 1/3/2024

TANGIPAHOA CELL 16 LEACHATE & STORMWATER FORCEMAIN AND SUPPORTING EQUIPMENT

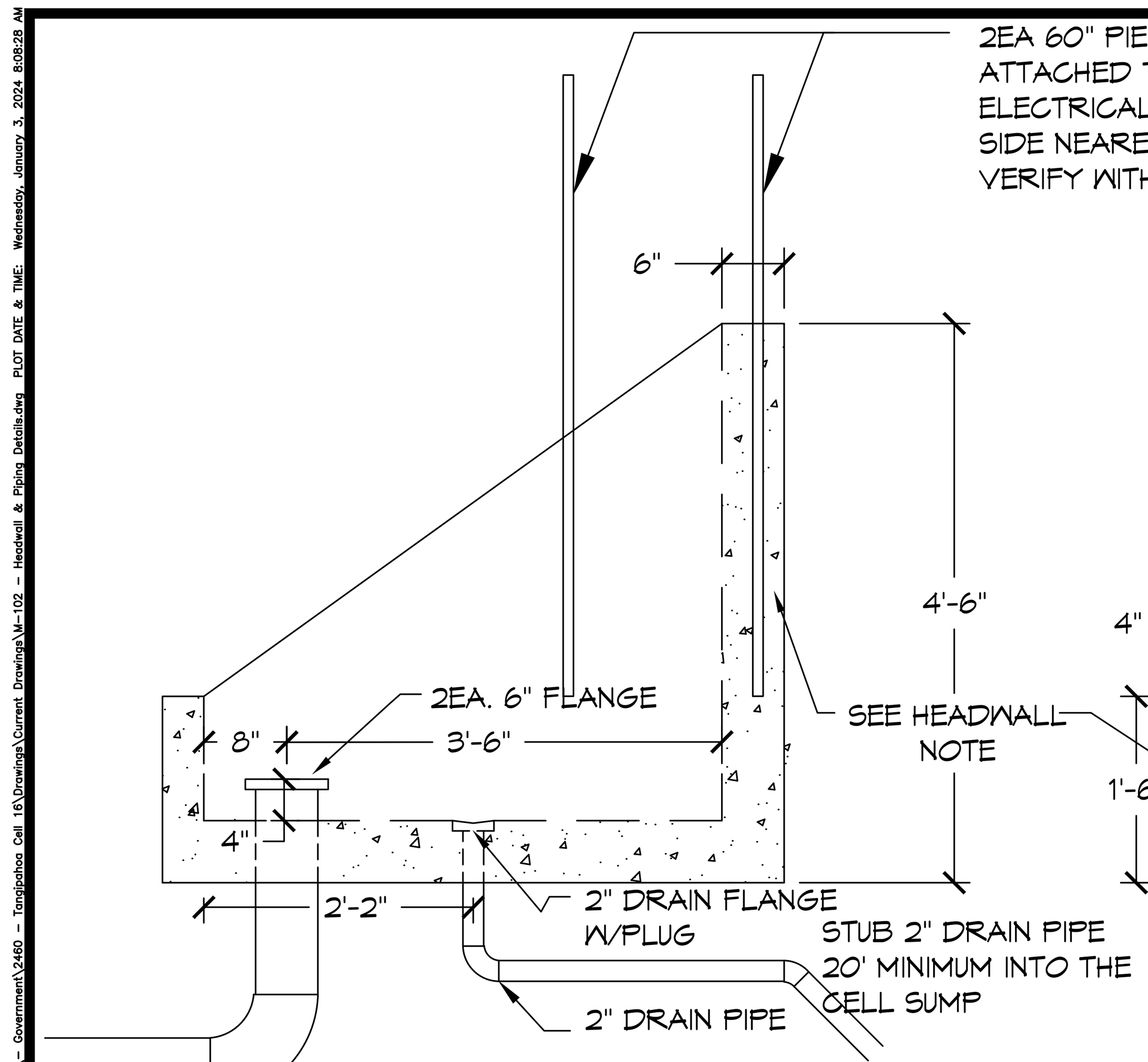
TANGIPAHOA REGIONAL SOLID WASTE FACILITY
57510 HANO ROAD
INDEPENDENCE, LOUISIANA

JOB No:	2460	DATE:	9/30/2022
DRAWN BY:	KJK/JTL	CHECKED BY:	KJK

SHEET TITLE:
PARTIAL SITE PLAN

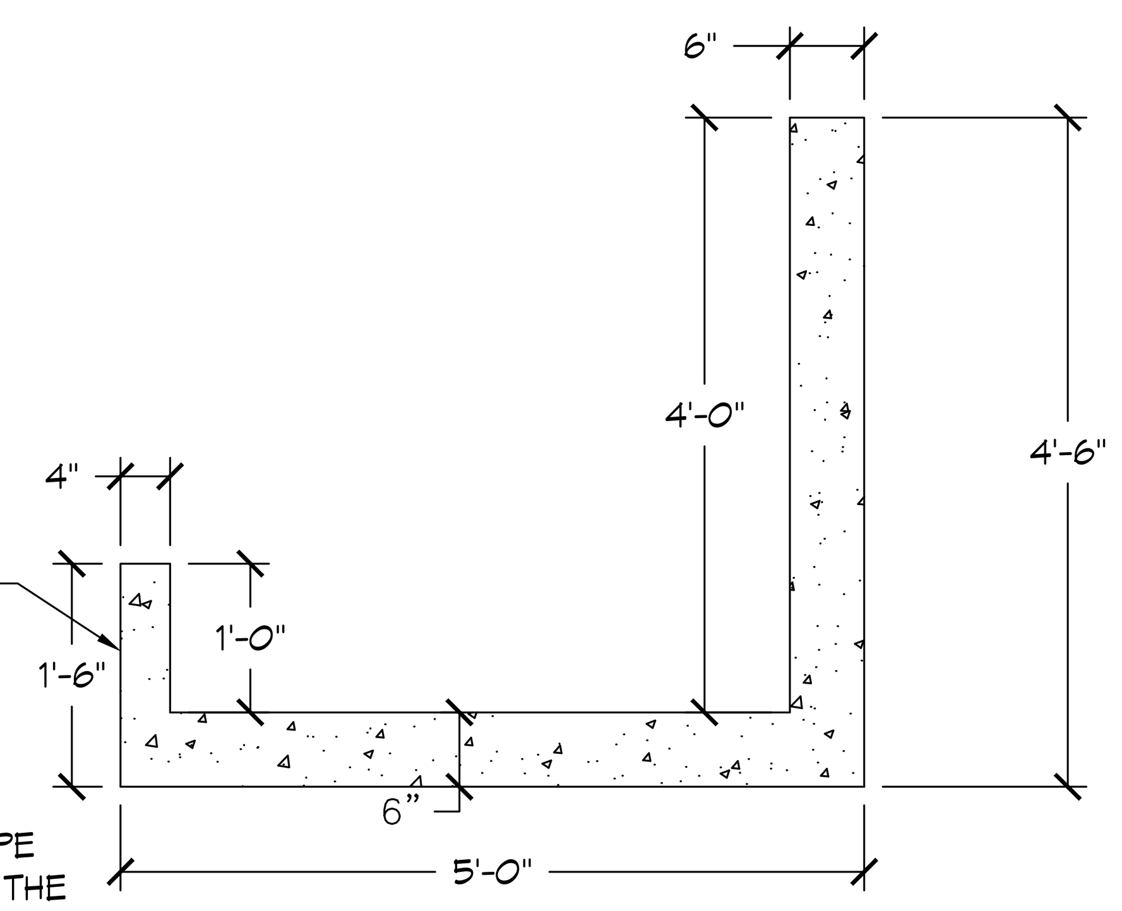
DRAWING NUMBER:
M101

SHEET No: 1 of 4



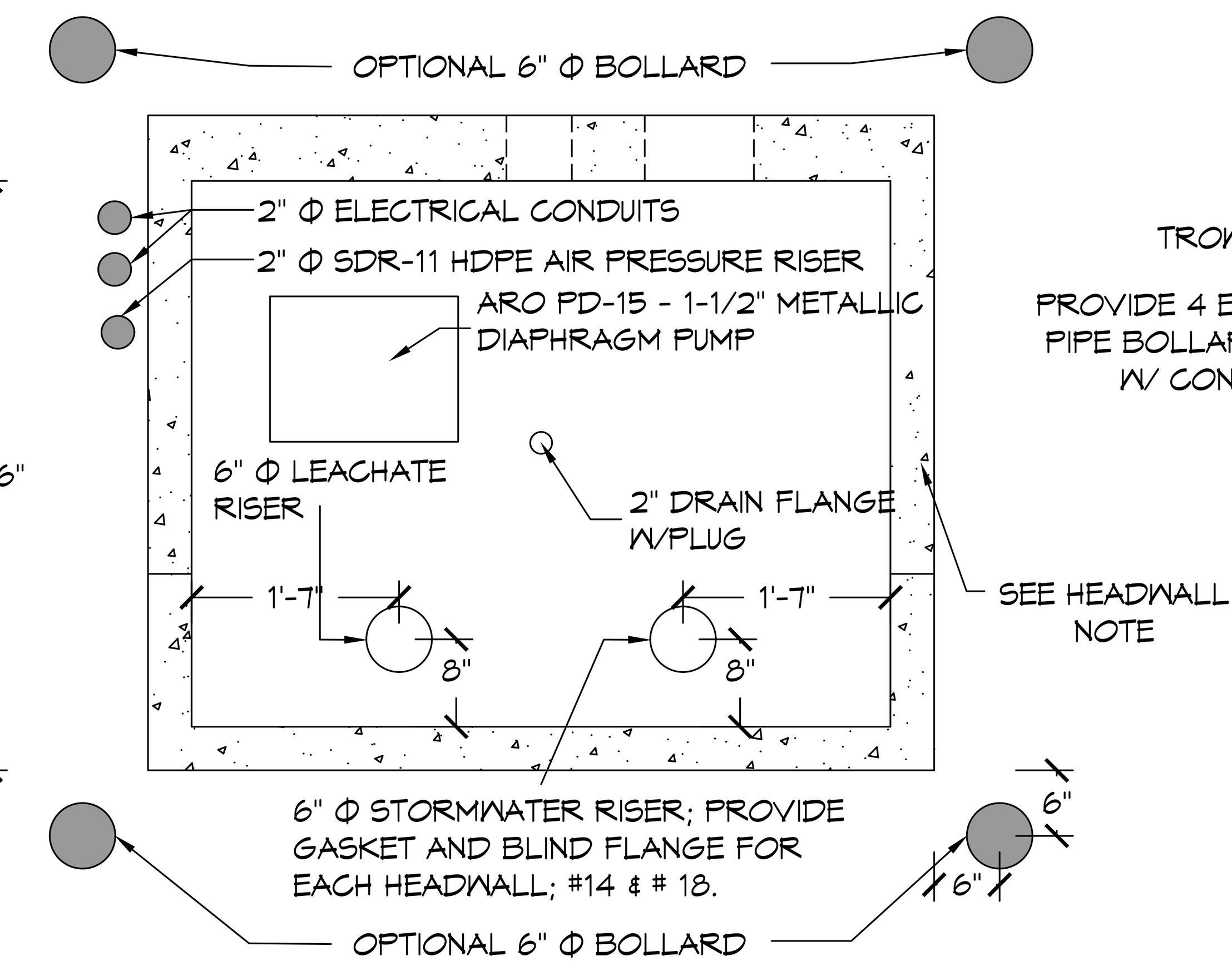
CROSS-SECTION HEADWALL (4E, M102 | M102)

N.T.S.



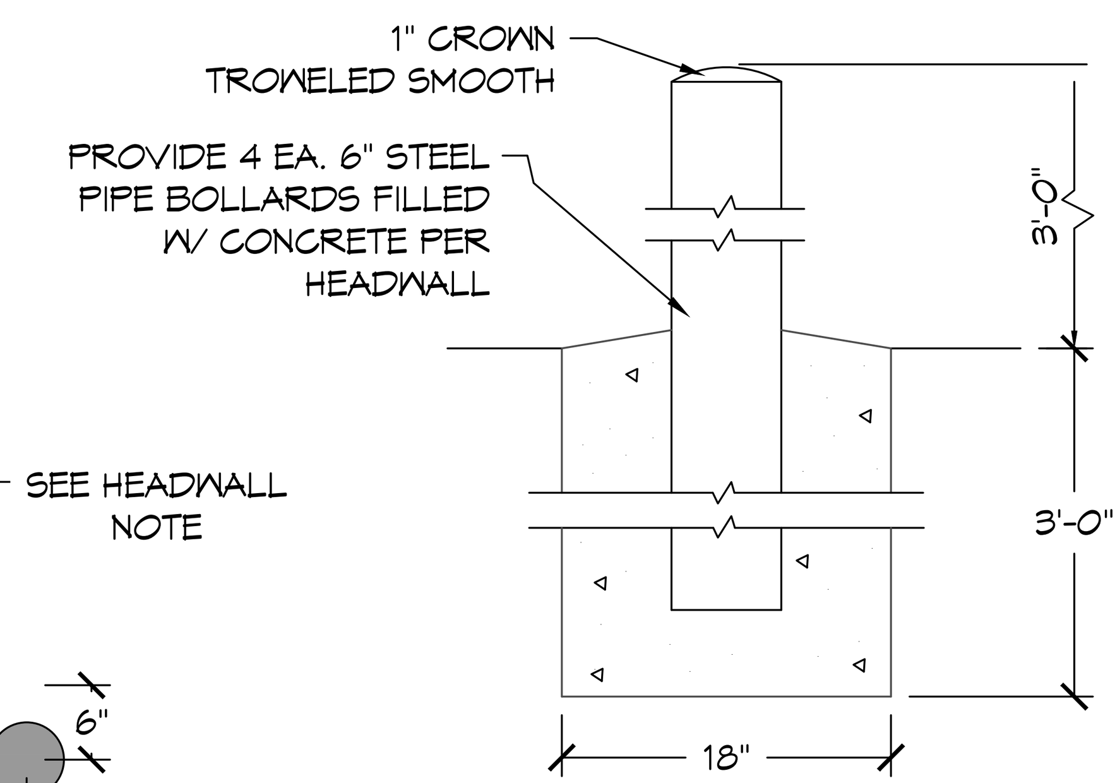
CROSS-SECTION HEADWALL (4D, M102 | M102)

N.T.S.



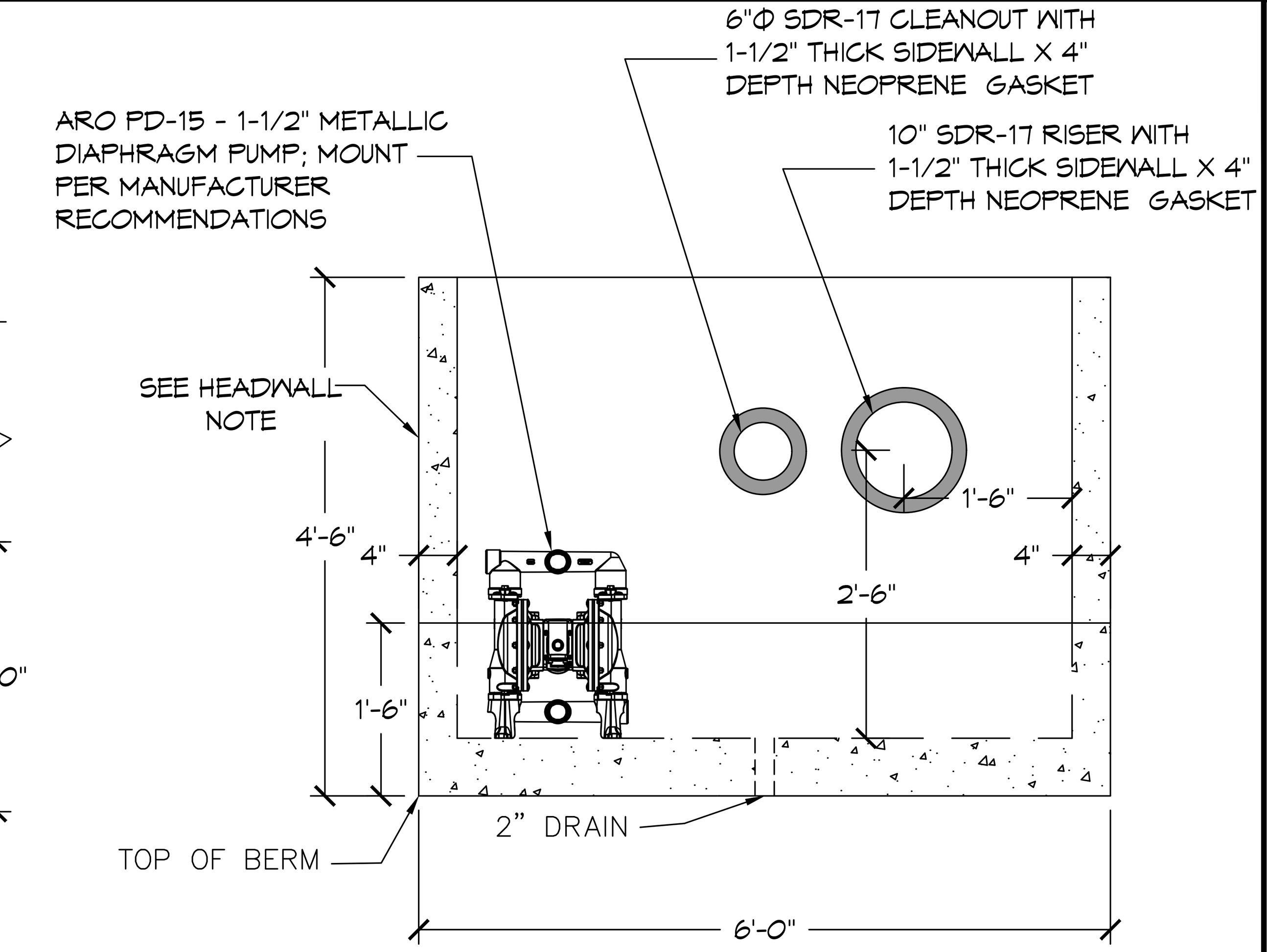
HEADWALL PLAN VIEW (4C, M102 | M102)

N.T.S.



PIPE BOLLARD DETAIL (4B, M102 | M102)

N.T.S. OPTIONAL



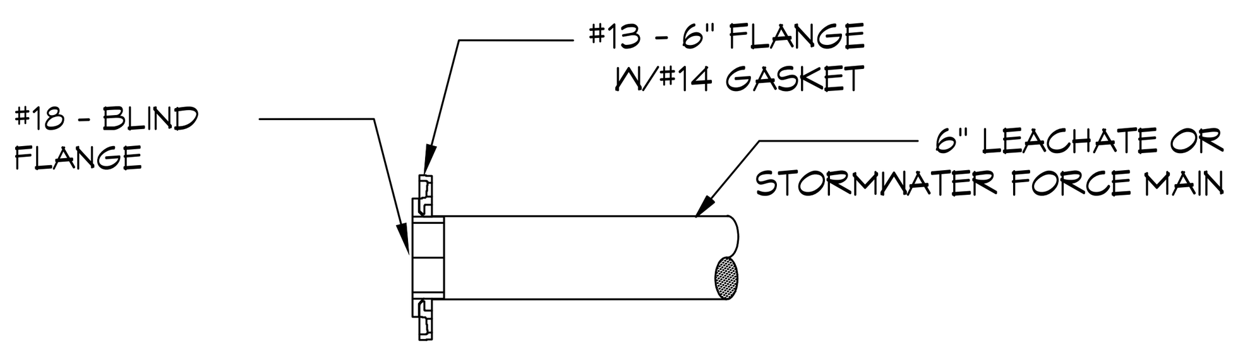
HEADWALL FRONT ELEVATION (4A, M102 | M102)

N.T.S.

HEADWALL NOTE: CONTRACTOR SHALL USE 4,000 psi CONCRETE, #5 BARS CONTINUOUS 12" O.C., ALL EDGES SHALL HAVE A CHAMFERED EDGES. HEADWALLS SHALL BE CAST IN PLACE ONLY.

HEADWALL DETAILS (4, M102 | M102)

N.T.S.



6" HDPE LEACHATE & STORMWATER (3, M102 | M102)

N.T.S.

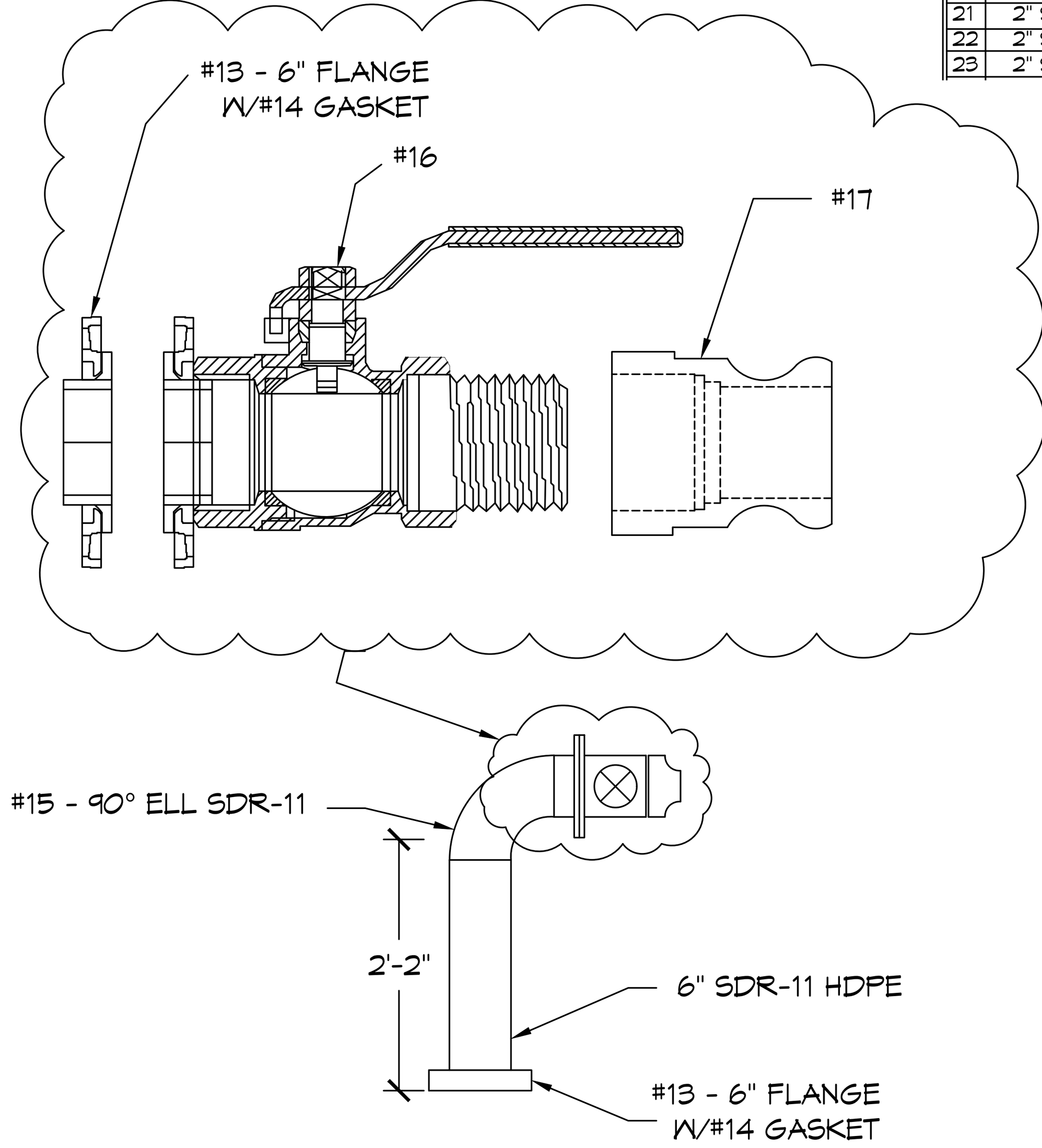
MATERIAL LIST

#	ITEM
1	1.5" SUMP STRAINER, 50 GPM; PART # CASS - 50 - 1-1/2 - NIPPLE - 100
2	1.5" SCH 80 PVC FEMALE ADAPTER NPT x SOCKET
3	1.5" SCH 80 PVC PIPE
4	1.5" PVC ZOELLER UNICHECK VALVE; PART # 30-0041 CLEAR BODY
5	1.5" FLEXIBLE SUCTION TUBING, 90 psi; STAINLESS STEEL NPTF (F) BOTH ENDS
6	1.5" POLYCAM TRANSITION HDPE TO STAINLESS STEEL
7	1.5" FLEXIBLE TUBING, 150 psi; STAINLESS STEEL CAMLOCK DISCONNECT (FEMALE) x NPTF (F)
8	1.5" STAINLESS CAMLOCK DISCONNECT (MALE) W/FEMALE PIPE THREADS
9	1.5" STAINLESS BALL VALVE W/ MALE PIPE THREADS
10	1.5" STAINLESS COLLAR
11	6" X 1.5" HDPE SADDLE
12	6" SDR-11 CAP
13	6" SDR-11 FLANGE W/CI RING
14	6" POLYETHYLENE GASKET
15	6" SDR-11 90 ° ELL
16	6" STAINLESS BALL OR GATE VALVE WITH FLANGE
17	6" CAMLOCK STANLESS (MALE) W/FEMALE PIPE THREADS
18	6" BLIND FLANGE
19	6" SDR-11 BUTT TEE
20	2" SDR-11 BUTT TEE
21	2" SDR-11 90 ° ELL
22	2" SDR-11 CAP
23	2" SDR-11 FLANGE W/CI RING

MATERIAL LIST

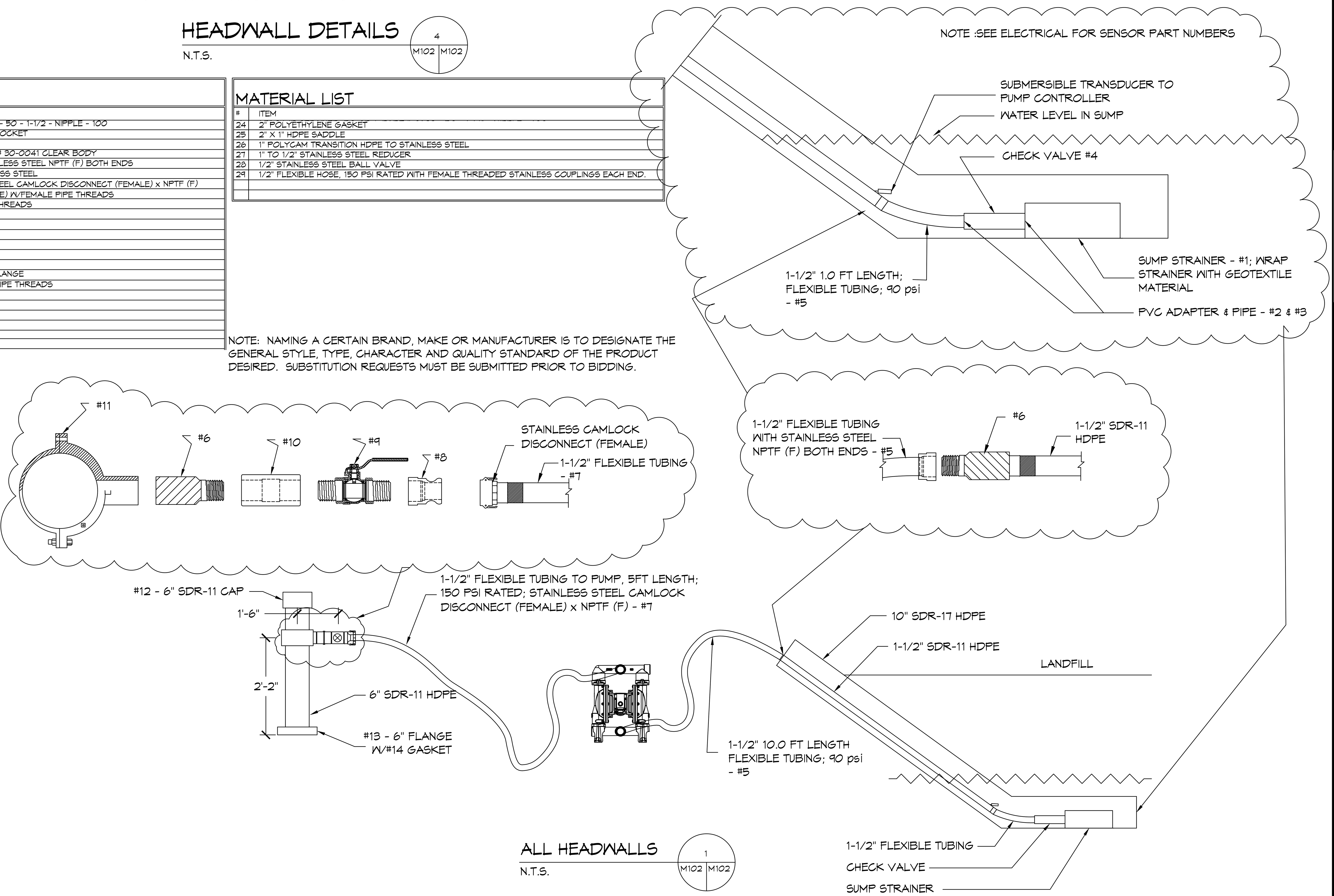
#	ITEM
24	2" POLYETHYLENE GASKET
25	2" X 1" HDPE SADDLE
26	1" POLYCAM TRANSITION HDPE TO STAINLESS STEEL
27	1" TO 1/2" STAINLESS STEEL REDUCER
28	1/2" STAINLESS STEEL BALL VALVE
29	1/2" FLEXIBLE HOSE, 150 PSI RATED WITH FEMALE THREADED STAINLESS COUPLINGS EACH END.

NOTE: NAMING A CERTAIN BRAND, MAKE OR MANUFACTURER IS TO DESIGNATE THE GENERAL STYLE, TYPE, CHARACTER AND QUALITY STANDARD OF THE PRODUCT DESIRED. SUBSTITUTION REQUESTS MUST BE SUBMITTED PRIOR TO BIDDING.



PROVIDE 2EA, CAPABLE OF ATTACHING AT EACH HEADWALL (2, M102 | M102)

N.T.S. STORMWATER FORCE MAIN



ALL HEADWALLS (1, M102 | M102)

N.T.S.

DAMMON ENGINEERING, INC.
LOUISIANA & MISSISSIPPI

Chief Engineer: Brian Mistich, PE
554 Old Spanish Trail
Slidell, LA 70458

www.dammonengineering.com
info@dammonengineering.com
PH: 985.649.5832

#	DESCRIPTION	REVISIONS	DATE

TANGIPAHOA CELL 16 LEACHATE & STORMWATER FORCEMAIN AND SUPPORTING EQUIPMENT

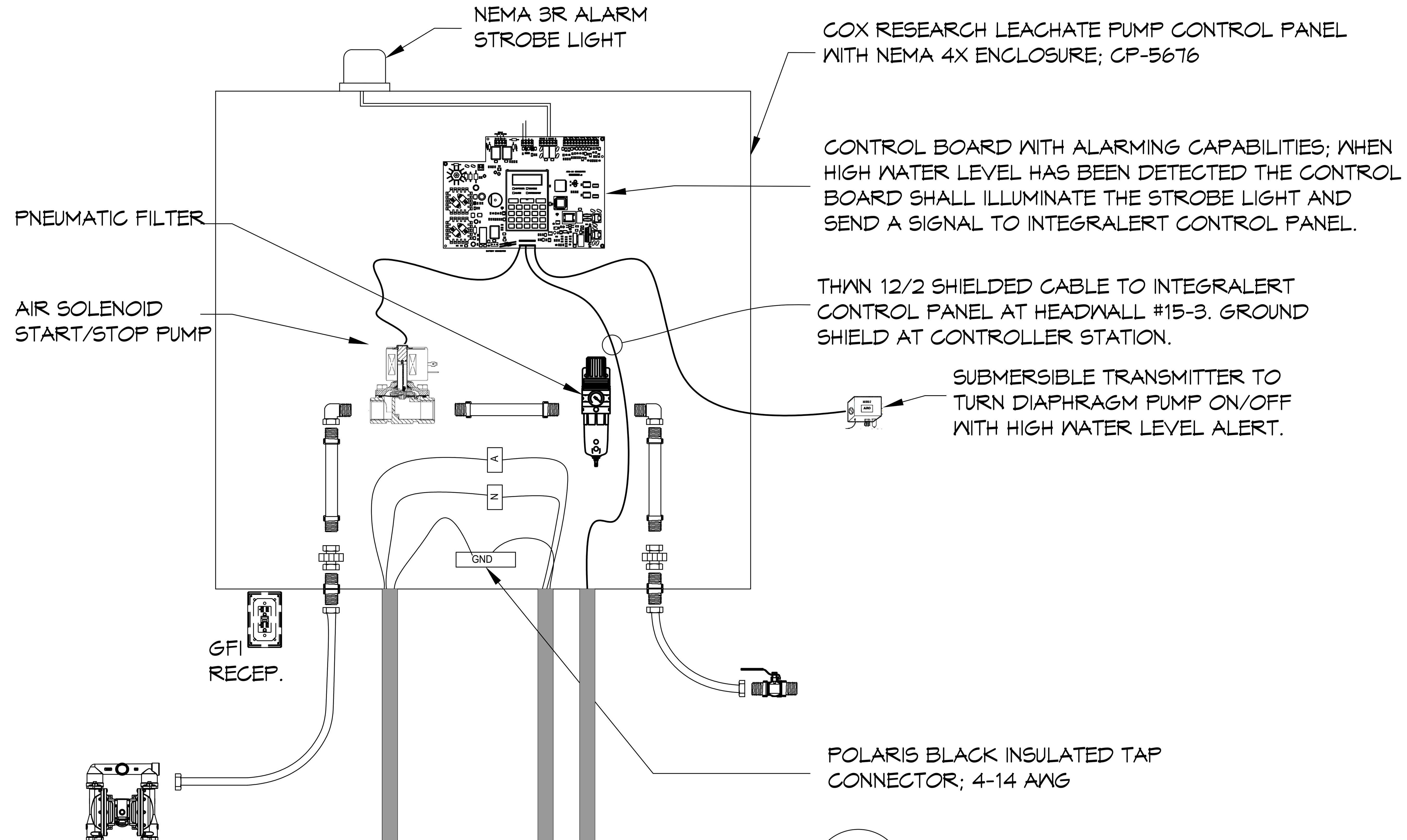
TANGIPAHOA REGIONAL SOLID WASTE FACILITY
57510 HANO ROAD
INDEPENDENCE, LOUISIANA

JOB No: 2460 DATE: 9/20/2022
DRAWN BY: KJK/JTL CHECKED BY: KJK

SHEET TITLE:
HEADWALL & PIPING DETAILS

DRAWING NUMBER:
M102

SHEET No: 2 of 4



PUMP CONTROLLER - ELECTRICAL
N.T.S.
2
M103 | M103

COX RESEARCH & TECHNOLOGY LEACHATE PUMP CONTROL PANEL AND TRANSDUCER EQUIPMENT LIST, MODEL CP-5676	
QUANTITY	ITEM
1	HOFFMAN NEMA 4X ENCLOSURE, PART # CSD24201055
1	COX RESEARCH BACKPLATE/SWING PANEL, PART # CAMO242010CSD
1	SQUARE D CIRCUIT 40 AMP BREAKER, PART # QOU140
1	SQUARE D CIRCUIT 15 AMP BREAKER, PART # QOU115
1	SQUARE D CIRCUIT 10 AMP BREAKER, PART # QOU110
1	HUBBELL GFI RECEPTACLE
1	TPS SURGE SUPPRESSOR, PART # TK-LT120-15A-DIN2
1	PRECISION DIGITAL SETPOINT CONTROLLER, PART # PD6000-6R7
1	MJK SUBMERSIBLE TRANSDUCER, PART # 3400
1	ABB H.O.A. SWITCH, PART # C3SS110B-20
1	ABB BLUE PILOT LIGHT, PART # CL513L
1	CONERY ALARM LIGHT, PART # R40-XLS
1	ASCO AIR SOLENOID VALVE, PART # 8210G002
2	IDEC ELECTROMECHANICAL RELAY, PART # RY4SULCAC120
1	HOFFMAN PAD LOCK HANDLE, PART # GPDLOCKHDL
1	MASTER PNEUMATIC FILTER, PART # CF5AR350
2	1/2" x 1/2" BULKHEAD COPPER ADAPTER
2	1/2" COPPER UNION
2	1/2" x 6" COPPER PIPE
2	1/2" 90° COPPER ELBOW
1	1/2" MALE TO MALE FITTING

DIAPHRAGM PUMP DESIGNED TO OPERATE, 40 GPM, 22scfm @50psi

MECHANICAL EQUIPMENT LIST	
QUANTITY	ITEM
3	1-1/2" METALLIC DIAPHRAGM PUMP, 40 GPM, MANUFACTURE: ARO; MODEL: PD-15A-AAS-CC

MATERIAL LIST	
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1	1.5" SUMP STRAINER, 50 GPM; PART # CASS - 50 - 1-1/2 - NIPPLE - 100
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6	1.5" POLYCAM TRANSITION HDPE TO STAINLESS STEEL
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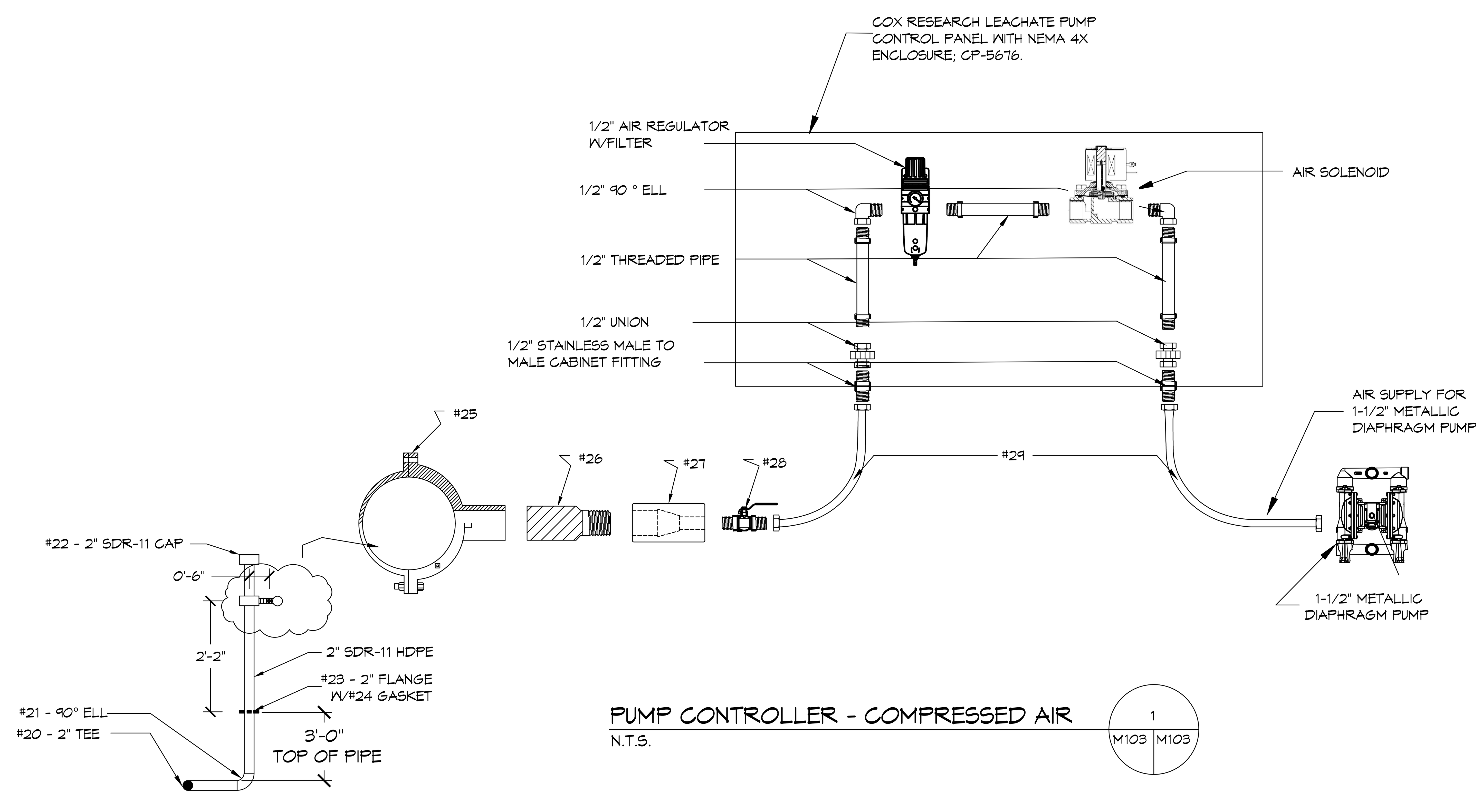
27	1" TO 1/2" STAINLESS STEEL REDUCER
28	1/2" STAINLESS STEEL BALL VALVE
29	1/2" FLEXIBLE HOSE, 150 PSI RATED WITH FEMALE THREADED STAINLESS COUPLINGS EACH END.



PUMP CONTROLLER - COMPRESSED AIR
N.T.S.
1
M103 | M103

NOTE: NAMING A CERTAIN BRAND, MAKE OR MANUFACTURER IS TO DESIGNATE THE GENERAL STYLE, TYPE, CHARACTER AND QUALITY STANDARD OF THE PRODUCT DESIRED. SUBSTITUTION REQUESTS MUST BE SUBMITTED PRIOR TO BIDDING.

DAMMON ENGINEERING, INC.
LOUISIANA & MISSISSIPPI

Chief Engineer: Brian Mistich, PE
554 Old Spanish Trail
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PH: 985.649.5832

#	DESCRIPTION	DATE

STATE OF LOUISIANA
BRIAN A. MISTICH
License No. 30187
PROFESSIONAL ENGINEER
1/3/2024

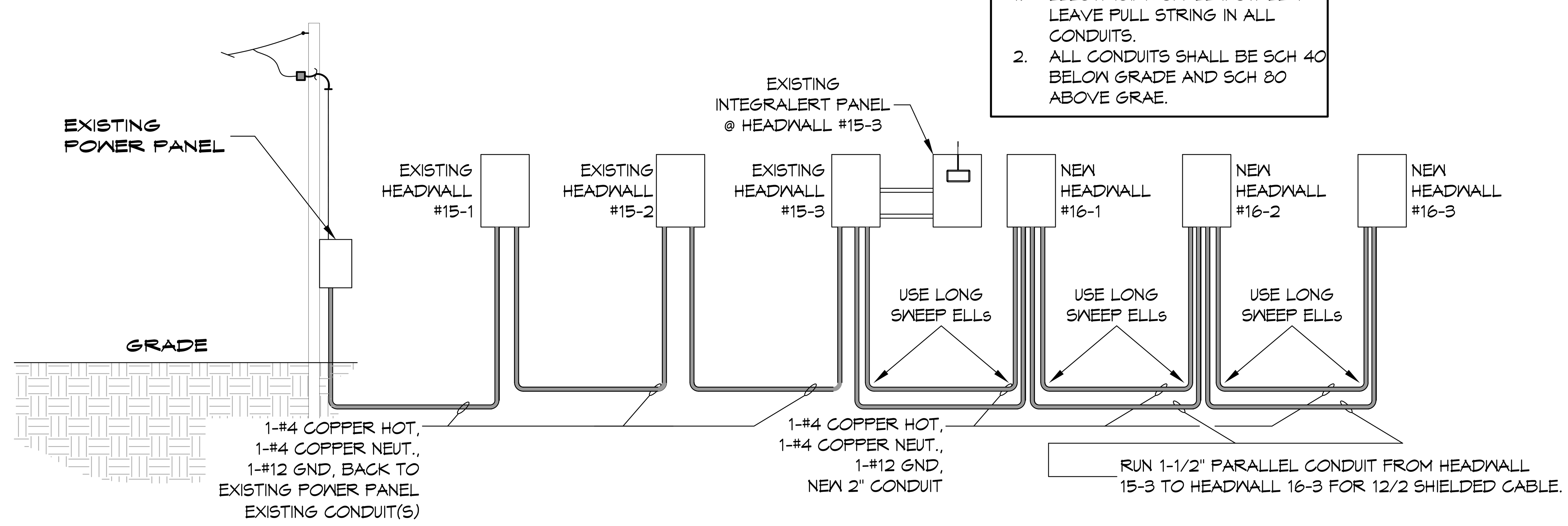
TANGIPAHOA CELL 16
LEACHATE &
STORMWATER
FORCEMAIN AND
SUPPORTING EQUIPMENT

TANGIPAHOA REGIONAL SOLID WASTE FACILITY
57510 HANO ROAD
INDEPENDENCE, LOUISIANA

JOB No: 2460	DATE: 9/30/2022
DRAWN BY: DPD	CHECKED BY: BM

SHEET TITLE:
PUMP CONTROLLER DETAILS

DRAWING NUMBER:
M103



1. ELECTRICIAN SHALL INSTALL & LEAVE PULL STRING IN ALL CONDUITS.
2. ALL CONDUITS SHALL BE SCH 40 BELOW GRADE AND SCH 80 ABOVE GRAE.

EQUIPMENT LIST	
QUANTITY	ITEM
3	LEACHATE PUMP CONTROL PANEL AND TRANSDUCER, MANUFACTURER COX, MDL CP-5676
9	POLARIS BLACK INSULATED TAP CONNECTOR; 4-14 AWG

NOTE : SEE SHEET M103 FOR LEACHATE PUMP CONTROL PANEL CONNECTIONS.

COX RESEARCH & TECHNOLOGY LEACHATE PUMP CONTROL PANEL AND TRANSDUCER EQUIPMENT LIST, MODEL CP-5676	
QUANTITY	ITEM
1	HOFFMAN NEMA 4X ENCLOSURE, PART # CSD24201OSS
1	COX RESEARCH BACKPLATE/SWING PANEL, PART # CAMO24201OCSD
1	SQUARE D CIRCUIT 40 AMP BREAKER, PART # QOU140
1	SQUARE D CIRCUIT 15 AMP BREAKER, PART # QOU115
1	SQUARE D CIRCUIT 10 AMP BREAKER, PART # QOU110
1	HUBBELL GFI RECEPTACLE
1	TPS SURGE SUPPRESSOR, PART # TK-LT120-15A-DIN2
1	PRECISION DIGITAL SETPOINT CONTROLLER, PART # PD6000-6R7
1	MJK SUBMERSIBLE TRANSDUCER, PART # 3400
1	ABB H.O.A. SWITCH, PART # C3SS110B-20
1	ABB BLUE PILOT LIGHT, PART # CL513L
1	CONERY ALARM LIGHT, PART # R40-XLS
1	ASCO AIR SOLENOID VALVE, PART # 8210G002
2	IDEC ELECTROMECHANICAL RELAY, PART # RY4SULCAC120
1	HOFFMAN PAD LOCK HANDLE, PART # GPDLOCKHDL
1	MASTER PNEUMATIC FILTER, PART # CF5AR350
2	1/2" x 1/2" BULKHEAD COPPER ADAPTER
2	1/2" COPPER UNION
2	1/2" x 6" COPPER PIPE
2	1/2" 90° COPPER ELBOW
1	1/2" MALE TO MALE FITTING

NOTE: NAMING A CERTAIN BRAND, MAKE OR MANUFACTURER IS TO DESIGNATE THE GENERAL STYLE, TYPE, CHARACTER AND QUALITY STANDARD OF THE PRODUCT DESIRED. SUBSTITUTION REQUESTS MUST BE SUBMITTED PRIOR TO BIDDING.

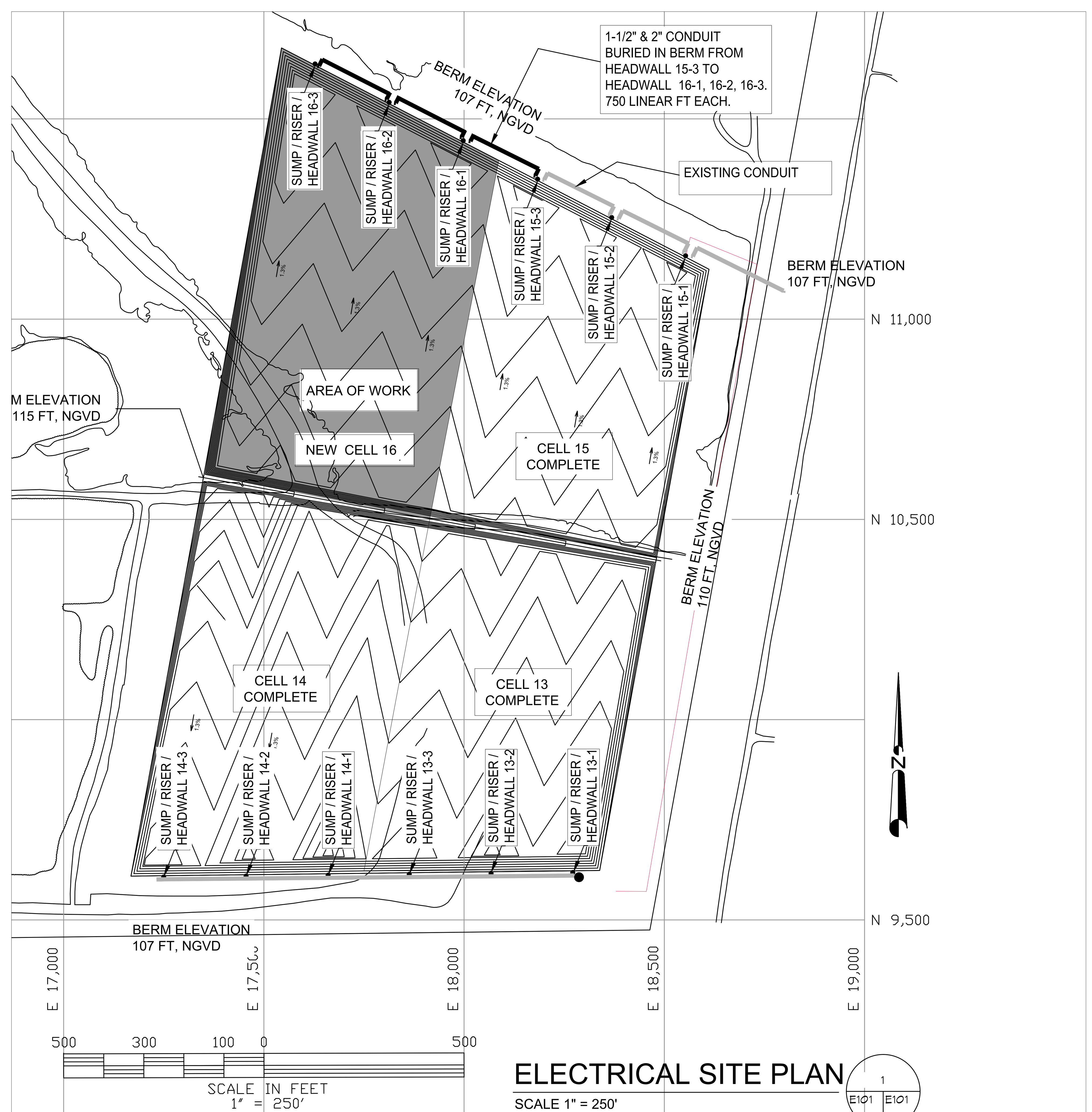
EXISTING INTEGRALERT SYSTEM LOCATED AT HEADWALL 15-3, CONTROL PANEL CONNECTIONS.

	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8
HEADWALL	15-1	15-2	15-3	16-1	16-2	16-3	SPARE	SPARE

1. ELECTRICIAN SHALL MAKE CONNECTIONS FROM THE NEW CONTROL PANEL'S ALARM CONTACT TO THE EXISTING INTEGRALERT SYSTEM LOCATED AT HEADWALL 15-3 USING THE TABLE ABOVE.
2. ELECTRICIAN SHALL TEST THE NEW CONTROL PANEL TO ENSURE THAT WHEN A HIGH WATER LEVEL HAS BEEN DETECTED THAT IT:
   A. TURNS ON THE STROBE LIGHT AT THAT CONTROL PANEL.
   B. SENDS AN ALERT VIA INTEGRALERT SYSTEM.

PUMP CONTROLLER SETTINGS:

	PUMP ON	PUMP OFF	HIGH LEVEL ON	HIGH LEVEL OFF
LEACHATE DEPTH	1.5	0.75	2.0	1.6



ELECTRICAL SITE PLAN 1 E101 E101

SCALE 1" = 250'

ELECTRICAL NOTES

1. ALL WORK SHALL CONFORM TO THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, THE GOVERNING ELECTRICAL CODE AND ALL OTHER INSPECTION DEPARTMENTS HAVING JURISDICTION. OBTAIN CERTIFICATES OR APPROVAL WHERE REQUIRED.
2. ALL MATERIALS FURNISHED SHALL BE NEW AND SHALL BE U.L. LISTED.
3. THE DRAWINGS INDICATE SIZE AND GENERAL LOCATION OF WORK. SCALE DIMENSIONS SHALL NOT BE USED. THE EXACT LOCATION AND LOCATION OF ALL POWER POLES AND ALL RISERS SHALL BE DETERMINED BY ACTUAL CONDITIONS IN THE FIELD.
4. PRIOR TO BIDDING, CONTRACTOR SHALL VISIT THE JOB SITE AND FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS.
5. ELECTRICAL CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER TRADES AND WITH OTHER CONTRACTORS WHOSE WORK MAY AFFECT THIS INSTALLATION.
6. PERFORM TEST REQUIRED BY THE OWNER OR THE ENGINEER IN CONNECTION WITH THE OPERATION OF THE ELECTRICAL SYSTEM IN THE BUILDING.
7. ALL TESTS SHALL BE MADE IN ACCORDANCE WITH THE LATEST STANDARD OF THE IEEE AND THE NATIONAL ELECTRICAL CODE.
8. MINIMUM CONDUCTOR SIZE SHALL BE #12, 600V INSULATION.
9. CONTRACTOR SHALL INSTALL WIRING AND OTHER CIRCUIT COMPONENTS TO MATCH EQUIPMENT ACTUALLY INSTALLED.
10. INSTALL GROUND FAULT RECEPTACLES AT RECEPTACLE LOCATIONS AT EXTERIOR LOCATIONS. EXTERIOR RECEPTACLES SHALL ALSO BE WATERPROOF.
11. BONDING AND GROUNDING SHALL BE IN ACCORDANCE WITH NFPA 70:230-63, NFPR 250-23, 250-71 & 250-72.
12. GROUND NEUTRAL IN ACCORDANCE WITH NFPA 70:250-23b.
13. FUSES SHALL BE ITT CLASS K5, 250 VOLT, 200,000 AMP INTERRUPTING CAP.
14. MINIMUM SIZE ELECTRICAL CONDUIT SHALL BE 1" FOR EXTERIOR USE, UNLESS OTHERWISE SHOWN. ALL ELECTRICAL CONDUIT SHALL BE SCHEDULE 40 PIPE BELOW GRADE AND SCHEDULE 80 PIPE ABOVE GRADE.
15. 1-1/2" & 2" UNDERGROUND CONDUITS SHALL BE INSTALLED BETWEEN HEADWALLS. EACH 20 AMP CIRCUIT BREAKER AT EXISTING POWER PANEL SHALL SUPPORT 1 CELL OR 3 HEADWALLS.
16. TERMINATE ALL EQUIPMENT ACCORDING TO MANUFACTURER'S RECOMMENDATION.
17. CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS FOR ALL WORK PERFORMED.

WORK AREA : ONLY CELL 16 IS BEING CONSTRUCTED UNDER THIS PROJECT.

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#	DESCRIPTION	REVISIONS	DATE

STATE OF LOUISIANA BRIAN A. MISTICH License No. 30187 PROFESSIONAL ENGINEER 1/3/2024

TANGIPAHOA CELL 16 LEACHATE & STORMWATER FORCEMAIN AND SUPPORTING EQUIPMENT

TANGIPAHOA REGIONAL SOLID WASTE FACILITY
57510 HANO ROAD
INDEPENDENCE, LOUISIANA

JOB No: 2460	DATE: 9/30/2022
DRAWN BY: DPD	CHECKED BY: BM

SHEET TITLE: ELECTRICAL PLAN

DRAWING NUMBER: E101