

August 9, 2016

Cory D. Dilmore, P.E.  
Environmental Administrator  
FDEP Permitting and Compliance Assistance Program  
2600 Blair Stone Road, MS 4565  
Tallahassee, FL 32399

**Re: Trail Ridge Landfill – Minor Modification  
DEP Permit Number 0013493-017-SO  
ETM No. 11-019-P5**

Dear Mr. Dilmore:

Pursuant to Chapter 62-701.320(4) (b), F.A.C. and on behalf of Trail Ridge Landfill, Inc., we hereby request a minor modification of the referenced permit for Trail Ridge Landfill to modify the top cover layer. As per our previous conversation, we have revised the top cover layer to change the top liner from a 40-mil textured liner with a 12" sand drainage layer and 12" top soil layer to a 50-mil AGRU Super Gripnet liner with a non-woven geotextile and 24" of protective cover layer (upper 6" vegetative top soil).

Please find attached, the following supportive information for your review and approval (1 Hard copy and 1 PDF):

- A. Fee (\$250) Application fee in accordance with (62-4.50(4)(5), F.A.C.
- B. Incremental Top Slope Closure, QA / QC Plan (signed and sealed with a revision date of 1-14-15)
- C. Previously permitted Incremental Top Slope Closure, QA / QC Plan (redline version)
- D. Revised Closure Details Sheet 20 (signed and sealed with a revision date of 8-5-2016).
- E. Previously permitted Closure Detail Sheet 20 with clouds on the original details that are being modified.
- F. Final Cover Slope stability calculations and Final Cover Geocomposite Transmissivity calculations (signed and sealed by GAI)

We respectfully request that the Department consider this requested modification. Please contact me at 265-3163 or email me at [Lockwoods@etminc.com](mailto:Lockwoods@etminc.com) if you have any questions or require additional information.

Sincerely,

**ENGLAND-THIMS & MILLER, INC.**

  
Scott Jordan Lockwood, P.E.  
Senior Project Manager, Shareholder

Attachments

Xc:	Lee Alford, P.E.	COJ	Eric Parker	TRLI
	Greg Mathes	TRLI	Jim Christiansen	TRLI
	Brian Dolihite	TRLI	Juanitta Clem, P.E.	ETM

## ENGINEER OF RECORD SIGNATURE PAGE

Project Name: Trail Ridge Landfill - DEP Permit Number 0013493-017-SO  
Project Location: End of Gilridge Drive - West of US Highway 301.  
Project City / State: Duval County, Florida  
Computer Programs used for this report: Microsoft Word and Excel 2007  
ETM Job No. E 11-019-P5

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#### Item

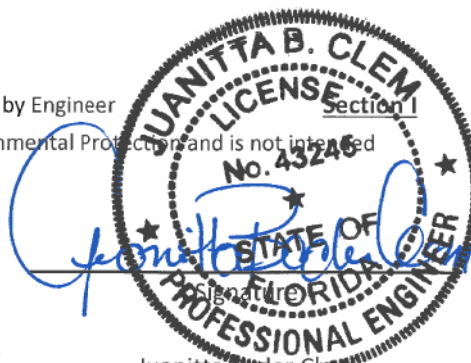
Trail Ridge Landfill - Incremental Top Slope Closure  
Quality Assurance / Quality Control Plan  
(Updated 1-14-15)

Portion of pages or sections of this report signed and sealed by Engineer

This report is provided for the Florida Department of Environmental Protection and is not intended for any other agency or third party use.



England - Thims & Miller, Inc.  
14775 Old St. Augustine Rd., Jacksonville, FL 32258  
Phone (904) 642-8990 CA No: 2584



Juanitta B. Clem  
Engineer of Record

8/9/2016  
Date:

43245  
P.E. No.

**TRAIL RIDGE LANDFILL  
INCREMENTAL TOP SLOPE CLOSURE  
QUALITY ASSURANCE/QUALITY CONTROL PLAN**

This plan specifically addresses the quality assurance and quality control (QA/QC) for Trail Ridge Landfill, Top Area Closure. This program delineates the quality procedures and standards for the construction.

In the context of this plan, quality assurance, quality control and the plan participants are defined as follows:

Quality Assurance - A planned and systematic pattern of all means and actions designed to provide adequate confidence that items or services meet contractual and regulatory requirements and will perform satisfactorily in service.

Quality Control - Those actions which provide a means to measure and regulate the characteristics of an item or service to contract and regulatory requirements.

Permittee - Trail Ridge Landfill, Inc.

Owner - The City of Jacksonville

Design Engineer - England, Thims & Miller, Inc.

The QA/QC Program for this project includes General QA/QC, Soils QA/QC, and Synthetic Liner System QA/QC. These QA/QC activities (including monitoring, sampling and testing) shall be directed and conducted by the third parties who are independent of the Contractor.

The General QA/QC includes full-time services to periodically observe the contractor's work to verify substantial compliance with permits, plans, specifications and design concepts.

General Quality Control Monitor - shall monitor the construction for compliance with the permits, plans, specifications and design including construction to proper lines and grades, maintain daily logs and weekly progress reports of the construction (including observation data sheets, problem identification and correction logs), make note of construction deviations, coordinate qualifying and testing of materials, and monitor filling. This individual shall be experienced in civil site construction and solid waste regulations.

General Quality Assurance Engineer - shall supervise the construction monitoring to verify compliance with permits, plans, specification and design concepts. This individual shall be experienced in civil site construction and solid waste regulations and shall be a registered Professional Engineer.

The General QA/QC Program includes monitoring the following activities:

1. General Earthwork
2. Drainage Installation
3. Overall Liner System Installation
4. General Construction Quality Control

The Soils QA/QC for this project includes soil material qualifying, sampling and testing to verify substantial compliance with the material standards.

Soils Quality Control Monitor - shall pre-qualify soil materials, monitor the installation of soil materials, determine where in-place soil materials shall be tested, and test the in-place soil materials. This individual shall be responsible for assuring that all soil materials have been pre-qualified and have a chain-of-custody from the pre-qualified source to the project site, prior to installation. This individual shall be experienced in quality assurance of soil materials and the preparation of quality assurance documentation including quality assurance forms, reports, certification and manuals. This individual shall be experienced in civil site construction and soil testing standards and procedures.

Soils Quality Assurance Engineer - shall supervise the soil material pre-qualifying and testing of in-place soil materials to assure compliance with the test standards and testing frequency requirements, and verify compliance with the plans, specification and design. This individual shall be experienced in quality assurance of soil materials and the preparation of quality assurance documentation including quality assurance forms, reports, certification and manuals. This individual shall hold a B.S., M.S., or PhD degree in civil engineering or related fields, be experienced in civil site construction and soil testing procedures and shall be a registered Professional Engineer.

The Top Area closure of Trail Ridge Landfill includes a final cover consisting of 12" of intermediate cover, a 50-mil Agru Super Gripnet® Drain Liner or equivalent geomembrane liner, non-woven geotextile, and 24" protective cover layer (from bottom to top). The QA/QC for the final cover is as follows:

#### A. INTERMEDIATE COVER

1. Location - The fill material shall come from an off-site source. The Soils Quality Control Monitor shall visually inspect the fill material.
2. Standard - Soil shall be free of brush, weeds, and other litter; and free of roots, stumps, stones and any other extraneous or toxic matter.

The intermediate cover shall be a minimum of 12" thick.

Compacted to 90% of Modified Proctor maximum dry density (ASTM D 1557), unless the soil material contains 30.0% or greater passing the No. 200 sieve, then compacted to 90% of Standard Proctor maximum dry density (ASTM D-698).

3. Frequency - Depth measurements and density tests shall be conducted at the frequency of four per acre.

#### B. GEOMEMBRANE LINER

The final cover shall include a 50-mil Agru Super Gripnet® Drain Liner or equivalent geomembrane liner. The geomembrane liner shall be installed, monitored and tested in accordance with the requirements of Section 02776 (LINEAR LOW DENSITY POLYETHYLENE (LLDPE) GEOMEMBRANE LINER) of the Technical Specifications.

#### C. NON-WOVEN GEOTEXTILE

The final cover shall include an 8-oz non-woven geotextile (filter fabric). The geotextile shall be installed, monitored and tested in accordance with the requirements of Section 02272 (FILTER FABRIC FOR SUBSURFACE PIPING AND LANDFILL CAP DRAINAGE LAYER) of the Technical Specifications.

#### D. PROTECTIVE COVER LAYER

After the geomembrane and non-woven geotextile have been installed, they shall be covered with a protective cover layer. The protective cover layer shall include an 18" soil fill layer and 6" top soil layer and shall be a minimum of 24" in thickness.

1. Location - The protective cover layer shall be tested in place. The location of testing shall be determined by the Soils Quality Control Monitor.
2. Standard - The protective cover soils shall be reasonably free of brush, weeds, and other litter; and relatively free of roots, stumps, stones and any other extraneous or toxic matter harmful to plant growth. Roots with a diameter greater than 1/2" shall be hand picked and removed.  
  
The top soil layer shall be at least 24" thick.
3. Frequency - Depth measurements shall be taken at the frequency of four per acre. The soil shall be monitored on a continuous basis for extraneous matter.

#### E. UNDERDRAIN FILTER SAND

The underdrains shall be surrounded by filter sand.

1. Location - The material shall be pre-qualified prior to installation.  
  
If the testing is done at the borrow source, a chain of custody shall be provided.

2. Standard - Clean, uniformly graded sand with a uniformity coefficient of 1.5 or greater and an effective grain size of 0.2 mm to 0.5 mm. Grain size distribution shall be conducted as part of pre-qualification.  
  
The sand shall have a hydraulic conductivity no less than  $1.0 \times 10^{-3}$  cm/sec at a density of 100 percent Modified Proctor. The hydraulic conductivity testing shall be by Constant Head method (ASTM D2434).
3. Frequency - The hydraulic conductivity of the sand shall be tested once per 500 cubic yard of sand material.

F. Gas Management System (Gas Wells and Headers)

Gas wells (temporary and permanent) shall be installed in accordance with the Construction Drawings. The QA/QC for gas well materials shall be as follows:

1. Gravel for Gas Wells

- a. Location - The gravel shall be pre-qualified by certification by the supplier.
- b. Standard - The gravel shall be clean gravel with no fines. The gravel shall be FDOT No. 3 Course Aggregate (ASTM D 448).  
  
The gravel shall be non-calcareous (ASTM D 4373).
- c. Frequency - The gravel shall be certified by the supplier. The gravel shall be tested once per 100 C.Y.

2. Bentonite for Gas Wells

- a. Location - The material shall be pre-qualified with documentation from the supplier.
- b. Standard - The material shall have a hydraulic conductivity no greater than  $1.0 \times 10^{-8}$  cm/sec (ASTM D 5084).
- c. Frequency - The material shall be certified by the supplier, one time only.

3. Permanent Header Pipe

The permanent header pipe shall be placed in the areas of final cover and shall be placed on the geomembrane layer, as shown on the Construction Drawings. The header pipe shall not be placed until the geomembrane has been tested and approved. The placement of the header pipe over the geomembrane layer and covering of the header pipe shall be conducted in the presence of either the Soils Quality Control Monitor or the General Quality Control Monitor.

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INCREMENTAL TOP SLOPE CLOSURE  
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General Quality Control Monitor - shall monitor the construction for compliance with the permits, plans, specifications and design including construction to proper lines and grades, maintain daily logs and weekly progress reports of the construction (including observation data sheets, problem identification and correction logs), make note of construction deviations, coordinate qualifying and testing of materials, and monitor filling. This individual shall be experienced in civil site construction and solid waste regulations.

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The Top Area closure of Trail Ridge Landfill includes a final cover consisting of 12" of intermediate cover, a ~~40-mil~~ 50-mil Agru Super Gripnet® Drain Liner or equivalent geomembrane liner, ~~non-woven geotextile, 12" of sand,~~ and 24" protective cover layer of top soil (from bottom to top). The QA/QC for the final cover is as follows:

#### A. INTERMEDIATE COVER

1. Location - The fill material shall come from an off-site source. The Soils Quality Control Monitor shall visually inspect the fill material.
2. Standard - Soil shall be free of brush, weeds, and other litter; and free of roots, stumps, stones and any other extraneous or toxic matter.

The intermediate cover shall be a minimum of 12" thick.

Compacted to 90% of Modified Proctor maximum dry density (ASTM D 1557), unless the soil material contains 30.0% or greater passing the No. 200 sieve, then compacted to 90% of Standard Proctor maximum dry density (ASTM D-698).

3. Frequency - Depth measurements and density tests shall be conducted at the frequency of four per acre.

## B. GEOMEMBRANE LINER

The final cover shall include a 50-mil Agru Super Gripnet® Drain Liner or equivalent textured 40-mil (average) geomembrane liner. The geomembrane liner shall be installed, monitored and tested in accordance with the requirements of Section 02776 (LINEAR LOW DENSITY POLYETHYLENE (LLDPE) GEOMEMBRANE LINER) of the Technical Specifications, of the Quality Assurance Guidance Document for the Installation of Lining Systems (WMI, August 1997) and the following revisions shall be made to Section 9.0B of the Quality Assurance Guidance Document for the Installation of Lining Systems with regard to the geomembrane liner:

~~9.2B 3.f. Add Puncture Resistance (ASTM D4833)~~

~~9.2B 3. Replace “30,000 lb except Multi-Axial Tensile Elongation which will be tested every 75,000 lbs.” with “100,000 ft<sup>2</sup> of geomembrane sheet except Multi-Axial Tensile Elongation which will be tested every 250,000 ft<sup>2</sup>. Further, thickness (ASTM D5199/ASTM D5944) will be performed for every roll.”~~

~~9.2B 3 Add the following: “Written certification from the manufacturer that the geomembrane product to be delivered has been extruded from an approved resin will be required. The certification shall include the origin (resin supplier’s name and resin production plant), identification (brand name and number), resin production date, and quality control certificates issued by the resin supplier.”~~

~~9.2B 4 Add the following: “6. Batch number” and “7. Date of manufacture” to the manufacturer’s roll identification information.~~

~~9.2B Add the following: “Conformance testing of geomembrane will be conducted by an independent laboratory selected by the CQA Engineer. The laboratory will be accredited by the Geosynthetics Accreditation Institute (GAI) for the specific tests to be performed. The results of the conformance testing shall be reviewed by the Geosynthetic QAE and compared to the Project Specifications. Any nonconformance will be the basis of rejection of the material by the Geosynthetic QAE.”~~

~~9.6.2B 2.e. Replace “the maximum permissible pressure differential as outlined in the project specifications” with “3 psi.”~~

## C. NON-WOVEN GEOTEXTILE

The final cover shall include an 8-oz non-woven geotextile (filter fabric). The geotextile shall be installed, monitored and tested in accordance with the requirements of Section 02272 (FILTER FABRIC FOR SUBSURFACE PIPING AND LANDFILL CAP DRAINAGE LAYER) of the Technical Specifications.

### ~~C. SAND LAYER~~

~~After the geomembrane liner has been installed, it shall be covered with a sand layer. The sand layer shall be a minimum of 12" in thickness.~~

~~1. Location — Material shall be pre-qualified by hydraulic conductivity and particle size testing at the borrow location.~~

~~2. Standard — Truck tickets shall be utilized for chain of custody to site. Sand shall be reasonably free of brush, weeds, and other litter; and relatively free of roots, stumps, stones and any other extraneous or toxic matter. The Soils Quality Control Monitor shall visually inspect the sand during placement.~~

~~Hydraulic Conductivity shall be greater than or equal to  $1 \times 10^{-3}$  cm/sec at a density of 96 percent Modified Proctor maximum dry density (ASTM D1557). Hydraulic Conductivity testing by Constant Head Method (ASTM D2434).~~

~~Thickness shall be no less than 12 inches at each location.~~

~~3. Frequency — Hydraulic Conductivity testing shall be on going as necessary to support fill borrow operations with minimum of one test per 500 cubic yards.~~

~~Prior to placement, the sand shall be tested for particle size. The test shall be taken at least once per 5,000 cubic yards and for each change in material source.~~

~~Depth measurements and density tests shall be conducted at the frequency of four per acre.~~

### ~~D. TOP SOIL PROTECTIVE COVER LAYER~~

~~After the sand layer has geomembrane and non-woven geotextile have been installed, they# shall be covered with a protective cover layer top soil. The protective cover layer shall include an 18" soil fill layer and 6" top soil layer and shall be a minimum of 2412" in thickness.~~

~~1. Location - The top-protective cover soil-layer shall be tested in place. The location of testing shall be determined by the Soils Quality Control Monitor.~~

~~2. Standard - The protective cover Top soils shall be reasonably free of brush, weeds, and other litter; and relatively free of roots, stumps, stones and any other extraneous or toxic matter harmful to plant growth.~~

Roots with a diameter greater than 1/2" shall be hand picked and removed.

The top soil layer shall be at least 24" thick.

3. Frequency - Depth measurements shall be taken at the frequency of four per acre. The soil shall be monitored on a continuous basis for extraneous matter.

## E. UNDERDRAIN FILTER SAND

The underdrains shall be surrounded by filter sand.

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If the testing is done at the borrow source, a chain of custody shall be provided.
2. Standard - Clean, uniformly graded sand with a uniformity coefficient of 1.5 or greater and an effective grain size of 0.2 mm to 0.5 mm. Grain size distribution shall be conducted as part of pre-qualification.  
  
~~The sand shall have hydraulic conductivity less than~~ The sand shall have hydraulic conductivity no greater than  $1.0 \times 10^{-3}$  cm/sec at a density of 100 percent Modified Proctor. The hydraulic conductivity testing shall be by Constant Head method (ASTM D2434).
3. Frequency - The hydraulic conductivity of the sand shall be tested once per 500 cubic yard of sand material.

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### 1. Gravel for Gas Wells

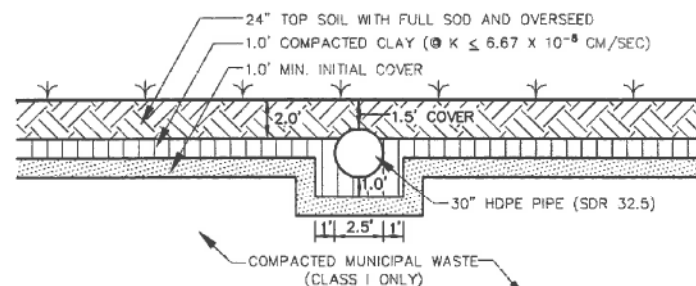
- a. Location - The gravel shall be pre-qualified by certification by the supplier.
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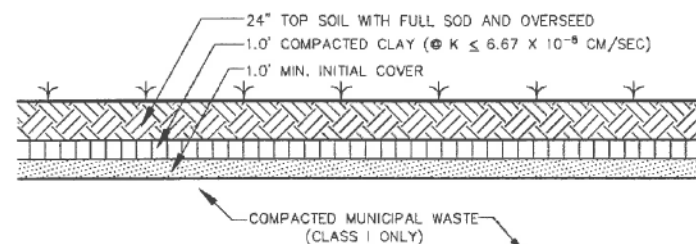
### 3. Permanent Header Pipe

The permanent header pipe shall be placed in the areas of final cover and shall be placed on the geomembrane layer, as shown on the Construction Drawings. The header pipe shall not be placed until the geomembrane has been tested and approved. The placement of the header pipe over the geomembrane layer and covering of the header pipe shall be conducted in the presence of either the Soils Quality Control Monitor or the General Quality Control Monitor.



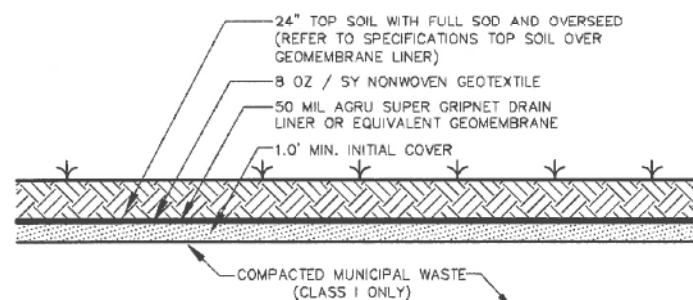
**NOTE:**  
1. 12" COMPACTED CLAY LAYER SHALL BE PLACED IN TWO 6" (MINIMUM) LIFTS.  
2. CONTRACTOR SHALL ENCASE DOWNCOMERS, 18" HDPE TERRACE SIDE DRAINS AND 6" HDPE NON PERFORATED PIPES IN CLAY.  
3. CONTRACTOR SHALL EXCAVATE WASTE TO 18" BELOW CLAY ENCASEMENT AND PLACE AND COMPACT 18" SUBGRADE WITH CLEAN FILL (INITIAL COVER).  
4. ALL WASTE EXCAVATED BY THE CONTRACTOR SHALL BE DISPOSED OF ONSITE AT THE WORKING FACE. CONTRACTOR SHALL COORDINATE WITH THE LANDFILL OPERATOR PRIOR TO DISPOSAL.

**TYPICAL PIPE ENCASEMENT SECTION** D2 7A/7A  
N.T.S.

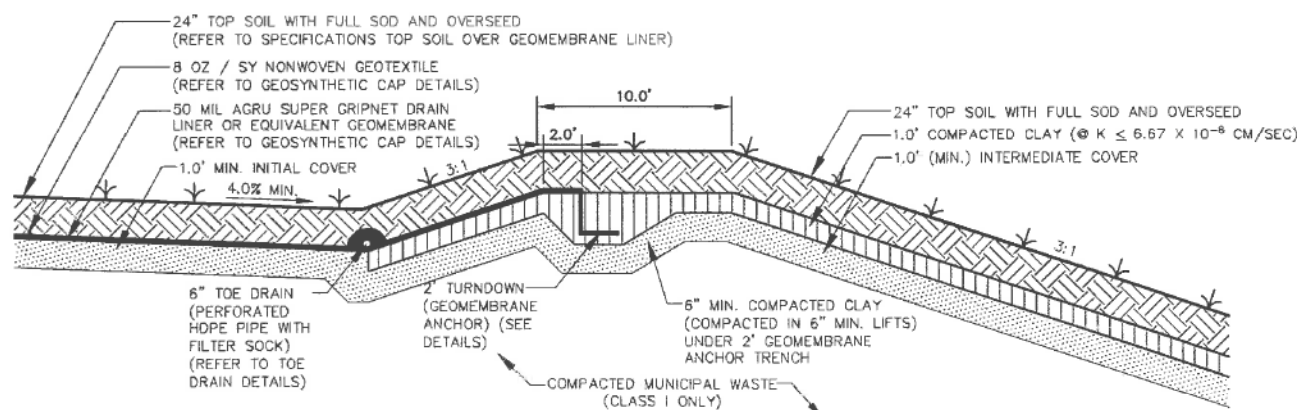


**NOTE:**  
12" COMPACTED CLAY LAYER SHALL BE PLACED IN TWO 6" (MINIMUM) LIFTS.

**FINAL COVER - SIDE SLOPE**  
N.T.S.

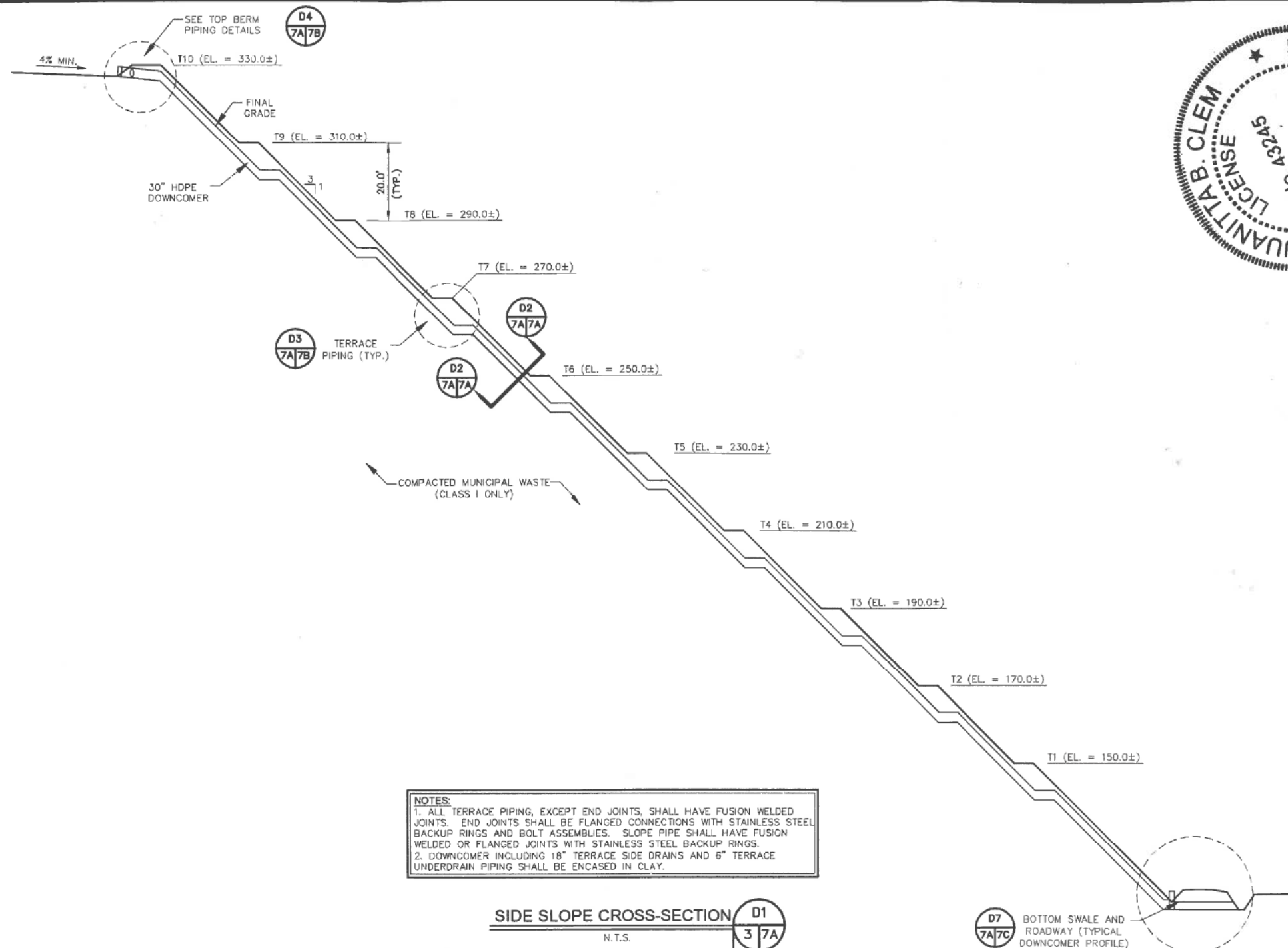


**FINAL COVER - TOP AREA**  
N.T.S.



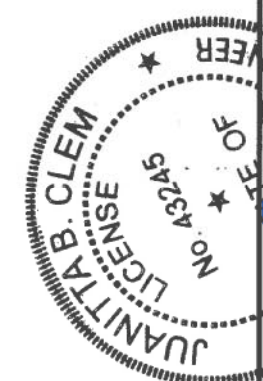
**NOTE:**  
12" COMPACTED CLAY LAYER SHALL BE PLACED IN TWO 6" (MINIMUM) LIFTS.

**TOP BERM TERRACE 10 DETAIL**  
N.T.S.



**NOTES:**  
1. ALL TERRACE PIPING, EXCEPT END JOINTS, SHALL HAVE FUSION WELDED JOINTS. END JOINTS SHALL BE FLANGED CONNECTIONS WITH STAINLESS STEEL BACKUP RINGS AND BOLT ASSEMBLIES. SLOPE PIPE SHALL HAVE FUSION WELDED OR FLANGED JOINTS WITH STAINLESS STEEL BACKUP RINGS.  
2. DOWNCOMER INCLUDING 18" TERRACE SIDE DRAINS AND 6" TERRACE UNDERDRAIN PIPING SHALL BE ENCASED IN CLAY.

**SIDE SLOPE CROSS-SECTION** D1 3 7A 4  
N.T.S.



<b>ETM</b> VISION • EXPERIENCE • RESULTS England-Thoma & Miller, Inc. 14775 Old St. Augustine Road Jacksonville, FL 32226 TEL: (904) 642-8990 FAX: (904) 642-8995 CA-0002884 LC-000316		REVISIONS: 8-9-2016 REVISED TOP DETAILS ETM NO. E 11-019-15 DRAWN BY: S. Lockwood DESIGNED BY: J. Clem CHECKED BY: S. Lockwood DATE: 6-24-2015
<b>CLOSURE DETAILS</b> TRAIL RIDGE LANDFILL PERMIT MODIFICATIONS THE CITY OF JACKSONVILLE, FLORIDA		DURING BADER CLEM, P.E. P.E. NUMBER: 43245 PLOTTED: August 5, 2016 - 8:15 AM BY: Scott Lockwood
DRAWING NUMBER <b>20</b>		

