Locklear & Associates

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February 16, 2017

Mr. Steven Morgan, Air & Solid Waste Permitting Manager
Permitting & Waste Cleanup Program
Florida Department of Environmental Protection
13051 North Telecom Parkway
Temple Terrace, FL 33637-0926

RE: Supplemental Information for Response to Second Request for Additional Information (RAI)
Facility Name: Enterprise Road Class III Recycling and Disposal
Facility Site ID: 87895
DEP Application No.: 177982-023-SC/T3 and 177982-024-SO/T3

Dear Steve:

Thank you for meeting with me on January 24, 2017 to review and discuss supplemental design information for the above referenced application. Per our discussion we have attached the following supplemental design information and updated Engineering Report, Landfill Operations Plan, Groundwater Monitoring Plan and Engineering Plan Set for your review and acceptance:

Attachment 1:	Toe Drain Capacity Calculations for HELP Model results and Open Cell Operations (Scenarios 1 and 2 respectively)
Attachment 2:	Toe Drain Pipe Crushing Calculations
Attachment 3:	Toe Drain Filter Fabric Clogging Calculations
Attachment 4:	Wetwell and Pump Capacity Calculations
Attachment 5:	Revised Engineering Report (replace previously submitted report in its entirety)
Attachment 6:	Revised Landfill Operations Plan (replace previously submitted plan in its entirety)
Attachment 7:	Revised Engineering Plan Set to include toe drain and wetwell design (replace previously submitted plan set in its entirety)
Attachment 8:	Groundwater Monitoring Plan (replace previously submitted report in its entirety)

Please feel free to call me or John Locklear at (352) 672-6867 with any questions regarding this submittal.

Sincerely,

Lisa Baker

Lisa J. Baker, P.E.
Locklear & Associates

cc: John Arnold, Angelo's Recycled Materials

ATTACHMENT 1

Toe Drain Capacity Calculations for HELP Model results and Open Cell Operation (Scenarios 1 and 2 respectively)

Locklear & Associates

Project Name: Enterprise Toe Drain Capacity Anal
Project Number: 02000-144-14
Designed By: LJB Date: 2/1/2017
Checked By: JON Date: 2/1/2017

Problem Statement:

Demonstrate swale and pipe capacity of toe drain.

A. FLOW RATE AND RUNOFF VOLUME

Two Scenarios to Check;

Scenario 1	Determine swale and pipe capacity of toe drain during Normal (Filled) Operations
Scenario 2	Determine swale and pipe capacity of toe drain during Initial (Open Cell) Operations

Scenario 1

A1. Per the HELP model results, calculations were performed to determine the maximum annual leachate flow rate for the landfill footprint boundary. See attached report for input parameters and calculated flow data.

$Q_{HELP\ Model}$ =	302,089	ft^3/year	
	827.67	ft^3/day	
	0.0096	ft^3/sec	Scenario 1 - Flowrate needed to remove stormwater event
	4.2994	gpm	

Scenario 2

A2. Estimated stormwater runoff over Cell 16 floor during early stages of filling.

SCS Rainfall-Runoff Relation:

$$Q := \frac{(P - 0.2 \cdot S)^2}{P + 0.8 \cdot S}$$

Q_{Runoff} = 0.79 inches

$$S := \frac{1000}{CN} - 10$$

S = 0.20

Design Data:

Q = Volume of runoff, inches	Calculated
P = Precipitation, inches	1
S = Potential maximum soil retention	Calculated
CN = Runoff curve number	98.00

Volume = Qrunoff * Area

$V_{RunoffVol}$ = 16,709 ft^3

V = 0.38 ac-ft

V = Total volume of runoff, ft^3	Calculated
A = Project Area, acres	5.82
A = Project Area, square feet	253,519

Estimated Flow to remove stormwater runoff within 24 hrs

Time =	24	hrs
	1,440.0	min
	86,400.0	sec

$Q_{flowrate}$ = Volume/Time

$V_{RunoffVol}$ =	16,709	ft^3	
Time =	86,400.0	sec	
$Q_{flowrate}$ =	0.1934	ft^3/sec	Scenario 2 - Flowrate needed to remove stormwater event
	86.8	gpm	

Locklear & Associates

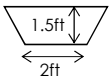
Project Name: Enterprise Toe Drain Capacity Anal
Project Number: 02000-144-14
Designed By: LJB Date: 2/1/2017
Checked By: JON Date: 2/1/2017

B. TOE DRAIN SWALE (Only) FLOW CAPACITY

Manning's Equation: $Q = VA = (1.49/n)*A(R^{2/3})*S^{1/2}$

where
- Q = peak discharge (cfs)
- V = velocity (cfs)
- A = cross-sectional area (sf)
- n = manning's roughness coef
- R = hydraulic radius (ft)
- S = channel slope (ft/ft)

Manning's Coeff. (n)	0.04
Slope (S) (ft/ft)	0.0030
Depth (h) (ft)	1.5
Left Side Slope (Z)	3
Right Side Slope (Z)	3
Bottom Width (b) (ft)	2
Top Width (T) (ft)	11



Calculations

$A_{trench\ total} = h(b+T)/2$	$A_{trench\ total}$ =	9.75	sf	*Trench + Pipe
A_{pipe} = See pipe calcs	A_{pipe} =	0.18	sf	*Pipe area - conservatively take out
$A_{gravel} = A_{total\ trench} - A_{pipe}$	A_{gravel} =	9.57	sf	* Area trench filled with gravel
Porosity of Gravel	n =	0.3		*pore volume with fluid
$A_{flow\ in\ gravel} = A_{gravel} * Porosity$	$A_{flow\ in\ gravel}$ =	2.87	sf	*Area in gravel conveying flow
$P = b+2(h)*((1+Z^2)^{1/2})$	P =	11.49	ft	
R = A/P	R =	0.25	ft	
$Q = VA = (1.49/n)*A(R^{2/3})*S^{1/2}$				
	$R^{2/3}$ =	0.40		
	$S^{1/2}$ =	0.05		
	Q =	2.32	cfs	
Velocity = Q/A	V =	0.81	ft/s	

Check to see if proposed SWALE capacity meets or exceeds discharge

Qtrench (Provided) =	2.32	>	0.0096 cfs - Scenario 1
		Yes!	
Qtrench (Provided) =	2.32	>	0.1934 cfs - Scenario 2
		Yes!	

Locklear & Associates

Project Name: Enterprise Toe Drain Capacity Anal
Project Number: 02000-144-14
Designed By: LJB Date: 2/1/2017
Checked By: JON Date: 2/1/2017

C. TOE DRAIN PIPE (Only) CAPACITY

Manning's Equation: $Q = VA = (1.49/n)*A(R^{2/3})*S^{1/2}$

Discharge (Q) from above	0.0096	cfs			
Pipe Parameters					
Pipe Diameter; D out =	6.6250	in			
Pipe Diameter, D in =	5.798	in			(HDPE SDR 17 pipe)
Depth of Flow, y =	0.45	ft	5.45	in	Maximum Pipe Flow Percentage
(must have y ≥ D/2)					94.0%
Full Pipe Manning roughness, n_{full} =	0.011	HDPE			
slope, S =	0.0030	ft/ft			

Calculations

Pipe Diameter (D)	0.48	ft
Pipe Radius,(r)	0.24	ft
Circular Segment Height (h)	0.03	ft
Central Angle (θ)	0.99	radians
Cross Sectional Area (A)	0.18	ft^2
Wetted Perimeter (P)	1.28	ft
Hydraulic Radius (R)	0.14	ft

Pipe Discharge, Q_{full} =	0.36	cfs
Velocity, V_{full} =	2.00	ft/s
Number of Pipes Required for Q_{full}	0.03	Q_{req}/Q_{pipe}
Number of Pipes Provided	1	
Total Q_{full} Discharge	0.36	cfs
Velocity	2.00	ft/s

Check to see if proposed pipe capacity meets or exceeds discharge

Q pipe (Provided) =	0.36	>	0.0096 cfs - Scenario 1
		Yes!	
Q pipe (Provided) =	0.36	>	0.1934 cfs - Scenario 2
		Yes!	

Locklear & Associates

Project Name: Enterprise Toe Drain Capacity Anal
Project Number: 02000-144-14
Designed By: LJB Date: 2/1/2017
Checked By: JON Date: 2/1/2017

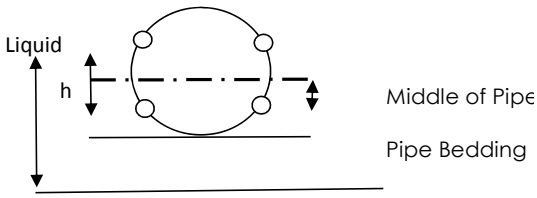
D. TOE DRAIN PIPE PERFORATION CAPACITY

Evaluate the perforation sizing and location

Calculations:
Evaluate flow capacity into pipe through orifice(s) with assumed head above orifice

1. Establish Head acting on orifice(s)

Pipe Dia (in) =	6.6250	
Pipe Bedding (in) =	3	
Height of Middle of Pipe (in) =	6.3125	above trench bottom
Office Dia (in) =	0.375	(3/8" dia perf)
Height of Middle of Office (in) =	5.9375	
Leachate Level in Trench (in) =	7	
Head on Orifice (in) =	1.0625	On orifice (below middle of pipe)



2. Determine Perforation Cross-Sectional Area

$A = \pi d^2/4$

where:
A = area of perforation
d = effective perforation diameter (ft)

Office Dia (in) =	0.375	(3/8" dia perf)
Reduction in perforation diameter due to clogging =	25%	(assumed)
Effective Perforation Diameter =	0.281 in	(Calculated)

$A =$ 0.000431 ft^2

3. Determine Flow Rate per Perforation

$Q_{perf} = Cd*A*(2gh)^{0.5}$

where:
Q_{perf} = flow through perforation [cfs]

Cd = orifice coefficient =	0.5	
g = acceleration due to gravity =	32.2	ft/s^2
h = height of water above orifice =	1.0625	in
	0.088542	ft

$Q_{perf} =$ 5.15E-04 ft^3/sec/perforation

4. Determine the Total Flow into Pipe through Orifice(s)

Perforations Around Diameter of Pipe =	4	
Number of Perforations Above Leachate =	2	
Number of Perforations Flowing with Leachate =	2	(Conservatively only counts lower perforations)
Perforation Lateral Spacing Along Pipe =	6	inches
Perforations per Foot of Pipe =	4	(Calculated)

Q_{perf} =	5.15E-04	ft^3/sec/perforation
$Q_{perf\ total}$ =	0.00206	ft^3/sec/LF pipe
Length of Pipe =	262	ft
Q_{total}	0.539834	ft^3/sec into Pipe System

5. Check to see if proposed orifice capacity meets or exceeds discharge

Q orifice (Provided) =	0.54	>	0.0096 cfs - Scenario 1
		Yes!	
Q orifice (Provided) =	0.54	>	0.1934 cfs - Scenario 2
		Yes!	

ATTACHMENT 2

Toe Drain Pipe Crushing Calculations

Reference: PPI Polyethylene Design Handbook

PLASTICS·PIPE·INSTITUTE

Underground

Earthloading

Spangler's Modified IOWA Formula for Ring Deflection, ref. Ch.6, p. 211, eqn. 3-10

$$\frac{\Delta X}{D_M} = \frac{1}{144}\left[\frac{K_{BED}\, L_{DL}\, P_E + K_{BED}\, P_L}{\frac{2E}{3}\left(\frac{1}{DR-1}\right)^3 + 0.061 F_s E'}\right]$$

Information

Date	
Project	
Engineer Name	
Comments	

Variables

E'	1000	PiModulus of Soil Reaction, psi
D_o	6.625	Pipe Outside Diameter, in
DR	17	Dimension Ratio
D_M	6.212	Mean Pipe Diameter, in
E	18500	Apparent Modulus of Elasticity, psi
w	50	Soil Density, lb/ft³
K_{BED}	0.1	Bedding Factor, typically 0.1
L_{LD}	1	Deflection Lag Factor
F_S	1	Soil Support Factor (refer to Chapter 6, Tables 3-9 and 3-10 for additional factors)
H	50	Height of Soil Cover above pipe, ft
H_W	0	Height of water table above pipe, ft
P_S	0	Total Static Load, psf

Gravel pack around pipe

Elastic Modulus of pipe - Modified for time (50yr and Temp 110F)

Class III Waste

Final Buildout - Pipe (EL 75) - Landfill - (EL 105 to 120) - Roundup to 50ft

Total Live Load, psi: H-20 Live Load

P_L	7200	Total Live Load, psf

Load of Fully Loaded CAT 740B Off-Road Dump

Result

P_E	2500	Earth Load on Pipe, psf
P_T	9700	Earth Load on Pipe, psf
ΔX	0.654	Vertical Deflection, in
d	10.52	Percent Vertical Defelction, %
P_{WC}	14686	Crictical Collapse Pressure, psf
SF	1.51	Safety Factor against Constrained Buckling

Factor of Safety is "Acceptable"

Note: These calculations are limited to the design of PE pipes buried in trenches or embankments. The load and pipe reaction calculations presented may not apply to pipes installed using trenchless technologies. Reference Chapter 12 of the PPI Design Handbook for additional piping design information.

ATTACHMENT 3

Toe Drain Filter Fabric Clogging Calculations

CIVIL DESIGN SERVICES INCORPORATED

11012 N. Ridgedale Road
Temple Terrace, Florida 33617
(813) 629-1965 office
(813) 914-7347 fax

February 14, 2017 Project No. 16-01-0111.01

Ms. Lisa Baker, P.E.
Engineering Division Director
Locklear and Associates, Inc.
4140 NW 37th Place Suite A
Gainesville, Florida 32606

RE: Toe Drain Collection System – Geotextile/Soil Compatibility
Enterprise Class III Landfill – Cell 16 Expansion
Dade City, Florida

Dear Ms. Baker,

Civil Design Services, Inc. (CDS) is submitting this geotextile/soil compatibility evaluation for the proposed toe drain collection for the Cell 16 expansion at the Enterprise Class III Landfill (Facility) located in Dade City, Florida. The proposed toe drain collection will consist of a perforated pipe surrounded by gravel. This pipe and gravel will be wrapped with geotextile and a sandy soil backfilled adjacent geotextile wrap. It is our understanding that the granular soils for the toe drain construction will be taken from the available onsite soils or off-site soils that have similar gradation characteristics.

CDS reviewed soil sieve analysis curves available from previous geotechnical investigations conducted at the Facility. The objective of the review was to identify soil types that could be used for the construction of the backfill adjacent to the toe drain and to develop a range or "band" of soil gradations that would accomplish two goals – 1) allow flow through the soil and geotextile and into the gravel pack and 2) evaluate the Apparent Opening Size (AOS) of a geotextile to retain soil particles without clogging the geotextile.

The Universal Engineering Sciences, Inc. (UES) report, dated May 5, 2000, contains boring logs and sieve analysis data for typical soil types encountered onsite. The borings logs and sieve analysis data is contained in Attachment A.

The geotextile filter compatibility of the proposed gradation range or "band" shown in Table 1 was evaluated using the methodology and calculations below.

Listed below in Table 1 is a general summary of the data and proposed range or "band" of sieve gradations for soils to be evaluated for compatibility with the geotextile materials.

Table 1. Soil Gradation Variation in Sieves for Granular Fill On-Site

		Percent Passing									
		Avg Gradation	*Specified Range*		In-Field Borrow Sample Results						
Sieve	Size (mm)	*(%)*	*Low-Band (%)*	*High-Band (%)*	Range (%)	B-5 (%)	B-5 (%)	B-7 (%)	B-8 (%)	B-8 (%)	B-9 (%)
No 1/2	12.7				100						
No 3/8	9.51	100	*100*	*100*	100	100	100	100		100	100
No 4	4.75	97.5	*95*	*100*	97.5 - 100	99.8	97.5	99.6		99.3	100
No 10	2	95	*90*	*100*	96.8 - 100	99.2	96.8	99.5		99	100
No 40	0.422	90	*80*	*100*	94.4 - 100	96.4	94.4	99.3		96.7	100
No 60	0.25	79.8	*60*	*99.6*	77.5 - 99.6	78.5	77.5	92.2		85.9	99.6
No 100	0.149	42.5	*20*	*65*	27.4 - 63.6	27.4	28.8	62.6		37.5	63.6
No 200	0.074	15	*5*	*25*	7.1 - 23.9	8	7.1	22.2	23.9	23.1	12.8

Methodology and Calculations of Geotextile Material with Soil Gradation

The methodology used to evaluate the geotextile compatibility of the Geocomposite is outlined in the "Geotextile Filter Design Guide" (1992) by S.M. Luettich, J.P. Giroud, and R.C. Bachus. The Geotextile Filter Design Guide is contained in Attachment B for reference only. The geotextile evaluated was a typical non-woven geotextile, a GSE 6-oz non-woven geotextile with an AOS Sieve 70 (0.21 mm) {or O_{95}} opening size. The Geotextile Filter Design Guide has a nine (9) step evaluation process to evaluate the grain sieve analysis, soil classification, and geotextile properties.

The steps for the calculations and evaluation are described below;

Step 1 - Define the Application Filter Requirements

Define whether the application of the geotextile will "*Favor*" Retention or Permeability requirements. Applications that "Favor" Permeability are characterized when the drainage material voids are large (i.e. the voids in the gravel surrounding the perforated collection pipe) requires a high degree of permeability of the geotextile filter and limiting retention to minimize potential clogging.

Solution: Use the evaluation criteria that "Favors" Permeability.

Step 2 - Define Boundary Conditions

Evaluate confining stress and effect on filtration – a) The relative density of the soils will provide resistance to the movement of particles. b) Fine-grained soils could migrate through the soil and into the geotextile filter c) high confining pressures during placement of the soils surrounding the geotextile and gravel pack could potential damage the geotextile material.

Solution: a) Since the installation "Favors" Permeability, or the free flow of liquid into the toe drain, placement of the soils should be done with little to no compactive effort. This will lower the relative density, and increase permeability, of the soils.

Solution: b) The graduation range or band was evaluated for typical soils onsite. Since the installation of the soils "favors" permeability, soils with high silt or clay content should be avoided. Soils with high sand, soil types SW, SP, SP-SM, and SC (with higher sand content) are the preferred soil types.

Solution: c) Refer to Solution a) above- The goal of the soil placement will be to limited compaction for the soil and thus this also provide protection of the geotextile by damage from equipment and potential puncture of the geotexile material from the gravel.

Step 3 - Determine Soil Retention Requirements

Evaluate a) flow condition and b) soil retention criteria to determine AOS of the filter (geotextile)

Solution: a) The flow condition is Steady-State drainage. Dynamic conditions are for wave action and high gradients and are not considered applicable for this Project. Use Figure 1 within the Geotextile Filter Design Guide contained in Attachment B.

Solution: b) soil retention criteria to determine AOS.

1) Determine soil percentage of fines – Based upon the gradation curves presented in Attachment A and Table 1, a range of possible gradations, defined as "Low-Band" and "High-Band" ranges of gradations was established. The proposed gradation banding is presented in Attachment C.

2) Determine percentage of fines – The soils to be used should be soils high sand content and low percentage of silts and clays. As shown in the proposed gradation curve onsite soils with relatively high percentage fines (some soils have +20 % passing the No. 200 sieve) could be used, the goal would be limit soils to no more than 20 percent passing the No. 200 sieve.

3) Determine Soil Plasticity – The soils to be used should have high sand contents and therefore will be NP (non-plastic).

4) The Application "Favors" Permeability of the soils.

5) Based upon the soils Coefficient of Curvature ($Cc = d_{30}^2/(d_{60}*d_{10})$) of the sandy soils onsite, the soils would classify as "Poorly-Graded" soils. The linear Coefficient of Uniformity (C'u) from the proposed Grain Sieve Distribution Curve indicated the soils to be "uniformly graded" or sands with primarily the same particle size.

   Refer to Attachment C for the Grain Sieve Distribution Curves for the soils and the "Low-Band" and "High-Band" Range Gradation Distribution. Table 2 provides a summary of Parameters and AOS determinations using the soil gradations shown the Attachment C and the geotextile methods described above.

Table 2. Summary of Gradation Parameters and AOS Determination

		Proposed Grain Size Distribution Range		
		Low (mm)	High (mm)	
	D60	**0.24**	**0.19**	
	D50	**0.13**	**0.17**	
	D30	**0.17**	**0.12**	
	D10	**0.12**	**0.072**	
D30^2/(D60*D10)	Cc	1.00	1.05	
D60/D10	Cu	2.00	2.64	
	Well Graded Soils	1<Cc<3		** Must meet all
	Well Graded Gravels	Cu>4		to be Well Graded
	Well Graded Sands	Cu>6		
Result: Poorly Graded Soil Gradation				
	INSTALLATION FAVORS - PERMEABILITY			
	Line drawn through D50 to determine d'100 % d'0			
	d'100	**0.41**	**0.27**	
	d'0	**0.12**	**0.048**	
√ (d'100/ d '0)	Cu'	1.848	2.372	
Geotextlie AOS Determination (AOS {095 less than values below)				
Rel. Density	Cu'<3	095 less than (mm)	(mm)	
Loose	**1**	0.240	0.403	
Med	**1.5**	0.360	0.605	
Dense	**2**	0.481	0.806	

Based upon the results shown in Table 2, the AOS of the geotextile should conservatively be BELOW 0.240 to 0.806 mm. The AOS for the GSE 6-oz geotextile is 0.21 mm (AOS 70). Therefore, the geotextile can function as a filter and retain the requested soil gradation.

Step 4 - Determine Geotextile Permeability Requirements

Determine the geotextile permeability based upon a hydraulic gradient of Is = 1.5 (landfill collection system) of more conservative Is=2 for (Dam toe drain).

Kgeotextile > Is * Ksoil where Kgeotextile = permittivity * thickness

> 2.0 x Ksoil = 1.5 sec^{-1} * 85 mils (0.21cm)

Kgeotextile / 2.0 > Ksoil = 0.315 cm/s (3x10-1 cm/s)

Determine Geotextile Permeability

0.315 cm/s / 2.0 > Ksoil

0.1575 cm/s (1.575 x 10-1 cm/s) > Ksoil
0.07878 cm/s (7.88 x10-2 cm/s) assuming 50% reducing in thickness after loading.

Solution- As shown above, a typical 6-oz non-woven geotextile will have a relatively high permeability when compared to the anticipated permeability of the soils onsite to be used for backfill area the toe drains. Since most of the soils onsite have relatively high fines contents it is anticipated that even the very sandy soils onsite will have permeability no more than 3 to 5 x10-3 cm/s, even when loosely compacted. Therefore the geotextile AOS and high permeability is acceptable.

Step 5 - Determine Anti-Clogging Requirements

For anti-clogging criteria select the largest available 0_{95} (AOS) available. The 6-oz non-woven geotextile selected has an acceptable AOS and is a commonly available product.

Step 6 - Determine Survivability Requirements

The survivability of the geotextile evaluated for high contact stresses on the geotextile from the gravel and low contract stress since the soil is recommended not to be compacted and simply placed over the collection toe drain. The compaction will be accomplished by spreading the soil with a dozer and the compaction equipment at least 24-inches from the geotextile. Typical geotextile properties are shown in Table 3 below;

Table 3. Recommended Geotextile Properties.

	Grab Strength ASTM D4362 (lb)	Puncture ASTMD4833 (1b)	Burst Strength ASTM3786 (psi)	Trapezoidal Tear ASTM D4533 (lbs)
High Contact Stress	180	80	290	50
GSE Geotextile	160*	95**	330**	65*
Low Contact Stress	80	25	130	25

* Taken from GSE typical properties sheet.

** Historical averages (current values not available): Mullen Burst Strength ASTM D3786 is no longer recognized by ASTM D-35 on Geosynthetics as an acceptable test method. Puncture Strength ASTM D4833 is not recognized by AASHTO M288 and has been replaced with CBR Puncture ASTM D6241.

Typical GSE geotextile properties are contained in Attachment D. Several of the ASTM methods are quoted in the Filer Design Guide are dated and no longer accepted by ASTM. Historical valves were found for typical 6-oz geotextiles and contained in Attachment D.

The GSE 6-oz non-woven geotextile will be acceptable from a survivability standpoint.

Step 7 - Determine Durability Requirements

Since the geotextile will be covered with fill material extended exposure to daylight will be minimized. The application is for a toe drain and the geotextile fibers are made from polypropylene and is chemical capability the anticipated leachate generated in a typical Class III landfill.

Step 8 - Miscellaneous Design Considerations

Other items to be address;

- Geotextile Structure – Non-woven geotextile material is acceptable for use on this Project.
- Intrusion of geotextile into the drainage layer – Even with limited intrusion into the gravel pack, the gravel is sufficient drainage capacity to convey the anticipated flow rates.
- Extrusion of fine-grained soil through geotextile – Correct AOS and soils types are specified.
- Abrasion of geotextile due to dynamic action – This application is not a dynamic installation.
- Intimate contact with the soil and geotextile – The soil and geotextile will be covered and in direct contact with each other.
- Biological and bio-chemical clogging – This geotextile types is standard material for Florida landfill collection systems.
- Safety factors – Included in calculations.

Step 9 - Select a Geotextile Filter

RESULT: The GSE 6-oz non-woven geotextile meets or exceeds the filter requirements for the requested granular soil gradation.

Other Recommendations;

1) ***Soils should be sandy soils, USCS Soil Types – SW, SP, SP-SM, SC (with high sand content).***
2) ***Soils should be Non-Plastic (NP) and limited fines passing the No. 200 sieve to no more than 20 percent.***
3) ***The soils should be lightly compacted or placed by simple spreading of the soils over the geotextile.***

Please call with any questions.

Sincerely,
Civil Design Services, Inc.

Joseph H. O'Neill, P.E.
Vice President

2/14/2017

Joseph H. O'Neill, P.E.
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11012 N. Ridgedale Road
Temple Terrace, Florida 33617
Certificate of Authorization 28923

Attachments

Attachment A Geotechnical Borings and Grain Sieve Analysis Data
Attachment B Geotextile Filter Design Guide
Attachment C Proposed Grain Sieve Distribution
Attachment D 6-oz Non-Woven Geotextile Properties

ATTACHMENT A

LABORATORY TEST SUMMARY

BORING/ PIEZO. NUMBER	SAMPLE NUMBER	SAMPLE DEPTH (feet)	NATURAL MOISTURE CONTENT (%)	PASSING NO. 200 SIEVE (%)	PASSING NO. 100 SIEVE (%)	PASSING NO. 60 SIEVE (%)	PASSING NO. 40 SIEVE (%)	PASSING NO. 10 SIEVE (%)	PASSING NO. 4 SIEVE (%)	LIQUID LIMIT (%)	PLAST-ICITY INDEX (%)	VERTICAL PERMEAB. K (ft/day)	UNIFIED SOIL CLASS.
B-1	15	74.0	17.2	32.1	43.8	59.4	63.0	68.8	100.0				limestone
B-1	18	41.0	35.9	41.0	51.2	58.4	61.6	68.7	72.1				limestone
B-2	U-1	45.0	23.7	42.8						47	28	7.00E-05	
B-2	12	64.5	36.5	37.6	74.3	84.9	87.9	93.0	95.1				SC
B-3	4	19.5	31.3	43.2	65.8	91.7	96.8	99.6	100.0				SC
B-3	U-1	25.0	28.6	48.5						57	36	1.90E-04	SC
B-3	7	34.5	56.6	42.5	77.1	88.8	94.0	99.2	100.0				SC
B-4	4	19.5	32.2	63.6	81.5	97.6	99.8	100.0	100.0				CH
B-4	U-1	25.0	29.9	55.6						65	45	2.20E-05	CH
B-5	4	21.5	26.8	8.0	27.4	78.5	96.4	99.2	99.8				SP
B-5	5	24.5	26.2	7.1	28.8	77.5	94.4	96.8	97.5				SP
B-5	U-1	40.0	24.8	47.7						60	41	2.90E-05	SC
B-6	U-1	17.0	31.1	52.3						71	48	4.20E-04	CH
B-6	4	21.5	18.2	26.5	36.5	72.5	88.2	92.9	94.2				CH
B-6	U-2	22.0	30.9	51.8						69	51	1.50E-04	CH
B-6	5	29.5	43.2	66.9	78.8	93.8	97.6	99.8	100.0				CH
B-7	U-1	23.0	34.0	57.0						73	51	3.00E-03	CH
B-7	6	29.5	39.3	41.8	78.0	95.2	99.4	100.0	100.0				SC
B-7	7	34.5	26.1	22.2	62.6	92.2	99.3	99.5	99.6				SC
B-8	U-1	25.0	17.1	23.9						20	NP	3.70E-03	SC
B-8	5	29.5	24.6	23.1	37.5	85.9	96.7	99.0	99.3				SC
B-8	6	34.5	36.5	57.3	77.0	96.1	99.5	100.0	100.0				CH
B-9	U-1	20.0	19.6	27.5						NP	NP	7.60E-03	SC
B-9	9	44.5	24.2	12.8	63.6	99.6	100.0	100.0	100.0				SM
B-9	11	59.5	33.4	46.3	92.1	98.1	99.4	100.0	100.0				SC
B-10	U-1	52.0	47.5	73.3						118	91	2.90E-05	CH
B-10	10	59.5	41.5	34.6	53.4	62.4	66.7	79.2	88.4				SC
B-10	12	69.5	14.3	13.4	16.5	19.6	23.2	37.1	49.0				limestone
P-3B	U-1	14.0	10.5	6.7								8.5	SP-SM

ATTACHMENT B

Geotextiles and Geomembranes **11** (1992) 355–370

Geotextile Filter Design Guide

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ABSTRACT

This paper provides the practicing designer with a comprehensive, systematic approach to solving common filtration design problems. Current filter design procedures often include only permeability and retention criteria. Several other concepts should be incorporated into the design process, such as: (i) consideration of whether permeability or retention is the primary function of a filter within the given application; (ii) quantifying the internal stability of soil; and (iii) addressing survivability and durability issues.

This paper incorporates several recently-developed design concepts, together with currently-used geotextile filter design criteria, into a comprehensive nine-step design methodology. Each step is discussed, specific numerical criteria are given, and information is provided for determining the parameters needed to satisfy the design criteria. The result is a user-oriented document for designing geotextile filters.

NOTATION

I_D Soil relative density
k_s Soil hydraulic conductivity
C_c Soil Coefficient of Curvature ($= (d_{30})^2/(d_{60} \times d_{10})$)
d_x Soil particle size of which x percent is smaller; obtained from the soil particle-size distribution
C_u Soil Coefficient of Uniformity ($= d_{60}/d_{10}$)
C'_u Soil linear Coefficient of Uniformity $= \sqrt{d'_{100}/d'_0}$

Geotextiles and Geomembranes 0266-1144/92/$05.00

d'_x Soil particle size of which x percent is smaller; obtained from a straight-line approximation to the soil particle-size distribution
PI Soil Plasticity Index
O_{95} Geotextile Apparent Opening Size
i_s Hydraulic gradient in the soil
k_g Geotextile hydraulic conductivity (permeability)
ψ_g Geotextile permittivity
t_g Geotextile thickness

INTRODUCTION

Geotextiles are commonly used in applications where their primary function is filtration. Pavement edge drains, dewatering trenches, armored slopes and shorelines, prefabricated drainage panels and leachate collection systems are but a few of the most common applications. Although this function of geotextiles is seeing widespread use, there is still much confusion surrounding proper filtration design procedures.

Many current filter design procedures include only considerations for retention and premeability. Whereas these are undoubtedly important *components* of the design process, a more comprehensive methodology is required to actually guide the designer through the entire process.

The purpose of this paper is not to revolutionize current filtration design criteria. Rather, this paper provides a framework that incorporates commonly-accepted filter design procedures into a comprehensive, systematic approach to solving common filtration design problems. Additionally, this paper provides the designer with methods for determining the *values* of the parameters called for by the design criteria.

The design methodology presented in this paper has been largely excerpted and condensed from a companion *Geotextile Filter Design Manual* (Luettich *et al.*, 1991), also developed by the authors. The *Geotextile Filter Design Manual* provides supporting theoretical information and several design examples for various applications which demonstrate the comprehensive design methodology.

MECHANISMS OF FILTRATION

A filter should prevent excessive migration of soil particles, while at the same time allowing flow of liquid from the soil. The filtration function is therefore summarized by two seemingly conflicting requirements:

- the filter must *retain* the soil, which implies that the size of the filter pore spaces or openings should be smaller than a specified maximum value; and
- the filter must be *permeable enough* to allow relatively unimpeded flow into the drainage medium, which implies that the size of the filter pore spaces or openings should be larger than a specified minimum value.

Prior to the introduction of geotextiles, granular materials were exclusively used as filters for geotechnical engineering applications. Geotextile filter requirements are similar to granular filter requirements. In addition to the retention and permeability requirements described previously, several other considerations are required for proper design of geotextile filters. The criteria for geotextile filter selection are summarized as follows:

- a retention criterion to ensure that the geotextile openings are small enough to prevent excessive migration of soil particles;
- a permeability criterion to ensure that the geotextile is permeable enough to allow liquids to pass through it without significant flow impedance;
- an anti-clogging criterion to ensure that the geotextile has a significant number of (i.e., many) openings so that if soil particles block or clog a few openings the permeability of the filter will not be significantly impaired;
- a survivability criterion to ensure that the geotextile is strong enough to survive its installation; and
- a durability criterion to ensure that the geotextile is resistant enough to withstand adverse chemical and ultraviolet light exposure for the design life of the project.

The specific numerical criteria that express the above considerations depend on the application of the filter, the filter boundary conditions, the properties of the soil being filtered, and the construction methods used to install the filter. These factors are discussed in the step-by-step geotextile filter design methodology presented in the following section.

DESIGN METHODOLOGY

The proposed design methodology represents a compilation of years of research and experience in geotextile filtration design. The approach is a logical progression through nine steps, as follows:

- Step 1. Define the application filter requirements
- Step 2. Define boundary conditions
- Step 3. Determine soil retention requirements
- Step 4. Determine geotextile permeability requirements
- Step 5. Determine anti-clogging requirements
- Step 6. Determine survivability requirements
- Step 7. Determine durability requirements
- Step 8. Miscellaneous design considerations
- Step 9. Select a geotextile filter

Detailed discussion of these steps is provided in the subsequent sections of this paper.

Step 1. Define the application filter requirements

The first step in the design process is to understand what the requirements are for the filter within the intended application. This involves determining what type of drainage material will be used adjacent to the geotextile filter, then defining what the *favored* characteristic (retention or permeability) should be for the given application.

Identify the drainage material

Typical drainage media include natural materials such as sand or gravel, and geosynthetic materials such as geonets, cuspated drainage cores, and other pre-fabricated drainage materials.

The drainage medium adjacent to the geotextile must be identified for the following reasons:

- drainage media with a large amount of voids or pore volume could influence the selection of the retention criterion;
- drainage media with sharp contact points (such as highly angular gravel) will influence the survivability requirements.

Define retention versus permeability trade-off

The drainage medium adjacent to the geotextile often affects the selection of the retention criterion. Due to the conflicting nature of the retention and permeability filter requirements, it is necessary to evaluate whether retention or permeability is the *favored* characteristic of the filter. For example, a drainage material that has relatively little void volume (e.g. a geonet or a strip drain) will require a high degree of retention from the filter. Alternatively, in applications where the drainage material void

volume is large (e.g. a gravel trench), it may be appropriate to favor the permeability and anti-clogging criteria more than the retention criterion.

Step 2. Define boundary conditions

Evaluate confining stress
The confining pressure in the vicinity of the filter is important for the following reasons:

- For coarse-grained soils, high confining pressures tend to increase the relative density (I_D) of the soil, hence increasing the soil's resistance to particle movement. This affects the selection of retention criteria.
- For fine-grained soils, high confining pressures decrease the hydraulic conductivity of the soil (k_s), and increase the potential for the soil to extrude through the geotextile filter.
- For all soil conditions, high confining pressures increase the potential for the geotextile and soil mass to intrude into the flow paths of the drainage material. This could reduce the flow capacity of the drainage media, especially thin geosynthetic drainage cores.

Define flow conditions
Flow conditions are defined as being either steady-state or dynamic. It is important to define the flow conditions because the retention criteria for steady-state flow conditions are different than for dynamic flow conditions. Standard dewatering drains, wall drains and leachate collection drains are examples of applications with steady-state flow conditions. Shoreline and coastal embankment protection layers are typical examples of applications where waves and water currents may cause dynamic flow conditions. Pavement edge drains may also experience dynamic flow conditions due to excess pore pressure caused by passing vehicles.

Step 3. Determine soil retention requirements

Most commonly-used filter design criteria were developed specifically for steady-state flow conditions *or* dynamic flow conditions. For this reason, two charts have been developed to aid the designer in understanding soil retention criteria. Figure 1 provides the numerical retention criteria for steady-state flow conditions; much of Fig. 1 was obtained from soil retention criteria established by Giroud (1982). Figure

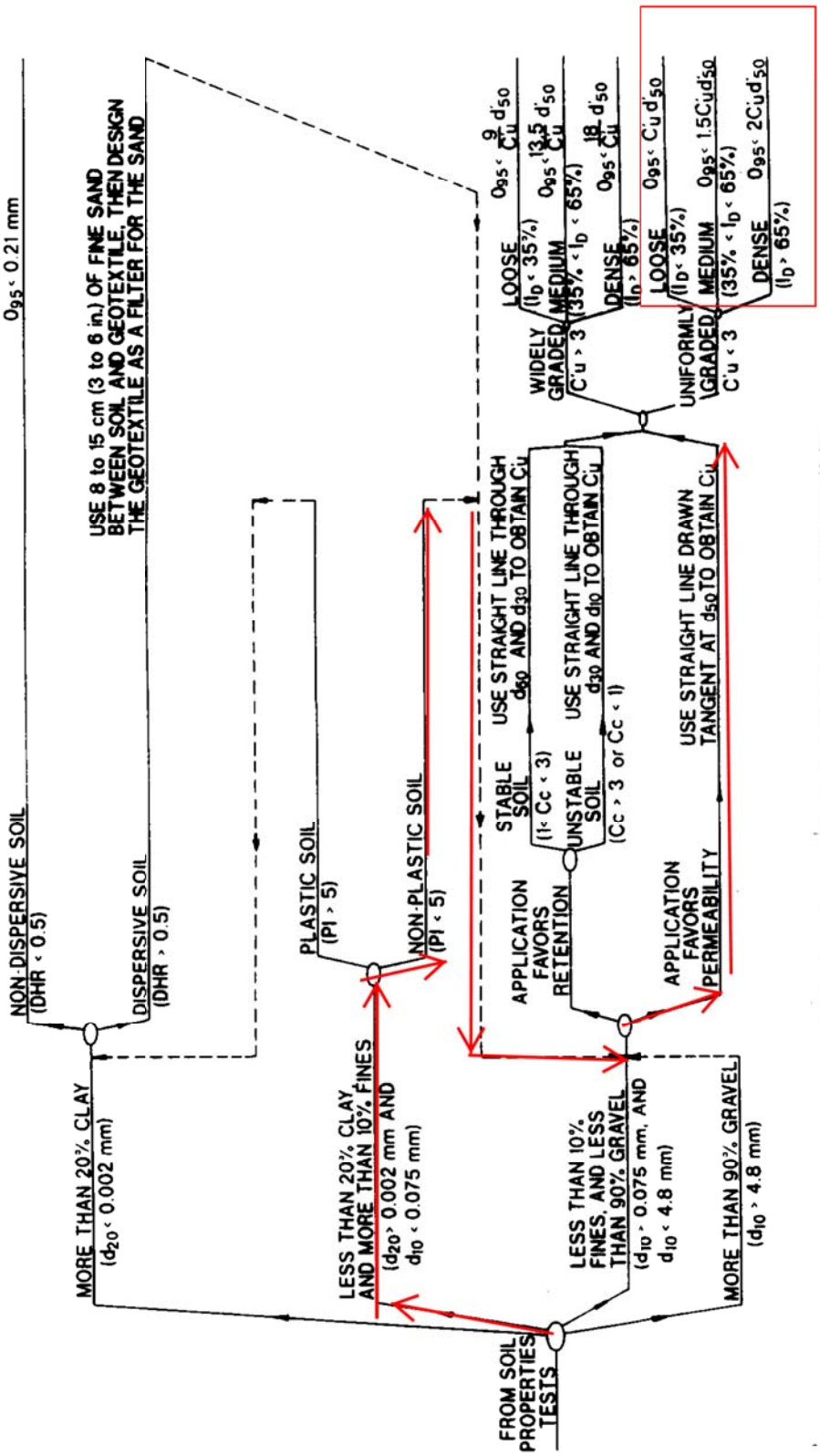


Fig. 1. Soil retention criteria for steady-state flow conditions.

2 provides the numerical retention criteria for dynamic flow conditions; much of Fig. 2 was derived from soil retention criteria for dynamic flow established by Heerten (1982).

Define soil particle-size distribution

The particle-size distribution of the soil being filtered should be determined in accordance with American Society for Testing and Materials (ASTM) D 422 test method or equivalent. The particle-size distribution curve is used to determine parameters that are necessary for selection of numerical retention criteria. Figures 1 and 2 indicate the use of particle-size distribution parameters for this purpose. These charts show that the amount of gravel, sand, silt, and/or clay affects the first quantitative step in selection of the retention criteria. For predominantly coarse-grained or non-plastic fine-grained soils, the grain-size distribution curve is used to calculate specific parameters, such as C_c, C_u, and C'_u, that govern the retention criteria.

Define soil Atterberg limits

If the soil contains a considerable amount of fine particles, the plasticity index (PI) of the soil should be determined from the Atterberg limits test method ASTM D 4318 or equivalent. Figures 1 and 2 show how to use the PI value for the purpose of selecting appropriate numerical retention criteria for fine-grained soils.

Define soil dispersion potential

If the soil is predominantly fine-grained and somewhat plastic, the dispersion potential of the soil should be evaluated using the double hydrometer test method ASTM D 4221 or equivalent. Figures 1 and 2 show how to use the double hydrometer ratio (DHR) in selecting appropriate numerical retention criteria.

Define soil density conditions

If the soil is predominantly granular, and steady-state flow conditions prevail, then the relative density of the soil should be determined in accordance with ASTM test method D 4254 or equivalent. For non-critical applications, the guidelines provided in Table 1 may be used to estimate the relative density of the soil.

Determine the maximum allowable geotextile opening size (O_{95})

Figures 1 and 2 show that the final step in determining soil retention requirements is to evaluate the maximum allowable opening size (O_{95}) of the geotextile which will provide adequate retention of the soil. The O_{95}

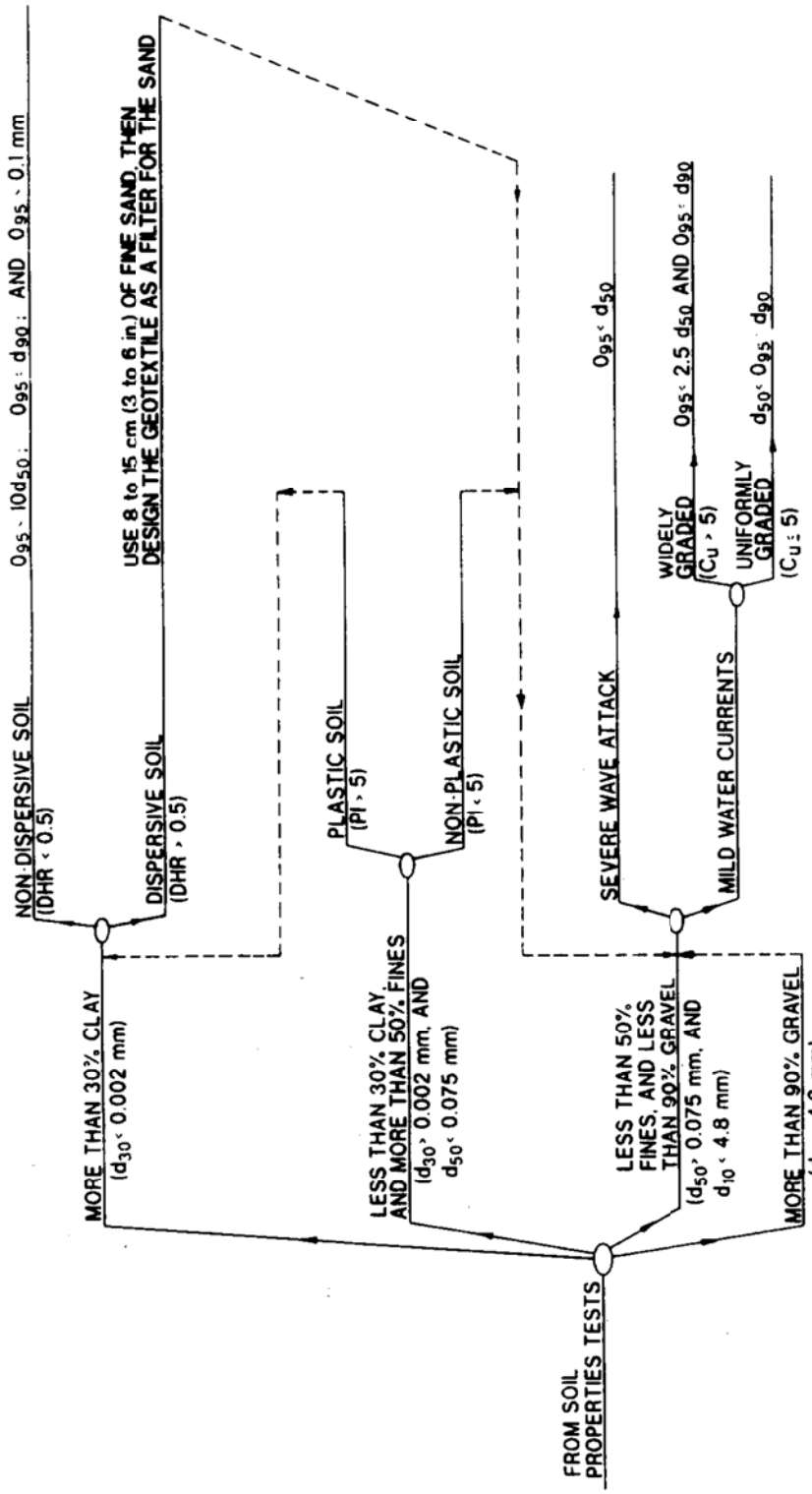


Fig. 2. Soil retention criteria for dynamic flow conditions.

TABLE 1
Typical Relative Densities (I_D) for Granular Soils

Soil conditions	*Low confining pressures (TYP < 50 kPa)*	*High confining pressures (TYP > 50 kPa)*
Unconsolidated sedimentary deposits or uncompacted hydraulic fill	$I_D < 35\%$	$35\% < I_D < 65\%$
Consolidated residual deposits or compacted fill	$35\% < I_D < 65\%$	$I_D > 65\%$

value can be determined from apparent opening size test method ASTM D 4751 or equivalent; this value can also be obtained from geotextile manufacturers' literature.

Step 4. Determine geotextile permeability requirements

Define the soil hydraulic conductivity (k_s)
The soil hydraulic conductivity (permeability) should be determined by one of the following methods:

- For critical applications, such as earth dams, the soil permeability should be measured in the laboratory using representative field conditions in accordance with test method ASTM D 5084 or equivalent.
- For many non-critical applications the soil hydraulic conductivity can be estimated from Fig. 3, using the characteristic particle size, d_{15}, of the soil.

Define the hydraulic gradient for the application (i_s)
The hydraulic gradient (i_s) will vary depending on the application of the filter. Anticipated hydraulic gradients for various applications may be estimated using Table 2.

Determine the minimum allowable geotextile permeability (k_g)
After determining the soil hydraulic conductivity and the hydraulic gradient, the following equation can be used to determine the minimum allowable geotextile permeability (Giroud, 1988):

$$k_g > i_s k_s \tag{1}$$

The hydraulic conductivity (permeability) of the geotextile can be calculated from the permittivity test method ASTM D 4491; this value

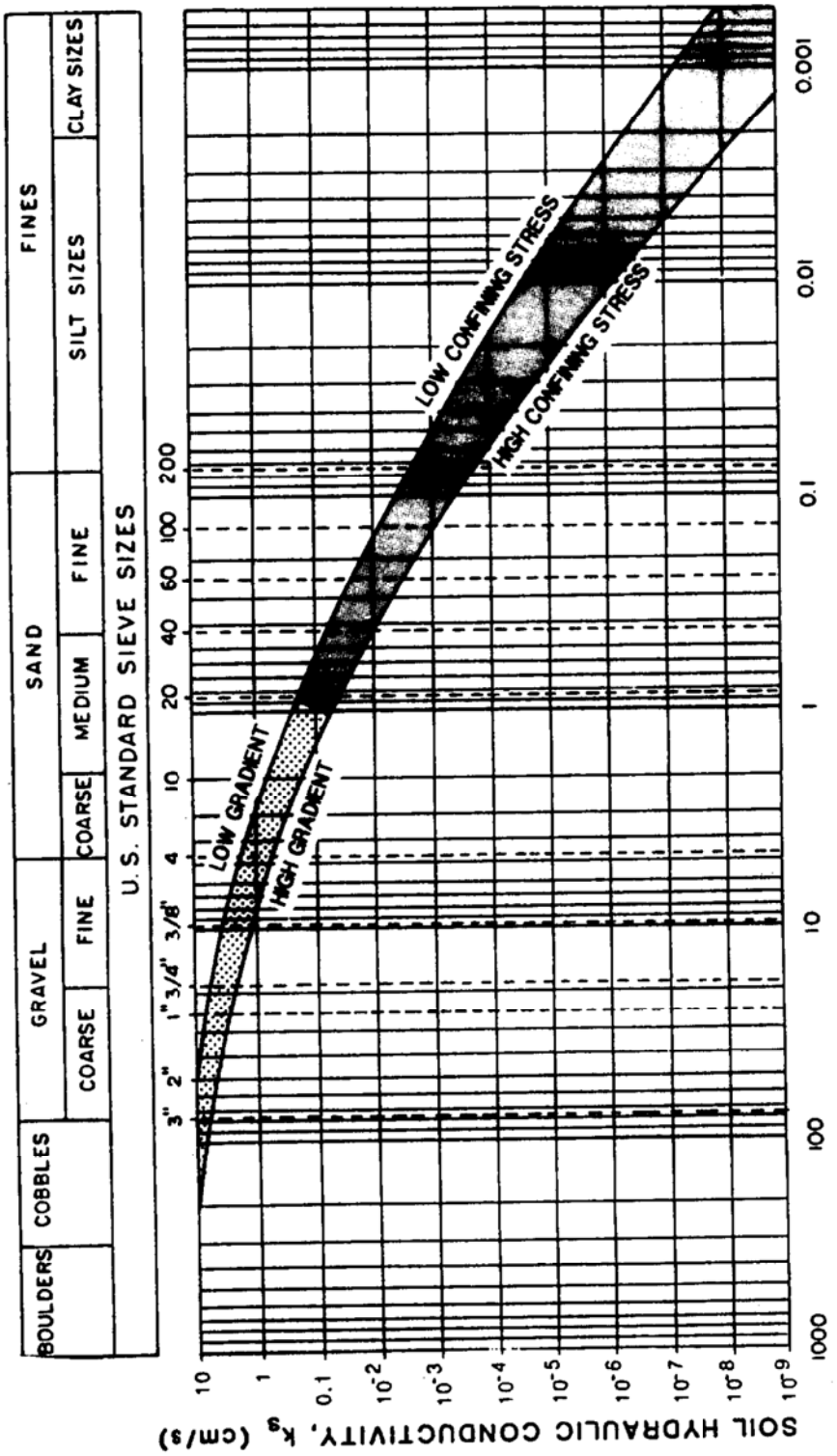


Fig. 3. Typical hydraulic conductivity values.

TABLE 2
Typical Hydraulic Gradients[a]

Drainage application	*Typical hydraulic gradient*
Standard dewatering trench	1·0
Vertical wall drain	1·5
Pavement edge drain	1[b]
Landfill leachate collection/detection removal system	1·5
Landfill leachate collection removal system	1·5
Landfill closure surface water collection removal system	1·5
Dam toe drains	2
Dam clay cores	3 to >10[b]
Inland channel protection	1[b]
Shoreline protection	10[b]
Liquid impoundment with clay liners	>10[b]

[a]Table developed after Giroud (1988).
[b]Critical applications may require designing for higher gradients than those given.

can often be obtained from the manufacturer's literature as well. The geotextile permeability is defined as the product of the permittivity (ψ_g), and the geotextile thickness (t_g):

$$k_g = \psi_g t_g \tag{2}$$

Step 5. Determine anti-clogging requirements

As mentioned previously, granular filters, when properly designed, were successfully used for many years prior to the introduction of geotextiles. The opening sizes provided by granular filters are controlled by choosing different sizes of granular media (for example, a uniform fine-sand filter yields smaller openings than a uniform coarse-sand filter). Inherent, however, in all granular filters, despite the size of the particles, are porosity values of approximately 0·25 to 0·35. The successful history of granular filters has often been attributed to the inherent amount of filter pore space (expressed as the porosity multiplied by the filter thickness) provided by granular filters.

It therefore stands to reason that, regardless of the size of the openings, a geotextile filter with many openings (i.e. a significant amount of pore space) is preferable to a similar geotextile filter with only a few openings. Hence, if soil particles block some of the openings, there should remain

plenty of openings such that the permeability of the filter is not significantly impaired.

To minimize the risk of clogging, the following criteria should be met:

- Use the largest opening size (O_{95}) that satisfies the retention criteria.
- For nonwoven geotextiles, use the largest porosity (n) available, but not less than 30%.
- For woven geotextiles, use the largest percent open area (POA) available, but not less than 4%.

To further minimize the risk of filter clogging, performance tests may be conducted to evaluate the potential filter behavior with a given soil. Performance tests for filters are subsequently described in the 'Testing for Critical Applications' section of this paper.

Step 6. Determine survivability requirements

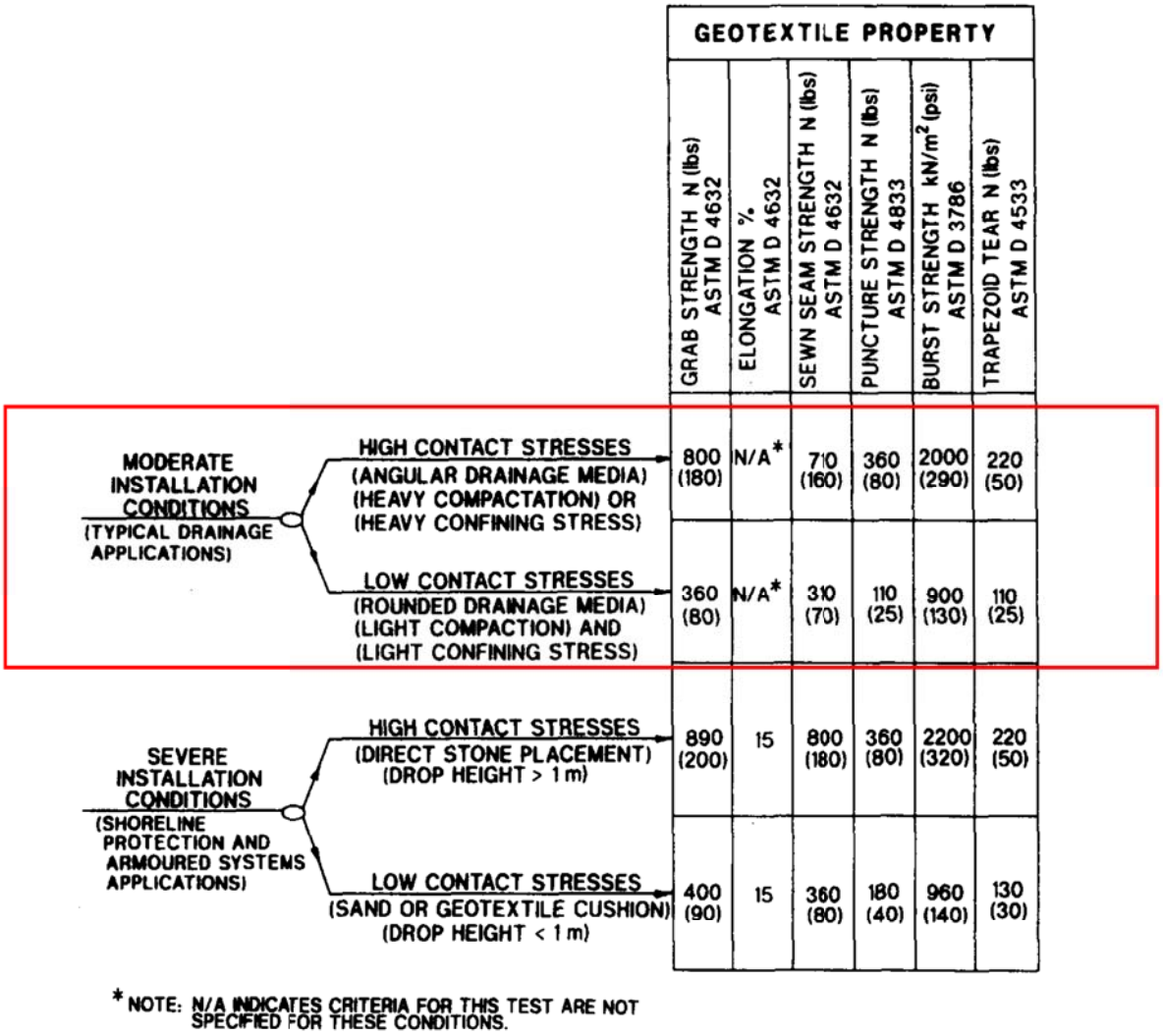
Experience has shown that the type of drainage material placed adjacent to the geotextile, and the construction technique used to place the drainage material can affect the potential damage to the geotextile. The most common technique for ensuring the construction survivability of the geotextile is to specify minimum index strength properties that correspond to the severity of the installation. It is noted that some engineering judgement must be used in defining the severity of the installation.

Figure 4 provides guidance in selecting required geotextile strength properties to ensure survivability for various degrees of installation conditions.

Step 7. Determine durability requirements

Some installations or applications of geotextile filters result in extended exposure to sunlight. In these cases, additives such as carbon black or titanium dioxide are recommended to provide the geotextile with added resistance to degradation due to ultraviolet light.

If the geotextile application will result in significant exposure to chemicals (such as in waste-containment landfill applications), the chemical compatibility of the geotextile with the chemicals should be evaluated using the US Environmental Protection Agency (USEPA) 9090 testing procedure.



		GRAB STRENGTH N (lbs) ASTM D 4632	ELONGATION % ASTM D 4632	SEWN SEAM STRENGTH N (lbs) ASTM D 4632	PUNCTURE STRENGTH N (lbs) ASTM D 4833	BURST STRENGTH kN/m² (psi) ASTM D 3786	TRAPEZOID TEAR N (lbs) ASTM D 4533
		GEOTEXTILE PROPERTY					
MODERATE INSTALLATION CONDITIONS (TYPICAL DRAINAGE APPLICATIONS)	HIGH CONTACT STRESSES (ANGULAR DRAINAGE MEDIA) (HEAVY COMPACTATION) OR (HEAVY CONFINING STRESS)	800 (180)	N/A*	710 (160)	360 (80)	2000 (290)	220 (50)
	LOW CONTACT STRESSES (ROUNDED DRAINAGE MEDIA) (LIGHT COMPACTION) AND (LIGHT CONFINING STRESS)	360 (80)	N/A*	310 (70)	110 (25)	900 (130)	110 (25)
SEVERE INSTALLATION CONDITIONS (SHORELINE PROTECTION AND ARMOURED SYSTEMS APPLICATIONS)	HIGH CONTACT STRESSES (DIRECT STONE PLACEMENT) (DROP HEIGHT > 1 m)	890 (200)	15	800 (180)	360 (80)	2200 (320)	220 (50)
	LOW CONTACT STRESSES (SAND OR GEOTEXTILE CUSHION) (DROP HEIGHT < 1 m)	400 (90)	15	360 (80)	180 (40)	960 (140)	130 (30)

* NOTE: N/A INDICATES CRITERIA FOR THIS TEST ARE NOT SPECIFIED FOR THESE CONDITIONS.

Fig. 4. Survivability strength requirements (after AASHTO–AGC–ARTBA, 89).

Step 8. Miscellaneous design considerations

Other considerations which should be addressed in design of geotextile filters are:

- the geotextile structure;
- intrusion of the geotextile into the drainage layer;
- extrusion of fine-grained soil through the geotextile when subjected to high confining pressures;
- abrasion of the geotextile due to dynamic action;
- intimate contact of the soil and geotextile;

- biological and bio-chemical clogging factors; and
- safety factors.

These topics are mentioned here for completeness, but due to space limitations, they cannot be explained in detail. These factors are, however, discussed in the *Geotextile Filter Design Manual* (Luettich *et al.*, 1991).

Step 9. Select a geotextile filter

The design considerations presented in Steps 3 through 8 provide a logical methodology for obtaining the required properties of the geotextile filter. To summarize, these properties are as follows:

- maximum allowable Apparent Opening Size (O_{95}) of the geotextile, as described in Step 3;
- minimum allowable permeability (k_g) or permittivity (ψ_g) of the geotextile, as described in Step 4;
- minimum allowable porosity (n), or percent open area (POA), of the geotextile, as described in Step 5;
- minimum allowable physical strength requirements of the geotextile as described in Step 6;
- guidance to help ensure adequate durability of the geotextile, as described in Step 7;
- miscellaneous considerations which are specific to certain applications and should qualitatively be integrated into the decision process, as mentioned in Step 8.

The final step is to select a geotextile filter using the required material properties. The required properties should be compared with the geotextile properties provided in geotextile manufacturers' product literature, and for some applications verified through conformance testing.

TESTING FOR CRITICAL APPLICATIONS

The design methodology presented thus far is intended to guide the designer through a series of logical steps for the selection of geotextile filters for noncritical applications. These guidelines were developed from a combination of theory, empirical data, and experience pertaining to geotextile filters.

Critical applications, where loss of life or significant loss of property may result from failure of the filter, may require laboratory and/or field

tests. Results of performance tests provide data regarding the behavior of the candidate geotextile filter when subjected to the actual (or closely simulated) boundary, flow, and soil conditions anticipated from the design application.

Performance testing may take many forms, depending on the application and the consequences of failure of the filter. The following list references test methods which may be used to provide additional information regarding filter behavior.

- Retention testing
  - —*Slurry testing*
    Legge, K. R. (1990). A New Approach to Geotextile Selection. *Proceedings of 4th International Conference on Geotextiles, Geomembranes and Related Products*, The Hague, Netherlands, May 1990. A. A. Balkema, Rotterdam, The Netherlands, pp. 269–72.
- Clogging Testing
  - —*Hydraulic Conductivity Ratio (HCR) testing*
    Williams, N. D. & Abouzakhm, A. M. (1989). Evaluation of geotextile/soil filtration characteristics using the hydraulic conductivity ratio analysis. *Geotextiles and Geomembranes*, **8**, 1–26.
  - —*Gradient ratio testing*
    ASTM D 5105 (1991) Standard Test Method for measuring the soil–geotextile system clogging by the gradient ratio. ASTM, Philadelphia, PA, Volume 4.08.
  - —*Biologicial clogging testing:*
    ASTM D 1987 (1991). Test Method for biologic clogging of geotextile or soil–geotextile filters, ASTM, Philadelphia, PA, Volume 4.08.
- Survivability testing
  - —Richardson, G. N. & Wyant, D. C. (1987). Geotextiles construction criteria. *Geotextiles Testing and the Design Engineer*, ASTM STP 952. ASTM, Philadelphia, PA, pp. 125–38.
  - —Bonaparte, R. *et al.* (1988). Survivability and durability of a nonwoven geotextile. *Geosynthetics for Soil Improvement*, ASCE geotechnical Special Publication No. 18, Nashville, TN, pp. 68–91.
- Durability testing
  - —*Ultraviolet light testing*
    ASTM D 4355 (1991) Standard Test Method for deterioration of geotextiles from exposure to ultraviolet light and water. ASTM, Philadelphia, PA, Volume 4.08.

—*Chemical compatibility testing*
USEPA Method 9090 (1987). Compatibility test for wastes and membrane liners. USEPA, Washington, DC, SW-846, 3rd edn.
—*Abrasion testing*
ASTM D 4886 (1991). Standard Test Method for abrasion resistance of geotextiles (sand paper/sliding block method), ASTM, Philadelphia, PA, Volume 4.08.

SUMMARY

Performing a complete geotextile filter design involves more than merely considering retention and permeability criteria. Other design considerations, such as the favored characteristic of the filter (i.e., the retention versus permeability tradeoff), boundary conditions, and the internal stability of the soil must be addressed. The methodology presented in this paper provides a systematic approach that includes the primary components required to design geotextile filters.

ACKNOWLEDGEMENTS

The authors wish to acknowledge Mr Joel Sprague of the Nicolon Corporation for providing technical review and the funding necessary to develop the concepts set forth in this paper, and the companion *Geotextile Filter Design Manual* (Luettich *et al.*, 1991).

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Heerten, G. (1982). Dimensioning the filtration properties of geotextiles considering long-term conditions. In *Proceedings of Second International Conference on Geotextiles*, Las Vegas, NV 1982, Volume I. Industrial Fabrics Association International, St Paul, MN, pp. 115–20.

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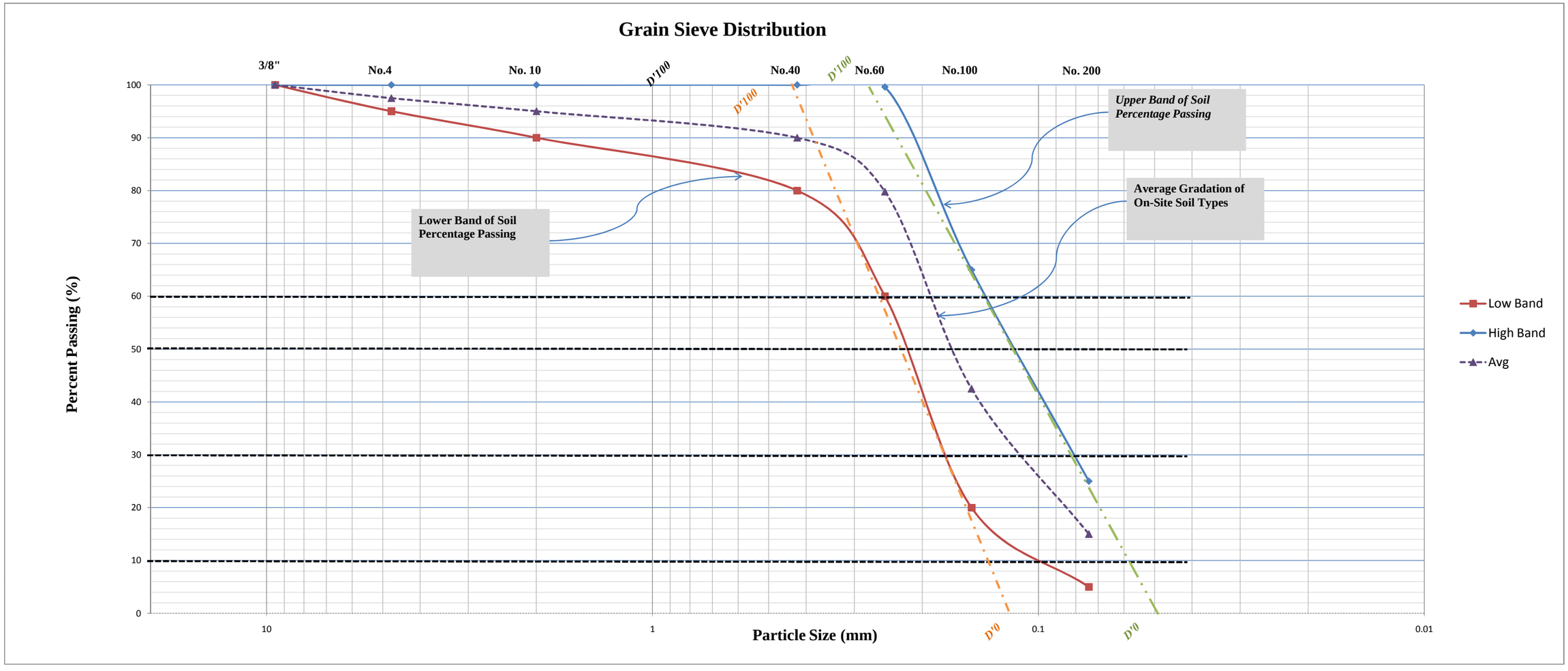
ATTACHMENT C


Grain Sieve Distribution
3/8"
No.4
No. 10
D'100
No.40
D'100
D'100
No.60
No.100
No. 200
Upper Band of Soil Percentage Passing
Average Gradation of On-Site Soil Types
Lower Band of Soil Percentage Passing
Low Band
High Band
Avg
Percent Passing (%)
100
90
80
70
60
50
40
30
20
10
0
10
1
Particle Size (mm)
D'0
0.1
D'0
0.01

ATTACHMENT D

GSE Internal Specification Review

Clarifications

Date: August 11, 2015

Project: Brevard Co CDF Slurry Wall Ph 5 Sequential Closure
Products: **1)** 6 oz/yd^2 Double Sided TRx Geocomposite
Sections: **02373** – Page 1 thru 16

Clarifications/Exceptions

Page 02373-5, Part 1.05.A.11 & 12; Page 02373-13, Table 02373-4
GSE asks that this section be amended with the following statement:

- Direct shear testing (ASTM D 5321 and D 6243) is a performance test, not an index test. As such, GSE does not perform or certify to direct shear results since the test relies on site-specific conditions. Interface values are greatly affected by (1) the material interface, (2) the rate of displacement, and (3) the normal load applied. However, GSE understands that this test is critical to design confirmation and can supply material to a laboratory of the customer's choice for testing or GSE can have the test performed at an outside laboratory for an additional cost if requested.

Page 02373-13, Table 02373-3
GSE asks that the project specifications be amended to standard GSE specifications.

Geocomposite Property	Project Specifications	GSE Specifications
Geotextile AOS	100 sieve (0.150 mm) max	70 sieve (0.212 mm)

PRODUCT DATA SHEET

GSE TrxNet 300 mil Geocomposite

GSE TrxNet geocomposite consists of a 300 mil thick GSE TrxNet geonet heat-laminated on one or both sides with a GSE nonwoven needle-punched geotextile. The geotextile is available in mass per unit area range of 6 oz/yd² to 16 oz/yd². The geocomposite is designed and formulated to perform drainage function under a range of anticipated site loads, gradients and boundary conditions.

[*]

AT THE CORE:

A 300 mil thick TrxNet geonet heat-laminated on one or both sides with a nonwoven needlepunched geotextile.

Product Specifications

Tested Property	Test Method	Frequency	Minimum Average Roll Value[1]		
Geocomposite			6 oz/yd²	8 oz/yd²	10 oz/yd²
Transmissivity[2], gal/min/ft, (m²/sec) Double-Sided Composite Single-Sided Composite	ASTM D 4716	1/540,000 ft²	12.1 (2.5x10⁻³) 15.7 (3.2x10⁻³)	12.1 (2.5x10⁻³) 15.7 (3.2x10⁻³)	10.1 (2.2x10⁻³) 13.8 (2.9x10⁻³)
Ply Adhesion, lb/in	ASTM D 7005	1/50,000 ft²	0.5	0.5	0.5
Geonet Core[3] – GSE TrxNet					
Geonet Core Thickness, mil	ASTM D 5199	1/50,000 ft²	300	300	300
Transmissivity[2], gal/min/ft (m²/sec)	ASTM D 4716		43.5 (9.0 x 10⁻³)	43.5 (9.0 x 10⁻³)	43.5 (9.0 x 10⁻³)
Density, g/cm³	ASTM D 1505	1/50,000 ft²	0.94	0.94	0.94
Tensile Strength (MD), lb/in	ASTM D 7179	1/50,000 ft²	75	75	75
Carbon Black Content, %	ASTM D 4218	1/50,000 ft²	2.0	2.0	2.0
Geotextile[3]					
Mass per Unit Area, oz/yd²	ASTM D 5261	1/90,000 ft²	6	8	10
Grab Tensile Strength, lb	ASTM D 4632	1/90,000 ft²	160	220	260
Grab Elongation	ASTM D 4632	1/90,000 ft²	50%	50%	50%
CBR Puncture Strength, lb	ASTM D 6241	1/540,000 ft²	435	575	725
Trapezoidal Tear Strength, lb	ASTM D 4533	1/90,000 ft²	65	90	100
AOS, US sieve[1], (mm)	ASTM D 4751	1/540,000 ft²	70 (0.212)	80 (0.180)	100 (0.150)
Permittivity, sec⁻¹	ASTM D 4491	1/540,000 ft²	1.5	1.3	1.0
Water Flow Rate, gpm/ft²	ASTM D 4491	1/540,000 ft²	110	95	75
UV Resistance, % retained	ASTM D 4355 (after 500 hours)	per formulation	70	70	70
NOMINAL ROLL DIMENSIONS[4]					
Roll Width, ft			15	15	15
Roll Length, ft	Double-Sided Composite Single-Sided Composite		160 170	150 170	140 160
Roll Area, ft²	Double-Sided Composite Single-Sided Composite		2400 2550	2250 2550	2100 2400

NOTES:

- [1]All geotextile properties are minimum average roll values except AOS which is maximum average roll value and UV resistance is typical value. Geonet core thickness is nominal value.
- [2]Gradient of 0.1, normal load of 10,000 psf, water at 70˚F between steel plates for 15 minutes. Contact GSE for performance transmissivity value for use in design.
- [3]Component properties prior to lamination.
- [4]Roll widths and lengths have a tolerance of ±1%.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.

GSE ENVIRONMENTAL™

[DURABILITY RUNS DEEP] For more information on this product and others, please visit us at GSEworld.com, call 800.435.2008 or contact your local sales office.

(http://www.erosionpollution.com) MENU

HOME (HTTP://WWW.EROSIONPOLLUTION.CCM/) / GEOTEXTILES (HTTP://WWW.EROSIONPOLLUTION.COM/GEOTEXTILE-FABRIC-APPLICATION.HTML) / 6 OZ. NOWOVEN GEOETEXTILE

Drainage Geotextile

Non Woven Geotextile Fabric

6 oz. Nonwoven Geotextile Fabric
For Landfills, Drainage, and Separation Applications

(http://www.erosionpollution.com/estimate_request.html)

This 6 oz. drainage geotextile fabric is the perfect choice for applications requiring ground stabilization, aggregate separation, and soil reinforcement. As part of our non-woven geotextile variety, these fabrics are constructed with a needle-punched exterior that helps facilitate filtration applications.

The 6 oz. material is part of the light weight fabric variety that is perfect for drainage, asphalt overlay and various other filtration requirements. Light weight fabrics are slightly lower in strength, but feature increased permeability levels as high as 125 gpm/sq. ft. This makes them a great option for use in both street and french drains.

Request a Quote (http://www.erosionpollution.com/estimate_request.html)

If you have **questions** about any of our products, give us a **call at (+1) 772.646.0597 or toll free at (+1) 888.703.9889** or request a price quote (http://www.erosionpollution.com/estimate_request.html).

Technical Specifications:

Property	Test Method	Minimum Average Roll Value (M.A.R.V.)
Weight (typical)	ASTM D5261 (http://www.astm.org/Standards/D5261.htm)	6 oz/yd² (203 g/m²)
Grab Tensile	ASTM D4632 (http://www.astm.org/Standards/D4632.htm)	160 lbs (.711 kN)
Grab Elongation	ASTM D4632 (http://www.astm.org/Standards/D4632.htm)	50 %
Trapezoid Tear Strength	ASTM D4533 (http://www.astm.org/Standards/D4533.htm)	65 lbs (0.29 kN)
Thickness*	ASTM D5199 (http://www.astm.org/Standards/D5199.htm)	85 mils (2.16 mm)
CBR Puncture Resistance	ASTM D6241 (http://www.astm.org/Standards/D6241.htm)	450 lbs (2 kN)

Permittivity*	ASTM D4491 (http://www.astm.org/Standards/D4491.htm)	1.63 sec -1
Permeability	ASTM D4491 (http://www.astm.org/Standards/D4491.htm)	0.3 cm/sec
Water Flow*	ASTM D4491 (http://www.astm.org/Standards/D4491.htm)	125 gpm/ft² (5080 l/min/m²)
A.O.S*	ASTM D4751 (http://www.astm.org/Standards/D4751.htm)	70 U.S. Sieve (.212 mm)
UV Resistance	ASTM D4355 (http://www.astm.org/Standards/D4355.htm)	70 %/500 hrs

*At the time of manufacturing handling, storage, and shipping may change these geotextile sales properties.

Request a Quote (http://www.erosionpollution.com/estimate_request.html)

If you have **questions** about any of our products, give us a **call at (+1) 772.646.0597 or toll free at (+1) 888.703.9889** or request a price quote (http://www.erosionpollution.com/estimate_request.html).

When is an Environmental Nonwoven Geotextile Used?

(http://www.erosionpollution.com/causes-of-soil-erosion.html)Nonwoven drainage geotextiles are typically used in a variety of different locations to help control erosion, stabilize roads, and reinforce areas prone to high levels of drainage applications.

(http://www.erosionpollution.com/causes-of-soil-erosion.html)The nonwoven material is generally known for its ability to help with separation, reinforcement, drainage, filtration, protection and waterproofing applications. Some common locations where these materials have been used include the following:

- (http://www.erosionpollution.com/causes-of-soil-erosion.html)Slope Reinforcement
- Landfill Lining and Stabilization
- Earth Retaining Structures
- Underlayment Fabric
- Landscaping Materials
- Pond Underlayment
- Walkway or Driveway Separation (especially in areas such as dirt or gravel roadways)

A majority of our nonwoven fabrics are frequently used for applications involving outdoor storage. Made from a high resistance polypropylene material, these fabrics have been able to hold up against rotting, deterioration, and UV exposure applications.

Not Sure Which Drainage Geotextile You Need?

View our products below, **sorted by function**, or Search our Products!

Attachment 4

Wetwell and Pump Capacity Calculations

Project Enterprise Wetwell Design
Project 02000-144-14

Purpose:
Determine wetwell working volume, associated working depth, and operational level.

Given:

Pump Information

1.	Pump Manufacturer/Model =	**Supplied By Owner**		
2.	Design Pumping Capacity (Min Head Case) =	**140**	gpm	Qmh
3.	Max # of Starts per Hour Avg Flow =	**2**		# of starts (Avg)
4.	Max # of Starts per Hour Peak Flow =	**12**		# of starts (Peak; limited duration of operation <5 min per cycle)
5.	Number of Pumps Used =	**1**		1 Pump Non-Alternating Operation.
6.	Required Depth of Submergence of Pump =	**0.17**	ft	

Wetwell Information

1.	Wetwell Inside Diameter =	**6**	ft	D
2.	Inflow Inv. Elevation =	**74.98**	ft	
3.	Bottom of Wetwell Elevation =	**72.00**	ft	
4.	Total Depth (Inv Elev to Bottom of Wetwell)	**2.98**	ft	
5.	Required Depth of Submergence of Pump =	**0.17**	ft	Height of Water Above pump
6.	Total Height of Pump =	**2.00**	ft	
7.	Total Depth Required =	**2.17**	ft	**Yes Total Depth is OK; water below invert**
8.	Working Depth volume from Pipe IE to Submergence)	**0.81**	ft	**Differenc from Pipe IE to Pump Submergence (Pump off)**
		9.76	inches	

Inflow Information

1.	Design Average Inflow (Qdai)=	**5**	gpm =	0.011	cfs
2.	Design Peak Inflow (Qpi)=	**90**	gpm =	0.201	cfs

Solution:

Determine Actual Working Depth and Volume

1.	Allowable Cycle Time (avg) =	**30**	min	tc = 60/# of starts (Avg)	No less than 5 minutes or the
2.	Allowable Cycle Time (peak) =	**5**	min	tc = 60/# of starts (Peak)	
3.	Wetwell Volume per Foot of Depth =	**211**	gal/ft	V/ft = π/4*D 2	
4.	Selected Working Depth =	**0.81**	ft	da	
5.	Actual Working Volume =	**172**	gal	Va = (π/4*D 2)*7.48*da	

Determine Fill, Empty, and Cyle Times for Design Average Inflow

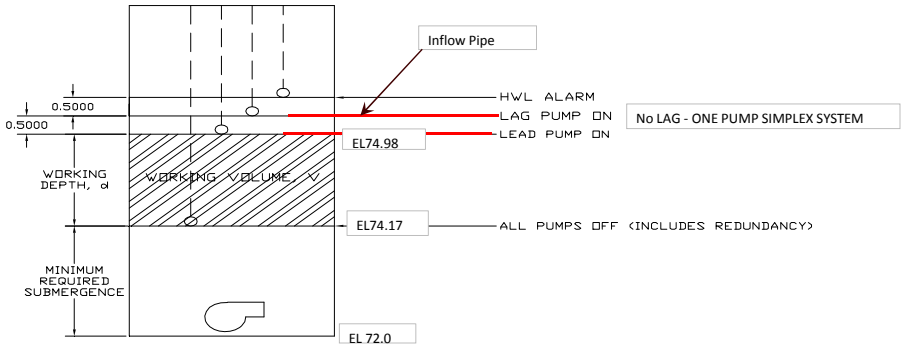
1.	Time to Fill (Design Average Inflow) =	**34.40**	min	tf = Va/Qdai	**0.57**	hours
2.	Time to Empty (Design Average Inflow) =	**1.27**	min	te = V/(Qmh-Qdai)	**0.02**	hours
3.	Cycle Time (Design Average Inflow) =	**35.68**	min	tc = tf + te	**0.59**	hours

Determine Fill, Empty, and Cycle Times for Design Peak Inflow

1.	Time to Fill (Peak Inflow) =	**1.91**	min	tf = Va/Qpi
2.	Time to Empty (Peak Inflow) =	**3.44**	min	te = V/(Qmh-Qpi)
3.	Cycle Time (Based on Peak Inflow) =	**5.35**	min	tc = tf + te

Proposed Operational Levels:

HWL Alarm:	**75.98**	ft	Ground EL =	90.5 ft
Lag Pump On:	74.98	ft	Bottom EL =	72.0 ft
Lead Pump On:	74.98	ft	Wetwell depth =	18.50 ft (min Static Head)
LWL/ All Pumps Off (Includes Redundancy):	74.17	ft	Inflow Pipe Inv EL =	74.98 ft
Calculated Wetwell Bottom with water over pump:	74.17	ft	Depth of Working Volume =	0.81 ft
Selected Wetwell Bottom:	**72.00**	ft		



Attachment 5

Revised Engineering Report

(replace previously submitted report in its entirety)

ENTERPRISE ROAD CLASS III RECYCLING AND DISPOSAL FACILITY
MAJOR PERMIT MODIFICATION
ENGINEERING REPORT

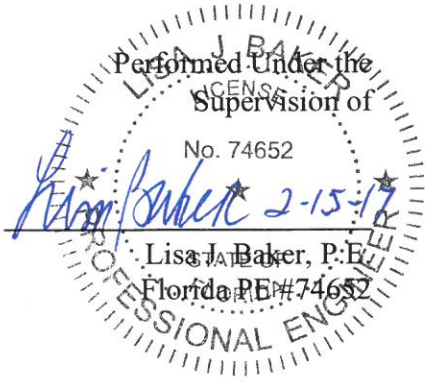
Prepared for:

ANGELO'S AGGREGATE MATERIALS, LTD
855 28th Street South
St. Petersburg, Florida 33712

Prepared by:

LOCKLEAR & ASSOCIATES, INC.
4140 NW 37th Place, Suite A
Gainesville, Florida 32606

~~Revised July 2016 (RAI 1 Response)~~
~~Revised December 2016 (RAI 2 Response)~~
Revised February 2017 (Supplemental Information)



Performed Under the
Supervision of

Lisa J. Baker, P.E.
Florida PE #74652

ENTERPRISE RECYCLING AND DISPOSAL FACILITY
ENGINEERING REPORT
TABLE OF CONTENTS

APPENDICES

SECTION 3
ENGINEERING REPORT

3.1 GENERAL

This Engineering Report is part of a comprehensive Florida Department of Environmental Protection (FDEP or Department) permit modification application for the Enterprise Road Class III Recycling and Disposal Facility (Facility) submitted by Locklear & Associates, Inc. (L&A) in March 2016 and revised in July and December, 2016, and February 2017 on behalf of Angelo's Aggregate Materials, Ltd. (Applicant). The Engineering Report is designed to meet the requirements of Rule 62-701, F.A.C. and Pasco County's Land Development Code (LDC) and includes the following major components (and their respective location within this Engineering Report):

- Plan Set dated March 2016 (revised July and December 2016 and February 2017), titled 2016 Plan Set, by Locklear & Associates, Inc. (Section 4);
- Figures (Appendix 3-C);
- An evaluation of the applicability of bottom liner and leachate collection system requirements (Section 2, Part G, G-1);
- Updated report evaluating geotechnical site conditions (Section 2, Part I, I-1);
- Updated Groundwater Monitoring Plan (Section 5);
- An analysis of slope stability (Section 2, Part I, I-2);
- Updated Closure and Reclamation Plan (Section 7);
- Updated financial assurance cost estimates (Section 7 Appendix 7-A);
- Updated Operations Plan (Section 3 Appendix 3-A);
- Updated Contingency Plan (Section 3 Appendix 3-B).

3.2 SITE LOCATION AND DESCRIPTION

The facility receives approximately 550 tons per day of Class III waste, which includes Construction and Demolition debris, from Pasco County and other surrounding Counties (including Pinellas, Hernando, Hillsborough and Polk). The Facility was originally permitted by the Department on October 5, 2001.

The subject site is located in Sections 5 and 8, Township 25 South, Range 22 East, in Pasco County, Florida, as shown on the United States Geological Survey (USGS) quadrangle map presented in Figure 3-1 in Appendix 3-C. More specifically, the Facility is located at the northwest corner of the intersection of Enterprise Road and Auton Road, southeast of Dade City, Florida (Figure 3-1 in Appendix 3-C). The site occupies approximately 160 acres of land on the north side of Enterprise Road. The square property is approximately 2,640 feet on a side and is located in the southwest quarter of Section 5 and the northwest quarter of Section 8.

There are no airports within 5 miles of the site, see Figure S-4 (Appendix 3-C).

3.2.1 Prohibition Compliance

In order to comply with Rule 62-701.300, F.A.C., the Facility will abide by the following:

- The Facility will not dispose of solid waste at the proposed site until proper permitting is obtained.

- Disposal of solid waste will not occur in areas that are: unable to provide support for the waste; geological formation or subsurface features that would allow unimpeded discharge to surface water on groundwater; are within 500 feet of an existing potable water well (Figure S-1 in Appendix 3-C); are within a dewatered pit; are in a frequently flooded area; are in a body of water; are within 200 feet of a surface water body that discharges offsite (Figure S-2 in Appendix 3-C); are on a right of way; are within 1,000 feet of an existing community potable water; or are within 3,000 ft. of Class I surface waters (Figure S-3 in Appendix 3-C).

- Open burning will not occur on the site unless the burning takes place in a permitted air curtain incinerator.

- Hazardous wastes, PCB's, biohazardous wastes, special wastes, liquids, and oily wastes will not be disposed of at the Facility. Random load checks and the use of spotters at the working face will ensure that these wastes are not placed for disposal at the Facility.

3.3 SURROUNDING LAND USES AND ZONING

Figure 3-2A in Appendix 3-C presents an aerial photograph map depicting the surrounding land uses and designated FDOT FLUCCS codes in the site vicinity. Open land, pastureland, row crop, tree crop, and upland hardwood forest land uses surround the site. A few scattered residences also surround the site. All adjoining properties are zoned AC. To the north is the East Pasco County Class I Sanitary Landfill, which is closed. To the east is an old borrow pit and agricultural land. South of the site is agricultural land and orange groves, and to the west are orange groves. Figure 3-2A in Appendix 3-C presents an aerial photograph map with future land use classifications.

Current site zoning designation, AC with a conditional use, is consistent with the Class III Landfill use. Revised Figure 5 depicts the locations of five (5) water wells proximate to the landfill limit. The well north of Cell 13 has been abandoned. The on-site non-potable Supply Well is operated and maintained by the facility and only utilized to flush on-site toilets. The well approximately 1000' south of the southeast corner of the facility is identified as "irrigation" by SWFWMD. The

500-foot setback from the approved landfill footprint to potable wells complies with the setback requirements of Rule 62-701.300(2)(C), F.A.C.

3.4 TOPOGRAPHY

The USGS 7.5 minute quadrangle map shown in Figure 3-1 in Appendix 3-C shows the land surface of the subject site has elevations ranging from 85 feet to 175 feet National Geodetic Vertical Datum (NGVD). Natural land surface generally slopes to the northeast on the northern half of the property and southeast on the southern half of the site. A 2013 site-specific topographic survey is shown on Sheets 1 and 2 of the 2016 Plan Set provided in Section 4.

3.4.1 100-Year Flood Prone Areas

Figure S-5 of the 2013 permit renewal application (which refers to the July 2006 Enterprise Recycling and Disposal Class III Landfill Response to 2nd Request for Additional Information, dated July 5, 2006 prepared by Jones Edmunds), depicts a 100-year flood prone area map from the U.S. Federal Emergency Management Administration for the subject vicinity. As shown, the site is not within and would not be impacted by an estimated 100-year storm flood.

3.5 SOILS

According to the Soil Survey of Pasco County, Florida, published by the U.S. Department of Agriculture Soil Conservation Services (USDA-SCS), the majority of the subject site and surrounding areas are covered by fine sands. A copy of the USDA-SCS Soils Survey Map showing the mapped areas of the major soil types at the subject site and its vicinity is presented in Figure 3-5 Soil Survey Map, as referred to in the 2013 permit renewal application as submitted as part of the 2005 Enterprise Recycling and Disposal Facility Class III Landfill Permit Renewal Application, Pasco County, dated August 2005, prepared by Tetra-Tech HAI (TTHAI).

USDA-SCS soil type 12- Astatula fine sands encompass a small portion in the northeast portion of the site. Astatula sands are nearly level to gently sloping, and excessively drained mainly in the sandhills. Seasonal high water table (SHWT) is typically at a depth of 72 inches in Astatula soil. The permeability is very rapid throughout the soil. Both the available water capacity and natural fertility of the Astatula soil are low.

USDA soil type 32 - Lake fine sands comprise the majority of the soils found on the property. These soils are nearly level to gently sloping and excessively well drained. They occur along ridgetops and on low hillsides in the uplands. Permeability is rapid throughout the soil and the water table is below a depth of 120 inches. The available water capacity is very low in all layers and the natural fertility and organic matter content are both low.

USDA soil type 72 - Orlando fine sands are found in a small area in the northeast portion of the property. These soils are nearly level to gently sloping and well drained. The water table is typically at a depth greater than 72 inches with permeability of the soil rapid throughout. The available water capacity is low in the surface layer and very low in the other layers.

3.6 LANDFILL SITE IMPROVEMENTS

Portions of the 160-acre landfill site are also currently being operated as orange groves. The following site improvements have been installed to meet landfill operational requirements.

3.6.1 Entrance Facilities

An office trailer (gatehouse) is located onsite for the gate attendant. This trailer has hand washing and toilet facilities. Potable bottled water is supplied to the trailer. Electric and telephone services are available to the trailer office. Site entrance improvements also include an all-weather entrance roadway, scales and perimeter road as shown in Sheet C0.02 of the 2016 Plan Set provided in Section 4.

3.6.2 Roads

The primary haul route servicing the Facility is Enterprise Road. Enterprise Road is serviced by Clinton Avenue and C.R. 35A.

Enterprise Road has been improved to an all-weather access roadway from C.R. 35A to the entrance of the Facility. All on-site roads are maintained by the Applicant to allow for all weather access. Access roads to the working face are constructed from on-site soils and/or recovered materials such as concrete and asphalt. This is done on an as needed basis

3.6.3 Effective Barrier

A 6-foot high security fence has been constructed along the south and east boundaries. The security fence consists of a 6-foot high-galvanized chain link fence, hereafter referred to as the "security fence." A five-foot wire fence runs along the north and west property boundaries. The chain link fence has been installed in accordance with the permit issued October 2001. Three (3) foot square "NO TRESPASSING" signs with 5-inch letters have been installed at no less than 500-feet spacing and at all corners to notice unauthorized access. The only point of access into the facility will be through the gate at the entrance. This gate will be locked during closed hours.

An 8-foot high landscape berm has been constructed along the site's frontage to Enterprise and Auton Roads, see Sheet C0.02 of the 2016 Plan Set provided in Section 4.

3.6.4 Weighing or Measuring Incoming Waste

A scale system is used to keep records of materials received at the Facility. The scales are calibrated every six (6) months. Vehicles are weighed when they enter the Facility, and based upon the tare weight of the vehicle, the waste tonnage will be determined. Prior to unloading debris, the tonnage or volume of waste materials received will be determined and the appropriate fee assessed.

3.6.5 Vehicle Traffic Control and Unloading

Generally, truck traffic will be controlled on a first-in, first-out basis, as directed by the spotter at the working face. There is adequate space for truck staging at the site's entrance gate (7-8 trucks) to mitigate any queuing onto Enterprise Road. The Facility will discourage any truck staging prior to landfill opening. Signs will be posted at the entrance gate and on interior roads to guide truck traffic.

3.7 EXCAVATION OPERATIONS AND CELL CONSTRUCTION

On-site soils will be excavated according to the Pasco County Class I Mining Permit. The soils will be excavated and removed for various uses, including construction, roadways, and in landfilling operations. The County permit allows an excavation up to within a 200-foot setback from the property boundary and an excavation slope of 6H:1V. The Class I Mine will be "reclaimed" as a Class III landfill. The 6H:1V excavation slopes are associated with the mining of the existing soil. Once the landfill is ready to accept waste, the mine side slopes will be excavated to 2H:1V side slopes (cell slopes). Waste will be placed against this excavated slope and then built above existing grade. Drawing Sheets C1.00 and C1.10 of the 2016 Plan Set (Section 4) show the phasing of the cell construction and filling operation at the Facility.

Excavation slopes will not exceed 6H:1V pursuant to the Pasco County permit; however, once an excavation phase is complete and construction commences on a new cell, the slopes will be excavated to 2H:1V. A portion of the excavated soils from the mining operation will be used as landfill construction material. Excavated soils will be reserved to provide adequate cover material for the landfill operation. Cell construction will follow the sequence described in Section 3.8.

As new cells are excavated and constructed, the cells will be overexcavated to approximately three-feet below the approved excavation base grade to allow for the construction of a 3’ clay layer. If limerock is encountered during construction, the following actions will be taken: **Where limerock is encountered at or below the elevation of the cell clay layer:**

- In the event that limerock is encountered during clay layer excavation or construction activities, the excavation / construction activities shall cease and the Department shall be notified by email within 24 hours of discovery.
- Excavation / construction activities related to determining location, elevation, and

extent of limestone or to remediation in accordance with these procedures will resume no sooner than 24 hours after notice, unless otherwise directed by the Department

- Written notification will be submitted within 7 days of discovery.
- The written notification shall include the location, elevation, and extent of limestone noted on a plan sheet, a description of the materials encountered, and a description of the completion of excavation / clay backfill in the identified area or the anticipated timeframe for completion of these activities.
- The limerock will be over-excavated (5-feet laterally beyond limerock boundary and 3-feet vertically below the bottom of the compacted clay layer) and the area backfilled with clay meeting the specifications in the FDEP Operation/Construction permit and Engineering Report.
- Excavation / construction activities will resume no sooner than 24 hours after notice, unless otherwise directed by the Department

Where limerock is encountered during mining operations at elevations above the elevation of the cell clay layer and do not extend into the clay layer:

- Document on the limerock observation log the location, elevation, and extent of limestone noted on a plan sheet, and a description of the materials encountered
- Submit limerock observation log to FDEP within 7 days of discovery
- Where limerock is encountered within 10-feet of the design elevation of the top of compacted clay layer, in addition to the procedures noted above, overexcavate 1-foot vertically and laterally around the exposed limerock and backfill with compacted clay to temporarily prevent infiltration during mining operations.

If limerock encountered during mining operations at elevations above the cell clay layer extends to or below the elevation of the cell clay layer, the procedures identified above under the heading *"Where limerock is encountered at or below the elevation of the cell clay layer"* shall be followed.

Stockpiled clay, obtained from on-site excavation, will be sampled for laboratory proctor testing for use as cell floor and cell side slope material to construct a three-foot thick clay barrier layer. Material with acceptable permeability and proctor test results will be placed onto the constructed cell floor in lifts, and compacted by multiple passes with a 40,000 lb, D-6 Dozer, or equivalent.

A three-foot thick clay layer will also be placed on the 2H:1V side slopes of the exterior excavation side slopes of each cell to complete the continuous clay barrier layer. Due to the steepness of the slope, clay placement and compaction will require an iterative process consisting of several horizontal lifts, stepped up progressively until the base elevation of the landfill is reached. In order to achieve the required compaction and hydraulic conductivity, as well as to achieve a constant three feet of clay along the slope, each lift along the cell wall will need to exceed three feet wide and be wide enough for the compacting equipment. Construction of the clay side slopes is shown on Drawing C3.00 of the 2016 Plan Set provided in Section 4. Soil in excess of three feet wide on the slopes may be removed after compaction and compliance testing

have been approved. Acceptable test results means the results of the laboratory proctor and permeability tests indicate that the permeability of the material meets the requirements of the construction permit ($1x10^{-7}$ cm/s), and the optimum moisture content is not too high for the equipment to manage. Optimum moisture content for the on-site stockpiles has been approximately 13 to 20 percent.

The dozer will compact the material in the bottom of the excavation and up the side slopes into the dozer track marks. After each lift is compacted with the dozer, a 12-ton, 84-inch vibratory sheeps-foot roller, or equivalent, will be used to roll the material. The daily activities will be recorded, including any tie-in locations, thickness of each compacted lift, verification of the compaction and moisture content testing, verification of equipment used for compaction, and verification of dozer tracks at the tie-in surfaces (no smooth surfaces). Field logs and photographs documenting the field work will be provided to the Department. A topographic survey will confirm the top of excavation and top of clay grades.

Excavation will be such that 2H:1V slopes will only be encountered on the outer edge boundaries of each cell. A 3H:1V working face slope, beginning at the 2H:1V slope face, will be used for landfilling the waste.

A berm will be constructed along the northern outer edge boundaries of Cells 6B and 7 to account for mining excavation in this area. Stockpiled clay obtained from on-site excavation to be utilized for berm construction shall be sampled consistent with the procedures described for the clay barrier layer and demonstrate acceptable test results, as described above. A detail of the berm and tie-in is provided on sheet C-5 of the 2012 permit modification Plan Set provided by Kelner Engineering and on sheet C1.00 of the 2016 Plan Set in Section 4.

A temporary stormwater and leachate diversion swale will be constructed immediately north of Cell 15. The swale will extend east to west the full width of Cell 16 and slope to the west to the temporary stormwater pond in the future Cell 14 area. Leachate generated in existing cells 1-7 and 15 will move to the remaining temporary stormwater pond in the future Cell 14 area. Once Cell 16 construction is complete, the swale will remain in place while the initial lift of waste is placed across the entire floor of Cell 16. Once Cell 16 is "floored out", the swale will be removed for the remainder of operations. Leachate generated in existing cells 1-7 and 15 will then move to a temporary stormwater pond in the future Cell 14 area as it did prior to removal of the swales. The remainder of the leachate generated in cells 1-7, 15 and all leachate generated in Cell 16 will move to a toe drain extending east to west along the northern perimeter of Cell 16. The toe drain will slope west to east and terminate in a manhole located between Cell 16 and Pond 3. The toe drain will "daylight" approximately 3 feet above the bottom of the manhole. A dedicated pump with float control system will be installed in the manhole. Leachate will be pumped from the manhole through a pipe directly to Pond 3.

3.8 METHOD OF CELL SEQUENCE

Angelo's Aggregate Materials is currently (as of ~~March November 2016~~February 2017) filling in Cells 1 – 6 and 15 of the Class III Landfill, while construction of Cell 7 is being completed. The cell construction and filling sequence operations will be as follows:

Phasing Sequence 1	As shown in Drawing Sheets C1.00 and C1.01 Continue filling Cells 1, 2, 3, 4, 5, 6, 6B, 7 and 15 in 10 – 12 foot lifts to waste elevation of 172' Maximum slope is 3H:1V from base grade to waste elevation 122'; 4H:1V from waste elevation 122' to 167'; 1% to 2% grade from waste elevation 167' to 172' 10-ft wide stormwater benches are to be constructed at waste elevations 122' and 147' Sideslope berms and stormwater appurtenances are to be constructed at final closure. Construct Cell 16 in accordance with permitted design
Phasing Sequence 2	As shown in Drawing Sheets C1.10 and C1.11 Begin filling Cell 16 with 4 – 6 feet lift north of the temporary ~~berm~~ stormwater and leachate diversion swale until cell is floored out. Remove temporary ~~berm~~ swale and fill with 4 – 6 feet lift. Continue filling Cell 16 in 10 – 12 foot lifts from base grade to waste elevation 147', including filling over Cell 15. Maximum slope is 3H:1V from base grade to waste elevation 122'; 4H:1V from waste elevation 122' to 147'. A 10-ft wide stormwater bench is to be constructed at elevation 122'. Sideslope berms and stormwater appurtenances are to be constructed at final closure.
Phasing Sequence 3	As shown in Drawing Sheets C2.00 and C2.10 Construct final closure cover system over Cells 1, 2, 3, 4, 5, 6, 6B, 7, 15 and 16 in accordance with the permitted closure design. Construct sideslope berms and stormwater appurtenances. Construct landfill gas vents.

Lift height includes cover material. Due to the landfill bottom elevation, some lifts may not be a full 10 feet in height.

As each sequence is active, the following procedures will be followed.

- The access road to the working face will be constructed and graded as necessary.

- Waste will be compacted as it is placed. General lift height will be 10 feet and will come within three (3) feet of the final elevation to provide for final cover.

- The working face will remain approximately 100 feet in length.

- Avoid channelizing stormwater flows

- Use mulch, grass, and maintain intermediate covers

- Weekly cover of six (6) inches of soil will be placed on the working face.

- Intermediate cover of 12 inches of soil will be placed in areas that will not receive waste within 180 days. The cover may be removed immediately prior to placement of new waste.

- Stormwater runoff from the interior of the excavation and filling area will be diverted to the onsite temporary storage pond using a temporary interior swale and 6-foot berm. Perimeter berms will direct stormwater away from excavation and filling areas. The temporary stormwater pond will receive runoff until Pond 3 is developed.

3.8.1 Vertical Expansion / Conceptual Closure

The landfill is permitted to be completed to a maximum height of 175 feet, NGVD. The final grading plan is shown on Drawing C2.00 of the 2016 Plan Set provided in Section 4. The Conceptual Closure Plan includes permitted Cells 1-7 and 15, and proposed Cell 16.

The Conceptual Closure Plan includes construction of berms on the stormwater benches that will direct stormwater to drop inlets and downcomer pipes spaced approximately every 400 – 500 feet along the benches. The downcomer pipes will discharge through an energy dissipater to the existing stormwater system. The facility's overall stormwater management system is governed by the mining operations and ERP Permits. Grades and elevation vary based on ongoing mining operations and topography. A detailed design that will tie the conceptual closure plan into the facility's stormwater management system will be submitted at the time of closure.

The top (1% to 2% grade) and side slope (4H:1V and 3H:1V) designs provide for proper drainage and minimize rainfall infiltration into the landfill surface.

3.8.2 Erosion Control

The following engineering controls will be used to minimize erosion at the working face:

- Regrade a maximum of 100 linear feet of the outer edge slopes at a time to 2H:1V. The purpose of this recommendation is that a relatively small area will be subjected to surface erosion at

any given time.

- Construct a berm along the top of the slope during the regrading to redirect any rainfall runoff away from the face of the slope. The area along the berm should be graded so as to allow rapid runoff along the top of the slope. Ponding of water near the top of the slope should not be allowed, since seepage through the slope may initiate slope erosion.

- As soon as possible following the construction of the clay layer, begin to fill against the Cell 7 2H:1V slope with the landfill material.

- For Cell 16 construction, filling shall begin immediately north of the east-west trending berm to be located near the southern boundary of Cell 16. The fill sequencing of Cell 16 is described in Section 3.8.

- Avoid channelizing stormwater flows

- Use mulch, grass, and maintain intermediate covers

3.8.3 Life Expectancy

The cell capacity and lifespan estimates for Cells 1 – 7, 15 and 16 have been estimated using the November 2013 topographic survey performed by Pickett and Associates (Sheets 1 and 2 of Section 4); and recent and projected tonnages.

Using the November 2013 topographic survey as a base, a three-dimensional AutoCAD model of Cells 1 – 7, 15 and 16 at closure was generated, using the following assumptions:

- For all cells except Cell 16, 3H:1V side slopes from base grade to waste elevation 122'; 4H:1V from waste elevation 122' to 167'; 1% to 2% grade from waste elevation 167' to 172'
- For Cell 16, 3H:1V from base grade to waste elevation 122'; 4H:1V from waste elevation 122' to 147'.
- 10-foot inset for benches at waste elevations 122-ft and 147-ft NGVD
- 36 inches of cover over the 67.0 acre 2D surface was subtracted from the maximum volume

The airspace volume remaining as of July 2016 was calculated to be approximately 2,535,047 yd^3 after accounting for the final cover volume of 322,829 yd^3.

The following design parameters were used to compute landfill design life remaining:

- **Density:** An in-place density of 1,350 lb/yd^3 (0.675 tons/ yd^3) was used for the design life estimate and is a typical density for Class III waste.

- **Waste acceptance rate:** a waste acceptance rate of 550 tons per day was used based on facility records.

The remaining life in Cells 1 – 7, 15 and 16 was calculated to be 13 years from the survey date, or 2026.

3.9 WASTE COMPACTION AND APPLICATION OF COVER

Waste received will be segregated based on compactibility. Bulky, incompressible items, such as concrete, asphalt, and tree debris, will be separated and stockpiled for future processing. Tree debris may be separated from the waste and periodically mulched on-site. The remaining debris is disposed of in designated cells using onsite equipment to place the debris and a Caterpillar 826 Compactor, or equivalent, to weekly compact the waste. Initial cover material is planned to be excavated from onsite areas and placed weekly in approximately 6-inch layers on the compacted lifts to control vectors, reduce rain infiltration and provide a more stable working face area. An intermediate cover of one (1) foot of compacted soil will be applied if final cover or an additional lift is not to be applied within 180 days of cell completion. Cell closure will occur when all permitted cells are filled. For final buildout grade and closure detail, see Drawing Sheets C2.00 and C2.10 of the 2016 Plan Set provided in Section 4, respectively. The Conceptual Closure Plan includes permitted Cells 1-7 and 15, and proposed Cell 16. Fill grades shall be such that final cover elevations are not exceeded on all slopes.

Final cover consisting of 18 inches of compacted soil barrier layer and 18 inches of soil that will sustain vegetative growth, as specified in the Closure and Reclamation Plan provided in Section 7. Cell closure shall generally conform to the lines and maximum grades specified on Drawing Sheet C2.00 (2016 Plan Set provided in Section 4 and the requirements of Rule 62-701.600 F.A.C., Rule 62-701.400 (7), F.A.C., and Rule 62-701.400(8),F.A.C.. Pesticides when deemed necessary to control rodents, insects and other vectors shall be used as specified by the Florida Department of Agriculture and Consumer Services. Uncontrolled and unauthorized scavenging shall not be permitted at the landfill site. Controlled recycling may be permitted by the Landfill Manager. Temporary storage of soil fill or recycling materials may occur within the inactive, or closed cell areas.

3.10 DESIGN OF GAS, LEACHATE AND STORMWATER CONTROLS

3.10.1 Gas Monitoring and Control

The type of materials to be disposed of in the Class III Landfill are not expected to generate significant amounts of methane or other gases since the landfill's design prevents groundwater contact. Therefore, no active gas control systems or venting is proposed. However, because some biodegradable waste may be accepted, a passive gas control system is proposed, see Section 3.10.1.5. The Landfill Manager will conduct daily and weekly inspections of the landfill and will

check for objectionable odors or gas around the perimeter of the site. The Manager will notify the FDEP of any exceedances and immediately take corrective actions. Corrective actions will include placement of additional cover material or mulch, or lime containing materials such as crushed concrete that is documented to abate the odors. Quarterly gas point monitoring is currently conducted. The facility only accepts Class III debris for disposal and accepts no putrescible household wastes. Surface water and groundwater contact with the Class III wastes will be prevented by the approved facility design. Other best management practices to prevent odors include: 1) closure of each cell as it is completed; 2) weekly soil cover application; and, 3) immediate corrective actions to abate any detected onsite odors.

3.10.1.1 Gas Probe Locations

Gas monitoring points are spaced approximately 600 linear feet apart surrounding the landfill. Sheet C0.03 of the 2016 Plan Set provided in Section 4 presents these locations of the gas probes surrounding the landfill. Gas Probes (GP) 6 through 15 are existing, GP 1 through 5 and 16 are proposed and will be installed as part of future cell construction completion certification at closure. The remaining gas probes are to be installed in accordance with the following schedule in Table 3.10:

Table 3.10 Gas Probe Installation Schedule

Gas Probe	**Cell Construction Completion**
GP-1	Future Cell 10 or closure
GP-2	Future Cell 11 or closure
GP-3	Future Cell 12 or closure
GP-4	Future Cell 13 or closure
GP-5	Future Cell 14 or closure
GP-16	Future Cell 9 or closure

Several existing gas probes on the southern and eastern portion of the property are currently located immediately adjacent to the disposal area rather than at the property boundary as required by Rule. Probes GP-6, -7, -8, -11, and -14 will be relocated to the property boundary as part of the construction activities for Cell 16. Probes GP-12 and -13 were abandoned and replaced with GP-12R and -13R along the property boundary in 2013.

3.10.1.2 Gas Probe Design

Figure 3-14 (provided in Appendix 3-C of the 2012 permit renewal application submitted by Kelner Engineering) presents the gas probe design for the subject landfill site. These gas probes are designed to be surface sealed and to provide a greater permeability than the surrounding sediments to act as collector points for any methane gas, if present. Based on the landfill design, all of the gas probes are designed to be approximately 20-foot in depth with an 18-foot open screen for the monitoring point, or to depth of adjacent waste. Table 3.10.1.2 presents supplemental

information related to the anticipated total depths of gas monitoring probes GP-6R, GP-7R and GP-8R and GP-11R and GP-14R. These depths will allow the screened interval to intercept the full cross-section of the landfilled waste that could potentially generate methane.

Table 3.10.1.2

Well	Elevation of the Bottom of Waste in the Adjacent Disposal Cell (ft., NGVD)	Elevation at Surface (ft., NGVD)	Total Depth (ft.)	Top of Perforated Section (ft., NGVD)	Bottom of Perforated Section (ft., NGVD)
GP-6R	78	90	20	88	70
GP-7R	78	90	20	88	70
GP-8R	78	90	20	88	70
GP-11R	82	120	40	118	80
GP-14R	86	115	30	113	85

The groundwater table may be encountered at depths of approximately 50-foot, or more below land surface (bls) across most of the site. Accordingly, gas probes are not designed to intercept the groundwater table. The gas probes are constructed of Schedule-40 polyvinyl chloride plastic pipe (PVC). The PVC casing and screen will be flush-threaded and have a screen slot size large enough to accommodate easy methane extraction from the monitoring point. The sand/bentonite slurry proposed for a surface seal will be a blend of 4 parts of sand to one part of granular bentonite. The sand and the bentonite will be mixed dry and hydrated immediately prior to placing it in the annular space of the borehole. The gas probe points are proposed to be installed by hollow-stem auger to construct an eight-inch borehole to be filled with pea gravel. The pea gravel will meet the requirements of FDOT standard size No. 10 aggregate washed pea gravel. Each gas probe will be protected by a surface mounted well protector and locked for security purposes. Each gas probe will terminate at the surface with a PVC ball valve to accommodate easy monitoring of methane levels, with a portable meter. The ball valve will remain closed between monitoring events and pre-purge measurements will be recorded. In the event of a positive gas measurement, the post-purge measurement will also be recorded.

3.10.1.3 Methane Gas Measurement

In accordance with the requirements of the current FDEP permits, methane gas levels are monitored at each of the active gas monitoring points quarterly, with results submitted to the FDEP. A lower explosive limit (LEL) meter will be used to measure methane levels from each of the gas probes. LEL meters, such as the MSA Model 260 or GEM 500 or equivalent, will be used to conduct this monitoring. These meters are capable of measuring percent volume of methane in air and the percent LEL level of the methane by volume. The meter will be calibrated in accordance with manufacturer's specifications prior to each methane monitoring event. Attachment 4 of the Operations Plan provided in Appendix H presents the proposed gas monitoring probe survey form to be used to conduct the quarterly monitoring at the subject site.

This form will document at the time of each gas probe reading, air temperature in degrees Fahrenheit, methane levels in percent volume in air and percent LEL. The reporting action level for methane in air will be considered 5 percent by volume in air as measured by the lower explosive limit. The reporting action limit for methane in structures is 25% of the LEL, or 1.25% methane by volume. The results of each quarterly gas probe survey will be submitted to the Department on the presented form within two weeks of each monitoring event. These events are planned to be coordinated with the semi-annual groundwater monitoring at the subject site.

3.10.1.4 Gas Contingency Plan

The following Contingency Plan will be implemented if any of the measured gas monitoring points methane levels are detected above the 100% LEL of greater than 5 percent methane in air, or if 25% of the LEL or higher is measured in a structure. If this level of methane or greater is detected in any of the probes, the Facility operator will institute measurement of methane in nearby, at, or below grade structures, i.e., stormwater collection points, or any maintenance or office buildings within 100 feet of the subject gas probe on a weekly basis until these levels go below the 100% LEL at the subject probe. If methane levels measured in any on-site building exceed 25% of the LEL, building windows and/or doors will be opened for ventilation and all personnel evacuated until methane readings are maintained below 25% of the LEL for methane. The monitoring report for any event that detects methane above the LEL will also report methane levels from nearby structures, as indicated above, until the levels go below the methane LEL level or until corrective actions are conducted to reduce methane levels. The FDEP will be notified within seven days of any gas monitoring levels that exceed the reporting action levels.

3.10.1.5 Passive Gas Vents

Within 90 days of closure of each landfill cell, a passive landfill gas vent will be installed at the highest point of the cell to prevent explosions, fires and damages to vegetation from methane gas buildup. Sheet C2.00 shows the location of the 10 gas vents and Figure 3-16 (provided in Appendix 3-C of the 2012 permit renewal application submitted by Kelner Engineering) presents the design of a typical vent. The facility's gas emissions are expected to be far below the threshold of a Title V or an NSPS permit.

3.10.2 Leachate Control

Any leachate that may be produced at the landfill will be controlled with the use of a continuous 3-foot thick clay layer ($1x10^{-7}$ cm/s) that will be placed on the bottom of the cells. The clay layer beneath each individual cell will form a continuous barrier layer that will be graded to direct leachate to the remaining portion of the temporary stormwater pond in future Cell 14 and/or a toe drain extending east to west along the northern perimeter of Cell 16. The toe drain will slope from west to east and terminate in a manhole between Cell 16 and Pond 3. The toe drain will "daylight" approximately 3 feet above the bottom of the manhole. A dedicated pump with float control system will be used to transfer leachate from the manhole to Pond 3. During Cell 7 construction,

leachate will continue to flow along the continuous bottom barrier layer towards the northern landfill boundary, and into the existing stormwater pond in future Cell 14 and proposed Cell 16. During excavation of proposed Cell 16, a ~~6-foot berm~~ temporary stormwater and leachate diversion swale shall be constructed along the ~~Cells 15 and~~ southern perimeter of Cell 16 ~~boundary~~ to divert leachate generated in Cells 1-7 and 15 to flow west to the temporary stormwater pond ~~east through the permeable side berm and into the proposed stormwater Pond 3. In the occurrence of a heavy storm event, a pump will be kept onsite to prevent any overtopping of the berm. The remaining portion of the stormwater pond in future Cell 14 shall continue to collect the leachate currently flowing towards the northern boundary~~.

The controlled method of screening waste also supplements the leachate control. Because the Applicant privately owns the Enterprise Class III Landfill facility, most of the haulers, waste generators, and sources of waste are known to Angelo's and the scale house attendants. For those haulers that are unfamiliar to the Applicant, the scale house attendants question the haulers more intensely to determine the contents of their loads. The spotters and operators add additional monitoring at the active disposal location. The addition of video surveillance to the monitoring process of incoming wastes helps to identify fires or smoking loads. Combined methods of screening waste is an effective method to reduce any possible threat to public health or the environment.

3.10.3 Stormwater Controls

The approved Stormwater Management Plan for the landfill consists of berms, swales, and ponds constructed within the 200-foot landscape buffer zone to divert, collect and contain stormwater runoff from the completed site. These stormwater facilities are designated to retain the 100-year, 24-hour storm volume as required by Pasco County and the FDEP. During excavation, construction and waste disposal, stormwater will be controlled by a series of berms that direct stormwater to the temporary stormwater pond located in the northeast corner of the site. A 6-foot berm adjacent to active and filled cells retains stormwater from the filling area and diverts stormwater from the excavation area to the temporary stormwater pond. A portion of the temporary stormwater pond will be filled as part of the construction of Cell 16. A new stormwater Pond 3 is being proposed and submitted to be permitted as an Industrial Wastewater Pond through FDEP. Additional details concerning the stormwater management system are provided in Drawing Sheets C1.00, C1.10, C2.00 and C2.10.

3.11 EROSION CONTROL

The perimeter swales and ponds surrounding the landfill prevent stormwater from leaving the property. The series of berms described in Section 3.10.3 above will help prevent erosion.

Additionally, landfill side slopes will be constructed at 3H:1V from base grade to elevation 125' NGVD and 4H:1V from 125' to 170' NGVD and will receive intermediate cover to be maintained until final landfill closure that will occur when all existing and proposed cells are filled. See the

Reclamation and Closure Plan provided in Section 7 for further details.

3.12 FINAL GRADE PLAN

The filling sequence of the landfill is shown on Sheets C1.00 through C2.10 of the 2016 Plan Set provided in Section 4. The excavated areas will be certified to the approved bottom grades prior to accepting any waste material. The finished elevation after all fill material has been placed and final cover provided is designed to reclaim excavated areas.

3.13 SETBACKS AND VISUAL BUFFERS

The following setbacks (buffers) shall be used:

1. Minimum of 200 feet from the property boundary to landfill footprint.

2. Minimum of 500 feet setback from surrounding potable residential wells to landfill footprint.

Buffer areas maintain visual screening of the landfill by the following methods.

1. 8-foot high berms along the frontage of Enterprise and Auton roads.

2. Landscaping and trees to provide visual buffers within setback areas

3. Existing trees within the setbacks will be maintained.

3.14 FOUNDATION ANALYSIS

A Geotechnical analysis was conducted on the landfill site to evaluate if the base and geologic setting are capable of providing structural support. Universal Engineering Sciences, Inc. completed the Geotechnical Report included as Section 4 to the September 2005 Enterprise Recycling and Disposal Facility Class III Landfill Permit Renewal Application, prepared by TetraTech HAI, and updated as the January 25, 2006. Universal Engineering Sciences *Geotechnical Exploration – Update*, provided as an appendix to the February 2006 letter from Jennifer Diehl, P.E. to Mr. Steve Morgan Subject: Angelo's Aggregate Materials, Ltd. Enterprise Recycling and Disposal Class III Landfill Pending Permit Nos.: 177982-007-SC and 177982-008-SO Pasco County. The report concludes that the landfill base will adequately support the Class III landfill wastes without excessive settlement. It also states that the potential for sinkhole development on the site is low. In the event a sinkhole is discovered on-site, or within 500-feet of the site, the Department will be notified within 24 hours. A reclamation plan of action will be submitted to the Department within seven days. Please see Appendix G-1, Attachment 1 for Universal Engineering Sciences' Geotechnical Services / Documentation Review dated May 31, 2016 for a signed and sealed review and evaluation of historical site related geotechnical records

which includes a recent site reconnaissance visit.

An updated foundation bearing capacity analysis was performed by Civil Design Services, Inc. and is provided in Section 2, Part I, I-2. The analysis demonstrates that the proposed Cell 16 has sufficient additional bearing capacity to accommodate the proposed design.

3.15 CERTIFICATION

Laboratory testing and observation of cell floor conditions during cell construction completion shall consist of the following:

- In-place density testing for each 12-inch thick soil lift, based on laboratory proctor test results for the construction material, will be recorded by a properly trained technician. These are to be conducted at the location of each permeability test.

- Thickness testing of each lift will be recorded at a minimum frequency of two tests per acre, per lift.

- Confirmation hydraulic conductivity testing of Shelby tube or drive cylinder samples of the compacted cell floor material will be performed at a minimum frequency of one test per lift, per acre.

- Observance for unstable areas such as limestone, sink holes and soft ground will be performed for each cell.

If the test data from a cell floor section does not meet the requirements of the anticipated conditions of the hydrologeological and geotechnical reports and the requirements of the facility construction permit, additional random samples may be tested from that cell section. If the additional testing demonstrates that the hydraulic conductivity meets the requirements, the cell will be considered acceptable. If not, that cell will be reworked or reconstructed so that it will meet these requirements.

Upon completion of construction of any cell within the disposal facility, the certification of construction completion will be provided to the FDEP on form 62-701.900(2), F.A.C.. The applicant will provide the completed form to the FDEP, along with the quality assurance test results described above, and arrange for an inspection prior to acceptance of Class III wastes into the constructed disposal area.

3.16 OPERATIONS PLAN

The Landfill's Operations Plan is included as Appendix 3-A.

3.17 CONTINGENCY PLAN

The Landfill's Contingency Plan is included as Appendix 3-B.

Attachment 6

Revised Landfill Operations Plan

(replace previously submitted plan in its entirety)

ENTERPRISE ROAD CLASS III RECYCLING AND DISPOSAL FACILITY
MAJOR PERMIT MODIFICATION
LANDFILL OPERATIONS PLAN

Prepared for:

ANGELO'S AGGREGATE MATERIALS, LTD
855 28th Street South
St. Petersburg, Florida 33712

Prepared by:

LOCKLEAR & ASSOCIATES, INC.
4140 NW 37th Place, Suite a
Gainesville, Florida 32606

~~Revised July 2016 (RAI 1 Response)~~
~~Revised December 2016 (RAI 2 Response)~~
Revised February 2017 (Supplemental Information)

Performed Under the
Supervision of

LISA J. BAKER LICENSE No. 74652 STATE OF FLORIDA PROFESSIONAL ENGINEER

Lisa J. Baker, P.E.
Florida PE #74652

ENTERPRISE RECYCLING AND DISPOSAL FACILITY
OPERATIONS PLAN
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ATTACHMENTS

1.0 DESIGNATION OF RESPONSIBLE PERSON(S) AND REFERENCES

Mr. John Arnold, P.E. is designated by Angelo's Aggregate Materials, LTD. (Applicant) as the individual responsible for operation and maintenance of the Enterprise Road Class III Recycling and Disposal Facility (Facility) in accordance with Rule 62-701.500, F.A.C. All correspondence and inquiries concerning the Facility permits and operation should be addressed to him at:

Mr. John Arnold, P.E.
Angelo's Aggregate Materials, LTD.
855 28th Street South
St. Petersburg, Florida 33712
Telephone: (813) 477-1719

Updated plan sheets and figures are provided in Sections 4 and 3 respectively of the March 2016 permit modification application RAI 1 response dated July 2016.

2.0 LANDFILL SITE IMPROVEMENTS

The 160 acre landfill site is also permitted by Pasco County to be a Class I mine (Pasco County Petition #CU04-26, approved 9/23/2004). The following site improvements have been installed to continue operation of the Class III Landfill.

2.1 Facilities

An office trailer (gate house) is located onsite for the gate attendant. This trailer has hand washing and toilet facilities. Bottled potable water is used to provide drinking water for the trailer. Electric and telephone services are available to the trailer office. Site entrance improvements also include an all-weather entrance roadway, scales and perimeter road as shown on the Sheet C0.02 of the 2016 Plan Set provided in Section 4 of the March 2016 permit modification application RAI 1 response dated July 2016.

2.2 Primary Haul Routes

The primary haul routes used to reach the Facility are U.S. 301, S.R. 52, C.R. 35A, U.S. 98, and Clinton Avenue. These routes lead to Enterprise Road, which is used to access the facility.

Enterprise Road was improved by the Applicant to an all-weather, paved access roadway from C.R. 35A to Auton Road. Enterprise Road is a Pasco county owned roadway that is maintained by the county. The Facility has an all-weather, paved access roadway that will be maintained by the Applicant to provide adequate access at all times.

2.3 Effective Barrier

The existing Facility property previously had a five-foot high wire fence along the perimeter of the site. A 6-foot security fence has been constructed along the south and east boundaries. The security fence consists of a 6-foot high galvanized chain link fence, hereafter referred to as the "security fence." The five-foot wire fence still exists along the north and west property boundaries. The chain link fence has been installed in accordance with permit issuance in October, 2001. Three (3) foot square "NO TRESPASSING" signs with five-inch letters has been installed at no less than 500-feet spacing and at all corners to notice unauthorized access. The only point of access into the landfill site will be through the ticket gate at the entrance. This gate will be locked during closed hours.

An 8-foot high landscape berm has been constructed along the frontages of Enterprise and Auton roads as a visual and noise buffer.

3.0 OPERATING HOURS

The landfill will have the following operating hours:

Day	Hours of Operation
Monday through Friday	7:00 am to 6:00 pm
Saturday	7:00 am to 2:00 pm

Operational hours may be extended periodically to meet special requests of customers, but at no time will normal operating hours extend beyond 7:00 A.M. to 7:00 P.M. Monday through Saturday. Waste will not be accepted during non-daylight hours.

4.0 CONTINGENCY OPERATIONS

If a natural disaster occurs at the facility rendering it unusable, the waste accepted at the Facility would be rerouted to another permitted landfill. If a storm occurs within the surrounding community, storm debris waste will also be accepted at the facility, providing additional staff if required. In terms of equipment breakdown, there will be two operating pieces of equipment for all stages of landfill operation. Currently, Angelo's has on-site two compactors [Cat 826 (2)], two loaders (Cat 950, Cat 980), two dozers (Cat D5, Cat D8), four excavators [John Deere 450 (2), Komatsu PC1100, Komatsu PC300], and two articulated dump trucks (Volvo). If both should breakdown, replacements can be rented or substituted from onsite or offsite within 24 hours.

The site access roads will be constructed to allow passage of vehicles under all expected weather conditions. See Appendix 3-A for the Contingency Plan.

5.0 WASTE STREAM QUALITY CONTROL PLAN

5.1 Visual Inspection

An estimated 550 tons of Class III waste material is currently received at the facility daily. Materials brought onto the Enterprise Road Class III RDF site will be inspected three times. The first inspection takes place at the site entrance. The site will only accept Class III debris (which includes construction and demolition debris by definition); therefore, any vehicles hauling unacceptable waste can be turned away by the attendant at the ticket gate. The gate attendant will question all waste carriers as to the character and origination of their wastes. A mirror is installed overhead and angled to allow gate inspection of all loads after they are untarped. A video camera has been installed over the scale location that allows the gate attendant to visually screen all carrier loads prior to disposal, mainly to identify fire or smoking loads. For loads that are not accepted, a Rejected Load Form will be completed.

The second inspection is a visual inspection that will occur at the working face by a certified, trained spotter. The spotter stationed at the working face will be responsible for spotting trucks bringing in disposal loads. The spotter will show the drivers where to unload, and will also inspect the trucks to make sure unacceptable materials are not unloaded. The spotter will have the authority to ensure that unacceptable materials are reloaded on the truck the material was brought in on.

The third inspection will occur as the waste is spread by the equipment operator. Any unacceptable wastes observed will be placed in the appropriate container located at the working face. The equipment operator may also serve as the spotter and will perform both visual inspections - as the waste is unloaded and as the waste is spread.

The facility will deploy and use spotters based on the volume of waste disposed at the working face. No more than two loads will be allowed to dump simultaneously per spotter at the working face.

5.2 Documentation of Waste Received

Documentation includes recording the name of the company disposing of the waste, driver's signature/information, all vehicle identification numbers, quantity of waste (tons), and type of waste (to meet FDEP and Pasco County's requirements). All vehicles entering the landfill will be weighed. The type of material and location from which the waste was generated will be recorded. This provides a record for tracing ownership of individual loads. See Landfill Operating Records, Section 19.2 for more details.

5.3 Contingency for Unacceptable Materials

If unacceptable waste materials are delivered to the landfill, the truck will be refused entry after inspection at the gate. If the unacceptable waste materials are observed by a spotter while

unloading, they will be reloaded onto the delivery vehicle. Should the vehicle leave before the unacceptable waste has been discovered, Enterprise Road Class III RDF personnel will place the unacceptable material into an appropriate container located at the working face. A maximum of 20 cubic yards of covered dumpster storage for Class I waste will be provided near the active face of the landfill, as shown on Drawing C0.03 of the 2016 Plan Set provided in Section 4 of the March 2016 permit modification application RAI 1 response dated July 2016. These containers are transported by Central Carting Disposal (or other qualified vendor) to a disposal facility permitted to accept Class I material. The covered storage containers will control vectors and odors and Class I waste will be removed within 30 days of discovery. If the storage containers cannot be secured to control vectors and odors, the putrescible waste will be stored no longer than 48-hours.

Unacceptable nonputrescible, non-hazardous wastes, such as batteries, paint, chemicals or similar items that are inadvertently accepted will be removed when observed and stored in a roll-off container or pile at the working face and removed daily to a lockable storage unit. A maximum of 40 cubic yards of stored unacceptable, nonputrescible, non-hazardous wastes may be provided near the active face of the landfill, as shown on Drawing C0.03 of the 2016 Plan Set provided in Section 4 of the March 2016 permit modification application RAI 1 response dated July 2016. These materials will be removed from the site at least every 30 days (sooner if required) by City Environmental (or other qualified vendor) and taken to their facility for processing and proper disposal. This plan should meet the inspection needs for the site to prevent disposal of unacceptable wastes.

If suspect regulated hazardous wastes are identified by operators or spotters by random load inspection or discovered deposited at the landfill, the FDEP will be notified promptly, as well as the hauler and generator of the wastes, if known. The area where the hazardous wastes are stored will immediately be secured from public access. If the generator or hauler cannot be identified, Enterprise Road Class III RDF will assume the cleanup, transportation and disposal of the waste at a permitted hazardous waste management facility.

5.4 Acceptable and Unacceptable Class III Landfill Waste Materials

The Enterprise Road Class III RDF will accept only those solid wastes as defined in Rule 62-701.200 (14), F.A.C. as Class III wastes, except as allowed otherwise by permit.

Acceptable Class III waste materials include the following:

- Land clearing debris
- Demolition debris
- Glass
- Carpet
- Cardboard
- Asbestos
- Construction debris
- Non-Treated Wood Pallets
- Unpainted, painted and untreated wood scraps from manufacturing
- Waste Tires (Processed)*
- Paper
- Furniture other than appliances

- Plastic
- Automobiles and parts without visible contamination from petroleum products or other chemicals
- Yard trash

* Processed waste tires are acceptable for disposal in the Class III Landfill provided that they have been cut into sufficiently small parts. The processed waste tire parts may be disposed of or used as initial cover at a permitted landfill. For use as initial cover, a sufficiently small part means that 70 percent of the waste tire material is cut into pieces of 4 square inches or less and 100 percent of the waste tire material is 32 square inches or less. For purposes of disposal, a sufficiently small part means that the tire has been cut into at least eight substantially equal pieces. Any processed tire which is disposed of in a landfill and which does not meet the size requirement of subsection (a) above must receive initial cover, as defined in subsection 62-701.200(53), F.A.C., once every week.

The following is a compilation of unacceptable Class III waste materials:

- Putrescible Household Waste
- Paint (liquid)
- Any toxic or hazardous Materials (i.e., batteries, solvents, oils, etc.)
- Contaminated soils
- Electronics
- Refrigerators, freezers, air conditioners (white goods)
- Biomedical waste
- Automobiles or parts that are contaminated with petroleum products or other chemicals.
- Septic tanks and pumping
- Whole waste tires (except at the waste tire processing facility)
- CCA Treated wood

The site has a visible sign at the site entrance on Enterprise Road as provided in Attachment 1. The sign identifies the accepted wastes, hours of operation, landfill classification, and site's 24-hour emergency contact and telephone number. Industrial or excavated waste will be considered for acceptance on a case by case basis, only with prior consent of the Department.

5.5 Random Load Inspection

In accordance with Rule 62-701.500(6)a., F.A.C., the owner or operator will implement a load-checking program to detect and discourage attempts to dispose of unauthorized wastes at the landfill. The load checking program will consist of the following minimum requirements:

1. The landfill operator will examine at least three random loads of solid waste delivered to the landfill per week. The waste collection vehicle drivers selected by the inspector will be directed to discharge their loads at a designated location in the landfill. A detailed inspection of the discharged material will be made for any unauthorized wastes. The

landfill operator will assure the random inspections will be distributed between both loads originating from the transfer facility and other private waste haulers delivering waste to the landfill.

2. If unauthorized wastes are found, the facility will contact the generator, hauler, or other party responsible for shipping the waste to the landfill to determine the identity of the waste sources.

The following procedures will be followed when inspecting the load:

A. The load will be "broken apart" by both the spotter and equipment operator to allow for a thorough inspection.

B. The inspectors will be searching and removing de minimis amounts of unauthorized waste contained in the load.

C. If the load contains more than de minimis amounts of unauthorized materials, they will immediately be reloaded onto the customer's vehicle for removal from the site. In the event that the transporter will not remove the unacceptable materials, the materials will be loaded into an appropriate container and removed from the site. The customer/generator will be contacted and notified of the site policies as well as charged for the off-site disposal services.

D. In all cases, if more than minimal unacceptable wastes are found during the inspection, the customer will be notified to assure the prevention of future occurrences.

All inspection will be documented on the site's "Random Load Inspection Form," signed by the inspector, and kept in a current Log Book, see Attachment 2. Log books will be maintained at the landfill for at least 3 years. Inspections will be performed by trained site personnel.

5.6 Asbestos Waste Disposal

Asbestos-containing materials (ACM's) will be accepted for disposal in accordance with 40 CFR Part 61.154. Arrangements for disposal of ACM's between the Facility and the waste generator/hauler will be recorded in the operations record as to the quantity and date of shipment to the landfill. The loads are accepted at pre-arranged times during operational hours.

To ensure that all waste deposited at the Facility meets state and local requirements, all facility personnel will receive training from their supervisor on the identification of unacceptable materials, which is any waste other than properly labeled and bagged ACM. Unregulated, non-friable asbestos containing materials are not required to be bagged, but all other requirements are unchanged.

Each load of ACM arriving at the facility must be accompanied by a completed Waste Shipment Record (WSR) in accordance with 40 CFR 61.150. Each load will be inspected to insure that it is properly bagged, that bags are intact and properly sealed, and that the required warning labels and generator labels are affixed. Bags will not be opened prior to disposal.

ACM arriving at the Facility for disposal will be visually screened by facility personnel a minimum of two times. The first screening will be at the scales, controlling access to the Facility, where the truck drivers will be questioned as to the contents of the load and the shipping documents will be reviewed. The gate attendant will direct the drivers to the appropriate disposal area.

The second screening will be at the working face where a trained inspector/spotter will again question the driver and make a visual examination of the load prior to dumping and as it is dumped. This examination will insure the ACM is properly bagged, the bags are intact and properly sealed, and that the warning labels and generator labels are affixed.

Facility personnel will direct the waste hauler to the designated ACM disposal location in each cell, to be determined by the Operator. The ACM will be covered with 6-inches of soil at the end of any day that ACM is accepted. This designated ACM location will be recorded and updated by the annual topographic survey in accordance with 40 CFR 61.154. ACM disposal records will be maintained for the life of the landfill and disposal locations documented in the Closure Report.

5.7 Incidental Recycling Operations

The Class III landfill does have a separate, dedicated materials recycling area. However, if recyclable wastes are incidentally received, such as metals, concrete rubble, asphalt, and wood wastes, the facility will separate them in stockpiles or in roll-off containers. Concrete and asphalt will be periodically transported to an appropriate location for crushing. Yard and wood wastes may be chipped for use onsite or be placed in roll-off containers for shipment to a wood recycler. These materials will be removed from the site approximately every 6 months. However, if the storage capacity is exceeded, the materials will be removed sooner. Incidental recyclable materials that are identified at the disposal area will be placed in containers located near the working face, as follows and as shown on Drawing C0.03 of the 2016 Plan Set provided in Section 4 of the March 2016 permit modification application RAI 1 response dated July 2016.

TYPE	MAX. QTY	STORAGE
Ferrous Metal	500 CY	Roll-off or pile
Aluminum	300 CY	Roll-off or pile
Stainless Steel	300 CY	Roll-off or pile
Copper	25 CY	Trash pail, roll-off or pile
Asphalt	300 CY	Roll-off or pile
Concrete / Rubble	300 CY	Roll-off or pile
Recyclable electronics	8 CY	Covered dumpster

Trucks identified at the entrance as carrying primarily recyclable products, (i.e., concrete, metal, wood, paper) will be refused entrance into the landfill.

5.7.1 Reports

A Recovered Materials report will be submitted by type of waste recovered and tonnage to the FDEP and Pasco County Solid Waste Department. These reports will also be compiled into an annual report to the FDEP.

5.8 Wood Acceptance Area

The facility is a registered Source-Separated Organics Processing Facility and in compliance with the requirements specified in Rule 62-709.320 and Rule 62-709.330. Initial inspection will be performed at the scalehouse by the attendant. Wood wastes are stockpiled until processing takes place every 180 days. Personnel trained to identify and remove any unacceptable wastes will be present during processing. Unacceptable wastes, if found, will be removed prior to wood processing.

5.9 CCA Treated Wood Management Plan

The following serves as the CCA-treated wood management plan required by 62-701.730(20), F.A.C. Employees will be trained in the proper management of CCA-treated wood. CCA-treated (chromate-copper arsenate) wood must be stored in the temporary storage container for waste destined to go to a lined facility. CCA-treated wood is not allowed to be disposed of in the Enterprise Class III Recycling and Disposal Facility.

The following is strictly prohibited:

- Disposal of CCA-treated wood in any unlined landfill or disposal facility
- Burning of CCA-treated wood in an open burn or an air curtain incinerator
- Mulching of CCA-treated wood or use of CCA-treated wood in other soil amendment products

There are several ways for employees to identify CCA-treated wood: 1) determining the place of origin, 2) identification by shape – typically large, dimensioned pieces of wood and 3) identification by color. CCA-treated wood has been used in a variety of applications including fencing, docks, outdoor decks and stairs, playground equipment and landscaping. The wood is typically large – dimensioned 4-inches or larger.

The most common method for visually identifying treated wood among lumber, timber and plywood is to look at the color of the wood. Untreated wood and borate-treated wood typically have a light yellow color. Wood treated with copper varies in color from a very light green to an intense green color depending on the degree of treatment. A higher degree of treatment is typical for marine applications and for structure with a high load-bearing support. Once the wood treated

with copper has been in-service and has weathered, the green color is generally converted to a silver color. It still may be difficult to visually distinguish weathered treated wood from weathered untreated wood.

Employees are cautioned against handling CCA-treated wood. Workers handling wood preserved with CCA should be sure to wash their hands before eating or smoking. CCA-treated wood splinters in the hands and fingers of workers are reported to be very problematic and should be removed as soon as possible. It is important to make sure that the entire splinter is removed. Removal may require medical attention.

The most efficient way to minimize CCA-treated wood disposal in the facility is to communicate with landfill customers. Dedicated, separate suitable temporary container for CCA-treated wood at demolition and construction job sites can be used. At the scale house, personnel will question transporters on the type of wood and direct customers to dispose CCA-treated wood at a Class I landfill. Personnel will also perform a visual inspection at the scale house if necessary especially for loads originating from the construction and demolition of fences and decks.

The facility shall incorporate CCA-treated wood into its spot-checking program. Spotters visually inspect and determine if any dimensioned wood is in the load, such as railroad ties and fence posts or building materials. If CCA-treated wood is found, the load will be diverted to a Class I landfill for disposal. Tipped loads will be spread and inspected for the presence of CCA-treated wood. CCA-treated wood will be adequately protected from rain to prevent leaching of contaminants.

6.0 WEIGHING OR MEASURING INCOMING WASTE

A scale system is used to weigh incoming waste. The scales will be calibrated every six (6) months. Vehicles will be weighed when they enter the disposal site, and based upon the tare weight of the vehicle, the waste tonnage will be determined. Prior to unloading debris, the tonnage or volume of the waste material disposed will be determined and the appropriate fee assessed. Weigh tickets will be kept on-site for a minimum of 5 years.

6.1 Fee Schedule

The fee schedule for disposal varies depending on the client, type of waste and volume received.

Waste Type	Unit	Fee per Unit
Class III	CY	Variable

This fee schedule will be periodically revised according to the prevailing market for waste disposal. The Operator will notify clients immediately in writing of all fee schedule changes.

7.0 VEHICLE TRAFFIC CONTROL AND UNLOADING

Generally, truck traffic will be controlled by first-in, first-out, as directed by the spotter located at the working. There will be adequate space for truck staging at the site's entrance (7-8 trucks) to mitigate any queuing onto Enterprise Road. Enterprise Road Class III RDF will discourage any truck staging prior to landfill opening. Signs will be posted at the entrance gate and on interior roads to guide mining truck traffic vs. landfill truck traffic to their appropriate areas of the site.

8.0 METHOD OF CELL SEQUENCE AND LIFE EXPECTANCY

8.1 Cell Sequence

Angelo's Aggregate Materials is currently (as of February 2017) filling in Cells 1 – 6 and 15 of the Class III Landfill, while construction of Cell 7 is being completed. The cell construction and filling sequence operations will be as follows:

Phasing Sequence 1	As shown in Drawing Sheets C1.00 and C1.01 Continue filling Cells 1, 2, 3, 4, 5, 6, 6B, 7 and 15 in 10 – 12 foot lifts to waste elevation of 172' Maximum slope is 3H:1V from base grade to waste elevation 122'; 4H:1V from waste elevation 122' to 167'; 1% to 2% grade from waste elevation 167' to 172' 10-ft wide stormwater benches are to be constructed at waste elevations 122' and 147' Sideslope berms and stormwater appurtenances are to be constructed at final closure. Construct Cell 16 in accordance with permitted design
Phasing Sequence 2	As shown in Drawing Sheets C1.10 and C1.11 Begin filling Cell 16 with 4 – 6 feet lift north of the temporary ~~berm~~ stormwater and leachate diversion swale until cell is floored out. Remove temporary ~~berm~~ swale and fill with 4 – 6 feet lift. Continue filling Cell 16 in 10 – 12 foot lifts from base grade to waste elevation 147', including filling over Cell 15. Maximum slope is 3H:1V from base grade to waste elevation 122'; 4H:1V from waste elevation 122' to 147'. A 10-ft wide stormwater bench is to be constructed at elevation 122'. Sideslope berms and stormwater appurtenances are to be constructed at final closure.
Phasing Sequence 3	As shown in Drawing Sheets C2.00 and C2.10 Construct final closure cover system over Cells 1, 2, 3, 4, 5, 6, 6B,

7, 15 and 16 in accordance with the permitted closure design.
Construct sideslope berms and stormwater appurtenances.
Construct landfill gas vents.

Lift height includes cover material. Due to the landfill bottom elevation, some lifts may not be a full 10 feet in height.

As each sequence is active, the following procedures will be followed

- The access road to the working face will be constructed and graded as necessary
- Waste will be compacted as it is placed. General lift height will be 10 feet and will come within three (3) feet of the final elevation to provide for final cover.
- The working face will remain approximately 100 feet in length
- Avoid channelizing stormwater flows
- Use mulch, grass, and maintain intermediate covers
- Weekly cover of six (6) inches of soil will be placed on the working face
- Intermediate cover of 12 inches of soil will be placed in areas that will not receive waste within 180 days. The cover may be removed immediately prior to placement of new waste

Stormwater runoff from the interior of the excavation and filling area will be diverted to the onsite temporary storage pond using a temporary interior swale and 6-foot berm. Perimeter berms will direct stormwater away from excavation and filling areas. The temporary stormwater pond will receive runoff until Pond 3 is developed.

8.2 Erosion Control

The following engineering controls will be used to minimize erosion at the working face:

- Regrade a maximum of 100 linear feet of the outer edge slopes at a time to 2H:1V. The purpose of this recommendation is that a relatively small area will be subjected to surface erosion at any given time.
- Construct a berm along the top of the slope during the regrading to redirect any rainfall runoff away from the face of the slope. The area along the berm should be graded so as to allow rapid runoff along the top of the slope. Ponding of water near the top of the slope should not be allowed, since seepage through the slope may initiate slope erosion.

- As soon as possible following the construction of the clay layer, begin to fill against the 2H:1V slope with the landfill material.

- Avoid channelizing stormwater flows

- Use mulch, grass, and maintain intermediate covers

8.3 Life Expectancy.

The capacity and lifespan estimates are provided in Section 3.8.3 of the Engineering Report.

9.0 WASTE COMPACTION AND APPLICATION OF COVER

Waste received will be segregated based on compatibility. Bulky, incompressible items, such as concrete and tree debris, will be separated and stockpiled for future processing. Tree debris is separated from the waste and periodically mulched for on-site uses. The remaining debris is disposed of in designated "cells" using a CAT 826G Compactor, or equivalent to place, spread the waste daily and compact the debris weekly. Initial cover material is planned to be excavated from onsite areas and placed weekly in approximately 6-inch layers on the compacted lifts to control vectors, reduce rain infiltration and provide a more stable working face area. The facility may also use a 50/50 mixture of mulch and soil as cover in accordance with Policy Memo # SWM-05.4 dated April 25, 2001. An intermediate cover of one (1) foot of compacted soil will be applied if final cover or an additional lift is not to be applied within 180 days of cell completion. Cell closure will occur when all permitted cells are filled. For final buildout grade and closure details, see Drawing Sheets C2.00 and C2.10 of the 2016 Plan Set provided in Section 4 of the ~~March~~ December 2016 permit modification application RAI ~~1~~ 2 response dated July 2016. The Conceptual Closure Plan includes permitted Cells 1-7 and 15, and proposed Cell 16.

Cell closure will generally conform to the lines and grades specified in the Landfill Conceptual Closure Plan. The grading plan will conform to the rules and regulation specified in 62-701.600, as well as 62-701.400(7) and 62-701.400(8), Florida Administrative Code. Pesticides when deemed necessary to control rodents, insects and other vectors will be used as specified by the Florida Department of Agriculture and Consumer Services. Uncontrolled and unauthorized scavenging will not be permitted at the landfill site. Controlled recycling may be permitted by the Site Manager responsible for the operation of the landfill facility. Temporary storage of soil fill or recycling materials may occur in the closed cell areas.

10.0 OPERATION OF GAS, LEACHATE AND STORMWATER CONTROLS

10.1 Gas Monitoring and Control

The type of materials to be disposed in the Class III Landfill are not expected to generate significant amounts of methane or other toxic gases since the landfill's design prevents

groundwater contact therefore, a passive gas control system is proposed. The Landfill Manager will conduct daily and weekly inspections of the landfill and will check for objectionable odors or gas by driving around the perimeter of the site, record the results, and notify the FDEP and County of any positive detection and immediately take corrective actions. Corrective actions will include placement of additional soil cover, or mulch, or lime containing materials such as crushed concrete that is documented to abate the odors. Quarterly gas monitoring is currently conducted.

Within 30 days of being notified by the Department that objectionable odors per Rule 62-701.200(77), F.A.C. have been confirmed off-site, the Facility will submit to the Department for approval an odor remediation plan. The plan will describe the nature and extent of the problem and the proposed long-term solution, which will be implemented within 30 days of approval. The plan will include procedures to implement a routine odor monitoring program to determine the timing and extent of objectionable odors and a means of evaluating the effectiveness of the remedy.

The facility only accepts Class III debris for disposal and accepts no putrescible household wastes. Surface water and groundwater contact with the Class III wastes will be prevented by the approved facility design thus preventing possible odor operation. Other best management practices to prevent odors include: 1) closure of each cell as it is completed; 2) weekly soil cover application; and, 3) immediate corrective actions to abate odors.

A system of passive gas vents will be installed to manage landfill gas. The location of the gas vents is shown on Sheet C2.00 of the 2016 Plan Set provided in Section 4 of the ~~March~~ December 2016 permit modification application RAI ~~1~~ 2 response dated July 2016. The construction details of the vents are shown on Figure 3-14 (provided in Appendix 3-C of the 2012 permit renewal application submitted by Kelner Engineering). The vents will be installed during the final closure and installation of the final cover over each landfill cell.

A system of 16 gas monitoring points will be installed to monitor gas at the site, see Sheet C0.03 of the 2016 Plan Set provided in Section 4 of the March 2016 permit modification application RAI 1 response dated July 2016. The construction details of a typical gas probe are shown on Figure 3-14 (provided in Appendix 3-C of the 2012 permit renewal application submitted by Kelner Engineering).

10.1.1 Methane Gas Measurement

In accordance with the requirements of the current FDEP permits, methane gas levels are monitored at each of the active gas monitoring points quarterly, with results submitted to the FDEP. A lower explosive limit (LEL) meter will be used to measure methane levels from each of the gas probes. LEL meters, such as the MSA Model 260 or GEM 500 or equivalent, will be used to conduct this monitoring. These meters are capable of measuring percent volume of methane in air and the percent LEL level of the methane by volume. The meter shall be calibrated in accordance with manufacturer's specifications prior to each methane monitoring event. Attachment 4 of the Operations Plan provided in Appendix 3A of the Engineering Report

presents the proposed gas monitoring probe survey form to be used to conduct the quarterly monitoring at the subject site. This form will document at the time of each gas probe reading, air temperature in degrees Fahrenheit, methane levels in percent volume in air and percent LEL. The reporting action level for methane in air will be considered 5 percent by volume in air as measured by the lower explosive limit. The reporting action limit for methane in structures is 25% of the LEL, or 1.25% methane by volume. The results of each quarterly gas probe survey will be submitted to the Department on the presented form within two weeks of each monitoring event. These events are planned to be coordinated with the semi-annual groundwater monitoring at the subject site.

10.1.2 Gas Contingency Plan

The following Contingency Plan will be implemented if any of the measured gas monitoring points methane levels are detected above the 100% LEL of greater than 5 percent methane in air, or if 25% of the LEL or higher is measured in a structure. If this level of methane or greater is detected in any of the probes, the Facility operator will institute measurement of methane in nearby, at, or below grade structures, i.e., stormwater collection points, or any maintenance or office buildings within 100 feet of the subject gas probe on a weekly basis until these levels go below the 100% LEL at the subject probe. If methane levels measured in any on-site building exceed 25% of the LEL, building windows and/or doors will be opened for ventilation and all personnel evacuated until methane readings are maintained below 25% of the LEL for methane. The monitoring report for any event that detects methane above the LEL will also report methane levels from nearby structures, as indicated above, until the levels go below the methane LEL level or until corrective actions are conducted to reduce methane levels. The FDEP will be notified within seven days of any gas monitoring levels that exceed the reporting action levels.

10.2 Leachate Control

Any leachate that may be produced at the landfill will be controlled with the use of a continuous 3-foot thick clay layer ($1x10^{-7}$ cm/s) that will be placed on the bottom of the cells. The clay layer beneath each individual cell will form a continuous barrier layer that will be graded to direct leachate to the remaining portion of the temporary stormwater pond in future Cell 14 and/or the proposed stormwater Pond 3. During Cell 7 construction, leachate will continue to flow along the continuous bottom barrier layer towards the northern landfill boundary, and into the existing stormwater pond in future Cell 14 and proposed Cell 16. Prior to starting construction in Cell 16, a ~~berm~~ temporary stormwater and leachate diversion swale will be constructed immediately north of Cell 15. The ~~berm~~ swale will extend east to west the full width of Cell 16 and slope to the west to the temporary stormwater pond in the future Cell 14 area. ~~A portion of the~~ Leachate generated in existing cells 1-7 and 15 will move to the remaining temporary stormwater pond in the future Cell 14 area. ~~The remainder of the leachate generated in existing cells 1-7 and 15 will move to Pond 3 via the berm located immediately north of Cell 15.~~ Once Cell 16 construction is complete, the ~~berm~~ swale will remain in place while the initial lift of waste is placed across the entire floor of Cell 16. Once Cell 16 is "floored out", the ~~berm~~ swale will be removed for the remainder of

operations. Leachate generated in existing cells 1-7 and 15 will then move to temporary stormwater pond in the future Cell 14 area as it did prior to removal of the ~~berms~~ swales. The remainder of the leachate generated in cells 1-7, 15 and all leachate generated in Cell 16 will move to ~~Pond 3 via the clay barrier layer beneath Cell 16~~ a toe drain extending east to west along the northern perimeter of Cell 16. The toe drain will slope west to east and terminate in a manhole located between Cell 16 and Pond 3. The toe drain will "daylight" approximately 3 feet above the bottom of the manhole. A dedicated pump with float control system will be installed in the manhole. Leachate will be pumped from the manhole through a pipe directly to Pond 3. Under no circumstances will waste be placed in water. In the event that water is present above the clay barrier layer at the time waste is to be placed, the operator will utilize pumps to remove the water to Pond 3. Once Cell 16 and any future Cells that would connect to the leachate collection system have been filled to their final design grades and closed, the pumping of leachate into Pond 3 will be vacated.

The controlled method of screening waste also supplements the leachate control. Because the Applicant privately owns the Enterprise Class III Landfill facility, most of the haulers, waste generators, and sources of waste are known to Angelo's and the scale house attendants. For those haulers that are unfamiliar to the Applicant, the scale house attendants question the haulers more intensely to determine the contents of their loads. The spotters and operators add additional monitoring at the active disposal location. The addition of video surveillance to the monitoring process of incoming wastes helps to identify fires or smoking loads. Combined methods of screening waste is an effective method to reduce any possible threat to public health or the environment.

10.3 Stormwater Control

The approved Stormwater Management Plan for the landfill consists of berms, swales, and ponds constructed within the 200-foot landscape buffer zone to divert, collect and contain stormwater runoff from the completed site. These stormwater facilities are designated to retain the 100-year, 24-hour storm volume as required by Pasco County and the FDEP. During excavation, construction and waste disposal, stormwater will be controlled by a series of berms that direct stormwater to the temporary stormwater pond located in the northeast corner of the site. A 6-foot berm adjacent to active and filled cells retains stormwater from the filling area and diverts stormwater from the excavation area to the temporary stormwater pond. A new stormwater Pond 3 is being proposed and submitted to be permitted as an Industrial Wastewater Pond through FDEP. Additional details concerning the stormwater management system are provided in Drawing Sheets C1.00, C1.10, C2.00 and C2.10.

The site manager will perform weekly inspections of the storm water management system. Any areas in need of maintenance will be repaired within seven days.

11.0 SIGNS

Signs will be posted at the entrance to the Facility site which will list the following information:

The operating entity;
Hours of operation;
No scavenging allowed;
No hazardous waste accepted;
List of acceptable and unacceptable waste; and,
24-hour phone number of emergency contact.

The scalehouse attendant will direct each driver to the area appropriate to unload wastes. Signs will also be posted to direct trucks to either the borrow pit or the landfill working face.

12.0 DUST ABATEMENT PLAN

The Facility will provide a water tanker to water the landfill access roads if and when dust becomes a problem. This will also be done whenever the County receives complaints about dust or when a dust problem is observed during a County or State inspection.

13.0 DUST, LITTER, AND VECTOR CONTROL PLAN

The nature of the waste to be disposed in the landfill does not typically create litter and vector problems. Daily placement of waste and/or compaction will be the primary means utilized to control litter and vectors. The facility personnel will perform daily inspections of the facility and the access road to assure litter is controlled. As needed, laborers will pick up blowing debris and dispose of it in appropriate containers and/or on site. Temporary fencing to contain litter at the working face of the landfill may be used as needed. These litter controls will also be implemented whenever the County or State receives a complaint from adjacent landowners or a litter problem is observed during an inspection.

If vectors (rodents, insects, and domestic animals) become a nuisance at the Facility, the Operator may obtain the services of a licensed pest management company to review the operations and recommend control measures.

14.0 FIRE PROTECTION AND FIRE FIGHTING FACILITIES

Fires that originate in landfills are primarily extinguished by soil application. Supplemental fire protection will be furnished by the Dade City Fire Department (Station No. 1). The Fire Department will be notified immediately of all landfill fires. An emergency contact list will be posted at the scalehouse with contact phone numbers.

During a fire, incoming trucks will be directed toward another area of the landfill so that a temporary active face can be established. Once the fire is extinguished, appropriate cover will be applied to the waste and operations will continue at the original active face. If the fire is extensive and a temporary active face cannot be established, incoming trucks will be redirected to another landfill.

Onsite fire prevention facilities will include:

- Fire extinguishers mounted in the cab of all heavy equipment and in the office/ scalehouse;
- Telephones to notify personnel of a fire;
- Onsite equipment (dozer) and fill dirt to extinguish fires on working face; and
- Site water truck

Soil for firefighting purposes will be borrowed from the closest unexcavated area of the site to the fire. Details of all firefighting episodes will be recorded in the landfill operating record.

14.1 Hot Loads and Spills

Any hot load (of authorized material) found will be dumped on an area at least 500 feet away from the active working face. The load will immediately be covered with soil if a fire is imminent. Once the fire is extinguished, the load will be pushed and spread using a dozer, allowing for the load to be inspected by a spotter. The waste will not be disposed of until it has cooled completely, and the fire hazard has been mitigated.

In the event of a fire at the working face, waste acceptance will cease until the fire has been completely extinguished and additional cover material compacted in the area of the fire. If the fire is located elsewhere in the landfill, waste acceptance operations may continue at the manager's discretion.

Since liquid disposal is prohibited in a Class III landfill, spills from waste vehicles are not anticipated. In the case of a fuel spill or leak, the contaminated soil will be collected to the extent possible, contained in a drum or roll off container, and taken offsite within thirty (30) days for proper disposal or treatment.

15.0 LANDFILL PERSONNEL

The scalehouse attendant and certified landfill operator will be onsite during all operating hours. In addition, there will be a minimum of one (1) other person (spotter) onsite, for a total of three (3). The state certified landfill operator will be assigned to manage the daily landfill operations. The personnel will be stationed at the landfill ticket gate and active disposal face. Additional

personnel will be assigned to the landfill operation as the demand necessitates. Two spotters are generally located at the working face at all times that waste is accepted. However, there are up to eight spotter-trained or in-house trained spotter employees on-site each day and therefore; additional trained employees can be relocated to the working face as necessary to inspect the incoming waste. Certificates for current trained personnel are attached as Attachment 6 to this plan.

At least one (1) spotter will be at the working face at all times the facility is accepting waste. The spotter will direct vehicle traffic around the working face and will direct drivers where to empty their vehicles. The loads will be inspected as described in Section 5.0. If the load is acceptable, the waste will be spread and compacted as necessary. If the load is unacceptable, the spotter will direct the driver to reload the waste into the vehicle, if possible. If the driver is unable to reload the material, on-site personnel will reload the material for the driver using onsite equipment. The spotter will also discourage scavenging by the public.

The equipment operator spreading waste at the working face may also act as a spotter in accordance with the following:

1. The heavy equipment operator must be trained as a spotter;
2. When unauthorized waste is discovered, the heavy equipment operator must either move the unauthorized waste away from the active area for later removal and proper management, or must stop operation and notify another person on the ground or on other equipment who will come to the active area and remove the unauthorized waste before operations are resumed;
3. Each load of waste must be visually inspected for unauthorized waste prior to being compacted or loaded into a transfer vehicle.

A typical work schedule is as follows:

Day	Operating Hours	Scalehouse Attendant	Certified Operator	Spotter(s)	Equipment Operator*
M-F	7 am – 6 pm	1 (7 am – 6 pm)	1 (7 am – 6 pm)	Min. 1 (7 am – 6 pm) For 2 or more (7 am – 4 pm), (12 pm – 6 pm)	Min. 1 (7 am – 6 pm)
S	7 am – 2 pm	1 (7 am – 3pm)	1 (7 am – 3 pm)		Min. 1 (7 am – 2 pm)

* - Equipment Operator may also serve as a spotter

15.1 Training Plan

The Facility will implement an employee training plan to properly train their landfill operators and spotters to operate the landfill in accordance with this Operations Plan, state and local regulations,

and accepted disposal practices and to properly manage any hazardous or prohibited materials which are received at the landfill.

A trained operator will be at the site during all times that the landfill receives waste. All facility operators will be trained at an approved FDEP training course. Each operator will submit proof of training and documentation to the FDEP upon receipt of their certificates.

Landfill operators must have at least one year of work experience in landfill operation and a high school diploma; or have at least two (2) years' experience at a Class I, II, or III landfill. Each operator will complete at least 24 hours of initial training in an FDEP-approved training course, and will pass an examination as part of that training. Sixteen (16) hours of continuing training will be completed within three (3) years of each operator's initial training from an approved course documented by the form in Attachment 3. A list of FDEP approved training courses for operators and spotters are included in Attachment 5.

The Facility spotters will complete an initial eight (8) hour FDEP-approved course and four (4) hours of continuing training every three (3) years. Records documenting each employee's training course completion and schedule will be maintained and kept at the landfill office at all times.

Interim operators must become trained operators within one year of employment as an interim operator and interim spotters must become trained spotters within 3 months of employment as an interim spotter

16.0 COMMUNICATIONS FACILITIES

The landfill scalehouse will have both telephone and facsimile facilities. In addition, all landfill operating areas (gate house, working face etc.) will have radio communication or cell phones with the base station at the gate house.

17.0 EQUIPMENT INVENTORY

Equipment currently planned for use at the landfill site includes:

A. D-8 Caterpillar bulldozer, CAT 826 G Compactor; two 2.5 cud loaders, water truck, 590 John Deer backhoe, or equivalent are sufficient for adequate operation of the facility. A wood chipper/grinding machine (Hogzilla), or equivalent, will be moved to the site periodically (approximately once every six months) to process wood wastes as needed. Additional equipment, such as a grader may be rented as needed.

B. Arrangements will be made to provide alternate equipment within 24 hours following an equipment breakdown.

Equipment rental companies that may be used to obtain reserve equipment include the following:

Ring Power - Brooksville, Florida
Contact: 352-796-4978

Flagler Equipment - Tampa, Florida
Contact: 813-630-0077

C. There will be safety devices present on equipment to shield and protect the operators from potential hazards during operation.

17.1 Equipment Maintenance

The Facility will conduct routine heavy equipment and vehicle maintenance onsite. Maintenance includes fueling of heavy equipment with diesel fuel, lubrication, oil changes and, antifreeze changes. Tire repairs will be handled by an outside service company.

A permanent equipment fueling facility will be installed and registered in accordance with F.A.C. 62-761. Pasco County will be copied on the registration.

Oil and antifreeze changes will be contained by large drip pans to catch the waste oils. These wastes will then be transferred either to a 250-gallon waste oil skid tank or to a 55-gallon drum for waste antifreeze, which will be located in a containment area. The containment area is a covered metal storage shed. Enterprise RDF plans to enter into contracts with licensed recyclers to periodically pick up the waste oil and antifreeze. Records of these pickups will be maintained by Enterprise RDF. All virgin lubricants will be stored undercover within the gate house building or suitable enclosure.

18.0 SAFETY DEVICES

All operating equipment which will be utilized at the landfill site will be fitted with rollover protection and fire extinguishers. All landfill personnel will be required to wear safety helmets, safety shoes, eye protective glasses, gloves, and safety vests. The onsite heavy equipment will meet OSHA safety requirements. First aid equipment will be kept in the office trailer and in the operating equipment.

19.0 RECORDS, PERMITS AND REPORTS

A copy of any Florida Department of Environmental Protection (FDEP) and Pasco County approved engineering drawings, permits and supporting information will be kept at the facility for reference and inspections. Permits will be posted at site per ordinance. A waste type and quantity

intake (in tons) log will be kept daily, compiled monthly and a report will be submitted annually to Pasco County and the FDEP.

An annual estimate of the remaining life and capacity in cubic yards of the landfill will be reported annually to the FDEP.

19.1 Water Quality Monitoring

The Facility will conduct the required initial and semi-annual groundwater monitoring at the sites' monitoring wells as described in the Facility's Groundwater Monitoring Plan. Semi-annual reports of this monitoring will be submitted to Pasco County and FDEP in accordance with this plan. Quarterly monitoring will also be conducted and reported at specific wells per Pasco County conditions.

19.2 Landfill Operating Records

The operating record for the landfill will document daily as a minimum the following activities:

- Self-inspections of landfill conditions, safety equipment and unacceptable waste received, any odor detected;
- Records used to develop permit applications;
- Change in construction, operation or closure permits and supporting designs;
- Water quality sampling events, analytical reports, well installation or repair;
- Employee training;
- Random load checks;
- Facility construction, major maintenance, or demolition;
- Other activities that significantly affect facility operations.

Self-inspections of the landfill conditions are conducted daily, and more extensive inspections are included weekly. Daily inspections include general inspection of site access, site security, and conditions of intermediate cover. Weekly inspections include more detailed inspections of the conditions of the surface water and stormwater management systems and groundwater monitoring wells.

The Operating Record will be kept at the landfill and be accessible to the landfill operators to maintain and for FDEP or Pasco County inspection at reasonable times.

Operational records will be maintained for the design life of the landfill, with the exception of weigh tickets which will be kept at least 5 years. Water quality monitoring information, maintenance records, and permit reports will be maintained for a minimum of 10 years. Background water quality records will be maintained for the design period of the landfill.

20.0 EROSION CONTROL

The site's inherent design as an excavation pit will prevent stormwater from leaving the property. Stabilization by seeding and mulching of the final fill areas will occur as the fill operations progress from cell to cell.

21.0 FINAL GRADE PLAN

Interim grades of the cells are shown on the plans (Drawings C1.00 and C2.00 of the 2016 Plan Set provided in Section 4 of the March 2016 permit modification application RAI ~~1~~ 2 response dated ~~July~~ December 2016) and in the cross-sections (Drawings C1.10 and C2.10). Permitted mining activities will continue in accordance with the site's Class I mining permit. The final elevations after construction of future cells is planned to reclaim excavated areas back to the grade which existed prior to the site being opened as a mine with allowance for positive drainage. The Landfill Conceptual Closure Plan is provided in Drawing C2.00 (Section 4 of the March 2016 permit modification application RAI ~~1~~ 2 response dated ~~July~~ December 2016).

22.0 CLOSURE AND LONG TERM CARE

The site's Reclamation and Closure Plan details the procedures to properly close and maintain the landfill during the 30-year post-closure period. A Closure Report will be prepared for the landfill that details the site-specific limitations for land use based on geotechnical stability (settlement), potential gas migration, and site access. Long-term maintenance of erosion controls, storm water controls and monitoring devices is discussed in the Closure Plan (Section 7 of the March 2016 permit modification application RAI ~~1~~ 2 response dated ~~July~~ December 2016).

23.0 CERTIFICATION

Laboratory testing and observation of cell floor conditions during cell construction completion will consist of the following:

- In-place density testing for each 12-inch thick soil lift, based on laboratory proctor test results for the construction material, will be recorded by a properly trained technician. These tests will be conducted in the location of each permeability test.

- Thickness testing of each lift will be recorded at a minimum frequency of two tests per acre, per lift.

- Confirmation hydraulic conductivity testing of Shelby tube or drive cylinder samples of the compacted cell floor material will be performed at a minimum frequency of one test per lift, per acre.

- Observance for unstable areas such as limestone, sinkholes and soft ground will be performed for each cell.

If the test data from a cell floor section does not meet the requirements of the anticipated conditions of the hydrogeological and geotechnical reports and the requirements of the facility construction permit, additional random samples may be tested from that cell section. If the additional testing demonstrates that the hydraulic conductivity meets the requirements, the cell will be considered acceptable. If not, that cell will be reworked or reconstructed so that it will meet these requirements.

Upon completion of construction of any cell (or cell increment) within the disposal facility, the Applicant will provide the FDEP with the necessary reports, documents, and form 62-701.900(2), F.A.C. demonstrating that the approved construction is complete and in accordance with the submitted plans. The operator will provide the completed form to the FDEP in accordance with Rule 62-701.320(9)a., F.A.C., along with the quality assurance test results described above.

24.0 HISTORY OF ENFORCEMENT ACTION

In 2000, OGC Case No. 00-0009 was opened against the applicant for the Frontier Recycling facility (now Angelo's Recycling Facility) in Largo, Florida. A model consent order was used to resolve the issues of the case. The DEP's database did not include information regarding the subject of the enforcement.

In 2004, OGC Case No. 04-0887 (solid waste) and No. 04-0426 (stormwater) were opened against the applicant for Angelo's Recycling facility in Largo, Florida. ARM requested a minor permit modification to resolve the solid waste enforcement case. Formal enforcement was not taken to resolve the stormwater case. Instead, it was handled through submittal of a new permit application.

In 2006, OGC Case No. 06-0783 was opened against the applicant for the Enterprise Class III Landfill and Recycling Facility in Pasco County, Florida. ARM performed the corrective actions that were required to bring the facility into compliance and the assessed civil penalties were paid.

In 2007, OGC Case No. 07-1985 was opened against the applicant for the Angelo’s C&D Recycling Waste Processing Facility in Apopka, Florida. ARM performed the corrective actions that were required to bring the facility into compliance and the assessed civil penalties were paid.

In 2007, Warning Letter #WL07-0019SW51SWD was issued to Angelo’s Aggregate Materials, Ltd. for the Enterprise Class III Landfill. The Warning Letter was settled June 5, 2008 for total

fines of $18,397. In the “Proposed Settlement of Warning Letter WL07-0019SW51SWD”, the Department acknowledged that Angelo’s would not be considered “irresponsible” under FDEP Rule 62-701.320, FAC, as a result of the enforcement action.

In 2007, Warning Letter # WL07-0008SW52SWD was issued to Angelo’s Aggregate Materials, Ltd. for the Recycling Waste Processing Facility in Largo, FL. The Warning Letter was settled April, 2009 for total fines of $24,986. In the “Proposed Settlement of Amended Warning Letter WL07-0008SW52SWD”, the Department acknowledged that Angelo’s would not be considered “irresponsible” under FDEP Rule 62-701.320, FAC, as a result of the enforcement action.

ATTACHMENT 1
FACILITY ENTRANCE SIGN

ATTACHMENT 2
RANDOM LOAD INSPECTION FORM

ATTACHMENT 3
FACILITY TRAINING LOG

ATTACHMENT 4
GAS MONITORING SURVEY FORM

ATTACHMENT 5
LIST OF APPROVED COURSES

ATTACHMENT 6
TRAINING CERTIFICATES

ATTACHMENT 7
SOURCE-SEPARATED ORGANICS PROCESSING FACILITY REGISTRATION

ATTACHMENT 7

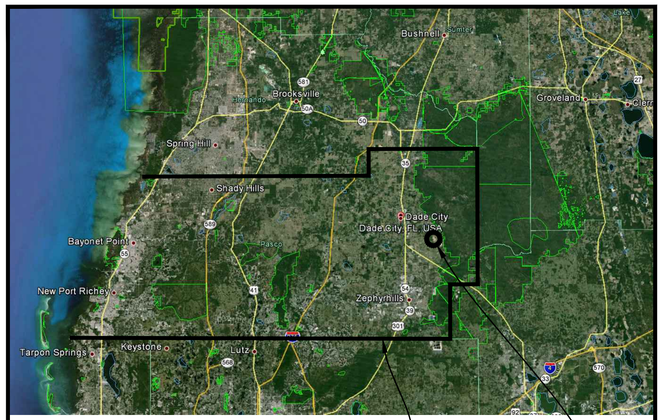
Revised Engineering Plan Set

(replace previously submitted plan set in its entirety)

ENTERPRISE ROAD CLASS III LANDFILL
RECYCLING & DISPOSAL FACILITY
LANDFILL PERMIT MODIFICATION

LOCATED:
DADE CITY, PASCO COUNTY, FLORIDA

SUBMITTED TO:
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION



PASCO COUNTY, FLORIDA

ENTERPRISE ROAD RECYCLING & DISPOSAL FACILITY
CLASS III LANDFILL

COUNTY LOCATION MAP

Sheet List Table

ENTERPRISE ROAD RECYCLING & DISPOSAL FACILITY
CLASS III LANDFILL

VICINITY MAP

NO.	DATE	REVISION DESCRIPTION	BY
1	7/31/16	FDEP R.A.I. NO. 1 RESPONSE	LJB
2	12/02/16	FDEP R.A.I. NO. 2 RESPONSE	LJB
3	1/24/17	SUPPLEMENTAL INFORMATION FOR TOE DRAIN	LJB
4	2/3/17	REVISED TOE DRAIN AND ADDED LEACHATE COLLECTION WETWELL	LJB

Locklear & Associates
4140 NW 37th Place, Suite A
Gainesville, Florida 32606
Phone: 352.672.6867 Fax: 352.692.5390
Certificate of Authorization No. 30066

PROJECT TITLE:
PERMIT PLANS
ENTERPRISE ROAD CLASS III
RECYCLING & DISPOSAL FACILITY
2016 PERMIT MODIFICATION
DADE CITY, PASCO COUNTY, FLORIDA

LISA J. BAKER	DESIGNED BY	LJB
	DRAWN BY	MAF
	CHECKED BY	JDL
FL PE NO. 74652	APPROVED BY	LJB

SHEET TITLE:
COVER SHEET

PROJECT NO.: 02000-144-14
SCALE: AS SHOWN
DATE: MARCH 2016
DRAWING: C0.00

REVIEW ONLY-NOT FOR CONSTRUCTION

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GENERAL NOTES

1. ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929, UNLESS OTHERWISE NOTED.
2. THE INFORMATION PROVIDED IN THESE PLANS IS SOLELY TO ASSIST THE PERMITTING AGENCY IN ASSESSING THE NATURE AND EXTENT OF THE CONDITIONS WHICH MAY BE ENCOUNTERED AT THE SITE.
3. CONTRACTOR SHALL CERTIFY IN WRITING TO THE ENGINEER OF RECORD THE ACCURACY OF ALL SURVEY AND OTHER GRADING DATA PRIOR TO BEGINNING WORK.
4. LOCATIONS, ELEVATIONS, AND DIMENSIONS OF EXISTING UTILITIES, STRUCTURES, AND OTHER FEATURES ARE SHOWN TO THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF THESE PLANS BUT DO NOT PURPORT TO BE ABSOLUTELY CORRECT. THERE MAY BE OTHER IMPROVEMENTS, UTILITIES, ETC. WHICH ARE WITHIN THE PROJECT AREA. THE CONTRACTOR SHALL VERIFY, PRIOR TO CONSTRUCTION, THE LOCATIONS, ELEVATIONS, AND DIMENSIONS OF ALL EXISTING UTILITIES, STRUCTURES, AND OTHER FEATURES (WHETHER OR NOT SHOWN ON THE PLANS) AFFECTING THE WORK.
5. CONTRACTOR SHALL TAKE WHATEVER MEANS NECESSARY TO PROTECT EXISTING PIPING, MONITORING WELLS/PIEZOMETERS FROM DAMAGE DURING CONSTRUCTION. CONTRACTOR SHALL REPAIR OR REPLACE PIPING, MONITORING WELLS/PIEZOMETERS DAMAGED DURING CONSTRUCTION WITH EQUIVALENT MATERIALS AND CONSTRUCTION METHODS AS APPROVED BY FACILITY OWNER AT NO ADDITIONAL COST TO THE OWNER.
6. FIELD CONDITIONS MAY NECESSITATE SLIGHT ALIGNMENT AND GRADE DEVIATION OF THE PROPOSED CONSTRUCTION TO AVOID OBSTACLES, AS ORDERED BY THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER.
7. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH EXISTING PASCO COUNTY DESIGN AND CONSTRUCTION STANDARDS UNLESS THOSE STANDARDS CONFLICT WITH THESE CONTRACT DOCUMENTS IN WHICH CASE THESE CONTRACT DOCUMENTS SHALL GOVERN. SUCH CONFLICTS SHALL BE BROUGHT TO THE PROFESSIONAL'S ATTENTION IMMEDIATELY.
8. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH PREVAILING FEDERAL, STATE, LOCAL AND OTHER APPLICABLE REGULATIONS.
9. CONSTRUCTION MONUMENTS FOR VERTICAL AND HORIZONTAL CONTROL HAVE BEEN PROVIDED AT THE PROJECT SITE.
10. PRIOR TO BEGINNING EARTHWORK, THE CONTRACTOR SHALL PROVIDE STORMWATER AND EROSION CONTROL PLANS TO PREVENT PONDING AND CONTROL EROSION AND RUNOFF. NO PONDING OF WATER SHALL BE ALLOWED. THE CONTRACTOR SHALL USE WHATEVER MEANS NECESSARY TO PREVENT EROSION AND SHALL BE RESPONSIBLE FOR ALL WORK, INCLUDING PROVIDING EQUIPMENT, LABOR, FILL, ETC NECESSARY TO REMEDIATE AND/OR RESTORE ALL AREAS IMPACTED BY EROSION.
11. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO BECOME FAMILIAR WITH THE OSHA EXCAVATION SAFETY STANDARDS AND TO ABIDE BY THEM.
12. THE CONTRACTOR SHALL PROVIDE ALL WARNING SIGNALS, SIGNS, LIGHTS, AND FLAG PERSON AS REQUIRED BY DOT IN THE "MANUAL ON TRAFFIC CONTROL & SAFE PRACTICES."
13. ALL PIPING SHALL HAVE MINIMUM COVER OF 24" UNLESS OTHERWISE NOTED.
14. WHERE IT IS NECESSARY TO DEFLECT PIPE EITHER HORIZONTALLY OR VERTICALLY, PIPE DEFLECTION SHALL NOT EXCEED 75% OF THE MANUFACTURER'S RECOMMENDED DEFLECTION ANGLE. MINIMUM PIPE RADIUS SHALL BE A MINIMUM OF 25% GREATER THAN THE MANUFACTURER'S RECOMMENDED MINIMUM RADIUS.
15. CONTAMINATED STORMWATER, DEWATERING DISCHARGE, LEACHATE, CONTAMINATED SOILS, OR EXCAVATED WASTE SHALL BE CONTAINED AND DISPOSED OF IN ACCORDANCE WITH THE LANDFILL OPERATIONS.
16. CONTRACTOR SHALL VERIFY ALL CLEARANCES PRIOR TO CONSTRUCTION.
17. THE CONTRACTOR SHALL MAINTAIN A CLEAR PATH FOR ALL SURFACE WATER DRAINAGE STRUCTURES AND DITCHES DURING ALL PHASES OF CONSTRUCTION AND SHALL UTILIZE WHATEVER MEANS NECESSARY TO MANAGE STORMWATER SUCH THAT IMPACT TO CONSTRUCTION IS MINIMIZED. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF DAMAGE DUE TO STORMWATER.
18. NO DISTURBANCE SHALL BE ALLOWED OUTSIDE OF THE AREAS SHOWN ON THE FINAL GRADING PLAN UNLESS APPROVED BY THE ENGINEER, OR SPECIFICALLY NOTED ON THE PLANS.
22. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ENVIRONMENTAL PROTECTION DURING THE LIFE OF THE CONTRACT. THE CONTRACTOR'S OPERATIONS SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS PERTAINING TO WATER, AIR, SOLID WASTE, HAZARDOUS WASTE MATERIALS, OILY SUBSTANCES, AND NOISE POLLUTION. THE CONTRACTOR SHALL IMPLEMENT EROSION AND SEDIMENTATION CONTROL MEASURES AS NECESSARY TO COMPLY WITH THESE REGULATIONS FOR BOTH TEMPORARY AND PERMANENT CONSTRUCTION.
23. THE CONTRACTOR SHALL COMPLY WITH ALL TERMS, CONDITIONS, AND REQUIREMENTS OF ALL APPLICABLE PERMITS, INCLUDING FDEP PERMITS FOR THE SITE.
24. THE CONTRACTOR SHALL REPLACE ALL EXISTING PAVING, LANDFILL COVER MATERIAL, ACCESS ROADS, PIPES, STABILIZED EARTH, FENCES, SIGNS AND OTHER IMPROVEMENTS WITH THE SAME TYPE OF MATERIAL THAT WAS REMOVED OR DAMAGED DURING CONSTRUCTION, AS A RESULT OF CONSTRUCTION, OR AS DIRECTED BY THE ENGINEER WITHOUT INCREASE IN THE CONTRACT PRICE OR TIME.
25. THE CONTRACTOR SHALL BE AWARE THAT THERE MAY BE SOME UTILITY CONFLICTS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND PROTECT ANY AND ALL EXISTING UTILITIES ON THIS PROJECT WITHOUT INCREASE IN THE CONTRACT PRICE OR TIME.
26. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY WHEN CONFLICTS BETWEEN DRAWINGS AND ACTUAL CONDITIONS ARE DISCOVERED.
27. THE CONTRACTOR SHALL COMPLY WITH ALL TERMS, CONDITIONS, AND REQUIREMENTS OF ALL APPLICABLE PERMITS, INCLUDING FDEP AND WATER MANAGEMENT DISTRICT PERMITS FOR THE SITE.

GRADING NOTES

1. ALL AREAS WITHIN AND AROUND THE LIMITS OF CONSTRUCTION SHALL BE MAINTAINED AS NEEDED TO CONTROL EROSION DURING THE LENGTH OF THE PROJECT.
2. FILL ELEVATIONS SHALL BE SUCH THAT INTERMEDIATE AND FINAL COVER DESIGN ELEVATIONS SHALL BE ACHIEVED ON ALL SLOPES.

NO.	DATE	REVISION DESCRIPTION	BY
1	7/31/16	FDEP R.A.I. NO. 1 RESPONSE	LJB
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Certificate of Authorization No. 30066

PROJECT TITLE:
PERMIT PLANS
ENTERPRISE ROAD CLASS III
RECYCLING & DISPOSAL FACILITY
2016 PERMIT MODIFICATION
DADE CITY, PASCO COUNTY, FLORIDA

LISA J. BAKER	DESIGNED BY	LJB
	DRAWN BY	MAF
	CHECKED BY	JDL
FL PE NO. 74652	APPROVED BY	LJB

SHEET TITLE:
GENERAL NOTES AND ABBREVIATIONS

PROJECT NO.: 02000-144-14
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DATE: MARCH 2016
DRAWING: C0.01

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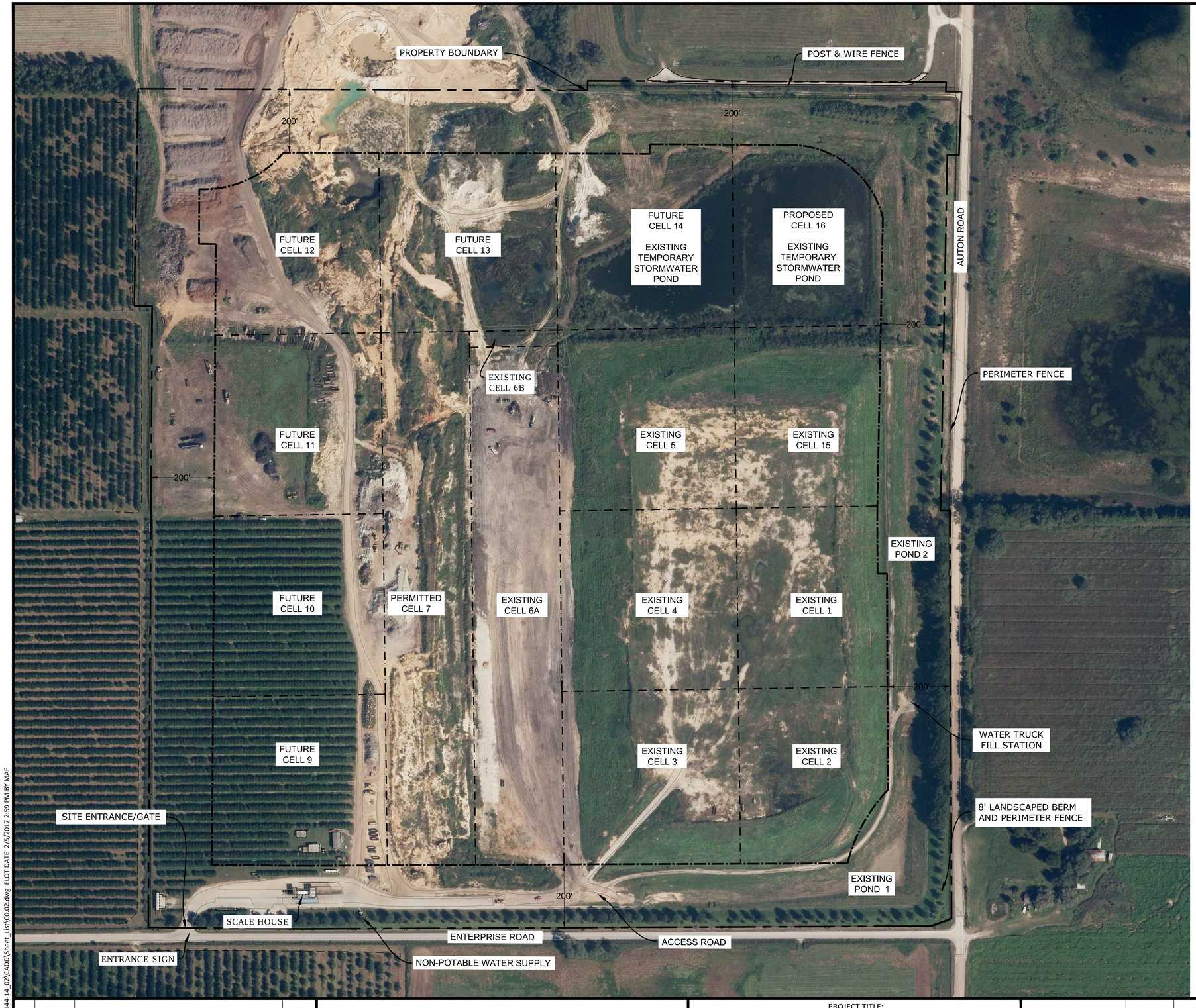

NORTH

0 150 300
GRAPHIC SCALE

LEGEND

- PERIMETER FENCE
- PROPERTY BOUNDARY
- LANDFILL FOOTPRINT (AT BUILD OUT)
- LANDFILL CELLS

NOTES:

1. PROPERTY BOUNDARY SURVEY CONDUCTED BY SIMMONS & BEALL, INC. 3-30-2001, PROVIDED BY ANGELO'S AGGREGATE MATERIALS.
2. CLASS III LANDFILL PERMITTED AND FUTURE CELL LAYOUT PER NOVEMBER 2006 ANGELO'S RECYCLED MATERIALS ENTERPRISE RECYCLING & DISPOSAL FACILITY (AS AMENDED FEBRUARY 2008 AND JANUARY 2010 BY JONES EDMUNDS, AS AMENDED MARCH 2013 BY KELNER ENGINEERING AND 2015 BY LOCKLEAR & ASSOCIATES).
3. 2013 AERIAL PHOTOGRAPHY PER FLORIDA DEPARTMENT OF TRANSPORTATION WEBSITE.

NO.	DATE	REVISION DESCRIPTION	BY
1	7/31/16	FDEP R.A.I. NO. 1 RESPONSE	LJB
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PERMIT PLANS
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DADE CITY, PASCO COUNTY, FLORIDA

LISA J. BAKER	DESIGNED BY	LJB
	DRAWN BY	MAF
	CHECKED BY	JDL
FL PE NO. 74652	APPROVED BY	LJB

SHEET TITLE:
AERIAL SITE PLAN

PROJECT NO.: 02000-144-14
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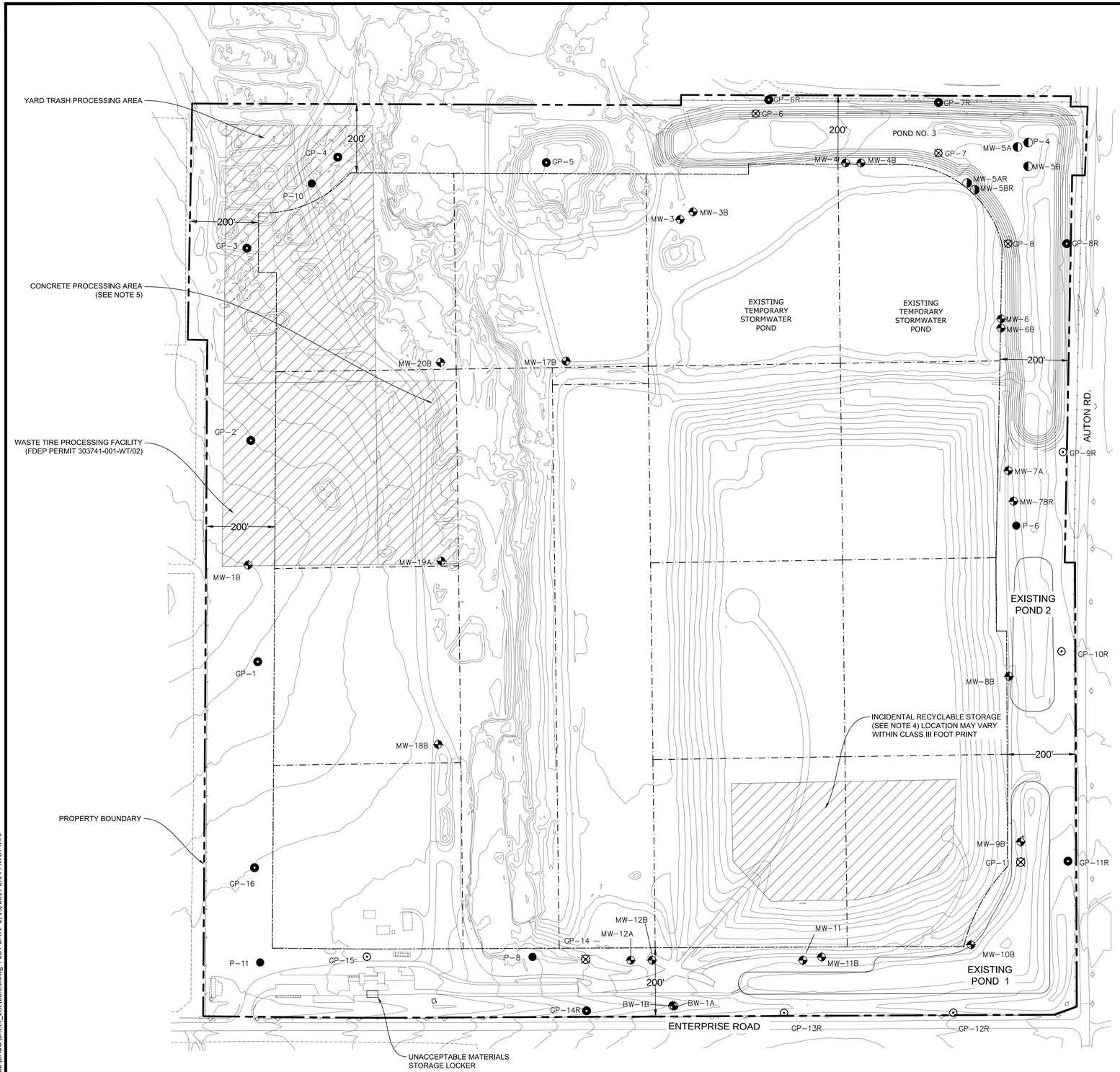

NORTH

0 150 300
GRAPHIC SCALE

LEGEND

- PERIMETER FENCE
- PROPERTY BOUNDARY
- LANDFILL FOOTPRINT (AT BUILD OUT)
- LANDFILL CELLS
- EXISTING CONTOURS (90)
- SPECIAL WASTE MANAGEMENT AREA

LEGEND

MW-4B	MONITORING WELL LOCATION
MW-5A	MONITORING WELL TO BE ABANDONED
MW-5BR	MONITORING WELL TO BE INSTALLED
GP-1	GAS PROBE LOCATION
GP-8	GAS PROBE TO BE ABANDONED
GP-8R	FUTURE GAS PROBE LOCATION
P-11	PIEZOMETER WELL LOCATION
MW-18B	FUTURE MONITOR WELL LOCATION*

NOTES:

1. PROPERTY BOUNDARY SURVEY CONDUCTED BY SIMMONS & BEALL, INC. 3-30-2001, PROVIDED BY ANGELO'S AGGREGATE MATERIALS.
2. CLASS III LANDFILL PERMITTED AND FUTURE CELL LAYOUT PER NOVEMBER 2006 ANGELO'S RECYCLED MATERIALS ENTERPRISE RECYCLING & DISPOSAL FACILITY (AS AMENDED FEBRUARY 2008 AND JANUARY 2010 BY JONES EDMUNDS AND AMENDED MARCH 2013 BY KELNER ENGINEERING).
3. TOPOGRAPHIC SURVEY BY PICKETT SURVEYING & PHOTOGRAMMETRY, DATED 11/11/13, UPDATED ON 12/31/13.
4. TEMPORARY STORAGE OF UNACCEPTABLE MATERIALS AND INCIDENTAL RECYCLABLES WITHIN THE LANDFILL FOOTPRINT AND NEAR WORKING FACE MAY BE PROVIDED AS FOLLOWS:

TYPE	MAX. QTY	STORAGE
INCIDENTAL RECYCLABLES		
FERROUS METAL	500 CY	ROLL-OFF OR PILE
ALUMINUM	300 CY	ROLL-OFF OR PILE
STAINLESS STEEL	300 CY	ROLL-OFF OR PILE
COPPER	25 CY	TRASH PAIL, ROLL-OFF OR PILE
ASPHALT	300 CY	ROLL-OFF OR PILE
CONCRETE / RUBBLE	300 CY	ROLL-OFF OR PILE
ELECTRONICS	8 CY	COVERED DUMPSTER
UNACCEPTABLE MATERIALS		
PAINT, BATTERIES, SOLVENTS, ELECTRONICS, OILS, ETC.	40 CY	ROLL-OFF OR PILE AT WORKING FACE, REMOVED DAILY TO STORAGE LOCKER
CLASS I WASTE	20 CY	COVERED DUMPSTERS

5. CONCRETE PROCESSING AREA WILL BE RELOCATED WHEN EXCAVATION OPERATIONS MOVE TO THIS AREA.

NO.	DATE	REVISION DESCRIPTION	BY
1	7/31/16	FDEP R.A.I. NO. 1 RESPONSE	LJB
2	12/02/16	FDEP R.A.I. NO. 2 RESPONSE	LJB
3	1/24/17	SUPPLEMENTAL INFORMATION FOR TOE DRAIN	LJB
4	2/3/17	REVISED TOE DRAIN AND ADDED LEACHATE COLLECTION WETWELL	LJB

Locklear & Associates
4140 NW 37th Place, Suite A
Gainesville, Florida 32606
Phone: 352.672.6867 Fax: 352.692.5390
Certificate of Authorization No. 30066

PROJECT TITLE:
PERMIT PLANS
ENTERPRISE ROAD CLASS III
RECYCLING & DISPOSAL FACILITY
2016 PERMIT MODIFICATION
DADE CITY, PASCO COUNTY, FLORIDA

LISA J. BAKER	DESIGNED BY	LJB
	DRAWN BY	MAF
	CHECKED BY	JDL
FL PE NO. 74652	APPROVED BY	LJB

SHEET TITLE:
SITE PLAN

PROJECT NO.: 02000-144-14
SCALE: AS SHOWN
DATE: MARCH 2016
DRAWING: C0.03

REVIEW ONLY-NOT FOR CONSTRUCTION

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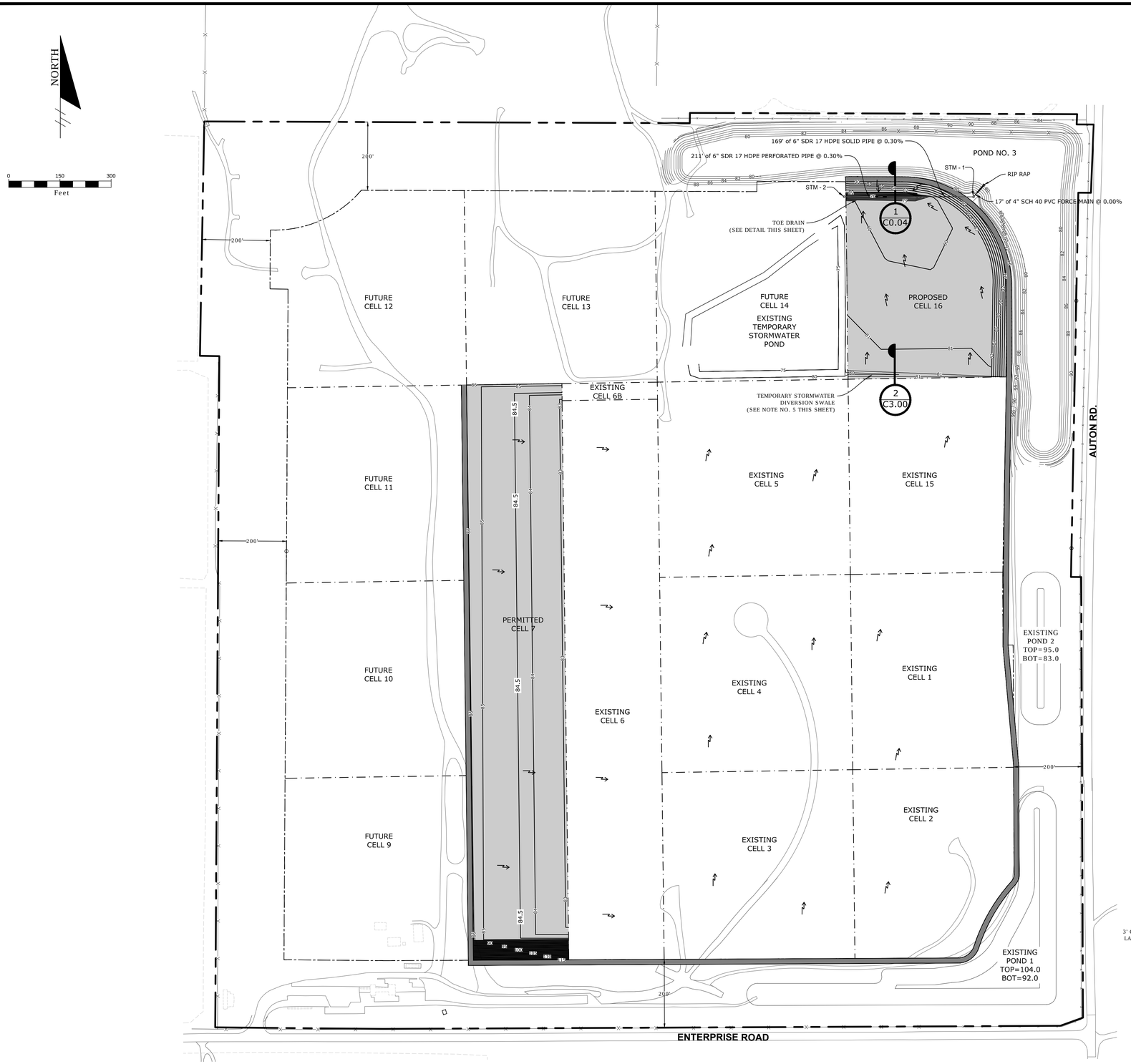


STORM SEWER STRUCTURE TABLE

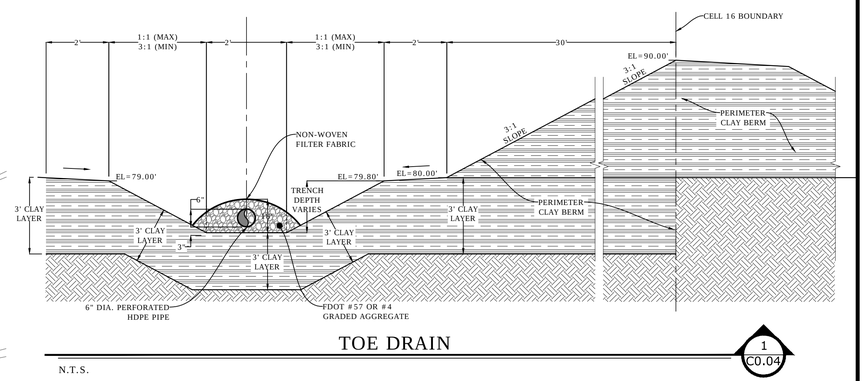
STRUCTURE NAME:	DETAILS:	NORTHING	EASTING
STORM SEWER STM - 1	LEACHATE COLLECTION WETWELL (SEE DETAIL ON C4.00) FINISH GRADE RIM EL = 91.92' INV IN = 74.98' 6" SDR 17 HDPE SOLID PIPE SUMP EL = 72.00' INV OUT = 88.50' 4" SCH 40 PVC FORCE MAIN	1,454,654.80	613,925.38
STORM SEWER STM - 2	6" CLEANOUT FINISH GRADE RIM EL = 80.00' INV OUT = 76.12' 6" SDR 17 HDPE PERFORATED PIPE	1,454,655.37	613,546.73

LEGEND

- PERIMETER FENCE
- PROPERTY BOUNDARY
- LANDFILL FOOTPRINT (AT BUILD OUT)
- LANDFILL CELLS
- 90 — EXISTING CLAY LAYER CONTOURS
- 90 — PROPOSED CLAY LAYER CONTOURS
- DIRECTIONAL FLOW ARROW
- FLOOR GRADING CLAY AREA (SHADED)

NOTES:

1. PROPOSED CONTOURS REPRESENT THE TOP OF CLAY (3' BARRIER LAYER) ELEVATION.
2. TOPOGRAPHIC SURVEY BY PICKETT SURVEYING & PHOTOGRAMMETRY, DATED 11/11/2013.
3. PHASE 1 - CONSTRUCTION OF CELL 7 FLOOR GRADING PLAN (PREVIOUSLY PERMITTED, CONSTRUCTION IN PROGRESS.
4. PHASE 2 - CONSTRUCTION OF CELL 16 FLOOR GRADING PLAN AND POND NO. 3 GRADING PLAN.
5. PHASE 2 - TEMPORARY STORMWATER DIVERSION SWALE. CONTRACTOR SHALL GRADE TEMPORARY SWALE FOR POSITIVE DRAINAGE TOWARD EXISTING TEMPORARY STORMWATER POND. TEMPORARY SWALE SHALL BE REMOVED AND FILLED WITH CLAY ONCE INITIAL WASTE LIFT REACHES THE SWALE FROM THE NORTH.



TOE DRAIN

N.T.S.

1
C0.04

NO.	DATE	REVISION DESCRIPTION	BY
1	7/31/16	FDEP R.A.I. NO. 1 RESPONSE	LJB
2	12/02/16	FDEP R.A.I. NO. 2 RESPONSE	LJB
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DADE CITY, PASCO COUNTY, FLORIDA

LISA J. BAKER	DESIGNED BY	LJB
	DRAWN BY	MAF
	CHECKED BY	JDL
FL PE NO. 74652	APPROVED BY	LJB

SHEET TITLE:

CELL FLOOR GRADING PLAN

PROJECT NO.: 02000-144-14
SCALE: AS SHOWN
DATE: MARCH 2016
DRAWING: C0.04

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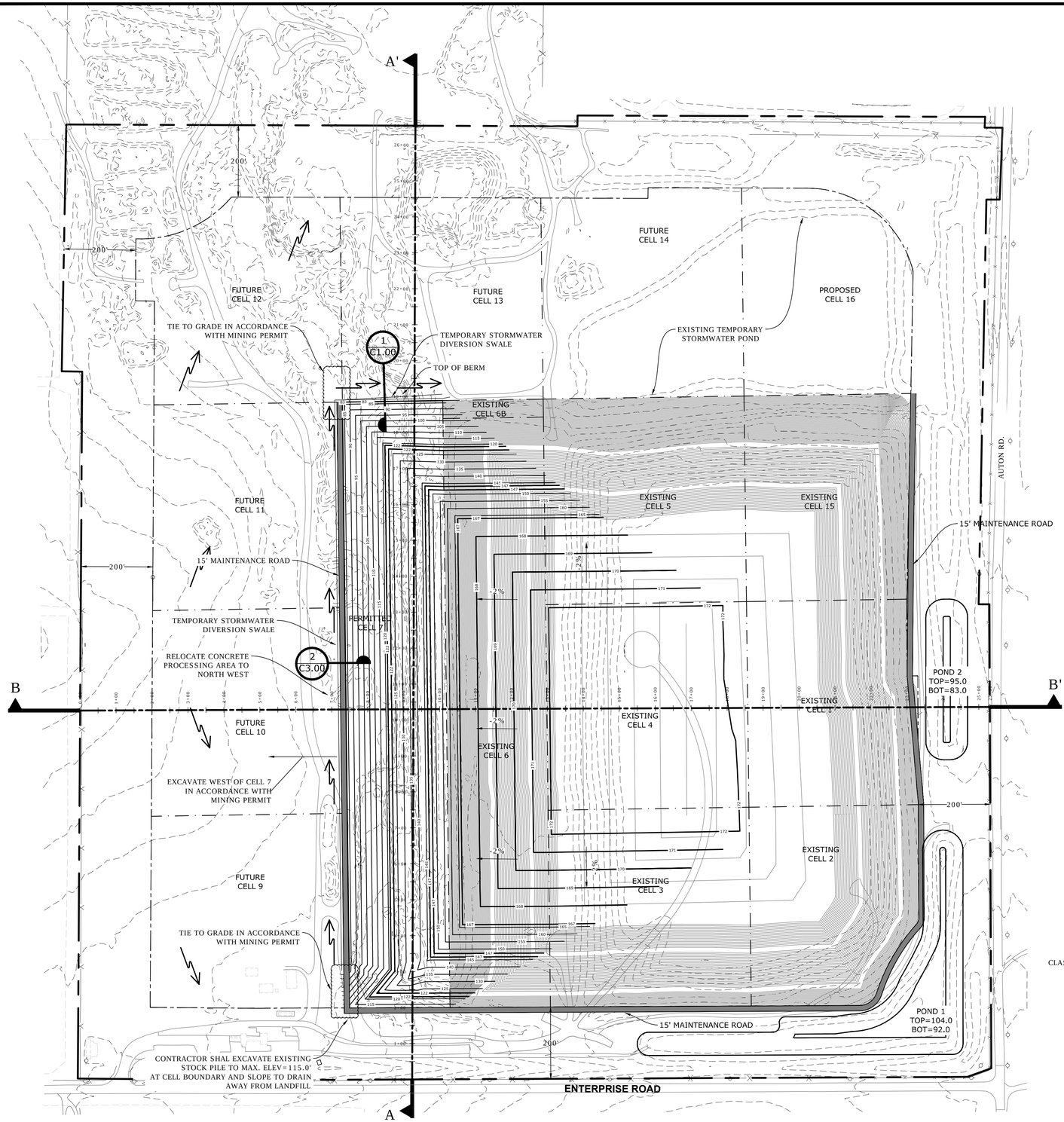


LEGEND

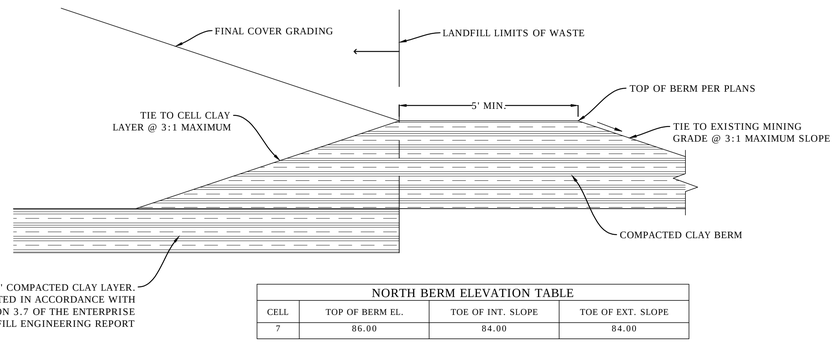
- PERIMETER FENCE
- PROPERTY BOUNDARY
- LANDFILL FOOTPRINT (AT BUILD OUT)
- LANDFILL CELLS
- EXISTING CONTOURS
- DIRECTIONAL FLOW ARROW
- 10+00 — CROSS SECTION STATIONS

NORTH

0 150 300
Feet

NOTES:

1. CONTOURS REPRESENT TOP OF WASTE. FILL ELEVATIONS SHALL BE SUCH THAT FINAL COVER DESIGN ELEVATIONS SHALL BE ACHIEVED ON ALL SLOPES.
2. TOPOGRAPHIC SURVEY BY PICKETT SURVEYING & PHOTOGRAMMETRY, DATED 11/11/13, UPDATED ON 12/31/13.
3. PRIOR TO WASTE BEING DISPOSED IN CELL 7, BACKFILL THE CELL 6 TEMPORARY DIVERSION SWALE WITH COMPACTED CLAY TO DRAIN TO EAST.
4. CELL 7 CLAY LAYER TO BE CONSTRUCTED IN ACCORDANCE WITH SECTION 3.7 OF ENTERPRISE CLASS III LANDFILL ENGINEERING REPORT.



NORTH BERM ELEVATION TABLE			
CELL	TOP OF BERM EL.	TOE OF INT. SLOPE	TOE OF EXT. SLOPE
7	86.00	84.00	84.00

PROPOSED CELL 7 NORTH BERM DETAIL PHASE SEQUENCE 1

1 C1.00 SCALE: N.T.S.

NO.	DATE	REVISION DESCRIPTION	BY
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4	2/3/17	REVISED TOE DRAIN AND ADDED LEACHATE COLLECTION WETWELL	LJB

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2016 PERMIT MODIFICATION
DADE CITY, PASCO COUNTY, FLORIDA

LISA J. BAKER — FL PE NO. 74652

DESIGNED BY	LJB
DRAWN BY	MAF
CHECKED BY	JDL
APPROVED BY	LJB

SHEET TITLE:
PHASING PLAN SEQUENCE NO. 1

PROJECT NO.:	02000-144-14
SCALE:	AS SHOWN
DATE:	MARCH 2016
DRAWING:	C1.00

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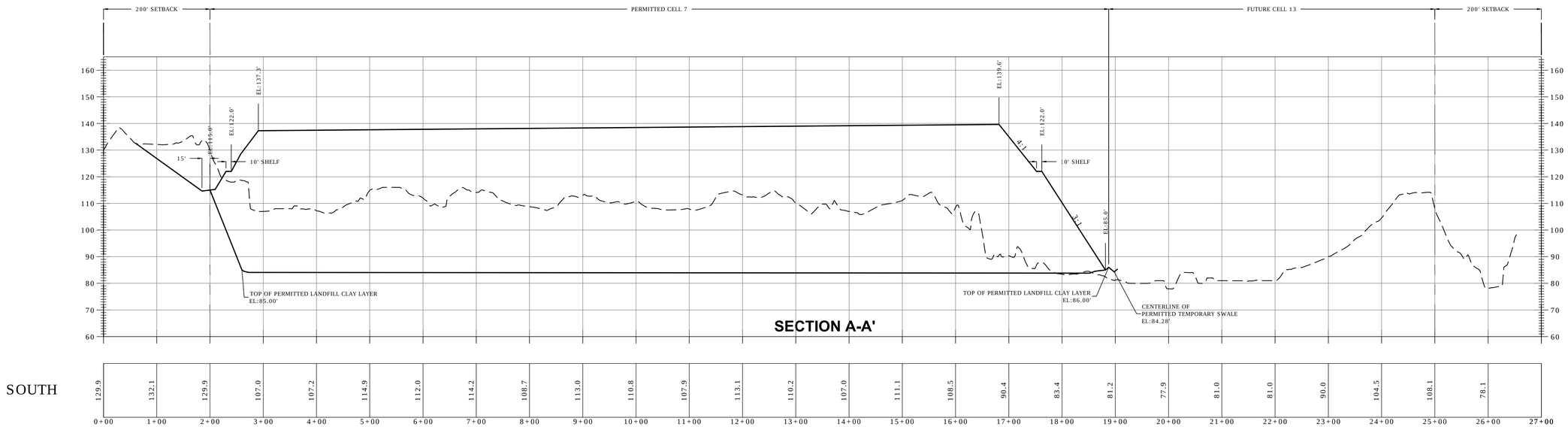
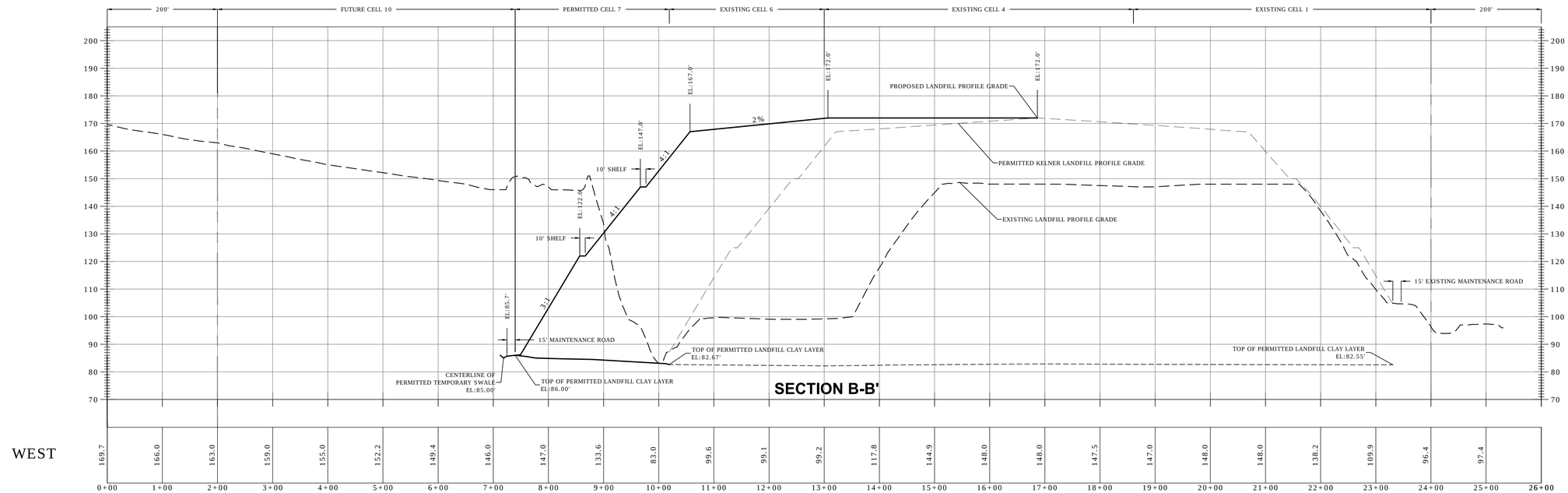
SCALES:
HORIZONTAL 1"=100'
VERTICAL 1"= 20'





NO.	DATE	REVISION DESCRIPTION	BY
1	7/31/16	FDEP R.A.I. NO. 1 RESPONSE	LJB
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2016 PERMIT MODIFICATION
DADE CITY, PASCO COUNTY, FLORIDA

LISA J. BAKER
FL PE NO. 74652

DESIGNED BY	LJB
DRAWN BY	MAF
CHECKED BY	JDL
APPROVED BY	LJB

SHEET TITLE:
PHASING PLAN SEQUENCE NO. 1 SECTIONS

PROJECT NO.: 02000-144-14
SCALE: AS SHOWN
DATE: MARCH 2016
DRAWING: C1.01

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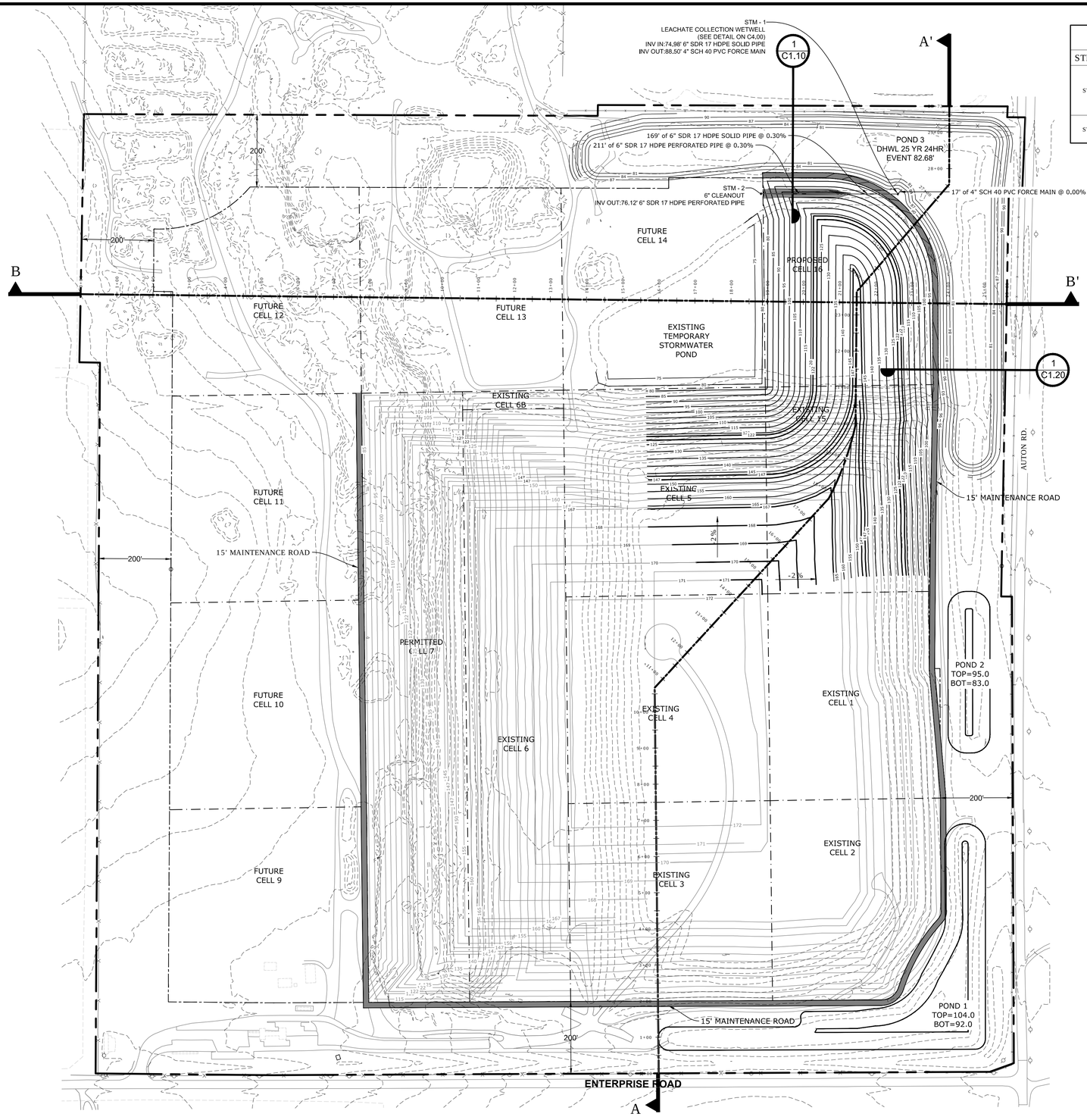

STORM SEWER STRUCTURE TABLE			
STRUCTURE NAME:	DETAILS:	NORTHING	EASTING
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STORM SEWER STM - 2	6" CLEANOUT FINISH GRADE RIM EL = 80.00' INV OUT = 76.12' 6" SDR 17 HDPE PERFORATED PIPE	1,454,655.37	613,546.73

NORTH

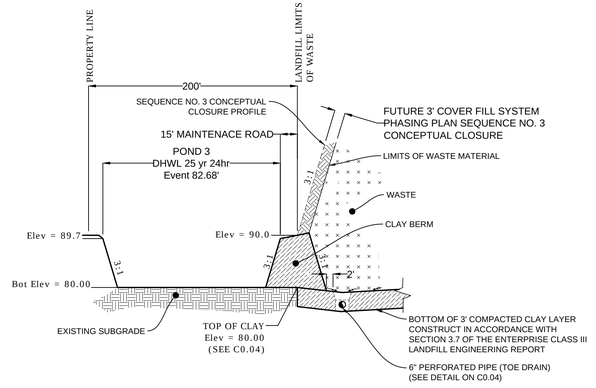
0 150 300
Feet

LEGEND

- PERIMETER FENCE
- PROPERTY BOUNDARY
- LANDFILL FOOTPRINT (AT BUILD OUT)
- LANDFILL CELLS
- 90 — EXISTING CONTOURS
- 10+00 — CROSS SECTION STATIONS

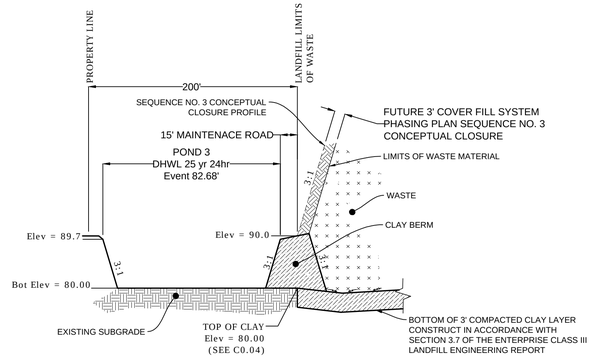
NOTES:

1. **CONTOURS REPRESENT TOP OF WASTE. FILL ELEVATIONS SHALL BE SUCH THAT FINAL COVER DESIGN ELEVATIONS SHALL BE ACHIEVED ON ALL SLOPES.**
2. TOPOGRAPHIC SURVEY BY PICKETT SURVEYING & PHOTOGRAMMETRY, DATED 11/11/13, UPDATED ON 12/31/13.



PROPOSED NORTH BERM DETAIL CELL 16
(SEQUENCE NO. 2)

1 C1.10 SCALE: N.T.S.



PROPOSED EAST BERM DETAIL CELL 16
(SEQUENCE NO. 2)

1 C1.20 SCALE: N.T.S.

NO.	DATE	REVISION DESCRIPTION	BY
1	7/31/16	FDEP R.A.I. NO. 1 RESPONSE	LJB
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PROJECT TITLE:
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ENTERPRISE ROAD CLASS III
RECYCLING & DISPOSAL FACILITY
2016 PERMIT MODIFICATION
DADE CITY, PASCO COUNTY, FLORIDA

LISA J. BAKER	DESIGNED BY	LJB
	DRAWN BY	MAF
	CHECKED BY	JDL
FL PE NO. 74652	APPROVED BY	LJB

SHEET TITLE:
PHASING PLAN SEQUENCE NO. 2

PROJECT NO.: 02000-144-14
SCALE: AS SHOWN
DATE: MARCH 2016
DRAWING: C1.10

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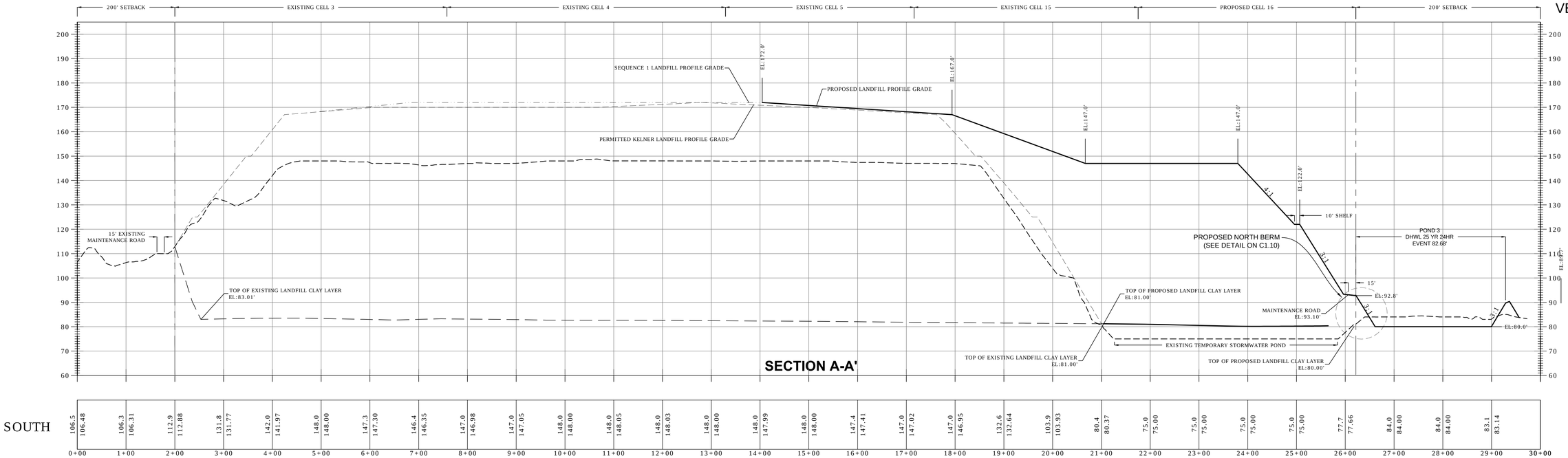
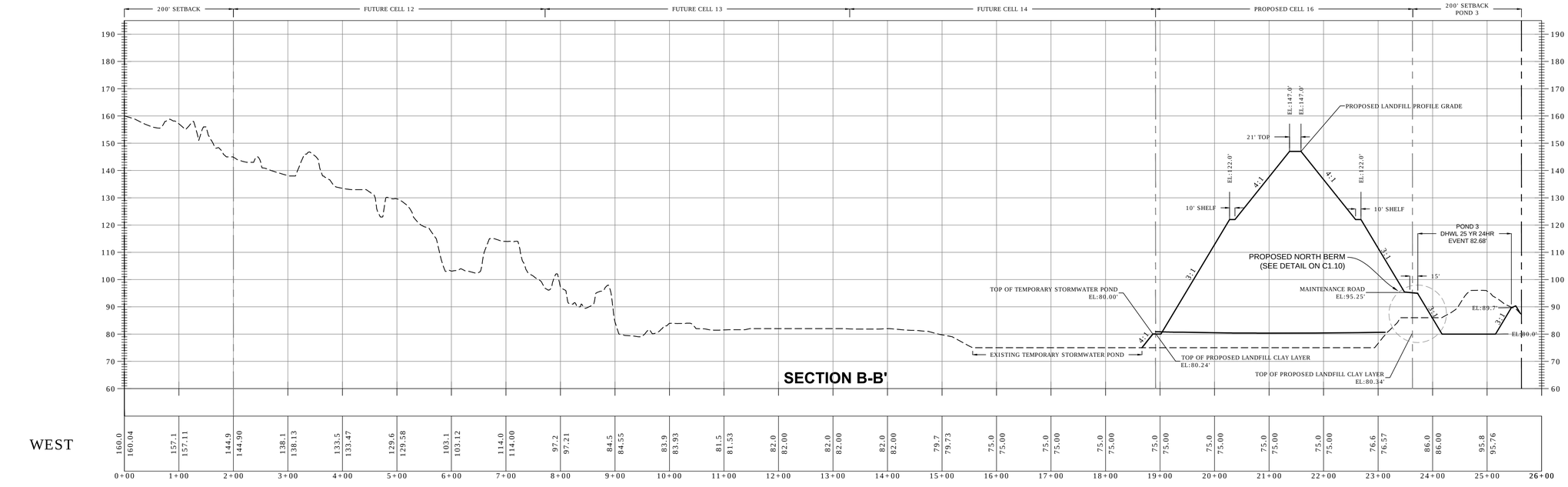
SCALES:
HORIZONTAL 1"=100'
VERTICAL 1"= 20'





NO.	DATE	REVISION DESCRIPTION	BY
1	7/31/16	FDEP R.A.I. NO. 1 RESPONSE	LJB
2	12/02/16	FDEP R.A.I. NO. 2 RESPONSE	LJB
3	1/24/17	SUPPLEMENTAL INFORMATION FOR TOE DRAIN	LJB
4	2/3/17	REVISED TOE DRAIN AND ADDED LEACHATE COLLECTION WETWELL	LJB

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PROJECT TITLE:
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RECYCLING & DISPOSAL FACILITY
2016 PERMIT MODIFICATION
DADE CITY, PASCO COUNTY, FLORIDA

LISA J. BAKER
FL PE NO. 74652

DESIGNED BY	LJB
DRAWN BY	MAF
CHECKED BY	JDL
APPROVED BY	LJB

SHEET TITLE:
PHASING PLAN SEQUENCE NO. 2 SECTIONS

PROJECT NO.: 02000-144-14
SCALE: AS SHOWN
DATE: MARCH 2016
DRAWING: C1.11

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STM - 1
LEACHATE COLLECTION WETWELL
(SEE DETAIL ON C4.00)
INV IN:74.98' 6" SDR 17 HDPE SOLID PIPE
INV OUT:88.50' 4" SCH 40 PVC FORCE MAIN

2 C2.00

C'

169' of 6" SDR 17 HDPE SOLID PIPE @ 0.30%
211' of 6" SDR 17 HDPE PERFORATED PIPE @ 0.30%

POND 3
DHWL 25 YR 24HR
EVENT 82.68'

STM - 2
6" CLEANOUT
INV OUT:76.12' 6" SDR 17 HDPE PERFORATED PIPE

17' of 4" SCH 40 PVC FORCE MAIN @ 0.00%

DROP INLET
(TYPICAL 20 PLACES)

DOWNCOMER PIPE
(TYPICAL 20 PLACES)

FUTURE
CELL 14

FUTURE
CELL 13

FUTURE
CELL 12

PROPOSED
CELL 16

EXISTING TEMPORARY
STORMWATER POND

1 C3.00

2 C2.10

EXISTING
CELL 6B

CONVEYANCE SWALE
FOR POSITIVE DRAINAGE NORTH

AUTON RD.

FUTURE
CELL 11

15' MAINTENANCE ROAD

EXISTING
CELL 5

EXISTING
CELL 15

3 C3.00

15' MAINTENANCE ROAD

EXISTING
CELL 4

PASSIVE LFG VENT
(TYPICAL 10 PLACES)

PERMITTED
CELL 7

1 C2.00

POND 2
TOP=95.0
BOT=83.0

D

FUTURE
CELL 10

D'

EXISTING
CELL 1

EXISTING
CELL 6

ACESS
ROAD

CONVEYANCE SWALE
FOR POSITIVE DRAINAGE SOUTH

4 C3.00

4' CONCEPTUAL CLOSURE BERM
LOCATED WITHIN 10'
OPERATIONS BERM AT
ELEV=150.00
(SEE DETAIL THIS SHEET)

FUTURE
CELL 9

EXISTING
CELL 2

EXISTING
CELL 3

DROP INLET
(TYPICAL 20 PLACES)

DOWNCOMER PIPE
(TYPICAL 20 PLACES)

POND 1
TOP=104.0
BOT=92.0

15' MAINTENANCE ROAD

STORM MANHOLE

STORM PIPE

MITERED END WITH
ENERGY DISSIPATERS
(TYPICAL 10 PLACES)

ENTERPRISE ROAD

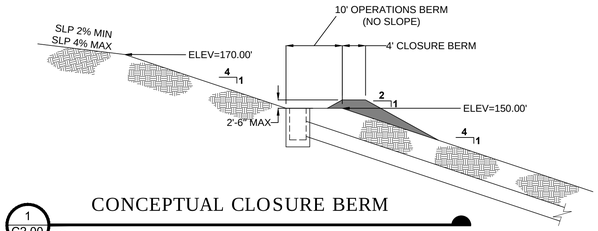
C

LEGEND

- PERIMETER FENCE
- PROPERTY BOUNDARY
- LANDFILL FOOTPRINT (AT BUILD OUT)
- LANDFILL CELLS
- EXISTING CONTOURS
- DIRECTIONAL FLOW ARROW
- DRAINAGE DIVIDE
- 10+00 CROSS SECTION STATIONS
- PASSIVE LFG VENT
- STORMWATER CONVEYANCE SYSTEM
  - DOWNCOMER PIPE
  - DROP INLET
  - MITERED END WITH ENERGY DISSIPATERS

NOTES:

1. **CONTOURS REPRESENT FINAL COVER. FILL ELEVATIONS SHALL BE SUCH THAT FINAL COVER DESIGN ELEVATIONS SHALL BE ACHIEVED ON ALL SLOPES**
2. **PRIOR TO WASTE BEING DISPOSED IN PROPOSED CELLS, BACKFILL TEMPORARY DIVERSION SWALE WITH COMPACTED CLAY.**
3. **LANDFILL FINAL COVER PER DETAIL 3, SHEET C3.00.**
2. TOPOGRAPHIC SURVEY BY PICKETT SURVEYING & PHOTOGRAMMETRY, DATED 11/11/13, UPDATED ON 12/31/13.
3. **FINAL COVER CONSTRUCTION TO BE IN ACCORDANCE WITH SECTION 7.1 OF THE ENTERPRISE RECYCLING & DISPOSAL FACILITY RECLAMATION & CLOSURE PLAN.**
4. **THE FACILITY'S OVERALL STORMWATER MANAGEMENT SYSTEM IS GOVERNED BY THE MINING OPERATIONS AND ERP PERMITS. GRADES AND ELEVATION VARY BASED ONGOING MINING OPERATIONS AND TOPOGRAPHY. A DETAILED DESIGN THAT WILL TIE THE CONCEPTUAL CLOSURE PLAN INTO THE FACILITY'S STORMWATER MANAGEMENT SYSTEM WILL BE SUBMITTED AT THE TIME OF CLOSURE.**

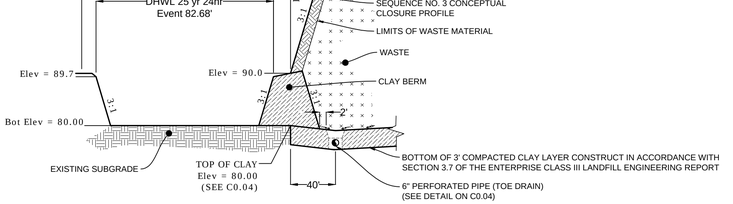


CONCEPTUAL CLOSURE BERM

1 C2.00 SCALE: N.T.S.

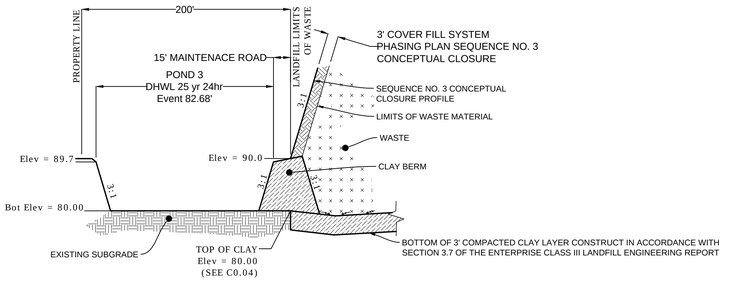
NORTH

0 150 300
Feet



PROPOSED NORTH BERM DETAIL CELL 16
(SEQUENCE NO. 3)

2 C2.00 SCALE: N.T.S.



PROPOSED EAST BERM DETAIL CELL 16
(SEQUENCE NO. 3)

2 C2.10 SCALE: N.T.S.

NO.	DATE	REVISION DESCRIPTION	BY
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SHEET TITLE:

PHASING PLAN SEQUENCE NO. 3 CONCEPTUAL CLOSURE

PROJECT NO.:	02000-144-14
SCALE:	AS SHOWN
DATE:	MARCH 2016
DRAWING:	C2.00

REVIEW ONLY-NOT FOR CONSTRUCTION

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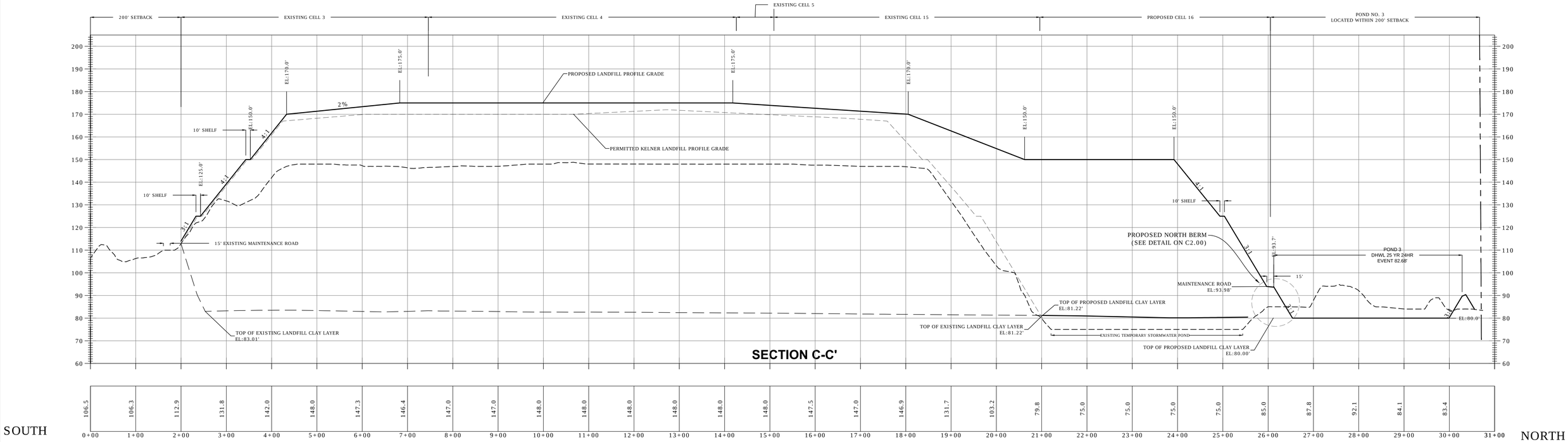

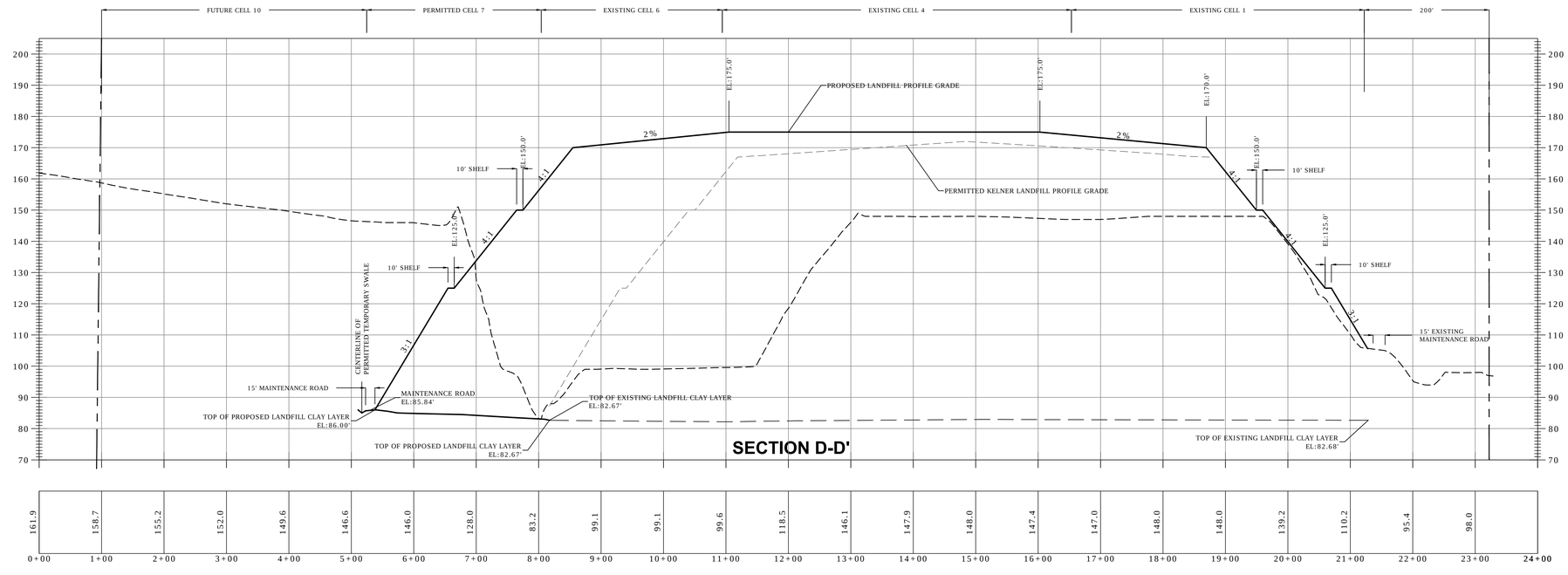

SCALES:
HORIZONTAL 1"=100'
VERTICAL 1"= 20'

NO.	DATE	REVISION DESCRIPTION	BY
1	7/31/16	FDEP R.A.I. NO. 1 RESPONSE	LJB
2	12/02/16	FDEP R.A.I. NO. 2 RESPONSE	LJB
3	1/24/17	SUPPLEMENTAL INFORMATION FOR TOE DRAIN	LJB
4	2/3/17	REVISED TOE DRAIN AND ADDED LEACHATE COLLECTION WETWELL	LJB

Locklear & Associates
4140 NW 37th Place, Suite A
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Phone: 352.672.6867 Fax: 352.692.5390
Certificate of Authorization No. 30066

PROJECT TITLE:
PERMIT PLANS
ENTERPRISE ROAD CLASS III
RECYCLING & DISPOSAL FACILITY
2016 PERMIT MODIFICATION
DADE CITY, PASCO COUNTY, FLORIDA

LISA J. BAKER
FL PE NO. 74652

DESIGNED BY	LJB
DRAWN BY	MAF
CHECKED BY	JDL
APPROVED BY	LJB

SHEET TITLE:
PHASING PLAN SEQUENCE NO. 3 CONCEPTUAL CLOSURE SECTIONS

PROJECT NO.: 02000-144-14
SCALE: AS SHOWN
DATE: MARCH 2016
DRAWING: C2.10

REVIEW ONLY-NOT FOR CONSTRUCTION

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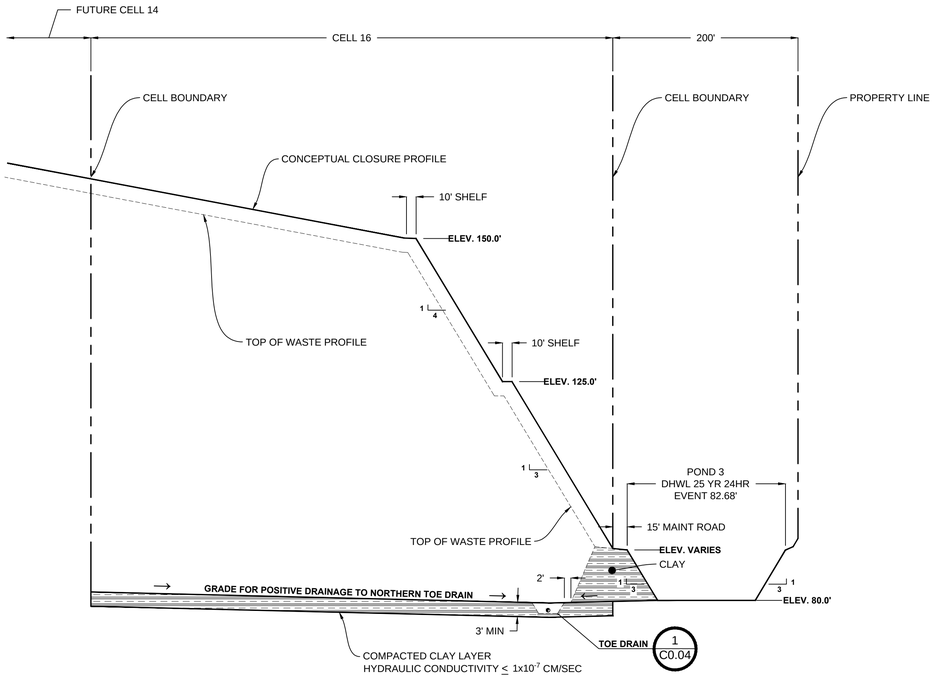
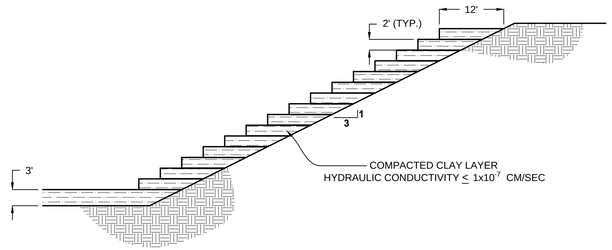


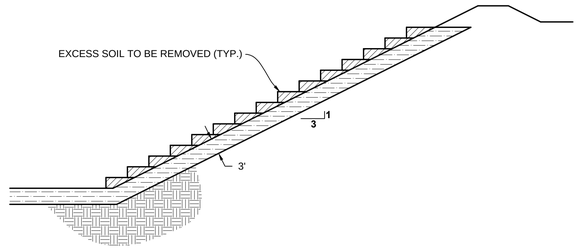
1 C3.00 TYPICAL DISPOSAL AREA DETAIL CELL 16

SCALE: N.T.S.



6 C3.00 CELL 7 SOUTH CLAY SIDE SLOPE CONSTRUCTION DETAIL

SCALE: N.T.S.



5 C3.00 CELL 7 SOUTH CLAY SIDE SLOPE CONSTRUCTION DETAIL

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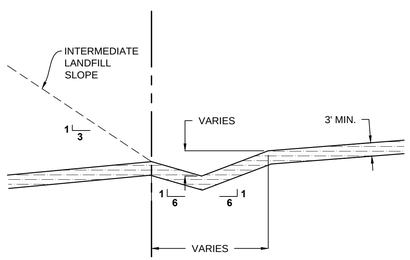
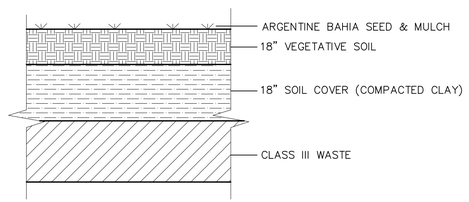


NOTES:

1. FOR CELL 7 THE TEMPORARY DIVERSION SWALE IS CONSTRUCTED PRIOR TO WASTE ACCEPTANCE WITHIN CELL.
2. PRIOR TO WASTE BEING DISPOSED OF ON THE PREVIOUS INTERMEDIATE SLOPE THE TEMPORARY SWALE IS BACKFILLED AND COMPACTED WITH CLAY TO PROVIDE A CONTINUOUS CLAY BARRIER LAYER.
3. CLAY BARRIER LAYER TO BE CONSTRUCTED IN ACCORDANCE WITH SECTION 3.7 OF THE ENTERPRISE CLASS III LANDFILL ENGINEERING REPORT.
4. STEP BACK AND SCARIFY EXISTING CLAY LAYER IN 12" LIFTS PRIOR TO CONSTRUCTION NEW CLAY LAYER ADJACENT TO EXISTING.
5. FINAL COVER CONSTRUCTION TO BE IN ACCORDANCE WITH SECTION 7.1 OF THE ENTERPRISE RECYCLING & DISPOSAL FACILITY RECLAMATION & CLOSURE PLAN.

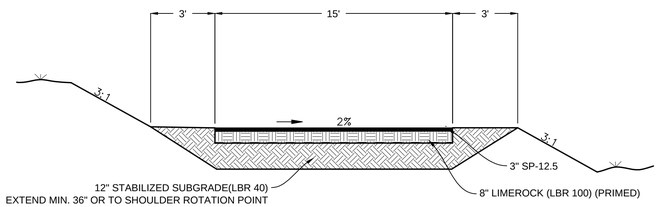
2 C3.00 TEMPORARY STORMWATER DIVERSION SWALE DETAIL

SCALE: N.T.S.



3 C3.00 TYPICAL FINAL COVER

SCALE: N.T.S.



4 C3.00 ACCESS ROAD TYPICAL SECTION

SCALE: N.T.S.

NO.	DATE	REVISION DESCRIPTION	BY
1	7/31/16	FDEP R.A.I. NO. 1 RESPONSE	LJB
2	12/02/16	FDEP R.A.I. NO. 2 RESPONSE	LJB
3	1/24/17	SUPPLEMENTAL INFORMATION FOR TOE DRAIN	LJB
4	2/3/17	REVISED TOE DRAIN AND ADDED LEACHATE COLLECTION WETWELL	LJB

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ENTERPRISE ROAD CLASS III
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2016 PERMIT MODIFICATION
DADE CITY, PASCO COUNTY, FLORIDA

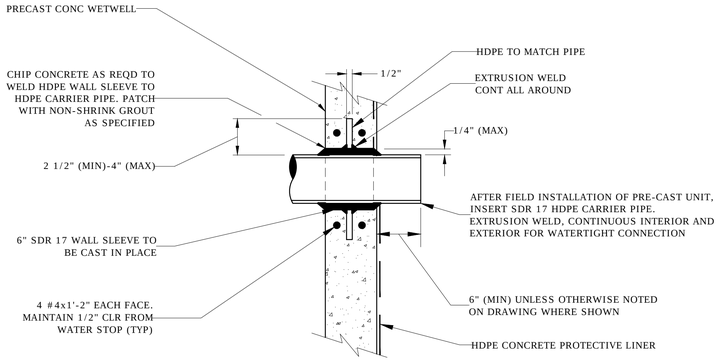
LISA J. BAKER	DESIGNED BY	LJB
	DRAWN BY	MAF
	CHECKED BY	JDL
FL PE NO. 74652	APPROVED BY	LJB

SHEET TITLE:

CLOSURE DETAILS

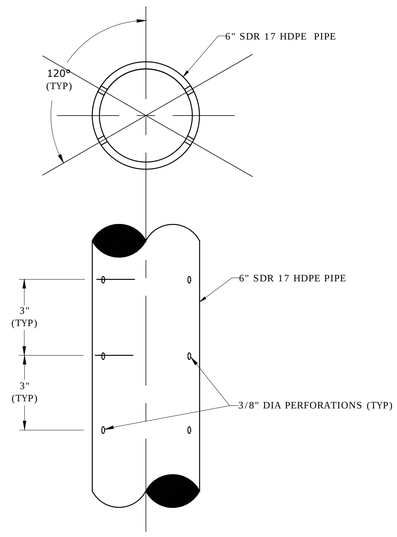
PROJECT NO.:	02000-144-14
SCALE:	AS SHOWN
DATE:	MARCH 2016
DRAWING:	C3.00

REVIEW ONLY-NOT FOR CONSTRUCTION



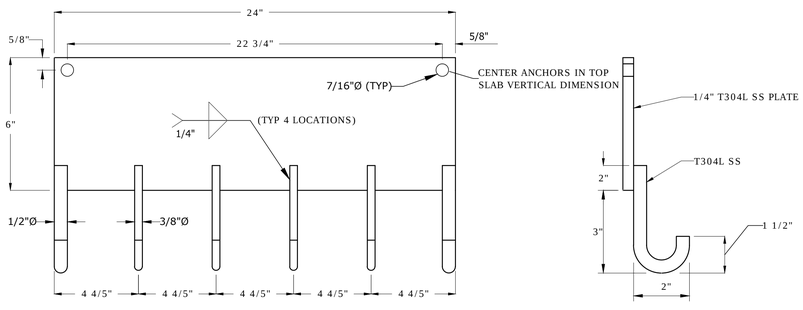
1 C4.00 WALL SLEEVE AND CONNECTION DETAIL

SCALE: N.T.S.



6" PERFORATED SDR 17 HDPE PIPE DETAIL

SCALE: N.T.S.



NOTE:

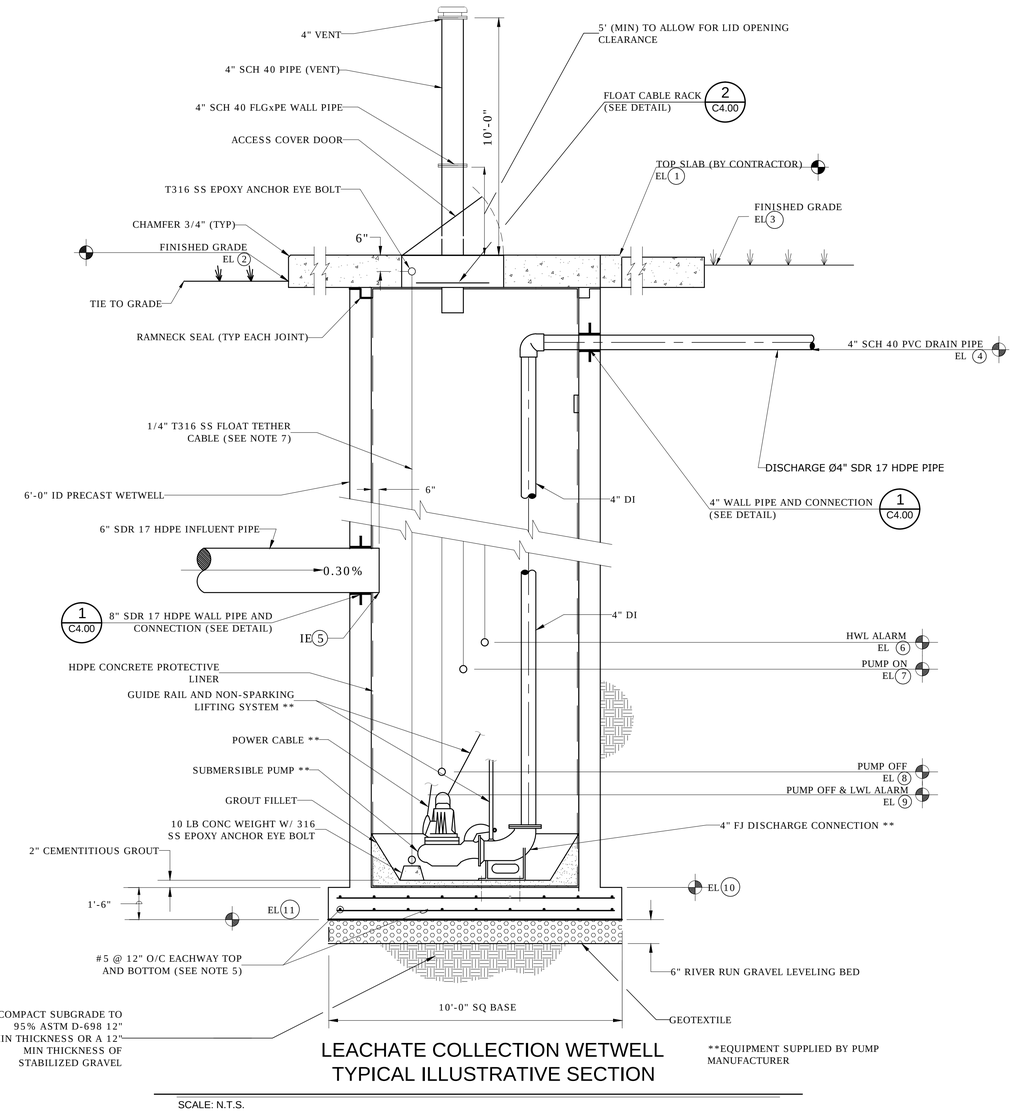
MOUNT RACK TO TOP SLAB WITH 3/8"Øx4" LONG T304 SS EPOXY ANCHORS.

2 C4.00 FLOAT CABLE RACK

SCALE: N.T.S.

WETWELL ELEVATIONS TABLE

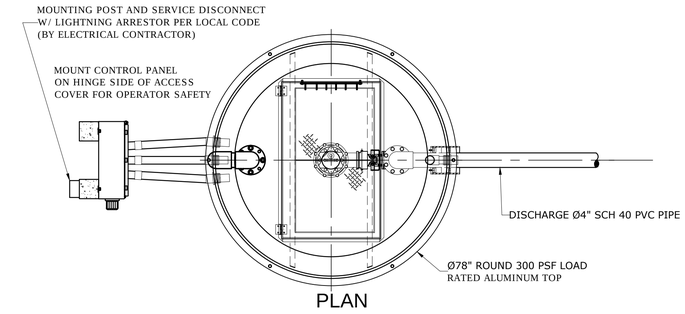
WETWELL LOCATION	IE(1)	IE(2)	IE(3)	IE(4)	IE(5)	EL(6)	EL(7)	EL(8)	EL(9)	EL(10)	EL(11)
LEACHATE COLLECTION WETWELL	91.50'	91.00'	91.00'	88.50'	74.98'	75.98'	74.98'	74.17'	73.67'	72.00'	70.50'



LEACHATE COLLECTION WETWELL TYPICAL ILLUSTRATIVE SECTION

**EQUIPMENT SUPPLIED BY PUMP MANUFACTURER

SCALE: N.T.S.



PLAN

NOTES:

1. SEE PLAN VIEW FOR LOCATION OF COMPONENTS.
2. PROVIDE 3" CLEAR COVER FOR REINFORCING ON ALL SIDES IN WETWELL BASE.
3. LEVEL SWITCHES SHALL BE SET TO ACTUATE WITHIN 2"± OF ELEVATION NOTED.
4. EXTERIOR OF WETWELL SHALL BE PAINTED WITH COAL TAR EPOXY AS SPECIFIED.
5. ALL PENETRATIONS SHALL BE SEALED AND WATER TIGHT.
6. THIS PIPE IS ONLY IN THE LEACHATE COLLECTION WETWELL. WELD TO WALL SLEEVE AFTER FIELD INSTALLATION.
7. CONNECT TETHER CABLE TO EYE BOLTS W/2 316 SS "U" CLAMPS AT EACH END. INSTALL CABLE WITHOUT ANY SLACK. ATTACH FLOAT CABLES TO TETHER CABLE W/ 316 SS "U" CLAMPS AT INDICATED ELEVATION.
8. WETWELL SHALL BE PURCHASED, SET AND JOINED BY OWNER. ALL OTHER CONCRETE INSTALLATION BY CONTRACTOR.
9. WETWELL LID SHALL BE PRECAST.
10. CONTRACTOR SHALL COORDINATE ACCESS HATCH (WITH SKIRT AND RETURN) AND WALL PIPE MANUFACTURE AND INSTALLATION CONTRACTOR, AND PUMP MANUFACTURER PRIOR TO WETWELL LID PRECASTING.
11. CONTRACTOR SHALL COORDINATE ALL FINAL WETWELL LINER WELDING WITH MANUFACTURER.

NO.	DATE	REVISION DESCRIPTION	BY
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2016 PERMIT MODIFICATION
DADE CITY, PASCO COUNTY, FLORIDA

LISA J. BAKER	DESIGNED BY	LJB
	DRAWN BY	MAF
	CHECKED BY	JDL
FL PE NO. 74652	APPROVED BY	LJB

SHEET TITLE:

LEACHATE COLLECTION WETWELL SECTIONS AND DETAILS

PROJECT NO.:	02000-144-14
SCALE:	AS SHOWN
DATE:	MARCH 2016
DRAWING:	C4.00

REVIEW ONLY-NOT FOR CONSTRUCTION

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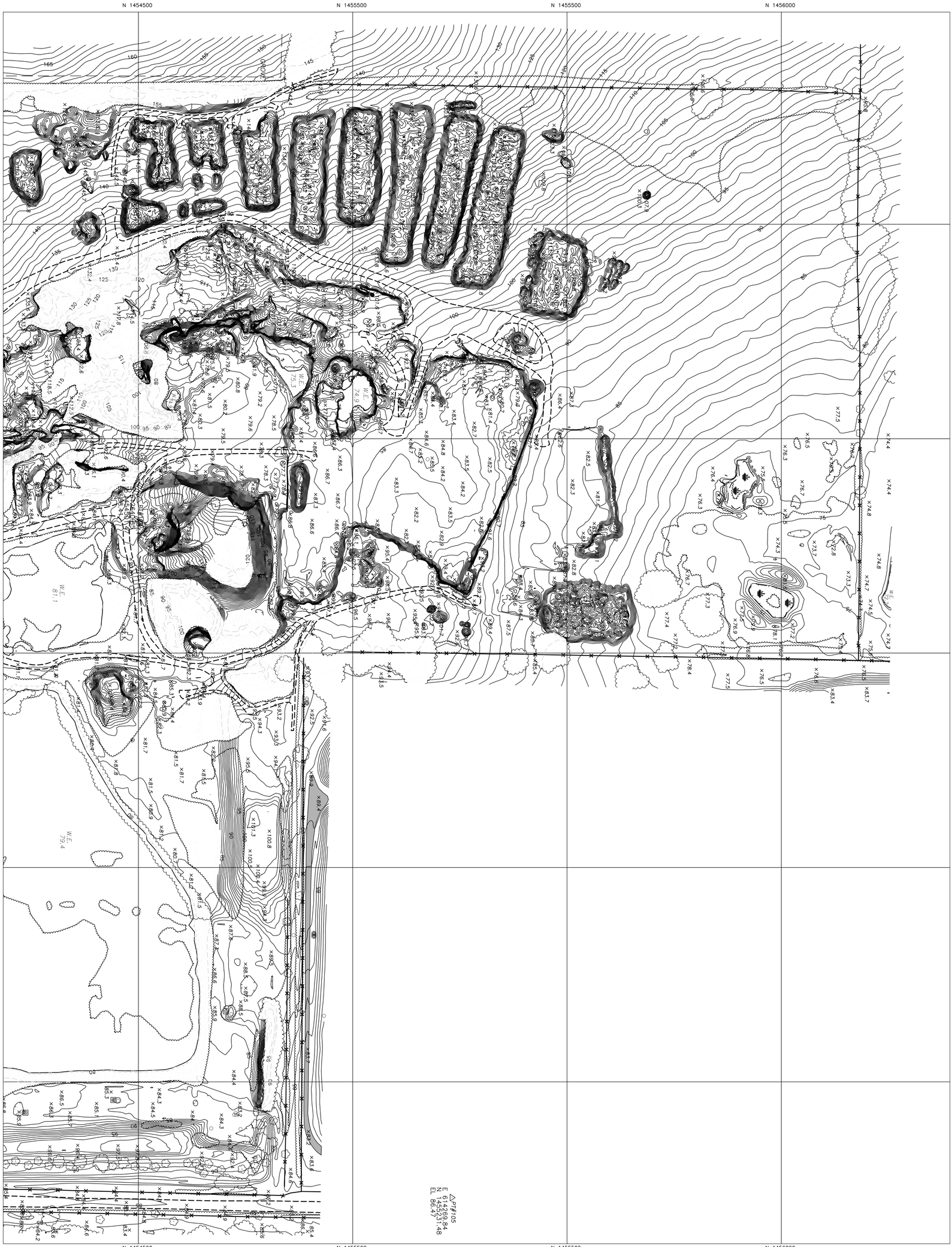


SURVEYOR's NOTES:

1.) North, the grid, and the coordinates shown hereon are referenced to the West Zone of the Florida State Plane Coordinate System, NAD 83, 1990 adjustment

2.) Elevations are to National Geodetic Vertical Datum of 1929.

3.) This topographic survey was prepared by photogrammetric methods. See the attached report for map accuracy and surveyor's signature and seal. This map is limited to those features visible on aerial photography.

LEGEND:

(THESE FEATURES ARE REPRESENTED BY SYMBOLS NOT TO SCALE)

- △ CONTROL
- PT# TARGET NUMBER
- N NORTHING
- E EASTING
- EL ELEVATION
- ⊙ UTILITY POLE
- △ SIGN
- ○ POST
- ✕ CULVERT
- ⬡ TREE
- SWAMP/MARSH
- MISCELLANEOUS SYMBOL

(THESE FEATURES ARE TO SCALE)

- PAVED ROAD
- CONCRETE SURFACE
- UNPAVED ROAD
- FENCE
- GUARDRAIL
- STRUCTURE
- TREE LINE
- SHRUB LINE
- EDGE OF GROVE
- EDGE OF WATER
- SWAMPLINE
- OBSCURED CONTOUR
- DEPRESSION CONTOUR

(THESE INFORMATIVE LABELS ARE NOT SCALE DEPENDENT)

- W.E. WATER ELEVATION
- ×120.1 SPOT ELEVATION
- ×120.1 OBSCURED SPOT
- MISC MISCELLANEOUS

C-3

NORTH

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

ACCURACY STATEMENT: The following stated plus or minus tolerances encompass a minimum of 90% of the difference between photogrammetrically measured values and ground truth of all well-identified features. Mapped features meet or exceed the Florida Minimum Technical Standards.

VERTICAL: Contours have been measured to an estimated vertical positional accuracy of 0.5'. Spot elevations and well-identified features have been measured to an estimated vertical positional accuracy of 0.25'

HORIZONTAL: Well-identified features have been measured to an estimated horizontal positional accuracy of 1.46'.

MAP PLOTTING: This map is intended to be displayed at a scale of 1" = 50' (1:600) or smaller.

MEASUREMENT METHODS: In areas where vegetation makes the ground difficult to determine contours are shown dashed and do not meet the above stated accuracy. Contours are removed from areas where vegetation completely hides the ground. This map is limited to those features visible on aerial photography.

LIMITATIONS: This mapping should be used for preliminary design work only and should not replace an actual field survey where the required accuracy is greater than the accuracy stated in this report. No responsibility is assumed for areas outside the contracted scope.

TOPOGRAPHIC SURVEY

ENTERPRISE ROAD LANDFILL

PREPARED FOR: ANGELO'S RECYCLED MATERIALS

PROJECT No. 14094-7
DRAWING No. LD-5285
C-2

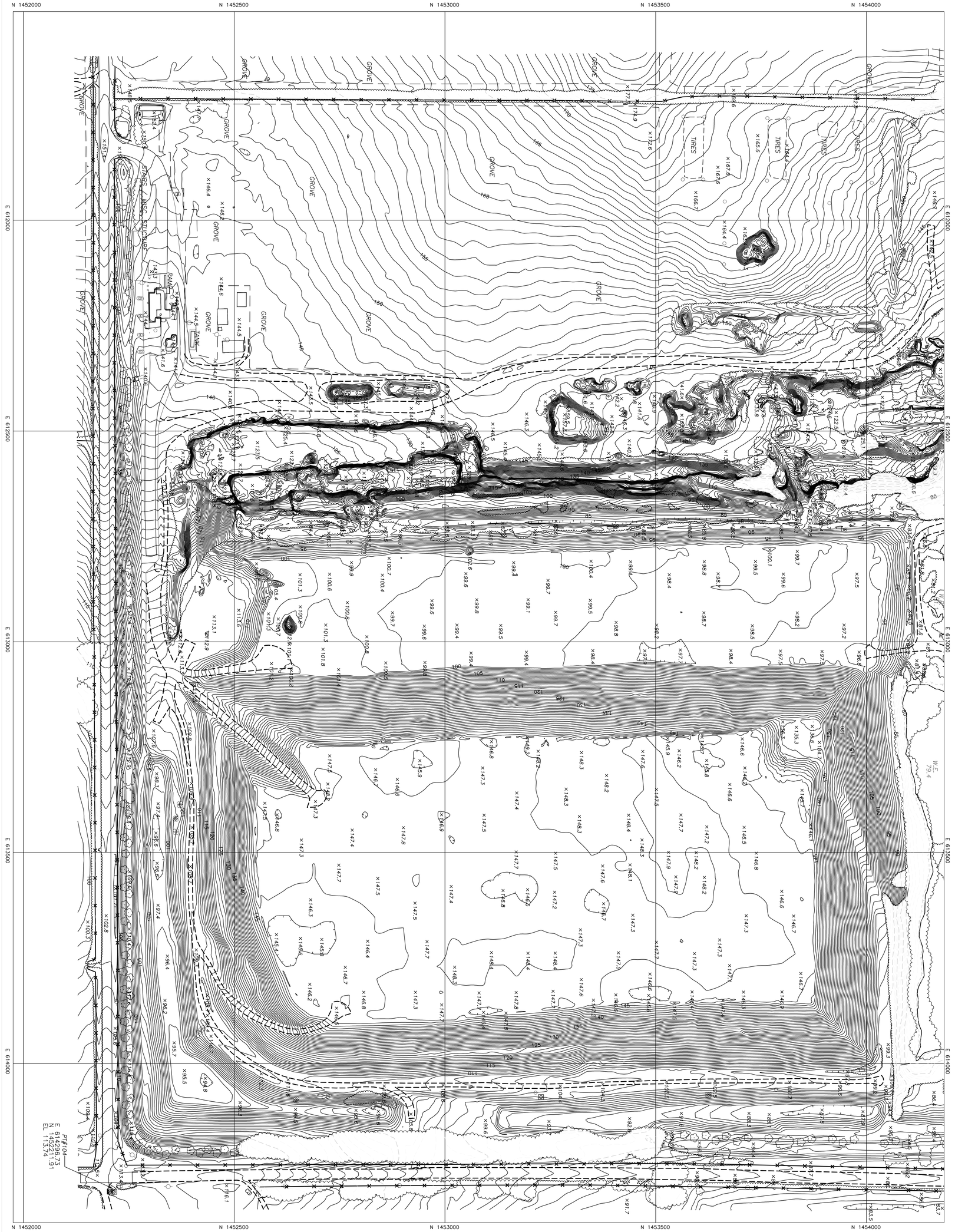
PICKETT
SURVEYING & PHOTOGRAMMETRY
PICKETT & ASSOCIATES, INC. LICENSED BUSINESS No. LB364
475 SOUTH FIRST AVENUE
BARTOW, FLORIDA 33830
PHONE: (863)-533-9095
FAX: (863)-534-1464

Horiz. Scale: 1" = 100'
Contour Interval: 1'
Edited by: RP
Compiled by: AK
Flight Date: 11/11/13
Drawing Name: 14094-7.DWG

No.	DATE	APPROVED	REVISION
O.R.	12/31/13	TJY	ORIGINAL RELEASE

11/11/13
SURVEY DATE

T. JEFFREY YOUNG, PSM, CP
FLORIDA REGISTRATION NO. 5440
PICKETT AND ASSOCIATES, INC.



SURVEYOR's NOTES:

1.) North, the grid, and the coordinates shown hereon are referenced to the West Zone of the Florida State Plane Coordinate System, NAD 83, 1990 adjustment

2.) Elevations are to National Geodetic Vertical Datum of 1929.

3.) This topographic survey was prepared by photogrammetric methods. See the attached report for map accuracy and surveyor's signature and seal. This map is limited to those features visible on aerial photography.

LEGEND:

(THESE FEATURES ARE REPRESENTED BY SYMBOLS NOT TO SCALE)

- CONTROL
- PT# TARGET NUMBER
- N NORTHING
- E EASTING
- EL ELEVATION
- UTILITY POLE
- SIGN
- POST
- CULVERT
- TREE
- SWAMP/MARSH
- MISCELLANEOUS SYMBOL

(THESE FEATURES ARE TO SCALE)

- PAVED ROAD
- CONCRETE SURFACE
- UNPAVED ROAD
- FENCE
- GUARDRAIL
- STRUCTURE
- TREE LINE
- SHRUB LINE
- EDGE OF GROVE
- EDGE OF WATER
- SWAMPLINE
- OBSCURED CONTOUR
- DEPRESSION CONTOUR

(THESE INFORMATIVE LABELS ARE NOT SCALE DEPENDENT)

- W.E. WATER ELEVATION
- × 120.1 SPOT ELEVATION
- × 120.1 OBSCURED SPOT
- MISC MISCELLANEOUS

C-2

NORTH

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

ACCURACY STATEMENT: The following stated plus or minus tolerances encompass a minimum of 90% of the difference between photogrammetrically measured values and ground truth of all well-identified features. Mapped features meet or exceed the Florida Minimum Technical Standards.

VERTICAL: Contours have been measured to an estimated vertical positional accuracy of 0.5'. Spot elevations and well-identified features have been measured to an estimated vertical positional accuracy of 0.25'.

HORIZONTAL: Well-identified features have been measured to an estimated horizontal positional accuracy of 1.66'.

MAP PLOTTING: This map is intended to be displayed at a scale of 1" = 50' (1:600) or smaller.

MEASUREMENT METHOD: In areas where vegetation makes the ground difficult to determine contours are shown dashed and do not meet the above stated accuracy. Contours are removed from areas where vegetation completely hides the ground. This map is limited to those features visible on aerial photography.

LIMITATIONS: This mapping should be used for preliminary design work only and should not replace an actual field survey where the required accuracy is greater than the accuracy stated in this report. No responsibility is assumed for areas outside the contracted scope.

THIS MAP AND ATTACHED REPORT ARE NOT FULL AND COMPLETE WITHOUT THE OTHER AND ARE NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER

SEE PAGE 1 FOR THE SIGNATURE AND THE ORIGINAL RAISED SEAL

TOPOGRAPHIC SURVEY

ENTERPRISE ROAD LANDFILL

PREPARED FOR: ANGELO'S RECYCLED MATERIALS

PROJECT No. 14094-7
DRAWING No. LD-5285
C-3

PICKETT
SURVEYING & PHOTOGRAMMETRY
PICKETT & ASSOCIATES, INC. LICENSED BUSINESS No. LB364
475 SOUTH FIRST AVENUE
BARTOW, FLORIDA 33830
PHONE: (863)-533-9095
FAX: (863)-534-1464

Horiz. Scale: 1" = 100'
Contour Interval: 1'
Edited by: RP
Compiled by: AK
Flight Date: 11/11/13
Drawing Name: 14094-7.DWG

No.	DATE	APPROVED	REVISION
O.R.	12/31/13	TJY	ORIGINAL RELEASE

ATTACHMENT 8

Groundwater Monitoring Plan

(replace previously submitted report in its entirety)

Enterprise Class III Landfill
Groundwater Monitoring Plan

Revised February 2017 ~~July 2016~~ (RAI ~~1~~ 2 Response)

Prepared for:

ANGELO'S RECYCLED MATERIALS, LTD.
41111 Enterprise Road
Dade City, Florida 33525

Prepared by:

LOCKLEAR & ASSOCIATES, INC.
4140 NW 37th Place, Suite A
Gainesville, FL 32606

2/15/17

John Locklear
FL PG 2467

This Groundwater Monitoring Plan (GWMP) has been prepared in accordance with the provisions of Rule 62-701.510, F.A.C., and any non-conflicting provisions of Chapter 62-520, F.A.C. The GWMP was developed based upon an extensive evaluation of site data provided in the March 2012 (Revised March 2013) Water Quality Monitoring Plan Evaluation Report prepared by Locklear & Associates, Inc. The Water Quality Monitoring Plan Evaluation Report is provided in Section 6 of the March 2012 Operations Permit Renewal Application. Analytical data tables and graphs as well as groundwater contour maps updated since 2012 were recently provided to the Department in the December 2015 Groundwater Technical Report (formerly referred to as a Biennial Report).

1. Water Quality Monitoring Plan

The groundwater monitoring network is shown in Table 1 and in Figure 1.

a. All groundwater monitoring well installations and abandonments shall be performed in accordance with ASTM D 5092-04, Rule 62-532.500(5), F.A.C. and the rules of Southwest Florida Water Management District.

b. Sign and Seal

The reports shall be signed and sealed in accordance with Chapter 471, Florida Statutes and Chapter 61G15, FAC for engineers or with Chapter 492 for professional geologists.

c. Sampling and Analysis

All sampling and analysis shall be performed in accordance with Chapter 62-160, FAC; 62-701.510(2)(b), FAC; the DEP Standard Operating Procedures for Field Activities (DEP-SOP-001/01); and the DEP Standard Operating Procedures for Laboratory Activities (DEP-SOP-002/01).

d. Groundwater Monitoring Requirements

The groundwater monitoring network consists of detection and compliance monitoring wells located downgradient from and within 100 feet of the disposal units. The detection wells are located no more than 500 feet apart. The network also includes background monitoring wells BW-1A and BW-1B screened within the surficial and Floridan aquifers, respectively. Downgradient compliance monitoring wells will be installed if warranted

based on the results of detection monitoring results and Evaluation Monitoring as discussed in Section 1.h. Compliance wells will be located at or immediately adjacent to the compliance line of the zone of discharge.

Monitoring wells shall be constructed to provide representative groundwater samples from the surficial aquifer, where present, and the Floridan aquifer system. Well screen placement will be determined from lithologic information collected at the time of well installation and historic water level elevations as discussed below.

The surficial aquifer was not encountered during the advancement of the borings at the MW-18 and MW-20 locations. Therefore, no surficial aquifer wells were installed at these locations. Floridan aquifer wells MW-18B and MW-20B were installed. A localized perched surficial aquifer was encountered during advancement of the boring at the MW-19 location. As a result, surficial aquifer well MW-19A was installed. Since MW-19A monitors the uppermost water bearing unit, Floridan aquifer well MW-19B was not installed. ~~The top and bottom of the screen elevations for proposed surficial aquifer monitoring wells MW-18A, -19A and -20A are based on the top of clay confining unit elevations encountered during the installation of adjacent monitoring wells MW-15B, -16B and -17B. The clay confining layer was encountered at the surface during the installation of these wells, and therefore, we do not anticipate water bearing soils above the clay confining layer at the locations of the proposed surficial aquifer monitoring wells MW-18A, -19A and -20A. However, the lithology will be assessed at the location of each new well and surficial aquifer wells will be installed if water bearing soils exist above the clay confining layer. The historic range of surficial aquifer water elevations in this area is not available.~~ The top and bottom of the screen elevations for proposed surficial aquifer well MW-5AR are based on the characteristics of existing surficial aquifer well MW-5A. The historical range of surficial aquifer water elevations in MW-5A is 78.45 to 68.99 ft. NGVD (previous ten sampling events). Proposed top and bottom screen elevations for MW-5AR are 79 ~~82~~ ft. and ~~64~~ ~~62~~ ft. NGVD, respectively.

Monitoring wells MW-18B, -19A and -20B were installed as required by the Cell 7 construction permit, and sampled per Table 2, below. The well completion reports with initial sampling results for monitoring wells MW-18B, -19A and -20B have been submitted under a separate cover. ~~The top and bottom of the screen elevations for proposed Floridan aquifer monitoring wells MW-18B, -19B and -20B are based on the top of limestone elevations encountered during the installation of adjacent monitoring wells MW-15B, -16B and -17B. The top of limestone elevation encountered during the~~

~~installation of MW-15B was observed at 119 ft. NGVD, however the limestone in this boring was dry down to an elevation of 83 ft. NGVD. Moisture was not described below this elevation. The historical range of Floridan aquifer water elevations in MW-15B is 66.1 to 74.17 ft. NGVD (previous ten sampling events). Proposed top and bottom screen elevations for MW-18B are 65 ft. and 45 ft. NGVD, respectively. The bottom of the clay confining layer elevations encountered during the installation of MW-16B and -17B were observed at 64.5ft. and 43.5 ft. NGVD, respectively. The historical range of Floridan aquifer water elevations in MW-16B and -17B is 66.2 to 74.3 ft. NGVD (previous ten sampling events), indicating the clay confining layer in these locations is creating artesian conditions. Proposed top and bottom screen elevations for MW-19B are 58 ft. and 38 ft. NGVD, respectively. Proposed top and bottom screen elevations for MW-20B are 35 ft. and 15 ft. NGVD, respectively.~~ The top of limestone elevation encountered during the installation of MW-5B was observed at 60 ft. NGVD The historical range of Floridan aquifer water elevations in MW-5B is 74.66 to 66.01 ft. NGVD (previous ten sampling events), indicating the clay confining layer in these locations is creating artesian conditions. Proposed top and bottom screen elevations for MW-5BR are 55 ft. and 35 ft. NGVD, respectively. Screen elevations for all proposed Floridan aquifer wells will be placed to encounter the upper-most saturated limestone layer beneath the bottom of the clay confining layer. Screen elevations will be determined based on field findings during well installation.

Figure 4 presents sections through Cell 16, the three sets of monitoring well pairs (MW-4/-4B, -5/AR/-5BR and -6/-6B), and Pond 3. The sections include the lateral distance from the edge of waste in Cell 16 to the monitoring well pairs and the lateral distance from the monitoring well pairs to the top of the bank of Pond 3.

Wells shall be constructed in accordance with the details provided in REV Figures 2 and 3. Documentation of well construction shall be submitted within 30 days of installation using Department Form #62-701.900(30).

Wells scheduled to be abandoned during construction of Cell 16 and Pond 3, (MW-5A, MW-5B and P-4), and wells which become damaged, shall be plugged and abandoned in accordance with Rule 62-532.500(5), F.A.C. and the rules of the Southwest Florida Water Management District. Documentation of abandonment shall be submitted to the Department within 30 days of abandonment.

Replacement wells associated with those abandoned as part of construction of Cell 16 and Pond 3 (MW-5AR and MW-5BR) will be constructed in accordance with the details provided in Figures 2 and 3.

The location(s) of all new or replacement monitoring wells, in degrees, minutes and seconds of latitude and longitude, and the elevation of the top of the well casing to the nearest 0.01 foot, using a consistent, nationally recognized datum, shall be determined by a Florida Licensed Professional Surveyor and Mapper. Wells will be marked with their identification label in the field.

e. Surface Water Monitoring Requirements

Ponds 1, 2 and 3 do not have off-site discharge associated with the 100-year flood event. Therefore, surface water sampling is not required as part of the solid waste operating permit. In the unexpected event of a surface water discharge event, surface water monitoring will occur per Appendix 3, Para. 8.a. and Para. 8.b. of #177982-020-SO/T3. However, surface water in Pond 3 will be sampled in accordance with the Industrial Wastewater pond permit being applied for concurrent with the solid waste permit modification application.

f. Leachate Monitoring Requirements

(1) Leachate monitoring is not applicable to this facility.

g. Sampling Frequency and Requirements

(1) Water samples from all newly installed monitoring wells (including replacement wells associated with those abandoned as part of construction of Cell 16 and Pond 3) will be collected to determine background groundwater quality. Groundwater samples from the initial sampling of any new wells will be analyzed for parameters listed in Rule 62-701.510(7)(a) and (7)(c), F.A.C. (Table 2).

Table 2
Initial Groundwater Sampling Parameters

Field Parameters	Laboratory Parameters
Static Water Levels	Total Ammonia – N
Specific Conductivity	Chlorides
pH	Iron
Dissolved Oxygen	Mercury

Turbidity	Nitrate
Temperature	Sodium
Colors and Sheens	Total Dissolved Solids (TDS)
	Those Parameters listed in 40 CFR Part 258, Appendices I and II

(2) Groundwater samples from all monitoring wells (background, detection, and compliance) and the on-site supply well shall be sampled and analyzed semiannually for the parameters listed in Table 3. A semiannual sampling frequency is adequate to detect potential groundwater quality standard exceedances based upon the flow velocities provided in Section III of the 2012 WQMPE. Maximum groundwater flow velocities were less than 50 feet per six months within both the surficial and Floridan aquifers. The first semiannual sampling event shall be performed between January 1 and June 30. The second semiannual sampling event shall be performed between July 1 and December 31.

Table 3
Routine Groundwater Sampling Parameters

Field Parameters	Laboratory Parameters
Static Water Level	Total Ammonia – N
Specific Conductivity	Chlorides
pH	Iron
Dissolved Oxygen	Mercury
Turbidity	Nitrate
Temperature	Sodium
Colors, Sheens	Total Dissolved Solids (TDS)
	Those Parameters listed in 40 CFR Part 258, Appendix I

(3) Surface water sampling shall be conducted at Pond 3 in accordance with the requirements of the separate Industrial Wastewater pond permit.

(4) Leachate sampling is not applicable to this facility.

h. Evaluation Monitoring, Prevention Measures, and Corrective Action

If parameters are detected in detection wells at concentrations that are significantly above background water quality, or that are at concentrations above the FDEP's water quality standards or criteria specified in 62-520, F.A.C., the well will be resampled within 30 days after the initial analytical data are received to confirm the data. If the data are confirmed or the well is not resampled, the FDEP will be notified in writing within 14 days of detection. Evaluation monitoring shall be initiated as follows:

- Routine monitoring of all monitoring wells will continue according to the GWMP.

- Within 90 days of initiating evaluation monitoring and annually thereafter, the background wells and all affected detection wells will be sampled for the parameters listed in 62-701.510(7)(c), F.A.C. Any new parameter detected and confirmed in the downgradient wells will be added to the routine groundwater monitoring parameter list.

- Within 90 days of initiating evaluation monitoring compliance monitoring wells will be installed at the compliance line of the zone of discharge and downgradient of the affected detection wells. The compliance wells will be installed in accordance with 62-701.510(3)(d), F.A.C. Compliance wells and affected detection wells shall be sampled quarterly for analysis of the parameters listed in Rule 62-701.510(7)(a), F.A.C. and any other parameters detected in the affected detection and downgradient wells sampled in accordance with Rule 62-701.510(6)(a)2, F.A.C. Compliance wells and affected detection wells shall be sampled annually for analysis of the parameters listed in Rule 62-701.510(7)(c), F.A.C.

- Within 180 days of initiating evaluation monitoring, a contamination evaluation plan will be submitted to the FDEP. The contamination evaluation plan will be designed to delineate the extent and cause contamination and to predict the probability that FDEP water quality standards are not violated outside the zone of discharge and to evaluate methods to prevent any violations. Upon agreement with the FDEP that the plan is so designed, the plan shall be implemented and a contamination evaluation report will be submitted to the FDEP. All reasonable efforts will be made to prevent further degradation of water quality from the landfill activities.

- If the contamination evaluation report indicates that water quality standards or criteria are likely to be violated outside the zone of discharge, a prevention measures plan shall be submitted to the Department. Upon approval, the prevention measures shall be initiated.

- Evaluation monitoring shall not be discontinued until authorization to return to routine monitoring only is received from the Department.

i. Water Quality Monitoring Report Requirements

(1) All representative water quality monitoring results shall be reported to the Department within 60 days from completion of laboratory analyses. In accordance with subsections 62-160.240(3) and 62-160.340(4), F.A.C., water quality data contained in the report shall be provided to the Department in an electronic format consistent with requirements for importing into Department databases.

At a minimum the semiannual report shall include the following:

- The facility name and identification number, sample collection dates, and analysis dates;
- All analytical results, including all peaks even if below maximum contaminant levels;
- Identification number and designation of all groundwater monitoring points;
- Applicable water quality standards;
- Quality assurance, quality control notations;
- Method detection limits;
- STORET code numbers for all parameters;
- Water levels recorded prior to evaluating wells or sample collection. Elevation reference shall include the top of well casing and the land surface at each well site at a precision of plus or minus 0.01 foot, National Geodetic Vertical Datum (NGVD);
- Department Form 62-701.900(31);
- An updated groundwater table contour map signed and sealed by a professional geologist or professional engineer with experience in hydrogeologic investigations, with contours at no greater than one-foot intervals unless site-specific conditions dictate otherwise, which indicates groundwater elevations and flow directions; and
- A summary of any water quality standards or criteria that are exceeded.

(2) A technical report will be submitted every two and one-half years summarizing and interpreting the water quality monitoring results and water level measurements collected during that period. The report will be in accordance with Rule 62-701.510(8)(b) and signed and sealed by Florida licensed Professional Geologist or Professional Engineer. The report shall contain, at a minimum, the following:

- Tabular displays of any data which shows that a monitoring parameter has been detected, and graphical displays of any leachate key indicator parameters detected (such as pH, specific conductance, TDS, TOC, sulfate, chloride, sodium and iron), including hydrographs for all monitoring wells;
- Trend analyses of any monitoring parameters consistently detected;
- Comparison among shallow, middle, and deep zone wells;
- Comparisons between background water quality and the water quality in detection and compliance wells;
- Correlations between related parameters such as total dissolved solids and specific conductance;
- Discussion of erratic and/or poorly correlated data;
- An interpretation of the groundwater contour maps, including an evaluation of groundwater flow rates; and
- An evaluation of the adequacy of the water quality monitoring frequency and sampling locations based on site conditions.

TABLE 1

Well ID	Well Type	Aquifer	Existing or Future	Notes
BW-1A	Background	Surficial	Existing	
BW-1B	Background	Floridan	Existing	
MW-1A	Water Level	Surficial	Existing	
MW-1B	Water Level	Floridan	Existing	
MW-3	Detection	Surficial	Existing	
MW-3B	Detection	Floridan	Existing	
MW-4	Detection	Surficial	Existing	
MW-4B	Detection	Floridan	Existing	
MW-5A	Detection	Surficial	Existing	To be abandoned 60 days prior to placement of waste in Cell 16
MW-5AR	~~Detection~~ Compliance	Surficial	Future	To be installed 60 days prior to placement of waste in Cell 16
MW-5B	Detection	Floridan	Existing	To be abandoned 60 days prior to placement of waste in Cell 16
MW-5BR	~~Detection~~ Compliance	Floridan	Future	To be installed 60 days prior to placement of waste in Cell 16
MW-6	Detection	Surficial	Existing	
MW-6B	Detection	Floridan	Existing	
MW-7A	Detection	Surficial	Existing	
MW-7BR	Detection	Floridan	Existing	
MW-8	Detection	Surficial	Existing	
MW-8B	Detection	Floridan	Existing	
MW-9	Detection	Surficial	Existing	
MW-9B	Detection	Floridan	Existing	
MW-10	Detection	Surficial	Existing	
MW-10B	Detection	Floridan	Existing	
MW-11	Water Level	Surficial	Existing	
MW-11B	Water Level	Floridan	Existing	
MW-12A	Water Level	Surficial	Existing	
MW-12B	Water Level	Floridan	Existing	
~~MW-15B~~	~~Detection~~	~~Floridan~~	~~Existing~~	~~Abandoned in conjunction with Cell 7 construction~~
~~MW-16B~~	~~Detection~~	~~Floridan~~	~~Existing~~	~~Abandoned in conjunction with Cell 7 construction~~
MW-17B	Detection	Floridan	Existing	
Water Supply	Supply	Floridan	Existing	
~~MW-18A*~~	~~Detection~~	~~Surficial~~	~~Future~~	~~Not installed due lack of water bearing unit~~
MW-18B	Detection	Floridan	~~Future~~ Existing	Installed in conjunction with Cell 7 construction
MW-19A	Detection	Surficial	~~Future~~ Existing	Installed in conjunction with Cell 7 construction
~~MW-19B~~	~~Detection~~	~~Floridan~~	~~Future~~	~~Not installed based on site lithology~~
~~MW-20A*~~	~~Detection~~	~~Surficial~~	~~Future~~	~~Not installed due lack of water bearing unit~~
MW-20B	Detection	Floridan	~~Future~~ Existing	Installed in conjunction with Cell 7 construction
P-4	Piezometer	Surficial	Existing	To be abandoned within 60 days of permit modification issuance
P-6	Piezometer	Surficial	Existing	
P-8	Piezometer	Floridan	Existing	
P-10	Piezometer	Floridan	Existing	
P-11	Piezometer	Surficial	Existing	

LEGEND

BW-1B	BACKGROUND MONITORING WELL LOCATION
MW-3	DETECTION MONITORING WELL LOCATION
	SUPPLY WELL LOCATION
P-11	SOLID WASTE PIEZOMETER WELL LOCATION
MW-5AR	PROPOSED COMPLIANCE MONITORING WELL LOCATION
MW-12A	WATER LEVEL ONLY WELL LOCATION
MW-5B	PROPOSED TO BE ABANDONED
MW-19B	COMPLIANCE MONITORING WELL LOCATION
GP–1	GAS PROBE LOCATION
GP–8R	FUTURE GAS PROBE LOCATION
	PROPERTY BOUNDARY
	LANDFILL LIMITS
	CELL BOUNDARY
	ZONE OF DISCHARGE

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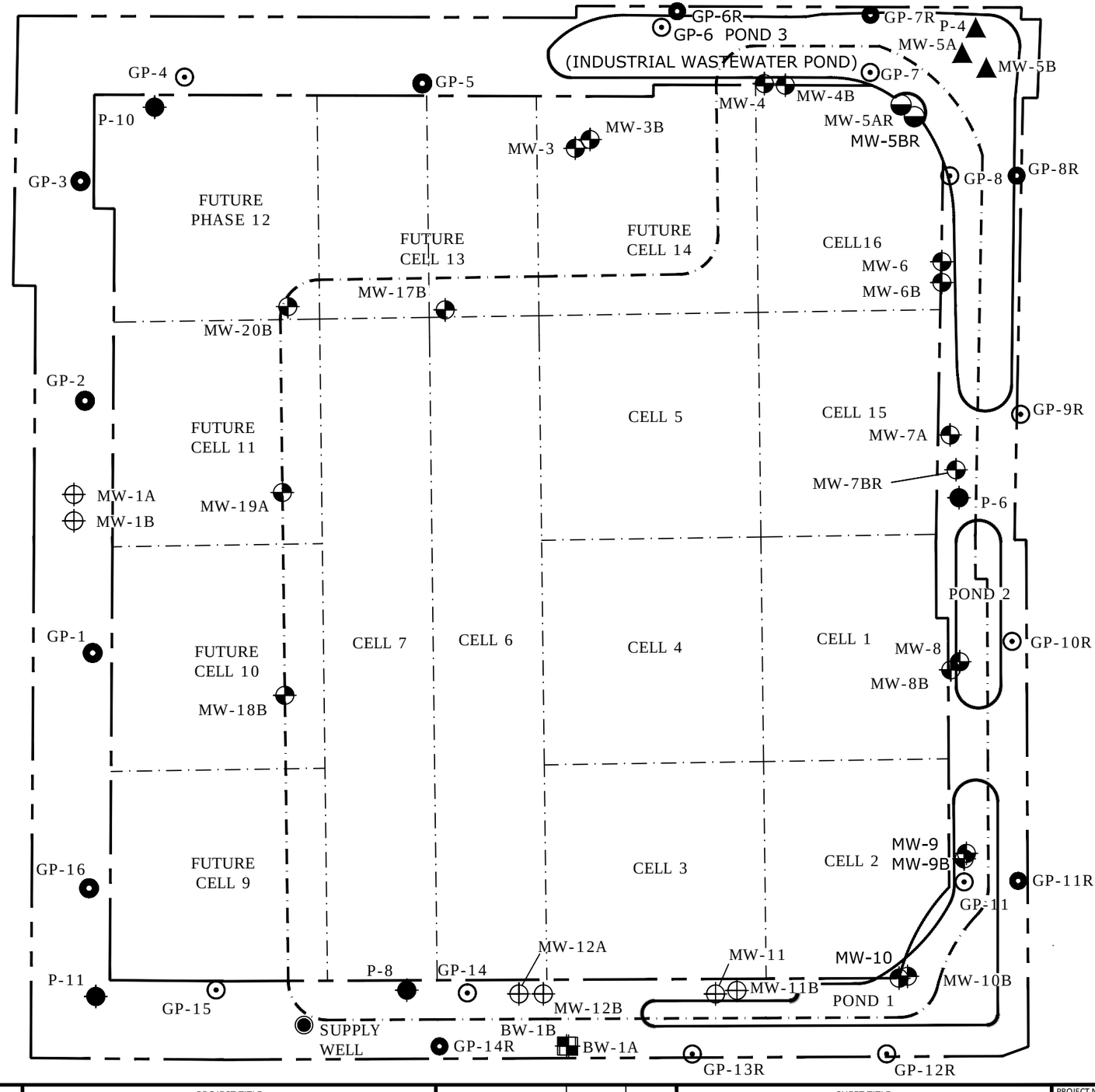
GRAPHIC SCALE



NO.	DATE	REVISION DESCRIPTION	BY

Locklear & Associates

4140 NW 37th Place, Suite A
Gainesville, Florida 32606
Phone: 352.672.6867 Fax: 352.692.5390
Certificate of Authorization No. 30066

PROJECT TITLE:

ENTERPRISE ROAD CLASS III RECYCLING AND DISPOSAL FACILITY DADE CITY, FLORIDA

LISA J. BAKER	DESIGNED BY	LJB
	DRAWN BY	LJB
	CHECKED BY	JDL
FL PE NO. 74652	APPROVED BY	LJB

SHEET TITLE:

SITE MONITORING NETWORK

PROJECT NO.: 02000-144-14
SCALE: AS SHOWN
DATE: JANUARY 2017
DRAWING: **FIGURE 1**

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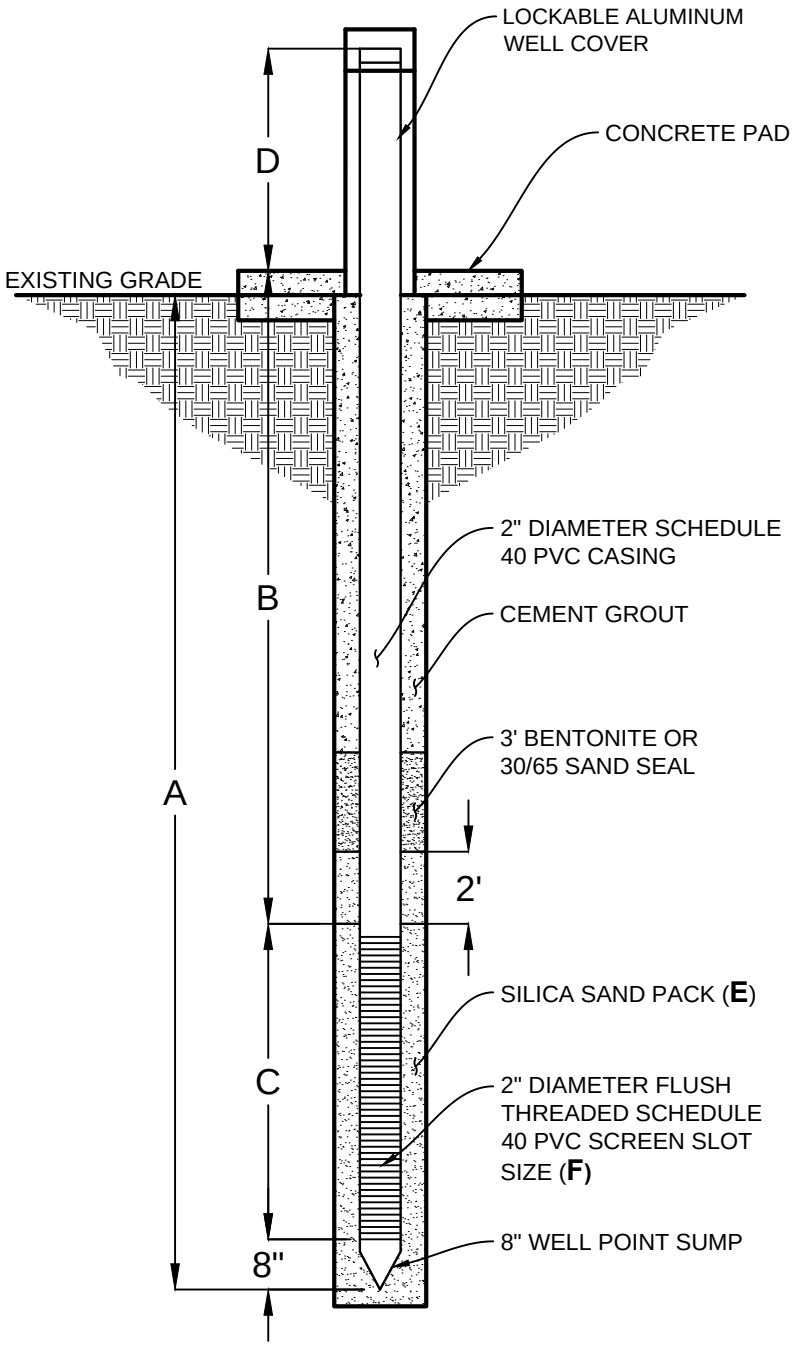


WELL	A	B	C	D	E	F	TOP OF WELL SCREEN ELEVATION FT. NGVD	BOTTOM OF WELL SCREEN ELEVATION FT. NGVD	ASSUMED GROUND SURFACE ELEVATION FT. NGVD	ASSUMED LIMESTONE SURFACE ELEVATION FT. NGVD
MW-5AR	23'	8'	15'	3'	20/30	0.010"	79' (4)	64' (2)	87' (2)	60' (3)

Notes:

(1) Wells to be installed only if water bearing sediments are encountered above the Floridan aquifer confining layer.

(2) From mw-5a elevation.

(3) From mw-5a lithology.

(4) Based on site-specific lithology and water level. Subject to change per field findings during well installation.

REVISED FEBRUARY 2017

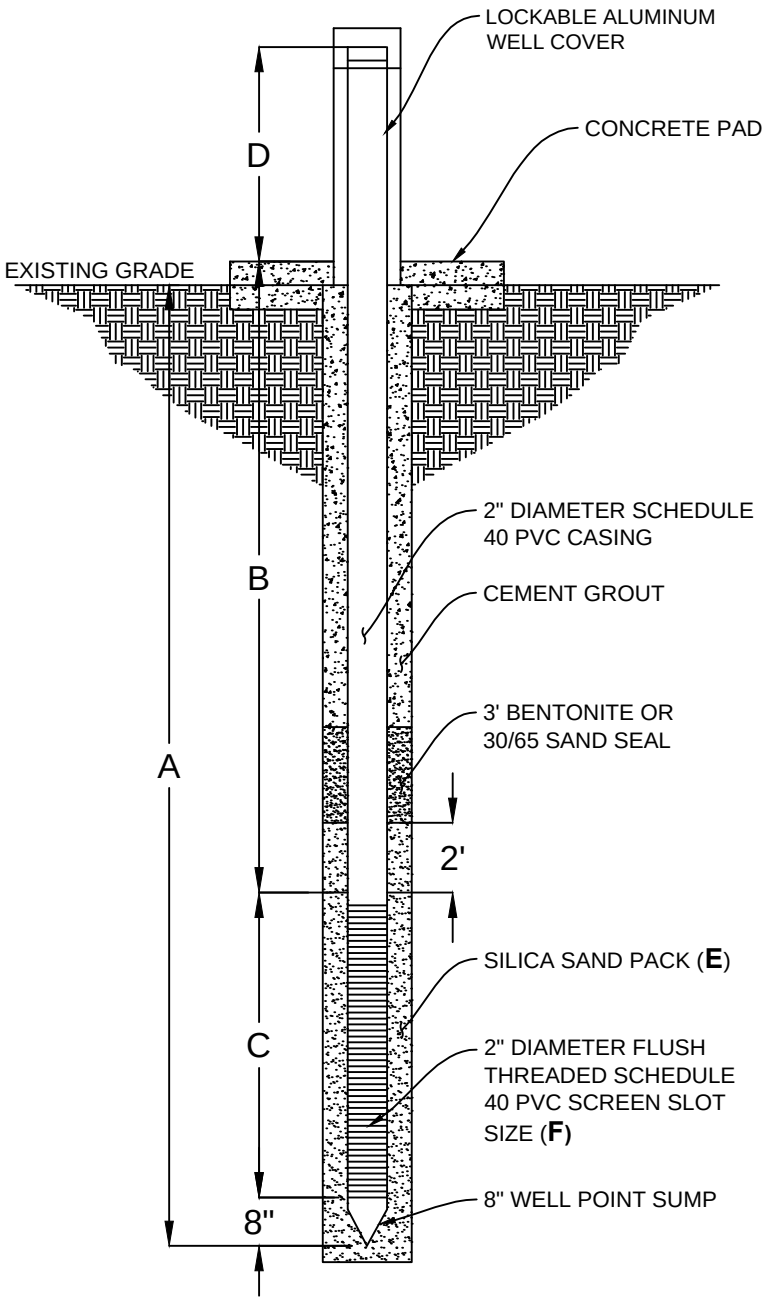
Locklear & Associates

ENTERPRISE ROAD RECYCLING AND DISPOSAL FACILITY DADE CITY, FLORIDA

PROPOSED SURFICIAL AQUIFER MONITOR WELL DETAIL

FIGURE 2

FIGURE NOT TO SCALE



WELL	A	B	C	D	E	F	TOP OF SCREEN ELEVATION FT, NGVD	BOTTOM OF SCREEN ELEVATION FT, NGVD	ASSUMED GROUND SURFACE ELEVATION FT, NGVD	ASSUMED LIMESTONE SURFACE ELEVATION FT, NGVD
MW-18B	103' ~~100'~~	83' ~~80'~~	20'	3'	20/30	0.010"	65' (9)	45' (9)	148' (1)	118' (5~~6~~)
MW-19B	100'	80'	20'	3'	20/30	0.010"	58' (9)	38' (9)	138' (2)	63' (6~~7~~)
MW-20B	72' ~~80'~~	52' ~~60'~~	20'	3'	20/30	0.010"	35' (9)	15' (9)	87' (3)	32' (7~~8~~)
MW-5BR	51' ~~40'~~	31' ~~30'~~	20' ~~10'~~	3'	20/30	0.010"	55' (9)	35' (9)	86' (4)	60' (8~~9~~)

NOTES:

(1) From MW-15B ground elevation
(2) From MW-16B ground elevation
(3) From MW-17B ground elevation
(4) From MW-5B ground elevation
(5) From MW-15B lithology
(6) From MW-16B lithology
(7) From MW-17B lithology
(8) From MW-5B lithology
(9) Based on site-specific lithology and water level data. Subject to change per field findings during well installation.

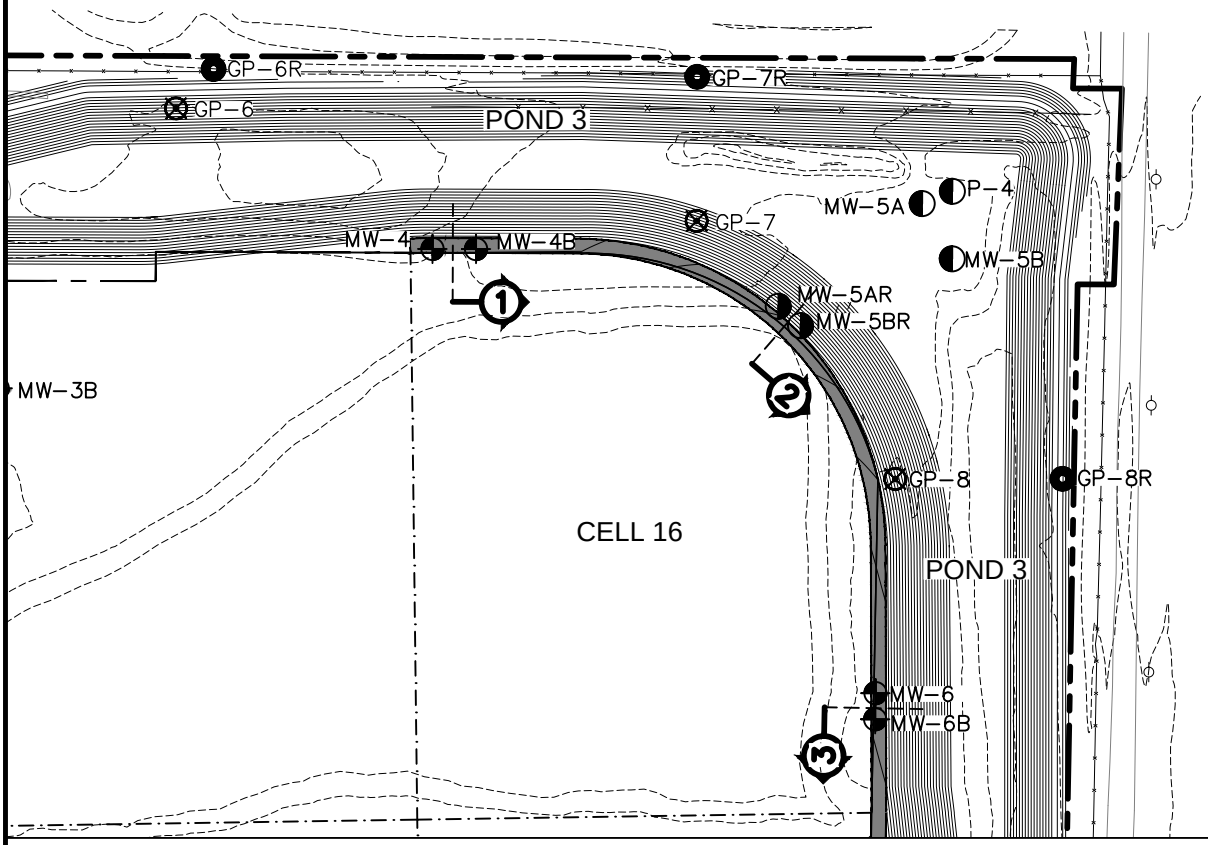
REVISED MAY ~~FEBRUARY~~ 2016

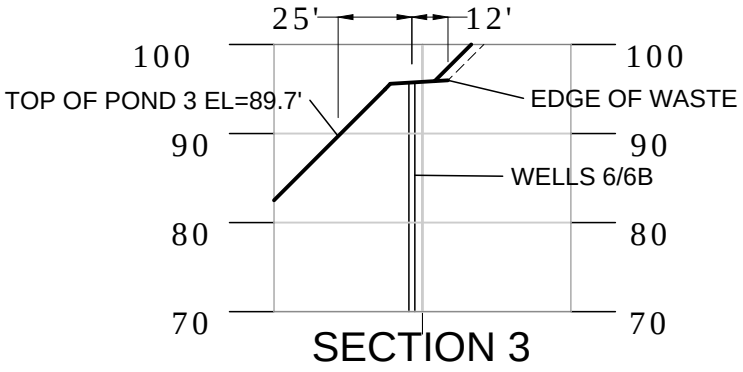
Locklear & Associates
Engineering & Environmental Consulting

ENTERPRISE ROAD RECYCLING AND DISPOSAL FACILITY
DADE CITY, FLORIDA

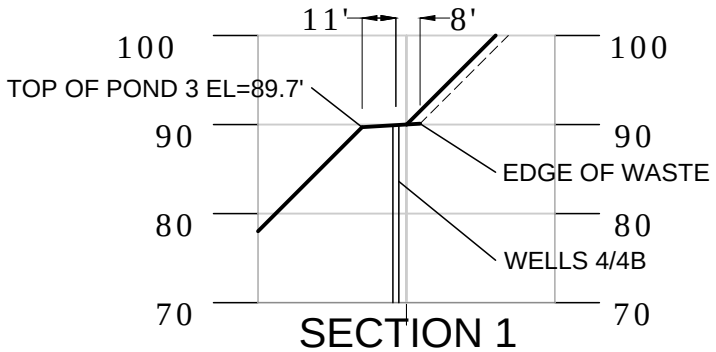
PROPOSED FLORIDAN AQUIFER MONITOR WELL DETAIL

REV FIGURE 3

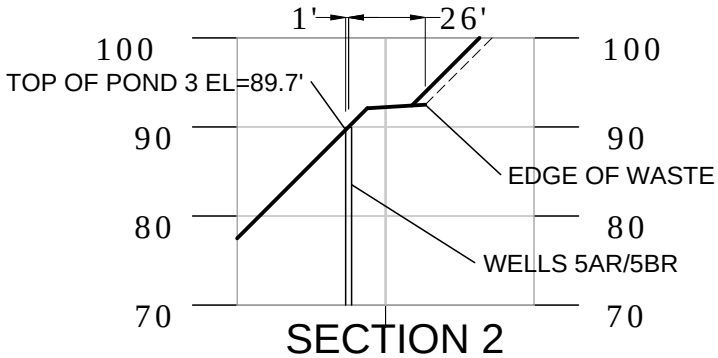




SECTION 3



SECTION 1



SECTION 2

Locklear & Associates

BORING CROSS SECTIONS FOR
ENTERPRISE ROAD CLASS III
RECYCLING & DISPOSAL FACILITY
2016 PERMIT MODIFICATION
DADE CITY, PASCO COUNTY, FLORIDA

N

FIGURE 4

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