

**V  
o  
l  
u  
m  
e  
  
3**

**SKYLINE LANDFILL  
CITY OF FERRIS  
DALLAS AND ELLIS COUNTIES, TEXAS  
TCEQ PERMIT APPLICATION NO. MSW 42D**

**PERMIT AMENDMENT APPLICATION**

**VOLUME 3 OF 5**

Prepared for

**Waste Management of Texas, Inc.**

April 2012

August 2012



Prepared by

**BIGGS & MATHEWS ENVIRONMENTAL**

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS  
FIRM REGISTRATION No. F-256

TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS  
FIRM REGISTRATION No. 50222

**SKYLINE LANDFILL  
CITY OF FERRIS  
DALLAS AND ELLIS COUNTIES, TEXAS  
TCEQ PERMIT APPLICATION NO. MSW 42D**

**PERMIT AMENDMENT APPLICATION**

**VOLUME 3 OF 5**

**CONTENTS**

---

**PART III FACILITY INVESTIGATION AND DESIGN**

Attachment D – Waste Management Unit Design



8/21/2012

**SKYLINE LANDFILL  
CITY OF FERRIS  
DALLAS AND ELLIS COUNTIES, TEXAS  
TCEQ PERMIT APPLICATION NO. MSW 42D**

**PERMIT AMENDMENT APPLICATION**

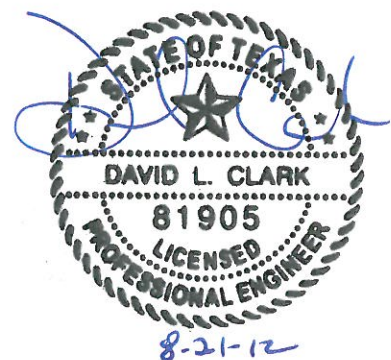
**PART III – FACILITY INVESTIGATION AND DESIGN  
ATTACHMENT D  
WASTE MANAGEMENT UNIT DESIGN**

Prepared for

**Waste Management of Texas, Inc.**

April 2012

Revised August 2012



Prepared by

**BIGGS & MATHEWS ENVIRONMENTAL**

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS  
FIRM REGISTRATION NO. F-256

TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS  
FIRM REGISTRATION NO. 50222

# CONTENTS

30 TAC §330.63(d)

<b>1</b>	<b>LANDFILL UNIT DESIGN .....</b>	<b>D-1</b>
1.1	All Weather Operation .....	D-1
1.2	Landfilling Methods .....	D-1
1.3	Landfill Design Parameters .....	D-2
1.4	Site Life Projection .....	D-2
1.5	Landfill Cross Sections .....	D-2
1.6	Liner Quality Control Plan .....	D-2
1.7	Final Cover Quality Control Plan .....	D-3
<b>2</b>	<b>STORAGE AND TRANSFER UNITS.....</b>	<b>D-4</b>
2.1	Large Item Storage .....	D-4
2.2	Reusable Materials Staging Area .....	D-4
2.3	Citizen's Convenience Area .....	D-5
2.4	Leachate Storage Facility.....	D-5
2.5	Bioremediation Treatment Pad .....	D-5
2.6	Mud Grate Facility.....	D-6
2.7	Liquid Waste Stabilization Area .....	D-6

Attachment D1 – Landfill Unit Design – Site Layout Plan

Attachment D2 – Cross Sections

Attachment D3 – Construction Design Details

Attachment D4 – Site Life

Attachment D5 – Geotechnical Design

Attachment D6 – Leachate and Contaminated Water Management Plan

Attachment D7 – Liner Quality Control Plan

Attachment D8 – Final Cover Quality Control Plan



**Table D-1  
Skyline Landfill  
Components of the Composite Liner System**

Liner System Component	Description	Thickness
Protective Cover	General earthfill	24 inches
Leachate Collection Layer	Single-sided geocomposite on floor Double-sided geocomposite on side slopes	0.2 inches
Geomembrane Liner	Smooth HDPE geomembrane on floor Textured HDPE geomembrane on side slopes	60 mil
Compacted Soil Liner	Compacted soil with a coefficient of permeability less than or equal to $1 \times 10^{-7}$ cm/sec	24 inches

**1.7 Final Cover Quality Control Plan**  
30 TAC §330.457

A ~~quality~~ Quality control plans for the final cover systems ~~is~~ are provided in Attachment D8 – Final Cover Quality Control Plan. Details of the final cover systems are provided in Attachment D3 – Construction Design Details. The components of the final cover system are listed from top to bottom in Table D-2.

**Table D-2  
Skyline Landfill  
Components of the Approved Alternate Final Cover System**

Cover System Component	Description	Thickness
Erosion Layer	Soil that is capable of sustaining native plant growth	36 inches
Drainage Layer	Double-sided geocomposite	0.2 inches
Infiltration Layer	Compacted soil with a coefficient of permeability less than or equal to $1 \times 10^{-7}$ cm/sec	18 inches

**Components of the Subtitle D Final Cover System**

<u>Cover System Component</u>	<u>Description</u>	<u>Thickness</u>
<u>Erosion Layer</u>	<u>Soil that is capable of sustaining native plant growth</u>	<u>36 inches</u>
<u>Cushion Layer</u>	<u>Geotextile on top slopes only</u>	<u>8 oz/yd<sup>2</sup></u>
<u>Drainage Layer</u>	<u>Double-sided geocomposite on side slopes only</u>	<u>0.2 inches</u>
<u>Flexible Membrane cover</u>	<u>Smooth LLDPE or HDPE geomembrane on tope slopes</u> <u>Textured LLDPE or HDPE geomembrane on side slopes</u>	<u>40 mil (LLDPE)</u> <u>60 mil (HDPE)</u>
<u>Infiltration Layer</u>	<u>Compacted soil with a coefficient of permeability less than or equal to <math>1 \times 10^{-7}</math> cm/sec</u>	<u>18 inches</u>

## 2 STORAGE AND TRANSFER UNITS

30 TAC §330.63(d)(1)(A) and (B)

The storage and transfer units will be designed for the rapid processing and minimum detention of solid waste at the facility and will be managed to prevent nuisances and fire hazards. The design of the storage and transfer units will be sufficient to control and contain a worst-case spill or release from the units and the unenclosed areas associated with the units, and will account for precipitation from the 25-year, 24-hour rainfall event. The storage and transfer units include the large item storage area, reusable materials staging area, citizen's convenience area, leachate storage facility, bioremediation treatment pad, mud grate facility, and liquid stabilization area.

### 2.1 Large Item Storage

A storage area for large items and white goods may be provided near the active working face. Large items and white goods include ovens, dishwashers, freezers, air conditioners, and other large items. Any rainfall runoff or runoff near the active working face will be contained within the active area and handled as contaminated water, as discussed in Part IV – Site Operating Plan. These items will be recycled every 180 days or less, or disposed at the active working face within 180 days of acceptance at the facility. Large items that are not recycled will be disposed of at the working face. The procedures for the acceptance, storage, processing, and disposal of large items, including items containing chlorinated fluorocarbons, are addressed in Part IV – Site Operating Plan.

### 2.2 Reusable Materials Staging Area

Inert materials such as brick, concrete, ~~asphalt, shingles~~, etc., and non-inert materials such as asphalt and shingles, are often received and staged at the facility for use as roadbase materials for facility access roads and staging areas or erosion control in drainage structures. Shingles will not be used for facility access roads. The reusable materials staging area will be located above existing lined areas and will be relocated periodically as the active working face moves. The size of the stockpiles may vary depending on the amount of inert materials received at any given time. Since ~~these the brick and concrete~~ materials are inert, their storage will not create a public health hazard or nuisance and runoff and runoff from rainfall will not be controlled in a special manner for these materials. Since asphalt and shingles are not inert materials, they will be managed in a manner that will prevent runoff or contaminated water, discharge of waste, or the creation of nuisance conditions. ~~Also, since~~ Since these inert and non-inert materials will continuously be reused for site operations, there is no time limit on the storage of these materials.

## 2.3 Citizen's Convenience Area

A citizen's convenience area for waste drop-off is located within the site entrance facilities, as shown in Attachment D1 – Landfill Unit Design – Site Layout Plan, Drawing D1.5 – Entrance Road and Entrance Facilities Plan. Thirty to forty cubic yard roll-off containers as well as containers for recycled goods may be provided. Roll-off containers will be emptied at the active working face or covered with a tarp at the end of each day. Operational procedures for the citizen's convenience center are addressed in Part IV – Site Operating Plan.

## 2.4 Leachate Storage Facility

Primary leachate storage will be provided by the leachate sumps, which are located within each landfill cell. Leachate will be pumped from the sumps through a leachate forcemain to a direct connection to publicly owned treatment works (POTW). Leachate passes through existing storage tanks which ~~Existing storage tanks~~ provide a minimum of approximately 38 hours of temporary leachate storage in the event that the direct connection to the POTW is not functional. The storage tanks will be emptied from the tanks into tanker trucks for transport based on leachate production and storage needs in the event that they are used.

The leachate storage facility is located near the maintenance facility, as shown in Attachment D1 – Landfill Unit Design – Site Layout Plan, Drawing D1.5 – Entrance Road and Entrance Facilities Plan. The storage facility consists of one 24,500-gallon storage tank and one 17,000-gallon storage tank. The calculations in Appendix D6-D – Secondary Containment Volume Calculations demonstrate that the secondary containment area provides containment, with 6 inches of freeboard, for the storage tanks and precipitation from the 25-year, 24-hour storm event.

## 2.5 Bioremediation Treatment Pad

A bioremediation treatment pad for petroleum contaminated materials is located within the future waste fill area, as shown in Attachment D1 – Landfill Unit Design – Site Layout Plan, Drawing D1.5 – Entrance Road and Entrance Facilities Plan. The treatment pad is constructed with a minimum 18-inch-thick compacted clay liner and is surrounded by a compacted clay containment berm. The containment berm is sized for precipitation from the 25-year, 24-hour storm event. Water that comes into contact with the contaminated soils will be handled as contaminated water, as discussed in Part IV – Site Operating Plan. Tarps may be placed over the contaminated soils to minimize the volume of contaminated water. Treatment procedures, testing requirements and material disposal are described in Part IV – Site Operating Plan, Appendix IVD – Bioremediation Treatment Plan.



## 2.6 Mud Grate Facility

The mud grate is located along the entrance road, as shown in Attachment D1 – Landfill Unit Design – Site Layout Plan, Drawing D1.5 – Entrance Road and Entrance Facilities Plan. The mud grate is a concrete structure with a series of metal grates that function as mud removal devices. As vehicles drive across the mud grate, mud from tires drops through the grates into a mud box. The accumulated mud is periodically removed from the mud box and placed in the active working face.

## 2.7 Liquid Waste Stabilization Area

Sludges, grease trap waste, grit trap waste, Class 2 or Class 3 liquid industrial waste, liquid waste from drilling activities, or liquid wastes from municipal sources may be accepted at the Skyline Landfill. Refer to Part IV, Appendix IVB – Special Waste Acceptance Plan. The facility may perform on-site liquid processing/stabilization of sludges, grease trap wastes, grit trap wastes, Class 2 or Class 3 liquid industrial wastes, liquid waste from drilling activities or liquids from municipal sources. Stabilization of liquids in this context is the addition of drying or bulking agents as described below to liquids waste so that the mixture passes the paint filter test. The facility will provide a stabilization basin placed within an existing lined cell. The basin will be secured during waste placement operations and soil will be graded around the basin to ensure that stormwater runoff is directed away from the basin. The container will be placed so that a minimum of one foot of the container extends above the surrounding soil. The bottom of the container will be at least 10 feet above the top of the protective cover soil component of the lining system and founded in the waste.

Once the basin is in place, trucks will discharge directly into the basin. Lime, fly ash, cement kiln dust, Portland cement, sawdust, dirt, auto fluff, or any combination of these materials may be used for liquid stabilization. Mixing will be accomplished with a backhoe or other appropriate machinery. Each batch of stabilized material will be tested for free liquids in accordance with Method 9095 (Paint Filter Liquids Test), as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods" (EPA Publication Number SW-846), as amended. Upon verification of the stabilized material passing the paint filter test, the mixture will be removed from the basin and deposited in the active face for landfilling on the day it is received. The procedures for acceptance, processing, odor control, and stabilizing liquid wastes accepted at the facility are addressed in Part IV – Site Operating Plan, Appendix IVE – Liquid Stabilization Plan.

**SKYLINE LANDFILL  
CITY OF FERRIS  
DALLAS AND ELLIS COUNTIES, TEXAS  
TCEQ PERMIT APPLICATION NO. MSW 42D**

**PERMIT AMENDMENT APPLICATION**

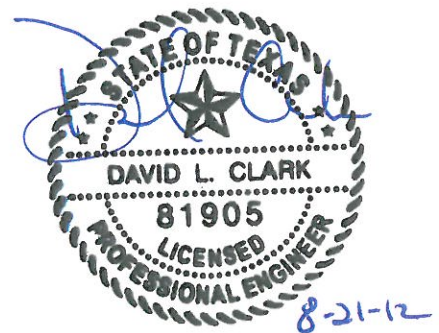
**PART III – FACILITY INVESTIGATION AND DESIGN  
ATTACHMENT D1  
LANDFILL UNIT DESIGN – SITE LAYOUT PLAN**

Prepared for

**Waste Management of Texas, Inc.**

April 2012

Revised August 2012



Prepared by

**BIGGS & MATHEWS ENVIRONMENTAL**

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS  
FIRM REGISTRATION No. F-256

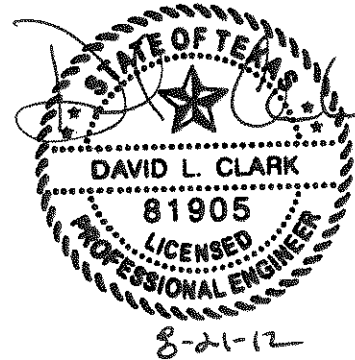
TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS  
FIRM REGISTRATION No. 50222

## CONTENTS

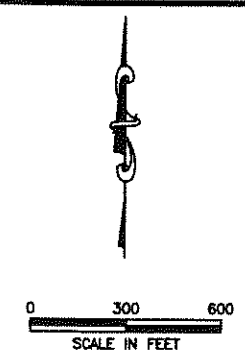
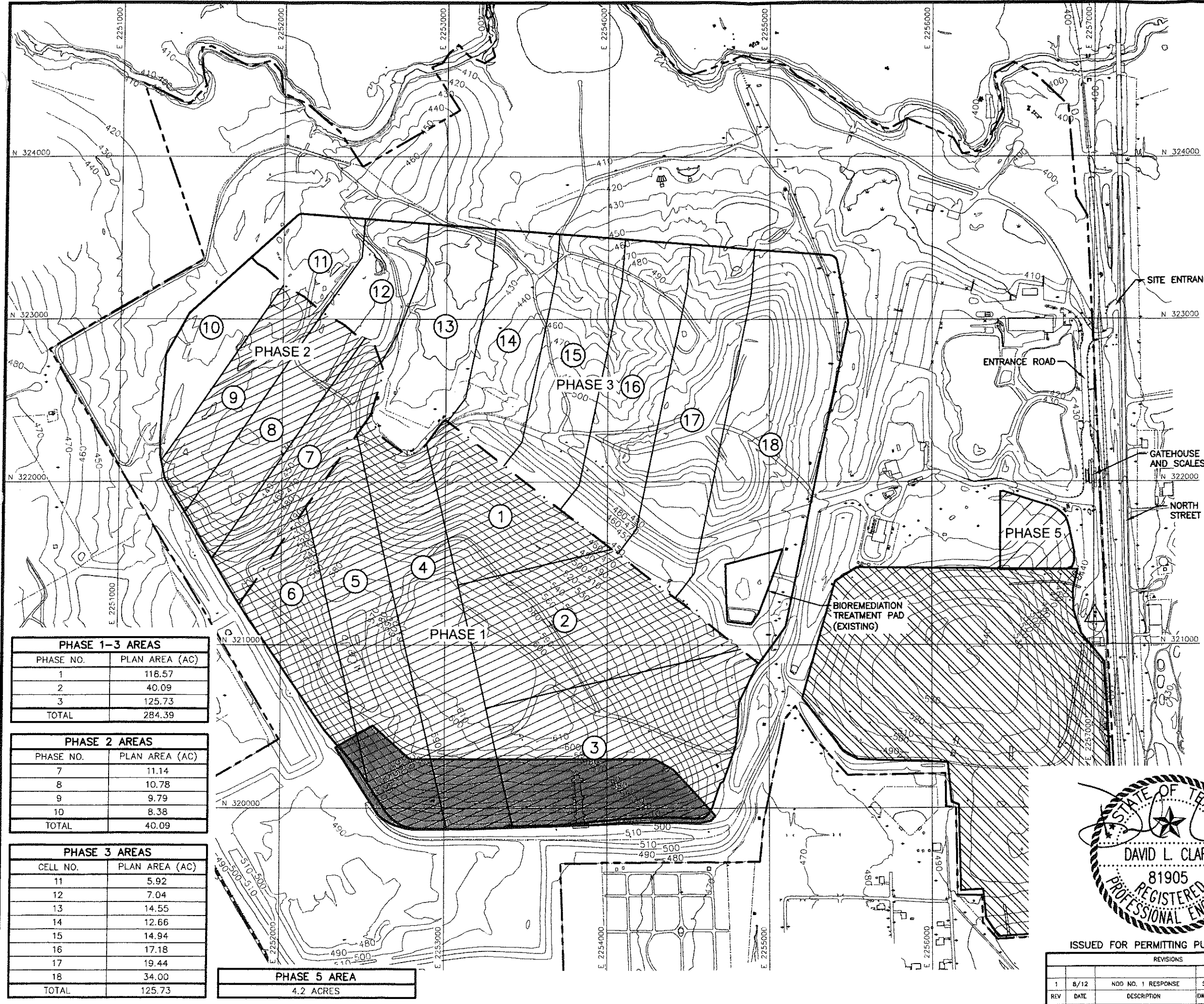
---

30 TAC §330.63(d)

- D1.1 – General Site Plan
- D1.2 – Site Layout Plan
- D1.3 – Excavation Plan
- D1.4 – Landfill Completion Plan
- D1.5 – Entrance Road and Entrance Facilities Plan
- D1.6 – Landfill Road Details



J:\101\01\120\ATT-D\01.2-SiteLayoutPlan.dwg Layout: Layout1 User: scurdiff



- LEGEND**
- PERMIT BOUNDARY
  - LANDFILL FOOTPRINT
  - 550 EXISTING 10' GROUND CONTOUR
  - N 323000 STATE PLANE GRID (NAD 27)
  - . - - PHASE BOUNDARY
  - CELL BOUNDARY
  - ⑩ CELL DESIGNATION
  - ▨ PRE-SUBTITLE D AREA WITH FINAL COVER
  - ▨ SUBTITLE D LINER CONSTRUCTED
  - CONSTRUCTED ALTERNATE FINAL COVER

- NOTE:**
1. EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL PHOTOGRAPHY, FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL ZONE, US FEET.
  2. PHASE 1 (CELL 1-6) HAVE BEEN LINED WITH SUBTITLE D LINER SYSTEM AND HAS WASTE FILL IN PLACE. 20 ACRES OF PHASE 1 HAS FINAL COVER IN PLACE.
  3. CELLS 7-9 IN PHASE 2 HAVE BEEN LINED WITH SUBTITLE D LINER SYSTEM AND HAS WASTE FILL IN PLACE.
  4. PHASE 5 HAS BEEN LINED WITH SUBTITLE D LINER SYSTEM AND IS AT FINAL GRADE.

**PHASE 1-3 AREAS**

PHASE NO.	PLAN AREA (AC)
1	118.57
2	40.09
3	125.73
<b>TOTAL</b>	<b>284.39</b>

**PHASE 2 AREAS**

PHASE NO.	PLAN AREA (AC)
7	11.14
8	10.78
9	9.79
10	8.38
<b>TOTAL</b>	<b>40.09</b>

**PHASE 3 AREAS**

CELL NO.	PLAN AREA (AC)
11	5.92
12	7.04
13	14.55
14	12.66
15	14.94
16	17.18
17	19.44
18	34.00
<b>TOTAL</b>	<b>125.73</b>

**PHASE 5 AREA**

<b>4.2 ACRES</b>
------------------



ISSUED FOR PERMITTING PURPOSES ONLY

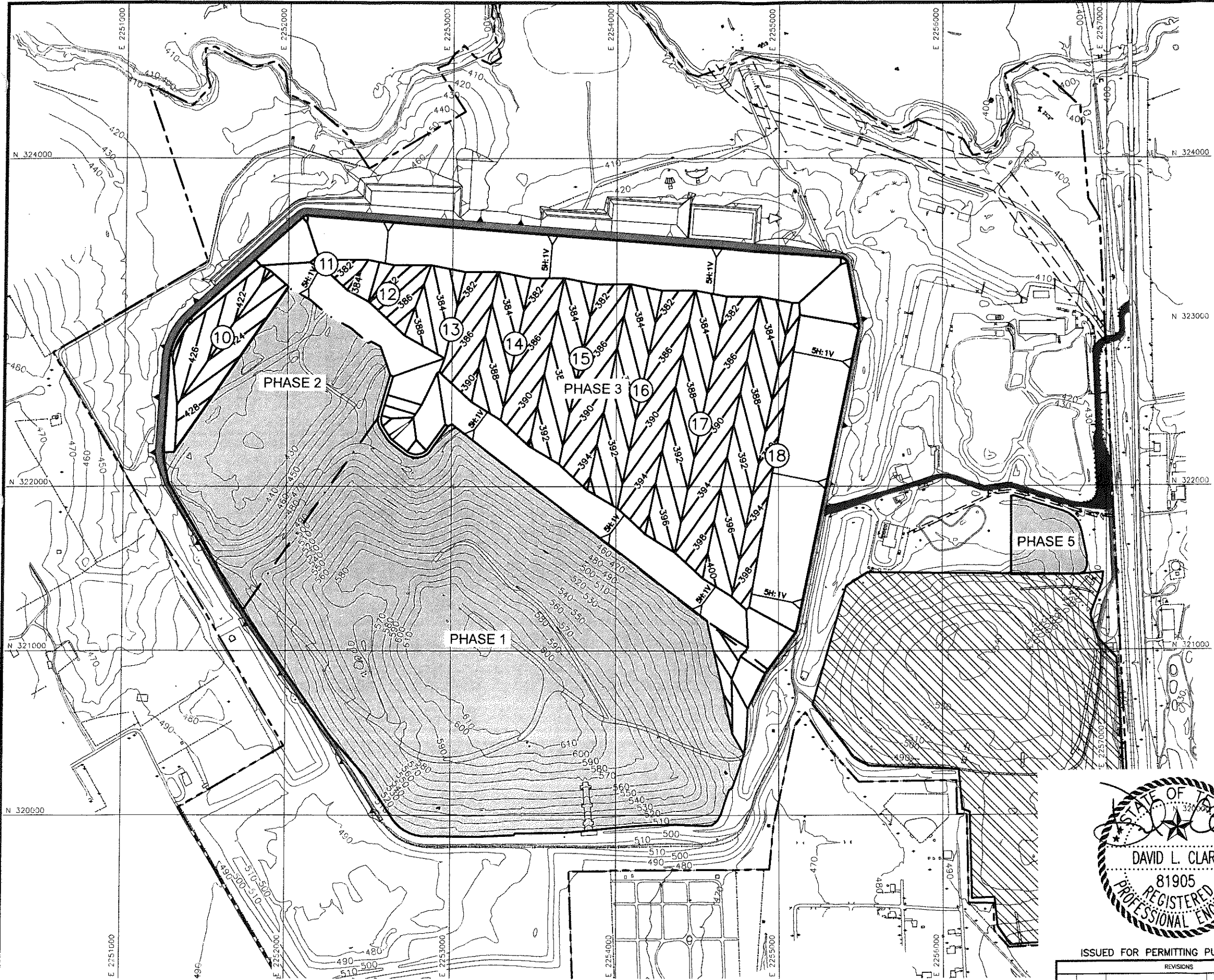
**SITE LAYOUT PLAN**  
**WASTE MANAGEMENT OF TEXAS, INC.**  
**SKYLINE LANDFILL**  
**MAJOR PERMIT AMENDMENT**



**BIGGS & MATHEWS**  
**ENVIRONMENTAL**  
**CONSULTING ENGINEERS**  
 MANSFIELD • WICHITA FALLS  
 817-563-1144

REVISIONS							TBPE FIRM NO. F-256	TBPG FIRM NO. 50222
1	8/12	NOD NO. 1 RESPONSE	SRG	DLC	DLC	DLC	DSN. SAB DATE: 04/12	DRAWING
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	DWN. SRC SCALE: GRAPHIC	<b>D1.2</b>
							CHK. DLC DWG: D1.2-SiteLayoutPlan.dwg	

J:\101\01\120\ATT D\1.3-ExcavPlan.dwg Layout: Layout\_1 User: soundiff



**LEGEND**

- PERMIT BOUNDARY
- LANDFILL FOOTPRINT
- EXISTING 10' GROUND CONTOUR
- STATE PLANE GRID (NAD 27)
- PROPOSED 2' EXCAVATION CONTOUR
- PHASE BOUNDARY
- CELL BOUNDARY
- CELL DESIGNATION
- LINED AREA
- PRE-SUBTITLE D AREA WITH FINAL COVER
- LANDFILL ACCESS ROAD
- LANDFILL ENTRANCE ROAD

**NOTE:**

1. EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL PHOTOGRAPHY, FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL ZONE, US FEET.
2. PROPOSED EXCAVATION CONTOURS DEPICT LINER SUBGRADE (EXCAVATION) GRADES.
3. ELEVATION OF DEEPEST EXCAVATION AT BOTTOM OF LEACHATE COLLECTION SUMPS IN CELLS 11-18: 377 FT-MSL.



ISSUED FOR PERMITTING PURPOSES ONLY

**EXCAVATION PLAN**  
**WASTE MANAGEMENT OF TEXAS, INC.**  
**SKYLINE LANDFILL**  
**MAJOR PERMIT AMENDMENT**

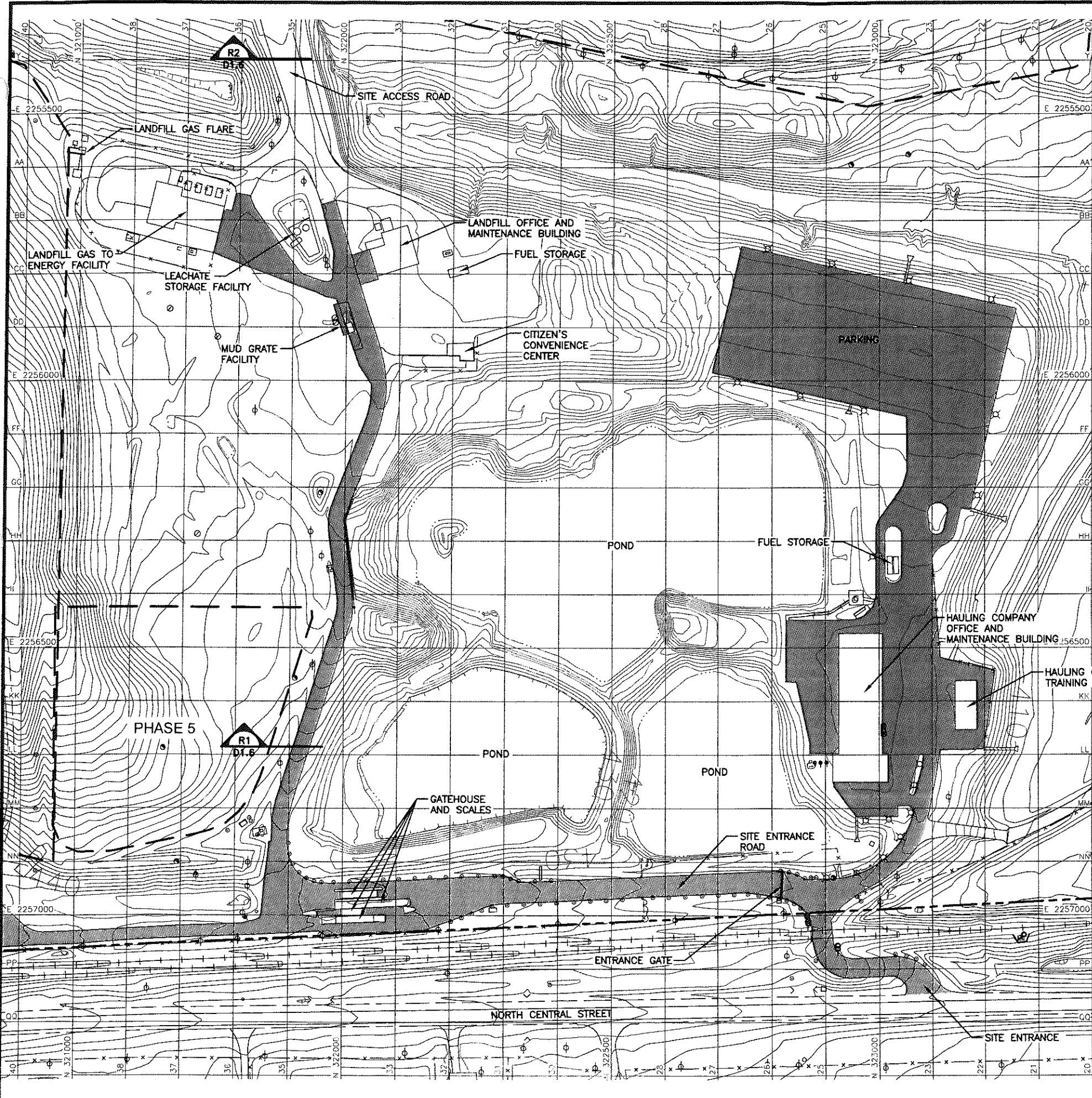


**BIGGS & MATHEWS**  
**ENVIRONMENTAL**  
**CONSULTING ENGINEERS**  
 MANSFIELD • WICHITA FALLS  
 817-563-1144

REVISIONS							TBPE FIRM NO. F-256		TBPC FIRM NO. 50222	
1	8/12	NOD NO. 1 RESPONSE	SRC	DLC	DLC	DLC	DSN.	SAB	DATE :	04/12
REV	DATE	DESCRIPTION	DWN	DES	BY	CHK	DWN.	SRC	SCALE :	GRAPHIC
							CHK.	DLC	DWG :	D1.3-ExcavPlan.dwg

DRAWING  
**D1.3**

J:\101\01\120\AT D1.5-EntrancePlan.dwg Layout: Layout1 User: scundiff



**LEGEND**

- PERMIT BOUNDARY
- LANDFILL FOOTPRINT
- 550 EXISTING 2' GROUND CONTOUR
- N 323000 STATE PLANE GRID (NAD 27)
- CONCRETE PAVEMENT
- RAILROAD TRACK
- FENCELINE
- POWER POLE
- LIGHT POLE
- POST

**NOTES:**

1. EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL PHOTOGRAPHY, FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL ZONE, US FEET.
2. ALL FACILITIES SHOWN ON THIS PLAN ARE EXISTING.



**ENTRANCE ROAD AND ENTRANCE FACILITIES PLAN**  
**WASTE MANAGEMENT OF TEXAS, INC.**  
**SKYLINE LANDFILL**  
**MAJOR PERMIT AMENDMENT**



BIGGS & MATHEWS  
 ENVIRONMENTAL  
 CONSULTING ENGINEERS  
 MANSFIELD • WICHITA FALLS  
 817-563-1144

ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS							TBPE FIRM NO. F-256		TBPG FIRM NO. 50222	
1	8/12	NOD NO. 1 RESPONSE	SRC	DLC	DLC	DLC	DSN.	SAB	DATE :	04/12
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	DWN.	SRC	SCALE :	GRAPHIC
							CHK.	DLC	DWG :	D1.5-EntrancePlan.dwg

DRAWING  
**D1.5**

**SKYLINE LANDFILL  
CITY OF FERRIS  
DALLAS AND ELLIS COUNTIES, TEXAS  
TCEQ PERMIT APPLICATION NO. MSW 42D**

**PERMIT AMENDMENT APPLICATION**

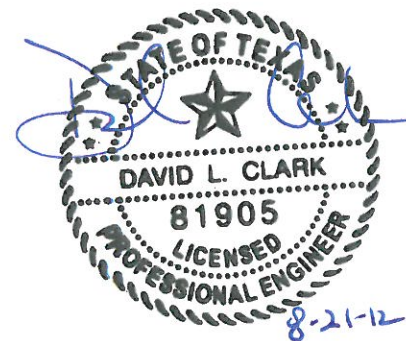
**PART III – FACILITY INVESTIGATION AND DESIGN  
ATTACHMENT D2  
CROSS SECTIONS**

Prepared for

**Waste Management of Texas, Inc.**

April 2012

Revised August 2012



Prepared by

**BIGGS & MATHEWS ENVIRONMENTAL**

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS  
FIRM REGISTRATION NO. F-256

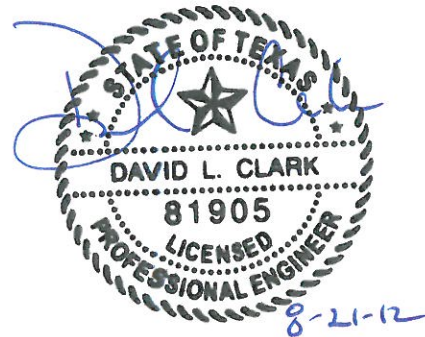
TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS  
FIRM REGISTRATION NO. 50222

## CONTENTS

---

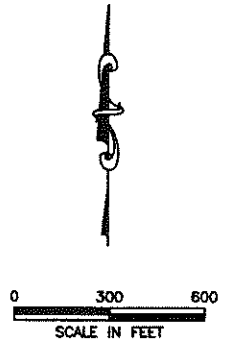
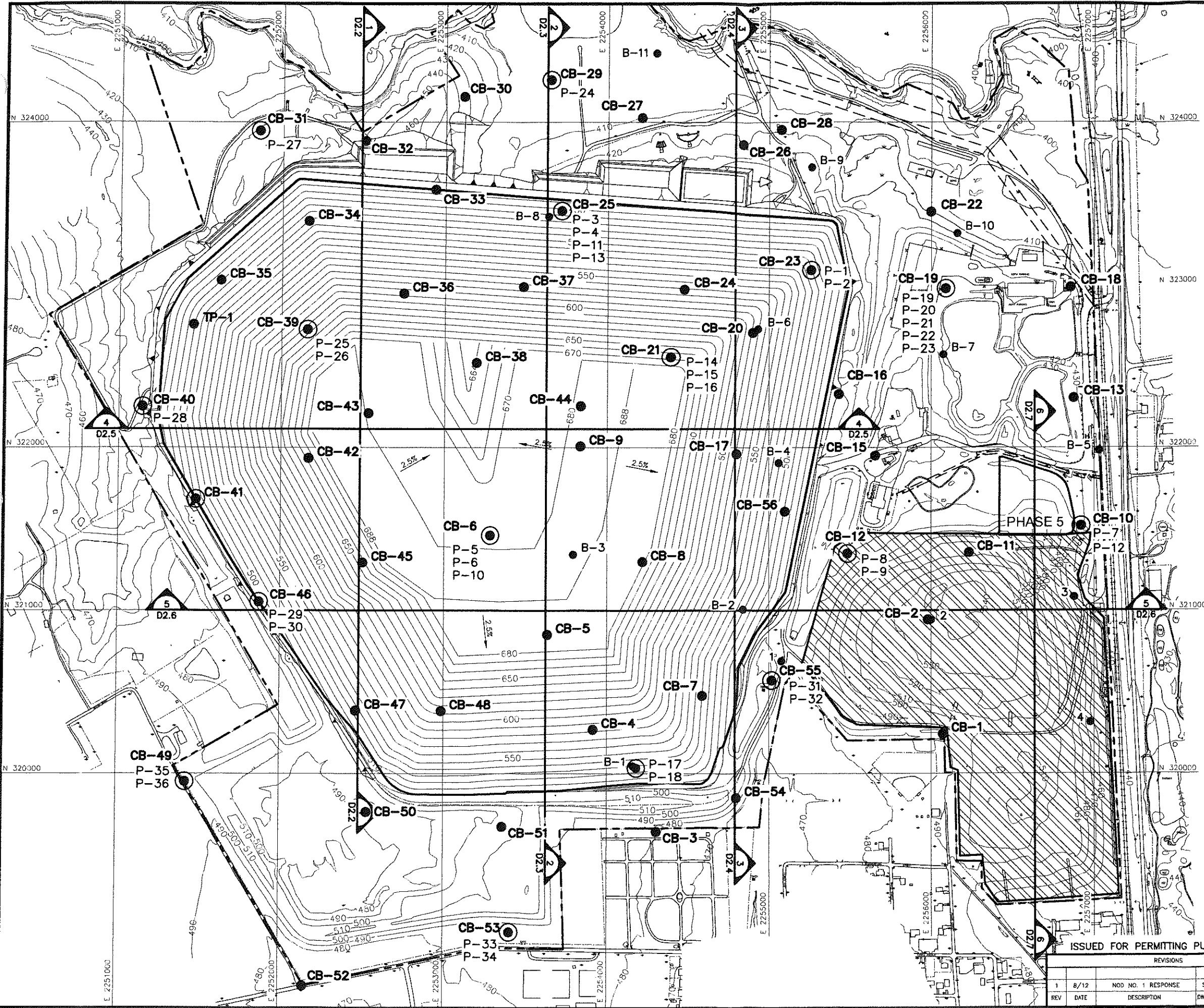
30 TAC §330.63(d)(4)(E)

- D2.1 – Section Layout Plan
- D2.2 – Typical Landfill Section 1
- D2.3 – Typical Landfill Section 2
- D2.4 – Typical Landfill Section 3
- D2.5 – Typical Landfill Section 4
- D2.6 – Typical Landfill Section 5
- D2.7 – Typical ~~Perimeter Section~~ Landfill Section 6
- D2.8 – Typical Perimeter Section





J:\101\01\120\ATT D\2.1-SectionLayout.dwg Layout: Layout 1 User: soundiff



- LEGEND**
- PERMIT BOUNDARY
  - LANDFILL FOOTPRINT
  - 500 EXISTING 10' GROUND CONTOUR
  - N 323000 STATE PLANE GRID (NAD 27)
  - 650 PROPOSED 10' FINAL CONTOUR
  - BORING LOCATION
  - PIEZOMETER
  - ▨ PRE-SUBTITLE D AREA WITH FINAL COVER

**NOTES:**

- EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL SURVEY FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL.



**SECTION LAYOUT PLAN**  
**WASTE MANAGEMENT OF TEXAS, INC.**  
**SKYLINE LANDFILL**  
**MAJOR PERMIT AMENDMENT**

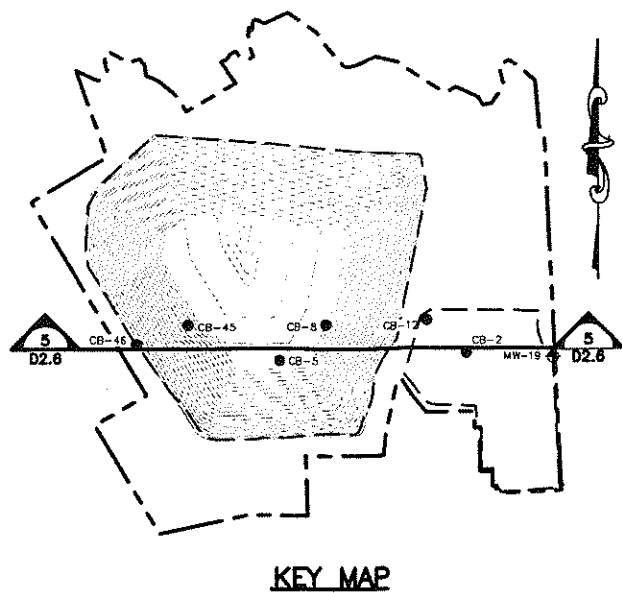
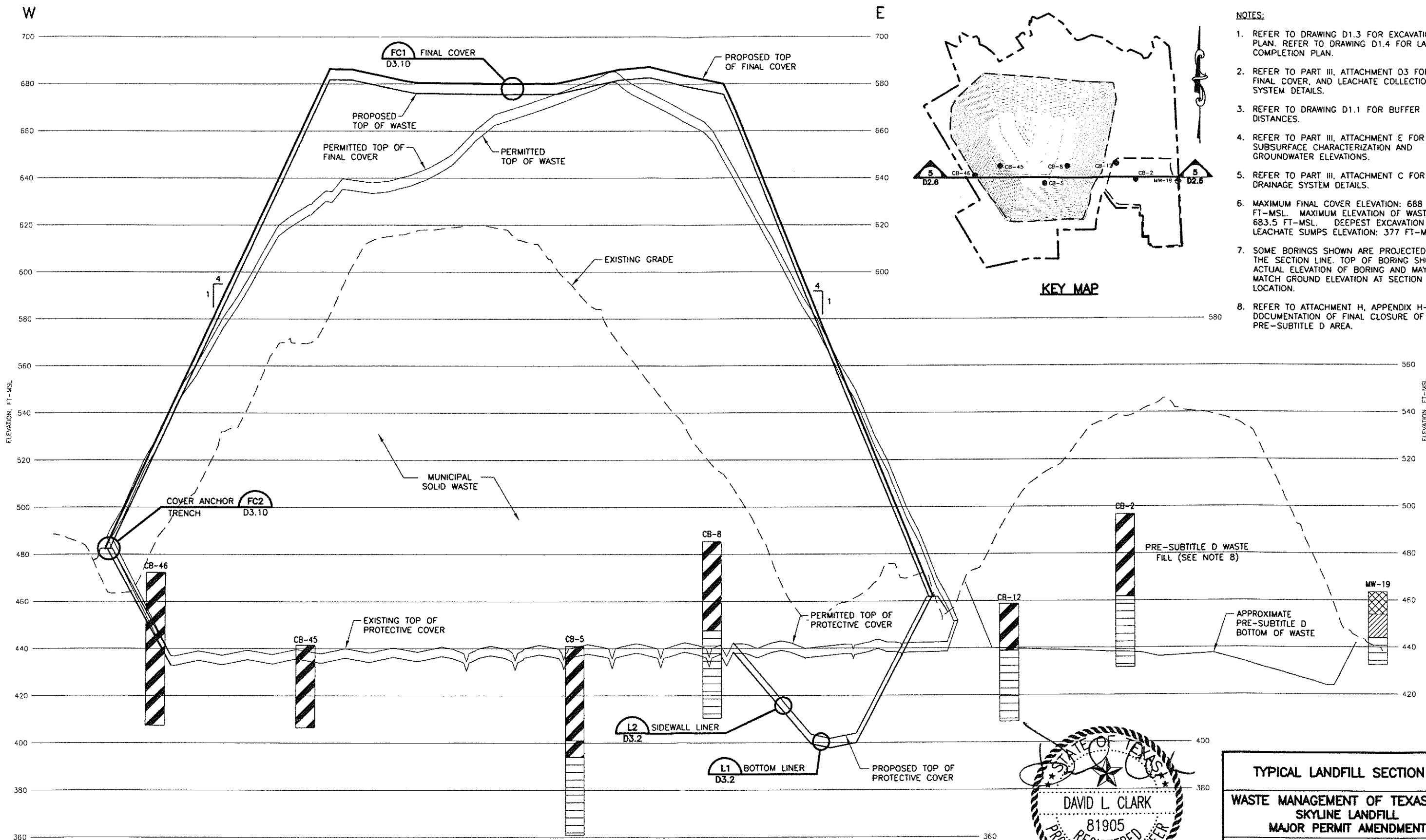
**BIGGS & MATHEWS**  
 ENVIRONMENTAL  
 CONSULTING ENGINEERS  
 MANSFIELD • WICHITA FALLS  
 817-563-1144

ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS							TBPE FIRM NO. F-256		TBPG FIRM NO. 50222	
1	8/12	NOD NO. 1 RESPONSE	SRC	DLC	DLC	DLC	DSN.	SAB	DATE :	04/12
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	DWN.	SRC	SCALE :	GRAPHIC
CHK.	DLC	DWG :	D2.1-SectionLayout.dwg							

DRAWING  
**D2.1**

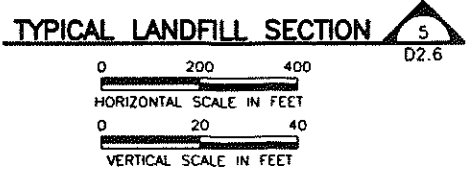
J:\101\011\120\ATT D\2.2-7-Section.dwg Layout: D2.6 User: scundiff



- NOTES:**
1. REFER TO DRAWING D1.3 FOR EXCAVATION PLAN. REFER TO DRAWING D1.4 FOR LANDFILL COMPLETION PLAN.
  2. REFER TO PART III, ATTACHMENT D3 FOR LINER, FINAL COVER, AND LEACHATE COLLECTION SYSTEM DETAILS.
  3. REFER TO DRAWING D1.1 FOR BUFFER DISTANCES.
  4. REFER TO PART III, ATTACHMENT E FOR SUBSURFACE CHARACTERIZATION AND GROUNDWATER ELEVATIONS.
  5. REFER TO PART III, ATTACHMENT C FOR DRAINAGE SYSTEM DETAILS.
  6. MAXIMUM FINAL COVER ELEVATION: 688 FT-MSL. MAXIMUM ELEVATION OF WASTE: 683.5 FT-MSL. DEEPEST EXCAVATION AT LEACHATE SUMPS ELEVATION: 377 FT-MSL
  7. SOME BORINGS SHOWN ARE PROJECTED ONTO THE SECTION LINE. TOP OF BORING IS ACTUAL ELEVATION OF BORING AND MAY NOT MATCH GROUND ELEVATION AT SECTION LOCATION.
  8. REFER TO ATTACHMENT H, APPENDIX H-5 FOR DOCUMENTATION OF FINAL CLOSURE OF PRE-SUBTITLE D AREA.

**LEGEND**

	Clay (CH)		Claystone
	Clay (CL)		Shale



ISSUED FOR PERMITTING PURPOSES ONLY

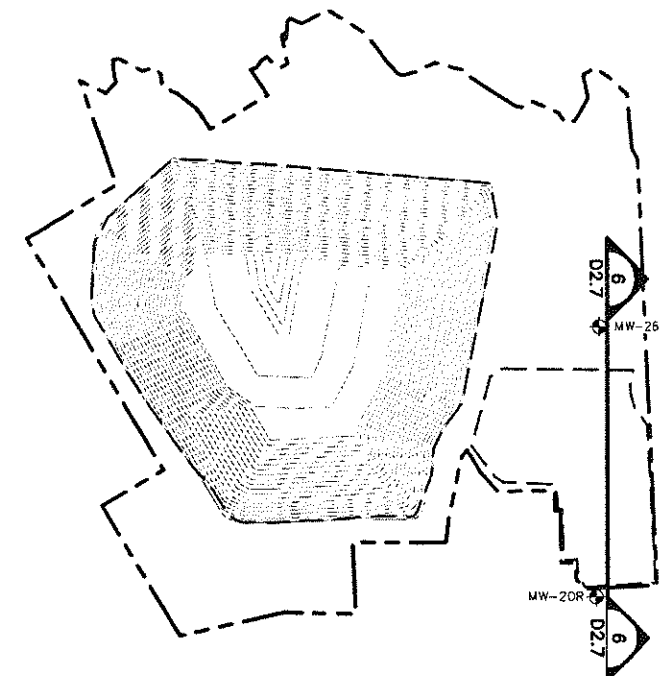
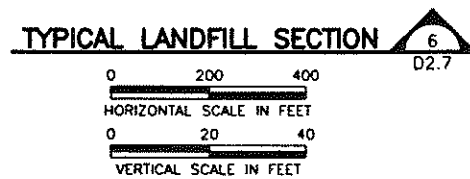
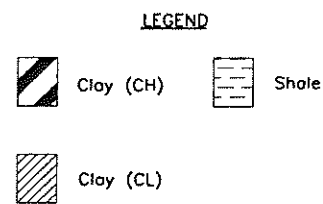
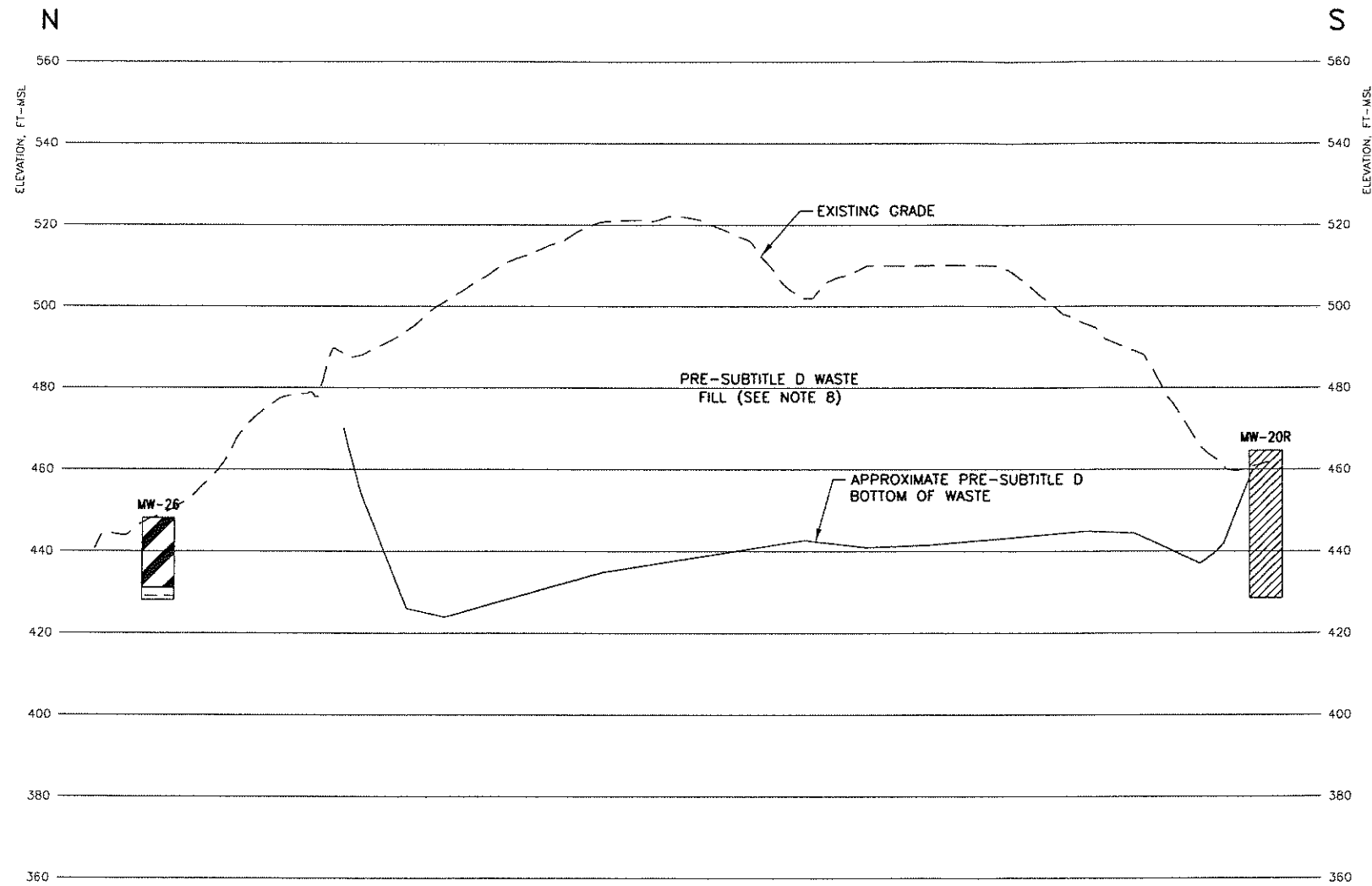
**TYPICAL LANDFILL SECTION 5**

**WASTE MANAGEMENT OF TEXAS, INC.**  
SKYLINE LANDFILL  
MAJOR PERMIT AMENDMENT

**BIGGS & MATHEWS**  
ENVIRONMENTAL  
CONSULTING ENGINEERS  
MANSFIELD • WICHITA FALLS  
817-563-1144

REVISIONS							TBPE FIRM NO. F-256		TBPG FIRM NO. 50222	
1	8/12	NOD NO. 1 RESPONSE	SRC	DLC	DLC	DLC	DSN.	SAB	DATE : 04/12	DRAWING
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	CHK.	DLC	SCALE : GRAPHIC	<b>D2.6</b>
									DWG : D2.2-7-Section.dwg	

J:\101\01\120VAT D\02.2-7-Section.dwg Layout: D2.7 User: soundiff



- NOTES:**
- REFER TO DRAWING D1.3 FOR EXCAVATION PLAN. REFER TO DRAWING D1.4 FOR LANDFILL COMPLETION PLAN.
  - REFER TO PART III, ATTACHMENT D3 FOR LINER, FINAL COVER, AND LEACHATE COLLECTION SYSTEM DETAILS.
  - REFER TO DRAWING D1.1 FOR BUFFER DISTANCES.
  - REFER TO PART III, ATTACHMENT E FOR SUBSURFACE CHARACTERIZATION AND GROUNDWATER ELEVATIONS.
  - REFER TO PART III, ATTACHMENT C FOR DRAINAGE SYSTEM DETAILS.
  - MAXIMUM FINAL COVER ELEVATION: 688 FT-MSL. MAXIMUM ELEVATION OF WASTE: 683.5 FT-MSL. DEEPEST EXCAVATION AT LEACHATE SUMPS ELEVATION: 377 FT-MSL.
  - SOME BORINGS SHOWN ARE PROJECTED ONTO THE SECTION LINE. TOP OF BORING SHOWN IS ACTUAL ELEVATION OF BORING AND MAY NOT MATCH GROUND ELEVATION AT SECTION LOCATION.
  - REFER TO ATTACHMENT H, APPENDIX H-5 FOR DOCUMENTATION OF FINAL CLOSURE OF PRE-SUBTITLE D AREA.



**TYPICAL LANDFILL SECTION 6**

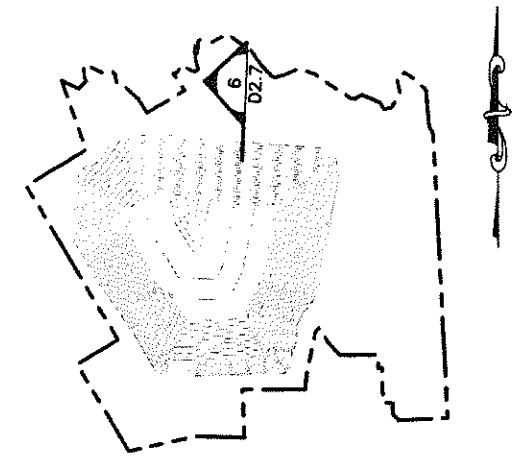
**WASTE MANAGEMENT OF TEXAS, INC.**  
SKYLINE LANDFILL  
MAJOR PERMIT AMENDMENT

BIGGS & MATHEWS  
ENVIRONMENTAL  
CONSULTING ENGINEERS  
MANSFIELD • WICHITA FALLS  
817-563-1144

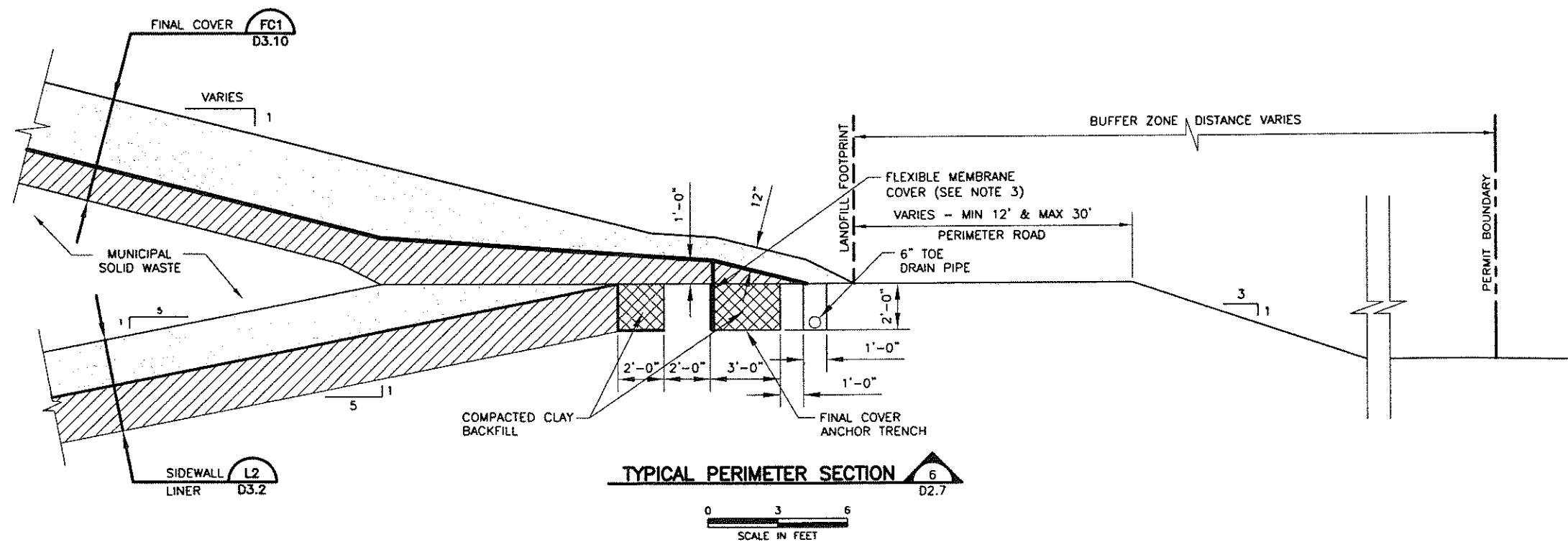
ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS								TBPE FIRM NO. F-256		TBPG FIRM NO. 50222	
1	8/12	NOD NO. 1 RESPONSE	SRC	DLC	DLC	DLC		DSN. SAB	DATE : 08/12	DRAWING	
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY		DWN. SRC	SCALE : GRAPHIC	D2.7	
								CHK. DLC	DWG : 02.2-7-Section.dwg		

J:\101\011\20\ATT D\02.8-Section.dwg Layout: D2.7 User: scundiff



KEY MAP



TYPICAL PERIMETER SECTION

SCALE IN FEET

- NOTES:
1. REFER TO DRAWING D1.3 FOR EXCAVATION PLAN. REFER TO DRAWING D1.4 FOR LANDFILL COMPLETION PLAN.
  2. REFER TO ATTACHMENT D3 FOR LINER, FINAL COVER, AND LEACHATE COLLECTION SYSTEM DETAILS.
  3. FOR SUBTITLE D FINAL COVER, FLEXIBLE MEMBRANE COVER TO BE TERMINATED IN BOTTOM OF FINAL COVER ANCHOR TRENCH.



ISSUED FOR PERMITTING PURPOSES ONLY

<b>TYPICAL PERIMETER SECTION</b>	
<b>WASTE MANAGEMENT OF TEXAS, INC.</b> <b>SKYLINE LANDFILL</b> <b>MAJOR PERMIT AMENDMENT</b>	
	BIGGS & MATHEWS ENVIRONMENTAL CONSULTING ENGINEERS MANSFIELD • WICHITA FALLS 817-563-1144
TBPE FIRM NO. F-256	TBPG FIRM NO. 50222
DSN. SAB	DATE : 04/12
DWN. SRC	SCALE : GRAPHIC
CHK. DLC	DWG : D2.8-Section.dwg
DRAWING <b>D2.8</b>	

REVISIONS						
REV	DATE	DESCRIPTION	OWN BY	DES BY	CHK BY	APP BY
1	8/12	NOD NO. 1 RESPONSE	SRC	DLC	DLC	DLC

**SKYLINE LANDFILL  
CITY OF FERRIS  
DALLAS AND ELLIS COUNTIES, TEXAS  
TCEQ PERMIT APPLICATION NO. MSW 42D**

**PERMIT AMENDMENT APPLICATION**

**PART III – FACILITY INVESTIGATION AND DESIGN  
ATTACHMENT D3  
CONSTRUCTION DESIGN DETAILS**

Prepared for

**Waste Management of Texas, Inc.**

April 2012

Revised August 2012



Prepared by

**BIGGS & MATHEWS ENVIRONMENTAL**

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS  
FIRM REGISTRATION NO. F-256

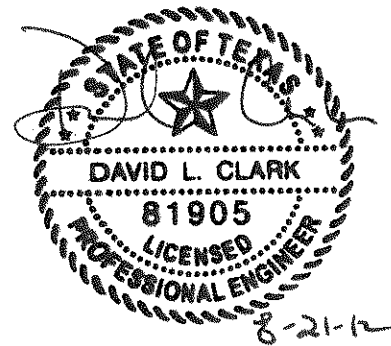
TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS  
FIRM REGISTRATION NO. 50222

## CONTENTS

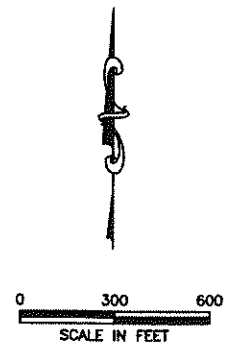
---

30 TAC §330.63(d)(4)(F)

- D3.1 – Liner Plan
- D3.2 – Liner Details
- D3.3 – Liner Details
- D3.4 – Leachate Collection System Plan
- D3.5 – Leachate Collection System Details
- D3.6 – Leachate Collection System Details
- D3.7 – Temporary Dewatering Plan
- D3.8 – Underdrain Details
- D3.9 – Final Cover Plan
- D3.10 – Final Cover Details



J:\101\01\120\ATT D\03.1-LinerPlan.dwg Layout: Layout 1 User: soundiff



**LEGEND**

- PERMIT BOUNDARY
- LANDFILL FOOTPRINT
- 550 EXISTING 10' GROUND CONTOUR
- N 323000 STATE PLANE GRID (NAD 27)
- 420 PROPOSED 2' TOP OF LINER CONTOUR
- - - PHASE BOUNDARY
- CONSTRUCTED SUBTITLE D LINER
- ▨ PRE-SUBTITLE D AREA WITH FINAL COVER

**NOTE:**

1. EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL PHOTOGRAPHY, FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL ZONE, US FEET.
2. PROPOSED CONTOURS DEPICT TOP OF LINER GRADES.
3. ELEVATION OF DEEPEST EXCAVATION AT BOTTOM OF LEACHATE COLLECTION SUMPS IN CELLS 11-18: 377 FT-MSL.



**LINER PLAN**  
**WASTE MANAGEMENT OF TEXAS, INC.**  
**SKYLINE LANDFILL**  
**MAJOR PERMIT AMENDMENT**



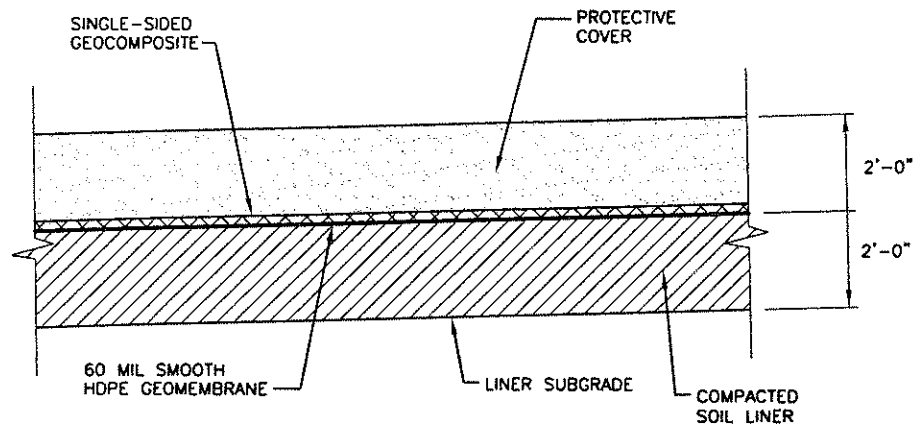
**BIGGS & MATHEWS**  
 ENVIRONMENTAL  
 CONSULTING ENGINEERS  
 MANSFIELD • WICHITA FALLS  
 817-563-1144

ISSUED FOR PERMITTING PURPOSES ONLY

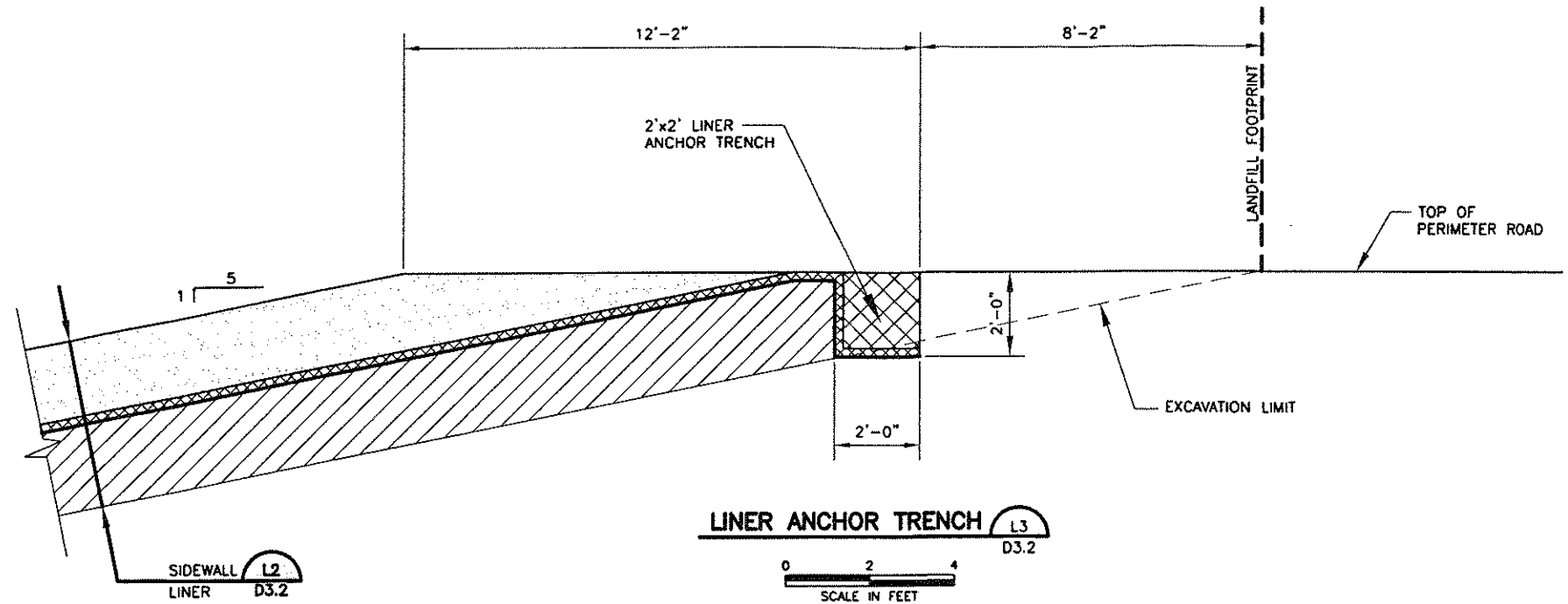
REVISIONS							TBPE FIRM NO. F-256		TBPG FIRM NO. 50222	
1	8/12	NOD NO. 1 RESPONSE	SRC	DLC	DLC	DLC	DSN. SAB	DATE :	04/12	
REV	DATE	DESCRIPTION	OWN BY	DES BY	CHK BY	APP BY	DWN. SRC	SCALE :	GRAPHIC	
							CHK. DLC	DWG :	D3.1-LinerPlan.dwg	

**DRAWING**  
**D3.1**

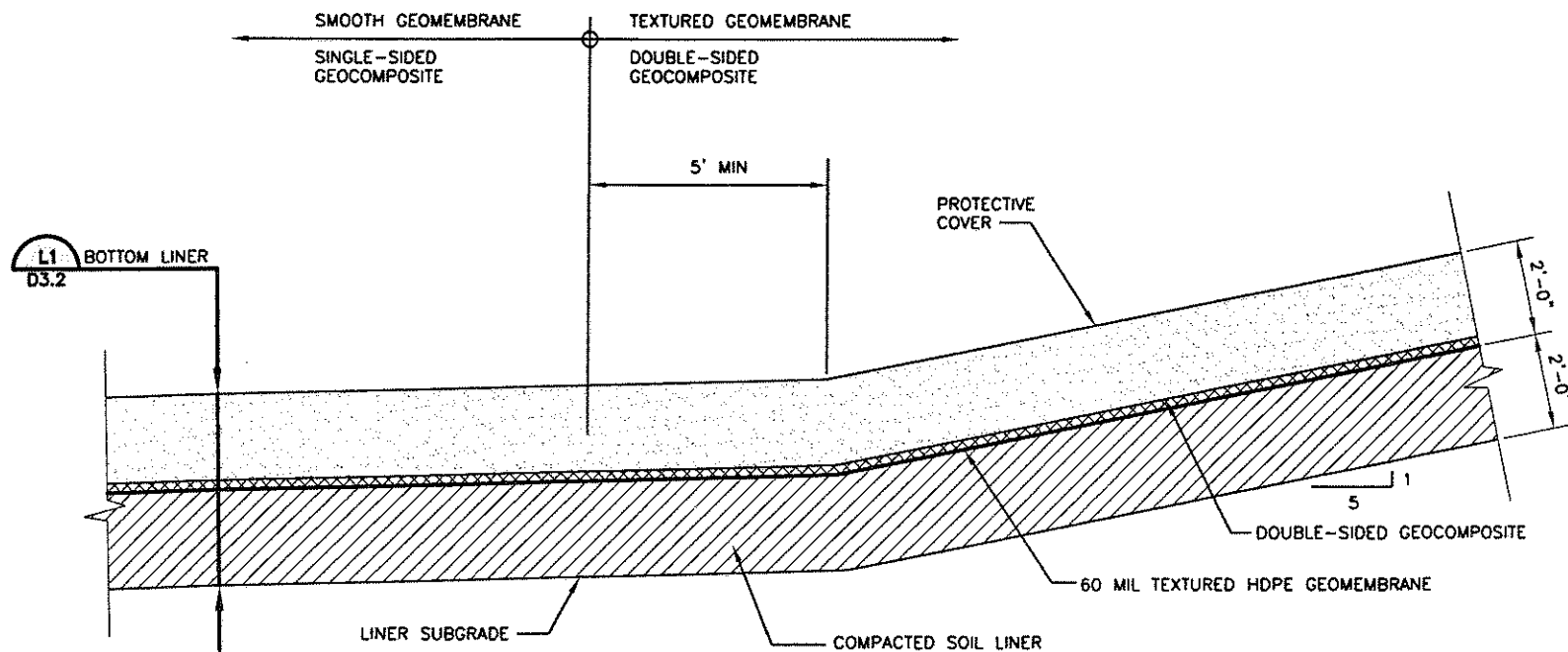
J:\101\01\120\ATT D\03.2-3-LinerDetails.dwg Layout: D3.2 User: scundiff



**BOTTOM LINER** L1  
D3.2  
0 2 4  
SCALE IN FEET

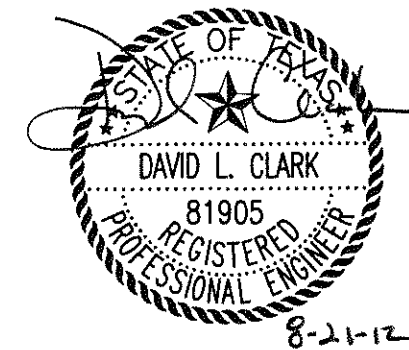


**LINER ANCHOR TRENCH** L3  
D3.2  
0 2 4  
SCALE IN FEET



**SIDEWALL LINER** L2  
D3.2  
0 2 4  
SCALE IN FEET

LINER DEVELOPMENT SURVEY		
PHASE	CELL	LINER SYSTEM
1	1-6	EXISTING SUBTITLE D
2	7-9	EXISTING SUBTITLE D
2	10	FUTURE SUBTITLE D
3	11-18	FUTURE SUBTITLE D
5	-	EXISTING SUBTITLE D
PRE-SUBTITLE D	ALL	EXISTING PRE-SUBTITLE D



**LINER DETAILS**

**WASTE MANAGEMENT OF TEXAS, INC.**  
SKYLINE LANDFILL  
MAJOR PERMIT AMENDMENT

**BIGGS & MATHEWS**  
ENVIRONMENTAL  
CONSULTING ENGINEERS  
MANSFIELD • WICHITA FALLS  
817-563-1144

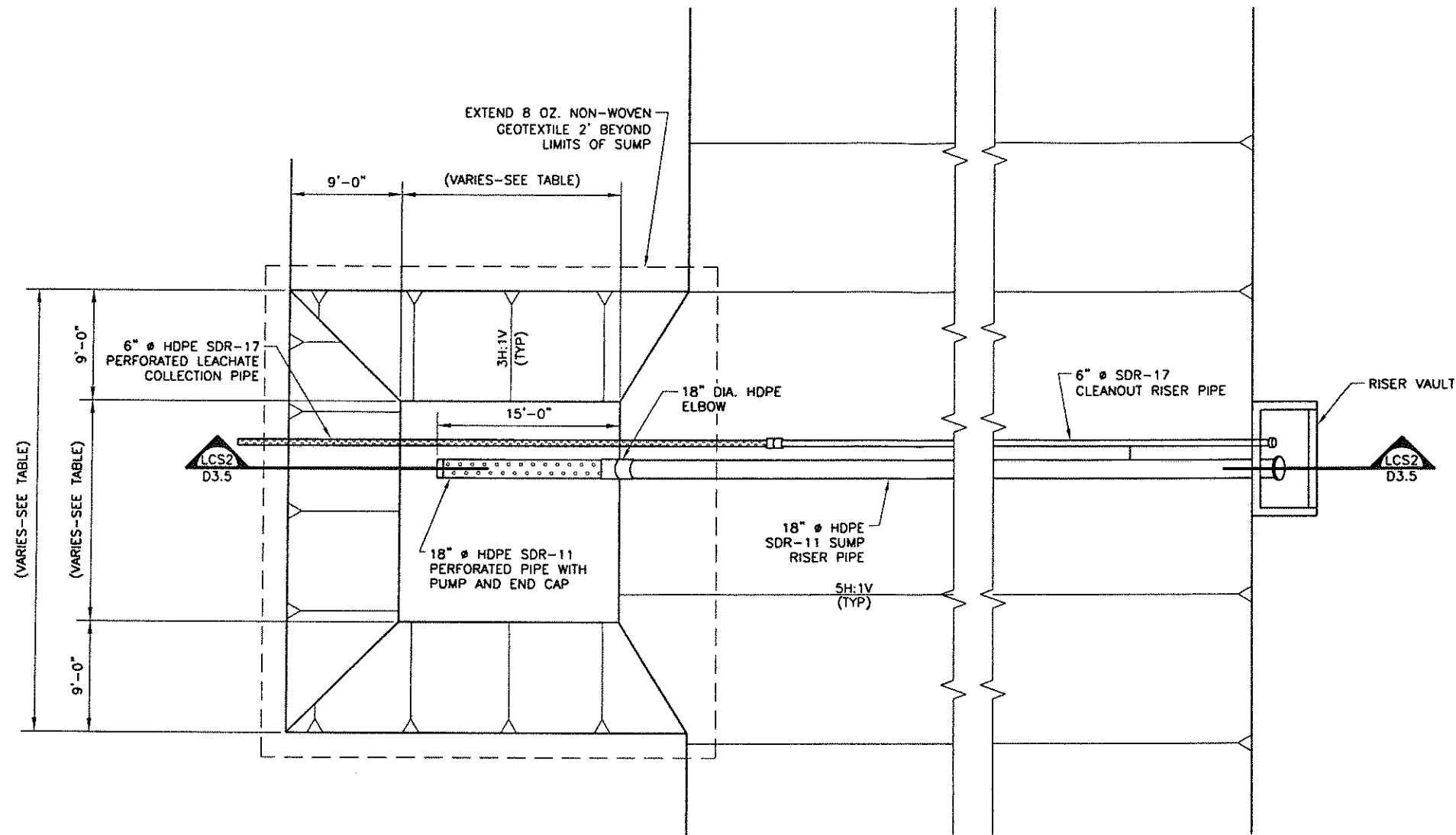
**NOTES:**

- REFER TO ATTACHMENT D7 FOR LINER INSTALLATION AND MATERIAL REQUIREMENTS.

ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS						TBPB FIRM NO. F-256		TBPB FIRM NO. 50222	
1	8/12	NOD NO. 1 RESPONSE	SRC	DLC	DLC	DSN.	SAB	DATE :	04/12
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	CHK.	DLC	SCALE : GRAPHIC
									DRAWING
									<b>D3.2</b>



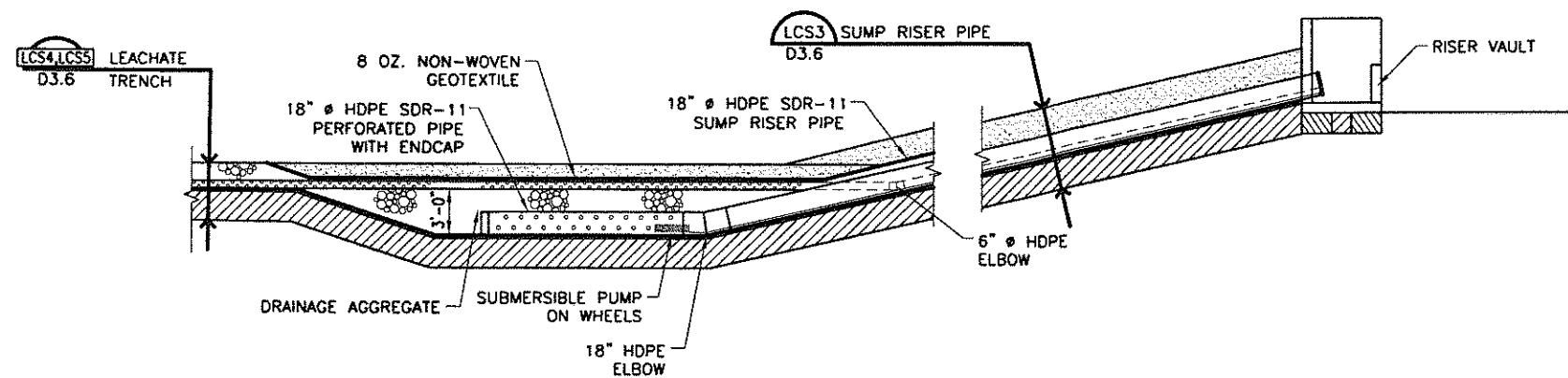


LEACHATE SUMP SIZE (SEE NOTE 3)		
CELLS	LANDFILL FLOOR (FT)	SUMP BASE (FT)
11-12, 14-18	38	20
13	58	40

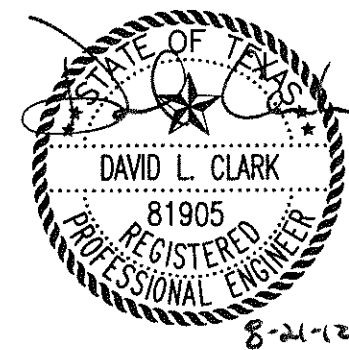
**NOTES:**

1. DRAINAGE AGGREGATE NOT SHOWN FOR CLARITY.
2. REFER TO ATTACHMENTS D6 AND D7 FOR INSTALLATION AND MATERIAL REQUIREMENTS.
3. REFER TO ATTACHMENT D6, APPENDIX D6-A FOR LEACHATE SUMP DESIGN CALCULATIONS.

**LEACHATE SUMP** LCS1  
D3.5  
0 6 12  
SCALE IN FEET



**LEACHATE SUMP AND RISER** LCS2  
D3.5  
0 6 12  
SCALE IN FEET



**LEACHATE COLLECTION SYSTEM DETAILS**  
WASTE MANAGEMENT OF TEXAS, INC.  
SKYLINE LANDFILL  
MAJOR PERMIT AMENDMENT

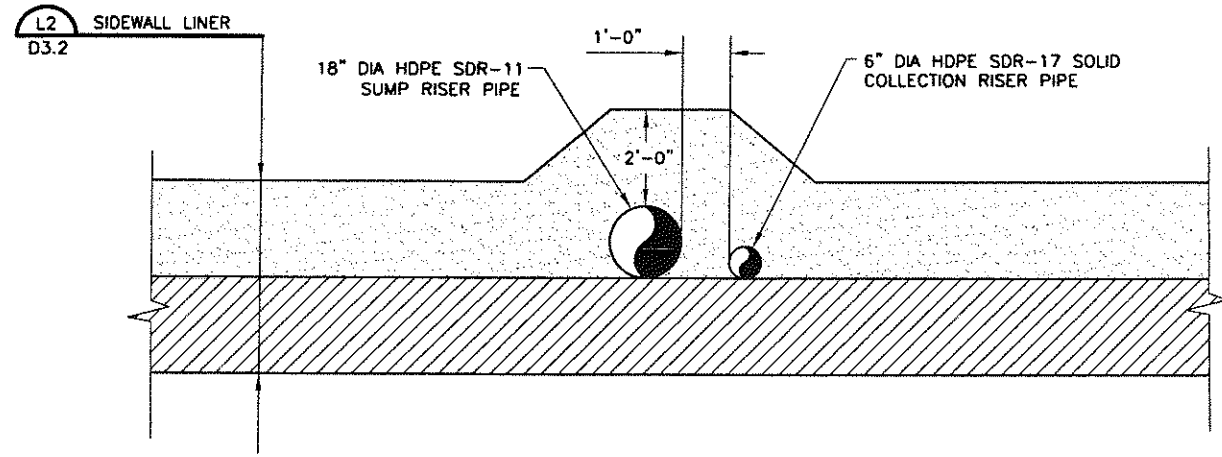


BIGGS & MATHEWS  
ENVIRONMENTAL  
CONSULTING ENGINEERS  
MANSFIELD • WICHITA FALLS  
817-563-1144

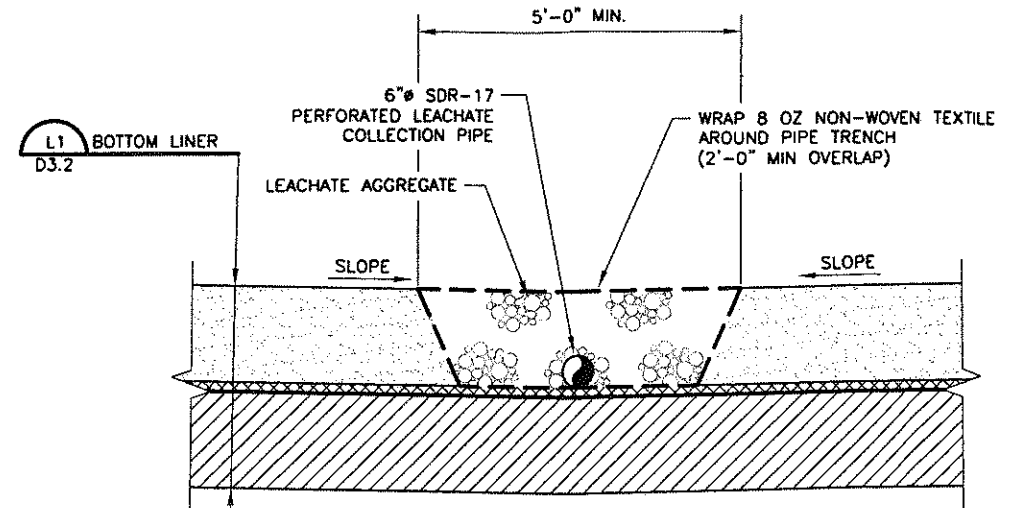
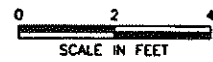
ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS						TBPB FIRM NO. F-256		TBPB FIRM NO. 50222	
1	8/12	NOD NO.1 RESPONSE	SRC	DLC	DLC	DSN.	SAB	DATE :	04/12
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	CHK.	DLC	SCALE : GRAPHIC
									DRAWING
									<b>D3.5</b>

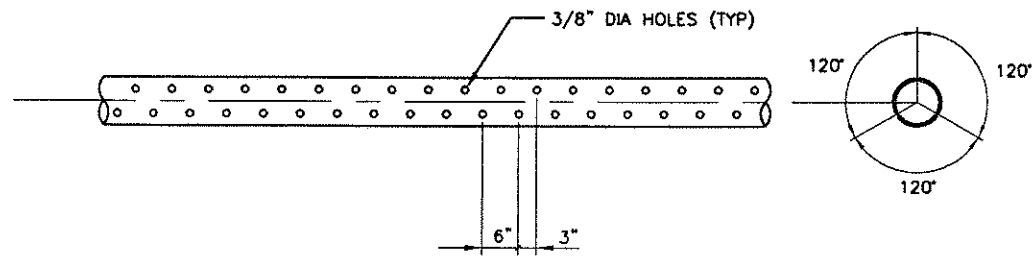
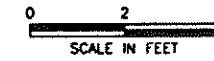
J:\101\011\120\ATT D\03.5-6-LCSDItis.dwg Layout: D3.6 User: scundiff



**SUMP RISER PIPE** LCS3  
D3.6



**LEACHATE TRENCH** LCS4  
D3.6



**PERFORATED PIPE** LCS5  
NTS D3.6

**NOTE:**

PERFORATION SCHEDULE APPLIES TO BOTH 6" LEACHATE COLLECTION PIPE AND 18" SUMP PIPE.

**NOTES:**

- REFER TO ATTACHMENTS D6 AND D7 FOR INSTALLATION AND MATERIAL REQUIREMENTS.



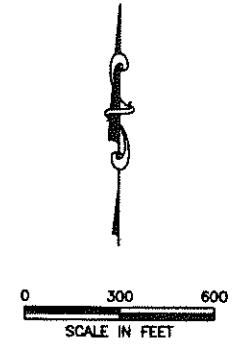
ISSUED FOR PERMITTING PURPOSES ONLY

<b>LEACHATE COLLECTION SYSTEM DETAILS</b>	
<b>WASTE MANAGEMENT OF TEXAS, INC.</b> SKYLINE LANDFILL MAJOR PERMIT AMENDMENT	
	BIGGS & MATHEWS ENVIRONMENTAL CONSULTING ENGINEERS MANSFIELD • WICHITA FALLS 817-563-1144

REVISIONS						TBPGE FIRM NO. F-256		TBPGE FIRM NO. 50222	
1	8/12	NOD NO. 1 RESPONSE	SRC	DLC	DLC	DSN.	SAB	DATE :	04/12
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	CHK.	DLC	DWG : D3.5-6-LCSDItis.dwg

DRAWING  
**D3.6**

J:\101\01\120\ATT D\03.7-DewaterPlan.dwg Layout: Layout 1 User: scundiff



- LEGEND**
- PERMIT BOUNDARY
  - LANDFILL FOOTPRINT
  - 550--- EXISTING 10' GROUND CONTOUR
  - N 323000 STATE PLANE GRID (NAD 27)
  - 420--- PROPOSED 2' EXCAVATION CONTOUR
  - CELL BOUNDARY
  - ⑩ CELL DESIGNATION
  - LINED AREA
  - ▨ TEMPORARY DEWATERING ZONE
  - ▩ PRE-SUBTITLE D AREA WITH FINAL COVER

- NOTE:**
1. EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL PHOTOGRAPHY. FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL ZONE, US FEET.
  2. PROPOSED CONTOURS DEPICT LINER SUBGRADE (EXCAVATION) GRADES.
  3. SIDEWALL DRAIN LOCATIONS ARE APPROXIMATE. ACTUAL LOCATION TO BE DETERMINED BASED ON STRATUM II MATERIALS AS IDENTIFIED IN THE FIELD.



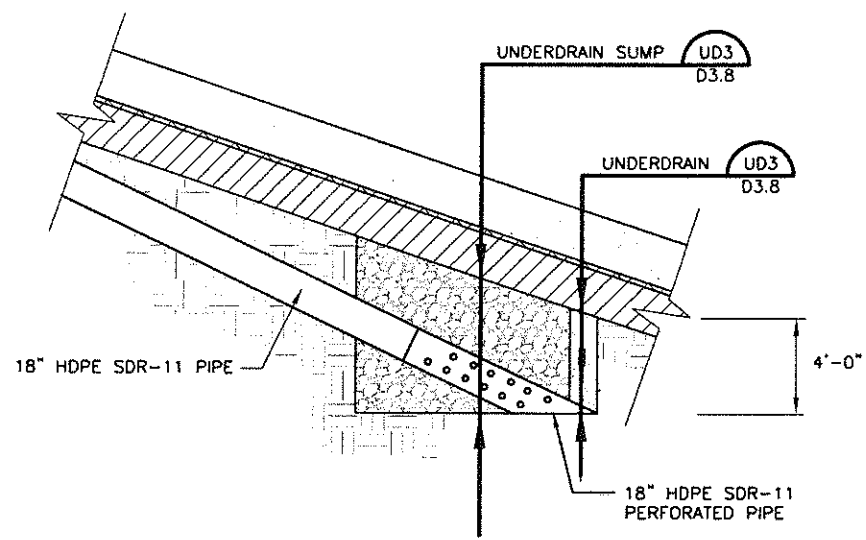
**TEMPORARY DEWATERING PLAN**  
**WASTE MANAGEMENT OF TEXAS, INC.**  
**SKYLINE LANDFILL**  
**MAJOR PERMIT AMENDMENT**


**BIGGS & MATHEWS**  
 ENVIRONMENTAL  
 CONSULTING ENGINEERS  
 MANFIELD • WICHITA FALLS  
 817-563-1144

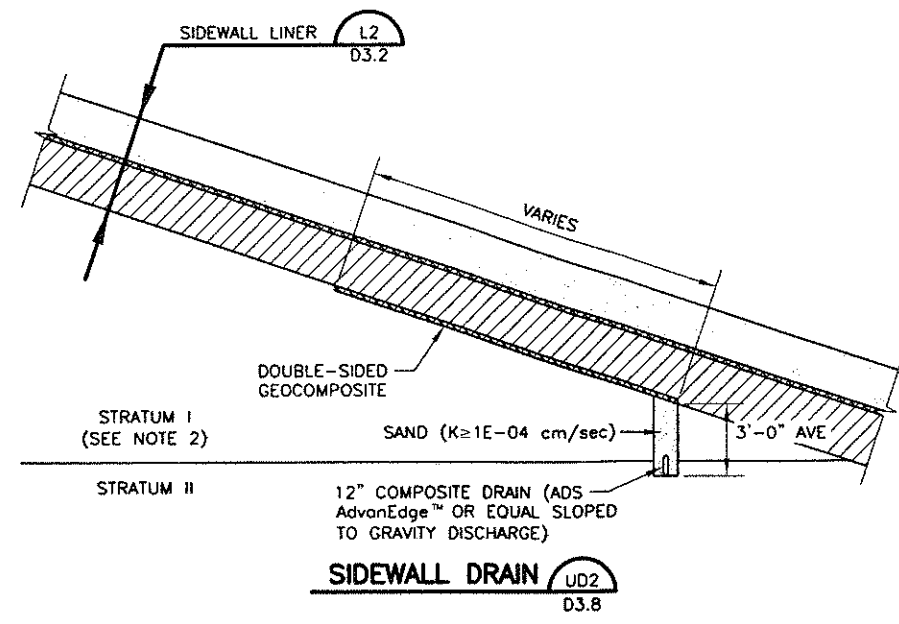
ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS						TBPE FIRM NO. F-256		TBPG FIRM NO. 50222	
1	8/12	NOD NO. 1 RESPONSE	SRC	DLC	DLC	DSN.	SAB	DATE :	04/12
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	CHK.	SCALE :	GRAPHIC
								DWG :	D3.7-DewaterPlan.dwg

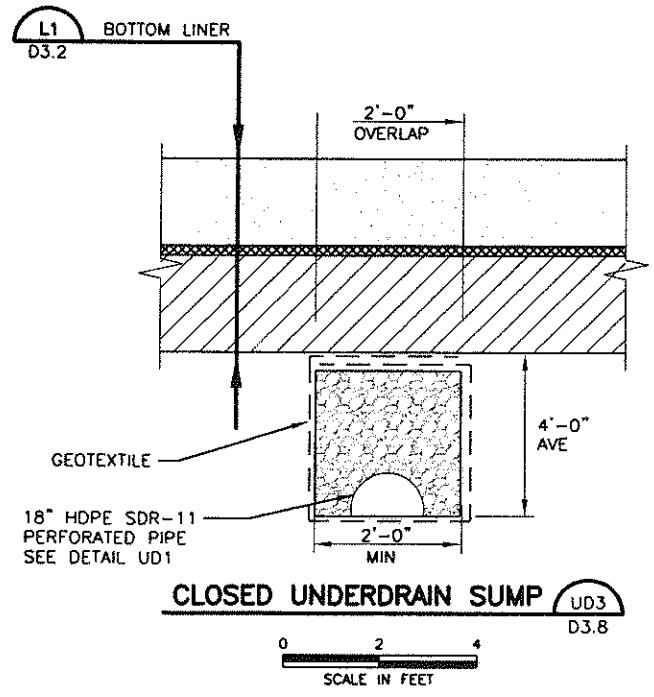
DRAWING  
**D3.7**



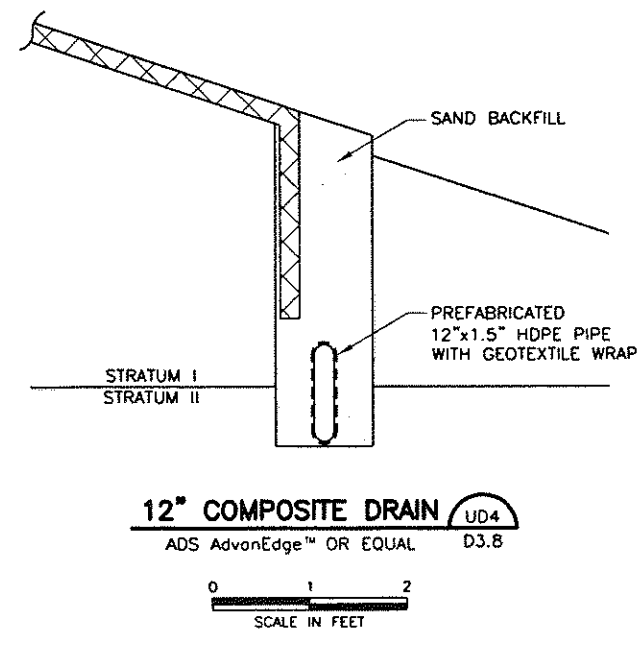
**CLOSED UNDERDRAIN SUMP AND RISER** (UD1, D3.8)  
 (SEE NOTE 3)  
 SCALE IN FEET



**SIDEWALL DRAIN** (UD2, D3.8)  
 SCALE IN FEET



**CLOSED UNDERDRAIN SUMP** (UD3, D3.8)  
 SCALE IN FEET



**12" COMPOSITE DRAIN** (UD4, D3.8)  
 ADS AdvanEdge™ OR EQUAL  
 SCALE IN FEET


- NOTES:**
- REFER TO ATTACHMENT D7 FOR INSTALLATION AND MATERIAL REQUIREMENTS.
  - SIDEWALL DRAIN LOCATION TO BE DETERMINED IN THE FIELD USING LINER CONSTRUCTION ACTIVITIES BASED ON IDENTIFICATION OF STRATUM I AND II MATERIALS THROUGH OBSERVATION OF MATERIAL TYPE, STRUCTURE, COLOR, MOISTURE CONTENT, AND OTHER CHANGES IN MATERIAL CHARACTERISTICS..
  - AN UNDERDRAIN SUMP WILL ONLY BE REQUIRED WHEN SIDEWALL DRAIN CANNOT BE GRAVITY DRAINED TO AN ADJACENT OPEN EXCAVATION.
  - ADS AdvanEdge™ IS A PREFABRICATED HDPE OVAL PIPE WITH GEOTEXTILE FABRIC THAT SUBSTITUTES FOR A PERFORATED PIPE/AGGREGATE/GEOTEXTILE WRAP.



ISSUED FOR PERMITTING PURPOSES

**UNDERDRAIN DETAILS**

**WASTE MANAGEMENT OF TEXAS, INC.**  
**SKYLINE LANDFILL**  
**MAJOR PERMIT AMENDMENT**

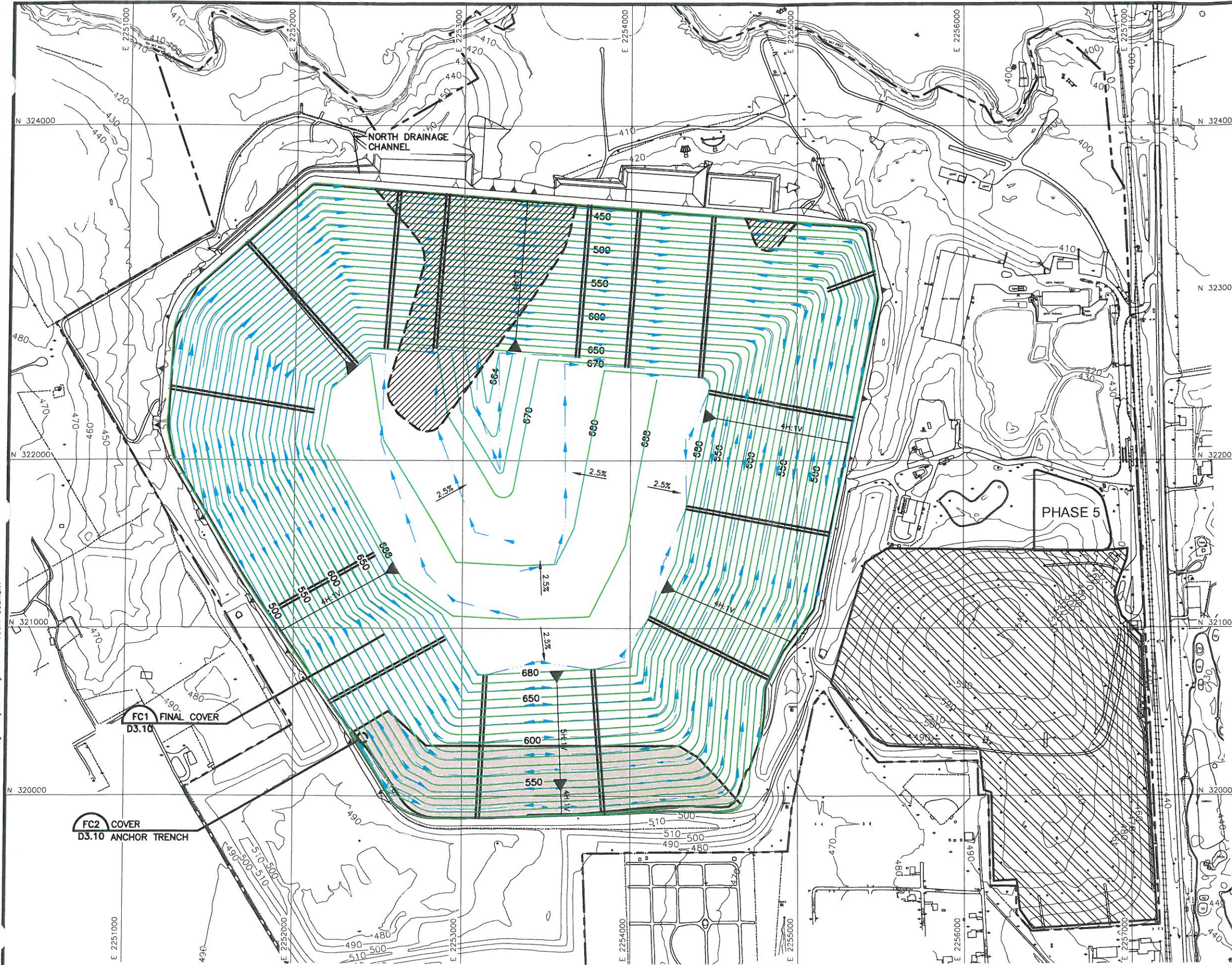


**BIGGS & MATHEWS**  
 ENVIRONMENTAL  
 CONSULTING ENGINEERS  
 MANSFIELD • WICHITA FALLS  
 817-563-1144

REVISIONS							TBPE FIRM NO. F-256	TBPC FIRM NO. 50222
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	DSN. SAB	DATE : 04/12
							DWN. SRC	SCALE : GRAPHIC
							CHK. DLC	DWG : D3.8-UnderdrainDIts.dwg

**DRAWING**  
**D3.8**

J:\101\01\120\ATT D\3.8-UnderdrainDIts.dwg Layout: Layout1 User: scundiff



- LEGEND**
- PERMIT BOUNDARY
  - LANDFILL FOOTPRINT
  - 500 EXISTING 10' GROUND CONTOUR
  - N 323000 STATE PLANE GRID (NAD 27)
  - 650 PROPOSED 10' FINAL CONTOUR
  - PROPOSED DRAINAGE SWALE
  - AREAS WITH CONSTRUCTED ALTERNATE FINAL COVER
  - ▨ PRE-SUBTITLE D AREA WITH FINAL COVER
  - ▨ AREAS TO BE COVERED WITH SUBTITLE D FINAL COVER

- NOTES:**
1. EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL SURVEY FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL.
  2. PROPOSED CONTOURS DEPICT TOP OF FINAL COVER.
  3. MAXIMUM FINAL COVER ELEVATION: 688 FT-MSL  
MAXIMUM WASTE FILL ELEVATION: 683.5 FT-MSL



**FINAL COVER PLAN**

**WASTE MANAGEMENT OF TEXAS, INC.**  
**SKYLINE LANDFILL**  
**MAJOR PERMIT AMENDMENT**

BIGGS & MATHEWS  
 ENVIRONMENTAL  
 CONSULTING ENGINEERS  
 MANSFIELD • WICHITA FALLS  
 817-563-1144

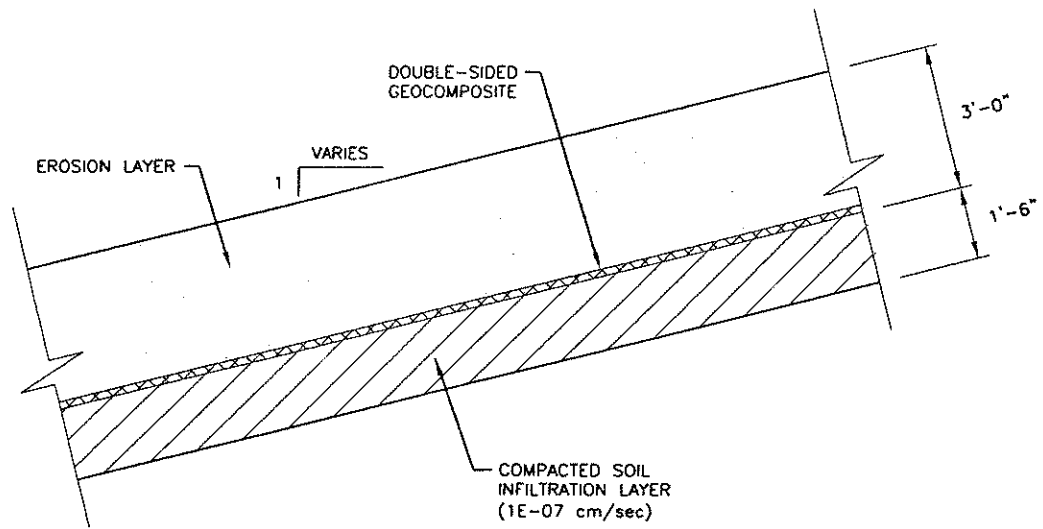
ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS						TBPG FIRM NO. F-256		TBPG FIRM NO. 50222	
1	8/12	NOD NO. 1 RESPONSE	SRC	DLC	DLC	DSN.	SAB	DATE :	04/12
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	CHK.	SCALE :	GRAPHIC
								DWG :	D3.9-FCPlan.dwg

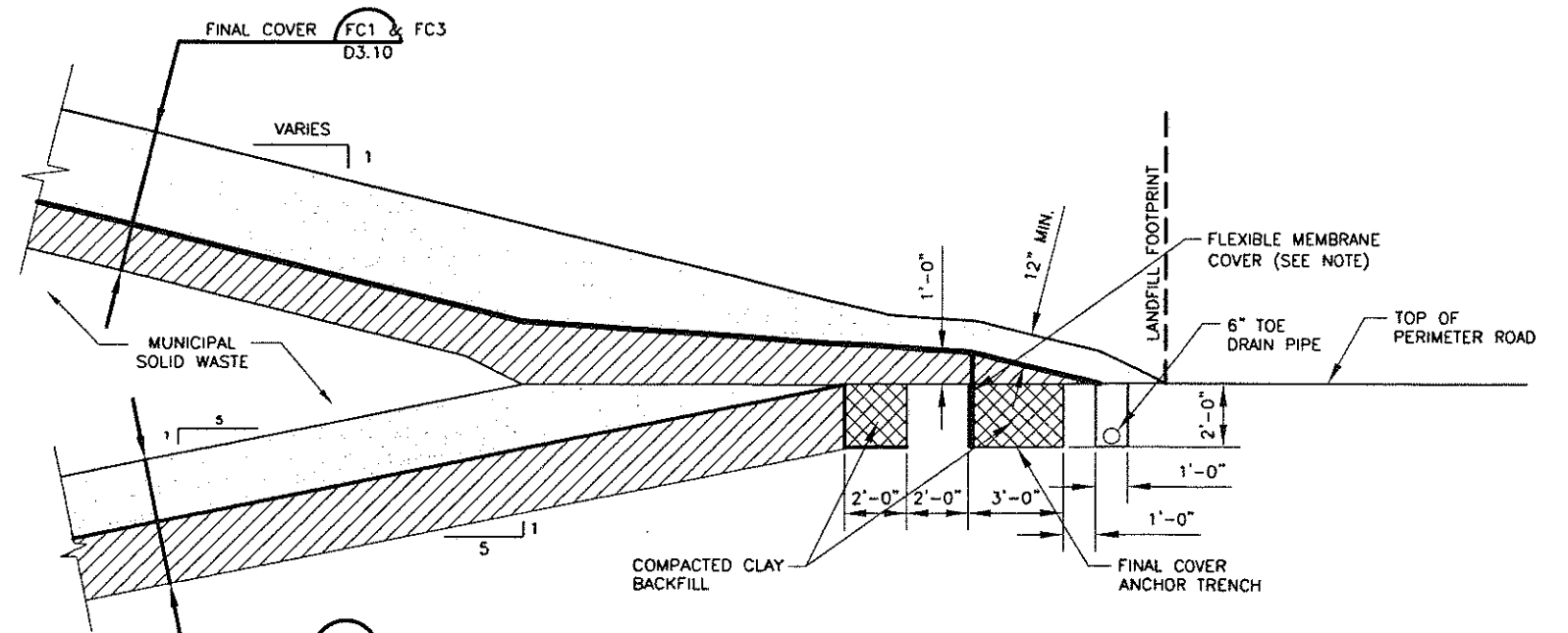
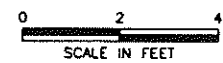
**DRAWING**  
**D3.9**

J:\101\01\120\ATT D\3.9-FCPlan.dwg Layout: Layout 1 User: scundiff

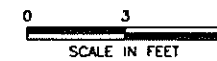
J:\101\01\120\ATT 0\03.10-FCDetails.dwg Layout: D3.10 User: scundiff



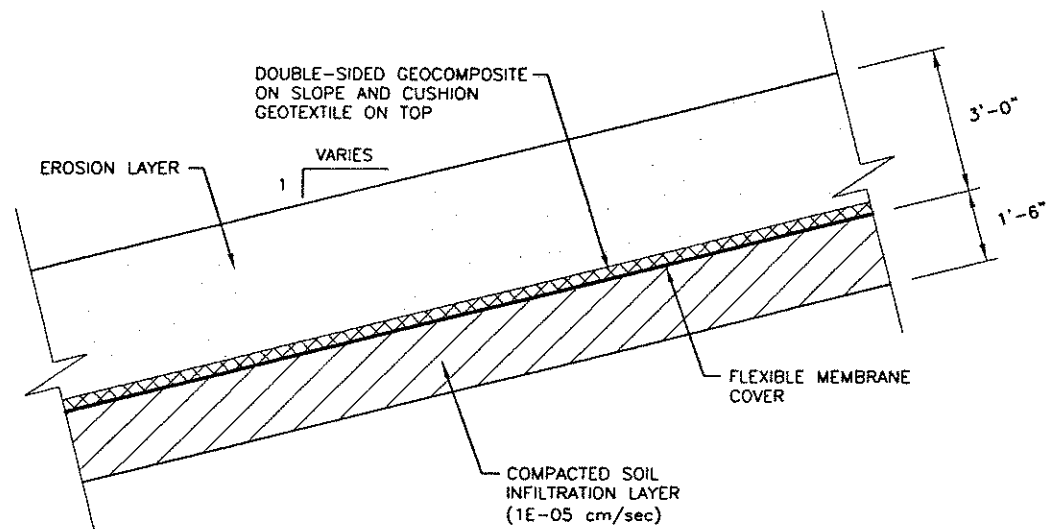
ALTERNATE FINAL COVER **FC1**  
D3.10



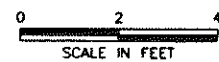
COVER ANCHOR TRENCH **FC2**  
D3.10



NOTE: FOR SUBTITLE D FINAL COVER, FLEXIBLE MEMBRANE COVER TO BE TERMINATED IN BOTTOM OF FINAL COVER ANCHOR TRENCH.



SUBTITLE D FINAL COVER **FC3**  
D3.10



FINAL COVER DETAILS

WASTE MANAGEMENT OF TEXAS, INC.  
SKYLINE LANDFILL  
MAJOR PERMIT AMENDMENT



BIGGS & MATHEWS  
ENVIRONMENTAL  
CONSULTING ENGINEERS  
MANSFIELD • WICHITA FALLS  
817-563-1144

ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS							TBPE FIRM NO. F-256		TBPG FIRM NO. 50222	
1	8/12	NOD NO. 1 RESPONSE	SRC	DLC	DLC	DLC	DSN. SAB	DATE :	04/12	DRAWING
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	CHK. DLC	SCALE :	GRAPHIC	D3.10
							DWG :	D3.10-FCDetails.dwg		