

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

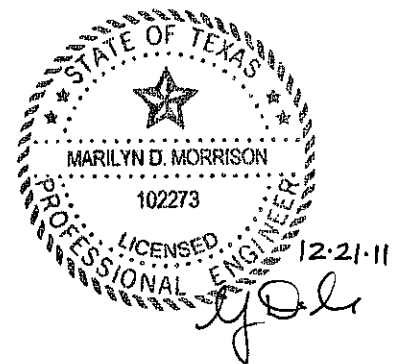
**PERMIT MODIFICATION**

**ABOVE GRADE CLASS 1 WASTE  
DISPOSAL OPTIONS**

Prepared for

BFI Waste Systems of North America, LLC

December 2011



Prepared by

**Weaver Boos Consultants, LLC-Southwest**  
TBPE Registration No. F-3727  
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817-735-9770

WBC Project No. 0120-109-11-54-01

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December 22, 2011  
Project No. 0120-109-11-54-01

Christine M. Bergren  
MC 124  
Municipal Solid Waste Permits Section  
Texas Commission on Environmental Quality  
P. O. Box 13087  
Austin, Texas 78711-3087

Re: Permit Modification – Above Grade Class 1 Waste Disposal Options  
Tessman Road Landfill – Permit No. MSW-1410C  
Bexar County, Texas

Dear Ms. Bergren:

The purpose of this permit modification, submitted on behalf of BFI Waste Systems of North America, LLC, is to provide the Tessman Road Landfill with an additional Class 1 nonhazardous industrial solid waste (Class 1 waste) disposal option. The Tessman Road Landfill is currently permitted to accept Class 1 waste. This modification will allow the site to fill Class 1 waste above grade, consistent with Title 30 Texas Administrative Code (TAC) §330.179(b). A detailed discussion of the proposed Site Development Plan revisions is provided in the attached permit modification. It is requested that this permit modification be processed per TAC §305.70(l). A detailed permit modification justification is included in the permit modification narrative.

It is our understanding that this permit modification will require notice in accordance with Title 30 TAC §305.70(k). The adjacent landowners list and map are provided in Appendix C of this permit modification. Address labels are formatted, as required, in TCEQ standard label format.

One original and one copy are provided for your use and distribution. Consistent with Title 30 TAC §305.70(f), a copy of this submittal was sent to the TCEQ regional office. A copy of this submittal was placed in the site operating record for this facility.

Additionally, the Part I form which includes the applicant's signature page (page 10) is included in Appendix D of the permit modification. In accordance with Title 30 TAC §330.59(h)(1), a \$150 application fee has been submitted to the TCEQ, as documented on page 8 of the Part I form.

Christine M. Bergren  
December 22, 2011  
Page 2

During the course of your review, if you need additional information or have any questions, please call.

Sincerely,  
**Weaver Boos Consultants, LLC–Southwest**



Marilyn D. Morrison, P.E.  
Project Manager

Attachments: Permit Modification (1 original and 1 copy)

cc: TCEQ Region 13 Office  
Frank Franko, BFI Waste Systems of North America, LLC  
Mitchell Patterson, BFI Waste Systems of North America, LLC  
Michael Stewart, BFI Waste Systems of North America, LLC

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### **APPENDIX A**

SDP Replacement Pages (Redline/Strikeout Copy)

### **APPENDIX B**

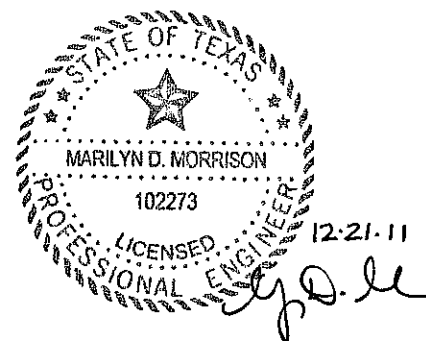
SDP Replacement Pages (Clean Copy)

### **APPENDIX C**

Adjacent Property Owners List and Map

### **APPENDIX D**

TCEQ Permit Application Part I Form



## PERMIT MODIFICATION NARRATIVE

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### Introduction

The purpose of this permit modification is to provide the Tessman Road Landfill with three Class 1 nonhazardous industrial solid waste (Class 1 waste) disposal area fill options. The facility is currently permitted to accept and place Class 1 waste in designated below grade cells in accordance with the previous TCEQ regulations which limited the disposal of the Class 1 waste to below grade areas. The previous TCEQ regulations were replaced with updated regulations that were effective in March 2006. The currently approved "below-grade" option will remain in the Site Development Plan (SDP). However, this modification includes changes to the Site Development Plan to allow MSW, Class 2 and 3 industrial waste, and other approved wastes to be comingled within the below grade fill area. In addition, the configuration of the 4-foot thick barrier layer has been updated to extend horizontally to the limits of the Class 1 waste disposal area.

Figure 1 shows an existing site plan that indicates the current and future Class 1 waste disposal areas. As shown, about 9.5 acres of Class 1 disposal area have been constructed to date.

The three proposed configurations of the Class 1 waste disposal are shown on Figure 2 and summarized below.

- Option 1 – Below Grade Class 1 Disposal Area with 4-foot-thick Separation Layer. This option limits the Class 1 waste disposal area to below existing grade. A 4-foot-thick compacted clay-rich barrier soil layer will be placed over the Class 1 waste as a separation layer between the Class 1 waste and the municipal solid waste (and other non-Class 1 waste material) to be placed above.
- Option 2 – Above Grade Class 1 Disposal Area with 4-foot-thick Separation Layer. As shown on Figure 2, this option is similar to Option 1, except this option allows for the disposal of Class 1 wastes above existing grade if containment dikes are constructed along the exterior slope of the Class 1 disposal area. This option also includes the placement of a 4-foot-thick compacted clay-rich barrier layer that will be placed over the Class 1 waste as a separation layer between the Class 1 waste and the municipal solid waste (and other non-Class 1 waste material) to be placed above. With this option, the 4-foot-thick separation or barrier layer will be sloped toward the interior of the landfill. As noted on Figure 2, the thickness of the composite final cover system's infiltration layer, for the area below the separation layer, will be increased from 1.5 feet to 4.0 feet with a maximum hydraulic conductivity of  $1 \times 10^{-7}$  cm/sec.

- Option 3 – Above Grade Class 1 Disposal Area. This option includes the construction of containment dikes along the exterior sideslope of the Class 1 areas to extend the limits of the Class 1 waste disposal area. No separation layer is required for this option; however, the thickness of the composite final cover system's infiltration layer will be increased from 1.5 feet to 4.0 feet with a maximum hydraulic conductivity of  $1 \times 10^{-7}$  cm/sec.

The following sections detail the proposed above-grade Class 1 fill disposal options, Site Development Plan replacement page summary, and permit modification justification.

## **Proposed Additional Class 1 Waste Disposal Option**

The additional Class 1 waste disposal options involve the disposal of Class 1 waste above existing grade and adjacent to containment dikes that will be constructed along the external slopes. The above-grade Class 1 disposal area options are highlighted on Figure 2.

As shown on Figure 2, Class 1 waste will be mixed with other wastes accepted at the facility in areas which have a liner system constructed in accordance with Title 30 TAC §330.331(e). This includes Phases IV through VII. Containment dikes will be constructed along the exterior above-grade slopes to the maximum above-grade elevation of Class 1 waste disposal.

In accordance with 30 TAC §335.590(24)(F)(i), the containment dikes are designed to:

- prevent washout, release, or exposure of waste;
- be physically stable against slope failure, with a minimum safety factor of 1.5;
- prevent washout from hydrostatic and hydrodynamic forces from storms and floods;
- prevent storm water run-on from reaching the waste;
- prevent the release of leachate; and
- minimize long term maintenance.

The containment dikes:

- will be constructed along exterior slopes as part of site operations from clay rich soils;
- will be approximately 10-foot high with a minimum crest width of 17 feet (equivalent to 4 feet of cover perpendicular to the fill slope);
- will be located over the lined area at the perimeter of the waste footprint; and
- will be certified by a Texas licensed Professional Engineer after construction.

As shown on Figure 3, Class 1 waste will only be placed after a containment dike has been constructed. In addition, each lift of waste will be placed below the elevation of each containment dike and will slope toward the interior of the landfill.

As indicated in the slope stability analysis, included in the Appendix III-F, the proposed placement of Class 1 waste is acceptable with respect to slope stability with a factor of safety of at least 1.5 in accordance with Title 30 TAC §335.590(24)(F)(i)(II). The stability analysis includes an analysis of the individual containment dike as well as analysis of the entire sideslope, which includes the containment dikes located along the bottom of the final cover. A dike certification, prepared in accordance with Title 30 TAC §335.590(24)(F)(vi), will be included as part of the site operating record following the procedure specified in Appendix III-F. The final cover system will be constructed over the containment dike once the final waste elevations have been achieved, as shown on Figure 2.

In addition to the above, the following three related items have also been incorporated into the SDP and Site Operating Plan (SOP).

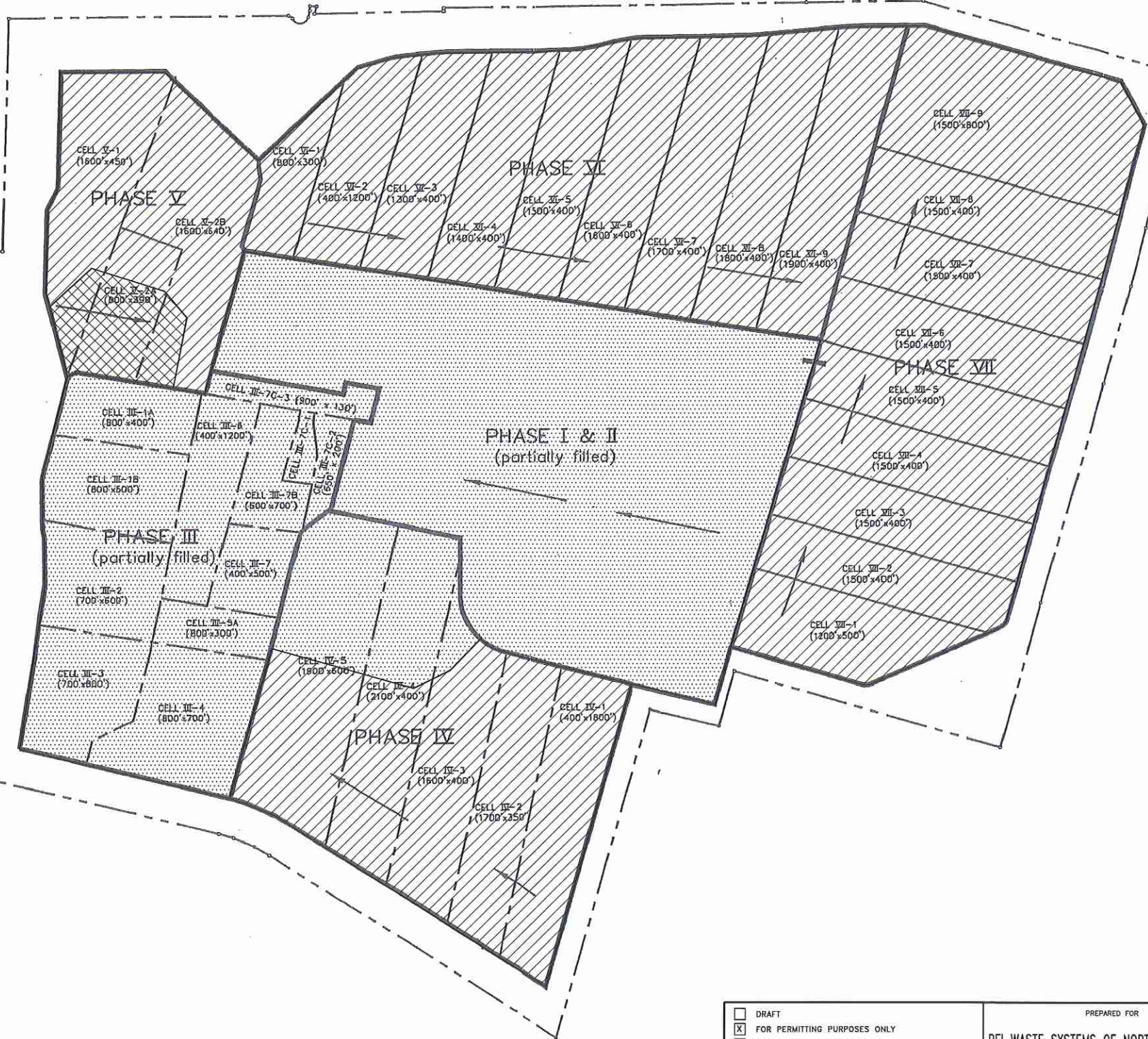
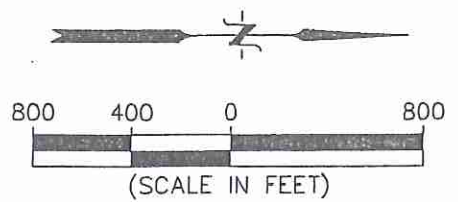
- Procedures have been added to the SOP (Section 7.2) to allow the option to combine the Class 1 and MSW working faces.
- Attachment 15 and the SOP have been modified to update the leachate recirculation plan consistent with §330.177, which allows leachate from either a Class 1 disposal area or an MSW disposal area to be recirculated within a landfill unit that has a leachate collection system and composite liner.

## **SDP Replacement Pages**

Consistent with Title 30 TAC §305.70(e)(3), applicable drawings and text within the currently permitted SDP that are affected by the changes in this modification are included in Appendix A (redline/strikeout version) and Appendix B (clean version). The summary table included in Appendix A notes the list of replacement pages.

## **Permit Modification Justification**

It is requested that this permit modification be processed per Title 30 TAC §305.70(l) since this type of permit modification is not specifically identified in Title 30 TAC §305.70. The additional Class 1 disposal option has been developed consistent with Title 30 TAC §305.70(l), given that the proposed changes meet the provisions of Title 30 TAC §305.70(d) and (e). Additionally, the proposed Class 1 waste disposal option meets the requirements of Title 30 TAC §330.179(b) and §335.590(F)(24)(i) and (vii). This modification requires notice in accordance with Title 30 TAC §305.70(k). A Property Owners Map and list have been included in Appendix C.



**LEGEND**

- PHASE BOUNDARY
- PERMIT BOUNDARY
- PROPERTY LINE
- (1100'x500') CELL DIMENSION SEQUENCE OF FILL
- EXISTING CONSTRUCTED MSW AREA
- FUTURE MSW OR CLASS 1 DISPOSAL AREA (SEE NOTE 1)
- EXISTING CONSTRUCTED CLASS 1 DISPOSAL AREA (SEE NOTE 1)

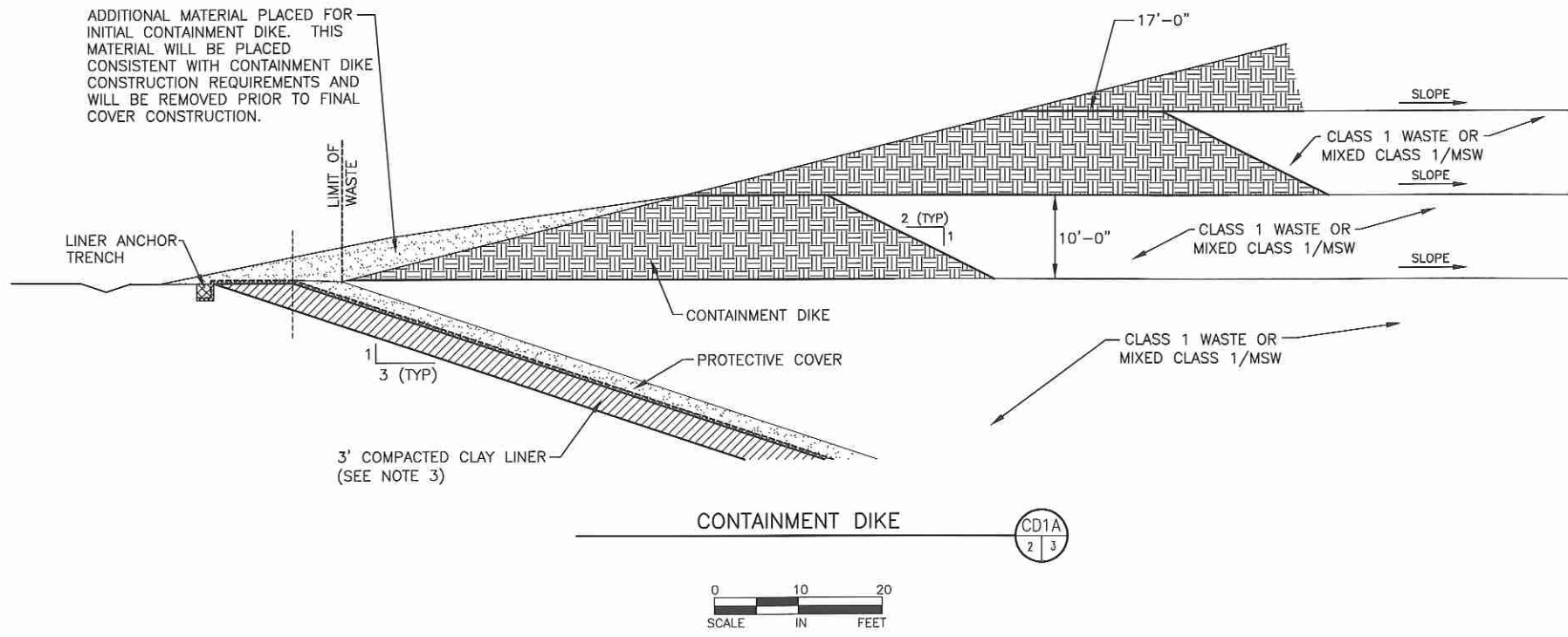
**NOTE:**  
 1. ABOVE GRADE CLASS 1 WASTE DISPOSAL MAY OCCUR IN THE EXISTING CONSTRUCTED CLASS 1 DISPOSAL AREA AND IN THE UNDEVELOPED AREAS OF PHASE IV, V, VI, AND VII IF A LINER SYSTEM IS CONSTRUCTED IN COMPLIANCE WITH 30 TAC §330.331(e).

<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY: _____		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>PERMIT MODIFICATION          GENERAL SEQUENCE OF FILL          AND CELL LAYOUT</b> TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS <i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727																		
DATE: 12/2011 FILE: 0120-109-11 CAD: 1-SEQ. OF FILLDWG		DRAWN BY: VRS DESIGN BY: MDM REVIEWED BY: JPY																				
REUSE OF DOCUMENTS <small>THIS DOCUMENT, AND THE DESIGN INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF WEAVER BOOS CONSULTANTS, LLC - SOUTHWEST AND IS NOT TO BE USED IN WHOLE OR IN PART, WITHOUT THE WRITTEN AUTHORIZATION OF WEAVER BOOS CONSULTANTS, LLC - SOUTHWEST.</small>		REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>		NO.	DATE	DESCRIPTION										CHICAGO, IL NAPERVILLE, IL COLUMBUS, OH DENVER, CO		FORT WORTH, TX EVANSVILLE, IN RIVERSIDE, MO		GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARMONT, FL		<b>FIGURE 1</b>
NO.	DATE	DESCRIPTION																				

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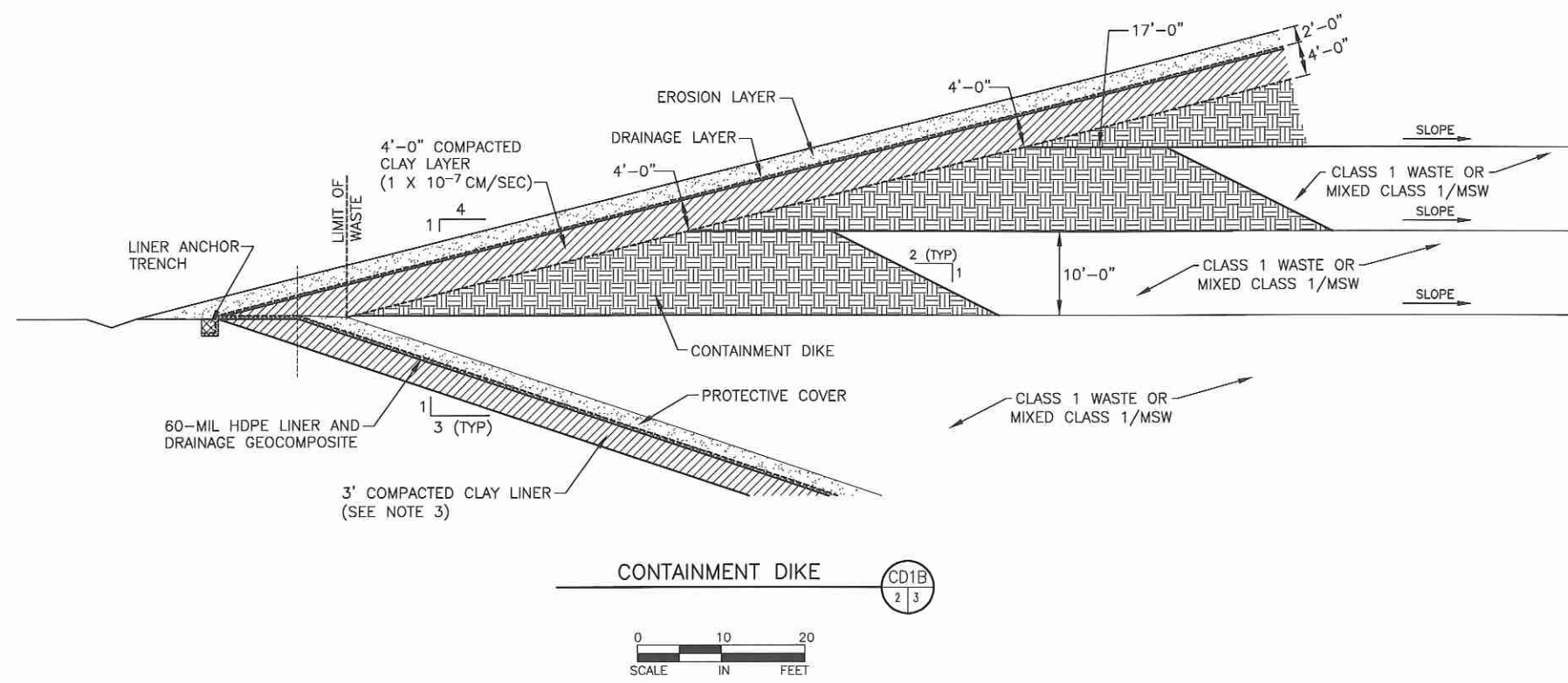


ADDITIONAL MATERIAL PLACED FOR INITIAL CONTAINMENT DIKE. THIS MATERIAL WILL BE PLACED CONSISTENT WITH CONTAINMENT DIKE CONSTRUCTION REQUIREMENTS AND WILL BE REMOVED PRIOR TO FINAL COVER CONSTRUCTION.



**CONTAINMENT DIKE CONSTRUCTION REQUIREMENTS**

- (REFER TO APPENDIX III-F OF THE SITE DEVELOPMENT PLAN)
- DIKES WILL BE CONSTRUCTED OF CLAY-RICH SOILS UNDER THE DIRECTION OF THE LANDFILL MANAGER OR HIS DESIGNEE.
  - SOILS WILL BE PLACED IN MAXIMUM 9-INCH THICK LIFTS AND COMPACTED WITH A MINIMUM OF FOUR PASSES WITH A DOZER OR SIMILAR EQUIPMENT.
  - UPON COMPLETION OF EACH DIKE, A THIRD PARTY INDEPENDENT PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN TEXAS WILL CERTIFY THE INSTALLED DIKE IN ACCORDANCE WITH TITLE 30 TAC §335.590(24)(F)(vi) AND THE REQUIREMENTS INCLUDED IN APPENDIX III-F OF THE SDP PRIOR TO PLACEMENT OF WASTE. THE LICENSED ENGINEER WILL UTILIZE THE CURRENT VERSION OF THE STANDARD FORM INCLUDED IN §335.590(24)(F)(vi) FOR THE CERTIFICATION OF THE DIKE. THE CERTIFICATION PREPARED AND SIGNED BY THE ENGINEER WILL BE PLACED IN THE SITE OPERATING RECORD.



- NOTES:**
1. CLASS 1 WASTE WILL BE DISPOSED OF ABOVE COMPACTED PERIMETER BERM GRADES WHEN CONTAINMENT DIKES ARE CONSTRUCTED. REFER TO APPENDIX III-F FOR MORE INFORMATION.
  2. CONTAINMENT DIKES WILL BE CONSTRUCTED IN AREAS WHERE THE DISPOSAL OF CLASS 1 WASTE WILL OCCUR ABOVE GRADE. THE CONTAINMENT DIKES WILL EXTEND ALONG THE BOTTOM OF FINAL COVER TO THE FINAL ELEVATION OF WASTE DISPOSAL.
  3. ALL AREAS WHICH RECEIVE CLASS 1 WASTE WILL HAVE A LINER SYSTEM CONSTRUCTED IN COMPLIANCE WITH 30 TAC §330.331(e).
  4. REFER TO APPENDIX III-F FOR INFORMATION REGARDING THE CONSTRUCTION OF CONTAINMENT DIKES.
  5. EACH CONTAINMENT DIKE OPTION IS ONLY APPLICABLE FOR
    - (1) THOSE AREAS CONSTRUCTED IN ACCORDANCE WITH §330.331(e) AND
    - (2) THE ALLOWABLE ABOVE GRADE CLASS 1 DISPOSAL AREAS SHOWN ON FIGURE 1.

<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY: _____	PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>	<b>PERMIT MODIFICATION</b> <b>CLASS 1 WASTE</b> <b>CONTAINMENT DIKE DETAIL</b> TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS <i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727											
	DATE: 12/2011 FILE: 0120-109-11 CAD: FIGURE 5.DWG.		REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	NO.	DATE	DESCRIPTION							
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		FORT WORTH, TX EVANSVILLE, IN RIVERSIDE, MO											
		GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARMONT, FL											
		<b>FIGURE 3</b>											

O:\0120\109\CLASS 1 WASTE.MXD\FIGURE 5.dwg, 12/7/2011 1:16:52 PM, r.sellers

**APPENDIX A**  
**SDP REPLACEMENT PAGES**  
**(REDLINE/STRIKEOUT COPY)**

## INTRODUCTION

The following replacement pages have been developed to replace applicable sections of the current Site Development Plan and Site Operating Plan. The following table summarizes the proposed replacement pages for the currently approved plans.

### Site Development Plan and Site Operating Plan Replacement Pages

Replacement or Additional Page Number	Explanation
Part III – SDP, Cover Page and Table of Contents	Pages have been signed and sealed for updated SDP.
Part III, Pages III-3, III-5, III-6, and III-18	Text has been updated to include above-grade Class 1 waste options and final cover requirements.
Part III, Appendix III-F	New appendix included to detail the design, construction, and maintenance of the Class 1 containment dikes.
Attachment 1 – Cover Page and Table of Contents	Pages have been signed and sealed for updated SDP.
Attachment 1 – Figures 1-1, 1-2, and 1-7	Figures have been updated to reference above-grade Class 1 waste option. Figure 1-7 updated for revised barrier layer termination.
Attachment 1 – New Figures 1-12 and 1-13	Figure 1-12 has been added to show allowable above-grade Class 1 disposal areas. Figure 1-13 has been added to show Class 1 disposal area options.
Attachment 2 – Cover Page and Table of Contents	Pages have been signed and sealed for updated SDP.
Attachment 2 – Figures 2-1 through 2-6	Cross-sections have been updated to include containment dikes.
Attachment 7 – Cover Page and Table of Contents	Pages have been signed and sealed for updated SDP.
Attachment 7 – Figures 7-3 through 7-8	Cross-sections have been updated to include containment dikes.
Attachment 8 – Cover Page and Table of Contents	Pages have been signed and sealed for updated SDP.
Attachment 8 – Closure/Postclosure Cost Estimates	Updated closure cost for above-grade Class 1 final cover construction, groundwater monitoring wells, and gas system.
Attachment 12 – Cover Page and Table of Contents	Pages have been signed and sealed for updated SDP.
Attachment 12 – Page III-ATT12-2	Text has been updated to include final cover requirements for above-grade Class 1 waste options.
Attachment 15 – Cover Page and Table of Contents	Pages have been signed and sealed for updated SDP.
Attachment 15 – Page ATT15-15	Text has been updated to allow recirculation of leachate in all Subtitle D cells.

**Site Development Plan and Site Operating Plan  
Replacement Pages (Continued)**

Replacement or Additional Page Number	Explanation
Part IV – SOP, Cover Page and Table of Contents	Pages have been signed and sealed for updated SDP.
Part IV – Pages IV-4, IV-43, IV-65, IV-66, IV-90, and new page IV-90a	Text has been updated to include above-grade Class 1 waste options, combined working face, and recordkeeping requirements for the Class 1 containment dike.
Appendix IV-D – Cover Page and Table of Contents	Pages have been signed and sealed for updated SOP.
Appendix IV-D – Figure IV-D-1	Revised barrier layer termination.

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

**PART III – SITE DEVELOPMENT PLAN**

Prepared for

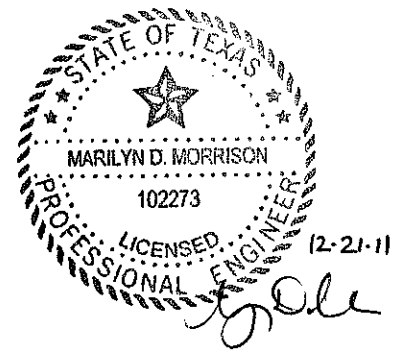
BFI Waste Systems of North America, LLC

Technically Complete January 1999

Revised March 2008

Revised November 2009

Revised December 2011



Prepared by

**Weaver Boos Consultants, LLC—Southwest**

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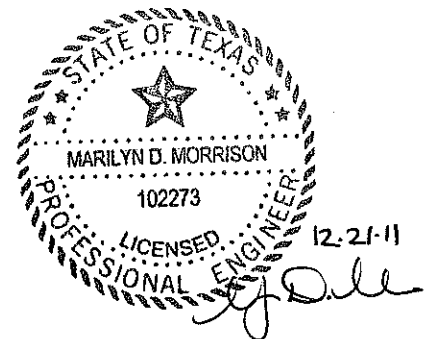
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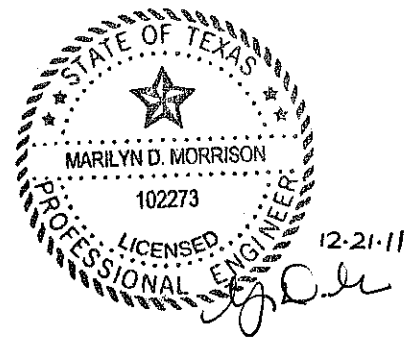
1.0	INTRODUCTION	III-1
2.0	SOLID WASTE DATA (330.54(3))	III-3
3.0	LANDFILL METHODS (330.55(a)1)	III-4
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11.0	FINAL COVER DESIGN (330.55(b)8)	III-18
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<b>14.0</b>	<b>ALTERNATIVE MATERIAL DAILY COVER PLAN (330.133(c))</b>	<b>III-24</b>
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### APPENDIX

- III-A PERMIT RELATED CORRESPONDENCE (330.54(4))
- III-B SITE LIFE CALCULATIONS (330.55(a)4)
- III-C SETTLEMENT CALCULATIONS (No Ref.)
- III-D UNIVERSAL SOIL LOSS CALCULATIONS (330.55(b)8(B))
- III-E STABILITY ANALYSES (No Ref.)
- III-F ABOVE GRADE CLASS 1 WASTE DISPOSAL AREA DESIGN**

## LIST OF ATTACHMENTS

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### ATTACHMENT

- 1 SITE LAYOUT PLAN (330.56(a))
- 2 FILL CROSS SECTIONS (330.56(b))
- 3 EXISTING CONTOUR MAP (330.56(c))
- 4 GEOLOGIC REPORT (330.56(d))
- 5 GROUNDWATER CHARACTERIZATION REPORT (330.56(e))
- 6 GROUNDWATER AND SURFACE WATER PROTECTION PLAN AND DRAINAGE PLAN (330.56(f))
- 7 FINAL CONTOUR MAP (330.56(g))
- 8 COST ESTIMATE FOR CLOSURE AND POST-CLOSURE CARE (330.56(h))
- 9 APPLICANTS STATEMENT (330.56(i))

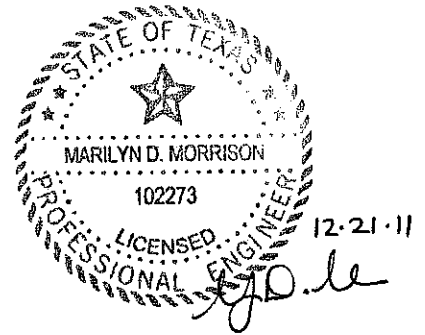


## LIST OF ATTACHMENTS - continued

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### ATTACHMENT

- 10 SOIL AND LINER QUALITY CONTROL PLAN (330.56(j))
- 11 GROUNDWATER SAMPLING AND ANALYSIS PLAN (330.56(k))
- 12 FINAL CLOSURE PLAN (330.56(l))
- 13 POST-CLOSURE CARE PLAN (330.56(m))
- 14 LANDFILL GAS MANAGEMENT PLAN (330.56(n))
- 15 LEACHATE AND CONTAMINATED WATER PLAN (330.56(o))



## 2.0 SOLID WASTE DATA (330.54(3))

Wastes currently being accepted for disposal at the Tessman Road Landfill are municipal solid waste, special wastes and certain non-hazardous industrial wastes as defined by the ~~TNRCC~~ **TCEQ** Municipal Solid Waste Regulations (30 TAC §330.2 [relating to Definitions]). Special Wastes and non-hazardous industrial wastes which may be accepted for disposal at the landfill as well as the appropriate handling and disposal methods, as applicable, are listed and detailed in Part IV, Site Operating Plan, Section 4.2.4, Disposal of Special Wastes and Section 4.2.5, Disposal of Industrial Wastes. Wastes expressly prohibited at the landfill are listed and detailed in Part IV, Site Operating Plan, Section 4.2.6, Screening of Deposited Waste. The site will continue to receive waste from commercial transporters, municipalities and the public.

The waste stream currently received at the Tessman Road Landfill consists of:

- Municipal solid waste;
- Special waste;
- Class 1, 2, and Class 3 industrial waste.

**In addition to below-grade Class 1 Waste Disposal, there are two above-grade Class 1 Waste Disposal options. Requirements for above grade disposal options are included in Appendix III-F – Above Grade Class 1 Waste Disposal Area Design.**

The Tessman Road Landfill is also registered with the ~~TNRCC~~ **TCEQ** to operate a bioremediation treatment facility for the management of nonhazardous petroleum substance contaminated soils as specified in 30 TAC §334.26(I).

The site is currently receiving approximately 2,800 tons of waste per day. Assuming a waste generation rate of 5 lb/capita/day, this site currently serves a population equivalent of 960,000 persons. Waste accepted for disposal at the Tessman Road Landfill is primarily generated in Bexar County with some waste also received from other areas. The total capacity of this landfill including this permit amendment is approximately 114 million cubic yards with the remaining airspace consisting of approximately 89 million cubic yards.

polyethylene (HDPE) flexible membrane liner (FML). Constructed in this fashion, these two liner components create a composite liner. The constructed clay sidewall liner is a minimum of 2 feet thick measured perpendicular to the slope and constructed in lifts on a 3 horizontal to 1 vertical slope. The FML used on the side slopes will be textured. Refer to Part III, Attachment 10, Soil and Liner Quality Control Plan;

- Installation of a leachate collection and removal system and protective cover system as shown in Part III, Attachment 15, Leachate and Contaminated Water Plan;
- Submission and TNRCC TCEQ approval of a Soil and Liner Evaluation Report (SLER) and a Flexible Membrane Liner Evaluation Report (FMLER) documenting the adequacy of constructed composite liner components;
- Placement, compaction, and covering of waste with soil cover on a daily basis. As necessary, ramps and internal roadways will be constructed and maintained to allow waste hauling vehicles access to the active working face;
- Areas of fill which have not reached completion grade and are not expected to receive additional waste for a period of 180 days or more will receive an intermediate cover. The intermediate cover shall consist of at least 12 inches of well compacted earthen material not previously mixed with garbage, rubbish, or other solid waste.
- Construction of the final cover compacted clay infiltration layer. The infiltration layer may be constructed of earthen materials with a coefficient of permeability no greater than  $1 \times 10^{-5}$  cm/s. The compacted clay infiltration layer is a minimum of 18 inches thick. However, where Class 1 waste is filled above grade, the thickness of the infiltration layer that is located adjacent to the Class 1 disposal area will be increased to 4 feet with a coefficient of permeability no greater than  $1 \times 10^{-7}$  cm/s. An alternative to the 18-inch-thick compacted clay infiltration layer will be a geosynthetic clay liner (GCL). Overlain on, and in direct contact with the infiltration layer will be a synthetic membrane FML with a minimum thickness of 20 mils. Constructed in this fashion, these two cover

components create a composite cover. Refer to Part III, Attachment 12, Final Closure Plan, Figures 12-2 through 12-4, Final Cover System Details, and Figures 12-6 through 12-9 for Class 1 waste disposal area final cover details;

- On side slopes, installation of a 12 inch granular drainage layer or a geonet drainage layer on top of and in immediate contact with the cover FML. Installation of a final cover slope toe drainage system for the water collected by the drainage layer;
- Installation of a final erosion layer with a minimum thickness of 6 inches of soil capable of supporting vegetative cover;
- Construction of terrace/rundown ditches and final drainage structures; and
- Vegetation.

For a more detailed discussion of the sequence of landfill development, refer to Part III, Attachment 1.

## 11.0 FINAL COVER DESIGN (330.55(b)8)

The final cover design depicted in Part III, Attachment 12, Final Closure Plan, has been developed to minimize the potential for surface water to infiltrate the covered wastes; maximize utilization of the landfill; and provide long-term, low maintenance protection of the landfilled wastes.

The final cover constructed slopes and grades range from 3 percent to 25 percent on the landfill top to achieve post settlement grades greater than 2 percent and less than 19 percent as established in Part III, Appendix III-C, Waste Settlement Calculations. These top grades minimize both the potential for the ponding of surface water on the cover FML and the potential for erosive surface water velocities while providing long-term stability of the soil surface and the vegetative cover. Surface water velocities on these gentle slopes will be less than five feet per second with an estimated soil loss of typically less than two tons/acre/year.

Drainage terraces and downchutes with slopes from 1.5 percent to 25 percent are used on the side slopes to reduce the potential for soil erosion. Utilization of diversion berms, drainage terraces, and downchutes to move surface water runoff from the landfill to natural ground provides for long-term, low maintenance surface drainage control. Refer to Part III, Appendix III-D, Erosion Calculations for a presentation of the erosion potential of constructed cover slopes.

In accordance with 30 TAC §330.253(b), BFI will install a final cover system that is designed to minimize infiltration and erosion. The system will be comprised of an erosion/vegetation layer underlain by an infiltration layer. The infiltration layer consists of a minimum 20-mil flexible membrane liner (FML) on top of and in direct and uniform contact with an 18 inch compacted soil infiltration layer with a permeability no greater than  $1 \times 10^{-5}$  cm/sec. However, where Class 1 waste is filled above grade, the thickness of the infiltration layer that is located adjacent to the Class 1 disposal area will be increased to 4 feet with a coefficient of permeability no greater than  $1 \times 10^{-7}$  cm/sec. A geosynthetic clay liner (GCL) may be substituted for the 18 inch compacted soil infiltration layer as shown in Part III, Attachment 12, Final Closure Plan.

On the side slopes, a drainage layer will be constructed immediately over the FML. The drainage layer will be graded to remove water which infiltrates through the erosion/vegetation layer. The drainage layer will be constructed of granular material geonet, or geocomposite. On the top slopes, 12 inches of protective soil will be placed over the FML.

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

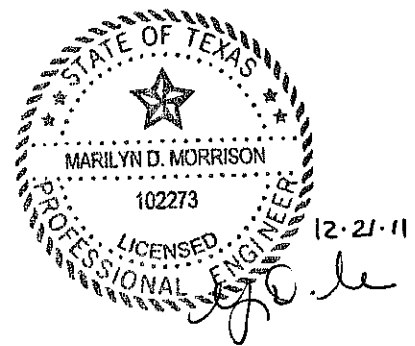
**APPENDIX III-F**

**ABOVE-GRADE CLASS 1 WASTE  
DISPOSAL AREA DESIGN**

Prepared for

BFI Waste Systems of North America, LLC

December 2011



Revision Prepared by

**Weaver Boos Consultants, LLC—Southwest**  
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Project No. 0120-109-11-54-01

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### **APPENDIX III-F1**

Class 1 Waste Containment Dike Slope Stability Analysis

### **APPENDIX III-F2**

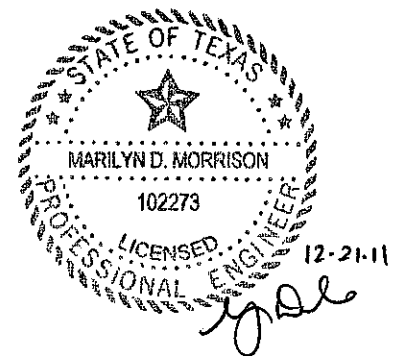
Class 1 Waste Containment Dike Construction Record Form

### **APPENDIX III-F3**

Containment Dike Certification Form

### **APPENDIX III-F4**

Above Grade Class 1 Waste Slope Stability Analysis



## 1 PURPOSE

---

The purpose of this appendix is to provide the details for the Class 1 nonhazardous industrial solid waste (Class 1 waste) above grade disposal options. Details for the options are discussed in the following section. Drawings that show the potential location of Class 1 cells and details of the disposal options are shown in Attachments 1 and 12.

## 2 ABOVE GRADE CLASS 1 WASTE DISPOSAL OPTION

---

### 2.1 Disposal Option Description

The two above-grade Class 1 waste disposal options (1) allow for Class 1 waste to be disposed of and possibly mixed with other waste in areas that have a liner system constructed in accordance with §330.331(e) and (2) allows for the disposal of Class 1 waste above existing grade and adjacent to containment dikes that will be constructed along the external slopes. The two above grade Class 1 disposal options are highlighted on Figure 1-13 in Attachment 1 and detailed below.

- Option 1 – Above Grade Class 1 Waste Disposal Area with 4-foot-thick Separation Layer. This option allows for the disposal of Class 1 wastes above existing grade if containment dikes are constructed along the exterior slope of the Class 1 waste disposal area. This option also includes the placement of a 4-foot-thick compacted clay rich barrier layer that will be placed over the Class 1 waste as a separation layer between the Class 1 waste and the municipal solid waste (and other non-Class 1 waste material) to be placed above. With this option, the 4-foot-thick separation or barrier layer will be sloped toward the interior of the landfill.
- Option 2 – Above Grade Class 1 Waste Disposal Area. This option includes the construction of containment dikes along the exterior sideslope of the Class 1 disposal area to extend the limits of the Class 1 waste disposal area. No separation layer is required for this option; however, the thickness of the composite final cover system's infiltration layer will be increased from 1.5 feet to 4.0 feet with a maximum hydraulic conductivity of  $1 \times 10^{-7}$  cm/s.

As shown on Figure 12-6, Class 1 waste may be mixed with other wastes accepted at the facility in areas which have a liner system constructed in accordance with Title 30 TAC §330.331(e). The above grade Class 1 waste options are available for undeveloped portions of Phases IV, V, VI, and VII (see Figure 1-12 in Attachment 1). Containment dikes will be constructed along the exterior above grade slopes to the maximum above grade elevation of Class 1 waste disposal.

In accordance with 30 TAC §335.590(24)(F)(i), the containment dikes are designed to:

- prevent washout, release, or exposure of waste;
- be physically stable;
- prevent washout from hydrostatic and hydrodynamic forces from storms and floods;
- prevent storm water run-on from reaching the waste;

- prevent the release of leachate; and
- minimize long term maintenance.

The containment dikes:

- will be constructed along exterior slopes as part of site operations from clay rich soils;
- will be approximately 10-foot high with a minimum crest width of 17 feet (equivalent to 4 feet of cover perpendicular to the fill slope);
- will be located over the lined area at the perimeter of the waste footprint; and
- will be certified by a Texas licensed Professional Engineer after construction.

As shown on Figure 12-7 in Attachment 12, Class 1 waste will only be placed after a containment dike has been constructed. In addition, each lift of waste will be placed below the elevation of each containment dike and will slope toward the interior of the landfill.

## **2.2 Class 1 Containment Dike Construction and Certification Requirements**

The containment dike construction requirements are listed below (and also summarized on-Figure 12-7 in Attachment 12.

1. Dikes will be constructed of clay-rich soils under the direction of the landfill manager or his designee.
2. Soils will be placed in maximum 9-inch-thick lifts and compacted with a minimum of four passes with a dozer or similar equipment.
3. The Landfill Manager or his designee will verify that the completed containment dike has the following dimensions.
  - 17-foot top width
  - Height of 10 feet
  - 4H:1V outside slope and 2H:1V inside slope
4. The Landfill manager or his designee will complete the Class 1 Waste Containment Dike Construction Record form included in Appendix III-F2 after each construction event.
5. A third party independent professional engineer licensed to practice in Texas will certify the installed containment dike in accordance with Title 30 TAC §335.590(24)(F)(vi) (see below for certification procedure).

This construction technique is designed to meet the requirements of Title 30 TAC §335.590(24)(F)(i)(II), which states, “waste placed above grade shall be laterally

contained by dikes that are constructed to be physically stable against slope failure, with a minimum safety factor of 1.5.” The stability analysis included in Appendix III-F1 demonstrates that the above listed construction technique will meet this requirement.

As listed above, the Landfill Manager or his designee will oversee the construction of the containment dike. Once construction has been completed, a Class 1 Waste Containment Dike Construction Record form, included in Appendix III-F2, will be completed. This form will be provided to the certifying professional engineer. The professional engineer will then complete the following steps.

1. Review the current permit documents that address the containment dike (including Attachment 12 details and this section).
2. Visit the site after containment dike construction has been completed to inspect the containment dike to be certified.
3. Interview the Landfill Manager or his designee to determine the construction technique and verify that the technique used is consistent with the permit requirements. The professional engineer will also obtain a copy of the completed Class 1 waste Containment Dike Construction Record.
4. Complete the Containment Dike Certification Form. The latest form included in Title 30 TAC §335.590(24)(F)(vi) shall be used (refer to Appendix III-F3).
5. The complete Containment Dike Certification Form will be placed in the Site Operating Record.

After the above procedure has been completed, the site may begin filling in the area behind the containment dike.

## **2.3 Class 1 Containment Dike Maintenance**

The installed containment dikes will be inspected in accordance with the inspection procedures and frequency included in Section 23.6 of the SOP to ensure that the installed dike surfaces are not eroded. Soil management practices outlined in Section 23.2 of the SOP will be followed to ensure the integrity of the dike is maintained.

## **2.4 Compliance with Title 30 TAC §330.179(b) and §335.590(24)(F)**

§330.179(b) allows for disposal of Class 1 waste above natural grade provided that the conditions in §335.590(24)(F)(i) – (vi) are met. As shown in Table 2-1, the above grade Class 1 waste fill area has been designed to meet each of the requirements listed in §335.590(24)(F)(i). In accordance with §335.590(24)(F)(vii), since the requirements of §335.590(24)(F)(i) will be met, the additional requirements listed in §335.590(24)(F)(ii) through (v) are not applicable. The information provided in this appendix demonstrates that §335.590(24)(F)(i) requirements are met (see Table 2-1).

**Table 2-1  
Compliance with Title 30 TAC §335.590(24)(F)**

Item	Compliance Discussion
Waste placed above grade shall be laterally contained by dikes that are constructed to prevent washout, release, or exposure of waste.	As shown on Figures 12-6 and 12-7 (Attachment 12), the containment dikes are substantial structures (10 feet high with a 17-foot-wide crest) that will prevent the washout, release, or exposure of waste. In addition, the containment dikes will be inspected and maintained on a routine basis, as noted in Section 2.3 of this appendix.
Waste placed above grade shall be laterally contained by dikes that are constructed to be physically stable against slope failure, with a minimum safety factor of 1.5.	As noted in Appendix III-F1, the containment dike has been designed to be physically stable with a safety factor that is above 1.5.
Waste placed above grade shall be laterally contained by dikes that are constructed to prevent washout from hydrostatic and hydrodynamic forces from storms and floods.	As noted above, the containment dikes are substantial structures that will prevent the washout from hydrostatic and hydrodynamic forces from storms or floods. In addition, the site's stormwater management system is also designed to prevent run-on to the disposal area during extreme storm events. Details of the stormwater management system are included in Attachment 6.
Waste placed above grade shall be laterally contained by dikes that are constructed to prevent storm water from reaching the waste.	The containment dike provides a substantial barrier between the exterior slope (e.g., minimum of 4 feet of soil) and the waste disposal area that will prevent the release of leachate.
Waste placed above grade shall be laterally contained by dikes that are constructed to minimize release of leachate.	Long-term maintenance of the slope is minimized by the establishment of vegetation as noted in Section 2.3 of this appendix and Section 23.2 of the SOP.
Waste placed above grade shall be laterally contained by dikes that are constructed to minimize long-term maintenance.	

## 3 CLASS 1 WASTE STABILITY ANALYSES

---

### 3.1 Purpose

The purpose of this appendix is to provide the basis for the construction requirements for the above grade Class 1 waste containment dike discussed in Section 2. The containment dike construction requirements presented on Figure 12-7 in Attachment 12 are listed below.

- Dikes will be constructed of clay-rich soils under the direction of the landfill manager or his designee. The landfill manager or his designee will complete the construction form included in Appendix III-F3 after each construction event.
- Soils will be placed in maximum 9-inch-thick lifts and compacted with a minimum of four passes with a dozer or similar equipment.
- Upon completion of each dike, a third party independent professional engineer licensed to practice in Texas will certify the installed dike in accordance with Title 30 TAC §335.590(24)(F)(vi) for the certification of the dike. The certification prepared and signed by the engineer will be placed in the site operating record.

As discussed in this appendix, this construction technique is designed to meet the requirements of §335.590(24)(F)(i)(II) which states, “waste placed above grade shall be laterally contained by dikes that are constructed to be physically stable against slope failure, with a minimum safety factor of 1.5.”

Two separate stability analyses were performed to demonstrate compliance with §335.590(24)(F)(i)(II). First, an analysis of the individual containment dike was performed. In addition, a stability analysis for the entire sideslope was completed to determine the factor of safety for the entire sideslope. Each analysis is discussed in the following subsections.

### 3.2 Containment Dike Stability Analysis

This stability analysis focuses on the stability of the individual containment dike with 2H:1V interior slopes and 4H:1V exterior slopes and is included in Appendix III-F1. This slope stability demonstration utilizes soil strength parameters of  $C'=100$  psf and  $\phi'=15^\circ$  for effective stress, and  $C=250$  psf and  $\phi=0^\circ$  for total stress analyses. These parameters conservatively represent clayey soils with no significant compaction during placement (sandy or gravelly soils will not be used in dike construction). As indicated by references 2, 3, and 4 (refer to page III-F1-1 for the reference list), these values represent the strength

parameters for clayey soils placed no significant compaction effort. Table 2.2 in reference 4 indicates that  $C'=400$  psf and  $\phi'=16^\circ$  represent the lowest value for strength of clayey materials. As discussed on page 151 of reference 2, the friction angle  $\phi'$ , which corresponds to the arrangement of particles, is mainly a function of the clay mineral content and clay mineralogy of the composition. Section 4 (Table 4.2) of reference 3 provides discussion on soil strength parameters for lightly compacted soils. As indicated,  $C=250$  psf represents the lowest value of cohesion for total stress conditions. Therefore, placement of soil dikes using dozer or similar landfill equipment will provide stable slopes with a minimum factor of safety of 1.5 as demonstrated in the slope stability analyses provided in the appendix. The stability of outer slopes of landfills with 4H:1V vertical sideslopes is evidenced by the fact that almost all the landfills in Texas developed with 4H:1V sideslopes are geotechnically stable.

### **3.3 Above Grade Class 1 Waste Stability Analysis**

#### **3.3.1 General**

This stability analysis focuses on the stability of the entire sideslope of the containment dike area. The configurations of containment dike placement are shown on Figures 1-1 and 1-2 in Appendix III-F4. The stability analysis was performed for both interim and closed conditions, as discussed in the following sections, and is included in Appendix III-F4.

#### **3.3.2 Above-Grade Configurations Analyzed**

##### **Option 1 – Above-Grade Class 1 Waste Disposal Area with Separation Layer**

Figure 1-1 in Appendix III-F4 shows the interim and closed condition slopes analyzed in the slope stability analysis for Option 1 (discussed in detail on page III-F-2). Option 1 includes 4H:1V exterior slopes with containment dikes extending partially up the sideslope.

##### **Option 2 – Above-Grade Class 1 Waste Disposal Area**

Figure 1-2 in Appendix III-F4 shows the interim and closed condition slopes analyzed in the slope stability analysis for Option 2 (discussed in detail on page III-F-2). Option 2 includes 4H:1V exterior slopes with containment dikes extending along the entire sideslope.

#### **3.3.3 Input Parameters**

The input parameters for the various landfill materials are discussed in detail in Appendix III-F4 (page III-F4-3). The containment dike strength parameters used for this analysis are the same as those discussed in Section 3.2. The liner system, waste, and subsurface material strength parameters are consistent with those presented in the slope stability analysis (Appendix III-E).

### 3.4 Results

The results of the slope stability analyses included in Appendices III-F1 and III-F4 are presented in Table 3-1.

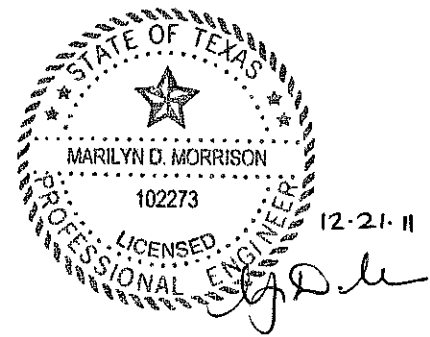
**Table 3-1  
Summary of Slope Stability Analyses Results**

Slope Designation	Method of Analysis	Minimum Factor of Safety Generated		Recommended Minimum Factor of Safety	Acceptable Factor of Safety
		Total Stress	Effective Stress		
<b>Individual Containment Dike</b>					
4H:1V Outer Slope	Bishop-Circular	2.21	2.09	1.5	YES
2H:1V Inner Slope	Bishop-Circular	1.82	1.54	1.5	YES
<b>Option 1</b>					
Interim Condition, Section 1-1	Bishop-Circular	2.25	2.27	1.5	YES
Interim Condition, Section 1-2	Rankine-Block	2.58	2.59	1.5	YES
Closed Condition, Section 1-1	Bishop-Circular	2.27	2.27	1.5	YES
Closed Condition, Section 1-2	Rankine-Block	2.76	2.78	1.5	YES
<b>Option 2</b>					
Interim Condition, Section 2-1	Bishop-Circular	2.13	2.14	1.5	YES
Interim Condition, Section 2-2	Rankine-Block	2.47	2.47	1.5	YES
Closed Condition, Section 2-1	Bishop-Circular	2.08	2.11	1.5	YES
Closed Condition, Section 2-2	Rankine-Block	2.53	2.54	1.5	YES

### 3.5 Summary

As demonstrated in Appendix III-F1, the containment dike configuration results in a factor of safety greater than 1.5. Additionally, the placement of containment dikes along the exterior sideslopes is demonstrated in Appendix III-F4 to be stable with factors of safety greater than 1.5, consistent with §335.590(24)(F)(i)(II).

**APPENDIX III-F1**  
**CLASS 1 WASTE CONTAINMENT DIKE**  
**SLOPE STABILITY ANALYSIS**



Includes pages III-F1-1 through III-F1-24

**Purpose:** The purpose of this analysis is to demonstrate that the construction technique specified in 2.2 of Appendix III-F will result in a containment dike that will be physically stable against slope failure with a minimum factor of safety of 1.5.

**Method:** The containment dike stability analysis has been completed using XSTABL 5.206, a computer program developed to model general slope stability. Circular failure surfaces using the Simplified Bishop method have been generated to analyze the slopes for the configuration given below.

- Individual Containment Dike - 4H:1V outer slopes.
- Individual Containment Dike - 2H:1V inner slopes.

The containment dike configuration is shown on Figure 1-1. XSTABL output is presented on pages III-F1-5 through III-F1-24.

**Procedure:**

1. Input containment dike configuration.
2. Select strength parameters.
3. Perform analysis to calculate factor of safety.

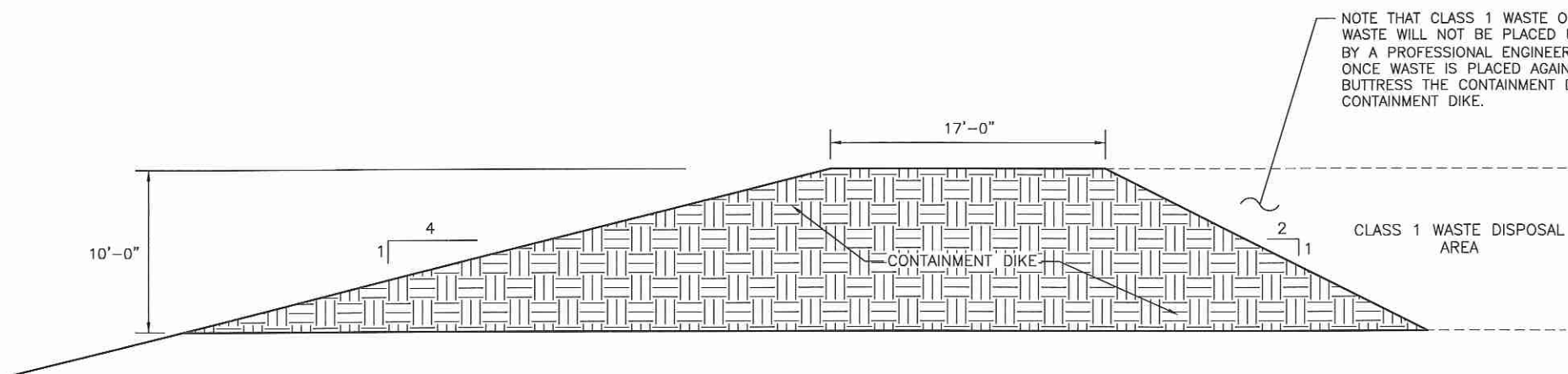
**References:**

1. Duncan, J. Michael and Stephen G. Wright., *Soil Strength and Slope Stability*, John Wiley & Sons, Inc. Hoboken, NJ, 2005
2. Terzaghi, Karl, Peck, Ralph B., and Mesri, Gholamreza, *Soil Mechanics in Engineering Practice, Third Ed.*, John Wiley & Sons, Inc. New York, NY, 1996
3. Day, Robert W., *Geotechnical Engineer's Portable Handbook*, McGraw-Hill Companies, Inc. New York, NY, 2000
4. Abramson, Lee W., Lee, Thomas S., Sharma, Sunil, Boyce, Glenn M., *Slope Stability and Stabilization Methods, 2nd Ed.*, John Wiley & Sons, Inc., New York.

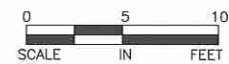
### 1. Input Containment Dike Configuration

The proposed containment dike configuration is shown on Figure 1-1. As shown, the containment dike has 4H:1V outer slopes and 2H:1V inner slopes and a 17-foot top width. The containment dike is 10 feet in height.

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CONTAINMENT DIKE



▲ INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

- LIST OF REVISIONS:  
1. NEW DRAWING ADDED.



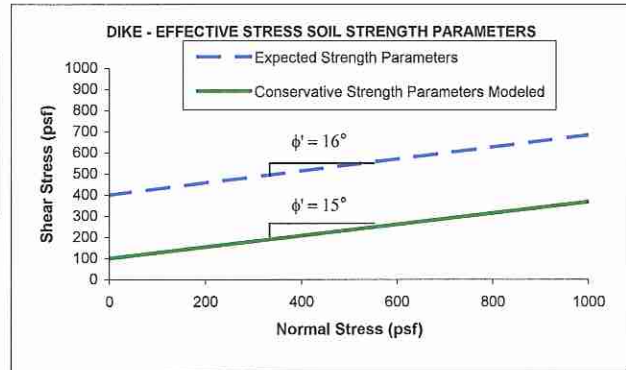
<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY: _____		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>CONTAINMENT DIKE CONFIGURATION</b>							
DATE: 12/2011 FILE: 0120-109-11 CAD: 1-1.DWG		DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY		TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS							
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				<b>FIGURE 1-1</b>							

**2. Select Strength Parameters**

The slope stability analysis has been developed for both total and effective stress conditions to address short and long term conditions that will exist after the installation of the dikes. The selected strength parameters for this analysis are listed in the table and graph shown below.

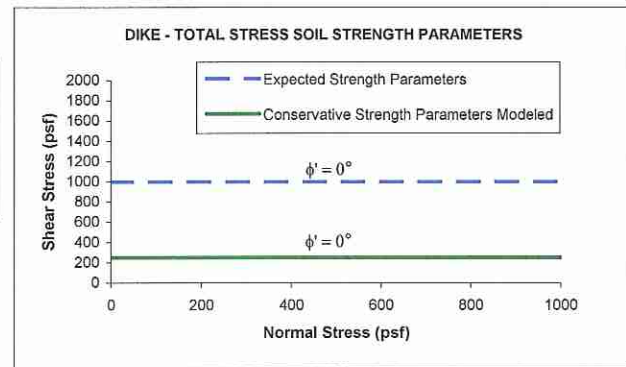
**EFFECTIVE STRESS SOIL PROPERTIES**

Unit	Unit Weight		Cohesion Intercept (psf)	Friction Angle (deg)
	Moist (pcf)	Saturated (pcf)		
Dike	116	120	100	15
Waste	65	65	0	25



**TOTAL STRESS SOIL PROPERTIES**

Unit	Unit Weight		Cohesion Intercept (psf)	Friction Angle (deg)
	Moist (pcf)	Saturated (pcf)		
Dike	116	120	250	0
Waste	65	65	0	25



As noted above, the slope stability demonstration included in this appendix utilizes containment dike soil strength parameters of  $C=100$  psf and  $\phi=15^\circ$  for effective stress, and  $C=250$  psf and  $\phi=0^\circ$  for the total stress analysis. These parameters were conservatively selected based on (1) WBC's experience with compacted soils placed with limited construction oversight and (2) various reference sources. For example, Table 2.2 - Strength and Sensitivity of Cohesive Soils included in reference 4 lists a cohesion of  $0.2 \text{ kg/cm}^2$  (400 psf) and a friction angle of  $16^\circ$  as the lowest strength values for cohesive soils. For the effective stress analysis this value was reduced to a cohesion of 100 psf and a friction angle of  $15^\circ$  to provide for a very conservative analysis. The strength parameters for solid waste are consistent with those used in the slope stability analysis of Appendix III-E.

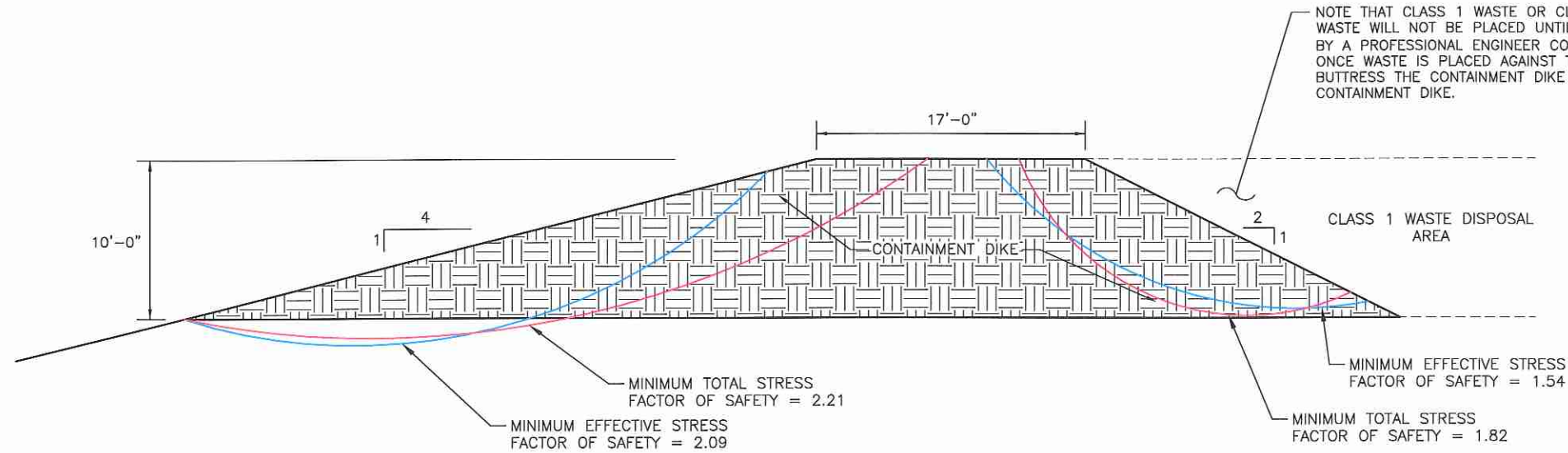
**3. Perform Analysis to Calculate Factor of Safety.**

The calculated factors of safety are shown below and summarized on Figure 3-1. As noted, all the calculated factors of safety, using conservatively selected strength parameters, are above 1.5. Therefore, the proposed design meets §335.590(24)(F)(i)(II) which requires the containment dike to "be physically stable against slope failure, with a minimum safety factor of 1.5."

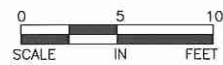
**Table 3-1  
Individual Containment Dike Slope Stability Analysis Results**

Slope Designation	Method of Analysis	Minimum Factor of Safety Generated		Recommended Minimum Factor of Safety	Acceptable Factor of Safety
		Total Stress	Effective Stress		
4H:1V Outer Slope	Bishop-Circular	2.21	2.09	1.5	YES
2H:1V Inner Slope	Bishop-Circular	1.82	1.54	1.5	YES

O:\0120\109\CLASS 1 WASTE MOD\JIF\F\3-1\_FACTOR OF SAFETY.dwg, 12/18/2011 8:44:53 AM, rseillers



CONTAINMENT DIKE



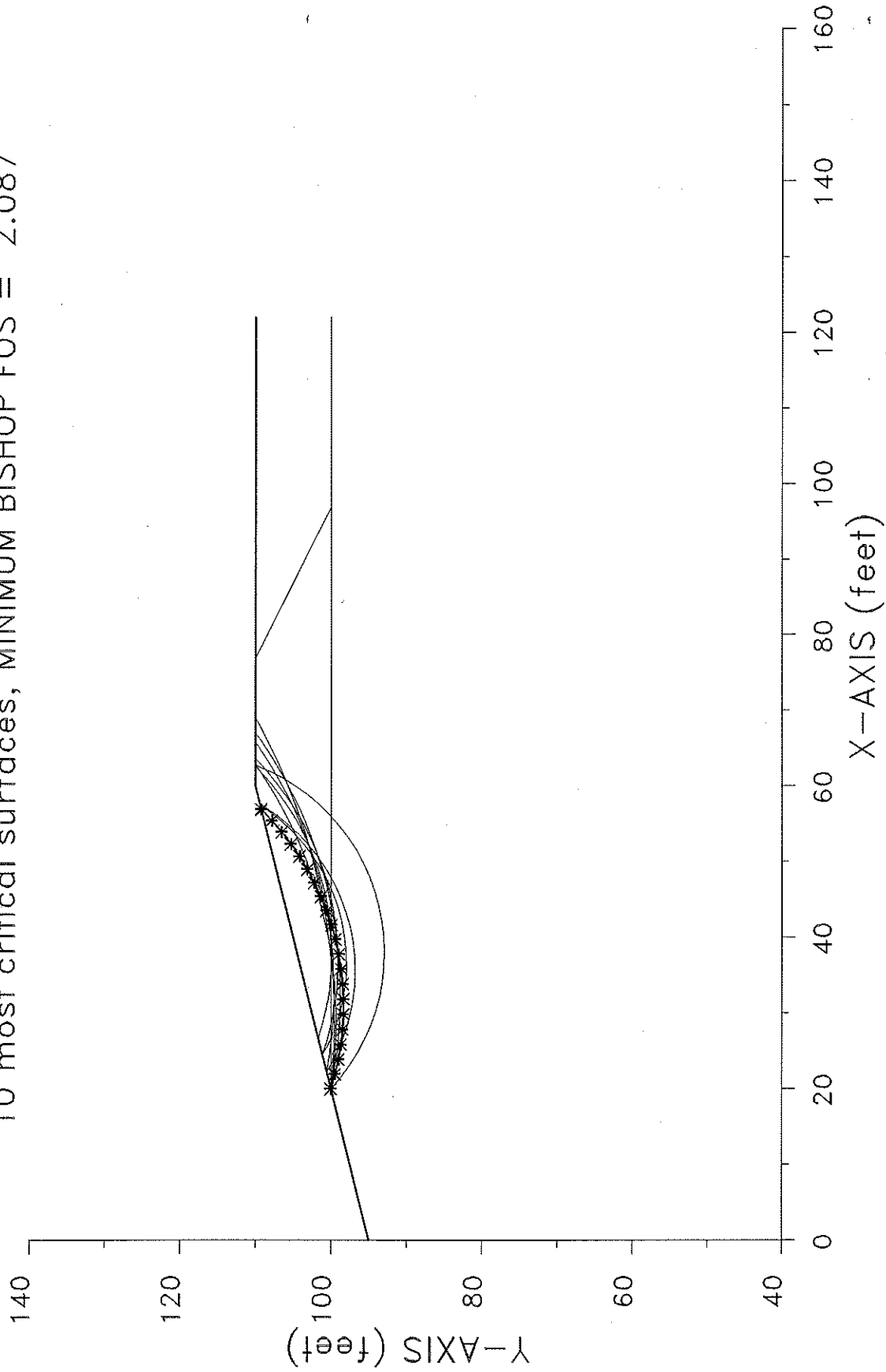
INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

- LIST OF REVISIONS:  
1. NEW DRAWING ADDED.

<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY: _____		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>CONTAINMENT DIKE FACTORS OF SAFETY</b>							
DATE: 12/2011 FILE: 0120-109-11 CAD: 3-1.DWG		DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY		TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS							
REUSE OF DOCUMENTS <small>THIS DOCUMENT, AND THE DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF WEAVER BOOS CONSULTANTS, LLC - SOUTHWEST AND IS NOT TO BE USED IN WHOLE OR IN PART, WITHOUT THE WRITTEN AUTHORIZATION OF WEAVER BOOS CONSULTANTS, LLC - SOUTHWEST.</small>		REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>SEE LIST OF REVISIONS</td> </tr> </tbody> </table>		NO.	DATE	DESCRIPTION	1	12/2011	SEE LIST OF REVISIONS	<i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727	
NO.	DATE	DESCRIPTION									
1	12/2011	SEE LIST OF REVISIONS									
<small>CHICAGO, IL NAPERVILLE, IL COLUMBUS, OH DENVER, CO</small>		<small>FORT WORTH, TX EVANSVILLE, IN RIVERSIDE, MO</small>		<small>GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARMONT, FL</small>							
				<b>FIGURE 3-1</b>							

D1E 12-06-11 7:55

TESSMAN RD LF - 4H:1V CONT DIKE 1E  
10 most critical surfaces, MINIMUM BISHOP FOS = 2.087



```

*****
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*      using the                   *
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*****
    
```

Problem Description : TESSMAN RD LF - 4H:1V CONT DIKE 1E

-----  
 SEGMENT BOUNDARY COORDINATES  
 -----

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	95.0	20.0	100.0	1
2	20.0	100.0	60.0	110.0	2
3	60.0	110.0	77.0	110.0	2
4	77.0	110.0	122.0	110.0	1

3 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	77.0	110.0	97.0	100.0	2
2	20.0	100.0	97.0	100.0	1
3	97.0	100.0	122.0	100.0	1

-----  
 ISOTROPIC Soil Parameters  
 -----

2 Soil unit(s) specified

Soil Unit	Weight Moist	Unit Sat.	Weight Sat.	Cohesion Intercept	Friction Angle	Pore Pressure Parameter	Water Constant	Surface
-----------	--------------	-----------	-------------	--------------------	----------------	-------------------------	----------------	---------

No.	(pcf)	(pcf)	(psf)	(deg)	Ru	(psf)	No.
1	65.0	65.0	.0	25.00	.000	.0	0
2	116.0	120.0	100.0	15.00	.000	.0	0

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced along the ground surface between x = 20.0 ft and x = 40.0 ft

Each surface terminates between x = 50.0 ft and x = 70.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 80.0 ft

\* \* \* \* \* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \* \* \* \* \*

2.0 ft line segments define each trial failure surface.

-----  
 ANGULAR RESTRICTIONS  
 -----

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees  
 Upper angular limit := (slope angle - 5.0) degrees

\*\*\*\*\*  
 -- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)  
 \*\*\*\*\*  
 Negative effective stresses were calculated at the base of a slice. This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.  
 \*\*\*\*\*

USER SELECTED option to maintain strength greater than zero

---

Factors of safety have been calculated by the :

\* \* \* \* \* SIMPLIFIED BISHOP METHOD \* \* \* \* \*

The most critical circular failure surface  
is specified by 22 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	20.00	100.00
2	21.92	99.45
3	23.87	99.00
4	25.84	98.67
5	27.83	98.44
6	29.83	98.32
7	31.83	98.31
8	33.82	98.41
9	35.81	98.62
10	37.79	98.94
11	39.74	99.37
12	41.67	99.91
13	43.56	100.55
14	45.42	101.29
15	47.23	102.14
16	48.99	103.08
17	50.70	104.12
18	52.35	105.25
19	53.94	106.48
20	55.45	107.78
21	56.89	109.17
22	56.95	109.24

\*\*\*\* Simplified BISHOP FOS = 2.087 \*\*\*\*

The following is a summary of the TEN most critical surfaces

Problem Description : TESSMAN RD LF - 4H:1V CONT DIKE 1E

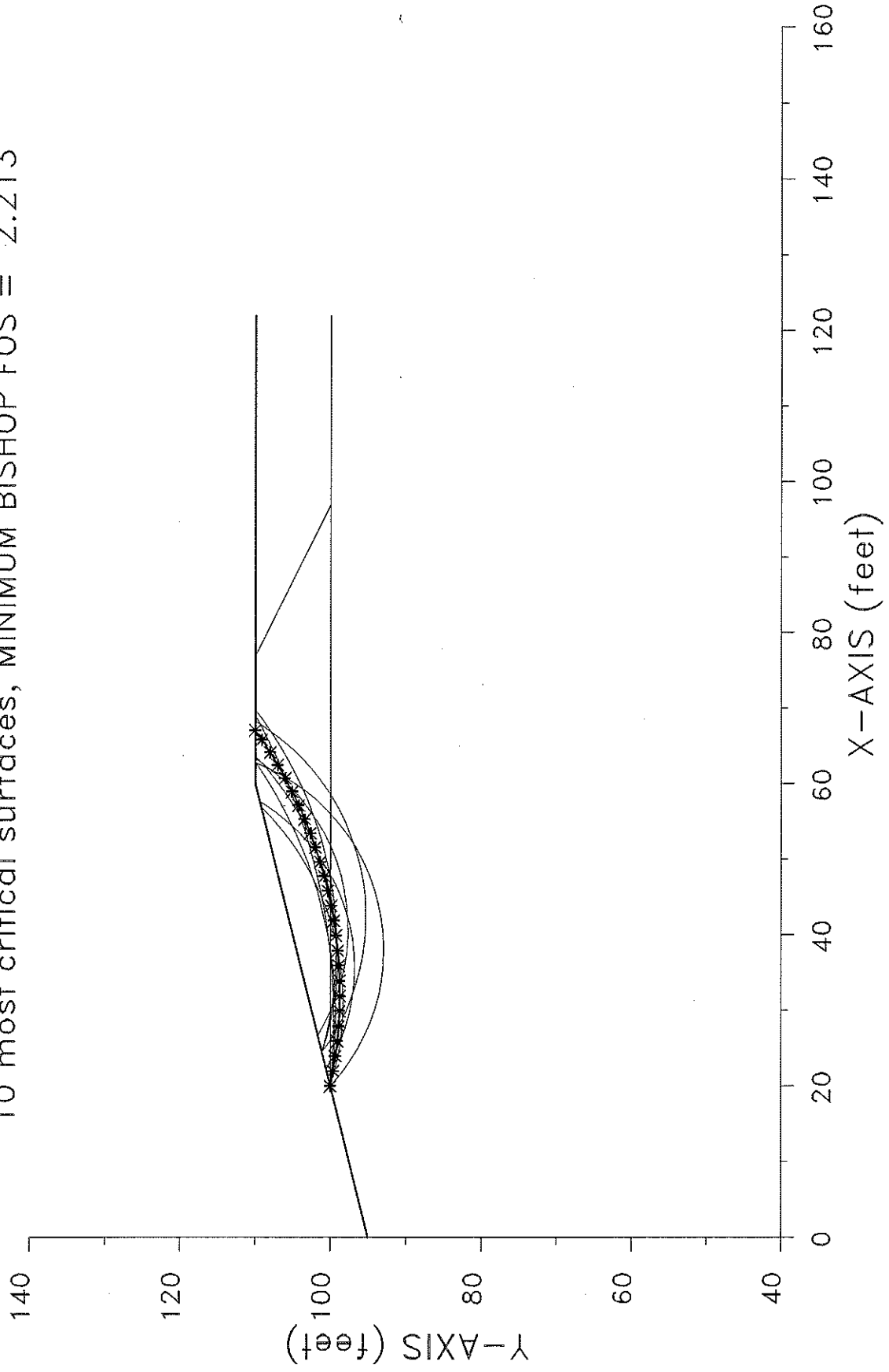
	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2.087	30.98	134.62	36.32	20.00	56.95	2.697E+05
2.	2.101	32.19	158.36	59.62	20.00	67.04	6.139E+05

3.	2.139	28.97	158.35	59.04	20.00	62.83	4.654E+05
4.	2.223	35.59	122.28	25.51	22.22	57.58	2.521E+05
5.	2.247	36.83	137.25	38.20	24.44	63.60	3.629E+05
6.	2.248	28.79	182.10	82.57	20.00	69.01	7.889E+05
7.	2.258	32.85	156.79	57.23	22.22	65.80	5.277E+05
8.	2.300	38.03	119.30	26.41	20.00	62.74	4.625E+05
9.	2.332	36.59	122.67	24.75	24.44	57.44	2.147E+05
10.	2.356	37.83	135.30	35.44	26.67	62.62	2.940E+05

\* \* \* END OF FILE \* \* \*

D1T 12-06-11 7:57

TESSMAN RD LF - 4H:1V CONT DIKE 1T  
10 most critical surfaces, MINIMUM BISHOP FOS = 2.213



```

*****
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*****

```

Problem Description : TESSMAN RD LF - 4H:1V CONT DIKE 1T

-----  
SEGMENT BOUNDARY COORDINATES  
-----

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	95.0	20.0	100.0	1
2	20.0	100.0	60.0	110.0	2
3	60.0	110.0	77.0	110.0	2
4	77.0	110.0	122.0	110.0	1

3 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	77.0	110.0	97.0	100.0	2
2	20.0	100.0	97.0	100.0	1
3	97.0	100.0	122.0	100.0	1

-----  
ISOTROPIC Soil Parameters  
-----

2 Soil unit(s) specified

Soil Unit	Unit Weight Moist	Unit Weight Sat.	Cohesion Intercept	Friction Angle	Pore Pressure Parameter	Water Constant	Surface
-----------	-------------------	------------------	--------------------	----------------	-------------------------	----------------	---------

No.	(pcf)	(pcf)	(psf)	(deg)	Ru	(psf)	No.
1	65.0	65.0	.0	25.00	.000	.0	0
2	116.0	120.0	250.0	.00	.000	.0	0

-----  
 UNDRAINED STRENGTHS as a function of effective vertical stress  
 have been specified for 1 Soil Unit(s)  
 -----

Soil Unit #	Parameter a	Parameter Psi
2.	250.0	.00

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced along the ground surface between x = 20.0 ft and x = 40.0 ft

Each surface terminates between x = 50.0 ft and x = 70.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 80.0 ft

\* \* \* \* \* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \* \* \* \* \*

2.0 ft line segments define each trial failure surface.

-----  
 ANGULAR RESTRICTIONS  
 -----

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees  
 Upper angular limit := (slope angle - 5.0) degrees

```

*****
-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)
*****
Negative effective stresses were calculated at the base of a slice.
This warning is usually reported for cases where slices have low self
weight and a relatively high "c" shear strength parameter. In such
cases, this effect can only be eliminated by reducing the "c" value.
*****

```

-----  
 USER SELECTED option to maintain strength greater than zero  
 -----

Factors of safety have been calculated by the :

\* \* \* \* \* SIMPLIFIED BISHOP METHOD \* \* \* \* \*

The most critical circular failure surface  
 is specified by 26 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	20.00	100.00
2	21.96	99.62
3	23.94	99.31
4	25.93	99.07
5	27.92	98.89
6	29.91	98.78
7	31.91	98.74
8	33.91	98.77
9	35.91	98.86
10	37.91	99.02
11	39.89	99.24
12	41.87	99.53
13	43.84	99.89
14	45.79	100.31
15	47.73	100.80
16	49.65	101.36
17	51.56	101.98
18	53.44	102.66
19	55.29	103.40
20	57.12	104.21
21	58.93	105.07
22	60.70	106.00
23	62.44	106.99
24	64.14	108.03
25	65.81	109.13
26	67.04	110.00

\*\*\*\* Simplified BISHOP FOS = 2.213 \*\*\*\*

The following is a summary of the TEN most critical surfaces

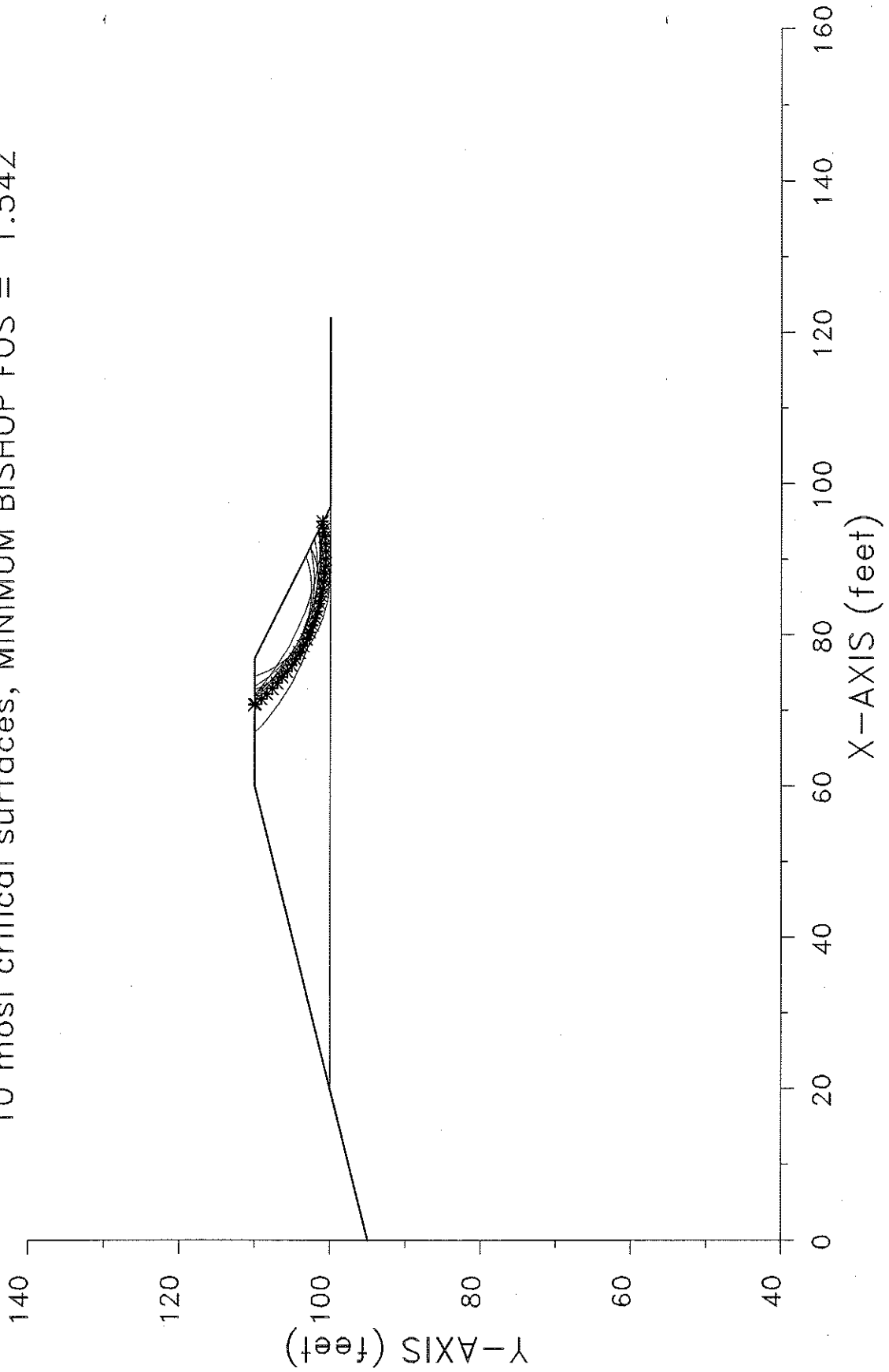
Problem Description : TESSMAN RD LF - 4H:1V CONT DIKE 1T

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2.213	32.19	158.36	59.62	20.00	67.04	6.466E+05
2.	2.349	38.03	119.30	26.41	20.00	62.74	4.725E+05
3.	2.375	30.98	134.62	36.32	20.00	56.95	3.070E+05
4.	2.403	35.59	122.28	25.51	22.22	57.58	2.725E+05
5.	2.479	36.83	137.25	38.20	24.44	63.60	4.004E+05
6.	2.481	28.79	182.10	82.57	20.00	69.01	8.709E+05
7.	2.491	28.97	158.35	59.04	20.00	62.83	5.418E+05
8.	2.507	38.36	150.09	50.92	24.44	69.75	6.228E+05
9.	2.523	42.31	125.47	30.21	24.44	68.25	5.246E+05
10.	2.524	40.78	124.43	26.78	26.67	63.34	3.245E+05

\* \* \* END OF FILE \* \* \*

D2E 12-06-11 8:15

TESSMAN RD LF - 2H:1V CONT DIKE 2E  
10 most critical surfaces, MINIMUM BISHOP FOS = 1.542



```

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*****

```

Problem Description : TESSMAN RD LF - 2H:1V CONT DIKE 2E

-----  
SEGMENT BOUNDARY COORDINATES  
-----

5 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	95.0	20.0	100.0	1
2	20.0	100.0	60.0	110.0	2
3	60.0	110.0	77.0	110.0	2
4	77.0	110.0	97.0	100.0	2
5	97.0	100.0	122.0	100.0	1

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	20.0	100.0	97.0	100.0	1

-----  
ISOTROPIC Soil Parameters  
-----

2 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pressure Constant (psf)	Water Surface No.
---------------	-------------------------	-------------------	--------------------------	----------------------	----------------------------	-------------------------	-------------------

1	65.0	65.0	.0	25.00	.000	.0	0
2	116.0	120.0	100.0	15.00	.000	.0	0

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced along the ground surface between x = 85.0 ft and x = 95.0 ft

Each surface terminates between x = 60.0 ft and x = 75.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 100.0 ft

\* \* \* \* \* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \* \* \* \* \*

1.0 ft line segments define each trial failure surface.

-----  
 ANGULAR RESTRICTIONS  
 -----

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees  
 Upper angular limit := (slope angle - 5.0) degrees

\*\*\*\*\*  
 -- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)  
 \*\*\*\*\*  
 Negative effective stresses were calculated at the base of a slice. This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.  
 \*\*\*\*\*

-----  
 USER SELECTED option to maintain strength greater than zero

-----  
Factors of safety have been calculated by the :

\* \* \* \* \* SIMPLIFIED BISHOP METHOD \* \* \* \* \*

The most critical circular failure surface  
is specified by 29 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	95.00	101.00
2	94.01	100.84
3	93.02	100.72
4	92.02	100.63
5	91.03	100.59
6	90.03	100.59
7	89.03	100.62
8	88.03	100.70
9	87.04	100.81
10	86.05	100.97
11	85.07	101.16
12	84.09	101.39
13	83.13	101.66
14	82.18	101.97
15	81.24	102.31
16	80.32	102.70
17	79.41	103.11
18	78.52	103.57
19	77.64	104.06
20	76.79	104.58
21	75.96	105.14
22	75.15	105.73
23	74.37	106.35
24	73.61	107.00
25	72.88	107.68
26	72.17	108.39
27	71.50	109.12
28	70.85	109.89
29	70.76	110.00

\*\*\*\* Simplified BISHOP FOS = 1.542 \*\*\*\*

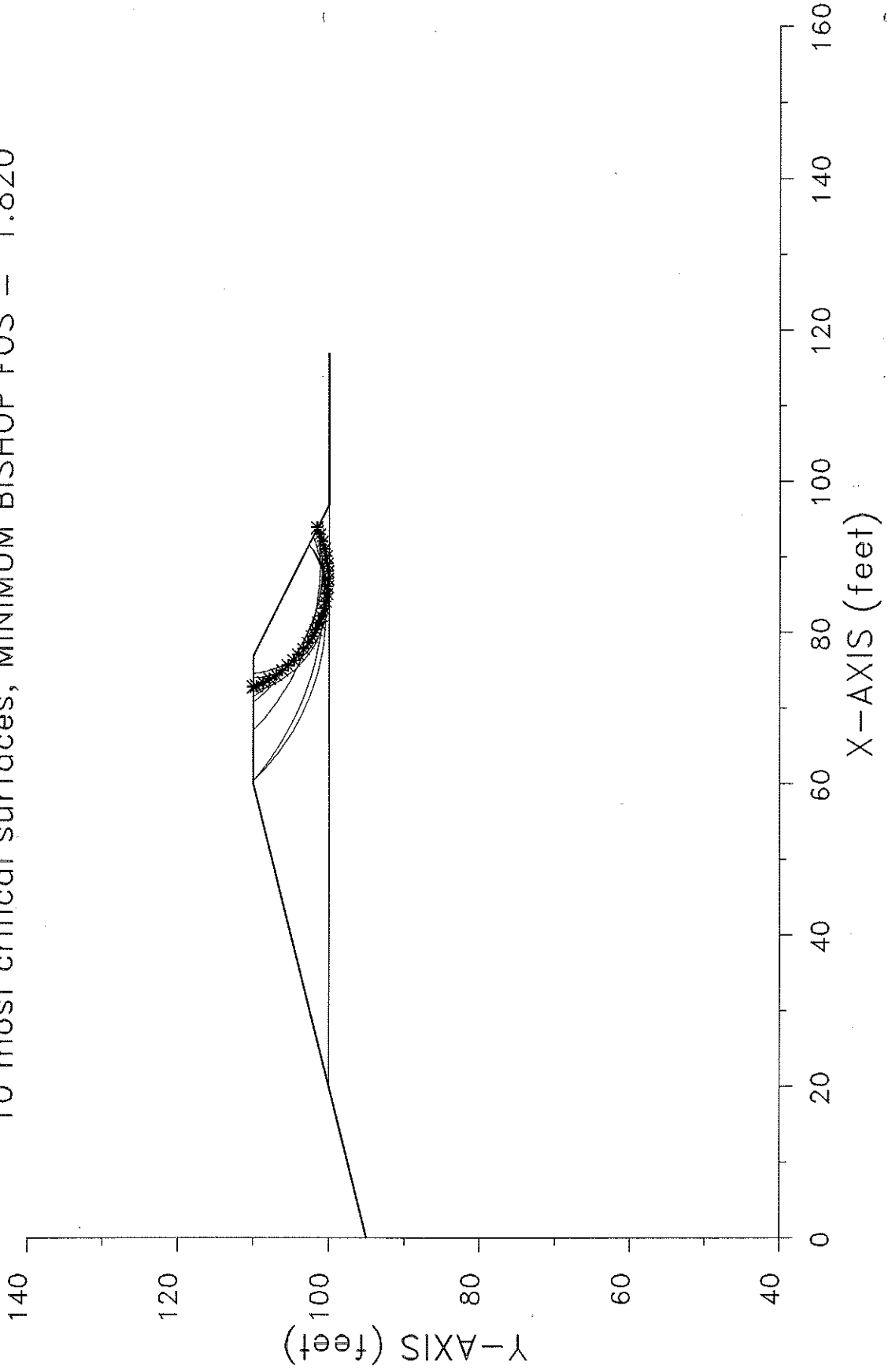
The following is a summary of the TEN most critical surfaces

Problem Description : TESSMAN RD LF - 2H:1V CONT DIKE 2E

	FOS (BISHOP)	Circle x-coord (ft)	Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.542	90.43	125.82	25.24	95.00	70.76	1.373E+05
2.	1.569	88.64	121.54	20.66	93.89	71.51	1.063E+05
3.	1.574	87.34	115.76	15.64	93.89	72.80	8.601E+04
4.	1.604	90.68	126.03	24.68	93.89	71.92	1.114E+05
5.	1.633	88.32	122.14	20.51	92.78	71.79	9.294E+04
6.	1.679	95.75	136.48	35.49	95.00	72.13	1.496E+05
7.	1.689	87.20	120.35	18.23	91.67	72.19	7.566E+04
8.	1.693	86.25	113.66	12.26	91.67	74.55	5.065E+04
9.	1.725	88.92	132.66	31.50	93.89	67.04	1.922E+05
10.	1.742	86.00	117.07	14.58	90.56	73.25	5.403E+04

\* \* \* END OF FILE \* \* \*

TESSMAN RD LF - 2H:1V CONT DIKE 2T  
10 most critical surfaces, MINIMUM BISHOP FOS = 1.820



```

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*                               *
*      Slope Stability Analysis   *
*      using the                 *
*      Method of Slices          *
*                               *
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*      Ver. 5.206                96 - 1927 *
*****

```

Problem Description : TESSMAN RD LF - 2H:1V CONT DIKE 2T

-----  
SEGMENT BOUNDARY COORDINATES  
-----

5 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	95.0	20.0	100.0	1
2	20.0	100.0	60.0	110.0	2
3	60.0	110.0	77.0	110.0	2
4	77.0	110.0	97.0	100.0	2
5	97.0	100.0	117.0	100.0	1

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	20.0	100.0	97.0	100.0	1

-----  
ISOTROPIC Soil Parameters  
-----

2 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
---------------	-------------------------	------------------------	--------------------------	----------------------	----------------------------	------------------------------	-------------------

1	65.0	65.0	.0	25.00	.000	.0	0
2	116.0	120.0	250.0	.00	.000	.0	0

-----  
 -----  
 UNDRAINED STRENGTHS as a function of effective vertical stress  
 have been specified for 1 Soil Unit(s)  
 -----  
 -----

Soil Unit #	Parameter a	Parameter Psi
2.	250.0	.00

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced along the ground surface between x = 85.0 ft and x = 95.0 ft

Each surface terminates between x = 60.0 ft and x = 75.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 100.0 ft

\* \* \* \* \* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \* \* \* \* \*

1.0 ft line segments define each trial failure surface.

-----  
 ANGULAR RESTRICTIONS  
 -----

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees  
 Upper angular limit := (slope angle - 5.0) degrees

```

*****
-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)
*****
Negative effective stresses were calculated at the base of a slice.
This warning is usually reported for cases where slices have low self
weight and a relatively high "c" shear strength parameter. In such
cases, this effect can only be eliminated by reducing the "c" value.
*****

```

```

-----
USER SELECTED option to maintain strength greater than zero
-----

```

Factors of safety have been calculated by the :

\* \* \* \* \* SIMPLIFIED BISHOP METHOD \* \* \* \* \*

The most critical circular failure surface  
is specified by 27 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	93.89	101.56
2	92.97	101.17
3	92.02	100.84
4	91.06	100.57
5	90.08	100.36
6	89.09	100.22
7	88.10	100.14
8	87.10	100.12
9	86.10	100.17
10	85.10	100.28
11	84.12	100.45
12	83.15	100.69
13	82.19	100.99
14	81.26	101.35
15	80.35	101.76
16	79.47	102.24
17	78.62	102.77
18	77.81	103.35
19	77.04	103.99
20	76.31	104.67
21	75.62	105.40
22	74.98	106.17
23	74.40	106.98
24	73.86	107.82
25	73.38	108.70
26	72.96	109.61
27	72.80	110.00

\*\*\*\* Simplified BISHOP FOS = 1.820 \*\*\*\*

The following is a summary of the TEN most critical surfaces

Problem Description : TESSMAN RD LF - 2H:1V CONT DIKE 2T

	FOS (BISHOP)	Circle x-coord (ft)	Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.820	87.34	115.76	15.64	93.89	72.80	9.941E+04
2.	1.924	90.43	125.82	25.24	95.00	70.76	1.713E+05
3.	1.944	88.64	121.54	20.66	93.89	71.51	1.318E+05
4.	1.972	84.41	112.87	12.52	91.67	72.23	7.674E+04
5.	2.061	88.92	132.66	31.50	93.89	67.04	2.297E+05
6.	2.062	84.66	110.75	10.69	91.67	74.00	6.329E+04
7.	2.082	85.62	139.50	38.83	93.89	60.38	3.477E+05
8.	2.083	82.72	131.23	30.81	92.78	60.40	2.712E+05
9.	2.107	85.05	110.75	10.44	91.67	74.65	5.953E+04
10.	2.107	85.04	110.73	10.44	91.67	74.64	5.955E+04

\* \* \* END OF FILE \* \* \*

**APPENDIX III-F2**

**CLASS 1 WASTE CONTAINMENT DIKE  
CONSTRUCTION RECORD FORM**

## CLASS 1 WASTE CONTAINMENT DIKE CONSTRUCTION RECORD

This form is to be completed by the landfill manager or designee to document construction of the above grade Class 1 waste containment dikes. One form will be developed for each containment dike area. This form is to be provided to the Texas Licensed Professional Engineer that will prepare the Containment Dike Certification Form, consistent with Title 30 TAC §335.590(24)(F)(vi).

### A. General Information

1. Area of construction (describe by attaching a drawing or by providing grid coordinates) \_\_\_\_\_  
\_\_\_\_\_
2. Dates of construction: \_\_\_\_\_
3. Describe clay rich soil source or soil borrow area: \_\_\_\_\_  
\_\_\_\_\_
4. Describe equipment used for construction (at a minimum, this must include type of equipment used to compact the dike – e.g., dozer make and model):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### B. Containment Dike Construction

1. Was each lift thickness equal to or less than 9 inches thick?  
(Check one)                      Yes                       No
2. Did minimum number of equipment passes exceed 4 passes per lift?  
(Check one)                      Yes                       No
3. Does the completed containment dike have the following dimensions:  
17-foot top width, height of 10 feet, 4H:1V outside slope, and 2H:1V inside  
slope?  
(Check one)                      Yes                       No

SIGNATURE OF LANDFILL MANAGER OR  
DESIGNEE

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Typed or Printed Name)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Date Signed)

**APPENDIX III-F3**  
**CONTAINMENT DIKE CERTIFICATION FORM**

Note: This appendix includes an example Containment Dike Certification Form. The actual form used must comply with the latest version of the form included in Title 30 TAC §335.590(24)(F)(vi).

**CONTAINMENT DIKE CERTIFICATION FORM**

---

“I, \_\_\_\_\_, Texas P.E. Registration Number \_\_\_\_\_  
(name of Texas Licensed Professional Engineer)

certify under penalty of law that I have personally examined and am familiar with the design and construction of the dikes that are a portion of \_\_\_\_\_  
(unit name)  
\_\_\_\_\_.

I further certify that I have evaluated the dike design and materials of construction using accepted engineering procedures, have determined that the dike has structural integrity, and have determined that the structure:

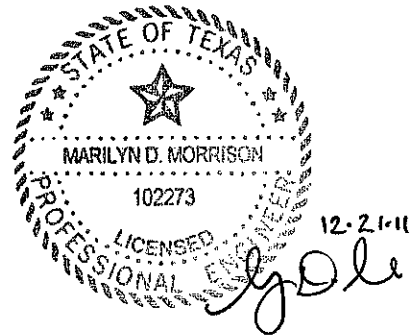
- (1) will withstand the stress of the pressure exerted by the types and amounts of wastes to be placed in the unit; and
- (2) will not fail due to scouring or piping, without dependence on any liner system included in the unit construction.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

(SEAL)

**APPENDIX III-F4**  
**ABOVE GRADE CLASS 1 WASTE**  
**SLOPE STABILITY ANALYSIS**



Includes pages III-F4-1 through III-F4-4

**Purpose:** The purpose of this analysis is to demonstrate that the containment dike configurations for above-grade Class 1 waste disposal Options 1 and 2 are stable against slope failure with a minimum factor of safety of 1.5 for interim and final conditions.

**Method:** The above-grade Class 1 waste stability analysis has been completed using XSTABL 5.206, a computer program developed to model general slope stability. Circular failure surfaces using the Simplified Bishop method and block type failure surfaces using the Rankine method have been generated to analyze the slopes for the configurations given below.

**Option 1:**

- Interim Section 1-1 - 4H:1V sideslope with containment dikes extending partially up the sideslope.
- Closed Condition Section 1-1 - 4H:1V sideslope with containment dikes extending partially up the sideslope, a 4-ft-thick overlying barrier layer, and a final cover system that includes a 4-ft-thick infiltration layer.

**Option 2:**

- Interim Section 2-1 - 4H:1V sideslope with containment dikes for the entire sideslope.
- Closed Condition Section 2-1 - 4H:1V sideslope with containment dikes for the entire sideslope and a final cover system that includes a 4-ft-thick infiltration layer.

The above-grade Class 1 waste configurations are shown on Figures 1-1 and 1-2.

**Procedure:**

1. Input interim and final condition above-grade Class 1 waste configurations.
2. Select strength parameters.
3. Perform analysis to calculate factor of safety.

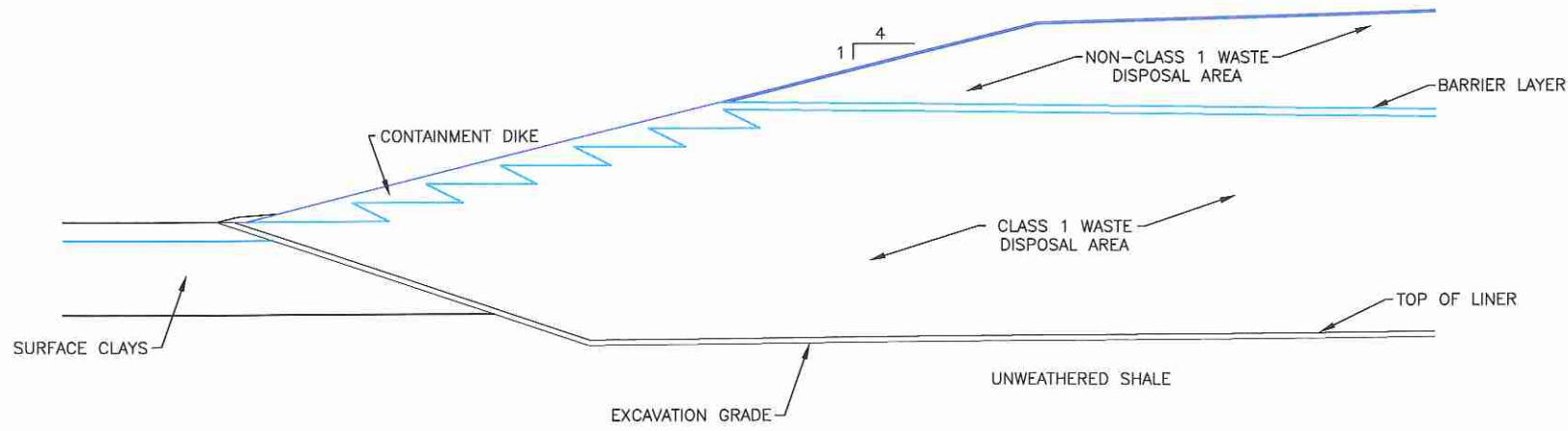
**References:**

1. Duncan, J. Michael and Stephen G. Wright., *Soil Strength and Slope Stability*, John Wiley & Sons, Inc. Hoboken, NJ, 2005
2. Terzaghi, Karl, Peck, Ralph B., and Mesri, Gholamreza, *Soil Mechanics in Engineering Practice, Third Ed.*, John Wiley & Sons, Inc. New York, NY, 1996
3. Day, Robert W., *Geotechnical Engineer's Portable Handbook*, McGraw-Hill Companies, Inc. New York, NY, 2000
4. Abramson, Lee W., Lee, Thomas S., Sharma, Sunil, Boyce, Glenn M., *Slope Stability and Stabilization Methods, 2nd Ed.*, John Wiley & Sons, Inc., New York.

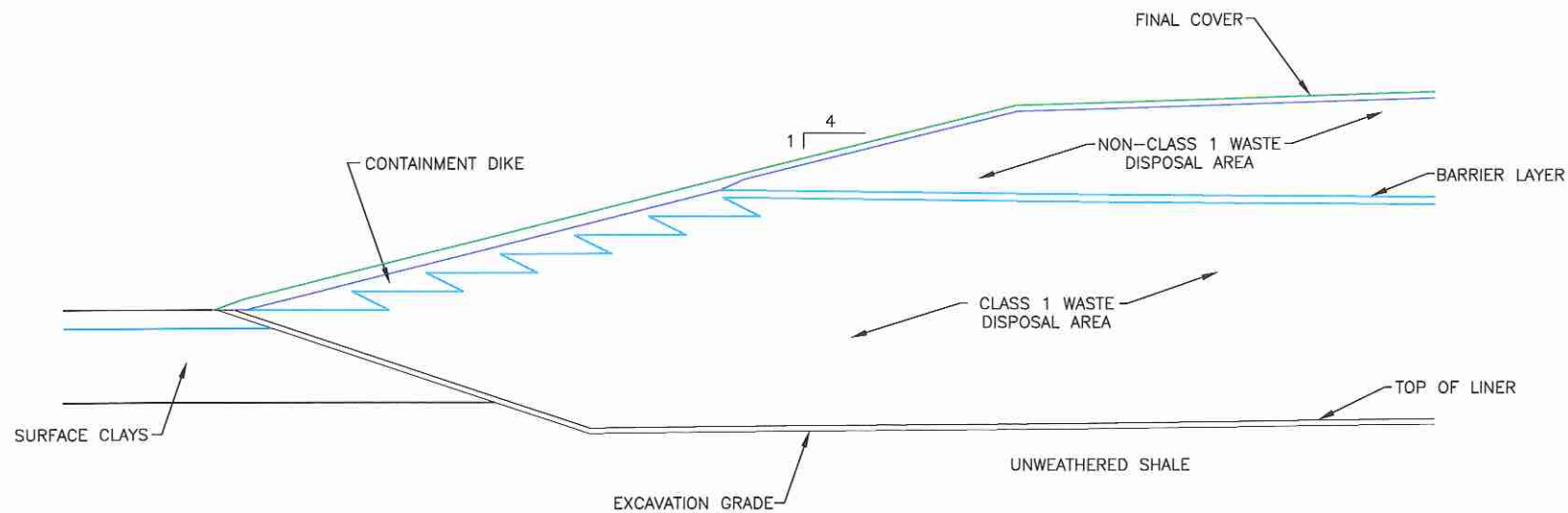
**1. Input interim and final condition containment dike configurations.**

Sections showing the containment dike configurations for above-grade Class 1 waste Options 1 and 2 are shown on Figures 1-1 and 1-2. As illustrated, the configurations show two scenarios: Option 1 - containment dikes that are placed only a portion of the way up the 4H:1V sideslope and Option 2 - containment dikes that are placed along the entire 4H:1V sideslope.

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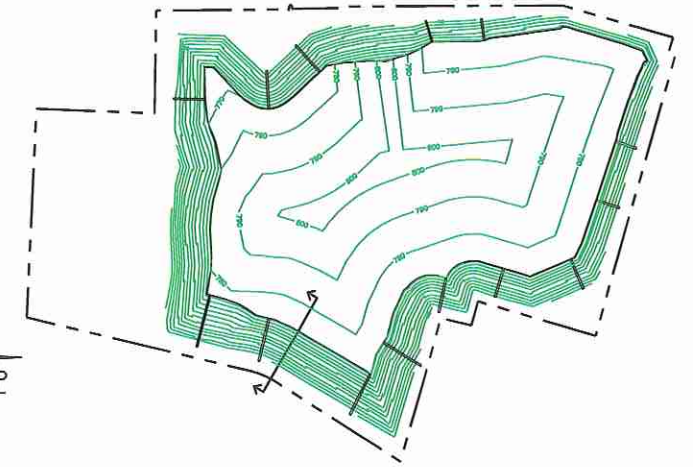


INTERIM SECTION 1-1



CLOSED SECTION 1-1

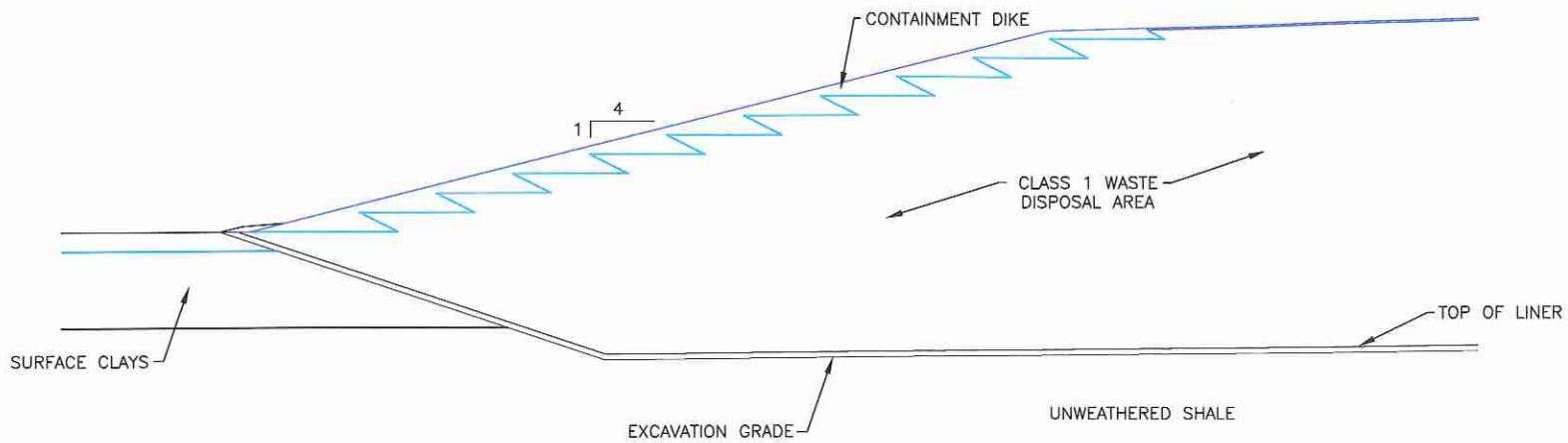
KEY MAP  
(NTS)



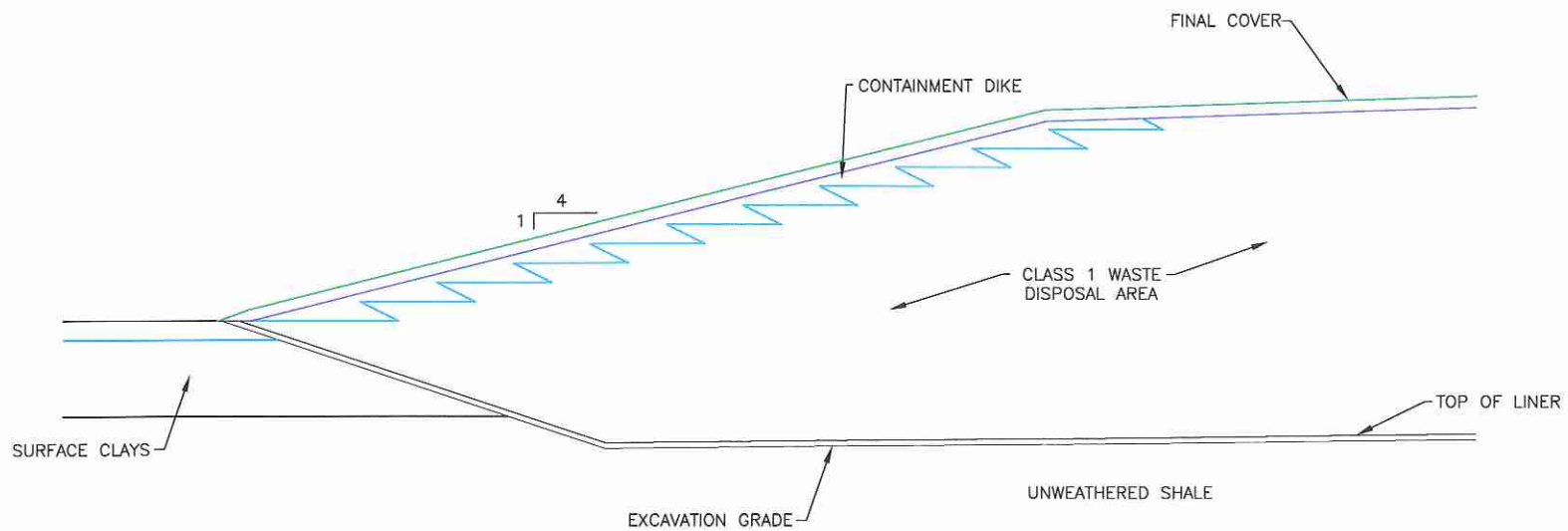
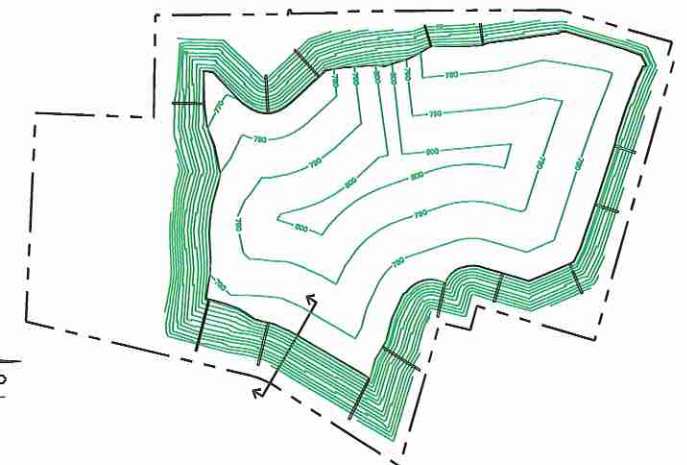
INDICATES REVISION  
(SEE LIST OF REVISIONS BELOW)

LIST OF REVISIONS:  
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DATE: 12/2011 FILE: 0120-109-11 CAD: 1-1_SEC 1.DWG		DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM		<i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727	
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		1    12/2011    SEE LIST OF REVISIONS		<b>FIGURE 1-1</b>	



INTERIM SECTION 2-1



CLOSED SECTION 2-1



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	DATE: 12/2011 FILE: 0120-109-11 CAD: 1-2_SEC 1.DWG	DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM	REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>SEE LIST OF REVISIONS</td> </tr> </tbody> </table>			NO.	DATE	DESCRIPTION	1	12/2011	SEE LIST OF REVISIONS	<i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727 <small>CHICAGO, IL    FORT WORTH, TX    GRAND RAPIDS, MI          NAPERVILLE, IL    SOUTH BEND, IN    SOUTH BEND, IN          COLUMBUS, OH    EVANSVILLE, IN    SPRINGFIELD, IL          DENVER, CO    RIVERSIDE, MO    CLEARMONT, FL</small>
NO.	DATE	DESCRIPTION										
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**2. Select Strength Parameters**

The slope stability analysis has been developed for both total and effective stress conditions to address short and long term conditions that will exist after the installation of the dikes. The selected strength parameters for the containment dike and other materials are described below.

**EFFECTIVE STRESS SOIL PROPERTIES**

Unit	Unit Weight		Cohesion Intercept (psf)	Friction Angle (deg)	Comments
	Moist (pcf)	Saturated (pcf)			
Dike	116	120	100	15	Refer to page III-F1-3 for more information.
Final Cover	116	120	100	15	Typical value for final cover soils.
Waste	65	65	0	25	These values match the values used in the stability analyses. Refer to Appendix III-E for more information.
Liner - 3H:1V	120	120	0	19	
Liner - Bottom	120	120	0	10	
Surface Clay, Upper & Lower Clays	120	120	0	23	
Unweathered Shale	120	120	0	21	

**TOTAL STRESS SOIL PROPERTIES**

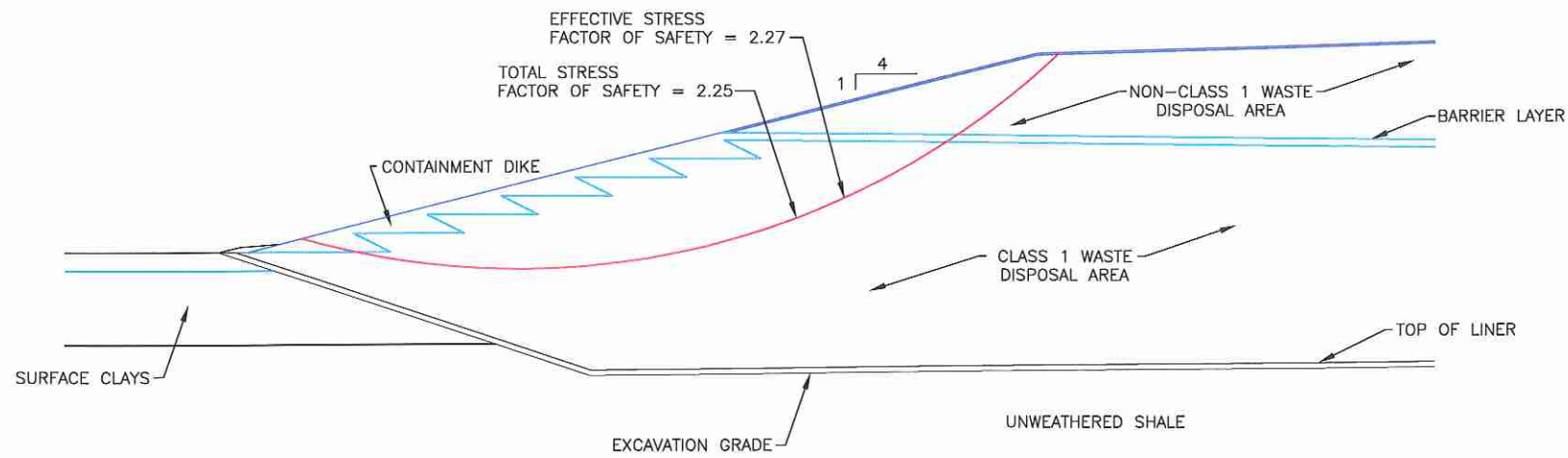
Unit	Unit Weight		Cohesion Intercept (psf)	Friction Angle (deg)	Comments
	Moist (pcf)	Saturated (pcf)			
Dike	116	120	250	0	Refer to page III-F1-3 for more information.
Final Cover	116	120	100	15	Typical value for final cover soils.
Waste	65	65	0	25	These values match the values used in the stability analyses. Refer to Appendix III-E for more information.
Liner - 3H:1V	120	120	0	19	
Liner - Bottom	120	120	0	10	
Surface Clay, Upper & Lower Clays	125	125	3750	0	
Unweathered Shale	125	125	4500	0	

**3. Perform Analysis to Calculate Factor of Safety.**

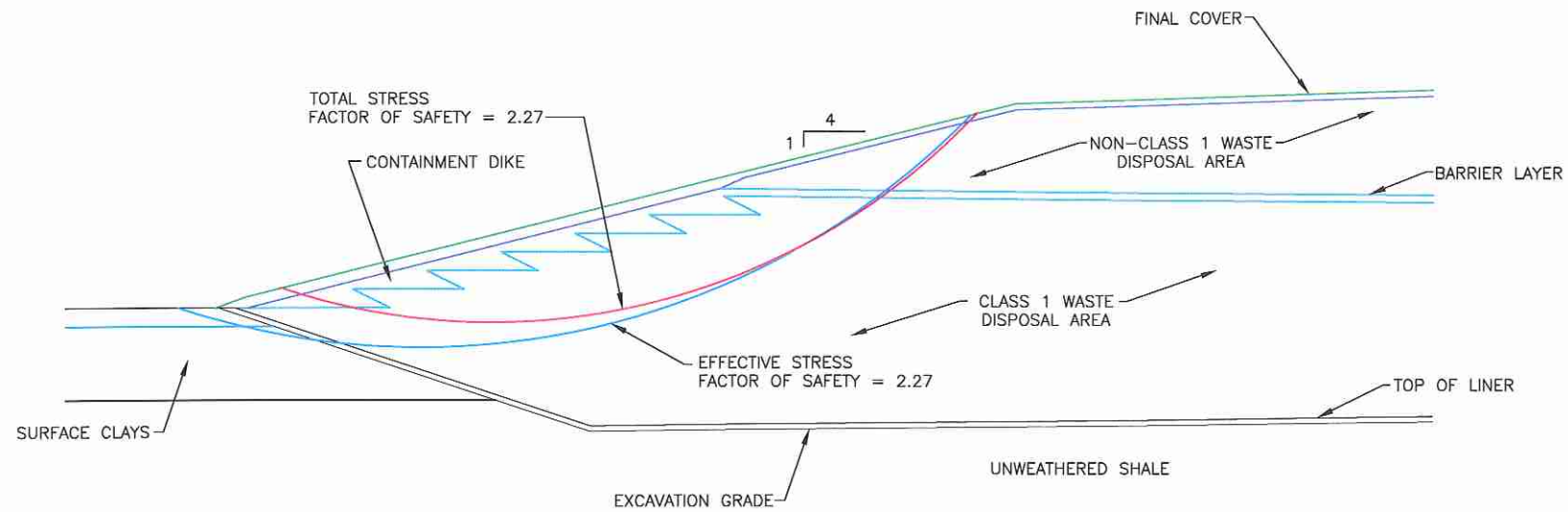
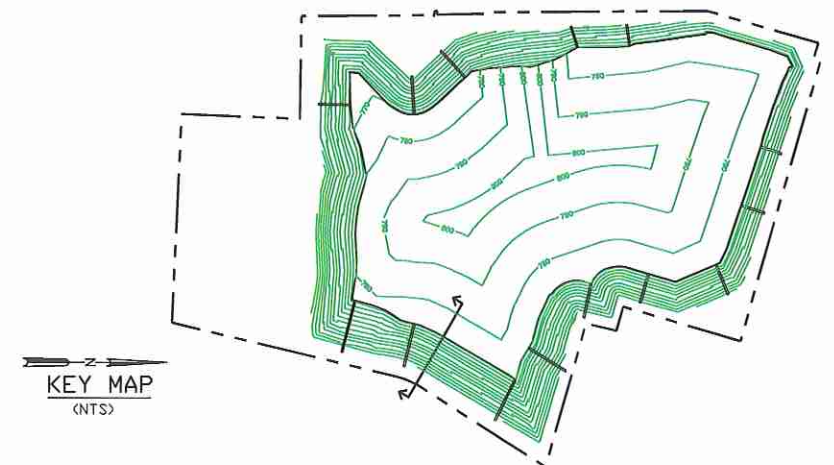
The calculated factors of safety are shown below and summarized on Figures 3-1 and 3-2. As noted, all the calculated factors of safety, using conservatively selected strength parameters, are above 1.5. Additionally, the results below demonstrate that a variety of assumed unit weight values for the waste all result in acceptable factors of safety. Therefore, the proposed design meets §335.590(24)(F)(i)(II) which requires the containment dike to "be physically stable against slope failure, with a minimum safety factor of 1.5."

**Table 3-1  
Stability Analysis Results**

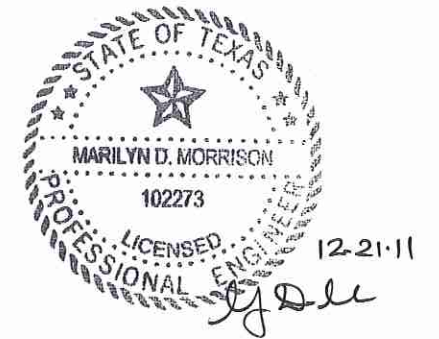
Slope Designation	Method of Analysis	Minimum Factor of Safety Generated		Recommended Minimum Factor of Safety	Acceptable Factor of Safety
		Total Stress	Effective Stress		
<b>Option 1</b>					
Interim Condition, Section 1-1	Bishop-Circular	2.25	2.27	1.5	YES
Interim Condition, Section 1-2	Rankine-Block	2.58	2.59	1.5	YES
Closed Condition, Section 1-1	Bishop-Circular	2.27	2.27	1.5	YES
Closed Condition, Section 1-2	Rankine-Block	2.76	2.78	1.5	YES
<b>Option 2</b>					
Interim Condition, Section 2-1	Bishop-Circular	2.13	2.14	1.5	YES
Interim Condition, Section 2-2	Rankine-Block	2.47	2.47	1.5	YES
Closed Condition, Section 2-1	Bishop-Circular	2.08	2.11	1.5	YES
Closed Condition, Section 2-2	Rankine-Block	2.53	2.54	1.5	YES



INTERIM SECTION 1-1



CLOSED SECTION 1-1

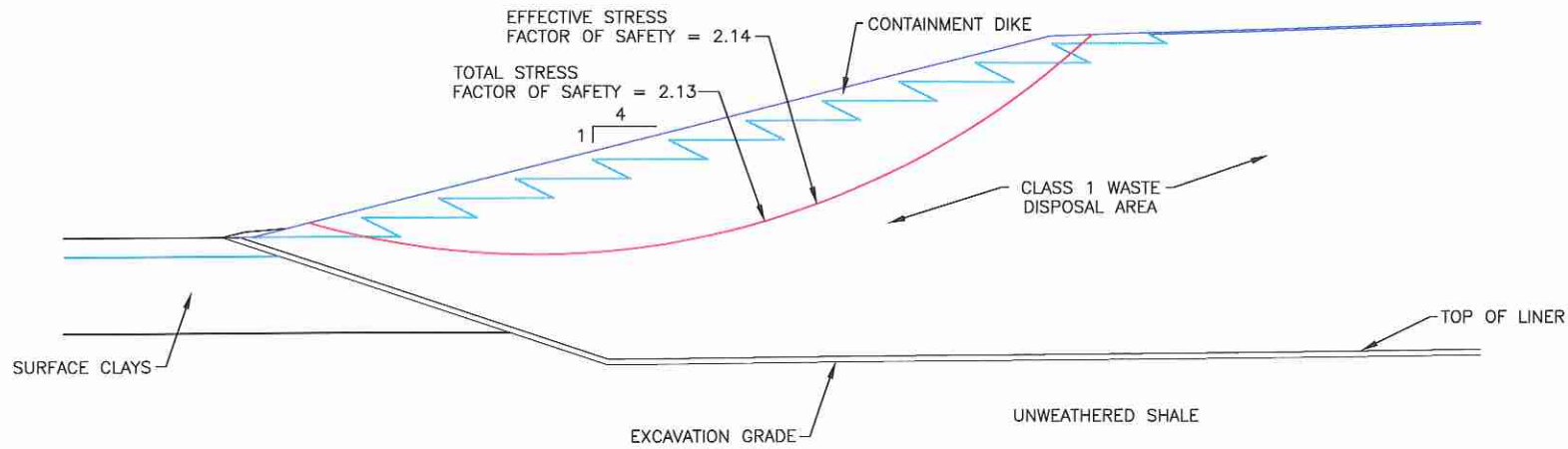


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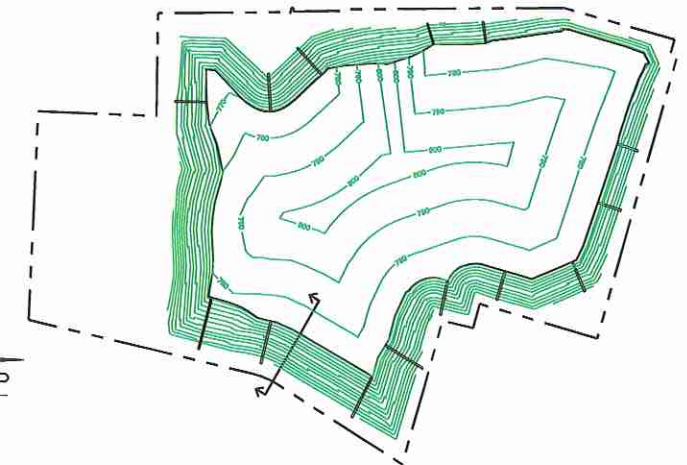
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	DATE: 12/2011 FILE: 0120-109-11 CAD: 3-1 DIKE.DWG	DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM		REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>SEE LIST OF REVISIONS</td> </tr> </tbody> </table>	NO.	DATE	DESCRIPTION	1
NO.	DATE	DESCRIPTION						
1	12/2011	SEE LIST OF REVISIONS						
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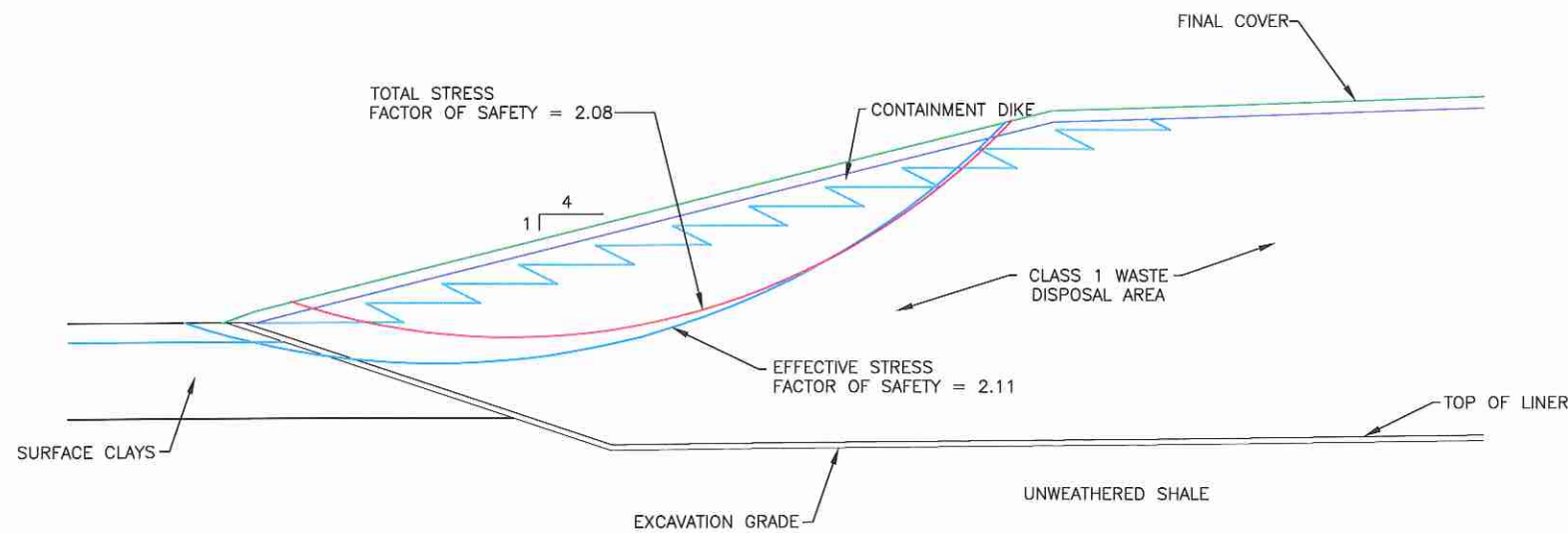
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INTERIM SECTION 2-1



KEY MAP  
(NTS)



CLOSED SECTION 2-1



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	BFI WASTE SYSTEMS OF NORTH AMERICA, LLC								
DATE: 12/2011 FILE: 0120-109-11 CAD: 3-2_SEC 1.DWG	DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM	REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>SEE LIST OF REVISIONS</td> </tr> </tbody> </table>		NO.	DATE	DESCRIPTION	1	12/2011	SEE LIST OF REVISIONS
NO.	DATE	DESCRIPTION							
1	12/2011	SEE LIST OF REVISIONS							
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**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

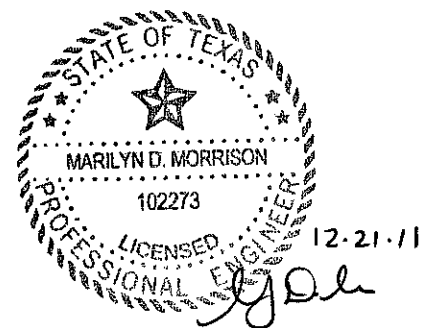
**PART III  
ATTACHMENT 1  
SITE LAYOUT PLAN**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999  
Revised November 2009

Revised December 2011



Prepared by

**Weaver Boos Consultants, LLC—Southwest**  
TBPE Registration No. F-3727  
6420 Southwest Boulevard, Suite 206  
Fort Worth, Texas 76109  
(817) 735-9770

Project No. 0120-109-11-54-01

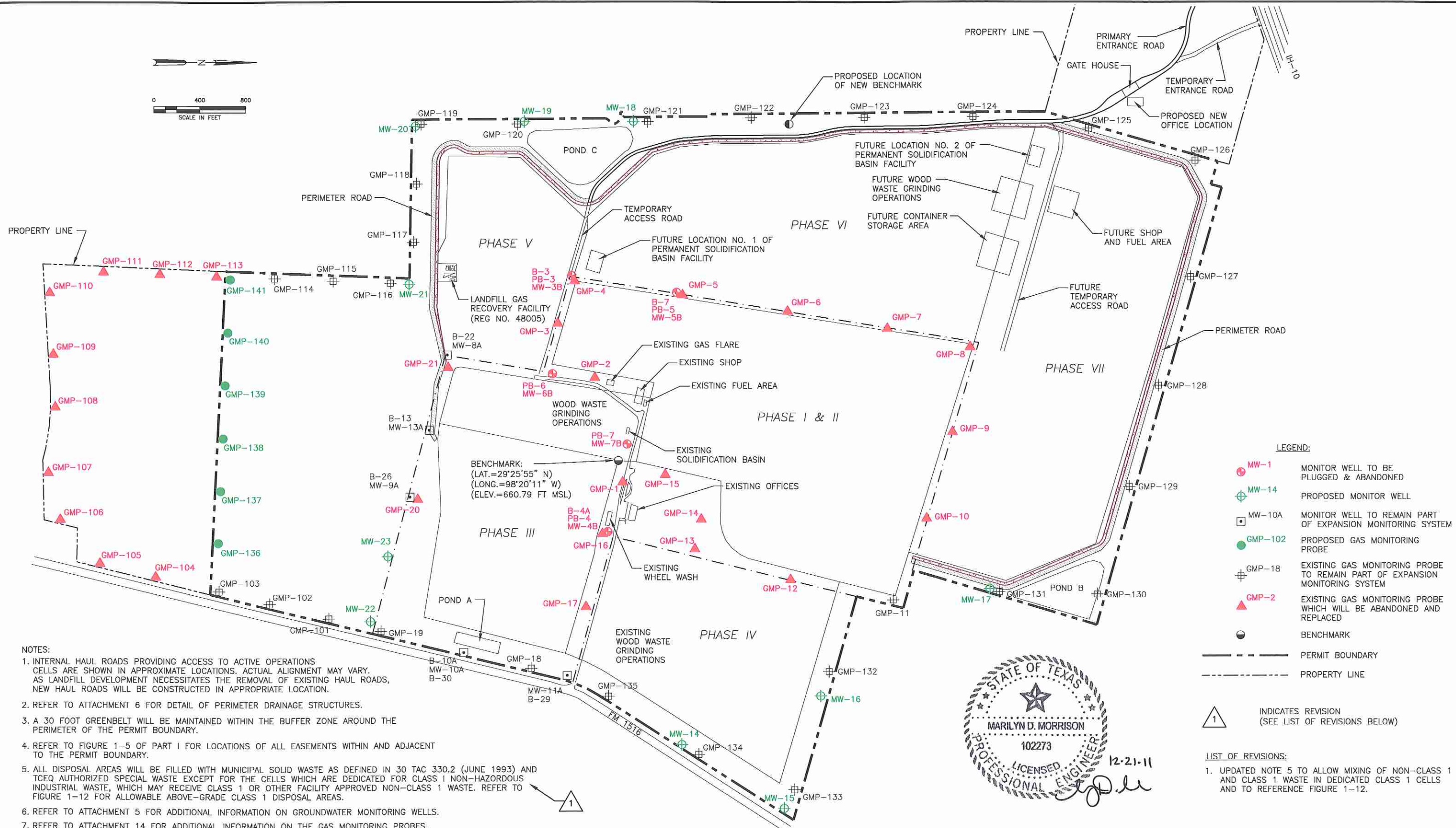
# ATTACHMENT 1 LIST OF FIGURES

## FIGURES (330.56(A))

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- 1-1 SITE LAYOUT PLAN
- 1-2 GENERAL SEQUENCE OF FILL AND CELL LAYOUT
- 1-3 SITE ENTRANCE
- 1-4 SITE ENTRANCE SECTION OPTIONS
- 1-5 FINAL CONTOUR MAP
- 1-6 SCREENING BERM LOCATION MAP
- 1-7 TYPICAL DEDICATED CLASS I NON-HAZARDOUS INDUSTRIAL WASTE CELL
- 1-8 SOLAR ENERGY SYSTEM PLAN LOCATION
- 1-9 SOLAR PANEL LAYOUT
- 1-10 SOLAR ENERGY SYSTEM TYPICAL DETAILS
- 1-11 SOLAR ENERGY SYSTEM TYPICAL DETAILS
- 1-12 ALLOWABLE CLASS 1 DISPOSAL AREAS
- 1-13 CLASS 1 WASTE DISPOSAL AREA OPTIONS

O:\0120\109\CLASS 1 WASTE MOD\ATT 1\FIG 1-1 SITE LAYOUT PLAN.dwg, 12/7/2011 1:57:48 PM, f.sellers



**NOTES:**

- INTERNAL HAUL ROADS PROVIDING ACCESS TO ACTIVE OPERATIONS CELLS ARE SHOWN IN APPROXIMATE LOCATIONS. ACTUAL ALIGNMENT MAY VARY. AS LANDFILL DEVELOPMENT NECESSITATES THE REMOVAL OF EXISTING HAUL ROADS, NEW HAUL ROADS WILL BE CONSTRUCTED IN APPROPRIATE LOCATION.
- REFER TO ATTACHMENT 6 FOR DETAIL OF PERIMETER DRAINAGE STRUCTURES.
- A 30 FOOT GREENBELT WILL BE MAINTAINED WITHIN THE BUFFER ZONE AROUND THE PERIMETER OF THE PERMIT BOUNDARY.
- REFER TO FIGURE 1-5 OF PART I FOR LOCATIONS OF ALL EASEMENTS WITHIN AND ADJACENT TO THE PERMIT BOUNDARY.
- ALL DISPOSAL AREAS WILL BE FILLED WITH MUNICIPAL SOLID WASTE AS DEFINED IN 30 TAC 330.2 (JUNE 1993) AND TCEQ AUTHORIZED SPECIAL WASTE EXCEPT FOR THE CELLS WHICH ARE DEDICATED FOR CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE, WHICH MAY RECEIVE CLASS 1 OR OTHER FACILITY APPROVED NON-CLASS 1 WASTE. REFER TO FIGURE 1-12 FOR ALLOWABLE ABOVE-GRADE CLASS 1 DISPOSAL AREAS.
- REFER TO ATTACHMENT 5 FOR ADDITIONAL INFORMATION ON GROUNDWATER MONITORING WELLS.
- REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION ON THE GAS MONITORING PROBES.
- FENCING WILL BE INSTALLED ALONG LATERAL EXPANSION SITE BOUNDARY AS SITE DEVELOPMENT PROGRESS.
- NO WASTE DISPOSAL ACTIVITIES AUTHORIZED BY PERMIT AMENDMENT 1410-C WILL BE WITHIN 100 FEET OF THE PERMIT BOUNDARY IN ACCORDANCE WITH CSA ZONING ORDINANCE 80809.
- TEMPORARY LIQUID WASTE SOLIDIFICATION FACILITY TO BE RELOCATED FROM TIME TO TIME WITHIN THE WASTE FOOTPRINT IN ACCORDANCE WITH THE TEMPORARY LIQUID WASTE SOLIDIFICATION FACILITY DESIGN DETAIL (SEE FIGURE 1-7).
- ONLY ONE LIQUID WASTE SOLIDIFICATION FACILITY, TEMPORARY OR PERMANENT, WILL BE UTILIZED AT ANY GIVEN TIME DURING LANDFILL OPERATIONS.
- PRIOR TO RELOCATION OF LIQUID WASTE SOLIDIFICATION FACILITY, TEMPORARY OR PERMANENT, DESIGN DRAWINGS WILL BE SUBMITTED TO TCEQ FOR REVIEW.

**LEGEND:**

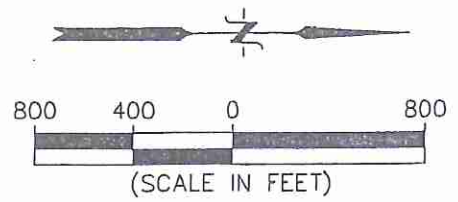
- MW-1 MONITOR WELL TO BE PLUGGED & ABANDONED
- MW-14 PROPOSED MONITOR WELL
- MW-10A MONITOR WELL TO REMAIN PART OF EXPANSION MONITORING SYSTEM
- GMP-102 PROPOSED GAS MONITORING PROBE
- GMP-18 EXISTING GAS MONITORING PROBE TO REMAIN PART OF EXPANSION MONITORING SYSTEM
- GMP-2 EXISTING GAS MONITORING PROBE WHICH WILL BE ABANDONED AND REPLACED
- BENCHMARK
- PERMIT BOUNDARY
- PROPERTY LINE
- INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

**LIST OF REVISIONS:**

- UPDATED NOTE 5 TO ALLOW MIXING OF NON-CLASS 1 AND CLASS 1 WASTE IN DEDICATED CLASS 1 CELLS AND TO REFERENCE FIGURE 1-12.

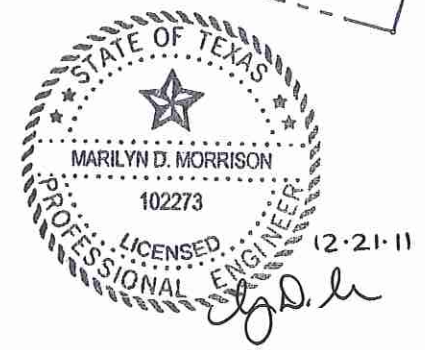


<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY:	PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>	<b>SITE LAYOUT PLAN</b>							
	DATE: 07/2005 FILE: 0120-109-11 CAD: 1-1 SITE LAYOUT.dwg	DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: JPY	TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS						
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REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>SEE LIST OF REVISIONS</td> </tr> </tbody> </table>		NO.	DATE	DESCRIPTION	1	12/2011	SEE LIST OF REVISIONS	CHICAGO, IL NAPERVILLE, IL COLUMBUS, OH DENVER, CO	
NO.	DATE	DESCRIPTION							
1	12/2011	SEE LIST OF REVISIONS							
		FORT WORTH, TX EVANSVILLE, IN RIVERSIDE, MO							
		GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARMONT, FL							
<b>FIGURE 1-1</b>									



- LEGEND**
- PHASE BOUNDARY
  - PERMIT BOUNDARY
  - PROPERTY LINE
  - CELL DIMENSION SEQUENCE OF FILL

- INDICATES REVISION (SEE LIST OF REVISIONS BELOW)
- LIST OF REVISIONS:  
1. ADDED NOTE 5.

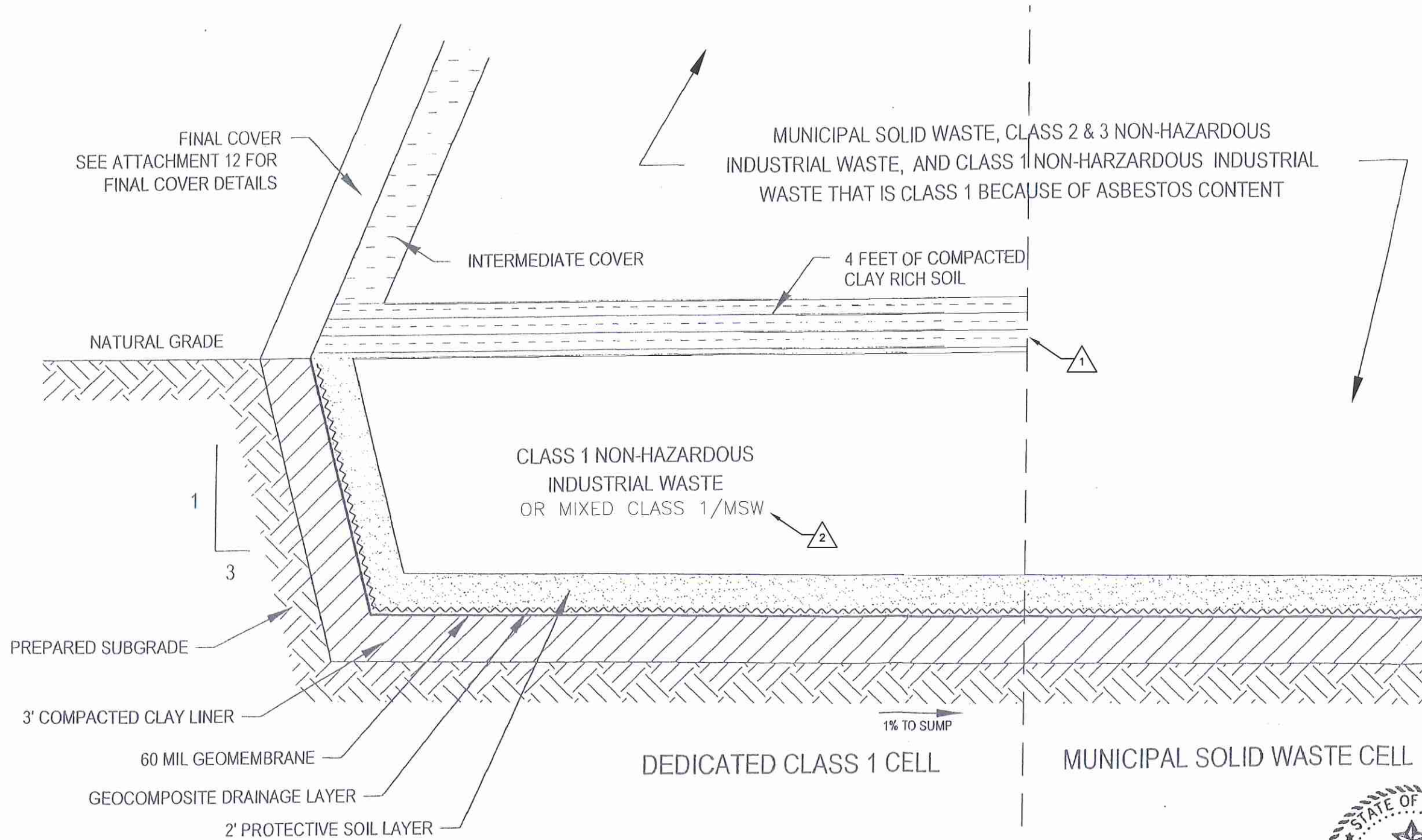


- NOTES:**
1. PHASES REFER TO GENERAL PROGRESSION OF LANDFILL DEVELOPMENT.
  2. CELL DIMENSIONS ARE APPROXIMATE.
  3. REFER TO "SEQUENCE OF LANDFILL DEVELOPMENT" SECTION IN ATTACHMENT 1 FOR DETAILED INFORMATION REGARDING FILL SEQUENCE.
  4. BELOW GRADE PORTIONS OF CELLS MAY BE DEDICATED FOR DISPOSAL OF NON-HAZARDOUS INDUSTRIAL WASTE WITH PRIOR APPROVAL FROM THE TCEQ.
  5. REFER TO FIGURE 1-12 FOR ALLOWABLE ABOVE-GRADE CLASS 1 DISPOSAL AREAS.

<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY:		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>GENERAL SEQUENCE OF FILL AND CELL LAYOUT</b>  TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS  <i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727												
DATE: 07/2005 FILE: 0120-109-11 CAD: 1-2 SEQ. OF FILL.DWG		DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM														
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NO.	DATE	DESCRIPTION														
1	12/2011	SEE LIST OF REVISIONS														

O:\0120\109\CLASS 1 WASTE MOD\ATT 1\FIG 1-2\_SEQUENCE OF FILL.dwg, 12/7/2011 2:00:49 PM, rselliers

C:\0120\109\CLASS 1 WASTE MOD\ATT 1\FIG 1-7 DETAIL.dwg, 12/7/2011 2:01:31 PM, rseliers



MUNICIPAL SOLID WASTE, CLASS 2 & 3 NON-HAZARDOUS INDUSTRIAL WASTE, AND CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE THAT IS CLASS 1 BECAUSE OF ASBESTOS CONTENT

CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE OR MIXED CLASS 1/MSW

DEDICATED CLASS 1 CELL

MUNICIPAL SOLID WASTE CELL



**1** INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

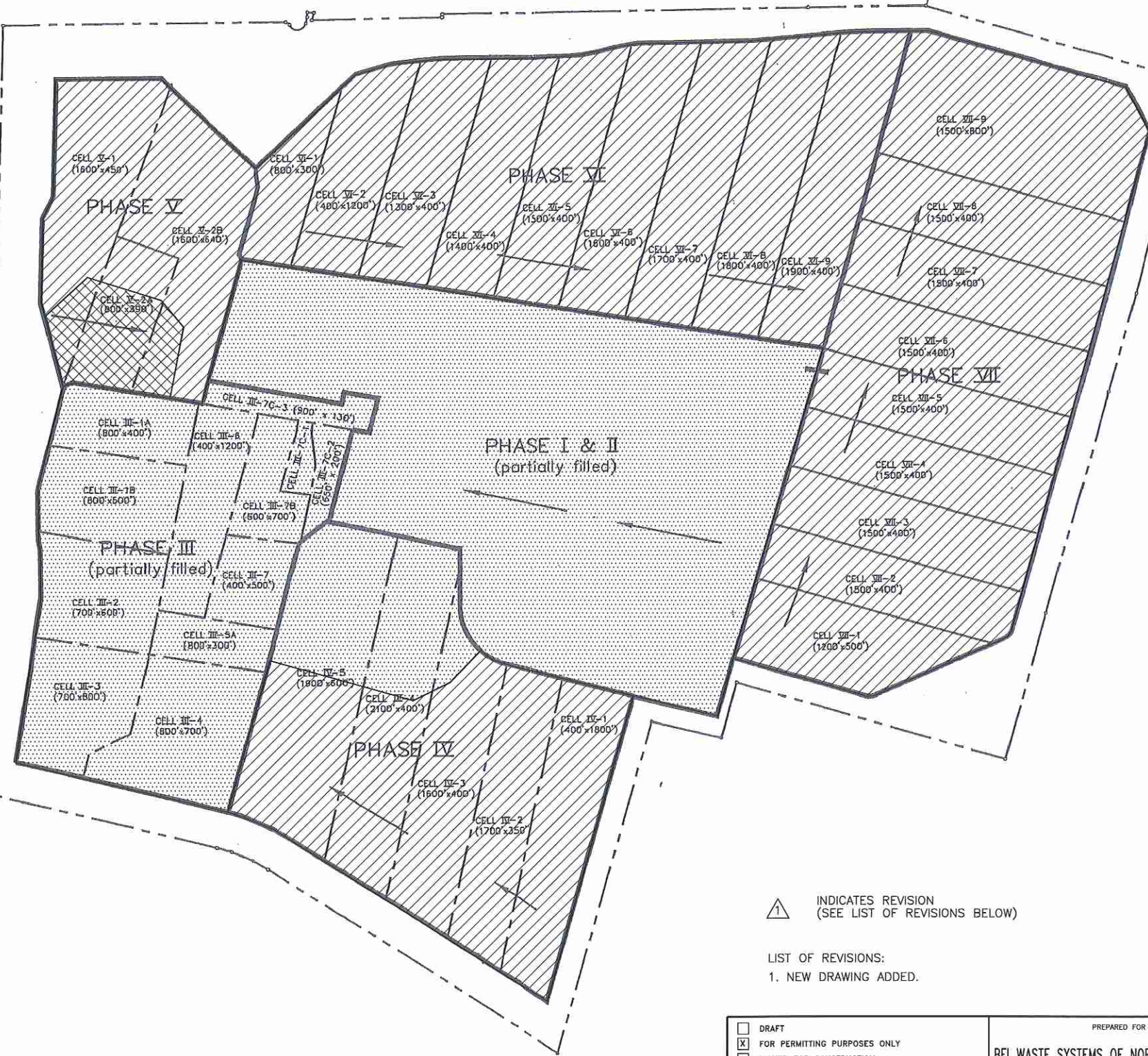
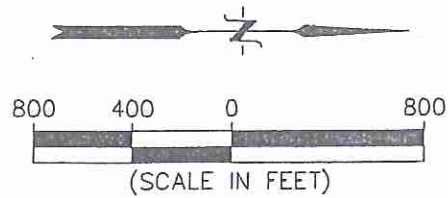
- LIST OF REVISIONS:
1. REVISED BARRIER LAYER TERMINATION.
  2. NOTED THAT CLASS 1 WASTE MAY BE MIXED WITH MSW.

<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY:		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>							
DATE: 12/2003 FILE: 0120-81-11 CAD: 1-7_ CELL DETAIL.DWG	DRAWN BY: VRS DESIGN BY: MDM REVIEWED BY: JPY	REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>SEE LIST OF REVISIONS</td> </tr> </tbody> </table>		NO.	DATE	DESCRIPTION	1	12/2011	SEE LIST OF REVISIONS
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TYPICAL DEDICATED CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE CELL  
 TESSMAN ROAD LANDFILL  
 BEXAR COUNTY, TEXAS

*Weaver Boos Consultants*  
 TBPE REGISTRATION NO. F-3727

CHICAGO, IL    FORT WORTH, TX    GRAND RAPIDS, MI  
 NAPERVILLE, IL    SOUTH BEND, IN  
 COLUMBUS, OH    EVANSVILLE, IN    SPRINGFIELD, IL  
 DENVER, CO    RIVERSIDE, MO    CLEARMONT, FL



**LEGEND**

- PHASE BOUNDARY
- PERMIT BOUNDARY
- PROPERTY LINE
- (1100'x500') CELL DIMENSION SEQUENCE OF FILL
- EXISTING CONSTRUCTED MSW AREA
- FUTURE MSW OR CLASS 1 DISPOSAL AREA (SEE NOTE 1)
- EXISTING CONSTRUCTED CLASS 1 DISPOSAL AREA (SEE NOTE 1)

INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

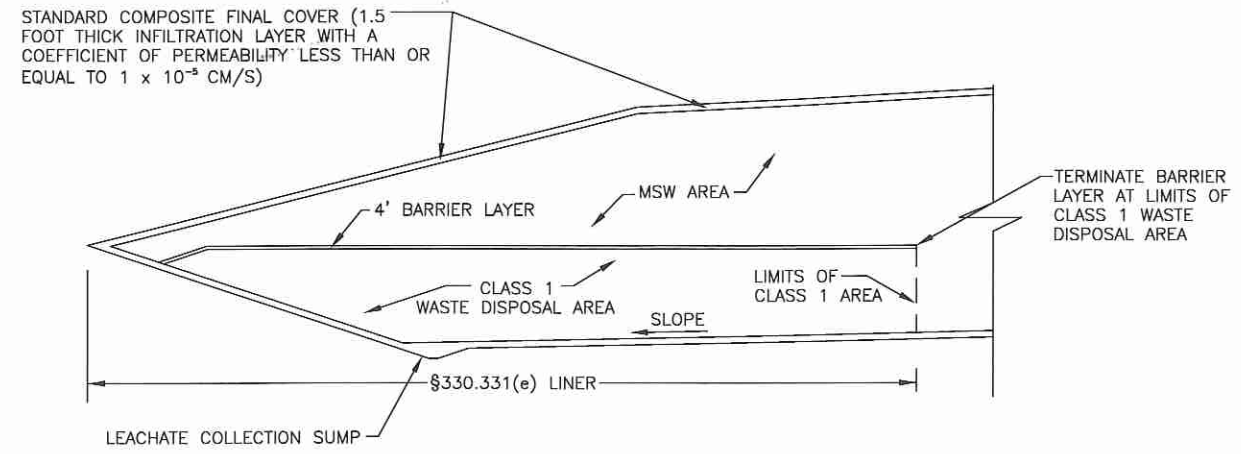
LIST OF REVISIONS:  
1. NEW DRAWING ADDED.

- NOTES:**
- ABOVE GRADE CLASS 1 WASTE DISPOSAL MAY OCCUR IN THE EXISTING CONSTRUCTED CLASS 1 DISPOSAL AREA AND IN THE UNDEVELOPED AREAS OF PHASE IV, V, VI, AND VII IF A LINER SYSTEM IS CONSTRUCTED IN COMPLIANCE WITH 30 TAC §330.331(e).
  - CLASS 1 WASTE MAY BE MIXED WITH MUNICIPAL SOILD WASTE AND OTHER WASTE TYPES ACCEPTED AT THE FACILITY IN AREAS WITH A LINER SYSTEM CONSTRUCTED IN COMPLIANCE WITH 30 TAC §330.331(e). REFER TO APPENDIX III-F.

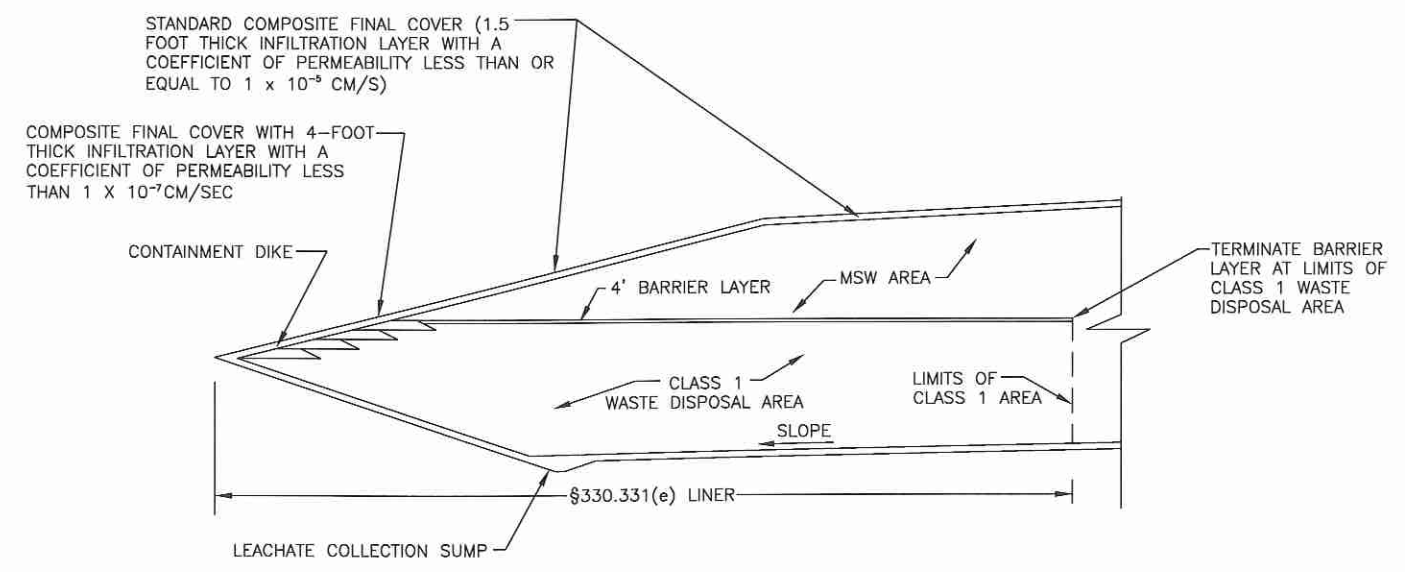
<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY:		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>ALLOWABLE CLASS 1 DISPOSAL AREAS</b>  TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS  <i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727									
DATE: 12/2011 FILE: 0120-109-11 CAD: 1-12 CLASS 1 AREAS.DWG		DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM											
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NO.	DATE	DESCRIPTION											
1	12/2011	SEE LIST OF REVISIONS											
<b>FIGURE 1-12</b>													

O:\0120\109\CLASS 1 WASTE MOD\ATT 1\FIG 1-12 CLASS 1 AREAS.dwg, 12/7/2011 2:02:35 PM, rsellers

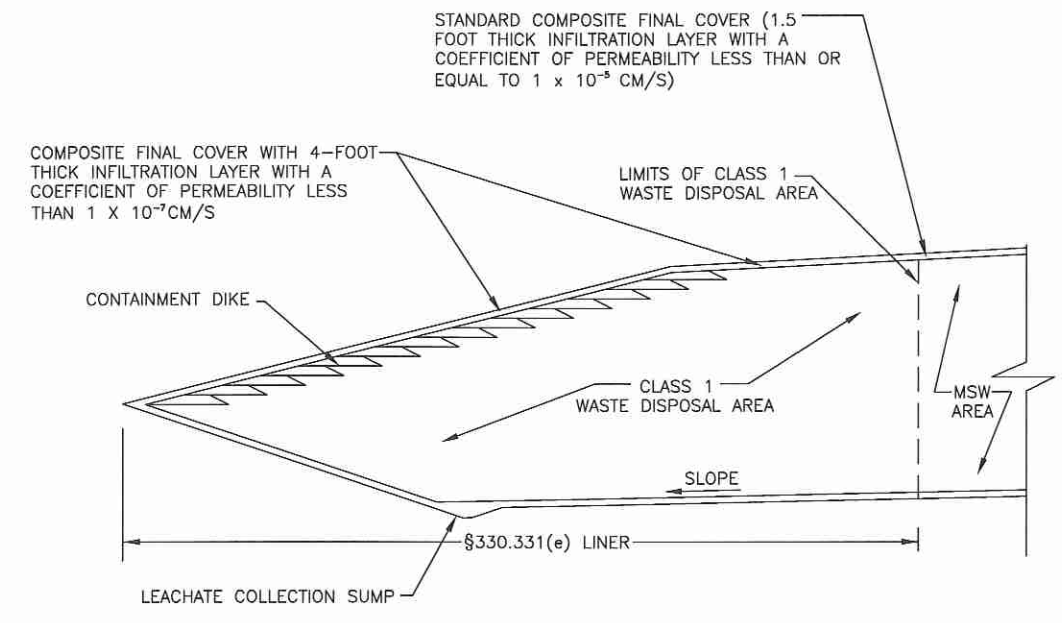
O:\0120\109\CLASS 1 WASTE MOD\ATT 1\FIG 1-13\_CLASS 1 OPTIONS.dwg, 12/8/2011 8:46:39 AM, rshellers



**OPTION 1 – BELOW GRADE CLASS 1 DISPOSAL AREA WITH SEPARATION LAYER**



**OPTION 2 – ABOVE GRADE CLASS 1 DISPOSAL AREA WITH SEPARATION LAYER**



**OPTION 3 – ABOVE GRADE CLASS 1 DISPOSAL AREA**

- NOTES:**
1. CLASS 1 WASTE AND CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE ARE USED INTERCHANGEABLY.
  2. REFER TO FIGURE 1-12 FOR ALLOWABLE ABOVE-GRADE CLASS 1 DISPOSAL AREAS.



**1** INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

- LIST OF REVISIONS:**
1. NEW DRAWING ADDED.

<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY: _____		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>CLASS 1 WASTE DISPOSAL AREA OPTIONS</b>  TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS													
DATE: 12/2011 FILE: 0120-109-11 CAD: FIG 1-13-DETAILS.DWG		DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY		<b>Weaver Boos Consultants</b> TBPE REGISTRATION NO. F-3727													
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NO.	DATE	DESCRIPTION															
1	12/2011	SEE LIST OF REVISIONS															

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

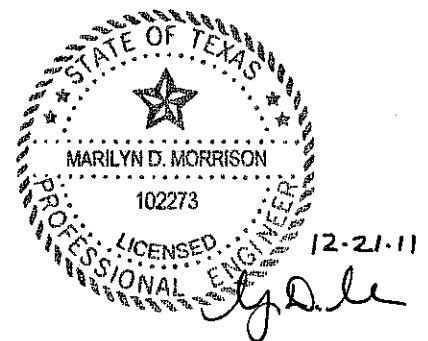
**PART III  
ATTACHMENT 2  
FILL CROSS SECTIONS**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999  
Revised April 2005

Revised December 2011



Prepared by

**Weaver Boos Consultants, LLC—Southwest**  
TBPE Registration No. F-3727  
6420 Southwest Boulevard, Suite 206  
Fort Worth, Texas 76109  
(817) 735-9770

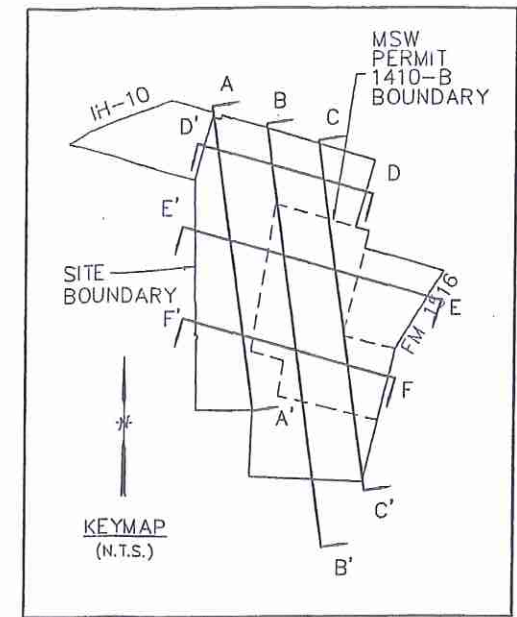
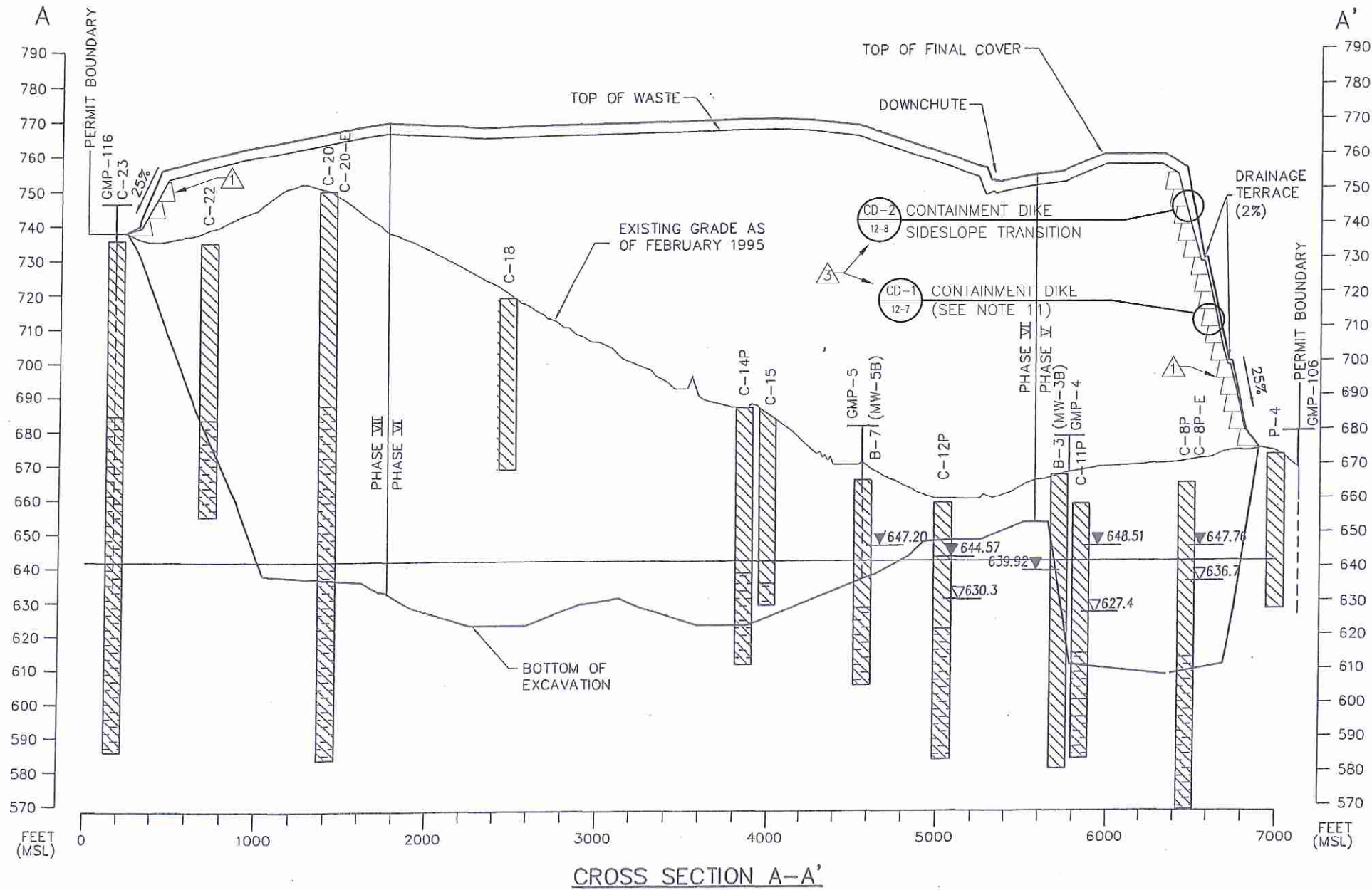
Project No. 0120-109-11-54-01

## LIST OF FIGURES

### FIGURES (330.56(b))

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2-1	CROSS SECTION A-A'
2-2	CROSS SECTION B-B'
2-3	CROSS SECTION C-C'
2-4	CROSS SECTION D-D'
2-5	CROSS SECTION E-E'
2-6	CROSS SECTION F-F'
2-7	CROSS SECTION G-G'
2-8	PERIMETER BERM LOCATION MAP
2-9	EAST SCREENING BERM
2-10	NORTHEAST PERIMETER BERM
2-11	WEST SCREENING BERM
2-12	WEST DRAINAGE BERM
2-13	TYPICAL BERM AND PERIMETER CROSS SECTIONS



- LEGEND**
- CLAY
  - CLAY SHALE
  - GAS PROBES
  - STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER  
GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING
  - APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING
- SCALE**
- 1' = 800' HORIZONTAL  
1" = 40' VERTICAL

**NOTES**

1. THE EXISTING AND PROPOSED MONITOR WELL LOCATIONS ARE SHOWN IN PART III, ATTACHMENT 4, GEOLOGY REPORT, FIGURE 4-27.
2. FOR ADDITIONAL GEOLOGIC INFORMATION REFER TO PART III, ATTACHMENT 4, GEOLOGY REPORT.
3. FOR GAS MONITORING PROBE LOCATIONS REFER TO ATTACHMENT 14, LANDFILL GAS MANAGEMENT PLAN, FIGURE 14-1.
4. THE GAS MONITORING PROBES GMP-1 THROUGH GMP-21 (EXCEPT GMP-11, GMP-18 AND GMP-19) WILL EVENTUALLY BE ABANDONED AND REPLACED BY GMP-101 THROUGH GMP-125.
5. GROUNDWATER MONITORING WELLS MW-3B, 4B, 5B, 6B AND 7B WILL BE ABANDONED DURING FACILITY DEVELOPMENT.
6. SIDE SLOPES OF FILL ARE TYPICALLY 25%. TOP SLOPES ARE TYPICALLY 3%. SOME SLOPES MAY APPEAR Milder OR STEEPER AS THE CROSS SECTION IS NOT ALWAYS CUT PERPENDICULAR TO THE CONTOURS.
7. BORINGS MAY NOT BE LOCATED ON CROSS SECTION LINES, MAY BE AS FAR AS 400 FEET OFFSET RIGHT OR LEFT, AND LITHOLOGIC SYMBOLS MAY BE TRUNCATED ABOVE EXISTING GRADE.
8. FOR COVER AND LINER DETAILS, REFER TO PART III, ATTACHMENT 10, FIGURE 10-12, AND ATTACHMENT 12, FIGURES 12-2, 12-3, AND 12-4.
9. DASHED PORTION OF GAS PROBE REPRESENT APPROXIMATE SCREENED INTERVALS.
10. MAXIMUM EXCAVATION IS 573' MSL IN PHASE IV.
11. CONTAINMENT DIKES WILL ONLY BE CONSTRUCTED IF THE ABOVE GRADE CLASS 1 OPTION IS UTILIZED. ABOVE GRADE CLASS 1 WASTE MAY BE MIXED WITH MUNICIPAL SOLID WASTE AND OTHER WASTE TYPES ACCEPTED AT THE FACILITY. REFER TO APPENDIX III-F.

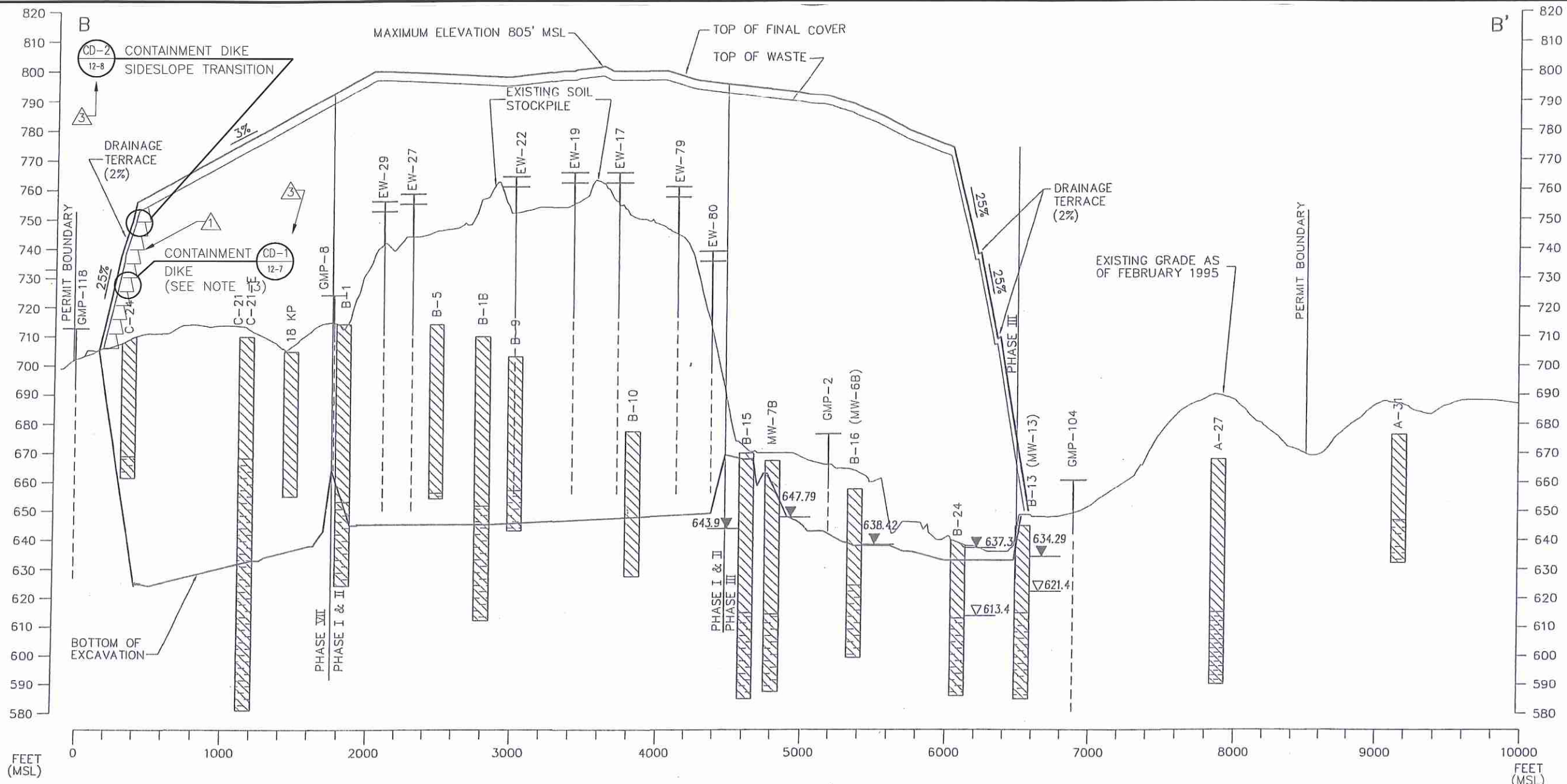
INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

- LIST OF REVISIONS:
1. ADDED CONTAINMENT DIKES.
  2. ADDED NOTE 11.
  3. ADDED CALLOUTS.



<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY: _____	PREPARED FOR	<b>CROSS SECTION A-A'</b>  TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS  <i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727  <small>CHICAGO, IL    FORT WORTH, TX    GRAND RAPIDS, MI          NAPERVILLE, IL    SOUTH BEND, IN          COLUMBUS, OH    EVANSVILLE, IN    SPRINGFIELD, IL          DENVER, CO    RIVERSIDE, MO    CLEARMONT, FL</small>						
	<b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>							
DATE: 04/2005 FILE: 0120-109-11 CAD: 2-1 SEC A-A.DWG	DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM	REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>SEE LIST OF REVISIONS</td> </tr> </tbody> </table>	NO.	DATE	DESCRIPTION	1	12/2011	SEE LIST OF REVISIONS
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O:\0120\109\CLASS 1 WASTE MOD\ATT 2\FIG 2-1-SEC A-A.dwg, 12/7/2011 2:07:08 PM, rseillers

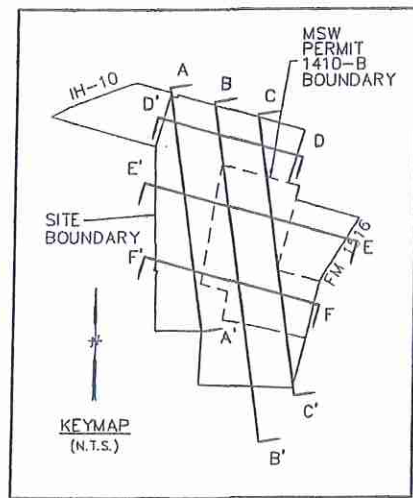


CROSS SECTION B-B'

SCALE  
 1" = 800' HORIZONTAL  
 1" = 40' VERTICAL

LEGEND  
 CLAY  
 CLAY SHALE  
 GAS PROBES  
 GAS EXTRACTION WELLS

▽ 637.3 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING  
 ▽ 613.4 APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING



NOTES

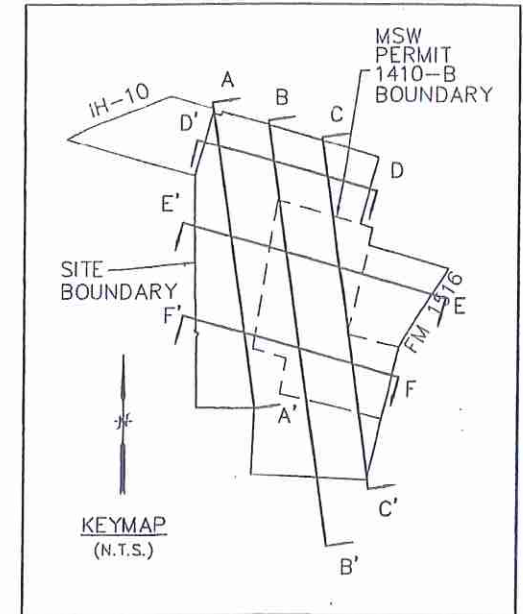
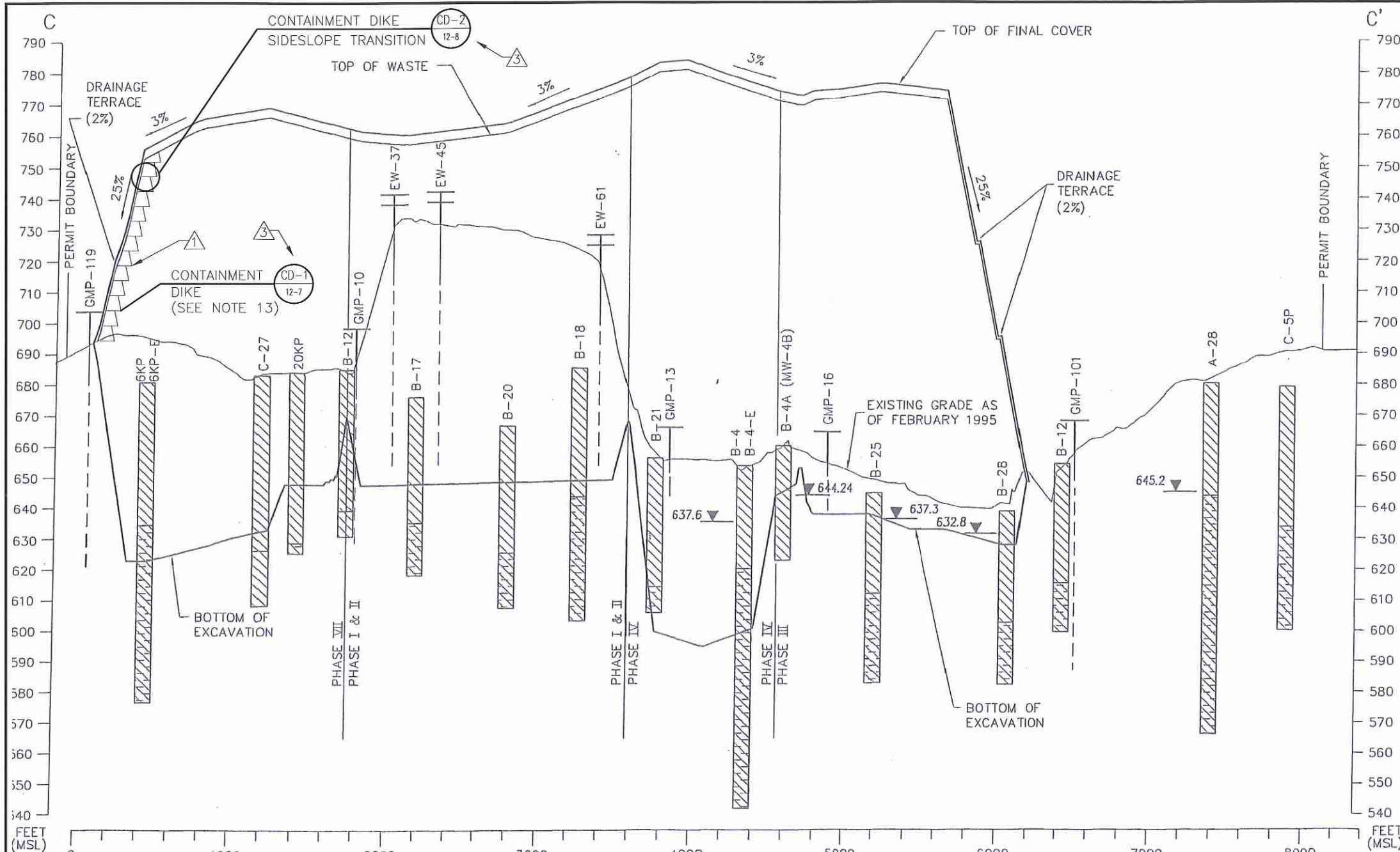
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7. FOR COVER AND LINER DETAILS, REFER TO PART III, ATTACHMENT 10, FIGURE 10-12, AND ATTACHMENT 12, FIGURES 12-2, 12-3, AND 12-4.
8. GROUNDWATER MONITORING WELLS MW-3B, 4B, 5B, 6B AND 7B WILL BE ABANDONED DURING FACILITY DEVELOPMENT.
9. DASHED PORTION OF GAS PROBES REPRESENT APPROXIMATE SCREENED INTERVAL.
10. LINER SYSTEM FOR PHASE I & II CONSISTS OF A CONSTRUCTED CLAY INFILTRATION LAYER ONLY.
11. MAXIMUM EXCAVATION IS 573' MSL IN PHASE IV.
12. ELEVATION FOR PHASE I & II BOTTOM OF EXCAVATION IS APPROXIMATE.
13. CONTAINMENT DIKES WILL ONLY BE CONSTRUCTED IF THE ABOVE GRADE CLASS 1 OPTION IS UTILIZED. ABOVE GRADE CLASS 1 WASTE MAY BE MIXED WITH MUNICIPAL SOLID WASTE AND OTHER WASTE TYPES ACCEPTED AT THE FACILITY. REFER TO APPENDIX III-F.



INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

- LIST OF REVISIONS:
1. ADDED CONTAINMENT DIKES.
  2. ADDED NOTE 13.
  3. ADDED CALLOUTS.

<input type="checkbox"/> DRAFT	PREPARED FOR		CROSS SECTION B-B'		
<input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY	BFI WASTE SYSTEMS OF NORTH AMERICA, LLC				
<input type="checkbox"/> ISSUED FOR CONSTRUCTION	REVISIONS		TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS		
<input type="checkbox"/> CLIENT APPROVAL BY:	NO.	DATE		DESCRIPTION	
DATE: 04/2005 FILE: 0120-109-11 CAD: 2-2 SEC B-B.DWG	DESIGN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM		1	12/2011	SEE LIST OF REVISIONS
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WEAVER BOOS CONSULTANTS, LLC - SOUTHWEST			TBPE REGISTRATION NO. F-3727		
CHICAGO, IL		FORT WORTH, TX	GRAND RAPIDS, MI	NAPERVILLE, IL	
COLUMBUS, OH		EVANSVILLE, IN	SOUTH BEND, IN	SPRINGFIELD, IL	
DENVER, CO		RIVERSIDE, MO	CLEARMONT, FL	FIGURE 2-2	



**LEGEND**

- CLAY
- CLAY SHALE
- GAS PROBES
- GAS EXTRACTION WELLS
- STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING
- APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING

**SCALE**  
 1" = 800' HORIZONTAL  
 1" = 40' VERTICAL

**CROSS SECTION C-C'**

- NOTES**
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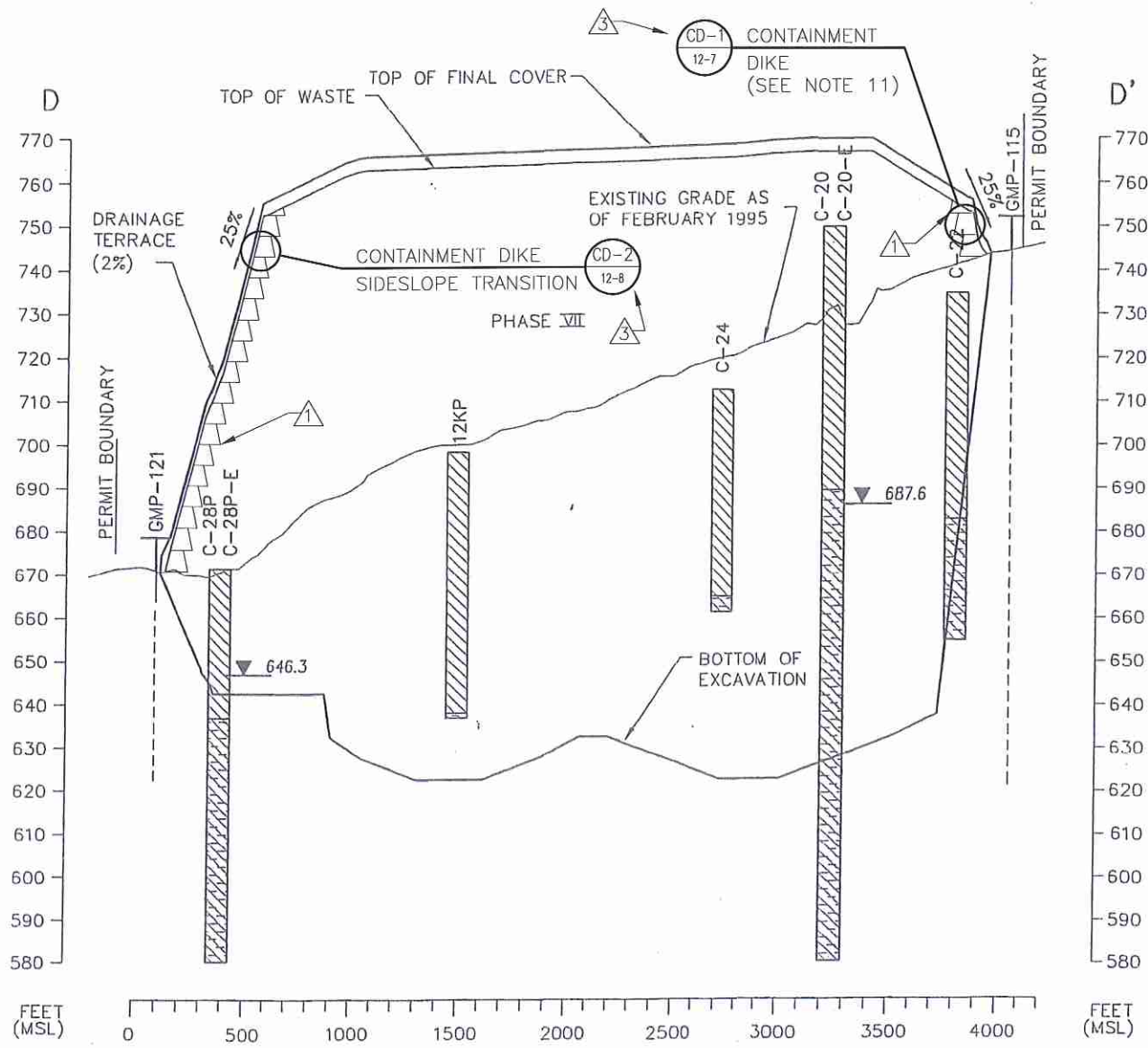
INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

- LIST OF REVISIONS:**
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  2. ADDED NOTE 13.
  3. ADDED CALLOUTS.

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DATE: 04/2005 FILE: 0120-109-11 CAD: 2-3 SEC C-C.DWG		DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDW		TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS							
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O:\0120\109\CLASS 1 WASTE MOD\ATT 2\FIG 2-3\_SEC C-C.dwg, 12/7/2011 2:09:00 PM, r.sellers

O:\0120\109\CLASS 1 WASTE MOD\ATT 2\FIG 2-4\_SEC D-D.dwg, 12/7/2011 2:09:57 PM, r.selliers



CROSS SECTION D-D'

SCALE:  
 1" = 800' HORIZONTAL  
 1" = 40' VERTICAL

LEGEND

- CLAY
- SHALE
- GAS PROBES
- STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING

NOTES

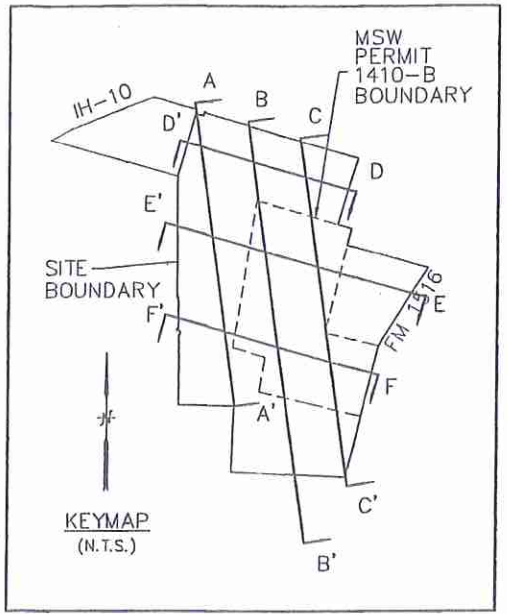
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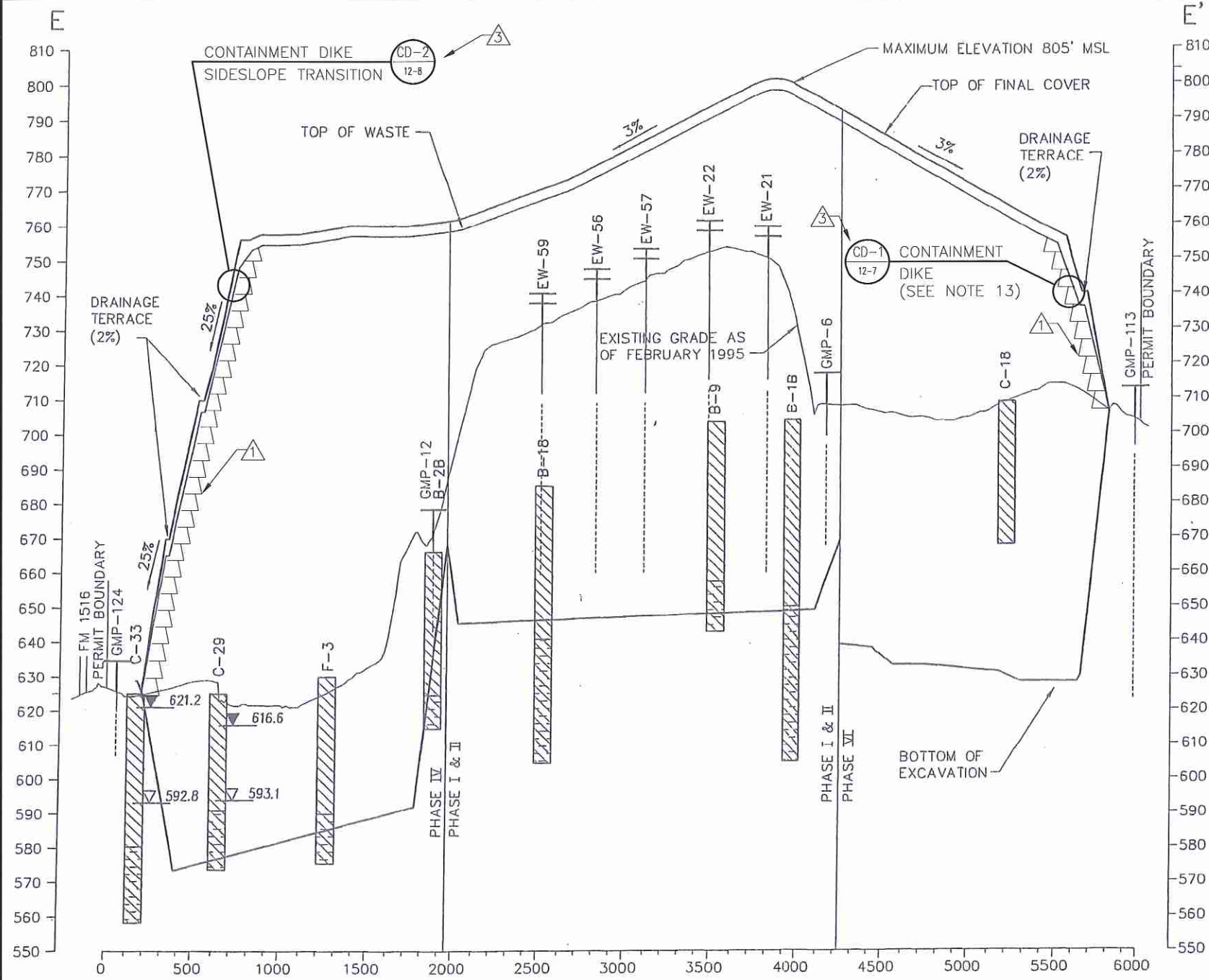


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DATE: 04/2005 FILE: 0120-109-11 CAD: 2-4 SEC D-D.DWG	DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM	CHICAGO, IL NAPERVILLE, IL COLUMBUS, OH DENVER, CO
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		FIGURE 2-4



CROSS SECTION E-E'

SCALE:

1" = 800' HORIZONTAL  
1" = 40' VERTICAL

LEGEND

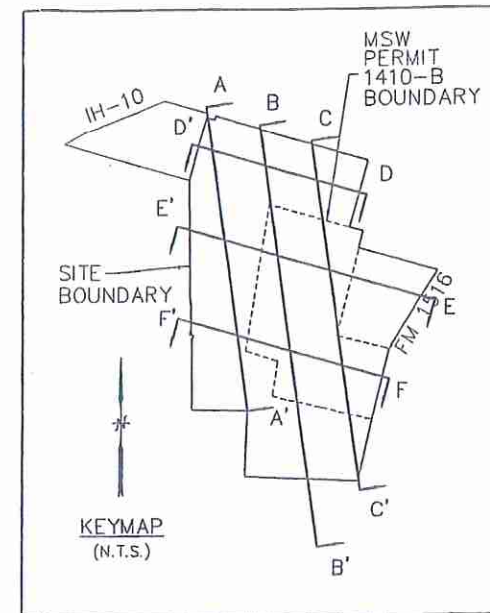
- CLAY
- CLAY SHALE

- GAS PROBES
- GAS EXTRACTION WELLS

- 621.2 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 1995; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING
- 592.8 APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING

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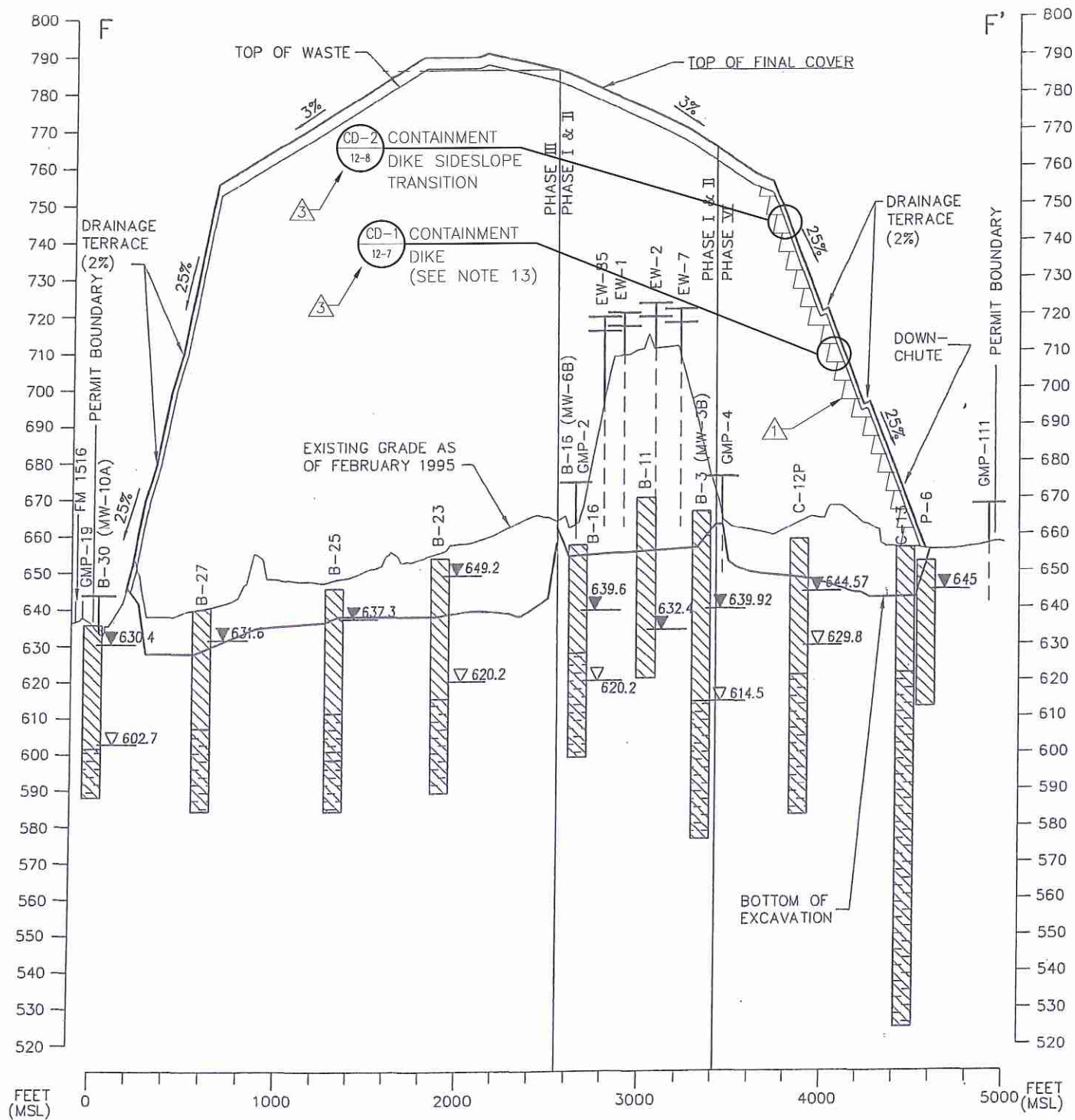
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O:\1020\109\CLASS 1 WASTE MOD\ATT 2\FIG 2-6-SEC F-F.dwg, 12/7/2011 2:12:04 PM, r.sellers

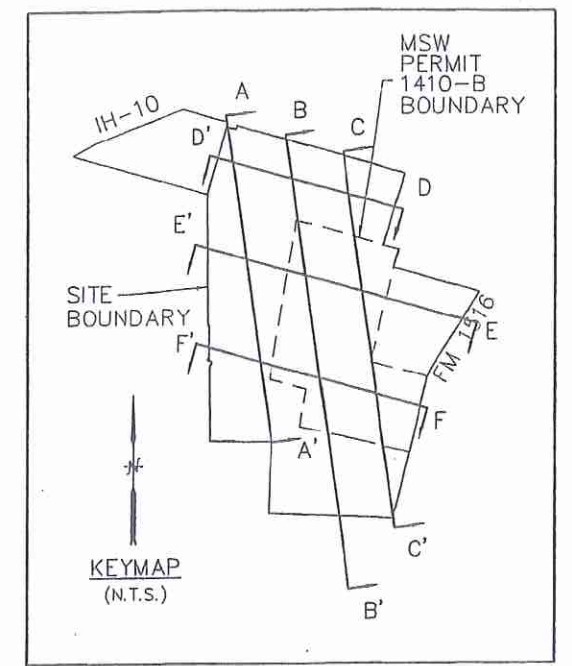


**SCALE**  
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**CROSS SECTION F-F'**

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- LEGEND**
- CLAY
  - CLAY SHALE
  - GAS PROBES
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**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

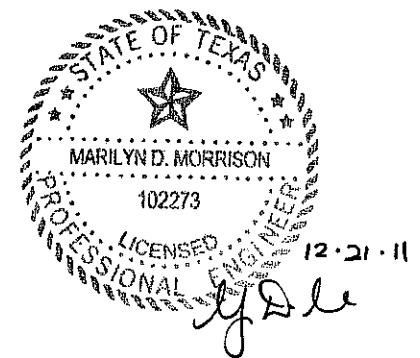
**PART III  
ATTACHMENT 7  
FINAL CONTOUR MAP**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999  
Revised July 2005

Revised December 2011



Prepared by

**Weaver Boos Consultants, LLC—Southwest**  
TBPE Registration No. F-3727  
6420 Southwest Boulevard, Suite 206  
Fort Worth, Texas 76109  
(817) 735-9770

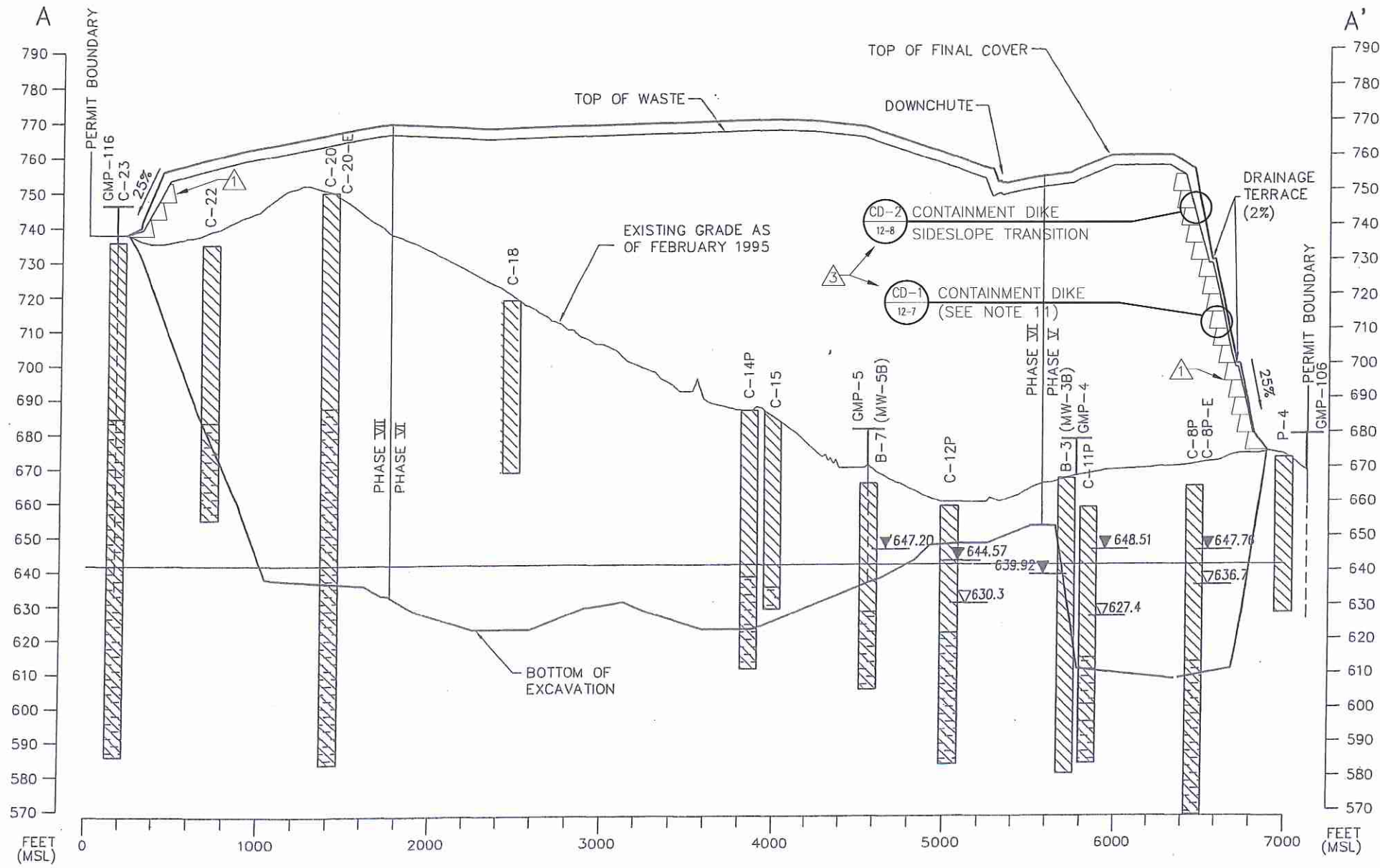
Project No. 0120-109-11-54-01

## LIST OF FIGURES

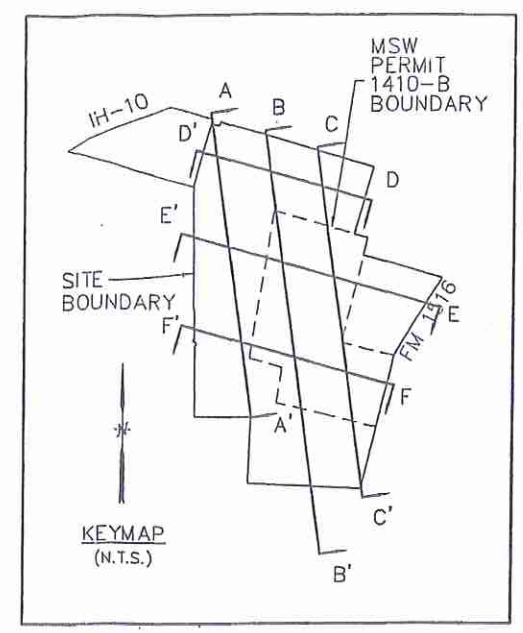
### FIGURES (330.56(b))

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7-1	FINAL CONTOUR MAP
7-2A	FINAL CONTOUR MAP (SOUTH)
7-2b	FINAL CONTOUR MAP (NORTH)
7-3	CROSS-SECTION A-A
7-4	CROSS-SECTION B-B
7-5	CROSS-SECTION C-C
7-6	CROSS-SECTION D-D
7-7	CROSS-SECTION E-E
7-8	CROSS-SECTION F-F
7-9	CROSS-SECTION G-G



CROSS SECTION A-A'



- LEGEND**
- CLAY
  - CLAY SHALE
  - GAS PROBES
  - STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING
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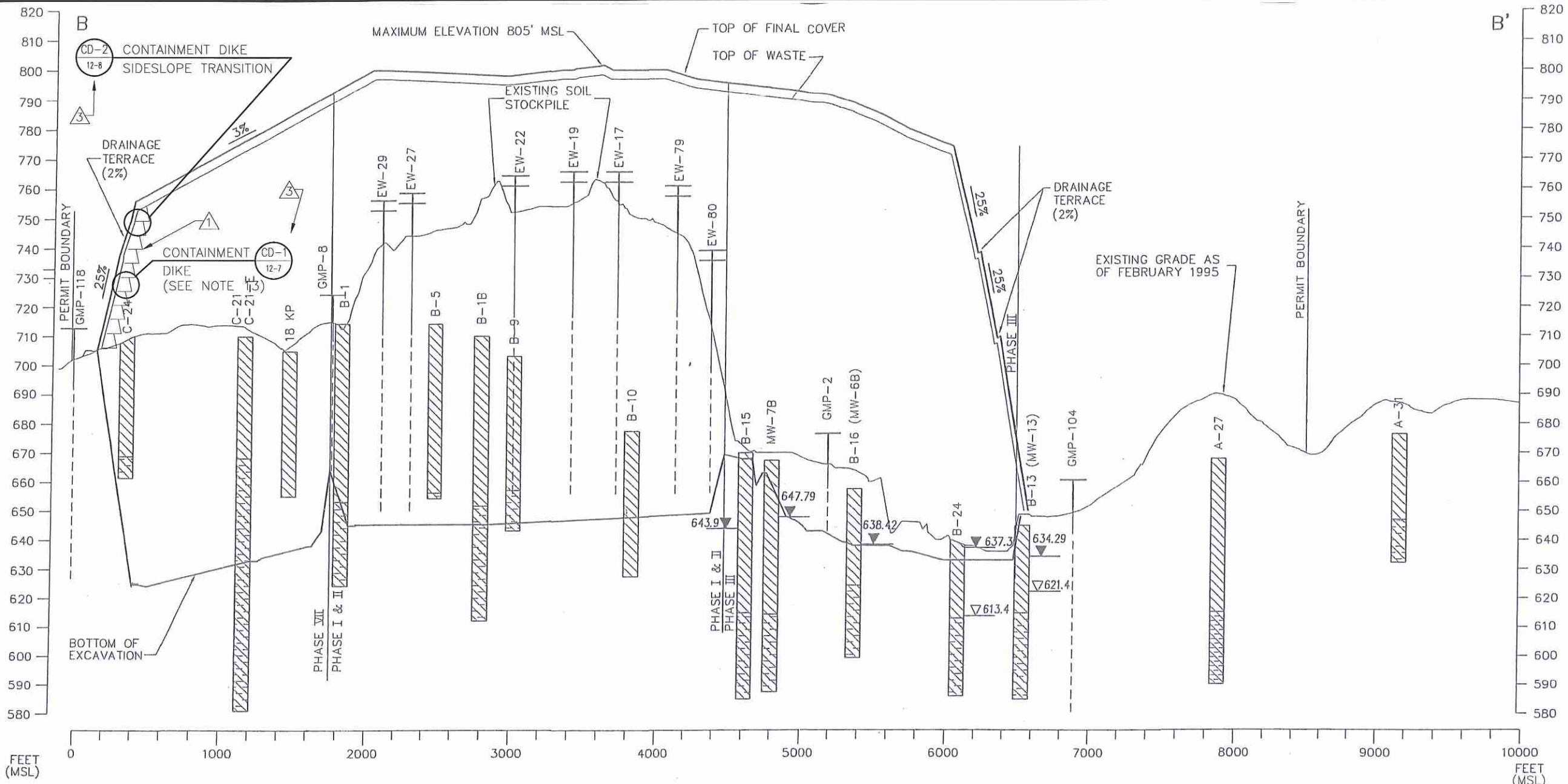
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O:\0120\109\CLASS 1 WASTE MOD\ATT 7\FIG 7-3\_SEC A-A.dwg, 12/7/2011 2:13:03 PM, r sellers

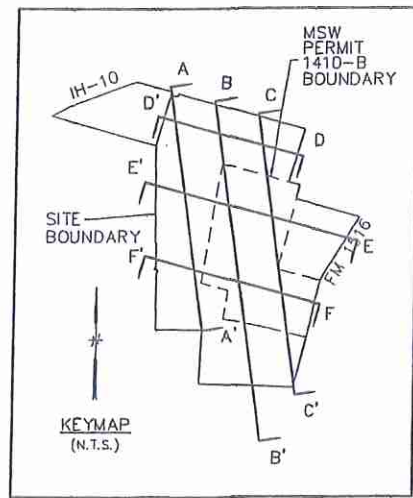


CROSS SECTION B-B'

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LEGEND  
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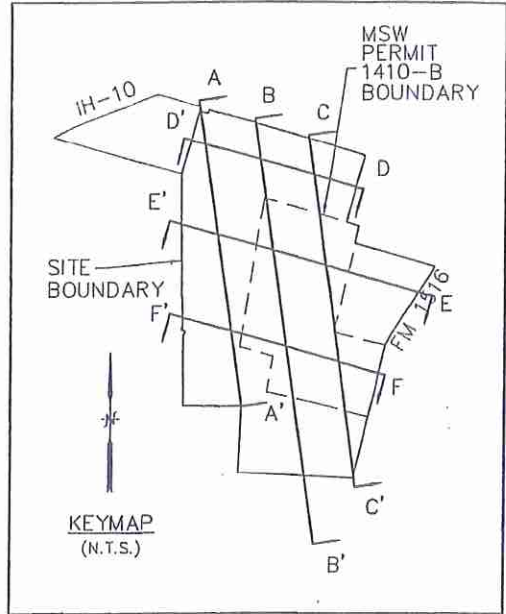
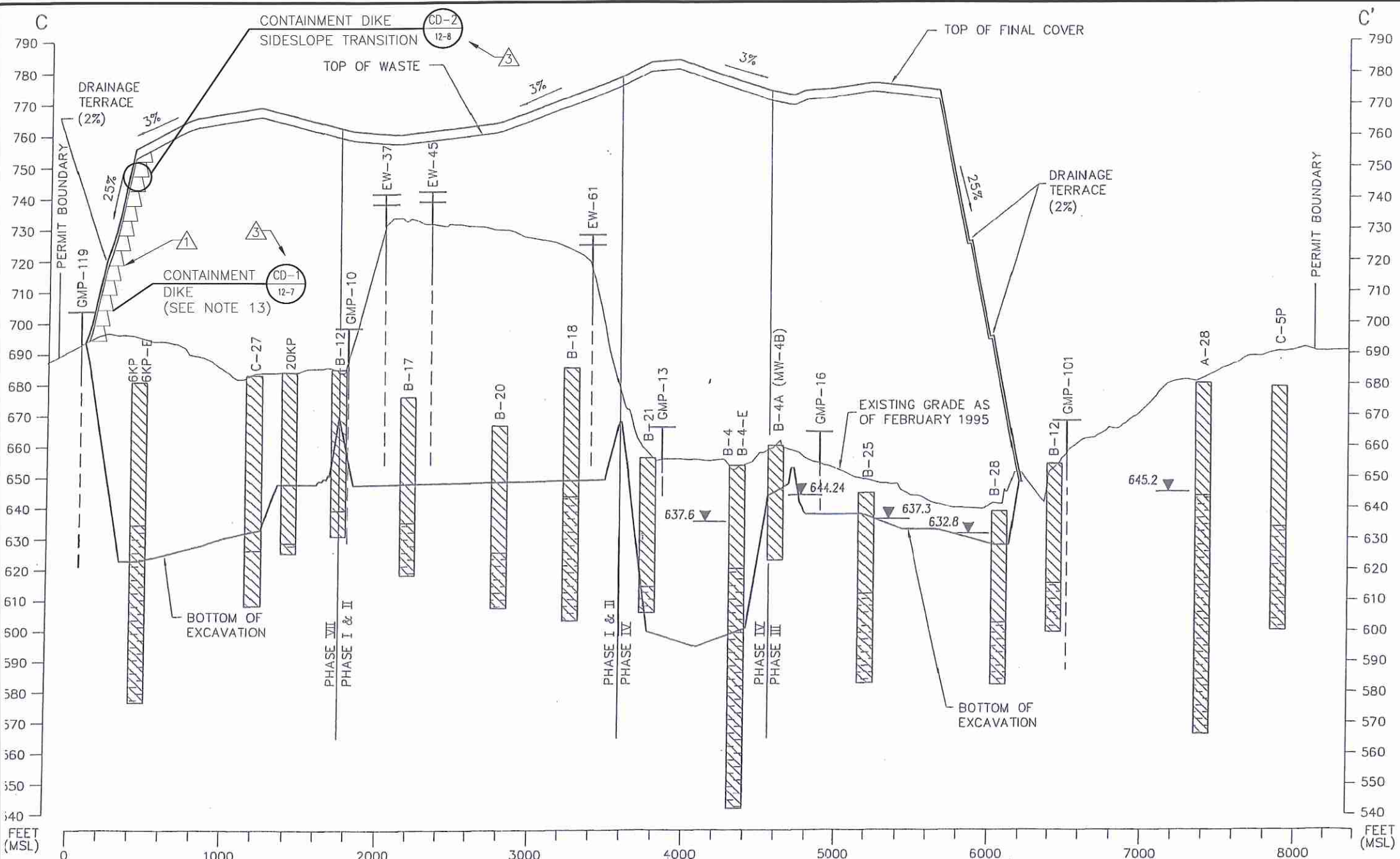
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TBPE REGISTRATION NO. F-3727 <b>Weaver Boos Consultants</b>				FIGURE 7-4							



**CROSS SECTION C-C'**

**LEGEND**

- CLAY
- CLAY SHALE
- GAS PROBES
- GAS EXTRACTION WELLS

▼ 644.24 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING

▽ 645.24 APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING

**SCALE**  
 1' = 800' HORIZONTAL  
 1" = 40' VERTICAL

**NOTES**

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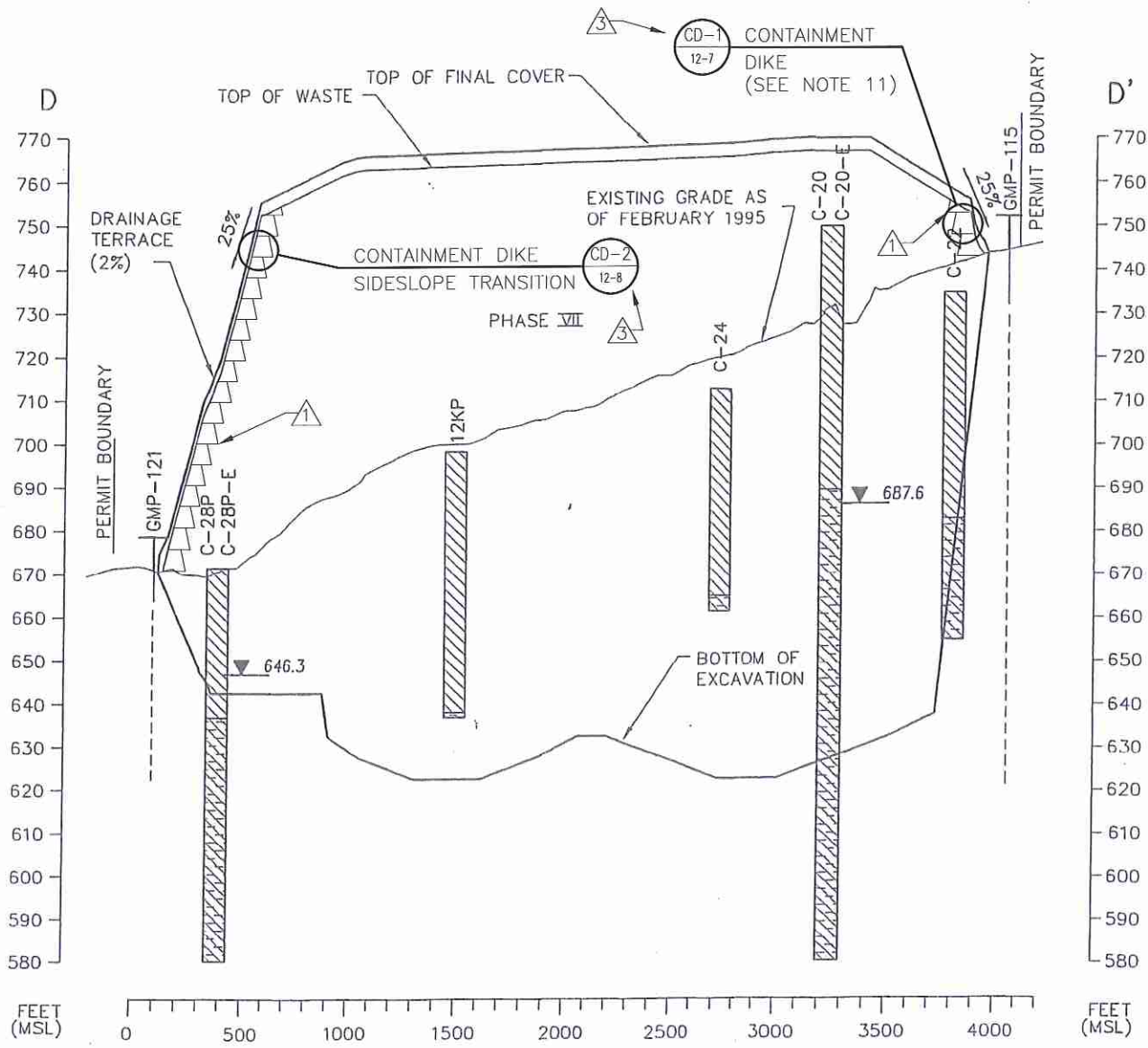
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O:\0120\109\CLASS 1 WASTE MOD\ATT 7\FIG 7-5\_SEC C-C.dwg, 12/7/2011 2:15:01 PM, rseilers

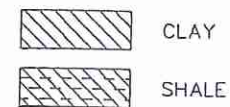
C:\0120\109\CLASS 1 WASTE MOD\ATT 7\FIG 7-6\_SEC D-D.dwg, 12/7/2011 2:15:57 PM, rsellers



CROSS SECTION D-D'

SCALE:  
 1" = 800' HORIZONTAL  
 1" = 40' VERTICAL

LEGEND



▼ 646.3 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING

NOTES

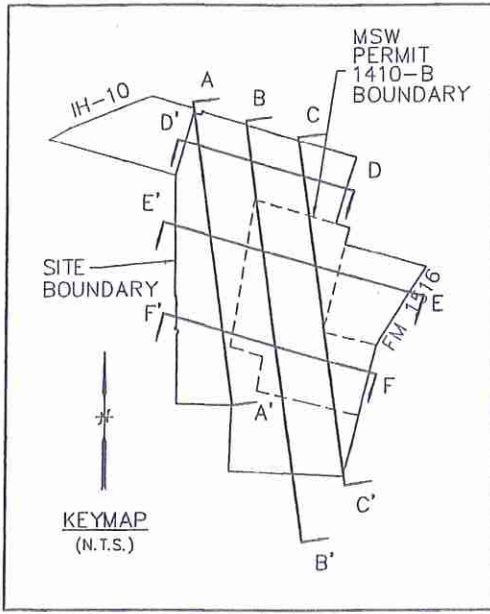
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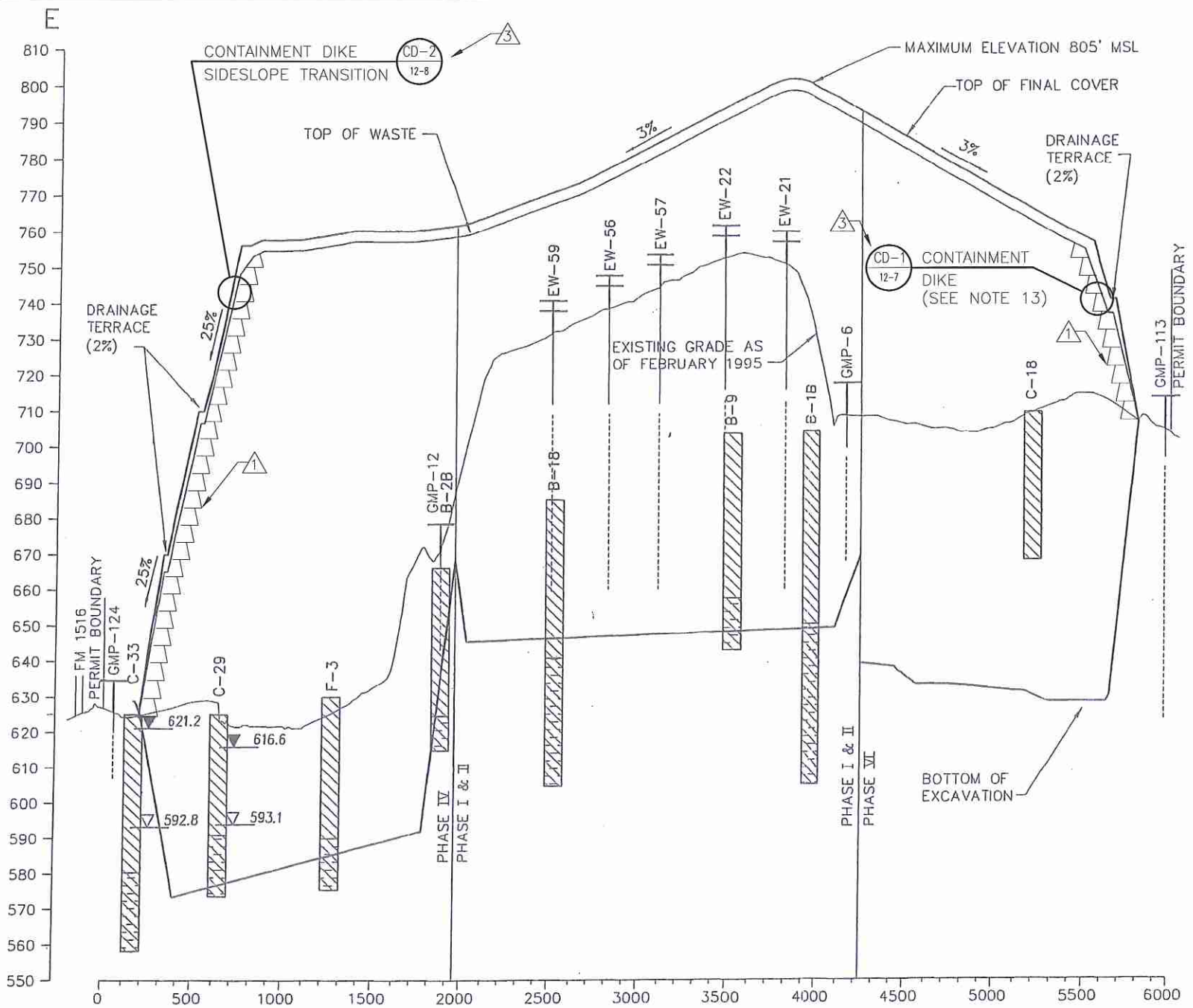


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			FIGURE 7-6						



CROSS SECTION E-E'

SCALE:  
 1" = 800' HORIZONTAL  
 1" = 40' VERTICAL

- LEGEND**
- CLAY
  - CLAY SHALE
  - GAS PROBES
  - GAS EXTRACTION WELLS

▼ 621.2 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 1995; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING

▽ 592.8 APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING

△ INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

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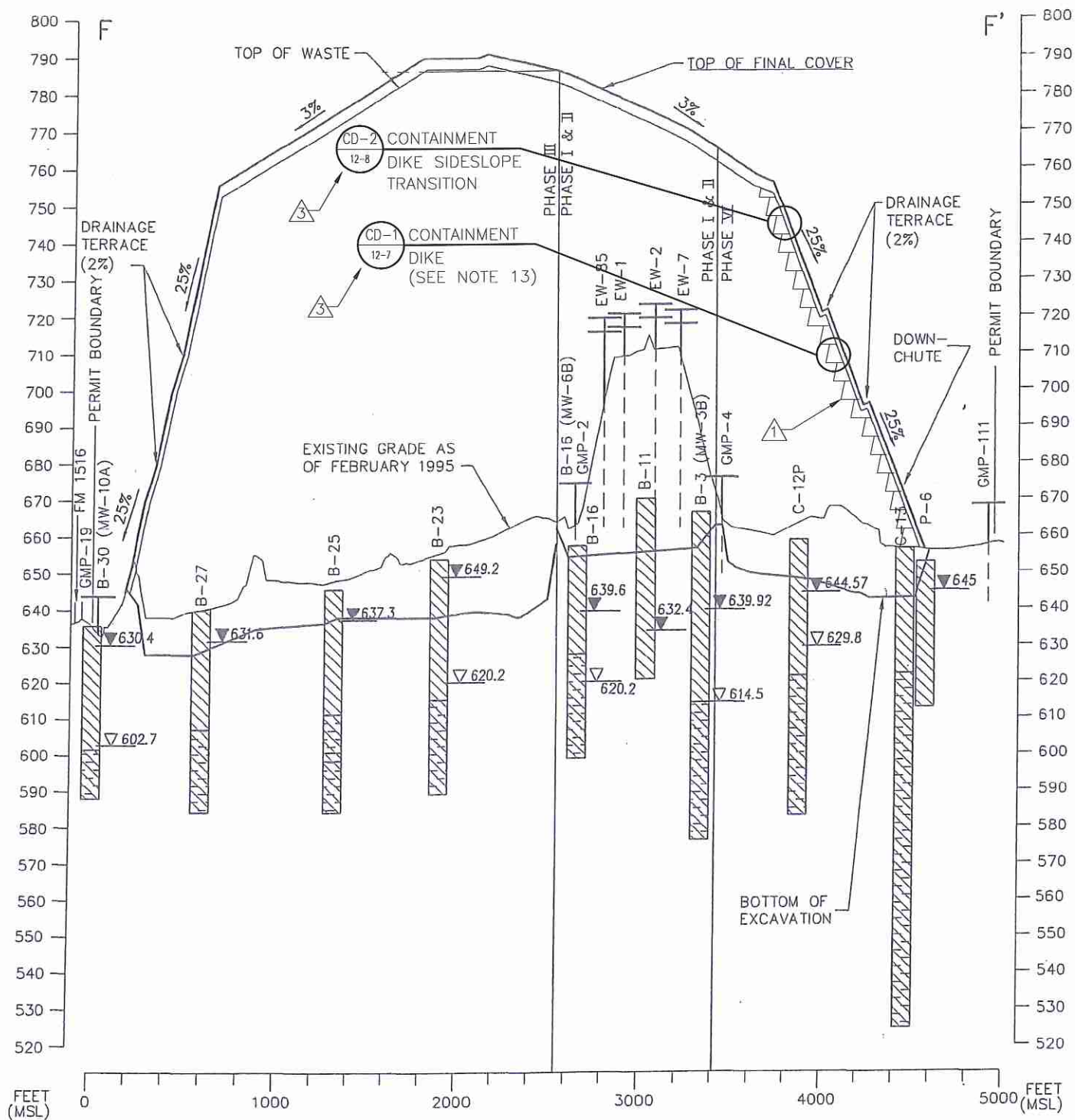
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<b>FIGURE 7-7</b>												

O:\0120\109\CLASS 1 WASTE.MXD\ATT 7\FIG 7-7\_SEC E-E.dwg, 12/7/2011 2:16:49 PM, r sellers

O:\0120\109\CLASS 1 WASTE MOD\ATT 7\FIG 7-8\_SEC F-F.dwg, 12/7/2011 2:17:50 PM, rselliers



SCALE

1" = 800' HORIZONTAL  
1" = 40' VERTICAL

CROSS SECTION F-F'

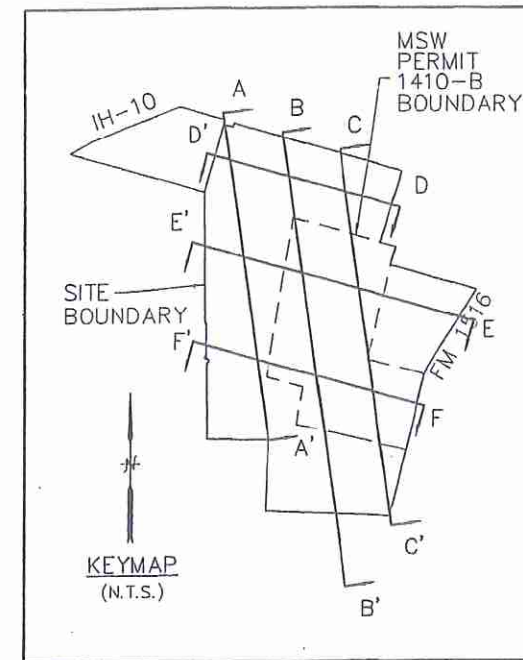
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**LEGEND**

- CLAY
- CLAY SHALE
- GAS PROBES
- GAS EXTRACTION WELLS

- $\nabla$  630.4 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING
- $\nabla$  602.7 APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING



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**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

**PERMIT MODIFICATION**

**ATTACHMENT 8  
COST ESTIMATE FOR CLOSURE  
AND POSTCLOSURE CARE**

Prepared for

BFI Waste Systems of North America, LLC

January 2004

Revised April 2007

Revised January 2008

Revised April 2009

Revised November 2009

Revised December 2011



Prepared by

**Weaver Boos Consultants, LLC—Southwest**

TBPE Registration No. F-3727

6420 Southwest Blvd, Suite 206

Fort Worth, Texas 76109

817-735-9770

Project No. 0120-109-11-54-01

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8-4	COST ESTIMATE ADJUSTMENTS	8-7



## 8-2 CLOSURE COST ESTIMATE

---

This cost estimate shows the cost of hiring a third party to close the largest area ever requiring closure at any time during the active life of the landfill. The closure cost estimate includes: 1) engineering costs required to administratively close the facility; 2) construction costs involved with the construction of the final cover system, the landfill gas system, and other activities required to close the facility, and 3) contingencies and other administrative costs that may be incurred during closure activities. A summary of closure cost estimate is presented on Table 1. The costs will be adjusted annually as indicated in Section 4. An assessment will be completed each year to verify that the Closure Cost Estimate shown in Table 1 is consistent with the current permit conditions and the projected permit conditions for the upcoming 12-month period. The assessment will verify that the closure costs are based on the current active area and that all other permit conditions are addressed by the Closure Cost Estimate (e.g., the number of groundwater monitor wells and landfill gas probes in the estimate match the wells and probes that are either in-place or need to be installed to match the number of wells and probes listed in the permit for the current phase of development). The estimates will be updated, as needed, consistent with the procedures noted in Section 4. Additional information regarding the closure cost estimate is summarized below.

### 8-2.1 Engineering Costs

The existing costs are based on closing the largest area scheduled to receive final cover, which is ~~243.5~~ 250.2 acres. A boundary survey will be required for the filing of the affidavit of closure, deed recording of any area of the site that has received waste, and publishing the public notice of closure activities. A topographic survey will be required to determine the existing height and top slope of the landfill so that permit compliance can be evaluated and the final closure system, drainage system, and final grading can be engineered. An inspection of the site is included to identify any disposal areas requiring closure, drainage and erosion protection improvements, and identify any potential regulatory deficiencies. The engineering costs include the cost to develop construction plans and closure schedules, closure testing and inspections, and permit document preparation. In addition, administration costs (i.e. for construction contracts) have also been included.

### 8-2.2 Construction Costs

As shown on Figure 1, construction costs include construction of the final cover system drainage improvements, and LFG system improvements for the ~~243.5~~ 250.2-acre area. The final cover system consists of an 18-inch-thick infiltration layer (clay cap) ~~or~~ 4-foot-thick in above-grade Class 1 areas, a flexible membrane cover, a geocomposite

drainage layer, and an erosion layer consisting of 18 inches of earthen material capable of sustaining plant growth. The construction costs include site grading and drainage including the final grading of the site, drainage improvements, and erosion and sedimentation controls for proper closure of the site. Since the landfill gas extraction system has been installed in the 243.5 ~~250.2~~-acre area, the construction costs for this line item are based on the extending the gas wells above the top of final cover.

Additionally, a cost to decommission the 5.6-acre solar energy system test area and prepare the intermediate cover for final cover placement in the test area has been added as a line item to the construction costs.

**TABLE 8-1  
TESSMAN ROAD LANDFILL - CLOSURE COST**

Area Requiring Final Cover	243.5	250.2	ac	Infiltration Layer Thickness	1.5	ft (Pre-Sub D)
Composite Topslope Area	182.4	184.8	ac	Infiltration Layer Thickness	1.5	ft (Sub D Area)
Composite Sideslope Area	61.4	65.4	ac	Infiltration Layer Thickness	4.0	ft (Above-Grade Class 1 Area)
Pre Subtitle D Area	129.0		ac	Erosion Layer Thickness	1.5	ft (Pre-Sub D)
Above-Grade Class 1 Area	3.0		ac	Erosion Layer Thickness	1.5	ft (Sub D Area)
				Erosion Layer Thickness	1.5	ft (Above-Grade Class 1 Area)

Description	Quantity	Unit	Unit Cost	1998 Total Cost	Inflation Factor <sup>1</sup>	2011 Total Cost
<b>1.0 ENGINEERING</b>						
1.1 Topographic Survey	243.5	250.2	AC	\$ 278	\$ 70,000	4.267 1.295 \$ 90,650
1.2 Boundary Survey for Affidavit	16,000		LF	\$ 0.89	\$ 14,000	4.267 1.295 \$ 18,130
1.3 Site Evaluation	243.5	250.2	AC	\$ 750	\$ 188,000	4.267 1.295 \$ 243,460
1.4 Development of Plans	200		HOURS	\$ 80	\$ 16,000	4.267 1.295 \$ 20,720
1.5 Construction Administration, Bidding & Awar	375		HOURS	\$ 80	\$ 30,000	4.267 1.295 \$ 38,850
1.6 Admin. Cost for Certification of Final Cover and Affidavit to the Public	120		HOURS	\$ 65	\$ 8,000	4.267 1.295 \$ 10,360
1.7 Project Management, Construction Observation and Testing	243.5	250.2	AC	\$ 1,000	\$ 250,200	4.267 1.295 \$ 324,009
<b>ENGINEERING SUBTOTAL</b>					\$ 576,200	\$ 746,179
<b>CONTINGENCY</b>	1		10%		\$ 57,620	\$ 74,618
<b>ENGINEERING TOTAL</b>					\$ 634,000	\$ 820,797
<b>2.0 CONSTRUCTION</b>						
2.1 Final Cover System						
2.1.1a Soil Placement (1.5 ft-thick)	589,270	598,224	CY	\$ 2.00	\$ 1,196,000	4.267 1.295 \$ 1,548,820
2.1.1b Soil Placement (4.0 ft-thick) <sup>7</sup>	19,360		CY	\$ 2.00	\$ 39,000	1.295 \$ 50,505
2.1.1c Soil Processing	589,270	617,584	CY	\$ 2.00	\$ 1,235,000	4.267 1.295 \$ 1,599,325
2.1.2 Flexible Membrane Cover	10,606,860	10,898,712	SF	\$ 0.32	\$ 3,488,000	4.267 1.295 \$ 4,516,960
2.1.3 Geonet/Geotextile Composite	61.4	65.4	AC	\$ 15,200	\$ 994,000	4.267 1.295 \$ 1,287,230
2.2 Erosion Layer Placement	243.5	250.2	AC	\$ 4,030	\$ 1,008,000	4.267 1.295 \$ 1,305,360
2.3 Revegetation	243.5	250.2	AC	\$ 1,000	\$ 250,000	4.267 1.295 \$ 323,750
2.4 Site Grading and Drainage	243.5	250.2	AC	\$ 150	\$ 38,000	4.267 1.295 \$ 49,210
2.5 Completion of Gas Extraction System <sup>2,3,4</sup>	438	133	WELL	\$ 500	\$ 67,000	4.438 1.021 \$ 68,407
2.6 Decommissioning 5.6-ac Solar Energy System <sup>5,6</sup>	1		LS	\$ 30,000	\$ 30,000	4.000 1.163 \$ 34,890
<b>CONSTRUCTION SUBTOTAL</b>					\$ 8,345,000	\$10,784,457
<b>CONTINGENCY</b>	1		10%		\$ 835,000	\$ 1,078,446
<b>CONSTRUCTION TOTAL</b>					\$ 9,180,000	\$11,862,903
<b>3.0 CONTRACT PERFORMANCE BOND</b>	\$64,720 + \$61,000		THOUSANDS	9,180	\$ 120,000	4.267 1.295 \$ 155,400
<b>TOTAL CLOSURE COST</b>					\$ 9,934,000	\$12,839,100

<sup>1</sup>Inflation factor is the product of the inflation factors for each year between 1998 and 2009 2011.

<sup>2</sup>Completion of landfill gas extraction system only requires the existing wells be extended above final cover. All existing piping and connections will be sufficient to accommodate final cover construction. No additional gas extraction wells are required.

<sup>3</sup>29 total LFG wells will be added in 2009 and 23 wells will be decommissioned. Therefore, the new total at the site is 132 existing + 29 installed - 26 decommissioned = 138 wells.

<sup>4</sup>12 total LFG wells were added in 2011. Therefore, the new total at the site of existing wells is 133.

<sup>5</sup>The inflation factor for this line item only is the product of the inflation factors for each year between 2004 and 2009 2011. This is due to this not becoming a line item until the 2004 permit modification.

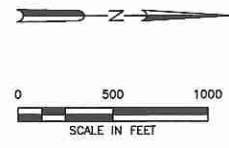
<sup>6</sup>Decommissioning the 5.6-ac Solar Energy System includes removal of geomembrane, solar panels, and associated electrical wiring. Preparation of intermediate cover for final cover placement is also included.

<sup>7</sup>The inflation factor for this line item only is the product of the inflation factors for each year between 2009 and 2011. This is due to this not becoming a line item until the 2009 permit modification.

<sup>8</sup>Assumed 3.0 acres of above grade Class 1 will be placed in 2012 and will require 4 feet of infiltration layer.



O:\0120\109\CLASS 1 WASTE MOD\ATT B\FIG-1 SITE PLAN.dwg, jwilson



**LEGEND:**

- PERMIT BOUNDARY
- E 2211500 --- SITE GRID
- - - - - LIMIT OF REFUSE
- GMP-101 EXISTING GAS MONITOR PROBE
- W043 EXISTING LFG EXTRACTION WELL
- EXISTING LFG COLLECTION PIPING
- MW-15 EXISTING GROUNDWATER MONITOR WELL
- ACTIVE FILL AREA REQUIRING CLOSURE
- △ INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

**NOTES:**  
 1. CONTOURS AND ELEVATIONS DEVELOPED BY COOPER AERIAL SURVEYS CO. FROM AERIAL PHOTOGRAPHY FLOWN JANUARY 21, 2011.

**LIST OF REVISIONS:**  
 1. UPDATED ACTIVE AREA, LFG WELLS, GROUNDWATER MONITOR WELLS, AND TOPOGRAPHY.



- DRAFT
- FOR PERMITTING PURPOSES ONLY
- ISSUED FOR CONSTRUCTION
- CLIENT APPROVAL BY: \_\_\_\_\_

DATE: 01/2004  
 FILE: 0120-109-10  
 CAD: FIGURE 1.dwg

DRAWN BY: SRF  
 DESIGN BY: B.J.L.  
 REVIEWED BY: JPY

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PREPARED FOR		
BFI WASTE SYSTEMS OF NORTH AMERICA, LLC		
REVISIONS		
NO.	DATE	DESCRIPTION
1	04/2007	ADDED NEW CONSTRUCTED SECTORS AND GAS SYSTEM AND UPDATED TOP, LIMITS OF WASTE, AND PERMIT BOUNDARY.
2	12/2007	UPDATED CELL CONSTRUCTION FOR 2007.
3	03/2009	UPDATED CELL CONSTRUCTION FOR 2008, ADDED NEW GAS SYSTEM CONFIGURATION, AND ADDED MONITORING WELLS.
4	12/2011	SEE LIST OF REVISIONS

**SITE PLAN**

TESSMAN ROAD LANDFILL  
 BEXAR COUNTY, TEXAS

*Weaver Boos Consultants*

CHICAGO, IL NAPERVILLE, IL COLUMBUS, OH DENVER, CO	FORT WORTH, TX (817) 735-9770	GRIFFITH, IN SOUTH BEND, IN SPRINGFIELD, IL ST. LOUIS, MO
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FIGURE 1

### 8-3 POSTCLOSURE CARE COST ESTIMATE

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The postclosure care period has been established by TCEQ regulations to be 30 years. This detailed cost estimate shows the cost of hiring a third party to conduct routine maintenance and monitoring during the postclosure period. During this period, continuous maintenance must be ongoing to assure the integrity and effectiveness of the final cover system, monitoring systems, leachate collection system, drainage system, and landfill gas system. A summary of postclosure cost estimate is presented on Table 2. An assessment will be completed each year to verify that the Postclosure Cost Estimate shown in Table 2 is consistent with the current permit conditions and the projected permit conditions for the upcoming 12-month period. The assessment will verify that the postclosure costs are based on the current active area and that all other permit conditions are addressed by the Postclosure Cost Estimate (e.g., verify the LFG O&M cost estimate is updated to match the number of wells that will need to be maintained during the postclosure period). The costs will be adjusted annually as indicated in Section 4.

As shown in Table 2, engineering postclosure estimates include the cost of annual site inspections, corrective plans and specifications, and site compliance monitoring. The estimates are based on the largest area with waste in-place to be closed which is ~~243.5~~ 250.2 acres. Site inspections will be performed annually and will include identification of areas experiencing settlement or subsidence, identification of erosion or other drainage-related problems, and inspection of the leachate collection system, gas control and monitoring system, and the groundwater monitoring system. Correctional plans and specifications include the costs for an engineering consultant to prepare construction plans and specifications to correct problems identified during the site inspections. Gas monitoring and groundwater sampling and analysis will be performed as outlined in the postclosure plan.

Postclosure construction/maintenance estimates include the costs to correct problems determined by the engineering site inspections and as specified by the engineer's correctional plans and specifications. These costs will also include any ongoing site maintenance that is needed throughout the postclosure period. These costs include cover and drainage maintenance and annual seeding and mowing costs.

The leachate disposal costs include trucking, treatment and disposal costs from areas contributing to leachate generation (approximately ~~114.5~~ 121.2 acres). Postclosure landfill gas control system O&M costs includes regular calibration and maintenance of regulatory equipment, such as valves and flow meters, associated system components of the active collection system and condensate disposal for the completely developed site.

**TABLE 8-2  
TESSMAN ROAD LANDFILL - POSTCLOSURE CARE COST**

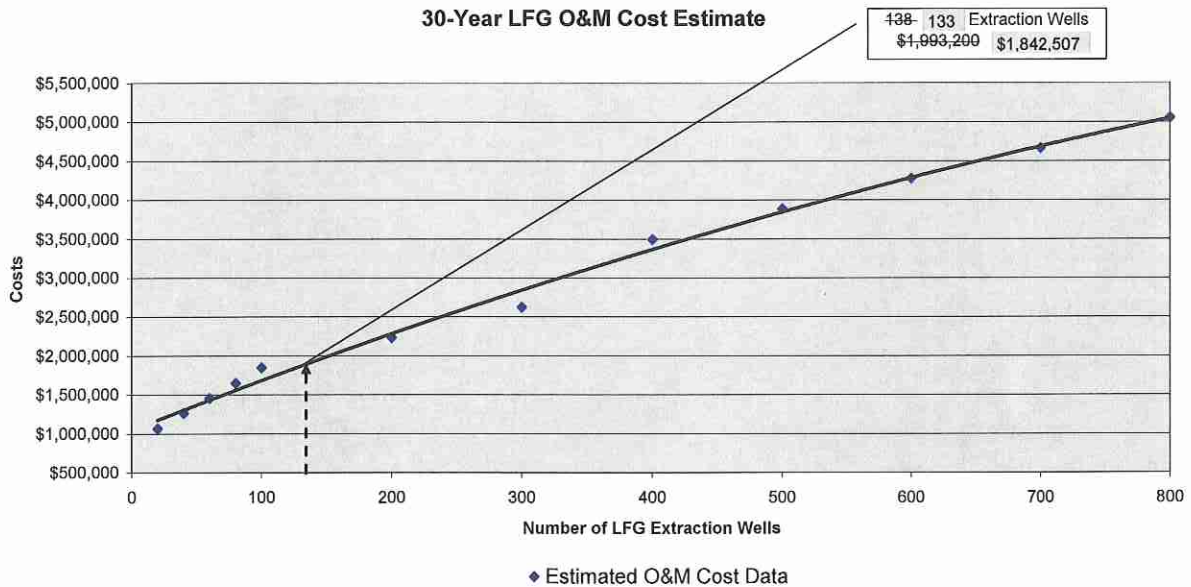
Permitted Waste Footprint	709.0	ac	Post Closure Care Period	30	yrs		
Area with leachate collection system	114.5	121.2	ac	LFG Extraction Wells	138	133	wells
Groundwater Monitoring Wells	21	16	wells	Gas Monitoring Events	4	/yr	
Area Requiring Final Cover	243.5	250.2	ac	GW Monitoring Events	2	/yr	

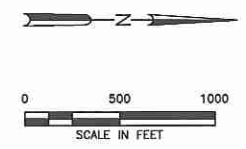
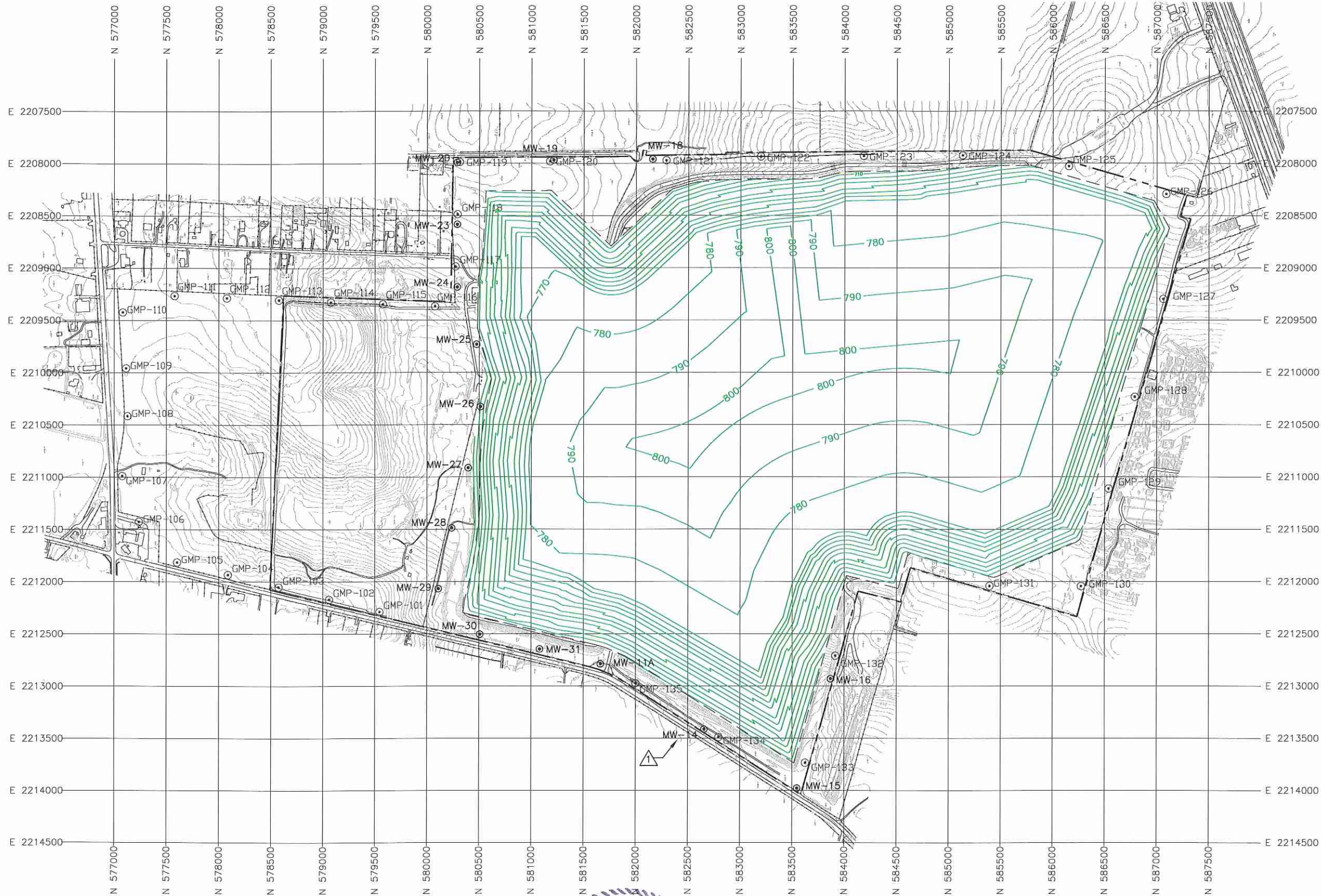
Description	Quantity	Unit	Unit Cost	Annual Cost	1998 Total Cost	Inflation Factor <sup>1</sup>	2011 Total Cost
<b>1.0 ENGINEERING</b>							
1.1 Postclosure Care Plan	243.5	250.2	ACRE	\$ 125	\$ 31,000	\$ 31,000	\$ 40,145
1.2 Site Inspection and Recordkeeping (annual)	243.5	250.2	ACRE	\$ 20	\$ 5,004	\$ 150,000	\$ 194,250
1.3 Correctional Plans and Specifications (annual)	1		LS	\$ 10,000	\$ 10,000	\$ 300,000	\$ 388,500
1.4 Site Monitoring							
1.4.1 Groundwater Monitoring (semiannual)	21	16	WELLS	\$ 1,050	\$ 16,800	\$ 504,000	\$ 652,680
1.4.2 Gas Monitoring (quarterly)	4		YR	\$ 600	\$ 2,400	\$ 72,000	\$ 93,240
1.5 LFG System Operation & Maintenance <sup>3</sup>	1		LS	See Graph Below	\$ 1,842,507	\$ 1,842,507	\$ 1,881,200
1.6 Cover Maintenance and Mowing	243.5	250.2	YR	\$ 65	\$ 16,263	\$ 488,000	\$ 631,960
<b>ENGINEERING SUBTOTAL</b>					\$ 3,388,000	\$ 3,388,000	\$ 4,387,460
<b>2.0 CONSTRUCTION / MAINTENANCE</b>	243.5	250.2	AC	\$ 200	\$ 50,000	\$ 1,500,000	\$ 1,942,500
<b>3.0 LEACHATE DISPOSAL/MAINTENANCE</b>	114.5	121.2	AC	\$ 180.00	\$ 21,816	\$ 654,480	\$ 847,552
<b>SUBTOTAL</b>					\$ 5,542,480	\$ 5,542,480	\$ 7,177,512
<b>4.0 CONTINGENCY</b>	1		10%		\$ 554,248	\$ 554,248	\$ 717,751
<b>TOTAL POSTCLOSURE CARE COST</b>					\$ 6,096,728	\$ 6,096,728	\$ 7,895,263

<sup>1</sup>Inflation factor is the product of the inflation factors for each year between 1998 and 2009 2011.

<sup>2</sup>Refer to the Figure shown below for additional information regarding how the LFG System Maintenance costs are estimated.

<sup>3</sup>The inflation factor for this line item only is the product of the inflation factors for each year between 2004 and 2009 2011. This is due to this not becoming a line item until the 2004 permit modification.





- LEGEND:**
- PERMIT BOUNDARY
  - - - LIMIT OF REFUSE
  - E 221150 SITE GRID
  - 770 FINAL COVER CONTOUR (SEE NOTE 2)
  - ⊙ GMP-101 EXISTING GAS MONITOR PROBE
  - ⊙ MW-15 EXISTING GROUNDWATER MONITOR WELL
  - △ INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

- NOTES:**
1. CONTOURS AND ELEVATIONS DEVELOPED BY COOPER AERIAL SURVEYS CO. FROM AERIAL PHOTOGRAPHY FLOWN JANUARY 21, 2011.
  2. FINAL COVER CONTOURS REPRODUCED FROM THE PERMIT MODIFICATION TO REVISE FINAL COVER TOP SLOPES AND EXCAVATION GRADES PREPARED BY ASSOCIATED CONSULTING ENGINEERS INC. IN MAY 2008.

- LIST OF REVISIONS:**
1. UPDATED GROUNDWATER MONITOR WELLS AND TOPOGRAPHY.

O:\10120\109\CLASS 1 WASTE MOD\ATT 8\FIGURE 2.DWG, jwilson



<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY:	PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>FINAL COVER PLAN</b>  TESSMAN LANDFILL BEXAR COUNTY, TEXAS  <i>Weaver Boos Consultants</i>	
	DATE: 1/2004 FILE: 0120-109-10 CAD: FIGURE 2.dwg			
DRAWN BY: SRF DESIGN BY: BAJ REVIEWED BY: JPY		NO.	DATE	DESCRIPTION
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		2	12/2007	UPDATED TOPO
		3	03/2009	UPDATED TOPO, FINAL COVER CONTOURS AND ADDED NOTE 2, AND ADDED MONITORING WELLS.
		4	12/2011	SEE LIST OF REVISIONS
CHICAGO, IL NAPERVILLE, IL COLUMBUS, OH DENVER, CO		FORT WORTH, TX (817) 735-9770		GRIFFITH, IN SOUTH BEND, IN SPRINGFIELD, IL ST. LOUIS, MO
				<b>FIGURE 2</b>

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

**PART III  
ATTACHMENT 12  
FINAL CLOSURE PLAN**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999

Revised December 2011



Prepared by

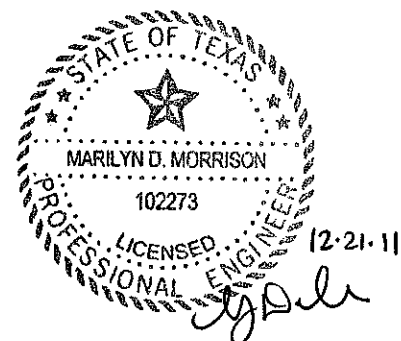
**Weaver Boos Consultants, LLC—Southwest**  
TBPE Registration No. F-3727  
6420 Southwest Boulevard, Suite 206  
Fort Worth, Texas 76109  
(817) 735-9770

Project No. 0120-109-11-54-01

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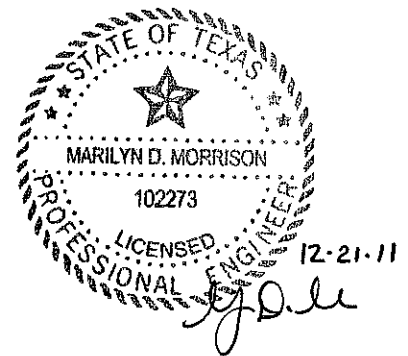


## LIST OF FIGURES

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### FIGURE

12-1	FINAL CONTOUR MAP
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12-1B	FINAL CONTOUR MAP (NORTH)
12-2	SIDE SLOPE FINAL COVER SYSTEM DETAILS
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12-4	FINAL COVER SYSTEM DETAILS
12-5	AFFIDAVIT TO THE PUBLIC
12-6	CLASS 1 WASTE DISPOSAL AREA OPTIONS
12-7	CLASS 1 WASTE CONTAINMENT DIKE DETAILS
12-8	CLASS 1 WASTE CONTAINMENT DIKE/FINAL COVER TIE-IN DETAIL
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12-1	LARGEST AREA SCHEDULED TO RECEIVE FINAL COVER AT A GIVEN TIME
12-2	DETAILED CLOSURE COST ESTIMATE

## 2.0 LANDFILL FINAL COVER SYSTEM

### 2.1 REGULATORY REQUIREMENTS

The Subtitle D final cover requirements vary according to the characteristics of the underlying liner. Alternate final cover designs may also be approved by the TNRCC TCEQ with proper demonstration of equivalency. The regulatory cover requirements are presented in the following paragraphs.

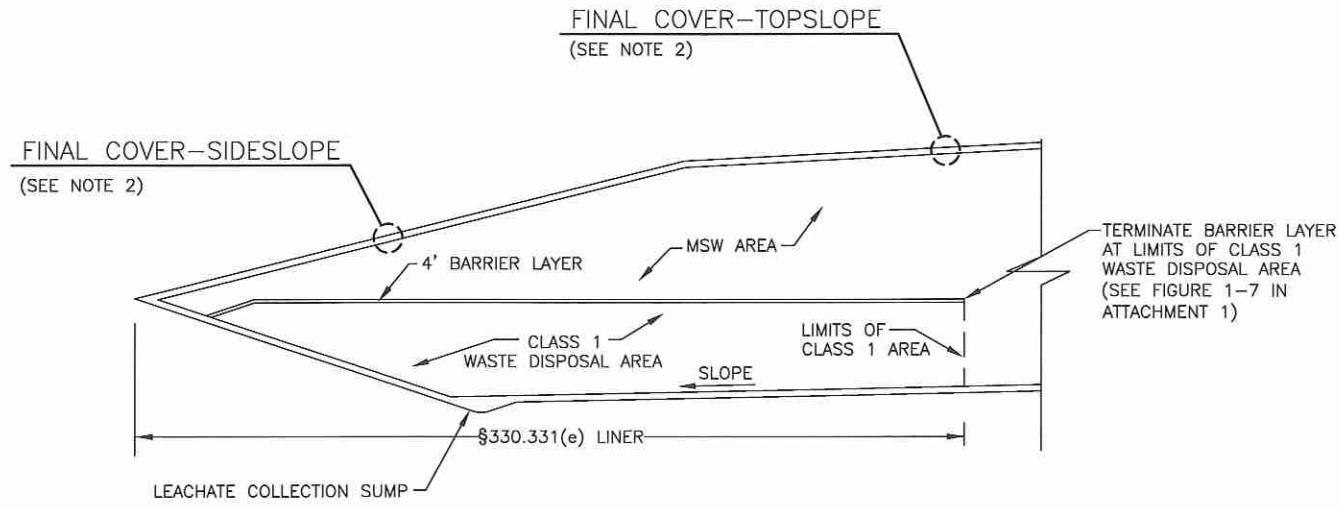
#### 2.1.1 Standard Final Cover Design

The infiltration layer shall consist of a minimum of 18 inches of earthen material with a coefficient of permeability no greater than  $1 \times 10^{-5}$  cm/sec. However, where Class 1 waste is filled above grade, the thickness of the infiltration layer that is located adjacent to the Class 1 disposal area will be increased to 4 feet with a coefficient of permeability no greater than  $1 \times 10^{-7}$  cm/sec. Each infiltration layer option will be overlain by a synthetic membrane consisting of HDPE, VLDPE, LLDPE, PVC, or equivalent with a minimum thickness of 20 mils in accordance with TNRCC TCEQ regulations. On the steeper side slopes (25% grade, maximum) a drainage layer consisting of sand, geonet, or geocomposite shall be provided to overlay the synthetic membrane layer. For the geonet or geocomposite option, a 12-inch thick soil cover layer will be placed on top of the geonet or geocomposite for protection against damage from construction equipment. On the flatter top slopes where a drainage layer will not be used, a 12-inch thick soil cover layer will be placed on top of the synthetic membrane for protection. The uppermost layer of the final cover system shall be an erosion layer which consists of a minimum of six inches of earthen material that is capable of sustaining native plant growth. The erosion layer shall be seeded or sodded following the application of the final cover in order to minimize erosion. Details of this final cover system are shown on Figures 12-2, 12-3, and 12-4.

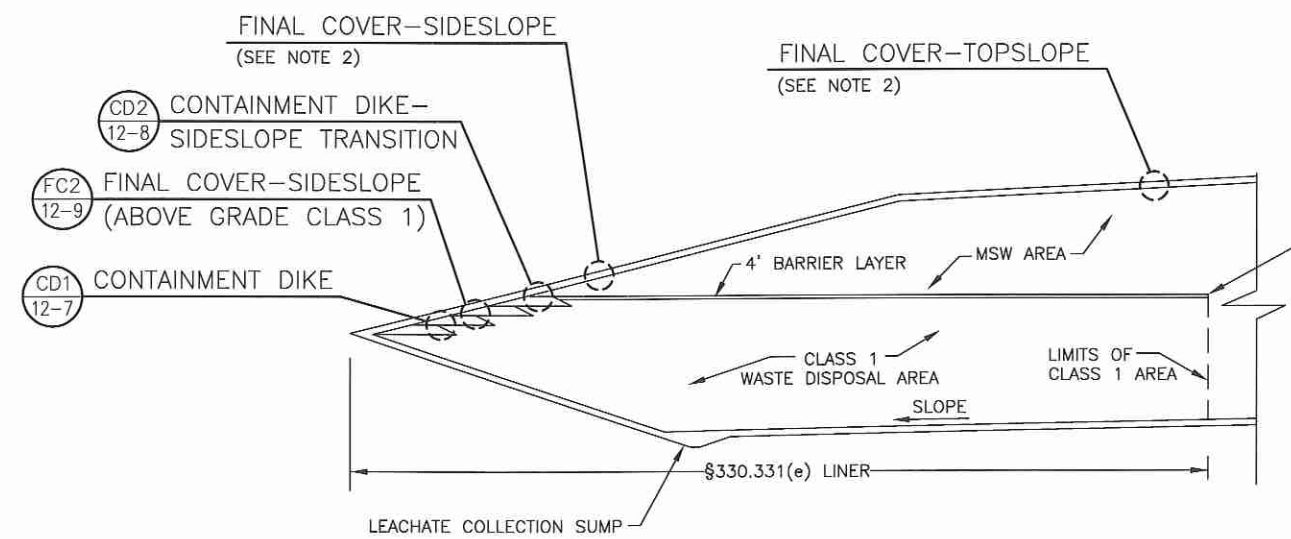
#### 2.1.2 Alternative Final Cover Design

According to the MSWR, the TNRCC TCEQ may approve an alternative final cover design that includes an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified in previous sections above and an erosion layer that provides equivalent protection from wind and water erosion as the erosion layer also specified above. A geosynthetic clay liner (GCL) is proposed as an alternate infiltration layer for the final cover as

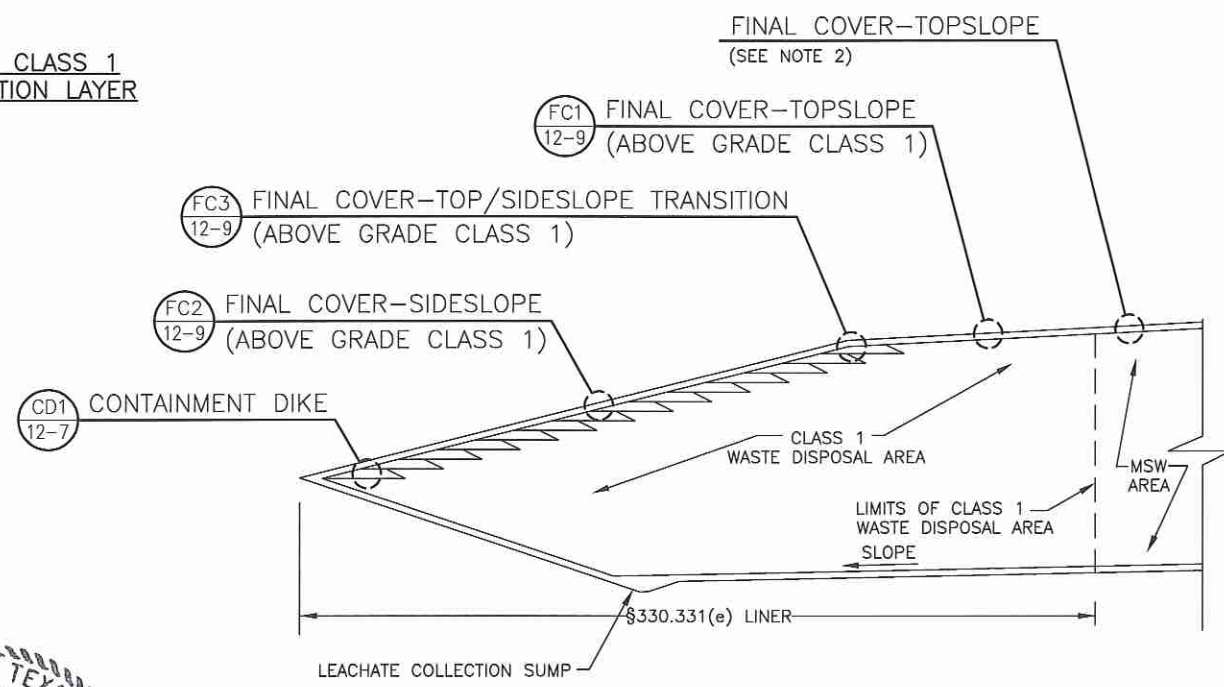
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**OPTION 1 – BELOW GRADE CLASS 1 DISPOSAL AREA WITH SEPARATION LAYER**



**OPTION 2 – ABOVE GRADE CLASS 1 DISPOSAL AREA WITH SEPARATION LAYER**



**OPTION 3 – ABOVE GRADE CLASS 1 DISPOSAL AREA**

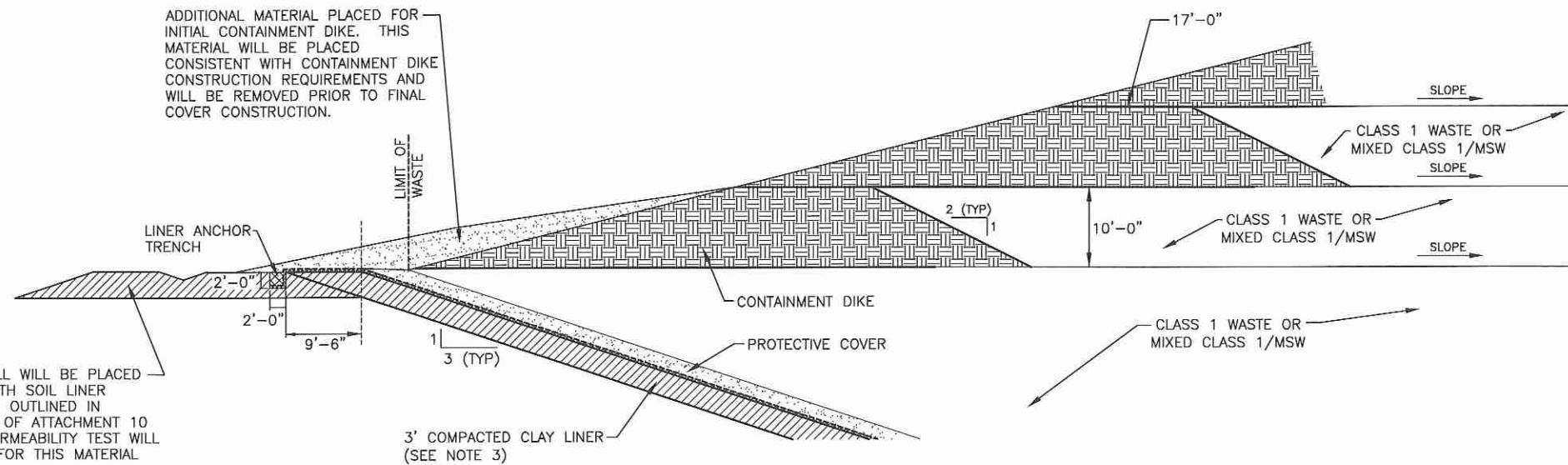
12-21-11

- NOTES:**
- CLASS 1 WASTE AND CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE ARE USED INTERCHANGEABLY.
  - TYPICAL AND ALTERNATIVE COMPOSITE FINAL COVER DETAILS ARE PROVIDED ON FIGURES 12-2 THROUGH 12-4.

△ INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

- LIST OF REVISIONS:**
- NEW DRAWING ADDED.

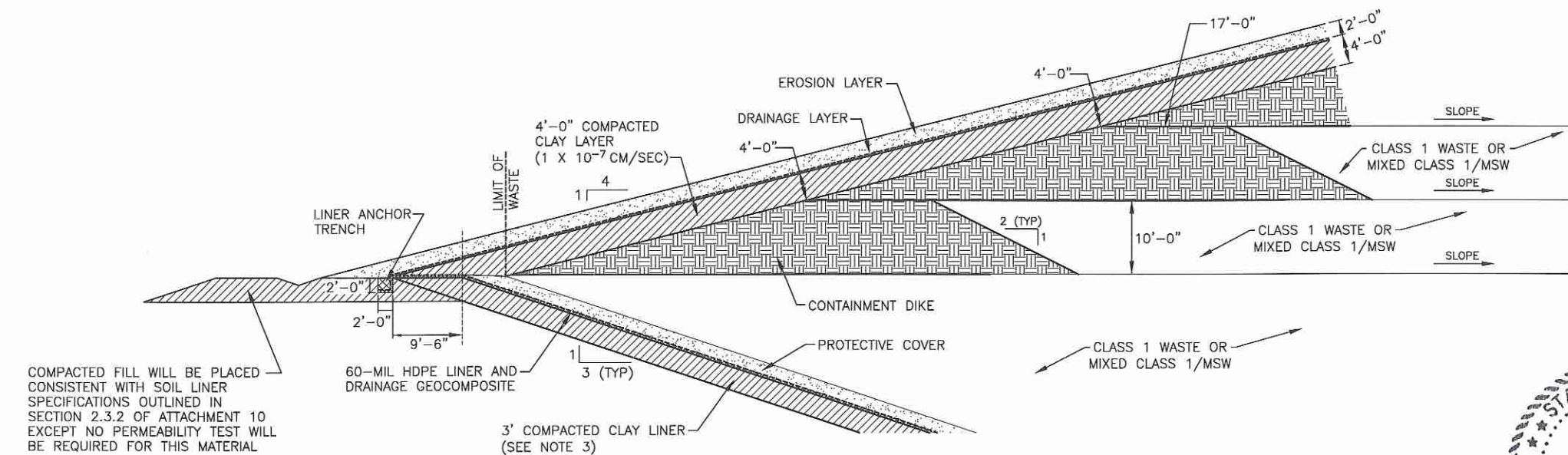
<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY:	PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>	<b>CLASS 1 WASTE DISPOSAL AREA OPTIONS</b>  TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS  <i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727												
DATE: 11/2011 FILE: 0120-81-11 CAD: 12-6_DETAILS.DWG	DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">REVISIONS</th> </tr> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">12/2011</td> <td style="text-align: center;">SEE LIST OF REVISIONS</td> </tr> </tbody> </table>	REVISIONS			NO.	DATE	DESCRIPTION	1	12/2011	SEE LIST OF REVISIONS			
REVISIONS														
NO.	DATE	DESCRIPTION												
1	12/2011	SEE LIST OF REVISIONS												
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		<table style="width: 100%; font-size: x-small;"> <tr> <td>CHICAGO, IL</td> <td>FORT WORTH, TX</td> <td>GRAND RAPIDS, MI</td> </tr> <tr> <td>NAPERVILLE, IL</td> <td>EVANSVILLE, IN</td> <td>SOUTH BEND, IN</td> </tr> <tr> <td>COLUMBUS, OH</td> <td>RIVERSIDE, MO</td> <td>SPRINGFIELD, IL</td> </tr> <tr> <td>DENVER, CO</td> <td></td> <td>CLEARMONT, FL</td> </tr> </table>	CHICAGO, IL	FORT WORTH, TX	GRAND RAPIDS, MI	NAPERVILLE, IL	EVANSVILLE, IN	SOUTH BEND, IN	COLUMBUS, OH	RIVERSIDE, MO	SPRINGFIELD, IL	DENVER, CO		CLEARMONT, FL
CHICAGO, IL	FORT WORTH, TX	GRAND RAPIDS, MI												
NAPERVILLE, IL	EVANSVILLE, IN	SOUTH BEND, IN												
COLUMBUS, OH	RIVERSIDE, MO	SPRINGFIELD, IL												
DENVER, CO		CLEARMONT, FL												



COMPACTED FILL WILL BE PLACED CONSISTENT WITH SOIL LINER SPECIFICATIONS OUTLINED IN SECTION 2.3.2 OF ATTACHMENT 10 EXCEPT NO PERMEABILITY TEST WILL BE REQUIRED FOR THIS MATERIAL

CONTAINMENT DIKE CD1A  
2-1 THROUGH 2-6, 7-3 THROUGH 7-8 12-7

0 10 20  
SCALE IN FEET



COMPACTED FILL WILL BE PLACED CONSISTENT WITH SOIL LINER SPECIFICATIONS OUTLINED IN SECTION 2.3.2 OF ATTACHMENT 10 EXCEPT NO PERMEABILITY TEST WILL BE REQUIRED FOR THIS MATERIAL

CONTAINMENT DIKE CD1B  
2-1 THROUGH 2-6, 7-3 THROUGH 7-8 12-7

0 10 20  
SCALE IN FEET

**CONTAINMENT DIKE CONSTRUCTION REQUIREMENTS**

- (REFER TO APPENDIX III-F OF THE SITE DEVELOPMENT PLAN)
- DIKES WILL BE CONSTRUCTED OF CLAY-RICH SOILS UNDER THE DIRECTION OF THE LANDFILL MANAGER OR HIS DESIGNEE.
  - SOILS WILL BE PLACED IN MAXIMUM 9-INCH THICK LIFTS AND COMPACTED WITH A MINIMUM OF FOUR PASSES WITH A DOZER OR SIMILAR EQUIPMENT.
  - UPON COMPLETION OF EACH DIKE, A THIRD PARTY INDEPENDENT PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN TEXAS WILL CERTIFY THE INSTALLED DIKE IN ACCORDANCE WITH TITLE 30 TAC §335.590(24)(F)(vi) AND THE REQUIREMENTS INCLUDED IN APPENDIX III-F OF THE SDP PRIOR TO PLACEMENT OF WASTE. THE LICENSED ENGINEER WILL UTILIZE THE CURRENT VERSION OF THE STANDARD FORM INCLUDED IN §335.590(24)(F)(vi) FOR THE CERTIFICATION OF THE DIKE. THE CERTIFICATION PREPARED AND SIGNED BY THE ENGINEER WILL BE PLACED IN THE SITE OPERATING RECORD.



**NOTES:**

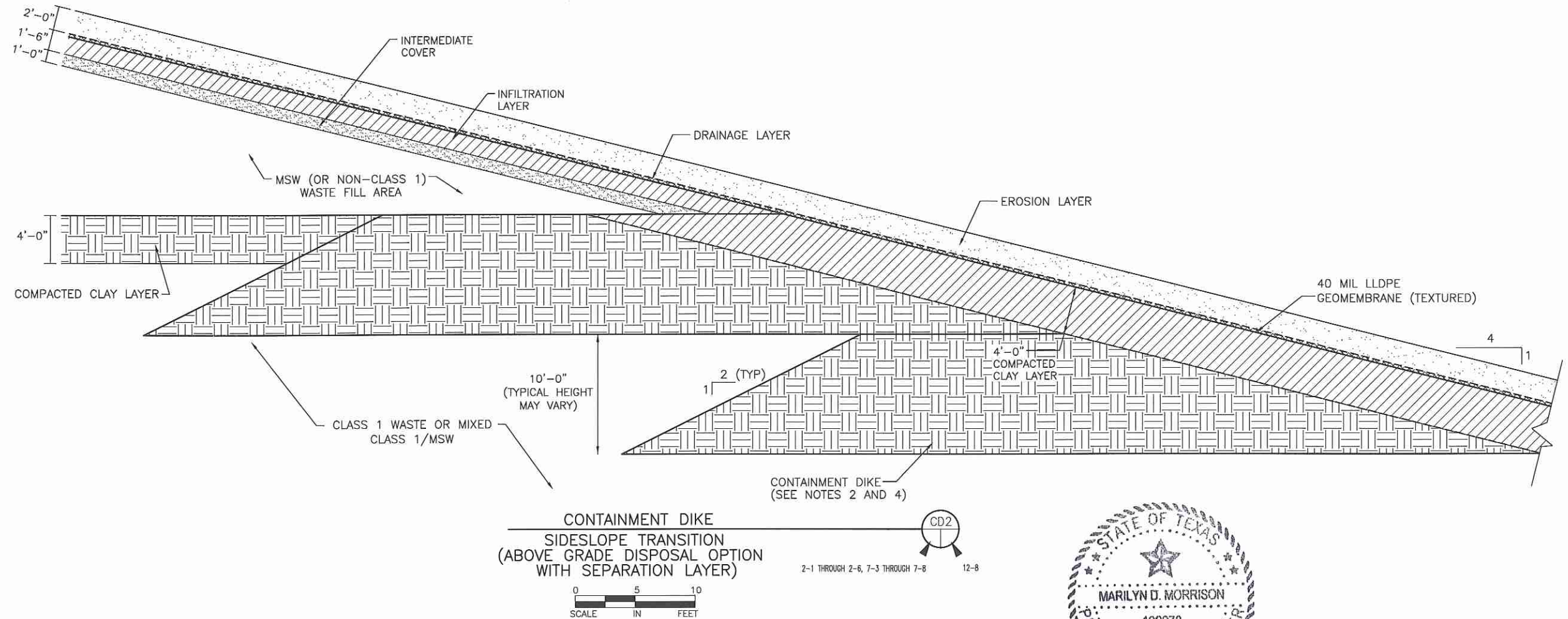
1. CLASS 1 WASTE WILL BE DISPOSED OF ABOVE COMPACTED PERIMETER BERM GRADES WHEN CONTAINMENT DIKES ARE CONSTRUCTED. REFER TO APPENDIX III-F FOR MORE INFORMATION.
2. CONTAINMENT DIKES WILL BE CONSTRUCTED IN AREAS WHERE THE DISPOSAL OF CLASS 1 WASTE WILL OCCUR ABOVE GRADE. THE CONTAINMENT DIKES WILL EXTEND ALONG THE BOTTOM OF FINAL COVER TO THE FINAL ELEVATION OF WASTE DISPOSAL.
3. ALL AREAS WHICH RECEIVE CLASS 1 WASTE WILL HAVE A LINER SYSTEM CONSTRUCTED IN COMPLIANCE WITH 30 TAC §330.331(e).
4. REFER TO APPENDIX III-F FOR INFORMATION REGARDING THE CONSTRUCTION OF CONTAINMENT DIKES.
5. EACH CONTAINMENT DIKE OPTION IS ONLY APPLICABLE FOR
  - (1) THOSE AREAS CONSTRUCTED IN ACCORDANCE WITH §330.331(e) AND
  - (2) THE ALLOWABLE ABOVE GRADE CLASS 1 DISPOSAL AREAS SHOWN ON FIGURE 1-12 IN ATTACHMENT 1.

INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

**LIST OF REVISIONS:**  
1. NEW DRAWING ADDED.

<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY:		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>CLASS 1 WASTE CONTAINMENT DIKE DETAIL</b>  TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS  <i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727							
DATE: 12/2011 FILE: 0120-81-11 CAD: 12-7_DETAILS.DWG		DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY									
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NO.	DATE	DESCRIPTION									
1	12/2011	SEE LIST OF REVISIONS									
		FORT WORTH, TX EVANSVILLE, IN RIVERSIDE, MO		GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARMONT, FL							
				<b>FIGURE 12-7</b>							

O:\0120\109\CLASS 1 WASTE MOD\ATT 12\12-8\_DIKE DETAILS.DWG, 12/7/2011 2:36:11 PM, rseliers



**CONTAINMENT DIKE**  
**SIDESLOPE TRANSITION**  
**(ABOVE GRADE DISPOSAL OPTION**  
**WITH SEPARATION LAYER)**

CD2  
 2-1 THROUGH 2-6, 7-3 THROUGH 7-8 12-8

0 5 10  
 SCALE IN FEET



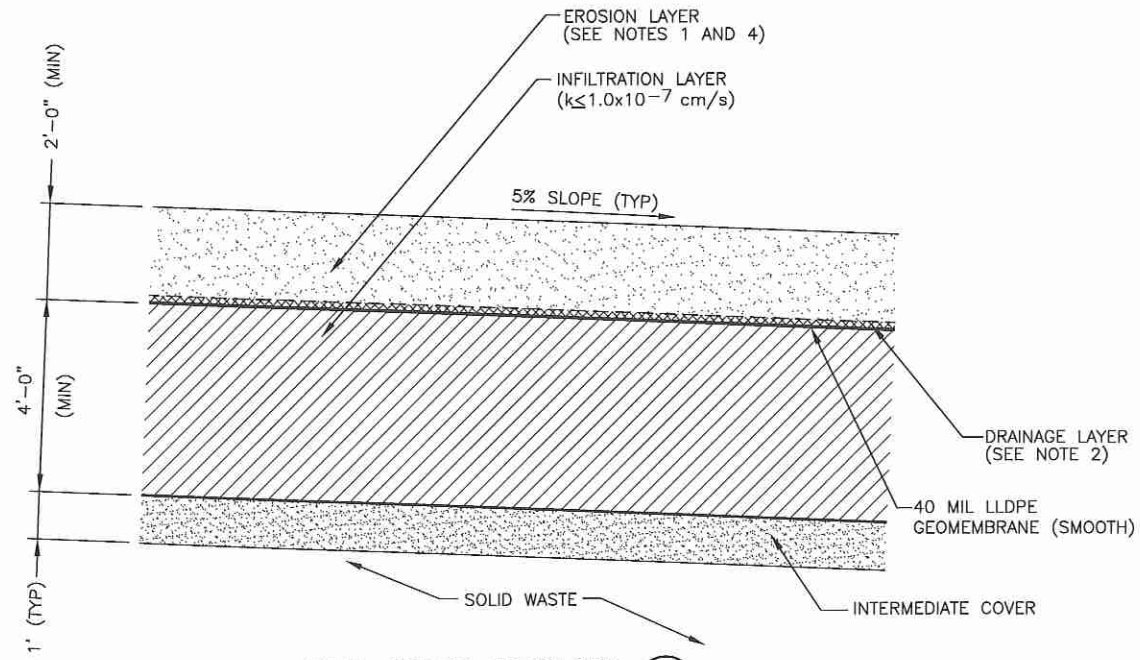
INDICATES REVISION  
 (SEE LIST OF REVISIONS BELOW)

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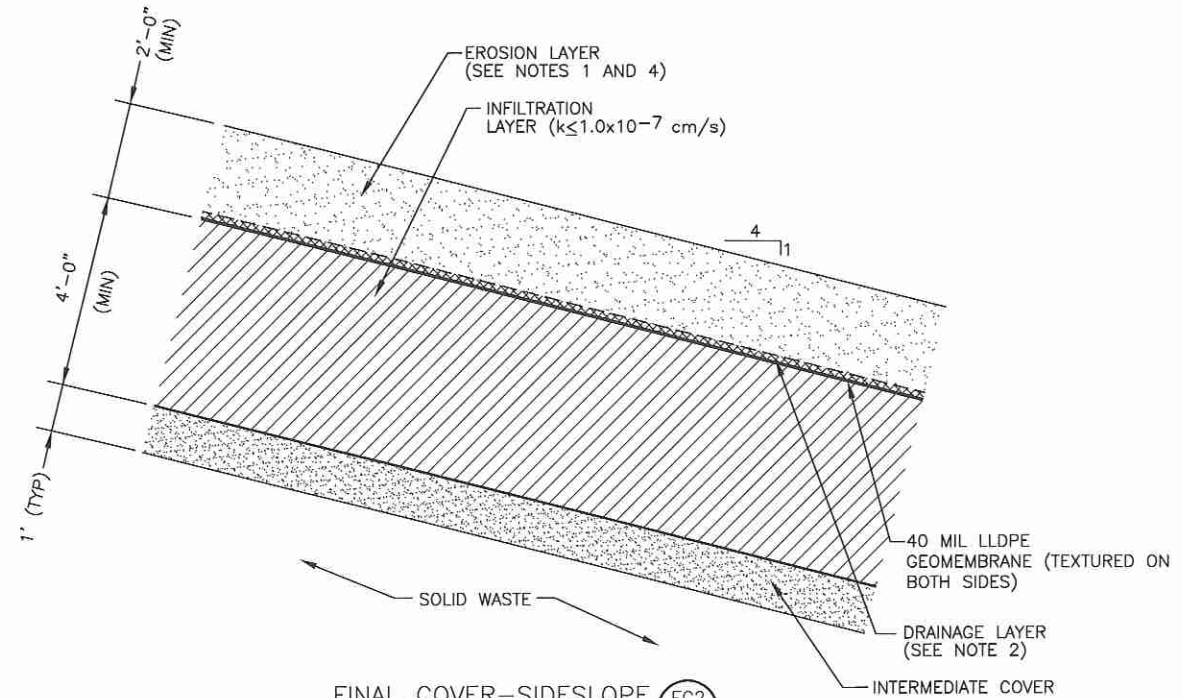
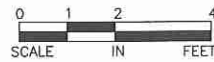


- NOTES:**
1. CLASS 1 WASTE WILL BE DISPOSED OF ABOVE COMPACTED PERIMETER BERM GRADES WHEN CONTAINMENT DIKES ARE CONSTRUCTED. REFER TO APPENDIX III-F FOR MORE INFORMATION.
  2. CONTAINMENT DIKES WILL BE CONSTRUCTED IN AREAS WHERE THE DISPOSAL OF CLASS 1 WASTE WILL OCCUR ABOVE GRADE. THE CONTAINMENT DIKES WILL EXTEND ALONG THE BOTTOM OF FINAL COVER TO THE FINAL ELEVATION OF WASTE DISPOSAL.
  3. ALL AREAS WHICH RECEIVE CLASS 1 WASTE IN A DEDICATED CELL OR MIXED WITH OTHER WASTE WILL HAVE A LINER SYSTEM CONSTRUCTED IN COMPLIANCE WITH 30 TAC § 330.331(e).
  4. REFER TO APPENDIX III-F FOR INFORMATION REGARDING THE CONSTRUCTION OF CONTAINMENT DIKES.

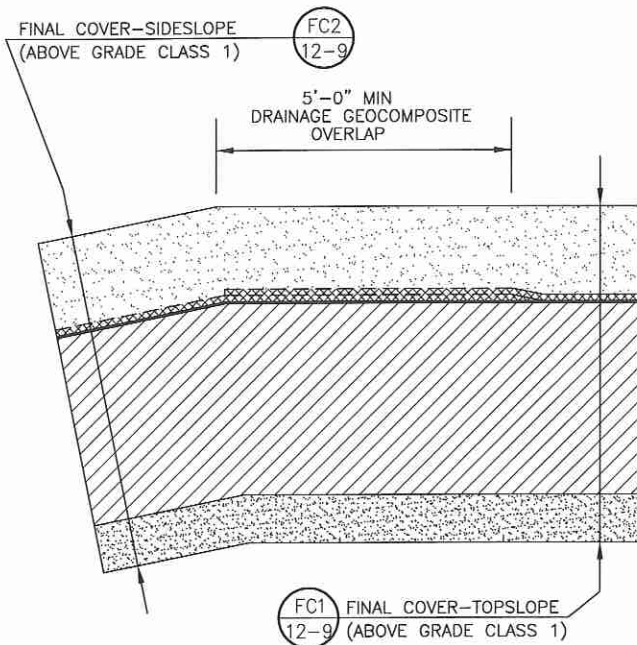
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	DATE: 12/2011 FILE: 0120-109-11 CAD: 12-8_DIKE DETAILS.DWG	
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		FORT WORTH, TX EVANSVILLE, IN RIVERSIDE, MO
		GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARMONT, FL
		<b>FIGURE 12-8</b>



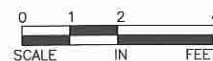
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(ABOVE GRADE CLASS 1) 12-9



FINAL COVER-SIDESLOPE (FC2)  
(ABOVE GRADE CLASS 1) 12-9



FINAL COVER-TOP/SIDESLOPE TRANSITION (FC3)  
(ABOVE GRADE CLASS 1) 12-9



NOTES:

- TOP 6" OF EROSION LAYER WILL BE CAPABLE OF SUSTAINING SELECTED VEGETATION.
- REFER TO FIGURE 12-2 FOR DRAINAGE LAYER INFORMATION.
- FINAL COVER COMPONENTS WILL BE CONSTRUCTED ACCORDING TO DETAILS SHOWN IN ATTACHMENT 12.
- EROSION LAYER MAY CONSIST OF BOTH ONSITE AND OFF-SITE SOILS. BORROW SOURCE TO BE SELECTED BY OWNER PRIOR TO CONSTRUCTION.

△ INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

LIST OF REVISIONS:

- NEW DRAWING ADDED.



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DATE: 12/2011 FILE: 0120-109-11 CAD: 12-9 FINAL COVER DTLS.DWG	DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY	REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>SEE LIST OF REVISIONS</td> </tr> </tbody> </table>				NO.	DATE	DESCRIPTION	1	12/2011	SEE LIST OF REVISIONS
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					<b>FIGURE 12-9</b>						

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**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

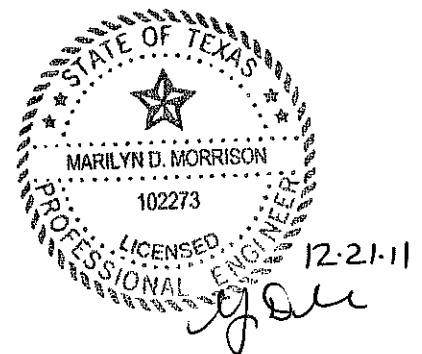
**PART III  
ATTACHMENT 15  
LEACHATE AND CONTAMINATED WATER PLAN**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999

Revised December 2011



Prepared by

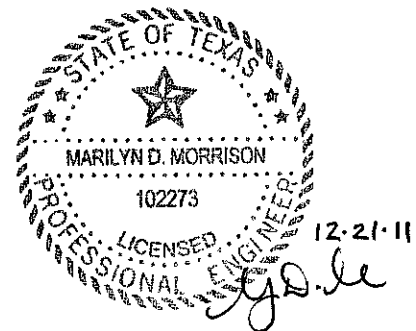
**Weaver Boos Consultants, LLC—Southwest**  
TBPE Registration No. F-3727  
6420 Southwest Boulevard, Suite 206  
Fort Worth, Texas 76109  
(817) 735-9770

Project No. 0120-109-11-54-01

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- Solidification of leachate and disposal of solidified material in the landfill.

Initially, leachate will be managed at this facility through recirculation and solidification. Future leachate treatment and disposal options include discharge to a POTW, on-site treatment, storage tanks or ponds, and treatment ponds. Modification and/or notification letters to the TNRCC TCEQ will be provided as required prior to modifying the current leachate plans.

Recirculation, if performed, may be accomplished by discharge of the collected liquid to the waste mass by any of the following procedures. Contaminated water and ground water will not be recirculated into the waste mass.

- Discharge to trenches containing perforated pipes or prefabricated infiltration units spaced at regular horizontal and vertical intervals throughout the waste;
- Discharge to vertical manholes spaced aerially across the waste footprint and having horizontal distribution pipes spaced at regular vertical intervals;
- Discharge to open trenches temporarily excavated into the waste which are then backfilled with waste and covered in accordance with 30 TAC, Section 330.133;
- Discharge to drip irrigation tubing buried about 6 inches beneath cover soils;
- Spray application of leachate to working face or daily cover; and
- Other methods with prior written approval of the TNRCC TCEQ.

Leachate collected from any sump draining a cell in which Class I non-hazardous industrial waste has been placed may be recirculated in cells ~~constructed with a Subtitle D liner approved for disposal of Class I non-hazardous industrial waste.~~ It may also be solidified and disposed of on-site, ~~only below grade and only in cells constructed with a Subtitle D liner approved by TNRCC for disposal of Class I non-hazardous industrial waste.~~ In the alternative, it may be disposed of off-site at a properly licensed facility. Finally, BFI may seek to have the solidified leachate reclassified by TNRCC as Class II industrial waste. ~~If this endeavor is successful, the solidified leachate may be disposed of in any cell in the landfill.~~

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

**PART IV**

**SITE OPERATING PLAN**

Prepared for

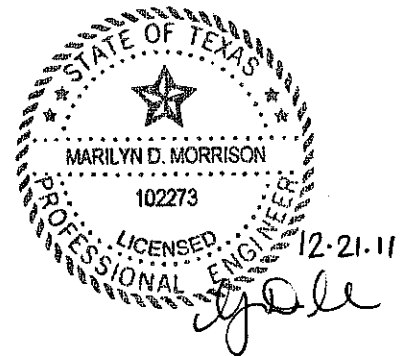
BFI Waste Systems of North America, LLC

Technically Complete January 1999

Revised November 2000

Revised May 2006

Revised December 2011



Prepared by

**Weaver Boos Consultants, LLC-Southwest**

TBPE Registration No. F-3727

6420 Southwest Boulevard, Suite 206

Fort Worth, Texas 76109

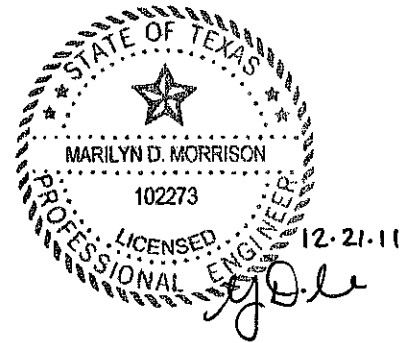
(817) 735-9770

Project No. 0120-109-11-54-01

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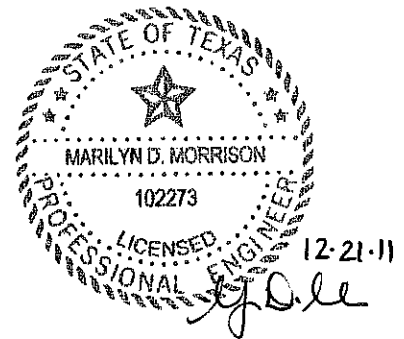
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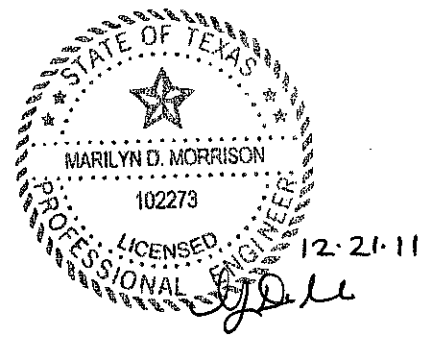
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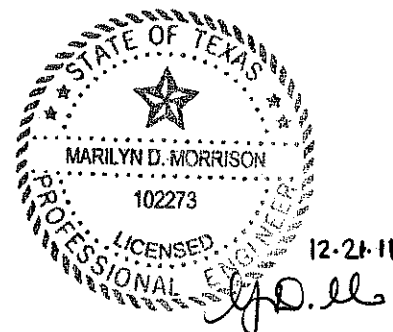


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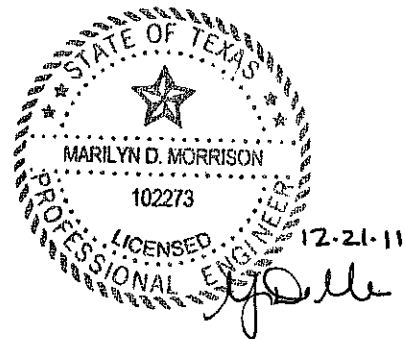
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**Appendix A**  
Example Forms



Records Needed for Site Operating Record, Figure 1

Records Needed	Frequency	Rule Citation
Location Restriction Demonstrations	Submittal of Permit Application	330.113(b)(1)
Prohibited Waste Inspection Records, Training and Receipt Notification Procedures	Per Occurrence	330.113(b)(2)
Gas Monitoring Results	Quarterly	330.113(b)(3)
Remediation Plans for Explosive and Other Gases, if applicable	Per Occurrence	330.113(b)(3)
Unit Design Documentation for Leachate or Gas Condensate Placement	Monitoring – Semi-annual / Corrective Action – As Required	330.113(b)(4)
Groundwater Monitoring and Corrective Action Demonstration, Certification, Monitoring, Testing & Analytical Data, if applicable	As Required	330.113(b)(5)
Closure and Post-Closure Plans	Submittal of Permit Application	330.113(b)(6)
Post-Closure Monitoring, Testing and Analytical Data, if applicable	Groundwater Monitoring – Semi-Annual Inspections	330.113(b)(6)
Cost Estimates and Financial Assurance Documentation for Closure and Post-closure	Annually	330.113(b)(7)
Facility Operation, Permit Modification, Approvals, and Technical Assistance Correspondence & Responses	Per Occurrence	330.113(b)(9)
Special Waste Manifests, Trip Tickets and All Other Documents Relating to Special Waste	Per Occurrence	330.113(b)(10)
Other Documents Specified in the Permit or by the executive director	As Required	330.113(b)(11)
Personnel Training Records '335.586(d)-(e)	As Needed	330.113(e)
Personnel Operator Licenses	As Needed	330.113(f)
Site Waste Acceptance Rate Evaluation	Annually	330.113(h)
Solid Waste Summary Reports	Quarterly/Annually	330.113 (h) 330.603
<b>Class 1 Waste Containment Dike Certification Report</b>	<b>As Needed</b>	<b>335.590(F)(VI)</b>

The Class I working face includes areas where waste has been deposited for disposal but has not been covered with soil.

- RACM Unloading and Disposal Area. The RACM unloading area will be designated by the Landfill Manager as noted in Section 26.4.
- Wood Grinding Area. The wood grinding area will process wood waste materials as discussed in Section 7.
- Waste Stabilization Basins. The liquid waste bulking facility will accept liquid wastes as outlined in Section 26.

The working faces will be sized to minimize the amount of waste exposed while still providing adequate area for safe and efficient vehicle unloading. Minimizing the size of the face aids in control of windblown waste and minimizes odor. The size should also accommodate customers in a reasonable amount of time without excessive delays. At a minimum, two commercial vehicles should be able to empty with a sufficient clearance between the vehicles to allow for safe backing and a third space for commercial customers who must unload manually. A separate area at the same active face may be provided for manual unloading vehicles such as pickups or trailers. Waste unloaded manually can be pushed and incorporated into the working face. The unloading area where waste is discharged by hauling trucks at the MSW working face will be less than 200 feet by 200 feet. The unloading area in the Class I Nonhazardous Industrial Waste Working face will be less than 100 feet by 100 feet. The unloading area in the RACM Unloading and Disposal Area will be less than 50 feet by 50 feet.

As discussed in Section 27.6, the Class 1 working face and the MSW working face may be combined in areas constructed in accordance with the requirements listed in Title 30 TAG §330.331(e) – refer to Part III, Appendix III-F. As discussed in Section 27.2, all Class 1 waste will be evaluated before acceptance under the site's Class 1 waste evaluation and acceptance procedures.

Cones, signs, or direction by spotters must be used to separate the vehicles at the unloading area. Spotters are responsible for keeping incoming vehicles far enough from the unloading area as these vehicles begin turning and backing into position for discharge of waste. Separation of vehicles while they are positioning for backing into disposal positions will reduce interference with other vehicles already in position and discharging their wastes.

### 23.3. Alternative Daily Cover Material

Petroleum contaminated soil may be used for alternative daily cover at the Tessman Road Landfill if approved by separate temporary authorization. The use of any approved ADC shall follow the conditions established for the ADC in the authorization.

### 23.4. Cover Log

A cover application log will be maintained by the lead operator, or his designee, documenting the area over which daily, intermediate, or final cover is applied. For daily and intermediate cover, the log shall specify the date the area was covered (no exposed waste), how it was accomplished, where cover was applied, and the last area that was covered. Areas with cover will be inspected on a daily basis to verify the integrity of the cover material. For final cover, this log shall specify the area covered, the date cover was applied, and the thickness applied that date. Each entry shall be certified by the signature of the on-site supervisor that the work was accomplished as stated in the log. The cover log shall be available for inspection by TCEQ representatives and authorized agents or employees of local governments having jurisdiction. An example of the Cover Log is included in Appendix A, Forms,

### 23.5. Final Cover

Final cover for the landfill shall be in accordance with Attachment 12, Final Closure Plan, of the permit amendment application.

### 23.6. Erosion of Cover

The landfill cover (or Class 1 waste containment dike external slope) will be inspected for erosion after each day that measurable rainfall occurs at the site. The inspection will be performed on the next Monday through Friday

operating day after the measurable rainfall occurs. Maintenance of the landfill cover (or Class 1 waste containment dike external slope) shall be performed to prevent exposure of waste due to erosion. Areas of the cover that require maintenance due to erosion will be identified. Any cover erosion of landfill cover (or Class 1 waste containment dike external slope) shall be repaired promptly by restoring the cover material, grading, compacting, and seeding it as applicable.

Areas of final and intermediate cover shall also be inspected for erosion at least monthly during the operating life of the landfill, and final cover shall be inspected at least semiannually during the post-closure care period of the landfill. Any areas requiring maintenance shall be promptly restored during the entire operational life and for the post-closure maintenance period of the facility. These cover erosion inspections shall be documented on the appropriate Daily Inspection Report, the Weekly Inspection Report, or the Monthly Inspection Report. An example of each of these reports is included in Appendix A, Forms.

## 24. Ponded Water

### 24.1. Landfill Unit

The ponding of water over waste placed at the municipal solid waste landfill shall be prevented or promptly eliminated after any such occurrence is identified. Waste fill areas with daily, intermediate, or final cover will be sloped to prevent ponding. Any areas of ponded water must be eliminated as soon as possible. The area in which the ponding occurred shall be filled in and regraded as soon as the surface dries adequately for regrading or adding soil such that the ponding will be eliminated within seven days of occurrence. If any ponded water has come into contact with waste, leachate, or waste contaminated soils, the ponded water will be managed in the accordance with Attachment 15, the Leachate and Contaminated Water Plan, of this permit amendment application.

Class 1 waste may be placed only in dedicated waste disposal cells that meet the requirements of 30 TAC § 330.137 (d) (1) — (6) 331(e). Placement, daily cover and intermediate cover will be accomplished consistent with the procedures for other wastes that are accepted at the landfill. Waste placement and cover requirements for above-grade and below-grade disposal options are noted below.

### **Class 1 Waste Below Grade Disposal Option**

Class 1 industrial waste, other than asbestos-containing waste, may only be placed in designated disposal cells and at or below the level of the natural elevation of the surrounding ground surface, which is approximately 660 feet MSL. When the cell has been filled to the level of the natural elevation of the surrounding ground surface, an extra thick intermediate cover of at least four feet of compacted clay-rich soil must be placed on top of the Class 1 waste and on any exposed side slopes. Municipal solid waste may then be placed above the extra thick intermediate cover up to the final design grade.

### **Above-Grade Class 1 Waste Disposal Options**

With the above grade Class 1 waste disposal options, Class 1 waste or Class 1 waste mixed with other accepted wastes may be placed either below or above the compacted perimeter berm elevation in areas with liners constructed in accordance with §330.331(e). The two above-grade Class 1 disposal options are shown on Figure 12-6 in Part III, Attachment 12 and summarized below.

- Above Grade Class 1 Waste Disposal Area with 4-foot-thick Separation Layer. This option allows for the disposal of Class 1 wastes above existing grade if containment dikes are constructed along the exterior slope of the Class 1 waste disposal area. This option also includes the placement of a 4-foot-thick compacted clay rich barrier layer that will be placed over the Class 1 waste as a separation layer between the Class 1 waste and the municipal solid waste (and other non-Class 1 waste material) to be placed above. With this option, the 4-foot-thick separation or barrier layer will be sloped toward the interior of the landfill.
- Above Grade Class 1 Waste Disposal Area. This option includes the construction of containment dikes along the exterior sideslope of the Class 1 disposal area to extend the limits of the Class 1 waste disposal area. No separation layer is required for this option; however, the thickness of the composite final cover system's infiltration layer will be increased from 1.5 feet to 4.0 feet with a maximum hydraulic conductivity of  $1 \times 10^{-7}$  cm/s.

Consistent with §330.173(e), the amount of Class 1 waste to be accepted will be limited to a maximum of 20 percent of the total waste, not including Class 1 waste, accepted during the current or previous year. The amount of waste may be determined by volume or by weight, but the same unit of measure must be used for each year. Details of the landfill perimeter containment dike construction are included in the cross-sections in Part III, Attachment 2, and described in detail in Part III, Appendix III-F.

## **Class 1 Waste Disposal Area Unloading Procedures**

In areas where Class 1 and MSW will be comingled, the unloading procedures for the combined working face will be consistent with the waste unloading procedures specified in Section 7.2. For example, Spotters, Equipment Operators, or other field personnel will be present at the combined working face at all times to monitor incoming loads of waste. These personnel will be familiar with the rules and regulations governing the various types of waste that can or cannot be accepted into this facility and will be trained to identify prohibited wastes before being assigned to this task (refer to Section 4.3.1 for training procedures). The personnel will also be trained in and have a basic understanding of both industrial and hazardous waste and their transportation and disposal requirements. Site personnel will establish unloading positions at the working face. The unloading positions are basically equally spaced lanes that each collection vehicle uses to unload waste material from the collection vehicle to the working face. Typically, each lane is about 20 feet wide. When the Class 1 and MSW working face are combined, if warranted, the distance between the unloading positions utilized by Class 1 waste collection vehicles and MSW collection vehicles may be increased. This additional distance will provide a buffer between Class 1 unloading positions and the non-Class 1 unloading positions, which may include individual citizens. The Spotters and Equipment Operators will monitor the working face to verify that adequate spacing is maintained between vehicles, dust is minimized, and waste is being offloaded to the working face area in a safe manner.

The Spotters and Equipment Operators will police the working face to verify that Class 1 waste is safely offloaded to the working face. If special handling procedures are required for Class 1 waste, then the working face personnel will be notified prior to the arrival of the waste haul vehicle at the working face so that the Spotters and Equipment Operators can take appropriate action (e.g., special handling procedures could include verifying that daily cover is placed over waste to minimize exposure to the atmosphere and/or establish a separate area at the working face to ensure that no other hauler is within a specified distance of the specific unloading position for the Class 1 waste that requires special handling).

### **27.7. Recordkeeping and Reporting**

All information and documents pertaining to Class 1 waste profiled for disposal and delivered to the landfill for disposal in the Class 1 cell including but not limited to, all records concerning measurements and analyses performed at the site, shall be retained at the site in accordance with the provisions in Section 3.

Additionally, the TCEQ Monthly Waste Receipt Summary Report will be prepared by the Site Manager, or his designee, and submitted to the TCEQ. This report will be submitted no later than the 25th day of the month following the month in which the waste was received. Reports will be on forms provided by and submitted to the TCEQ Executive Director. The facility will file reports including those months in which they receive no Class 1 waste at the facility unless the TCEQ grants an exception. The reports will summarize the quantity, character, transporter identity, and the method of storage, processing and disposal of each Class 1 waste shipment received, and itemizes by manifest document number as required by the TCEQ.

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

**PART IV**

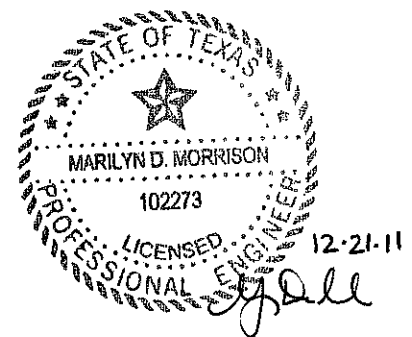
**APPENDIX IV-D  
CLASS 1 WASTE ACCEPTANCE PLAN**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999

Revised December 2011



Prepared by

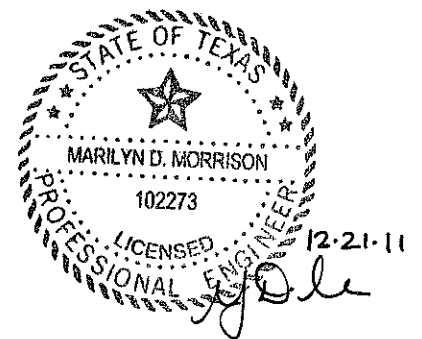
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TBPE Registration No. F-3727  
6420 Southwest Boulevard, Suite 206  
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(817) 735-9770

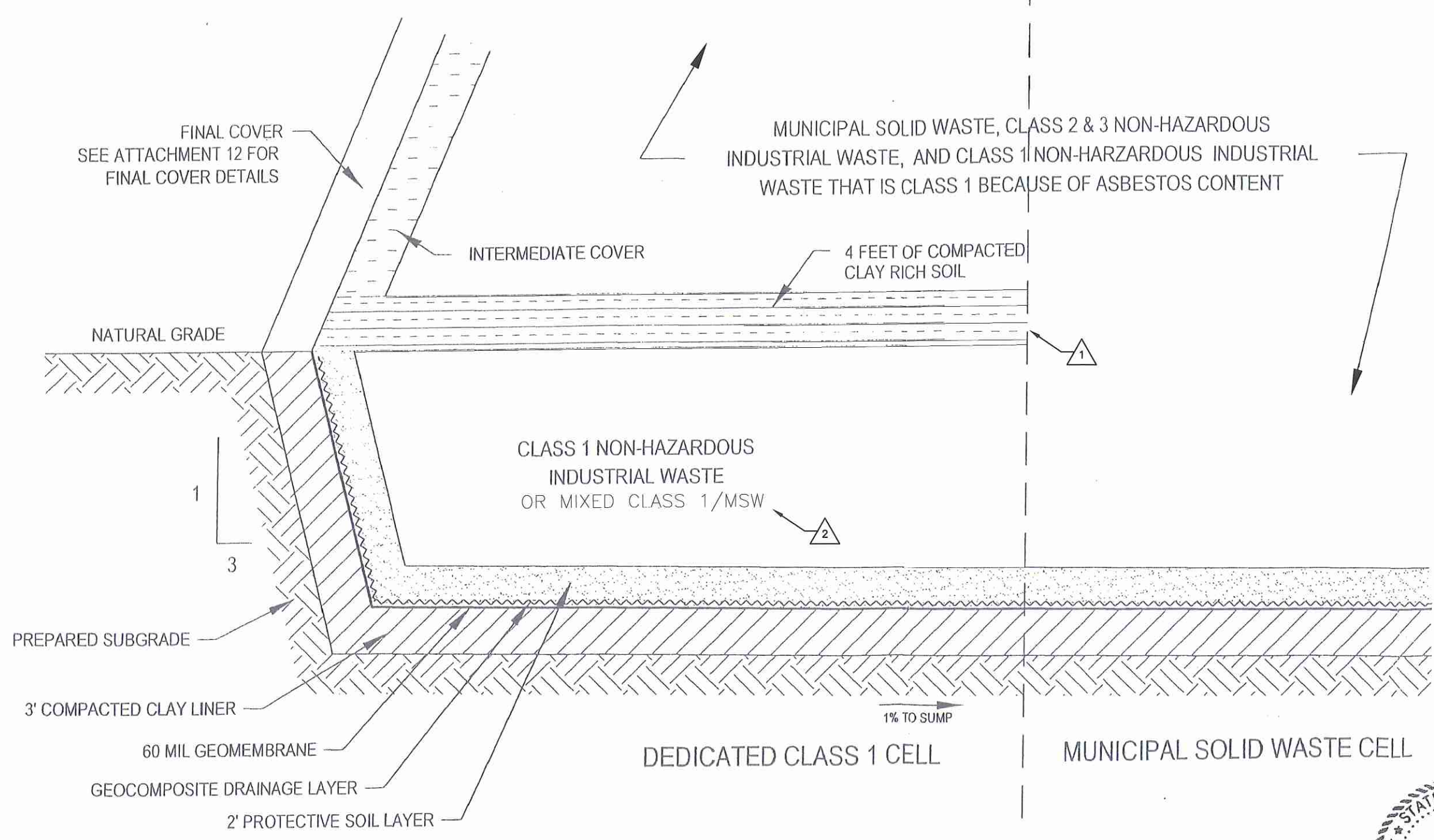
Project No. 0120-109-11-54-01

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**1** INDICATES REVISION  
(SEE LIST OF REVISIONS BELOW)

- LIST OF REVISIONS:
1. REVISED BARRIER LAYER TERMINATION.
  2. NOTED THAT CLASS 1 WASTE MAY BE MIXED WITH MSW.

DRAFT  
 FOR PERMITTING PURPOSES ONLY  
 ISSUED FOR CONSTRUCTION  
 CLIENT APPROVAL BY: \_\_\_\_\_

DATE: 12/2003  
 FILE: 0120-81-11  
 CAD: IV-D-1\_CELL\_DETAIL.DWG

DRAWN BY: VRS  
 DESIGN BY: MDM  
 REVIEWED BY: JPY

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PREPARED FOR BFI WASTE SYSTEMS OF NORTH AMERICA, LLC		
REVISIONS		
NO.	DATE	DESCRIPTION
1	12/2011	SEE LIST OF REVISIONS

TYPICAL DEDICATED CLASS 1  
NON-HAZARDOUS INDUSTRIAL  
WASTE CELL

TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS

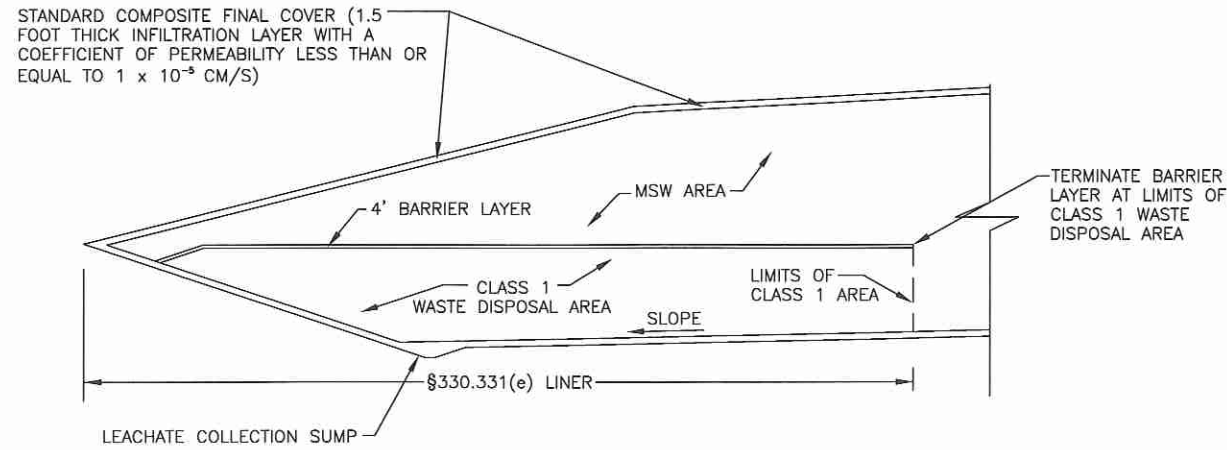
*Weaver Boos Consultants*  
TBPE REGISTRATION NO. F-3727

CHICAGO, IL    FORT WORTH, TX    GRAND RAPIDS, MI  
 NAPERVILLE, IL    SOUTH BEND, IN  
 COLUMBUS, OH    EVANSVILLE, IN    SPRINGFIELD, IL  
 DENVER, CO    RIVERSIDE, MO    CLEARMONT, FL

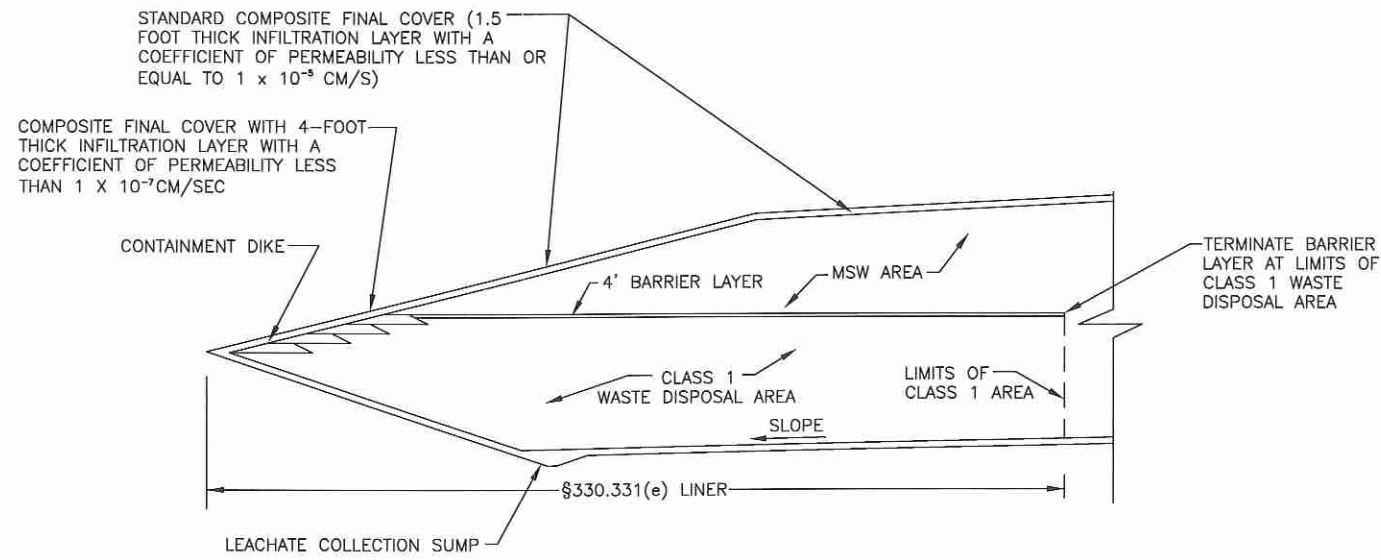
FIGURE IV-D-1

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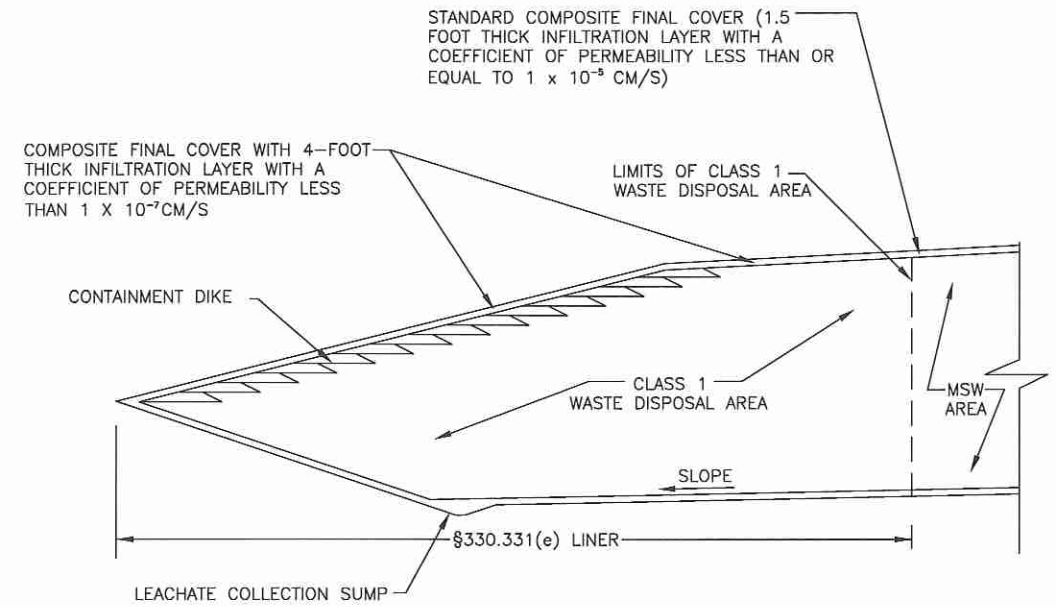
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**OPTION 1 – BELOW GRADE CLASS 1 DISPOSAL AREA WITH SEPARATION LAYER**



**OPTION 2 – ABOVE GRADE CLASS 1 DISPOSAL AREA WITH SEPARATION LAYER**



**OPTION 3 – ABOVE GRADE CLASS 1 DISPOSAL AREA**



INDICATES REVISION (SEE LIST OF REVISIONS BELOW)

- LIST OF REVISIONS:  
1. NEW DRAWING ADDED.

**NOTES:**

1. CLASS 1 WASTE AND CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE ARE USED INTERCHANGEABLY.
2. REFER TO ATTACHMENT 12 FOR FINAL COVER DETAILS.
3. REFER TO APPENDIX III-F FOR ABOVE GRADE CLASS 1 WASTE DISPOSAL INFORMATION.

<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY:		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>CLASS 1 WASTE DISPOSAL AREA OPTIONS</b>  TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS  <i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727												
DATE: 12/2011 FILE: 0120-109-11 CAD: FIG IV-D-2-DETAILS.DWG		DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY														
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NO.	DATE	DESCRIPTION														
1	12/2011	SEE LIST OF REVISIONS														

**APPENDIX B**

**SDP REPLACEMENT PAGES (CLEAN COPY)**

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

**PART III – SITE DEVELOPMENT PLAN**

Prepared for

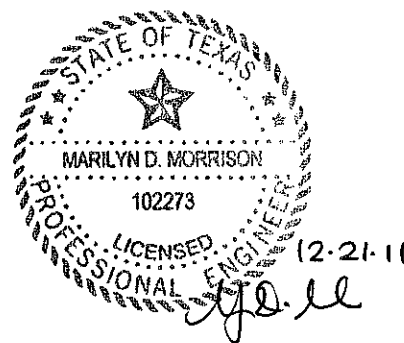
BFI Waste Systems of North America, LLC

Technically Complete January 1999

Revised March 2008

Revised November 2009

Revised December 2011



Prepared by

**Weaver Boos Consultants, LLC—Southwest**  
TBPE Registration No. F-3727  
6420 Southwest Boulevard, Suite 206  
Fort Worth, Texas 76109  
817-735-9770

Project No. 0120-109-11-54-01

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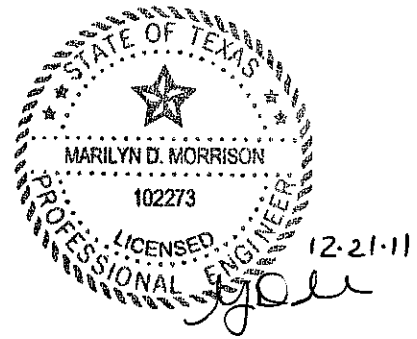
<b>1.0</b>	<b>INTRODUCTION</b>	<b>III-1</b>
<b>2.0</b>	<b>SOLID WASTE DATA (330.54(3))</b>	<b>III-3</b>
<b>3.0</b>	<b>LANDFILL METHODS (330.55(a)1)</b>	<b>III-4</b>
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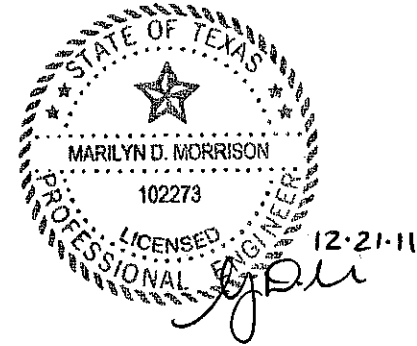


## LIST OF APPENDICES

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### APPENDIX

- III-A PERMIT RELATED CORRESPONDENCE (330.54(4))
- III-B SITE LIFE CALCULATIONS (330.55(a)4)
- III-C SETTLEMENT CALCULATIONS (No Ref.)
- III-D UNIVERSAL SOIL LOSS CALCULATIONS (330.55(b)8(B))
- III-E STABILITY ANALYSES (No Ref.)
- III-F ABOVE GRADE CLASS 1 WASTE DISPOSAL AREA DESIGN



## LIST OF ATTACHMENTS

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### ATTACHMENT

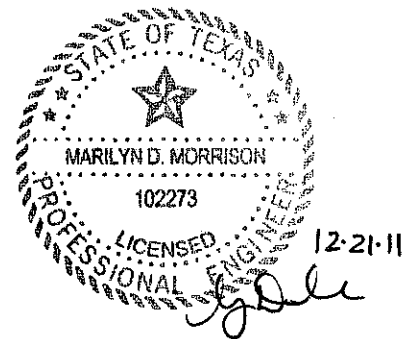
- 1 SITE LAYOUT PLAN (330.56(a))
- 2 FILL CROSS SECTIONS (330.56(b))
- 3 EXISTING CONTOUR MAP (330.56(c))
- 4 GEOLOGIC REPORT (330.56(d))
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### ATTACHMENT

- 10 SOIL AND LINER QUALITY CONTROL PLAN (330.56(j))
- 11 GROUNDWATER SAMPLING AND ANALYSIS PLAN (330.56(k))
- 12 FINAL CLOSURE PLAN (330.56(l))
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- 15 LEACHATE AND CONTAMINATED WATER PLAN (330.56(o))



## **2.0 SOLID WASTE DATA (330.54(3))**

Wastes currently being accepted for disposal at the Tessman Road Landfill are municipal solid waste, special wastes and certain non-hazardous industrial wastes as defined by the TCEQ Municipal Solid Waste Regulations (30 TAC §330.2 [relating to Definitions]). Special Wastes and non-hazardous industrial wastes which may be accepted for disposal at the landfill as well as the appropriate handling and disposal methods, as applicable, are listed and detailed in Part IV, Site Operating Plan, Section 4.2.4, Disposal of Special Wastes and Section 4.2.5, Disposal of Industrial Wastes. Wastes expressly prohibited at the landfill are listed and detailed in Part IV, Site Operating Plan, Section 4.2.6, Screening of Deposited Waste. The site will continue to receive waste from commercial transporters, municipalities and the public.

The waste stream currently received at the Tessman Road Landfill consists of:

- Municipal solid waste;
- Special waste;
- Class 1, 2, and Class 3 industrial waste.

In addition to below-grade Class 1 Waste Disposal, there are two above-grade Class 1 Waste Disposal options. Requirements for above grade disposal options are included in Appendix III-F – Above Grade Class 1 Waste Disposal Area Design.

The Tessman Road Landfill is also registered with the TCEQ to operate a bioremediation treatment facility for the management of nonhazardous petroleum substance contaminated soils as specified in 30 TAC §334.26(I).

The site is currently receiving approximately 2,800 tons of waste per day. Assuming a waste generation rate of 5 lb/capita/day, this site currently serves a population equivalent of 960,000 persons. Waste accepted for disposal at the Tessman Road Landfill is primarily generated in Bexar County with some waste also received from other areas. The total capacity of this landfill including this permit amendment is approximately 114 million cubic yards with the remaining airspace consisting of approximately 89 million cubic yards.

polyethylene (HDPE) flexible membrane liner (FML). Constructed in this fashion, these two liner components create a composite liner. The constructed clay sidewall liner is a minimum of 2 feet thick measured perpendicular to the slope and constructed in lifts on a 3 horizontal to 1 vertical slope. The FML used on the side slopes will be textured. Refer to Part III, Attachment 10, Soil and Liner Quality Control Plan;

- Installation of a leachate collection and removal system and protective cover system as shown in Part III, Attachment 15, Leachate and Contaminated Water Plan;
- Submission and TCEQ approval of a Soil and Liner Evaluation Report (SLER) and a Flexible Membrane Liner Evaluation Report (FMLER) documenting the adequacy of constructed composite liner components;
- Placement, compaction, and covering of waste with soil cover on a daily basis. As necessary, ramps and internal roadways will be constructed and maintained to allow waste hauling vehicles access to the active working face;
- Areas of fill which have not reached completion grade and are not expected to receive additional waste for a period of 180 days or more will receive an intermediate cover. The intermediate cover shall consist of at least 12 inches of well compacted earthen material not previously mixed with garbage, rubbish, or other solid waste.
- Construction of the final cover compacted clay infiltration layer. The infiltration layer may be constructed of earthen materials with a coefficient of permeability no greater than  $1 \times 10^{-5}$  cm/s. The compacted clay infiltration layer is a minimum of 18 inches thick. However, where Class 1 waste is filled above grade, the thickness of the infiltration layer that is located adjacent to the Class 1 disposal area will be increased to 4 feet with a coefficient of permeability no greater than  $1 \times 10^{-7}$  cm/s. An alternative to the 18-inch-thick compacted clay infiltration layer will be a geosynthetic clay liner (GCL). Overlain on, and in direct contact with the infiltration layer will be a synthetic membrane FML with a minimum thickness of 20 mils. Constructed in this fashion, these two cover

components create a composite cover. Refer to Part III, Attachment 12, Final Closure Plan, Figures 12-2 through 12-4, Final Cover System Details, and Figures 12-6 through 12-9 for Class 1 waste disposal area final cover details;

- On side slopes, installation of a 12 inch granular drainage layer or a geonet drainage layer on top of and in immediate contact with the cover FML. Installation of a final cover slope toe drainage system for the water collected by the drainage layer;
- Installation of a final erosion layer with a minimum thickness of 6 inches of soil capable of supporting vegetative cover;
- Construction of terrace/rundown ditches and final drainage structures; and
- Vegetation.

For a more detailed discussion of the sequence of landfill development, refer to Part III, Attachment 1.

## 11.0 FINAL COVER DESIGN (330.55(b)8)

The final cover design depicted in Part III, Attachment 12, Final Closure Plan, has been developed to minimize the potential for surface water to infiltrate the covered wastes; maximize utilization of the landfill; and provide long-term, low maintenance protection of the landfilled wastes.

The final cover constructed slopes and grades range from 3 percent to 25 percent on the landfill top to achieve post settlement grades greater than 2 percent and less than 19 percent as established in Part III, Appendix III-C, Waste Settlement Calculations. These top grades minimize both the potential for the ponding of surface water on the cover FML and the potential for erosive surface water velocities while providing long-term stability of the soil surface and the vegetative cover. Surface water velocities on these gentle slopes will be less than five feet per second with an estimated soil loss of typically less than two tons/acre/year.

Drainage terraces and downchutes with slopes from 1.5 percent to 25 percent are used on the side slopes to reduce the potential for soil erosion. Utilization of diversion berms, drainage terraces, and downchutes to move surface water runoff from the landfill to natural ground provides for long-term, low maintenance surface drainage control. Refer to Part III, Appendix III-D, Erosion Calculations for a presentation of the erosion potential of constructed cover slopes.

In accordance with 30 TAC §330.253(b), BFI will install a final cover system that is designed to minimize infiltration and erosion. The system will be comprised of an erosion/vegetation layer underlain by an infiltration layer. The infiltration layer consists of a minimum 20-mil flexible membrane liner (FML) on top of and in direct and uniform contact with an 18 inch compacted soil infiltration layer with a permeability no greater than  $1 \times 10^{-5}$  cm/sec. However, where Class 1 waste is filled above grade, the thickness of the infiltration layer that is located adjacent to the Class 1 disposal area will be increased to 4 feet with a coefficient of permeability no greater than  $1 \times 10^{-7}$  cm/sec. A geosynthetic clay liner (GCL) may be substituted for the 18 inch compacted soil infiltration layer as shown in Part III, Attachment 12, Final Closure Plan.

On the side slopes, a drainage layer will be constructed immediately over the FML. The drainage layer will be graded to remove water which infiltrates through the erosion/vegetation layer. The drainage layer will be constructed of granular material geonet, or geocomposite. On the top slopes, 12 inches of protective soil will be placed over the FML.

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

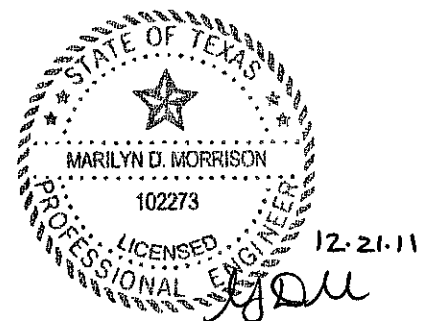
**APPENDIX III-F**

**ABOVE-GRADE CLASS 1 WASTE  
DISPOSAL AREA DESIGN**

Prepared for

BFI Waste Systems of North America, LLC

December 2011



Revision Prepared by

**Weaver Boos Consultants, LLC-Southwest**  
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Project No. 0120-109-11-54-01

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### **APPENDIX III-F1**

Class 1 Waste Containment Dike Slope Stability Analysis

### **APPENDIX III-F2**

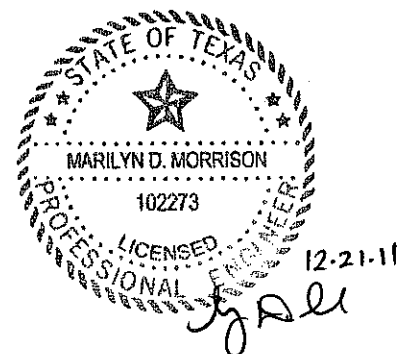
Class 1 Waste Containment Dike Construction Record Form

### **APPENDIX III-F3**

Containment Dike Certification Form

### **APPENDIX III-F4**

Above Grade Class 1 Waste Slope Stability Analysis



## 1 PURPOSE

---

The purpose of this appendix is to provide the details for the Class 1 nonhazardous industrial solid waste (Class 1 waste) above grade disposal options. Details for the options are discussed in the following section. Drawings that show the potential location of Class 1 cells and details of the disposal options are shown in Attachments 1 and 12.

## 2 ABOVE GRADE CLASS 1 WASTE DISPOSAL OPTION

---

### 2.1 Disposal Option Description

The two above-grade Class 1 waste disposal options (1) allow for Class 1 waste to be disposed of and possibly mixed with other waste in areas that have a liner system constructed in accordance with §330.331(e) and (2) allows for the disposal of Class 1 waste above existing grade and adjacent to containment dikes that will be constructed along the external slopes. The two above grade Class 1 disposal options are highlighted on Figure 1-13 in Attachment 1 and detailed below.

- Option 1 – Above Grade Class 1 Waste Disposal Area with 4-foot-thick Separation Layer. This option allows for the disposal of Class 1 wastes above existing grade if containment dikes are constructed along the exterior slope of the Class 1 waste disposal area. This option also includes the placement of a 4-foot-thick compacted clay rich barrier layer that will be placed over the Class 1 waste as a separation layer between the Class 1 waste and the municipal solid waste (and other non-Class 1 waste material) to be placed above. With this option, the 4-foot-thick separation or barrier layer will be sloped toward the interior of the landfill.
- Option 2 – Above Grade Class 1 Waste Disposal Area. This option includes the construction of containment dikes along the exterior sideslope of the Class 1 disposal area to extend the limits of the Class 1 waste disposal area. No separation layer is required for this option; however, the thickness of the composite final cover system's infiltration layer will be increased from 1.5 feet to 4.0 feet with a maximum hydraulic conductivity of  $1 \times 10^{-7}$  cm/s.

As shown on Figure 12-6, Class 1 waste may be mixed with other wastes accepted at the facility in areas which have a liner system constructed in accordance with Title 30 TAC §330.331(e). The above grade Class 1 waste options are available for undeveloped portions of Phases IV, V, VI, and VII (see Figure 1-12 in Attachment 1). Containment dikes will be constructed along the exterior above grade slopes to the maximum above grade elevation of Class 1 waste disposal.

In accordance with 30 TAC §335.590(24)(F)(i), the containment dikes are designed to:

- prevent washout, release, or exposure of waste;
- be physically stable;
- prevent washout from hydrostatic and hydrodynamic forces from storms and floods;
- prevent storm water run-on from reaching the waste;

- prevent the release of leachate; and
- minimize long term maintenance.

The containment dikes:

- will be constructed along exterior slopes as part of site operations from clay rich soils;
- will be approximately 10-foot high with a minimum crest width of 17 (equivalent to 4 feet of cover perpendicular to the fill slope) feet;
- will be located over the lined area at the perimeter of the waste footprint; and
- will be certified by a Texas licensed Professional Engineer after construction.

As shown on Figure 12-7 in Attachment 12, Class 1 waste will only be placed after a containment dike has been constructed. In addition, each lift of waste will be placed below the elevation of each containment dike and will slope toward the interior of the landfill.

## **2.2 Class 1 Containment Dike Construction and Certification Requirements**

The containment dike construction requirements are listed below (and also summarized on-Figure 12-7 in Attachment 12).

1. Dikes will be constructed of clay-rich soils under the direction of the landfill manager or his designee.
2. Soils will be placed in maximum 9-inch-thick lifts and compacted with a minimum of four passes with a dozer or similar equipment.
3. The Landfill Manager or his designee will verify that the completed containment dike has the following dimensions.
  - 17-foot top width
  - Height of 10 feet
  - 4H:1V outside slope and 2H:1V inside slope
4. The Landfill manager or his designee will complete the Class 1 Waste Containment Dike Construction Record form included in Appendix III-F2 after each construction event.
5. A third party independent professional engineer licensed to practice in Texas will certify the installed containment dike in accordance with Title 30 TAC §335.590(24)(F)(vi) (see below for certification procedure).

This construction technique is designed to meet the requirements of Title 30 TAC §335.590(24)(F)(i)(II), which states, “waste placed above grade shall be laterally

contained by dikes that are constructed to be physically stable against slope failure, with a minimum safety factor of 1.5.” The stability analysis included in Appendix III-F1 demonstrates that the above listed construction technique will meet this requirement.

As listed above, the Landfill Manager or his designee will oversee the construction of the containment dike. Once construction has been completed, a Class 1 Waste Containment Dike Construction Record form, included in Appendix III-F2, will be completed. This form will be provided to the certifying professional engineer. The professional engineer will then complete the following steps.

1. Review the current permit documents that address the containment dike (including Attachment 12 details and this section).
2. Visit the site after containment dike construction has been completed to inspect the containment dike to be certified.
3. Interview the Landfill Manager or his designee to determine the construction technique and verify that the technique used is consistent with the permit requirements. The professional engineer will also obtain a copy of the completed Class 1 waste Containment Dike Construction Record.
4. Complete the Containment Dike Certification Form. The latest form included in Title 30 TAC §335.590(24)(F)(vi) shall be used (refer to Appendix III-F3).
5. The complete Containment Dike Certification Form will be placed in the Site Operating Record.

After the above procedure has been completed, the site may begin filling in the area behind the containment dike.

## **2.3 Class 1 Containment Dike Maintenance**

The installed containment dikes will be inspected in accordance with the inspection procedures and frequency included in Section 23.6 of the SOP to ensure that the installed dike surfaces are not eroded. Soil management practices outlined in Section 23.2 of the SOP will be followed to ensure the integrity of the dike is maintained.

## **2.4 Compliance with Title 30 TAC §330.179(b) and §335.590(24)(F)**

§330.179(b) allows for disposal of Class 1 waste above natural grade provided that the conditions in §335.590(24)(F)(i) – (vi) are met. As shown in Table 2-1, the above grade Class 1 waste fill area has been designed to meet each of the requirements listed in §335.590(24)(F)(i). In accordance with §335.590(24)(F)(vii), since the requirements of §335.590(24)(F)(i) will be met, the additional requirements listed in §335.590(24)(F)(ii) through (v) are not applicable. The information provided in this appendix demonstrates that §335.590(24)(F)(i) requirements are met (see Table 2-1).

**Table 2-1  
Compliance with Title 30 TAC §335.590(24)(F)**

Item	Compliance Discussion
Waste placed above grade shall be laterally contained by dikes that are constructed to prevent washout, release, or exposure of waste.	As shown on Figures 12-6 and 12-7 (Attachment 12), the containment dikes are substantial structures (10 feet high with a 17-foot-wide crest) that will prevent the washout, release, or exposure of waste. In addition, the containment dikes will be inspected and maintained on a routine basis, as noted in Section 2.3 of this appendix.
Waste placed above grade shall be laterally contained by dikes that are constructed to be physically stable against slope failure, with a minimum safety factor of 1.5.	As noted in Appendix III-F1, the containment dike has been designed to be physically stable with a safety factor that is above 1.5.
Waste placed above grade shall be laterally contained by dikes that are constructed to prevent washout from hydrostatic and hydrodynamic forces from storms and floods.	As noted above, the containment dikes are substantial structures that will prevent the washout from hydrostatic and hydrodynamic forces from storms or floods. In addition, the site's stormwater management system is also designed to prevent run-on to the disposal area during extreme storm events. Details of the stormwater management system are included in Attachment 6.
Waste placed above grade shall be laterally contained by dikes that are constructed to prevent storm water from reaching the waste.	The containment dike provides a substantial barrier between the exterior slope (e.g., minimum of 4 feet of soil) and the waste disposal area that will prevent the release of leachate.
Waste placed above grade shall be laterally contained by dikes that are constructed to minimize release of leachate.	Long-term maintenance of the slope is minimized by the establishment of vegetation as noted in Section 2.3 of this appendix and Section 23.2 of the SOP.
Waste placed above grade shall be laterally contained by dikes that are constructed to minimize long-term maintenance.	

## 3 CLASS 1 WASTE STABILITY ANALYSES

---

### 3.1 Purpose

The purpose of this appendix is to provide the basis for the construction requirements for the above grade Class 1 waste containment dike discussed in Section 2. The containment dike construction requirements presented on Figure 12-7 in Attachment 12 are listed below.

- Dikes will be constructed of clay-rich soils under the direction of the landfill manager or his designee. The landfill manager or his designee will complete the construction form included in Appendix III-F3 after each construction event.
- Soils will be placed in maximum 9-inch-thick lifts and compacted with a minimum of four passes with a dozer or similar equipment.
- Upon completion of each dike, a third party independent professional engineer licensed to practice in Texas will certify the installed dike in accordance with Title 30 TAC §335.590(24)(F)(vi) for the certification of the dike. The certification prepared and signed by the engineer will be placed in the site operating record.

As discussed in this appendix, this construction technique is designed to meet the requirements of §335.590(24)(F)(i)(II) which states, “waste placed above grade shall be laterally contained by dikes that are constructed to be physically stable against slope failure, with a minimum safety factor of 1.5.”

Two separate stability analyses were performed to demonstrate compliance with §335.590(24)(F)(i)(II). First, an analysis of the individual containment dike was performed. In addition, a stability analysis for the entire sideslope was completed to determine the factor of safety for the entire sideslope. Each analysis is discussed in the following subsections.

### 3.2 Containment Dike Stability Analysis

This stability analysis focuses on the stability of the individual containment dike with 2H:1V interior slopes and 4H:1V exterior slopes and is included in Appendix III-F1. This slope stability demonstration utilizes soil strength parameters of  $C'=100$  psf and  $\phi'=15^\circ$  for effective stress, and  $C=250$  psf and  $\phi=0^\circ$  for total stress analyses. These parameters conservatively represent clayey soils with no significant compaction during placement (sandy or gravelly soils will not be used in dike construction). As indicated by references 2, 3, and 4 (refer to page III-F1-1 for the reference list), these values represent the strength

parameters for clayey soils placed no significant compaction effort. Table 2.2 in reference 4 indicates that  $C'=400$  psf and  $\phi'=16^\circ$  represent the lowest value for strength of clayey materials. As discussed on page 151 of reference 2, the friction angle  $\phi'$ , which corresponds to the arrangement of particles, is mainly a function of the clay mineral content and clay mineralogy of the composition. Section 4 (Table 4.2) of reference 3 provides discussion on soil strength parameters for lightly compacted soils. As indicated,  $C=250$  psf represents the lowest value of cohesion for total stress conditions. Therefore, placement of soil dikes using dozer or similar landfill equipment will provide stable slopes with a minimum factor of safety of 1.5 as demonstrated in the slope stability analyses provided in the appendix. The stability of outer slopes of landfills with 4H:1V vertical sideslopes is evidenced by the fact that almost all the landfills in Texas developed with 4H:1V sideslopes are geotechnically stable.

### **3.3 Above Grade Class 1 Waste Stability Analysis**

#### **3.3.1 General**

This stability analysis focuses on the stability of the entire sideslope of the containment dike area. The configurations of containment dike placement are shown on Figures 1-1 and 1-2 in Appendix III-F4. The stability analysis was performed for both interim and closed conditions, as discussed in the following sections, and is included in Appendix III-F4.

#### **3.3.2 Above-Grade Configurations Analyzed**

##### **Option 1 – Above-Grade Class 1 Waste Disposal Area with Separation Layer**

Figure 1-1 in Appendix III-F4 shows the interim and closed condition slopes analyzed in the slope stability analysis for Option 1 (discussed in detail on page III-F-2). Option 1 includes 4H:1V exterior slopes with containment dikes extending partially up the sideslope.

##### **Option 2 – Above-Grade Class 1 Waste Disposal Area**

Figure 1-2 in Appendix III-F4 shows the interim and closed condition slopes analyzed in the slope stability analysis for Option 2 (discussed in detail on page III-F-2). Option 2 includes 4H:1V exterior slopes with containment dikes extending along the entire sideslope.

#### **3.3.3 Input Parameters**

The input parameters for the various landfill materials are discussed in detail in Appendix III-F4 (page III-F4-3). The containment dike strength parameters used for this analysis are the same as those discussed in Section 3.2. The liner system, waste, and subsurface material strength parameters are consistent with those presented in the slope stability analysis (Appendix III-E).

### 3.4 Results

The results of the slope stability analyses included in Appendices III-F1 and III-F4 are presented in Table 3-1.

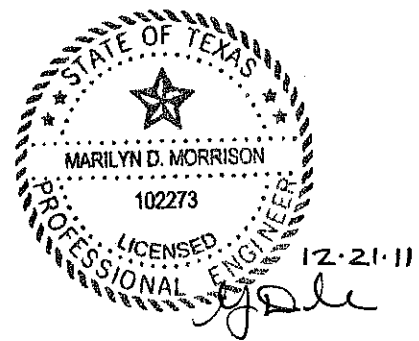
**Table 3-1  
Summary of Slope Stability Analyses Results**

Slope Designation	Method of Analysis	Minimum Factor of Safety Generated		Recommended Minimum Factor of Safety	Acceptable Factor of Safety
		Total Stress	Effective Stress		
<b>Individual Containment Dike</b>					
4H:1V Outer Slope	Bishop-Circular	2.21	2.09	1.5	YES
2H:1V Inner Slope	Bishop-Circular	1.82	1.54	1.5	YES
<b>Option 1</b>					
Interim Condition, Section 1-1	Bishop-Circular	2.25	2.27	1.5	YES
Interim Condition, Section 1-2	Rankine-Block	2.58	2.59	1.5	YES
Closed Condition, Section 1-1	Bishop-Circular	2.27	2.27	1.5	YES
Closed Condition, Section 1-2	Rankine-Block	2.76	2.78	1.5	YES
<b>Option 2</b>					
Interim Condition, Section 2-1	Bishop-Circular	2.13	2.14	1.5	YES
Interim Condition, Section 2-2	Rankine-Block	2.47	2.47	1.5	YES
Closed Condition, Section 2-1	Bishop-Circular	2.08	2.11	1.5	YES
Closed Condition, Section 2-2	Rankine-Block	2.53	2.54	1.5	YES

### 3.5 Summary

As demonstrated in Appendix III-F1, the containment dike configuration results in a factor of safety greater than 1.5. Additionally, the placement of containment dikes along the exterior sideslopes is demonstrated in Appendix III-F4 to be stable with factors of safety greater than 1.5, consistent with §335.590(24)(F)(i)(II).

**APPENDIX III-F1**  
**CLASS 1 WASTE CONTAINMENT DIKE**  
**SLOPE STABILITY ANALYSIS**



Includes pages III-F1-1 through III-F1-24

**Purpose:** The purpose of this analysis is to demonstrate that the construction technique specified in 2.2 of Appendix III-F will result in a containment dike that will be physically stable against slope failure with a minimum factor of safety of 1.5.

**Method:** The containment dike stability analysis has been completed using XSTABL 5.206, a computer program developed to model general slope stability. Circular failure surfaces using the Simplified Bishop method have been generated to analyze the slopes for the configuration given below.

- Individual Containment Dike - 4H:1V outer slopes.
- Individual Containment Dike - 2H:1V inner slopes.

The containment dike configuration is shown on Figure 1-1. XSTABL output is presented on pages III-F1-5 through III-F1-24.

**Procedure:**

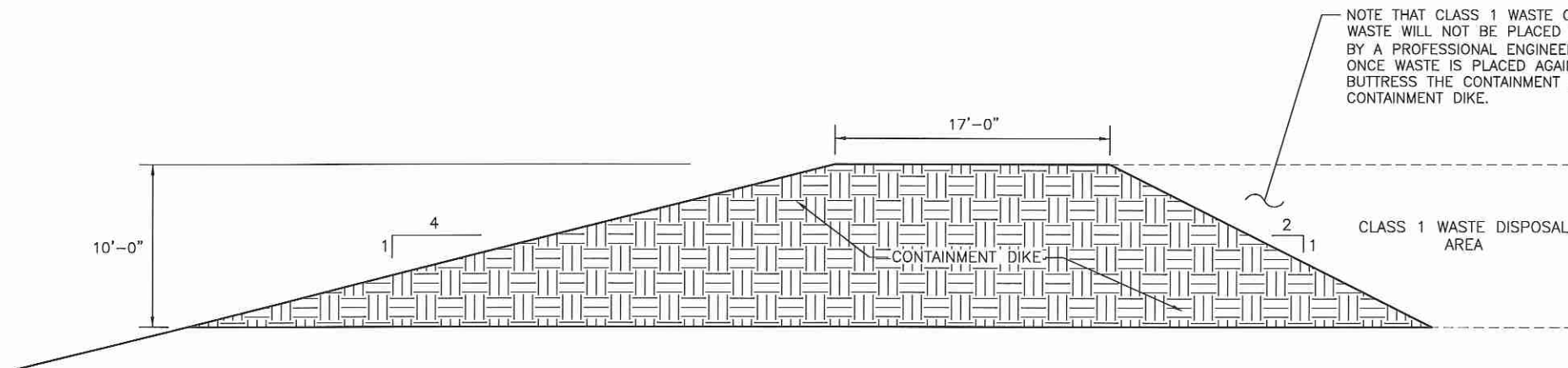
1. Input containment dike configuration.
2. Select strength parameters.
3. Perform analysis to calculate factor of safety.

**References:**

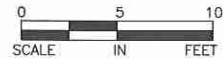
1. Duncan, J. Michael and Stephen G. Wright., *Soil Strength and Slope Stability*, John Wiley & Sons, Inc. Hoboken, NJ, 2005
2. Terzaghi, Karl, Peck, Ralph B., and Mesri, Gholamreza, *Soil Mechanics in Engineering Practice, Third Ed.*, John Wiley & Sons, Inc. New York, NY, 1996
3. Day, Robert W., *Geotechnical Engineer's Portable Handbook*, McGraw-Hill Companies, Inc. New York, NY, 2000
4. Abramson, Lee W., Lee, Thomas S., Sharma, Sunil, Boyce, Glenn M., *Slope Stability and Stabilization Methods, 2nd Ed.*, John Wiley & Sons, Inc., New York.

### **I. Input Containment Dike Configuration**

The proposed containment dike configuration is shown on Figure 1-1. As shown, the containment dike has 4H:1V outer slopes and 2H:1V inner slopes and a 17-foot top width. The containment dike is 10 feet in height.



CONTAINMENT DIKE



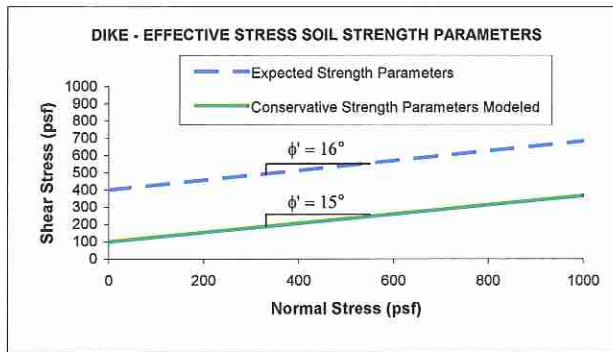
<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY: _____	PREPARED FOR	CONTAINMENT DIKE CONFIGURATION
	BFI WASTE SYSTEMS OF NORTH AMERICA, LLC	
DATE: 12/2011 FILE: 0120-109-11 CAD: 1-1.DWG	DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY	<i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727
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		FORT WORTH, TX RIVERSIDE, MO GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARWATER, FL
		FIGURE 1-1

**2. Select Strength Parameters**

The slope stability analysis has been developed for both total and effective stress conditions to address short and long term conditions that will exist after the installation of the dikes. The selected strength parameters for this analysis are listed in the table and graph shown below.

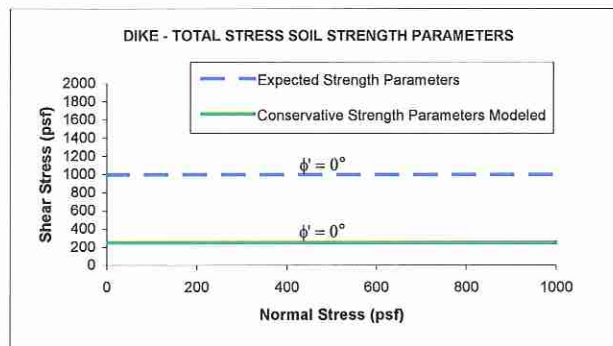
**EFFECTIVE STRESS SOIL PROPERTIES**

Unit	Unit Weight		Cohesion Intercept (psf)	Friction Angle (deg)
	Moist (pcf)	Saturated (pcf)		
Dike	116	120	100	15
Waste	65	65	0	25



**TOTAL STRESS SOIL PROPERTIES**

Unit	Unit Weight		Cohesion Intercept (psf)	Friction Angle (deg)
	Moist (pcf)	Saturated (pcf)		
Dike	116	120	250	0
Waste	65	65	0	25



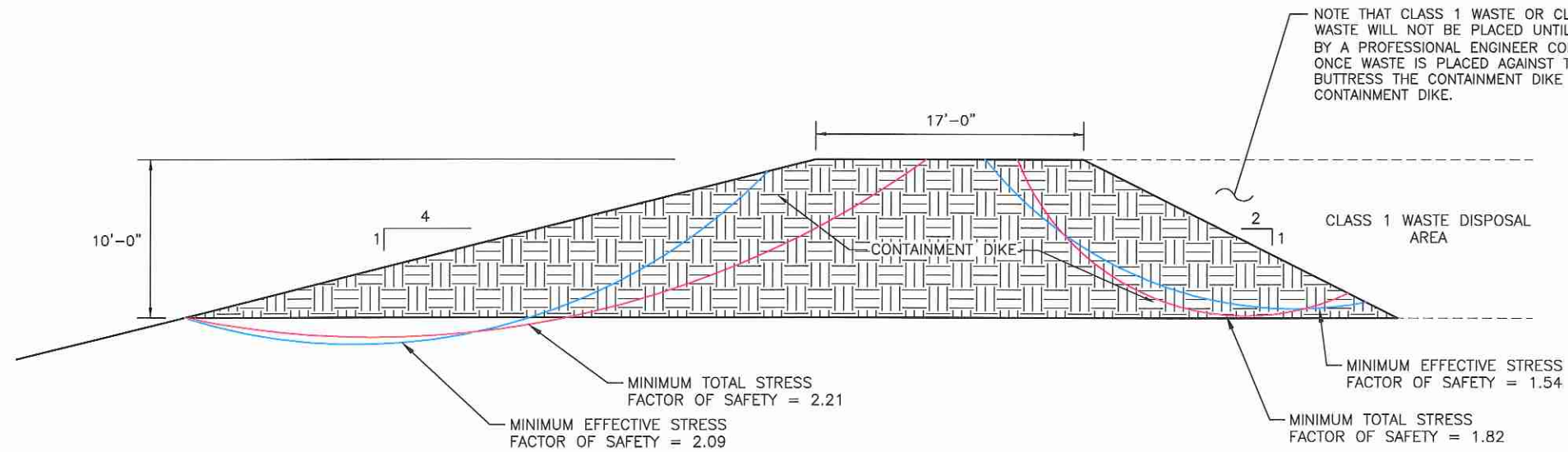
As noted above, the slope stability demonstration included in this appendix utilizes containment dike soil strength parameters of  $C'=100$  psf and  $\phi'=15^\circ$  for effective stress, and  $C=250$  psf and  $\phi=0^\circ$  for the total stress analysis. These parameters were conservatively selected based on (1) WBC's experience with compacted soils placed with limited construction oversight and (2) various reference sources. For example, Table 2.2 - Strength and Sensitivity of Cohesive Soils included in reference 4 lists a cohesion of  $0.2 \text{ kg/cm}^2$  (400 psf) and a friction angle of  $16^\circ$  as the lowest strength values for cohesive soils. For the effective stress analysis this value was reduced to a cohesion of 100 psf and a friction angle of  $15^\circ$  to provide for a very conservative analysis. The strength parameters for solid waste are consistent with those used in the slope stability analysis of Appendix III-E.

**3. Perform Analysis to Calculate Factor of Safety.**

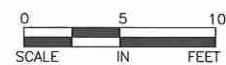
The calculated factors of safety are shown below and summarized on Figure 3-1. As noted, all the calculated factors of safety, using conservatively selected strength parameters, are above 1.5. Therefore, the proposed design meets §335.590(24)(F)(i)(II) which requires the containment dike to "be physically stable against slope failure, with a minimum safety factor of 1.5."

**Table 3-1  
 Individual Containment Dike Slope Stability Analysis Results**

Slope Designation	Method of Analysis	Minimum Factor of Safety Generated		Recommended Minimum Factor of Safety	Acceptable Factor of Safety
		Total Stress	Effective Stress		
4H:1V Outer Slope	Bishop-Circular	2.21	2.09	1.5	YES
2H:1V Inner Slope	Bishop-Circular	1.82	1.54	1.5	YES



CONTAINMENT DIKE

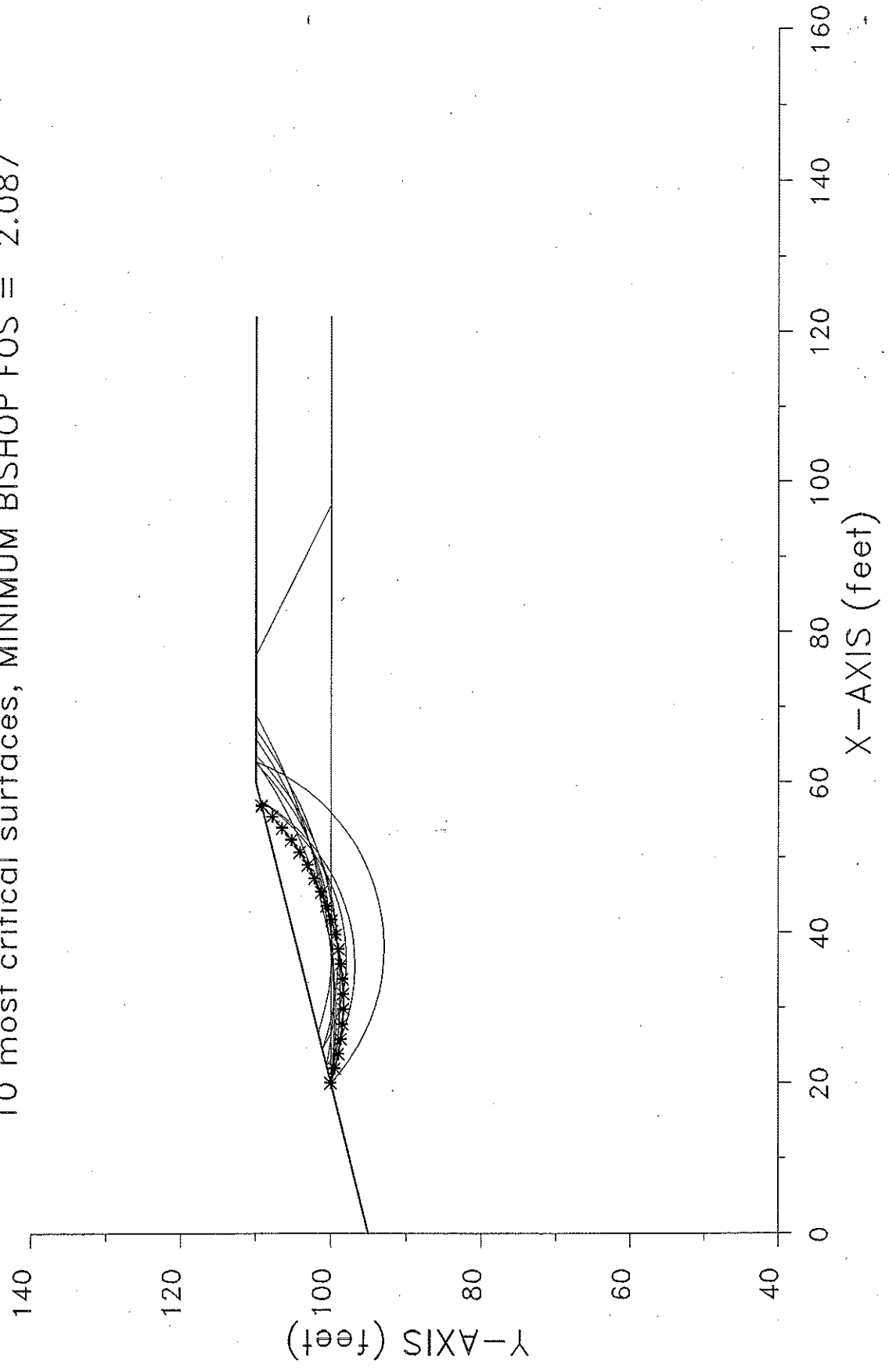


<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY: _____	PREPARED FOR	CONTAINMENT DIKE FACTORS OF SAFETY
	BFI WASTE SYSTEMS OF NORTH AMERICA, LLC	
DATE: 12/2011 FILE: 0120-109-11 CAD: 3-1.DWG	DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY	<i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727
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		FORT WORTH, TX EVANSVILLE, IN RIVERSIDE, MO
		GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARMONT, FL
		FIGURE 3-1

O:\0120\109\CLASS 1 WASTE.MXD\CLEAN\IIF\F1\3-1\_FACTOR OF SAFETY.dwg, jwilson

D1E 12-06-11 7:55

TESSMAN RD LF - 4H:1V CONT DIKE 1E  
10 most critical surfaces, MINIMUM BISHOP FOS = 2.087



```

*****
*           X S T A B L           *
*                               *
*      Slope Stability Analysis   *
*      using the                 *
*      Method of Slices         *
*                               *
*      Copyright (C) 1992 - 2002 *
*      Interactive Software Designs, Inc. *
*      Moscow, ID 83843, U.S.A.   *
*                               *
*      All Rights Reserved       *
*                               *
*      Ver. 5.206                96 - 1927 *
*****

```

Problem Description : TESSMAN RD LF - 4H:1V CONT DIKE 1E

-----  
SEGMENT BOUNDARY COORDINATES  
-----

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	95.0	20.0	100.0	1
2	20.0	100.0	60.0	110.0	2
3	60.0	110.0	77.0	110.0	2
4	77.0	110.0	122.0	110.0	1

3 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	77.0	110.0	97.0	100.0	2
2	20.0	100.0	97.0	100.0	1
3	97.0	100.0	122.0	100.0	1

-----  
ISOTROPIC Soil Parameters  
-----

2 Soil unit(s) specified

Soil Unit	Weight Moist	Unit Sat.	Weight Cohesion Intercept	Friction Angle	Pore Pressure Parameter	Water Surface Constant
-----------	--------------	-----------	---------------------------	----------------	-------------------------	------------------------

No.	(pcf)	(pcf)	(psf)	(deg)	Ru	(psf)	No.
1	65.0	65.0	.0	25.00	.000	.0	0
2	116.0	120.0	100.0	15.00	.000	.0	0

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced along the ground surface between x = 20.0 ft and x = 40.0 ft

Each surface terminates between x = 50.0 ft and x = 70.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 80.0 ft

\* \* \* \* \* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \* \* \* \* \*

2.0 ft line segments define each trial failure surface.

-----  
 ANGULAR RESTRICTIONS  
 -----

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees  
 Upper angular limit := (slope angle - 5.0) degrees

\*\*\*\*\*  
 -- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)  
 \*\*\*\*\*  
 Negative effective stresses were calculated at the base of a slice. This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.  
 \*\*\*\*\*

USER SELECTED option to maintain strength greater than zero

---

Factors of safety have been calculated by the :

\* \* \* \* \* SIMPLIFIED BISHOP METHOD \* \* \* \* \*

The most critical circular failure surface  
is specified by 22 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	20.00	100.00
2	21.92	99.45
3	23.87	99.00
4	25.84	98.67
5	27.83	98.44
6	29.83	98.32
7	31.83	98.31
8	33.82	98.41
9	35.81	98.62
10	37.79	98.94
11	39.74	99.37
12	41.67	99.91
13	43.56	100.55
14	45.42	101.29
15	47.23	102.14
16	48.99	103.08
17	50.70	104.12
18	52.35	105.25
19	53.94	106.48
20	55.45	107.78
21	56.89	109.17
22	56.95	109.24

\*\*\*\* Simplified BISHOP FOS = 2.087 \*\*\*\*

The following is a summary of the TEN most critical surfaces

Problem Description : TESSMAN RD LF - 4H:1V CONT DIKE 1E

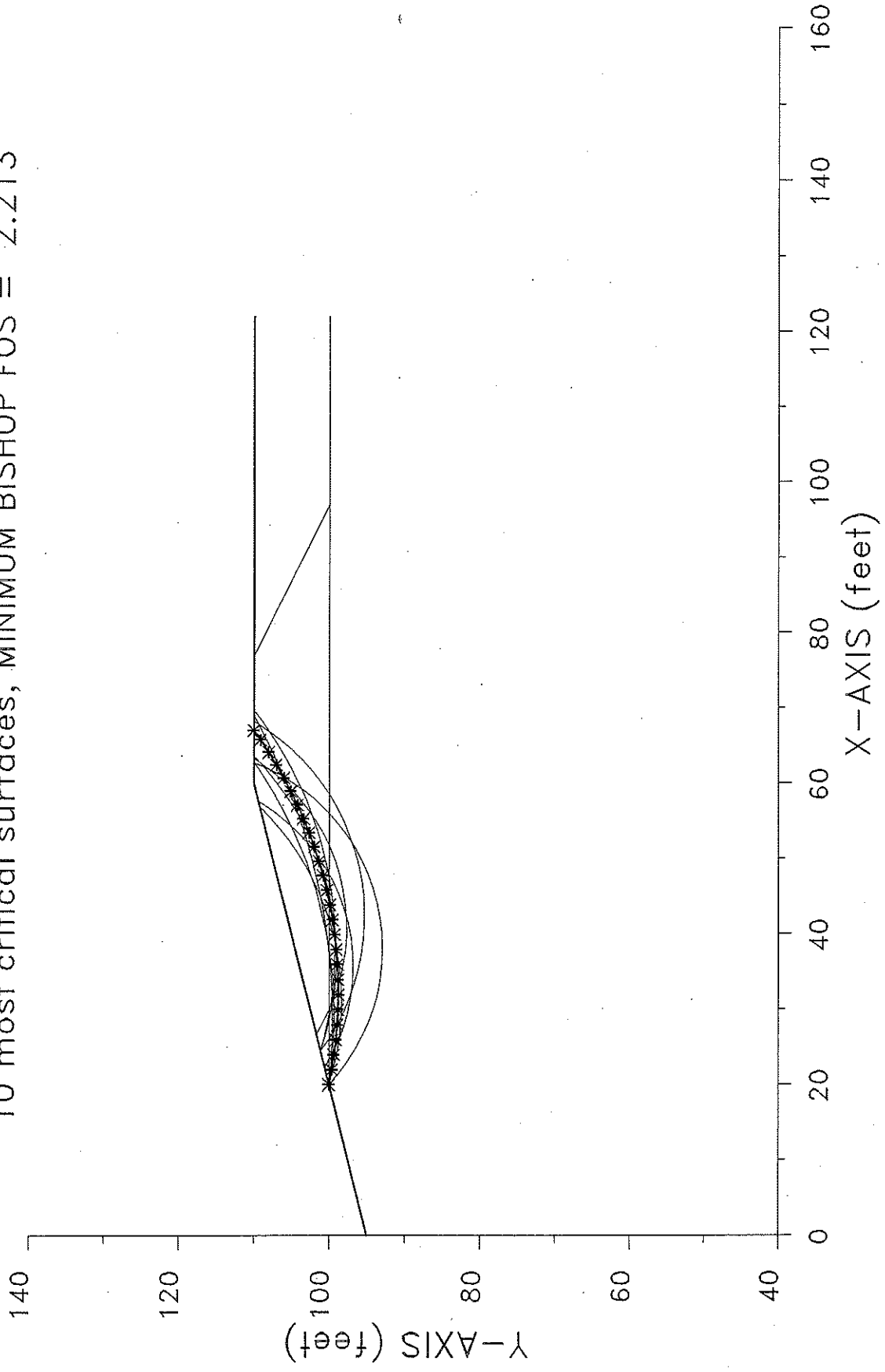
	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2.087	30.98	134.62	36.32	20.00	56.95	2.697E+05
2.	2.101	32.19	158.36	59.62	20.00	67.04	6.139E+05

3.	2.139	28.97	158.35	59.04	20.00	62.83	4.654E+05
4.	2.223	35.59	122.28	25.51	22.22	57.58	2.521E+05
5.	2.247	36.83	137.25	38.20	24.44	63.60	3.629E+05
6.	2.248	28.79	182.10	82.57	20.00	69.01	7.889E+05
7.	2.258	32.85	156.79	57.23	22.22	65.80	5.277E+05
8.	2.300	38.03	119.30	26.41	20.00	62.74	4.625E+05
9.	2.332	36.59	122.67	24.75	24.44	57.44	2.147E+05
10.	2.356	37.83	135.30	35.44	26.67	62.62	2.940E+05

\* \* \* END OF FILE \* \* \*

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TESSMAN RD LF - 4H:1V CONT DIKE 1T  
10 most critical surfaces, MINIMUM BISHOP FOS = 2.213



```

*****
*           X S T A B L           *
*           *                       *
*           Slope Stability Analysis *
*           using the               *
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*           96 - 1927                *
*****

```

Problem Description : TESSMAN RD. LF - 4H:1V CONT DIKE 1T

-----  
SEGMENT BOUNDARY COORDINATES  
-----

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	95.0	20.0	100.0	1
2	20.0	100.0	60.0	110.0	2
3	60.0	110.0	77.0	110.0	2
4	77.0	110.0	122.0	110.0	1

3 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	77.0	110.0	97.0	100.0	2
2	20.0	100.0	97.0	100.0	1
3	97.0	100.0	122.0	100.0	1

-----  
ISOTROPIC Soil Parameters  
-----

2 Soil unit(s) specified

Soil Unit	Unit Weight Moist	Weight Sat.	Cohesion Intercept	Friction Angle	Pore Pressure Parameter	Water Surface Constant
-----------	-------------------	-------------	--------------------	----------------	-------------------------	------------------------

No.	(pcf)	(pcf)	(psf)	(deg)	Ru	(psf)	No.
1	65.0	65.0	.0	25.00	.000	.0	0
2	116.0	120.0	250.0	.00	.000	.0	0

-----  
 UNDRAINED STRENGTHS as a function of effective vertical stress  
 have been specified for 1 Soil Unit(s)  
 -----

Soil Unit #	Parameter a	Parameter Psi
2.	250.0	.00

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced along the ground surface between x = 20.0 ft and x = 40.0 ft

Each surface terminates between x = 50.0 ft and x = 70.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 80.0 ft

\* \* \* \* \* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \* \* \* \* \*

2.0 ft line segments define each trial failure surface.

-----  
 ANGULAR RESTRICTIONS  
 -----

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees  
 Upper angular limit := (slope angle - 5.0) degrees

\*\*\*\*\*  
 -- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)  
 \*\*\*\*\*  
 Negative effective stresses were calculated at the base of a slice.  
 This warning is usually reported for cases where slices have low self  
 weight and a relatively high "c" shear strength parameter. In such  
 cases, this effect can only be eliminated by reducing the "c" value.  
 \*\*\*\*\*

-----  
 USER SELECTED option to maintain strength greater than zero  
 -----

Factors of safety have been calculated by the :

\* \* \* \* \* SIMPLIFIED BISHOP METHOD \* \* \* \* \*

The most critical circular failure surface  
 is specified by 26 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	20.00	100.00
2	21.96	99.62
3	23.94	99.31
4	25.93	99.07
5	27.92	98.89
6	29.91	98.78
7	31.91	98.74
8	33.91	98.77
9	35.91	98.86
10	37.91	99.02
11	39.89	99.24
12	41.87	99.53
13	43.84	99.89
14	45.79	100.31
15	47.73	100.80
16	49.65	101.36
17	51.56	101.98
18	53.44	102.66
19	55.29	103.40
20	57.12	104.21
21	58.93	105.07
22	60.70	106.00
23	62.44	106.99
24	64.14	108.03
25	65.81	109.13
26	67.04	110.00

\*\*\*\* Simplified BISHOP FOS = 2.213 \*\*\*\*

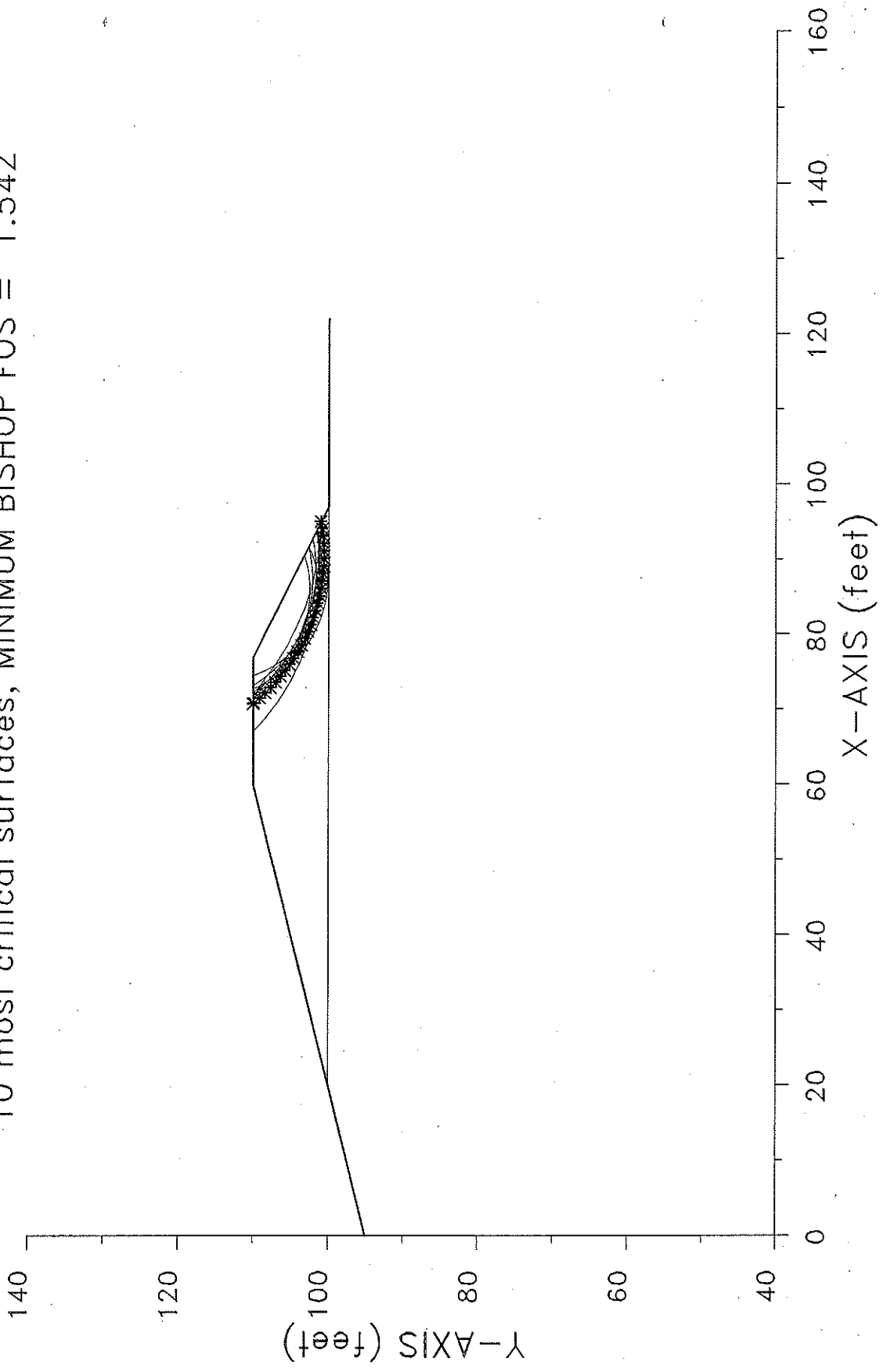
The following is a summary of the TEN most critical surfaces

Problem Description : TESSMAN RD LF - 4H:1V CONT DIKE 1T

	FOS (BISHOP)	Circle x-coord (ft)	Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2.213	32.19	158.36	59.62	20.00	67.04	6.466E+05
2.	2.349	38.03	119.30	26.41	20.00	62.74	4.725E+05
3.	2.375	30.98	134.62	36.32	20.00	56.95	3.070E+05
4.	2.403	35.59	122.28	25.51	22.22	57.58	2.725E+05
5.	2.479	36.83	137.25	38.20	24.44	63.60	4.004E+05
6.	2.481	28.79	182.10	82.57	20.00	69.01	8.709E+05
7.	2.491	28.97	158.35	59.04	20.00	62.83	5.418E+05
8.	2.507	38.36	150.09	50.92	24.44	69.75	6.228E+05
9.	2.523	42.31	125.47	30.21	24.44	68.25	5.246E+05
10.	2.524	40.78	124.43	26.78	26.67	63.34	3.245E+05

\* \* \* END OF FILE \* \* \*

TESSMAN RD LF - 2H:1V CONT DIKE 2E  
10 most critical surfaces, MINIMUM BISHOP FOS = 1.542



```

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*****
    
```

Problem Description : TESSMAN RD LF - 2H:1V CONT DIKE 2E

-----  
 SEGMENT BOUNDARY COORDINATES  
 -----

5 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	0	95.0	20.0	100.0	1
2	20.0	100.0	60.0	110.0	2
3	60.0	110.0	77.0	110.0	2
4	77.0	110.0	97.0	100.0	2
5	97.0	100.0	122.0	100.0	1

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	20.0	100.0	97.0	100.0	1

-----  
 ISOTROPIC Soil Parameters  
 -----

2 Soil unit(s) specified

Soil Unit No.	Unit Weight (pcf)	Moist Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pressure Constant (psf)	Water Surface No.
---------------	-------------------	------------------	--------------------------	----------------------	----------------------------	-------------------------	-------------------

1	65.0	65.0	.0	25.00	.000	.0	0
2	116.0	120.0	100.0	15.00	.000	.0	0

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced along the ground surface between x = 85.0 ft and x = 95.0 ft

Each surface terminates between x = 60.0 ft and x = 75.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 100.0 ft

\* \* \* \* \* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \* \* \* \* \*

1.0 ft line segments define each trial failure surface.

-----  
 ANGULAR RESTRICTIONS  
 -----

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees  
 Upper angular limit := (slope angle - 5.0) degrees

\*\*\*\*\*  
 -- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)  
 \*\*\*\*\*  
 Negative effective stresses were calculated at the base of a slice. This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.  
 \*\*\*\*\*

-----  
 USER SELECTED option to maintain strength greater than zero

-----  
Factors of safety have been calculated by the :

\* \* \* \* \* SIMPLIFIED BISHOP METHOD \* \* \* \* \*

The most critical circular failure surface  
is specified by 29 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	95.00	101.00
2	94.01	100.84
3	93.02	100.72
4	92.02	100.63
5	91.03	100.59
6	90.03	100.59
7	89.03	100.62
8	88.03	100.70
9	87.04	100.81
10	86.05	100.97
11	85.07	101.16
12	84.09	101.39
13	83.13	101.66
14	82.18	101.97
15	81.24	102.31
16	80.32	102.70
17	79.41	103.11
18	78.52	103.57
19	77.64	104.06
20	76.79	104.58
21	75.96	105.14
22	75.15	105.73
23	74.37	106.35
24	73.61	107.00
25	72.88	107.68
26	72.17	108.39
27	71.50	109.12
28	70.85	109.89
29	70.76	110.00

\*\*\*\* Simplified BISHOP FOS = 1.542 \*\*\*\*

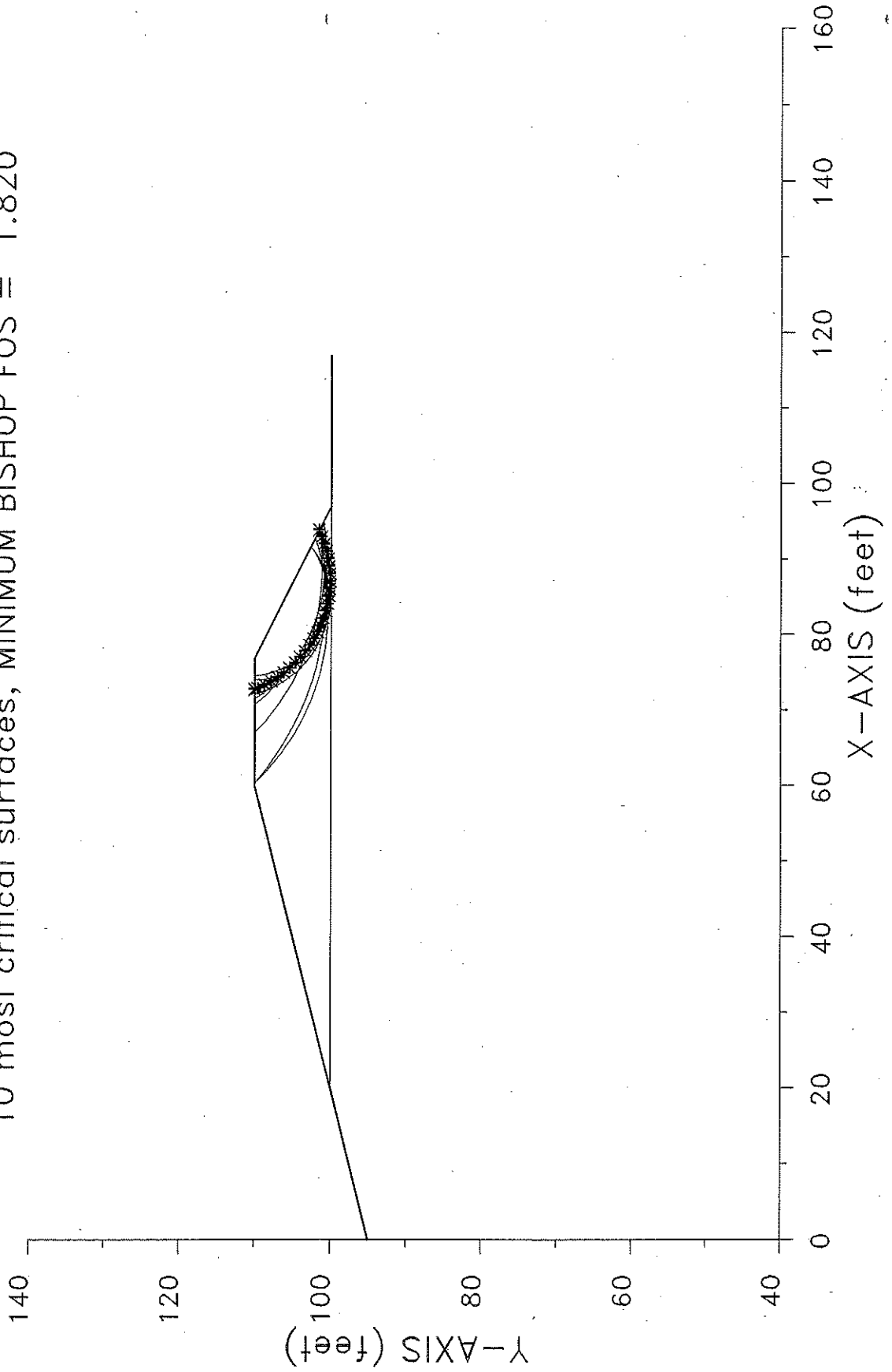
The following is a summary of the TEN most critical surfaces

Problem Description : TESSMAN RD LF - 2H:1V CONT DIKE 2E

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.542	90.43	125.82	25.24	95.00	70.76	1.373E+05
2.	1.569	88.64	121.54	20.66	93.89	71.51	1.063E+05
3.	1.574	87.34	115.76	15.64	93.89	72.80	8.601E+04
4.	1.604	90.68	126.03	24.68	93.89	71.92	1.114E+05
5.	1.633	88.32	122.14	20.51	92.78	71.79	9.294E+04
6.	1.679	95.75	136.48	35.49	95.00	72.13	1.496E+05
7.	1.689	87.20	120.35	18.23	91.67	72.19	7.566E+04
8.	1.693	86.25	113.66	12.26	91.67	74.55	5.065E+04
9.	1.725	88.92	132.66	31.50	93.89	67.04	1.922E+05
10.	1.742	86.00	117.07	14.58	90.56	73.25	5.403E+04

\* \* \* END OF FILE \* \* \*

TESSMAN RD LF - 2H:1V CONT DIKE 2T  
10 most critical surfaces, MINIMUM BISHOP FOS = 1.820



```

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*           *                       *
*           Slope Stability Analysis *
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*           *                       *
*           Ver: 5.206               *
*           96 - 1927               *
*****

```

Problem Description : TESSMAN RD LF - 2H:1V CONT DIKE 2T

-----  
SEGMENT BOUNDARY COORDINATES  
-----

5 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	95.0	20.0	100.0	1
2	20.0	100.0	60.0	110.0	2
3	60.0	110.0	77.0	110.0	2
4	77.0	110.0	97.0	100.0	2
5	97.0	100.0	117.0	100.0	1

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	20.0	100.0	97.0	100.0	1

-----  
ISOTROPIC Soil Parameters  
-----

2 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Constant (psf)	Water Surface No.
---------------	-------------------------	-------------------	--------------------------	----------------------	----------------------------	----------------	-------------------

1	65.0	65.0	.0	25.00	.000	.0	0
2	116.0	120.0	250.0	.00	.000	.0	0

-----  
 -----  
 UNDRAINED STRENGTHS as a function of effective vertical stress  
 have been specified for 1 Soil Unit(s)  
 -----  
 -----

Soil Unit #	Parameter a	Parameter Psi
2.	250.0	.00

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced along the ground surface between x = 85.0 ft and x = 95.0 ft

Each surface terminates between x = 60.0 ft and x = 75.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 100.0 ft

\* \* \* \* \* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \* \* \* \* \*

1.0 ft line segments define each trial failure surface.

-----  
 ANGULAR RESTRICTIONS  
 -----

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees  
 Upper angular limit := (slope angle - 5.0) degrees

```

*****
-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)
*****
Negative effective stresses were calculated at the base of a slice.
This warning is usually reported for cases where slices have low self
weight and a relatively high "c" shear strength parameter. In such
cases, this effect can only be eliminated by reducing the "c" value.
*****

```

```

-----
USER SELECTED option to maintain strength greater than zero
-----

```

Factors of safety have been calculated by the :

\* \* \* \* \* SIMPLIFIED BISHOP METHOD \* \* \* \* \*

The most critical circular failure surface  
is specified by 27 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	93.89	101.56
2	92.97	101.17
3	92.02	100.84
4	91.06	100.57
5	90.08	100.36
6	89.09	100.22
7	88.10	100.14
8	87.10	100.12
9	86.10	100.17
10	85.10	100.28
11	84.12	100.45
12	83.15	100.69
13	82.19	100.99
14	81.26	101.35
15	80.35	101.76
16	79.47	102.24
17	78.62	102.77
18	77.81	103.35
19	77.04	103.99
20	76.31	104.67
21	75.62	105.40
22	74.98	106.17
23	74.40	106.98
24	73.86	107.82
25	73.38	108.70
26	72.96	109.61
27	72.80	110.00

\*\*\*\* Simplified BISHOP FOS = 1.820 \*\*\*\*

The following is a summary of the TEN most critical surfaces

Problem Description : TESSMAN RD LF - 2H:1V CONT DIKE 2T

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.820	87.34	115.76	15.64	93.89	72.80	9.941E+04
2.	1.924	90.43	125.82	25.24	95.00	70.76	1.713E+05
3.	1.944	88.64	121.54	20.66	93.89	71.51	1.318E+05
4.	1.972	84.41	112.87	12.52	91.67	72.23	7.674E+04
5.	2.061	88.92	132.66	31.50	93.89	67.04	2.297E+05
6.	2.062	84.66	110.75	10.69	91.67	74.00	6.329E+04
7.	2.082	85.62	139.50	38.83	93.89	60.38	3.477E+05
8.	2.083	82.72	131.23	30.81	92.78	60.40	2.712E+05
9.	2.107	85.05	110.75	10.44	91.67	74.65	5.953E+04
10.	2.107	85.04	110.73	10.44	91.67	74.64	5.955E+04

\* \* \* END OF FILE \* \* \*

**APPENDIX III-F2**

**CLASS 1 WASTE CONTAINMENT DIKE  
CONSTRUCTION RECORD FORM**

## CLASS 1 WASTE CONTAINMENT DIKE CONSTRUCTION RECORD

This form is to be completed by the landfill manager or designee to document construction of the above grade Class 1 waste containment dikes. One form will be developed for each containment dike area. This form is to be provided to the Texas Licensed Professional Engineer that will prepare the Containment Dike Certification Form, consistent with Title 30 TAC §335.590(24)(F)(vi).

### A. General Information

1. Area of construction (describe by attaching a drawing or by providing grid coordinates) \_\_\_\_\_  
\_\_\_\_\_
2. Dates of construction: \_\_\_\_\_
3. Describe clay rich soil source or soil borrow area: \_\_\_\_\_  
\_\_\_\_\_
4. Describe equipment used for construction (at a minimum, this must include type of equipment used to compact the dike – e.g., dozer make and model):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### B. Containment Dike Construction

1. Was each lift thickness equal to or less than 9 inches thick?  
(Check one)                      Yes                       No
2. Did minimum number of equipment passes exceed 4 passes per lift?  
(Check one)                      Yes                       No
3. Does the completed containment dike have the following dimensions:  
17-foot top width, height of 10 feet, 4H:1V outside slope, and 2H:1V inside slope?  
(Check one)                      Yes                       No

SIGNATURE OF LANDFILL MANAGER OR  
DESIGNEE

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Typed or Printed Name)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Date Signed)

**APPENDIX III-F3**  
**CONTAINMENT DIKE CERTIFICATION FORM**

Note: This appendix includes an example Containment Dike Certification Form. The actual form used must comply with the latest version of the form included in Title 30 TAC §335.590(24)(F)(vi).

**CONTAINMENT DIKE CERTIFICATION FORM**

---

"I, \_\_\_\_\_, Texas P.E. Registration Number \_\_\_\_\_  
(name of Texas Licensed Professional Engineer)

certify under penalty of law that I have personally examined and am familiar with the design and construction of the dikes that are a portion of \_\_\_\_\_  
(unit name)

\_\_\_\_\_.

I further certify that I have evaluated the dike design and materials of construction using accepted engineering procedures, have determined that the dike has structural integrity, and have determined that the structure:

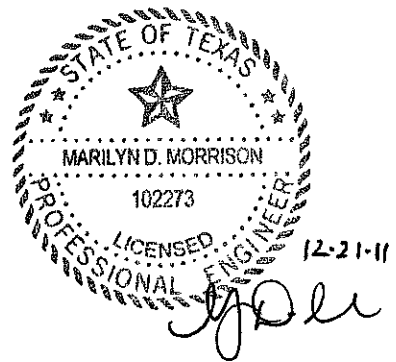
- (1) will withstand the stress of the pressure exerted by the types and amounts of wastes to be placed in the unit; and
- (2) will not fail due to scouring or piping, without dependence on any liner system included in the unit construction.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

(SEAL)

**APPENDIX III-F4**  
**ABOVE GRADE CLASS 1 WASTE**  
**SLOPE STABILITY ANALYSIS**



Includes pages III-F4-1 through III-F4-4

**Purpose:** The purpose of this analysis is to demonstrate that the containment dike configurations for above-grade Class 1 waste disposal Options 1 and 2 are stable against slope failure with a minimum factor of safety of 1.5 for interim and final conditions.

**Method:** The above-grade Class 1 waste stability analysis has been completed using XSTABL 5.206, a computer program developed to model general slope stability. Circular failure surfaces using the Simplified Bishop method and block type failure surfaces using the Rankine method have been generated to analyze the slopes for the configurations given below.

**Option 1:**

- Interim Section 1-1 - 4H:1V sideslope with containment dikes extending partially up the sideslope.
- Closed Condition Section 1-1 - 4H:1V sideslope with containment dikes extending partially up the sideslope, a 4-ft-thick overlying barrier layer, and a final cover system that includes a 4-ft-thick infiltration layer.

**Option 2:**

- Interim Section 2-1 - 4H:1V sideslope with containment dikes for the entire sideslope.
- Closed Condition Section 2-1 - 4H:1V sideslope with containment dikes for the entire sideslope and a final cover system that includes a 4-ft-thick infiltration layer.

The above-grade Class 1 waste configurations are shown on Figures 1-1 and 1-2.

**Procedure:**

1. Input interim and final condition above-grade Class 1 waste configurations.
2. Select strength parameters.
3. Perform analysis to calculate factor of safety.

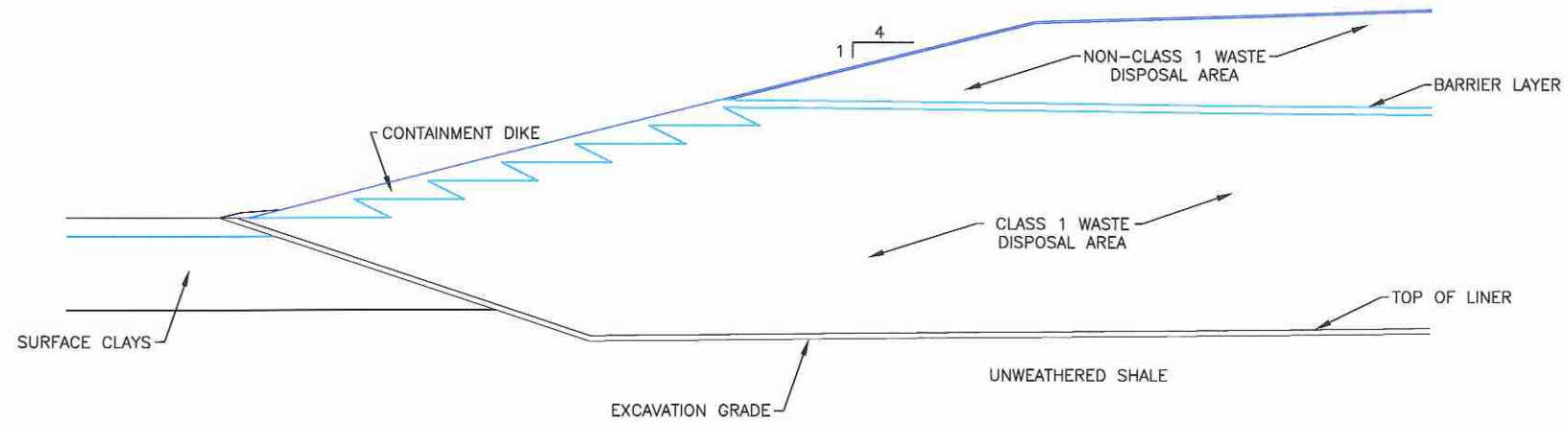
**References:**

1. Duncan, J. Michael and Stephen G. Wright., *Soil Strength and Slope Stability*, John Wiley & Sons, Inc. Hoboken, NJ, 2005
2. Terzaghi, Karl, Peck, Ralph B., and Mesri, Gholamreza, *Soil Mechanics in Engineering Practice, Third Ed.*, John Wiley & Sons, Inc. New York, NY, 1996
3. Day, Robert W., *Geotechnical Engineer's Portable Handbook*, McGraw-Hill Companies, Inc. New York, NY, 2000
4. Abramson, Lee W., Lee, Thomas S., Sharma, Sunil, Boyce, Glenn M., *Slope Stability and Stabilization Methods, 2nd Ed.*, John Wiley & Sons, Inc., New York.

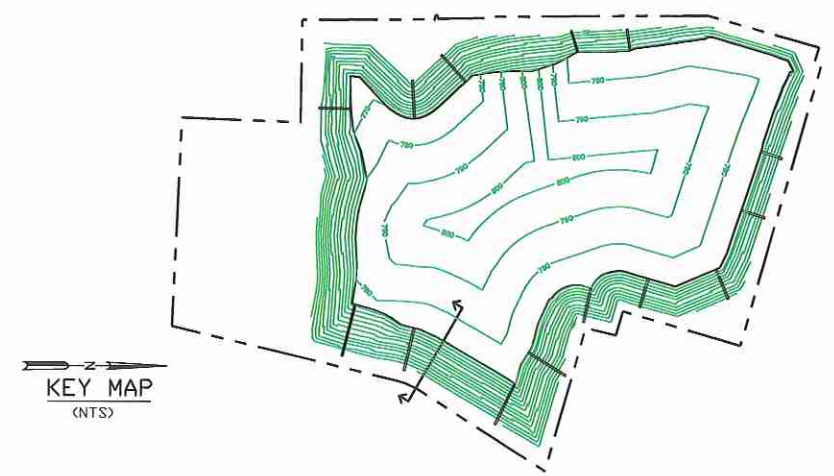
**1. Input interim and final condition containment dike configurations.**

Sections showing the containment dike configurations for above-grade Class 1 waste Options 1 and 2 are shown on Figures 1-1 and 1-2. As illustrated, the configurations show two scenarios: Option 1 - containment dikes that are placed only a portion of the way up the 4H:1V sideslope and Option 2 - containment dikes that are placed along the entire 4H:1V sideslope.

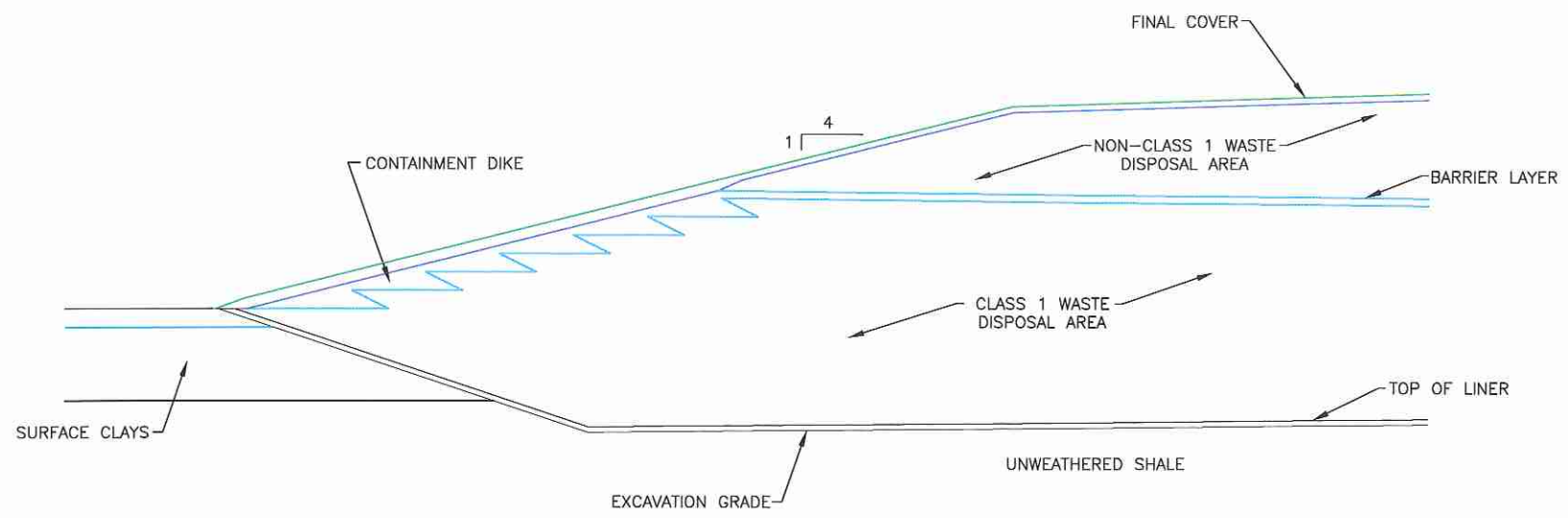
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INTERIM SECTION 1-1



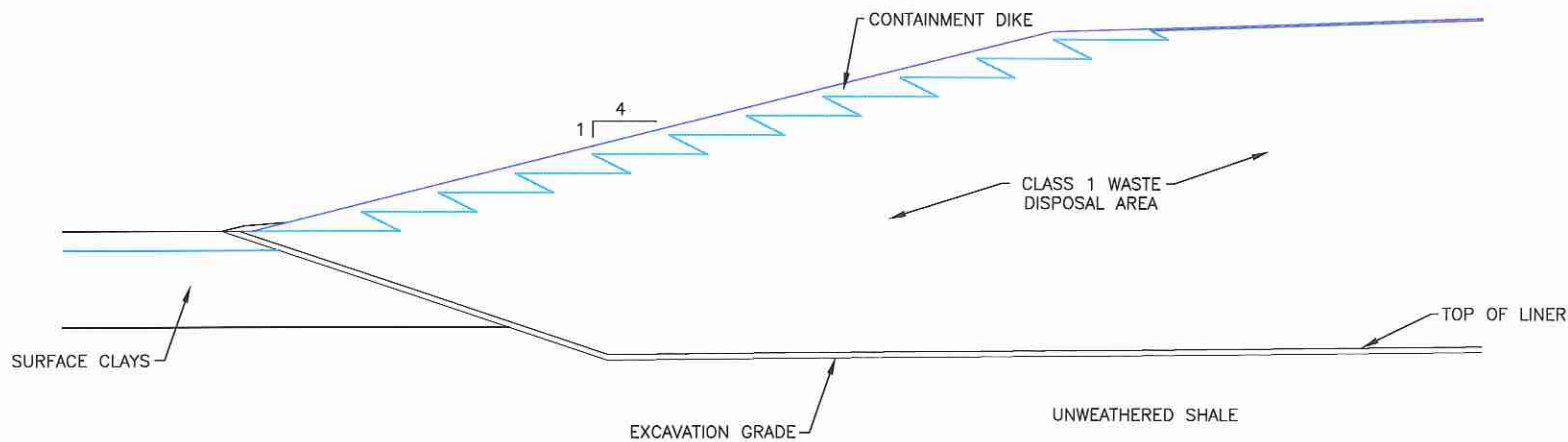
KEY MAP  
(NTS)



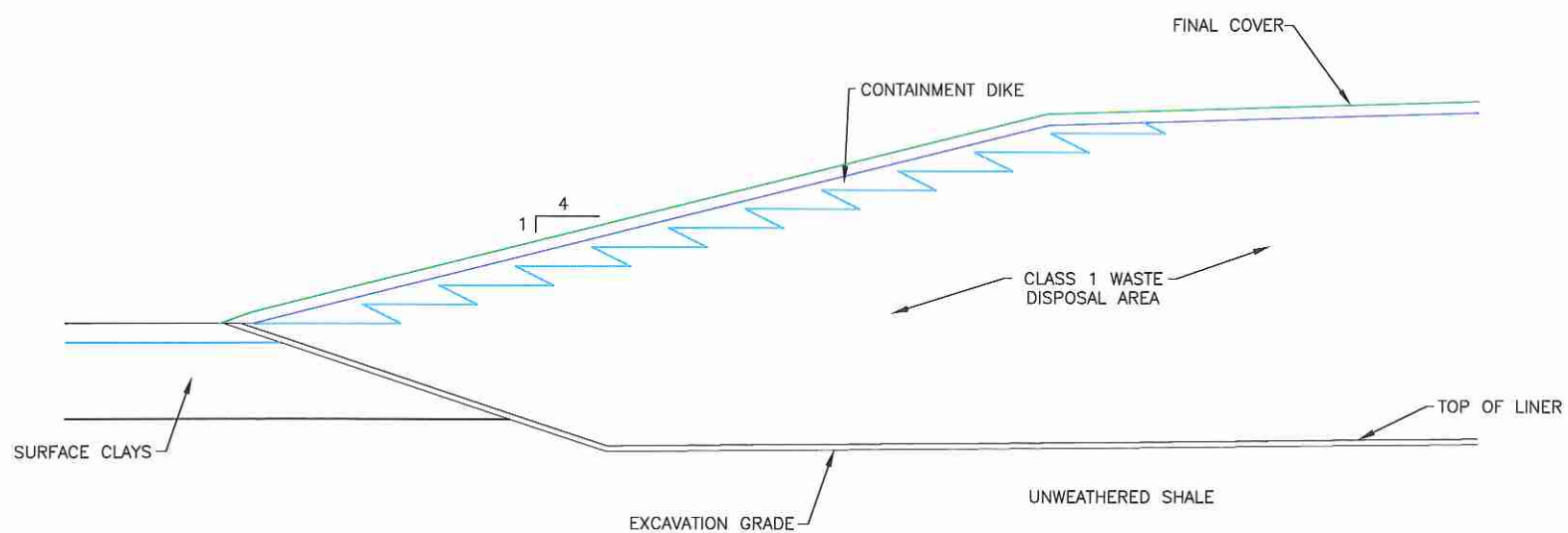
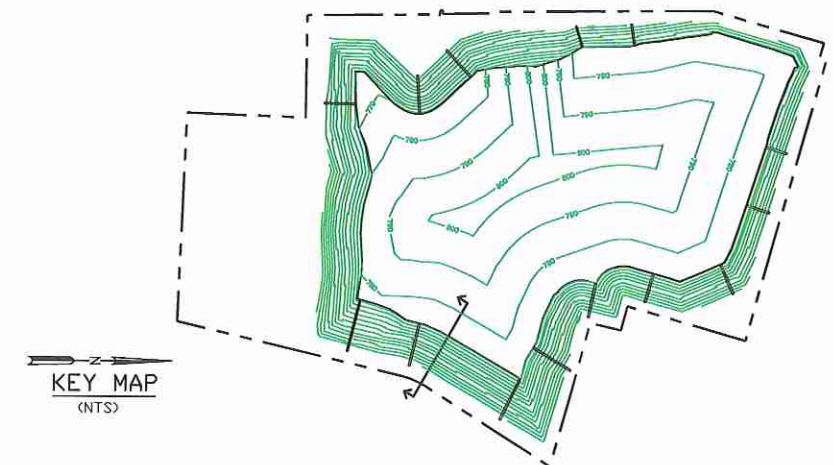
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	DATE: 12/2011 FILE: 0120-109-11 CAD: 1-1_SEC 1.DWG		TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS	
DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM	REVISIONS		<b>Weaver Boos Consultants</b> TBPE REGISTRATION NO. F-3727	
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INTERIM SECTION 2-1



CLOSED SECTION 2-1



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**2. Select Strength Parameters**

The slope stability analysis has been developed for both total and effective stress conditions to address short and long term conditions that will exist after the installation of the dikes. The selected strength parameters for the containment dike and other materials are described below.

**EFFECTIVE STRESS SOIL PROPERTIES**

Unit	Unit Weight		Cohesion Intercept (psf)	Friction Angle (deg)	Comments
	Moist (pcf)	Saturated (pcf)			
Dike	116	120	100	15	Refer to page III-F1-3 for more information.
Final Cover	116	120	100	15	Typical value for final cover soils.
Waste	65	65	0	25	These values match the values used in the stability analyses. Refer to Appendix III-E for more information.
Liner - 3H:1V	120	120	0	19	
Liner - Bottom	120	120	0	10	
Surface Clay, Upper & Lower Clays	120	120	0	23	
Unweathered Shale	120	120	0	21	

**TOTAL STRESS SOIL PROPERTIES**

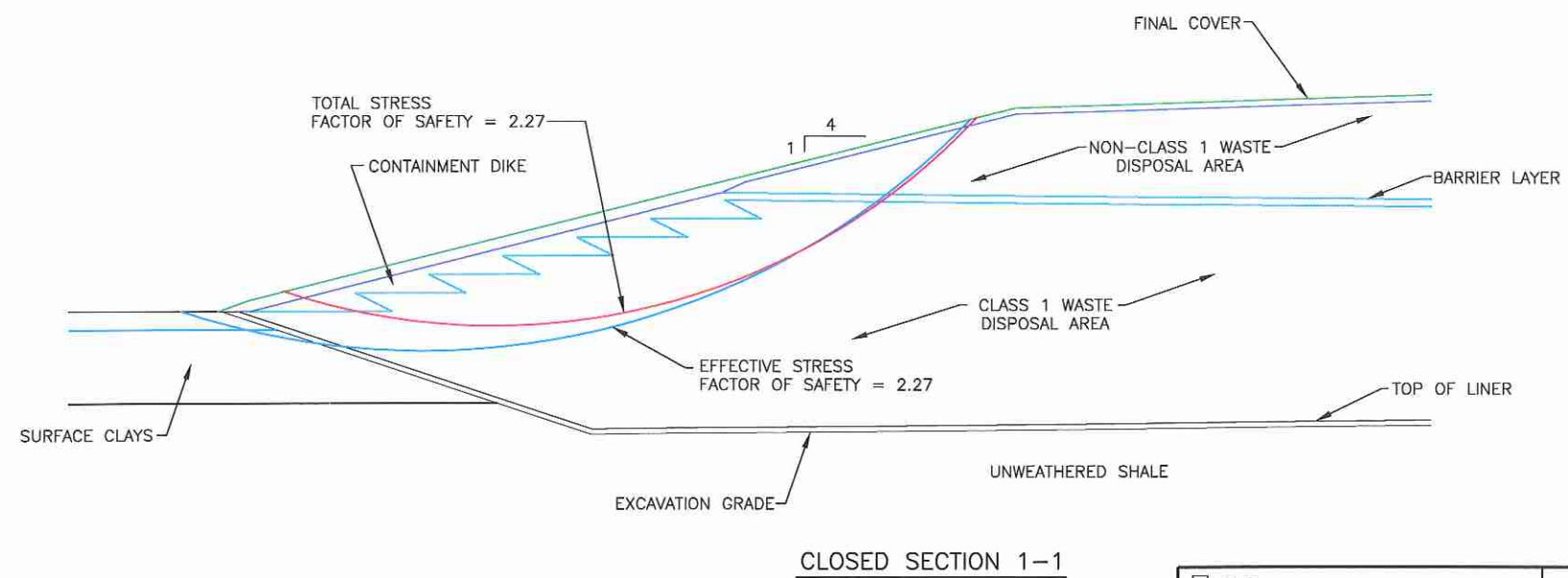
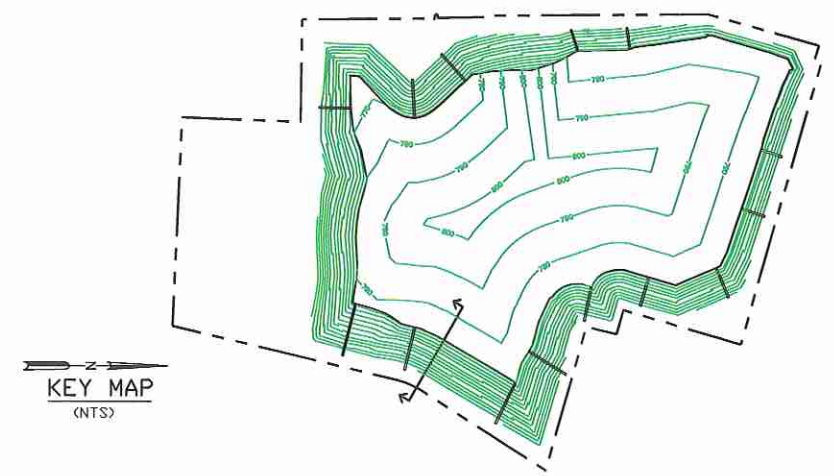
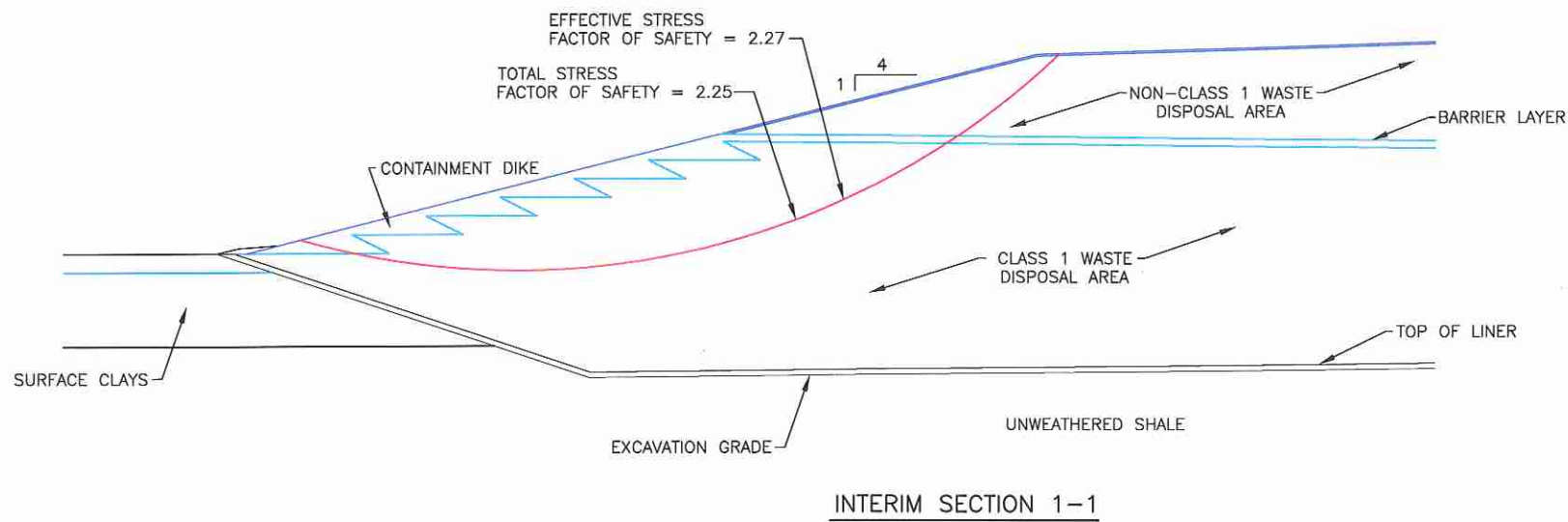
Unit	Unit Weight		Cohesion Intercept (psf)	Friction Angle (deg)	Comments
	Moist (pcf)	Saturated (pcf)			
Dike	116	120	250	0	Refer to page III-F1-3 for more information.
Final Cover	116	120	100	15	Typical value for final cover soils.
Waste	65	65	0	25	These values match the values used in the stability analyses. Refer to Appendix III-E for more information.
Liner - 3H:1V	120	120	0	19	
Liner - Bottom	120	120	0	10	
Surface Clay, Upper & Lower Clays	125	125	3750	0	
Unweathered Shale	125	125	4500	0	

**3. Perform Analysis to Calculate Factor of Safety.**

The calculated factors of safety are shown below and summarized on Figures 3-1 and 3-2. As noted, all the calculated factors of safety, using conservatively selected strength parameters, are above 1.5. Additionally, the results below demonstrate that a variety of assumed unit weight values for the waste all result in acceptable factors of safety. Therefore, the proposed design meets §335.590(24)(F)(i)(II) which requires the containment dike to "be physically stable against slope failure, with a minimum safety factor of 1.5."

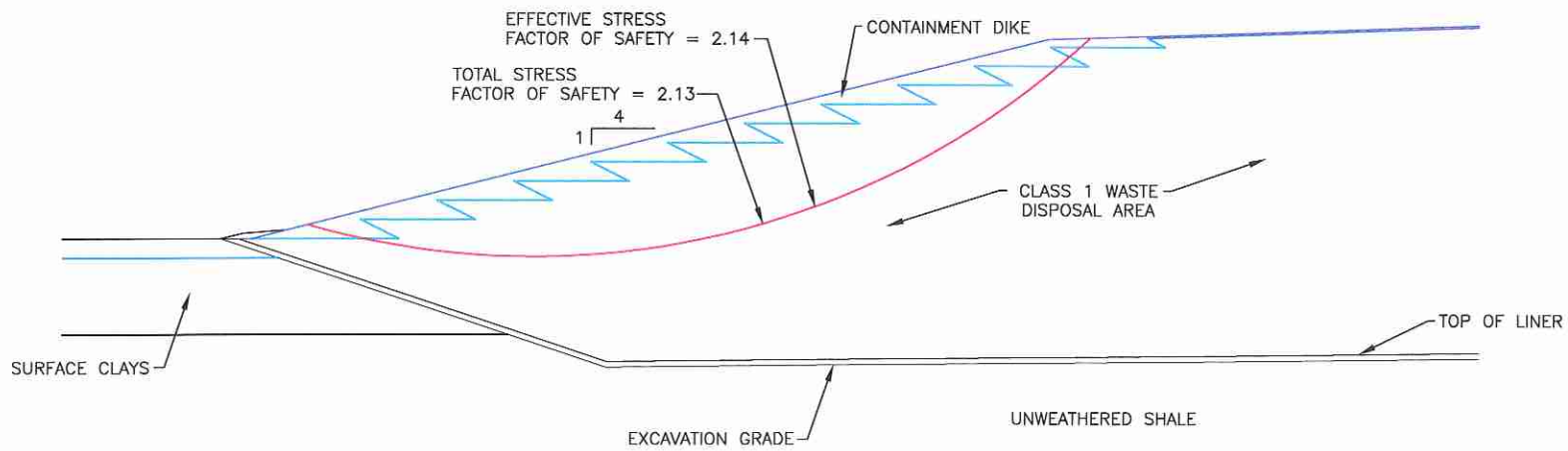
**Table 3-1  
Stability Analysis Results**

Slope Designation	Method of Analysis	Minimum Factor of Safety Generated		Recommended Minimum Factor of Safety	Acceptable Factor of Safety
		Total Stress	Effective Stress		
<b>Option 1</b>					
Interim Condition, Section 1-1	Bishop-Circular	2.25	2.27	1.5	YES
Interim Condition, Section 1-2	Rankine-Block	2.58	2.59	1.5	YES
Closed Condition, Section 1-1	Bishop-Circular	2.27	2.27	1.5	YES
Closed Condition, Section 1-2	Rankine-Block	2.76	2.78	1.5	YES
<b>Option 2</b>					
Interim Condition, Section 2-1	Bishop-Circular	2.13	2.14	1.5	YES
Interim Condition, Section 2-2	Rankine-Block	2.47	2.47	1.5	YES
Closed Condition, Section 2-1	Bishop-Circular	2.08	2.11	1.5	YES
Closed Condition, Section 2-2	Rankine-Block	2.53	2.54	1.5	YES

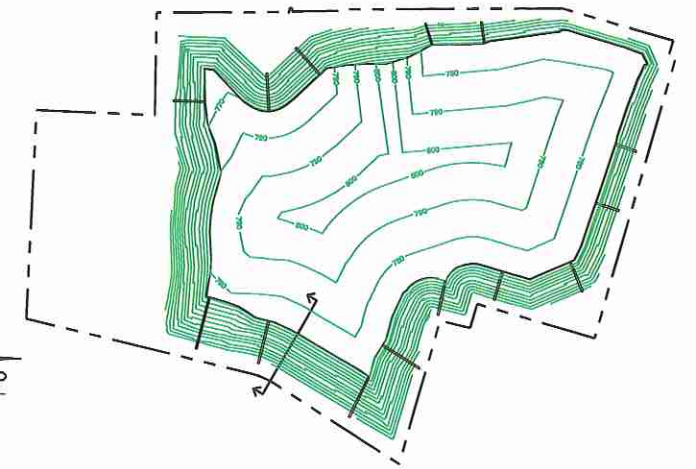


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	DATE: 12/2011 FILE: 0120-109-11 CAD: 3-1 DIKE.DWG		DESIGN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM							
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		GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARMONT, FL		<b>Weaver Boos Consultants</b> TBPE REGISTRATION NO. F-3727 <b>FIGURE 3-1</b>						

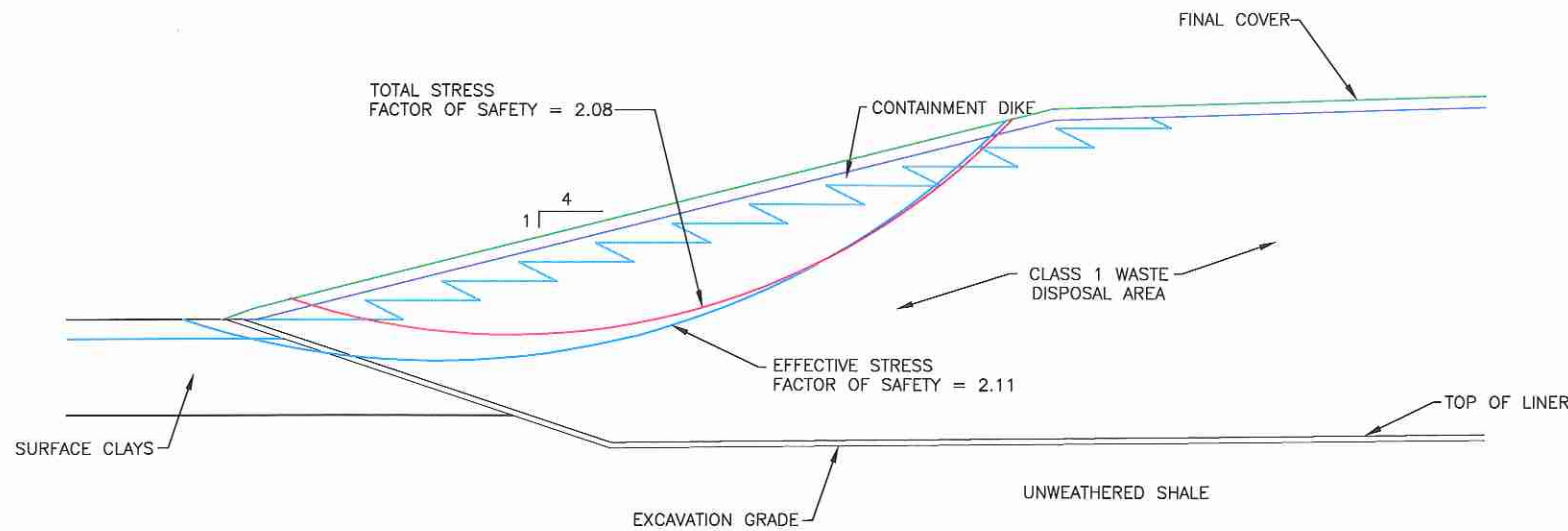
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INTERIM SECTION 2-1



KEY MAP  
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CLOSED SECTION 2-1



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**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

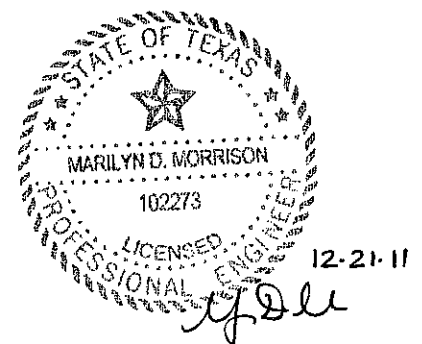
**PART III  
ATTACHMENT 1  
SITE LAYOUT PLAN**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999  
Revised November 2009

Revised December 2011



Prepared by

**Weaver Boos Consultants, LLC—Southwest**  
TBPE Registration No. F-3727  
6420 Southwest Boulevard, Suite 206  
Fort Worth, Texas 76109  
(817) 735-9770

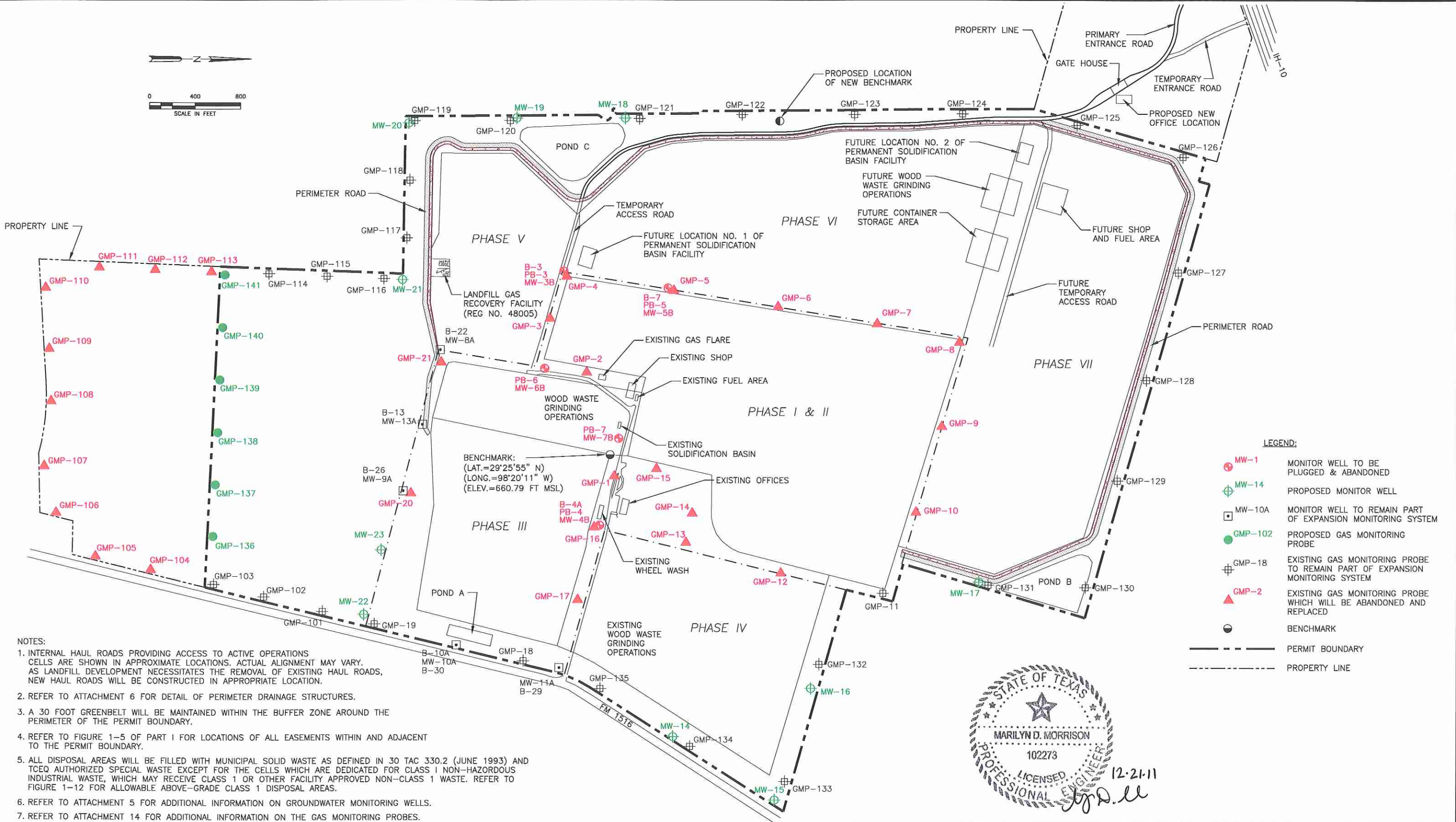
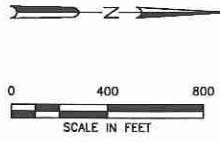
Project No. 0120-109-11-54-01

## **ATTACHMENT 1 LIST OF FIGURES**

### **FIGURES (330.56(A))**

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- 1-1 SITE LAYOUT PLAN
- 1-2 GENERAL SEQUENCE OF FILL AND CELL LAYOUT
- 1-3 SITE ENTRANCE
- 1-4 SITE ENTRANCE SECTION OPTIONS
- 1-5 FINAL CONTOUR MAP
- 1-6 SCREENING BERM LOCATION MAP
- 1-7 TYPICAL DEDICATED CLASS I NON-HAZARDOUS INDUSTRIAL WASTE CELL
- 1-8 SOLAR ENERGY SYSTEM PLAN LOCATION
- 1-9 SOLAR PANEL LAYOUT
- 1-10 SOLAR ENERGY SYSTEM TYPICAL DETAILS
- 1-11 SOLAR ENERGY SYSTEM TYPICAL DETAILS
- 1-12 ALLOWABLE CLASS 1 DISPOSAL AREAS
- 1-13 CLASS 1 WASTE DISPOSAL AREA OPTIONS



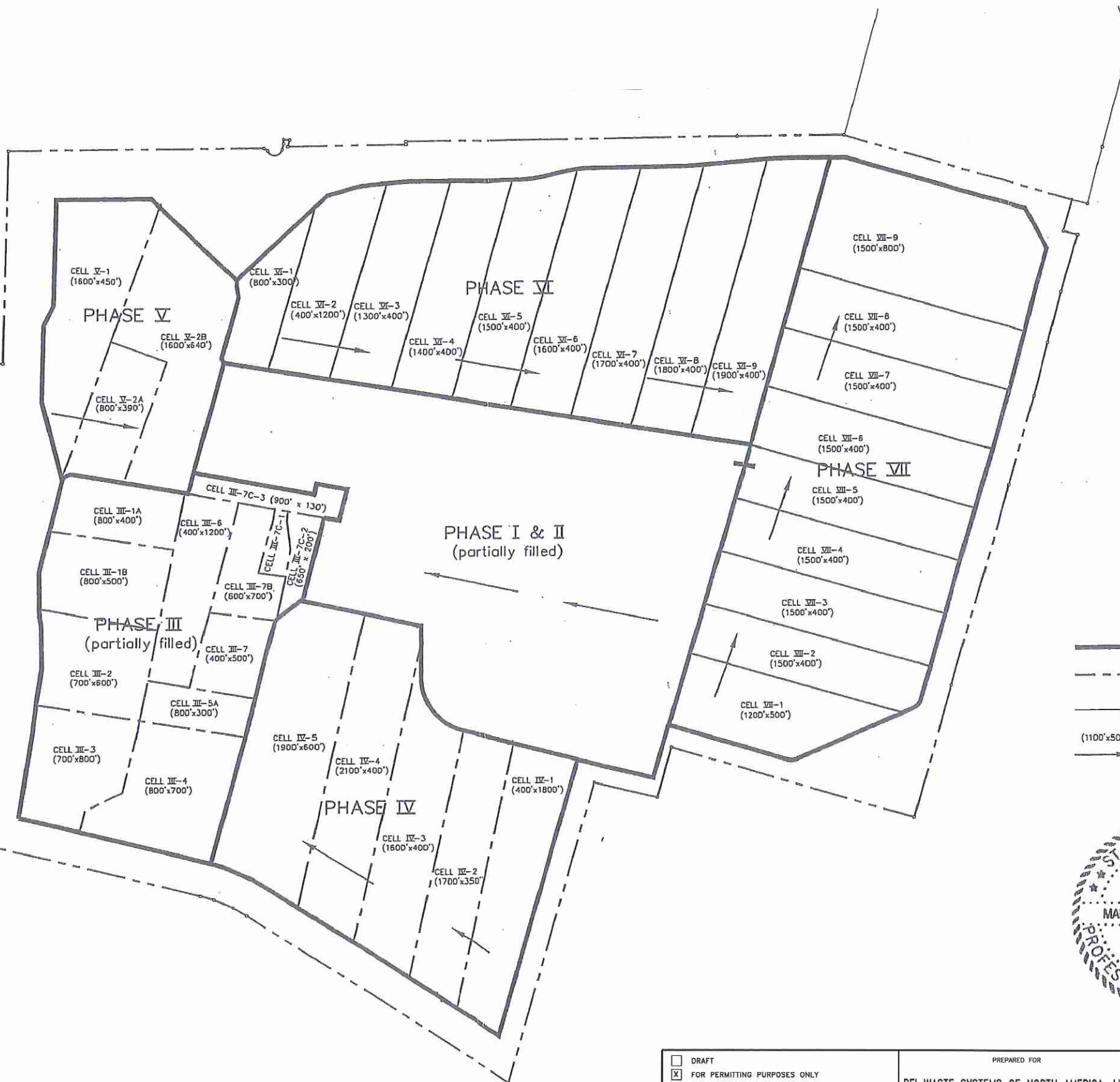
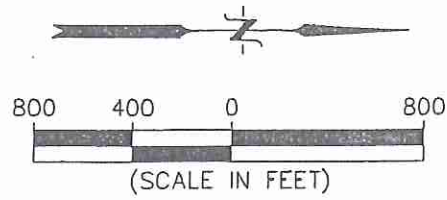
**LEGEND:**

- ⊕ MW-1 MONITOR WELL TO BE PLUGGED & ABANDONED
- ⊕ MW-14 PROPOSED MONITOR WELL
- MW-10A MONITOR WELL TO REMAIN PART OF EXPANSION MONITORING SYSTEM
- GMP-102 PROPOSED GAS MONITORING PROBE
- GMP-18 EXISTING GAS MONITORING PROBE TO REMAIN PART OF EXPANSION MONITORING SYSTEM
- ▲ GMP-2 EXISTING GAS MONITORING PROBE WHICH WILL BE ABANDONED AND REPLACED
- BENCHMARK
- PERMIT BOUNDARY
- - - - - PROPERTY LINE

- NOTES:**
- INTERNAL HAUL ROADS PROVIDING ACCESS TO ACTIVE OPERATIONS CELLS ARE SHOWN IN APPROXIMATE LOCATIONS. ACTUAL ALIGNMENT MAY VARY. AS LANDFILL DEVELOPMENT NECESSITATES THE REMOVAL OF EXISTING HAUL ROADS, NEW HAUL ROADS WILL BE CONSTRUCTED IN APPROPRIATE LOCATION.
  - REFER TO ATTACHMENT 6 FOR DETAIL OF PERIMETER DRAINAGE STRUCTURES.
  - A 30 FOOT GREENBELT WILL BE MAINTAINED WITHIN THE BUFFER ZONE AROUND THE PERIMETER OF THE PERMIT BOUNDARY.
  - REFER TO FIGURE 1-5 OF PART I FOR LOCATIONS OF ALL EASEMENTS WITHIN AND ADJACENT TO THE PERMIT BOUNDARY.
  - ALL DISPOSAL AREAS WILL BE FILLED WITH MUNICIPAL SOLID WASTE AS DEFINED IN 30 TAC 330.2 (JUNE 1993) AND TCEQ AUTHORIZED SPECIAL WASTE EXCEPT FOR THE CELLS WHICH ARE DEDICATED FOR CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE, WHICH MAY RECEIVE CLASS 1 OR OTHER FACILITY APPROVED NON-CLASS 1 WASTE. REFER TO FIGURE 1-12 FOR ALLOWABLE ABOVE-GRADE CLASS 1 DISPOSAL AREAS.
  - REFER TO ATTACHMENT 5 FOR ADDITIONAL INFORMATION ON GROUNDWATER MONITORING WELLS.
  - REFER TO ATTACHMENT 14 FOR ADDITIONAL INFORMATION ON THE GAS MONITORING PROBES.
  - FENCING WILL BE INSTALLED ALONG LATERAL EXPANSION SITE BOUNDARY AS SITE DEVELOPMENT PROGRESS.
  - NO WASTE DISPOSAL ACTIVITIES AUTHORIZED BY PERMIT AMENDMENT 1410-C WILL BE WITHIN 100 FEET OF THE PERMIT BOUNDARY IN ACCORDANCE WITH CSA ZONING ORDINANCE 80809.
  - TEMPORARY LIQUID WASTE SOLIDIFICATION FACILITY TO BE RELOCATED FROM TIME TO TIME WITHIN THE WASTE FOOTPRINT IN ACCORDANCE WITH THE TEMPORARY LIQUID WASTE SOLIDIFICATION FACILITY DESIGN DETAIL (SEE FIGURE 1-7).
  - ONLY ONE LIQUID WASTE SOLIDIFICATION FACILITY, TEMPORARY OR PERMANENT, WILL BE UTILIZED AT ANY GIVEN TIME DURING LANDFILL OPERATIONS.
  - PRIOR TO RELOCATION OF LIQUID WASTE SOLIDIFICATION FACILITY, TEMPORARY OR PERMANENT, DESIGN DRAWINGS WILL BE SUBMITTED TO TCEQ FOR REVIEW.



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DATE: 07/2005 FILE: 0120-109-11 CAD: 1-1 SITE LAYOUT.dwg	DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: JPY	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">REVISIONS</th> </tr> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">12/2011</td> <td>PERMIT MODIFICATION</td> </tr> </tbody> </table>	REVISIONS			NO.	DATE	DESCRIPTION	1	12/2011	PERMIT MODIFICATION
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FORT WORTH, TX SOUTH BEND, IN RIVERSIDE, MO		GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARMONT, FL									
		FIGURE 1-1									



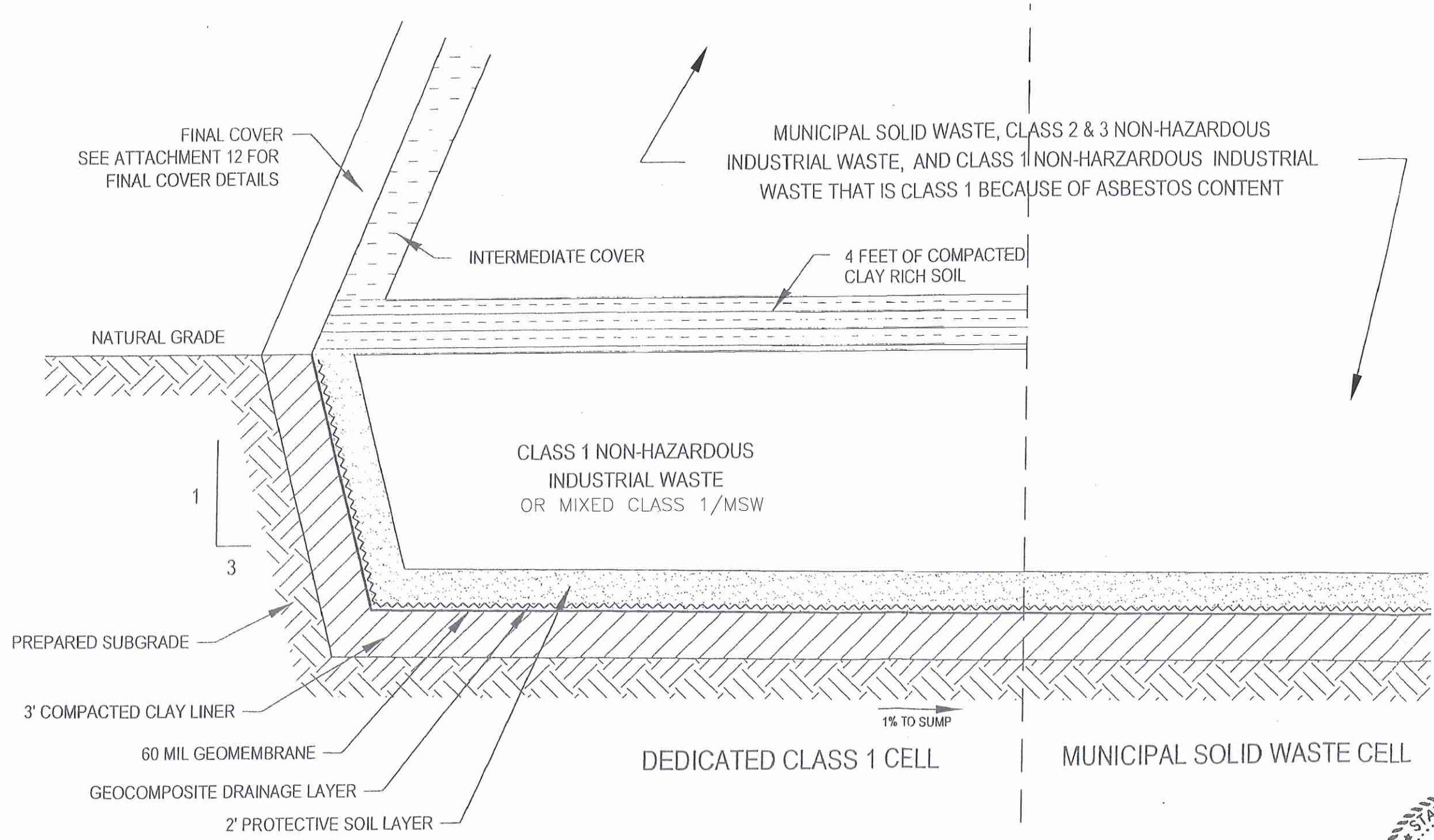
- LEGEND**
- PHASE BOUNDARY
  - PERMIT BOUNDARY
  - PROPERTY LINE
  - (1100'x500') CELL DIMENSION SEQUENCE OF FILL

- NOTES:**
1. PHASES REFER TO GENERAL PROGRESSION OF LANDFILL DEVELOPMENT.
  2. CELL DIMENSIONS ARE APPROXIMATE.
  3. REFER TO "SEQUENCE OF LANDFILL DEVELOPMENT" SECTION IN ATTACHMENT 1 FOR DETAILED INFORMATION REGARDING FILL SEQUENCE.
  4. BELOW GRADE PORTIONS OF CELLS MAY BE DEDICATED FOR DISPOSAL OF NON-HAZARDOUS INDUSTRIAL WASTE WITH PRIOR APPROVAL FROM THE TCEQ.
  5. REFER TO FIGURE 1-12 FOR ALLOWABLE ABOVE-GRADE CLASS 1 DISPOSAL AREAS.



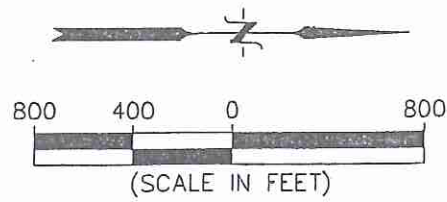
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DATE: 07/2005 FILE: 0120-109-11 CAD: 1-2 SEQ. OF FILLDWG		DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM				REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>PERMIT MODIFICATION</td> </tr> </tbody> </table>		NO.	DATE	DESCRIPTION	1
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O:\0120\109\CLASS 1 WASTE MOD\CLEANWATT 1\FIG 1-2\_SEQUENCE OF FILL.dwg, jwilson



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	DATE: 12/2003 FILE: 0120-81-11 CAD: 1-7_CELL DETAIL.DWG	DRAWN BY: VRS DESIGN BY: MDM REVIEWED BY: JPY	<b>Weaver Boos Consultants</b> TBPE REGISTRATION NO. F-3727
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		GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARMONT, FL	
		<b>FIGURE 1-7</b>	

O:\0120\108\CLASS 1 WASTE MOD\CLEAN\ATT 1\FIG 1-7 DETAIL.dwg, jwilson



**LEGEND**

- PHASE BOUNDARY
- PERMIT BOUNDARY
- PROPERTY LINE
- (1100'x500') CELL DIMENSION SEQUENCE OF FILL
- EXISTING CONSTRUCTED MSW AREA
- FUTURE MSW OR CLASS 1 DISPOSAL AREA (SEE NOTE 1)
- EXISTING CONSTRUCTED CLASS 1 DISPOSAL AREA (SEE NOTE 1)

- NOTES:**
1. ABOVE GRADE CLASS 1 WASTE DISPOSAL MAY OCCUR IN THE EXISTING CONSTRUCTED CLASS 1 DISPOSAL AREA AND IN THE UNDEVELOPED AREAS OF PHASE IV, V, VI, AND VII IF A LINER SYSTEM IS CONSTRUCTED IN COMPLIANCE WITH 30 TAC §330.331(e).
  2. CLASS 1 WASTE MAY BE MIXED WITH MUNICIPAL SOLID WASTE AND OTHER WASTE TYPES ACCEPTED AT THE FACILITY IN AREAS WITH A LINER SYSTEM CONSTRUCTED IN COMPLIANCE WITH 30 TAC §330.331(e). REFER TO APPENDIX III-F.



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DATE: 12/2011 FILE: 0120-109-11 CAD: 1-12 CLASS 1 AREAS.DWG	DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDW	REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>PERMIT MODIFICATION</td> </tr> </tbody> </table>		NO.	DATE	DESCRIPTION	1	12/2011	PERMIT MODIFICATION
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**ALLOWABLE CLASS 1 DISPOSAL AREAS**

TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS

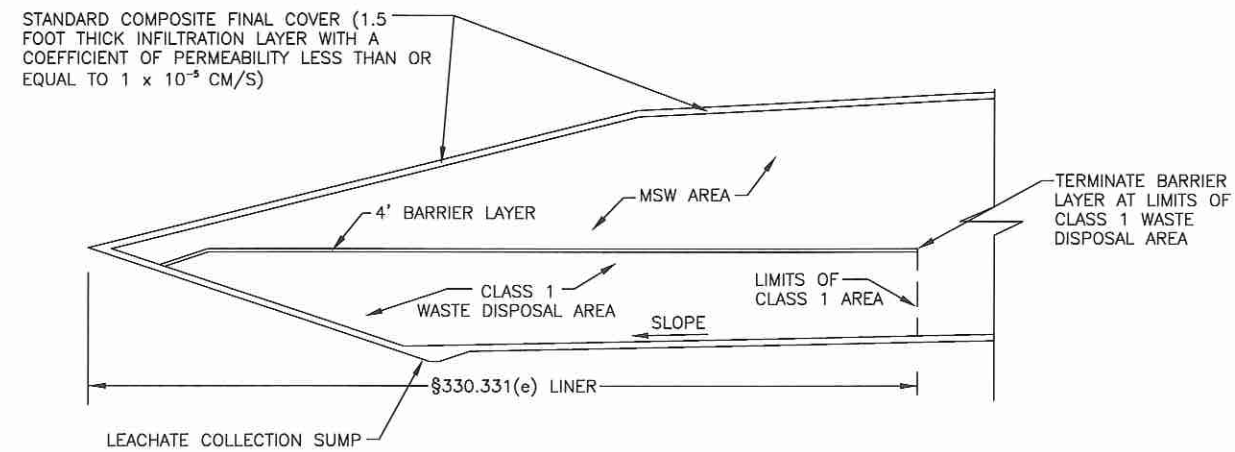
*Weaver Boos Consultants*  
TBPE REGISTRATION NO. F-3727

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 COLUMBUS, OH    RIVERSIDE, MO    SPRINGFIELD, IL  
 DENVER, CO    CLEARMONT, FL

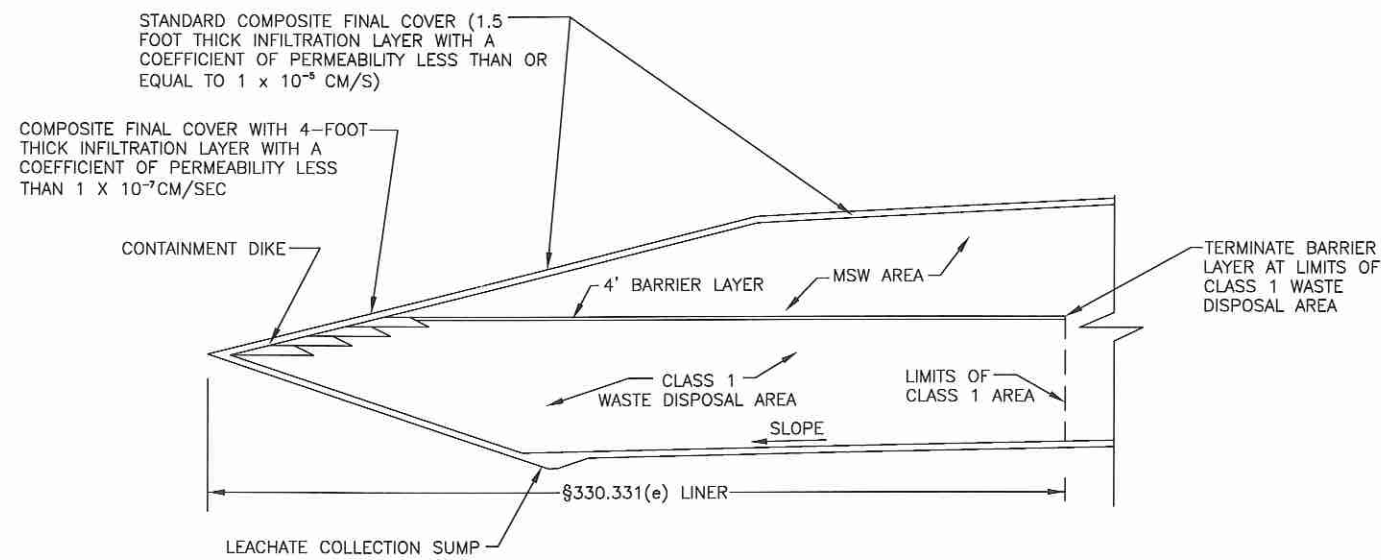
**FIGURE 1-12**

O:\0120\109\CLASS 1 WASTE MOD\CLEAN\ATT 1\FIG 1-12 CLASS 1 AREAS.dwg, jwilson

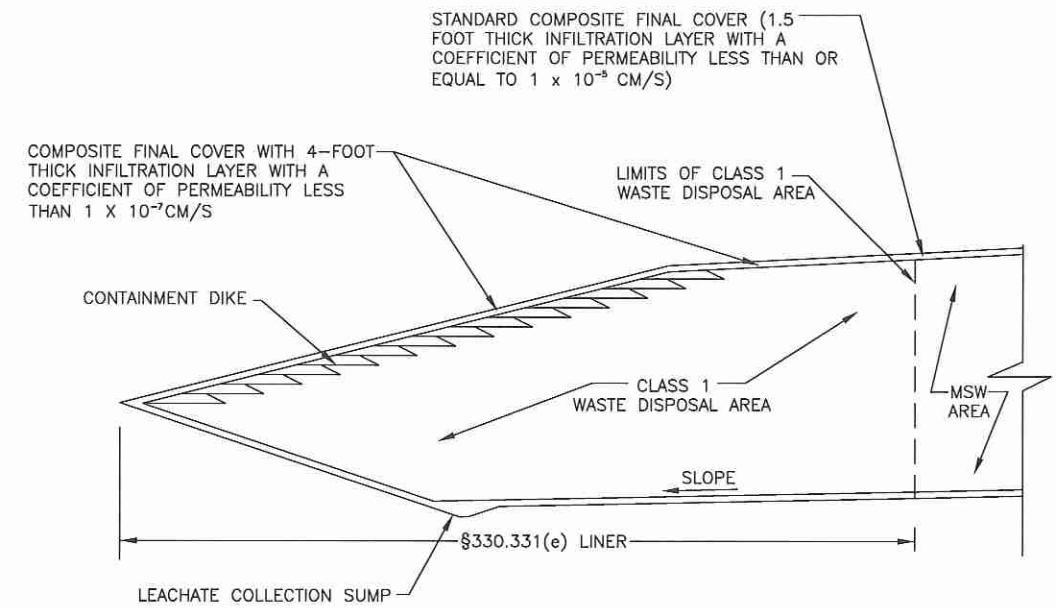
O:\0120\109\CLASS 1 WASTE.MD\CLEAN\ATT 1\FIG 1-13\_CLASS 1 OPTIONS.dwg, jwilson



**OPTION 1 – BELOW GRADE CLASS 1 DISPOSAL AREA WITH SEPARATION LAYER**



**OPTION 2 – ABOVE GRADE CLASS 1 DISPOSAL AREA WITH SEPARATION LAYER**



**OPTION 3 – ABOVE GRADE CLASS 1 DISPOSAL AREA**



**NOTES:**

1. CLASS 1 WASTE AND CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE ARE USED INTERCHANGEABLY.
2. REFER TO FIGURE 1-12 FOR ALLOWABLE ABOVE-GRADE CLASS 1 DISPOSAL AREAS.

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DATE: 12/2011 FILE: 0120-109-11 CAD: FIG 1-13-DETAILS.DWG	DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY	REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>PERMIT MODIFICATION</td> </tr> </tbody> </table>	NO.	DATE	DESCRIPTION	1	12/2011	PERMIT MODIFICATION	<b>Weaver Boos Consultants</b> TBPE REGISTRATION NO. F-3727						
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**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

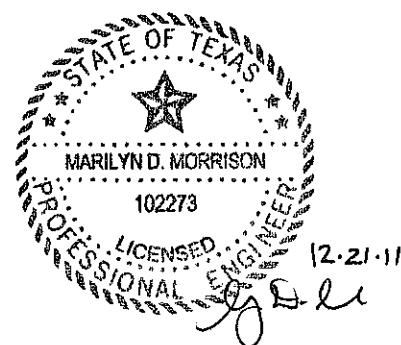
**PART III  
ATTACHMENT 2  
FILL CROSS SECTIONS**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999  
Revised April 2005

Revised December 2011



Prepared by

**Weaver Boos Consultants, LLC—Southwest**  
TBPE Registration No. F-3727  
6420 Southwest Boulevard, Suite 206  
Fort Worth, Texas 76109  
(817) 735-9770

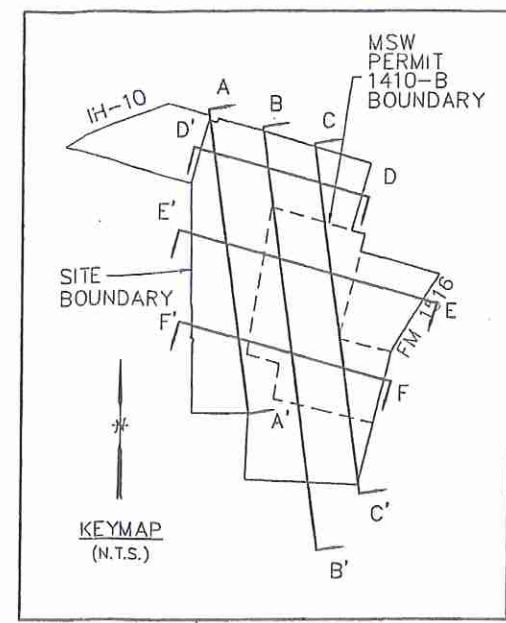
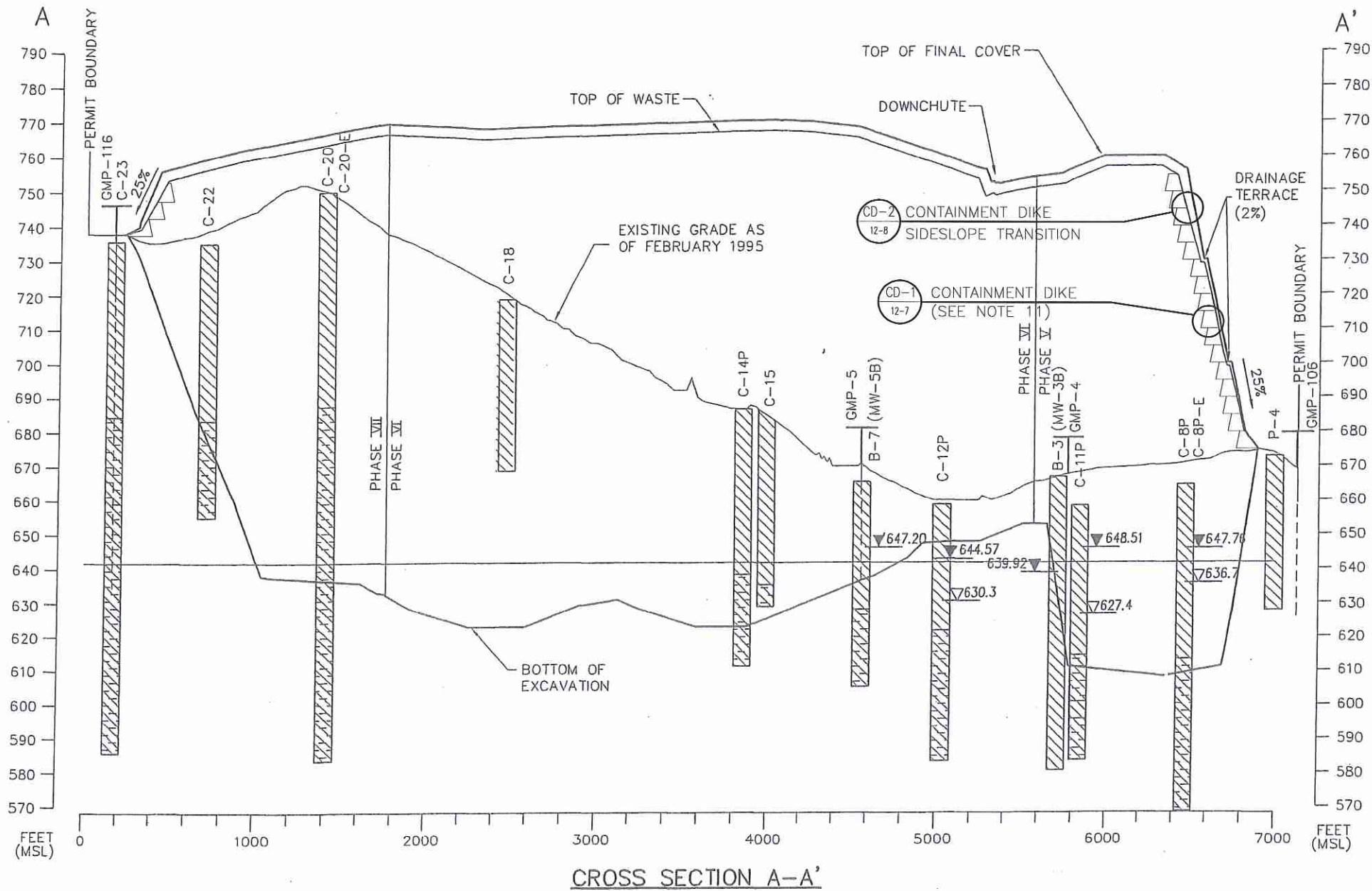
Project No. 0120-109-11-54-01

## LIST OF FIGURES

### FIGURES (330.56(b))

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2-1	CROSS SECTION A-A'
2-2	CROSS SECTION B-B'
2-3	CROSS SECTION C-C'
2-4	CROSS SECTION D-D'
2-5	CROSS SECTION E-E'
2-6	CROSS SECTION F-F'
2-7	CROSS SECTION G-G'
2-8	PERIMETER BERM LOCATION MAP
2-9	EAST SCREENING BERN
2-10	NORTHEAST PERIMETER BERM
2-11	WEST SCREENING BERM
2-12	WEST DRAINAGE BERM
2-13	TYPICAL BERM AND PERIMETER CROSS SECTIONS



**LEGEND**

CLAY  
 CLAY SHALE  
 GAS PROBES  
 644.57 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING  
 630.3 APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING

**SCALE**

1" = 800' HORIZONTAL  
 1" = 40' VERTICAL

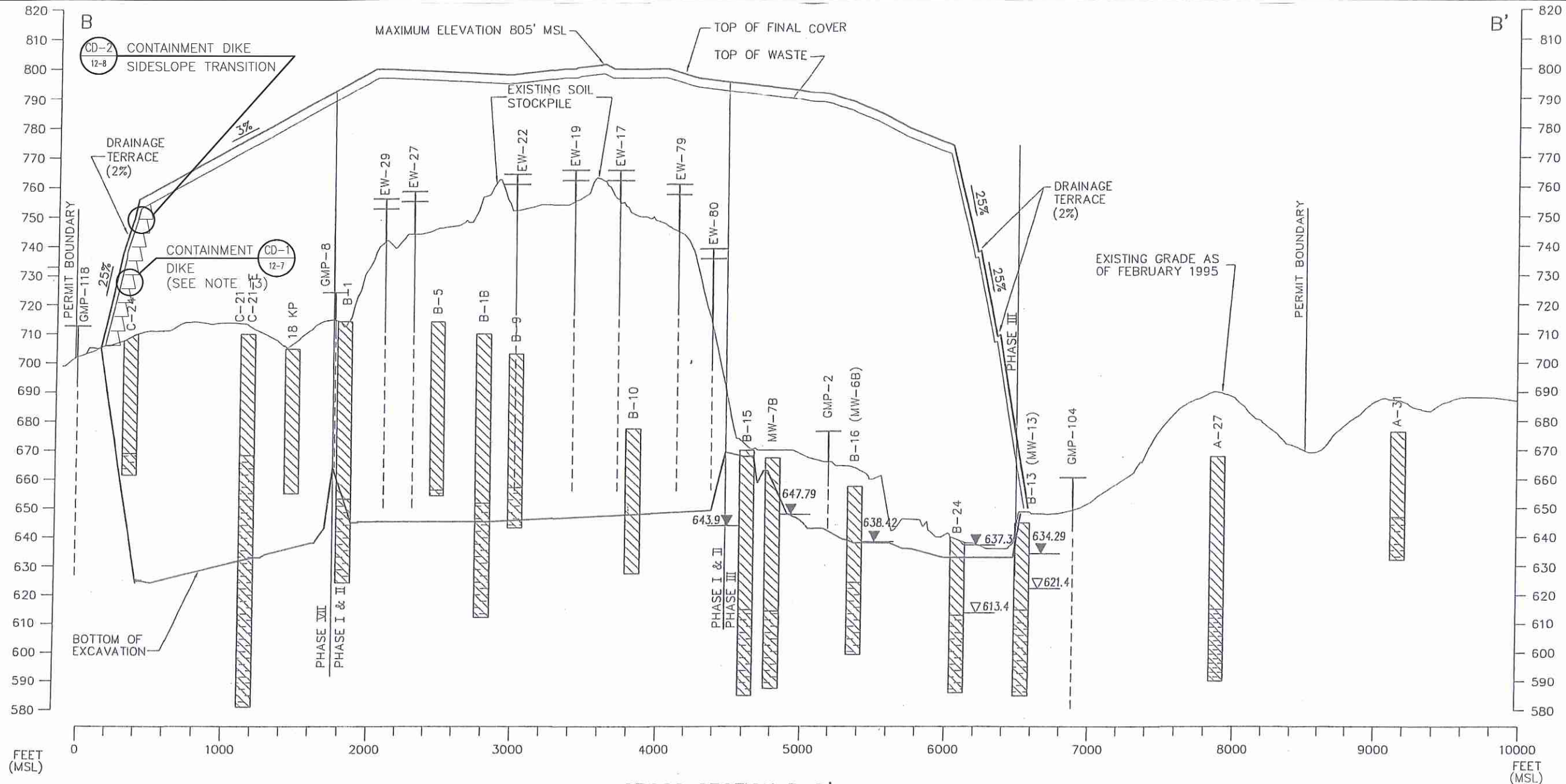
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O:\0120\109\CLASS 1 WASTE.MXD\CLEAN\ATT 2\FIG 2-1\_SEC A-A.DWG, jwilson

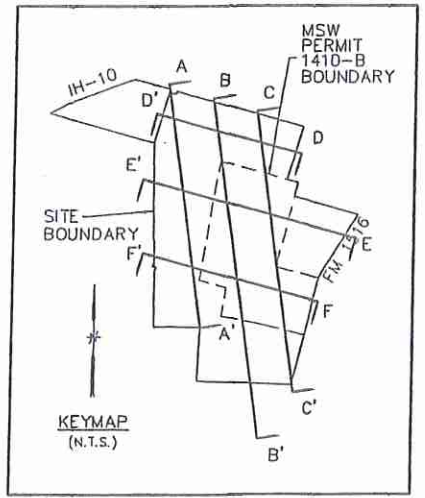


CROSS SECTION B-B'

SCALE  
 1" = 800' HORIZONTAL  
 1" = 40' VERTICAL

LEGEND  
 CLAY  
 CLAY SHALE  
 GAS PROBES  
 GAS EXTRACTION WELLS

▽ 637.3 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING  
 ∇ 613.4 APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING

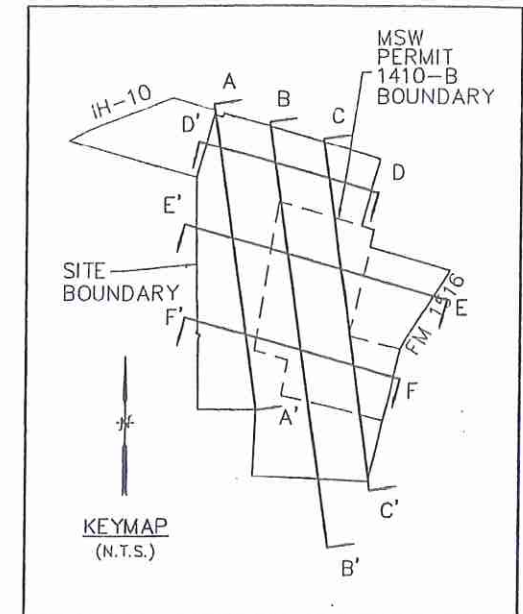
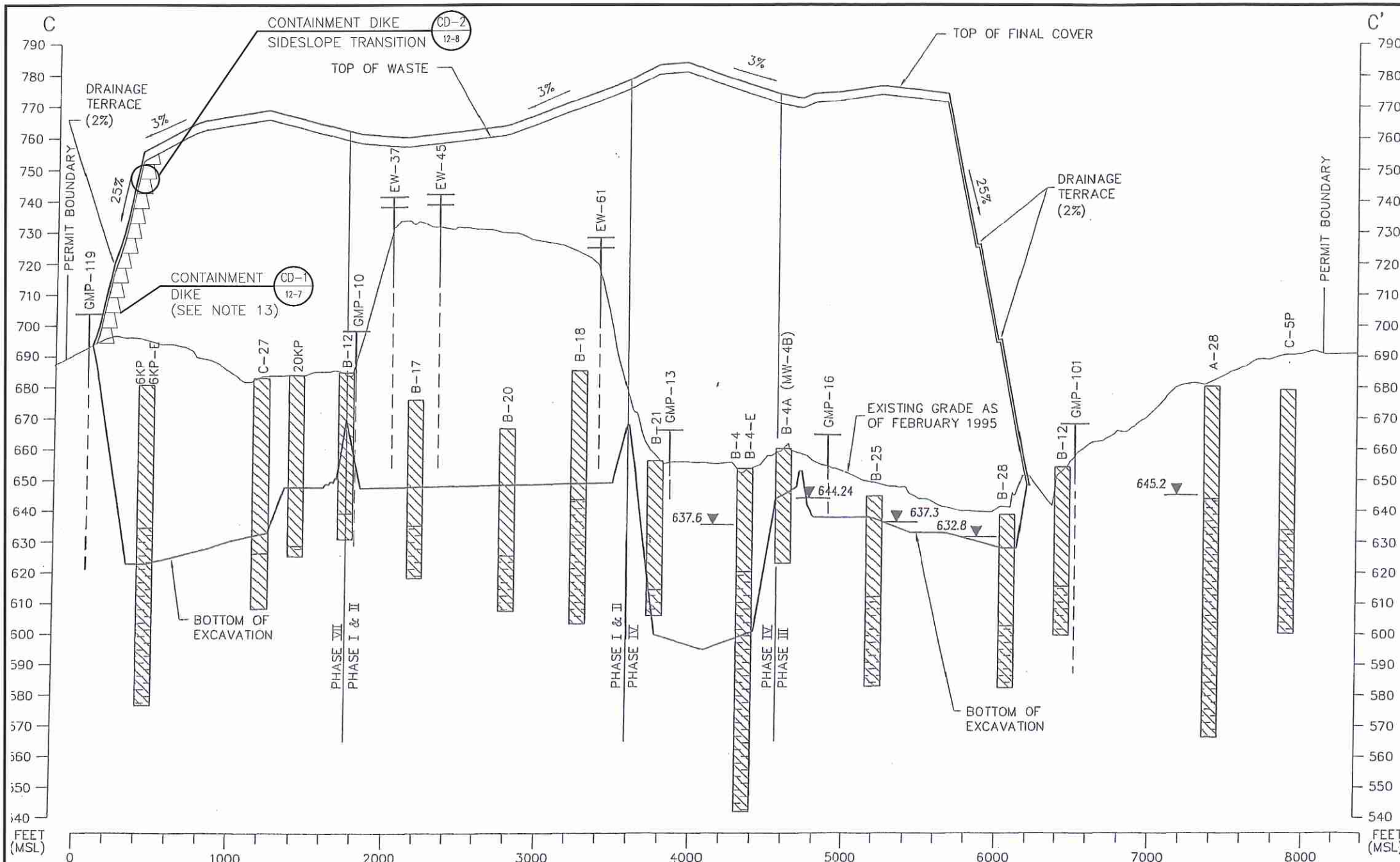


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				FIGURE 2-2	

O:\0120\109\CLASS 1 WASTE.MDW\CLEAN\ATT 2\FIG 2-2\_SEC B-B.dwg, jwilson



**CROSS SECTION C-C'**

- NOTES**
1. THE EXISTING AND PROPOSED MONITOR WELL LOCATIONS ARE SHOWN IN PART III, ATTACHMENT 4, GEOLOGY REPORT, FIGURE 4-27.
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**LEGEND**

- CLAY
- CLAY SHALE
- GAS PROBES
- GAS EXTRACTION WELLS

644.24 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING

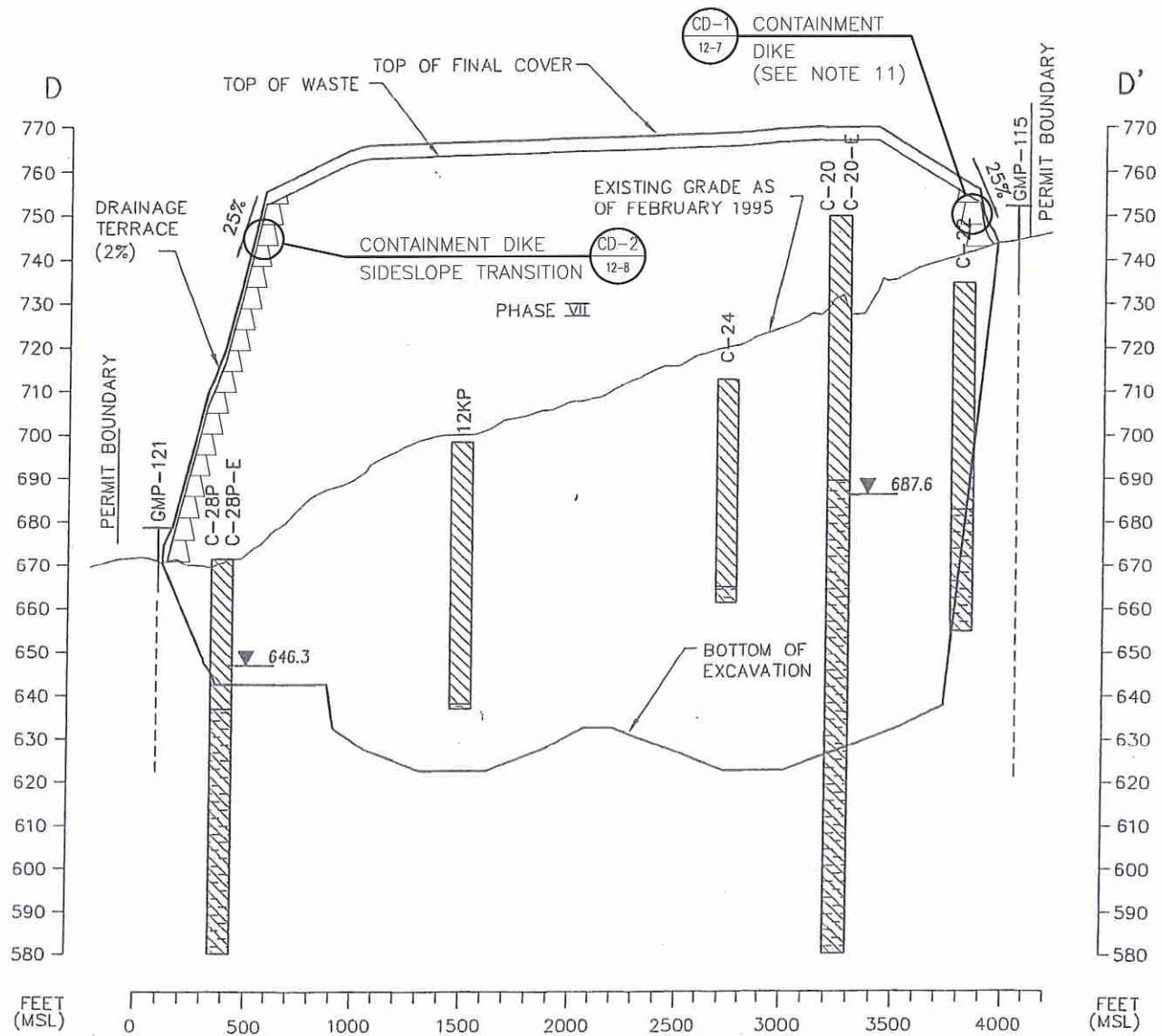
645.24 APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING

**SCALE**  
 1" = 800' HORIZONTAL  
 1" = 40' VERTICAL



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O:\0120\109\CLASS 1 WASTE MOD\CLEAN\ATT 2\FIG 2-3\_SEC C-C.dwg\_jwilson



CROSS SECTION D-D'

SCALE:  
 1" = 800' HORIZONTAL  
 1" = 40' VERTICAL

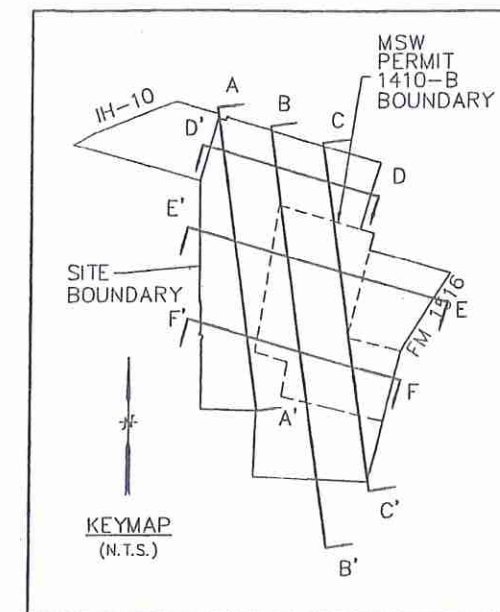
LEGEND

- CLAY
- SHALE
- GAS PROBES

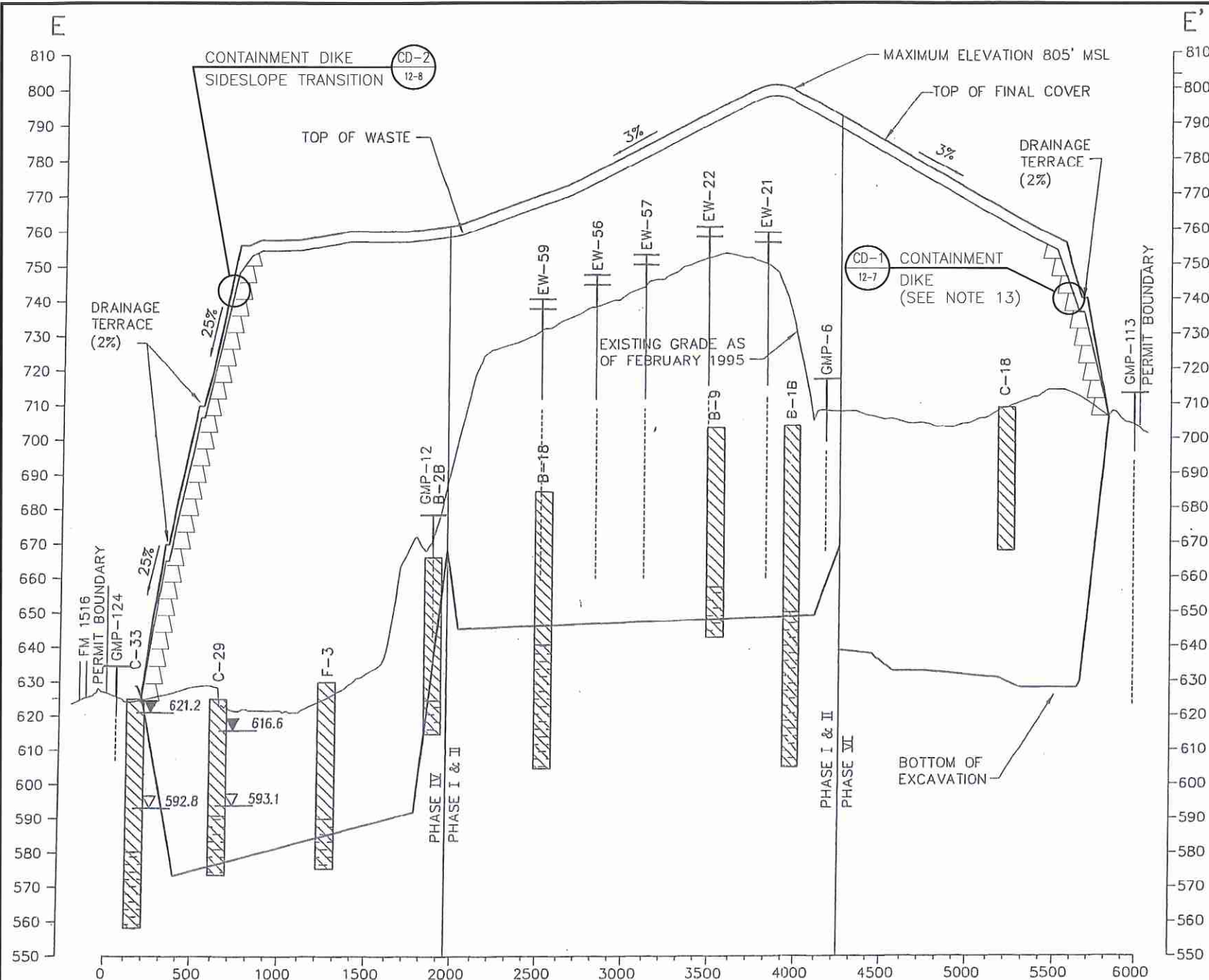
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9. DASHED PORTION OF GAS PROBES REPRESENT APPROXIMATE SCREENED INTERVALS.
10. MAXIMUM EXCAVATION 573' MSL IN PHASE IV.
11. CONTAINMENT DIKES WILL ONLY BE CONSTRUCTED IF THE ABOVE GRADE CLASS 1 OPTION IS UTILIZED. ABOVE GRADE CLASS 1 WASTE MAY BE MIXED WITH MUNICIPAL SOLID WASTE AND OTHER WASTE TYPES ACCEPTED AT THE FACILITY. REFER TO APPENDIX III-F.



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	DATE: 04/2005 FILE: 0120-109-11 CAD: 2-4 SEC D-D.DWG	DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM	TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS	
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		FIGURE 2-4		



CROSS SECTION E-E'

SCALE:  
 1" = 800' HORIZONTAL  
 1" = 40' VERTICAL

LEGEND  
 [Hatched Box] CLAY  
 [Hatched Box] CLAY SHALE  
 [T Symbol] GAS PROBES  
 [T Symbol with Horizontal Line] GAS EXTRACTION WELLS

▽ 621.2 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 1995; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING  
 ▽ 592.8 APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING

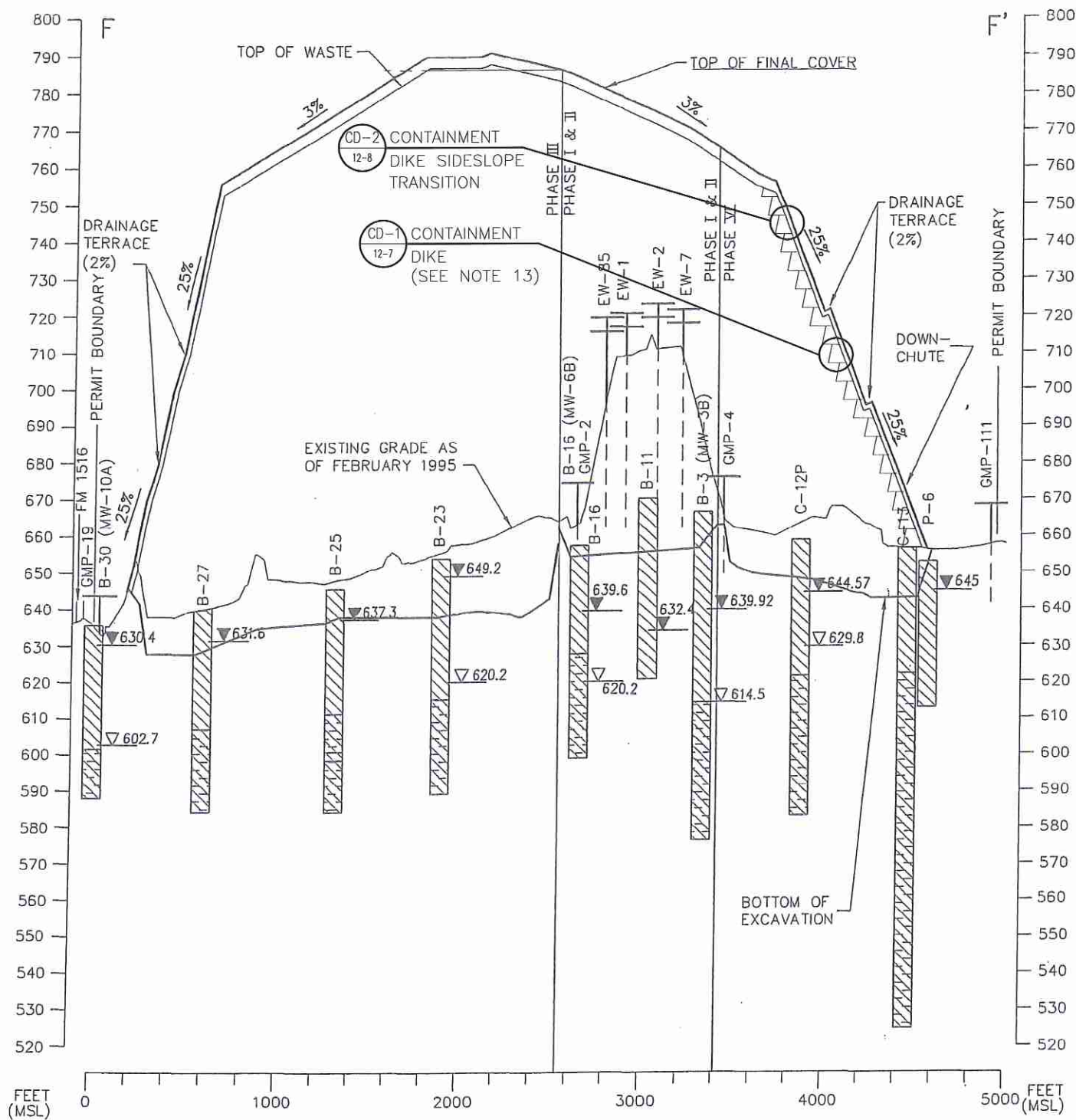
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5. GROUNDWATER MONITORING WELLS MW-3B, 4B, 5B, 6B AND 7B WILL BE ABANDONED DURING FACILITY DEVELOPMENT.
6. SIDE SLOPES OF FILL ARE TYPICALLY 25%. TOP SLOPES ARE TYPICALLY 3%. SOME SLOPES MAY APPEAR Milder OR STEEPER AS THE CROSS SECTION IS NOT ALWAYS CUT PERPENDICULAR TO THE CONTOURS.
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<b>FIGURE 2-5</b>					

O:\0120\109\CLASS 1 WASTE MOD\CLEAN\ATT 2\FIG 2-5\_SEC E-E.dwg, jwilson

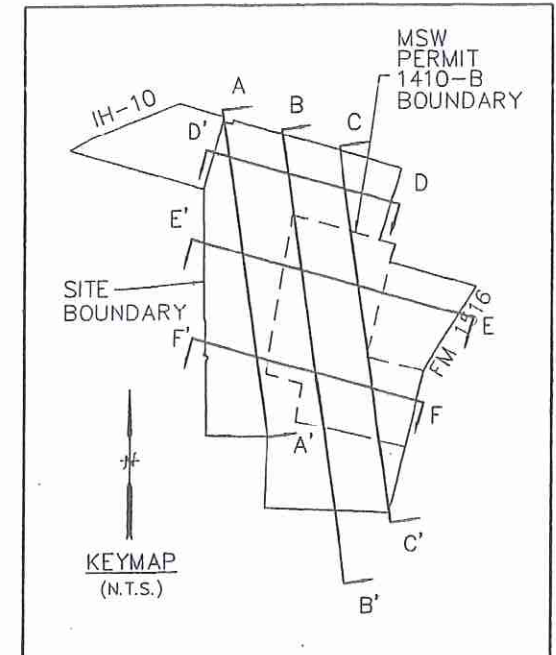


SCALE  
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 1" = 40' VERTICAL

CROSS SECTION F-F'

- NOTES**
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- LEGEND**
- CLAY
  - CLAY SHALE
  - GAS PROBES
  - GAS EXTRACTION WELLS
  - STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER  
 GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING
  - APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING



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<b>FIGURE 2-6</b>											

O:\0120\109\CLASS 1 WASTE MOD\CLEAN\ATT 2\FIG 2-6\_SEC F-F.dwg, jwilson

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

**PART III  
ATTACHMENT 7**

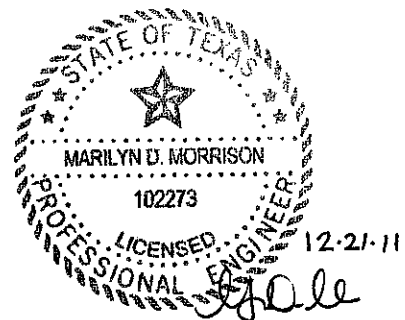
**FINAL CONTOUR MAP**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999  
Revised July 2005

Revised December 2011



Prepared by

**Weaver Boos Consultants, LLC—Southwest**  
TBPE Registration No. F-3727  
6420 Southwest Boulevard, Suite 206  
Fort Worth, Texas 76109  
(817) 735-9770

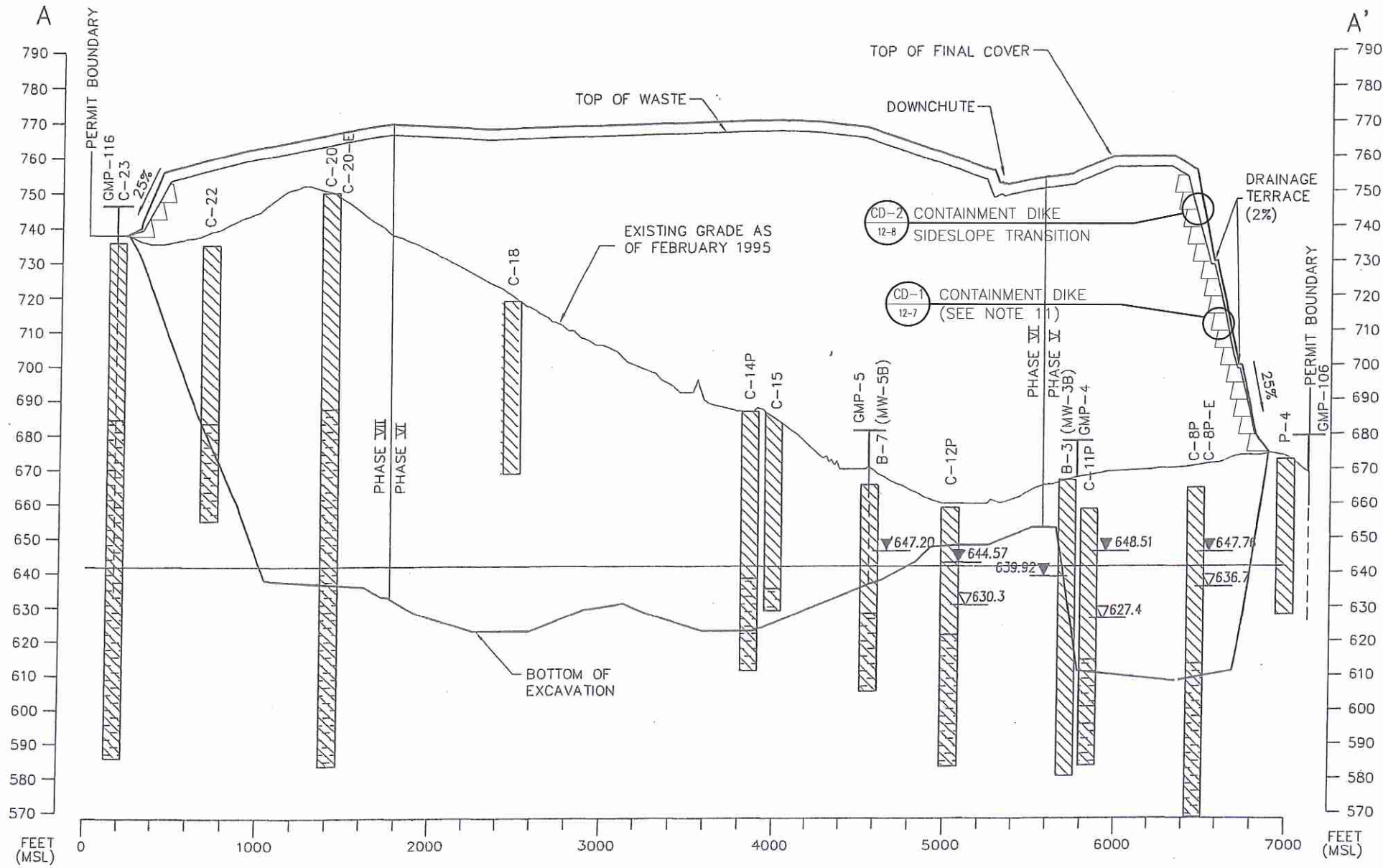
Project No. 0120-109-11-54-01

## LIST OF FIGURES

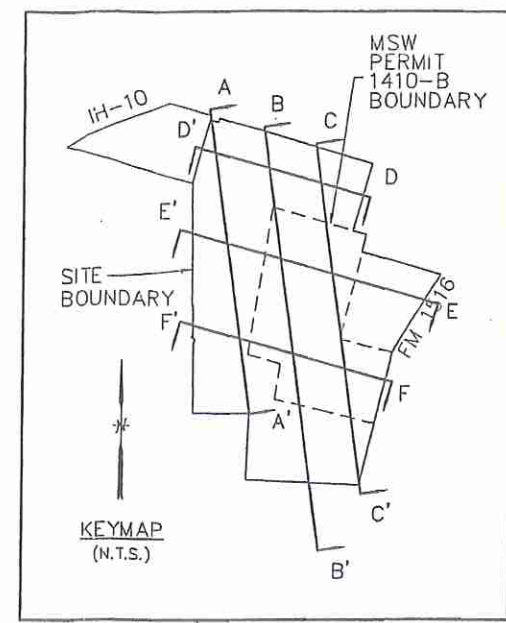
### FIGURES (330.56(b))

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7-1	FINAL CONTOUR MAP
7-2A	FINAL CONTOUR MAP (SOUTH)
7-2b	FINAL CONTOUR MAP (NORTH)
7-3	CROSS-SECTION A-A
7-4	CROSS-SECTION B-B
7-5	CROSS-SECTION C-C
7-6	CROSS-SECTION D-D
7-7	CROSS-SECTION E-E
7-8	CROSS-SECTION F-F
7-9	CROSS-SECTION G-G



CROSS SECTION A-A'



**LEGEND**

CLAY (diagonal hatching)

CLAY SHALE (cross-hatching)

GAS PROBES (T-shaped symbol)

STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER (inverted triangle symbol)

GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING

APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING (inverted triangle with dot symbol)

**SCALE**

1" = 800' HORIZONTAL

1" = 40' VERTICAL

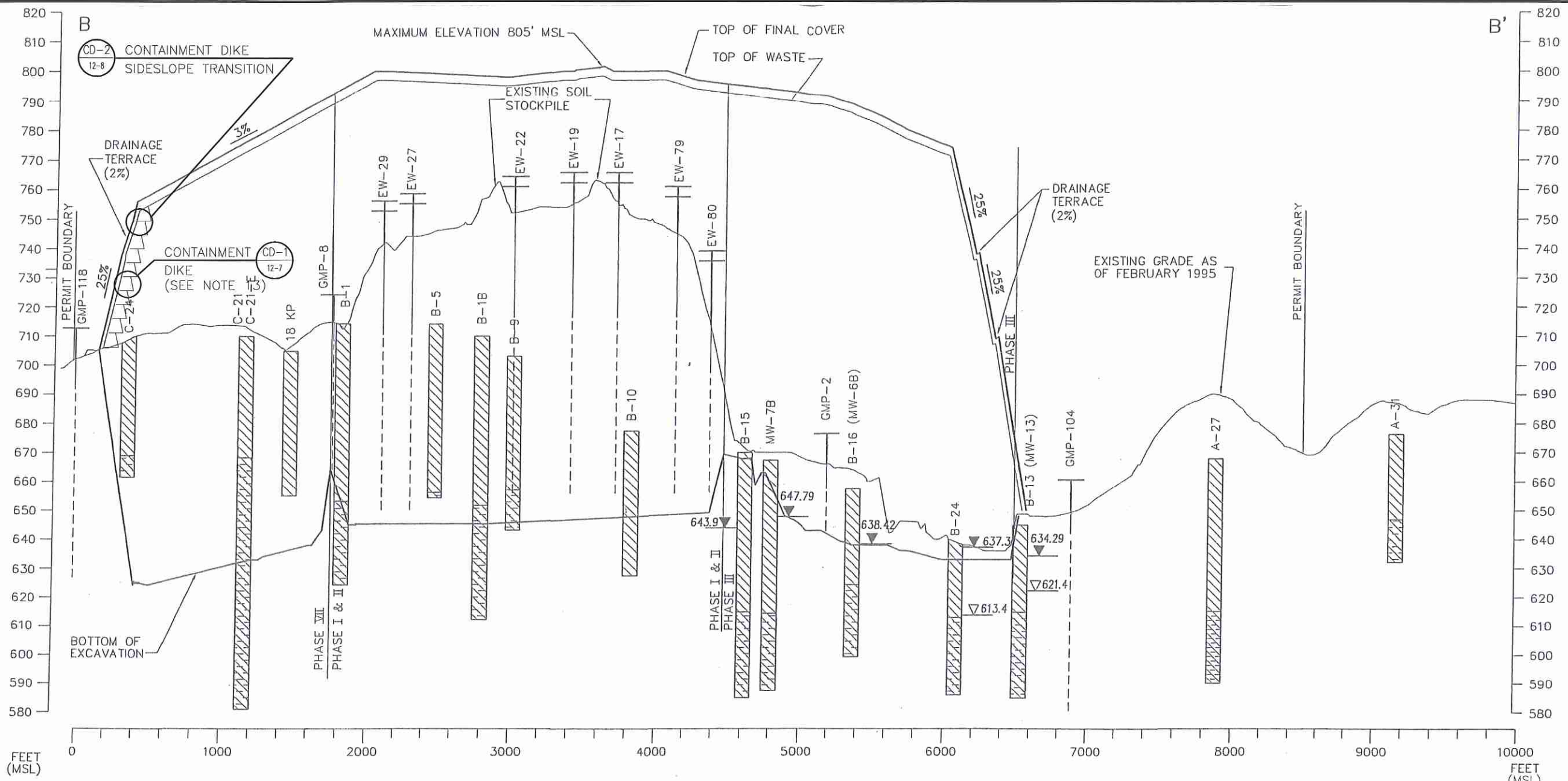
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<b>FIGURE 7-3</b>											

O:\0120\109\CLASS 1 WASTE.MXD\CLEAN\ATT 7\FIG 7-3\_SEC A-A.dwg. jwilson

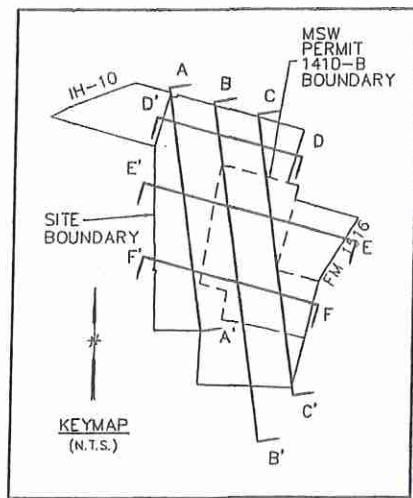


CROSS SECTION B-B'

SCALE  
 1" = 80' HORIZONTAL  
 1" = 40' VERTICAL

LEGEND  

 CLAY  
 CLAY SHALE  
 GAS PROBES  
 GAS EXTRACTION WELLS



NOTES

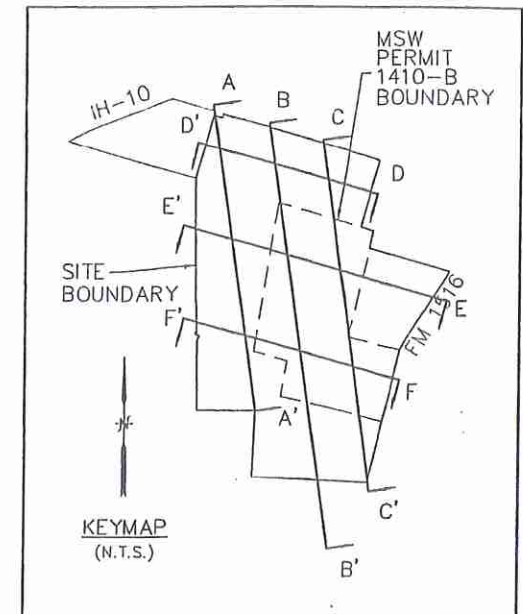
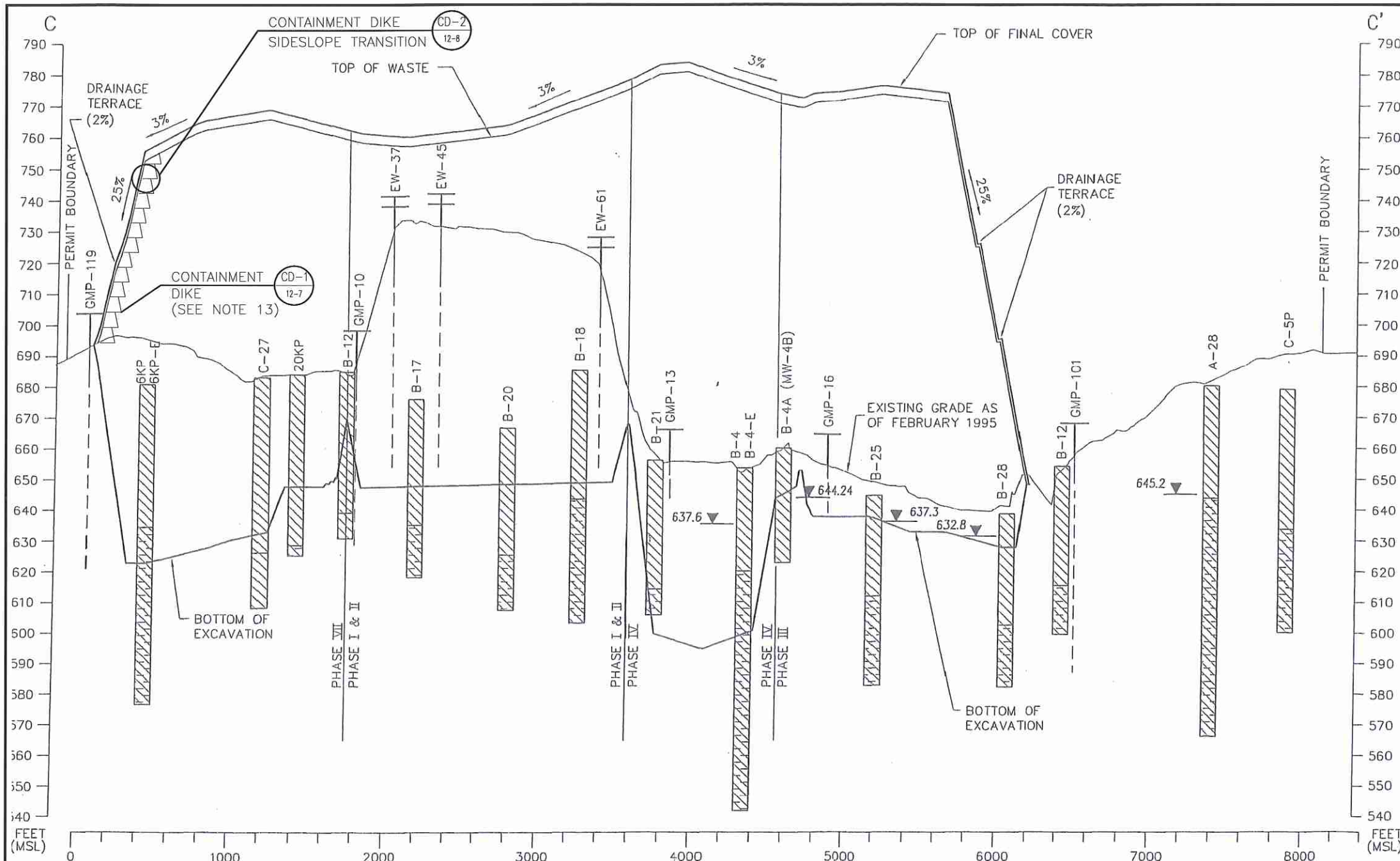
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▼ 637.3 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING  
 ▽ 613.4 APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING



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C:\0120\108\CLASS 1 WASTE MOD\CLEAN\ATT 7\FIG 7-4\_SEC B-B.dwg, jwilson



**CROSS SECTION C-C'**

**SCALE**  
 1" = 800' HORIZONTAL  
 1" = 40' VERTICAL

- LEGEND**
- CLAY
  - CLAY SHALE
  - GAS PROBES
  - GAS EXTRACTION WELLS

644.24 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING

645.24 APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING

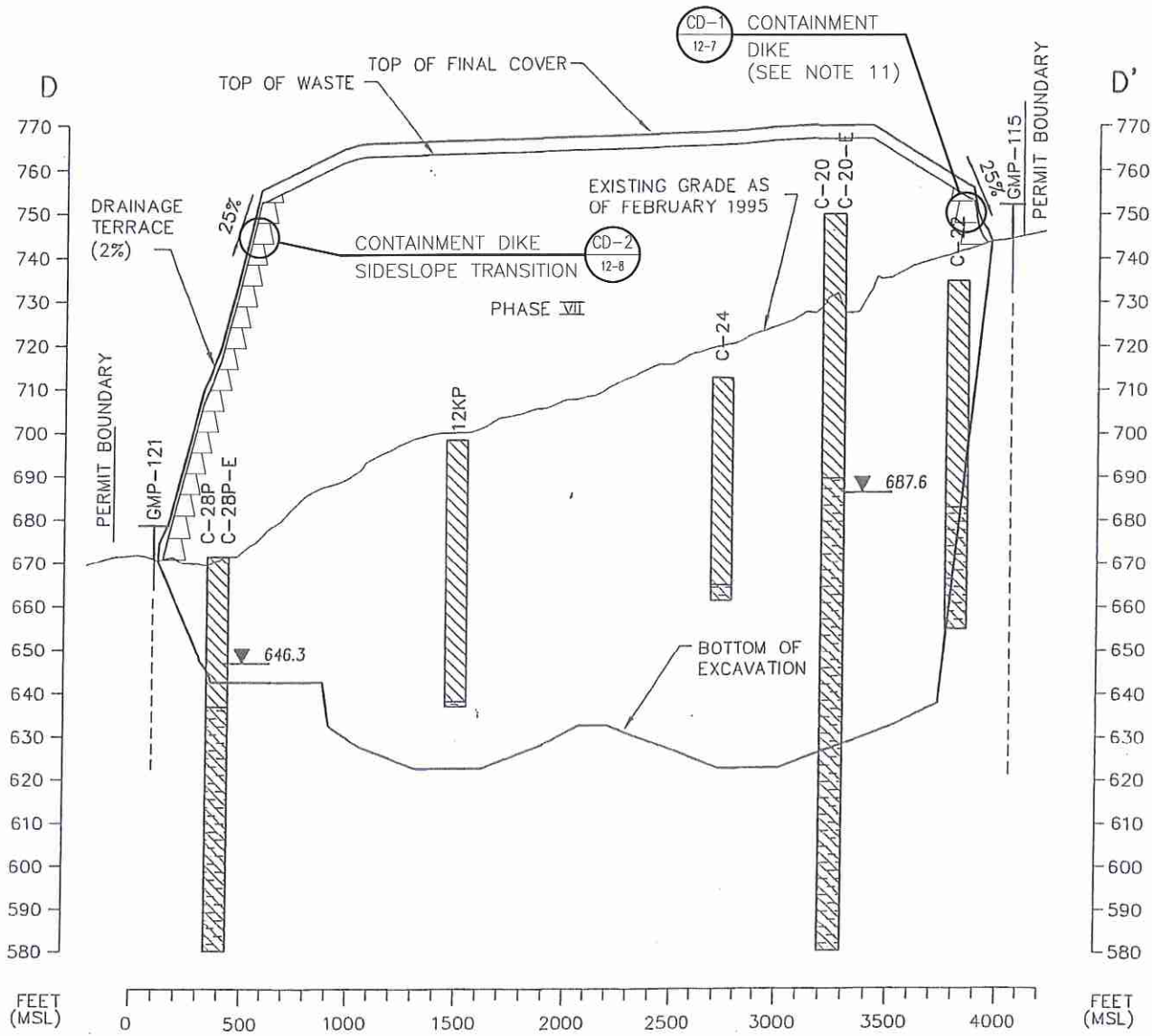
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				FIGURE 7-5	





D:\0120\109\CLASS 1 WASTE MOD\CLEAN\ATT 7\FIG 7-5\_SEC C-C.dwg, jwilson



CROSS SECTION D-D'

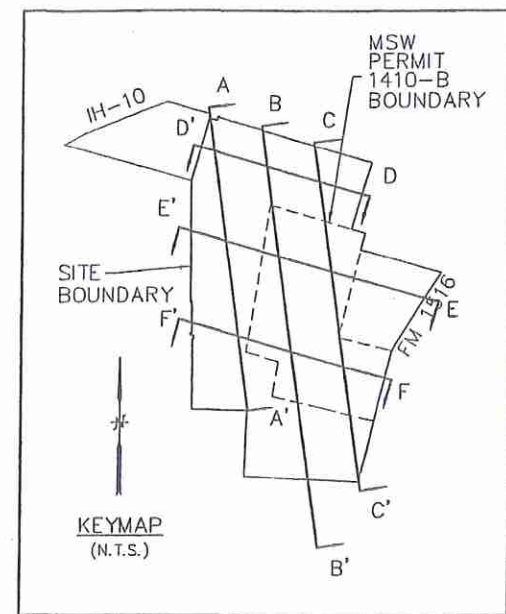
SCALE:  
 1" = 800' HORIZONTAL  
 1" = 40' VERTICAL

LEGEND

-  CLAY
-  SHALE
-  GAS PROBES
-  646.3  
 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 95; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING

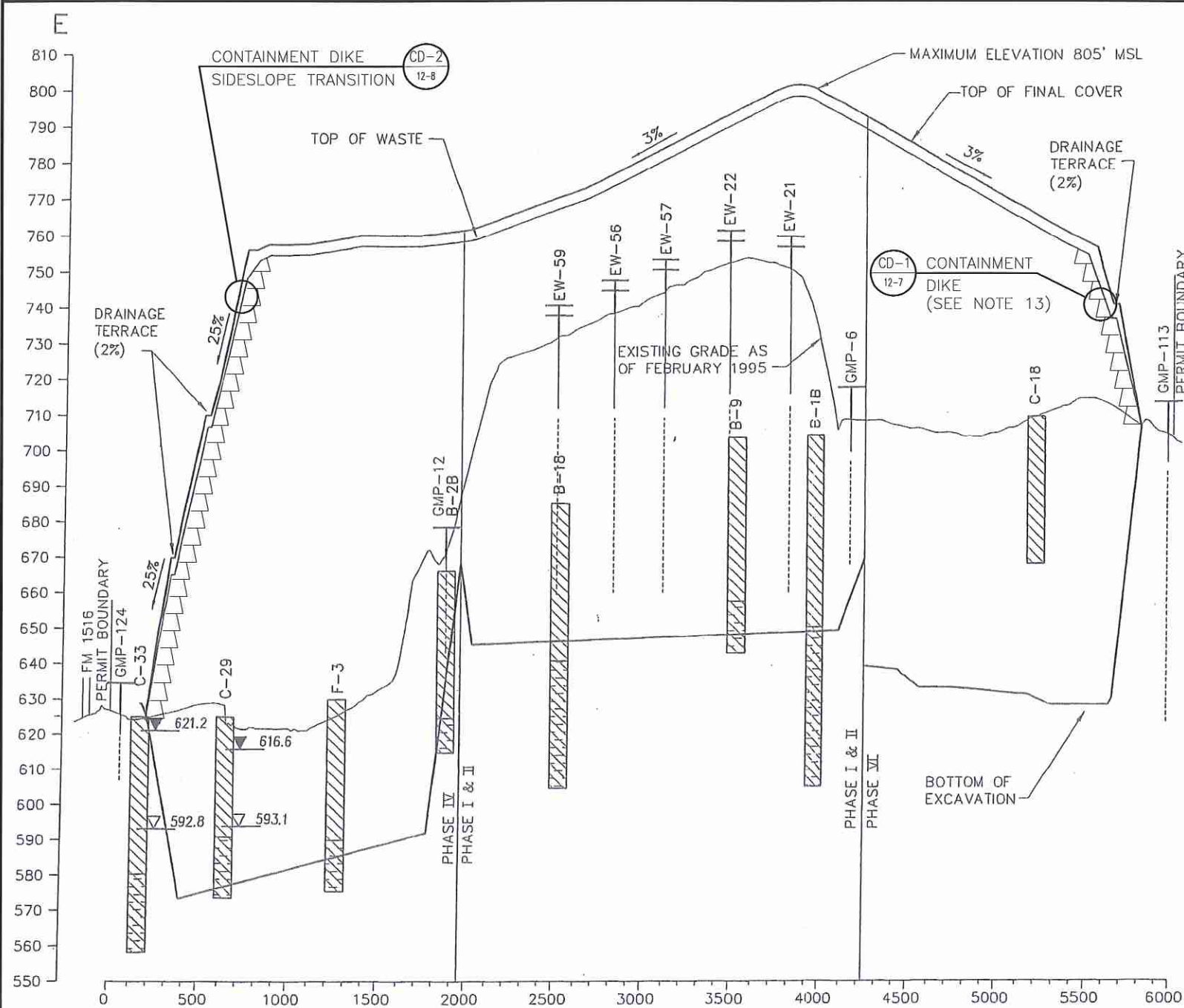
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10. MAXIMUM EXCAVATION 573' MSL IN PHASE IV.
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DATE: 04/2005 FILE: 0120-109-11 CAD: 7-6 SEC D-D.DWG	DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM	REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>PERMIT MODIFICATION</td> </tr> </tbody> </table>	NO.	DATE	DESCRIPTION	1	12/2011	PERMIT MODIFICATION	TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS <b>Weaver Boos Consultants</b> TBPE REGISTRATION NO. F-3727
NO.	DATE	DESCRIPTION							
1	12/2011	PERMIT MODIFICATION							
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O:\0120\109\CLASS 1 WASTE MOD\CLEAN\ATT 7\FIG 7-6\_SEC D-D.dwg\_jwilson



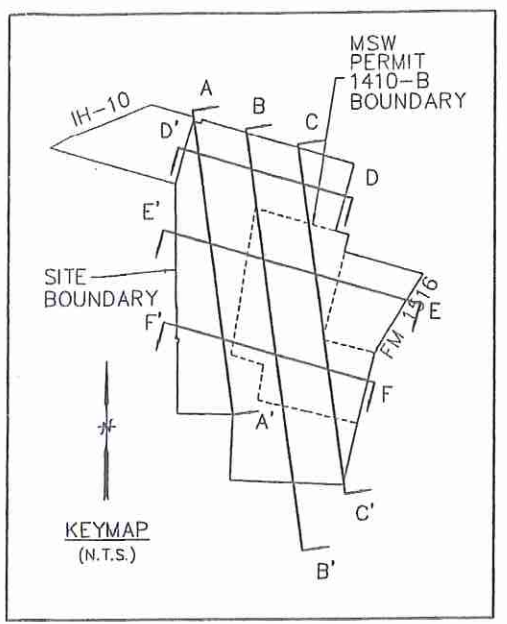
CROSS SECTION E-E'

SCALE:  
 1" = 800' HORIZONTAL  
 1" = 40' VERTICAL

- LEGEND**
- CLAY
  - CLAY SHALE
  - GAS PROBES
  - GAS EXTRACTION WELLS

▼ 621.2 STATIC PIEZOMETRIC MONITOR WELL OR PIEZOMETER GROUNDWATER LEVEL OBSERVED 12 MAY 1995; OR STATIC BORING LEVEL OBSERVED BEFORE PLUGGING

▽ 592.8 APPARENT INITIAL GROUNDWATER LEVEL OBSERVED DURING DRILLING



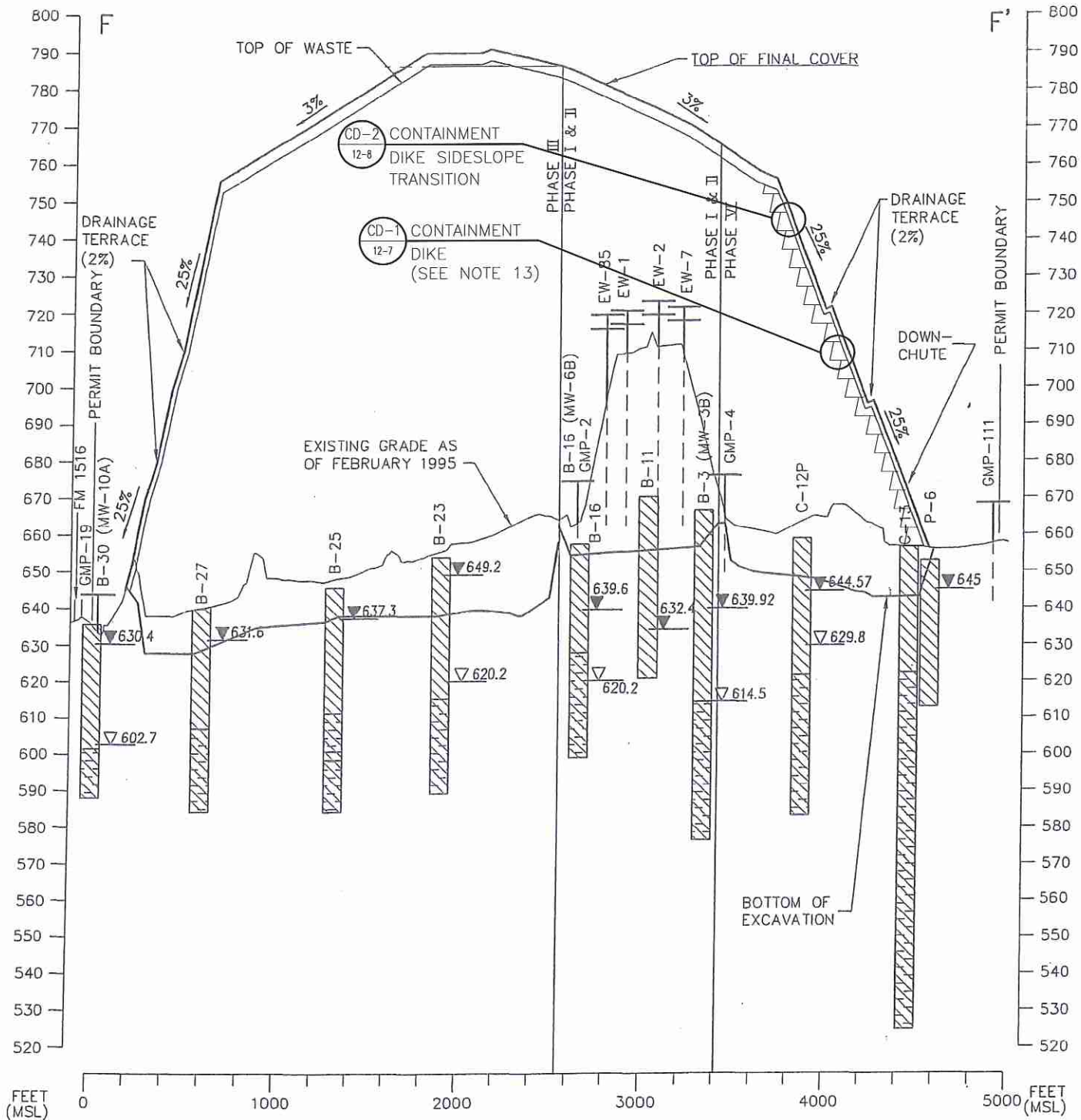
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DATE: 04/2005 FILE: 0120-109-11 CAD: 7-7 SEC E-E.DWG		DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM		TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS							
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O:\0120\109\CLASS 1 WASTE\_MDI\CLEAN\ATT 7\FIG 7-7\_SEC E-E.dwg\_jwilson

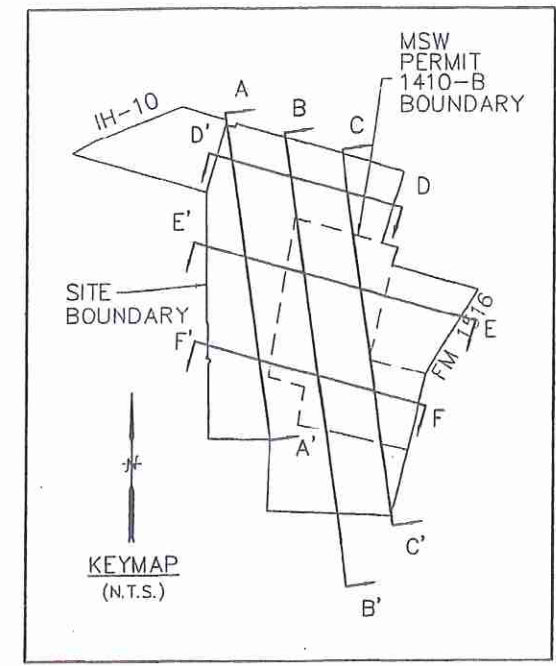


SCALE  
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CROSS SECTION F-F'

- NOTES**
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FORT WORTH, TX GRAND RAPIDS, MI SOUTH BEND, IN RIVERSIDE, MO		GRAND RAPIDS, MI SPRINGFIELD, IL CLEARMONT, FL		<b>FIGURE 7-8</b>	

O:\0120\109\CLASS 1 WASTE MOD\CLEAN\ATT 7\FIG 7-8\_SEC F-F.dwg, jmwilson

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

**PERMIT MODIFICATION**

**ATTACHMENT 8  
COST ESTIMATE FOR CLOSURE  
AND POSTCLOSURE CARE**

Prepared for

BFI Waste Systems of North America, LLC

January 2004

Revised April 2007

Revised January 2008

Revised April 2009

Revised November 2009

Revised December 2011



Prepared by

**Weaver Boos Consultants, LLC-Southwest**  
TBPE Registration No. F-3727  
6420 Southwest Blvd, Suite 206  
Fort Worth, Texas 76109  
817-735-9770

Project No. 0120-109-11-54-01

## CONTENTS

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8-2	CLOSURE COST ESTIMATE	8-2
8-3	POSTCLOSURE CARE COST ESTIMATE	8-5
8-4	COST ESTIMATE ADJUSTMENTS	8-7



## 8-2 CLOSURE COST ESTIMATE

---

This cost estimate shows the cost of hiring a third party to close the largest area ever requiring closure at any time during the active life of the landfill. The closure cost estimate includes: 1) engineering costs required to administratively close the facility; 2) construction costs involved with the construction of the final cover system, the landfill gas system, and other activities required to close the facility, and 3) contingencies and other administrative costs that may be incurred during closure activities. A summary of closure cost estimate is presented on Table 1. The costs will be adjusted annually as indicated in Section 4. An assessment will be completed each year to verify that the Closure Cost Estimate shown in Table 1 is consistent with the current permit conditions and the projected permit conditions for the upcoming 12-month period. The assessment will verify that the closure costs are based on the current active area and that all other permit conditions are addressed by the Closure Cost Estimate (e.g., the number of groundwater monitor wells and landfill gas probes in the estimate match the wells and probes that are either in-place or need to be installed to match the number of wells and probes listed in the permit for the current phase of development). The estimates will be updated, as needed, consistent with the procedures noted in Section 4. Additional information regarding the closure cost estimate is summarized below.

### 8-2.1 Engineering Costs

The existing costs are based on closing the largest area scheduled to receive final cover, which is 250.2 acres. A boundary survey will be required for the filing of the affidavit of closure, deed recording of any area of the site that has received waste, and publishing the public notice of closure activities. A topographic survey will be required to determine the existing height and top slope of the landfill so that permit compliance can be evaluated and the final closure system, drainage system, and final grading can be engineered. An inspection of the site is included to identify any disposal areas requiring closure, drainage and erosion protection improvements, and identify any potential regulatory deficiencies. The engineering costs include the cost to develop construction plans and closure schedules, closure testing and inspections, and permit document preparation. In addition, administration costs (i.e. for construction contracts) have also been included.

### 8-2.2 Construction Costs

As shown on Figure 1, construction costs include construction of the final cover system drainage improvements, and LFG system improvements for the 250.2-acre area. The final cover system consists of an 18-inch-thick infiltration layer (clay cap) or 4-foot-thick in above grade Class 1 areas, a flexible membrane cover, a geocomposite

drainage layer, and an erosion layer consisting of 18 inches of earthen material capable of sustaining plant growth. The construction costs include site grading and drainage including the final grading of the site, drainage improvements, and erosion and sedimentation controls for proper closure of the site. Since the landfill gas extraction system has been installed in the 250.2-acre area, the construction costs for this line item are based on the extending the gas wells above the top of final cover.

Additionally, a cost to decommission the 5.6-acre solar energy system test area and prepare the intermediate cover for final cover placement in the test area has been added as a line item to the construction costs.

**TABLE 8-1  
TESSMAN ROAD LANDFILL - CLOSURE COST**

Area Requiring Final Cover	250.2	ac	Infiltration Layer Thickness	1.5	ft (Pre-Sub D)
Composite Topslope Area	184.8	ac	Infiltration Layer Thickness	1.5	ft (Sub D Area)
Composite Sideslope Area	65.4	ac	Infiltration Layer Thickness	4.0	ft (Above-Grade Class 1 Area)
Pre Subtitle D Area	129.0	ac	Erosion Layer Thickness	1.5	ft (Pre-Sub D)
Above-Grade Class 1 Area	3.0	ac	Erosion Layer Thickness	1.5	ft (Sub D Area)
			Erosion Layer Thickness	1.5	ft (Above-Grade Class 1 Area)

Description	Quantity	Unit	Unit Cost	1998 Total Cost	Inflation Factor <sup>1</sup>	2011 Total Cost
<b>1.0 ENGINEERING</b>						
1.1 Topographic Survey	250.2	AC	\$ 278	\$ 70,000	1.295	\$ 90,650
1.2 Boundary Survey for Affidavit	16,000	LF	\$ 0.89	\$ 14,000	1.295	\$ 18,130
1.3 Site Evaluation	250.2	AC	\$ 750	\$ 188,000	1.295	\$ 243,460
1.4 Development of Plans	200	HOURS	\$ 80	\$ 16,000	1.295	\$ 20,720
1.5 Construction Administration, Bidding & Award	375	HOURS	\$ 80	\$ 30,000	1.295	\$ 38,850
1.6 Admin. Cost for Certification of Final Cover and Affidavit to the Public	120	HOURS	\$ 65	\$ 8,000	1.295	\$ 10,360
1.7 Project Management, Construction Observation and Testing	250.2	AC	\$ 1,000	\$ 250,200	1.295	\$ 324,009
<b>ENGINEERING SUBTOTAL</b>				\$ 576,200		\$ 746,179
<b>CONTINGENCY</b>	1	10%		\$ 57,620		\$ 74,618
<b>ENGINEERING TOTAL</b>				\$ 634,000		\$ 820,797
<b>2.0 CONSTRUCTION</b>						
2.1 Final Cover System						
2.1.1a Soil Placement (1.5 ft-thick)	598,224	CY	\$ 2.00	\$ 1,196,000	1.295	\$ 1,548,820
2.1.1b Soil Placement (4.0 ft-thick) <sup>7</sup>	19,360	CY	\$ 2.00	\$ 39,000	1.295	\$ 50,505
2.1.1c Soil Processing	617,584	CY	\$ 2.00	\$ 1,235,000	1.295	\$ 1,599,325
2.1.2 Flexible Membrane Cover	10,898,712	SF	\$ 0.32	\$ 3,488,000	1.295	\$ 4,516,960
2.1.3 Geonet/Geotextile Composite	65.4	AC	\$ 15,200	\$ 994,000	1.295	\$ 1,287,230
2.2 Erosion Layer Placement	250.2	AC	\$ 4,030	\$ 1,008,000	1.295	\$ 1,305,360
2.3 Revegetation	250.2	AC	\$ 1,000	\$ 250,000	1.295	\$ 323,750
2.4 Site Grading and Drainage	250.2	AC	\$ 150	\$ 38,000	1.295	\$ 49,210
2.5 Completion of Gas Extraction System <sup>2,3,4</sup>	133	WELL	\$ 500	\$ 67,000	1.021	\$ 68,407
2.6 Decommissioning 5.6-ac Solar Energy System <sup>5,6</sup>	1	LS	\$ 30,000	\$ 30,000	1.163	\$ 34,890
<b>CONSTRUCTION SUBTOTAL</b>				\$ 8,345,000		\$10,784,457
<b>CONTINGENCY</b>	1	10%		\$ 835,000		\$ 1,078,446
<b>CONSTRUCTION TOTAL</b>				\$ 9,180,000		\$11,862,903
<b>3.0 CONTRACT PERFORMANCE BOND</b>	\$64,720 + \$6/1,000	THOUSANDS	9,180	\$ 120,000	1.295	\$ 155,400
<b>TOTAL CLOSURE COST</b>				\$ 9,934,000		\$12,839,100

<sup>1</sup>Inflation factor is the product of the inflation factors for each year between 1998 and 2011.

<sup>2</sup>Completion of landfill gas extraction system only requires the existing wells be extended above final cover. All existing piping and connections will be sufficient to accommodate final cover construction. No additional gas extraction wells are required.

<sup>3</sup>12 total LFG wells were added in 2011. Therefore, the new total at the site of existing wells is 133.

<sup>4</sup>The inflation factor for this line item only is the product of the inflation factors for each year between 2004 and 2011. This is due to this not becoming a line item until the 2004 permit modification.

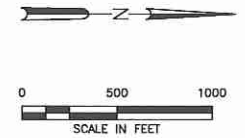
<sup>5</sup>Decommissioning the 5.6-ac Solar Energy System includes removal of geomembrane, solar panels, and associated electrical wiring. Preparation of intermediate cover for final cover placement is also included.

<sup>6</sup>The inflation factor for this line item only is the product of the inflation factors for each year between 2009 and 2011. This is due to this not becoming a line item until the 2009 permit modification.

<sup>7</sup>Assumed 3.0 acres of above grade Class 1 will be placed in 2012 and will require 4 feet of infiltration layer.



0:\0120\109\CLASS 1 WASTE MOD\CLEAN\ATT 8\FIG-1 SITE PLAN.dwg, jwilson



**LEGEND:**

- PERMIT BOUNDARY
- E 2211500 --- SITE GRID
- - - - - LIMIT OF REFUSE
- GMP-101 EXISTING GAS MONITOR PROBE
- ⊙ W043 EXISTING LFG EXTRACTION WELL
- EXISTING LFG COLLECTION PIPING
- ⊙ MW-15 EXISTING GROUNDWATER MONITOR WELL
- ACTIVE FILL AREA REQUIRING CLOSURE

NOTES:  
 1. CONTOURS AND ELEVATIONS DEVELOPED BY COOPER AERIAL SURVEYS CO. FROM AERIAL PHOTOGRAPHY FLOWN JANUARY 21, 2011.



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DATE: 01/2004 FILE: 0120-109-10 CAD: FIGURE 1.dwg		REVISIONS	
DRAWN BY: SRF DESIGN BY: BJL REVIEWED BY: JPY	NO.	DATE	DESCRIPTION
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	2	12/2007	UPDATED CELL CONSTRUCTION FOR 2007.
	3	03/2009	UPDATED CELL CONSTRUCTION FOR 2008, ADDED NEW GAS SYSTEM CONFIGURATION, AND ADDED MONITORING WELLS.
	4	12/2011	PERMIT MODIFICATION

**SITE PLAN**

TESSMAN ROAD LANDFILL  
 BEXAR COUNTY, TEXAS

*Weaver Boos Consultants*

CHICAGO, IL    NAPERVILLE, IL    FORT WORTH, TX    GRIFFITH, IN  
 COLUMBUS, OH    EDWARDS, CO    (817) 735-5770    SOUTH BEND, IN    SPRINGFIELD, IL    ST. LOUIS, MO

**FIGURE 1**

### 8-3 POSTCLOSURE CARE COST ESTIMATE

---

The postclosure care period has been established by TCEQ regulations to be 30 years. This detailed cost estimate shows the cost of hiring a third party to conduct routine maintenance and monitoring during the postclosure period. During this period, continuous maintenance must be ongoing to assure the integrity and effectiveness of the final cover system, monitoring systems, leachate collection system, drainage system, and landfill gas system. A summary of postclosure cost estimate is presented on Table 2. An assessment will be completed each year to verify that the Postclosure Cost Estimate shown in Table 2 is consistent with the current permit conditions and the projected permit conditions for the upcoming 12-month period. The assessment will verify that the postclosure costs are based on the current active area and that all other permit conditions are addressed by the Postclosure Cost Estimate (e.g., verify the LFG O&M cost estimate is updated to match the number of wells that will need to be maintained during the postclosure period). The costs will be adjusted annually as indicated in Section 4.

As shown in Table 2, engineering postclosure estimates include the cost of annual site inspections, corrective plans and specifications, and site compliance monitoring. The estimates are based on the largest area with waste in-place to be closed which is 250.2 acres. Site inspections will be performed annually and will include identification of areas experiencing settlement or subsidence, identification of erosion or other drainage-related problems, and inspection of the leachate collection system, gas control and monitoring system, and the groundwater monitoring system. Correctional plans and specifications include the costs for an engineering consultant to prepare construction plans and specifications to correct problems identified during the site inspections. Gas monitoring and groundwater sampling and analysis will be performed as outlined in the postclosure plan.

Postclosure construction/maintenance estimates include the costs to correct problems determined by the engineering site inspections and as specified by the engineer's correctional plans and specifications. These costs will also include any ongoing site maintenance that is needed throughout the postclosure period. These costs include cover and drainage maintenance and annual seeding and mowing costs.

The leachate disposal costs include trucking, treatment and disposal costs from areas contributing to leachate generation (approximately 121.2 acres). Postclosure landfill gas control system O&M costs includes regular calibration and maintenance of regulatory equipment, such as valves and flow meters, associated system components of the active collection system and condensate disposal for the completely developed site.

**TABLE 8-2  
TESSMAN ROAD LANDFILL - POSTCLOSURE CARE COST**

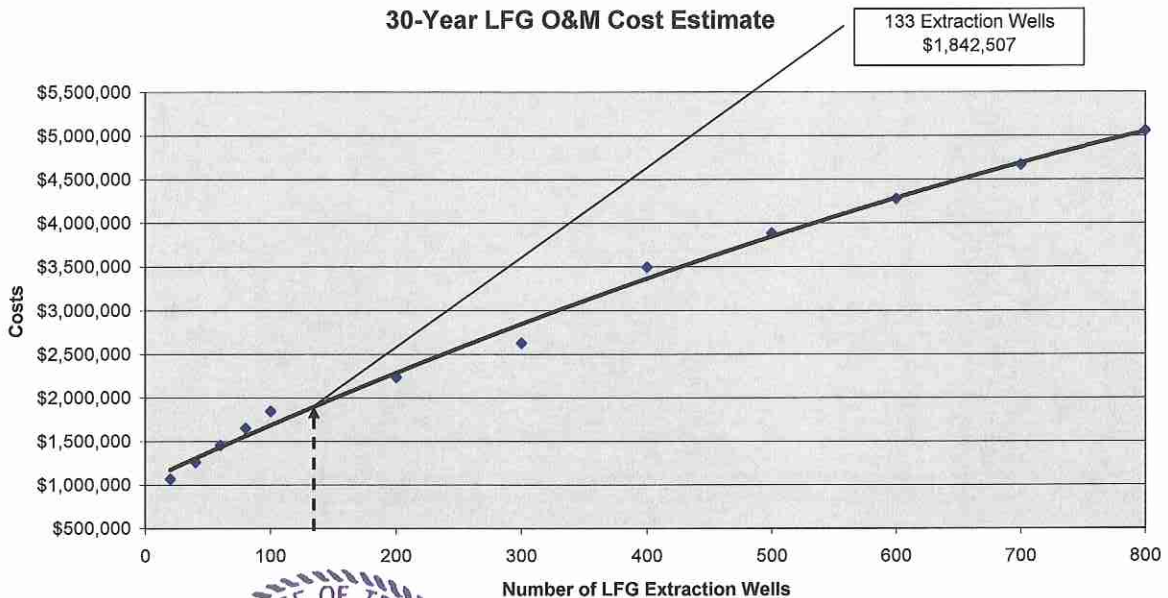
Permitted Waste Footprint	709.0 ac	Post Closure Care Period	30 yrs
Area with leachate collection system	121.2 ac	LFG Extraction Wells	133 wells
Groundwater Monitoring Wells	16 wells	Gas Monitoring Events	4 /yr
Area Requiring Final Cover	250.2 ac	GW Monitoring Events	2 /yr

Description	Quantity	Unit	Unit Cost	Annual Cost	1998 Total Cost	Inflation Factor <sup>1</sup>	2011 Total Cost
<b>1.0 ENGINEERING</b>							
1.1 Postclosure Care Plan	250.2	ACRE	\$ 125	\$ 31,000	\$ 31,000	1.295	\$ 40,145
1.2 Site Inspection and Recordkeeping (annual)	250.2	ACRE	\$ 20	\$ 5,004	\$ 150,000	1.295	\$ 194,250
1.3 Correctional Plans and Specifications (annual)	1	LS	\$10,000	\$ 10,000	\$ 300,000	1.295	\$ 388,500
1.4 Site Monitoring							
1.4.1 Groundwater Monitoring (semiannual)	16	WELLS	\$ 1,050	\$ 16,800	\$ 504,000	1.295	\$ 652,680
1.4.2 Gas Monitoring (quarterly)	4	YR	\$ 600	\$ 2,400	\$ 72,000	1.295	\$ 93,240
1.5 LFG System Operation & Maintenance <sup>3</sup>	1	LS	See Graph Below		\$ 1,842,507	1.021	\$ 1,881,200
1.6 Cover Maintenance and Mowing	250.2	YR	\$ 65	\$ 16,263	\$ 488,000	1.295	\$ 631,960
<b>ENGINEERING SUBTOTAL</b>					\$ 3,388,000	1.295	\$ 4,387,460
<b>2.0 CONSTRUCTION / MAINTENANCE</b>	250.2	AC	\$ 200	\$ 50,000	\$ 1,500,000	1.295	\$ 1,942,500
<b>3.0 LEACHATE DISPOSAL/MAINTENANCE</b>	121.2	AC	\$180.00	\$ 21,816	\$ 654,480	1.295	\$ 847,552
<b>SUBTOTAL</b>					\$ 5,542,480	1.295	\$ 7,177,512
<b>4.0 CONTINGENCY</b>	1	10%			\$ 554,248	1.295	\$ 717,751
<b>TOTAL POSTCLOSURE CARE COST</b>					\$ 6,096,728		\$ 7,895,263

<sup>1</sup>Inflation factor is the product of the inflation factors for each year between 1998 and 2011.

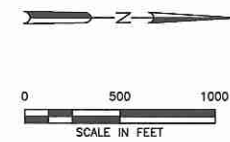
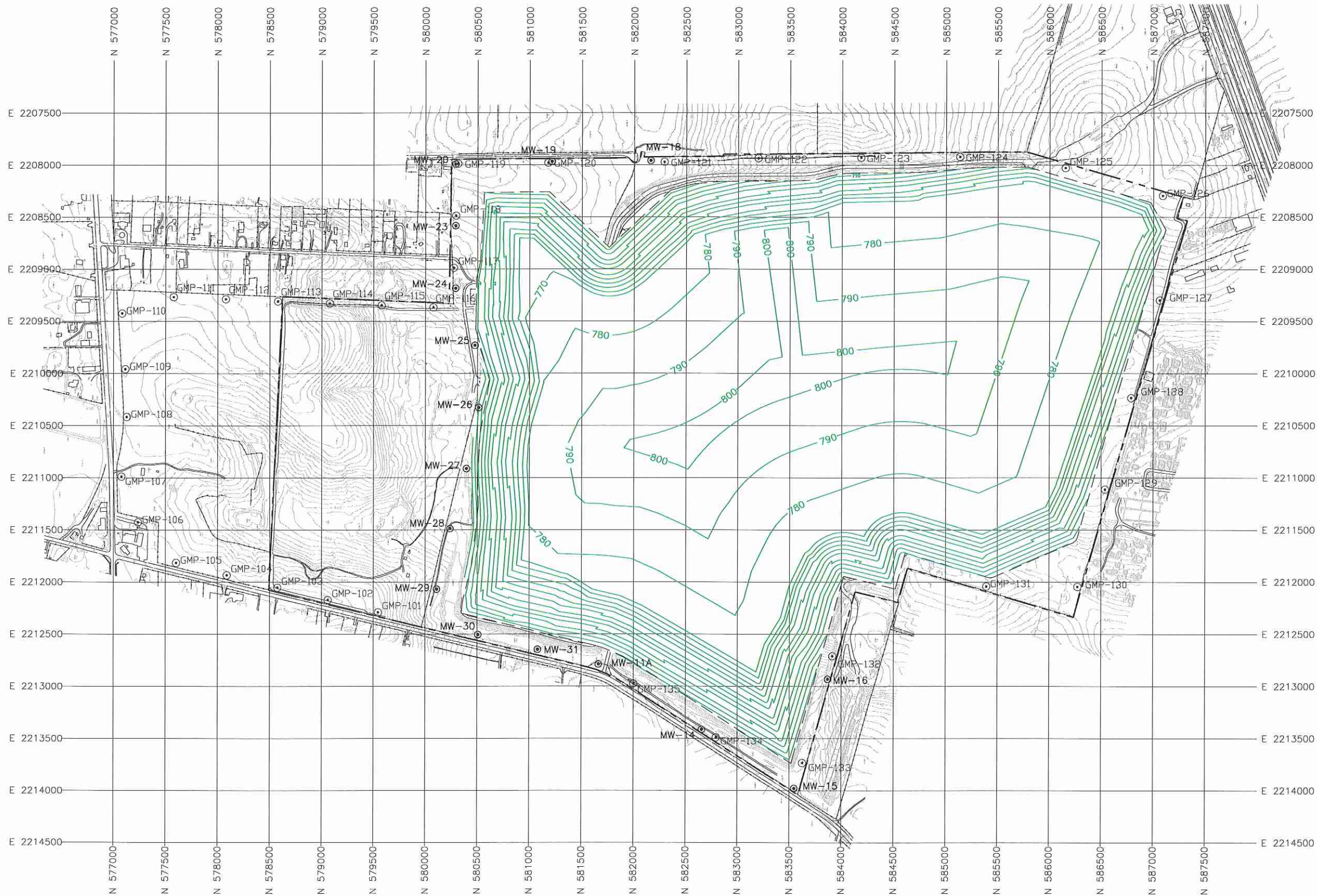
<sup>2</sup>Refer to the Figure shown below for additional information regarding how the LFG System Maintenance costs are estimated.

<sup>3</sup>The inflation factor for this line item only is the product of the inflation factors for each year between 2004 and 2011. This is due to this not becoming a line item until the 2004 permit modification.



◆ Estimated O&M Cost Data

*B. J. Largent*  
12-21-11



- LEGEND:**
- PERMIT BOUNDARY
  - LIMIT OF REFUSE
  - E 221150 --- SITE GRID
  - 770--- FINAL COVER CONTOUR (SEE NOTE 2)
  - GMP-101 EXISTING GAS MONITOR PROBE
  - MW-15 EXISTING GROUNDWATER MONITOR WELL

- NOTES:**
1. CONTOURS AND ELEVATIONS DEVELOPED BY COOPER AERIAL SURVEYS CO. FROM AERIAL PHOTOGRAPHY FLOWN JANUARY 21, 2011.
  2. FINAL COVER CONTOURS REPRODUCED FROM THE PERMIT MODIFICATION TO REVISE FINAL COVER TOP SLOPES AND EXCAVATION GRADES PREPARED BY ASSOCIATED CONSULTING ENGINEERS INC. IN MAY 2008.



O:\0120\108\CLASS 1 WASTE MOD\CLEAN\ATT 8\FIGURE 2.DWG, jwilson

<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY: _____		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>FINAL COVER PLAN</b>  TESSMAN LANDFILL BEXAR COUNTY, TEXAS  <i>Weaver Boos Consultants</i>																			
DATE: 1/2004 FILE: 0120-109-10 CAD: FIGURE 2.dwg		DRAWN BY: SRF DESIGN BY: BAJ REVIEWED BY: JPY				<table border="1"> <thead> <tr> <th colspan="3">REVISIONS</th> </tr> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>04/2007</td> <td>UPDATED TOPO, FINAL COVER CONTOURS, LIMITS OF WASTE, AND PERMIT BOUNDARY.</td> </tr> <tr> <td>2</td> <td>12/2007</td> <td>UPDATED TOPO</td> </tr> <tr> <td>3</td> <td>03/2009</td> <td>UPDATED TOPO, FINAL COVER CONTOURS AND ADDED NOTE 2, AND ADDED MONITORING WELLS.</td> </tr> <tr> <td>4</td> <td>12/2011</td> <td>PERMIT MODIFICATION</td> </tr> </tbody> </table>		REVISIONS			NO.	DATE	DESCRIPTION	1	04/2007	UPDATED TOPO, FINAL COVER CONTOURS, LIMITS OF WASTE, AND PERMIT BOUNDARY.	2	12/2007	UPDATED TOPO	3	03/2009	UPDATED TOPO, FINAL COVER CONTOURS AND ADDED NOTE 2, AND ADDED MONITORING WELLS.	4
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					<b>FIGURE 2</b>																		

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

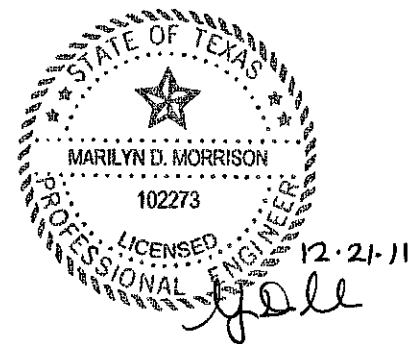
**PART III  
ATTACHMENT 12  
FINAL CLOSURE PLAN**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999

Revised December 2011



Prepared by

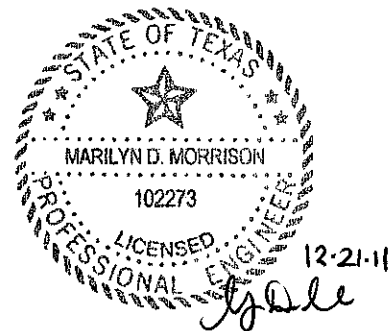
**Weaver Boos Consultants, LLC—Southwest**  
TBPE Registration No. F-3727  
6420 Southwest Boulevard, Suite 206  
Fort Worth, Texas 76109  
(817) 735-9770

Project No. 0120-109-11-54-01

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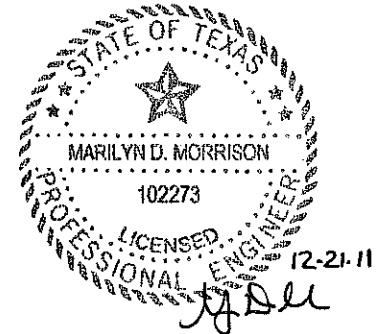


## LIST OF FIGURES

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### FIGURE

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12-1B	FINAL CONTOUR MAP (NORTH)
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12-4	FINAL COVER SYSTEM DETAILS
12-5	AFFIDAVIT TO THE PUBLIC
12-6	CLASS 1 WASTE DISPOSAL AREA OPTIONS
12-7	CLASS 1 WASTE CONTAINMENT DIKE DETAILS
12-8	CLASS 1 WASTE CONTAINMENT DIKE/FINAL COVER TIE-IN DETAIL
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12-1	LARGEST AREA SCHEDULED TO RECEIVE FINAL COVER AT A GIVEN TIME
12-2	DETAILED CLOSURE COST ESTIMATE

## 2.0 LANDFILL FINAL COVER SYSTEM

### 2.1 REGULATORY REQUIREMENTS

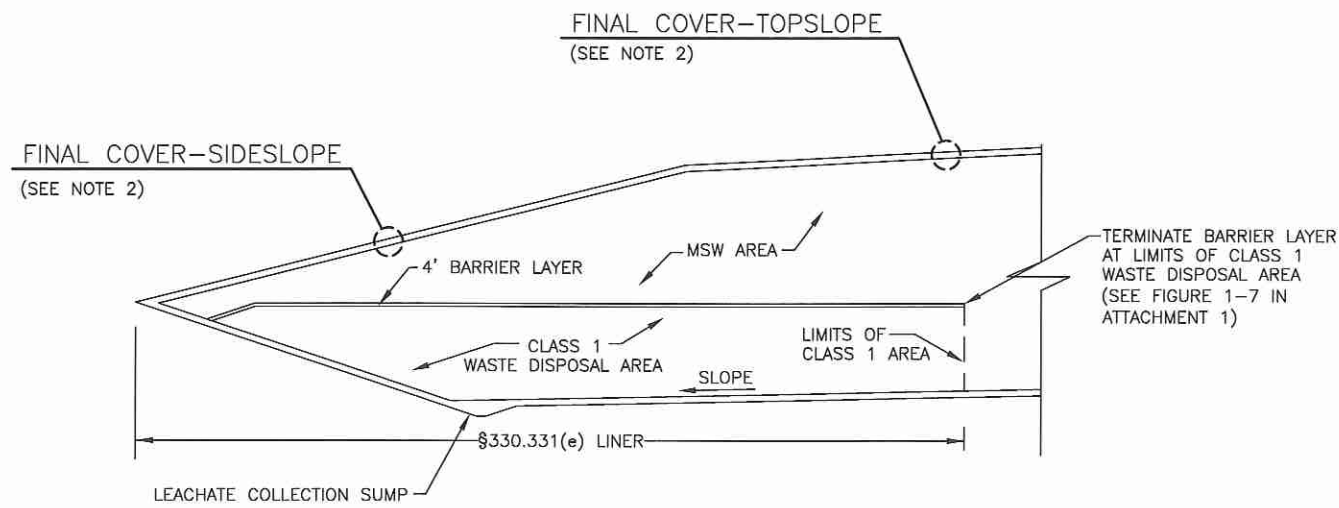
The Subtitle D final cover requirements vary according to the characteristics of the underlying liner. Alternate final cover designs may also be approved by the TCEQ with proper demonstration of equivalency. The regulatory cover requirements are presented in the following paragraphs.

#### 2.1.1 Standard Final Cover Design

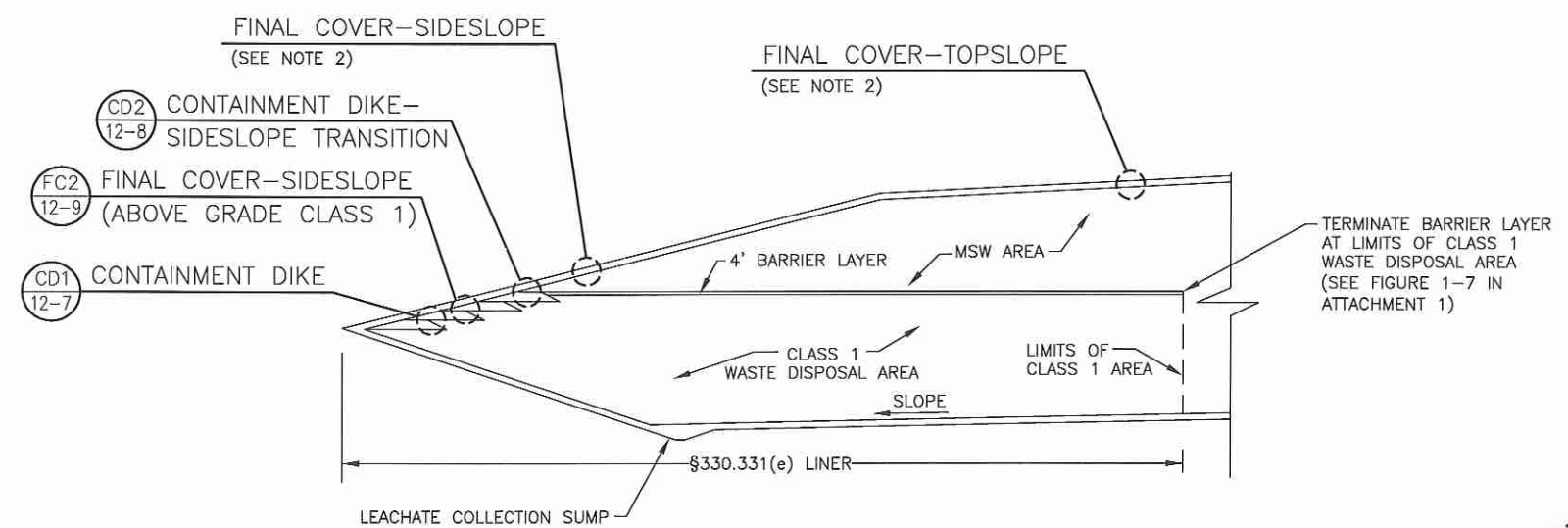
The infiltration layer shall consist of a minimum of 18 inches of earthen material with a coefficient of permeability no greater than  $1 \times 10^{-5}$  cm/sec. However, where Class 1 waste is filled above grade, the thickness of the infiltration layer that is located adjacent to the Class 1 disposal area will be increased to 4 feet with a coefficient of permeability no greater than  $1 \times 10^{-7}$  cm/sec. Each infiltration layer option will be overlain by a synthetic membrane consisting of HDPE, VLDPE, LLDPE, PVC, or equivalent with a minimum thickness of 20 mils in accordance with TCEQ regulations. On the steeper side slopes (25% grade, maximum) a drainage layer consisting of sand, geonet, or geocomposite shall be provided to overlay the synthetic membrane layer. For the geonet or geocomposite option, a 12-inch thick soil cover layer will be placed on top of the geonet or geocomposite for protection against damage from construction equipment. On the flatter top slopes where a drainage layer will not be used, a 12-inch thick soil cover layer will be placed on top of the synthetic membrane for protection. The uppermost layer of the final cover system shall be an erosion layer which consists of a minimum of six inches of earthen material that is capable of sustaining native plant growth. The erosion layer shall be seeded or sodded following the application of the final cover in order to minimize erosion. Details of this final cover system are shown on Figures 12-2, 12-3, and 12-4.

#### 2.1.2 Alternative Final Cover Design

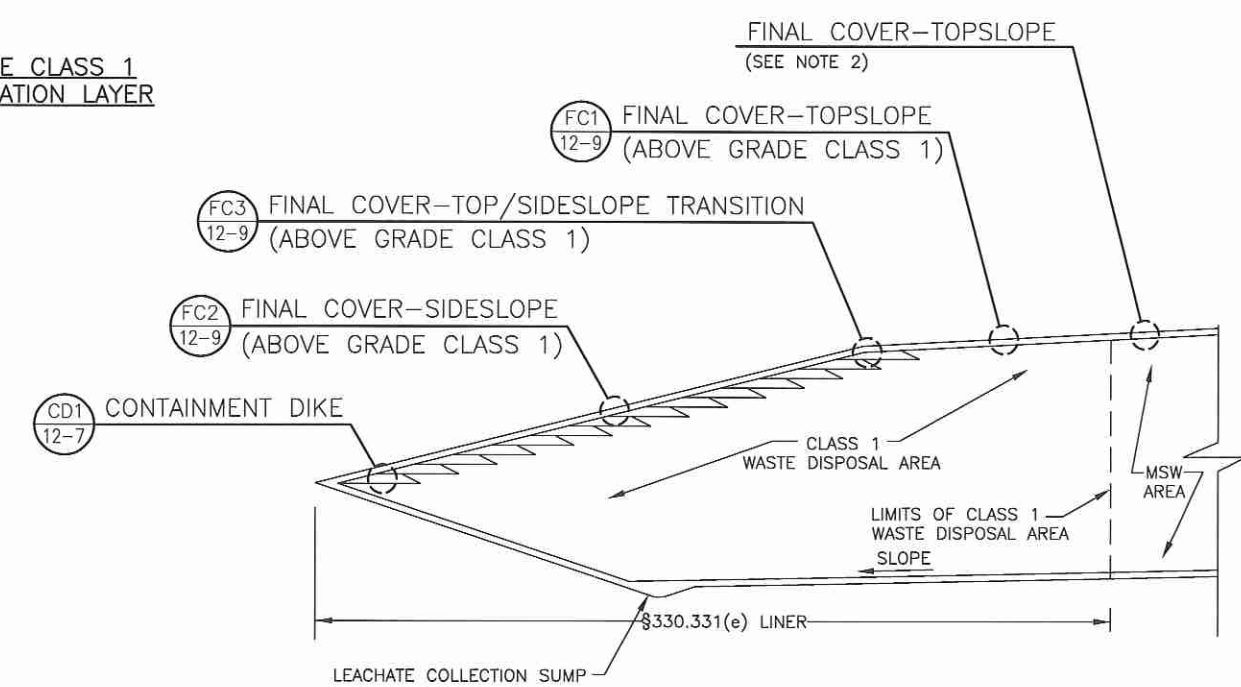
According to the MSWR, the TCEQ may approve an alternative final cover design that includes an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified in previous sections above and an erosion layer that provides equivalent protection from wind and water erosion as the erosion layer also specified above. A geosynthetic clay liner (GCL) is proposed as an alternate infiltration layer for the final cover as



OPTION 1 - BELOW GRADE CLASS 1 DISPOSAL AREA WITH SEPARATION LAYER



OPTION 2 - ABOVE GRADE CLASS 1 DISPOSAL AREA WITH SEPARATION LAYER



OPTION 3 - ABOVE GRADE CLASS 1 DISPOSAL AREA



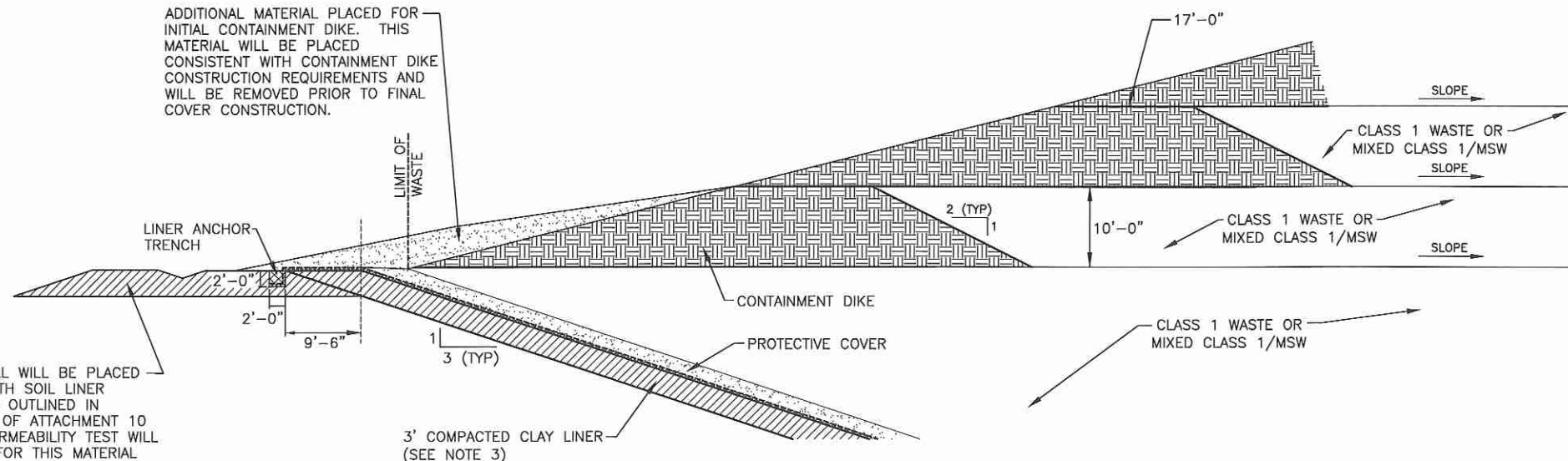
- NOTES:
- CLASS 1 WASTE AND CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE ARE USED INTERCHANGEABLY.
  - TYPICAL AND ALTERNATIVE COMPOSITE FINAL COVER DETAILS ARE PROVIDED ON FIGURES 12-2 THROUGH 12-4.

<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY:	PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>CLASS 1 WASTE DISPOSAL AREA OPTIONS</b>  TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS  <i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727													
	DATE: 11/2011 FILE: 0120-81-11 CAD: 12-6_DETAILS.DWG	DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY			REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>PERMIT MODIFICATION</td> </tr> </tbody> </table>		NO.	DATE	DESCRIPTION	1	12/2011	PERMIT MODIFICATION				
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CHICAGO, IL	FORT WORTH, TX	GRAND RAPIDS, MI														
NAPERVILLE, IL	EVANSVILLE, IN	SOUTH BEND, IN														
COLUMBUS, OH	RIVERSIDE, MO	SPRINGFIELD, IL														
DENVER, CO	CLEARMONT, FL															

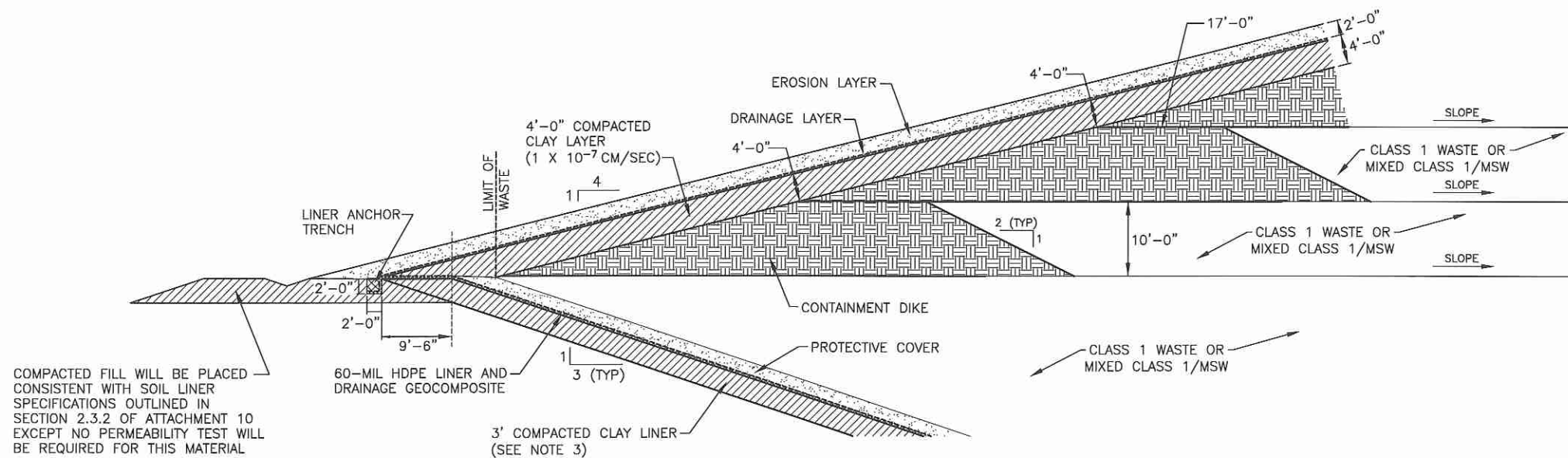
O:\0120\109\CLASS 1 WASTE MOD\CLEAN\ATT 12\12-6\_DIKE DETAILS.dwg, jwilson

ADDITIONAL MATERIAL PLACED FOR INITIAL CONTAINMENT DIKE. THIS MATERIAL WILL BE PLACED CONSISTENT WITH CONTAINMENT DIKE CONSTRUCTION REQUIREMENTS AND WILL BE REMOVED PRIOR TO FINAL COVER CONSTRUCTION.

COMPACTED FILL WILL BE PLACED CONSISTENT WITH SOIL LINER SPECIFICATIONS OUTLINED IN SECTION 2.3.2 OF ATTACHMENT 10 EXCEPT NO PERMEABILITY TEST WILL BE REQUIRED FOR THIS MATERIAL



CONTAINMENT DIKE CD1A  
2-THROUGH 2-6, 7-3 THROUGH 7-8 12-7  
SCALE 0 10 20 IN FEET



CONTAINMENT DIKE CD1B  
2-THROUGH 2-6, 7-3 THROUGH 7-8 12-7  
SCALE 0 10 20 IN FEET

**CONTAINMENT DIKE CONSTRUCTION REQUIREMENTS**

- (REFER TO APPENDIX III-F OF THE SITE DEVELOPMENT PLAN)
- DIKES WILL BE CONSTRUCTED OF CLAY-RICH SOILS UNDER THE DIRECTION OF THE LANDFILL MANAGER OR HIS DESIGNEE.
  - SOILS WILL BE PLACED IN MAXIMUM 9-INCH THICK LIFTS AND COMPACTED WITH A MINIMUM OF FOUR PASSES WITH A DOZER OR SIMILAR EQUIPMENT.
  - UPON COMPLETION OF EACH DIKE, A THIRD PARTY INDEPENDENT PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN TEXAS WILL CERTIFY THE INSTALLED DIKE IN ACCORDANCE WITH TITLE 30 TAC §335.590(24)(F)(vi) AND THE REQUIREMENTS INCLUDED IN APPENDIX III-F OF THE SDP PRIOR TO PLACEMENT OF WASTE. THE LICENSED ENGINEER WILL UTILIZE THE CURRENT VERSION OF THE STANDARD FORM INCLUDED IN §335.590(24)(F)(vi) FOR THE CERTIFICATION OF THE DIKE. THE CERTIFICATION PREPARED AND SIGNED BY THE ENGINEER WILL BE PLACED IN THE SITE OPERATING RECORD.

COMPACTED FILL WILL BE PLACED CONSISTENT WITH SOIL LINER SPECIFICATIONS OUTLINED IN SECTION 2.3.2 OF ATTACHMENT 10 EXCEPT NO PERMEABILITY TEST WILL BE REQUIRED FOR THIS MATERIAL

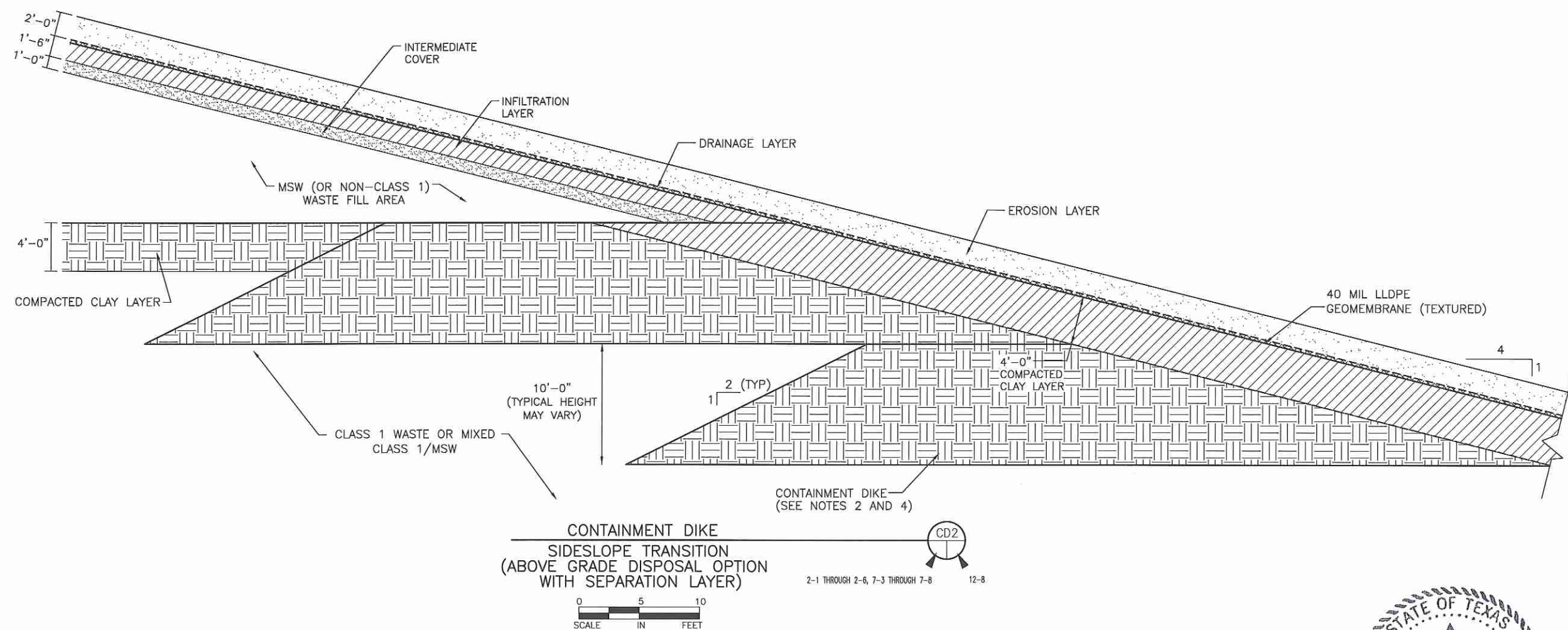


**NOTES:**

1. CLASS 1 WASTE WILL BE DISPOSED OF ABOVE COMPACTED PERIMETER BERM GRADES WHEN CONTAINMENT DIKES ARE CONSTRUCTED. REFER TO APPENDIX III-F FOR MORE INFORMATION.
2. CONTAINMENT DIKES WILL BE CONSTRUCTED IN AREAS WHERE THE DISPOSAL OF CLASS 1 WASTE WILL OCCUR ABOVE GRADE. THE CONTAINMENT DIKES WILL EXTEND ALONG THE BOTTOM OF FINAL COVER TO THE FINAL ELEVATION OF WASTE DISPOSAL.
3. ALL AREAS WHICH RECEIVE CLASS 1 WASTE WILL HAVE A LINER SYSTEM CONSTRUCTED IN COMPLIANCE WITH 30 TAC §330.331(e).
4. REFER TO APPENDIX III-F FOR INFORMATION REGARDING THE CONSTRUCTION OF CONTAINMENT DIKES.
5. EACH CONTAINMENT DIKE OPTION IS ONLY APPLICABLE FOR
  - (1) THOSE AREAS CONSTRUCTED IN ACCORDANCE WITH §330.331(e) AND
  - (2) THE ALLOWABLE ABOVE GRADE CLASS 1 DISPOSAL AREAS SHOWN ON FIGURE 1-12 IN ATTACHMENT 1.

<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY:		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>CLASS 1 WASTE CONTAINMENT DIKE DETAIL</b>  TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS  <i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727							
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FORT WORTH, TX EVANSVILLE, IN RIVERSIDE, MO		GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARMONT, FL		<b>FIGURE 12-7</b>							

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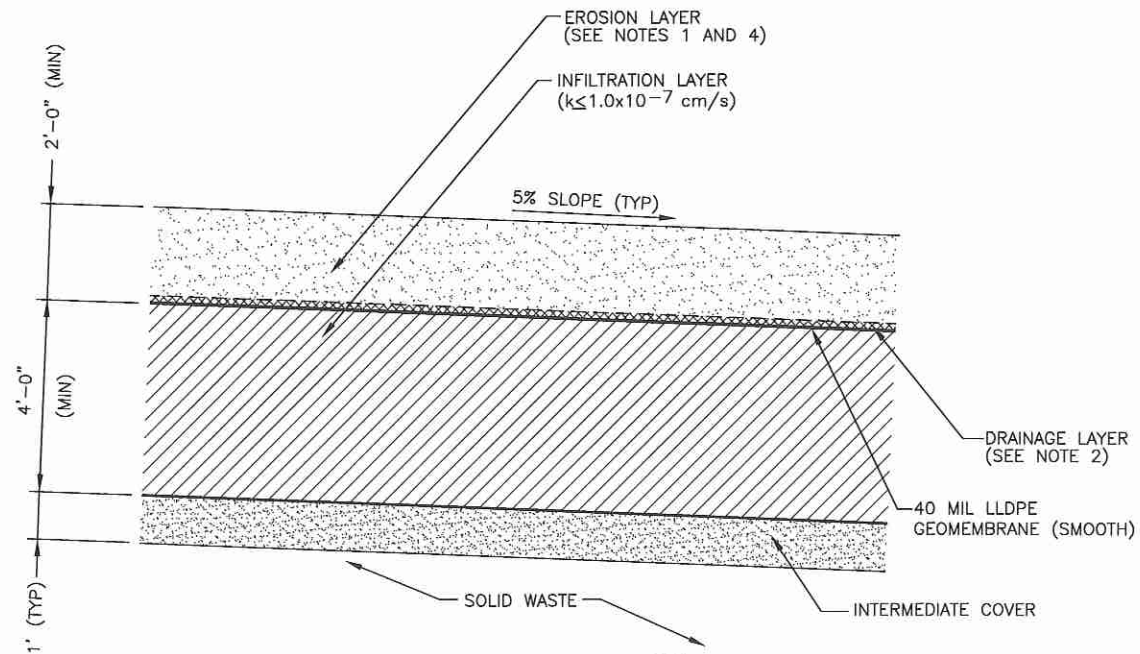


**NOTES:**

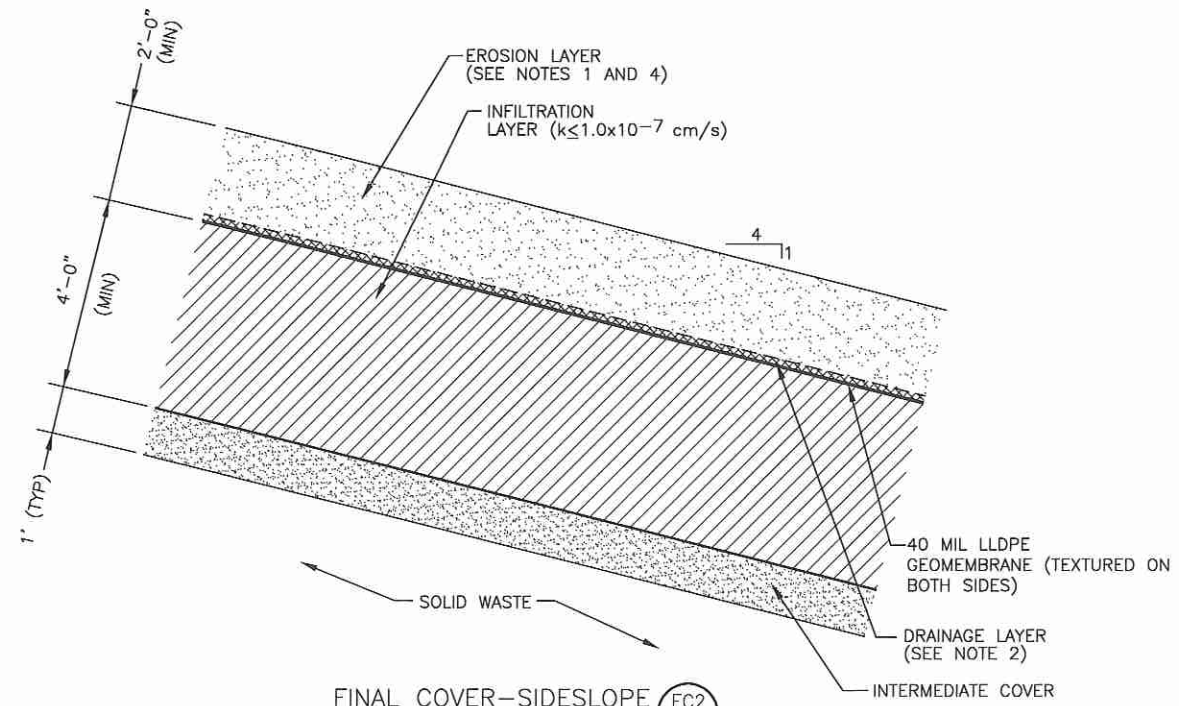
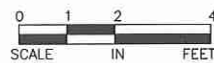
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4. REFER TO APPENDIX III-F FOR INFORMATION REGARDING THE CONSTRUCTION OF CONTAINMENT DIKES.



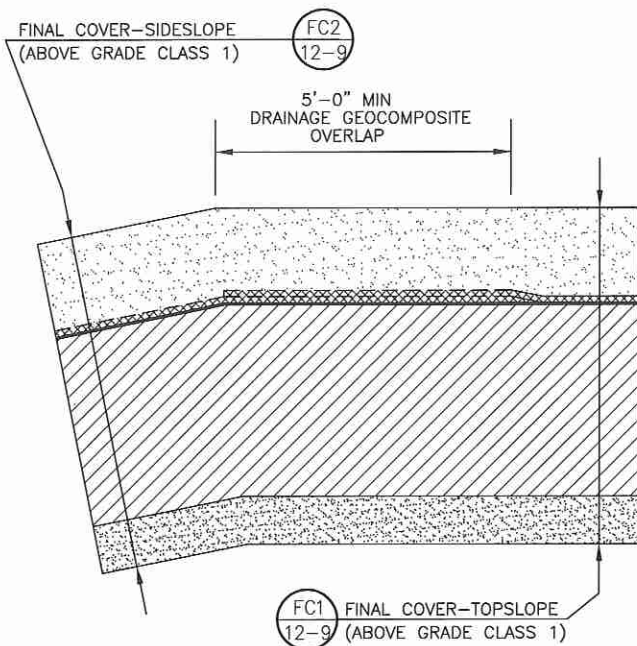
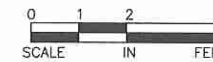
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COPYRIGHT © 2011 WEAVER BOOS CONSULTANTS, LLC - SOUTHWEST. ALL RIGHTS RESERVED.				<b>FIGURE 12-8</b>							



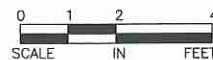
FINAL COVER-TOPSLOPE (FC1)  
(ABOVE GRADE CLASS 1) 12-9



FINAL COVER-SIDESLOPE (FC2)  
(ABOVE GRADE CLASS 1) 12-9



FINAL COVER-TOP/SIDESLOPE TRANSITION (FC3)  
(ABOVE GRADE CLASS 1) 12-9



NOTES:

- TOP 6" OF EROSION LAYER WILL BE CAPABLE OF SUSTAINING SELECTED VEGETATION.
- REFER TO FIGURE 12-2 FOR DRAINAGE LAYER INFORMATION.
- FINAL COVER COMPONENTS WILL BE CONSTRUCTED ACCORDING TO DETAILS SHOWN IN ATTACHMENT 12.
- EROSION LAYER MAY CONSIST OF BOTH ONSITE AND OFF-SITE SOILS. BORROW SOURCE TO BE SELECTED BY OWNER PRIOR TO CONSTRUCTION.



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DATE: 12/2011 FILE: 0120-109-11 CAD: 12-9 FINAL COVER DTLS.DWG		DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY		TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS							
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NO.	DATE	DESCRIPTION									
1	12/2011	PERMIT MODIFICATION									
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<b>FIGURE 12-9</b>											

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BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

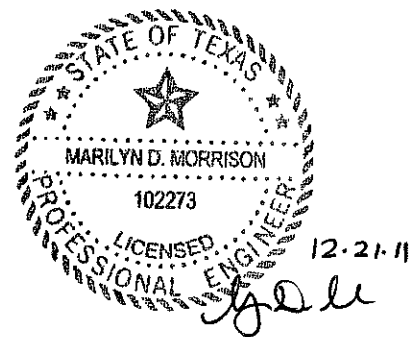
**PART III  
ATTACHMENT 15  
LEACHATE AND CONTAMINATED WATER PLAN**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999

Revised December 2011



Prepared by

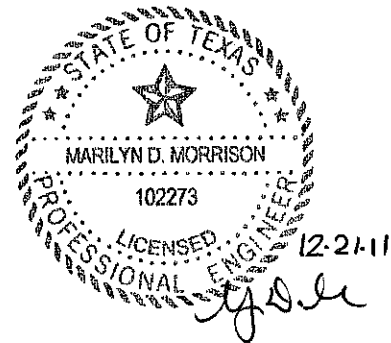
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6420 Southwest Boulevard, Suite 206  
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(817) 735-9770

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- Solidification of leachate and disposal of solidified material in the landfill.

Initially, leachate will be managed at this facility through recirculation and solidification. Future leachate treatment and disposal options include discharge to a POTW, on-site treatment, storage tanks or ponds, and treatment ponds. Modification and/or notification letters to the TCEQ will be provided as required prior to modifying the current leachate plans.

Recirculation, if performed, may be accomplished by discharge of the collected liquid to the waste mass by any of the following procedures. Contaminated water and ground water will not be recirculated into the waste mass.

- Discharge to trenches containing perforated pipes or prefabricated infiltration units spaced at regular horizontal and vertical intervals throughout the waste;
- Discharge to vertical manholes spaced aerially across the waste footprint and having horizontal distribution pipes spaced at regular vertical intervals;
- Discharge to open trenches temporarily excavated into the waste which are then backfilled with waste and covered in accordance with 30 TAC, Section 330.133;
- Discharge to drip irrigation tubing buried about 6 inches beneath cover soils;
- Spray application of leachate to working face or daily cover; and
- Other methods with prior written approval of the TCEQ.

Leachate collected from any sump draining a cell in which Class I non-hazardous industrial waste has been placed may be recirculated in cells constructed with a Subtitle D liner. It may also be solidified and disposed of on-site, only in cells constructed with a Subtitle D liner. In the alternative, it may be disposed of off-site at a properly licensed facility.

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

**PART IV**

**SITE OPERATING PLAN**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999

Revised November 2000

Revised May 2006

Revised December 2011



Prepared by

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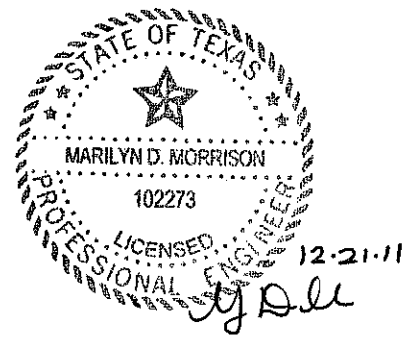
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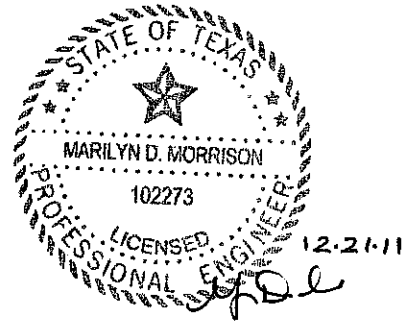
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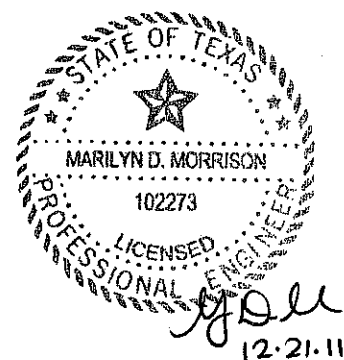


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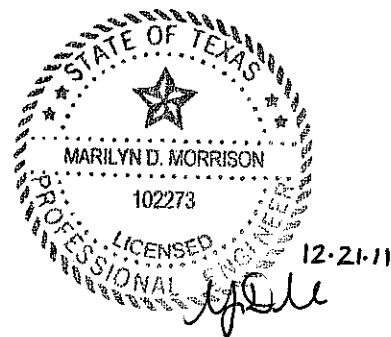


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### Appendix A Example Forms



Records Needed for Site Operating Record, Figure 1

Records Needed	Frequency	Rule Citation
Location Restriction Demonstrations	Submittal of Permit Application	330.113(b)(1)
Prohibited Waste Inspection Records, Training and Receipt Notification Procedures	Per Occurrence	330.113(b)(2)
Gas Monitoring Results	Quarterly	330.113(b)(3)
Remediation Plans for Explosive and Other Gases, if applicable	Per Occurrence	330.113(b)(3)
Unit Design Documentation for Leachate or Gas Condensate Placement	Monitoring – Semi-annual / Corrective Action – As Required	330.113(b)(4)
Groundwater Monitoring and Corrective Action Demonstration, Certification, Monitoring, Testing & Analytical Data, if applicable	As Required	330.113(b)(5)
Closure and Post-Closure Plans	Submittal of Permit Application	330.113(b)(6)
Post-Closure Monitoring, Testing and Analytical Data, if applicable	Groundwater Monitoring – Semi-Annual Inspections	330.113(b)(6)
Cost Estimates and Financial Assurance Documentation for Closure and Post-closure	Annually	330.113(b)(7)
Facility Operation, Permit Modification, Approvals, and Technical Assistance Correspondence & Responses	Per Occurrence	330.113(b)(9)
Special Waste Manifests, Trip Tickets and All Other Documents Relating to Special Waste	Per Occurrence	330.113(b)(10)
Other Documents Specified in the Permit or by the executive director	As Required	330.113(b)(11)
Personnel Training Records '335.586(d)-(e)	As Needed	330.113(e)
Personnel Operator Licenses	As Needed	330.113(f)
Site Waste Acceptance Rate Evaluation	Annually	330.113(h)
Solid Waste Summary Reports	Quarterly/Annually	330.113 (h) 330.603
Class 1 Waste Containment Dike Certification Report	As Needed	335.590(F)(vi)

The Class I working face includes areas where waste has been deposited for disposal but has not been covered with soil.

- RACM Unloading and Disposal Area. The RACM unloading area will be designated by the Landfill Manager as noted in Section 26.4.
- Wood Grinding Area. The wood grinding area will process wood waste materials as discussed in Section 7.
- Waste Stabilization Basins. The liquid waste bulking facility will accept liquid wastes as outlined in Section 26.

The working faces will be sized to minimize the amount of waste exposed while still providing adequate area for safe and efficient vehicle unloading. Minimizing the size of the face aids in control of windblown waste and minimizes odor. The size should also accommodate customers in a reasonable amount of time without excessive delays. At a minimum, two commercial vehicles should be able to empty with a sufficient clearance between the vehicles to allow for safe backing and a third space for commercial customers who must unload manually. A separate area at the same active face may be provided for manual unloading vehicles such as pickups or trailers. Waste unloaded manually can be pushed and incorporated into the working face. The unloading area where waste is discharged by hauling trucks at the MSW working face will be less than 200 feet by 200 feet. The unloading area in the Class I Nonhazardous Industrial Waste Working face will be less than 100 feet by 100 feet. The unloading area in the RACM Unloading and Disposal Area will be less than 50 feet by 50 feet.

As discussed in Section 27.6, the Class 1 working face and the MSW working face may be combined in areas constructed in accordance with the requirements listed in Title 30 TAC §330.331(e) – refer to Part III, Appendix III-F. As discussed in Section 27.2, all Class 1 waste will be evaluated before acceptance under the site's Class 1 waste evaluation and acceptance procedures.

Cones, signs, or direction by spotters must be used to separate the vehicles at the unloading area. Spotters are responsible for keeping incoming vehicles far enough from the unloading area as these vehicles begin turning and backing into position for discharge of waste. Separation of vehicles while they are positioning for backing into disposal positions will reduce interference with other vehicles already in position and discharging their wastes.

### 23.3. Alternative Daily Cover Material

Petroleum contaminated soil may be used for alternative daily cover at the Tessman Road Landfill if approved by separate temporary authorization. The use of any approved ADC shall follow the conditions established for the ADC in the authorization.

### 23.4. Cover Log

A cover application log will be maintained by the lead operator, or his designee, documenting the area over which daily, intermediate, or final cover is applied. For daily and intermediate cover, the log shall specify the date the area was covered (no exposed waste), how it was accomplished, where cover was applied, and the last area that was covered. Areas with cover will be inspected on a daily basis to verify the integrity of the cover material. For final cover, this log shall specify the area covered, the date cover was applied, and the thickness applied that date. Each entry shall be certified by the signature of the on-site supervisor that the work was accomplished as stated in the log. The cover log shall be available for inspection by TCEQ representatives and authorized agents or employees of local governments having jurisdiction. An example of the Cover Log is included in Appendix A, Forms,

### 23.5. Final Cover

Final cover for the landfill shall be in accordance with Attachment 12, Final Closure Plan, of the permit amendment application.

### 23.6. Erosion of Cover

The landfill cover (or Class 1 waste containment dike external slope) will be inspected for erosion after each day that measurable rainfall occurs at the site. The inspection will be performed on the next Monday through Friday

operating day after the measurable rainfall occurs. Maintenance of the landfill cover (or Class 1 waste containment dike external slope) shall be performed to prevent exposure of waste due to erosion. Areas of the cover that require maintenance due to erosion will be identified. Any cover erosion of landfill cover (or Class 1 waste containment dike external slope) shall be repaired promptly by restoring the cover material, grading, compacting, and seeding it as applicable.

Areas of final and intermediate cover shall also be inspected for erosion at least monthly during the operating life of the landfill, and final cover shall be inspected at least semiannually during the post-closure care period of the landfill. Any areas requiring maintenance shall be promptly restored during the entire operational life and for the post-closure maintenance period of the facility. These cover erosion inspections shall be documented on the appropriate Daily Inspection Report, the Weekly Inspection Report, or the Monthly Inspection Report. An example of each of these reports is included in Appendix A, Forms.

## 24. Ponded Water

### 24.1. Landfill Unit

The ponding of water over waste placed at the municipal solid waste landfill shall be prevented or promptly eliminated after any such occurrence is identified. Waste fill areas with daily, intermediate, or final cover will be sloped to prevent ponding. Any areas of ponded water must be eliminated as soon as possible. The area in which the ponding occurred shall be filled in and regraded as soon as the surface dries adequately for regrading or adding soil such that the ponding will be eliminated within seven days of occurrence. If any ponded water has come into contact with waste, leachate, or waste contaminated soils, the ponded water will be managed in the accordance with Attachment 15, the Leachate and Contaminated Water Plan, of this permit amendment application.

Class 1 waste may be placed only in dedicated waste disposal cells that meet the requirements of 30 TAC § 330.331(e). Placement, daily cover and intermediate cover will be accomplished consistent with the procedures for other wastes that are accepted at the landfill. Waste placement and cover requirements for above-grade and below-grade disposal options are noted below.

### **Class 1 Waste Below Grade Disposal Option**

Class 1 industrial waste, other than asbestos-containing waste, may only be placed in designated disposal cells and at or below the level of the natural elevation of the surrounding ground surface, which is approximately 660 feet MSL. When the cell has been filled to the level of the natural elevation of the surrounding ground surface, an extra thick intermediate cover of at least four feet of compacted clay-rich soil must be placed on top of the Class 1 waste and on any exposed side slopes. Municipal solid waste may then be placed above the extra thick intermediate cover up to the final design grade.

### **Above-Grade Class 1 Waste Disposal Options**

With the above grade Class 1 waste disposal options, Class 1 waste or Class 1 waste mixed with other accepted wastes may be placed either below or above the compacted perimeter berm elevation in areas with liners constructed in accordance with §330.331(e). The two above-grade Class 1 disposal options are shown on Figure 12-6 in Part III, Attachment 12 and summarized below.

- Above Grade Class 1 Waste Disposal Area with 4-foot-thick Separation Layer. This option allows for the disposal of Class 1 wastes above existing grade if containment dikes are constructed along the exterior slope of the Class 1 waste disposal area. This option also includes the placement of a 4-foot-thick compacted clay rich barrier layer that will be placed over the Class 1 waste as a separation layer between the Class 1 waste and the municipal solid waste (and other non-Class 1 waste material) to be placed above. With this option, the 4-foot-thick separation or barrier layer will be sloped toward the interior of the landfill.
- Above Grade Class 1 Waste Disposal Area. This option includes the construction of containment dikes along the exterior sideslope of the Class 1 disposal area to extend the limits of the Class 1 waste disposal area. No separation layer is required for this option; however, the thickness of the composite final cover system's infiltration layer will be increased from 1.5 feet to 4.0 feet with a maximum hydraulic conductivity of  $1 \times 10^{-7}$  cm/s.

Consistent with §330.173(e), the amount of Class 1 waste to be accepted will be limited to a maximum of 20 percent of the total waste, not including Class 1 waste, accepted during the current or previous year. The amount of waste may be determined by volume or by weight, but the same unit of measure must be used for each year. Details of the landfill perimeter containment dike construction are included in the cross-sections in Part III, Attachment 2, and described in detail in Part III, Appendix III-F.

## **Class 1 Waste Disposal Area Unloading Procedures**

In areas where Class 1 and MSW will be comingled, the unloading procedures for the combined working face will be consistent with the waste unloading procedures specified in Section 7.2. For example, Spotters, Equipment Operators, or other field personnel will be present at the combined working face at all times to monitor incoming loads of waste. These personnel will be familiar with the rules and regulations governing the various types of waste that can or cannot be accepted into this facility and will be trained to identify prohibited wastes before being assigned to this task (refer to Section 4.3.1 for training procedures). The personnel will also be trained in and have a basic understanding of both industrial and hazardous waste and their transportation and disposal requirements. Site personnel will establish unloading positions at the working face. The unloading positions are basically equally spaced lanes that each collection vehicle uses to unload waste material from the collection vehicle to the working face. Typically, each lane is about 20 feet wide. When the Class 1 and MSW working face are combined, if warranted, the distance between the unloading positions utilized by Class 1 waste collection vehicles and MSW collection vehicles may be increased. This additional distance will provide a buffer between Class 1 unloading positions and the non-Class 1 unloading positions, which may include individual citizens. The Spotters and Equipment Operators will monitor the working face to verify that adequate spacing is maintained between vehicles, dust is minimized, and waste is being offloaded to the working face area in a safe manner.

The Spotters and Equipment Operators will police the working face to verify that Class 1 waste is safely offloaded to the working face. If special handling procedures are required for Class 1 waste, then the working face personnel will be notified prior to the arrival of the waste haul vehicle at the working face so that the Spotters and Equipment Operators can take appropriate action (e.g., special handling procedures could include verifying that daily cover is placed over waste to minimize exposure to the atmosphere and/or establish a separate area at the working face to ensure that no other hauler is within a specified distance of the specific unloading position for the Class 1 waste that requires special handling).

### **27.7. Recordkeeping and Reporting**

All information and documents pertaining to Class 1 waste profiled for disposal and delivered to the landfill for disposal in the Class 1 cell including but not limited to, all records concerning measurements and analyses performed at the site, shall be retained at the site in accordance with the provisions in Section 3.

Additionally, the TCEQ Monthly Waste Receipt Summary Report will be prepared by the Site Manager, or his designee, and submitted to the TCEQ. This report will be submitted no later than the 25th day of the month following the month in which the waste was received. Reports will be on forms provided by and submitted to the TCEQ Executive Director. The facility will file reports including those months in which they receive no Class 1 waste at the facility unless the TCEQ grants an exception. The reports will summarize the quantity, character, transporter identity, and the method of storage, processing and disposal of each Class 1 waste shipment received, and itemizes by manifest document number as required by the TCEQ.

**TESSMAN ROAD LANDFILL  
BEXAR COUNTY, TEXAS  
TCEQ PERMIT NO. MSW-1410C**

**PART IV**

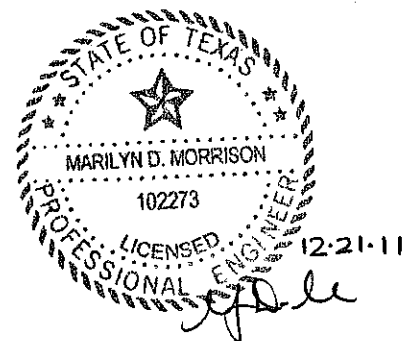
**APPENDIX IV-D  
CLASS 1 WASTE ACCEPTANCE PLAN**

Prepared for

BFI Waste Systems of North America, LLC

Technically Complete January 1999

Revised December 2011



Prepared by

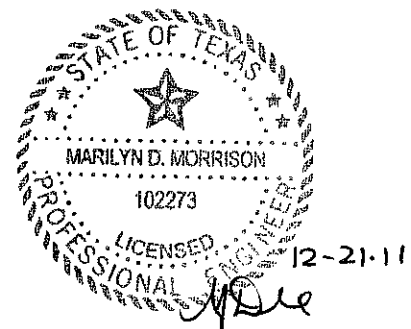
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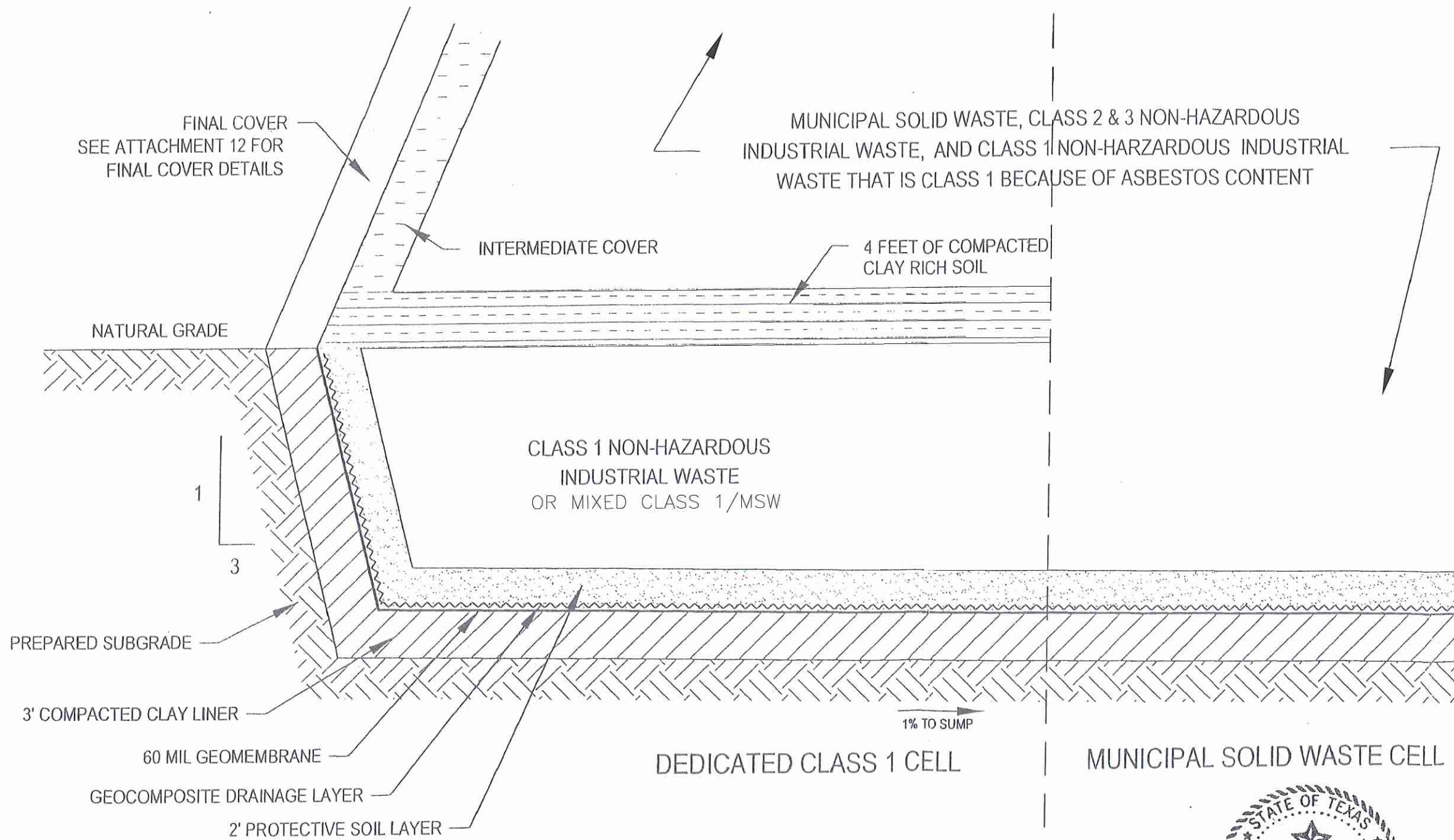
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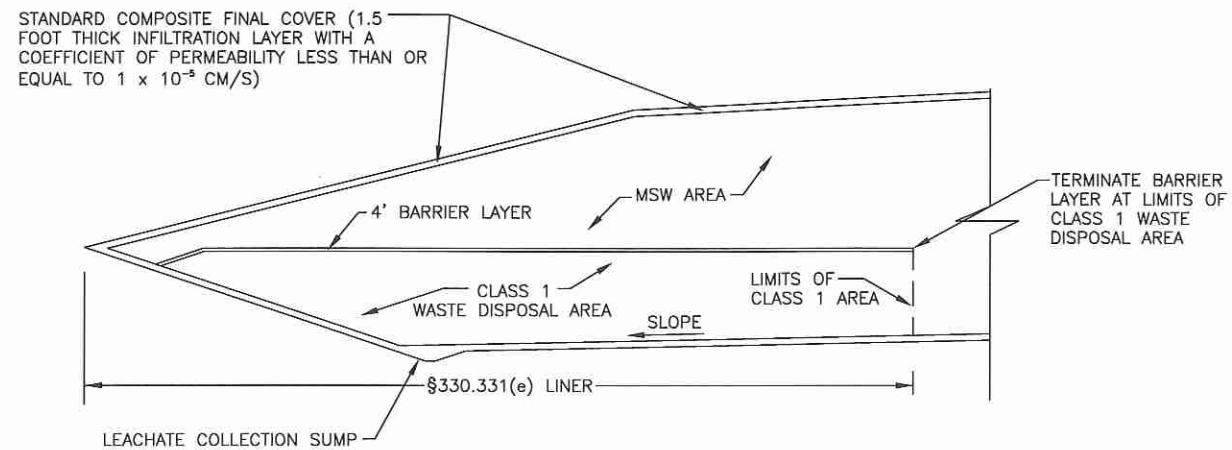
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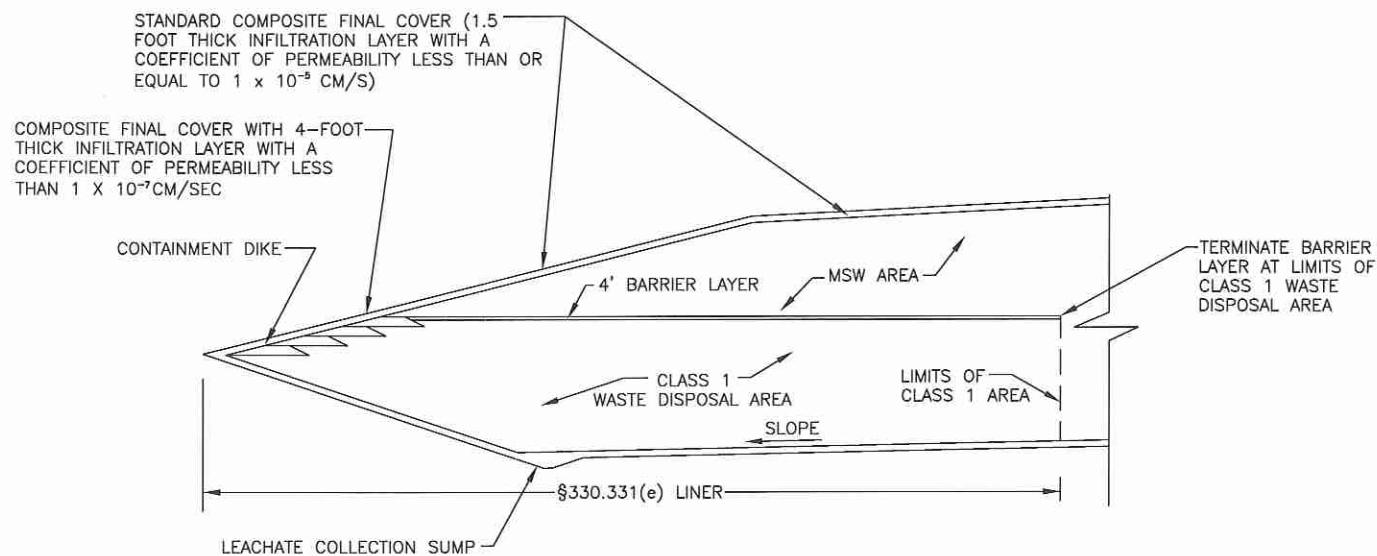


<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY:		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>	<b>TYPICAL DEDICATED CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE CELL</b> TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS						
DATE: 12/2003 FILE: 0120-81-11 CAD: IV-D-1_CELL_DETAIL.DWG	DRAWN BY: VRS DESIGN BY: MDM REVIEWED BY: JPY	REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>PERMIT MODIFICATION</td> </tr> </tbody> </table>	NO.	DATE	DESCRIPTION	1	12/2011	PERMIT MODIFICATION	<i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727
NO.	DATE	DESCRIPTION							
1	12/2011	PERMIT MODIFICATION							
REUSE OF DOCUMENTS <small>THIS DOCUMENT, AND THE DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF WEAVER BOOS CONSULTANTS, LLC - SOUTHWEST AND IS NOT TO BE USED IN WHOLE OR IN PART, WITHOUT THE WRITTEN AUTHORIZATION OF WEAVER BOOS CONSULTANTS, LLC - SOUTHWEST.</small>		<small>CHICAGO, IL    FORT WORTH, TX    GRAND RAPIDS, MI          NAPERVILLE, IL    SOUTH BEND, IN          COLUMBUS, OH    EVANSVILLE, IN    SPRINGFIELD, IL          DENVER, CO    RIVERSIDE, MO    CLEARMONT, FL</small>	<b>FIGURE IV-D-1</b>						

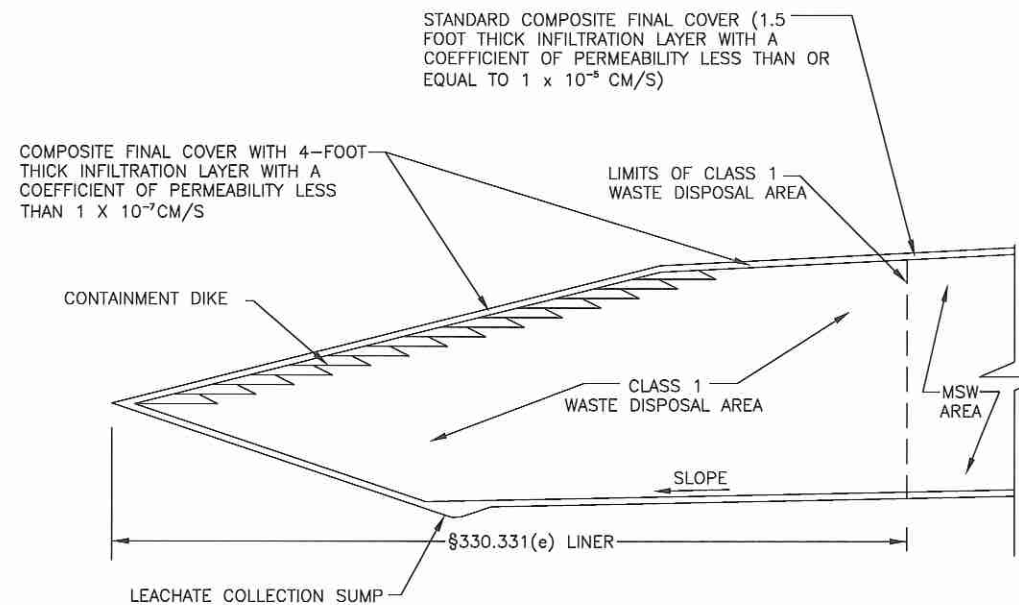
O:\0120\109\CLASS 1 WASTE MOD\CLEAN\SOP\FIG IV-D-1 DETAIL.dwg, jwilson



**OPTION 1 – BELOW GRADE CLASS 1 DISPOSAL AREA WITH SEPARATION LAYER**



**OPTION 2 – ABOVE GRADE CLASS 1 DISPOSAL AREA WITH SEPARATION LAYER**



**OPTION 3 – ABOVE GRADE CLASS 1 DISPOSAL AREA**

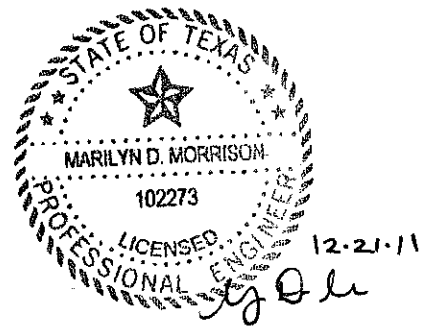


**NOTES:**

1. CLASS 1 WASTE AND CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE ARE USED INTERCHANGEABLY.
2. REFER TO ATTACHMENT 12 FOR FINAL COVER DETAILS.
3. REFER TO APPENDIX III-F FOR ABOVE GRADE CLASS 1 WASTE DISPOSAL INFORMATION.

<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY:		PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>CLASS 1 WASTE DISPOSAL AREA OPTIONS</b>  TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS  <i>Weaver Boos Consultants</i> TBPE REGISTRATION NO. F-3727											
DATE: 12/2011 FILE: 0120-109-11 CAD: FIG IV-D-2-DETAILS.DWG		DRAWN BY: JDW DESIGN BY: MDM REVIEWED BY: JPY													
REUSE OF DOCUMENTS <small>THIS DOCUMENT, AND THE DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF WEAVER BOOS CONSULTANTS, LLC - SOUTHWEST AND IS NOT TO BE USED IN WHOLE OR IN PART, WITHOUT THE WRITTEN AUTHORIZATION OF WEAVER BOOS CONSULTANTS, LLC - SOUTHWEST.</small>		REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/2011</td> <td>PERMIT MODIFICATION</td> </tr> </tbody> </table>		NO.	DATE	DESCRIPTION	1	12/2011	PERMIT MODIFICATION	CHICAGO, IL NAPERVILLE, IL COLUMBUS, OH DENVER, CO		FORT WORTH, TX EVANSVILLE, IN RIVERSIDE, MO		GRAND RAPIDS, MI SOUTH BEND, IN SPRINGFIELD, IL CLEARMONT, FL	
NO.	DATE	DESCRIPTION													
1	12/2011	PERMIT MODIFICATION													
COPYRIGHT © 2011 WEAVER BOOS CONSULTANTS, LLC - SOUTHWEST. ALL RIGHTS RESERVED.				FIGURE IV-D-2											

APPENDIX C  
ADJACENT PROPERTY OWNERS INFORMATION



## ADJACENT PROPERTY OWNERS INFORMATION

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The following list and figure (Figure C-1) provide the names, mailing addresses, and locations of the "Adjacent and Potentially Affected Landowners" around the facility. The list is based on records from the Bexar County Appraisal District as of December 21, 2011, and includes tracts within ¼ mile of the site. Refer to Figure C-1, Adjacent Property Owners Map, for location of the properties. The numbers of the landowner list correspond to the numbers listed on Figure C-1.

- |   |  |
|---|--|
| 1. JEROME L ZIGMOND<br>1720 FM 1516 N<br>CONVERSE TX 78109  | 10. BFI WASTE SYSTEMS OF<br>NORTH AMERICA INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9245   |
| 2. BFI WASTE SYS OF N A INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246  | 11. WICHAN & JARIYA CHAICHA<br>19006 GREEN KNL<br>SAN ANTONIO TX 78258-3412  |
| 3. MRS DARLENE S DAGUE ETAL<br>LESLIE STEUBING<br>19300 CLASSEN CRST # 1<br>SAN ANTONIO TX 78258-4212                     | 12. WICHAN & JARIYA CHAICHA<br>19006 GREEN KNL<br>SAN ANTONIO TX 78258-3412  |
| 4. MRS DARLENE S DAGUE ETAL<br>LESLIE STEUBING<br>19300 CLASSEN CRST # 1<br>SAN ANTONIO TX 78258-4212                     | 13. WICHAN & JARIYA CHAICHA<br>19006 GREEN KNL<br>SAN ANTONIO TX 78258-3412  |
| 5. GVRRP LLC<br>C/O NEW EARTH LLC<br>7800 E IH 10<br>SAN ANTONIO TX 78219-4800  | 14. MARY ELIZABETH DAWSON<br>C/O JOHNNIE S DAWSON JR<br>7917 SNOWDEN ST<br>HOUSTON TX 77028-1421                                 |
| 6. GVRRP LLC<br>C/O NEW EARTH LLC<br>7800 E IH 10<br>SAN ANTONIO TX 78219-4800  | 15. BFI WASTE SYSTEMS OF N AMER INC<br>REPUBLIC SERVICES INC<br>C/O THOMSON REUTERS PTS<br>PO BOX 29246<br>PHOENIX AZ 85038-9246 |
| 7. L & H LEASING CO LTD<br>PO BOX 831368<br>SAN ANTONIO TX 78283-1368   | 16. JUDSON ISD<br>8012 SHIN OAK DR<br>LIVE OAK TX 78233-2413   |
| 8. SAN ANTONIO WATER SYSTEM<br>PO BOX 2449<br>SAN ANTONIO TX 78298-2449   | 17. 7304 E IH 10 INVESTMENTS LLC<br>7304 INTERSTATE 10E<br>SAN ANTONIO TX 78219-4806   |
| 9. BFI WASTE SYS OF N A<br>REPUBLIC SERVICES INC<br>C/O THOMSON REUTERS PTS<br>PO BOX 460189 INC<br>HOUSTON TX 77056-8189 | 18. BFI WASTE SYSTEMS OF N AMER INC<br>REPUBLIC SERVICES INC<br>C/O THOMSON REUTERS PTS<br>PO BOX 29246<br>PHOENIX AZ 85038-9246 |

## ADJACENT PROPERTY OWNERS INFORMATION (Continued)

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|---|--|
| 19. BEXAR COUNTY<br>PO BOX 839950<br>SAN ANTONIO TX 78283-3950                            | 29. ELIZABETH GARCIA<br>5411 KEYSTONE ST<br>SAN ANTONIO TX 78229-5232  |
| 20. GARY A KAHLIG<br>2831 DEER LEDGE ST<br>SAN ANTONIO TX 78230-4552                      | 30. ROGER B CYR<br>7102 IH 10 E<br>SAN ANTONIO TX 78219-4801   |
| 21. CLARENCE J & ELVIRA KAHLIG<br>2831 DEER LEDGE ST<br>SAN ANTONIO TX 78230-4552         | 31. MFP FOSTER RANCH LP<br>755 E MULBERRY AVE STE 600<br>SAN ANTONIO TX 78212-6013                                   |
| 22. FERNANDO & CECILIA VAZQUEZ<br>6830 LUCKY FLDS<br>CONVERSE TX 78109-3582               | 32. MFP FOSTER RANCH LP<br>755 E MULBERRY AVE STE 600<br>SAN ANTONIO TX 78212-6013                                   |
| 23. FERNANDO & CECILIA VAZQUEZ<br>6830 LUCKY FLDS<br>CONVERSE TX 78109-3582               | 33. BROWNING FERRIS INC<br>REPUBLIC SERVICES INC<br>C/O THOMSON REUTERS PTS<br>PO BOX 29246<br>PHOENIX AZ 85038-3246 |
| 24. FERNANDO & CECILIA VAZQUEZ<br>6830 LUCKY FLDS<br>CONVERSE TX 78109-3582               | 34. BROWNING FERRIS INC<br>REPUBLIC SERVICES INC<br>C/O THOMSON REUTERS PTS<br>PO BOX 29246<br>PHOENIX AZ 85038-9246 |
| 25. LARRY R SKLOSS<br>9819 GREEN RD<br>CONVERSE TX 78109-3387                             | 35. BROWNING FERRIS INC<br>WILLIAM D RUCKELSHAUS – CEO<br>PO BOX 29246<br>PHOENIX AZ 85038-9246                      |
| 26. EMMA JANE BARKSDALE &<br>JEWEL F HENSLEY<br>PO BOX 10807<br>SAN ANTONIO TX 78210-0807 | 36. BROWNING FERRIS INC<br>WILLIAM D RUCKELSHAUS – CEO<br>PO BOX 29246<br>PHOENIX AZ 85038-9246                      |
| 27. EMMA JANE BARKSDALE &<br>JEWEL HENSLEY<br>PO BOX 10807<br>SAN ANTONIO TX 78210-0807   | 37. BROWNING FERRIS INC<br>REPUBLIC SERVICES INC<br>C/O THOMSON REUTERS PTS<br>PO BOX 29246<br>PHOENIX AZ 85038-9246 |
| 28. ELIZABETH GARCIA<br>5411 KEYSTONE ST<br>SAN ANTONIO TX 78229-5232                     | 38. PADOR PROPERTIES LTD<br>C/O FROST BANK TR<br>R/E (T-6)<br>PO BOX 2950<br>SAN ANTONIO TX 78299-2950               |

## ADJACENT PROPERTY OWNERS INFORMATION (Continued)

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|--|--|
| 39. VAUGHAN & SONS INC<br>PO BOX 17258<br>SAN ANTONIO TX 78217-0258  | 51. EMMA L HARRIS<br>C/O ALBERT RAY<br>738 GULF<br>SAN ANTONIO TX 78202-3256           |
| 40. BROWNING FERRIS INC<br>REPUBLIC SERVICES INC<br>C/O THOMSON REUTERS PTS<br>PO BOX 29246<br>PHOENIX AZ 85038-9246 | 52. BFI WASTE SYS OF N A INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246                  |
| 41. VAUGHAN & SONS INC<br>PO BOX 17258<br>SAN ANTONIO TX 78217-0258  | 53. LILLIE V BYRD C/S<br>194 KIEFER RD<br>SAN ANTONIO TX 78220-2117                    |
| 42. BHA FINANCIAL LP<br>14502 BROOK HOLLOW BLVD<br>SAN ANTONIO TX 78232-3810   | 54. GLENN M & JENNY L PACHECO<br>192 KIEFER RD<br>SAN ANTONIO TX 78220-2117            |
| 43. BHA FINANCIAL LP<br>14502 BROOK HOLLOW BLVD<br>SAN ANTONIO TX 78232-3810   | 55. ERNEST JAMES IVORY<br>811 LAMAR<br>SAN ANTONIO TX 78202-1228                       |
| 44. CANDELARIO TREVINO<br>390 KIEFER RD<br>SAN ANTONIO TX 78220-2118   | 56. CLIFFORD DOTSON<br>150 KIEFER RD<br>SAN ANTONIO TX 78220-4507                      |
| 45. PAUL ANDREW MARTINEZ<br>310 KIEFER RD<br>SAN ANTONIO TX 78220-2118   | 57. SEAN M BAKER<br>10078 PALOMINO CYN<br>CONVERSE TX 78109-1649                       |
| 46. ADAM A LAWSON<br>302 KIEFER RD<br>SAN ANTONIO TX 78220-2118  | 58. HELEN E BAKER<br>138 KIEFER RD<br>SAN ANTONIO TX 78220-2117                        |
| 47. ANTONIO A MARTINEZ<br>302 KIEFER RD<br>SAN ANTONIO TX 78220-2118   | 59. SEAN M BAKER<br>10078 PALOMINO CYN<br>CONVERSE TX 78109-1649                       |
| 48. CONSUELO BELTRAN<br>7241 BELMEDE CT<br>CONVERSE TX 78109-3242  | 60. BFI WASTE SYSTEMS OF<br>NORTH AMERICA INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246 |
| 49. BFI WASTE SYS OF N A INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246  | 61. BFI WASTE SYSTEMS OF<br>NORTH AMERICA INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246 |
| 50. BFI WASTE SYS OF N A INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246  | 62. ARTURO A PARRO<br>4118 SILVER LAKE DR<br>SAN ANTONIO TX 78219-3921                 |

## ADJACENT PROPERTY OWNERS INFORMATION (Continued)

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|--|---|
| 63. ESTATE OF FRANK M BOSTON<br>PO BOX 714<br>ADKINS TX 78101-0714                                     | 74. WORTHY IS THE LAMB LLC<br>1415 AYLSBURY ST<br>SAN ANTONIO TX 78216-2927                           |
| 64. YOLANDA MARTINEZ<br>209 DANIEL ST<br>SAN ANTONIO TX 78204-1506                                     | 75. JULIUS E JR & TENDELYN M BOWENS<br>4130 MISTY PINE DR<br>SAN ANTONIO TX 78220-1510                |
| 65. SYLVIA & ALBERT C WHEAT<br>225 DANIEL RD<br>SAN ANTONIO TX 78220-2116                              | 76. JULIA ANN BAREFIELD<br>C/O SYBIL J WILLIAMS<br>3358 J ST<br>SAN ANTONIO TX 78220-4152             |
| 66. JOHNNIE D & CHERYL A MIMS<br>3127 SABLE CREEK<br>SAN ANTONIO TX 78259-2637                         | 77. ALBERT C SR & SYLVIA D WHEAT<br>225 DANIEL RD<br>SAN ANTONIO TX 78220-2116                        |
| 67. ILDEBRANDO G GUAJARDO<br>197 DANIEL ST<br>SAN ANTONIO TX 78204                                     | 78. BFI WASTE SYSTEMS OF<br>NORTH AMERICA INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246                |
| 68. D WEBB & WIFE<br>308 LONGVIEW DR<br>SAN ANTONIO TX 78220-1616                                      | 79. LEONOR HERNANDEZ<br>139 DANIEL RD<br>SAN ANTONIO TX 78204   |
| 69. JOYCE CHAVFUL<br>815 PASO HONDO<br>SAN ANTONIO TX 78202-2931                                       | 80. JACKLYN NEWELL<br>135 DANIEL ST<br>SAN ANTONIO TX 78204   |
| 70. NAMON & ARRAN JEFFERSON<br>C/O BT BROWN AND ISHMAL MADRY<br>3307 K ST<br>SAN ANTONIO TX 78220-4149 | 81. SHIRLEY A YOUNG<br>707 MANHATTAN DR<br>SAN ANTONIO TX 78219-3912                                  |
| 71. MARIE WILLIAMS YATES<br>PO BOX 200703<br>SAN ANTONIO TX 78220-0703                                 | 82. BFI WASTE SYS OF N A INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246                                 |
| 72. MELVIN L KING<br>1215 PASO HONDO<br>SAN ANTONIO TX 78202-3153                                      | 83. JAIME DELOSANTOS & MARIA INES<br>C/S ROBERT C FLORES<br>539 PERRY DR<br>SAN ANTONIO TX 78219-4419 |
| 73. MINNIE MAE KING<br>1786 W 20 <sup>TH</sup> ST<br>SAN BERNARDINO CA 92411-1151                      | 84. JOSE LUIS ORTEGA<br>313 ARANSAS AVE<br>SAN ANTONIO TX 78210-2149                                  |

## ADJACENT PROPERTY OWNERS INFORMATION (Continued)

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|---|--|
| 85. BFI WASTE SYSTEMS OF NORTH AMERICA INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246 | 96. BFI WASTE SYSTEMS OF NORTH AMERICA INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246  |
| 86. BFI WASTE SYSTEMS<br>C/O JOHN GREENE<br>PO BOX 29246<br>PHOENIX AZ 85038-9246   | 97. BFI WASTE SYSTEMS OF NORTH AMERICA INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246  |
| 87. ALBERT C & SYLVIA D WHEAT<br>225 DANIEL RD<br>SAN ANTONIO TX 78220-2116         | 98. GEORGIA L MCKNIGHT<br>213 LYNHAVEN DR<br>SAN ANTONIO TX 78220-1826               |
| 88. BFI WASTE SYSTEMS OF NORTH AMERICA<br>PO BOX 29246<br>PHOENIX AZ 85038-9246     | 99. BFI WASTE SYSTEMS OF N A INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246            |
| 89. BFI WASTE SYSTEMS OF NORTH AMERICA<br>PO BOX 29246<br>PHOENIX AZ 85038-9246     | 100. BFI WASTE NORTH AMERICA INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246            |
| 90. EDYTHE LORRAINE BREWSTER<br>2603 PARKWOOD PL<br>OCEAN SPRINGS MS 39564-4212     | 101. BFI WASTE SYSTEMS OF N A INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246           |
| 91. CUBERT G YOUNG III<br>5802 TEAL LAKE<br>SAN ANTONIO TX 78244-1314               | 102. BFI WASTE SYSTEMS OF NORTH AMERICA INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246 |
| 92. PHILLIP CLAYTON YOUNG<br>6421 FIRESTONE PKWY<br>SAN ANTONIO TX 78244-1545       | 103. BFI WASTE SYSTEMS OF NORTH AMERICA INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246 |
| 93. BFI WASTE SYSTEMS OF NORTH AMERICA<br>PO BOX 29246<br>PHOENIX AZ 85038-9246     | 104. BFI WASTE SYSTEMS OF NORTH AMERICA<br>PO BOX 29246<br>PHOENIX AZ 85038-9246     |
| 94. BFI WASTE SYSTEMS INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246                  | 105. RONALD BETHANY<br>128 DANIEL RD<br>SAN ANTONIO TX 78220-2115                    |
| 95. ELLIS & EUGENE SULLIVAN<br>4705 PRAIRIE BEND<br>SAN ANTONIO TX 78244-2814       | 106. RAY CHARLES MACKKEY<br>122 DANIEL RD<br>SAN ANTONIO TX 78220-2115               |

## ADJACENT PROPERTY OWNERS INFORMATION (Continued)

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- |      |   |      |  |
|------|---|------|--|
| 107. | NATHANIEL MACKEY<br>714 KAYROE RD<br>ADKINS TX 78101-9796                                       | 119. | ALEX & MARIE JUAREZ<br>7941 FM 1346 LOT 7<br>SAN ANTONIO TX 78263-1010                     |
| 108. | BFI WASTE SYSTEMS OF N AMER INC<br>C/O ALLIED WASTE<br>PO BOX 29246<br>PHOENIX AZ 85038-9246    | 120. | ENRIQUE M REYNA<br>402 RANMAR AVE<br>SAN ANTONIO TX 78214-1646                             |
| 109. | BROWNING FERRIS INC<br>C/O WILLIAM D RUCKELSHAUS – CEO<br>PO BOX 29246<br>PHOENIX AZ 85038-9246 | 121. | JANET FEVOLD<br>7941 FM 1346 LOT 3<br>SAN ANTONIO TX 78263-1010                            |
| 110. | BEXAR COUNTY JR LIVE STOCK SHOW<br>PO BOX 1187<br>HELOTES TX 78023-1187                         | 122. | LOUIS MONTALVO<br>7941 FM 1346<br>SAN ANTONIO TX 78263-1004                                |
| 111. | MARTINEZ SOCIAL CLUB<br>PO BOX 201101<br>SAN ANTONIO TX 78220-8101                              | 123. | RUBEN & CHRISTINE G GUZMAN<br>11730 S FM 2790 W<br>LYTLE TX 78052-3522                     |
| 112. | BFI WASTE SYS OF N A INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246                               | 124. | EST OF LOUIS & RENE MONTALVO<br>7941 FM 1346 LOT 1<br>SAN ANTONIO TX 78263-1010            |
| 113. | BFI WASTE SYSTEMS OF<br>NORTH AMERICA<br>PO BOX 29246<br>PHOENIX AZ 85038-9246                  | 125. | PHIL SKLOSS<br>141 SCHUWIRTH RD<br>CONVERSE TX 78109-3131                                  |
| 114. | LARRY R SKLOSS<br>9819 GREEN RD<br>CONVERSE TX 78109-3387                                       | 126. | LARRY R SKLOSS<br>9819 GREEN RD<br>CONVERSE TX 78109-3387                                  |
| 115. | BFI WASTE SYS OF N A INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246                               | 127. | DEBORAH BRADSHAW<br>7915 FM 1346<br>SAN ANTONIO TX 78263-1003                              |
| 116. | BFI WASTE SYSTEMS OF N A INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246                           | 128. | FERNANDO GUAJARDO C/S ETAL<br>HERMAN A SKLOSS<br>7919 FM 1346<br>SAN ANTONIO TX 78263-1003 |
| 117. | BFI WASTE SYS OF NA INC<br>PO BOX 29246<br>PHOENIX AZ 85038-9246                                | 129. | ROBERT D SCHNEIDER<br>7953 FM 1346<br>SAN ANTONIO TX 78263-1003                            |
| 118. | JOSE C & MARIA R RODRIGUEZ<br>7941 FM 1346<br>SAN ANTONIO TX 78263-1004                         | 130. | MICHAEL & MARIA NAVARIJO<br>7941 FM 1346 LOT 2<br>SAN ANTONIO TX 78263-1010                |

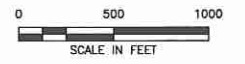
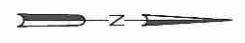
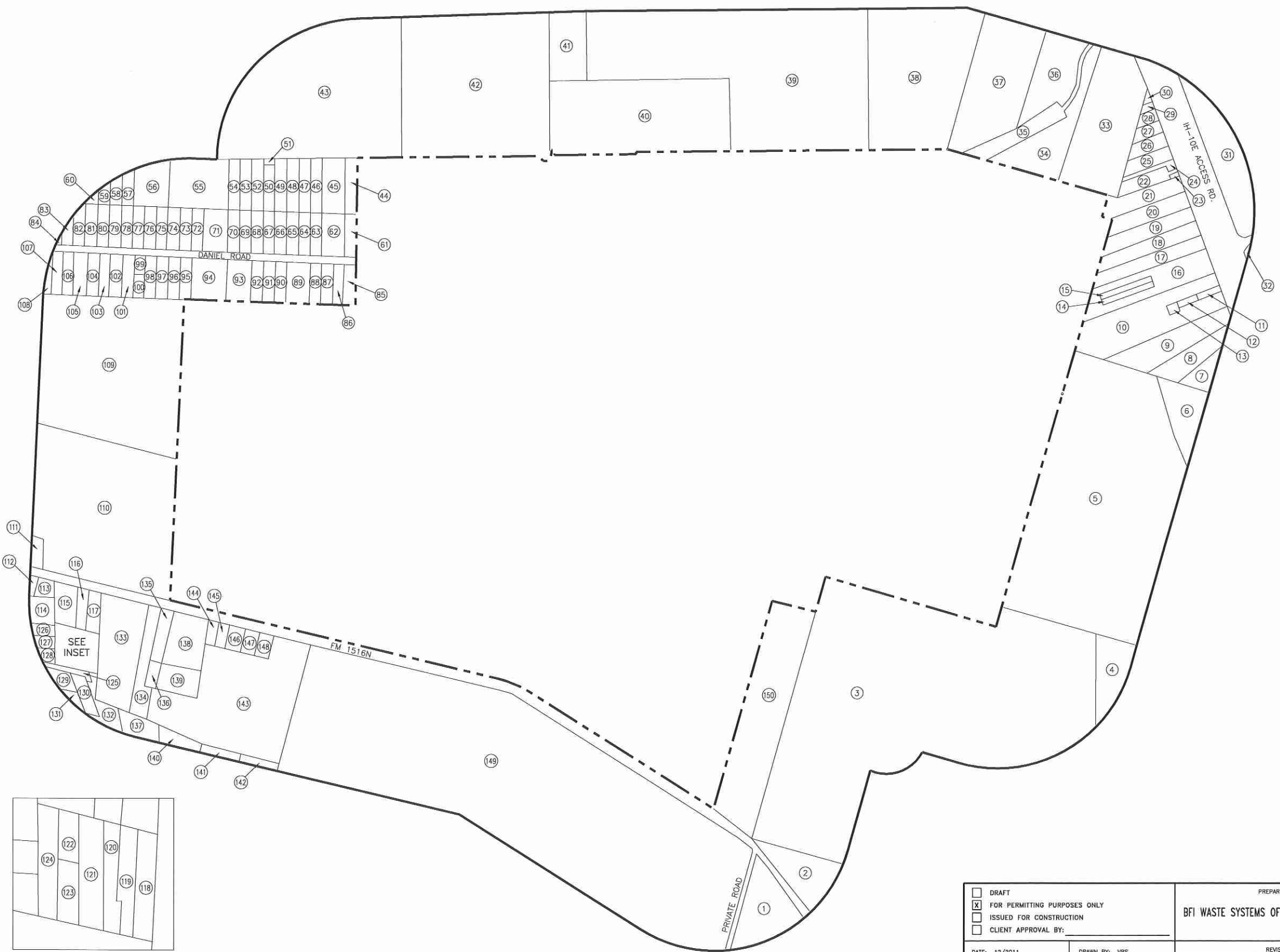
## ADJACENT PROPERTY OWNERS INFORMATION (Continued)

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131.	PHIL A SKLOSS 141 SCHUWIRTH RD CONVERSE TX 78109-3131	141.	BFI WASTE SYS OF N A INC PO BOX 29246 PHOENIX AZ 85038-9246
132.	PHIL A SKLOSS 141 SCHUWIRTH RD CONVERSE TX 78109-3131	142.	BFI WASTE SYS OF N A INC PO BOX 29246 PHOENIX AZ 85038-9246
133.	FRANK A & PEGGY D HOWELL PO BOX 200576 SAN ANTONIO TX 78220-0576	143.	BFI WASTE SYS OF N A INC PO BOX 29246 PHOENIX AZ 85038-9246
134.	BFI WASTE SYSTEMS OF N AMER INC C/O ALLIED WASTE PO BOX 29246 PHOENIX AZ 85038-9246	144.	BFI WASTE SYS OF N A INC PO BOX 29246 PHOENIX AZ 85038-9246
135.	BROWNING-FERRIS INC BFI WASTE SYS OF NA INC PO BOX 29246 PHOENIX AZ 85038-9246	145.	BFI WASTE SYS OF NA INC PO BOX 29246 PHOENIX AZ 85038-9246
136.	BFI WASTE SYSTEMS OF N AMER INC C/O ALLIED WASTE PO BOX 29246 PHOENIX AZ 85038-9246	146.	BFI WASTE SYSTEMS OF N A INC PO BOX 29246 PHOENIX AZ 85038-9246
137.	ANTONIO JR CIRLOS 1019 COUNTY ROAD 336 ALICE TX 78332-6996	147.	BFI WASTE SYS OF N A INC PO BOX 29246 PHOENIX AZ 85038-9246
138.	BFI WASTE SYSTEMS OF N AMER INC C/O ALLIED WASTE PO BOX 29246 PHOENIX AZ 85038-9246	148.	BFI WASTE SYS OF NA INC PO BOX 29246 PHOENIX AZ 85038-9246
139.	BFI WASTE SYSTEMS OF N AMER INC C/O ALLIED WASTE PO BOX 29246 PHOENIX AZ 85038-9246	149.	CALVIN W LIECK TRUST & GERALD E LIECK TRUST CALVIN W & GERALD E LIECK TR 602 FM 1516 N CONVERSE TX 78109-3341
140.	BFI WASTE SYS OF N A INC PO BOX 29246 PHOENIX AZ 85038-9246	150.	BFI WASTE SYS OF NA INC C/O PROP TAX DEPT PO BOX 29246 PHOENIX AZ 85038-9246

In accordance with 30 TAC §330.59(c)(3), the availability of mineral ownership beneath the facility has been investigated. Based on conversations with the Bexar County Appraisal District their records do not include mineral ownership.

O:\0120\109\CLASS 1 WASTE MOD\C-1-ADJACENT PROPERTY OWNERS.dwg, jwilson

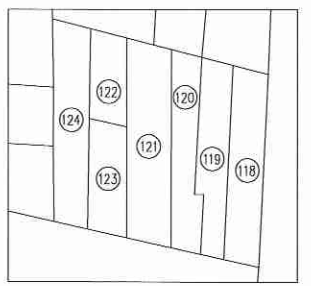


**LEGEND:**

- PERMIT BOUNDARY
- 1/4 MILE OFFSET (SEE NOTE 2)

**NOTES:**

1. ① REFERS TO LANDOWNERS LISTED ON LANDOWNERS LIST IN THIS APPENDIX.
2. THIS LINE REPRESENTS A 1/4-MILE DISTANCE FROM THE LIMIT OF THE PERMIT BOUNDARY.
3. LANDOWNERS AND MINERAL RIGHTS OWNERS LIST WAS DEVELOPED FROM THE 2011 BEXAR COUNTY APPRAISAL DISTRICT.



<input type="checkbox"/> DRAFT <input checked="" type="checkbox"/> FOR PERMITTING PURPOSES ONLY <input type="checkbox"/> ISSUED FOR CONSTRUCTION <input type="checkbox"/> CLIENT APPROVAL BY: _____	PREPARED FOR <b>BFI WASTE SYSTEMS OF NORTH AMERICA, LLC</b>		<b>ADJACENT PROPERTY OWNERS MAP</b>	
	DATE: 12/2011 FILE: 0120-109-11 CAD: C-1 PROP. OWNERS MAP.dwg		TESSMAN ROAD LANDFILL BEXAR COUNTY, TEXAS	
DRAWN BY: VRS DESIGN BY: JLG REVIEWED BY: MDM	REVISIONS		<b>Weaver Boos Consultants</b> TBPE REGISTRATION NO. F-3727	
REUSE OF DOCUMENTS <small>THIS DOCUMENT, AND THE DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF WEAVER BOOS CONSULTANTS, LLC. SOUTHWEST AND IS NOT TO BE USED IN WHOLE OR IN PART, WITHOUT THE WRITTEN AUTHORIZATION OF WEAVER BOOS CONSULTANTS, LLC - SOUTHWEST.</small>		NO.	DATE	DESCRIPTION
<small>COPYRIGHT © 2011 WEAVER BOOS CONSULTANTS, LLC-SOUTHWEST. ALL RIGHTS RESERVED.</small>				CHICAGO, IL NAPERVILLE, IL DENVER, CO
				FORT WORTH, TX (817) 735-9770
				GRIFFITH, IN SOUTH BEND, IN SPRINGFIELD, IL ST. LOUIS, MO
				<b>FIGURE C-1</b>

**APPENDIX D**

**TCEQ PERMIT APPLICATION PART I FORM**



# Texas Commission on Environmental Quality

## Permit or Registration Application for Municipal Solid Waste Facility

### Part I

#### A. General Information

Facility Name:	BFI Tessman Road Landfill			
Physical or Street Address (if available):	7000 IH 10 East			
(City) (County)( State)( Zip Code):	San Antonio	Bexar	TX	78219
(Area Code) Telephone Number:	(210) 661-4104			
Charter Number:				

If the application is submitted on behalf of a corporation, provide the Charter Number as recorded with the Office of the Secretary of State for Texas.

Operator Name <sup>1</sup> :	BFI Waste Systems of North America, LLC			
Mailing Address:	18500 North Allied Way			
(City) (County)( State)( Zip Code):	Phoenix	Arizona	AZ	85054
(Area Code) Telephone Number:	(480) 627-2700			
(Area Code) FAX Number:	(480) 627-2701			
Charter Number:	9104006			

If the permittee is the same as the operator, type "Same as Operator".

Permittee Name:	Same as Operator			
Physical or Street Address (if available):				
(City) (County)( State)( Zip Code):			TX	
(Area Code) Telephone Number:				
Charter Number:				

If the application is submitted by a corporation or by a person residing out of state, the applicant must register an Agent in Service or Agent of Service with the Texas Secretary of State's office and provide a complete mailing address for the agent. The agent must be a Texas resident.

Agent Name:	CT Corporation			
Mailing Address:	1021 Main St., Suite 1150			
(City) (County)( State)( Zip Code):	Houston	Harris	TX	77002
(Area Code) Telephone Number:	(713) 658-9486			
(Area Code) FAX Number:	(713) 658-9720			

#### Application Type:

<input checked="" type="checkbox"/> Permit	<input type="checkbox"/> Major Amendment	<input type="checkbox"/> Minor Amendment
<input type="checkbox"/> Registration	<input checked="" type="checkbox"/> Modification	<input type="checkbox"/> Temporary Authorization
	<input checked="" type="checkbox"/> w/Public Notice	
	<input type="checkbox"/> w/out Public Notice	<input type="checkbox"/> Notice of Deficiency Response

<sup>1</sup> The operator has the duty to submit an application if the facility is owned by one person and operated by another [30 TAC 305.43(b)]. The permit will specify the operator and the owner who is listed on this application [Section 361.087 Texas Health and Safety Code].

Facility Classification:

<input checked="" type="checkbox"/>	Type I	<input type="checkbox"/>	Type IV	<input type="checkbox"/>	Type V	<input type="checkbox"/>	Type IX
<input type="checkbox"/>	Type I AE	<input type="checkbox"/>	Type IV AE	<input type="checkbox"/>	Type VI		

Activities covered by this application (check all that apply):

<input type="checkbox"/>	Storage	<input type="checkbox"/>	Processing	<input checked="" type="checkbox"/>	Disposal
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Waste management units covered by this application (check all that apply):

<input type="checkbox"/>	Containers	<input type="checkbox"/>	Tanks	<input type="checkbox"/>	Surface Impoundments	<input checked="" type="checkbox"/>	Landfills
<input type="checkbox"/>	Incinerators	<input type="checkbox"/>	Composting	<input type="checkbox"/>	Type IV Demonstration Unit	<input type="checkbox"/>	Type IX Energy/Material Recovery
<input type="checkbox"/>	Other (Specify)			<input type="checkbox"/>	Other (Specify)		
<input type="checkbox"/>	Other (Specify)			<input type="checkbox"/>	Other (Specify)		

Is this submittal part of a Consolidated Permit Processing request, in accordance with 30 TAC Chapter 33?

Yes  No

If yes, state the other TCEQ program authorizations requested.

Provide a brief description of the portion of the facility covered by this application. For amendments, modifications, and temporary authorizations, provide a brief description of the exact changes to the permit or registration conditions and supporting documents referenced by the permit or registration. Also, provide an explanation of why the amendment, modification, or temporary authorization is requested.

The purpose of this permit modification is to provide the Tessman Road Landfill with an additional Class 1 nonhazardous industrial solid waste (Class 1 waste) disposal option that will allow the site to dispose of Class 1 waste above existing grade.

Does the application contain confidential Material?  Yes  No

If yes, cross-reference the confidential material *throughout the application* and submit as a separate document or binder conspicuously marked "CONFIDENTIAL."

Alternative Language Notice Instructions

For certain permit applications, public notice in an alternate language is required. If an elementary school or middle school nearest to the facility offers a bilingual program, notice may be required to be published in an alternative language. The Texas Education Code, upon which the TCEQ alternative language notice requirements are based, trigger a bilingual education program to apply to an entire school district should the requisite alternative language speaking student population exist. However, there may not exist any bilingual students at a particular school within a district which is required to offer the bilingual education program. For this reason, the requirement to publish notice in an alternative language is triggered if the nearest elementary or middle school, as a part of a larger school district, is required to make a bilingual education program available to qualifying students and either the school has students enrolled at such a program on-site, or has students who attend such a program at another location in satisfaction of the school's obligation to provide such a program as a member of a triggered district.

If it is determined that an alternative language notice is required, the applicant is responsible for ensuring that the publication in the alternate language is complete and accurate in that language. Electronic versions of the Spanish template examples are available from the TCEQ to help the applicant complete the publication in the alternative language.

Alternative Language Notice Application Form:

Alternative language notice confirmation for this application:

1. Is a bilingual program required by the Texas Education Code in the school district where the facility is located?  YES  NO

(If NO, alternative language notice publication not required)

2. If YES to question 1, are students enrolled in a bilingual education program at either the elementary school or the middle school nearest to the facility?  YES  NO

(If YES to questions 1 and 2, alternative language publication is required; If NO to question 2, then consider the next question)

3. If YES to question 1, are there students enrolled at either the elementary school or the middle school nearest to the facility who attend a bilingual education program at another location?  YES  NO

(If Yes to questions 1 and 3, alternative language publication is required; If NO to question 3, then consider the next question)

4. If YES to question 1, would either the elementary school or the middle school nearest to the facility be required to provide a bilingual education program but for the fact that it secured a waiver from this requirement, as available under 19 TAC '89.1205(g)?  YES  NO

(If Yes to questions 1 and 4, alternative language publication is required; If NO to question 4, alternative language notice publication not required)

If a bilingual education program(s) is provided by either the elementary school or the middle school nearest to the facility, which language(s) is required by the bilingual program?

Note: Applicants for new permits and major amendments must make a copy of the administratively complete application available at a public place in the county where the facility is, or will be, located for review and copying by the public.

Public place where administratively complete permit application will be located.	
Public Place (e.g., public library, county court house, city hall, etc.):	Not Applicable
Mailing Address:	
(City) (County) ( State) ( Zip Code):	
(Area Code) Telephone Number:	

Except for Type I AE and Type IV AE landfill facilities, for permits, registrations, amendments, and modifications requiring public notice, provide the URL address of a publicly accessible internet web site where the application and all revisions to that application will be posted.

[www.ftwweaverboos.com](http://www.ftwweaverboos.com)

**B. Facility Location (Not Applicable)**

Local Government Jurisdiction:	
Within City Limits of:	
Within Extraterritorial Jurisdiction of City of:	
Is the proposed municipal or industrial solid waste disposal or processing facility located in an area in which the governing body of the municipality or county has prohibited the disposal or processing of municipal or industrial solid waste? (If YES, provide a copy of the ordinance or order):	
<input type="checkbox"/> YES <input type="checkbox"/> NO	

Provide a description of the location of the facility with respect to known or easily identifiable landmarks.

Detail the access routes from the nearest United States or state highway to the facility.

Provide the latitudinal and longitudinal geographic coordinates of the facility.

Latitude	N
Longitude	W
Elevation (above msl)	

Is the facility within the Coastal Management Program boundary?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
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Texas Department of Transportation District Location:

TXDOT District Name & Number:	
District Engineer's Name:	
Street or P. O. Box:	
(City) (County)( State)( Zip Code):	
(Area Code) Telephone Number:	
(Area Code) FAX Number:	

The local governmental authority or agency responsible for road maintenance:

Agency Name	
Contact Person's Name:	
Street or P. O. Box:	
(City) (County)( State)( Zip Code):	
(Area Code) Telephone Number:	
(Area Code) FAX Number:	

State Representative:

District Number:	
State Representative's Name:	
District Office Address:	
(City) (County)( State)( Zip Code):	
(Area Code) Telephone Number:	
(Area Code) FAX Number:	

State Senator:

District Number:			
State Senator's Name:			
District Office Address:			
(City) (County)( State)( Zip Code):			
(Area Code) Telephone Number:			
(Area Code) FAX Number:			

Council of Government (COG) Information:

COG Name:			
COG Representative's Name:			
COG Representative's Title:			
Street or P. O. Box:			
(City) (County)( State)( Zip Code):			
(Area Code) Telephone Number:			
(Area Code) FAX Number:			

River Basin Information:

River Authority:			
Contact Person's Name:			
Watershed Sub-Basin Name:			
Street or P. O. Box:			
(City) (County)( State)( Zip Code):			
(Area Code) Telephone Number:			
(Area Code) FAX Number:			

This site is located in the following District of the U.S. Army Corps of Engineers:			
<input type="checkbox"/> Albuquerque, NM	<input checked="" type="checkbox"/> Ft. Worth, TX	<input type="checkbox"/> Galveston, TX	<input type="checkbox"/> Tulsa, OK

**C. Maps (Not Applicable)**

General

For permits, registrations, and amendments only, submit a topographic map, ownership map, county highway map, or a map prepared by a registered professional engineer or a registered surveyor which shows the facility and each of its intake and discharge structures and any other structure or location regarding the regulated facility and associated activities. Maps must be of material suitable for a permanent record, and shall be on sheets 8-1/2 inches by 14 inches or folded to that size, and shall be on a scale of not less than one inch equals one mile. The map shall depict the approximate boundaries of the tract of land owned or to be used by the applicant and shall extend at least one mile beyond the tract boundaries sufficient to show the following:

- each well, spring, and surface water body or other water in the state within the map area;
- the general character of the areas adjacent to the facility, including public roads, towns and the nature of development of adjacent lands such as residential, commercial, agricultural, recreational, undeveloped, etc;
- the location of any waste disposal activities conducted on the tract not included in the application; and
- the ownership of tracts of land adjacent to the facility and within a reasonable distance from the proposed point or points of discharge, deposit, injection, or other place of disposal or activity.

#### General location maps

For permits, registrations, and amendments only, submit at least one general location map at a scale of one-half inch equals one mile. This map shall be all or a portion of a county map prepared by Texas Department of Transportation (TxDOT). If TxDOT publishes more detailed maps of the proposed facility area, the more detailed maps shall also be included in Part I. Use the latest revision of all maps.

#### Land ownership map

Provide a map that locates the property owned by adjacent and potentially affected landowners. The maps should show all property ownership within 1/4 mile of the facility, on-site facility easement holders, and all mineral interest ownership under the facility.

#### Landowners list

Provide the adjacent and potentially affected landowners' list, keyed to the land ownership map with each property owner's name and mailing address. The list shall include all property owners within 1/4 mile of the facility, easement holders, and all mineral interest ownership under the facility. Provide the property, easement holders', and mineral interest owners' names and mailing addresses derived from the real property appraisal records as listed on the date that the application is filed. Provide the list in electronic form, as well.

#### **D. Property owner information (Not Applicable)**

For permits, registrations, amendments, and modifications that change the legal description, a change in owner, or a change in operator only, provide the following:

(1) the legal description of the facility;

- (A) the abstract number as maintained by the Texas General Land Office for the surveyed tract of land;
- (B) the legal description of the property and the county, book, and page number or other generally accepted identifying reference of the current ownership record;
- (C) for property that is platted, the county, book, and page number or other generally accepted identifying reference of the final plat record that includes the acreage encompassed in the application and a copy of the final plat, in addition to a written legal description;
- (D) a boundary metes and bounds description of the facility signed and sealed by a registered professional land surveyor;
- (E) on-site easements at the facility, and
- (F) drawings of the boundary metes and bounds description; and

(2) a property owner affidavit signed by the owner.

#### **E. Legal authority (Not Applicable)**

Provide verification of the legal status of the owner and operator, such as a one-page certificate of incorporation issued by the secretary of state. List all persons having over a 20% ownership in the proposed facility.

Indicate Ownership status of the facility:									
<input type="checkbox"/>	Private	<input type="checkbox"/>	Corporation	<input type="checkbox"/>	Partnership	<input type="checkbox"/>	Proprietorship	<input type="checkbox"/>	Non-Profit Organization
<input type="checkbox"/>	Public	<input type="checkbox"/>	Federal	<input type="checkbox"/>	Military	<input type="checkbox"/>	State	<input type="checkbox"/>	Regional
<input type="checkbox"/>	County	<input type="checkbox"/>	Municipal	<input type="checkbox"/>	Other (Specify)				

Does the operator own the facility units and the facility property?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
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If "No," for permits, registrations, amendments, and modifications that changes the legal description, a change in owner, or a change in operators submit a copy of the lease for the use of or the option to buy the facility units or facility property, as appropriate, and identify:

Owner Name:	Not Applicable
Street or P. O. Box:	
(City) (County)( State)( Zip Code):	
(Area Code) Telephone Number:	
(Area Code) FAX Number:	
Charter Number:	

**F. Evidence of competency (Not Applicable)**

For permits, registrations, amendments, and modifications that change the legal description, a change in owner, or a change in operators submit a list of all Texas solid waste sites that the owner and operator have owned or operated within the last ten years.

Site Name	Site Type	Permit/Reg. No.	County	Dates of Operation
Not Applicable				

Submit a list of all solid waste sites in all states, territories, or countries in which the owner and operator have a direct financial interest.

Site Name	Location	Dates of Operation	Regulatory Agency (Name & Address)
Not Applicable			

A licensed solid waste facility supervisor, as defined in 30 TAC Chapter 30, Occupational Licenses and Registrations will be employed before commencing facility operation.

Provide the names of the principals and supervisors of the owner's and operator's organization, together with previous affiliations with other organizations engaged in solid waste activities.

Name	Previous Affiliation	Other Organization
Not Applicable		

For landfill permit applications only, evidence of competency to operate the facility shall also include landfilling and earthmoving experience if applicable, and other pertinent experience, or licenses as described in 30 TAC Chapter 30 possessed by key personnel. The number and size of each type of equipment to be dedicated to facility operation will be specified in greater detail on Part IV of the application within the site operating plan.

Landfilling/Earthmoving Equipment Types	Personnel Experience or Licenses
Not Applicable	

For mobile liquid waste processing units, submit a list of all solid waste, liquid waste, or mobile waste units that the owner and operator have owned or operated within the past five years. Submit a list of any final enforcement orders, court judgments, consent decrees, and criminal convictions of this state and the federal government within the last five years relating to compliance with applicable legal requirements relating to the handling of solid or liquid waste under the jurisdiction of the commission or the United States Environmental Protection Agency. Applicable legal requirement means an environmental law, regulation, permit, order, consent decree, or other requirement.

Solid waste, liquid waste, or mobile waste units owned or operated within past 5 years	Texas and federal final enforcement orders, court judgments, consent decrees, and criminal convictions
Not Applicable	

**G. Appointments (Not Applicable)**

Provide documentation that the person signing the application meets the requirements of 30 TAC §305.44, Signatories to Applications. If the authority has been delegated, provide a copy of the document issued by the governing body of the owner or operator authorizing the person that signed the application to act as agent for the owner or operator.

**H. Application Fees**

For a new permit, registration, amendment, modification, or temporary authorization, submit a \$150 application fee.

For authorization to construct an enclosed structure over an old, closed municipal solid waste landfill in accordance with 30 TAC 330 Subchapter T, submit a \$2,500 application fee.

If paying by check, send payment to:

Texas Commission on Environmental Quality  
 Financial Administration Division, MC 214  
 P. O. Box 13087  
 Austin, Texas 78711-3087

Payment maybe made online using TCEQ e-pay at <a href="http://www.tceq.state.tx.us/e-services/">www.tceq.state.tx.us/e-services/</a>	
E-pay confirmation number	582EA000113227

**PROPERTY OWNER AFFIDAVIT**

"I, \_\_\_\_\_,  
(property owner)

acknowledge that the State of Texas may hold me either jointly or severally responsible for the operation, maintenance, and closure and post-closure care of the facility. For a facility where waste will remain after closure, I acknowledge that I have a responsibility to file with the county deed records an affidavit to the public advising that the land will be used for a solid waste facility prior to the time that the facility actually begins operating as a municipal solid waste landfill facility, and to file a final recording upon completion of disposal operations and closure of the landfill units in accordance with Title 30 Texas Administrative Code §330.19, Deed Recordation. I further acknowledge that I or the operator and the State of Texas shall have access to the property during the active life and post-closure care period, if required, after closure for the purpose of inspection and maintenance."

\_\_\_\_\_  
(Owner signature)

\_\_\_\_\_  
(Date)

Signature Page

I, Michael Stewart Environmental Manager, BFI Waste Systems of North America, LLC  
(Operator) (Title)

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: *Michael Stewart* Date: 12/21/2011

-----  
TO BE COMPLETED BY THE OPERATOR IF THE APPLICATION IS SIGNED BY AN AUTHORIZED REPRESENTATIVE FOR THE OPERATOR

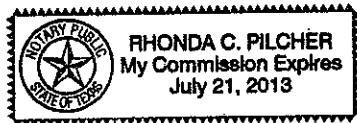
I, \_\_\_\_\_, hereby designate \_\_\_\_\_  
(Print or Type Operator Name) (Print or Type Representative Name)

as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

\_\_\_\_\_  
Printed or Typed Name of Operator or Principal Executive Officer

\_\_\_\_\_  
Signature

-----  
SUBSCRIBED AND SWORN to before me by the said Michael Stewart  
On this 21<sup>st</sup> day of December, 2011  
My commission expires on the 21<sup>st</sup> day of July, 2013



*Rhonda C. Pilcher*  
Notary Public in and for  
Hays County, Texas

(Note: Application Must Bear Signature & Seal of Notary Public)