ATTACHMENT 5

GROUNDWATER MONITORING PLAN

FAIRBANKS LANDFILL
HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW 1565B

PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 5
GROUNDWATER MONITORING PLAN

Prepared for

USA WASTE OF TEXAS LANDFILLS, INC.
A WASTE MANAGEMENT COMPANY

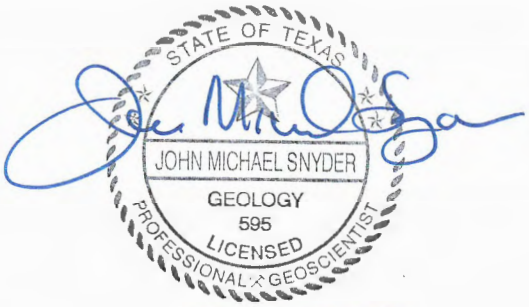
August 2013

Prepared by

BIGGS & MATHEWS ENVIRONMENTAL
1700 Robert Road, Suite 100 • Mansfield, Texas 76063 • 817-563-1144

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

TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS
FIRM REGISTRATION NO. 50222



8-12-2013

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GROUNDWATER MONITORING SYSTEM DESIGN CERTIFICATION

General Site Information

Site: Fairbanks Landfill

Site Location: Harris County, Texas

MSW Permit Application No.: 1565B

Qualified Groundwater Scientist Statement

I, Michael Snyder, am a licensed professional geoscientist in the State of Texas and a qualified groundwater scientist as defined in 30 TAC §330.3. I have reviewed the groundwater monitoring system and supporting data contained herein. In my professional opinion, the groundwater monitoring system is in compliance with the groundwater monitoring requirements specified in 30 TAC §330.401 through §330.421. This system has been designed for specific application to the Fairbanks Landfill (Permit Application No. MSW 1565B). The only warranty made by me in connection with this document is that I have used that degree of care and skill ordinarily exercised under similar conditions by reputable members of my profession, practicing in the same or similar locality. No other warranty, expressed or implied, is intended.

Firm/Address: Biggs and Mathews Environmental, Inc.
1700 Robert Road, Suite 100
Mansfield, Texas 76063

Signature: _____

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST

Michael Snyder, P.G.
No. 595-Texas

Date: 8-12-2013

1 SITE HYDROGEOLOGY

1.1 Hydrogeologic Units

1.1.1 Layer II Groundwater Zone

As described in Section 4.4, site stratigraphy is divided into five geologic units: Layer I (surficial sand, silt, and clay), Layer II (sand), Layer III (clay), Layer IV (sand) and Layer V (clay). The uppermost groundwater zone at the site is the Layer II sand unit. Water levels measured in site monitoring wells and exploratory borings indicate that groundwater in the upper Layer II sand unit occurs under generally unconfined, water-table conditions and is confined or retarded at its lower limit by the underlying Layer III clay. The thickness of Layer II ranges from approximately 20 to 40 feet and has an average thickness of approximately 35 feet. Open excavations on the site and adjacent properties have been excavated for sand mining and waste filling operations. Over most of the existing site the Layer II sand has been removed. When the excavation for the proposed waste area is complete Layer II will have been entirely removed across both the existing site and the proposed expansion area (see Attachment 4, Figure 4C-9, 4F-2, and 4F-3). Groundwater levels in Layer II are affected by natural dewatering related to evaporation in the open excavation. Monitoring wells and piezometers near the open excavations are frequently dry. Figure 4F-1 is a potentiometric surface map constructed from water levels in site piezometers during the site characterization prior to site excavation. Figure 4F-2 shows a potentiometric surface constructed from groundwater monitoring wells and piezometers from a May 2012 water level reading event. Groundwater currently only flows in the limited areas where Layer II still exists. Figure 4F-3 depicts that all Layer II will have been removed from the site when the expansion area is excavated.

1.1.2 Layer III Confining Unit

The low permeability (predominantly CH clay) and continuity of Layer III enable this thick clay unit to function as the confining unit between the uppermost Layer II sand groundwater zone and the deeper Layer IV sand. The thickness of Layer III clay encountered at the site ranges from approximately 18 to 34 feet and averages approximately 27 feet. The proposed landfill bottom will be excavated in the Layer III clay.

Three Layer III clay piezometers, P-3A, P-E1, and P-5A, were installed in July and August 1997. Water levels measured in these piezometers indicate that groundwater in this clay unit is limited and that the permeability of the clay is low. Piezometer P-E1 in the northwest corner of the site was basically dry until October 1997, with less than 1 foot of water in the bottom of the well. Water level measurement in P-E1 is 57.80 feet above msl, indicating a very slow recovery rate of less than 0.02 feet per day. P-5A in the southwest corner of the site has had approximately two feet of water column since its

installation in August 1997. Because the clay piezometer borings were completed using wet rotary drilling techniques, the small volumes of water observed in these wells are probably artifacts of the drilling fluid. The highest groundwater elevation in P-3A was observed on November 21, 1997, at 63.96 feet above msl. The recovery rate for P-3A is about 0.03 feet per day. The high groundwater elevation (63.96 feet above msl) in the Layer III clay is 35 feet lower than the highest water level in the overlying Layer II groundwater zone and 10 feet higher than the highest water level in the underlying Layer IV groundwater zone.

1.1.3 Layer IV Uppermost Aquifer

Layer IV consists primarily of soil, silty sand, and gravel. It occurs below the Layer III sands and is the uppermost aquifer. The maximum thickness explored was approximately 60 feet; the average thickness of the Layer IV sand is approximately 50 feet.

Three Layer IV sand piezometers, P-3B, P-E2, and P-5B, were installed in July and August 1997. Groundwater elevations measured since August 5, 1997, indicate that water levels are stable in these wells. An additional five Layer IV sand piezometers, P-6 through P-10, were installed in October 1997. Eight monitoring wells (MW-8 through MW-15) were installed in 1997. Two piezometers were installed in the expansion area in 2012 as part of this study. The highest measured water level elevation in Layer IV was observed on July 16, 2009 is 54.62 feet above msl in monitoring well MW-15. This elevation is approximately 10 feet lower than the highest measured elevation in the overlying Layer III clay and approximately 55 feet lower than the highest elevation in the uppermost Layer II groundwater zone, indicating that these three geologic units are not hydraulically connected. Groundwater in the Layer IV sand is confined. Layer IV groundwater elevations are listed in Table 4-6 and Table 4-7.

1.1.1 Layer V Lower Confining Unit

Layer V is a continuous, low permeability clay layer that functions as the lower confining unit to the overlying Layer IV groundwater zone. The maximum thickness explored was approximately 30 feet. Laboratory hydraulic conductivity tests on samples of the Layer V clay resulted in hydraulic conductivity values of 4.8×10^{-8} and 2.1×10^{-8} centimeters per second (cm/sec). Layer V is interpreted to be continuous across the site. Its composition and permeability is similar to the Layer III clay, making it an effective lower confining unit.

1.2 Groundwater Flow Direction and Rate

Shallow groundwater in the site area naturally flows to the southeast. Because extensive excavation activities have removed a large portion of the sands in the uppermost Layer II zone, shallow groundwater flow within the site boundary is toward open excavations. As areas of the landfill are lined and filled, shallow groundwater outside of the liner system will resume flow generally to the southeast.

Groundwater flow in the deeper Layer IV sand unit is to the northwest. Groundwater in Layer IV is confined at its upper limit by the overlying Layer III clay and at its lower limit by the underlying Layer V clay. Groundwater in the deeper Layer IV zone is not hydraulically connected to groundwater in the uppermost Layer II zone or the deeper Chicot Aquifer sand unit.

Groundwater velocity for the deeper Layer IV uppermost aquifer was calculated using the geometric mean of the hydraulic conductivity values from slug tests in Layer IV piezometers (see Attachment 4, Section 6.2), hydraulic gradients from the potentiometric surface maps on Figures 4F-4 and 4F-15 in Appendix 4F, and an effective porosity of 30 percent for fine sand. Calculations indicate that groundwater in Layer IV moves approximately four feet per year (see Figure 4F-16).

2 GROUNDWATER MONITORING SYSTEM

2.1 Existing Monitoring Well Locations

Groundwater occurs and is being monitored in two subsurface units: the uppermost aquifer, Layer IV and the uppermost groundwater zone, Layer II. The Layer II sand is currently monitored by eight monitoring wells (MW-1A, MW-2A, MW-2B, MW-3A, MW-5A, MW-6A and MW-7B). While Layer IV sand is monitored by eight monitoring wells, seven downgradient (MW-8 through MW-14) and one upgradient monitoring well (MW-15).

2.2 Proposed Groundwater Monitoring System

2.2.1 Layer II Monitoring Wells

Over most of the site Layer II has been removed by previous sand mining and waste fill excavation. Once the expansion area is excavated into the Layer III clay, Layer II will have been removed across both the existing site and the proposed expansion area (see Figure 4C-9). Sand mining activities have removed all of the Layer II sands up to, and in some cases, beyond the permit boundary on the eastern and southern boundaries as shown on the cross sections included in Attachment 4, Appendix 4C, Figures 4C-2 through 4C-8. Because the Layer II sand will not exist in the permit boundary, no monitoring is proposed for Layer II (see Figures 4C-9, 4F-2, and 4F-3).

2.2.2 Layer IV Monitoring Wells

There will be a total of eight monitoring wells; one upgradient well (MW-15R) and seven downgradient wells (MW-8 through MW-14) monitoring Layer IV. The groundwater monitoring design and monitoring well locations are shown on Figure 5A-1. Monitoring wells details are provided on Figure 5A-2. The point of compliance has been determined at the downgradient northern and most of the western boundary of the site, as shown in Appendix 5A on Figure 5A.1. This POC is located within 500 feet from the waste management unit.

2.3 Monitoring Well Design

In accordance with §330.421 – Monitor Well Construction Specifications, a licensed Texas driller will install monitoring wells in accordance with the regulations. Wells will be drilled by a method that will not introduce contaminants into the borehole or casing. A licensed professional geoscientist or engineer who is familiar with the geology of the area will supervise monitoring well installation and development and will provide a log of the boring. Equivalent alternatives to TCEQ rules may be used if prior written approval is obtained from the executive director. Monitoring well construction details including screen intervals, well locations and elevations, filter pack and bentonite seal elevations, and surface

completion are shown on Figure 5A-2. Monitoring well construction will be completed in accordance with §§330.63, 330.403, and 330.421.

If any fluid is required in the drilling of monitoring wells, clean, treated city water shall be used and a chemical analysis provided to the executive director. No glue or solvents will be used in monitoring well construction.

After installation, monitoring wells will be developed to remove drilling artifacts and open the water-bearing zone for maximum flow until all water used or affected during drilling activities is removed and field measurements of pH, specific conductance, and temperature are stabilized.

A registered professional land surveyor will survey the well location and elevation.

Within 30 days of completion of a monitoring well or any other part of a monitoring system, an installation report will be submitted. The report will include construction and installation details for each well on forms available from the commission, a site map drawn to scale showing the location of all monitoring wells and the relevant point(s) of compliance, well elevations to the nearest 0.01 foot above msl (with year of datum shown), latitude and longitude or landfill grid location of each well, copies of detailed geologic logs including soil sample data, and copies of driller's reports required by other agencies.

Damaged monitoring wells that are no longer usable will be reported to the executive director for a determination whether to replace or repair the well. In accordance with 30 TAC §305.70, if a compromised well requires replacement a permit modification request will be submitted within 45 days of the discovery.

Plugging and abandonment of monitoring wells will be performed in accordance with 16 TAC §76.702 and §76.1004. No abandonment will be performed without prior written authorization.

All parts of the groundwater monitoring system will be operated and maintained so that they perform at least to design specifications throughout the life of the groundwater monitoring program.

The facility must notify the executive director if changes in site construction or operation or changes in adjacent property affect or are likely to affect the direction and rate of groundwater flow and the potential for detecting groundwater contamination from the facility.

2.4 Groundwater Monitoring Program

A Groundwater Sampling and Analysis Plan (GWSAP) for the site is contained in Appendix 5B. Annual sampling and analytical testing for the proposed monitoring system will be performed in accordance with the TCEQ regulations outlined in 30 TAC §330.417.

3 GROUNDWATER QUALITY

Groundwater monitoring is being conducted in accordance with the Groundwater Sampling and Analysis Plan (GWSAP) approved by the TCEQ on May 12, 2009. Four quarterly background monitoring events have been completed for each of the monitoring wells at the facility. Background sampling consisted of required TCEQ monitoring parameters that are listed in Appendix 5B, Table 5B-1 of this attachment. Annual detection monitoring is currently conducted for all facility wells. A tabulation of the historical groundwater analytical data is provided in Attachment 4, Appendix 4G.

The Subtitle D monitoring well system for this Type IV facility was installed in 1999 and the first monitoring event was performed in April 2000. Annual groundwater monitoring reports have been submitted each year since 2000 that included the analytical results, a potentiometric map, time series plots of constituent concentrations, and descriptive analysis of the groundwater flow and groundwater quality indicator results.

Since the initial monitoring event, a one-time detection of trichloroethylene at 13 µg/L in MW-1A occurred in the August 2001 event; it has not been detected since that event.

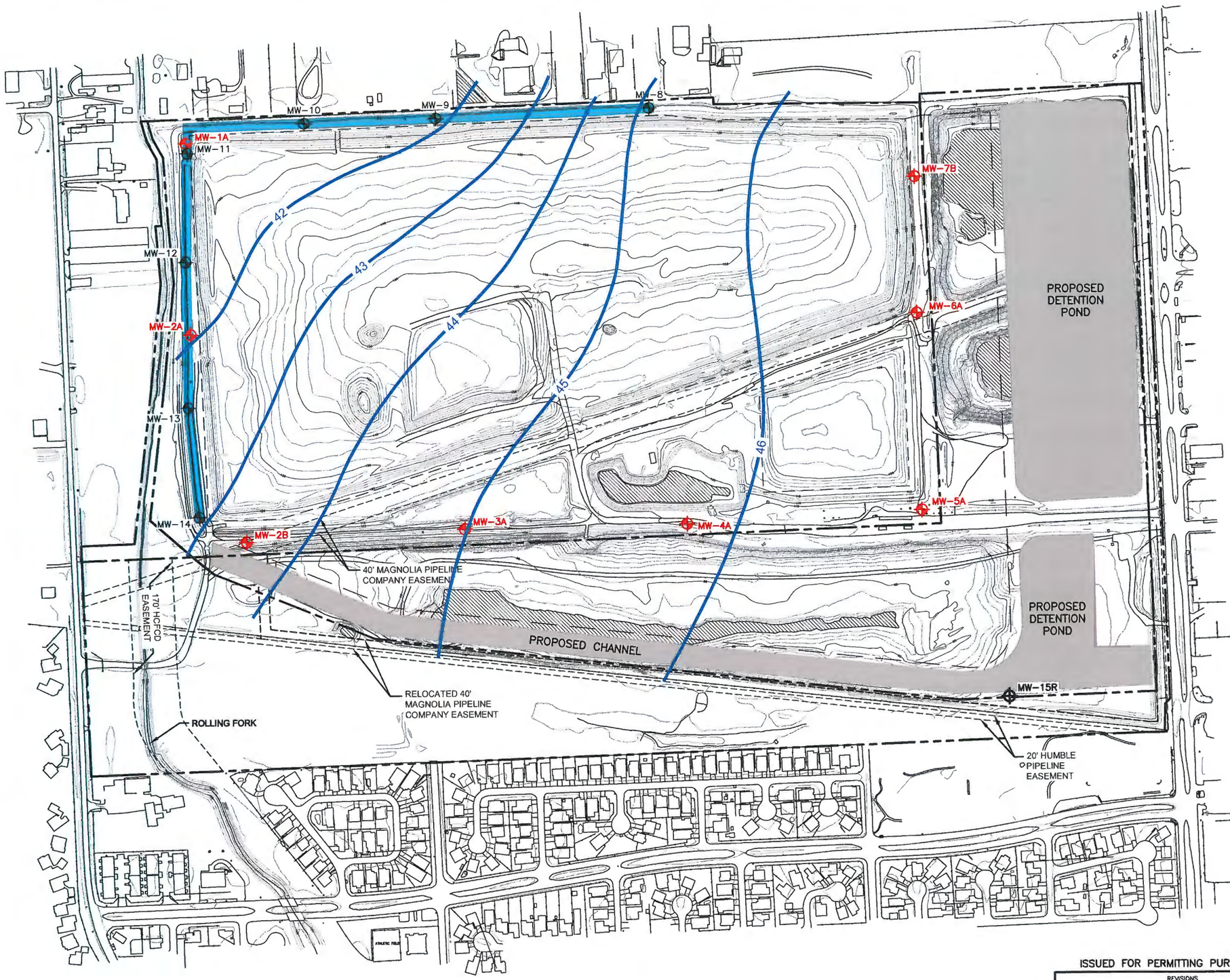
Arsenic was detected above its MCL in 2007 and 2008 in MW-4 and MW-14. An investigation of the arsenic concentrations detected was conducted in March 2007 by Pastor, Behling, and Wheeler, LLC and the results submitted to TCEQ in a report. The investigation findings showed that the elevated arsenic concentrations were a result of localized reduction/oxidation changes in the Layer IV groundwater causing reductive dissolution of naturally occurring arsenic in soils and not due to a release of leachate from the landfill. These results were accepted in both the 2007 and 2008 annual groundwater monitoring report acknowledgement letters from TCEQ (dated November 9, 2007 and September 10, 2008).

No trends or patterns are apparent in examining the groundwater sampling results. Detection monitoring will continue in accordance with the approved GWSAP. Background will be established for new monitoring wells proposed for the site. No facility wells are in assessment monitoring.

APPENDIX 5A

GROUNDWATER MONITORING WELL SYSTEM

8-12-2013



0 200 400
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- PROPOSED PERMIT BOUNDARY
- PROPERTY BOUNDARY
- PERMITTED FOOTPRINT
- PROPOSED FOOTPRINT
- MW-10 — MONITOR WELL LOCATION (STRATUM IV)
- MW-5A — MONITORING WELL TO BE PLUGGED (STRATUM II)
- POINT OF COMPLIANCE
- 43 — POTENTIOMETRIC CONTOUR FROM MAY, 2012 (FIGURE 4F.4)

NOTE:

1. TOPOGRAPHY FROM AERIAL PHOTOGRAPHY BY DALLAS AERIAL SURVEYS, INC., DATED 03/26/2012.

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST

8-12-2013

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REVISIONS						
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

GROUNDWATER MONITORING SYSTEM

WASTE MANAGEMENT OF TEXAS, INC.
FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION

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

TBPE FIRM NO. F-256 | TBPG FIRM NO. 50222

DSN. JMS	DATE : 7/13	FIGURE
DWN. SRC	SCALE : GRAPHIC	5A-1
CHK. JMS	DWG : 5A-1_GWMWPlan.dwg	

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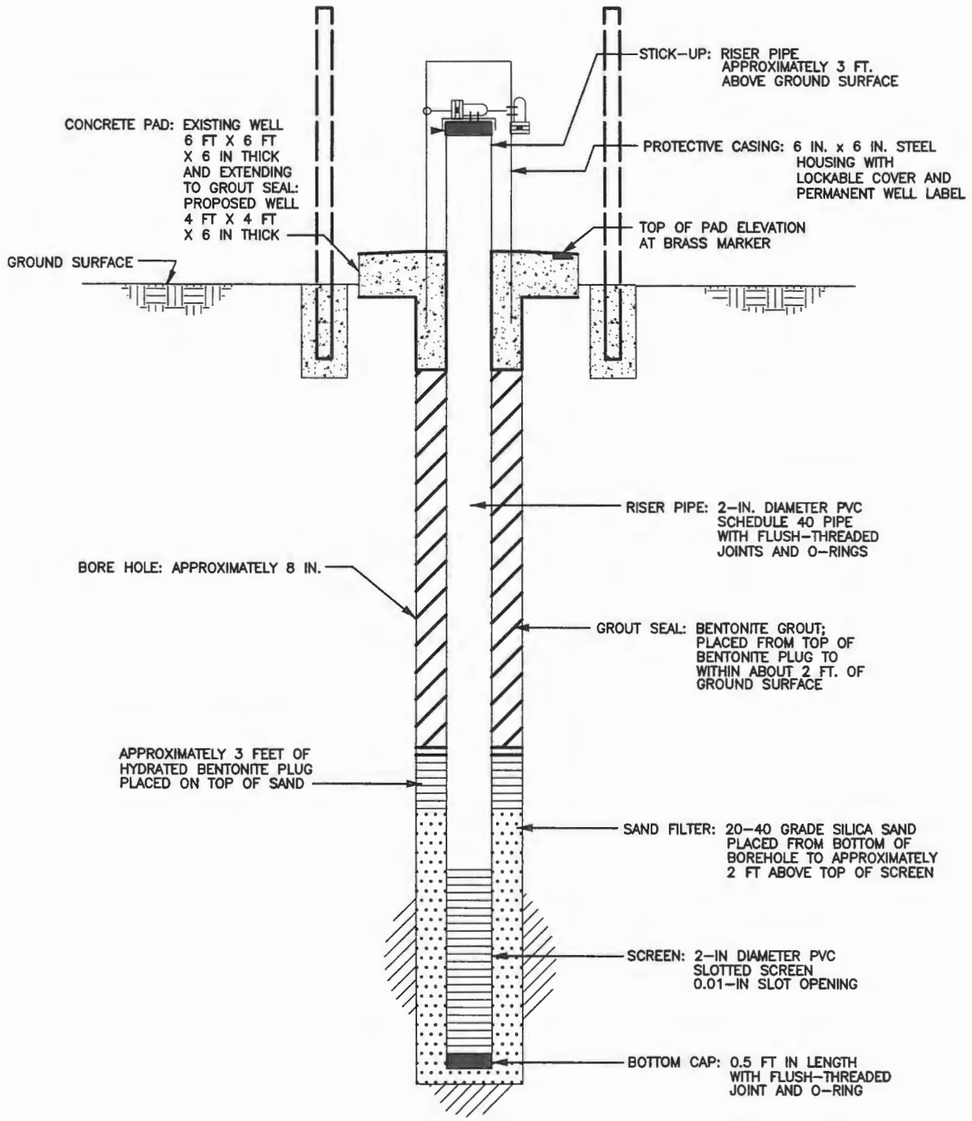
TYPICAL MONITORING WELL DETAIL



MONITORING WELL NO.	NORTHING	EASTING	GROUND ELEVATION	TOTAL WELL DEPTH	SCREEM ELEVATIONS (ft-msl)		TOP OF FILTER PACK (ft-msl)	TOP OF BENTONITE SEAL (ft-msl)
					FROM	TO		
STRATUM IV MONITORING WELLS								
MW-8	13892749.2	3067353.2	112.4	99.5	18.4	13.4	22.4	25.4
MW-9	13892713.9	3066521.9	113.7	96.0	23.2	18.2	25.6	30.2
MW-10	13892696.8	3066007.2	112.7	97.0	21.2	16.2	36.2	40.2
MW-11	13892581.8	3065552.0	112.1	81.0	36.6	33.6	40.6	45.1
MW-12	13892159.2	3065545.3	112.5	123.1	-5.1	-0.1	-1.9	1.7
MW-13	13891593.0	3065554.2	112.8	123.4	-5.1	-0.1	-1.1	1.9
MW-14	13891167.8	3065595.8	112.9	87.1	31.3	26.3	34.9	38.3
MW-15R*	13890455.9	3068750.0	102.5±	100	7.5	2.5	9.5	13.5

* ACTUAL DETAILS WILL BE DETERMINED IN THE FIELD BASED ON LITHOLOGICAL OBSERVATIONS DURING INSTALLATION.

NOTE:

1. ELEVATIONS AND DEPTHS OF THE PROPOSED WELLS MAY VARY DEPENDING ON ACTUAL SUBSURFACE CONDITIONS OBSERVED AT THE TIME OF INSTALLATION.
2. GROUND ELEVATIONS ARE BASED ON SITE BENCHMARK SURVEY ESTABLISHED 2012.
3. MONITORING WELL DATA SHEETS FOR EXISTING WELLS INCLUDED AS FIGURE 5A.3 THROUGH 5A.___.

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST

8-12-2013

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REVISIONS							
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	

MONITORING WELL DETAIL

WASTE MANAGEMENT OF TEXAS, INC.
FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION

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

TBPE FIRM NO. F-256 | TBPG FIRM NO. 50222

DSN. ESF | DATE : 7/13
DWN. SRC | SCALE : GRAPHIC
CHK. JMS | DWG : 5A-2_MonWellDetail.dwg

FIGURE 5A-2

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Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation 1/6/99
Monitor Well Latitude: 29°54'15.64" Longitude: 95°31'51.57"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

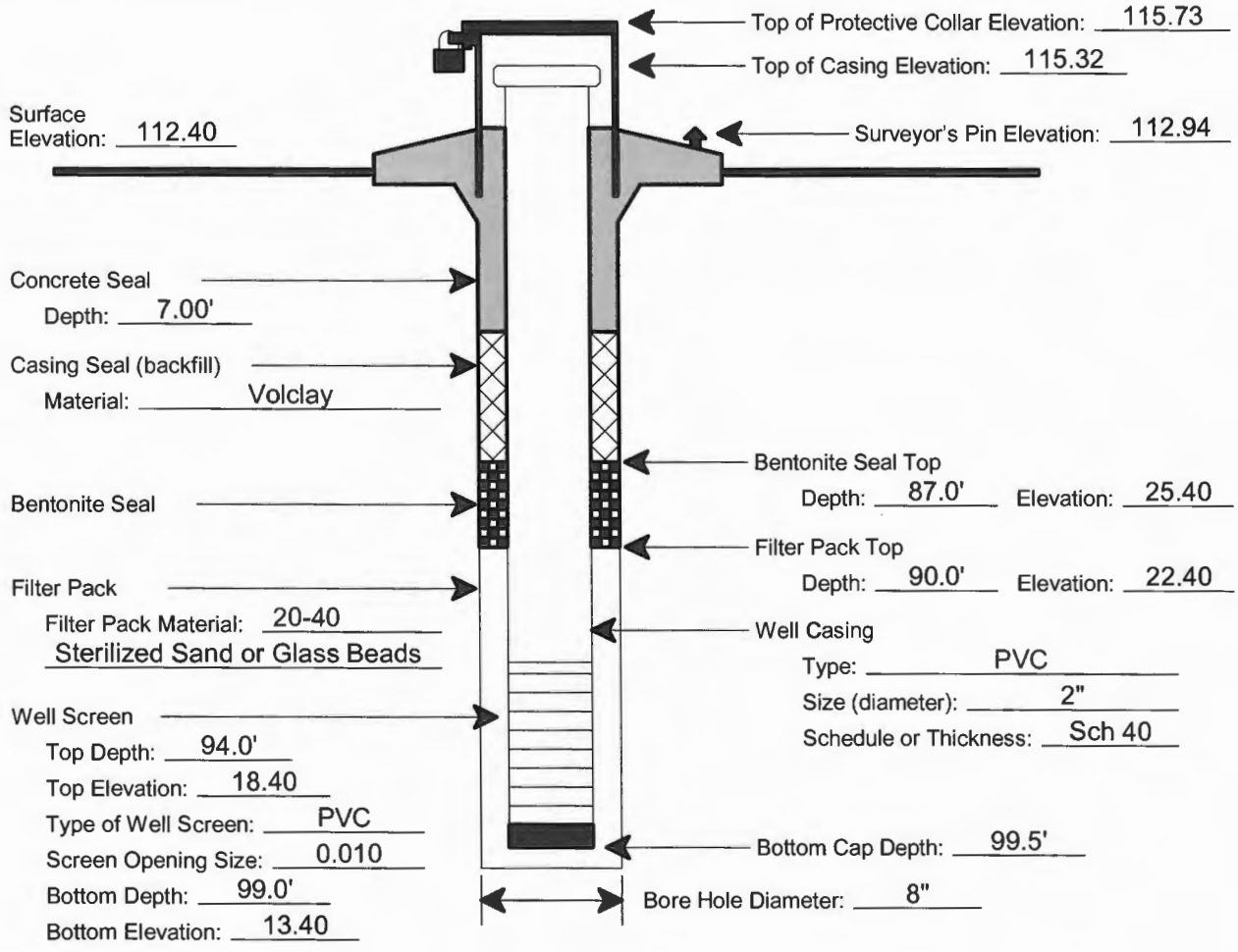
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-8
Date of Monitor Well Development: 2/16/99
Monitor Well Driller Name: T. E. Mathers
License No.: 3096W

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Stefan Stamoulis
Static Water Level Elevation (with respect to MSL) after Well Development: 49.94
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 3'x3'x4"



TCEQ-10308

Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation: 11/4/98
Monitor Well Latitude: 29°54'15.54" Longitude: 95°32'1.25"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

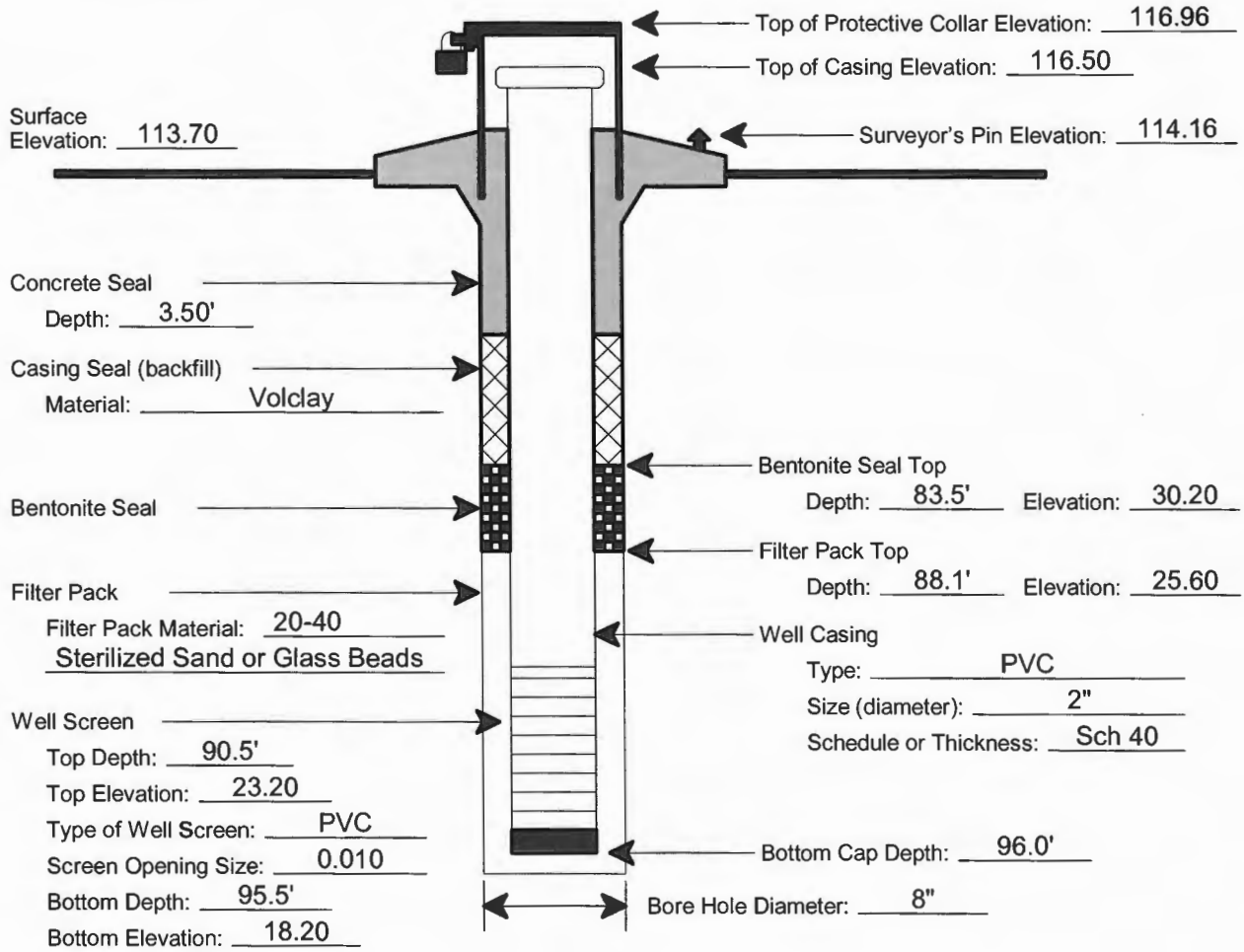
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-9
Date of Monitor Well Development: 2/12/99
Monitor Well Driller Name: T. E. Mathers
License No.: 3096W

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Stefan Stamoulis
Static Water Level Elevation (with respect to MSL) after Well Development: 50.29
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 3'x3'x4"



TCEQ-10308

Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation: 1/8/99
Monitor Well Latitude: 29°54'15.52" Longitude: 95°32'6.87"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

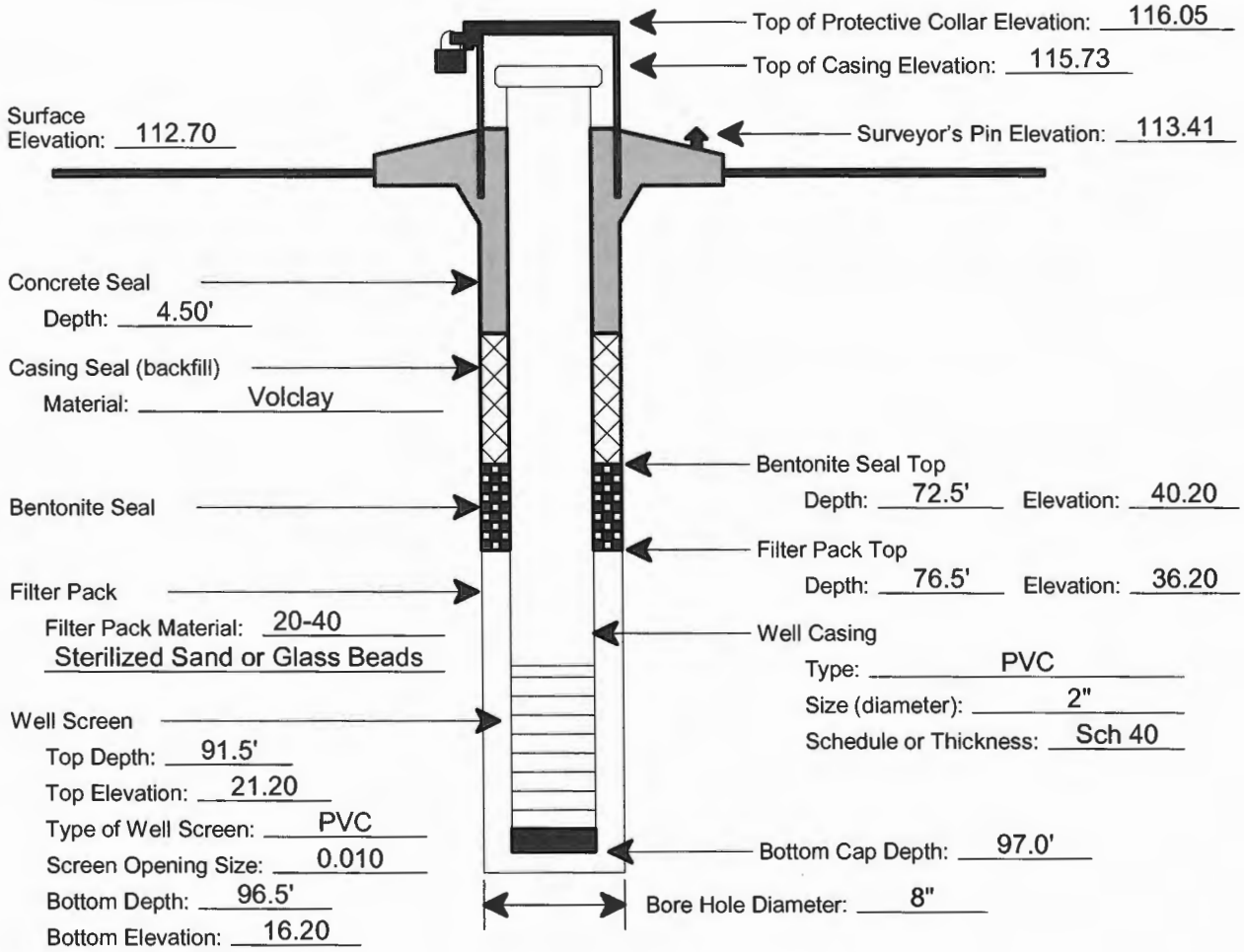
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-10
Date of Monitor Well Development: 2/12/99
Monitor Well Driller Name: T. E. Mathers
License No.: 3096W

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Stefan Stamoulis
Static Water Level Elevation (with respect to MSL) after Well Development: 48.17
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 3'x3'x4"



TCEQ-10308

Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation: 12/2/98
Monitor Well Latitude: 29°54'14.53" Longitude: 95°32'12.08"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

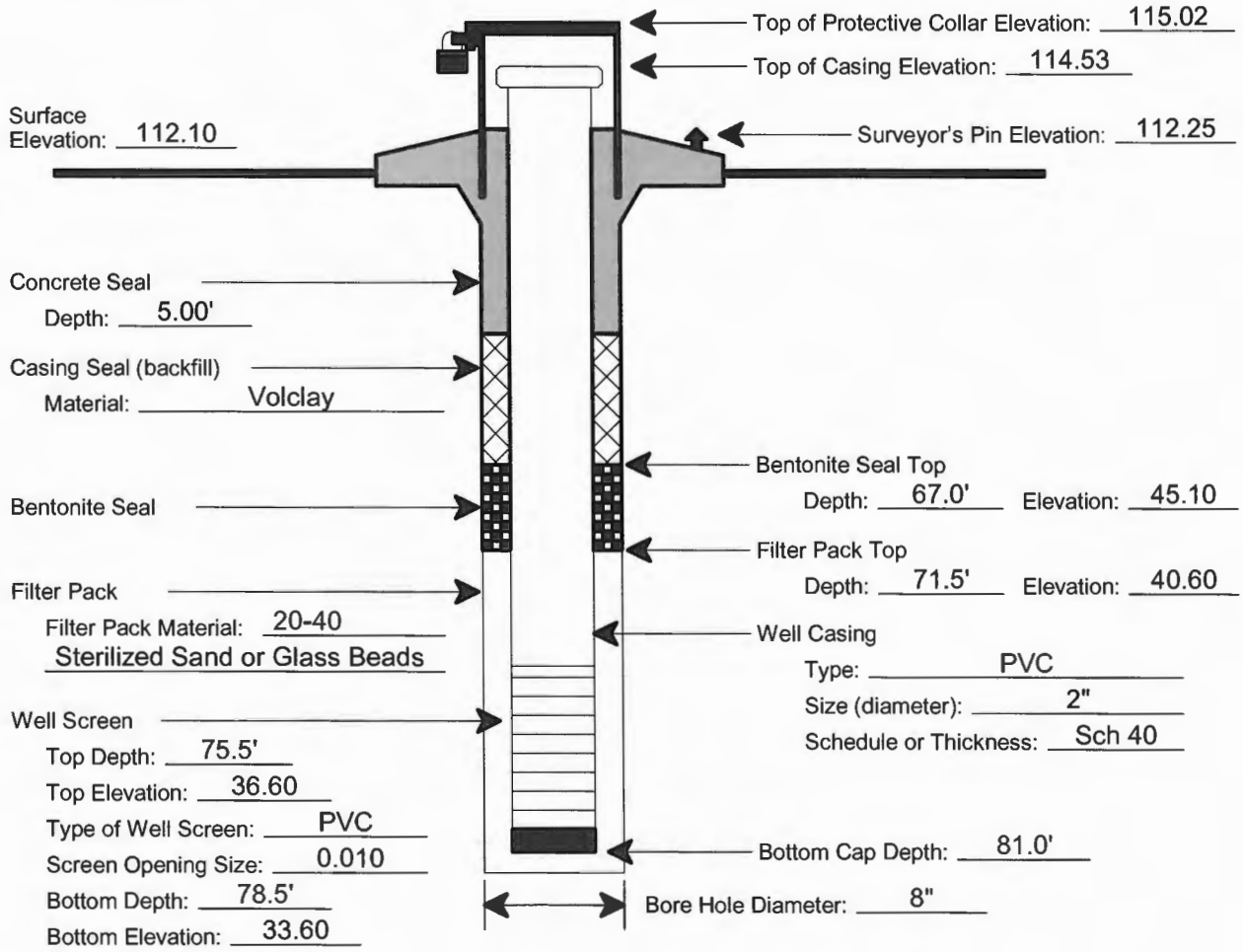
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-11
Date of Monitor Well Development: 2/5/99
Monitor Well Driller Name: T. E. Mathers
License No.: 3096W

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Stefan Stamoulis
Static Water Level Elevation (with respect to MSL) after Well Development: 48.54
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 3'x3'x4"



TCEQ-10308

Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation 12/17/98
Monitor Well Latitude: 29°54'10.35" Longitude: 95°32'12.3"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

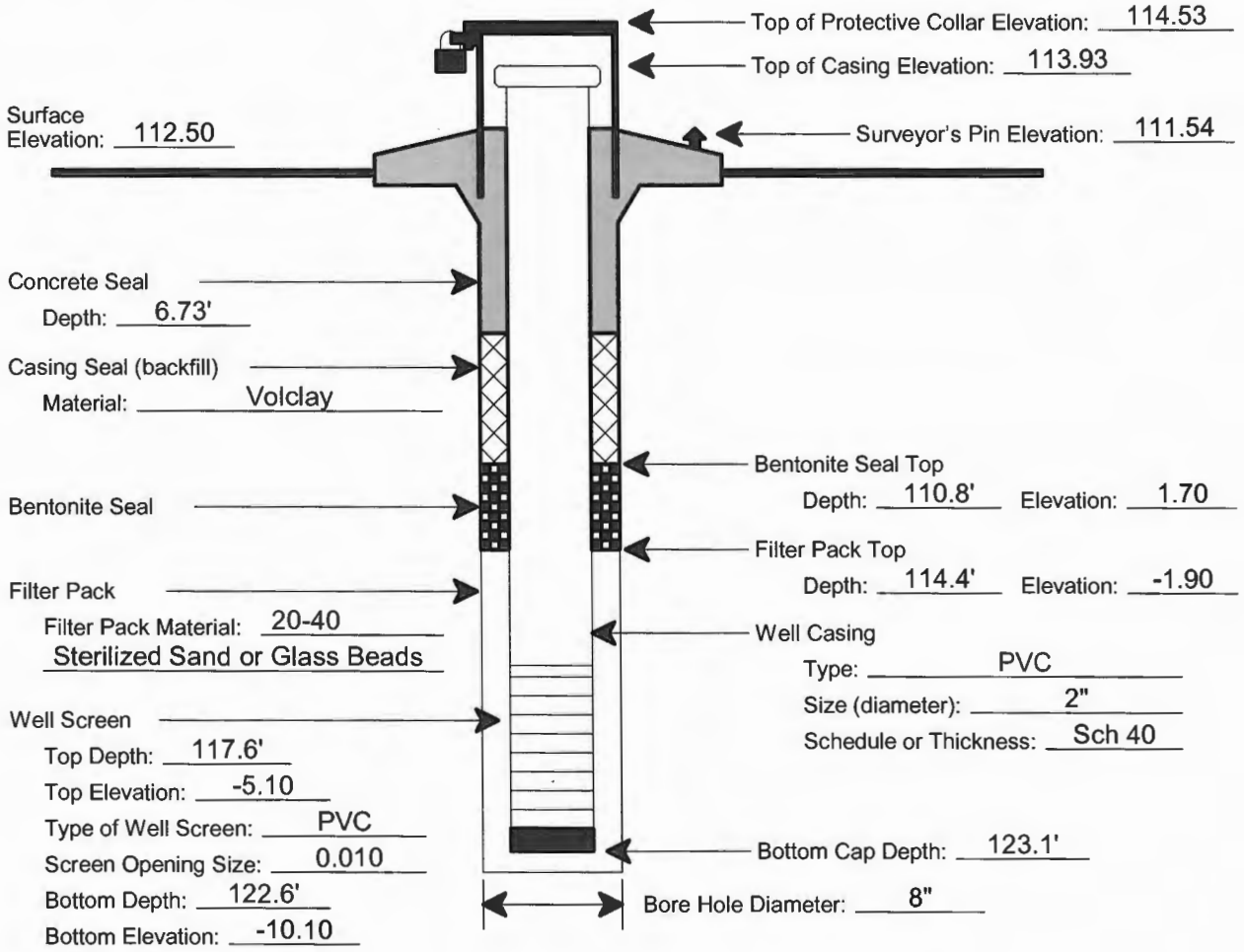
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-12
Date of Monitor Well Development: 2/8/99
Monitor Well Driller Name: T. E. Mathers
License No.: 3096W

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Stefan Stamoulis
Static Water Level Elevation (with respect to MSL) after Well Development: 47.99
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 3'x3'x4"



TCEQ-10308

Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation: 12/16/98
Monitor Well Latitude: 29°54'4.74" Longitude: 95°32'12.39"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

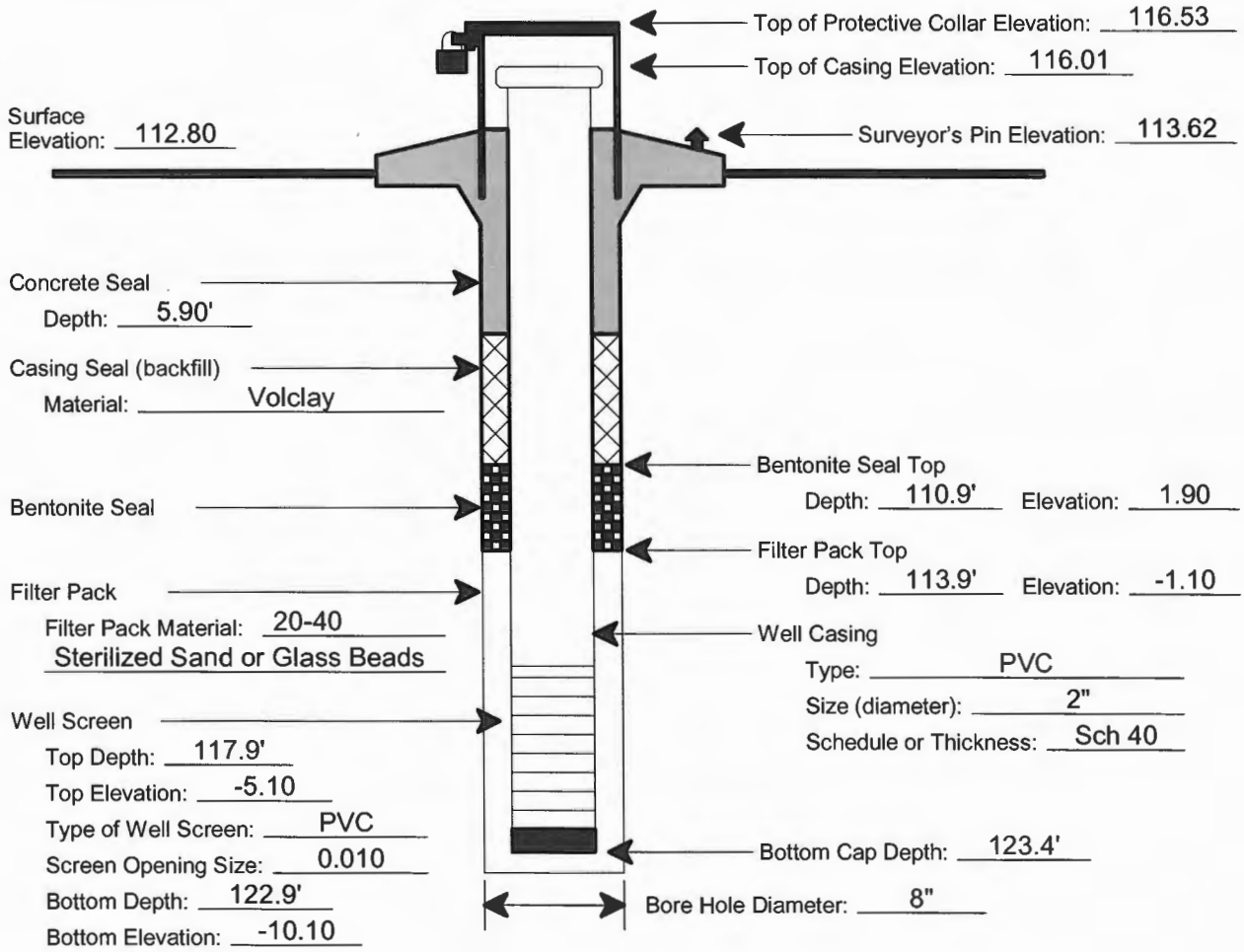
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-13
Date of Monitor Well Development: 2/15/99
Monitor Well Driller Name: T. E. Mathers
License No.: 3096W

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Stefan Stamoulis
Static Water Level Elevation (with respect to MSL) after Well Development: 48.35
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 4'x4'x4"



TCEQ-10308

Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation: 12/28/98
Monitor Well Latitude: 29°54'60.52" Longitude: 95°32'12.05"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

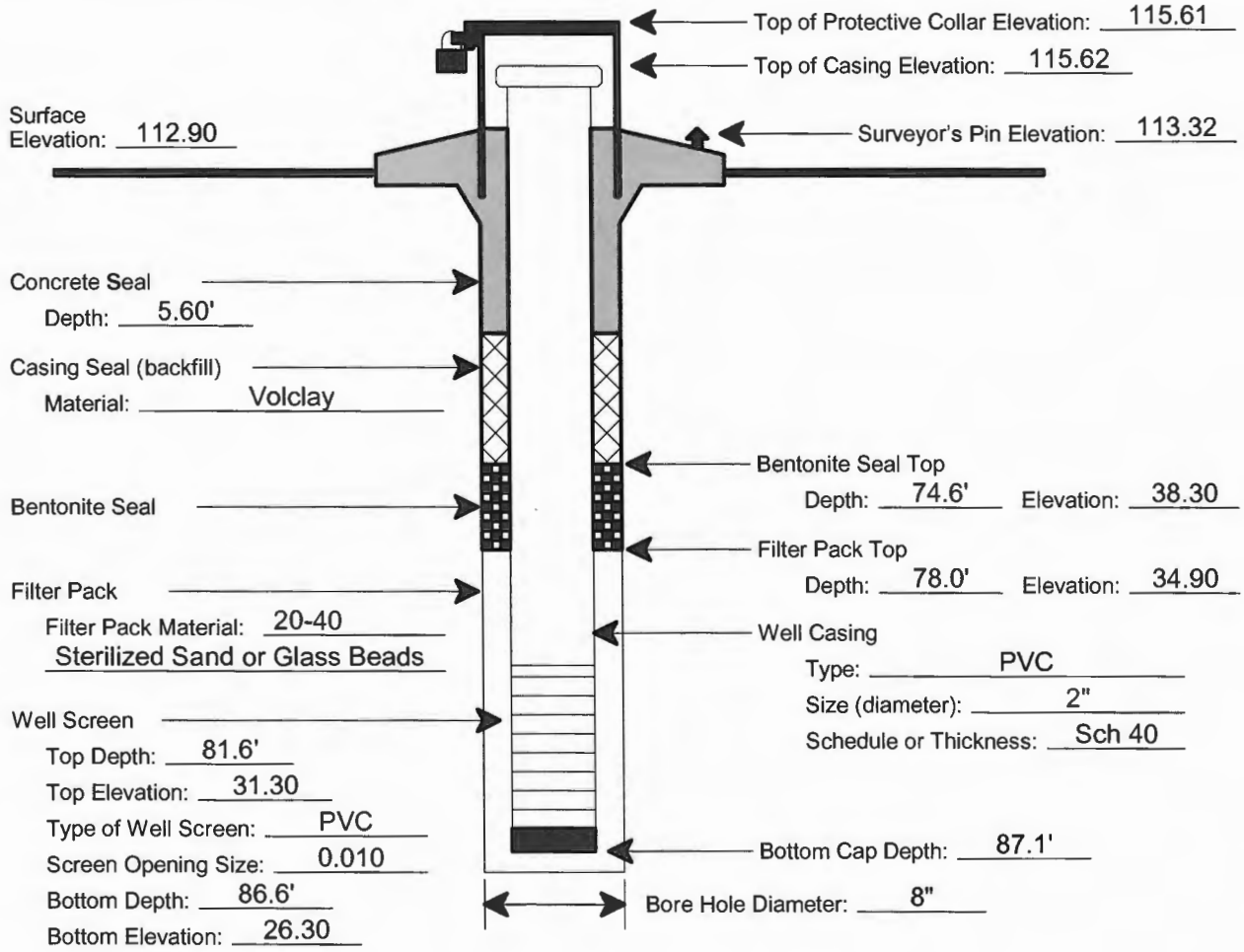
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-14
Date of Monitor Well Development: 2/3/99
Monitor Well Driller
Name: T. E. Mathers
License No.: 3096W

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Stefan Stamoulis
Static Water Level Elevation (with respect to MSL) after Well Development: 49.15
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 4'x4'x4"



TCEQ-10308

Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation 12/29/98
Monitor Well Latitude: 29°53'59.87" Longitude: 95°31'40.61"
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient

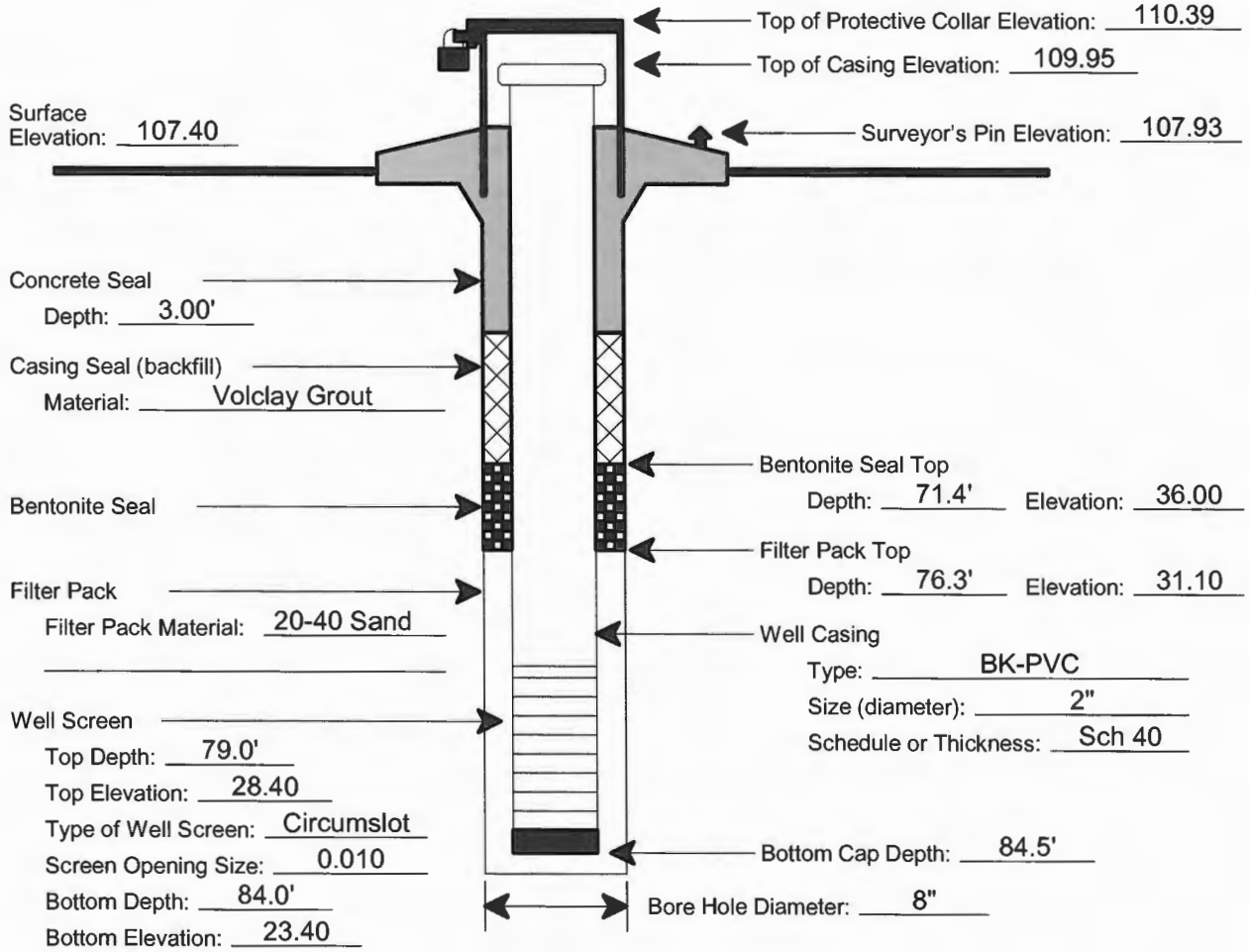
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-15
Date of Monitor Well Development: 2/16/99
Monitor Well Driller Name: T. E. Mathers
License No.: 3096W

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Stefan Stamoulis
Static Water Level Elevation (with respect to MSL) after Well Development: 52.64
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 5'x5'x6"



TCEQ-10308

MONITORING WELL DATA SHEETS

EXISTING STRATUM II

TO BE PLUGGED

Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation: 9/25/92
Monitor Well Latitude: 29°54'14.92" Longitude: 95°32'11.95"
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient

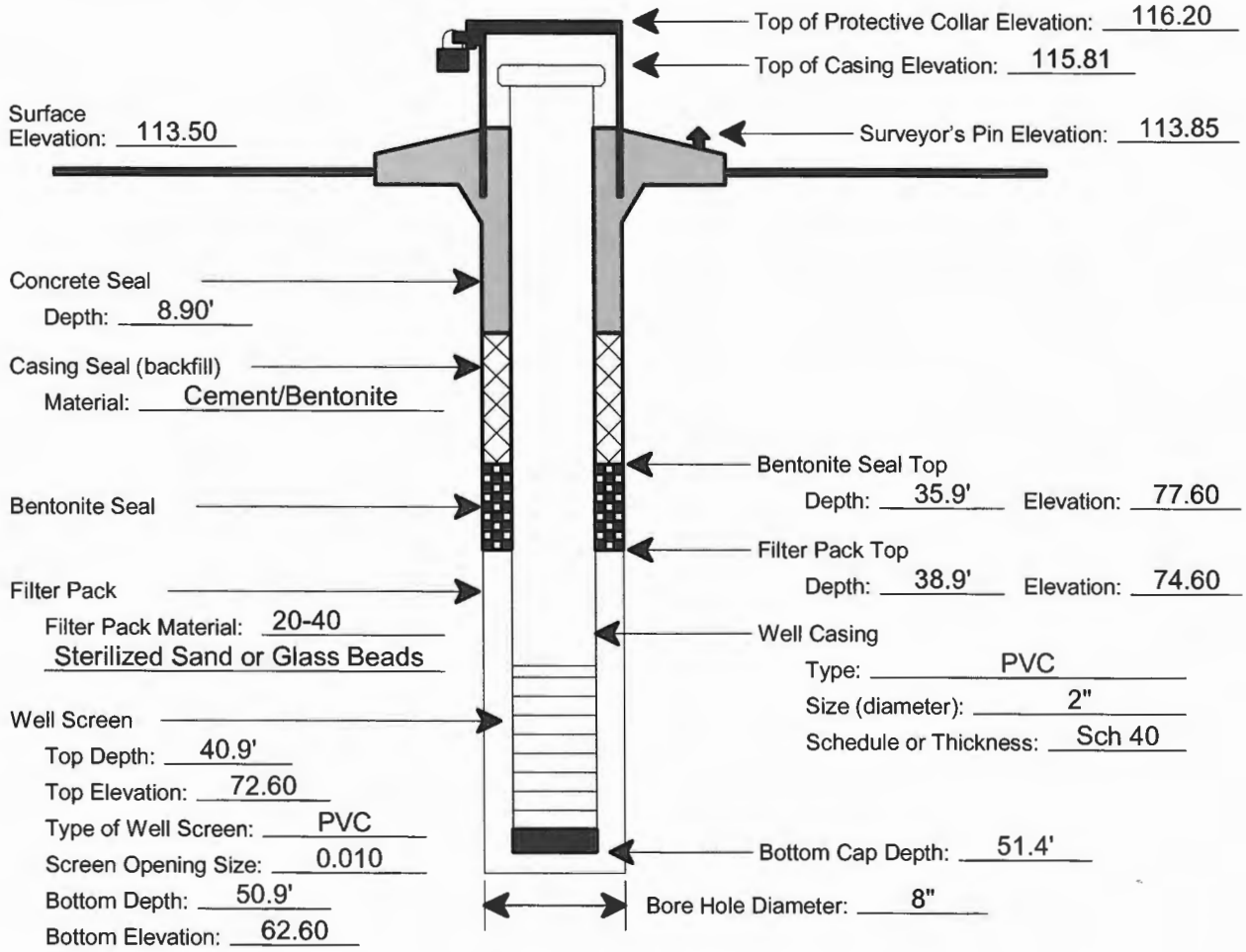
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-1A
Date of Monitor Well Development: 9/28/92
Monitor Well Driller Name: Mark Thornton
License No.: 3286-M

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Steven A. Hammett
Static Water Level Elevation (with respect to MSL) after Well Development: 83.41
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 3'x3'x4"



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Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation: 9/25/92
Monitor Well Latitude: 29°54'7.54" Longitude: 95°32'12.18"
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient

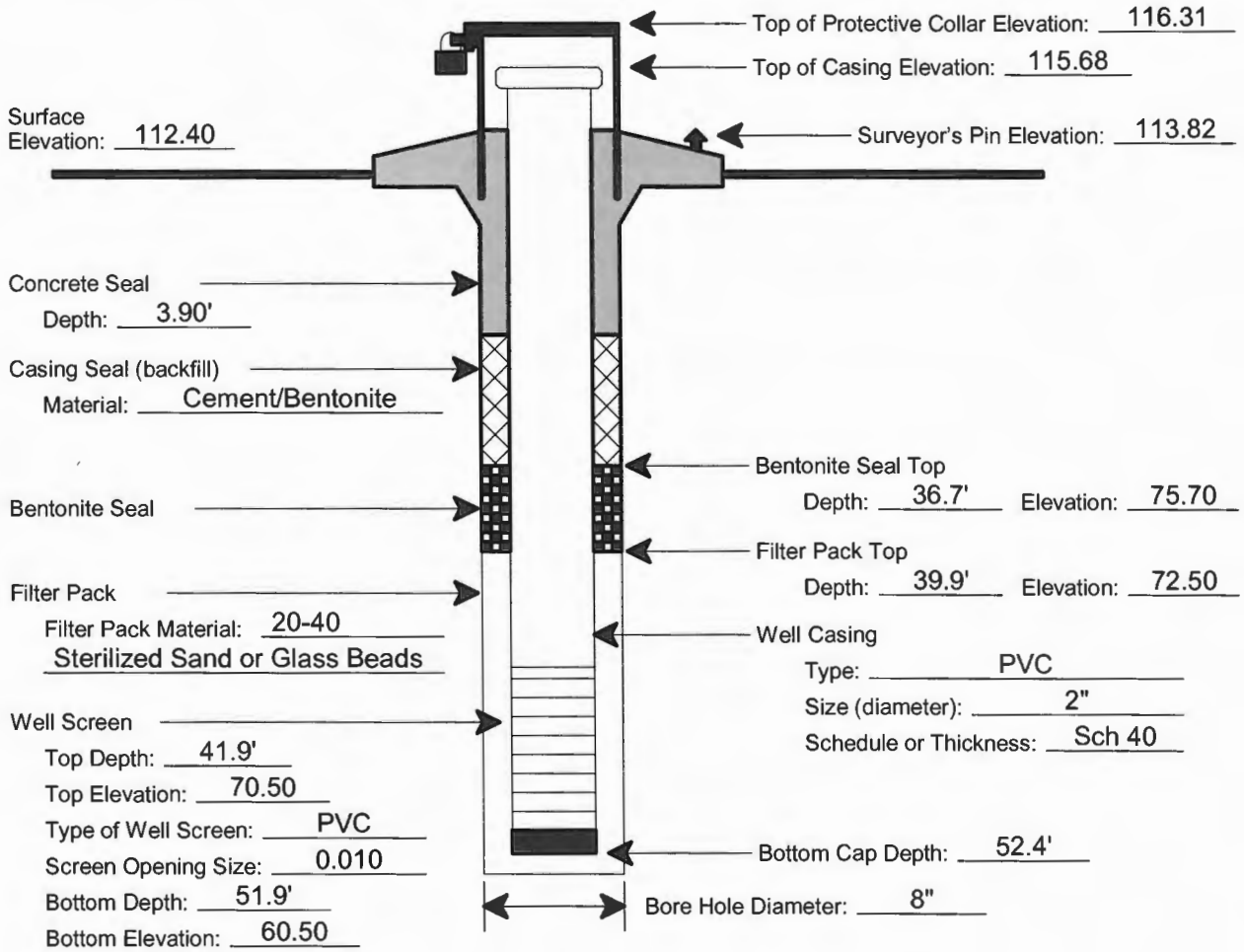
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-2A
Date of Monitor Well Development: 9/28/92
Monitor Well Driller Name: Mark Thornton
License No.: 3286-M

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Steven A. Hammett
Static Water Level Elevation (with respect to MSL) after Well Development: 83.41
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 3'x3'x4"



TCEQ-10308

Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation: 12/21/98
Monitor Well Latitude: 29°53'59.5" Longitude: 95°32'10.05"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

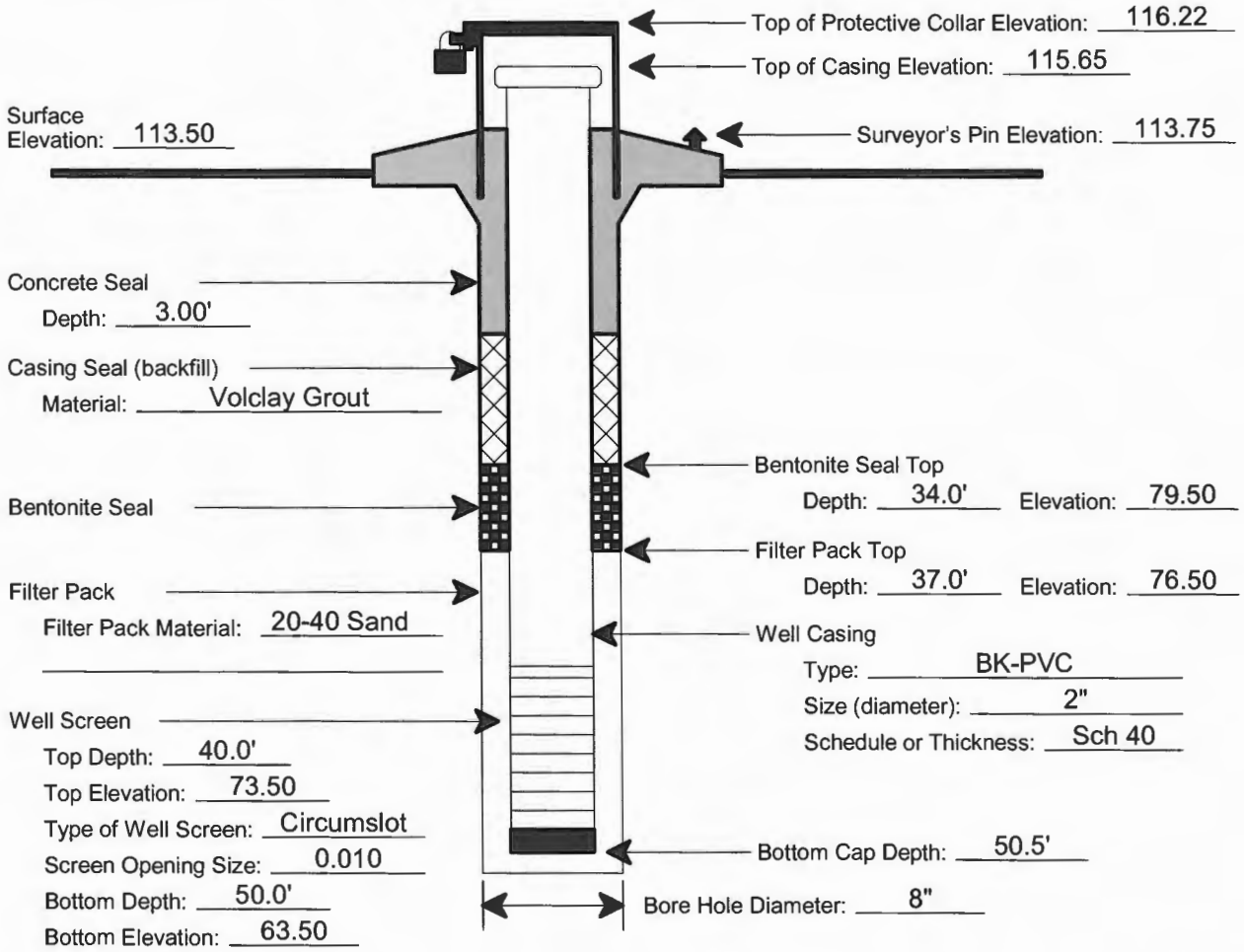
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-2B
Date of Monitor Well Development: 2/3/99
Monitor Well Driller Name: T. E. Mathers
License No.: 3096W

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Stefan Stamoulis
Static Water Level Elevation (with respect to MSL) after Well Development: 84.38
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 5'x5'x6"



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Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation 9/25/92
Monitor Well Latitude: 29°54'0.5" Longitude: 95°32'1.1"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

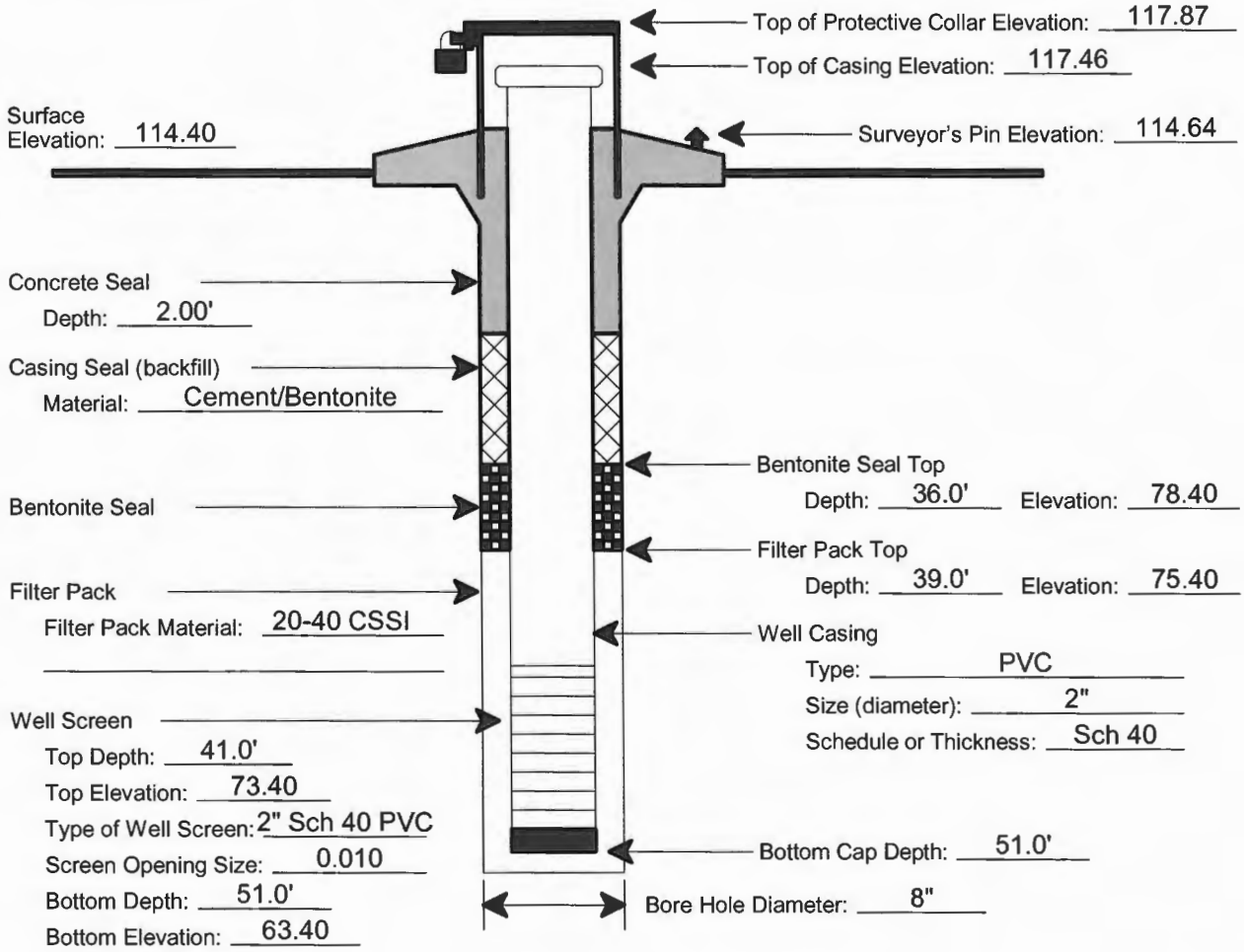
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-3A
Date of Monitor Well Development: 9/28/92
Monitor Well Driller Name: Mark Thornton
License No.: 3286-M

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Steven A. Hammett
Static Water Level Elevation (with respect to MSL) after Well Development: 74.29
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 6'x6'x0.5'



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Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation: 9/25/92
Monitor Well Latitude: 29°54'0.4" Longitude: 95°31'51.3"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

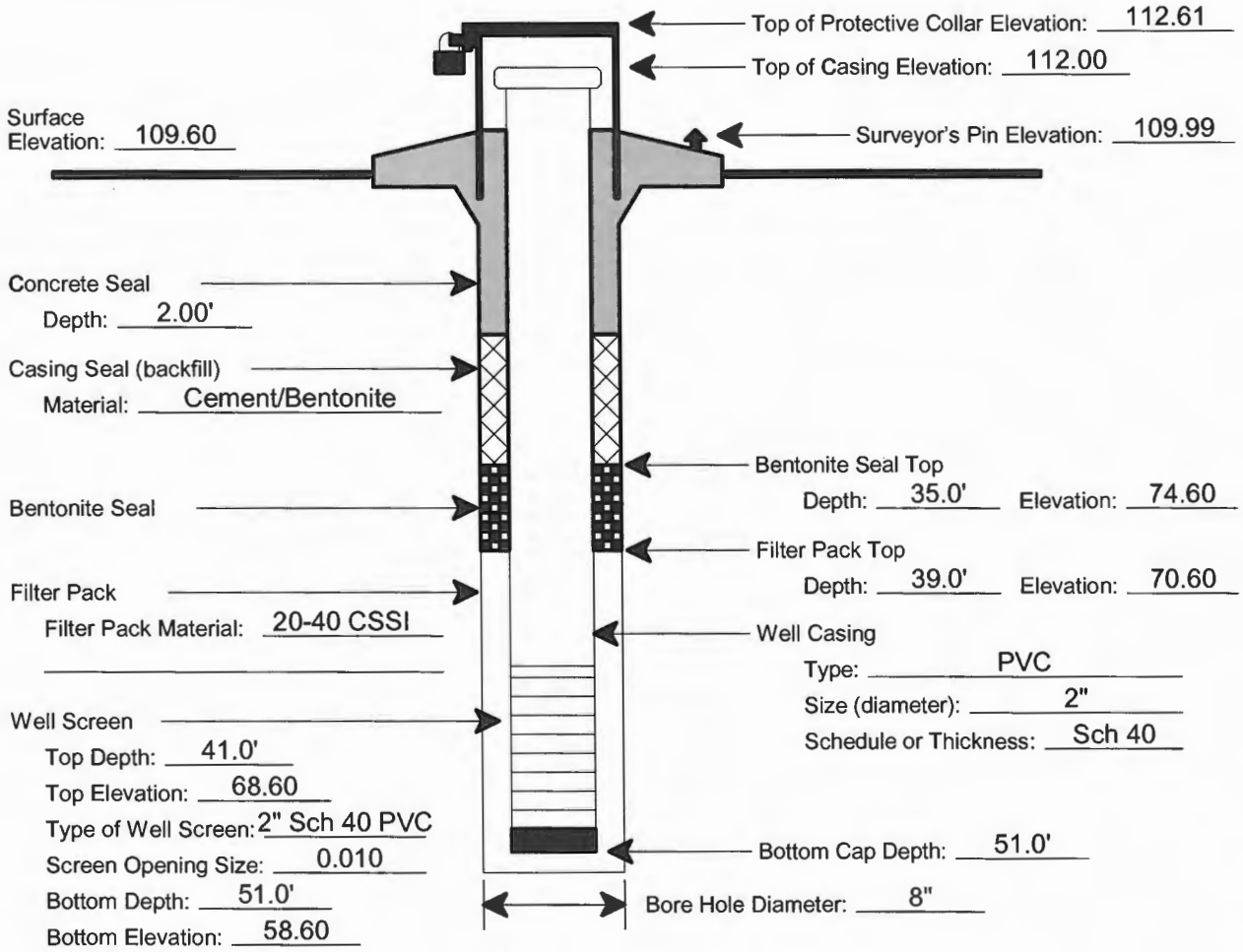
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-4A
Date of Monitor Well Development: 9/28/92
Monitor Well Driller Name: Mark Thornton
License No.: 3286-M

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Steven A. Hammett
Static Water Level Elevation (with respect to MSL) after Well Development: 71.02
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 6'x6'x0.5'



TCEQ-10308

Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation 9/25/92
Monitor Well Latitude: 29°54'0.6" Longitude: 95°31'40.1"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

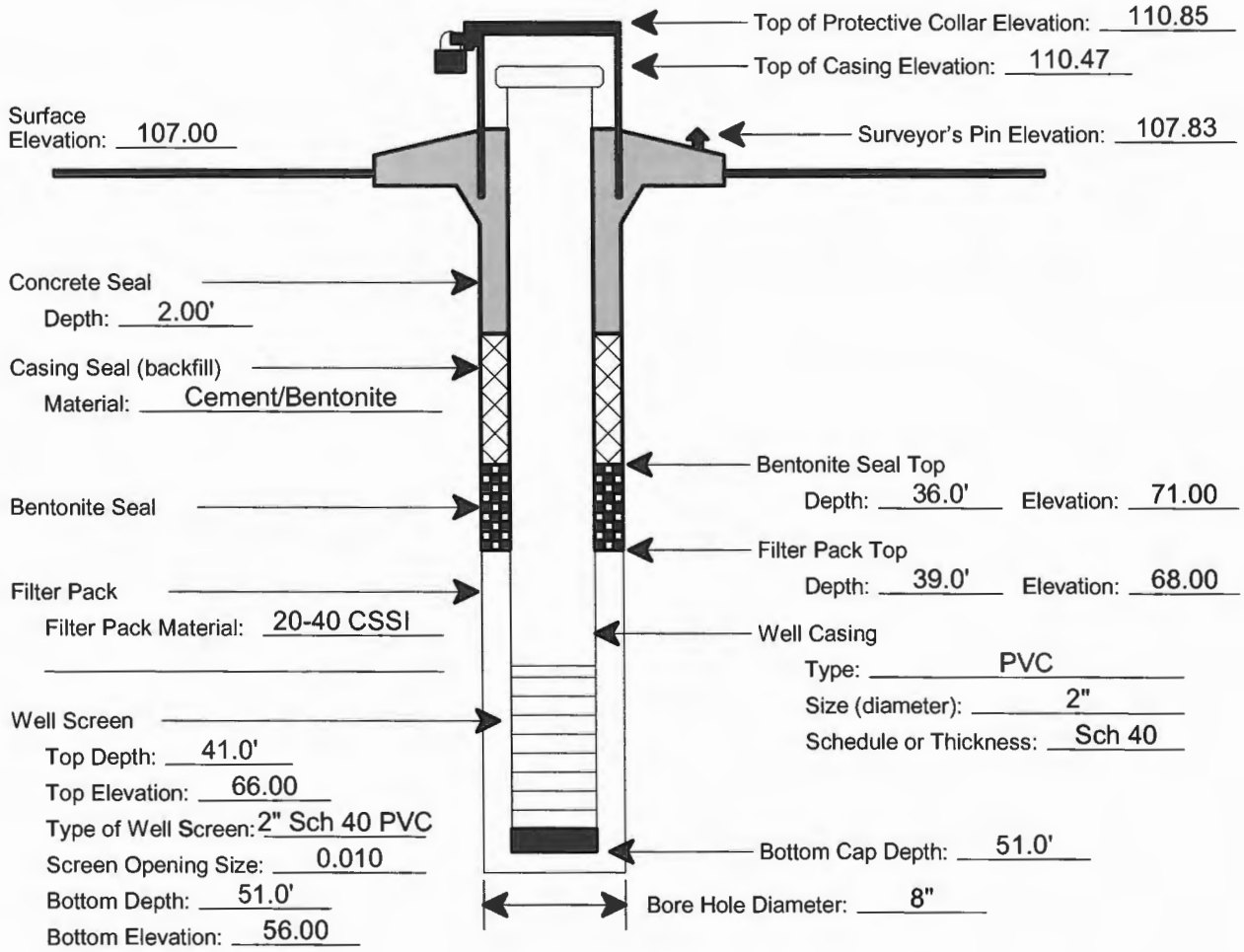
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-5A
Date of Monitor Well Development: 9/28/92
Monitor Well Driller Name: Mark Thornton
License No.: 3286-M

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Steven A. Hammett
Static Water Level Elevation (with respect to MSL) after Well Development: _____
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 6'x6'x0.5'



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Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation 9/25/92
Monitor Well Latitude: 29°54'8.2" Longitude: 95°31'40.8"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

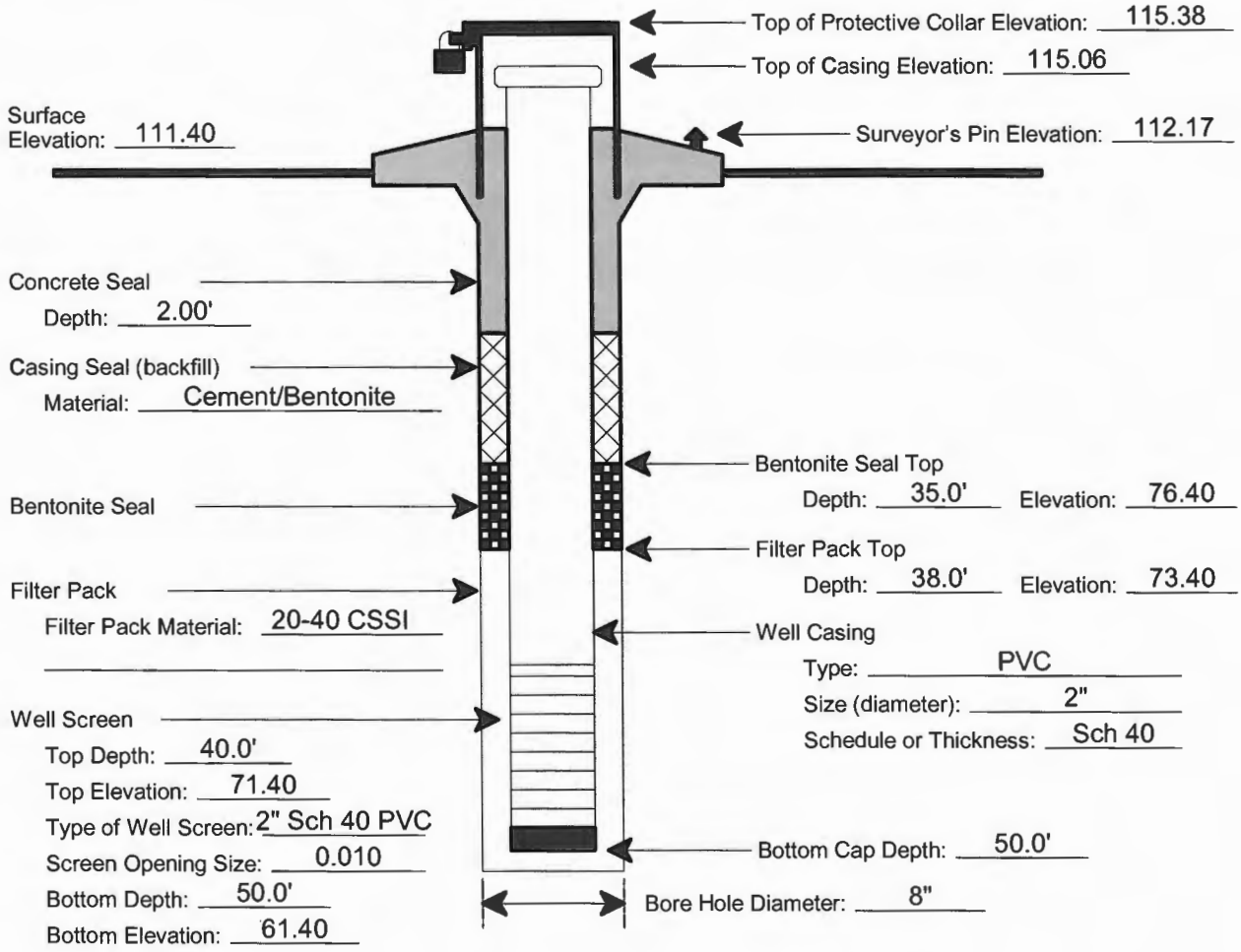
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-6A
Date of Monitor Well Development: 9/28/92
Monitor Well Driller Name: Mark Thornton
License No.: 3286-M

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Steven A. Hammett
Static Water Level Elevation (with respect to MSL) after Well Development: 70.54
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 6'x6'x0.5'



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Monitor Well Data Sheet

Revised October 2012

Permittee or Site Name: Fairbanks North Houston
County: Harris
Date of Monitor Well Installation 12/18/98
Monitor Well Latitude: 29°54'12.64" Longitude: 95°31'39.92"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

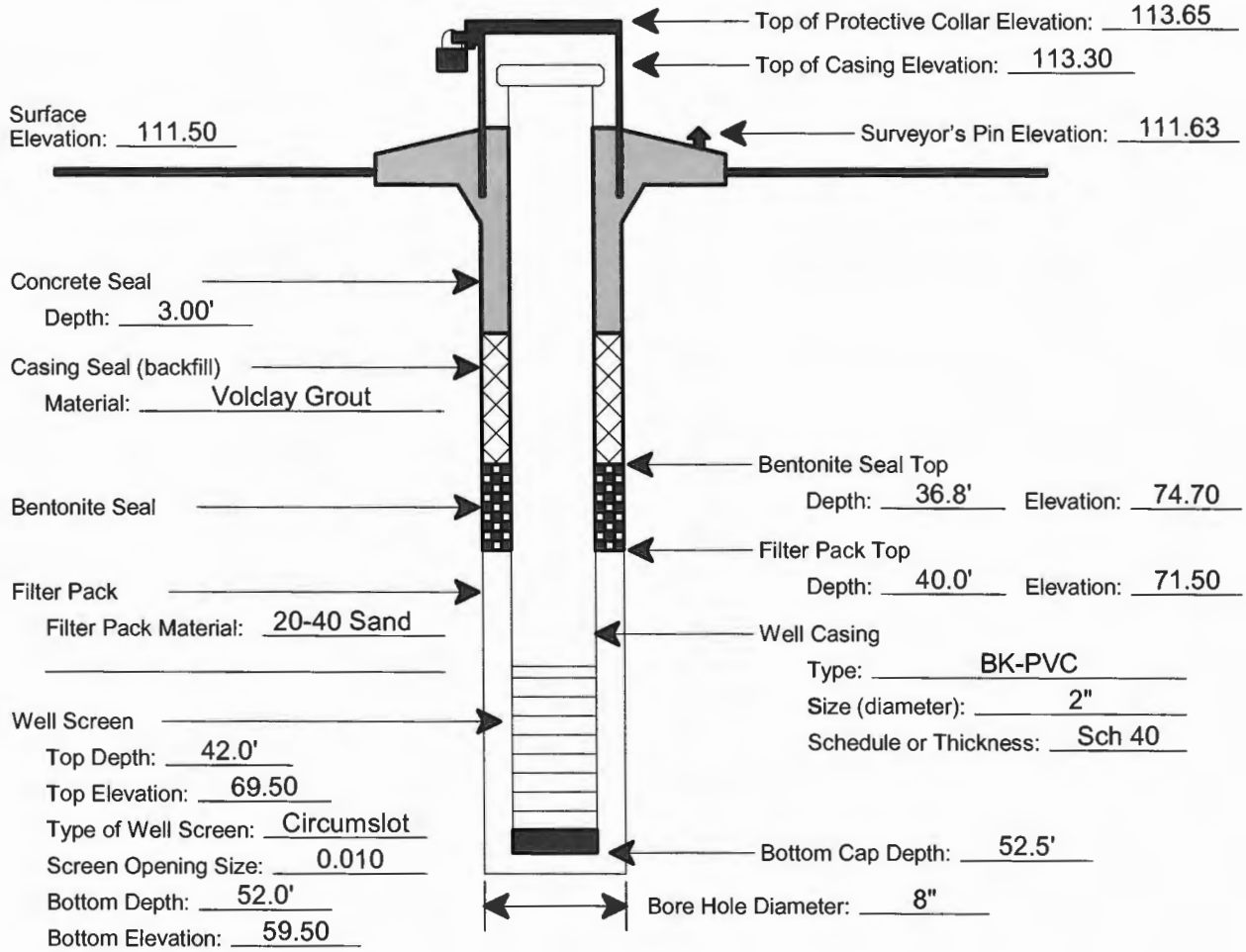
MSW Permit No.: 1565-A
Monitor Well I.D. No.: MW-7B
Date of Monitor Well Development: 2/16/99
Monitor Well Driller Name: T. E. Mathers
License No.: 3096W

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Stefan Stamoulis
Static Water Level Elevation (with respect to MSL) after Well Development: 73.55
Name of Geologic Formation(s) in which Well is completed: Lissie

Type of Locking Device: Pad Lock Type of Casing Protection: Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 5'x5'x6"



TCEQ-10308

FAIRBANKS LANDFILL
HARRIS COUNTY, TEXAS
TCEQ PERMIT NO. MSW 1565B

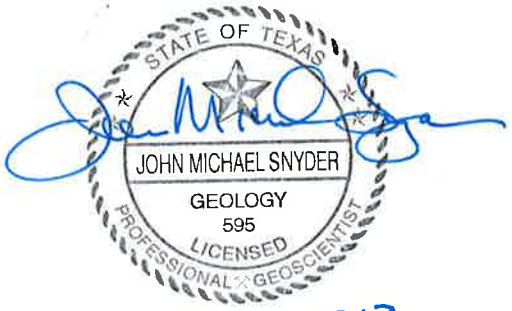
PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 5B
GROUNDWATER SAMPLING AND ANALYSIS PLAN

Prepared for

USA WASTE OF TEXAS LANDFILLS, INC.
A WASTE MANAGEMENT COMPANY

August 2013



8-12-2013

Prepared by

BIGGS & MATHEWS ENVIRONMENTAL
1700 Robert Road, Suite 100 • Mansfield, Texas 76063 • 817-563-1144

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

TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS
FIRM REGISTRATION NO. 50222

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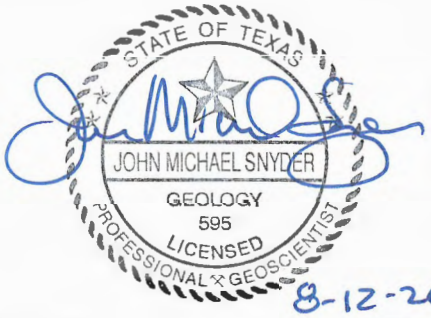

8-12-2013

CONTENTS (Continued)

APPENDIX 5B1

TABLES

1 INTRODUCTION TO DETECTION MONITORING

This Monitoring and Reporting Program presents details of the groundwater and physical parameter sampling and analysis monitoring plan (the "Plan") for the Fairbanks Landfill located in Harris County, Texas. The Fairbanks Landfill is an existing Type IV landfill currently owned and operated by USA Waste of Texas Landfills, Inc. under municipal solid waste permit 1565A.

This Plan presents requirements for monitoring groundwater quality and hydraulic characteristics in the vicinity of the landfill. All elements of this program are in compliance with relevant parts of TCEQ Subchapter J, Groundwater Monitoring and Corrective Action (30 TAC §330.401 through §330.421). This Plan will be used by personnel performing site monitoring during the active life of the facility and during closure and post-closure periods.

The Plan describes the background and compliance monitoring frequencies for each monitor point, the monitoring parameters, and a sampling and analysis plan. The program incorporates permanent monitoring elements to provide environmental protection during and after landfill development. The proposed final groundwater monitoring program at the site is based on the distinct hydrogeologic characteristics of the area and the potential influence of the landfill on the hydrogeologic system as it exists both today and projected in the future.

The detection monitoring network will consist of monitoring wells installed within the uppermost aquifer (Layer IV) positioned and designed to provide detection of a release.

Detection monitoring involves the effective use of monitoring parameters (or "indicator" parameters) and locations to provide earliest possible detection of a potential release from a facility. The objective is to select proper sample locations and parameters, identify an appropriate "background" (i.e., sampling medium that has not been affected by the facility and that represents the medium at the relevant point(s) of compliance), and evaluate changes in water quality.

2 SAMPLE ANALYSES

2.1 Background Groundwater Sampling

The purpose of obtaining adequate background groundwater data is to approximate, as accurately as possible, the true range of ambient concentrations or targeted compounds in the groundwater system being monitored and is not previously impacted by the waste management unit.

2.1.1 Groundwater Monitoring Parameters

Monitoring wells at the site are to be sampled and analyzed for the parameters listed in Table 5B-1. These are the parameters listed in 30 TAC §330.417.

Table 5B-1
Groundwater Monitoring Parameters
30 TAC §330.417

Parameter	Method*
Cadmium (total)	EPA 6010B
Chloride	EPA 300.0
Iron (total)	EPA 6010B
Manganese (total)	EPA 6010B
Total dissolved solids	EPA 160.1
Zinc (total)	EPA 6010B
Specific conductance (field and laboratory)	EPA 120.1
pH (field and laboratory)	EPA 150.1
Non-purgeable organic carbon *(three replicates per well, per event)*	EPA 415.1

*U.S. Environmental Protection Agency, *Methods for Chemical Analysis of Water and Wastes, March 1983 (as revised). The analytical methods listed above may be substituted as necessary provided that the alternate methods provide adequate analytical data to fulfill monitoring requirements and meet regulatory performance standards.*

In addition to the required parameter list, the facility may monitor the water quality parameters listed in Table 5B-2.

Table 5B-2
Water Quality Parameters

Calcium
Magnesium
Sodium
Potassium
Hydrogen carbonate (bicarbonate)
Sulfate

All sample containers must be labeled for identification purposes. The labels shall include information such as sample number, well number, site identification, analysis to be performed, preservatives used, date and time of sample collection, and name of sampler.

Field measurements (i.e., electrical conductance, pH, temperature, turbidity, groundwater surface elevation) will be conducted at each sampling event.

2.2 Monitoring Frequency

Four quarterly background samples for TNRCC Groups 1 through 4 parameters were completed for the existing site monitoring wells from September 1992 through June 1993. Annual Detection Monitoring for the parameters listed in Table 5B-1 is currently being conducted.

If new or replacement monitoring wells are incorporated into the groundwater monitoring system then background groundwater sampling will be initiated. Four (4) background groundwater samples from the new (or replacement) monitoring well(s) will be obtained within a period of 12 months after completion of the monitoring well(s). Background levels will be established from samples collected from each new (or replacement) well at least once during each of the four calendar quarters: January-March, April-June, July-September, and October-December. Samples from any monitoring well will not be collected for at least 45 days following collection of a previous sample, unless a replacement sample is necessary. Background analyses will be performed for the parameters listed Table 5B-1.

3 SAMPLING PLAN

The objective of the detection monitoring program is to determine if the waste facility has impacted the environment.

Section 3.1, Sampling Procedure, describes the procedures followed prior to and during sample collection, as well as Quality Control/Quality Assurance measures used to ensure representative samples are being received from the field.

3.1 Sampling Procedure

Proper sampling procedures are the most important aspect in an effective monitoring program. All environmental quality sampling at the site will be accomplished by personnel trained in proper sampling protocol.

3.1.1 Procedures Prior and Subsequent to Groundwater Sample Collection

This section details the proposed methodologies to be utilized for purging, sample handling, maintaining sample point integrity, and obtaining field measurements.

Upon arrival at the well location, the condition of the well and its surroundings will be observed and recorded. Information to be recorded includes the condition of the well identification sign, the condition of the locking cap and key, the condition of the well cement footing, casing surface and seal, and evidence of any surface contamination.

Prior to groundwater purging and sample withdrawal, an accurate water-level measurement will be taken with a portable electronic sounder, fiberglass tape, or a pneumatic probe. The water-level measurement will be recorded on a Field Information Form.

3.1.2 Sampling Methodology

Dedicated bladder purge and sample pumps are installed in all sampled monitor wells. This facility is approved for "micropurge" or low-flow purge and sampling. To accomplish low-flow sampling, these requirements must be met:

- The sampling pumps must be dedicated to eliminate disturbance of the upper water column caused by insertion and removal of the pump.
- Flow rates during purging and sampling must be low enough to achieve no net drawdown of the water level greater than 0.3 foot to prevent mixing within the well (purging at a pumping rate of 1.0 liter/minute or less and sampling at a rate

of 0.25 liter/minute or less). Water levels should be measured periodically during purging to verify the stabilization of drawdown.

- During sampling, the pump discharge should be maintained as a thin continuous stream when filling sample containers.

- Intake of the sampling pump must be located within the saturated zone and within the well screen.

Water quality parameters pH, temperature, turbidity, and conductivity are monitored every three to five minutes with an in-line device during low-rate purging. The stabilization of these parameters indicates when the discharge water is representative of formation water and that samples can be collected for analysis. Stabilization is defined to be when two consecutive readings show ± 0.1 ° C for temperature, ± 3 percent for specific conductance, ± 0.2 pH units, and ± 10 percent for turbidity (Puls and Barcelona, 1995). A minimum of two tubing and pump volumes will be purged. Purge data, including volume, flow rates, water-level and field parameter measurements, will be recorded on the Field Information Form.

If a dedicated pump is damaged or inoperable, a properly decontaminated non-dedicated pump or disposable bailer may be used to purge and sample the well. However, traditional purge techniques (i.e., minimum of 3 well volume) must also be used and noted on the Field Information Form.

3.1.3 Groundwater Sample Collection

Water-level measurement: The depth to groundwater shall be measured from the top of the well casing and recorded on the Field Information Form. The water level measuring device shall be decontaminated between wells. Water-level depths are to be measured and reported to the nearest hundredth of a foot. Groundwater elevations will be calculated using water level depths and surveyed top of casing elevations.

If contamination is known to be present, monitoring wells not likely to be contaminated will be sampled before those that are known to be contaminated.

The temperature, conductivity, pH, and turbidity of a groundwater sample collected in a container not used for analysis shall be measured and recorded on the Field Information Form. Field measurements shall be performed in the order given to avoid any effect on the sample from salts on the pH probe. The measuring equipment is to be calibrated immediately prior to commencement of the sampling event in accordance with the manufacturer's specification.

Appropriate decontamination methods will be employed for all measuring equipment between each well. Care will be taken during purging and sampling to avoid the introduction of contaminants into the well. Appropriate latex or vinyl gloves shall be used during all purging and sampling procedures and changed after each well to avoid cross contamination. The collection, storage, and disposal of effluent purged from groundwater monitoring wells will be handled/managed appropriately.

Groundwater samples shall not be field filtered prior to laboratory analysis.

Water samples collected in the field need to be placed into laboratory-provided bottles of the appropriate size and construction for the chemical parameters to be analyzed. A list of chemical parameters and recommended types and sizes of sample containers are shown in a table on page 5B1-3.

Under normal conditions (i.e., a well that recovers relatively quickly and to 90 percent of the initial static water elevation), the sample bottles will be filled in the order of decreasing volatilization sensitivity. Generally, that will be in the following order, as applicable:

- Volatile organic compounds (VOCs), if required
- Non-purgeable organic carbon (NPOC)
- Total metals
- Other inorganic parameters

Sampling for analysis of VOCs and NPOC: Filling the sample containers involves extra care. The sample containers used for water analysis of these parameters should consist of glass vials (of the appropriate size) with Teflon-lined caps. Water should flow slowly from the discharge tube of the pump into each sample vial, until a positive meniscus is formed over the top of the container. After the cap has been placed on the vial and tightened, the vial should be checked for air bubbles by turning it upside down and tapping with your finger. If an air bubble is seen rising to the bottom of the vial, the process outlined above should be repeated. Air bubbles can be eliminated by removing the cap, topping off the vial with water to a positive meniscus, and resealing. If no air bubbles are seen in each vial, the process is complete.

Laboratory-supplied bottles will be filled from the discharge tube of the sample pump. A physical description of the sample will be recorded on the Field Information Form, including the sample color, odor, clarity, foaming, and any other physical characteristics. If the field values obtained are not within the expected ranges, the Project Manager or Coordinator will be notified immediately, as it may be necessary to resample. The initial sample will not be discarded. Additional samples may be requested by the Project Manager or Coordinator to ascertain the cause of the erratic field measurements.

If the well becomes dry prior to completion of the sampling event, the sampling team will return to the well no more than 48 hours later. Upon return, the sampling team will measure the depth of water in the well and calculate the volume of water present in the well casing. If this volume is sufficient, the team will complete the sampling. If the volume of water in the well casing is not sufficient, the team will not complete sampling and will send the samples (if collected) to the laboratory. Whether or not the sampling team is able to complete the sampling, all occurrences and conditions will be recorded on the Field Information Form.

Field activities must be thoroughly documented on the Field Information Form. Below is an outline of the information typically documented during field activities.

- Project name and number
- Date and time of all activities
- Weather conditions
- Sampling personnel
- Field instrument calibration methods and remarks
- Well location (identification number)

- Well description, including casing size
- Description of well condition
- Initial water-level measurement with point of reference (top of casing) and time of measurement
- Well volume calculations, if needed
- Initial pH, temperature, turbidity, and conductivity measurements
- Presence and thicknesses of immiscible layers (if applicable)
- Time starting and ending well evacuation, volume purged, and method of removal
- Sampling equipment and remarks
- Sample time and date
- Description of groundwater sample
- Quality control remarks
- Samples collected (number of bottles)
- Analysis to be performed
- Preservatives added
- Mode of sample transport

3.1.4 Preservation and Shipment

Samples will be preserved immediately after sample collection. These sample containers may have preservatives included in the sample bottle as discussed below. When filling them, the bottles will not be allowed to overflow any more than necessary to eliminate headspace.

Pre-measured amounts of preservative reagents are usually supplied with the sample bottles by the laboratory. Analysis methods determine what samples require preservation, the specific preservative, and how much preservative is required. For samples that do not have preservatives in the bottle but that require preservation, the preservatives will be added to the sample bottle after it has been filled. Bottles will not be overfilled and will be inverted (once capped) to mix the preservative with the sample. Bottle lids will not be placed on the ground or interchanged among sample bottles.

Subsequent to sample collection, samples will be immediately placed in insulated shipping containers, chilled to 4 degrees C using ice, and "locked" with a security seal. Ice packs (if) used in containers will be frozen prior to use. The sampler will record sample designations on Chain-of-Custody form(s). The forms will be reviewed to ensure completeness, and all paperwork will be placed in a plastic bag, sealed, and placed inside the shipping container.

The containers and packing materials provided by the laboratory are designed to prevent breakage and spills during shipping. Tight, shock-resistant bottle holders are provided around each glass bottle.

The filled, sealed containers will be sent to the laboratory. All arrivals are scheduled for next day delivery. A member of the sampling team will be appointed to arrange sample pickup and transportation to the laboratory. Friday shipment of samples to subcontract laboratories will be avoided, when possible, to ensure that holding times are not exceeded over a weekend.

To comply with packaging regulations and to take practical measures to prevent damage to expensive samples, the sampling personnel will follow packaging and shipping instructions supplied by the certified testing laboratory.

In the unlikely event materials to be shipped are considered hazardous or if their nature is uncertain, the samples will be appropriately labeled and will be transported by sampling personnel directly to the analytical facility. The other alternative is that they are shipped using a carrier licensed to transport hazardous materials. However, in most instances, the concentration and type of compounds present in sample media are considered non-hazardous by the U.S. Department of Transportation (DOT).

3.1.5 Chain-of-Custody Record

To help maintain the integrity of the samples, strict chain-of-custody procedures will be utilized. An example of a Chain-of-Custody form is provided in Appendix 5B1. These procedures ensure that the bottles and samples will be recorded from the time the sample bottles leave the laboratory until the issuance of the analytical laboratory results.

In order to maintain the Chain-of-Custody, the samples will be either in sight of the assigned custodian, locked in a tamper-proof location, or sealed with a tamper-proof seal. A record of sample bottle possession and any transfers of samples must be maintained and documented on the Chain-of-Custody form.

The Chain-of-Custody form will be signed with each date and time that the container's seal is broken. When the shipment container is initially opened for inspection of its contents, the seal number (if any) will be noted. The signature of the responsible party, time, and date will also be recorded each time the sample container is transferred to the custody of another person and immediately before sealing the container for transport to the laboratory.

In addition, the sample point designation date, and time of sampling will be recorded on the form. Use of pre-filtration bottles and any problems with the sample also are noted on the form. Upon receipt of the sample container by the laboratory, the seal will be broken, and the condition of the samples, temperature, date, and time are recorded on the Chain-of-Custody form by the log-in personnel receiving the sample shipment.

The Chain-of-Custody form indicates by bottle and analysis group if samples are to be preserved. If actual preservation and filtration procedures vary from the instructions provided in these spaces, the Chain-of-Custody instructions will be modified by a member of the sampling team and initialed in the appropriate locations provided on the Chain-of-Custody form.

4 LABORATORY ANALYSIS

This section describes the procedures for completing successful laboratory analyses of the samples that are collected from the site.

4.1 Program Quality Assurance/Quality Control Procedures

Trip blanks, field blanks, field forms, and the Chain-of-Custody forms provide quality assurance/quality control measures for the monitoring program.

4.1.1 Trip Blanks

Trip and field blanks are a required part of the field sampling QA/QC program. They are used to detect contamination that may be introduced in the field (either atmospheric or from sampling equipment), in transit (to or from the sampling site), or in the bottle preparation, sample log-in, or sample storage stages at the laboratory. Laboratory method blanks are used during the analytical process to detect any laboratory introduced contamination that may occur during analysis.

Trip blanks are samples of organic-free water (e.g., deionized) prepared at the laboratory and will only be prepared and analyzed for volatile organic compounds (VOCs) if they are collected during the sample event. They remain with the sample bottles while in transit to the site, during sampling, and during the return trip to the laboratory. Trip blank sample bottles are not opened at any time during this process. Upon return to the laboratory, trip blanks are analyzed using the same procedures and methods that are used for the collected field samples.

During sampling events requiring VOC analyses, a minimum of one trip blank per sampling event will be collected. Trip blank results will be reported in the laboratory results as separate samples, using the designations TB-(well #) as their sample point designation.

4.1.2 Field Blanks

Field blanks are prepared in the field (at the sampling site) using laboratory-supplied bottles and deionized or laboratory reagent-quality water. Field blank water for VOC samples, which is the same type of water as that used to prepare trip blanks, can be supplied by the laboratory. The field blank is prepared by pouring the deionized water into the sample bottles at the location of one of the wells in the sampling program. The purpose of the field blank is to detect any contamination which might be introduced into the groundwater samples through the air. Once a field blanks are collected, they are handled and shipped in the same manner as the rest of the samples.

For dedicated or disposable equipment requiring no filtration, the deionized or laboratory reagent-quality water is exposed to the air, transferred to the field blank bottles, and the proper preservative added as required.

For the field blank, water is placed into the field blank bottles and the proper preservative added (as required).

Field blank results will be reported in the laboratory results as separate samples, using the designations FB-(well #) as their sample point designation.

4.1.3 Field Duplicates

Sample duplicates are collected to assure the precision of the sampling and analytical processes. For sampling events involving collection of five or less samples, no sample duplicates are required. For sampling events that involve the collection of five or more samples, one duplicate will be obtained during each day of the sampling event. Each duplicate will be a blind sample, meaning the sample will be labeled with a sample number but no site designation.

4.1.4 Equipment Blanks

Since sampling equipment consists of dedicated pumps, an equipment blank sample is not necessary at this site.

4.1.5 Chain-of-Custody Forms

The quality control of sample integrity including field operations and laboratory operations (i.e., chemical laboratory analysis) will be administered by the field sampling personnel. An example Chain-of-Custody form is provided in Appendix 5B1. The specific information that is required for documentation is both listed on the form and described in Sections 3.1.4, Preservation and Shipment, and 3.1.5, Chain-of-Custody Record. Copies of the Chain-of-Custody forms will be filed in the Operations Record after the laboratory has returned the form with the analytical results.

4.2 Quality Assurance/Quality Control

Fairbanks Landfill has historically utilized a NELAC (National Environmental Laboratory Accreditation Council) certified laboratory for analysis of groundwater samples and will continue to use a NELAC certified laboratory for future groundwater analyses. Laboratory data analyses with a laboratory case narrative, or with a Laboratory Review Checklist, will be performed and submitted for each sampling event. NELAC standards require that laboratories have an established quality system that includes a comprehensive laboratory quality manual (LQM) and an authorized quality assurance officer. A copy of the LQM will be maintained in the Fairbanks Landfill Site Operating Records (SOR) for use in data evaluation.

The laboratory calibrates equipment and instrumentation according to the laboratory's LQM and referenced methodologies. Quality control including matrix spikes, matrix spike duplicates or sample duplicates, laboratory control samples, method blanks, and surrogates are analyzed along with field groundwater samples and field QC samples also in accord with LQM and method requirements. The laboratory evaluates and reports this information in a report with laboratory case narrative (LCN), with qualifiers and narrative detail where appropriate such that Fairbanks Landfill may ensure that all sample collection, preparation and analyses, and data management activities have been conducted. The laboratory report (including the LCN) will report the number of samples, sampling parameters, and sample matrix, the name of the laboratory (including subcontract labs) involved in the analysis, an explanation of each failed precision and accuracy measurement determined to be outside the laboratory and/or method control limits and whether such a quality control excursion represents a positive or negative bias and the limitations these excursions have on data quality. Additionally exceedance of sample holding times and identification of matrix interferences shall be identified in the LCN. Any dilutions implemented due to sample matrix interference will be done to the smallest dilution possible to bring the sample into control for analysis.

In addition to the exceptions listed above, the LCN report for all problems and anomalies observed will be included in the laboratory report for each sampling event. The LCN will report, at a minimum, the following information:

1. The exact number of samples, testing parameters and sample matrix.

2. The name of the laboratory involved in the analysis. If more than one laboratory is used, all laboratories shall be identified in the case narrative.

3. The test objective regarding samples.

4. Explanation of each failed precision and accuracy measurement determined to be outside of the laboratory and/or method control limits.

5. Explanation if the effect of the failed precision and accuracy measurements on the results induces a positive or negative bias.

6. Identification and explanation of problems associated with the sample results, along with the limitations these problems have on data usability.

7. A statement on the estimated uncertainty of analytical results of the samples when appropriate and/or when requested.

8. A statement of compliance and/or noncompliance with the requirements and specifications. Exceedance of holding times and identification of matrix interferences must be identified. Dilutions shall be identified and if dilutions are necessary, they must be done to the smallest dilution possible to effectively minimize matrix interferences and bring the sample into control for analysis.

9. Identification of any and all applicable quality assurance and quality control samples that will require special attention by the reviewer.

10. A statement on the quality control of the analytical method of the permit and the analytical recoveries information shall be provided when appropriate and/or when requested.

The analytical laboratory report for each sampling event will document the results and methods for each sample and analyte along with the quantification limit. The report will also include a copy of the chain-of-custody and an understandable correlation between the chain-of-custody and the sample results reported to the TCEQ. The analytical laboratory report will be submitted either electronically or in hard copy upon TCEQ request.

The Fairbanks Landfill shall ensure that a data reviewer consider the project data quality objectives as appropriate to determine if the results meet the project needs with respect to completeness, representativeness, and accuracy. Prior to submittal of the data to the Commission all analytical data will be examined to ensure that the data quality objectives are considered and met and that the results representing the samples are accurate and complete. The data will be reviewed, including the laboratory quality control results, the relative percent difference (RPD) of the monitor well results and its duplicate analysis (DUP) as a measure of accuracy. The data review will include a statement assessing data usability by a certified groundwater scientist with respect to the project data quality objectives (primarily a statistical evaluation of the groundwater analytical data) and, when necessary, provide comment to further explain or supplement the quality control data on the laboratory report. If the facility determines that the analytical data may be utilized, any and all problems and corrective action that the laboratory identified during the analysis will be included in the report submitted to the TCEQ. Either a completed version of the laboratory review checklist or the laboratory analytical report with LCN will be submitted to the TCEQ for each sampling event. For every response of "No, NA, or NR" reported on the Laboratory Review Checklist the facility will ensure the laboratory provides a detailed description of the exception in the LCN.

A record of laboratory sample receipt, storage and analysis procedures will be kept for each sample received. A summary of this record will be part of the laboratory analysis report. A copy of the NELAC Certified LQM is maintained as part of the facility's Site Operating Record (SOR). If at any time the Site changes analytical laboratories, the new laboratory's LQM will be submitted by the laboratory and the site SOR updated.

Although the QA/QC procedures in use at this facility apply predominantly to groundwater analytical data, it is possible that soil sample analytical results may be reported in the future. If the data is from soils and/or sediment samples, it will be reported on a dry weight basis with the percent solids and the percent moisture reported so that any back calculations of the wet analysis may be performed.

4.3 Analytical Methodologies

Table 5B-3 presents the analytical methodologies to be used by the laboratory for all of the parameters required in the monitoring program. All methods are USEPA approved and are fully described in the laboratory method and standard operating procedure documents.

Table 5B-3
Analytical Methods

Parameter	Method Description	Reference Method
Chloride	Ion chromatography	300.0
Total metals	ICP/ICP-MS	6010B
Total dissolved solids	Gravimetric	160.1
Non-purgeable organic carbon	Combustion or oxidation	415.1
pH	Probe	150.1
Specific conductance	Probe	120.1
Reference:	Methods for Chemical Analysis of Water and Wastes, EPAS 600/4-79-020, EMSL, Cincinnati, OH (Revision March 1983).	

Note: Analytical methods listed above may be substituted as necessary provided that the alternate methods provide adequate analytical data to fulfill monitoring requirements and meet regulatory performance standards.

Precision and accuracy targets shown in the table below represent TCEQ guidance as of the date of this document. Should TCEQ guidance change, the targets will be adjusted accordingly. The specification limits below are intended to be applied to the approved (or as otherwise required by the executive director) constituent list for this Type IV facility.

The practical quantitation limit (PQL) is defined as the lowest concentration reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions and is considered equivalent to the limit of quantitation (LOQ) described in the most recent National Environmental Laboratory Accreditation Conference (NELAC) Standard (www.nemc.us/epa12/2003standards.html). The PQL is method, instrument, and analyte specific and may be updated as more data becomes available. To help ensure these practices will be observed the following information is provided:

- The PQL will be at or below the groundwater protection standard established for each analyte in accordance with 30 TAC §330.409(h) unless approved otherwise by the executive director.

- The PQL will be determined as the concentration that corresponds to the following precision and accuracy criteria:

Table 5B-4
QC Specification Limits for the PQL and Lower Limit of Quantitation Check Samples

Constituent/Chemical of Concern	Precision (% RSD)	Accuracy (% Recovery)
Metals	10	70-130
Volatiles	20	50-150
Semi-Volatiles	30	50-150

- The precision and accuracy of the PQL initially will be determined from the PQLs reported over the course of a minimum of eight groundwater monitoring events.

The results obtained from these events will be used to demonstrate that the PQLs meet the specified precision and accuracy limits. The PQL may be updated as more data becomes available.

- The PQL will be supported by analysis of a PQL check sample, consisting of a laboratory reagent grade sample matrix spiked with constituents/chemicals of concern at concentrations equal to or less than the PQL. At a minimum, a PQL check sample will be performed quarterly during the calendar year to demonstrate that the PQL continues to meet the specified limits for precision and accuracy.

- Analytical results for data below the limit of detection ("non-detect" results) must be reported as less than the established PQL that meets the specified precision and accuracy requirements.

- If a PQL cannot be established according to the specified precision and accuracy limits, the owner or operator will ensure that the laboratory provides sufficient documentation to justify the alternate precision and accuracy limits. This information will be reported to the executive director by the owner or operator and will be evaluated on a case-by-case basis.

4.4 Data Recordkeeping

All analytical data are maintained by the laboratory indefinitely. The laboratory ensures that, at each stage of a process where a permanent data record is required, security measures are in place to guarantee the integrity of the data. Standard Operating Procedures are in place for computer security, computer data storage, and back-up.

5 DATA EVALUATION, REPORTING AND RECORDKEEPING

The following sections describe the evaluation, reporting, and recordkeeping procedures that are followed upon receipt of the analytical report.

5.1 Data Evaluation Methods

Since no previous impacts to the water bearing units (due to the facility) have been determined, an intrawell monitoring approach will be employed to monitor for potential impacts. Even though no statistics will be utilized at the site, it is still much more effective to eliminate the confounding effects of spatial chemistry variability of up versus downgradient comparisons. The point of compliance (POC) will be defined at the downgradient edge of the facility for all of the monitoring units.

The potential for sample contamination is assessed by measurements of "blank" samples. Blanks are samples of ultra-pure laboratory water that are not spiked with any analyses and are carried through the field sampling and laboratory environments. These samples are known as "field," "lab," and "trip" blanks. It is assumed that any analyses that occur in the field or laboratory which might add to the concentration of the analyte in the sample will be picked up by the blank samples and measured. If any of the analyses of interest are found in the blank samples, it is an indication of potential contamination of the unknown sample. Control criteria for blank determinations are taken from regulatory method requirements.

5.2 Data Record Keeping Requirements

The Fairbanks Landfill will maintain indefinitely a copy of all water quality monitoring data collected in accordance with this plan in the facility operating record.

5.3 Reporting Requirements

In accordance with 30 TAC 330.417, not later than 60 days after each sampling event, the owner or operator shall determine whether the landfill has released contaminants to the uppermost aquifer.

The executive director may require additional sampling, analyses of additional constituents, installation of additional monitoring wells or other sampling points, and/or other hydrogeological investigations if the facility appears to be contaminating the uppermost aquifer.

If the owner or operator finds the facility to have contaminated or be contaminating the uppermost aquifer, the executive director may order corrective action appropriate to protect human health and the environment up to and including that in §330.411, 330.413,

and 330.415 of this title (relating to Assessment of Corrective Measures; Selection of Remedy; and Implementation of the Corrective Action Program).

5.4 Annual Reports

The owner or operator shall provide an annual report, including background sampling reports, detection monitoring reports, and verifications sampling reports, and any other groundwater monitoring report required to be submitted to TCEQ, within 60 days after the facility's annual groundwater monitoring event that includes the following information determined since the previously submitted report:

A. The results of all monitoring, testing, and analytical work obtained or prepared in accordance with the requirements of this permit, including a summary of background groundwater quality values, groundwater monitoring analyses, any statistical calculations, graphs, and drawings.

B. The groundwater flow rate and direction in the uppermost aquifer. The groundwater flow rate and direction of groundwater flow shall be established using the data collected during the preceding calendar year's sampling events from the monitoring wells of the Detection Monitoring Program. The owner or operator shall also include in the report all documentation used to determine the groundwater flow rate and direction of groundwater flow.

C. A contour map of piezometric water levels in the uppermost aquifer based at a minimum upon concurrent measurement in all monitoring wells. All data or documentation used to establish the contour map should be included in the report.

D. Recommendation for any changes.

E. Any other items requested by the executive director.

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FAIRBANKS LANDFILL

APPENDIX 5B1

EXAMPLE CHAIN-OF-CUSTODY-FORM

EXAMPLE FIELD INFORMATION FORM

SAMPLING, PRESERVATION, AND STORAGE PROCEDURES

LABORATORY REVIEW CHECKLIST

(For information purposes only. Actual may vary)

Chain of Custody Record

BTL-4124 (0700)

Client			Project Manager		Date	Chain of Custody Number 036068
Address			Telephone Number (Area Code)/Fax Number		Lab Number	Page _____ of _____
City	State	Zip Code	Site Contact	Lab Contact	Analysis (Attach list if more space is needed)	
Project Name and Location (State)			Carrier/Waybill Number			
Contract/Purchase Order/Quote No.			Matrix / Containers & Preservatives			Special Instructions/ Conditions of Receipt

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H_2SO_4	HNO_3	HCl	NaOH	ZnAc/ NaOH	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
(A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

1. Relinquished By	Date	Time	1. Received By	Date	Time
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

FIELD INFORMATION FORM

Site Name: _____

Site No.: _____ Sample Point: _____ (Sample ID)

This Waste Management Field Information Form is Required
This form is to be completed, in addition to any State Forms. The Field Form is submitted along with the Chain of Custody Forms that accompany the sample containers (i.e. with the cooler that is returned to the laboratory).

Laboratory Use Only/Lab ID: _____

PURGE INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hr:min)	WATER VOL IN CASING (Gallons)	ACTUAL VOL PURGED (Gallons)	WELL VOLs PURGED

Note: For Passive Sampling, replace "Water Vol in Casing" and "Well Vols Purged" w/ Water Vol in Tubing/Flow Cell and Tubing/Flow Cell Vols Purged. Mark changes, record field data, below.

PURGE/SAMPLE EQUIPMENT

Purging and Sampling Equipment ... Dedicated: [Y] or [N]

Filter Device: [Y] or [N] [0.45 µ] or [ ] µ (circle or fill in)

Purging Device [ ] A- Submersible Pump, B-Peristaltic Pump, C-QED Bladder Pump, D-Bailer, E-Piston Pump, F-Dipper/Bottle

Sampling Device [ ] (same options)

X-Other: _____

Filter Type: [ ] A-In-line Disposable, B-Pressure, C-Vacuum, X-Other _____

Sample Tube Type: [ ] A-Teflon, B-Stainless Steel, C-PVC, D-Polypropylene, X-Other: _____

WELL DATA

Well Elevation (at TOC) _____ (ft/msl)

Depth to Water (DTW) (from TOC) _____ (ft)

Groundwater Elevation (site datum, from TOC) _____ (ft/msl)

Total Well Depth (from TOC) _____ (ft)

Stick Up (from ground elevation) _____ (ft)

Casing ID _____ (in)

Casing Material _____

Note: Total Well Depth, Stick Up, Casing Id, etc. are optional and can be from historical data, unless required by State/Permit. Well Elevation, DTW, and Groundwater Elevation must be current.

STABILIZATION DATA (Optional)

Sample Time (2400 Hr Clock)	Rate/Unit _____	pH (std)	Conductance (SC/EC) (µmhos/cm @ 25 °C)	Temp. (°C)	Turbidity (ntu)	D.O. (mg/L - ppm)	eH/ORP (mV)	DTW (ft)
	1st	1st	1st					
	2nd	2nd	2nd					
	3rd	3rd	3rd					
	4th	4th	4th					
Suggested range for 3 consec. readings or note Permit/State requirements:		+/- 0.2	+/- 3%	–	–	+/- 10%	+/- 25 mV	Stabilize

Stabilization Data Fields are Optional *(i.e. complete stabilization readings for parameters required by WM, Site, or State). These fields can be used where four (4) field measurements are required by State/Permit/Site. If a Data Logger or other Electronic format is used, fill in final readings below and submit electronic data separately to Site. If more fields above are needed, use separate sheet or form.*

FIELD DATA

SAMPLE DATE (MM DD YY)	pH (std)	CONDUCTANCE (umhos/cm @ 25°C)	TEMP. (°C)	TURBIDITY (ntu)	DO (mg/L-ppm)	eH/ORP (mV)	Other: _____ Units

Final Field Readings are required *(i.e. record field measurements, final stabilized readings, passive sample readings before sampling for all field parameters required by State/Permit/Site.*

FIELD COMMENTS

Sample Appearance: _____ Odor: _____ Color: _____ Other: _____

Weather Conditions (required daily, or as conditions change): Direction/Speed: _____ Outlook: _____ Precipitation: Y or N

Specific Comments (including purge/well volume calculations if required): _____

I certify that sampling procedures were in accordance with applicable EPA, State, and WM protocols (if more than one sampler, all should sign):

Date	Name	Signature	Company
/ /			
/ /			

DISTRIBUTION: WHITE/ORIGINAL - Stays with Sample, YELLOW - Returned to Client, PINK - Field Copy

STL-8029WM R: 12/00

Recommended Sampling, Preservation, and Storage Procedures for Groundwater Monitoring

Parameter	Recommended Containers	Preservation	Maximum Holding Time	Minimum Volume
pH	P, G	None.	Analyze immediately	25 ml
Spec, Cond,	P, G	None	Analyze immediately	100 ml
Temperature	P, G	None	Analyze immediately	
Heavy Metals (includes iron and manganese)	P, G	Acidify w/HNO_3 to pH<2, 4°C	6 months except 28 days for Hg	1 liter
Calcium, Magnesium, Sodium, Potassium, Fluoride, Sulfate, Chloride, and Hardness	P, G	4°C	28 days	1 liter
TDS (may be included with above parameters)	P, G	4°C	7 days	1 liter
Nitrate	P, G	4°C	48 hrs	100 ml
Ammonia	P, G	4°C; acidify w/H_2SO_4 to pH <2, 4°C	7 days; 28 days if acidified	500 ml
Alkalinity	P, G	4°C	48 hrs	200 ml
NPOC	G amber, T-lined caps	4°C; acidify w/HCl to pH <2, 4°C	48 hrs; 28 days if acidified	100 ml / replicate
COD	P, G	4°C; acidify w/H_2SO, to pH<2, 4°C	48 hrs; 28 days if acidified	100 ml
SVOC	G, T-lined caps	4°C	7 days until extraction, then analyze within 40 days	1 liter
BOD	P, G	4°C	24 hrs	1 liter
VOC	G, T-lined septa	4°C; acidify w/HCl to pH<2, 4°C	14 days	2 x 40 ml

P-Polyethylene, G=Glass, T=Teflon.

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- ☐ This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- ☐ R1 Field chain-of-custody documentation
- ☐ R2 Sample identification cross-reference
- ☐ R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- ☐ R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- ☐ R5 Test reports/summary forms for blank samples
- ☐ R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- ☐ R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- ☐ R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- ☐ R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- ☐ R10 Other problems or anomalies
- ☐ The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: [ ] This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name (printed)	Signature	Official Title	Date

Table 1. Reportable Data.

Laboratory Name: _____

Project Name: _____

Reviewer Name: _____

LRC Date: _____

Laboratory Job Number: _____

Prep Batch Number(s): _____

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?		
		Were all departures from standard conditions described in an exception report?		
R2	O, I	**Sample and quality control (QC) identification**		
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?		
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?		
R3	O, I	**Test reports**		
		Were all samples prepared and analyzed within holding times?		
		Other than those results < MQL, were all other raw values bracketed by calibration standards?		
		Were calculations checked by a peer or supervisor?		
		Were all analyte identifications checked by a peer or supervisor?		
		Were sample quantitation limits reported for all analytes not detected?		
		Were all results for soil and sediment samples reported on a dry weight basis?		
		Was % moisture (or solids) reported for all soil and sediment samples?		
		If required for the project, TICs reported?		
R4	O	**Surrogate recovery data**		
		Were surrogates added prior to extraction?		
		Were surrogate percent recoveries in all samples within the laboratory QC limits?		
R5	O, I	**Test reports/summary forms for blank samples**		
		Were appropriate type(s) of blanks analyzed?		
		Were blanks analyzed at the appropriate frequency?		

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?		
		Were blank concentrations < MQL?		
R6	O, I	**Laboratory control samples (LCS):**		
		Were all COCs included in the LCS?		
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?		
		Were LCSs analyzed at the required frequency?		
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?		
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?		
		Was the LCSD RPD within QC limits?		
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
		Were the project/method specified analytes included in the MS and MSD?		
		Were MS/MSD analyzed at the appropriate frequency?		
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		
		Were MS/MSD RPDs within laboratory QC limits?		
R8	O, I	**Analytical duplicate data**		
		Were appropriate analytical duplicates analyzed for each matrix?		
		Were analytical duplicates analyzed at the appropriate frequency?		
		Were RPDs or relative standard deviations within the laboratory QC limits?		
R9	O, I	**Method quantitation limits (MQLs):**		
		Are the MQLs for each method analyte included in the laboratory data package?		
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?		
		Are unadjusted MQLs included in the laboratory data package?		
R10	O, I	**Other problems/anomalies**		
		Are all known problems/anomalies/special conditions noted in this LRC and ER?		
		Were all necessary corrective actions performed for the reported data?		
		Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?		

Table 2. Supporting Data.

Laboratory Name: _____

Project Name: _____

Reviewer Name: _____

LRC Date: _____

Laboratory Job Number: _____

Prep Batch Number(s): _____

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
		Were response factors and/or relative response factors for each analyte within QC limits?		
		Were percent RSDs or correlation coefficient criteria met?		
		Was the number of standards recommended in the method used for all analytes?		
		Were all points generated between the lowest and highest standard used to calculate the curve?		
		Are ICAL data available for all instruments used?		
		Has the initial calibration curve been verified using an appropriate second source standard?		
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
		Was the CCV analyzed at the method-required frequency?		
		Were percent differences for each analyte within the method-required QC limits?		
		Was the ICAL curve verified for each analyte?		
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?		
S3	O	**Mass spectral tuning:**		
		Was the appropriate compound for the method used for tuning?		
		Were ion abundance data within the method-required QC limits?		
S4	O	**Internal standards (IS):**		
		Were IS area counts and retention times within the method-required QC limits?		
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?		
		Were data associated with manual integrations flagged on the raw data?		

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
		Did dual column confirmation results meet the method-required QC?		
S7	O	**Tentatively identified compounds (TICs):**		
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?		
S8	I	**Interference Check Sample (ICS) results:**		
		Were percent recoveries within method QC limits?		
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?		
S10	O, I	**Method detection limit (MDL) studies**		
		Was a MDL study performed for each reported analyte?		
		Is the MDL either adjusted or supported by the analysis of DCSs?		
S11	O, I	**Proficiency test reports:**		
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?		
S12	O, I	**Standards documentation**		
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?		
S13	O, I	**Compound/analyte identification procedures**		
		Are the procedures for compound/analyte identification documented?		
S14	O, I	**Demonstration of analyst competency (DOC)**		
		Was DOC conducted consistent with NELAC Chapter 5C?		
		Is documentation of the analyst's competency up-to-date and on file?		
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
		Are all the methods used to generate the data documented, verified, and validated, where applicable?		
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
		Are laboratory SOPs current and on file for each method performed?		

Table 3. Exception Reports.

Laboratory Name: _____

Project Name: _____

Reviewer Name: _____

LRC Date: _____

Laboratory Job Number: _____

Prep Batch Number(s): _____

Exception Report No.	Description

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

[3] NA - Not applicable; NR - Not reviewed.

[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

ATTACHMENT 6

LANDFILL GAS MANAGEMENT PLAN

Prepared for:

USA Waste of Texas Landfills, Inc.

PERMIT AMENDMENT APPLICATION
PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 6

LANDFILL GAS MANAGEMENT PLAN

FAIRBANKS LANDFILL
MSW PERMIT NO. 1565B
HOUSTON, HARRIS COUNTY, TEXAS

Prepared by:

Geosyntec consultants

Texas Board of Professional Engineers Firm Registration No. F-1182
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(512) 451-4003

8/26/2013

FOR PERMIT PURPOSES ONLY

August 2013

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STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED
PROFESSIONAL ENGINEER
8/26/2013
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FOR PERMIT PURPOSES ONLY

APPENDICES

1. INTRODUCTION

This Landfill Gas Management Plan (LGMP) was prepared for the Fairbanks Landfill (the facility) to describe the program that will be implemented to monitor for potential off-site methane migration and potential accumulation of methane in onsite structures, and related features to manage and control landfill gas (LFG). This plan also outlines notification procedures and possible remediation activities, if required.

LFG is a byproduct of waste decomposition. The Fairbanks Landfill is a Type IV municipal solid waste (MSW) facility, and as such will receive primarily construction and demolition (C&D)-type waste and is not allowed to accept putrescible waste. Thus, the waste composition at the facility will contain a smaller quantity of decomposable material compared to typical Type I MSW facilities. Nevertheless, LFG generation will still likely occur due to decomposable material (e.g., wood waste) within the landfill.

In general, LFG may contain approximately 50 percent to 60 percent methane by volume. Methane is an odorless gas, yet potentially explosive in concentrations between 5 and 15 percent by volume in air (i.e., the lower explosive limit (LEL) and upper explosive limit (UEL), respectively). The LEL and UEL are defined as the lowest and highest percent by volume of a mixture of explosive gases in air, respectively, that will propagate a flame at 25º Celsius and atmospheric pressure.

Texas Commission on Environmental Quality (TCEQ) landfill gas management rules set forth in 30 TAC §330.371(a) require that the landfill is operated to ensure that the concentration of methane gas generated by the facility does not exceed:

1. One and a quarter (1.25) % methane by volume (i.e., twenty-five percent (25%) of the LEL for methane) in facility structures (excluding gas control or recovery system components); and

2. Five (5) % methane by volume (i.e., one hundred percent (100%) of the LEL for methane) in monitoring points, probes, subsurface soils, and other matrices at the facility permit boundary.

30 TAC §330.371(b) further requires that a routine methane monitoring program be implemented to ensure that the above standards are met. Accordingly, this LGMP describes subsurface monitoring of for methane along the permit boundary and monitoring for methane in on-site enclosed structures. This LGMP also presents a description of assessment and

remediation procedures that may potentially be required at the facility. Finally, this plan discusses the planned LFG controls that may be implemented.

The requirements of this plan will remain in effect during operations, closure, and the post-closure period. Any revisions or modifications to the plan will be submitted to TCEQ for review and approval.

2. SITE DESCRIPTION

2.1 Site Location

The Fairbanks Landfill is an existing Type IV municipal solid waste (MSW) facility located in Harris County, Texas. The facility is located on the northwest side of Houston, outside the Houston City Limits and approximately 14 miles north of downtown Houston. The site is located on the west side of Fairbanks N Houston Road, 2.7 miles north of the intersection of US 290 and Fairbanks N Houston Road, and 2.3 miles south of the intersection of Beltway 8 and Fairbanks N Houston Road. The facility address is: 8205 Fairbanks N Houston Rd, Houston, Texas, 77064. The site entrance/exit point is a paved driveway on the west side of Fairbanks N Houston Road. A site plan showing the facility and adjacent areas is shown on Drawing 6-1 at the end of this attachment.

2.2 Climate

The site is located in a part of the state described as the Upper Coast climate division of the Texas Gulf Coast, which has a humid subtropical climate. Such a location allows for relatively large variations in monthly and annual precipitation amounts. The average annual precipitation for Houston is 49.8 inches, although it may range from near 20 to near 70 inches from one year to another. February is typically the driest month, with 3.2 inches of precipitation on average. June is typically the wettest month, with 5.9 inches of precipitation on average. The average low temperature varies seasonally from 43°F in January, the coldest month, to 95°F in August, the warmest month. Average high temperatures vary from 63°F to 95°F for January and August, respectively. Below freezing temperatures during the winter occur on approximately 25 days each year on average. Relative humidity is often above 80 percent during the early morning hours much of the year, typically dropping to near 50 percent in late afternoon.

2.3 Surrounding Land Use

Maps and a report presenting information on the surrounding land use are included in Part II of the Permit Amendment Application (see Appendix IIB – the Land Use Study). In general, the following features characterize the land use of the surrounding area:

1. Predominant single-family residential development in the southern half of the one-mile radius area with limited industrial development.

2. Substantial industrial development in the northern half of the one-mile radius area with a residential mix of permanent homes, manufactured homes and mobile homes.

3. Limited retail uses, mostly along Fairbanks-North Houston Road east of the site, and along Beltway 8, far west of the site.

4. Undeveloped land of various sizes scattered throughout the area, but mostly north and east of the site.

A map of inhabitable buildings and structures on-site and within a 500-ft offset from the permit boundary is shown in Part II on Drawing II-6. The drawing shows that there are a number of inhabitable buildings and structures adjacent to the site – primarily to the south and north. This information on surrounding land use, and in particular the nearby inhabitable structures, was considered during development of the landfill gas monitoring program described subsequently.

2.4 On-Site Enclosed Structures

No structures are located or planned to be located on waste. On-site enclosed building structures at the facility are shown on attached Drawing 6-1, and are summarized below:

- The initial scale house/site office location is located southeast of the current landfill footprint on the main site access road, and approximately 1000-ft west of Fairbanks N Houston Road.

- As development reaches Sector 17, a new scale house/office will be constructed and the previous one will be removed. This new structure will be located on the southeastern side of the site on the main site access road, and approximately 400-ft west of Fairbanks N Houston Road.

2.5 Underground Utilities

A map of the drainage, pipeline, and utility easements within or adjacent to the permit boundary is presented in Part II of the Permit Amendment Application (see Drawing IIA-9). As shown, there is one existing underground utility – a pipeline easement and associated physical pipeline – that crosses the site in a general southwest to northeast orientation.

This existing pipeline will function until (at the latest) the start of construction of Sector 14, when it will be relocated to the south and east, outside of the facility permit boundary. Once it is relocated, there will be no underground utilities within the permit boundary. Until the time of the relocation, the facility monitoring program described herein includes perimeter monitoring probes positioned immediately adjacent to the points where the existing pipeline crosses the permit boundary (discussed further in Section 3.4), in order to monitor the pipeline corridor for potential gas migration.

2.6 Hydrogeology, Soils, and Surface Hydrology

Landfill gas has the potential to migrate in the subsurface through the vadose zone (i.e., unsaturated zone) through preferential soil layers of relatively high air permeability. Surface hydrology features (rivers, lakes, etc.) can act as barriers for gas migration depending on subsurface conditions beneath them. This section presents an overview of the basic hydrogeology, soils, and hydrology encountered at the site, in order to describe the subsurface conditions relevant to potential subsurface landfill gas migration pathways. A detailed description of the geology and hydrogeology of the subsurface is presented in Part III, Attachments 4 and 5, respectively, of this Permit Amendment Application. The detailed geotechnical characterization of the soils is presented in Part III, Attachment 3D.

The subsurface hydrogeology and soils on-site are characterized in five strata as summarized below.

- Stratum I (Sand, Silt and Clay): Surficial fine-grained sand, clayey and silty sand, silty and sandy clay and clay (predominantly CL). It consists of sand and clay units which are discontinuous across the site and is on average approximately 14 ft thick. Due to site activities some areas consist of constructed fill material with similar composition. Groundwater has not been encountered in Stratum I at the site; it is an unsaturated zone therefore, Stratum I is a potential pathway for landfill gas migration.

- Stratum II (Sand): Fine grained sand and silty sand with some clayey sand. Based on the water levels measured in site monitoring wells and exploratory borings, the groundwater in this upper sand layer occurs under generally unconfined conditions. The average thickness of this layer is about 32 feet. Much of this layer has been removed from the site through either excavation to construct the existing landfill liner, or through sand-pits to mine the sand material. Where Stratum II is present, it is considered a potential pathway for landfill gas migration.

- Stratum III (Clay): Very stiff to hard, reddish brown and gray clay (mostly CH), silty clay, and sandy clay. This layer is continuous throughout the site with average thickness of 25 ft. Due to the continuity, low-permeability, and thickness of this clay layer, it acts as a confining unit between uppermost Stratum II sand groundwater zone and the deeper Stratum IV sand. As such, Stratum III is not expected to provide a pathway for landfill gas migration.

- Stratum IV (Sand): This deep sand unit consisting primarily of sand, silty sand and gravelly sand. The average thickness of the layer is 50 ft and groundwater in this layer is

confined making it the uppermost aquifer and groundwater monitoring unit at the site. Stratum IV is situated beneath the bottom of the landfill liner system, as the landfill liner system is keyed-in to the overlying low-permeability Stratum III clays. As such, Stratum IV is not expected to provide a pathway for landfill gas migration.

- Stratum V (Clay): Hard, gray and light brown clay similar to Stratum III clay. This layer is situated approximately 50 feet below the top of Stratum IV, and has low-permeability. Given Stratum V's depth below the bottom of the landfill, its low permeability, and the groundwater in the overlying Stratum IV that would be a barrier to downward gas migration, Stratum V is a very unlikely migration pathway for landfill gas.

A review of surface hydrology shows that there is one stream on site: Rolling Fork Creek, which is located on the western side of the site and flows in a general southward direction. Rolling Fork Creek joins White Oak Bayou approximately 1.4 miles south of the site.

Portions of the east and south sides of the site contain man-made depressions that were formerly mined as sand-pits, and now periodically contain water. These sand pits removed much of a potential subsurface gas migration pathway (Stratum II sands) around the southern and eastern sides of the site. The facility design will expand the size of these depressions, and convert them into storm water ponds for detention and management of storm water generated on-site. Storm water ponds would also tend to reduce the potential for subsurface gas migration by providing a hydraulic barrier within the pond, along with any contribution they make to groundwater recharge.

3. LANDFILL GAS MONITORING

3.1 Overview of Landfill Gas Monitoring Program

The landfill gas monitoring program will include a perimeter monitoring network, and monitoring of indoor air inside facility structures. An overview of the landfill gas monitoring program is provided in Table 6-1 below.

TABLE 6-1
SUMMARY OF FACILITY LANDFILL GAS MONITORING PROGRAM

LOCATION	TYPE	FREQUENCY(1)	MAXIMUM ALLOWABLE GAS CONC.	INSTALLATION REPORTING	ROUTINE MONITORING REPORTING	EXCEEDANCE ACTIONS
Facility Permit Boundary (includes at underground utility lines)	Gas Monitoring Probes	Quarterly	100% LEL (5% methane by volume)	Installation Report to TCEQ and Place Copy in Site Operating Record (See Section 4.1 of this Plan)	Place Copy in Site Operating Record (See Section 4.2 of this Plan)	Implement Contingency Plan (See Section 5 of this Plan)
Facility Structures	Ambient Indoor Air	Quarterly	25% LEL (1.25% methane by volume)	None	Place Copy in Site Operating Record (See Section 4.2 of this Plan)	Implement Contingency Plan (See Section 5 of this Plan)

Notes:
(1) Monitoring frequency shall be performed for the life of the landfill and during the 5-year post-closure period, unless written authorization to reduce the program is received by the TCEQ Executive Director. The authorization shall be based on a demonstration, supported by collected data and studies, by facility that there is no potential for gas migration beyond the facility boundary or inside site structures.
(2) More frequent monitoring will be required if monitoring results indicate gas migration/accumulation.

3.2 Facility Boundary Monitoring

3.2.1 Overview

Landfill gas monitoring along the facility permit boundary will be performed at a network of permanent subsurface landfill gas monitoring probes (GPs) at the locations shown on Drawing 6-1 presented at the end of this plan, and summarized in Table 6-2 below.

TABLE 6-2
LANDFILL GAS MONITORING PROBE INFORMATION

GAS PROBE I.D.	COORD.[1]	GROUND SURFACE ELEV.	ADJACENT LOWEST TOP OF LINER ELEV.[4]	EXISTING/ANTICIPATED PROBE DETAILS[3]							STATUS / TIMING
				GAS PROBE BOTTOM ELEV.	TOTAL GAS PROBE DEPTH	DEPTH OF SCREENED INTERVAL		SCREEN LENGTH	ELEV. OF SCREENED INTERVAL		
		(ft, MSL)	(ft, MSL)	(ft, MSL)	(ft, bgs)	(ft, bgs)		(ft)	(ft, MSL)		
						FROM	TO		FROM	TO	
EXISTING GAS PROBES[2]											
GP-1	N 13,892,664 E 3,065,444	109.1	55.0	42.5	66.6	5.0	41.5	36.5	104.1	67.6	No Changes Proposed.
GP-2	N 13,892,714 E 3,066,403	111.1	55.0	46.0	65.1	5.0	45.0	40.0	106.1	66.1	No Changes Proposed.
GP-3A	N 13,892,773 E 3,067,354	106.9	55.0	46.0	60.9	5.0	45.0	40.0	101.9	61.9	No Changes Proposed.
GP-4A	N 13,892,753 E 3,068,405	108.4	55.0	46.0	62.4	5.0	45.0	40.0	103.4	63.4	No Changes Proposed.
GP-5	N 13,891,946 E 3,068,411	110.3	89.6	49.5	60.8	5.0	48.5	43.5	105.3	61.8	Replace with GP-5A (See Note 5).
GP-6	N 13,891,199 E 3,068,441	107.49	85.1	54.0	53.49	5.0	53.0	48.0	102.5	54.5	Replace with GP-6A (See Note 5).
GP-7	N 13,891,129 E 3,067,467	109.9	55.0	52.0	57.88	5.0	51.0	46.0	104.9	58.9	Replace with GP-7A (See Note 5).
GP-8	N 13,891,109 E 3,066,466	115.7	55.0	43.0	72.70	5.0	42.0	37.0	110.7	73.7	Replace with GP-8A (See Note 5).
GP-9	N 13,891,065 E 3,065,673	113.7	55.0	50.5	63.21	5.0	49.5	44.5	108.7	64.2	No Changes Proposed.
GP-10	N 13,891,695 E 3,065,565	113.7	55.0	45.0	68.74	5.0	44.0	39.0	108.7	69.7	No Changes Proposed.

SEE NOTES (1) THROUGH (5) AT END OF TABLE ON NEXT PAGE.

TABLE 6-2 (Continued)
LANDFILL GAS MONITORING PROBE INFORMATION

GAS PROBE I.D.	COORD.[1]	GROUND SURFACE ELEV.	ADJACENT LOWEST TOP OF LINER ELEV.[4]	EXISTING/ANTICIPATED PROBE DETAILS[3]							STATUS / TIMING
				GAS PROBE BOTTOM ELEV.	TOTAL GAS PROBE DEPTH	DEPTH OF SCREENED INTERVAL		SCREEN LENGTH	ELEV. OF SCREENED INTERVAL		
		(ft, MSL)	(ft, MSL)	(ft, MSL)	(ft, bgs)	(ft, bgs)		(ft)	(ft, MSL)		
						FROM	TO		FROM	TO	
PROPOSED GAS PROBES[3]											
GP-5A	N 13,892,182 E 3,069,251	111	69.6	68	44	5	69	64	106	43	Replacement for GP-5. Install Prior to Constructing Sector 14.
GP-6A	N 13,891,217 E 3,069,288	107	57.0	55	52	5	56	51	102	51	Replacement for GP-6. Install Prior to Constructing Sector 17.
GP-7A	N 13,890,582 E 3,067,396	91	55.0	53	38	5	54	49	86	37	Replacement for GP-7. Install Prior to Constructing Sector 16.
GP-8A	N 13,890,682 E 3,066,463	103	55.0	53	50	5	54	49	98	49	Replacement for GP-8. Install Prior to Constructing Sector 15.
GP-11	N 13,892,760 E 3,069,228	110	69.9	68	42	5	69	64	105	41	Install Prior to Accepting Waste in Sector 14.
GP-12	N 13,890,485 E 3,069,318	110	55.0	53	57	5	54	49	105	56	Install Prior to Accepting Waste in Sector 17.
GP-13	N 13,890,473 E 3,068,398	93	55.0	53	40	5	54	49	88	39	Install Prior to Accepting Waste in Sector 16.
GP-14	N 13,890,857 E 3,065,930	106	55.0	53	53	5	54	49	101	52	Install Prior to Accepting Waste in Sector 15.

Notes:

MSL = Mean Sea Level. bgs = below ground surface

(1) Coordinates refer to state plane coordinates.

(2) Information for existing gas probes taken from construction logs.

(3) Information for proposed gas monitoring probes is approximate based on anticipated subsurface characterization and may be varied in the field as appropriate based on drill rig access conditions and actual subsurface findings.

(4) Lowest elevation of adjacent liner is within an approximately 1000-ft distance from each probe, taken from the base grading plan (Attachment 3, Drawing 3-2).

(5) Prior to new sector construction affecting an existing gas probe (GP-5, GP-6, GP-7, and GP-8), the corresponding replacement gas probe (GP-5A, GP-6A, GP-7A, and GP-8A, respectively) will be installed. Then the existing gas probe will be plugged and abandoned.

3.2.2 Basis for Gas Monitoring Probe Locations

The GP locations were selected based on the geometry of the landfill in relation to the property boundary, the subsurface characterization, surface hydrology/hydraulics features, and the land use of adjacent properties. A description of the surrounding land use and nearby structures and inhabitable buildings was previously presented in Section 2.3 of this plan. As shown on Drawing 6-1 and summarized above in Table 6-2, a network of gas probes are proposed for monitoring the facility permit boundary. Gas probes that already exist will retain their numerical probe designation. A description of and rationale for the selected locations is presented below.

- The landfill currently has ten (10) existing gas monitoring probes around its perimeter (GP-1 through GP-10). Six of these probes are proposed to continue. These six existing gas monitoring probes are: GP-1, GP-2, GP-3A GP-4A, GP-9, and GP-10; which are already being routinely monitored as part of the current landfill gas monitoring program. These probes are situated around the north and west sides of the existing landfill.

- Four existing gas monitoring probes (GP-5, GP-6, GP-7 and GP-8) are located on the east and south side of existing landfill footprint. As shown on Drawing 6-1, the permit boundary is changing to be further to the east and south, and these existing probes will no longer be at the permit boundary and will eventually be on areas that will become landfill footprint. The replacement probes are situated adjacent to their previous location, but relocated to reflect the new permit boundary. Gas probes GP-5, GP-6, GP-7, and GP-8 will be replaced with gas probes designated as GP-5A, GP-6A, GP-7A, and GP-8A respectively. As indicated in Table 6-2, prior to new sector construction affecting an existing gas probe (GP-5, GP-6, GP-7, and GP-8), the corresponding replacement gas probe (GP-5A, GP-6A, GP-7A, and GP-8A, respectively) will be installed. Then the existing gas probe will be plugged and abandoned in accordance with TCEQ rules.

- Four new gas monitoring probes are proposed around the new lateral expansion permit boundary of the landfill, to supplement the six existing and four relocated gas probes. This will increase the number of gas monitoring probes at the facility from ten (10) to fourteen (14). The new gas monitoring probes are designated as GP-11 through GP-14. As shown on Drawing 6-1, the additional gas monitoring probes are being added between several existing and relocated gas probes on the east and south sides of the landfill. The phased installation of these probes will be as indicated in Table 6-2.

The horizontal location of the new gas monitoring probes may be modified slightly at the time of installation to allow for drill rig access and to avoid any nearby obstacles.

3.2.3 Basis for Gas Monitoring Probe Depths

The subsurface conditions were previously described in Section 2.6, and as described, some of the subsurface strata may have greater potential to transmit landfill gas than others. The depths of the new landfill gas probes are designed to be consistent with the existing probes, and to extend to a depth that is 2-ft below the lowest waste elevation at the site. To be conservative, the new landfill gas monitoring probes will be screened along their full column (i.e., from the bottom, up to within approximately 5-ft of the ground surface (to provide for a surface-seal of the probe casing)).

3.2.4 Gas Monitoring Probe Design

The proposed GP construction detail is shown on Drawing 6-2 at the end of this plan. Details of the existing GPs are shown on their construction logs/installation reports presented in Appendix 6-A of this plan.

3.2.5 Gas Monitoring Probe Installation

A typical GP is constructed in the following manner by a qualified drilling contractor, and logged by a geologist or engineer. A drill rig equipped with a hollow stem auger is positioned above the desired well location. A borehole is drilled vertically down to the design bottom elevation. After the borehole is completed, the gas probe casing is inserted. The bottom of the probe should be capped to prevent soil from plugging any portion of the perforated pipe section. Sand (filter pack) is poured into the borehole to backfill the annular space surrounding the perforations/screened interval. This will facilitate gas movement into the GP from the surrounding soil. Above the filter pack, a bentonite seal is installed in the borehole. This will prevent LFG from migrating up the borehole and surface water from infiltrating the well. The GP will be clearly marked and protected by an outer steel collar. A concrete pad is poured on the ground surface around the collar, and four bollard posts may be installed at the four corners of the concrete pad as further protection.

Details of the gas monitoring probe installation reporting requirements are given subsequently in Section 4.1 of this plan. Once installed, the integrity of the gas probes will be inspected during each routine quarterly monitoring event, and maintenance/repairs will be made as needed based

on inspection findings (e.g., repair any damage to probe collar or casing, trim or remove unwanted vegetation, etc.).

3.3 Facility Structures Monitoring

The locations of on-site structure(s) are shown on Drawing 6-1. Routine quarterly monitoring of the on-site structure(s) that exist at the time of monitoring will be performed as described in Section 3.5 of this plan.

It is noted that the facility may at their discretion elect to install continuous gas monitors/alarms within on-site building(s). However, continuous monitors are outside the scope of this LGMP, and as noted, facility structures will be monitored in the manner described in Section 3.5 of this plan.

3.4 Underground Pipeline Monitoring

An underground pipeline that crosses the site was previously discussed in Section 2.5.

The underground pipeline corridor is currently monitored for potential landfill gas migration at each end where it enters and exits the permit boundary, by existing gas probes GP-5 and GP-9 (see Drawing 6-1). GP-5 will be replaced with GP-5A – also located where the pipeline corridor exits the northeastern side of the facility. GP-9 on the southwestern side of the facility will remain in-place.

As noted, the pipeline will exist until (at the latest) the start of construction of Sector 14, when it will be relocated to the south and east, outside of the facility permit boundary. Once it is relocated, there will be no underground utilities within the permit boundary.

3.5 Monitoring Procedures

Routine landfill gas monitoring at each sampling location (gas monitoring probes and structures/buildings) will be performed using the following equipment:

- combustible gas indicator (CGI), or an equivalent instrument (e.g., Landtec® GEM-2000, photo/flame ionization detector, etc.) capable of detecting methane gas at concentrations of 0.5 percent to 100 percent by volume;

- pressure gauge;

- water level indicator; and
- thermometer.

These instruments will be calibrated, used, and maintained in accordance with the equipment manufacturers' recommended procedures. The information, measurements, and observations required to be taken at each sampling location during each monitoring event will include:

- Documentation of the sampling location designation, date and time of each measurement, ambient atmospheric temperature and barometric pressure, general weather conditions, general condition of the gas probe or vent, and name(s) of sampling personnel.
- Monitoring equipment used and including date of calibration.
- Temperature and gas pressure within the gas monitoring probe.
- Depth to water (if any) in gas monitoring probe.
- Methane concentrations in units of percent by volume methane and percent LEL.

The monitoring records will be recorded on data sheets similar to the one attached to this document (see Appendix 6-B). The exact format of the monitoring form may be modified from the example attached to this document, but the data recorded during each monitoring event will at a minimum include the information identified above.

3.6 Maintenance Procedures

Each landfill gas monitoring event will include an inspection of the integrity of landfill gas probes, to check for the following:

- verify that the landfill gas monitoring probe is clearly labeled on the outer casing or lid;
- verify that the protective casing is intact and not bent or excessively corroded;
- verify that the concrete pad is intact (no evidence of excessive cracking or heaving);
- verify that the padlock is functional; and

- verify that the inner casing is intact.

If damage or excessive wear to the landfill gas monitoring probe is observed, it will be reported to the Site Manager. If it is not possible to repair the landfill gas monitoring probe and the damage could potentially affect the accuracy of future monitoring results, the landfill gas monitoring probe will be decommissioned and replaced with a new landfill gas monitoring probe of the same design and at the same location and documented in accordance with Section 4.1.

3.7 Gas Monitoring System Backup Plan

The following is a back-up plan to be used if any installed LFG monitoring probes become unusable or inoperative.

1. Damaged or inoperative perimeter probes will be repaired within 30 days of the date of damage or replaced within 60 days from the TCEQ approval date of the permit modification requesting replacement.

2. Upon completion of the replacement probe, an installation report including boring logs and construction details will be submitted to the TCEQ.

3. Should a monitoring event occur prior to replacement of a damaged probe, a bar hole will be placed next to the damaged probe or vent and a portable gas monitor used until the probe or vent is replaced.

3.8 Gas Monitoring System Revisions

Landfill gas monitoring systems shall be revised as needed to maintain current and effective gas monitoring systems. Also, post-closure land use at the site shall not interfere with the function of gas monitoring systems.

4. RECORDKEEPING AND REPORTING

4.1 Gas Monitoring Probe Installation Report

A gas monitoring probe installation report shall be prepared upon completion of each gas probe installation project and submitted to TCEQ. The installation report will include the following:

- A figure showing the site plan and gas monitoring probe locations/designations (e.g., copy of Drawing 6-1 of this plan, or similar figure).
- Boring logs for each new gas probe installed, including the drilling date and method, name(s) of the engineer or geologist who logged the hole, and information on the subsurface findings (soil types and depths, groundwater depth, if present, etc.).
- Construction summary logs for each new installed gas probe, providing the surveyed location coordinates of the probe, surveyed elevation of existing ground and top of probe riser casing, and identification of the probe materials, dimensions and depths/elevations, screen type and interval length, extent and types of filter pack, extent and types of annular seal, material and extent of backfill, presence of concrete pad, protective bollards, etc.

As previously discussed, GP-1 through GP-10, are existing gas monitoring probes. Installation information for these existing gas probes is presented in Appendix 6-A of this plan.

When additional gas monitoring probes are installed, their installation records will be submitted to TCEQ as mentioned above, and the records may be added to Appendix 6-A of this plan.

4.2 Quarterly Gas Monitoring Records

Quarterly monitoring records for the gas probes and facility structures will be maintained at the landfill in the facility's Site Operating Record throughout the active life of the facility and during the post-closure period. The monitoring records will be recorded on data sheets similar to the one attached to this document (Appendix 6-B). The exact format of the monitoring form may be modified from the example attached to this document, but the data recorded during each monitoring event will at a minimum include the information identified in Section 3.5 of this plan.

In the event that the maximum allowable landfill gas concentrations set forth in Section 3.1 of this plan are exceeded, the facility must report the results to TCEQ and take other steps required by 30 TAC §330.371(c)(1) through (3), and as described subsequently in Section 5 of this plan.

5. ACTION PLAN

The steps outlined in this section shall be taken if the monitoring reveals that methane is detected above the following allowable limits:

- One and a quarter (1.25) % methane by volume (i.e., twenty-five percent (25%) of the LEL for methane) in facility structures (excluding gas control or recovery system components); and

- Five (5) % methane by volume (i.e., one hundred percent (100%) of the LEL for methane) in monitoring points, probes, subsurface soils, and other matrices at the facility permit boundary.

1. Immediate Actions.
    a. If methane is detected above the allowable limits, the facility must immediately take necessary steps to protect human health. For example, the area around the exceedance will be inspected for any potential flame or spark sources, and these will be removed, and the area may be roped-off to prevent unwanted entry. For structures, the building will be evacuated and ventilated. Periodic follow up methane readings will be taken to check whether the building is safe to be re-inhabited.
    b. After taking steps to protect human health, the facility will begin verification procedures to determine if the methane levels detected are accurate, or if erroneous levels have been detected due to equipment malfunction or other reasons:
        - In facility buildings/structures where the exceedance occurred, methane monitoring will be performed daily for one week. If concentrations of methane above the regulatory limit are not detected (i.e., a malfunction or erroneous reading is suspected), daily monitoring will cease, and routine monitoring will resume. Otherwise, step "c" below will be performed.
        - At the permit boundary where the exceedance occurred, a verification reading will be taken within 24 hours, and again within seven (7) days. If concentrations of methane above the regulatory limit are not detected (i.e., a malfunction or erroneous reading is suspected), daily monitoring will cease, and routine monitoring will resume. Otherwise, step "c" below will be performed.

c. If the initial detection is verified to be an exceedance, the following parties shall be notified of the situation:
    - the TCEQ Executive Director;
    - TCEQ Region 12;
    - the local Fire Department and Harris County Public Health and Environmental Services; and
    - neighboring landowners within 500-ft of the exceedance location.

2. Within Seven Days of Verified Exceedance. A record of the methane gas levels detected and a description of the immediate actions taken to protect human health will be placed in the Site Operating Record.

3. Within 60 Days of Verified Exceedance.
    a. A detailed evaluation will be made to determine the potential source and extent of the methane gas migration. A Remediation Plan will be prepared and must be submitted to the TCEQ Executive Director. The Remediation Plan will present the results of the detailed evaluation, along with the remedial measures taken, which may include additional monitoring, source control t (e.g., installation of gas vent(s)) a passive interceptor trench/barrier system, active building ventilation systems,), etc.
    b. The Remediation Plan will incorporate remediation performance monitoring. The remediation performance monitoring will be conducted on a monthly basis at the affected gas monitoring location(s) and will submitted to TCEQ, until methane concentrations in the affected gas monitoring location(s) are below the allowable limits specified at the beginning of this section for six (6) consecutive months.

As allowed by 30 TAC §330.371(d), alternate schedules to those given above may be established by the TCEQ Executive Director.

6. LANDFILL GAS CONTROL SYSTEM

6.1 Passive Landfill Gas Vents

Passive landfill gas vents are one means of controlling landfill gas to address exceedance of methane gas concentration. To date, a total of 18 passive gas vents have been installed at this facility to help control landfill gas. The location of these gas vents are shown on Drawing 6-1. An engineering detail showing a typical passive landfill gas vent is presented on Drawing 6-2.

Existing gas vents GV-1 through GV-4 will remain in-place and will continue to function.

Gas vents GV-5 through GV-18 will stay in-place until it is time for waste placement above these vents (for vents installed in waste), or until it is time to construct the new landfill sector where the vents are located (for vents installed adjacent to the landfill).

New gas vents will be considered, should the results of ongoing routine landfill gas monitoring indicate verified exceedances. Their location and installation will be handled through a Remediation Plan described in Section 5.

6.2 Passive Gas Vents Operations and Maintenance

Operations and maintenance (O&M) of the passive landfill gas vents (and any other landfill gas control components installed at the facility) will include inspection of the above-ground components on a quarterly during the monitoring of gas probes to verify their integrity and function. These features will be maintained as necessary.

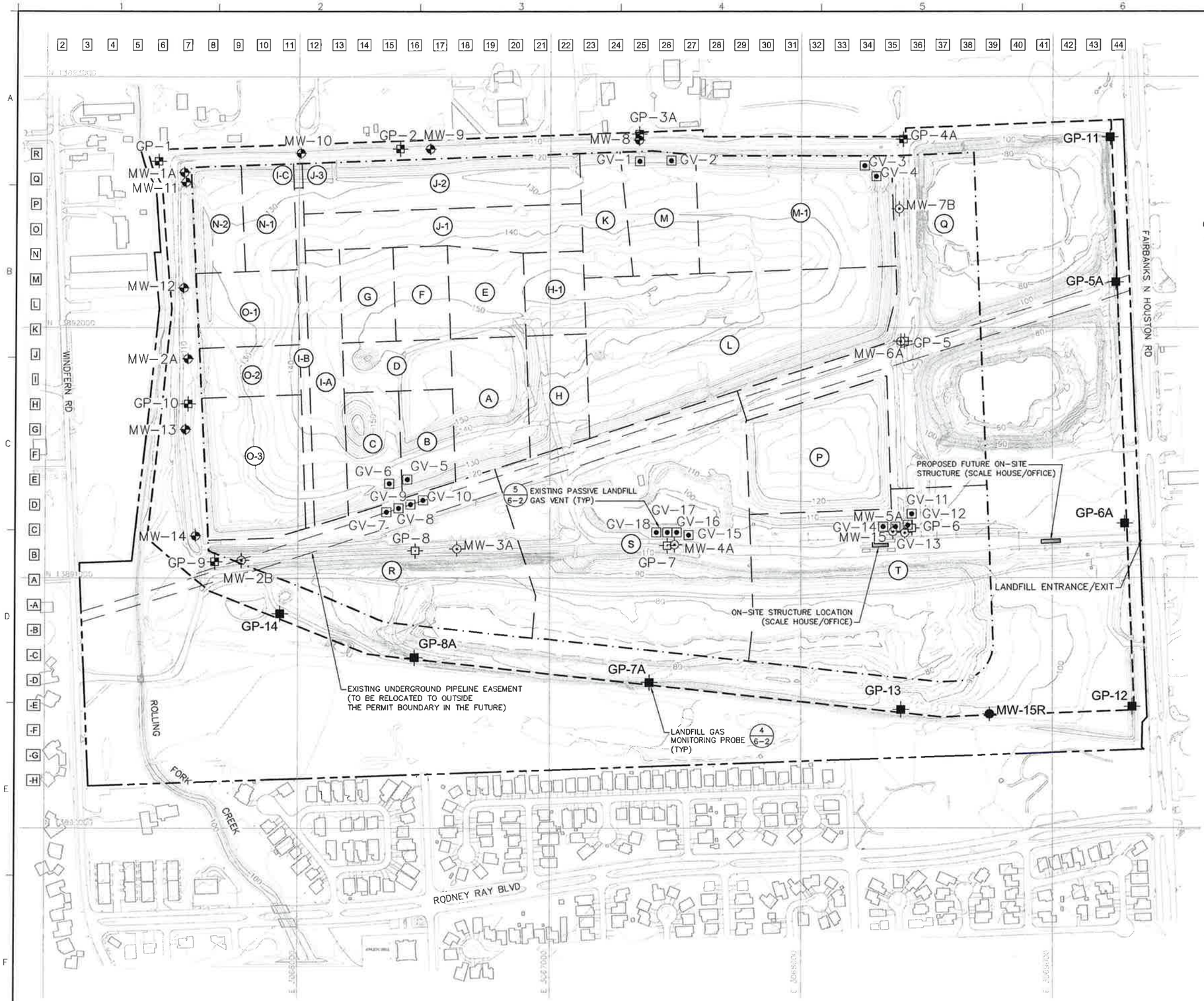
6.3 Gas Control System Revisions

Landfill gas control systems such as the passive vents shall be revised as needed to maintain current and effective gas control. Also, post-closure land use at the site shall not interfere with the function of gas monitoring and control systems.

DRAWINGS

LANDFILL GAS MANAGEMENT SYSTEM

- Drawing 6-1 Landfill Gas Monitoring Probe Plan
- Drawing 6-2 Landfill Gas Monitoring System Details



N

0 200' 400'
SCALE IN FEET

LEGEND

- EXISTING GROUND ELEVATION (FT, MSL) (NOTE 1)
- EXISTING ROAD
- EXISTING WATER LINE
- STATE PLANE COORDINATES (NOTE 2)
- SITE GRID
- PROPERTY BOUNDARY
- EXISTING (PERMIT MSW-1565A) LANDFILL FOOTPRINT
- PERMIT BOUNDARY
- PROPOSED LANDFILL FOOTPRINT
- SECTOR BOUNDARY
- SECTOR DESIGNATION
- MW-4A — EXISTING GROUNDWATER MONITORING WELL
- MW-15R — PROPOSED GROUNDWATER MONITORING WELL
- MW-7B — EXISTING GROUNDWATER MONITORING WELL TO BE PLUGGED/ABANDONED
- GP-2 — EXISTING LANDFILL GAS PROBE
- GP-7 — EXISTING LANDFILL GAS PROBE TO BE PLUGGED/ABANDONED
- GP-13 — PROPOSED LANDFILL GAS PROBE
- GV-7 — EXISTING PASSIVE LANDFILL GAS VENT

NOTES:

1. THE EXISTING TOPOGRAPHIC BASE MAP SHOWN ON THIS DRAWING WAS COMPILED USING PHOTOGRAMMETRIC METHODS BASED ON AERIAL PHOTOGRAPHY PERFORMED ON 26 MARCH 2012 AND PREPARED BY DALLAS AERIAL SURVEYS (DAS), INC.
2. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL (FT, MSL), AS DEFINED BY THE USGS NATIONAL GEODETIC VERTICAL DATUM (NAVD) OF 1988. STATE PLANE COORDINATE GRID CORRESPONDS TO TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS SOUTH CENTRAL ZONE (4204), NORTH AMERICAN DATUM OF 1983 (NAD-83).
3. SEE TABLE 6-2 OF LANDFILL GAS MANAGEMENT PLAN FOR TIMING OF GAS PROBE INSTALLATIONS AND ABANDONMENTS.

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED
PROFESSIONAL ENGINEER

8/26/2013

FOR PERMIT PURPOSES ONLY

REV	DATE	DESCRIPTION	DRN	APP
-	AUG. 2013	INITIAL SUBMITTAL TO TCEQ	JJV	SMG

USA WASTE OF TEXAS LANDFILLS, INC.

LANDFILL SITE ADDRESS:
8205 FAIRBANKS N HOUSTON RD
HOUSTON, TEXAS 77064
PHONE: 713.824.6867

Geosyntec consultants
GEOSYNTEC CONSULTANTS, INC.
TEXAS ENG. FIRM REGISTRATION NO. 1182
3600 BEE CAVES ROAD, SUITE 101
AUSTIN, TEXAS 78746
PHONE: 512.451.4003

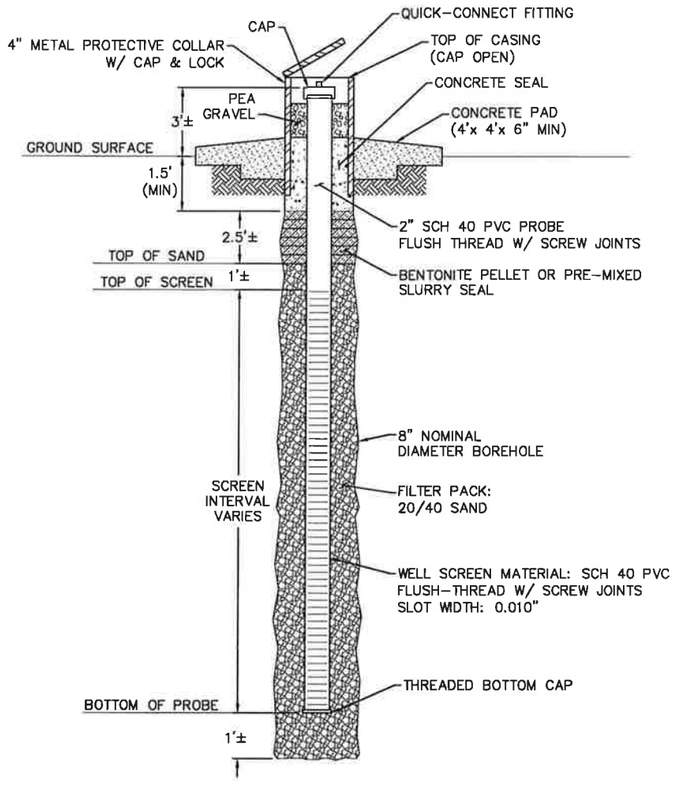
TITLE:
LANDFILL GAS MONITORING SYSTEM PLAN

PROJECT:
FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION – PERMIT NO. MSW-1565B

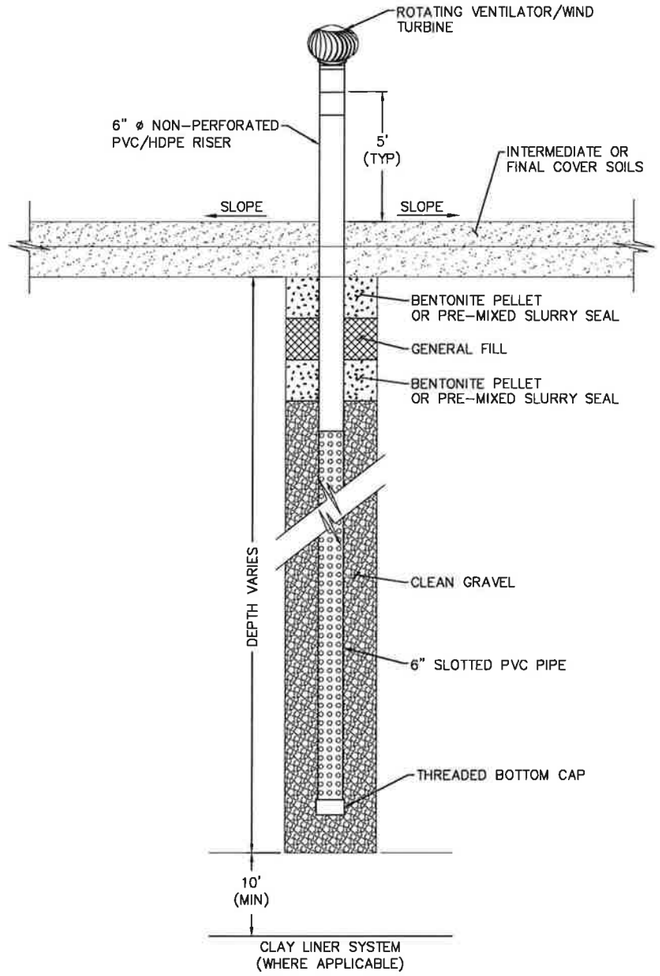
PROJECT NO.: TXL0263	DESIGN BY: RG	REVIEWED BY: SMG	PART NO.: III	DRAWING: 6-1
FILE: 0263P6A-1	DRAWN BY: JJV	APPROVED BY: SMG		

PERMIT DRAWING

DRAWING: Austin P:\CADD\Projects\F\Fairbanks Landfill\Permit\Expansion (TXL0263)\Drawings\Dwgs-Rev0\0263P6A-1.dwg PLOTTED: Aug 23, 2013 - 9:13am



4 / 6-2 DETAIL
LANDFILL GAS MONITORING PROBE
SCALE: N.T.S.



5 / 6-2 DETAIL
PASSIVE LANDFILL GAS VENT
SCALE: N.T.S.

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED PROFESSIONAL ENGINEER
8/26/2013

FOR PERMIT PURPOSES ONLY

REV	DATE	DESCRIPTION	DRN	APP
–	AUG. 2013	INITIAL SUBMITTAL TO TCEQ	JJV	SMG

USA WASTE OF TEXAS LANDFILLS, INC.

LANDFILL SITE ADDRESS:
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GEOSYNTEC CONSULTANTS, INC.
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3600 BEE CAVES ROAD, SUITE 101
AUSTIN, TEXAS 78746
PHONE: 512.451.4003

TITLE:
LANDFILL GAS MONITORING SYSTEM DETAILS

PROJECT:
FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION – PERMIT NO. MSW-1565B

PROJECT NO.: TXL0263	DESIGN BY: LOL	REVIEWED BY: SMG	PART NO.: III	DRAWING: 6-2
FILE: 0263P6A-2	DRAWN BY: JJV	APPROVED BY: SMG		

PERMIT DRAWING

APPENDIX 6-A

GAS MONITORING PROBE INSTALLATION DOCUMENTATION

LOG OF BORING NO. GMP-1

Project Description: **Waste Management, Inc.**
Fairbanks N. Houston (MSWF), Permit No. 1565, Harris County, Texas

Location: 29°54'15.57"/95°32'13.29"
Surface El.: 113.4'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Pocket Penetrometer, TSF	Penetration Blows / Foot	Recovery %	RQD	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0			SILTY CLAY, tan to dark brown, with rootlets.											
5			7.0											
			SILTY CLAY, with sand, light brown, with trace calcareous nodules.											
10														
15			19.0											
			CLAY, slightly silty, reddish brown, very stiff, with ferrous stains, with calcareous nodules.											
20														
25														
30			31.0											
			SILTY SAND, tan to light brown, unconsolidated, very fine grained to fine grained, subrounded, poorly sorted.											
35														
40			42.5											
45														
50														

Completion Depth: **42.5**
Date Boring Started: **12/16/98**
Date Boring Completed: **12/16/98**
Engineer/Geologist: **Stamoulis**
Project No.: **9811-004**

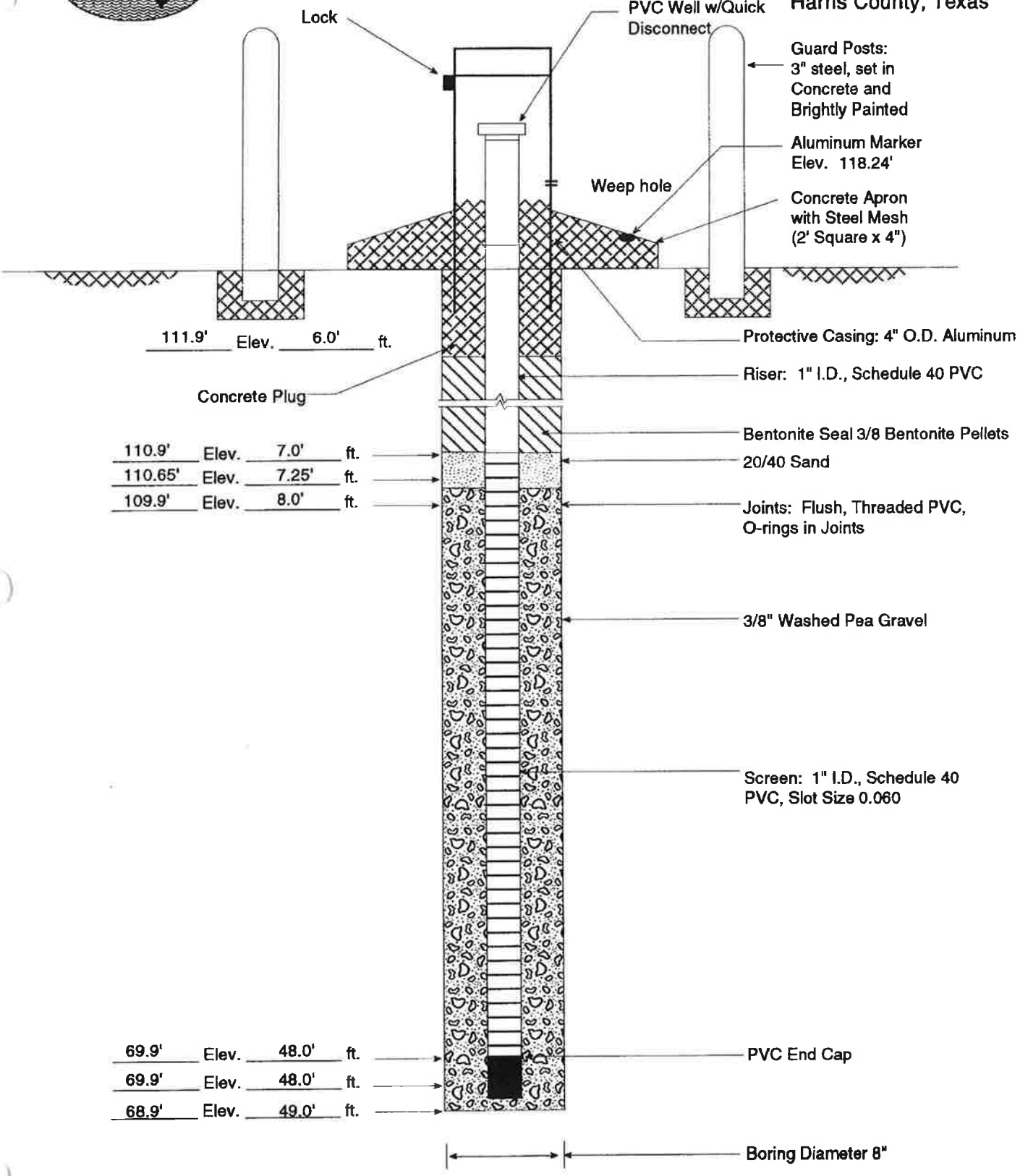
Remarks: **Installed gas probe upon completion. See Plate B.1 for gas probe specifications.**

Hydrogeologic/Engineering of Texas

The stratification lines represent approximate strata boundaries. Insitu, the transition may be gradual.

PLATE A.3

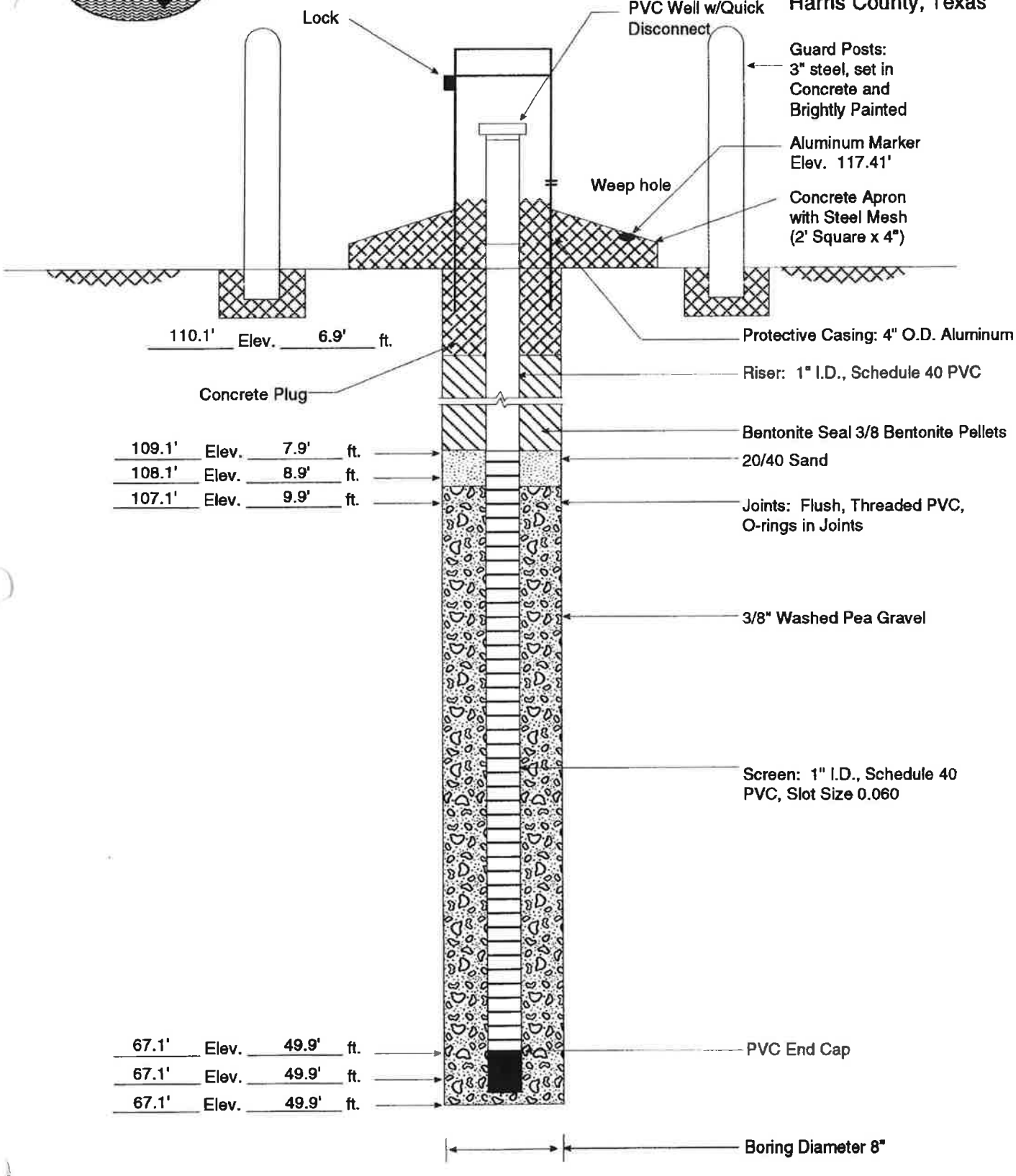
Waste Management, Inc.
Fairbanks North Houston
(MSWF)
Permit No. 1565-A
Harris County, Texas



Methane Gas Probe No. GMP-2 (Revised)

Project No. 2003-08-21

Waste Management, Inc.
Fairbanks North Houston
(MSWF)
Permit No. 1565-A
Harris County, Texas



Methane Gas Probe No. GMP-3 (Revised)

Project No. 2003-08-21

LOG OF BORING NO. GMP-4

Project Description: **Waste Management, Inc.**
Fairbanks N. Houston (MSWF), Permit No. 1565, Harris County, Texas

Location: 29°54'14.14"/95°31'39.95"
Surface El.: 117.8'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Pocket Penetrometer, TSF	Penetration Blows / Foot	Recovery %	RQD	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0			SILTY SAND, light brown, firm.											
			4.0											
5			SILTY CLAY, dark gray, firm to stiff.											
			9.5											
10			SILTY CLAY, reddish brown, firm to stiff, with trace sand.											
			15.0											
15			SANDY CLAY, reddish brown, stiff.											
			17.0											
20			SAND, tan to light brown, unconsolidated, very fine grained to fine grained, subrounded, poorly sorted.											
25														
30			-tan below 31.0'.											
35														
40														
45			46.0											
50														

Completion Depth: **46.0**
Date Boring Started: **1/10/99**
Date Boring Completed: **1/10/99**
Engineer/Geologist: **Stamoulis**
Project No.: **9811-004**

Remarks: **Installed gas probe upon completion. See Plate B.4 for gas probe specifications.**

Hydrogeologic/Engineering of Texas

The stratification lines represent approximate strata boundaries. Insitu, the transition may be gradual.

PLATE A.6

LOG OF BORING NO. GMP-5

Project Description: **Waste Management, Inc.**
Fairbanks N. Houston (MSWF), Permit No. 1565, Harris County, Texas

Location: 29°54'07.38"/95°31'39.85"
Surface El.: 114.5'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Pocket Penetrometer, TSF	Penetration Blows / Foot	Recovery %	RQD	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0			SILTY SAND, tan, firm, with clay. 2.0											
5			SILTY CLAY, dark gray, firm to stiff, with rootlets. 8.0											
10			SILTY CLAY, tan to light brown, firm to stiff. 14.0											
15			CLAYEY SAND, light brown, firm, with ferrous stains. 17.0											
20			SILTY SAND, tan to light brown, unconsolidated, fine grained, subrounded to rounded, poorly sorted. 25.0											
25			SILTY CLAY, brown, stiff. 26.5											
30			SILTY SAND, tan to light brown, unconsolidated, very fine grained to fine grained, subrounded to rounded.											
35														
40														
45														
50			49.5											

Completion Depth: **49.5**
Date Boring Started: **1/5/99**
Date Boring Completed: **1/5/99**
Engineer/Geologist: **Stamoulis**
Project No.: **9811-004**

Remarks: **Installed gas probe upon completion. See Plate B.5 for gas probe specifications.**

Hydrogeologic/Engineering of Texas

The stratification lines represent approximate strata boundaries. Insitu, the transition may be gradual.

PLATE A.7

LOG OF BORING NO. GMP-6

Project Description: **Waste Management, Inc.**
Fairbanks N. Houston (MSWF), Permit No. 1565, Harris County, Texas

Location: 29°53'59.98"/95°31'39.77"
Surface El.: 111.5'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Pocket Penetrometer, TSF	Penetration Blows / Foot	Recovery %	RQD	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0			SANDY CLAY, light brown, stiff, with rootlets. 3.0											
5			SILTY CLAY, light brown to tan, firm to stiff. 18.0											
20			SAND, silty, tan, unconsolidated, very fine grained to fine grained, well sorted, subrounded to rounded. 35.0											
35			SAND, silty, reddish brown, unconsolidated, very fine grained, subrounded, well sorted.											
50														

Completion Depth: **54.0**
Date Boring Started: **12/17/98**
Date Boring Completed: **12/17/98**
Engineer/Geologist: **Stamoulis**
Project No.: **9811-004**

Remarks: **Installed gas probe upon completion. See Plate B.6 for gas probe specifications.**

-Continued Next Page

Hydrogeologic/Engineering of Texas The stratification lines represent approximate strata boundaries. Insitu, the transition may be gradual.

PLATE A.8

LOG OF BORING NO. GMP-6

Project Description: **Waste Management, Inc.**
Fairbanks N. Houston (MSWF), Permit No. 1565, Harris County, Texas

Location: 29°53'59.98"/95°31'39.77"
Surface El.: 111.5'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Pocket Penetrometer, TSF	Penetration Blows / Foot	Recovery %	RQD	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
			SAND, silty, reddish brown, unconsolidated, very fine grained, subrounded, well sorted.											
54.0														

55 60 65 70 75 80 85 90 95 100

Completion Depth: **54.0**
Date Boring Started: **12/17/98**
Date Boring Completed: **12/17/98**
Engineer/Geologist: **Stamoulis**
Project No.: **9811-004**

Remarks: **Installed gas probe upon completion. See Plate B.6 for gas probe specifications.**

The stratification lines represent approximate strata boundaries. Insitu, the transition may be gradual.

PLATE A.8

LOG OF BORING NO. GMP-7

Project Description: **Waste Management, Inc.**
Fairbanks N. Houston (MSWF), Permit No. 1565, Harris County, Texas

Location: 29°53'59.58"/95°31'50.85"
Surface El.: 114.4'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Pocket Penetrometer, TSF	Penetration Blows / Foot	Recovery %	RQD	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0			SILTY SAND, tan to light brown, firm. 3.0											
5			SILTY CLAY, gray, firm. 8.0											
10			SILTY CLAY, with sand, tan to light brown, stiff. 12.0											
15			SILTY CLAY, with sand, tan, stiff. 18.0											
20			CLAYEY SAND, tan, firm. 23.0											
25			SILTY SAND, light brown to tan, unconsolidated, very fine grained to fine grained, subrounded. 30.0											
30			SILTY SAND, tan to white, unconsolidated, very fine grained to fine grained, subrounded, poorly sorted. 34.0											
35			SAND, with clay, unconsolidated, very fine grained, subrounded. 37.0											
40			SILTY SAND, tan to light brown.											
45														
50														

Completion Depth: **52.0**
Date Boring Started: **1/10/99**
Date Boring Completed: **1/10/99**
Engineer/Geologist: **Stamoulis**
Project No.: **9811-004**

Remarks: **Installed gas probe upon completion. See Plate B.7 for gas probe specifications.**

-Continued Next Page

LOG OF BORING NO. GMP-7

Project Description: **Waste Management, Inc.**
Fairbanks N. Houston (MSWF), Permit No. 1565, Harris County, Texas

Location: 29°53'59.58"/95°31'50.85"
Surface El.: 114.4'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Pocket Penetrometer, TSF	Penetration Blows / Foot	Recovery %	RQD	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
			SILTY SAND, tan to light brown.											
52.0														

55
60
65
70
75
80
85
90
95
100

Completion Depth: **52.0**
Date Boring Started: **1/10/99**
Date Boring Completed: **1/10/99**
Engineer/Geologist: **Stamoulis**
Project No.: **9811-004**

Remarks: **Installed gas probe upon completion. See Plate B.7 for gas probe specifications.**

Hydrogeologic/Engineering of Texas

The stratification lines represent approximate strata boundaries. Insitu, the transition may be gradual.

PLATE A.9

LOG OF BORING NO. GMP-8

Project Description: **Waste Management, Inc.**
Fairbanks N. Houston (MSWF), Permit No. 1565, Harris County, Texas

Location: 29°53'59.67"/95°32'02.22"
Surface El.: 119.5'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Pocket Penetrometer, TSF	Penetration Blows / Foot	Recovery %	RQD	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0			SILTY CLAY, with sand, light brown, stiff. 3.0											
5			SILTY CLAY, with sand, light brown to gray, firm to stiff. 6.0											
			SILTY CLAY, reddish brown, stiff. 7.0											
10			SILTY CLAY, gray to light gray, firm, with trace sand. 24.0											
25			SILTY SAND, tan to white, unconsolidated, very fine grained to fine grained, subrounded, poorly sorted. 41.0											
40			SANDY CLAY, light brown, firm to stiff. 43.0											
45														
50														

Completion Depth: **43.0**
Date Boring Started: **1/11/99**
Date Boring Completed: **1/11/99**
Engineer/Geologist: **Stamoulis**
Project No.: **9811-004**

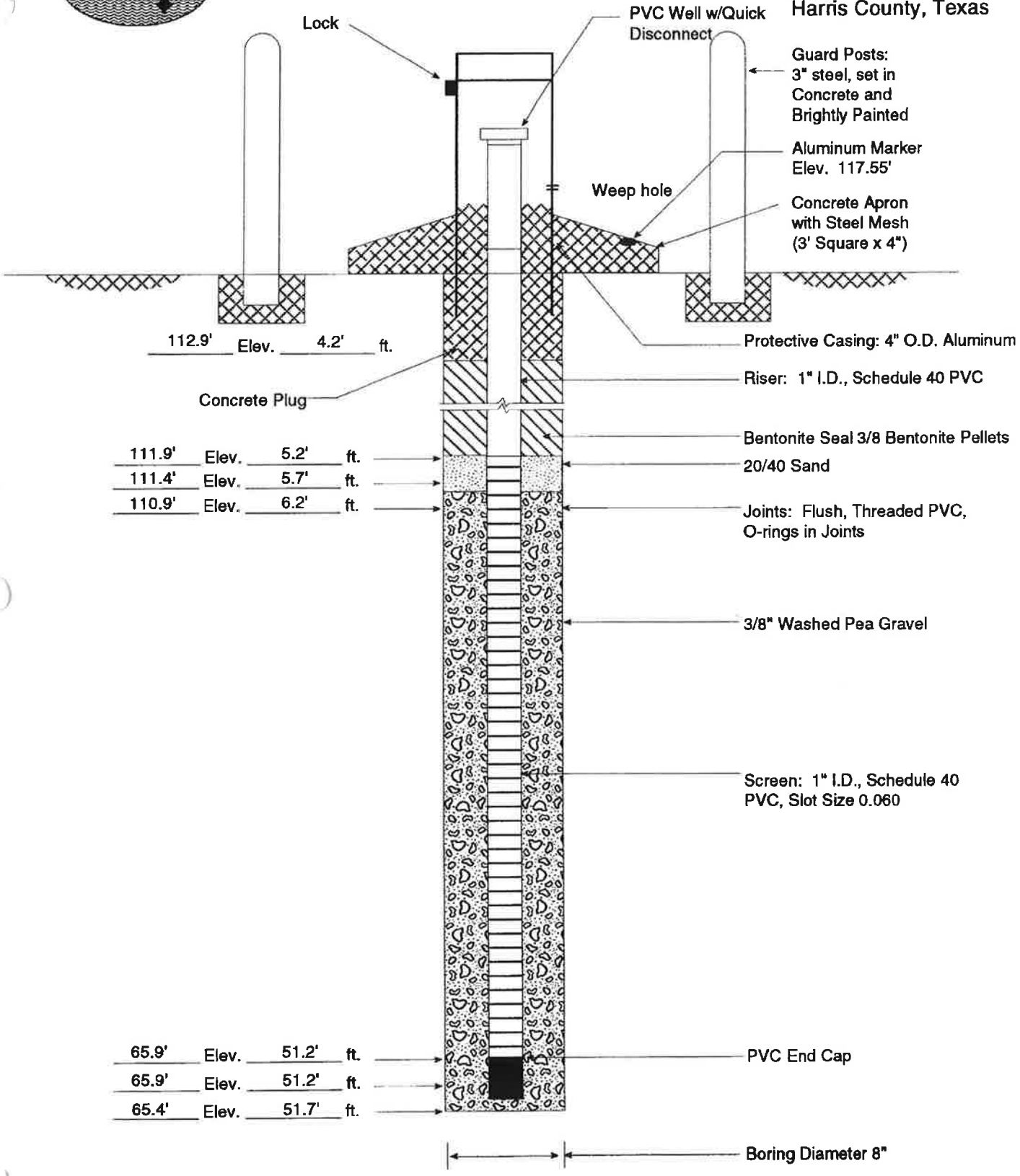
Remarks: **Installed gas probe upon completion. See Plate B.8 for gas probe specifications.**

Hydrogeologic/Engineering of Texas

The stratification lines represent approximate strata boundaries. Insitu, the transition may be gradual.

PLATE A.10

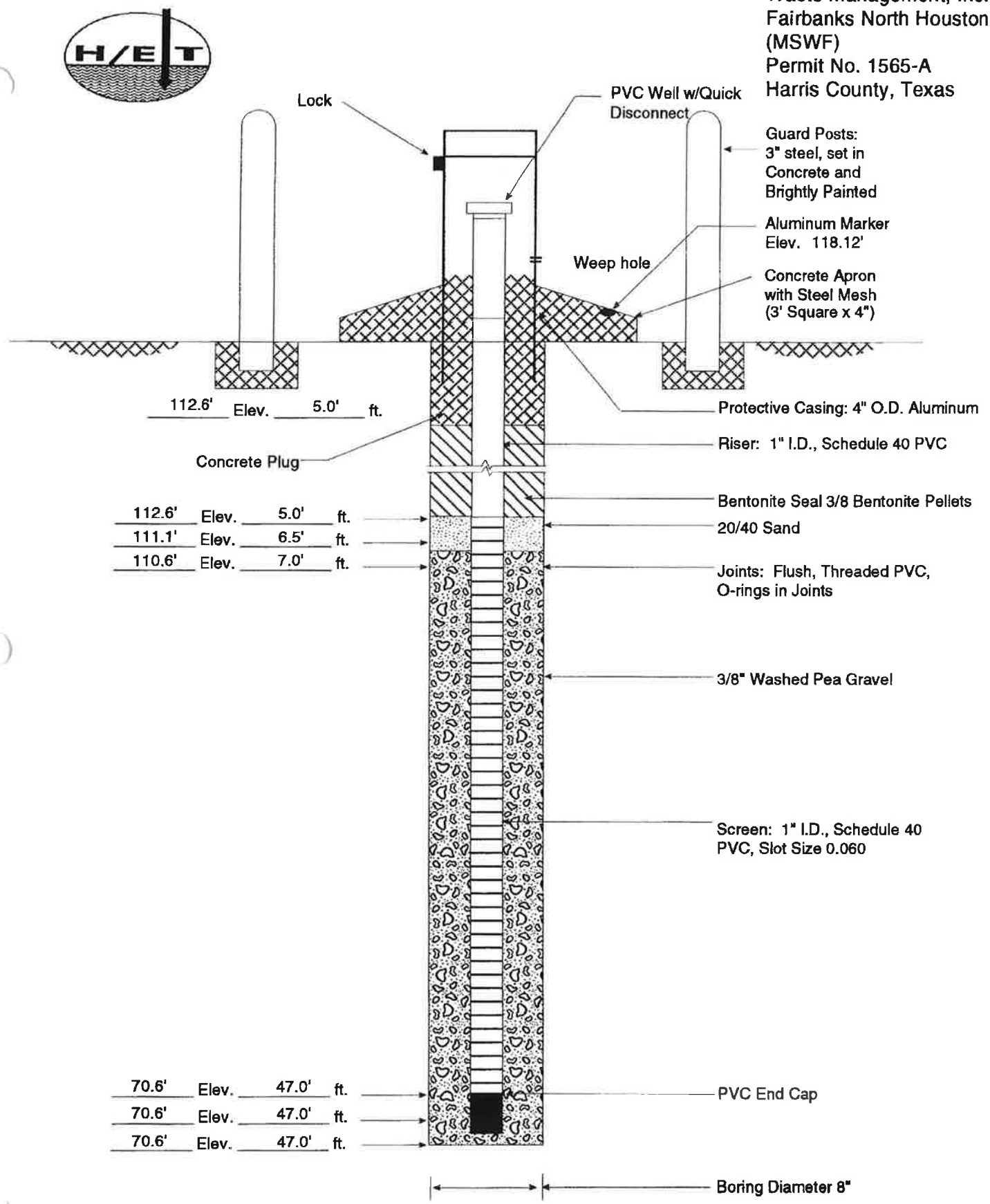
Waste Management, Inc.
Fairbanks North Houston
(MSWF)
Permit No. 1565-A
Harris County, Texas



Methane Gas Probe No. GMP-9 (Revised)

Project No. 2003-08-21

Waste Management, Inc.
Fairbanks North Houston
(MSWF)
Permit No. 1565-A
Harris County, Texas



Methane Gas Probe No. GMP-10 (Revised)

Project No. 2003-08-21

APPENDIX 6-B

SAMPLE LANDFILL GAS MONITORING FORM

LANDFILL GAS MONITORING FORM
FAIRBANKS LANDFILL

Name: _____ General Weather Conditions: _____
Date of Monitoring: _____ Temperature (deg. F): _____

Barometric Pressure (in. Hg): _____

Gas Instrument: _____ Serial No.: _____

Date Last Calibrated: _____ Method: _____

Pressure Instrument Type: _____ Serial No.: _____

Water Level Instrument Type: _____ Serial No.: _____

GAS MONITORING PROBES

MONITORING POINT I.D.	TIME	GAS PROBE PRESSURE (in. H_2O)	GAS PROBE TEMPERATURE (deg. F)	METHANE CONC. (% by Volume)	GAS PROBE DEPTH TO WATER LEVEL (ft, bgs)	COMMENTS

(Attach additional sheets as needed)

Notes on Probe Conditions:

Note: This form is provided as a guideline. The format of this form may be changed by the permittee, but will be consistent with the information shown on this form.

STRUCTURES						
STRUCTURE	MONITORING LOCATION	DATE	TIME	TEMPERATURE (deg. F)	METHANE CONC. (% by Volume)	COMMENTS
	North Face					
	East Face					
	South Face					
	West Face					
	Continuous Monitor Reading (if present)					
	North Face					
	East Face					
	South Face					
	West Face					
	Continuous Monitor Reading (if present)					
	North Face					
	East Face					
	South Face					
	West Face					
	Continuous Monitor Reading (if present)					
	North Face					
	East Face					
	South Face					
	West Face					
	Continuous Monitor Reading (if present)					

(Attach additional sheets as needed)

ATTACHMENT 7

CLOSURE PLAN

Prepared for:
USA Waste of Texas Landfills, Inc.

PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 7

CLOSURE PLAN

FAIRBANKS LANDFILL
PERMIT NO. MSW-1565B
HOUSTON, HARRIS COUNTY, TEXAS

Prepared by:

Geosyntec consultants
Texas Board of Professional Engineers Firm Registration No. F-1182
3600 Bee Caves Road, Suite 101
Austin, Texas 78746
(512) 451-4003

FOR PERMIT PURPOSES ONLY

August 2013

TABLE OF CONTENTS
CLOSURE PLAN

8/26/2013

FOR PERMIT PURPOSES ONLY

ATTACHMENTS

WITHIN EACH ATTACHMENT, ITEMS THAT REQUIRE A SIGNATURE AND SEAL BY A LICENSED PROFESSIONAL (E.G., ENGINEER, SURVEYOR, OR GEOSCIENTIST) ARE SIGNED AND SEALED, AS APPROPRIATE, BY THE RESPONSIBLE PROFESSIONAL

1. INTRODUCTION

This Closure Plan (Plan) for the Fairbanks Landfill was prepared to meet the requirements of 30 TAC §330.63(h) and 30 TAC §330.453(e). This Plan also includes closure information not specifically required for Type IV landfills but that are required for Type I landfills – and this level of detail is included here to provide more information on the steps necessary for facility closure, and to facilitate the development of the closure cost estimate presented in Part III, Attachment 9 (Cost Estimate for Closure and Post-Closure Care) of the Permit Amendment Application. Closure primarily involves the construction of a final cover system that minimizes infiltration of precipitation into the closed landfill area, includes a topsoil layer that is capable of sustaining native plant growth and is vegetated immediately after construction to minimize erosion, promotes and controls drainage, and functions with relatively low maintenance.

This Plan identifies the steps required to completely close the facility at any point during the active life of the facility. The Plan includes the following:

- a description of the final cover system design, methods, and procedures to install the final cover system;
- an estimate of the largest area of the landfill ever requiring a final cover system at any time during the active life of the landfill;
- an estimate of the maximum inventory of wastes ever on site over the active life of the landfill;
- closure sequence and schedule;
- a final contour map of the proposed final cover grading plan, including surface-water drainage features;
- landfill cross sections; and
- closure recording and certification requirements.

Post-closure care activities, which will be implemented upon completion of final closure, are included in Part III, Attachment 8 (Post-Closure Plan) of the Permit Amendment Application.

2. GENERAL INFORMATION

2.1 Introduction

This section provides the largest area requiring closure, maximum waste inventory, and final contour plan.

2.2 Largest Area Requiring Closure

Closure of the landfill (i.e., installation of the final cover system) is planned to be performed incrementally as landfill areas reach final grade. The largest area of the landfill that could potentially be open and require final cover is 52.2 acres, as shown on Drawing 7-1 in Attachment 7A of this Plan.

2.3 Maximum Waste Inventory

The maximum waste inventory of the landfill at final grade is calculated to be 26,212,000 yd^3 in Part III, Attachment 3B (Volume and Site Life Estimate) of this Permit Amendment Application.

2.4 Final Contour Map

A final contour map, showing the proposed final cover system elevations, slopes, and surface-water drainage features is presented on Drawing 2-1 in Part III, Attachment 2A (Landfill Stormwater Management System Drawings) of this Permit Amendment Application. A copy of this drawing is provided in Attachment 7A to this Plan. Inspection of Drawing 2-1 shows that the location of the 100-year floodplain will not encroach on the landfill footprint; therefore, special provisions for protection from a 100-year flood are not applicable to the facility or this Plan.

2.5 Landfill Cross Sections

Landfill cross sections are shown on Drawings 3-6 to 3-10 in Part III, Attachment 3A (Landfill Design Drawings) of this Permit Amendment Application. Copies of the cross-section location map (Drawing 3-5 from that attachment) and the cross sections are provided in Attachment 7A to this Plan. The cross sections were selected to pass through key site features to accurately depict the existing and proposed depths of all fill areas within the site.

3. DESCRIPTION OF CLOSURE DESIGN AND CLOSURE SEQUENCE

3.1 Introduction

This section describes the design and installation requirements for the landfill final cover system, and discusses the closure sequence.

3.2 Final Cover System Design

The final cover system is designed to meet the requirements of 30 TAC §330.453(a), (b), and (c).

3.2.1 Cross Section

The proposed final cover system for the facility is shown on an engineering detail on Drawing 3-11 in Attachment 3A (Landfill Design Drawings) of this Permit Amendment Application, and is described as follows (from bottom to top):

- 1.5-ft thick compacted soil layer composed of clayey soil, classified by the Unified Soil Classification System (USCS) as "SC" (sandy clay), "CL" (lean clay), or "CH" (fat clay); and

- a 6-inch or 12-inch thick topsoil layer[(1)] capable of sustaining native plant growth and seeded immediately after installation.

[(1)]If the underlying compacted soil layer is classified as SC or CL, the minimum topsoil thickness is 6 inches. If the underlying compacted soil layer is classified as CH, the minimum topsoil thickness is 12 inches.

The material requirements specified for the final cover system are included in the Final Cover Quality Control Plan (FCQCP) provided in Attachment 7B to this Plan. Soils with USCS classifications other than those listed above may be used in the final cover system with prior written approval from the TCEQ Executive Director.

3.2.2 Erosion Potential

The annual soil loss from the topsoil layer due to erosion is calculated in Part III, Attachment 3F (Final Cover Soil Erosion Loss Calculations) of this permit application. The calculated soil loss is less than the permissible value, indicating that the final cover system is designed with adequate resistance to erosion.

3.2.3 Surface-Water Drainage

The final cover system is designed to collect runoff and direct it to a perimeter drainage system through the use of drainage terraces and downchutes. The locations of surface-water drainage features on the final cover system are shown on Drawing 2-1 in Part III, Attachment 2A (Landfill Stormwater Management System Drawings) of this Permit Amendment Application. A copy of this drawing is provided in Attachment 7A to this Plan. The maximum grades of side slopes are 4 horizontal: 1 vertical (4H:1V) or 25%. The grades of the top deck are 3%, which is considered sufficient to preclude ponding of surface water when total fill height and expected subsidence are taken into consideration. Additional information on the surface-water drainage is presented in Part III, Attachment 2 (Facility Surface Water Drainage Report) of this Permit Amendment Application.

3.2.4 Landfill Gas Control System

A Landfill Gas Management Plan has been prepared for the facility, and is included in Part III, Attachment 6 of the Permit Amendment Application. As reflected in that plan, there is no planned or required layout design of a landfill gas control system for this facility. However, passive landfill gas vents that extend through the final cover system may be used as needed to help control landfill gas migration. Currently four of the existing gas vents (i.e., GV-1 to GV-4) are located adjacent to areas of the landfill that are completed to final grades. Any future gas vents installed are expected to be in response to verified exceedances of methane detected during ongoing routine landfill gas monitoring. Portions of any required landfill gas control system that have not been constructed prior to closure will be installed as part of closure activities. However, for the purpose of estimating closure costs, since there is no required layout or number of gas vents, it is assumed that all necessary landfill gas control system features will have been constructed prior to initiation of final closure. Additional information on the landfill gas control system is presented in the aforementioned Landfill Gas Management Plan.

3.3 Installation of Final Cover System and Closure Sequence

The construction procedures and quality assurance/quality control (QA/QC) requirements for the landfill final cover system installation are included in the FCQCP presented in provided in Attachment 7B to this Plan.

The overall steps, procedures, and processes to be used during installation of the landfill final cover system and final closure of the facility are described below.

1. *Final Cover Subgrade Preparation.* Closure of a given area will begin by preparing the final cover system subgrade (surface on which the final cover system will be constructed). For routine closure, it is anticipated that the subgrade will be configured in a manner consistent with permitted final waste grades. In the event of premature closure, the surface will be regraded as necessary to provide a minimum slope of two percent and to allow for proper surface water run-off.

2. *Final Cover System Construction.* The final cover system components will be constructed, tested, documented, and certified in accordance with the FCQCP. The general final cover system construction activities and sequence are listed below.

    a. Final cover system construction on top of the prepared subgrade will begin by placing and compacting the clayey soil material of the compacted soil layer.

    b. The topsoil layer will be placed on top of the compacted soil layer.

    c. Surface-water drainage features (e.g., drainage terraces, downchutes, channels, etc.) will then be installed in the general locations shown on Drawing 2-1 in Part III, Attachment 2 of this permit application. A copy of this drawing is provided in Attachment 7A to this Plan.

    d. Finally, the surface of the final cover system will be vegetated. Temporary erosion and sediment controls (e.g., mulch cover, silt fence, etc.) will also be installed and maintained while the permanent vegetation is being established.

3. *Landfill Gas Control System Construction.* As mentioned, there is no planned layout design of a landfill gas control system for this facility. Therefore, this item may not be an applicable component of final cover construction or closure. However, if there are any passive landfill gas vents required at the time of final cover system construction, they will be installed.

4. *Closure of Processing Areas.* As part of facility closure, the on-site processing facilities (i.e., the special area to collect large/heavy/bulky items for recycling or salvaging; the wood processing area; and the construction and demolition (C&D) waste recycling area) will be cleaned up. This will involve removing any materials stored in these areas from the site or disposing of them in the landfill. The processing areas will then be graded and reshaped as needed to provide positive drainage slopes, and will then be vegetated to minimize erosion.

5. *Closure Certification.* In accordance with 30 TAC §330.461(c), within ten days after completion of final closure activities of a facility, the applicant will submit to the Executive Director by registered mail certification from an independent registered professional engineer that closure has been completed in accordance with the approved Plan. The submittal will be include a Final Cover System Evaluation Report (FCSER) and a description of processing area closure, and will include all applicable documentation necessary for this certification. The minimum documentation to be included in the FCSER is listed in the FCQCP. After the closure certification and FCSER has been approved by the Texas Commission on Environmental Quality (TCEQ), a copy of the submittal will be placed in the Site Operating Record.

4. CLOSURE ACTIVITIES IMPLEMENTATION SCHEDULE

4.1 Introduction

As mentioned, the final cover system is planned to be installed incrementally during the active life of the landfill. Final facility closure is planned to commence when the permitted disposal capacity has been exhausted; however, it could commence prior to completely exhausting the permitted disposal capacity if it becomes necessary to final close the facility at an earlier time. The remainder of this section describes the required submittals and related notices to occur in conjunction with final facility closure

4.2 Submit Final Closure Plan

In accordance with 30 TAC §330.453(e), the design and specifications for closure of the landfill must be submitted to the Executive Director for review and approval no later than 60 days prior to the initiation of closure activities. This Closure Plan, and the FCQCP provided in Attachment 7B to this Plan, were prepared to fulfill this requirement.

4.3 Notices

4.3.1 TCEQ Notification

Pursuant to 30 TAC §330.461(a), at least 90 days prior to the initiation of final facility closure, the applicant will provide written notification to the Executive Director of the intent to final close the facility. The applicant will place this notification in the Site Operating Record.

4.3.2 Public Notification

Pursuant to 30 TAC §330.461(a), at least 90 days prior to the initiation of final facility closure, the applicant will publish public notice of final facility closure in the newspaper of largest circulation in the vicinity of the facility. This notice will include the name, address, and physical location of the facility; the permit number; and the last date of intended receipt of waste. The applicant will also make available an adequate number of copies of this Plan and the Post-Closure Plan presented in Part III, Attachment 8 of this permit application for public access and review.

4.3.3 Access Signs and Barriers

Pursuant to 30 TAC §330.461(b), upon notification of the Executive Director of the intent to close the landfill, the applicant will post a minimum of one sign at the main entrance and all

other frequently used points of access for the facility providing notification of the date of closing for the entire facility and the prohibition against further receipt of waste material after the stated date. Additionally, barriers will be installed at all gates or access points to prevent the unauthorized dumping of solid waste at the closed facility.

4.3.4 Affidavit to the Public

Pursuant to 30 TAC §330.461(c), within ten days after completion of final closure activities of the facility, the applicant will submit to the Executive Director by registered mail a certified copy of an affidavit to the public in accordance with 30 TAC §330.19(c) and place a copy of the affidavit in the Site Operating Record. The affidavit will include an updated metes and bounds description of the extent of the disposal areas and the restrictions to future use of the land. A certified notation will be recorded on the deed to the facility that will notify any potential purchaser of the property that the land has been used as a landfill and that future land use is restricted. The applicant will submit a certified copy of the modified deed to the Executive Director and place a copy of the modified deed in the Site Operating Record within the same time frame specified for the affidavit to the public.

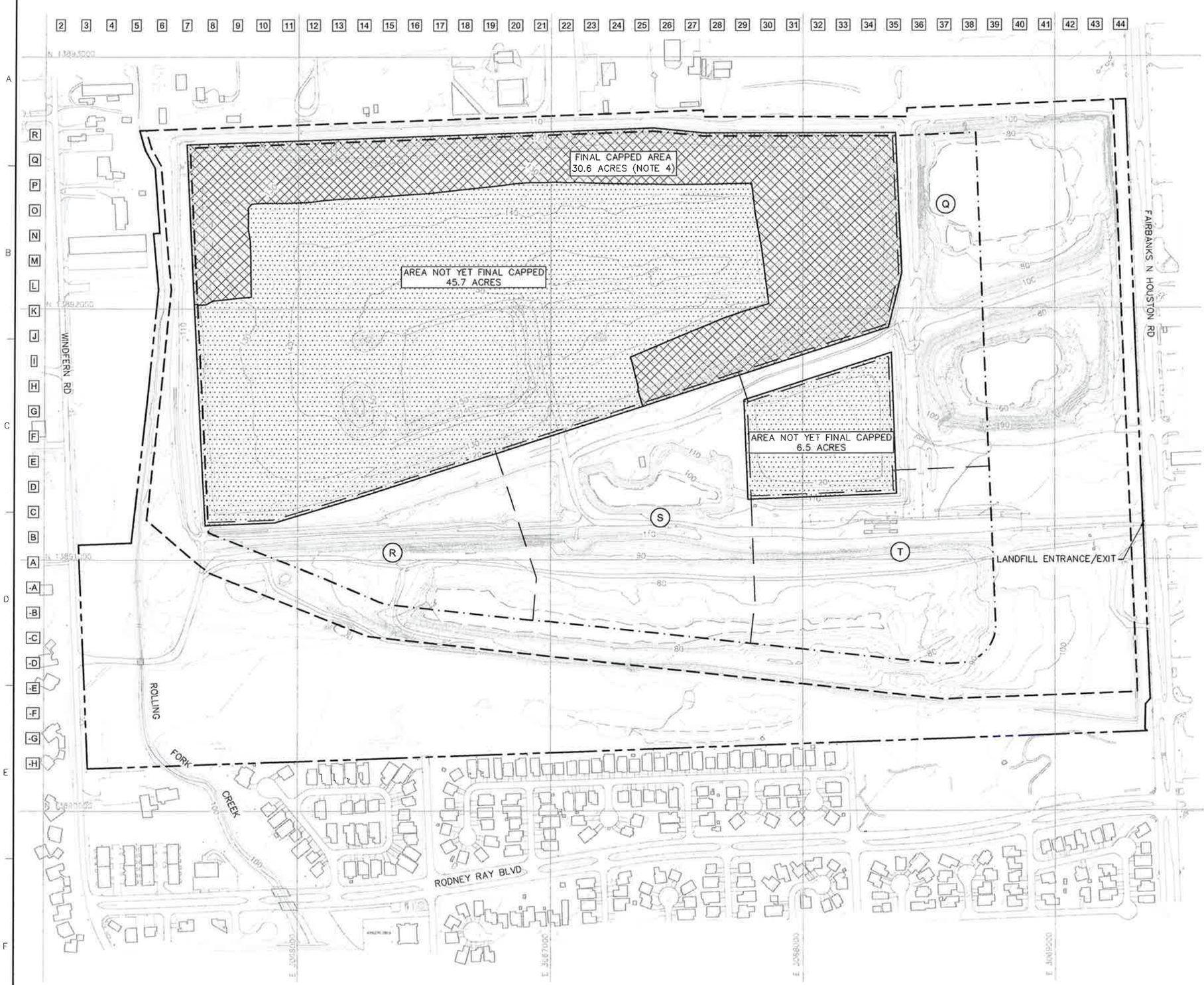
4.4 Closure Sequencing

After providing written notice to TCEQ and the public of the initiation of final facility closure as described in Sections 4.3.1 and 4.3.2 and meeting the facility posting requirements described in Section 4.3.3, closure activities can commence. A summary of the closure activities is provided in Section 3.3. Following completion of closure, the applicant will comply with the post-closure care requirements for the facility.

ATTACHMENT 7A

CLOSURE PLAN DRAWINGS

LIST OF DRAWINGS		
Drawing No.	Title	Drawing Date (latest revision)
7-1	Largest Area Requiring Closure	August 2013
Copies of Drawings from Other Attachments		
2-1	Facility Surface Water Management Plan	August 2013
3-5	Landfill Cross Section Location Map	August 2013
3-6	Landfill Cross-Section A	August 2013
3-7	Landfill Cross-Section B	August 2013
3-8	Landfill Cross-Section C	August 2013
3-9	Landfill Cross-Section D	August 2013
3-10	Landfill Cross-Section E	August 2013



LEGEND

- EXISTING GROUND ELEVATION (FT, MSL) (NOTE 1)
- EXISTING ROAD
- EXISTING WATER LINE
- STATE PLANE COORDINATES (NOTE 2)
- 44 SITE GRID
- PROPERTY BOUNDARY
- EXISTING (PERMIT MSW-1565A) LANDFILL FOOTPRINT
- PERMIT BOUNDARY
- PROPOSED LANDFILL FOOTPRINT
- FUTURE SECTOR BOUNDARY
- Q FUTURE SECTOR DESIGNATION
- FINAL CAPPED AREA TO-DATE (NOTE 3)
- AREA NOT YET FINAL CAPPED

NOTES:

1. THE EXISTING TOPOGRAPHIC BASE MAP SHOWN ON THIS DRAWING WAS COMPILED USING PHOTOGRAMMETRIC METHODS BASED ON AERIAL PHOTOGRAPHY PERFORMED ON 26 MARCH 2012 AND PREPARED BY DALLAS AERIAL SURVEYS (DAS), INC.
2. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL (FT, MSL), AS DEFINED BY THE USGS NATIONAL GEODETIC VERTICAL DATUM (NAVD) OF 1988. STATE PLANE COORDINATE GRID CORRESPONDS TO TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS SOUTH CENTRAL ZONE (4204), NORTH AMERICAN DATUM OF 1983 (NAD-83).
3. EXISTING FINAL CAPPED AREA IS DERIVED FROM FINAL COVER SYSTEM EVALUATION REPORTS (FCSERs) BY GOLDER ASSOCIATES DATED NOVEMBER 2004 (WITH JANUARY 2005 ADDENDUM) AND OCTOBER 2006, FOR 19.9 ACRES OF CAPPING AND 10.7 ACRES OF CAPPING, RESPECTIVELY.

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED
PROFESSIONAL ENGINEER
8/26/2013

FOR PERMIT PURPOSES ONLY

REV	DATE	DESCRIPTION	DRN	APP
–	AUG. 2013	INITIAL SUBMITTAL TO TCEQ	JJV	SMG

USA WASTE OF TEXAS LANDFILLS, INC.

LANDFILL SITE ADDRESS:
8205 FAIRBANKS N HOUSTON RD
HOUSTON, TEXAS 77064
PHONE: 713.824.6867

Geosyntec consultants

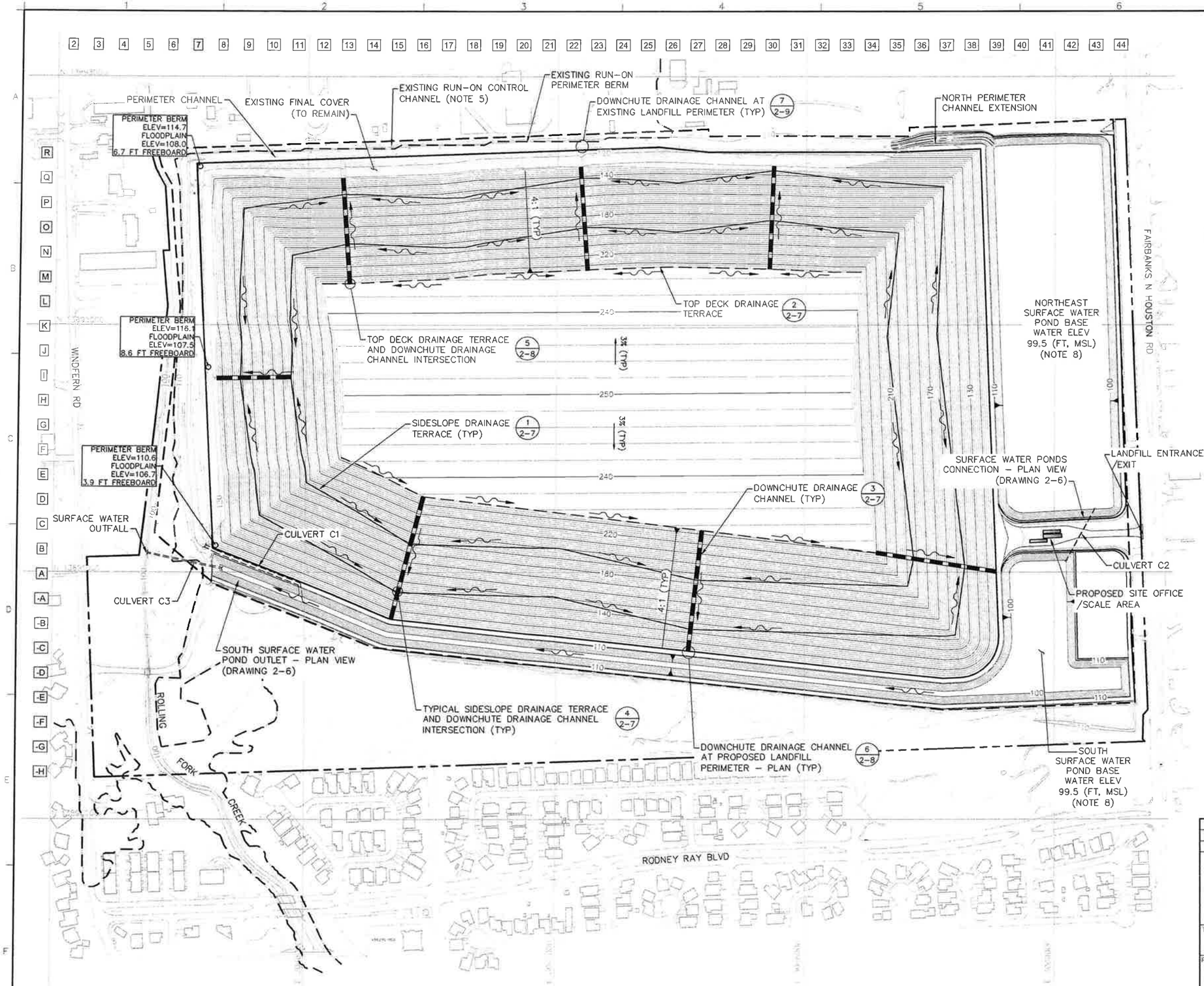
GEOSYNTEC CONSULTANTS, INC.
TEXAS ENG. FIRM REGISTRATION NO. 1182
3600 BEE CAVES ROAD, SUITE 101
AUSTIN, TEXAS 78746
PHONE: 512.451.4003

TITLE:
LARGEST AREA REQUIRING CLOSURE (FINAL CAPPING)

PROJECT:
FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION – PERMIT NO. MSW-1565B

PROJECT NO.: TXL0263	DESIGN BY: RG	REVIEWED BY: SMG	PART NO.: III	DRAWING: 7-1
FILE: 0263P7-1	DRAWN BY: JJV	APPROVED BY: SMG		

PERMIT DRAWING



LEGEND

- EXISTING GROUND ELEVATION (FT, MSL) (NOTES 1,2)
- EXISTING ROAD
- EXISTING WATER LINE
- STATE PLANE COORDINATES (NOTE 2)
- 44 SITE GRID
- PROPERTY BOUNDARY
- PROPOSED PERMIT BOUNDARY
- OVERALL LIMIT OF FINAL COVER
- TOP DECK DRAINAGE TERRACE
- SIDESLOPE DRAINAGE TERRACE
- DOWNCHUTE DRAINAGE CHANNEL
- DRAINAGE FLOW DIRECTION
- 200 PROPOSED GROUND ELEVATION (FT, MSL) (NOTE 3)
- 100-YEAR FLOODPLAIN (NOTE 7)

N

0 200' 400'
SCALE IN FEET

NOTES:

1. THE EXISTING TOPOGRAPHIC BASE MAP SHOWN ON THIS DRAWING WAS COMPILED USING PHOTOGRAMMETRIC METHODS BASED ON AERIAL PHOTOGRAPHY PERFORMED ON 26 MARCH 2012 AND PREPARED BY DALLAS AERIAL SURVEYS (DAS), INC. .
2. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL (FT, MSL), AS DEFINED THE USGS NATIONAL GEODETIC VERTICAL DATUM (NAVD) OF 1988. STATE PLANE COORDINATE GRID CORRESPONDS TO THE TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS SOUTH CENTRAL ZONE (4204), NORTH AMERICAN DATUM OF 1983 (NAD 83).
3. TOP OF FINAL COVER SYSTEM REFERS TO THE PROPOSED FINISHED GRADE (TOP OF THE TOPSOIL COMPONENT OF THE FINAL COVER SYSTEM). LIMIT OF FINAL COVER SYSTEM REFERS TO THE TOE OF SLOPE OF THE TOPSOIL LAYER.
4. OUTSIDE OF THE LIMIT OF FINAL COVER, THE PROPOSED CONTOURS REFER TO FINISHED GRADE.
5. EXISTING RUN-ON CONTROL CHANNEL IS LOCATED AT TOE OF NORTHERN SLOPE PERIMETER BERM, WITHIN PERMIT BOUNDARY AND WILL BE MAINTAINED AS NEEDED FOR POSITIVE DRAINAGE.
6. INFORMATION ON SURFACE WATER POND APPURTENANCES IS PROVIDED ON SHEET 2-6.
7. 100-YEAR FLOODPLAIN LIMITS ARE FROM FEMA MAPS, AS DESCRIBED IN PART II, NARRATIVE REPORT, SECTIONS 10.1.2 AND 10.1.3.
8. SURFACE WATER PONDS WILL BE "WET" PONDS. ACCORDINGLY, THE BASE WATER ELEVATION REFERS TO THE OUTFALL ELEVATION. THUS, THE DETENTION VOLUME OF THE PONDS IS CALCULATED AS THE STORAGE VOLUME ABOVE THIS BASE WATER ELEVATION.

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED PROFESSIONAL ENGINEER
8/26/2013

FOR PERMIT PURPOSES ONLY

REV	DATE	DESCRIPTION	DRN	APP
–	AUG. 2013	INITIAL SUBMITTAL TO TCEQ	JJV	SMG

USA WASTE OF TEXAS LANDFILLS, INC.

LANDFILL SITE ADDRESS:
8205 FAIRBANKS N HOUSTON RD
HOUSTON, TEXAS 77064
PHONE: 713.824.6867

Geosyntec consultants

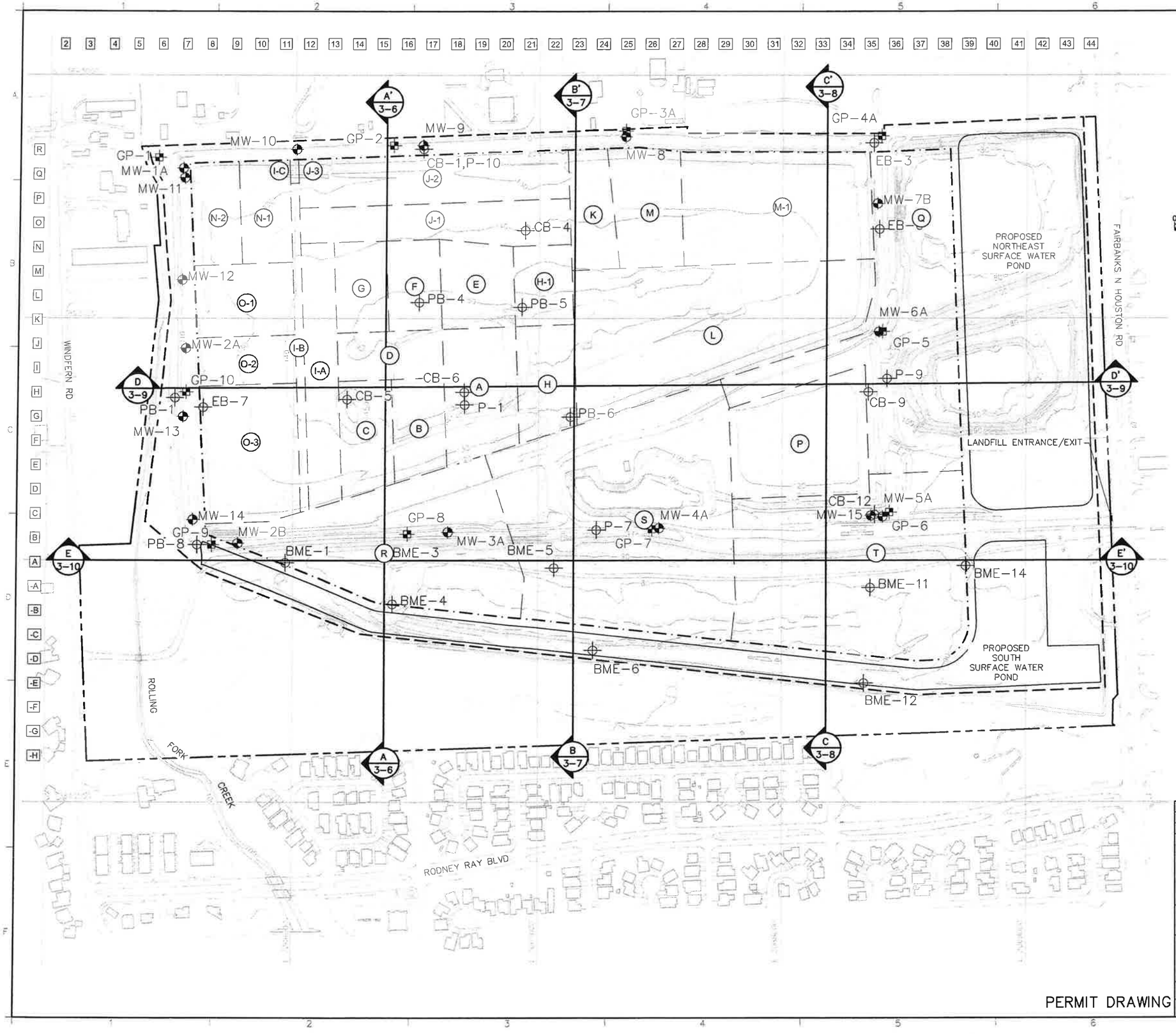
GEOSYNTEC CONSULTANTS, INC.
TEXAS ENG. FIRM REGISTRATION NO. 1182
3600 BEE CAVES ROAD, SUITE 101
AUSTIN, TEXAS 78746
PHONE: 512.451.4003

TITLE:
FACILITY SURFACE WATER MANAGEMENT PLAN

PROJECT:
FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION – PERMIT NO. MSW-1565B

PROJECT NO.: TXL0263	DESIGN BY: BK	REVIEWED BY: SMG	PART NO.: III	DRAWING: 2-1
FILE: 0263P2-1	DRAWN BY: JJV	APPROVED BY: SMG		

PERMIT DRAWING



LEGEND

- EXISTING GROUND ELEVATION (FT, MSL) (NOTE 1)
- EXISTING ROAD
- EXISTING WATER LINE
- STATE PLANE COORDINATES (NOTE 2)
- 44 — SITE GRID
- PROPERTY BOUNDARY
- PERMIT BOUNDARY
- PROPOSED LANDFILL FOOTPRINT
- SECTOR BOUNDARY
- Q — SECTOR DESIGNATION
- MW-6A — EXISTING GROUNDWATER MONITORING WELL
- GP-5 — EXISTING LANDFILL GAS PROBE
- P-9 — SOIL BORING

N

0 200' 400'
SCALE IN FEET

NOTES:

1. THE EXISTING TOPOGRAPHIC BASE MAP SHOWN ON THIS DRAWING WAS COMPILED USING PHOTOGRAMMETRIC METHODS BASED ON AERIAL PHOTOGRAPHY PERFORMED ON 26 MARCH 2012 AND PREPARED BY DALLAS AERIAL SURVEYS (DAS), INC.
2. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL (FT, MSL), AS DEFINED BY THE USGS NATIONAL GEODETIC VERTICAL DATUM (NAVD) OF 1988. STATE PLANE COORDINATE GRID CORRESPONDS TO TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS SOUTH CENTRAL ZONE (4204), NORTH AMERICAN DATUM OF 1983 (NAD-83).
3. SEE DRAWING 3-2 FOR OVERALL BASE GRADING PLAN.
4. SEE DRAWING 3-3 FOR OVERALL FINAL COVER GRADING PLAN.
5. THE PURPOSE OF THIS DRAWING IS TO SHOW THE LOCATIONS OF THE LANDFILL CROSS SECTIONS IN RELATION TO THE SITE LAYOUT AND PREVIOUSLY-DRILLED/INSTALLED SOIL BORINGS, GAS PROBES, AND MONITORING WELLS. REFER TO PART III, ATTACHMENT 5 AND 6 FOR THE PROPOSED GROUNDWATER MONITORING WELL LAYOUT AND PROPOSED LANDFILL GAS PROBE LAYOUT, RESPECTIVELY.

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED PROFESSIONAL ENGINEER
8/26/2013

FOR PERMIT PURPOSES ONLY

REV	DATE	DESCRIPTION	DRN	APP
-	AUG. 2013	INITIAL SUBMITTAL TO TCEQ	JJV	SMG

USA WASTE OF TEXAS LANDFILLS, INC.

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8205 FAIRBANKS N HOUSTON RD
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AUSTIN, TEXAS 78746
PHONE: 512.451.4003

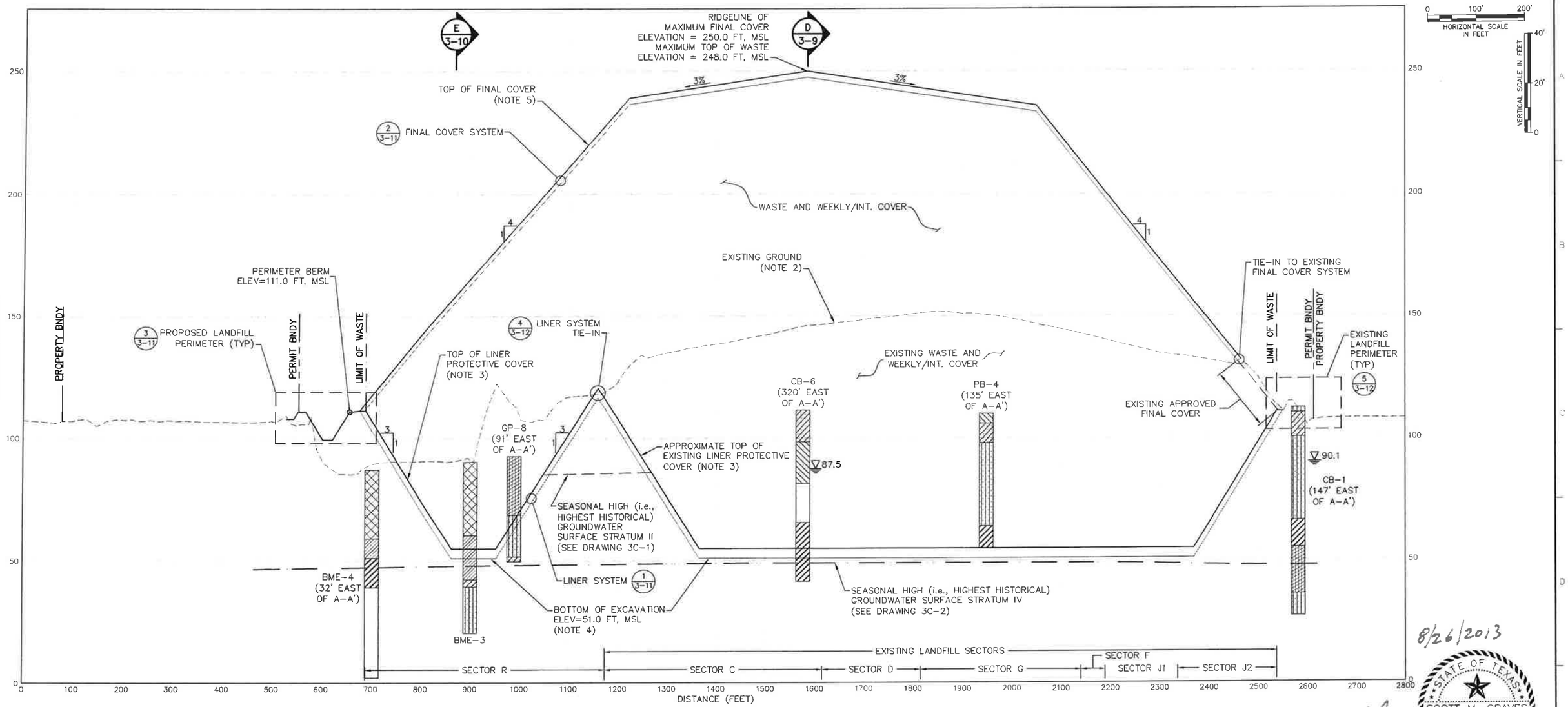
TITLE: LANDFILL CROSS-SECTION LOCATION MAP

PROJECT: FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION – PERMIT NO. MSW-1565B

PROJECT NO.: TXL0263	DESIGN BY: SMG	REVIEWED BY: SMG	PART NO.: III	DRAWING: 3-5
FILE: 0263P3-5	DRAWN BY: JJV	APPROVED BY: SMG		

PERMIT DRAWING

DRAWING: Austin P:\CADD\Projects\F\Fairbanks Landfill\Permit\Expansion (TXL0263)\Drawings\Dwgs-Rev0\0263P3-5.dwg PLOTTED: Aug 23, 2013 - 9:03am



NOTES:

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL (FT, MSL).
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3. TOP OF LINER PROTECTIVE COVER SHOWN ON THIS DRAWING IS TAKEN FROM THE OVERALL BASE GRADING PLAN ON DRAWING 3-2.
4. BOTTOM OF EXCAVATION SHOWN ON THIS DRAWING REFERS TO THE BOTTOM OF CLAY LINER, BASED ON THE BASE GRADING PLAN ON DRAWING 3-2. THE ELEVATION OF DEEPEST EXCAVATION (EDE) FOR THE FACILITY IS 51.0 FT, MSL.
5. TOP OF FINAL COVER TAKEN FROM OVERALL FINAL COVER GRADING PLAN ON DRAWING 3-3.
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7. PROPOSED TOP OF FINAL COVER IS SLOPED AT 4H:1V ON THE LANDFILL SIDESLOPES AND THREE PERCENT ON THE LANDFILL TOP AREAS. SLOPES AND FINAL COVER SYSTEM LAYER THICKNESS MAY APPEAR DISTORTED ON THESE CROSS SECTIONS DUE TO THE EXAGGERATED VERTICAL SCALE AND THE SKEWED ANGLE AT WHICH THE SECTIONS WERE CUT COMPARED TO THE THREE-DIMENSIONAL SLOPE DIRECTIONS.
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LEGEND OF SOIL/ROCK CLASSIFICATIONS AND GROUNDWATER

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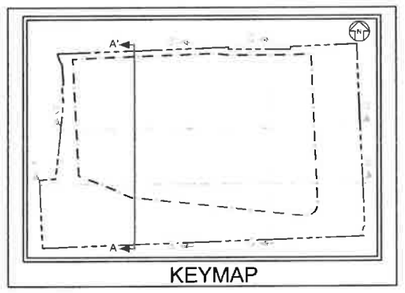
- SAND
- CLAY (CL)
- CLAY (CH)
- CLAYEY SAND
- SILTY SAND
- SANDY CLAY
- SILTY CLAY
- INITIAL GROUNDWATER ELEVATION (NOTE 6)



KEYMAP

8/26/2013

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED PROFESSIONAL ENGINEER

FOR PERMIT PURPOSES ONLY

REV	DATE	DESCRIPTION	DRN	APP
-	AUG. 2013	INITIAL SUBMITTAL TO TCEQ	JJV	SMG

USA WASTE OF TEXAS LANDFILLS, INC.

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3600 BEE CAVES ROAD, SUITE 101
AUSTIN, TEXAS 78746
PHONE: 512.451.4003

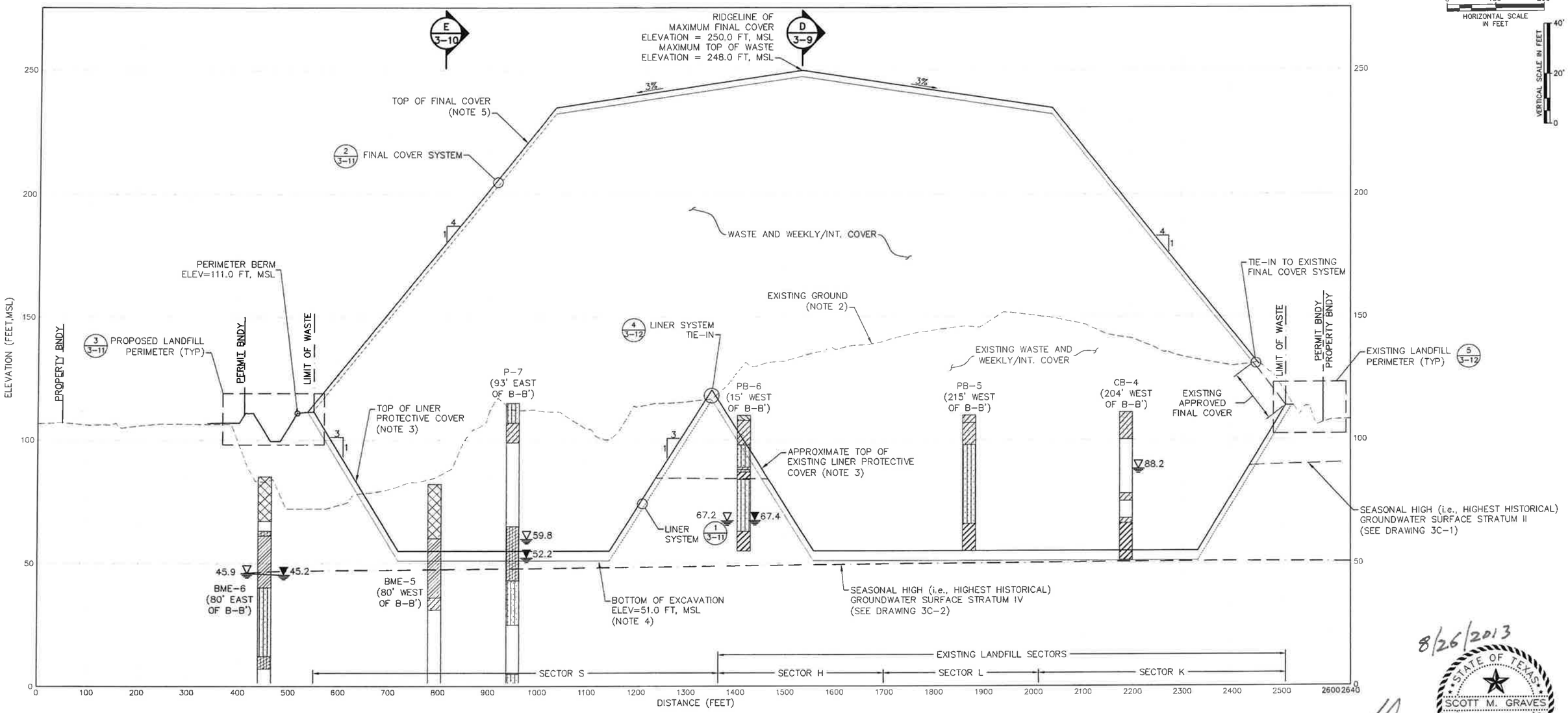
TITLE:
LANDFILL CROSS-SECTION A-A'

PROJECT:
FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION – PERMIT NO. MSW-1565B

PROJECT NO.: TXL0263	DESIGN BY: SMG	REVIEWED BY: SMG	PART NO.: III	DRAWING: 3-6
FILE: 0263P3-6	DRAWN BY: JJV	APPROVED BY: SMG		

PERMIT DRAWING

DRAWING: Austin P:\CADD\Projects\F\Fairbanks Landfill\Permit\Exposition (TXL0263)\Drawings\Dwgs-Rev0\0263P3-6.dwg PLOTTED: Aug 19, 2013 - 8:33am



NOTES:

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2. EXISTING GROUND SHOWN ON THIS DRAWING IS TAKEN FROM THE TOPOGRAPHIC BASE MAP SHOWN ON DRAWING 3-5.
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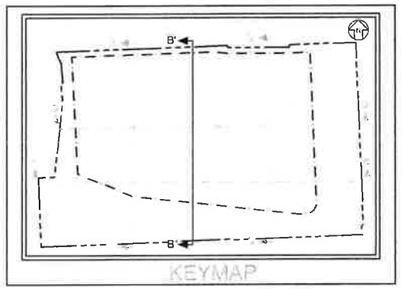
LEGEND OF SOIL/ROCK CLASSIFICATIONS AND GROUNDWATER

- FILL
- SAND
- CLAY (CL)
- CLAY (CH)
- CLAYEY SAND
- SILTY SAND
- SANDY CLAY
- SILTY CLAY
- INITIAL GROUNDWATER ELEVATION (NOTE 6)
- STATIC MEASUREMENT OF GROUNDWATER ELEVATION (NOTE 6)



8/26/2013

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED
PROFESSIONAL ENGINEER

FOR PERMIT PURPOSES ONLY

REV	DATE	DESCRIPTION	DRN	APP
-	AUG. 2013	INITIAL SUBMITTAL TO TCEQ	JJV	SMG

USA WASTE OF TEXAS LANDFILLS, INC.

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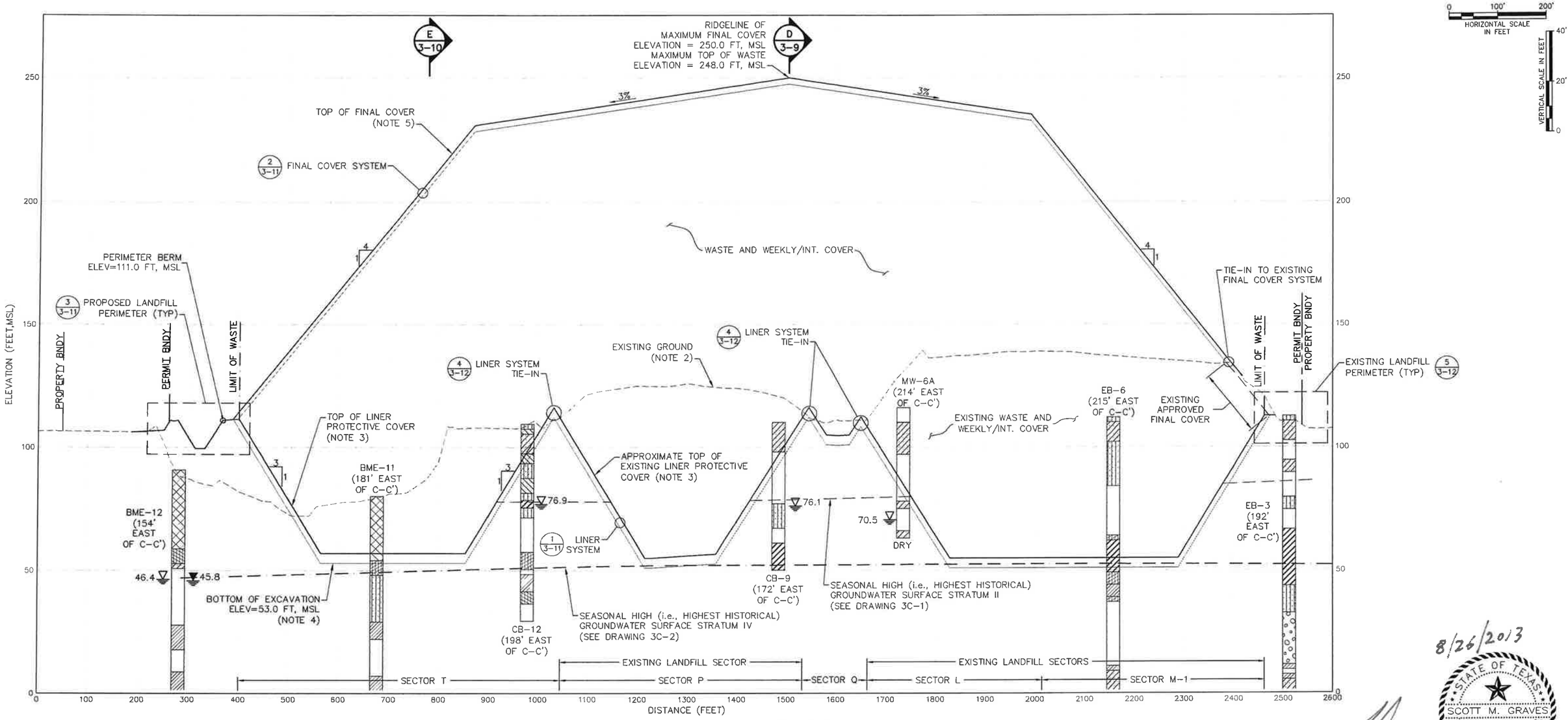
TEXAS ENG. FIRM REGISTRATION NO. 1182
3600 BEE CAVES ROAD, SUITE 101
AUSTIN, TEXAS 78746
PHONE: 512.451.4003

TITLE: LANDFILL CROSS-SECTION B-B'

PROJECT: FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION – PERMIT NO. MSW-1565B

PROJECT NO.: TXL0263	DESIGN BY: SMG	REVIEWED BY: SMG	PART NO.: III	DRAWING: 3-7
FILE: 0263P3-7	DRAWN BY: JJV	APPROVED BY: SMG		

PERMIT DRAWING



NOTES:

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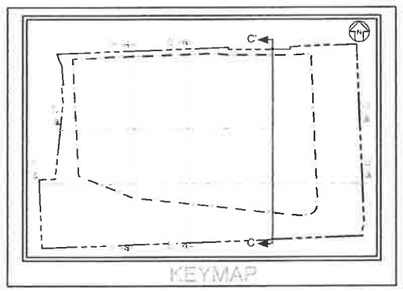
- GRAVELLY SAND
- CLAYEY SILT
- INITIAL GROUNDWATER ELEVATION (NOTE 6)
- STATIC MEASUREMENT OF GROUNDWATER ELEVATION (NOTE 6)



PERMIT DRAWING

8/26/2013

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED PROFESSIONAL ENGINEER

FOR PERMIT PURPOSES ONLY

REV	DATE	DESCRIPTION	DRN	APP
-	AUG. 2013	INITIAL SUBMITTAL TO TCEQ	JJV	SMG

USA WASTE OF TEXAS LANDFILLS, INC.

LANDFILL SITE ADDRESS:
8205 FAIRBANKS N HOUSTON RD
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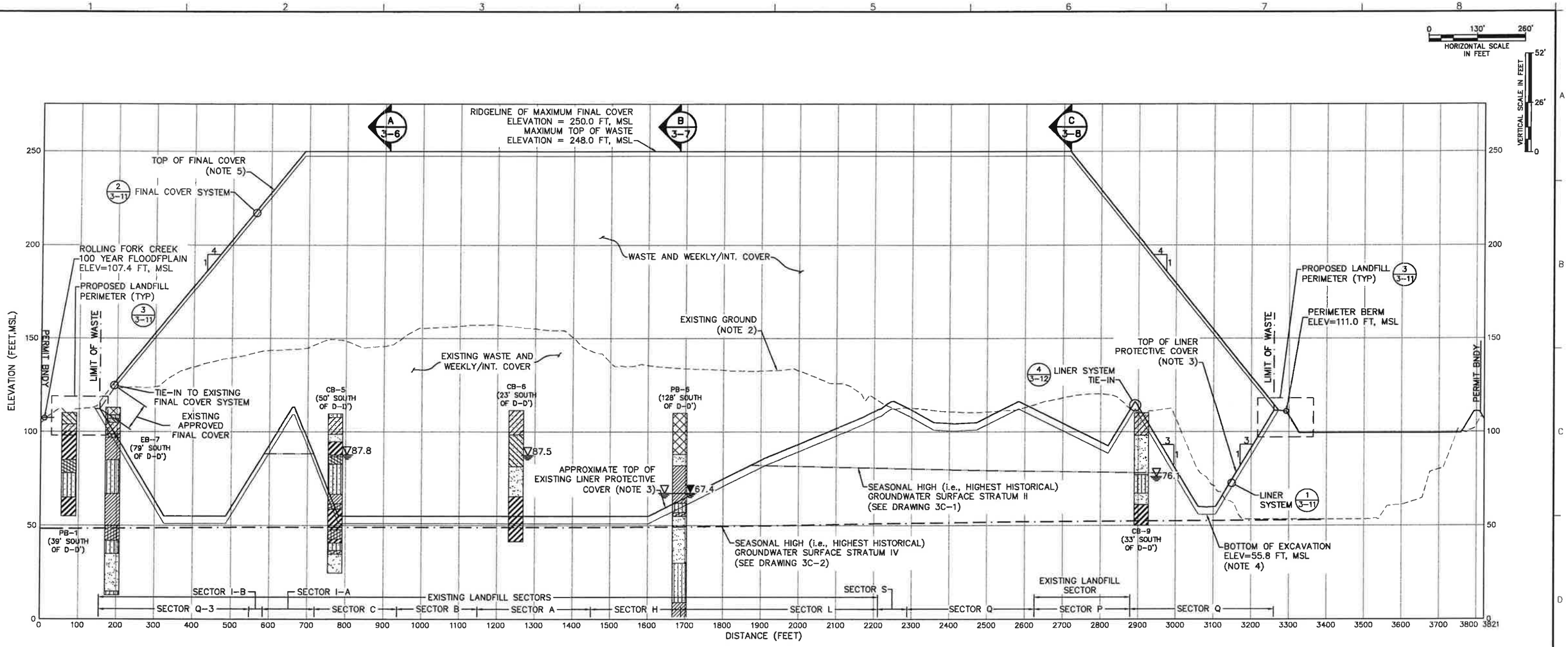
3600 BEE CAVES ROAD, SUITE 101
AUSTIN, TEXAS 78746
PHONE: 512.451.4003

TITLE:
LANDFILL CROSS-SECTION C-C'

PROJECT:
FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION – PERMIT NO. MSW-1565B

PROJECT NO.: TXL0263	DESIGN BY: SMG	REVIEWED BY: SMG	PART NO.: III	DRAWING: 3-8
FILE: 0263P3-8	DRAWN BY: JJV	APPROVED BY: SMG		

DRAWING: Austin P:\CADD\Projects\F\Fairbanks Landfill\Permit\Expansion (TXL0263)\Drawings\Dwgs-Rev0\0263P3-8.dwg PLOTTED: Aug 19, 2013 - 8:33am



NOTES:

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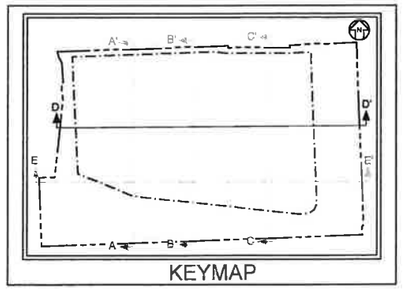

PERMIT DRAWING

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED
PROFESSIONAL ENGINEER
8/26/2013

FOR PERMIT PURPOSES ONLY

REV	DATE	DESCRIPTION	DRN	APP
-	AUG. 2013	INITIAL SUBMITTAL TO TCEQ	JJV	SMG

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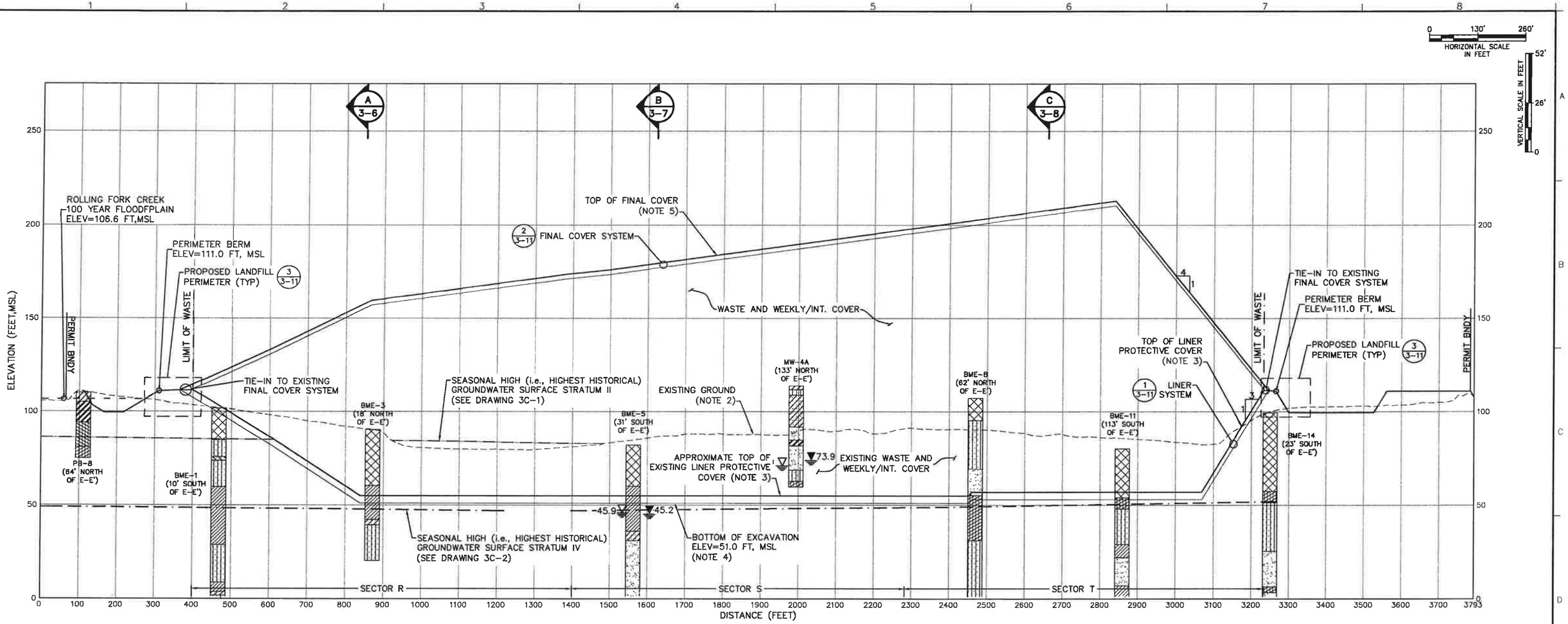
AUSTIN, TEXAS 78746
PHONE: 512.451.4003

TITLE: LANDFILL CROSS-SECTION D-D'

PROJECT: FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION – PERMIT NO. MSW-1565B

PROJECT NO.: TXL0263	DESIGN BY: SMG	REVIEWED BY: SMG	PART NO.: III	DRAWING: 3-9
FILE: 0263P3-9	DRAWN BY: JJV	APPROVED BY: SMG		



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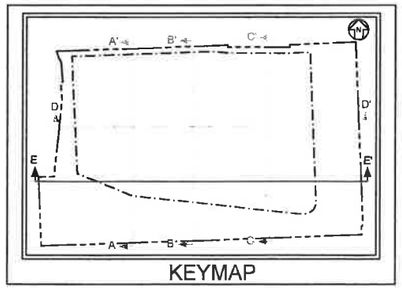
7. PROPOSED TOP OF FINAL COVER IS SLOPED AT 4H:1V ON THE LANDFILL SIDESLOPES AND THREE PERCENT ON THE LANDFILL TOP AREAS. SLOPES AND FINAL COVER SYSTEM LAYER THICKNESS MAY APPEAR DISTORTED ON THESE CROSS SECTIONS DUE TO THE EXAGGERATED VERTICAL SCALE AND THE SKEWED ANGLE AT WHICH THE SECTIONS WERE CUT COMPARED TO THE THREE-DIMENSIONAL SLOPE DIRECTIONS.
8. LINER SYSTEM IS SLOPED AT 3H:1V ON THE LANDFILL BASE SIDESLOPES. SLOPES AND LINER SYSTEM THICKNESS MAY APPEAR DISTORTED ON THESE CROSS SECTIONS DUE TO THE EXAGGERATED VERTICAL SCALE AND THE SKEWED ANGLE AT WHICH THE SECTIONS WERE CUT COMPARED TO THE THREE-DIMENSIONAL SLOPE DIRECTIONS.
9. THIS CROSS-SECTION SHOWS THE SOIL PROFILE (BORING LOG) TAKEN FROM PREVIOUSLY DRILLED BORINGS AND/OR PREVIOUSLY-INSTALLED GROUNDWATER MONITORING WELLS AND LANDFILL GAS PROBES THAT THE CROSS-SECTION PASSES THROUGH OR NEAR. REFER TO PART III, ATTACHMENTS 5 AND 6 FOR THE PROPOSED GROUNDWATER MONITORING WELL LAYOUT AND PROPOSED LANDFILL GAS PROBE LAYOUT, RESPECTIVELY.

LEGEND OF SOIL/ROCK CLASSIFICATIONS AND GROUNDWATER

- FILL
- SAND
- CLAY (CL)
- CLAY (CH)
- CLAYEY SAND
- SILTY SAND
- SANDY CLAY
- SILTY CLAY
- CLAYEY SILT
- INITIAL GROUNDWATER ELEVATION (NOTE 6)
- STATIC MEASUREMENT OF GROUNDWATER ELEVATION (NOTE 6)



PERMIT DRAWING

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED
PROFESSIONAL ENGINEER
8/26/2013

FOR PERMIT PURPOSES ONLY

REV	DATE	DESCRIPTION	DRN	APP
–	AUG. 2013	INITIAL SUBMITTAL TO TCEQ	JJV	SMG

USA WASTE OF TEXAS LANDFILLS, INC.

LANDFILL SITE ADDRESS:
8205 FAIRBANKS N HOUSTON RD
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TITLE: LANDFILL CROSS-SECTION E-E'

PROJECT: FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION – PERMIT NO. MSW-1565B

PROJECT NO.: TXL0263	DESIGN BY: SMG	REVIEWED BY: SMG	PART NO.: III	DRAWING: 3-10
FILE: 0263P3-10	DRAWN BY: JJV	APPROVED BY: SMG		

DRAWING: Austin P:\CADD\Projects\F\Fairbanks Landfill\Permit\Expansion (TXL0263)\Drawings\Dwgs-Rev0\0263P3-10.dwg PLOTTED: Aug 23, 2013 - 2:42pm

ATTACHMENT 7B

FINAL COVER QUALITY CONTROL PLAN

Prepared for:
USA Waste of Texas Landfills, Inc.

PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 7B

FINAL COVER QUALITY CONTROL PLAN

FAIRBANKS LANDFILL
PERMIT NO. MSW-1565B
HOUSTON, HARRIS COUNTY, TEXAS

Prepared by:

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FOR PERMIT PURPOSES ONLY

August 2013

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FINAL COVER QUALITY CONTROL PLAN

8/26/2013

STATE OF TEXAS
SCOTT M. GRAVES
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LICENSED
PROFESSIONAL ENGINEER

FOR PERMIT PURPOSES ONLY

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FOR PERMIT PURPOSES ONLY

TABLES

1. INTRODUCTION

1.1 Purpose

This Final Cover Quality Control Plan (FCQCP) for the Fairbanks Landfill was prepared to meet the requirements of 30 TAC §330.453(e). This FCQCP establishes the material requirements; construction installation requirements; quality control program; and quality assurance monitoring, testing, documentation, and reporting procedures that shall be used during construction of the soils for the final cover system at the Fairbanks Landfill (the facility). This FCQCP shall be followed during closure of the disposal cells to verify that the final cover is constructed in accordance with the site-specific permitted design and with the applicable state regulations for final closure.

A copy of the current version of this FCQCP must be maintained on site at all times. The FCQCP shall also be made available to facility employees, construction personnel, and testing personnel at the outset of each final cover system project, and at any time upon request by Texas Commission on Environmental Quality's (TCEQ's) inspectors. Revisions to this FCQCP shall receive written approval from TCEQ before implementation.

1.2 Final Cover System Cross Section

The proposed final cover system for the facility is shown on an engineering detail on Drawing 3-11 in Attachment 3A (Landfill Design Drawings) of this permit amendment application, and is described as follows (from bottom to top):

- 1.5-foot thick compacted soil layer composed of clayey soil, classified by the Unified Soil Classification System (USCS) as "SC" (sandy clay), "CL" (lean clay), or "CH" (fat clay); and

- a 6-inch or 12-inch thick topsoil layer[(1)] capable of sustaining native plant growth and seeded immediately after installation.

[(1)]If the underlying compacted soil layer is classified as SC or CL, the minimum topsoil thickness is 6 inches. If the underlying compacted soil layer is classified as CH, the minimum topsoil thickness is 12 inches.

Soils with USCS classifications other than those listed above may be used in the final cover system with prior written approval from the TCEQ Executive Director.

1.3 Definitions of Quality Assurance and Quality Control

In the context of this document, it is important to distinguish between construction quality assurance and construction quality control. These terms are defined as follows:

- Construction Quality Assurance (CQA) refers to means and actions employed by the CQA personnel to assure conformity of final cover system construction with the requirements of the permitted design, as shown on project-specific Construction Documents including this FCQCP. CQA is provided by a third-party consultant who is independent from production and installation (i.e., independent of the Contractor and any other material suppliers).

- Construction Quality Control (CQC) refers to those actions taken by the Contractor to ensure that the materials and the workmanship meet the requirements of the permitted design, as shown on project-specific Construction Documents including this FCQCP.

1.4 Contractor Responsibilities

In this document, the term Contractor refers to the parties who are constructing and installing the final cover system components. It is the responsibility of the Contractor to provide materials meeting the physical specifications provided herein, to construct the final cover system in accordance with the installation specifications provided herein, and to follow at least the minimum QC requirements set forth in this document.

1.5 CQA Personnel Roles and Responsibilities

1.5.1 CQA Professional of Record (POR)

Each phase of the final cover system installation evaluation shall be conducted by the CQA POR (hereafter referred to simply as "POR") or by a qualified representative (described subsequently) under the direct supervision of the POR. The POR shall be an independent third-party professional engineer (P.E.) registered in Texas and experienced in geotechnical engineering and soils testing. In addition, the POR must also be familiar with the use of soils for landfill construction and with the applicable regulatory requirements.

1.5.2 CQA Technician

A properly qualified CQA Technician may work under the direct supervision of the POR to monitor, test, and document the final cover system construction. The CQA Technician shall

have one of the following minimum levels of experience: (i) a minimum of two years of directly related landfill construction experience (or experience with similar low permeability compacted soil layers used in other containment applications); or (ii) for an engineer or geologist with a bachelor of science degree, a minimum of six months of directly related experience. If there is more than one CQA Technician on-site at the same time on a project, a Lead CQA Technician shall be designated, who shall meet the above CQA Technician requirements.

Note – the above CQA Technician experience requirement intentionally excludes references to National Institute for Certification in Engineering Technologies (NICET) certification. A previously-published TCEQ guidance document known as the "1994 Liner Construction and Testing Handbook" (currently out-of-print), suggested the technician should have NICET Level 2 certification in soils testing. NICET Level 2 for soils construction requires two years of experience and passing a written examination, but this examination is not specific to landfills or construction of low permeability soil layers. As a suitable alternative since NICET is no longer the landfill industry standard, this FCQCP requires a minimum of two years of landfill construction experience or equivalent for a non-graduate engineer or geologist level, instead of the two years of general soils experience plus examination required by NICET for Level 2.

1.6 Construction Timing and Full-Time CQA

Final cover system components and related surface water management features shall be constructed in a systematic and timely manner. Once construction is started, delays should be avoided unless adverse weather conditions prevent construction progress. Work areas for final cover system construction should be selected, sized, and sequenced so that each day's work can be protected from adverse weather conditions. Furthermore, the selection of size and shape of work areas shall be consistent, so that uniform construction/installation techniques and equipment can be selected.

Full-time CQA shall be provided during construction and installation of the final cover system soils by the POR or his/her qualified representative(s) serving as CQA Technicians as described above. In the remainder of this document, the term "CQA personnel" refers collectively to either the POR or to the CQA Technician(s) working on-site under direct supervision of the POR.

2. COMPACTED SOIL LAYER

2.1 Introduction

This section addresses the specifications and CQA requirements for the proposed compacted soil layer.

2.2 Compacted Soil Layer Specifications

2.2.1 Compacted Soil Layer Material Requirements

Material requirements for the physical properties of the compacted soil layer are presented in Table 7B-1.

2.2.2 Compacted Soil Layer Moisture-Density Target Compaction Requirements

Each lift of the compacted soil layer shall be compacted to within the required range of moisture content and density defined by the pre-construction CQA testing program as described subsequently in Section 2.3 of this FCQCP. The pre-construction CQA testing program will establish the target compaction criteria for construction of the compacted soil layer. The minimum standards for target compaction are as follows:

- For lifts compacted with "light" compaction equipment (representative of CAT 815 compactor or equivalent), the lifts shall be compacted to at least 95% of the standard Proctor maximum dry density and a corresponding standard Proctor moisture content between 0% to 5% wet of the optimum moisture content, as determined by standard Proctor test results (ASTM D 698) conducted on similar representative material during the pre-construction testing program.

- For lifts compacted with "heavy" compaction equipment (representative of CAT 825 compactor or equivalent), the lifts shall be compacted to at least 90% of the modified Proctor maximum dry density and a corresponding modified Proctor moisture content between 1% dry to 3% wet of the optimum moisture content, as determined by modified Proctor test results (ASTM D 1557) conducted on similar representative material during the pre-construction testing program.

2.2.3 Compacted Soil Layer Construction Requirements

2.2.3.1 Subgrade Preparation

A. The compacted soil layer subgrade of the final cap (i.e., surface on which the compacted soil layer will be constructed) shall be graded to be relatively smooth, uniform, with positive drainage, and within general accordance of the lines and grades shown on the drawings. The subgrade shall be free of exposed waste, debris, organic matter, standing water, or excessive moisture.

B. For areas requiring placement of additional fill to achieve the subgrade elevations for the compacted soil layer, structural fill shall be placed and compacted in 6-inch thick lifts to at least 95% of the standard Proctor maximum dry density (ASTM D 698), or at least 90% of the modified Proctor maximum dry density (ASTM D 1557), to achieve the design elevations and to provide foundation support to adequately place and compact subsequent layers of the compacted soil layer. Structural fill shall be natural soil, free of organics, debris, frozen material, or excessive moisture. The maximum particle size of structural fill shall be 3 inches.

C. For areas requiring cut to achieve the subgrade elevations for the compacted soil layer, once design elevations are reached the subgrade surface shall be proof-rolled and observed by CQA personnel for evidence that the surface provides support to adequately place and compact subsequent lifts of the overlying compacted soil layer (e.g., lack of excessive pumping, rutting, deflection of ground surface, etc.).

D. Soft, excessively wet, or otherwise deleterious subgrade areas as identified by CQA personnel shall be removed (over-excavated) and replaced with structural fill meeting the material and compaction requirements described above, to achieve the design elevations and to provide sufficient foundation support to adequately place and compact subsequent overlying lifts of the compacted soil layer. The extent of over-excavation shall be identified by CQA personnel so that the affected area provides a firm foundation and ties in to surrounding areas with acceptable proof-roll results or properly placed structural fill.

2.2.3.2 Standing Water Considerations

A. Compacted soil layer construction shall not take place in standing (ponded) water.

B. Completed compacted soil layer areas, both during ongoing construction and after submittal of the Final Cover System Evaluation Report (FCSER), shall have sufficient surface-water drainage controls to prevent the accumulation of water. Any ponded water that accumulates on newly constructed compacted soil layer surfaces shall be promptly removed.

2.2.3.3 Placement and Compaction

A. Scarification. Prior to placing a lift, the existing surface (i.e., top of subgrade or previous lifts) shall be scarified by tracking with a dozer, making a pass with the compactor, or similar as approved by the POR to promote bonding between the top of final cover subgrade and the first lift, and between adjacent lifts.

B. Lift Thickness. Compacted soil layer material shall be placed in loose lifts of uniform thickness generally not exceeding 8-inches thick after spreading and leveling, resulting in a compacted thickness of approximately 6-inches thick. In all cases, the loose lift thickness must not be greater than the pad/prong length of the compactor to promote bonding between lifts, reduce individual clods, and help blend and knead the soil matrix.

C. Soil Processing. Compacted soil layer material shall be processed as needed either in-place on the loose lift, or in a separate processing area, to yield a relatively uniform soil matrix devoid of large clods or macrostructural features. Clod size in the compacted soil layer should not exceed approximately 1-inch. Processing may be achieved by disking, grading, compacting, or pulverizing.

D. Moisture Conditioning. Moisture conditioning (either adding water to the soil or drying the soil) of the compacted soil layer shall be performed as needed to adjust the in-place moisture content to within the specified range of allowable moistures and densities. If water addition is required, the water shall be as uniformly distributed over the lift using water trucks with pressure-spray capabilities or similar. Proper hydration time, as evaluated by CQA personnel, shall be allowed so the added water blends and mixes with the soil. Care shall be taken to prevent over-watering and ponding of water within the loose lift, as this excess water is difficult to redistribute. If drying is necessary, it shall be accomplished by disking or similar techniques to lower the moisture content to the required range in a relatively uniform and controlled manner.

E. Moisture Content and Density. Each lift of compacted soil shall be compacted to meet the required range of moisture contents and densities as described in Section 2.2.2.

F. Equipment. Compaction equipment shall meet the following requirements:

1) Must have either pad/tamping-foot rollers or prong-feet (sheepsfoot) rollers.

2) Must have operating weight and characteristics capable of kneading and compacting the soil to within the specified range of allowable moistures and densities. Use of bulldozers, pneumatic rollers, rubber-tired equipment, or flat-wheel rollers as the compaction equipment is not allowed.

G. Equipment Passes. Generally, compaction equipment should pass across a lift at least four to six times, regardless of equipment size and compaction performance to help ensure adequate remolding and lift bonding of each soil lift. However, the number of equipment passes to achieve the desired results may vary depending on the soil material and the field CQA test results.

H. Non-Conforming Tests. Should the CQA field tests (described subsequently in this FCQCP) indicate that the moisture content or density of any layer of compacted soil material, or portion thereof, is not within the range of allowable moistures and densities, the representative portions of that particular layer shall be reworked and retested.

2.2.3.4 Compacted Soil Layer Tie In

A. Tie in of a new section of compacted soil layer to an old section of compacted soil layer shall be accomplished by either: (i) stair-step method; or (ii) slope method.

1) For the stair-step method, the old compacted soil layer shall be cut back at least 2.5-ft on 6-inch thick offset layers and the surface scarified so that the edge of each lift of the existing soil layer is tied in to new construction without superimposed construction joints.

2) For the slope method, the old section of compacted soil layer shall be cut back at a 5H:1V (horizontal:vertical) slope and the surface scarified, so that the edge of the existing soil layer is tied in to new construction without superimposed construction joints.

2.2.3.5 Sideslope Construction Considerations

A. The side slopes at this site are proposed to be 4H:1V.

B. The compacted soil layer on the side slopes may be constructed using either lifts parallel to the slope or horizontal lifts placed against the slope. However, the typical construction method for 4H:1V slopes is parallel lifts.

C. Requirements for Parallel Lift Side Slope Construction. The construction specifications, practices, and CQA requirements presented in this FCQCP are fully applicable to side slopes constructed in lifts parallel to the slope. In addition, the following considerations shall apply:

1) For parallel lift construction, compaction equipment shall run up and down the slope.

2) Visual observation shall be made by construction and CQA personnel to verify that the eccentric weight of the equipment (with its tendency to slide down the slope) does not cause shearing of the upper portion of the lift.

3) If the equipment tends to slide down the slope and adequate compaction cannot be achieved using parallel lifts on side slopes, horizontal lifts shall be employed.

D. Requirements for Horizontal Lift Side Slope Construction. Because horizontal lift construction is not anticipated for future final cover system construction at this site, has not been necessary previously at this site, and is not a common landfill construction practice, requirements for horizontal lifts are not presented in this FCQCP.

2.2.3.6 Top of Compacted Soil Layer Preparation and Maintenance

A. The top surface of the compacted soil layer shall be relatively smooth and uniform and free of irregularities, dimples, loose soil, or abrupt changes in grade.

B. The top surface of the compacted soil layer shall not exhibit excessive desiccation prior to placement of the overlying topsoil layer and shall be maintained (e.g., kept moist) as needed to prevent formation of excessive desiccation cracks.

C. The surface of the compacted soil layer shall also be kept free of standing water from rainfall events. Damage caused by precipitation shall be repaired, and if the lift must be reworked as determined by CQA personnel, then appropriate retesting of the lift shall be performed.

2.3 Compacted Soil Layer CQA

2.3.1 General

This section of the FCQCP addresses the CQA program to be implemented with regard to the compacted soil layer component of the final cover system. The following CQA activities are discussed in the remainder of this section:

- Pre-Construction Evaluation of Material Sources;
- Material Conformance Testing During Construction;
- Field Evaluation/Monitoring During Construction;

- Field Testing of Work Product;
- Deficiencies, Problems, and Repairs;
- Thickness Verification; and
- Compacted Soil Layer Documentation

2.3.2 Pre-Construction Evaluation of Material Sources

Prior to construction of the compacted soil layer, CQA personnel shall obtain a soil sample from the proposed source(s). Each source shall be evaluated for potential use as compacted soil layer by performing the pre-construction laboratory tests presented in Table 7B-2.

2.3.3 Material Conformance Testing During Construction

When soil from the borrow/stockpile area is easily distinguished and consistent with the soil characterized during pre-construction testing, additional ongoing laboratory conformance testing beyond the initial pre-construction tests is not required. Any time the compacted soil material being used becomes variable, or soils vary or appear inappropriate or questionable compared to the results from the initial pre-construction test program, additional material conformance testing of the tests and methods outlined in Table 7B-2 should be performed at a frequency of one series of tests per 20,000 cubic yards of compacted soil layer material or until a consistent soil type is easily distinguished.

2.3.4 Field Evaluation/Monitoring During Construction

CQA personnel will be on-site at all times when final cover compacted soil layer construction is ongoing, so that all relevant activities can be observed and documented. The POR will visit the site periodically as construction progress warrants. Such visits will be frequent enough so that the POR is fully knowledgeable of the construction methods and performance, so that the POR can determine that quality control monitoring and testing activities are adequate to meet the terms and intent of this FCQCP. CQA personnel shall visually monitor and document that construction of the compacted soil layer is in accordance with the specifications and requirements set forth previously in this FCQCP. These observations shall include, but not be limited to, monitoring of:

- moisture content and distribution, particle size, and other physical properties of the soil during processing, placement, and compaction;

- type and level of compactive effort, including roller type and weight, drum size and foot length, and number of passes;
- action of compaction equipment on soil surface (i.e. foot penetration, rolling, pumping, or shearing);
- maximum clod size and breakdown of soil structure;
- method of bonding lifts together and making final cover tie ins;
- stones or other inclusions which may adversely affect compaction, lift bonding, and in-place testing/sampling; and
- areas where damage due to excess moisture, insufficient moisture, or freezing may have occurred.

2.3.5 Field Testing of Work Product

2.3.5.1 Routine Field Testing

Field testing (e.g., density and moisture content testing) of placed compacted soil layer materials will be performed by CQA personnel during construction to evaluate the Contractor's work product with respect to the requirements of the specifications as set forth in this FCQCP. The test methods and frequencies for routine CQA field testing of the compacted soil layer are given in Table 7B-3. Sampling and test locations shall be selected by CQA personnel.

2.3.5.2 Special Testing

A special testing frequency shall be implemented at the discretion of CQA personnel when observations indicate potential problems, or as requested by the Owner. Additional testing for suspected areas shall be considered when:

- the compactor rollers slip during rolling operations;
- the lift thickness is greater than specified;
- the material is at improper and/or highly variable moisture content;
- fewer than the anticipated number of roller passes are made;
- dirt-clogged rollers are used to compact the material;
- the fill materials differ substantially from those specified; or
- the degree of compaction is doubtful.

During construction, the frequency of testing may also be increased in the following situations:

- adverse weather conditions;
- breakdown of equipment;
- at the start and finish of grading;
- if the material fails to meet specification requirements;
- the work area is reduced; or
- as otherwise requested by the Owner.

2.3.5.3 Perforations

Perforations are holes in the compacted soil layer that must be filled, and may include, but are limited to, the following:

- nuclear density test probe locations; and
- sand cone test locations or other density verification test methods.

All perforations in the compacted soil layer created during any sampling or testing shall be backfilled using a mixture of at least 20% bentonite mixed with soil layer material and compacted in place with a tamping rod, or using an appropriate bentonite grout.

2.3.5.4 Placement of Overlying Soil Layers

All testing and evaluation of the compacted soil layer shall be complete prior to installing the overlying topsoil layer.

2.3.6 Deficiencies, Problems, and Repairs

If a deficiency or noncompliance in the compacted soil layer is discovered, CQA personnel shall promptly evaluate the extent and nature of the defect. The extent of the deficient area shall be evaluated by additional tests, observations, a review of records, or other means deemed appropriate.

Sections of compacted soil layer that do not pass the required field tests shall be reworked as appropriate (e.g., water added, additional compaction passes, etc.) and retested until the section in question does pass. If a failure occurs, the failing area shall be defined. This shall be accomplished by performing additional tests between the failed test and the nearest adjacent

passing test locations. If those additional tests pass, then the area between the failed test and the additional passing tests must be reworked and retested until passing. If the additional tests fail, then additional tests must be performed halfway between the initial additional tests and the adjacent passing tests to further define the failing area. This procedure must be repeated until the failing area is defined, reworked, and retested with passing results. All field moisture-density results shall be reported in the FCSER whether they indicate passing or failing values.

2.3.7 Thickness Verification

A licensed land surveyor shall be retained to verify all lines and grades of the compacted soil layer prior to subsequent final cover system construction. Compacted soil layer thickness verification shall be determined by instrument survey method only; no test probes that create holes will be allowed. The verification points for record purposes shall be on a grid not exceeding 10,000 square feet per grid. The selected grid shall be the same for both beginning and finished elevations of the compacted soil layer, so that thicknesses can be calculated and verified.

2.3.8 Compacted Soil Layer Documentation

Documentation of the compacted soil layer shall be included in the FCSER. The required FCSER contents are described subsequently in Section 4 of this FCQCP.

TABLE 7B-1
MATERIAL SPECIFICATIONS FOR COMPACTED SOIL LAYER

PROPERTY	QUALIFIER	UNITS	SPECIFIED VALUES	TEST METHOD(1)
Maximum Particle Size	Maximum	Inch	1	ASTM D 422
Soil Classification	Meets Category	USCS Category	SC, CL, or CH	ASTM D 2487 (classified based on results from ASTM D 1140/422 and ASTM D 4318 tests)

Notes:

(1) CQA testing frequencies are provided in Tables 7B-2 and 7B-3 of this FCQCP.

TABLE 7B-2
PRE-CONSTRUCTION TESTING REQUIREMENTS FOR COMPACTED SOIL LAYER

TEST	METHOD	MINIMUM FREQUENCY OF TESTING[1]
Particle Size (Sieve) Analysis	ASTM D 422	1 per source
Atterberg Limits	ASTM D 4318	1 per source
Soil Classification	ASTM D 2487	1 per source
Natural (as-received) Moisture Content	ASTM D 2216	1 per source
Standard Compaction	ASTM D 698, if "light" weight compactor to be used[2]	1 per source (select either Standard or Modified Compaction Test based on weight of compactor to be used)
Modified Compaction	ASTM D 1557, if "heavy" weight compactor to be used[2]	

Notes:

(1) The testing frequency of one per source refers to a relatively consistent and distinguishable soil type at a borrow source location based on visual observations and field classification procedures. If the same borrow source is utilized for the soil supply of more than one project, results from previous pre-construction tests may continue to be used.

(2) Compaction test method shall be selected to be representative of the type of compaction equipment planned for use by the Contractor. For reference, CAT 815 series compactors or equivalent are considered "light" weight equipment, representative of Standard Compaction Tests, and CAT 825 series compactors or equivalent are considered "heavy" weight equipment, representative of Modified Compaction Tests.

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TABLE 7B-3
FIELD TESTING REQUIREMENTS FOR COMPACTED SOIL LAYER

TEST	METHOD	MINIMUM FREQUENCY OF TESTING
In-Place Density and In-Place Moisture Content (Nuclear Gauge)	ASTM D 2922 ASTM D 3017	1 per 8,000 ft^2 of surface area per lift (minimum 3 tests per lift)
Particle Size Analysis	ASTM D 422	1 per 100,000 ft^2 of surface area per lift (minimum 1 test per lift)
Atterberg Limits	ASTM D 4318	1 per 100,000 ft^2 of surface area per lift (minimum 1 test per lift)
Oven Moisture Content	ASTM D 2216	As necessary to verify nuclear gauge density results.
In-Place Density (Sand Cone, Rubber Balloon, or Drive Cylinder Method)	ASTM D 1556 or ASTM D 2167 or ASTM 2937	As necessary to verify nuclear gauge density results.
Layer Thickness Verification	Instrument Survey Measurements by Registered Surveyor	1 per 10,000 ft^2 of surface area using uniform grid pattern

3. TOPSOIL LAYER

3.1 Introduction

This section addresses the specifications and CQA requirements for the topsoil layer proposed for placement above the compacted soil layer component of the final cover system.

3.2 Topsoil Layer Specifications

3.2.1 Topsoil Layer Material Requirements

The topsoil layer material shall be earthen material with a 3-in. diameter maximum particle size, and without deleterious materials. In addition, the topsoil layer soil shall have suitable properties that provide a layer capable of sustaining native vegetation. The vegetative soil from the site that has been stripped from the natural ground surface (i.e., topsoil) has been determined to support site vegetation through adequate performance of previously installed final cover system areas, and is considered to have suitable properties.

If an alternate source of vegetative layer soil is proposed (besides the topsoil stripped from on-site areas), or if the owner or POR question the ability of the soil to perform, agronomic tests can be performed to evaluate the soil.

3.2.2 Topsoil Layer Placement Requirements

Topsoil layer placement does not require compaction control. Instead, to enhance vegetative growth, the material should be given relatively low compactive effort through placement and spreading using low-ground pressure bulldozers or similar equipment.

3.3 Topsoil Layer CQA

3.3.1 General

This section of the FCQCP addresses the CQA program to be implemented with regard to the topsoil layer. The following CQA activities are discussed in the remainder of this section:

- Field Evaluation/Monitoring During Construction;
- Thickness Verification; and

- Topsoil Layer Documentation.

Pre-construction evaluation of material sources, material conformance testing during construction, and field testing of the topsoil layer is not required.

3.3.2 Field Evaluation/Monitoring During Construction

CQA personnel will be on-site at all times when topsoil layer construction is ongoing, so that all relevant activities can be observed and documented. CQA personnel shall visually monitor and document that construction of the topsoil layer is in accordance with the specifications and requirements set forth previously in this FCQCP. These observations shall include, but not be limited to visual monitoring and documentation of:

- the topsoil layer soil material to evaluate the visual material classification and check for the presence of deleterious materials; and

- the thickness and dimensions of the material as spread for compliance with the drawings and engineering details; and

- the construction equipment used during placement of the material to verify that only low-ground pressure equipment traverses over the topsoil layer.

3.3.3 Thickness Verification

A licensed land surveyor shall be retained to verify topsoil thickness. Topsoil layer thickness verification shall be determined by instrument survey method only. The verification points for record purposes shall be on a grid not exceeding 10,000 square feet per grid. The beginning survey shall be the previously completed top of compacted soil layer survey. The finished elevations of the topsoil layer shall be taken using the same horizontal survey locations, so that thicknesses can be calculated and verified.

3.3.4 Topsoil Layer Documentation

Upon completion of all required construction and evaluation of the final cover system, the POR shall prepare and submit a FCSER to TCEQ containing a construction report along with relevant test data and related documentation. The required FCSER contents are described subsequently in Section 4 of this FCQCP.

4. DOCUMENTATION

Upon completion of all required final cover system construction and evaluation, the POR shall prepare and submit a FCSER to TCEQ for review and approval. The construction documentation will contain a narrative report describing the conduct of work and testing programs required by the FCQCP, "as-built" record drawings, and appendices of field and laboratory data. The FCSER shall include the following items at a minimum:

- narrative report summarizing construction activities;
- a figure or drawing showing the location of the subject final cover system evaluation area in relation to the overall final cover system layout, and showing previously final capped areas;
- as-built record drawing(s) showing confirmation of the compacted soil layer and topsoil layer elevations and thicknesses;
- a statement of compliance with the FCSER, signed and sealed by the POR performing the evaluation and counter-signed by the site operator's authorized representative (using the latest versions of any applicable TCEQ final cover system evaluation report forms); and
- supporting documentation, including the following items addressed either through the narrative construction report or as attachments to the construction report:
    - provision of full-time CQA by the POR or their representative during final cover system construction;
    - preconstruction soil test results; and
    - construction field testing and laboratory soil test results.

ATTACHMENT 8

POST-CLOSURE PLAN

Prepared for:
USA Waste of Texas Landfills, Inc.

PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 8

POST-CLOSURE PLAN

FAIRBANKS LANDFILL
PERMIT NO. MSW-1565B
HOUSTON, HARRIS COUNTY, TEXAS

Prepared by:

Geosyntec consultants
Texas Board of Professional Engineers Firm Registration No. F-1182
3600 Bee Caves Road, Suite 101
Austin, Texas 78746
(512) 451-4003

FOR PERMIT PURPOSES ONLY

August 2013

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POST CLOSURE PLAN

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED
PROFESSIONAL ENGINEER
8/26/2013
FOR PERMIT PURPOSES ONLY

TABLE

1. INTRODUCTION

This Post-Closure Plan (Plan) for the Fairbanks Landfill (facility) was prepared to meet the requirements of 30 TAC §330.63(i) and 30 TAC §330.463(a). This Plan also includes post-closure information not specifically required for Type IV landfills but that are required for Type I landfills – and this level of detail is included here to provide more information on the inspection, maintenance, and monitoring activities to be carried out during the post-closure care period, and to facilitate the development of the post-closure care cost estimate presented in Part III, Attachment 9 (Cost Estimate for Closure and Post-Closure Care) of this Permit Amendment Application.

This Plan includes the following:

- minimum duration of the post-closure care period;
- contact information for the person responsible for post-closure care activities;
- a description of the planned uses of the property during the post-closure care period;
- a description of the required monitoring and operation and maintenance (O&M) activities and the frequency at which these activities shall be performed; and
- a description of the post-closure certification to be conducted at the end of the post-closure care period.

Post-closure care will consist of the following activities:

- inspection and maintenance of the integrity and effectiveness of the final cover system, facility vegetation, and surface-water management system;
- inspection and maintenance of the groundwater monitoring wells and landfill gas management system;
- inspection and maintenance of site access features and controls;
- groundwater monitoring; and
- landfill gas monitoring.

2. GENERAL INFORMATION

2.1 Duration of Post-Closure Care Period

The minimum length of the post-closure period is five years. During this time, the applicant will retain the right of entry to and maintain all right-of-ways to conduct periodic inspections of the closed landfill. The applicant will also carry out the inspection, maintenance, and monitoring activities described in this Plan.

2.2 Post-Closure Contact Information

The contact information of the person responsible for overseeing the management of the facility is as follows:

Director of Landfill Operations
USA Waste of Texas Landfills, Inc.
820 Gessner, Suite 1100
Houston, TX 77024
281-922-0012

2.3 Planned Land Uses During Post-Closure Care Period

The property is currently planned to be kept as an open green space during the post-closure period.

2.4 Post-Closure Certification

In accordance with 30 TAC §330.465(a), following completion of the post-closure care period for the facility, the applicant will submit to the Executive Director for review and approval a certification from an independent registered professional engineer that post-closure care has been completed in accordance with the approved Plan. The submittal will include all applicable documentation necessary for this certification. After the certification has been approved, it will be placed in the operating record for the facility, and post-closure care activities will end.

3. INSPECTION, MAINTENANCE, AND MONITORING ACTIVITIES

3.1 Introduction

This section describes the facility inspection, maintenance, and monitoring activities to be conducted during the post-closure care period. The schedule for these activities is presented in Section 4.

3.2 Final Cover System

The applicant will inspect the final cover system during each facility inspection event to assess its integrity and effectiveness. Maintenance will be conducted as needed to correct settlement, subsidence, ponded water, erosion, stressed or dead vegetation or other events or failures of the final cover system. However, at a minimum, mowing of the final cover system and other vegetated areas at the facility will be conducted annually.

The final cover system inspection and maintenance activities will include the following:

- The final cover system vegetation will be mowed to maintain healthy vegetation, avoid die-out due to shading, eliminate woody-stemmed vegetation, and provide for adequate inspection of the final cover system.

- The final cover system will be inspected for conditions that could impact cover integrity, including settlement, subsidence, ponding water, burrowing animals, erosion, stressed or dead vegetation, and leachate seeps.

- Settled, depressed or eroded areas will be filled with soil, graded to provide positive drainage, and then revegetated. Repair materials will be placed in a manner consistent with the original final cover system construction.

- Areas with stressed or dead vegetation will be evaluated to determine the problem, and appropriate actions will be taken, such as reseeding the areas.

3.3 Surface-Water Management System

The applicant will inspect the facility surface-water management system during each facility inspection event to ensure functionality of the surface-water management system and erosion and sedimentation controls and verify that surface runon or runoff is not eroding or otherwise damaging the final cover system. Maintenance will be conducted as necessary. It is anticipated

that the required level of maintenance will decrease over time during the post-closure period as vegetation placed during final facility closure becomes better established.

The surface-water management system inspection and maintenance activities will include the following:

- Inspections of all components for damage, silting, and erosion.
- Repair of broken or washed-out drainage terraces, downchutes, ditches, and culverts.
- Removal of excess sediment, weeds, and other debris from drainage terraces, downchutes, ditches, and culverts to restore their design configuration, followed by revegetation of disturbed areas as appropriate.
- Removal of accumulated sediment from the detention ponds when sediment reaches the specified cleanout elevations in each pond.
- Repair of eroded areas by grading and revegetation.

3.4 Site Access

During the post-closure period, the applicant will retain the right of entry to all right-of-ways and maintain the right-of-ways in order to conduct periodic facility inspections and perform the monitoring and maintenance activities as described in this Plan.

Site access and access controls will be inspected during each facility inspection event. During an event, on-site roads will be inspected and maintained as necessary to provide appropriate access within the facility. Maintenance will include repairing ruts, soft spots, and potholes of significant severity. The perimeter fence surrounding the site will also be inspected during each facility inspection event. Fences, gates and locks, and barriers around the site will be maintained and repaired as necessary to inhibit unauthorized access to the site.

3.5 Groundwater Monitoring System

During the post-closure period, the groundwater monitoring wells will be inspected, maintained, and monitored in the same manner as during landfill operation. The wells will be inspected during routine groundwater monitoring events as described in Part III, Attachment 5 (Groundwater Monitoring Plan) of this Permit Amendment Application. Specific inspection and

maintenance requirements for groundwater monitoring wells are given in the Groundwater Monitoring Plan. Maintenance will be conducted as necessary.

3.6 Landfill Gas Management System

During the post-closure period, the landfill gas control and monitoring systems will be inspected, maintained, and monitored in the same manner as during landfill operation. The landfill gas management system will be inspected during routine landfill gas monitoring events as described in Part III, Attachment 6 (Landfill Gas Management Plan) of this Permit Amendment Application. Maintenance will be conducted as necessary.

Inspections will include checks of the gas monitoring probes, passive gas vents, and any other landfill gas control components installed at the facility. Specific inspection and maintenance requirements for landfill gas probes are given in the Landfill Gas Management Plan.

4. SCHEDULE OF POST-CLOSURE ACTIVITIES

The frequency of inspection, maintenance, and monitoring and maintenance activities to be conducted during the post-closure care period is presented below in Table 8-1.

TABLE 8-1
FAIRBANKS LANDFILL
SCHEDULE OF POST-CLOSURE INSPECTION, MAINTENANCE, AND MONITORING ACTIVITIES

Activity	Frequency
Facility Inspections (final cover system, surface-water management system, facility vegetation, on-site roads, and access control)	Annually
Groundwater Monitoring Wells Inspection and Monitoring	Annually per Part III, Attachment 5 (Groundwater Monitoring Plan)
Landfill Gas Management System Inspections and Monitoring	Quarterly per Part III, Attachment 6 (Landfill Gas Management Plan)
Facility Maintenance (final cover system, surface-water management system, facility vegetation, on-site roads, access controls, ground water monitoring wells, landfill gas control and monitoring systems).	As Needed, and with Annual Mowing of the Final Cover

ATTACHMENT 9

COST ESTIMATES FOR CLOSURE AND POST-CLOSURE CARE

Prepared for:
USA Waste of Texas Landfills, Inc.

PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 9

COST ESTIMATE FOR CLOSURE AND POST-CLOSURE CARE

FAIRBANKS LANDFILL
PERMIT NO. MSW-1565B
HOUSTON, HARRIS COUNTY, TEXAS

Prepared by:

Geosyntec consultants
Texas Board of Professional Engineers Firm Registration No. F-1182
3600 Bee Caves Road, Suite 101
Austin, Texas 78746
(512) 451-4003

8/26/2013

FOR PERMIT PURPOSES ONLY

August 2013

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COST ESTIMATE

TABLES

ATTACHMENT

FOR PERMIT PURPOSES ONLY

1. INTRODUCTION

This Cost Estimate for Closure and Post-Closure Care (Cost Estimate) for the Fairbanks Landfill (facility) was prepared to meet the requirements of 30 TAC §330.63(j) and 30 TAC §330.501, §330.503, and §330.507. The Cost Estimate presents the estimated costs for:

- closure of the landfill when the largest waste fill area that could potentially be open would require closure (and closure costs would be the greatest) and closure activities implemented in accordance with the Closure Plan presented in Part III, Attachment 7 of this permit application; and

- post-closure care for the largest waste fill area that could possibly require post-closure care (and post-closure costs would be the greatest) and post-closure care activities implemented in accordance with the Post-Closure Plan presented in Part III, Attachment 8 of this permit application.

The Cost Estimate also presents information on the financial assurance currently established for the facility in accordance with 30 TAC §37, Subchapter R.

2. CLOSURE COST ESTIMATE

2.1 Cost Estimate

The closure cost estimate, in current dollars, has been developed in accordance with 30 TAC §330.503. The cost estimate accounts for closure of the landfill when the when the largest waste fill area that could potentially be open would require closure. Drawing 7-1 showing the largest area that could potentially require closure (i.e., 56 acres) is presented in Part III, Attachment 7 (Closure Plan) of this Permit Amendment Application. The following conditions were used in preparing the closure cost estimate:

- all groundwater monitoring wells, landfill gas probes, and passive landfill gas vents will be in place before final closure is initiated;
- the site perimeter fence will be in place prior to initiating final closure;
- all required permits will be obtained prior to initiating final closure;
- all closure activities will be performed by a third party engineer or contractor;
- a topographic survey of the site will be conducted as part of closure, prior to installation of the final cover;
- a boundary survey will be conducted as part of final closure;
- a pre-design site evaluation will be performed to determine if the facility systems and features, including the environmental monitoring systems and operations records, are adequate for the post-closure care period;
- closure activities will be performed in accordance with Part III, Attachment 7 (Closure Plan) of the permit application;
- a contingency has been added to the cost, calculated as 10% of the engineering and construction costs;
- contract payment and performance bonds for closure activities that will be obtained are estimated at 1.5% of the engineering and construction costs; and

- TCEQ administration and legal fee costs are estimated at 1% of the engineering and construction costs.

The estimated cost for final facility closure is given in Table 9-1. This cost estimate is presented in current dollars and is based on unit costs from recent bids obtained for similar landfill construction projects, site-specific cost information obtained from the applicant, vendor quotes, and engineering judgment.

2.2 Financial Assurance for Final Closure

Evidence of the facility's current financial assurance that is in-place is provided in Attachment 9A. It is noted that this documentation has been previously provided to TCEQ as indicated on the cover letter that accompanies Attachment 9A; and that this documentation also covers a number of other facilities in Texas owned/operated by USA Waste of Texas Landfills, Inc. or its parent company, Waste Management of Texas, Inc. Once Permit MSW-1565B is issued, the facility will need to update the financial assurance amount to that presented herein for closure costs (as well as to include post-closure care costs, discussed subsequently in Section 3).

The updated documentation of financial assurance for the facility will be provided to TCEQ within 60 days of approval of issuance of Permit MSW-1565B. The financial assurance for closure will be maintained continuously until the facility is officially placed under the post-closure maintenance period and all requirements of the Closure Plan have been met as evidenced in writing by the TCEQ Executive Director.

The permittee will review the facility's permit conditions on an annual basis and verify that the current active areas match the areas on which closure cost estimates are based. In increase in the closure cost estimate and the amount of financial assurance will be made if changes to the Closure Plan or landfill conditions increase the maximum cost of closure.

A reduction in the closure cost estimate and amount of financial assurance provided may be approved if the maximum cost of closure has decreased and the applicant provides a permit modification request to the TCEQ Executive Director that includes a detailed justification for this reduction.

TABLE 9-1
FAIRBANKS LANDFILL
CLOSURE COST ESTIMATE[1]
LARGEST AND MOST EXPENSIVE AREA REQUIRING CLOSURE
Total surface area to be closed and capped = 52.2 Acres
Approx. permit boundary area = 189 Acres

ITEM NO.	DESCRIPTION	UNIT[2]	UNIT COST	QUANTITY	TOTAL COST
1	**Engineering**				
1.1	Topographic Survey	LS	$10,000	1	$10,000
1.2	Boundary Survey for Affidavit	LS	$5,000	1	$5,000
1.3	Pre-Design Site Evaluation	LS	$55,000	1	$55,000
1.4	Development of Engineering Plans and Documents	LS	$30,000	1	$30,000
1.5	Administration	LS	$10,000	1	$10,000
1.6	QA/QC, CQA Surveying, and Cert. (Final Report)	AC	$3,000	52.2	$156,600
				ENGINEERING SUBTOTAL	$266,600
2	**Closure Construction**				
2.1	Final Cover System				
2.1.1	1.5-ft-thick Compacted Soil Layer	CY	$5.00	126,324	$631,620
2.1.2	0.5-ft-thick Topsoil Layer	CY	$4.00	42,108	$168,432
2.1.3	Cover Vegetation (fertilizing, seeding, and mulching)	AC	$2,500	52.2	$130,500
2.1.4	Grading and Drainage	AC	$6,000	52.2	$313,200
2.2	Closure of Wood Processing Area	LS	$10,000	1	$10,000
2.3	Closure of Large/Heavy/Bulky Item Area	LS	$10,000	1	$10,000
2.4	Closure of C&D Recycling Area	LS	$10,000	1	$10,000
				CLOSURE CONSTRUCTION SUBTOTAL	$1,273,752
				ENGINEERING AND CONSTRUCTION SUBTOTAL	$1,540,352
				10% CONTINGENCY	$154,035
3	**Administrative and Legal**				
3.1	Contract Performance Bonds (1.5% of Eng/Constr Subtotal)				$23,105
3.2	TCEQ Contract Admin & Legal Fees (1% of Eng/Constr Subtotal)				$15,404
				TOTAL CLOSURE COST	**$1,732,896**

[1]This closure cost estimate was developed in 2013 dollars.

[2]LS = Lump Sum; AC = Acres; CY = Cubic Yards.

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FOR PERMIT PURPOSES ONLY

3. POST-CLOSURE CARE COST ESTIMATE

3.1 Cost Estimate

A post-closure care cost estimate, in current dollars, has been developed in accordance with 30 TAC §330.507 for the 5-year post-closure period for the entire facility and using the Post-Closure Plan (Part III, Attachment 8). The following conditions were used in preparing the post-closure cost estimates:

- costs are based on post-closure activities being performed by a third-party;
- inspection, maintenance, and monitoring will be conducted in accordance with the schedule of post-closure care activities presented in Table 8-1 of Part III, Attachment 8 (Post-Closure Plan);
- a 10% contingency has been added to the cost of post-closure activities; and
- TCEQ post-closure care administration costs are estimated at 5% of the pre-contingency total post-closure care cost.

The estimated cost for post-closure care is given below in Table 9-2. This cost estimate is presented in current dollars and is based on unit costs from recent bids obtained for similar landfill projects, site-specific cost information obtained from the applicant, vendor quotes, and engineering judgment.

TABLE 9-2
FAIRBANKS LANDFILL
POST-CLOSURE CARE COST ESTIMATE
Approx. permit boundary area = 189 Acres

ITEM No.	DESCRIPTION	UNIT	UNIT COST	QUANTITY	TOTAL
1	Facility Inspections	YR	$6,200	5	$31,000
2	Facility Maintenance	YR	$31,700	5	$158,500
3	Groundwater Monitoring (8 wells)	YR	$4,500	5	$22,500
4	Landfill Gas Monitoring (18 probes)	YR	$2,000	5	$10,000
5	Groundwater Monitoring Well Maint/Repair	WELL	$1,500	8	$12,000
	Subtotal Post-Closure Cost				$234,000
	10% CONTINGENCY				$23,400
6	TCEQ Administration Cost (5% of total post-closure cost)				$11,700
	Total Post-Closure Care Cost				**$269,100**

8/26/2013

FOR PERMIT PURPOSES ONLY

3.2 Financial Assurance

As mentioned, evidence of the facility's current financial assurance that is in-place is provided in Attachment 9A. Once Permit MSW-1565B is issued, the facility will need to update the financial assurance amount to that presented herein for post-closure care costs (as well as to include the closure costs, discussed previously in Section 2).

The updated documentation of financial assurance for the facility will be provided to TCEQ within 60 days of issuance of Permit MSW-1565B. The financial assurance will be maintained continuously until the facility is officially released in writing by the TCEQ Executive Director from the post-closure period in accordance with all requirements of the Post-Closure Closure Plan.

An increase in the post-closure cost estimate and the amount of financial assurance will be made if changes to the Post-Closure Plan or the landfill conditions increase the maximum cost of post-closure care. A reduction in the post-closure cost estimate and amount of financial assurance provided may be approved if the maximum cost of post-closure care has decreased and the applicant provides a permit modification request to the TCEQ Executive Director that includes a detailed justification for this reduction.

ATTACHMENT 9A

CURRENT FINANCIAL ASSURANCE DOCUMENTATION

WASTE MANAGEMENT INC.

1001 Fannin, Suite 4000
Houston, TX 77002
(713) 512-6282
1(866) 239-7964 Fax

July 2, 2012

UPS 2nd Day Air

Ms. Deborah Wisneski (512) 239-6262
Texas Commission on Environmental Quality
Financial Assurance Section MC-184
12100 Park 35 Circle, Building A
Austin, Texas 78753

RE: Financial Assurance

Dear Deborah:

Enclosed are Bond Riders and Certificates of Insurance for each landfill listed below evidencing closure and post-closure cost estimates were revised to reflect inflation adjustment of 2.1%. For your reference, a summary sheet listing the specific instrument(s) on file for each facility is attached to the respective financial assurance instrument.

Also enclosed are revised Schedules A and B for the Standby Trust Agreements on file with the TCEQ.

Facilities For Waste Management of Texas, Inc.	MSW Permit No.
Atascosa County Transfer Station	1871
Atascocita Recycling and Disposal Facility	1307
Austin Community Landfill Gas to Energy	48019
Austin Community Recycling and Disposal Facility	249-D
B & B Landfill	1454-A
Bluebonnet RDF	1279
Bonanza Transfer Station	40009
City of Wharton Transfer Station	2099
Coastal Plains RDF	1721-A
Comal County Transfer Station	40200
Covel Gardens RDF	2093-A
DFW RDF	1025-B
Hillside Material Recovery & Transfer	40082
Hillside RDF	523
Kingsland Transfer Station	40003
Lacy Lakeview RDF	1646-A
Mesquite Creek Landfill	66-B

Pecan Prairie RDF	1503
Pittsburgh Transfer Station	40174
Security Recycling and Disposal Facility	1752
Skyline RDF	42-C
Temple LF	692-A
Westside RDF	1019-A
Westside Transfer Station	40186
Williamson County LF	1405B
Winnsboro Transfer Station	40058

Facilities For USA Waste of Texas Landfills, Inc.	**MSW Permit No.**
Addicks-Fairbanks Landfill	1301
Baytown Landfill	1535B
Fairbanks North Houston Landfill	1565-A
Greenshadow Landfill	1540
Hawthorne Park C&D	2185

Facilities For Western Waste of Texas, L.L.C.	**MSW Permit No.**
City of Conroe Type I Landfill	81-A
New Boston Landfill	576
Newton County Landfill	2242
Western Waste Industrial LF	SW39001

Facilities For Chemical Waste Management, Inc.	**Permit No.**
Corpus Christi	HW 32325

Facilities For WM Renewable Energy, LLC	**MSW Permit No.**
Skyline Landfill Gas-to-Energy	48018

Facilities For WM Resource Recovery & Recycling Center, Inc.	**MSW Permit No.**
Wheelabrator Chambers, Inc.	2239A

Facilities For Cougar Landfill, Inc.	**MSW Permit No.**
Cougar Disposal	1921

Facilities For USA Waste Landfill Operations and Transfer, Inc.	MSW Permit No.
Sam Houston Recycling Center	1471

Facilities For Western Waste Industries	MSW Permit No.
Texarkana Transfer Station	1022

If you have any questions, please feel free to call me at (713) 512-6282.

Sincerely,

Donna L. Meals AFSB, ARM
Director, Financial Assurance

Enclosures

cc: Susie Becvar, JPMorgan Chase Bank
Paula Carboni, WMI (File the enclosed documents in operating record)
Tim Champagne, WMI (File the enclosed documents in operating record)
Heather Lehrmann, WMI (File the enclosed documents in operating record)
Drew Shafer, WMI (File the enclosed documents in operating record)
Vic Saufley, WMI (File the enclosed documents in operating record)
Ayuk Etta, WMI (File the enclosed documents in operating record)
Richard Witek, MB Financial Bank

Standby Trust Agreement dated March 1, 2001
USA Waste of Texas Landfills, Inc., Grantor

Schedule A
(Revised 08/01/12)

1.	Facility:	Addicks-Fairbanks Landfill 6415 Addicks-Fairbanks Road Houston, Texas 77041
	Permit No.:	MSW-1301
	Closure:	$1,018,902.84
	Post-Closure:	$301,294.30
	Total Bond:	$1,320,197.14
2.	Facility:	Fairbanks North Houston Landfill 8205 Fairbanks – North Houston Houston, Texas 77064
	Permit No.:	MSW No. 1565-A
	Closure:	$1,828,267.27
	Post-Closure:	$255,001.05
	Total Bond:	$2,083,268.32
3.	Facility:	Hawthorne C & D Landfill 3623 Wilson Road Humble, Texas 77396
	Permit No.:	MSW No. 2185
	Closure:	$2,839,534.76
	Post-Closure:	$457,289.01
	Total Bond:	$3,296,823.77

Standby Trust Agreement dated March 1, 2001
USA Waste of Texas Landfills, Inc., Grantor

Schedule A
(Revised 08/01/2012)
(Continued)

4.	Facility:	Koenig Street Transfer Station 100 Genoa Red Bluff Houston, Texas 77034
	Permit No.:	MSW-1483A
	Closure:	$115,487.37
	Post-Closure:	$0.00
	Total Bond:	$115,487.37
5.	Facility:	Greenshadow Landfill 1100 Jana Lane Pasadena, Texas 77503
	Permit No.:	MSW 1540
	Closure:	$1,767,349.57
	Post-Closure:	$380,086.48
	Total Bond:	$2,147,436.05

ADDICKS-FAIRBANKS LANDFILL, MSW #1301

	#1016484
Closure	$1,018,902.84
Post-Closure	$301,294.30
Total	$1,320,197.14

6/28/2012

Facility Name: Addicks-Fairbanks Landfill
MSW Permit No: 1301

Bond No. 1016484

RIDER

To be attached to and form a part of Closure/Post Closure Bond, No. 1016484

dated the 25th day of February , 2006 issued by

LEXON Insurance Company, 10002 Shelbyville Road, Louisville, KY 40223 as Surety, on behalf of

USA Waste of Texas Landfills, Inc., 6415 Addicks-Fairbanks Road, Houston, TX 77041 , as Principal,

in the penal sum of One Million Two Hundred Eighty Thousand Two Hundred Forty and 82/100

Dollars ($ 1,280,240.82), and in favor of Texas Commission on Environmental Quality 12100 Park 35 Circle, Building A, Austin, TX 78753

In consideration of the premium charged for the attached bond, it is hereby agreed that the attached bond be amended as follows:

THIS RIDER WILL CHANGE AND AMEND THE BOND PENALTY AS FOLLOWS:

CURRENT CLOSURE AMOUNT:	$997,945.97
NEW CLOSURE AMOUNT:	$1,018,902.84
CURRENT POST CLOSURE AMOUNT:	$295,097.26
NEW POST CLOSURE AMOUNT:	$301,294.30
TOTAL PENAL SUM:	$1,320,197.14

Provided, However, that the attached bond shall be subject to all its agreements, limitations and conditions except as herein expressly modified, and further that the liability of the Surety under the attached bond and the attached bond as amended by this rider shall not be cumulative.

This rider shall become effective as of the 1st day of August , 2012

Signed, sealed and dated this 12th day of June , 2012

WITNESS:

PRINCIPAL

USA Waste of Texas Landfills, Inc.

By Donna L. Meals

Donna L. Meals, Authorized Representative

WITNESS:

LEXON Insurance Company

By Sandra L. Fusinetti

Sandra L. Fusinetti , Attorney-in-Fact

POWER OF ATTORNEY

Lexon Insurance Company

LX - 055793

KNOW ALL MEN BY THESE PRESENTS, that **LEXON INSURANCE COMPANY**, a Texas Corporation, with its principal office in Louisville, Kentucky, does hereby constitute and appoint: Brook T. Smith, Kathy Hobbs, Raymond M. Hundley, Jason D. Cromwell, James H. Martin, Sandra L. Fusinetti, ******* Myrtie F. Henry, Deborah Neichter, Jill Kemp, Jackie C. Koestel, Sheryon Quinn, Dawson West, Bonnie J. Wortham, Amy Meredith, Lynnette Long, Barbara Duncan **

its true and lawful Attorney(s)-In-Fact to make, execute, seal and deliver for, and on its behalf as surety, any and all bonds, undertakings or other writings obligatory in nature of a bond.

This authority is made under and by the authority of a resolution which was passed by the Board of Directors of **LEXON INSURANCE COMPANY** on the 1st day of July, 2003 as follows:

Resolved, that the President of the Company is hereby authorized to appoint and empower any representative of the Company or other person or persons as Attorney-In-Fact to execute on behalf of the Company any bonds, undertakings, policies, contracts of indemnity or other writings obligatory in nature of a bond not to exceed $ 4,000,000.00 Four million dollars ********** dollars, which the Company might execute through its duly elected officers, and affix the seal of the Company thereto. Any said execution of such documents by an Attorney-In-Fact shall be as binding upon the Company as if they had been duly executed and acknowledged by the regularly elected officers of the Company. Any Attorney-In-Fact, so appointed, may be removed for good cause and the authority so granted may be revoked as specified in the Power of Attorney.

Resolved, that the signature of the President and the seal of the Company may be affixed by facsimile on any power of attorney granted, and the signature of the Assistant Secretary, and the seal of the Company may be affixed by facsimile to any certificate of any such power and any such power or certificate bearing such facsimile signature and seal shall be valid and binding on the Company. Any such power so executed and sealed and certificate so executed and sealed shall, with respect to any bond of undertaking to which it is attached, continue to be valid and binding on the Company.

IN WITNESS THEREOF, **LEXON INSURANCE COMPANY** has caused this instrument to be signed by its President, and its Corporate Seal to be affixed this 21st day of September, 2009.

LEXON INSURANCE COMPANY
A TEXAS INSURANCE COMPANY

LEXON INSURANCE COMPANY

BY _____
David E. Campbell
President

ACKNOWLEDGEMENT

On this 21st day of September, 2009, before me, personally came David E. Campbell to me known, who being duly sworn, did depose and say that he is the President of **LEXON INSURANCE COMPANY**, the corporation described in and which executed the above instrument; that he executed said instrument on behalf of the corporation by authority of his office under the By-laws of said corporation.

"OFFICIAL SEAL"
MAUREEN K. AYE
Notary Public, State of Illinois
My Commission Expires 09/21/13

_____
Maureen K. Aye
Notary Public

CERTIFICATE

I, the undersigned, Assistant Secretary of **LEXON INSURANCE COMPANY**, A Texas Insurance Company, DO HEREBY CERTIFY that the original Power of Attorney of which the foregoing is a true and correct copy, is in full force and effect and has not been revoked and the resolutions as set forth are now in force.

Signed and Sealed at Woodridge, Illinois this 12th Day of June, 2012.

LEXON INSURANCE COMPANY
A TEXAS INSURANCE COMPANY

_____
Philip G. Lauer
Assistant Secretary

August 2013

"WARNING: Any person who knowingly and with intent to defraud any insurance company or other person, files an application for insurance or statement of claim containing any materially false information, or conceals for the purpose of misleading, information concerning any fact material thereto, commits a fraudulent insurance act, which is a crime and subjects such person to criminal and civil penalties."

FAIRBANKS NORTH HOUSTON #1565A

	Evergreen #850147
Closure	$1,828,267.27
Post-Closure	$255,001.05
Total:	$2,083,268.32

Facility Name: Fairbanks North Houston Landfill
Permit Number: MSW 1565-A

INCREASE RIDER TO SURETY BOND

PURPOSE: INCREASE RIDER

To be attached to Bond Number 850147 issued by Evergreen National Indemnity Company, as Surety in the amount of Two Million Forty Thousand Four Hundred Nineteen and 51/100 Dollars ($2,040,419.51)(Closure:$1,790,663.34/PostClosure: $249,756.17), on behalf of USA Waste of Texas Landfills, Inc., in favor of the Texas Commission on Environmental Quality (TCEQ).

In consideration of the premium charged for the attached bond, it is mutually understood and agreed by the Principal and the Surety that the bond shall be modified to read as follows:

The above said bond amount shall be Two Million Eighty Three Thousand Two Hundred Sixty Eight and 32/100 Dollars ($2,083,268.32)(Closure:$1,828,267.27/PostClosure: $255,001.05), effective the 1st day of August 2012.

All other items, limitations and conditions of said bond except as herein expressly modified shall remain unchanged.

Signed, sealed and dated this 12th day of June 2012.

Principal: USA Waste of Texas Landfills, Inc.

By: Donna L Meals

Donna L. Meals, Authorized Representative

Surety: Evergreen National Indemnity Company

By: Cheryl C May

Cheryl C. May, Attorney-In-Fact

EVERGREEN NATIONAL INDEMNITY COMPANY
MAYFIELD HEIGHTS, OH
POWER OF ATTORNEY

POWER NO.**850147**

KNOW ALL MEN BY THESE PRESENTS: That the Evergreen National Indemnity Company, a corporation in the State of Ohio does hereby nominate, constitute and appoint: *** CHERYL C. MAY ***

its true and lawful Attorney(s)-In-Fact to make, execute, attest, seal and deliver for and on its behalf, as Surety, and as its act and deed, where required, any and all bonds, undertakings, recognizances and written obligations in the nature thereof, PROVIDED, however, that the obligation of the Company under this Power of Attorney shall not exceed **TWO MILLION EIGHTY THREE THOUSAND TWO HUNDRED SIXTY EIGHT AND 32/100 DOLLARS ($2,083,268.32)**

This Power of Attorney is granted and is signed by facsimile pursuant to the following Resolution adopted by its Board of Directors on the 23rd day of July, 2004:

"RESOLVED, That any two officers of the Company have the authority to make, execute and deliver a Power of Attorney constituting as Attorney(s)-in-fact such persons, firms, or corporations as may be selected from time to time.
FURTHER RESOLVED, that the signatures of such officers and the Seal of the Company may be affixed to any such Power of Attorney or any certificate relating thereto by facsimile; and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company; and any such powers so executed and certified by facsimile signatures and facsimile seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached."

IN WITNESS WHEREOF, the Evergreen National Indemnity Company has caused its corporate seal to be affixed hereunto, and these presents to be signed by its duly authorized officers this 1st day of June, 2009.

EVERGREEN NATIONAL INDEMNITY COMPANY

By:_____
Charles D. Hamm Jr , President

By _____
David A. Canzone, CFO

Notary Public)
State of Ohio) SS:

On this 1st day of June, 2009, before the subscriber, a Notary for the State of Ohio, duly commissioned and qualified, personally came Charles D. Hamm, Jr. and David A. Canzone of the Evergreen National Indemnity Company, to me personally known to be the individuals and officers described herein, and who executed the preceding instrument and acknowledged the execution of the same and being by me duly sworn, deposed and said that they are the officers of said Company aforesaid, and that the seal affixed to the preceding instrument is the Corporate Seal of said Company, and the said Corporate Seal and signatures as officers were duly affixed and subscribed to the said instrument by the authority and direction of said Corporation, and that the resolution of said Company, referred to in the preceding instrument, is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal at Columbus, Ohio, the day and year above written.

PENNY M. BURNS
NOTARY PUBLIC
STATE OF OHIO
Comm. Expires
April 04, 2012

Penny M. Burns, Notary Public
My Commission Expires April 4, 2012

State of Ohio) SS:

I, the undersigned, Secretary of the Evergreen National Indemnity Company, a stock corporation of the State of Ohio, DO HEREBY CERTIFY that the foregoing Power of Attorney remains in full force and has not been revoked; and furthermore that the Resolution of the Board of Directors, set forth herein above, is now in force.

Signed and sealed in Mayfield Hts, Ohio this 12th day of June 2012.

Wan C. Collier, Secretary

Greenshadow Landfill #1540

	Evergreen #550031
Closure	1,767,349.57
Post-Closure	380,086.48
Total	2,147,436.05

Facility Name: Sanifill of Texas, Inc., Greenshadow Landfill
Permit Number: MSW 1540

INCREASE RIDER TO SURETY BOND

PURPOSE: INCREASE

To be attached to Surety Bond Number 550031 issued by Evergreen National Indemnity Company, as Surety, in the amount of Two Million One Hundred Three Thousand Two Hundred Sixty Seven and 43/100 Dollars ($2,103,267.43) (Closure: $1,730,998.60/Post-Closure: $372,268.83), on behalf of Sanifill of Texas, Inc., Greenshadow Landfill in favor of the Texas Commission on Environmental Quality (TCEQ).

In consideration of the premium charged for the attached bond, it is mutually understood and agreed by the Principal and the Surety that the bond shall be modified to read as follows: The above said bond amount shall be Two Million One Hundred Forty Seven Thousand Four Hundred Thirty Six and 05/100 Dollars ($2,147,436.05) (Closure: $1,767,349.57/Post-Closure: $380,086.48), effective the 1st day of August, 2012.

All other items, limitations and conditions of said bond except as herein expressly modified shall remain unchanged.

Signed, sealed and dated this 12th day of June, 2012.

Principal: Sanifill of Texas, Inc., Greenshadow Landfill

By: _____
Donna L. Meals, Authorized Representative

Surety: Evergreen National Indemnity Company

By: _____
Cheryl C. May, Attorney-In-Fact

EVERGREEN NATIONAL INDEMNITY COMPANY
MAYFIELD HEIGHTS, OH
POWER OF ATTORNEY

POWER NO.**550031**

KNOW ALL MEN BY THESE PRESENTS: That the Evergreen National Indemnity Company, a corporation in the State of Ohio does hereby nominate, constitute and appoint: *** CHERYL C. MAY ***

its true and lawful Attorney(s)-In-Fact to make, execute, attest, seal and deliver for and on its behalf, as Surety, and as its act and deed, where required, any and all bonds, undertakings, recognizances and written obligations in the nature thereof, PROVIDED, however, that the obligation of the Company under this Power of Attorney shall not exceed **TWO MILLION ONE HUNDRED FORTY SEVEN THOUSAND FOUR HUNDRED THIRTY SIX AND 05/100 DOLLARS ($2,147,436.05)**

This Power of Attorney is granted and is signed by facsimile pursuant to the following Resolution adopted by its Board of Directors on the 23rd day of July, 2004:

"RESOLVED, That any two officers of the Company have the authority to make, execute and deliver a Power of Attorney constituting as Attorney(s)-in-fact such persons, firms, or corporations as may be selected from time to time.
FURTHER RESOLVED, that the signatures of such officers and the Seal of the Company may be affixed to any such Power of Attorney or any certificate relating thereto by facsimile; and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company; and any such powers so executed and certified by facsimile signatures and facsimile seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached."

IN WITNESS WHEREOF, the Evergreen National Indemnity Company has caused its corporate seal to be affixed hereunto, and these presents to be signed by its duly authorized officers this 1st day of June, 2009.

EVERGREEN NATIONAL INDEMNITY COMPANY

By:_____
Charles D. Hamm Jr , President

By _____
David A. Canzone, CFO

Notary Public)
State of Ohio) SS:

On this 1st day of June, 2009, before the subscriber, a Notary for the State of Ohio, duly commissioned and qualified, personally came Charles D. Hamm, Jr. and David A. Canzone of the Evergreen National Indemnity Company, to me personally known to be the individuals and officers described herein, and who executed the preceding instrument and acknowledged the execution of the same and being by me duly sworn, deposed and said that they are the officers of said Company aforesaid, and that the seal affixed to the preceding instrument is the Corporate Seal of said Company, and the said Corporate Seal and signatures as officers were duly affixed and subscribed to the said instrument by the authority and direction of said Corporation, and that the resolution of said Company, referred to in the preceding instrument, is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal at Columbus, Ohio, the day and year above written.

PENNY M. BURNS
NOTARY PUBLIC
STATE OF OHIO
Comm. Expires
April 04, 2012

Penny M. Burns, Notary Public
My Commission Expires April 4, 2012

State of Ohio) SS:

I, the undersigned, Secretary of the Evergreen National Indemnity Company, a stock corporation of the State of Ohio, DO HEREBY CERTIFY that the foregoing Power of Attorney remains in full force and has not been revoked; and furthermore that the Resolution of the Board of Directors, set forth herein above, is now in force.

Signed and sealed in Mayfield Hts, Ohio this 12th day of June 2012.

Wan C. Collier, Secretary

HAWTHORNE PARK C & D Landfill
Permit #2185

	Evergreen #551553	Lexon #1016486	Total
Closure	$160,777.00	$2,678,757.76	$2,839,534.76
Post-Closure	$147,405.00	$309,884.01	$457,289.01
Total	$308,182.00	$2,988,641.77	$3,296,823.77

6/28/2012

Facility Name : Hawthorne Park C & D Landfill
Permit Number : 2185

Bond No. 1016486

RIDER

To be attached to and form a part of Closure/Post Closure Bond, No. 1016486

dated the 19th day of February, 2006 issued by

LEXON Insurance Company, 10002 Shelbyville Road, Louisville, KY 40223 as Surety, on behalf of

USA Waste of Texas Landfills, Inc., 10550 Tanner Road, Houston, TX 77064, as Principal,

in the penal sum of Two Million One Thousand Eight Hundred Fifty-Nine and 00/100

Dollars ($ 2,001,859.00), and in favor of Texas Commission on Environmental Quality ~~12100 Park 35 Circle, Building A, Austin, TX 78753~~

In consideration of the premium charged for the attached bond, it is hereby agreed that the attached bond be amended as follows:

This rider will change and amend the bond penalty as follows:

Current Closure Amount :	$2,620,354.00
New Closure Amount :	$2,678,757.76
Current Post-Closure Amount :	$ 300,478.46
New Post-Closure Amount :	$ 309,884.01
Total Penal Sum :	$2,988,641.77

Provided, However, that the attached bond shall be subject to all its agreements, limitations and conditions except as herein expressly modified, and further that the liability of the Surety under the attached bond and the attached bond as amended by this rider shall not be cumulative.

This rider shall become effective as of the 1st day of August, 2012

Signed, sealed and dated this 12th day of June, 2012

WITNESS: [signature]

PRINCIPAL

USA Waste of Texas Landfills, Inc.

By [signature]

Donna L. Meals, Authorized Representative

WITNESS: [signature]

LEXON Insurance Company

By [signature]

Dawson West, Attorney-in-Fact

POWER OF ATTORNEY

Lexon Insurance Company

LX- 055946

KNOW ALL MEN BY THESE PRESENTS, that **LEXON INSURANCE COMPANY**, a Texas Corporation, with its principal office in Louisville, Kentucky, does hereby constitute and appoint: Brook T. Smith, Kathy Hobbs, Raymond M. Hundley, Jason D. Cromwell, James H. Martin, Sandra L. Fusinetti, *******

Myrtie F. Henry, Deborah Neichter, Jill Kemp, Jackie C. Koestel, Sheryon Quinn, Dawson West, Bonnie J. Wortham, Amy Meredith, Lynnette Long, Barbara Duncan **

its true and lawful Attorney(s)-In-Fact to make, execute, seal and deliver for, and on its behalf as surety, any and all bonds, undertakings or other writings obligatory in nature of a bond.

This authority is made under and by the authority of a resolution which was passed by the Board of Directors of **LEXON INSURANCE COMPANY** on the 1st day of July, 2003 as follows:

Resolved, that the President of the Company is hereby authorized to appoint and empower any representative of the Company or other person or persons as Attorney-In-Fact to execute on behalf of the Company any bonds, undertakings, policies, contracts of indemnity or other writings obligatory in nature of a bond not to exceed $ 4,000,000.00 Four million dollars ** dollars, which the Company might execute through its duly elected officers, and affix the seal of the Company thereto. Any said execution of such documents by an Attorney-In-Fact shall be as binding upon the Company as if they had been duly executed and acknowledged by the regularly elected officers of the Company. Any Attorney-In-Fact, so appointed, may be removed for good cause and the authority so granted may be revoked as specified in the Power of Attorney.

Resolved, that the signature of the President and the seal of the Company may be affixed by facsimile on any power of attorney granted, and the signature of the Assistant Secretary, and the seal of the Company may be affixed by facsimile to any certificate of any such power and any such power or certificate bearing such facsimile signature and seal shall be valid and binding on the Company. Any such power so executed and sealed and certificate so executed and sealed shall, with respect to any bond of undertaking to which it is attached, continue to be valid and binding on the Company.

IN WITNESS THEREOF, **LEXON INSURANCE COMPANY** has caused this instrument to be signed by its President, and its Corporate Seal to be affixed this 21st day of September, 2009.

LEXON INSURANCE COMPANY A TEXAS INSURANCE COMPANY

LEXON INSURANCE COMPANY

BY ____________________

David E. Campbell
President

ACKNOWLEDGEMENT

On this 21st day of September, 2009, before me, personally came David E. Campbell to me known, who being duly sworn, did depose and say that he is the President of **LEXON INSURANCE COMPANY**, the corporation described in and which executed the above instrument; that he executed said instrument on behalf of the corporation by authority of his office under the By-laws of said corporation.

"OFFICIAL SEAL"
MAUREEN K. AYE
Notary Public, State of Illinois
My Commission Expires 09/21/13

____
Maureen K. Aye
Notary Public

CERTIFICATE

I, the undersigned, Assistant Secretary of **LEXON INSURANCE COMPANY**, A Texas Insurance Company, DO HEREBY CERTIFY that the original Power of Attorney of which the foregoing is a true and correct copy, is in full force and effect and has not been revoked and the resolutions as set forth are now in force.

Signed and Sealed at Woodridge, Illinois this 12th Day of June, 2012.

LEXON INSURANCE COMPANY A TEXAS INSURANCE COMPANY

____
Philip G. Lauer
Assistant Secretary

"WARNING: Any person who knowingly and with intent to defraud any insurance company or other person, files an application for insurance or statement of claim containing any materially false information, or conceals for the purpose of misleading, information concerning any fact material thereto, commits a fraudulent insurance act, which is a crime and subjects such person to criminal and civil penalties."

Prepared for:
USA Waste of Texas Landfills, Inc.

PERMIT AMENDMENT APPLICATION

PART IV – SITE OPERATING PLAN (SOP)

FAIRBANKS LANDFILL
MSW PERMIT NO. 1565B
HOUSTON, HARRIS COUNTY, TEXAS

Prepared by:

Geosyntec consultants
Texas Board of Professional Engineers Firm Registration No. F-1182
3600 Bee Caves Road, Suite 101
Austin, Texas 78746
(512) 451-4003

8/26/2013

SEALED FOR THIS PART IV SITE OPERATING PLAN, AND FOR PERMITTING PURPOSES ONLY.

August 2013

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TABLE OF CONTENTS
SITE OPERATING PLAN (SOP)

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED
PROFESSIONAL ENGINEER
8/26/2013
FOR PERMIT PURPOSES ONLY

8/26/2013

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED
PROFESSIONAL ENGINEER

FOR PERMIT PURPOSES ONLY

FOR PERMIT PURPOSES ONLY

TABLES

8/26/2013

SEALED FOR THIS PART IV SITE OPERATING PLAN, AND FOR PERMITTING PURPOSES ONLY.

CONTENTS OF THE APPENDICES ARE SIGNED, SEALED, AND DATED, AS APPROPRIATE, BY THE RESPONSIBLE PROFESSIONAL.

FIGURE

APPENDICES

SITE OPERATING PLAN (SOP)

1. INTRODUCTION

1.1 Terms of Reference

The Fairbanks Landfill (hereafter referred to as the "facility" or "site") is a Type IV municipal solid waste (MSW) facility, owned and operated by USA Waste of Texas Landfills, Inc. This Site Operating Plan (SOP) provides general instructions for site management and personnel to operate the facility in a manner consistent with the design of the facility and with the Texas Commission on Environmental Quality's (TCEQ's) rules to protect human health and the environment. This SOP complies with the requirements of 30 TAC Chapter 330 Subchapter D of the TCEQ Municipal Solid Waste Management Regulations (MSWMR) "Operational Standards for Solid Waste Land Disposal Sites" for Type IV landfills.

The specific procedures outlined in this SOP are operational requirements and must be understood, acknowledged, and followed by the site personnel. This SOP will be maintained at the site as part of the Site Operating Record in an easily accessible location to allow the site operating personnel to review the SOP as needed. This SOP will be retained during the active life of the site and throughout the site's post-closure care maintenance period.

References to the terms "Executive Director" or "TCEQ" used in this SOP shall refer to the Executive Director of the TCEQ or the designated representative of the TCEQ. References to information in the permit or "permit application" for this facility shall refer to the most current version of these documents, including any amendments, modifications, or revisions as approved.

The Site Manager has overall responsibility for implementation and adherence to this SOP. Wherever this SOP describes procedures or requirements without naming a specific individual or position responsible for those requirements, the Site Manager shall have primary responsibility for those requirements. Where a specific position is responsible for a particular task, that responsibility is described. Otherwise, the Site Manager may assign any qualified personnel to accomplish the requirements of this SOP.

1.2 Facilities Addressed by this SOP

As mentioned in Section 1.1, this SOP has been prepared to address 30 TAC Chapter 330 Subchapter D for Type IV landfills. Disposal of waste in the landfill is the primary site activity. Additionally, the following processing facilities will be established on-site: (i) a special area to collect large/heavy/bulky items (e.g., appliances) for recycling or salvaging; (ii) a wood processing area ; and (iii) a construction and demolition (C&D) waste recycling area. This SOP

also addresses the relevant operational requirements and activities associated with these on-site processing areas, as well as waste disposal operations.

1.3 Sequence of Landfill Operations

The facility is designed to operate as a multi-level, modified aerial fill landfill, with above and below-grade filling. The general sequence of anticipated landfill operations is shown on the drawings presented in Part II, Appendix IIA of the Permit Amendment Application (see Drawings IIA-12 through IIA-17).

2. PRE-OPERATION NOTICE

At least 14 days prior to placement of waste in any newly constructed disposal area, the facility will provide written notice to the TCEQ in the form of a Soils and Liner Evaluation Report (SLER) of the final construction and lining of the new disposal area. Placement of waste in a newly constructed disposal area shall not occur unless either: (i) TCEQ provides its verbal or written approval; or (ii) by the end of the 14th day following submittal to TCEQ of the SLER, no verbal or written comments are received from TCEQ. Following one of these two events, the Site Manager may direct waste placement to begin in the newly constructed cell.

3. RECORDKEEPING REQUIREMENTS

A Site Operating Record will be maintained to document operating and landfill construction related information as required by the TCEQ. The Site Operating Record will be kept either: (i) on-site; (ii) off-site at 10550 Tanner Road, Houston, Texas 77041; or (iii) at an alternate location approved by the Executive Director. The Site Operating Record will include site-specific records in accordance with 30 TAC §330.125 and will be maintained and kept current for the life of the site and during the post-closure care period. A detailed list of required information is provided below.

3.1 Required Information

The documents that will be maintained in the Site Operating Record are listed below in Table IV-1. The recordkeeping information listed in Table IV-1 will be placed and retained in the Site Operating Record within seven (7) working days of the completion of listed activities or the receipt of analytical data.

Table IV-1
Recordkeeping Requirements

Record Needed	Description of Contents	Rule Citation (30 TAC)	Frequency	For More Information
Permit No. MSW-1565B (including all modifications and amendments)	a. Site Development Plan b. Site Operating Plan c. Closure Plan d. Post-Closure Plan e. Landfill Gas Management Plan	330.121(a) and 330.125(a)	Upon Issuance of Permit, and Approved Modifications and Amendments	None
Location Restriction Demonstrations	Demonstrations that the site is in compliance with the location restriction criteria.	330.125(b)(1)	Submittal of Permit Amendment Application	Part II of Permit Application, Appendix IIL
Information on Excluding Prohibited Waste	Records to include training, inspections, and notifications relating to excluding the receipt of prohibited waste, including a record of unauthorized material incidents (receipt of prohibited waste and removal/remediation of the incident)	330.125(b)(2) and 330.133(b)	Per Occurrence	SOP Sections 5.6, 8.2

Table IV-1
Recordkeeping Requirements

Record Needed	Description of Contents	Rule Citation (30 TAC)	Frequency	For More Information
Gas Monitoring Results and Remediation Plans	Required gas monitoring reports and other related submittals required by the Landfill Gas Management Plan, including results from gas monitoring and any notification and remediation plans relating to exceedances of explosive gas concentrations at points of compliance.	330.125(b)(3)	Gas Monitoring - Quarterly; Remediation Plans - Per Occurrence	SOP Sections 16 and 21. Site Development Plan Attachment 6
Groundwater Monitoring and Corrective Action Information	Demonstrations, certifications, findings, monitoring, testing, and analytical data relating to groundwater monitoring and/or corrective action.	330.125(b)(5)	Monitoring - Annual; Corrective Action and Other Documentation - As Required	Site Development Plan Attachment 5
Closure and Post-Closure Care Data	Closure and Post-Closure Plans, and applicable monitoring, testing, or analytical data relating to post-closure requirements.	330.125(b)(6)	Monitoring and Data - Annual	Site Development Plan Attachments 7 and 8
Cost Estimates and Financial Assurance Documentation	Any and all cost estimates and financial assurance documentation relating to financial assurance for closure and post-closure care.	330.125(b)(7)	Annual	Site Development Plan, Attachment 9
Correspondence	Copies of correspondence and responses relating to the operation of the facility, modifications to the permit, approvals and other matters pertaining to technical assistance.	330.125(b)(9)	Per Occurrence	None
Personnel Training Records	Training records for all personnel will be maintained in accordance with 30 TAC §335.586(d) and (e).	330.125(e)	As Needed (Minimum Annually)	SOP Section 5.4
Required Personnel Operator Licenses	Licensing records will be maintained in accordance with 30 TAC Chapter 30, Subchapter F.	330.125(f)	As Needed	None

Table IV-1
Recordkeeping Requirements

Record Needed	Description of Contents	Rule Citation (30 TAC)	Frequency	For More Information
Waste Acceptance Rate Documentation	Documentation in the form of quarterly and annual solid waste summary reports will be maintained as required by 30 TAC §330.675.	330.125(h)	Quarterly and Annually, As Appropriate	SOP Section 4.2
Landfill Marker Inspections	A record of the landfill marker inspections, findings, and any repairs.	330.143(a)	Monthly	SOP Section 13.3
Cover Inspection Record	A record of the required cover inspections, findings, and any corrective actions (e.g., repairs) taken. Includes inspecting for and remedy of ponded water.	330.165(h)	Active Facility - Weekly and after storm events); Closed Facility - Per Post-Closure Plan (Semi-Annually)	SOP Section 24.5 and 24.6.2
Cover Application Log	A record showing site grid areas where weekly and/or intermediate cover has been placed each week.	330.165(h)	Weekly (when site is in operation)	SOP Section 24.6.1
Access Control	A record of the required access inspections, findings, and any repairs made and notification of breach if applicable.	330.131	Inspect - Monthly; Repair/ Notification - As Needed	SOP Section 7.2
Liner Evaluation Reports, Ballast Evaluation Reports, and Liner Interim Status Reports	Documentation of construction of the liner for a new disposal area, along with evaluation and documentation of ballast (if required), and interim status of liner (if needed).	330.125(b)(12)	Per Occurrence	SOP Section 2; Site Development Plan Attachment 3C (Liner Quality Control Plan)
Landfill Gas System Inspections	Documentation of inspection of the landfill gas monitoring system indicating the findings and documenting any repairs made.	330.125(b)(12) and 330.159	Inspect Gas Monitoring System - Quarterly	Site Development Plan Attachment 6
Vector Control	A record of instances when the facility uses a professional exterminator to apply pesticides for vector control.	330.125(b)(12)	Per Occurrence	SOP Section 17

Table IV-1
Recordkeeping Requirements

Record Needed	Description of Contents	Rule Citation (30 TAC)	Frequency	For More Information
Internal Roadways	Documentation of inspection of internal roadways, and maintenance/re-grading as needed.	330.125(b)(12)	Inspections - Every Two Months; Maintenance & Regrading - As Needed (Minimum Annually)	SOP Section 18.3
Public Road Litter Pickup	A record of inspecting for and pickup of litter on public roads.	330.125(b)(12)	Daily (on days when site is in operation)	SOP Section 14
Fire Occurrence Notices	Written description of waste-related fire that is not extinguished within 10 minutes, including record of required notifications.	330.129	Per Occurrence	SOP Section 6
Ponded Water Inspections	Inspection of the landfill waste fill areas to check for ponded water, and maintenance/repairs to remove ponded water as needed.	330.167	Part of Cover Inspections (see above)	SOP Sections 24 and 25
Other	Any other plans or documents required to be maintained by the approved permit or by the ED.	330.121(a), 330.125(b)(12), and 330.125(a)	As Required by Permit or ED	None

Other recordkeeping items that are identified in 30 TAC §330.125(b) but that are not required at this facility because they are not applicable are: (i) unit design documentation for the placement of leachate or gas condensate in a municipal solid waste landfill; (ii) small community exemption information; (iii) special waste documentation (manifests, etc.); and (iv) spray-applied alternate (ADC) material.

3.2 Executive Director Access to Information

The facility will maintain the Site Operating Record in an organized format, where information is readily locatable and retrievable. The Site Operating Record will be made available to the TCEQ upon request, and will be accessible to for TCEQ inspection during normal operating hours.

4. WASTE ACCEPTANCE RATES

4.1 Estimated Waste Acceptance Rates

The estimated waste acceptance rate over the projected approximately 27-year life of the facility ranges from approximately 275,000 tons per year (tpy) in year one to an estimated 628,000 tpy in the final full year. The assumptions used to make this forecast were previously described in the Part II Narrative Report (Section 2.2.3) of the Permit Amendment Application. In summary, the forecast is based on anticipated waste receipts in consideration of population growth of the service area, economic conditions, long-term impacts of recycling and re-use of materials, competition within the marketplace, and available landfill disposal capacity within the area. A detailed estimated year-by-year waste acceptance forecast (and corresponding site life calculation) is provided in Part III (Site Development Plan, Attachment 3B). The listed yearly rates are estimates and were used to determine equipment and manpower needed for landfill operations; they are not intended to be a limiting parameter of the site's permit or to otherwise limit waste acceptance or operations at the site.

This SOP has been prepared to address operating requirements for a wider range of waste receipts than the maximum estimated volume forecasted. This will account for the inherent uncertainties in predicting long term waste acceptance rates to meet the requirements of 30 TAC §330.125(h) and will allow the facility to self-adjust the SOP provisions, with regard to manpower and equipment, based on actual waste receipt tracking, as discussed below, without having to modify the permit. Specifically, the SOP addresses waste acceptance rates of less than 100,000 tpy up to 1,250,000 tpy. Elements of site operation(s) that are related to the waste acceptance rate (e.g., personnel, equipment, etc.) are shown in this SOP in matrix tables of requirements versus annual waste receipt tonnage.

4.2 Actual Waste Acceptance Rate Tracking

The actual waste acceptance rate will be tracked by quarter, and the actual annual waste acceptance rate will be a rolling average based on the sum of the previous four quarterly summary reports. The quarterly and annual solid waste summary reports for the facility will be maintained in the Site Operating Record. If the actual annual waste acceptance rate, as established by the sum of the previous four quarterly summary reports, exceeds the previous rate at which the site was operating, and the exceedance is not due to a temporary occurrence, the facility will adjust operations with regard to personnel and equipment needed to manage the waste as specified in Sections 5.1 and 5.2 of this SOP (see Tables IV-2 and IV-3), without the need for a permit modification, provided that the actual rate is within the range covered by this SOP.

If the waste volume being received is outside that presented in these Tables based on the sum of the last four quarterly summary reports, the facility will file a permit modification within 90 days of the exceedance. The permit modification will identify any needed changes to the SOP to manage the increased waste acceptance rate to protect human health and the environment.

5. GENERAL SITE OPERATING REQUIREMENTS

5.1 Facility Personnel

The general organizational structure for facility personnel will be as shown on the organizational chart shown below as Figure IV-1. The Site Manager will have overall responsibility for day to day landfill operations. Individual job titles and personnel are subject to change based on changes in operational conditions and changes in roles and responsibilities. However, total number of key site personnel will be sufficient to meet the requirements outlined in Table IV-1. In addition, training will be maintained regarding duties and responsibilities to ensure ongoing compliance with the requirements of this SOP.

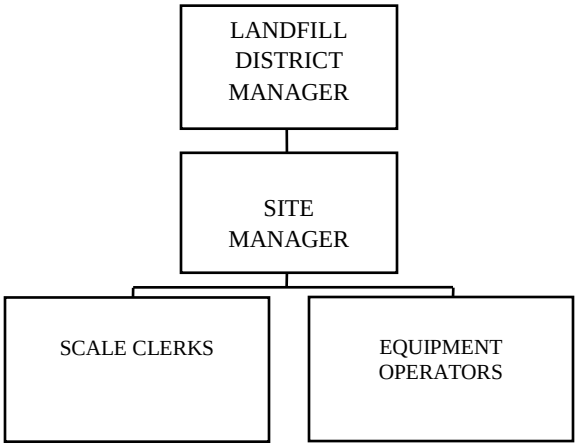


Figure IV-1. Fairbanks Landfill Organizational Chart

A detailed description of roles and responsibilities of facility personnel are described in the remainder of this section.

5.1.1 Landfill District Manager

The Landfill District Manager is the designated regulatory point-of-contact person for this facility. This individual has the authority to hire necessary supervisory and operating/administrative personnel for the landfill and to arrange or provide for their training and orientation. This individual also evaluates the facility's equipment needs and initiates requests to replace or obtain additional equipment. The Landfill District Manager may also engage outside contractors, as needed, to provide supplemental equipment, construction, or other services as deemed necessary for site operation. The Landfill District Manager is typically responsible for

overall landfill management of one or more landfills in the geographic area, and therefore will not necessarily always be physically located (i.e., work full-time) at this facility. At minimum, the Landfill District Manager must be knowledgeable and experienced in aspects of solid waste disposal operations including relevant regulations, permit requirements, waste-handling and safe management practices for disposal of municipal solid waste, non-hazardous industrial waste, and special waste, and will have at least four (4) years of landfill operations experience with a proven work history in the waste services industry.

5.1.2 Site Manager

The Site Manager will be responsible for day-to-day on-site landfill operations. As such, this individual will be directly responsible for staff and equipment allocation to insure operation of the facility in accordance with the approved Site Development Plan, Site Operating Plan, and applicable TCEQ and federal regulations. The Site Manager serves as the emergency contact and coordinator for the facility, and will be responsible for maintaining the Site Operating Record and required logs. The Site Manager must have a minimum of two (2) years of experience in the solid waste industry with experience in earthmoving and landfill operations management, who is familiar with and has the aptitude to manage personnel and implement operational aspects of solid waste disposal operations. This includes having knowledge of relevant regulations and permit requirements; waste-handling and safe management practices for disposal of municipal solid waste; health and safety; and waste identification. The Site Manager or designated alternate has the responsibility to reject or have unauthorized wastes removed. The Site Manager will have and maintain a MSW Facility Class A License as a municipal solid waste facility supervisor in accordance with 30 TAC Chapter 30, Subchapter F Note that the Landfill District Manager having a Class A license may also serve as the Site Manager.

5.1.3 Scale Clerks

Scale Clerks, stationed at the scale house, have primary responsibility for receiving the incoming vehicles, collecting waste disposal fees, preliminary screening for prohibited wastes and visual inspection of select incoming trucks as specified elsewhere in the SOP. Scale Clerks record specific hauler information, volume estimates or weight and provide directions to the driver with respect to on-site rules and the current unloading areas. At all times when the facility is open to receive waste, one of the Scale Clerks will be responsible for waste screening duties as outlined in Section 5.6 of this SOP. Accordingly, the minimum qualifications for the Scale Clerks will be the ability to perform clerical duties and to comprehend in-house training on prohibited waste identification, health and safety response, and record keeping.

5.1.4 Equipment Operators

Equipment Operators' primary duties will include safe operation of the landfill-related equipment. Equipment Operators will be trained to identify prohibited/unacceptable waste materials as they are unloaded from incoming trucks at the working face. Equipment Operators will notify the Site Manager or designated alternate should suspect wastes be observed at the working face. Equipment Operators' screening duties are further discussed in Section 5.6 of this SOP.

At all times when the facility is open to receive waste, at least one of the Equipment Operators will be designated as the Lead Equipment Operator on duty, and will manage the active disposal area and direct the other Equipment Operators in the execution of their duties. At a minimum, all Equipment Operators will be qualified to safely and effectively operate compactors and bulldozers at landfills, have the ability to operate other heavy equipment on-site, and have the ability to comprehend on-the-job training in landfill operations, health and safety, and waste identification.

Equipment operators may also perform maintenance and repair of heavy equipment, support equipment, and vehicles as directed by the Site Manager or designated alternate. Duties may include regular servicing of all light and heavy equipment to maximize equipment performance and eliminate equipment downtime. Tasks may also include fueling equipment, maintaining the equipment maintenance yard and shop, and performing other duties as assigned. Equipment operators may also be responsible for patrolling for and picking up litter and windblown trash as needed.

5.1.5 Other Personnel

The Site Manager may hire other personnel or third-party outside workers to perform mechanic duties (e.g., equipment repairs, servicing and fueling) as well as laborer activities (e.g., patrolling for and collecting windblown trash, other manual labor and site maintenance activities). These personnel will be employed on an as-needed basis and accordingly, are not specifically reflected on the organization chart or table of minimum personnel requirements.

5.1.6 Minimum Required Number of Personnel

Table IV – 2 provides a list of operation personnel that represents the minimum staffing levels required to maintain safe and efficient landfill operations for a broad range of waste acceptance rates. The estimated waste acceptance rates were discussed in Section 4.1 of this SOP.

Table IV – 2
Minimum Facility Staffing Levels

Estimated Waste Acceptance Rate (tpy)	Less than 350,000	350,001 to 750,000	750,001 to 1,250,000
Staff Position	**Number of Personnel**	**Number of Personnel**	**Number of Personnel**
Site Manager[(1)]	1	1	1
Equipment Operators	2	3	6
Scale Clerks	1	2	2

[(1)]The Site Manager may perform other staff position duties, and may designate an alternate to perform Site Manager duties when they are not at the site.

Required staff will not necessarily be on-site at the same time (e.g., Equipment Operators and other staff may work different shift schedules throughout the day). As changes in waste acceptance rates dictate, hours of operation and staff changes will be made to meet the staffing requirements listed above in Table IV-2. Additional staff will have qualifications commensurate with their duties, and key personnel will meet the minimum qualifications previously presented. The designated level of staffing will be maintained as required by operating conditions to ensure operations will be conducted in compliance with the TCEQ municipal solid waste management rules and the facility's permit provisions.

5.2 Equipment

Equipment requirements at the facility may vary based on actual operational requirements. Table IV – 3 provides a list of equipment that represents the minimum needed to undertake safe and efficient landfill disposal operations for a range of waste acceptance rates. The estimated waste acceptance rates were discussed in Section 4.1 of this SOP. Equipment will be added or removed as needed to meet changes in waste disposal demands and supporting operational requirements.

Table IV - 3
Minimum Equipment Dedicated to the Facility

Estimated Waste Acceptance Rate: tons per year (tpy)			Less than 350,000	350,001 to 750,000	750,001 to 1,250,000
Equipment Type	**Size[(1)]**	**Function**	**Minimum Number**		
Compactor	CAT 826	Waste spreading and compaction; fire protection	0	1	2

Estimated Waste Acceptance Rate: tons per year (tpy)			Less than 350,000	350,001 to 750,000	750,001 to 1,250,000
Equipment Type	**Size[(1)]**	**Function**	**Minimum Number**		
Bulldozer	CAT D6	Movement and placement of soil; waste spreading and compaction; fire protection	1	2	2
Excavator[(2)]	CAT 235	Excavation of soil; fire protection	1	1	1
Haul Truck[(2)]	Volvo A25	Hauling of soil; fire protection	1	1	2
Motor Grader	CAT 120	Maintenance of site roads	1	1	1
Water Truck	2,500 gallons	Dust control; fire protection	1	1	1
Rotary Broom Sweeper	Broce RJ-300	Road maintenance (cleaning)	1	1	1
Pump	50 gpm	Storm water removal	1	1	1

[(1)]The equipment size is the minimum size to be provided. Equipment from other manufacturers with equivalent function/performance to meet these minimums may be substituted.

[(2)]The equivalent function of an excavator and a haul truck(s) working in tandem to excavate and transport soil may be met by a scraper (CAT 627 or equivalent). Thus, at the facility's discretion the excavator(s) and haul truck(s) may be replaced by a scraper(s) that provides equivalent production rates.

[(3)]In the event of equipment breakdown or maintenance, backup equipment will be provided from other landfills that the facility owns/operates, or from independent contractors or local rental companies, to avoid interruption of waste services and required facility operations.

The above list identifies the minimum number and size of equipment that will be utilized based on changes in the actual waste acceptance rate. Additional equipment may be used to meet operational needs beyond that specified in the above table. Changes in equipment required for temporary increases or decreases in waste acceptance rates will be left to the discretion of the Site Manager. In addition to the equipment listed above, miscellaneous pickup trucks, vans, various pumps, portable lighting, litter fences, instruments, and safety and training equipment may also be on-site as necessary to support operations.

Equipment will be routinely maintained, repaired, replaced, or supplemented with additional equipment as required to maintain uninterrupted operations. The equipment fleet at the facility is sized to meet current operating requirements, practices, and experience to account for periodic scheduled maintenance or short-term breakdowns. If additional equipment is needed within 24 hours of primary equipment breakdown, the facility has access to back-up waste spreading, compaction, and earthmoving equipment with equivalent performance capabilities from other landfills owned/operated in the area, or from local equipment dealers or contractors. Emergency back-up equipment will be rented or made available from other landfills owned/operated in the area. Additional equipment may also be added as necessary to adequately perform all required operations. Construction may be performed by an outside contractor that will provide the additional construction equipment required, including earthwork equipment such as excavators, trucks, and soil compactors.

The following is a brief description of the function of the equipment used for site operations.

- Landfill Compactor – used to spread and compact the volume of waste received at the working face. Also used to spread soil for fire protection and fire-fighting.

- Bulldozer – used to spread waste in conjunction with compactors, place and remove intermediate cover, prepare turnaround areas, aid in preparation and construction of liners, and spread intermediate cover. Other tasks involving the placement and movement of soil will also be completed with bulldozers, including fire protection and fire-fighting. The number and type of bulldozers will be a function of the tasks performed.

- Scraper – If used in place of excavator and dump truck(s), a scraper is used for excavation and hauling of soil for construction of liners, hauling soil for cover operations, for fire protection and fire-fighting, and for associated soil needs.

- Hydraulic Excavator – used to excavate soil and load dump trucks for use as weekly, intermediate, or final cover. Also used for fire protection and fire-fighting.

- Dump Truck – utilized to haul soil for construction of liners, cover operations, for fire protection and fire-fighting, and for associated soil needs.

- Motor Grader – used to grade access roads and provide all-weather access to the working face.

- Water Truck - used to control dust on site roads, to haul water for irrigation of vegetation at the facility, to supply construction water, and as fire control equipment. Site water trucks may be used to haul contaminated water in emergencies.

- Motorized Power Broom - used to clean paved roads throughout the site.

- Portable Litter Fencing – used to control windblown litter as discussed subsequently in Section 11. The size, number of pieces, and type of fencing varies.

As stated above, this list is subject to change as necessary to maintain effective site operations including compliance with permit provisions and regulatory requirements. The minimum number and types of equipment specified in Table IV-3 will be maintained.

5.3 General Instructions for Operating Personnel

This SOP contains the procedures necessary for daily operations of the facility and instructions for compliance with applicable regulations, including:

- Personnel training requirements;
- Wastes authorized for receipt and disposal;
- Detection and prevention of disposal of prohibited waste, hazardous waste, and PCBs;
- Fire protection;
- Access control;
- Unloading waste;
- Facility operating hours;
- Site signage;
- Control of windblown waste and litter;
- Easements and buffer zones;
- Landfill markers and benchmark;
- Materials along the route to the site;
- Disposal of large items;
- Air criteria;
- Disease vector control;
- Site access roads;
- Salvaging and scavenging;
- Endangered species protection;
- Landfill gas control;
- Oil, gas and water wells;
- Compaction;

- Landfill cover;
- Ponded water;
- Disposal of special wastes;
- Disposal of industrial wastes;
- Visual screening of deposited waste; and
- Contaminated water management and discharge.

The procedures and instructions are included in the subsequent sections of this SOP.

5.4 Personnel Training

5.4.1 Overview of Training Program

Training of facility personnel will consist of classroom instruction and/or on-the-job training that instructs site personnel in the performance of their duties and compliance with this SOP, the facility's permits, and applicable regulations. Training will be directed by employees, supervisors, or other individuals experienced in waste management procedures and operations, health and safety, and related subjects needed for satisfactory job performance. Training will include instruction in the solid waste management and related procedures relevant to each position. The training program will also ensure that personnel are familiar with emergency response procedures, emergency equipment, and emergency systems.

5.4.2 Training Frequencies and Position-Specific Training

Training will include both introductory and continuing training. Facility personnel must successfully complete initial training on topics relevant to their position within six (6) months after the date of their employment or assignment to the facility. When an existing employee is transferred or promoted to a new position at the facility with training requirements that differ from the previous position, that employee will receive the additional training required. Additional supervision will be provided to personnel during the training period, and personnel activities will be limited during the training period.

Facility personnel will take part in an annual review of the initial training topics relevant to their position.

Table IV-4 presented below summarizes the position-specific training topics for facility personnel.

Table IV - 4
Position-Specific Training Topics

Position	Required Training Topics												
	Site Orientation	Site Operations	Initial Training Topics (see Section 5.4.1)	Health and Safety	Regulated Hazardous Waste& Prohibited PCBs	Other Prohibited Wastes	Fire Prevention and Protection	Landfill Gas Management	Emergency Response	Spill control	Litter Control	Random Inspections	Storm-water Inspections
Site Manager	X	X	X	X	X	X	X	X	X	X	X	X	X
Scale Clerks	X	X	X	X	X	X	X		X		X	X	
Equipment Operators	X	X	X	X	X	X	X	X	X	X	X	X	X

5.4.3 Training Recordkeeping

Documentation of training will be maintained in the Site Operating Record. Training records on current personnel must be kept until closure of the facility, and training records of former employees must be kept for at least three years from the date the employee last worked at the facility. Personnel training records will be transferred with an employee if the employee is transferred to a different facility.

With regard to training on the topics of the program for detection and prevention of regulated hazardous waste and prohibited PCB wastes, those training records will be retained for the operating life of the facility and the post-closure care period.

5.5 Wastes Authorized for Receipt and Disposal

A waste acceptance plan was provided in Part II of the Permit Amendment Application (see Section 2.1 of the Part II narrative report) as required by 30 TAC §330.61(b). From this waste acceptance plan, lists of the allowable and prohibited wastes are provided below.

Allowable Wastes: The facility may accept the following wastes:

- brush;
- construction waste;
- demolition waste;
- rubbish;

- inert material (both natural and man-made);
- Class 2 industrial solid waste that is free of putrescible waste;
- Class 3 industrial solid waste;
- special wastes as allowed by 30 TAC §330.171(a), including non-regulated asbestos-containing materials (non-RACM) and empty containers which have been used for pesticides, herbicides, fungicides, or rodenticides;
- soils contaminated by petroleum products with concentrations of less than 1,500 milligrams per kilogram total petroleum hydrocarbons;
- trash;
- yard waste that is free of putrescible and household waste; and
- scrap tires that have been slit and quartered or shredded and do not come from a tire disposer/recycler who is reimbursed from the State Waste Tire Recycling Fund.

Prohibited Wastes: The facility may not accept the following wastes:

- putrescible wastes;
- conditionally exempt small-quantity generator waste;
- household wastes;
- regulated hazardous waste;
- Class 1 nonhazardous industrial waste;
- special wastes (with the exception of those allowable special wastes noted in the above list of wastes that may be accepted);
- radioactive waste;
- prohibited polychlorinated biphenyls (PCB) waste;
- liquid waste;
- water and wastewater treatment sludges;
- grease/grit trap waste;
- lead acid storage batteries;
- used motor vehicle oil;
- used oil filters from internal combustion engines;
- whole used or scrap tires;
- wastes incompatible with landfilling activities.

5.6 Methods for Detection and Prevention of Disposal of Prohibited Waste

This section describes the program that the facility will implement to detect and prevent the disposal of prohibited wastes. A list of prohibited wastes is presented above in the previous section of this SOP.

5.6.1 Overview of Methods

The following control methods are used to minimize the potential for receiving prohibited waste at the facility, and to detect and prevent the unauthorized disposal of prohibited waste at the facility:

- Signage. Signs posted near the facility entrance inform potential customers of wastes that are not allowed and state the landfill's requirements for transporters.
- Screening at the Scale. Scale clerks answer customer inquiries and inform customers of the types of prohibited wastes. The scale clerks are trained to observe incoming waste loads for unauthorized waste material and will reject loads containing unauthorized waste.
- Program for Enclosed Containers and Enclosed Vehicles. Special procedures will apply to waste received in enclosed containers or enclosed vehicles, as discussed in Section 26 of this SOP.
- Program for Detection and Prevention of Regulated Hazardous Wastes and Prohibited PCBs. This program is discussed below in Section 5.6.3.
- Random Load Inspections. Random inspections of incoming loads are performed as discussed below in Section 5.6.3.
- Working Face Observations. Equipment operators at the working face observe each load as it is unloaded and disposed of, and are trained to identify prohibited/unacceptable wastes, and will reject loads containing unauthorized waste. Further details are provided below in Section 5.6.2.

5.6.2 Description of Procedures

This section describes the procedures that will be implemented during all periods of landfill operation to screen the incoming waste and take appropriate actions. As noted, the facility may accept rubbish, but cannot accept putrescible waste, and applicable requirements specific to these wastes are included below. These procedures are also part of the program for detection and prevention of disposal of regulated hazardous waste and prohibited PCB wastes. These procedures will be made available for review by the TCEQ. The procedures will be followed and will be modified as necessary to accomplish its purpose.

1. As each transportation vehicle arrives at the scale, the scale clerk will observe it for indications that putrescible waste, or any other type of prohibited waste, may be present. The scale clerk will obtain load documentation from transporters of enclosed vehicles or delivering stationary compactors to the landfill. Transporters without proper load documentation, route permits, or transportation certificates, as required by 30 TAC §330.7(c), on file with the landfill, will not be allowed to unload at the landfill.

2. Incoming loads will be subject to random inspections to check for prohibited wastes, as described subsequently in Section 5.6.3.

3. Incoming loads will be visually inspected by appropriately trained equipment operators at the working face. The equipment operators will have the authority and responsibility to reject unauthorized loads, have unauthorized material removed by the transporter, and/or assess appropriate surcharges and have the unauthorized material removed by on-site personnel.

4. Should indications of prohibited wastes be detected, appropriate landfill personnel will be summoned to conduct a thorough evaluation of the load, and also the generator may be contacted for further information. The driver will be directed to a lined area located near the working face, where the load will be discharged from the vehicle. The landfill personnel inspecting the load will spread out and break up the waste pile and inspect the material for putrescible or other prohibited waste.

5. Unauthorized waste will be placed back into the transporter's vehicle and the driver will be instructed to depart the site. Or, if this is not possible, the facility will isolate and secure this waste (e.g., place in an appropriate container) to prevent its inclusion into the landfill. The Site Manager will be notified to determine the appropriate course of procedures to be implemented to properly manage the prohibited waste.

6. If putrescible wastes are identified, the putrescible waste will be segregated, loaded into a transporter's vehicle or into suitable collection bins, and removed from the site within 24 hours for disposal at a Type I landfill.

7. A record of unauthorized waste removal and management will be maintained in the Site Operating Record.

8. The TCEQ will be notified of any incident involving the confirmed receipt or disposal of regulated hazardous waste or prohibited PCB waste at the facility as discussed below in Section 5.6.3.

5.6.3 Program for Detection and Prevention of Regulated Hazardous Wastes and Prohibited PCBs

The program for detection and prevention of disposal of regulated hazardous waste and prohibited PCB wastes at the facility includes the following elements:

1. Informing generators and transporters of unauthorized waste types, including regulated hazardous and prohibited PCB wastes.

2. Strict review of waste streams prior to acceptance as described previously in Section 5.6.2.

3. Training for facility personnel to recognize regulated hazardous and prohibited PCB wastes, and using these skills to perform screen the incoming wastes at the scales and at the working face.

4. Random inspections of incoming loads.

5. Records of random inspections.

6. Working face observations as described previously in Section 5.6.2.

7. Notification to TCEQ of incidents involving the disposal of regulated hazardous waste and prohibited PCB wastes.

8. Provisions for remediation of the incident.

Training. The overall personnel training program that will be implemented at the facility will be as previously described in Section 5.4 of this SOP. This program will include training on topics specifically related to detection and exclusion of regulated hazardous waste and prohibited PCB wastes, including the following:

- Familiarization with applicable regulations;
- load inspection procedures;
- identification and recognition of regulated hazardous waste, prohibited PCB wastes, and other prohibited wastes – including indications for hazardous and PCB wastes such as:
    - yellow hazardous waste of PCB labels;
    - DOT hazard placards or markings;
    - liquids and/or sludges;
    - drums (55-gallon, or 85-gallon overpack);
    - powders or dusts;
    - odors, heat, or chemical fumes; and
    - bright or unusual colored wastes;
- waste handling procedures;
- health and safety;
- notification procedures; and
- recordkeeping.

Load Inspection Procedure. Random inspections of incoming waste loads will be performed by facility personnel trained in the recognition of prohibited waste including regulated hazardous waste and prohibited PCB waste. In addition to the random load inspections, incoming loads will be visually inspected at the working face as described previously in Section 5.6.2.

For the random load inspections, the Site Manager or designated alternate will objectively select an average of one (1) waste hauling vehicle per day based on days that the facility accepts waste. The waste hauling vehicles will be selected at varying times. Compactor vehicles will be included in the random inspection program. Incoming loads, including compactor vehicles, from permitted or registered transfer stations will not be included in the random load inspections since they have been previously subjected to screening procedures. The driver of the randomly selected load will be notified and instructed to proceed to an area near the working race. The waste will be spread sufficiently to determine the composition of the waste in order to inspect for regulated hazardous and prohibited PCB waste and other prohibited wastes.

Recordkeeping. As part of the program for detection and prevention of disposal of regulated hazardous waste and prohibited PCB wastes, the following documentation will be maintained in the Site Operating Record:

- Load Inspection Reports;
- records of regulated hazardous waste or prohibited PCB waste notifications;
- records of rejected loads; and
- personnel training.

The Load Inspection Reports will be completed for loads subjected to random inspection. The reports will include the date and time of inspection, the name and address of the transporter, the type of vehicle, the size and contents of the load, and the results of the inspection.

Management and Notification of Incidents. If regulated hazardous or prohibited PCB waste is detected, the waste will be promptly returned to the vehicle and the waste will not be disposed of at the facility. If the hauler is not available the waste will be properly segregated and protected against the elements, secured against unauthorized removal, and isolated from other waste and landfill activities until arrangements can be made for appropriate handling and transportation to the generator or an appropriately authorized facility. If known, the hauler will be contacted and required to remove the waste from the facility. TCEQ will be notified of any incident involving the confirmed disposal of regulated hazardous waste or prohibited PCB waste in the landfill. No notification will be provided for loads rejected by the facility or returned to the transporter or generator. A remediation plan will be submitted and coordinated with TCEQ for removal of regulated hazardous waste or prohibited PCB waste disposed of in the landfill.

6. FIRE PROTECTION PLAN

6.1 Fire Protection Training

Facility operations personnel, (not including personnel with administrative duties only) will receive annual training in fire protection and fire-fighting. The training will include:

- review and discussion of this Fire Protection Plan;
- fire prevention and hazard awareness;
- location of fire-fighting equipment and materials;
- operation of fire extinguishers;
- alternate fire-fighting methods, including use of soil stockpile and water truck;
- appropriate personnel protective equipment;
- properties of methane gas and proper safety procedures;
- facility evacuation procedures; and
- coordination with the local fire department.

Administrative personnel will receive annual training relating to fire prevention and hazard awareness and facility evacuation procedures. Records of training will be kept in the Site Operating Record.

6.2 Fire Prevention

The main potential fire hazard at this facility is operations associated with waste disposal (disposal truck traffic on-site, off-loading of waste at working face, handling waste during compaction for disposal), since some wastes are potentially combustible materials. Other site activities involving potentially combustible materials are vehicle fuel storage and dispensing, wood processing, and landfill gas monitoring/management.

In order to minimize fire hazards at the site, the following standards are in effect.

- Smoking is allowed only in designated areas. Smoking is specifically prohibited:
    - on any area of the landfill waste footprint;
    - at fuel storage and dispensing areas;
    - at material processing areas; and
    - near landfill gas management system features (gas monitoring probes);
- "No Smoking" signs will be posted at appropriate locations.

- Fuels will be stored and dispensed only in authorized areas. Efforts will be made to contain and control fuel spills immediately upon discovery. Spilled fuel and impacted soil will be promptly collected, profiled, and properly disposed (in accordance with the facility "Spill Prevention, Control, and Countermeasures [SPCC] Plan" and applicable state and federal requirements).

- No unauthorized burning of solid waste will be permitted at the site.

- "Hot loads" will not be placed at the working face. The scale clerks and equipment operators will observe incoming loads for signs of burning waste such as smoke, steam, or heat; and will manage hot loads as described subsequently in Section 6.4.2.

- Waste will be properly compacted and covered with soil as described in this SOP.

- All landfill equipment and buildings at the site will be equipped with fire extinguishers. Fire extinguishers will be maintained as required by the manufacturer.

- The emergency telephone contact numbers for the facility will be posted at the front gate.

- All employees will be instructed in the control of small fires during the facility's required emergency response training.

6.3 General Fire-Fighting Procedures

The following general procedures will be implemented in the event of a fire.

- If it can be done safely, fires will be promptly extinguished by trained site personnel.
- If necessary:
    - Contact the local fire department by calling 911.
    - Notify the Site Manager and alert other facility personnel.
    - Assess the extent of the fire and the potential for the fire to spread.
    - If safe, attempt to contain or extinguish the fire until the local fire department arrives.
    - Assist the local fire department as appropriate.
    - Evacuate the facility as necessary.

In general, fire-fighting methods include smothering a fire with soil, spraying a fire with water, using a fire extinguisher, or separating burning material from other waste. Fire-fighting

equipment available at the site includes: (i) a water truck; (ii) fire extinguishers; and (iii) landfill equipment for transporting and placing soil.

6.4 Area-Specific Fire-Fighting Procedures

6.4.1 Working Face

Working Face Fire-Fighting Procedures. If there is a fire at the working face, incoming waste receipts will be temporarily suspended or rerouted to another portion of the disposal area and another working face established there until the fire is extinguished. The following fire-fighting methods may be employed at the working face:

- isolate the burning material from other waste using bulldozers and compactors;
- smother with soil using bulldozers or compactors;
- apply water from the water truck (replenished from on-site water sources);
- use a fire extinguisher on small fires;
- cut a firebreak using bulldozers or compactors around the fire to prevent it from spreading; and
- place earthen berms around the fire area using bulldozers or compactors to prevent it from spreading.

If a fire cannot be extinguished using the above methods, the local fire department will be contacted immediately by telephoning 911. Facility personnel will use reasonable measures to contain the fire until the fire department arrives.

Calculation of Soil Stockpile Size Requirements. A soil stockpile or borrow area (such as on-site borrow area from which weekly/intermediate cover soil is obtained) will be available on-site at all times to provide a source of earthen material available for extinguishing a fire. The stockpile or borrow area will have enough soil to provide all of the material required to cover the open area of the working face to a depth of six inches. Based on the anticipated ranges in size of the working face(s) at the facility, the anticipated range of corresponding stockpile/borrow source sizes is as follows:

Area of Working Face (ft^2)	Minimum Required Stockpile/Borrow Size (yd^3)
2,500	46
10,000	185
40,000	741
62,500	1,157
80,000	1,481

The Site Manager or designated alternate will estimate and adjust the appropriate stockpile/borrow source size as needed using the above table and the actual working face dimensions, or by calculating the volume in cubic yards using the formula: [(working face(s) length (ft) x width (ft) x 0.5' thick)/27 ft^3/cy]. It is noted that the above table of working face areas and corresponding stockpile sizes show the amount of soil that may be needed for typical conditions to cover the entire work area, depending on working face size. At any given time, the actual size of the open, uncovered working face may be smaller (i.e., just a portion of that day's working face may be open at any one time).

The size of the working face will be limited based on the availability of equipment to provide the fire protection described below, within one hour of detection of a fire.

Calculation of Maximum Allowable Working Face Size from Fire-Fighting (Soil Covering) Requirements. Sufficient on-site equipment must be provided to place a six-inch layer of earthen material to cover any waste not already covered with six inches of earthen material within one hour of detecting a fire. Calculations demonstrating that the type and number of equipment listed previously in Table IV-3 in Section 5.2 of this SOP will be able to transport the volume of earth required are presented below. The calculation is performed to back-calculate (solve for) the maximum allowable size of the working face based on the equipment present and their earthmoving capabilities.

- Three (3) scenarios are analyzed based on the minimum pieces of earth moving (fire-fighting) equipment that would be available depending on the range of waste acceptance rates, as presented in Table IV-3 in Section 5.2.

- The equipment capabilities are as follows (using production rates published in Caterpillar Performance Handbook, Edition 31):

    - The equipment will push soil from the nearby stockpile(s) described above.
    - The average dozing distance is 100'.
    - Each piece of equipment (bulldozer(s) and compactor, when present) will have production equivalent to a D6 dozer pushing a loose soil stockpile – i.e., 624 cy/hr.

- The working face size in square feet is solved-for by dividing the production capacity by the required soil thickness, using consistent units. For example, with one bulldozer, the maximum allowable working face size is calculated as: [(460 cy/hr x 27 ft^3/cy) / 0.5 ft] = 22,680 ft^2 (rounded to the nearest 10 square feet). For a convenient frame of reference,

this area can also be expressed as an equivalent square area by taking the square root of the calculated area. The resulting calculation for all three scenarios is tabulated below.

Scenario	Equipment Piece(s)	Production Capacity (CY/hr)	Area (ft^2) That Can Be Covered by 6-inches of Soil in One Hour [i.e., Maximum Working Face Size]	Equivalent Square Dimensions of Calculated Area (ft x ft)
1	1 Bulldozer	420	22,680	150 x 150
2	1 Bulldozer + 1 Compactor	840	45,360	210 x 210
3	2 Bulldozers + 1 Compactor	1,260	68,040	260 x 260

The above table presents the results of the calculation of the maximum allowable working face size based on the different anticipated scenarios of available equipment. It is noted that during a fire, other on-site equipment (e.g., water truck, fire extinguishers, excavator and dump truck, or scraper) may be used to fight the fire. To be conservative, the soil covering/fire-fighting capabilities of these other equipment pieces have not been included in the above calculation. It should be recognized that these other equipment pieces will add to the fire-fighting capabilities at the facility.

6.4.2 Incoming Hot Load

"Hot loads" may be identified by the presence of smoke, steam, heat or flames being released from the load, or notification by the driver. Any truck perceived to be carrying a hot load will be directed to a portion of the disposal area away from the working face, where the load can be discharged without danger of spreading the fire. The fire will then be extinguished by smothering with earthen material or the application of water. The waste will only be transported to the working face after the Site Manager or designated alternate has determined that no potential exists for the waste to re-ignite. No smoldering or smoking waste will be moved to the working face. Hot loads inadvertently discharged at the working face and resulting in a fire will be handled in the manner described above for managing a fire at the working face.

6.4.3 Vehicle or Equipment

If site equipment or a site-operated vehicle catches fire, the operator will attempt to bring the unit to a stop away from fuel areas, exposed waste material, and other equipment or vehicles. If possible, the operator will shut off the engine and set the brake. Fire may be extinguished by fire suppression equipment installed on some equipment or by trained personnel that will attempt to extinguish the fire using fire extinguishers or water. If the fire cannot be extinguished using the

above methods, the local fire department will be contacted immediately at 911. Facility personnel will use reasonable measures to contain the fire until the fire department arrives.

6.4.4 Structures

Personnel will follow the general procedures outlined in Section 6.3 of this SOP for fires occurring in on-site structures. The potential for fires will be minimized by employing routine maintenance and cleanup. Fire extinguishers will be provided in structures. No site personnel will enter a structure that is on fire.

6.4.5 Other Areas

Fire-fighting procedures at the large/heavy/bulky item area, the wood processing area, and the C&D recycling area will be the same as for the working face, as described in Section 6.4.1.

6.5 Notification of TCEQ

If a fire is not extinguished within 10 minutes of detection, the facility will contact the TCEQ Region 12 Office by phone immediately, but no later than four hours after detection. The facility will provide the Region 12 Office with a written description of the fire and response within 14 days of the event. TCEQ Region 12 contact information is as follows:

TCEQ Region 12 Office
5425 Polk St., Ste. H
Houston, TX 77023-1452
Ph. (713) 767-3500
Fax (713) 767-3646

7. ACCESS CONTROL

7.1 Access Control Measures

Access control to prevent unauthorized access, unauthorized dumping, and public exposure to the landfill is provided by: (i) fencing around the perimeter of the facility; (ii) control features at the main entrance/exit gates; (iii) locked gates at other secondary site access point(s) around the facility perimeter; and (iv) site personnel awareness and observations for maintaining access control. The layout of the fencing around the site perimeter and the location of the main entrance/exit gate are shown on Part III, Attachment 3, Drawing 3-1.

Fencing and gates will serve as the primary landfill access controls. To discourage unauthorized entry into the landfill facility, the perimeter of the facility will be protected by fencing that is at minimum composed of 4-ft high, three-strand barbed wire fence, field fence, or other fence materials.

The site is accessed through an entry gate at the main entrance. Entry to the landfill is restricted to only personnel whose entry is authorized by site management (e.g., the facility employees and contractors, authorized waste haulers, TCEQ personnel, properly identified visitors, etc.). Visitors entering the site are directed to the office location for check-in.

The Scale Clerk(s) will direct waste transport drivers to the proper disposal area. There, the drivers will be directed to a specific unloading area. The Scale Clerk(s) or other site personnel will also direct drivers needing access to other portions of the facility (e.g., construction contractors). Additionally, when appropriate, signs with directional arrows and/or barricades may be placed along site roads to direct traffic and control interior access.

During normal operating hours, facility personnel will be on duty at the scale house and in the vicinity of landfill operations to control access and disposal operations. When the site is closed, the entry gate will be closed to prevent site access, and locked when no personnel are present on site.

7.2 Access Control Inspection, Maintenance, and Notifications

Access control features will be inspected monthly, and the results of the inspection will be documented. A breach in the perimeter fence will be temporarily repaired within 24 hours of detection.

When a breach of the perimeter fence or gate cannot be permanently repaired within 8 hours of detection of the breach, the facility will notify the TCEQ Region 12 Office within 24 hours of detection. The notice will include a schedule for when a permanent repair will be completed. Once the permanent repair is complete, the facility will notify the Region 12 Office of the completed repair.

8. UNLOADING AREAS

8.1 Unloading at Working Face

Unloading of waste to be placed in the landfill will only take place at the designated working face or processing area under the supervision of trained site personnel. A maximum of two working faces at a time may be used for the receipt and disposal of waste. The maximum size of the working face(s) will be in accordance with the fire-fighting/soil spreading capabilities of the equipment (see Section 6.4.1). Equipment Operators will maintain the daily working face(s) at the smallest safe and practical size. Signs and barricades may be used in addition to instructions from site personnel to direct incoming loads to the designated unloading area.

Equipment Operators and other staff with responsibility for the working face operations will be appropriately trained as specified in Section 5.4 of this SOP with regard to approved waste acceptance procedures and requirements. This will include an understanding of prohibited waste (e.g., putrescible, hazardous, PCB, etc.) recognition and incident management methods. One or more of these trained employees will direct and visually monitor disposal of incoming loads of waste at the working face. Trained personnel will be on duty at all times when wastes are being discharged at the working face, and will have the authority and responsibility to reject unauthorized loads, to assess appropriate surcharges, and to have unauthorized material removed by the transporter or on-site personnel or otherwise properly managed by the facility. A sign at the site entrance will display the rules regarding authorized and prohibited waste restrictions for the facility. Additionally, as previously mentioned in Section 5.6, the Scale Clerks will be trained to be on alert for signs of unauthorized waste in incoming loads.

8.2 Unloading Unauthorized and Prohibited Wastes

Unloading of waste in unauthorized areas is prohibited. Waste deposited in an unauthorized area will be removed immediately and disposed of properly.

The methods employed at the site to detect and prevent the disposal of prohibited wastes were discussed in Section 5.6 and will be followed during waste unloading. If unauthorized or prohibited waste is detected by site personnel after it has been discharged, the procedures, notifications, and recordkeeping outlined in Sections 5.6.2 and 5.6.3 will be followed for the type of waste involved in the incident.

8.3 Large/Heavy/Bulky Item Unloading and Collection Area

A special area to unload, stage, and store received or salvaged large/heavy/bulky items (e.g., appliances, white goods) may be maintained at the site, either located on waste within the current landfill footprint, or in areas within the future landfill footprint.. The unloading of such items

will be supervised by site personnel and the large/heavy/bulky item area will be policed regularly to insure that any noncompliant materials are removed and deposited in the landfill.

8.4 Wood Processing Area

An unloading and stockpile area associated with the wood processing area may be maintained at the site to facilitate segregation of wood materials (e.g., brush, leaves, grass clippings, other wood materials)) and subsequent on-site processing. The wood processing area will be either located on waste within the current landfill footprint, or will be located in areas within the future landfill footprint. The unloading of brush and wood will be supervised by site personnel and the storage area for these materials will be inspected monthly to insure that any non-brush/wood materials are removed and deposited in the landfill.

8.5 C&D Waste Recycling Area

A special area to stage and store potentially-recyclable C&D materials received/salvaged at the facility may be maintained at the site, either located on waste within the current landfill footprint, or in areas within the future landfill footprint. The unloading of such items will be supervised by site personnel and the C&D recycling area will be inspected monthly to insure that any noncompliant materials are removed and deposited in the landfill.

9. FACILITY OPERATING HOURS

The operating times when the facility may accept waste are Monday through Saturday 6:00 a.m. to 7:00 p.m.

The operating times when the facility may operate heavy equipment for conducting landfill operations (e.g., waste compaction; cover soil excavation, spreading, and placement, maintenance involving heavy equipment, etc.) and transport materials on or off site are Monday through Saturday 4:00 a.m. through 9:00 p.m. On site construction activities, including operation of heavy equipment, may be performed Monday through Sunday 4:00 a.m. through 9:00 p.m.

Site monitoring, surveying, maintenance, and other activities not requiring heavy equipment operation do not require specific approval and may be performed 7 days per week, 24 hours per day.

The facility may request TCEQ approval of alternate operating hours up to five (5) days in a calendar year period to accommodate special occasions, special purpose events, holidays, and other special occurrences. Also, the TCEQ Region 12 Office may allow additional temporary waste acceptance hours to address disasters, emergency situations, or other unforeseen circumstances that could result in the disruption of waste management services in the area. The facility will record in the Site Operating Record the dates, times, and durations when any alternate operating hours are used.

10. SITE SIGNS

A conspicuous sign measuring at least 4-ft by 4-ft will be maintained at the site entrance. The sign will be readable from the facility entrance and will state, at a minimum, in letters at least 3 inches high:

- the name of the facility;
- the type of site (i.e., Type IV);
- the hours and days of operation;
- a 24-hour emergency contact phone number(s);
- the phone number of the local fire department; and
- the facility MSW permit number.

The contact phone number(s) must reach an individual with the authority to obligate the facility at all times that the facility is closed.

Other signs will be posted at the site entrance or along roads within the site to provide rules, operational procedures, traffic control procedures, warnings, and other relevant site information.

11. CONTROL OF WINDBLOWN SOLID WASTE AND LITTER

The site will be operated in such a way as to minimize windblown material, using the measures described below.

- Incoming waste loads will be in enclosed vehicles or required to be covered/tarped or otherwise properly secured.
- Waste will be tracked and compacted with heavy equipment as it is placed at the working face.
- Cover soil will be applied to the working face at least once each week (as described in Section 24 of this SOP).
- Temporary litter control fences include portable panels with wire-mesh screens of varying heights that can be placed as necessary, and as close as practicable near the downwind side of the working face.

The number and location of temporary fences will be determined by the Site Manager or designated alternate as needed based on operating and weather conditions. Litter fences that are damaged shall be promptly repaired or replaced.

Weather conditions may result in material occasionally being blown away from the working face during waste placement operations. Facility personnel will collect litter within and around the site each day that the facility is operating. Windblown materials will be collected and returned to the active disposal area.

12. EASEMENTS AND BUFFER ZONES

This section of the SOP describes easement protection and buffer zones at the site.

12.1 Easements

Requirements: No solid waste unloading, storage, disposal, or processing operations shall occur within any easement, buffer zone, or right-of-way that crosses the site. No solid waste disposal shall occur within 25 feet of the center line of any utility line or pipeline easement (but no closer than the easement), unless otherwise authorized by the Executive Director. All pipeline and utility easements must be clearly marked with posts that extend at least six feet above ground level, spaced at intervals no greater than 300 feet.

Protection of Site Easements: Existing easements on or adjacent to the site were presented in Part I of the Permit Amendment Application (see Part I Narrative Report Section 4.3 and Drawing IC-2). A facility layout plan showing the easements in relation to the limits of waste was presented in Part II (see Appendix IIA, Drawing IIA-10). As shown, a 40-ft to 60-ft wide pipeline easement crosses the site in a southwest-to-northeast direction. This easement shall be clearly marked and maintained as detailed in Section 13 of this SOP. When the phase of landfill development affecting this pipeline easement is ready to begin, this pipeline easement will be relocated to be adjacent to (and outside of) the southern and eastern permit boundaries, and the existing easement and associated pipelines will be abandoned.

12.2 Buffer Zones

Requirements: A minimum 50-ft separating distance shall be maintained between the landfill unit (limit of waste disposal) and the facility permit boundary. The buffer zone must provide for safe passage for fire-fighting and other emergency vehicles.

Site Buffers: Buffer zones extending from the permit boundary to the limit of waste will be as shown on the facility layout plan presented in Part II of the Permit Amendment Application (see Appendix IIA, Drawing IIA-10). No solid waste unloading, storage, or processing, or disposal will occur within the regulatory 50-ft minimum buffer distance maintained at the facility. Buffer zones shall be clearly marked and maintained as detailed in Section 13 of this SOP.

13. LANDFILL MARKERS AND BENCHMARK

13.1 Required Landfill Markers

Landfill markers, consisting of metal or wood (or other durable material) posts extending at least 6-ft above ground level will be used to clearly mark specific site features. The markers will be color-coded to differentiate between features and will be visible during operating hours. The type, placement, and color-coding system for the markers are described below.

1. Facility Boundary Markers (Black) - Facility boundary markers will be placed at each corner of the facility and along each boundary line of the permit boundary at intervals no greater than 300 ft. Fencing may be placed within these markers are required.

2. Buffer Zone Markers (Yellow) - Markers identifying the buffer zone will be placed along each buffer zone boundary at all corners and between corners along the buffer zone at intervals no greater than 300 ft. Placement of the landfill grid markers (discussed below) may be made along a buffer zone boundary.

3. Easements and Rights-of-Way Markers (Green) - Easement and right-of-way markers will be placed along the centerline or boundary edges of an easement and along the boundary of a right-of-way at intervals no greater than 300 ft and at each corner within the site and at the intersection of the facility boundary.

4. Site Landfill Grid System Markers (White) – The site grid system consists of lettered markers along two opposite sides and numbered markers along the other two sides. The grid system will encompass at least the area expected to be filled within the next 3-yr period. Markers will be spaced no greater than 100-ft apart measured along perpendicular lines. Where markers cannot be seen from opposite boundaries, intermediate markers will be installed.

5. SLER Area Markers (Red) – SLER area markers will be placed so that areas for which a SLER has been submitted and approved by TCEQ are readily determinable. Such markers are to provide site workers immediate knowledge of the extent of approved disposal areas. These markers will be located so that they are not susceptible to being damaged during operations. The location of the SLER markers will be tied into the site grid system and will be reported on each SLER submitted. SLER markers will typically be placed at the corners (boundaries) of the lined cell and will not be placed inside constructed areas. The SLER markers will be maintained for at least as long as the disposal cell for which they are marking is active.

6. Flood Protection Markers (Blue) – Flood protection markers will be installed at along the boundary of the 100-year floodplain within the facility permit boundary. The area subject to flooding shall be clearly marked by means of permanent posts spaced not more than 300 feet apart or closer if necessary to retain visual continuity.

13.2 Permanent Benchmark

A permanent benchmark has been established at the site. The benchmark has a bronze marker set in concrete with the benchmark elevations and survey dates stamped on it. The benchmark is established at the site in an area that is readily accessible and will not be used for disposal. The location, coordinates, and elevation of the benchmark are shown on the facility layout plan in Part II of the Permit Amendment Application (see Appendix IIA, Drawing IIA-10). The benchmark elevation was established using known and reliable benchmarks in the area, including nearby National Geodetic Survey (NGS) monuments (Note: NGS was formerly named the United States Coast and Geodetic Survey).

13.3 Inspection and Maintenance of Markers and Benchmark

The benchmark and all required site markers will be maintained so that they are visible during operating hours and will not be obscured by vegetation. Markers that are removed or destroyed will be replaced within 15 calendar days of removal or destruction. Landfill markers will be inspected monthly to insure that they comply with the requirements of this SOP, and documentation of the inspections will be maintained at the facility. Markers that are damaged, missing, or that do not meet the regulatory requirements will be repaired or replaced within 15 calendar days of discovery of the deficiency. All markers will be repainted or otherwise maintained as necessary to retain visibility.

14. MATERIALS ALONG THE ROUTE TO THE SITE

Waste hauling vehicles arriving at the landfill will be required to have their loads covered with tarps, nets, or other means to secure the load. The facility will post a sign near the entrance identifying this requirement. Additionally, the facility will add a surcharge, as appropriate, to encourage compliance.

Once per day on days when the facility is receiving waste, site personnel will pick up existing litter spilled along and within the rights-of-way of Fairbanks North Houston Road (which is the public access road serving the facility) for a distance of two miles in either direction from the facility entrance. This activity will be documented to demonstrate compliance.

15. LARGE, HEAVY, OR BULKY ITEMS

Large, heavy or bulky items received at the site may have a designated collection area and may be salvaged as described in Section 19.1 of this SOP, or may be disposed of at the working face.

Large appliances, brush, and other bulky items will not be placed within 5-ft of the top of the clay liner system. Items classified as large, heavy, or bulky may include, but are not limited to white goods (appliances), air conditioner units, and large metal pieces. No chlorofluorocarbon (CFC)-containing appliances, or electrical equipment containing prohibited PCBs, will be accepted for disposal. Appliances that have had CFCs removed and have certification of removal in accordance with Chapter 40 to the Code of Federal Regulations (40 CFR) 82.156(f)(2) may be accepted. In accordance with 40 CFR 82.156(f)(3), signs will be posted indicating that appliances containing CFCs will not be accepted for disposal.

CFC-containing appliances such as refrigerators, freezers, and air conditioning units that are accepted for recycling will have a licensed CFC recovery technician come on-site to recover the CFCs, or will be sent to an off-site facility for CFC recovery, in accordance with 40 CFR 82.156(f). These items may be stored as potentially recyclable materials as described in Section 19.1 of this SOP prior to CFC recovery or shipment to an off-site facility.

16. ODOR MANAGEMENT PLAN

16.1 Identification of Potential Odor Sources

Since putrescible waste is not accepted at the facility, the potential for generation of odors is limited. Potential odor sources at the facility may include other wastes being delivered to the landfill, the open working face, ponded water, or contaminated water.

16.2 Odor Control Measures

Other odor control measures to minimize odor generation and odor emissions, and to address specific potential sources, are as follows:

- Incoming wastes will be promptly landfilled and compacted. Wastes with odors will be promptly covered with other waste or with cover soil (see below).

- Cover will be applied on a weekly basis at minimum (per Section 24 of this SOP), to prevent air and water from further impacting the wastes which could result in odors. If odors persist, cover soil may be placed more frequently than weekly, and using a cover soil thickness of greater than 6-inches.

- Contaminated water may become a source of odors and will be segregated from clean surface water (i.e., storm water runoff), and will be managed in accordance with the Contaminated Water Management Plan (see Appendix IV-A of this SOP). In summary, contaminated water will be removed within 7 days of the detection, weather permitting. Excess contaminated water will be removed and transported off-site for disposal at a permitted treatment/disposal facility, or the contaminated water will be handled in a manner as approved by TCEQ.

- Ponded water over waste disposal areas at the site will be controlled as described in Section 25 of this SOP, which will help eliminate the potential for occurrence of odors associated with ponded water.

17. DISEASE VECTOR CONTROL

Because of the types of waste the facility may accept, and those that are prohibited, the attraction of vectors is expected to be minimal. In particular, the facility may not accept putrescible wastes, which are the types of wastes that most commonly attract disease vectors, such as rodents, excessive bird populations, flies, and mosquitoes. Also, the facility's routine operational requirements are designed to prevent the habitation of the landfill by vectors through: compaction and covering of waste; periodic grading/site-maintenance to eliminate environments that can attract vectors (e.g., eliminating weeds around the working face, eliminating ponded water).

Notwithstanding, facility personnel will monitor ongoing operations and be prepared to take additional action as necessary to control vectors. These actions may include:

- temporarily applying cover more frequently than once per week;
- temporarily applying a thicker layer of cover;
- use of non-lethal bird control measures such as pyrotechnics, baiting, decoys, etc. to discourage birds at the site and scare them away if they become a nuisance; and
- contracting with professional exterminators, if necessary, to control rodents or other pests that may appear at the site.

If professional applications of pesticides are utilized, these will be documented in the Site Operating Record.

18. SITE ACCESS ROADS

18.1 Description of Site Roads

All-weather roadways will be used to provide access during wet weather from the site entrance at Fairbanks North Houston Road (public roadway) to the waste unloading area being used during wet weather. On-site access roadways will be maintained in a clean and safe condition. At the facility, all-weather landfill access is provided by a paved entrance road from Fairbanks North Houston Road to the scales, where the road then transitions to an all-weather surface that continues as an internal access road onto the landfill to the waste unloading area.

Additional internal roads needed to access waste unloading areas will be established to provide waste vehicle access and facilitate site operations as waste filling progresses. These internal roads will be accessed from the facility entrance road described above. Internal roads for use during wet weather conditions will be surfaced with all-weather material, such as gravel, so that continuous access to waste disposal areas is provided during both wet and dry weather. Reflective guideposts or other suitable reflective equipment may be used as needed along select internal access roads used between the scale house and disposal areas to help direct traffic during early morning or evening operations.

18.2 Mud and Dust Control Measures

The all-weather road surfacing on the internal roads, and the paved access road between the scale area and the entrance/exit to Fairbanks North Houston Road will minimize dust generation and mud tracking by vehicles exiting the facility. The site will also utilize a motorized power broom or other equipment to remove dust, debris, and mud from the paved site access road; and a water truck to minimize dust generation, as needed and described further below.

At least once per day on days when mud and associated debris may be tracked off-site onto Fairbanks North Houston road, the Site Manager or designated alternate will inspect and, if necessary, clean the main site access road at the entrance area and the public road (Fairbanks North Houston Road) adjacent to the facility entrance. If mud or other associated debris is observed, it will be removed using the power broom or other equipment; and if additional efforts are necessary to remove mud or other associated debris from the roads, by spray-washing the road surface using a water truck or other equipment capable of spray- or power-washing. Site access roads will also be graded and maintained periodically (see below in Section 18.3) as needed to minimize depressions, ruts, and potholes, which can all lead to mud formation.

During dry weather, the operator will control dust by watering site roads using the water truck and/or sweeping the roads. The on-site water source that can be used for this purpose are the surface water ponds.

As mentioned in Section 11 of this SOP, litter and other debris on site roads will be picked up at least once per day and disposed of properly.

18.3 Road Maintenance Frequencies

Internal roads will be inspected at least once every two months for the presence of ruts, soft spots, potholes and drainage to determine the need for regrading. The frequency of road regrading will be dependent on the results of inspections and whether ruts, potholes, or soft spots of sufficient severity are detected. However, at a minimum, road regrading will occur once per year. As directed by the Site Manager or designated alternate, wet weather operations may require more frequent regrading to properly maintain the roads. Roadside ditches or culverts will be maintained as necessary to provide drainage. The on-site fleet of equipment, such as the on-site motor grader, broom, backhoe excavator, and dozers, may be used to provide maintenance, as appropriate.

Road inspections and maintenance/repair activities will be documented by the Site Manager or designated alternate and placed in the Site Operating Record. Minimum information will include date of inspection and/or repairs, name of employee performing work, and the relevant findings/actions.

19. SALVAGING AND SCAVENGING

19.1 Salvaging

Salvaging, defined as the "controlled removal of waste materials for utilization, recycling or sale," may be performed at the facility. If so, salvaging will not be allowed to interfere with prompt disposal of solid waste or otherwise create unsafe operating conditions or a public health nuisance. No items will be salvaged from the working face if the salvaging would endanger site personnel. Also, salvaging may not occur in areas that have already received weekly or intermediate cover.

Salvaged items, including potentially recyclable items such as shingles, sheetrock, tires, land clearing debris, metal, concrete, bricks, large/heavy/bulky items, or other inert materials, will be temporarily stored in a designated area at the landfill located within the current or future waste footprint. Due to the location of access roads and waste placement, the location of this designated area may vary over time. Concrete, bricks, or other inert materials may be used for erosion control, road base materials, or other similar uses. Salvaged items will be removed often enough to prevent them from becoming a nuisance, to preclude the discharge of any pollutants from the area, and to prevent an excessive accumulation of the material at the site. Potentially recyclable materials will not be stored at the facility for more than 180 days.

Additional information on C&D waste recycling at the facility can be found in Section 31 of this SOP.

19.2 Scavenging

Scavenging, defined as the "uncontrolled and unauthorized removal of materials at any point in the solid waste management system," will not be allowed at the facility. Scavenging will be prevented through the following controls:

- Access control measures such as fencing, gates, and facility personnel duties (described in Section 7.1);
- Access control inspections and maintenance (e.g., fence inspection and repair as described in Section 7.2);
- Litter control and pickup (described in Section 11);
- Vector control actions (described in Section 17); and
- Application of weekly cover, and inspection/repairs to cover (described in Section 24).

20. ENDANGERED SPECIES PROTECTION

Requirement: A facility and the operation of the facility must not result in the destruction or adverse modification of the critical habitat of endangered or threatened species, or cause or contribute to the taking of any endangered or threatened species. Facilities must be operated in conformance with any endangered or threatened species protection plan required by the commission.

Site-Specific Conditions and Protection: An endangered and threatened species assessment was conducted for the site by a qualified biologist, as discussed in Part II of the Permit Amendment Application (see Section 11 of the Part II Narrative Report). No federal- or state-listed endangered or threatened species or any critical habitats for such species, were found at the site. Therefore, ongoing facility development and operation is not expected to cause or result in the destruction or adverse modification of critical habitats or contribute to the taking or harming of any endangered or threatened species.

21. LANDFILL GAS CONTROL

The monitoring and control of landfill gas will be in accordance with the approved Landfill Gas Management Plan presented in Part III, Attachment 6 of the Site Development Plan. As stated in Section 3.1 of this SOP, the Landfill Gas Management Plan, as well as related landfill gas monitoring records and submittals, will be included in the Site Operating Record. Also, submittals will be made to TCEQ as outlined in the landfill Gas Management Plan.

22. OIL, GAS AND WATER WELLS

Information on water wells and oil/gas wells within the facility permit boundary is presented in Part II of the Permit Amendment Application (see Sections 9.1 and 9.2, respectively, of the Part II Narrative Report).

22.1 Oil and Gas Wells

As described in the above-referenced section of Part II, nine (9) previously drilled – now plugged and abandoned oil/gas wells – were identified as being within the permit boundary. Since these are plugged and abandoned, no further actions are required for these oil/gas wells. With respect to the possibility of other oil and gas wells: in the event that an oil or gas well is discovered during site development, the facility will:

- Within 30 days of discovery, provide written notification to the TCEQ's Executive Director of the location of any oil well, natural gas well, or other well associated with mineral recovery.

- Expose and cut the casing a minimum of 2-ft below the bottom of excavation for the liner at that location, followed by capping and plugging the well in accordance with all applicable rules and regulations of the Texas Railroad Commission, or other applicable state agency.

- Provide the Executive Director with written certification that all such wells have been capped, plugged, and closed in accordance with all applicable rules and regulations of the Texas Railroad Commission.

- Submit to the Executive Director of the TCEQ a copy of the well plugging report that was submitted to the appropriate state agency, within 30 days after the well has been plugged.

22.2 Water Wells

As described in the above-referenced section of Part II, two (2) existing water wells were identified as being within the permit boundary. One existing water well (identified as Harris-Galveston Subsidence District (HGSD) Well ID #8836) is located southeast of the existing landfill at the site, near the existing scale area, and used by the facility for non-potable water supply. This existing well is identified and approved in the current permit (MSW-1565A). The facility plans to continue using this existing water well until (at the latest) just before the phase of landfill development that will affect the water well, at which time the well will be plugged and abandoned using the same procedures as listed below for unknown water wells (except that

written notification of the location need not be made since it is a known water well). The other existing water well (identified as HGSD Well ID #9641) is also located just inside the future landfill footprint in an area on the eastern side of the site adjacent to the main site access road. Well ID #9641 may remain in place until (at the latest) just before the phase of landfill development that will affect the water well, at which time the well will be plugged and abandoned using the same procedures as listed below for unknown water wells (except that written notification of the location need not be made since it is a known water well).

With respect to unknown water wells: in the event that an on-site water well is discovered during the site development, within 30 days of discovery, the facility will:

- Provide written notification to the TCEQ's Executive Director of the location of the water well.

- Expose and cut the casing a minimum of 2-ft below the bottom of excavation for the liner at that location, followed by capping and plugging the well in accordance with all applicable TCEQ rules and regulations, or the rules and regulations of any other applicable state agency.

- Provide the Executive Director with written certification that all such wells have been capped, plugged and closed in accordance with all applicable rules and regulations.

Other types of wells will be plugged in accordance with the rules and regulations of the applicable state agency, and a copy of the well plugging report will be submitted to the appropriate state agency and also the TCEQ within 30 days after the well has been plugged.

The facility will submit a permit modification application to TCEQ identifying any proposed changes to the liner installation plan as a result of any oil, gas, or water well abandonment.

23. COMPACTION

Waste will be compacted to provide more efficient use of available disposal capacity, to minimize future consolidation and settlement, to help provide a more firm base for proper application of intermediate and final cover, as well as aid in fire protection and litter control.

Upon unloading, incoming waste will be spread at the working face by a bulldozer or landfill compactor. This equipment will then be used to move, shape and make repeated passes on the material to sufficiently minimize voids and produce a compact mass. The equipment operators will be trained to determine whether the compaction equipment is functioning as designed to ensure that the waste lift is adequately compacted. The number of passes depends upon the nature of the waste that is being compacted.

24. LANDFILL COVER

This section contains the general provisions for weekly, intermediate, and final cover for the facility. The Executive Director may grant a temporary waiver from the requirements for weekly and intermediate cover if site management demonstrates that there are extreme seasonal climatic conditions that make meeting such requirements impractical.

24.1 Soil Management

Soil will be obtained from on-site and off-site soil borrow sources and will be maintained in a soil stockpile as needed for facility operations, including application of cover, and fire protection. The earthen material will consist of soil that has not previously come in contact with waste and will be of sufficient volume to meet the fire protection requirements specified in Section 6.4 of this SOP. As this earthen material is used, it will be replenished and/or located as soon as practical but shall at all times be maintained to meet the aforementioned fire protection requirements. The soil material will be located as not to interfere with vehicular traffic or impede drainage.

24.2 Weekly Cover

Cover will be placed weekly on all solid waste received during that week, by placing a layer of cover soil after the last load of waste from an operational week has been placed. The purposes of weekly cover include minimization of fire hazards, odors, blowing litter, vector food and harborage, and infiltration of precipitation. In addition, cover materials should discourage scavenging, limit erosion, and improve the aesthetic appearance of the facility.

A minimum compacted thickness of six inches of soil will be placed in one lift and compacted. Scrapers or dump trucks will transport cover soil to the working face. A bulldozer or compactor will spread and compact the soil cover. Soil cover will be clean soil material that has not been mixed with or in previous contact with solid waste. Care will be taken to avoid mixing the landfilled waste with the soil cover material.

The Site Manager or designated alternate will document the weekly cover placement and indicate that he/she has visually verified the thickness and condition of the cover in a Cover Application Log (see Section 24.6 of this SOP).

24.3 Intermediate Cover

All areas that will receive additional waste but have been inactive for longer than 180 days will be covered with intermediate cover. This intermediate cover will consist of an additional 6 inches of soil cover material applied over the weekly cover, for a total of at least 12 inches of

well-compacted material. The top 6 inches of this cover shall be material that is capable of sustaining native plant growth. The intermediate cover will be seeded, sodded, or stabilized with other materials as approved by TCEQ and the plant growth and/or erosion control features will be maintained. The intermediate cover will be graded to help prevent ponding of water. Storm water runoff from areas that have intact intermediate cover is not considered as having come in contact with waste, and accordingly this water will remain uncontaminated. Refer to the Intermediate Cover Erosion and Sediment Control Plan (ICESCP) presented in Attachment 2H of Part III (the Site Development Plan) for details on the erosion controls and management practices that shall apply to areas with intermediate cover draining to the site perimeter surface water management system.

When areas that have received intermediate cover are to become active again, the top 6 inches may be stripped off for use as weekly cover.

24.4 Final Cover

Final cover placement will occur after areas of the site are filled to the design top-of-waste grades. Since the facility will be developed in phases over time, areas of the landfill will reach final waste grades as development progresses, and final cover installation will occur incrementally after such areas reach final grade. Placement of final cover on completed areas of the landfill will not interfere with ongoing operations. Surface water will be managed throughout the active life of the site to minimize infiltration into the filled areas and to minimize contact with solid waste.

The final cover grading plan (i.e., landfill completion plan showing final contours) and final cover system components are presented in the Part III of the Permit Amendment Application – the Site Development Plan. Specifically, refer to Site Development Plan Attachment 3, Drawing 3-3 for the final cover grading plan, and Site Development Plan Attachment 7 for the Closure Plan describing the final cover system components.

The Closure Plan (Attachment 7 of the Site Development Plan) presents the specific requirements and schedules for closure activities, and related final cover system specifications, QA/QC requirements, certification requirements, notifications, etc. This includes requirements for establishing vegetation on the final cover. During the early stages of vegetative growth, mulching, slope soil regrading, and mowing will be performed as required to promote a complete vegetative coverage and effective erosion control.

24.5 Cover Inspection, Repair of Erosion, and Final Cover Maintenance

24.5.1 Inspection

During the active life of the landfill, inspection of intermediate and final cover, including checking for erosion and ponded water, will be performed on a weekly basis, and within two (2) operating days following the end of a rainfall event of 0.5 inches or more. These inspection reports will continue to be maintained as part of the Site Operating Record.

24.5.2 Repair of Erosion

On intermediate and final cover areas, erosion shall be repaired before a six-inch deep gully within the intermediate cover soil or vegetative/erosion layer soil is exposed (to maintain integrity of the erosion layer and underlying cover materials). Accordingly, erosion to a depth of greater than four (4) inches will be repaired and restored within five (5) days of detection, unless the TCEQ regional office approves an extension (e.g., due to inclement weather, unfavorable seasonal weather conditions, extent of the damage and resulting repair work needing more time to complete, etc.). Repairs will typically consist of regrading, backfilling, compacting, and seeding, as necessary. The dates of detection of erosion and completion of repairs, and reasons for delay of repairs will be documented in the Cover Inspection Record (see Section 24.6).

24.5.3 Final Cover Maintenance

Maintenance of the integrity and effectiveness of the final cover system (cap) shall include mowing, and regular inspections and repairs to correct stressed or dead vegetation, erosion, settlement, cracking, and standing water.

- The final cover vegetation will be mowed periodically to maintain healthy vegetation, avoid die-out due to shading, eliminate woody-stemmed vegetation, and provide for adequate inspection of the cover system.

- The final cover will be inspected for conditions that could impact cover integrity, including settlement, ponding water, burrowing animals, erosion, stressed or dead vegetation, and seeps.

- Settled, depressed or eroded areas will be filled with soil and graded to provide positive drainage, and then revegetated. The top six inches of soil fill used for repairs will be capable of supporting vegetation. Repair materials will be placed in a manner consistent with the original final cap system construction.

- Surface water conveyance devices on the cover will be inspected and maintained.

Areas with stressed or dead vegetation will be evaluated to determine the problem, and appropriate actions will be taken such as reseeding the areas or checking for the presence of landfill gas.

After Final Closure of the facility, the final cover will be inspected, repairs made, and documented in accordance with the Post Closure Plan (Attachment 8 of the Site Development Plan).

24.6 Cover Documentation and Inspection Record

24.6.1 Cover Application Documentation

The Site Manager or designated alternate will maintain on a weekly basis a Cover Application Log to document those site grid areas where weekly cover and/or intermediate cover have been placed. The log will be kept at the site, readily available for inspection by the TCEQ. The log for weekly and intermediate cover will specify the date cover was placed, the method used, and the last area where cover was placed. The Site Manager or designated alternate will sign each entry to certify that the work was accomplished as stated in the log.

24.6.2 Cover Inspection Record

A Cover Inspection Record will also be maintained weekly and kept by the Site Manager or designated alternate to document the inspections described in Section 24.5, including the findings and any corrective actions (e.g., repairs) taken when necessary. For repairs made to the final cover system, the Cover Inspection Record will specify the area covered, the dates final cover was applied (repaired), and the thickness applied. The Site Manager or designated alternate will sign each entry to certify that the inspection and/or work was accomplished as stated in the record. The Cover Inspection Record will be placed in the Site Operating Record.

25. PONDED WATER

Ponding of water over waste-filled areas will be minimized to the extent possible. The techniques the site will use to minimize ponding of water will be: (i) thorough compaction of waste as described in Section 23 of this SOP, to limit differential waste settlement/consolidation; (ii) proper grading of final waste slopes to the elevations shown on the Final Cover Grading Plan (shown in Site Development Plan), which provide for positive surface water drainage without depressions or low spots; and (iii) proper grading of interim waste slopes to have positive surface water drainage.

Landfill areas will be inspected as described in Section 24.5 to identify areas where ponding has occurred, including inspections after specified storm events. In the event ponded water on the landfill is observed, action will be taken to remedy the problem (e.g., regrading, pumping out the ponded water, or grading a temporary drainage path at the down-gradient side), as appropriate. The area of ponding will be backfilled with clean soil and regraded as soon as practicable after identified (within seven days of the occurrence, weather permitting). Ponded water will be removed and managed as: (i) contaminated water if the ponded water has come in contact with waste; or (ii) as surface water if it has not come in contact with waste. Contaminated water will be managed in accordance with the Contaminated Water Management Plan presented in Appendix IV-A of this SOP.

Actions to prevent ponded water in advance of expected extended wet weather periods include inspecting for potential low spots that could pond water and filling these areas, installing diversion berms to limit run-on, or installing a drainage outlet if possible. During and after extended wet weather conditions, corrective actions to remedy ponded water include using pumps to dewater ponded areas along with the aforementioned preventative measures as feasible. During periods of extended wet weather, access to pump and repair areas may be delayed.

As described in Section 24.5 and 24.6, inspections for ponded water and any corrective actions will be documented in the Cover Inspection Record.

26. WASTE IN ENCLOSED CONTAINERS OR ENCLOSED VEHICLES

Waste will be accepted for disposal from stationary compactors and municipal waste collector routes that are permitted in accordance with 30 TAC §330.7(c) or 30 TAC 330 Subchapter C. The following procedures will be implemented for any waste received from permitted stationary compactors and municipal waste collector routes:

1. The collector will submit load documentation prior to discharging waste at the site.

2. The facility will retain the load documentation on-site for inspection by TCEQ.

3. The special procedures for waste received in enclosed containers or enclosed vehicles, as described in the remainder of this section, will be followed.

Waste in completely enclosed containers or enclosed vehicles other than those meeting the requirements listed above, will not be accepted for disposal at the facility, unless the following special procedures for this situation have been met:

1. The facility will participate in the Funding Program to monitor as detailed in Paragraph (2) of 30 TAC §330.169.

2. Each enclosed container or enclosed vehicle will have all required approvals and/or permits from the TCEQ in accordance with 30 TAC §330.7(c) relating to Collection and Transportation Requirements.

3. Enclosed containers or enclosed vehicles will be accepted at their designated time and on the specified day in accordance with 30 TAC §330.169, TCEQ permits, or other orders of the TCEQ. The TCEQ Region 12 Office will be notified at least 24 hours prior to an enclosed container or vehicle unloading at the site.

4. A TCEQ Inspector will be on-site and will witness the unloading process to ensure that no putrescible waste or household waste is present. Any waste considered non-allowable by the TCEQ Inspector will be removed from the working face and subsequently removed from the site in accordance with 30 TAC §330.133.

5. Each transporter delivering waste in enclosed containers or enclosed vehicles will, prior to discharging the load, provide to the facility load documentation for the route the transporter is delivering. This load documentation will be maintained in the Site Operating Record.

6. The TCEQ may revoke a transporter's authorization to deliver waste to a Type IV MSW facility for failure to comply with regulations.

The TCEQ will determine the approximate annual costs of implementing and maintaining the surveillance and enforcement of all the activities associated with the acceptance of enclosed containers or enclosed vehicles at Type IV landfills. Notification of these costs will be provided to each affected holder of a Type IV landfill permit with Notice of Public Hearing to apportion these costs. The public hearing will be held at a location to be determined by the Commission with 20 days advance notice. Notice will be provided to Type IV Landfill Operators by written notice in regular and certified mail. The public hearing will be for the purpose of establishing the total compensation and expenditures required to administer this program and the apportionment of those costs to the Type IV Landfill Operators to be reimbursed to the commission. Unless other arrangements are made, the apportioned monthly payments will be due by the 10^{th} day of each month. The apportioned costs to each Type IV landfill may be altered periodically to add or subtract landfills from the program. A 30-day notice will be provided to each participating Type IV landfill and/or proposed additional landfill and a hearing will be held upon request by one of the affected parties or on the Commissioner's own motion.

If the landfill operator is delinquent in making the monthly payment, the landfill must immediately halt acceptance of waste in enclosed containers or enclosed vehicles, and may be subject to other penalties allowable under state law.

Stationary compactors permitted in accordance with 30 TAC 330.7 and municipalities having transporter routes permitted in accordance with this rule are exempt from the requirements identified in 30 TAC 330.169(1)-(3), and transporters will be allowed to discharge waste from these compactors at the facility. However, the Site Manager or designated alternate will obtain from the transporter load documentation for a municipal transporter route or a stationary compactor, as appropriate, prior to allowing discharge of the waste at the landfill. This load documentation will be maintained in the Site Operating Record

27. DISPOSAL OF SPECIAL WASTES

Special wastes as defined in 30 TAC §330.3(148) will not be accepted at this facility, except for special wastes allowed by 30 TAC §330.171(a) (i.e., consistent with the limitations established in 30 TAC §330.5(a)(2) for Type IV facilities), and as described in the facility waste acceptance plan (see Part II narrative report, Section 2.1).

28. DISPOSAL OF INDUSTRIAL WASTES

28.1 Class 1 Non-Hazardous Industrial Waste

Class 1 nonhazardous industrial waste (defined in 30 TAC §330.3(21)) will not be accepted at this facility.

28.2 Class 2 and 3 Industrial Solid Waste

The facility may accept Class 2 industrial solid waste that is free of putrescible waste as allowed by 30 TAC §330.173(i) (i.e., consistent with the limitations established in 30 TAC §330.5(a)(2) for Type IV facilities), and as described in the facility waste acceptance plan (see Part II narrative report, Section 2.1).

The facility may accept Class 3 industrial solid waste provided the acceptance of this waste does not interfere with facility operation.

29. VISUAL SCREENING OF DEPOSITED WASTE

Visual screening of deposited waste materials at the facility is provided at times when waste placement is occurring below-grade, or by way of already-filled portions of the landfill that shield the working face.

30. CONTAMINATED WATER MANAGEMENT AND DISCHARGE

Contaminated water will be managed in accordance with the Contaminated Water Management Plan presented in Appendix IV-A of this SOP. The facility shall implement necessary steps to control and prevent the unauthorized discharge of contaminated water from the facility.

31. CONSTRUCTION AND DEMOLITION (C&D) WASTE RECYCLING

The site will implement a C&D recycling program and will designate a recycling area for these activities. An operations plan for this facility is presented in Appendix IV-B of this SOP.

APPENDIX IV-A

CONTAMINATED WATER MANAGEMENT PLAN

CONTAMINATED WATER MANAGEMENT PLAN

8/26/2013

FOR PERMIT PURPOSES ONLY;
PAGES IV-A-1 THROUGH 4

GEOSYNTEC CONSULTANTS, INC.
TEXAS ENGINEERING FIRM
REGISTRATION NO. F-1182

A1. INTRODUCTION

This Contaminated Water Management Plan for the Fairbanks Landfill (facility) provides details for the collection and containment, storage, and disposal of any contaminated water generated at the site, any leachate collected, or any gas condensate generated. The facility is operated as a Type IV landfill and consistent with 30 TAC Chapter 330, Subchapter H, will not have a leachate collection system. Also, the facility manages landfill gas passively using vents, as described in the Landfill Gas Management Plan (Attachment 6 to the Site Development Plan), and therefore generation of gas condensate is not anticipated. Therefore, this plan focuses on contaminated water management.

Contaminated water is defined by 30 TAC §330.3(36) as leachate, gas condensate, or water that has come into contact with waste. Examples of contaminated water are storm-water runoff that has come in contact with waste at the working face, or storm-water runoff on weekly cover soil that is not intact and has become contaminated by waste. As stated by 30 TAC §330.165(b), storm-water runoff from areas that have intact weekly cover is not considered as having come into contact with the active face or leachate.

The management of both uncontaminated (i.e. clean) surface water and contaminated water (i.e., water that has come into contact with waste) is described in the remainder of this plan.

A2. WORKING FACE WATER MANAGEMENT

A2.1 Uncontaminated Water

Throughout the active life of the facility, best management practices will be used to manage surface water and minimize contaminated water generation at the facility. The facility will be graded with temporary and permanent drainage features to provided run-on/off controls for storm-water. Weekly, intermediate, and final cover will be graded and maintained to promote runoff, minimize the area of exposed waste, and prevent ponding of surface water as detailed in the Site Operating Plan (SOP). Should ponding of surface water occur in areas having intact weekly cover, intermediate cover, or final cover, the water shall be considered clean and discharged into the facility's surface water management system.

At the working face, a system of temporary diversion berms will be constructed around the active face to minimize the possibility of clean storm-water run-on from becoming contaminated water. These temporary diversion berms will be constructed, as needed, with clean soil and will route clean storm-water runoff into the surface water management system and away from the active face. Figure IV-A-1, presented at the end of this plan, illustrates the diversion berms, and provides the required size of the berms (which varies depending on their slope configuration and the contributing up-gradient drainage area). The design calculations for sizing of the diversion berms are provided in the On-Site Design – Active Face Surface Water Controls calculation package (Sub-Attachment 2F to the Facility Surface Water Drainage Report).

Also it is noted that if a leachate collection system and/or a gas recovery system are employed in the future, leachate and/or gas condensate will be collected and segregated from surface water to minimize contaminated water generation at the facility.

A2.2 Contaminated Water

A system of temporary containment berms will be constructed around the down-gradient portions of the active face to collect and contain surface water that has come into contact with waste. Also, similar containment berms will be constructed elsewhere at the facility wherever they are needed to collect and contain contaminated water. Figure IV-A-1, presented at the end of this plan, illustrates the containment berms, and provides the required size of the berms (which varies depending on the size of the working face and the containment area). As mentioned, the design calculations for sizing of the containment berms are provided in the On-Site Design – Active Face Surface Water Controls calculation package (Sub-Attachment 2F to the Facility Surface Water Drainage Report).

Contaminated water at the active face may be allowed to remain within the active face for evaporation or to be absorbed into the waste. However, any contaminated water shall not be allowed to remain ponded and become stagnant, nor shall contaminated water be allowed to cause nuisance conditions (e.g. odors) or the attraction of vectors. These operational requirements regarding ponded water, odors, and preventing vectors, are described in the SOP and shall be followed. Quantities of contaminated water that would cause such problems shall be removed and disposed of at an authorized facility, as discussed subsequently in Section A3 of this plan.

A3. CONTAMINATED WATER DISCHARGE AND DISPOSAL

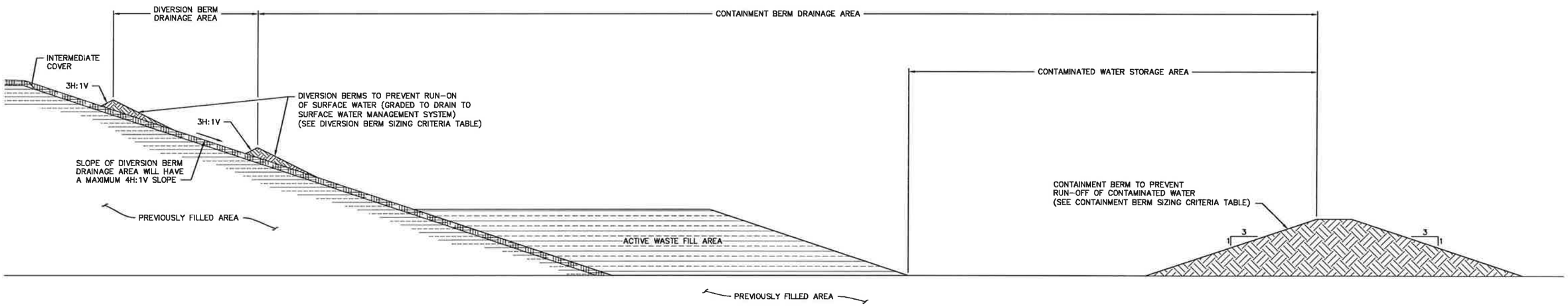
A3.1 Contaminated Water Discharge

No discharge of contaminated water off-site or into waters of the United States shall occur without obtaining specific written authorization from the TCEQ prior to the discharge. The landfill will be operated consistent with §330.15(h) regarding discharge of solid wastes or pollutants into waters of the United States.

A3.2 Contaminated Water Disposal

If necessary, contaminated water will be transported off-site to a Publicly Owned Treatment Works (POTW), or similar facility, for treatment and disposal. Transportation will be by tanker truck. Sampling and analysis of the contaminated water will be performed as required by the POTW.

The results of any monitoring required by the POTW, a copy of the disposal agreement, and documentation of disposal shall be placed in the Site Operating Record.



DIVERSION BERM SIZING CRITERIA			
BERM HEIGHT	FLOW LINE SLOPE	MAXIMUM DRAINAGE AREA	MAXIMUM FLOW VELOCITY
(FT)	(%)	(AC)	(FT/S)
2.5	0.5	9.2	3.0
	1.0	13.0	4.2
	1.5	16.0	5.2
	2.0	18.4	6.0

NOTE:
1. THE DIVERSION BERMS ARE SIZED TO CONTAIN SURFACE WATER FROM THE 25-YEAR, 24-HOUR RAINFALL EVENT.
2. OPERATOR WILL USE THIS TABLE AND THE ACTUAL BERM SLOPE TO DETERMINE THE MAXIMUM ALLOWABLE DRAINAGE AREA CONTRIBUTING RUNOFF TO A GIVEN BERM.

CONTAINMENT BERM SIZING CRITERIA		
CONTAINMENT BERM DRAINAGE AREA	CONTAMINATED WATER STORAGE AREA	MINIMUM REQUIRED BERM HEIGHT
(AC)	(AC)	(FT)
0.50	0.10	5.0
	0.25	2.6
	0.50	1.8
1.0	0.10	9.0
	0.25	4.2
	0.50	2.6
1.5	0.25	5.8
	0.50	3.4
	0.75	2.6
2.0	0.25	7.4
	0.50	4.2
	0.75	3.1
3.0	0.40	7.0
	0.75	4.2
	1.00	3.4
4.0	0.50	7.4
	0.75	5.3
	1.00	4.2

NOTE:
1. THE CONTAINMENT BERM HEIGHT INCLUDES 1.0 FT OF FREEBOARD AND BERMS ARE SIZED TO CONTAIN SURFACE WATER FROM THE 25-YEAR, 24-HOUR RAINFALL EVENT.
2. OPERATOR WILL USE THIS TABLE AND ACTUAL WORKING FACE/DRAINAGE AREA SIZE AND STORAGE AREA SIZE TO DETERMINE THE APPROPRIATE MINIMUM CONTAINMENT BERM SIZE.

PERMIT DRAWING

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED
PROFESSIONAL ENGINEER
8/26/2013

SCALE: N.T.S.

FOR PERMIT PURPOSES ONLY

REV	DATE	DESCRIPTION	DRN	APP
-	AUG. 2013	INITIAL SUBMITTAL TO TCEQ	JJV	SMG

USA WASTE OF TEXAS LANDFILLS, INC.

LANDFILL SITE ADDRESS:
8205 FAIRBANKS N HOUSTON RD
HOUSTON, TEXAS 77064
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Geosyntec consultants

GEOSYNTEC CONSULTANTS, INC.
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AUSTIN, TEXAS 78746
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TITLE: CONTAMINATED WATER RUN-ON AND RUNOFF DETAILS

PROJECT: FAIRBANKS LANDFILL
PERMIT AMENDMENT APPLICATION – PERMIT NO. MSW-1565B

PROJECT NO.: TXL0263	DESIGN BY: LOL	REVIEWED BY: SMG	PART NO.: IV	DRAWING: IV-A-1
FILE: 0263P3E-1	DRAWN BY: JJV	APPROVED BY: SMG		

APPENDIX IV-B

CONSTRUCTION AND DEMOLITION (C&D) MATERIAL RECYCLING PLAN

CONSTRUCTION AND DEMOLITION (C&D) MATERIAL RECYCLING PLAN

8/26/2013

FOR PERMIT PURPOSES ONLY;
PAGES IV-B-1 THROUGH 3

GEOSYNTEC CONSULTANTS, INC.
TEXAS ENGINEERING FIRM
REGISTRATION NO. F-1182

B1. INTRODUCTION AND OVERVIEW

A C&D recycling program will be implemented at the facility to collect and process (segregate) C&D materials into separate material streams for recycling. The program will include various C&D materials that are potentially-recyclable items, such as, metal, cardboard, plastic, concrete, bricks, shingles, sheetrock, tires, land clearing debris, wood pallets, or other inert materials. A special area to stage, store, and process potentially-recyclable C&D materials received/salvaged at the facility will be established in an area of the site separate from the active working face to provide convenient access to users, without interrupting landfill operations. It is anticipated that the area will move as landfill development progresses, but in all cases the area will either be located on waste within the current landfill footprint, or in areas within the future landfill footprint.

Separated materials will be stockpiled either in piles (e.g., for shingles and yard waste), or in roll-off box containers (e.g., for sheetrock). The incoming loads of C&D will be weighed at the facility's scales, and then will be visually observed by facility personnel to decide whether the material is clean and composed of material(s) that is suitable to be diverted to the C&D recycling area instead of disposal at the working face.

Some of the processed C&D materials may be diverted for other use (e.g., grinding/wood-chipping to create mulch) or be used at the facility (e.g., concrete debris for road base). Other separated materials will be sent off-site for beneficial use where possible as described herein, or landfilled on-site.

Consistent with 30 TAC §328.4, the materials removed for recycling shall not be considered to be accumulated, but shall be considered to be recycled, since they have been contained, covered,

or otherwise managed to protect them from degradation, contamination, or loss of value as recyclable material.

B2. PROCESS AND STANDARD OPERATING PROCEDURES

Equipment. Standard landfill and material handling equipment may be used for the purpose of separating C&D materials into separate streams. Equipment proposed for this recycling operation also includes: grinders with optional belt-feeders; conveyors; magnets; and a trommel screen.

C&D waste may also be hand-sorted on optional belt-feeder(s) and/or processed using magnets, screen, or hand-picking prior to placement in the grinder(s). In this system, the ground-up waste would pass along a conveyor under a magnet, to separate most remaining metal material.

Material-Specific Process Descriptions. Details of the process for specific types of recyclable materials are presented below.

- Asphalt Shingles. Residential asphalt shingles (RAS) can be beneficially-reused. RAS contains ingredients that can be utilized by hot mix asphalt (HMA) producers to enhance paving mixtures. These ingredients include asphalt cement (AC) binder, and mineral aggregate. Shingles also contain fibrous mat made from organic felt (cellulose) or fiberglass that can be valuable as fiber in some asphalt paving mixtures. Sampling and analysis of shingle material for asbestos will be done by facility personnel or qualified vendors. The required sampling frequency is one sample per 1,000 tons of shingle material received. Incoming shingles will be brought to the site by customers such as roofing contractors. Those loads deemed by facility personnel as suitable for shingle recycling will be unloaded and stockpiled in the recycling area. Loads that are lightly mixed with other debris may be sent to a belt feeder manual sorting line, or may be hand-picked. A magnet is typically also provided to remove nails and other metals. Dumpsters are located below the sorting line for the separated materials. The separated shingles are then moved to another shingle stockpile area. Periodically, the stockpiled shingles are loaded into a third-party transport trailer and hauled off-site to a grinding plant. The asphalt shingle recycling effort may include agreements or partnerships with specialized vendors for transport, grinding, and distribution to asphalt vendors. Any residual shingle material will be landfilled on-site.

- Metals. Metals are separated from the recyclable loads by both hand-sorting and magnetic separation. Materials that are processed on the sort line pass under a magnet

that separates metals. The facility may also use a magnet attached to a piece of heavy equipment such as a track-hoe for separating metals from stockpiles of mixed materials. Metals will be collected and stockpiled, and transferred off-site to a TCEQ-approved recycling facility.

- Wood and Wood Pallets. Those loads deemed by facility personnel as suitable for wood processing will be unloaded and stockpiled in the recycling area. Clean wood and wood pallets will then be separated by hand-sorting and mechanical means. The wood will then be processed on-site.

- Plastics/Cardboard. Those loads deemed by facility personnel as suitable for plastics and cardboard recycling will be unloaded and stockpiled in the recycling area. The plastics and cardboard will then be hand-sorted and stored in dumpsters until full loads of each material are available for transportation to an off-site TCEQ-approved recycling facility.

Material Unloading. The unloading of C&D materials in the recycling area shall be confined to as small an area as practical. The unloading of such items will be supervised by site personnel and the C&D recycling area will be policed regularly to insure that any noncompliant materials are removed and deposited in the landfill.

Access Control. Since the C&D recycling area will be located within the limit of landfill footprint inside the permit boundary, access will be through the main landfill entrance, and access control will be accomplished through the overall facility access controls described in Section 7 of the SOP.

Surface Water Management and Other Environmental Controls. To prevent surface water runoff onto and off of the recycling area, this area will be operated and maintained to manage runon and runoff during peak discharge from the 25-year, 24-hour storm event and to prevent the potential for off-site discharge of waste and contaminated water. This will be accomplished through the installation of runon diversion berms up-gradient from the recycling area in the same manner as for the active working face – in accordance with the Contaminated Water Management Plan (Appendix IV-A to the SOP). This will prevent excessive surface water from passing through the area and potentially causing any washouts, etc. The recycling area will also be operated in a manner that prevents it from becoming a nuisance or fire hazard. Dust control will be performed. Fire protection requirements for the area are provided in Section 6 of the SOP (in particular see Section 6.4.5).