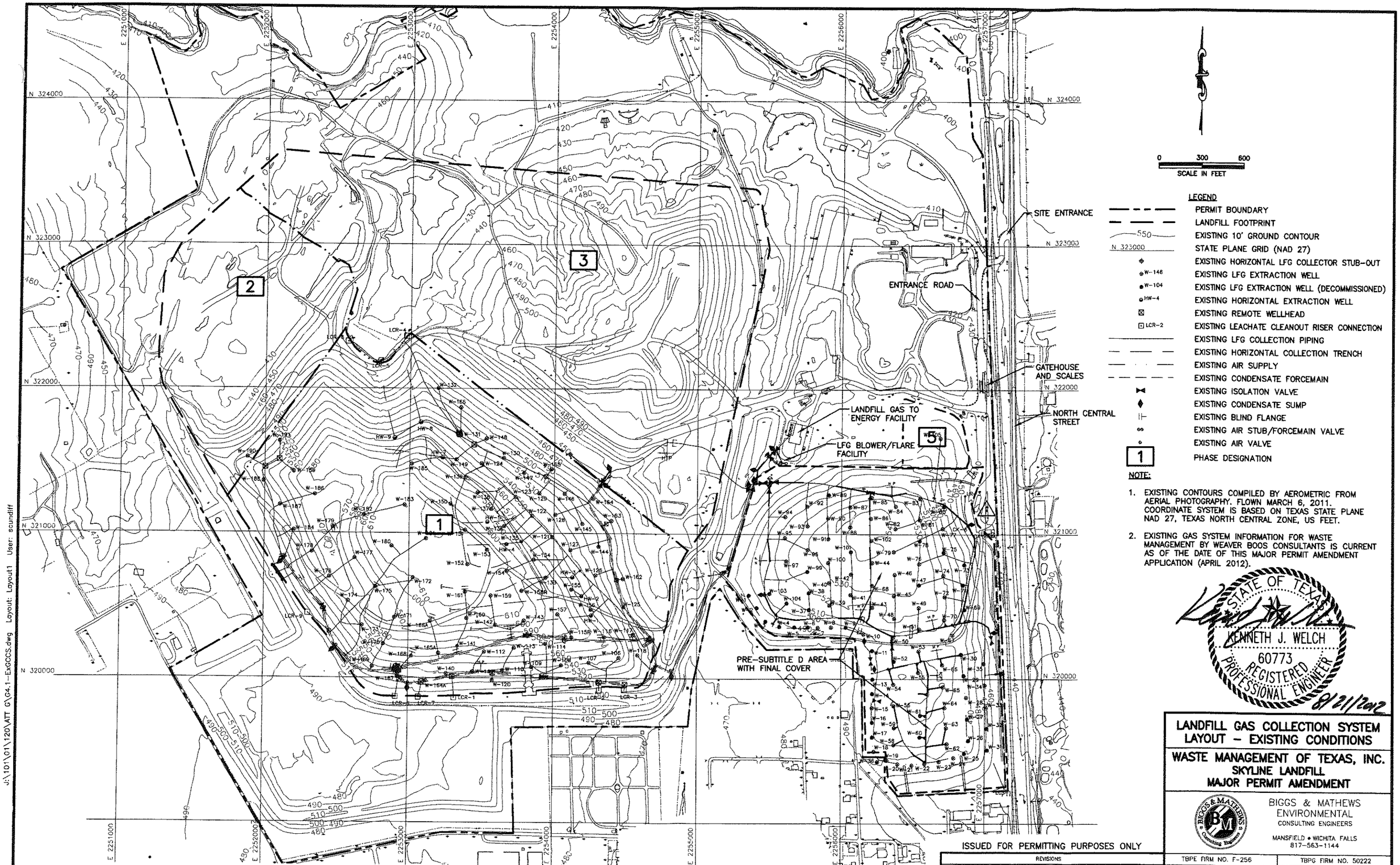
SKYLINE LANDFILL

APPENDIX G4
LANDFILL GAS COLLECTION SYSTEM
EXISTING CONDITIONS

30 TAC §330.371



LEGEND

- PERMIT BOUNDARY
- LANDFILL FOOTPRINT
- EXISTING 10' GROUND CONTOUR
- STATE PLANE GRID (NAD 27)
- EXISTING HORIZONTAL LFG COLLECTOR STUB-OUT
- EXISTING LFG EXTRACTION WELL
- EXISTING LFG EXTRACTION WELL (DECOMMISSIONED)
- EXISTING HORIZONTAL EXTRACTION WELL
- EXISTING REMOTE WELLHEAD
- EXISTING LEACHATE CLEANOUT RISER CONNECTION
- EXISTING LFG COLLECTION PIPING
- EXISTING HORIZONTAL COLLECTION TRENCH
- EXISTING AIR SUPPLY
- EXISTING CONDENSATE FORCEMAIN
- EXISTING ISOLATION VALVE
- EXISTING CONDENSATE SUMP
- EXISTING BLIND FLANGE
- EXISTING AIR STUB/FORCEMAIN VALVE
- EXISTING AIR VALVE
- PHASE DESIGNATION

NOTE:

1. EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL PHOTOGRAPHY, FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL ZONE, US FEET.
2. EXISTING GAS SYSTEM INFORMATION FOR WASTE MANAGEMENT BY WEAVER BOOS CONSULTANTS IS CURRENT AS OF THE DATE OF THIS MAJOR PERMIT AMENDMENT APPLICATION (APRIL 2012).

STATE OF TEXAS
KENNETH J. WELCH
60773
REGISTERED PROFESSIONAL ENGINEER
8/21/2012

ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS						
1	8/12	NOD NO. 1 RESPONSE	SRC	SAB	KJW	KJW
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

LANDFILL GAS COLLECTION SYSTEM LAYOUT – EXISTING CONDITIONS

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

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817-563-1144
TBPE FIRM NO. F-256 TBPG FIRM NO. 50222

DSN.	SAB	DATE :	04/12
DWN.	SRC	SCALE :	GRAPHIC
CHK.	KJW	DWG :	G4.1-ExGCCS.dwg

DRAWING G4.1

J:\101\01\120\ATT G\G4.1-ExGCCS.dwg Layout: Layout1 User: scundiff

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

PERMIT AMENDMENT APPLICATION

PART III – FACILITY INVESTIGATION AND DESIGN
APPENDIX G5
LANDFILL GAS CONTROL SYSTEM DESIGN

Prepared for

Waste Management of Texas, Inc.

April 2012

Revised August 2012

Prepared by

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

CONTENTS

1 LFG SYSTEM

1.1 Existing LFG Collection and Control System

Currently, the site has an active LFG collection and control system (GCCS), as shown in Appendix G5-A on Drawing G5-A-1. The site has a design capacity greater than 2.5 million megagrams and 2.5 million cubic meters, and has a nonmethane organic compound (NMOC) emission rate greater than 50 megagrams per year. This makes the facility subject to the requirements under 40 CFR Part 60, Subpart WWW, New Source Performance Standards for Municipal Solid Waste Landfills (NSPS). As a result, the existing GCCS will be required to begin operating in accordance with NSPS requirements on April 29, 2013.

The existing GCCS consists of vertical LFG extraction wells, a piping network, a condensate management system, a blower/flare facility, and a Waste Management owned and operated landfill gas-to-energy (LFGTE) facility. The existing blowers provide vacuum to the extraction wells through the LFG collection piping network. The extracted LFG is routed from the collection points to the LFGTE facility, which uses extracted LFG from the landfill as fuel to generate electricity. Any remaining extracted LFG not sent to the LFGTE facility is diverted to an on-site flare where the gas is combusted.

As additional waste is placed, the existing LFG extraction wells will be extended and/or redrilled.

1.2 Future GCCS Expansions

As the site develops, additional extraction wells will be installed as needed to reduce the buildup of internal gas pressures caused by the increased generation of LFG and to comply with the requirements under 40 CFR Part 60, Subpart WWW. The locations of the anticipated future vertical extraction wells are shown on Drawing G5-A-1.

~~Two~~ Three vertical extraction well alternatives are proposed for different final cover areas, as shown on Drawings G5-A-2 and G5-A-3. In areas with Subtitle D final cover and alternate final cover, extraction wells will be constructed as shown on Details LFG-1 and LFG-2, respectively. If additional wells or redrills are needed in areas with pre-Subtitle D final cover, the vertical extraction wells will be constructed as shown on Detail LFG-~~2~~3.

Each LFG extraction well will consist of a perforated pipe within a gravel backfill. The LFG extraction wells will be installed in phases as needed as the landfill develops. The

exact number and location of wells, horizontal collectors, piping, and future LFG facilities will be determined based on field conditions at the time of installation.

Using the EPA Landfill Gas Emissions Model, it is estimated that the site will generate a maximum of approximately 13,315 standard cubic feet per minute (scfm) of LFG in 2044 (Appendix G5-B). As such, blowers and piping network will be installed as needed to provide the vacuum and capacity to handle the predicted maximum flow rate of LFG. In addition, each extraction well will be equipped with a control valve and monitoring port, as shown on Drawing G5-A-2. These control valves and monitoring ports, used in conjunction with controls on the blower, will allow the site to regulate vacuum and LFG levels at each individual extraction well. This will allow the site to make adjustments in order to effectively collect LFG.

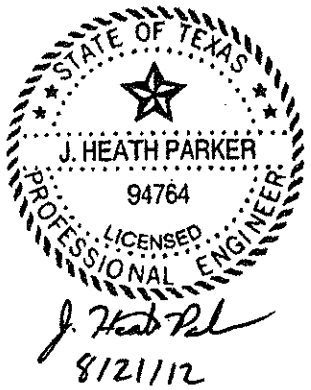
The operation and maintenance of the proposed LFG system will be performed consistent with industry guidelines and practices. Wellhead and system monitoring will be performed on a routine basis to monitor overall system performance. As needed, system adjustments will be made to optimize the extraction of LFG from the landfill to control LFG migration, odors, and greenhouse gases. In addition, the system will be routinely visually inspected for any evidence of needed repairs or other maintenance. General maintenance procedures will include the following:

- Each wellhead will be monitored and adjusted as needed to control LFG while reducing oxygen intrusion into the landfill.
- Condensate sumps will be checked for proper operation.
- Blowers and flares will be inspected for proper operation.

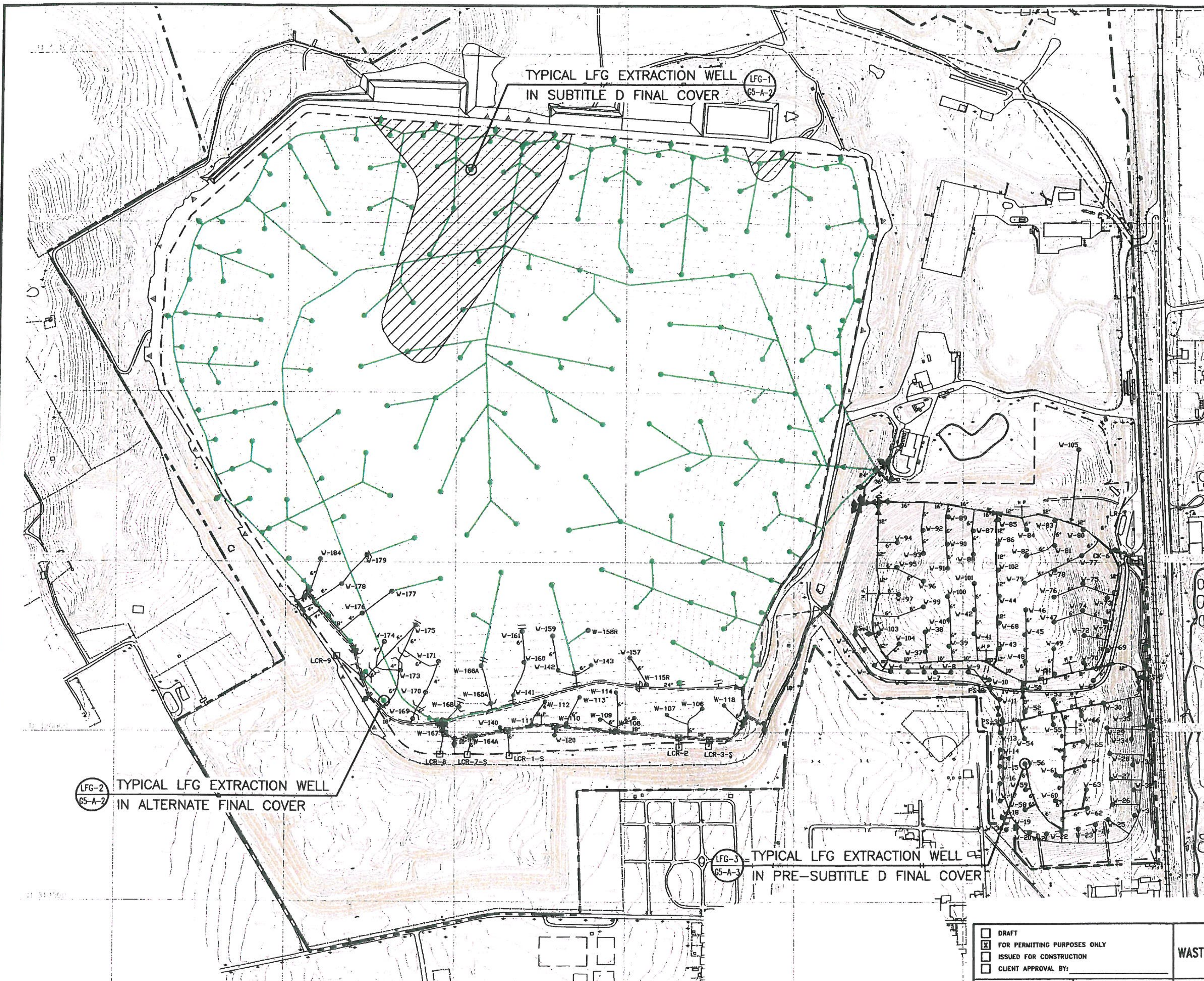
The system has been designed to include isolation valves and a looped piping network to allow the site to be adjusted, maintained, and quickly repaired.

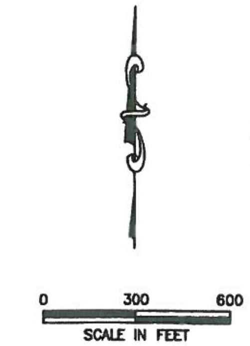
SKYLINE LANDFILL

APPENDIX G5-A
LANDFILL GAS COLLECTION AND CONTROL SYSTEM PLAN



Includes Drawings G5-A-1 ~~and~~ Through G5-A-23





STATE OF TEXAS
J. HEATH PARKER
94764
LICENSED
PROFESSIONAL ENGINEER

J. Heath Parker
8/21/12

LEGEND

	PERMIT BOUNDARY
	LANDFILL FOOTPRINT
	EXISTING CONTOUR
	STATE PLANE GRID (NAD 27)
	LIMITS OF SUBTITLE D FINAL COVER
	EXISTING LFG EXTRACTION WELL
W-104	EXISTING LFG EXTRACTION WELL (DECOMMISSIONED)
	EXISTING REMOTE WELLHEAD
LCR-2	EXISTING LEACHATE CLEANOUT RISER CONNECTION
	EXISTING LFG COLLECTION PIPING
	EXISTING AIR SUPPLY
	EXISTING CONDENSATE FORCEMAIN
	EXISTING ISOLATION VALVE
	EXISTING CONDENSATE SUMP
	EXISTING BLIND FLANGE
	EXISTING AIR STUB/FORCEMAIN VALVE
	EXISTING AIR VALVE
	EXISTING ROAD CROSSING
	PROPOSED LFG EXTRACTION WELL
	PROPOSED ISOLATION VALVE
	PROPOSED CONDENSATE SUMP
	PROPOSED LFG COLLECTION PIPING

NOTES:

1. EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL PHOTOGRAPHY FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL ZONE, US FEET.
2. THE LOCATION AND NUMBER OF PROPOSED FUTURE EXTRACTION WELLS AND GCCS COMPONENTS ARE APPROXIMATE. EXACT NUMBER AND LOCATION WILL BE DETERMINED BASED ON SITE CONDITIONS AT THE TIME OF INSTALLATION. EXISTING WELLS MAY BE EXTENDED OR REDRILLED TO ACCOMMODATE FUTURE FILLING.

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION
- [ ] CLIENT APPROVAL BY: ____

DATE: 04/2012
FILE: 0086-11-17
CAD: G5-A-1 FINAL GCCS.DWG

DRAWN BY: VRS
DESIGN BY: SR
REVIEWED BY: JHP

PREPARED FOR
WASTE MANAGEMENT OF TEXAS, INC.

REVISIONS

NO.	DATE	DESCRIPTION
1	08/2012	TCEQ 1st NOD COMMENT RESPONSE

MAJOR PERMIT AMENDMENT FINAL GCCS PLAN

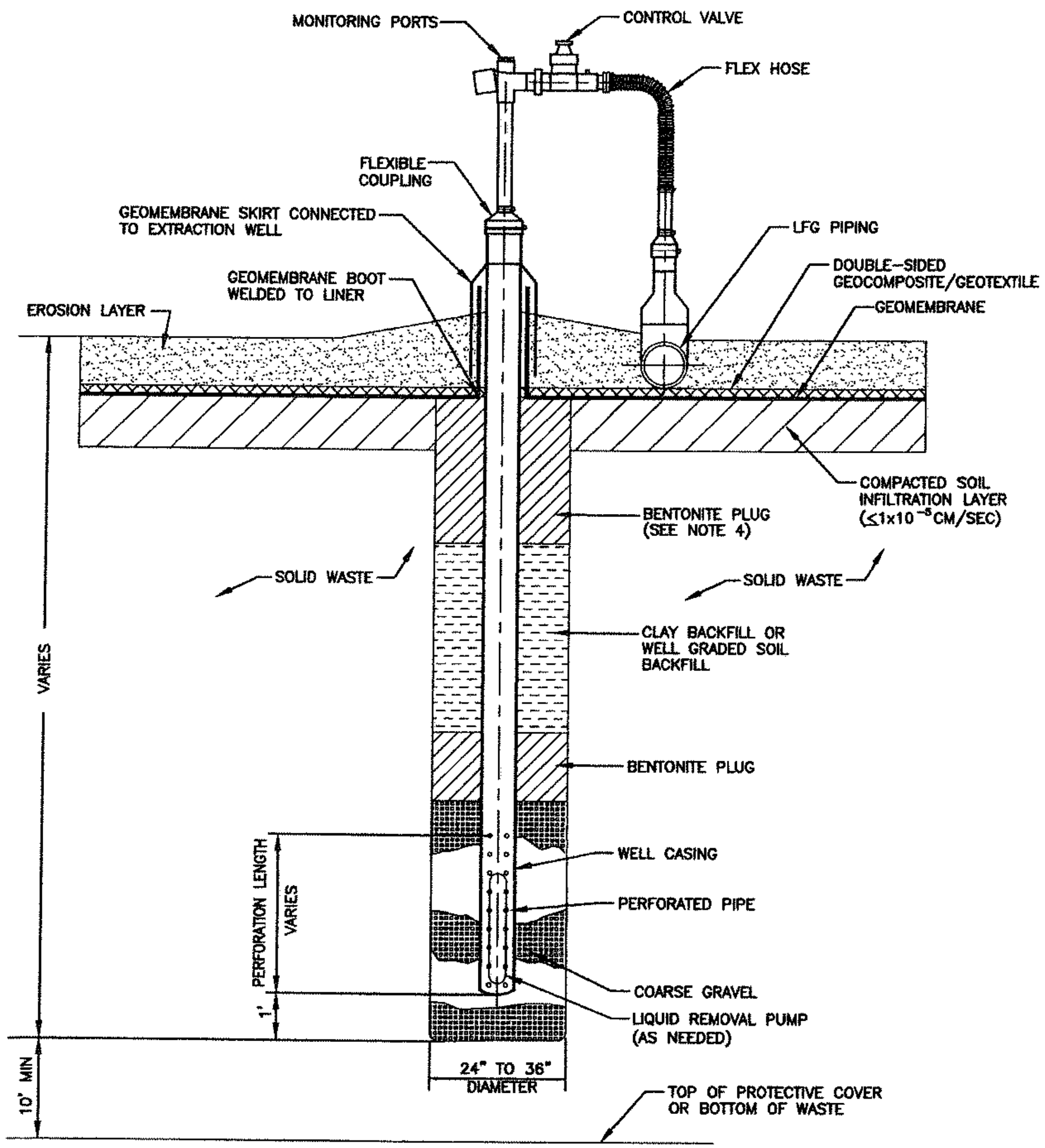
SKYLINE RECYCLING & DISPOSAL FACILITY
DALLAS & ELLIS COUNTIES, TEXAS

Weaver Boos Consultants
TBPE REGISTRATION NO. F-3727

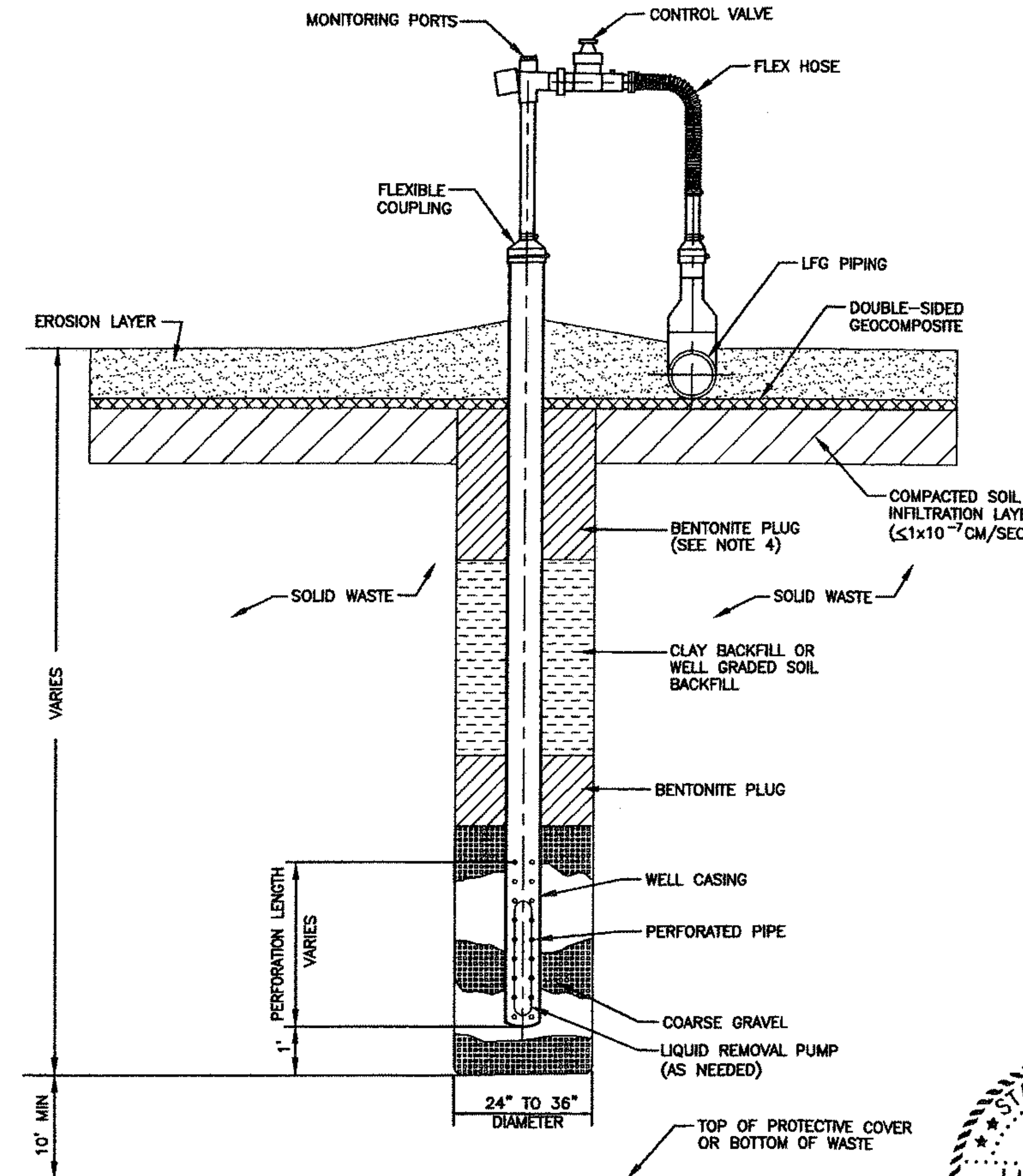
CHICAGO, IL · NAPERVILLE, IL · COLUMBUS, OH · DENVER, CO · FORT WORTH, TX · EVANSVILLE, IN · RIVERSIDE, MO · GRAND RAPIDS, MI · SOUTH BEND, IN · SPRINGFIELD, IL · CLEARMONT, FL

DRAWING G5-A-1

O:\0086\11\EXPANSION LGMP (03-12)\nod\G5-A-1-FINAL GCCS PLAN.dwg, rsellers



TYPICAL LFG EXTRACTION WELL IN SUBTITLE D FINAL COVER (LFG-1 / G5-A-2)
NTS



TYPICAL LFG EXTRACTION WELL IN ALTERNATE FINAL COVER (LFG-2 / G5-A-2)
NTS

STATE OF TEXAS
J. HEATH PARKER
94764
LICENSED
PROFESSIONAL ENGINEER

J. Heath Parker
8/21/12

NOTES:

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. THE EXACT WELLHEAD CONFIGURATION DEPENDS ON MANUFACTURER.
3. THE ELEVATION OF THE EXISTING LINER SYSTEM WILL BE VERIFIED PRIOR TO CONSTRUCTION. THE VERIFICATION PROCESS WILL INCLUDE THE REVIEW OF EXISTING AS-BUILT LINER CERTIFICATION INFORMATION.
4. UPPER BENTONITE PLUG WILL COINCIDE WITH THE LOCATION OF THE COMPACTED SOIL.

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION
- [ ] CLIENT APPROVAL BY: ____

DATE: 04/2012
FILE: 0086-11-17
CAD: G5-A-2 WELL DETAILS.DWG

DRAWN BY: VRS
DESIGN BY: SR
REVIEWED BY: JHP

PREPARED FOR
WASTE MANAGEMENT OF TEXAS, INC.

REVISIONS

NO.	DATE	DESCRIPTION
1	08/2012	TCEQ 1st NOD COMMENT RESPONSE

MAJOR PERMIT AMENDMENT
TYPICAL EXTRACTION WELL DETAILS

SKYLINE RECYCLING & DISPOSAL FACILITY
DALLAS & ELLIS COUNTIES, TEXAS

Weaver Boos Consultants
TBPE REGISTRATION NO. F-3727

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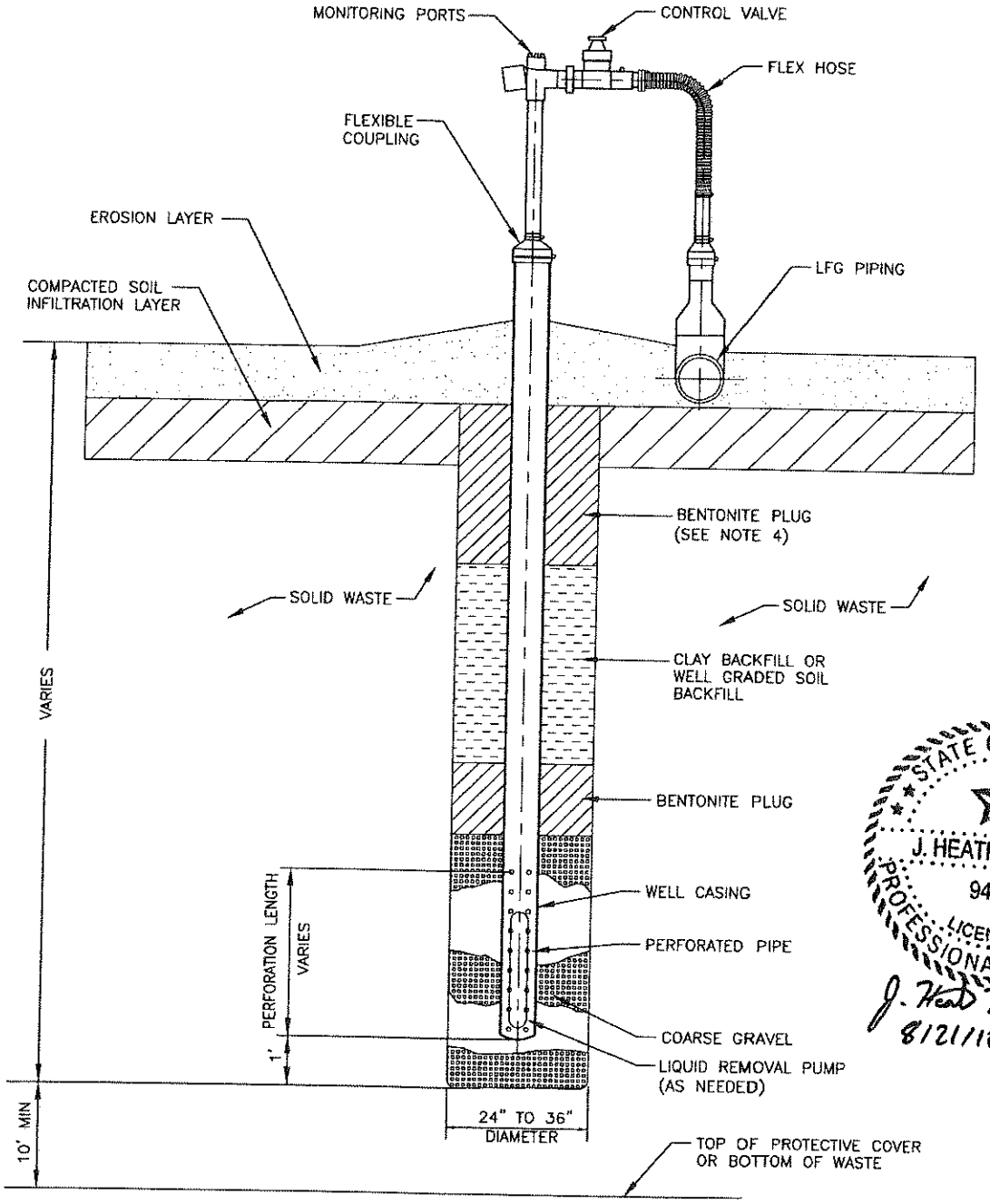
DRAWING G5-A-2

G:\0086\11\EXPANSION LGMP (03-12)\mod\G5-A-2-WELL DETAILS.dwg, rsellers



STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER
8/21/12

TYPICAL LFG EXTRACTION WELL IN PRE-SUBTITLE D FINAL COVER

LFG-3
G5-A-3

NTS

NOTES:

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. THE EXACT WELLHEAD CONFIGURATION DEPENDS ON MANUFACTURER.
3. THE ELEVATION OF THE EXISTING LINER SYSTEM WILL BE VERIFIED PRIOR TO CONSTRUCTION. THE VERIFICATION PROCESS WILL INCLUDE THE REVIEW OF EXISTING AS-BUILT LINER CERTIFICATION INFORMATION.
4. UPPER BENTONITE PLUG WILL COINCIDE WITH THE LOCATION OF THE COMPACTED SOIL.

MAJOR PERMIT AMENDMENT
TYPICAL EXTRACTION WELL DETAIL

SKYLINE RECYCLING & DISPOSAL FACILITY
DALLAS & ELLIS COUNTIES, TEXAS

Weaver Boos Consultants
TBPE REGISTRATION NO. F-3727
CHICAGO, IL · NAPERVILLE, IL · COLUMBUS, OH · DENVER, CO · FORT WORTH, TX · EVANSVILLE, IN · RIVERSIDE, MO · GRAND RAPIDS, MI · SOUTH BEND, IN · SPRINGFIELD, IL · CLEARMONT, FL

DRAWN BY: VRS	DATE: 08/2012	FILE: 0086-11-17
REVIEWED BY: JHP	CAD: WELL-DETAIL.DWG	DRAWING G5-A-3