BIGGS & MATHEWS ENVIRONMENTAL
Consulting Engineers ♦ Hydrogeologists
Mansfield ♦ Arlington ♦ Dallas ♦ Wichita Falls

March 21, 2007

Richard C. Carmichael, Ph.D., P.E., CIH
MSW Permits Section – MC-124
Waste Permits Division
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

Re: Security Recycling and Disposal Facility – MSW Permit No. 1752B
Permit Modification – Attachment 4 – Section 7 - Groundwater Monitoring Plan and
Attachment 11 – Groundwater Sampling and Analysis Plan
CN: 600893697 / RN: 100218700

Dear Dr. Carmichael:

On behalf of the Security Recycling and Disposal Facility (Security RDF), we are submitting this permit modification in response to the revised 30 TAC 330 rules provided on March 27, 2006. Specifically, this submittal addresses the groundwater monitoring requirements of Subchapter J. A permit modification narrative describing the changes is included with this submittal.

One original and two copies of this submittal are provided for your use and distribution. We are also providing a submittal to the TCEQ Region 12 office for their files. A copy of this submittal has been placed in the site operating record for this facility.

We believe the enclosed modification to be consistent with the requirements of the Texas Commission on Environmental Quality rules and with our previous discussions. Please call or email me if you have any questions at 817-563-1144 or msnyder@biggsandmathews.com.

Sincerely,

BIGGS & MATHEWS ENVIRONMENTAL

Michael Snyder, P.G.
Senior Hydrogeologist

Attachments: Part 1 Application Form
Permit Modification Fee Receipt
Permit Modification (original and two copies)

cc: Gordon Spradley, Security RDF (2)
Charles Rivette, P.E., Waste Management of Texas (1)
Donna Phillips, TCEQ Region 12 (1)

M:\PROJ\101\16\101\PERMIT MOD LTR.DOC

Texas Commission on Environmental Quality

Permit or Registration Application for Municipal Solid Waste Facility

Part I

A. General Information

Facility Name:	Security RDF			
Physical or Street Address (if available):	19428 State Hwy 105			
(City) (County)(State)(Zip Code):	Cleveland	Montgomery	TX	77328
(Area Code) Telephone Number:	281-592-3543			
Charter Number:	0022300000			

If the application is submitted on behalf of a corporation, provide the Charter Number as recorded with the Office of the Secretary of State for Texas.

Operator Name[1]:	Waste Management of Texas, Inc.			
Mailing Address:	100 Genoa-Red Bluff Rd.			
(City) (County)(State)(Zip Code):	Houston	Harris	TX	77034
(Area Code) Telephone Number:	281-922-0012			
(Area Code) FAX Number:	281-922-0014			
Charter Number:	0022300000			

If the permittee is the same as the operator, type "Same as Operator".

Permittee Name:	Same as Operator			
Physical or Street Address (if available):				
(City) (County)(State)(Zip Code):			TX	
(Area Code) Telephone Number:				
Charter Number:				

If the application is submitted by a corporation or by a person residing out of state, the applicant must register an Agent in Service or Agent of Service with the Texas Secretary of State's office and provide a complete mailing address for the agent. The agent must be a Texas resident.

Agent Name:	Charles Rivette, P.E.			
Mailing Address:	100 Genoa Red Bluff			
(City) (County)(State)(Zip Code):	Houston	Harris	TX	77034
(Area Code) Telephone Number:	281-922-0012			
(Area Code) FAX Number:	281-922-0014			

Application Type:

☐	Permit	☐	Major Amendment	☐	Minor Amendment
☐	Registration	☒	Modification	☐	Temporary Authorization
		☒	w/Public Notice		
		☐	w/out Public Notice	☐	Notice of Deficiency Response

[1] The operator has the duty to submit an application if the facility is owned by one person and operated by another [30 TAC 305.43(b)]. The permit will specify the operator and the owner who is listed on this application [Section 361.087 Texas Health and Safety Code].

Facility Classification:

☒	Type I	☐	Type IV	☐	Type V	☐	Type IX
☐	Type I AE	☐	Type IV AE	☐	Type VI		

Activities covered by this application (check all that apply):

☐	Storage	☐	Processing	☒	Disposal

Waste management units covered by this application (check all that apply):

☐	Containers	☐	Tanks	☐	Surface Impoundments	☒	Landfills
☐	Incinerators	☐	Composting	☐	Type IV Demonstration Unit	☐	Type IX Energy/Material Recovery
☐	Other (Specify)			☐	Other (Specify)		
☐	Other (Specify)			☐	Other (Specify)		

Is this submittal part of a Consolidated Permit Processing request, in accordance with 30 TAC Chapter 33?

☐ Yes ☒ No

If yes, state the other TCEQ program authorizations requested.

Provide a brief description of the portion of the facility covered by this application. For amendments, modifications, and temporary authorizations, provide a brief description of the exact changes to the permit or registration conditions and supporting documents referenced by the permit or registration. Also, provide an explanation of why the amendment, modification, or temporary authorization is requested.

Revise existing Attachment 4 – Section 7 and Attachment 11 to comply with the revised 30 TAC §330, Subchapter J regulations.

Does the application contain confidential Material? ☐ Yes ☒ No

If yes, cross-reference the confidential material *throughout the application* and submit as a separate document or binder conspicuously marked "CONFIDENTIAL."

Bilingual Notice Instructions **N/A**

For certain permit applications, public notice in an alternate language is required. If an elementary school or middle school nearest to the facility offers a bilingual program, notice may be required to be published in an alternative language. The Texas Education Code, upon which the TCEQ alternative language notice requirements are based, trigger a bilingual education program to apply to an entire school district should the requisite alternative language speaking student population exist. However, there may not exist any bilingual-speaking students at a particular school within a district which is required to offer the bilingual education program. For this reason, the requirement to publish notice in an alternative language is triggered if the nearest elementary or middle school, as a part of a larger school district, is required to make a bilingual education program available to qualifying students and either the school has students enrolled at such a program on-site, or has students who attend such a program at another location in satisfaction of the school's obligation to provide such a program as a member of a triggered district.

If it is determined that a bilingual notice is required, the applicant is responsible for ensuring that the publication in the alternate language is complete and accurate in that language. Electronic versions of

the Spanish template examples are available from the TCEQ to help the applicant complete the publication in the alternative language.

Bilingual Notice Application Form: **N/A**

Bilingual notice confirmation for this application:

1. Is a bilingual program required by the Texas Education Code in the school district where the facility is located? ☐ YES ☐ NO

   (If NO, alternative language notice publication not required)

2. If YES to question 1, are students enrolled in a bilingual education program at either the elementary school or the middle school nearest to the facility? ☐ YES ☐ NO

(IF YES to questions 1 and 2, alternative language publication is required; If NO to question 2, then consider the next question)

3. If YES to question 1, are there students enrolled at either the elementary school or the middle school nearest to the facility who attend a bilingual education program at another location? ☐ YES ☐ NO

(If Yes to questions 1 and 3, alternative language publication is required; If NO to question 3, then consider the next question)

4. If YES to question 1, would either the elementary school or the middle school nearest to the facility be required to provide a bilingual education program but for the fact that it secured a waiver from this requirement, as available under 19 TAC ' 89.1205(g)? ☐ YES ☐ NO

(If Yes to questions 1 and 4, alternative language publication is required; If NO to question 4, alternative language notice publication not required)

If a bilingual education program(s) is provided by either the elementary school or the middle school nearest to the facility, which language(s) is required by the bilingual program?

Note: Applicants for new permits and major amendments must make a copy of the administratively complete application available at a public in the county where the facility is, or will be, located for review and copying by the public.

Public place where administratively complete permit application will be located.				
Public Place (e.g., public library, county court house, city hall, etc.):	N/A			
Mailing Address:				
(City) (County)(State)(Zip Code):				
(Area Code) Telephone Number:				

B. Facility Location

Except for Type I AE and Type IV AE landfill facilities, for permits, registrations, amendments, and modifications requiring public notice, provide the URL address of a publicly accessible internet web site where the application and all revisions to that application will be posted.
Http://www.wm.com/wm/texas/houstonma/Security_Well_Spacing_MOD.pdf

Local Government Jurisdiction:	Montgomery County
Within City Limits of:	**N/A**
Within Extraterritorial Jurisdiction of City of:	**N/A**
Is the proposed municipal or industrial solid waste disposal or processing facility located in an area in which the governing body of the municipality or county has prohibited the disposal or processing of municipal or industrial solid waste? (If YES, provide a copy of the ordinance or order):	
☐ YES ☐ NO	

Provide a description of the location of the facility with respect to known or easily identifiable landmarks.
N/A

Detail the access routes from the nearest United States or state highway to the facility.
N/A

Provide the latitudinal and longitudinal geographic coordinates of the facility. **N/A**

Latitude	
Longitude	
Elevation (above msl)	

Is the facility within the Coastal Management Program boundary? **N/A**	☐ Yes ☐ No

Texas Department of Transportation District Location: **N/A**

TXDOT District Name & Number:				
District Engineer's Name:				
Street or P. O. Box:				
(City) (County)(State)(Zip Code):				
(Area Code) Telephone Number:				
(Area Code) FAX Number:				

The local governmental authority or agency responsible for road maintenance: **N/A**

Contact Person's Name:				
Street or P. O. Box:				
(City) (County)(State)(Zip Code):				
(Area Code) Telephone Number:				
(Area Code) FAX Number:				

State Representative: **N/A**

District Number:				
State Representative's Name:				
District Office Address:				
(City) (County)(State)(Zip Code):				
(Area Code) Telephone Number:				
(Area Code) FAX Number:				

State Senator: **N/A**

District Number:	
State Senator's Name:	
District Office Address:	
(City) (County)(State)(Zip Code):	
(Area Code) Telephone Number:	
(Area Code) FAX Number:	

Council of Government (COG) Information: **N/A**

COG Name:	
COG Representative's Name:	
COG Representative's Title:	
Street or P. O. Box:	
(City) (County)(State)(Zip Code):	
(Area Code) Telephone Number:	
(Area Code) FAX Number:	

River Basin Information: **N/A**

River Authority:	
Contact Person's Name:	
Watershed Sub-Basin Name:	
Street or P. O. Box:	
(City) (County)(State)(Zip Code):	
(Area Code) Telephone Number:	
(Area Code) FAX Number:	

This site is located in the following District of the U.S. Army Corps of Engineers: **N/A**			
☐ Albuquerque, NM	☐ Ft. Worth, TX	☐ Galveston, TX	☐ Tulsa, OK

C. Maps N/A

General

For permits, registrations, and amendments only, submit a topographic map, ownership map, county highway map, or a map prepared by a registered professional engineer or a registered surveyor which shows the facility and each of its intake and discharge structures and any other structure or location regarding the regulated facility and associated activities. Maps must be of material suitable for a permanent record, and shall be on sheets 8-1/2 inches by 14 inches or folded to that size, and shall be on a scale of not less than one inch equals one mile. The map shall depict the approximate boundaries of the tract of land owned or to be used by the applicant and shall extend at least one mile beyond the tract boundaries sufficient to show the following:

each well, spring, and surface water body or other water in the state within the map area;

the general character of the areas adjacent to the facility, including public roads, towns and the nature of development of adjacent lands such as residential, commercial, agricultural, recreational, undeveloped, etc;

the location of any waste disposal activities conducted on the tract not included in the application; and

the ownership of tracts of land adjacent to the facility and within a reasonable distance from the proposed point or points of discharge, deposit, injection, or other place of disposal or activity.

General location maps
For permits, registrations, and amendments only, submit at least one general location map at a scale of one-half inch equals one mile. This map shall be all or a portion of a county map prepared by Texas Department of Transportation (TxDOT). If TxDOT publishes more detailed maps of the proposed facility area, the more detailed maps shall also be included in Part I. Use the latest revision of all maps.

Land ownership map
Provide a map that locates the property owned by adjacent and potentially affected landowners. The maps should show all property ownership within 500 feet of the facility, on-site facility easement holders, and all mineral interest ownership under the facility.

Landowners list
Provide the adjacent and potentially affected landowners' list, keyed to the land ownership map with each property owner's name and mailing address. The list shall include all property owners within 500 feet of the facility, easement holders, and all mineral interest ownership under the facility. Provide the property, easement holders', and mineral interest owners' names and mailing addresses derived from the real property appraisal records as listed on the date that the application is filed. Provide the list in electronic form, as well.

D. Property owner information N/A

For permits, registrations, amendments, and modifications that change the legal description, a change in owner, or a change in operator only, provide the following:

(1) the legal description of the facility;

(A) the abstract number as maintained by the Texas General Land Office for the surveyed tract of land;

(B) the legal description of the property and the county, book, and page number or other generally accepted identifying reference of the current ownership record;

(C) for property that is platted, the county, book, and page number or other generally accepted identifying reference of the final plat record that includes the acreage encompassed in the application and a copy of the final plat, in addition to a written legal description;

(D) a boundary metes and bounds description of the facility signed and sealed by a registered professional land surveyor;

(E) on-site easements at the facility, and

(F) drawings of the boundary metes and bounds description; and

(2) a property owner affidavit signed by the owner.

E. Legal authority N/A

Provide verification of the legal status of the owner and operator, such as a one-page certificate of incorporation issued by the secretary of state. List all persons having over a 20% ownership in the proposed facility.

Indicate Ownership status of the facility:									
☐	Private	☐	Corporation	☐	Partnership	☐	Proprietorship	☐	Non-Profit Organization
☐	Public	☐	Federal	☐	Military	☐	State	☐	Regional
☐	County	☐	Municipal	☐	Other (Specify)				

Does the operator own the facility units and the facility property?	☐ Yes	☐ No

If "No," for permits, registrations, amendments, and modifications that changes the legal description, a change in owner, or a change in operators submit a copy of the lease for the use of or the option to buy the facility units or facility property, as appropriate, and identify:	
Owner Name:	
Street or P. O. Box:	
(City) (County)(State)(Zip Code):	
(Area Code) Telephone Number:	
(Area Code) FAX Number:	
Charter Number:	

F. Evidence of competency N/A

For permits, registrations, amendments, and modifications that change the legal description, a change in owner, or a change in operators submit a list of all Texas solid waste sites that the owner and operator have owned or operated within the last ten years.

Site Name	Site Type	Permit/Reg. No.	County	Dates of Operation

Submit a list of all solid waste sites in all states, territories, or countries in which the owner and operator have a direct financial interest.

Site Name	Location	Dates of Operation	Regulatory Agency (Name & Address)

A licensed solid waste facility supervisor, as defined in 30 TAC Chapter 30, Occupational Licenses and Registrations will be employed before commencing facility operation.

Provide the names of the principals and supervisors of the owner's and operator's organization, together with previous affiliations with other organizations engaged in solid waste activities.

Name	Previous Affiliation	Other Organization

For landfill permit applications only, evidence of competency to operate the facility shall also include landfilling and earthmoving experience if applicable, and other pertinent experience, or licenses as described in 30 TAC Chapter 30 possessed by key personnel. The number and size of each type of equipment to be dedicated to facility operation will be specified in greater detail on Part IV of the application within the site operating plan.

Landfilling/Earthmoving Equipment Types	Personnel Experience or Licenses

For mobile liquid waste processing units, submit a list of all solid waste, liquid waste, or mobile waste units that the owner and operator have owned or operated within the past five years. Submit a list of any final enforcement orders, court judgments, consent decrees, and criminal convictions of this state and the federal government within the last five years relating to compliance with applicable legal requirements relating to the handling of solid or liquid waste under the jurisdiction of the commission or the United States Environmental Protection Agency. Applicable legal requirement means an environmental law, regulation, permit, order, consent decree, or other requirement.

Solid waste, liquid waste, or mobile waste units owned or operated within past 5 years	Texas and federal final enforcement orders, court judgments, consent decrees, and criminal convictions

G. Appointments N/A

Provide documentation that the person signing the application meets the requirements of 30 TAC §305.44, Signatories to Applications. If the authority has been delegated, provide a copy of the document issued by the governing body of the owner or operator authorizing the person that signed the application to act as agent for the owner or operator.

H. Application Fees (See Attached Fee Receipt)

For a new permit, registration, amendment, modification, or temporary authorization, submit a $150 application fee.

For authorization to construct an enclosed structure over an old, closed municipal solid waste landfill in accordance with 30 TAC 330 Subchapter T, submit a $2,500 application fee.

If paying by check, send payment to:

Texas Commission on Environmental Quality
Financial Administration Division, MC 214
P. O. Box 13087
Austin, Texas 78711-3087

Payment maybe made online using TCEQ e-pay at www.tceq.state.tx.us/e-service/index.html	
E-pay confirmation number	582EA000021396

PROPERTY OWNER AFFIDAVIT N/A

"I, _____,
(property owner)
acknowledge that the State of Texas may hold me either jointly or severally responsible for the operation, maintenance, and closure and post-closure care of the facility. For a facility where waste will remain after closure, I acknowledge that I have a responsibility to file with the county deed records an affidavit to the public advising that the land will be used for a solid waste facility prior to the time that the facility actually begins operating as a municipal solid waste landfill facility, and to file a final recording upon completion of disposal operations and closure of the landfill units in accordance with Title 30 Texas Administrative Code §330.19, Deed Recordation. I further acknowledge that I or the operator and the State of Texas shall have access to the property during the active life and post-closure care period, if required, after closure for the purpose of inspection and maintenance."

_____ _____
(Owner signature) (Date)

Signature Page

I, Charles Rivette (Operator), District Landfill Manager (Title),

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: Charles A. Rivette Date: 3-21-2007

TO BE COMPLETED BY THE OPERATOR IF THE APPLICATION IS SIGNED BY AN AUTHORIZED REPRESENTATIVE FOR THE OPERATOR

I, N/A (Print or Type Operator Name), hereby designate _____ (Print or Type Representative Name)

as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

_____
Printed or Typed Name of Operator or Principal Executive Officer

_____
Signature

SUBSCRIBED AND SWORN to before me by the said CHARLES RIVETTE

On this 21st day of March, 2007

My commission expires on the 25TH day of September, 2007

DIXIE GIBSON MEYNIER
Notary Public, State of Texas
My Commission Expires
September 25, 2007

_____
Notary Public in and for

HARRIS County, Texas

(Note: Application Must Bear Signature & Seal of Notary Public)

SECURITY RECYCLING AND DISPOSAL FACILITY
MONTGOMERY COUNTY, TEXAS
TCEQ PERMIT NO. MSW 1752B

PERMIT MODIFICATION FEE RECEIPT

On behalf of Waste Management of Texas, Inc., Biggs and Mathews Engineers has made payment of the $150.00 permit modification fee online using TCEQ e-pay at www.tceq.state.tx.us/e-service/index.html.

The e-pay confirmation number is 582EA000021396.

SECURITY RECYCLING AND DISPOSAL FACILITY
MONTGOMERY COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1752B

PERMIT MODIFICATION

MINOR REVISION TO THE SITE DEVELOPMENT PLAN

ATTACHMENT 4 – SECTION 7
GROUNDWATER MONITORING PLAN

ATTACHMENT 11
GROUNDWATER SAMPLING AND ANALYSIS PLAN

Prepared for

Waste Management of Texas, Inc.

March 2007

Prepared by

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

CONTENTS

Permit Modification Narrative
Appendix A Adjacent Property Owners List and Map

Attachment 4 – Section 7 – Groundwater Monitoring Plan

Attachment 11 – Groundwater Sampling and Analysis Plan

PERMIT MODIFICATION NARRATIVE

This permit modification is submitted in response to the revised 30 TAC §330 rules promulgated by TCEQ on March 27, 2006. Subchapter J of those rules requires that owners and operators comply with those rules by submitting a permit modification to revise any inconsistent provisions in their permit within two years of the effective date or March 27, 2008. This modification is being submitted based on operational considerations well in advance of that deadline because Security RDF prefers to proceed with the installation of additional monitoring wells as soon as possible.

The Subchapter J rules require changes to address groundwater monitoring well spacing, addressed in the attached changes to Attachment 4 – Section 7 – Groundwater Monitoring Plan, and changes to the groundwater sampling and reporting procedures, addressed in the attached changes to Attachment 11 – Groundwater Sampling and Analysis Plan (GWSAP). As required by 30 TAC §330.401(b), this modification is submitted as a notice modification and includes the TCEQ Part I Application Form, with the e-pay confirmation number for the $150 permit fee.

The existing monitoring well network consisting of seven (7) upgradient or background wells, and nine (9) downgradient monitoring wells was approved in the 2004 Permit Amendment. Installation of proposed wells MW-14, 18, 19, and 20 (replacement wells for observation wells OW-2, 4, 8, and 15) has been delayed pending compliance with the requirements of Subchapter J. The existing well network meets the requirements for well spacing under Subchapter J therefore installation of these approved well locations is expected to commence immediately. This modification proposes to remove four (4) upgradient monitoring wells from the approved network and retain only as piezometers. Additionally, the modification proposes to replace existing background monitoring well MW-15 with new point-of-compliance well MW-15R based upon the network design submitted herein. The permit modification contains a description of the methodology for monitoring system design used in the placement of groundwater monitoring wells.

Another change required by the new rules includes modifying the GWSAP to eliminate field filtering of the groundwater samples and to require analysis for totals. The Security RDF GWSAP was previously approved to analyze for and perform statistical analysis on total metals. No changes were made to the GWSAP for that issue. Changes to the reporting requirements have been addressed in this modification in Attachment 11.

In addition, Security RDF proposes to remove the water quality parameters (see Table 6-1 of the GWSAP) from the detection monitoring list. This modification does not reduce the protection to human health and the environment as these parameters will continue to analyzed and evaluated for changes in groundwater chemistry but will not perform statistical analysis on the results.

APPENDIX A

LAND OWNERSHIP MAP AND LAND OWNERS LIST

LANDOWNER'S LIST

1 WASTE MANAGEMENT OF HARRIS COUNTY, INC
PO BOX 1450
CHICAGO, IL 60690-1450

2 TURNER, GEORGE W
19032 HIGHWAY 105
CLEVELAND, TX 77328-2420

3 LISCO, GENE
PO BOX 1646
CLEVELAND, TX 77328-1646

4 WALKER, ROBERT W
310 NORTH STREET
HOUSTON, TX 77009-5649

5 KIRKLAND, ROBIN
18595 SOLOMON ST
HOUSTON, TX 77328-6347

6 WALKER, L R
8915 KENNARD DR
HOUSTON, TX 77074-2509

7 HOWELL, SARAH M
10314 SHADY RIVER DR
HOUSTON, TX 77042-1240

8 METTS, JOHN MARK
247 SADDLE RDG
THE WOODLANDS, TX 77380-2748

9 METTS, HAROLD
1107 BRIARPARK DR
HOUSTON, TX 77042-2110

10 DIENER, ELLSWORTH-ESTATE
DIENER FAM TR 45 REPOSO DR
OAK VIEW, CA 93022-9528

11 THOMPSON, TODD & LORI
19715 OLD HIGHWAY 105
CLEVELAND, TX 77328-6417

12 HAMMAN, PAUL D & LAURIE P
19800 SECURITY WAY
CLEVELAND, TX 77328

13 MONTGOMERY COUNTY TAX TRUST
400 N SAN JACINTO ST
CONROE, TX 77301-2823

14 ELSEY, CHARLES N, JR.
19582 HIGHWAY 105
CLEVELAND, TX 77328

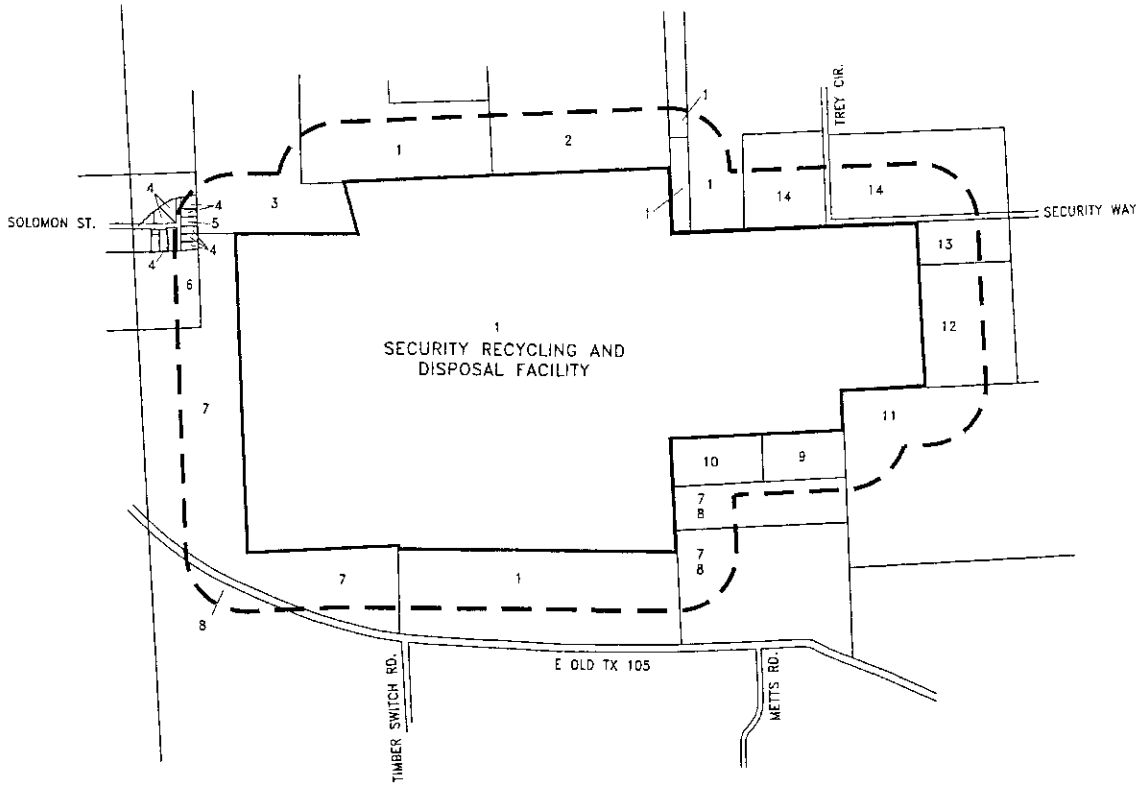
EASEMENT HOLDER

GULF STATES UTILITY EASEMENT
C/O MR. CHUCK HUGHES
SENIOR WHOLESALE EXECUTIVE
ENTERGY SERVICES, INC.
PO BX 2951
BEAUMONT, TX 77702

12/11/06

STATE OF TEXAS
PHILLIP REID MATTHEWS II
83554
LICENSED
PROFESSIONAL ENGINEER

THIS DOCUMENT IS SEALED
FOR PERMITTING PURPOSES ONLY.



12/11/06

PHILIP REID MATTHEWS
83554
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

THIS DOCUMENT IS SEALED FOR PERMITTING PURPOSES ONLY.

LEGEND:

- 500 FT PERMIT BOUNDARY OFFSET
- SECURITY RECYCLING AND DISPOSAL FACILITY PERMIT BOUNDARY
- ADJACENT LAND OWNERSHIP PROPERTY LINE

REF:

PERMIT APPLICATION WASTE MANAGEMENT OF TEXAS, INC. SECURITY RECYCLING AND DISPOSAL FACILITY TCEQ PERMIT NO. MSW-1752B

ADJACENT LAND OWNERSHIP INFORMATION ACQUIRED FROM MONTGOMERY COUNTY APPRAISAL DISTRICT MAPS http://www.mcad-tx.org/html/records.html, DECEMBER 6, 2006

1000 500 0 1000
SCALE FEET

ADJACENT LAND OWNERSHIP

Date	Revision/Description

Drawn By	Checked By	Project No.	Dwg. Date
JCT	PPM	026226-2	12/2006

WASTE MANAGEMENT OF TEXAS, INC.
SECURITY RECYCLING AND DISPOSAL FACILITY
TCEQ PERMIT NO. MSW-1752B

Metroplex core

14433 Cornerstone Village Drive
Houston, Texas 77014
Telephone: 281.440.9001
Facsimile: 281.444.3376

Figure No. 1

I:\CADD\026226\026226A01AT-REV-1.dwg, 12/11/2006 8:35:29 AM

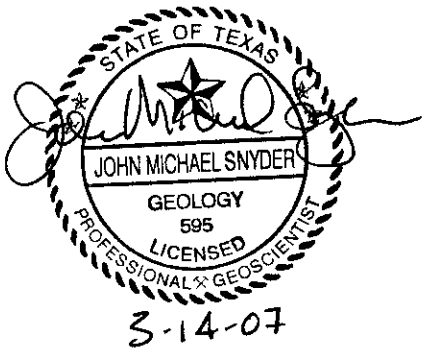
Groundwater Monitoring Plan
Attachment 4 – Section 7
Security RDF, Montgomery County, Texas

MSW Permit No. 1752B

Prepared for:

WASTE MANAGEMENT

Waste Management of Texas, Inc.
100 Genoa Red Bluff
Houston, Texas 77034



Prepared by:

Biggs & Mathews Environmental
1700 Robert Road, Suite 100
Mansfield, Texas 76063

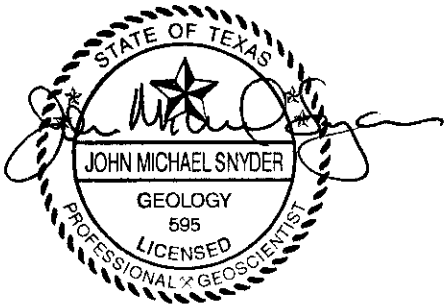
Revision 2.0 March 2007

TABLE OF CONTENTS

GROUNDWATER MONITORING SYSTEM DESIGN CERTIFICATION iii
7.0 GROUNDWATER MONITORING PLAN 21
7.1 Regional Geology 21
7.1.1 Regional Geology 21
7.1.2 Regional Hydrogeology 22
7.2 Site Geology 23
7.3 SITE HYDROGEOLOGY 23.2
7.3.1 Hydrogeologic Units 23.2
7.3.2 Aquifer Characteristics 23.2
7.3.3 Groundwater Flow Direction 23.3
7.3.4 Groundwater Flow Rate 23.4
7.4 OPERATIONAL CONSIDERATIONS 23.5
7.4.1 Relationship of Excavation Bottom to Uppermost Aquifer 23.5
7.4.2 Leachate Sump Design and Location 23.5
7.4.3 Critical Receptors 23.5
7.5 GROUNDWATER MONITORING SYSTEM 23.7
7.5.1 Existing System 23.7
7.5.2 Proposed Monitoring System 23.8

FIGURES

Figure F.1 Cross Section C – C'
Figure F.2 Cross Section F – F'
Figure F.3 Geologic Cross Section Location Map
Figure F.4 Isopach Map, Net Thickness – Stratum III Gravel
Figure F.5 Potentiometric Surface – July 1993
Figure F.6 Potentiometric Surface – May 1999
Figure F.7 Potentiometric Surface – November 28, 2000
Figure F.8 Potentiometric Surface – April 24, 2002
Figure F.9 Potentiometric Surface – October 20, 2005
Figure F.10 Potentiometric Surface – February 6, 2006
Figure F.11 Cumulative Groundwater Flow Direction
Figure F.12 Proposed Groundwater Monitoring System
Figure F.13 Monitoring System Status
Figure F.14 Monitoring Well Detail



3-14-07

GROUNDWATER MONITORING SYSTEM DESIGN CERTIFICATION

General Site Information

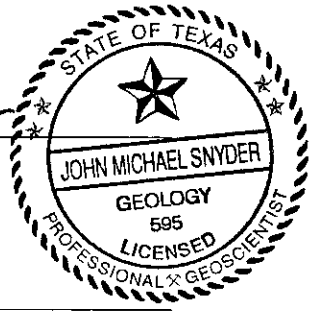
Site:	Security Recycling and Disposal Facility
Site Location:	2.4 Miles SE Intersection State Highway 105 and/or Old State Highway 105 - Adjacent Old State Highway 105
MSW Permit No.:	1752B

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 §330.2. 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 §330.230 through §330.235. This system has been designed for specific application to the Security Recycling and Disposal Facility (Permit No. MSW-1752B). 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: _____
Michael Snyder, P.G.
No. 595-Texas



Date: 3-14-07

7.0 GROUNDWATER MONITORING PLAN

7.1 Regional Geology

The regional geologic and hydrogeologic setting for the Security Recycling and Disposal Facility (Security RDF) has been described in several previous reports including the most recent study, Attachments 4 and 5 associated with a 2004 permit amendment application by Golder Associates. The following is a summary of those previous studies.

7.1.1 Regional Geology

The site is located within the Gulf Coast sedimentary basin, which consists of thousands of feet of sediments deposited through deltaic, alluvial, eolian dune, bay-estuarine, and barrier island-shoreline geologic process. The southeast Texas portion of the Coastal Plain is underlain by a thick mass of sediments (in excess of 30,000 feet) that dip and thicken toward the Gulf of Mexico with successively older geologic formations exposed progressively further inland.

The project site is underlain by the Pleistocene age Willis Formation. The Willis Formation is characterized by clay, silt, sand and minor amounts of siliceous gravel. Locally, the sediments may be cemented by iron oxide and contain abundant amounts of iron oxide nodules. The Willis Formation is fluvial in origin and has a thickness of approximately 100 feet. The formation dips to the southeast at an approximate rate of 10 feet per mile (Bureau of Economic Geology, 1982; Popkin, 1971).

Underlying the Willis Formation is the Pliocene age Goliad Sand Formation. The formation is fluvial in origin and consists of bentonitic clays, sands with grains of chert, gravelly beds, and lenses of lime-cemented sandstones. The Goliad Sand Formation dips to the southeast at an approximate rate of 40 feet per mile and has a thickness ranging from approximately 250 feet in north Montgomery County to approximately 1,200 feet in southeast Montgomery County.

Underlying the Goliad Sand Formation is the Miocene age Fleming Formation. Sediments of the Fleming Formation were deposited by fluvial and fluvial-deltaic processes that were active during the Miocene. The marginal-fluvial and fluvial-deltaic deposits are represented by calcareous clays and muds with some sparsely distributed, thin sand layers and lignites. Fluvial lithologies are comprised of sand, silt; and clay. The Fleming Formation has a thickness ranging from approximately 1,400 feet in north Montgomery County to approximately 3,200 feet in southeast Montgomery County. The predominantly clay Burkeville aquiclude is included in the Fleming Formation and ranges in thickness from 130 to 300 feet. The generalized regional stratigraphic units are summarized in Table 1.

The thicknesses and depth to major geologic units is as follows:

Table 1
Regional Stratigraphic Units

Geologic Unit	Approximate Elevation	Approximate Thickness
Willis Formation	Ground surface to 90 ft msl	100 ft
Goliad Sand Formation	90 ft msl to -600 ft msl	690 ft
Fleming Formation	-600 ft msl to -3000+ ft msl	2400+ ft

7.1.2 Regional Hydrogeology

The most significant hydrogeologic units in the region from youngest to oldest are the Quaternary Chicot aquifer, the Evangeline aquifer, the Burkeville aquiclude, the upper part of the Jasper aquifer, the lower part of the Jasper aquifer and the Miocene Catahoula Sandstone, which consists of semi-consolidated or unconsolidated sands interbedded with clay. Most of the wells in Montgomery County, which are used for domestic consumption, are located to the south and west of the facility. A majority of these wells are completed in the Chicot aquifer and a few in the Evangeline. The primary water-bearing unit beneath the facility consists of the Willis Formation, which is part of the Chicot aquifer.

The Chicot aquifer is the most significant water-bearing unit and outcrops in the eastern and southern portions of Montgomery County. It consists of the Willis Formation and younger deposits. The Chicot consists primarily of unconsolidated sands (60 - 80 percent) and gravels, often ferruginous (iron rich). The approximate thickness of the Chicot ranges from 0 to 200 feet and dips at a rate of 10 feet per mile.

The Evangeline aquifer is the principal aquifer for a large part of southeast Texas and is an important source of water in the Houston area. The Evangeline is composed of a sequence of alternating sands (40 - 70 percent) and clays of the Goliad Sand and part of the Fleming Formation above the Burkeville aquiclude. The approximate thickness of the formation ranges from zero to 1,300 feet, with a dip rate of 40 feet per mile to the southeast.

The estimated average permeabilities are 500 and 250 gallons per day per square foot for the Chicot and Evangeline aquifers, respectively. The rate of horizontal groundwater movement is approximately 40 and 60 feet per year in the Evangeline and the Chicot aquifers, respectively. The direction of groundwater flow in both aquifers is generally to the southeast along structural dip (Popkin, 1971).

7.2 Site Geology

Based upon a review of previous studies, five sediment groups, or strata, have been identified at the site. Each stratum is composed of one or more of the uses soil classifications. Facies changes are noted within sedimentary units that reflect changes in the depositional environment between various borehole locations. This is reflected by lateral gradational changes within the units [e.g., silty sand (SM) grading to sandy silts (ML), etc.]. A generalized summary of the strata is presented in Table 2 along with the approximate range in elevation above mean sea level where these strata were encountered.

Table 2
Strata Identification

Stratum	Approximate Elevation Range (ft msl)	Description
I	193 to 172	Silty sand, sandy silt, and clayey silt
II	193 to 140	Silty to sandy clay and high plasticity clay
III	179 to 108	Silty sand, clayey sand, sand, gravelly sand, clayey silt, sandy silt, sandy gravel and gravel
IV	141 to 77	High plasticity clay with sand lenses and silty to sandy clay with sand and silt lenses
V	101 to boring depth	Silt, clayey silt, sandy silt, clayey sand, silty sand, and sand

Based on the regional geology, it appears that Strata I, II, and III are within the Willis Formation and the water-bearing zones within these units are part of the Chicot Aquifer. Stratum IV and V are interpreted to be within the upper portion of the Goliad Sand Formation, with water-bearing zones within the Evangeline Aquifer.

Stratum I is a surficial soil consisting of silty sand and sandy to clayey silt. It ranges from 0 to 8 feet thick. This stratum was not encountered in all of the soil borings.

Stratum II consists primarily of silty to sandy clay and high plasticity clays. Its thickness ranges from approximately 8 to 37 feet thick.

Stratum III consists primarily of silty to clayey sand and clayey to sandy silt. This stratum ranges

in thickness from approximately 28 to 60 feet thick. Within Stratum III, a layer of gravel and gravelly sand was encountered in some of the borings, ranging in thickness from less than 1 foot to

12 feet. This stratum is the shallowest water-bearing unit, and comprises the uppermost aquifer at the site.

Stratum IV consists of high plasticity clay with sand lenses and silty to sandy clay with sand and silt lenses. Its thickness ranges from about 10 to 41 feet. Because this zone consists primarily of low permeability clay with isolated lenses of sand, it acts as an aquitard and restricts vertical groundwater movement.

Stratum V consists of clayey to sandy silt and clayey to silty sand. The full thickness of this stratum was not fully penetrated during site investigations. This stratum is the second water-bearing unit and is not detailed in this study.

Two representative geologic cross-sections (Figure F.1 and F.2) C-C' (west to east) and F-F' (north to south) from the 2004 Golder Attachment 4 are included to graphically illustrate the relative position and thickness of each stratum. Figure F.3 shows the location for each cross-section.

7.3 SITE HYDROGEOLOGY

7.3.1 Hydrogeologic Units

Based upon an evaluation of the soil boring and groundwater data from previous site investigations, two water-bearing zones have been identified at the site. The uppermost zone exists as a generally confined aquifer located in the sands, silts, and gravel of Stratum III. This unit is naturally recharged by precipitation and/or surface water infiltration. Stratum III represents the uppermost groundwater unit beneath the site. The lower water-bearing zone is a confined aquifer located in the Stratum V sands and silts encountered at an elevation generally below 100 ft msl. Stratum IV is comprised predominantly of low permeability fine-grained soils and separates these two water-bearing zones.

7.3.1.1 Uppermost Groundwater Zone – Stratum III

Stratum III is the uppermost groundwater zone and consists primarily of silty to clayey and sandy silt. The stratum ranges in thickness from about 28-60 feet and contains interbeds of gravel and gravelly sand ranging in thickness from less than 1 to 12 feet. The gravel interbeds are discontinuous and occur within the site boundaries between approximate elevations of 140 to 160. Figure F.4 is an isopach map of the net gravel thickness within Stratum III. The gravel is limited to within the site boundaries and does not reach the southern point of compliance or any site boundary. This map was developed using lithology data from 41 borings. At least 27 of those borings showed no gravel. Stratum III is present and correlateable across the site, is the shallowest water bearing unit and represents the uppermost aquifer beneath the site.

Groundwater in Stratum III is generally confined and occurs at an elevation of between about 179- to 108 feet above means sea level.

7.3.1.2 Aquiclude – Stratum IV

Stratum IV consists of high plasticity clay with interbedded lenses of sand and silty to sandy clay. It ranges in thickness from about 10 to 41 feet. This low permeability clay restricts downward vertical groundwater movement and thus serves as the lower confining unit (aquiclude) to the overlying Stratum III.

7.3.2 Aquifer Characteristics

Slug tests were performed in 12 piezometers and in all the monitoring wells at the site to determine the hydraulic properties of the two water-bearing units (Rust, 1996). An additional slug test was performed by Golder to measure the hydraulic properties of a gravelly sand zone within Stratum III. From the results of the slug testing, Golder calculated the geometric mean hydraulic conductivities and are included in Table 3.

Table 3
Summary of Aquifer (Slug) Tests

Stratum	Geometric Mean Hydraulic Conductivity (cm/sec)
III	1.4×10^{-3}
IV	6.7×10^{-7}
V	1.6×10^{-3}

The hydraulic conductivities of the fine-grained soils within Strata II, III, IV, and V have been determined from laboratory permeability testing of undisturbed samples (Appendix VII of the Corps of Engineers Manual EM 1110 - falling head). A summary of hydraulic conductivities determined by Rust (Rust, 1996) and Southwestern Laboratories (TES, 1985) are presented in Table 4.

Table 4
Summary of Hydraulic Conductivity Data (Fine-Grained Soils)

Stratum	Hydraulic Conductivity (cm/sec)
II	4.5×10^{-7}
III	1.1×10^{-6}
IV	1.9×10^{-7}
V	2.5×10^{-5}

7.3.3 Groundwater Flow Direction

Groundwater flow across the site within Stratum III is generally north to south. Potentiometric surface maps (Figures F.5 to F.10) of the groundwater elevation in Stratum III have been prepared to illustrate the temporal and seasonal groundwater flow direction for the period of 1993 to 2006.

Groundwater flow has remained consistently generally north to south with temporary minor variations ranging from south-southeast to south-southwest. For instance in July, 1993, on the southern part of the site there are south-southeast and south-southwest flow components. In May, 1999, there is a south-southeast component. In November, 2000 the groundwater flow on the downgradient southern part of the site converges to a south-southwest component that would

concentrate the flow into a narrow area near monitoring well MW-18. In April, 2002, the flow is generally to the south. In October, 2005 and February 2006, groundwater flow over most of the southern portion of the site is slightly to the south-southwest except for a small portion of the southeastern part of the site where groundwater flow has developed an east-southeast flow towards monitoring well MW-14 and proposed MW-15R.

Figure F.11 represents cumulative flow lines based on the potentiometric surface maps (Figures F.5 through F.10). Based on these flow lines, the downgradient point of compliance is from MW-9 on the southern part of the west side of the site, along the southern perimeter through MW-21, MW-10, MW-17- through MW-20 and then northward through MW-14 to proposed well MW-15R along the southern part of the east side of the site. The point of compliance is shown on Figure F.12.

7.3.4 Groundwater Flow Rate

Horizontal travel times were estimated for Stratum III from the March 1996, May 1999, and November 2000 potentiometric maps using the formula:

$$v = \frac{ki}{n_e}$$

where: v = travel velocity
k = hydraulic conductivity of the aquifer
i = hydraulic gradient
n_e = effective porosity

Resulting values indicate an average travel time in Stratum III of approximately 15.6 ft/year. Table 5 summarizes the Stratum III groundwater velocity calculation.

Table 5
Estimated Groundwater Velocities

Unit	Hydraulic Conductivity (k) (cm/sec)	Hydraulic Gradient (i) (ft/ft)	Effective Porosity (n_e)	Velocity (v) ft./year
III	1.4 E-03	0.0043	0.4	15.6

7.4 OPERATIONAL CONSIDERATIONS

7.4.1 Relationship of Excavation Bottom to Uppermost Aquifer

Because the excavation of the Security RDF is designed to remain in the clayey portions of Stratum II and remain primarily above Stratum III, the excavation will not have affected the groundwater flow direction. An underdrain is designed to manage the potential seepage from the isolated sandy interbeds within Stratum II and will not affect the confined potentiometric surface of Stratum III.

7.4.2 Leachate Sump Design and Location

The Security RDF containment system and excavation are designed to accommodate a Subtitle D leachate collection system (LCS). Except for a pre-subtitle D lined area in the eastern 1/3 of the northern portion of the site, the excavation bottom is lined with a composite liner and is sloped to direct leachate flow to the lowest areas where sumps are designed to collect the leachate. Leachate is then pumped out of the sumps. While leachate will not remain for lengthy periods of time nor at significant depths, the sump locations are the lowest areas of the excavation. While a leak from the Subtitle D cell is unlikely, if one were to occur, it would be more likely to be at the lowest leachate collection points in the sumps. For that reason, sump locations on the downgradient side of the site are considered in the design of the groundwater monitoring system. Sump locations at the Security RDF are shown on Figures F.5 through F.13.

Groundwater monitoring wells MW-21, MW-10, MW-17, and MW-18 are located downgradient of the five sumps in the downgradient southwest corner of the site. MW-14 and MW-20 are located adjacent to the sump in the downgradient southeast corner of the site. Proposed monitoring well MW-15R is located downgradient of the sump located on the central part of the eastern side of the site.

7.4.3 Critical Receptors

Critical receptors to groundwater flow downgradient of a landfill could include public drinking water supply wells, individual drinking water or livestock wells, and surface water bodies used for drinking water supply. A comprehensive water well search was conducted in 2004 by Golder Associates as part of the permit amendment application. That study identified six individual wells downgradient of the facility within one mile. There are no public drinking water wells screened in the zone identified as the uppermost aquifer, downgradient the Security RDF, nor any surface water bodies used for drinking water near the site. The closest well appears to be more than 1000 feet south of the facility. The others range from about 2000-4000 feet south of the facility. Downgradient monitoring wells MW-17, MW-18, MW-19, MW-20, MW-14 and MW-15R are appropriately located between the waste fill area and those water wells to detect a release from the facility.

At the downgradient southern portion of the site, the top of Stratum III occurs at an approximate elevation of 160. Although the elevations of the Stratum III potentiometric surface is at a higher

elevation than the adjacent creek bottoms (approximate elevation of 170 msl), groundwater is confined within Stratum III and does not appear to discharge to Spring Creek or the West Fork of Spring Creek.

7.5 GROUNDWATER MONITORING SYSTEM

7.5.1 Existing System

Currently, sixteen monitoring wells are present on-site: six background wells, (MW-1, MW-2, MW-3, MW-4, MW-8, MW-15 and MW-16), three interior wells (MW-5R, MW-6 and MW-7) that are downgradient from the northern portion of the landfill and upgradient from the southern portion of the landfill, and seven downgradient wells (MW-4, MW-9, MW-10, MW-11, MW-12, MW-13 and MW-14).

In accordance with the approved permit, MW-11, MW-12, and MW-13 will be replaced by MW-17, MW-18, MW-19, and MW-20. In addition, a new monitoring well, MW-21, will be installed at the southwestern corner of the facility. The new wells will be developed and will be sampled as background wells for eight consecutive quarters prior to inclusion in the detection monitoring program. Semiannual sampling will be continued for non-plugged existing wells excepting MW-11, MW-12, and MW-13, which will remain in place for measuring groundwater elevations only, and renamed PMW-11, PMW-12, and PMW-13, respectively. Data related to each modification of the well system (well forms (SE-67), boring logs, development data, etc.) required for certification will be provided to the TCEQ.

Wells MW-5R, MW-6 and MW-7 are located within the proposed expansion area and will be plugged and abandoned in accordance with 16 TAC §76.702 and 16 TAC §76.1004, prior to landfill development in this area. MW-16 will also be plugged and abandoned in accordance with the approved permit and 16 TAC §76.702 and 16 TAC §76.1004.

Figure F.13 shows the locations of the existing and proposed monitoring wells. The locations and depths of the downgradient monitoring wells are designed to ensure the detection of groundwater contamination in the uppermost aquifer at the point of compliance (30 TAE §330.231(a)(2)). The most likely pathway for contaminant movement is within Stratum III, which is the uppermost aquifer at the site and the permeable unit where site monitoring wells are completed. Because groundwater flow is southerly, the downgradient wells are located on the southern portion of the site. Similarly, the background wells are located on the northern portion of the site hydraulically upgradient of the site and will allow determination of background groundwater quality that has not been affected by leakage from a unit (30 TAC §330.231(a)(1)).

Figure F.14 illustrates a typical monitoring well construction, which is in conformance with requirements within 30 TAC §330.242(a)(2). Wells will be drilled by Texas-licensed drillers who are qualified to drill and install monitoring wells using drilling equipment and methods appropriate for the site conditions. The drilling, installation, and development will be supervised by and a detailed log of the boring made by a qualified engineer or geologist who is familiar with the geology of the area (30 TAC §330.242(a)(1)). The boring will be at least 4-inches larger than the outer diameter of the well casing and screen. If water is used in drilling, it will be from a potable source, and a current chemical analysis will be provided with the monitoring well installation report.

7.5.2 Proposed Monitoring System

7.5.2.1 Design Criteria

In accordance with §330.403(a) and (e), *a groundwater monitoring system must be installed that consists of a sufficient number of monitoring wells installed at appropriate locations and depths to yield representative samples from the uppermost aquifer. The design of the system shall be based on site specific technical information that includes a thorough characterization of: aquifer thickness, groundwater flow rate, groundwater flow direction, including seasonal and temporal fluctuations in flow, effect of site construction and operations on groundwater flow direction and rates, and thickness, stratigraphy, lithology and hydraulic characteristics of saturated and unsaturated geologic units and fill materials overlying the uppermost aquifer, materials of the uppermost aquifer, and materials of the lower confining unit of the uppermost aquifer.*

The existing groundwater monitoring system for the Security RDF was designed and is operated in accordance with those rules and was certified by a qualified groundwater scientist.

The proposed modifications to the Security groundwater monitoring system are also designed in accordance with the required elements of the stated regulations AND have also been designed so that the monitoring well spacing does not exceed 600 feet or has otherwise been demonstrated to be adequate. Well spacing between all wells located on the downgradient point of compliance is 600 feet or less. Although designed for monitoring well spacing to be no further apart than 600 feet on the downgradient point of compliance, many of the wells have an effective spacing much closer than 600 feet. Because the groundwater flow approaches the POC at oblique angles, the effective spacing measured from groundwater flow lines perpendicular to isocontour lines is less than 600 feet. For example, effective spacing between MW-14 and MW-20 is approximately 500 feet and between MW-14 and proposed MW-15R is approximately 400 feet and the effective spacing between MW-9 and MW-21 is approximately 300 feet.

In order to achieve a groundwater monitoring system design to comply with §330.403, the following criteria listed in Table 6 were followed. The table lists the location of the appropriate section where the required information is located in this modification.

Table 6
Groundwater Monitoring System
Design Criteria

Criterion	Location of Information in this Report
Identify and Charactierize the Uppermost Aquifer	Section 3 – Site Hydrogeology
Establish Groundwater Flow Direction and Rate	Section 3.2 – Aquifer Characteristics Section 3.3 – Groundwater Flow Rate Section 3.4 – Groundwater Flow Direction
Evaluate Potential Impacts of Operational Attributes of the Facility on Groundwater Flow	Section 4.1 – Excavation, Bottom and Uppermost Aquifer Section 4.2 – Leachate Sumps
Determine Impacts of Critical Receptors	Section 4.3 – Critical Receptors
Determine the Appropriate Locations and Screened Intervals of Groundwater Monitoring Wells	Section 5.2.3 – Monitoring Well Locations Section 5.2.4 – Monitoring Well Screen Intervals

7.5.2.2 Contaminant Pathway Analysis

In the unlikely event that a contaminant would escape from the Security RDF containment systems into the underlying Stratum II clays, the clayey material would retard the lateral and downward vertical movement of the contaminant. Downward movement through the clays would be slow and movement into the uppermost aquifer difficult because the groundwater is under confined conditions.

If the contaminant was able to reach Stratum III, it would then move in a downgradient direction, generally southward, and would be detected in the groundwater monitoring system installed at the downgradient point of compliance.

7.5.2.3 Monitoring Well Location

The uppermost aquifer beneath the Security RDF site has been identified as Stratum III. Stratum III is a geologic unit consisting of interbedded clastic lithologies of silt, sand and gravel ranging in thickness from about 28-60 feet thick. The unit is present and correlateable across the site. Groundwater occurs in Stratum III under confined conditions.

The proposed monitoring system is shown on Figure F.12 and in Table 7. The system consists of nine downgradient wells, (9, 10,, 14, 15R, 17, 18, 19, 20, and 21) and two upgradient wells (MW-1 and MW-3).

The existing groundwater monitoring system contains seven upgradient (MW-1, MW-2, MW-3, and MW-4) or background wells (MW-8, MW-15, and MW-16). The approved 2004 groundwater monitoring plan called for the elimination of background well MW-16.

Based on past groundwater monitoring events there is no need for more than two upgradient wells. Therefore this plan calls for the elimination of MW-2 and MW-4 which will be removed from the system. MW-8 and MW-15, while not upgradient wells, were designated as background wells in the 2004 monitoring plan. Based on historical groundwater monitoring results MW-8 and MW-15 are not necessary and will be removed from the system and plugged in accordance with TCEQ regulations. Security RDF plans to retain MW-2, 4, 8, and 15 as observation wells for possible future water level reading. They will be renamed OW-2, OW-4, OW-8, and OW-15.

In accordance with the approved 2004 groundwater monitoring plan monitoring wells MW-11, MW-12, and MW-13 are no longer part of the groundwater monitoring system but are now designated as piezometers PMW-11, PMW-12, and PMW-13. These piezometers will be used for water level measurements only.

This permit modification then, proposes to remove four upgradient or background wells (MW-2,MW-4, MW-8, and MW-15), to lengthen the downgradient point of compliance on the southern part of the eastern boundary of the site to proposed well MW-15R and to add one downgradient point of compliance well (MW-15R) to the system. The location of proposed monitoring well MW-15R was selected to monitor the northern unit of the downgradient point of compliance on which no monitoring well was proposed in the approved system. Along with MW-18, MW-19, MW-20, and MW-14, proposed monitoring well MW-15R will monitor groundwater that flows beneath the pre-subtitle D area. Table 7 summarizes the proposed Security RDF groundwater monitoring system.

Table 7
Security RDF
Proposed Groundwater Monitoring System

Upgradient Monitoring Wells	Downgradient Monitoring Wells	Piezometers
MW-1	MW-9	PMW-11
MW-3	MW-10	PMW-12
	MW-14	PMW-13
	MW-15R	OW-2
	MW-17	OW-4
	MW-18	OW-8
	MW-19	OW-15
	MW-20	
	MW-21	

7.5.2.4 Monitoring Well Design Details

Because the excavation bottom occurs primarily in the Stratum II clayey unit overlying Stratum III, the groundwater monitoring wells are designed to be screened by 10 foot screens placed near the top of the Stratum III interval. Since the groundwater in Stratum III is confined, there is no evidence of vertical gradients. Screens placed in the upper 10 feet of the unit would provide the earliest possible detection of potential contaminants. Further hydraulic conductivity values in Table 3 show more than three orders of magnitude higher values in Stratum III than IV, indicating that horizontal rather than vertical flow is likely. The screen locations at the top of the interval would provide the earliest detection of a contaminant in the uppermost aquifer.

Monitoring well design details are shown in Figure F.14.

Monitoring wells will be constructed in accordance with the Typical Monitoring Well Construction Details indicated on Figure F.14, which is in conformance with requirements within 30 TAC Subchapter J. Wells will be drilled by a Texas-licensed driller who is qualified to drill and install monitoring wells using drilling equipment and methods appropriate for the site conditions. The drilling, installation, and development will be supervised by and a detailed log of the boring made by a qualified engineer or geologist who is familiar with the geology of the area. The boring will be at least 4-inches larger than the outer diameter of the well casing and screen. If water is used in drilling, it will be from a potable source, and a current chemical analysis will be provided with the monitoring well installation report.

Upon completion of he well, it will be developed until excessive turbidity due to drilling/installation has been removed and field measurements of pH, specific conductance and temperature have

stabilized. Development may be accomplished through the use of pumping and/or bailing.

Each well will be surveyed by a registered professional engineer or registered professional surveyor with vertical measurements to the nearest 0.01 foot and referenced to mean sea level. Survey point for each well will include the top of PVC casing (with referenced point marked), top of protective cap and ground surface adjacent to the well pad. Horizontal locations will be determined to the nearest 10th of a second or accurately located relative to the landfill grid system.

Within 30 days of well completion, well installation and construction information will be submitted to the commission on current forms. The report will include a detailed geologic log, any test results, development details, and a site map (to scale) showing the location of all monitoring wells. Any monitoring well that is damaged to the extent that it is no longer suitable will be reported to the commission with a recommendation for repair or replacement of the well.

The wells will be operated and maintained so that they will yield representative groundwater samples from the appropriate hydrogeologic unit (uppermost aquifer) throughout the life of the groundwater monitoring programs.

Table 8 provides completion data for the completed monitoring wells at the facility and Table 9 provides estimated completion data for the monitoring wells to be installed.

Table 8
Well Completion Data

Monitoring Well No.	Drilled Depth (ft)	Ground Surface Elevation (ft/msl)[1]	Groundwater Depth (ft)[2]	Top of PVC Elevation (ft/msl)[3]	Screen		Filter Pack	
					Depth to Top (ft)[4]	Depth to Base (ft)[4]	Depth to Top (ft)[4]	Depth to Base (ft)[4]
MW-4	30	188.1	8	190.67	25	30	20	30
MW-5	30	186.9	6.5	190.67	18	28	17	30
MW-5R	37.5	189.4	18.3	192.11	27	37	25	37.5
MW-6	29	184.8	8	186.08	23	28	18	29
MW-7	31	186	9.5	188.74	25	30	19	31
MW-8	24	183.4	8	185.24	17	22	15	24
MW-11	33	183.8	13	186.29	28	33	17	33
MW-12	28	185.6	15	187.15	23	28	17	28
MW-13	28	177.2	8	176.68	23	28	21	28
MW-15	30	175.6	4.5	177.13	18	27	16	30
MW-16	40	183.4	8	185.52	28	38	26	40

Table 9
Estimated Completion Data for Proposed Monitoring Wells

Monitoring Well No.	Drilled Depth (ft)	Ground Surface Elevation (ft/msl)[1]	Groundwater Depth (ft)[2]	Top of PVC Elevation (ft/msl)[3]	Screen[5]		Filter Pack	
					Depth to Top (ft)[4]	Depth to Base (ft)[4]	Depth to Top (ft)[4]	Depth to Base (ft)[4]
MW-1	30	187.5	6.5	191.23	23	27	16	30
MW-3	30	193.6	11	195.39	18	28	16	30
MW-9	33	188.9	16.5	191.29	24.5	32	22	33
MW-10	33	188.6	17	191.03	27	32	25	33
MW-14	28	177.6	6	179.29	17.5	25	15	28
MW-15R	30	175	10	178	20	30	18	30
MW-17	38	185	17	188	28	38	26	38
MW-18	41	182	14	185	31	41	29	41
MW-19	41	182	14	185	31	41	29	41
MW-20	31	180	12	183	21	31	19	31
MW-21	36	188	20	191	26	36	24	36

All elevations and depths are to the nearest foot above mean sea level (MSL) and are estimated from available maps and cross-sections. Construction details and locations may vary depending on field conditions when the wells are installed.

[1] Groundwater surface elevations estimated from site topographic map.
[2] Depths are measured from the ground surface and estimated based on site Topo maps.
[3] Top of PVC elevations are the estimated ground surface elevation plus typical 3' riser height.
[4] Depths are measured from the ground surface and estimated based on geologic mapping.
[5] Screens are to be placed near the top of Stratum III.

The proposed monitoring system, consisting of 11 monitoring wells, meets the requirements of 30 TAC §330.405 and the TCEQ Guidelines for preparing a Ground-water Sampling and Analysis Plan (GWSAP)

FIGURES F.1 – F.14

W

C

E

C'

220
200
180
160
140
120
100
80
60

MW-09
G-1
G-2
SB-07
SB-09
SB-13/PZ-09
SB-12/PZ-08
SB-16
F-6
MW-15
F-7
F-8

ORIGINAL GROUND SURFACE

GRAVEL

I
II
III
IV
V

?

10 0 10 20
Vertical scale feet

300 0 300 600
Horizontal scale feet

- CLAY
- SILTY CLAY
- SANDY CLAY
- SILT
- CLAYEY SILT
- SANDY SILT
- SAND
- CLAYEY SAND
- SILTY SAND
- GRAVEL
- GRAVELLY SAND
- FILL
- TOPSOIL
- INITIAL WATER ENCOUNTER
- STATIC WATER LEVEL

NOTE:
CROSS-SECTION MODIFIED FROM ORIGINAL BY GOLDER ASSOCIATES.

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST

3-14-07

J:\101\16\101\SECTIONCC.dwg Layout: Layout1 User: rpowledge

ISSUED FOR PERMITTING PURPOSES ONLY

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

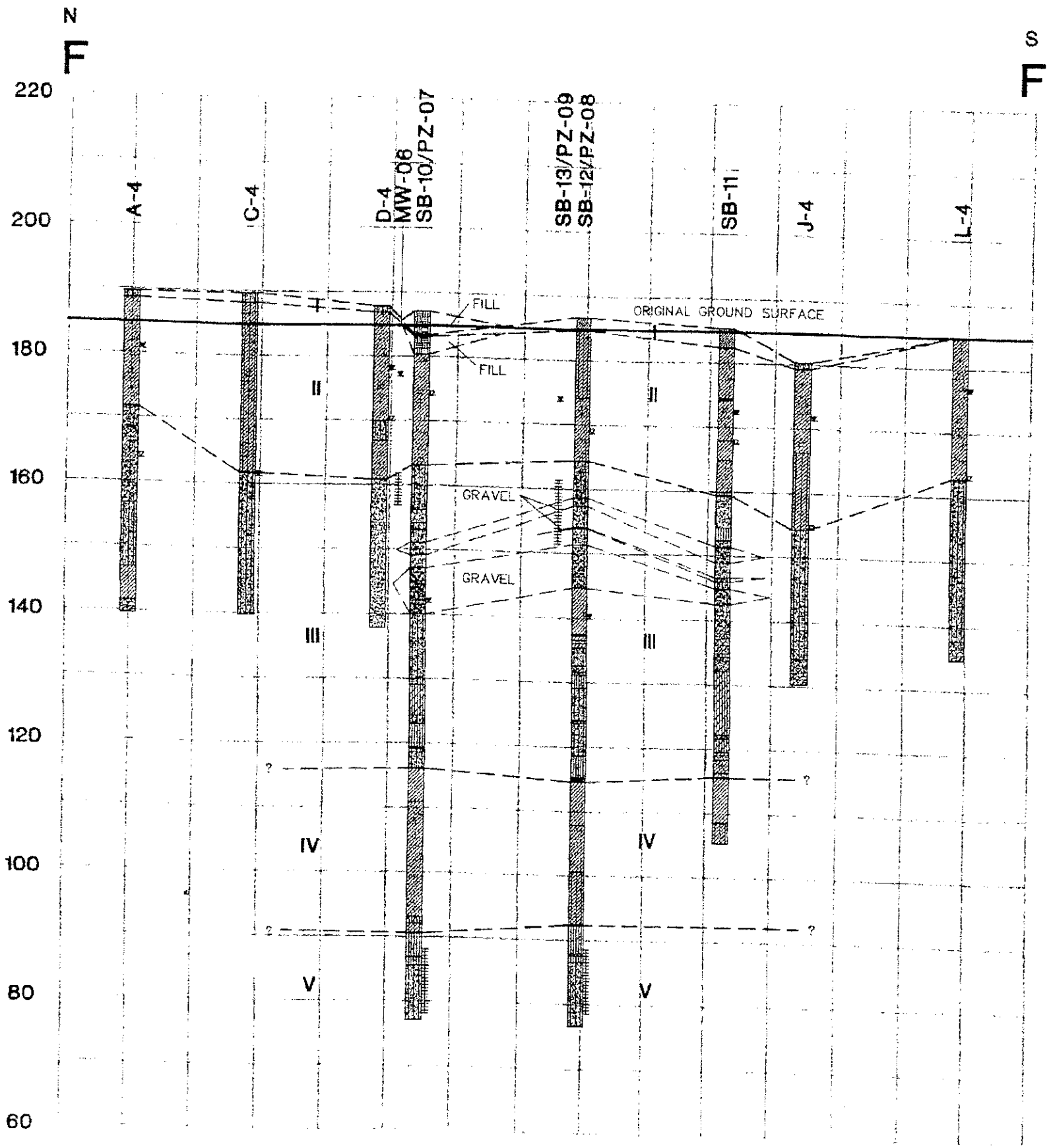
CROSS-SECTION C-C'

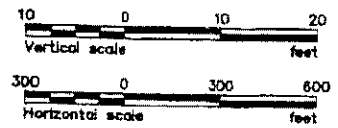
WASTE MANAGEMENT OF TEXAS, INC.
SECURITY RECYCLING AND DISPOSAL FACILITY
SUBCHAPTER J - PERMIT MODIFICATION

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

DSN.	MS	DATE :	11/06
DWN.	GLW	SCALE :	GRAPHIC
CHK.	MS	DWG :	SECTIONCC.dwg

FIGURE
F.1





- CLAY
- SILTY CLAY
- SANDY CLAY
- SILT
- CLAYEY SILT
- SANDY SILT
- SAND
- CLAYEY SAND
- SILTY SAND
- GRAVEL
- GRAVELLY SAND
- FILL
- TOPSOIL
- INITIAL WATER ENCOUNTERED
- STATIC WATER LEVEL
- INFERRED CORRELATIONS
- SCREENED INTERVAL

NOTE:
CROSS-SECTION MODIFIED FROM ORIGINAL BY GOLDER ASSOCIATES.

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST

3-14-07

CROSS-SECTION F-F'

WASTE MANAGEMENT OF TEXAS, INC.
SECURITY RECYCLING AND DISPOSAL FACILITY
SUBCHAPTER J – PERMIT MODIFICATION

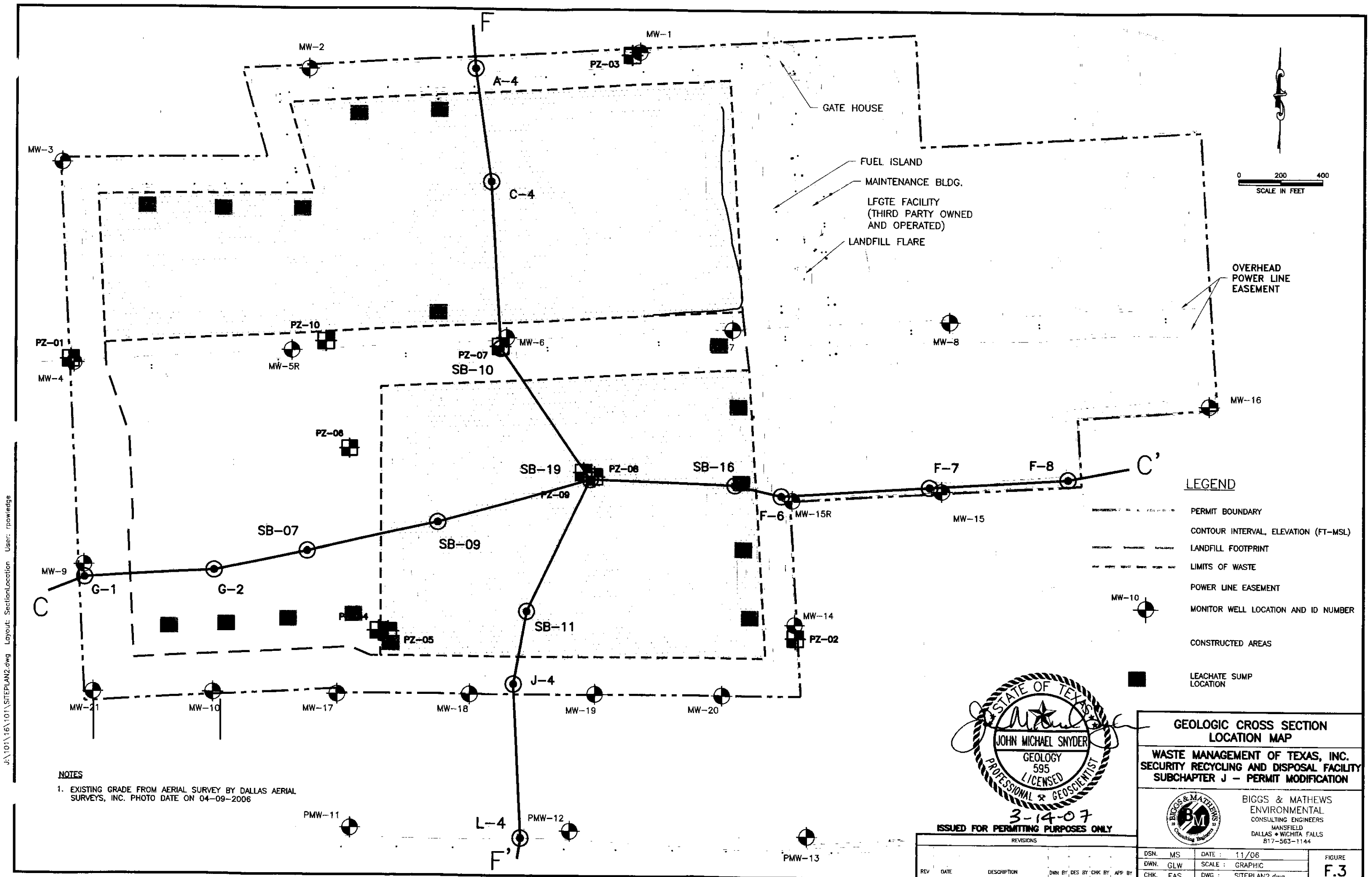
BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD
DALLAS • WICHITA FALLS
817-563-1144

ISSUED FOR PERMITTING PURPOSES ONLY

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

DSN. MS	DATE : 11/06	FIGURE
DWN. GLW	SCALE : GRAPHIC	F.2
CHK. MS	DWG : SECTIONFF.dwg	

J:\101\16\101\SECTIONFF.dwg Layout: Layout1 User: rpowledge



NOTES

1. EXISTING GRADE FROM AERIAL SURVEY BY DALLAS AERIAL SURVEYS, INC. PHOTO DATE ON 04-09-2006

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST

3-14-07

ISSUED FOR PERMITTING PURPOSES ONLY

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

GEOLOGIC CROSS SECTION LOCATION MAP

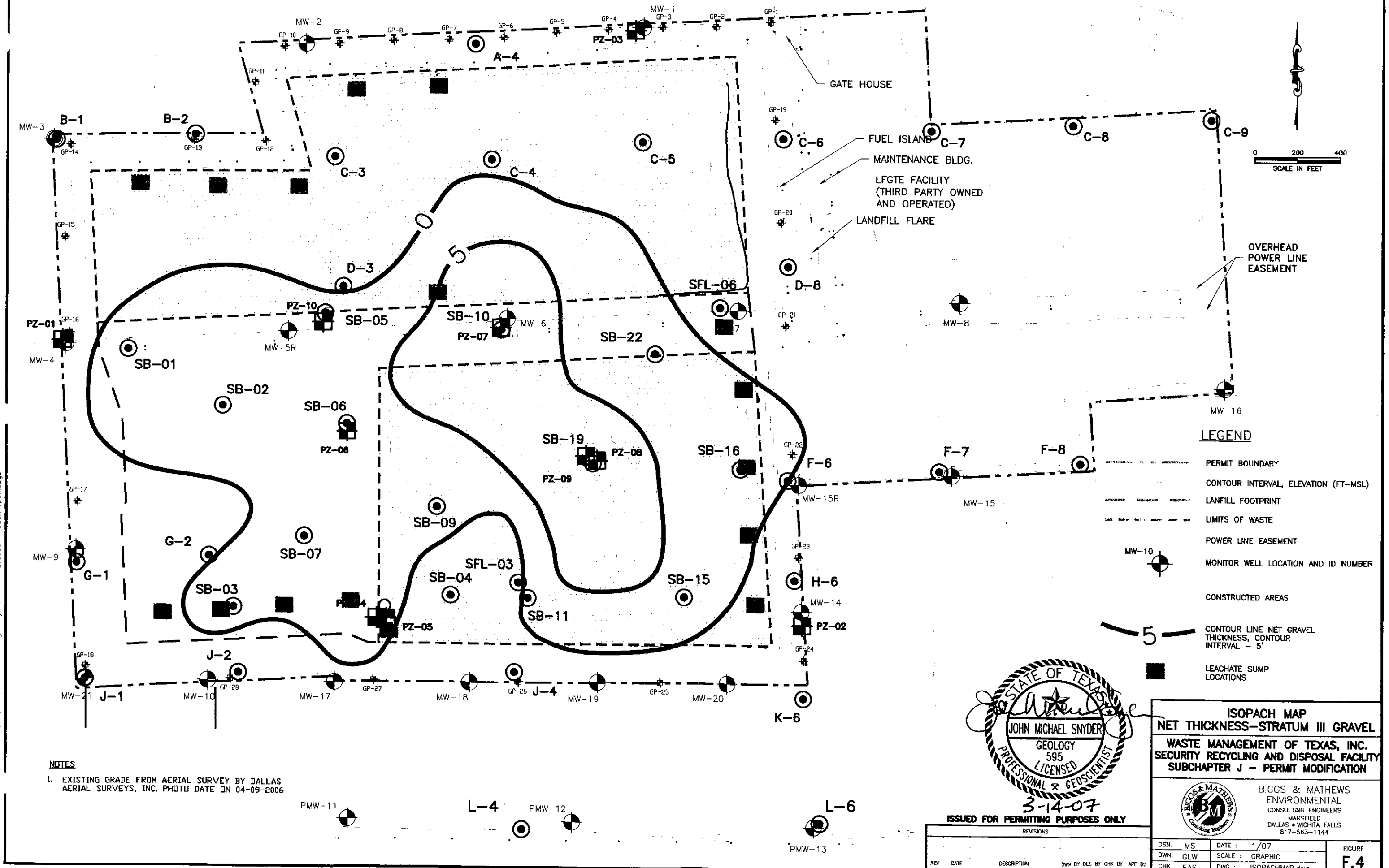
WASTE MANAGEMENT OF TEXAS, INC.
SECURITY RECYCLING AND DISPOSAL FACILITY
SUBCHAPTER J – PERMIT MODIFICATION

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

DSN.	MS	DATE :	11/06
DWN.	GLW	SCALE :	GRAPHIC
CHK.	EAS	DWG :	SITEPLAN2.dwg

FIGURE F.3

J:\101\16\101\SITEPLAN2.dwg Layout: SectionLocation User: rpowledge



LEGEND

- PERMIT BOUNDARY
- CONTOUR INTERVAL, ELEVATION (FT-MSL)
- LANFILL FOOTPRINT
- LIMITS OF WASTE
- POWER LINE EASEMENT
- MONITOR WELL LOCATION AND ID NUMBER (MW-10)
- CONSTRUCTED AREAS
- CONTOUR LINE NET GRAVEL THICKNESS, CONTOUR INTERVAL = 5' (5)
- LEACHATE SUMP LOCATIONS

NOTES

1. EXISTING GRADE FROM AERIAL SURVEY BY DALLAS AERIAL SURVEYS, INC. PHOTO DATE ON 04-09-2006

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST
3-14-07

ISSUED FOR PERMITTING PURPOSES ONLY

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

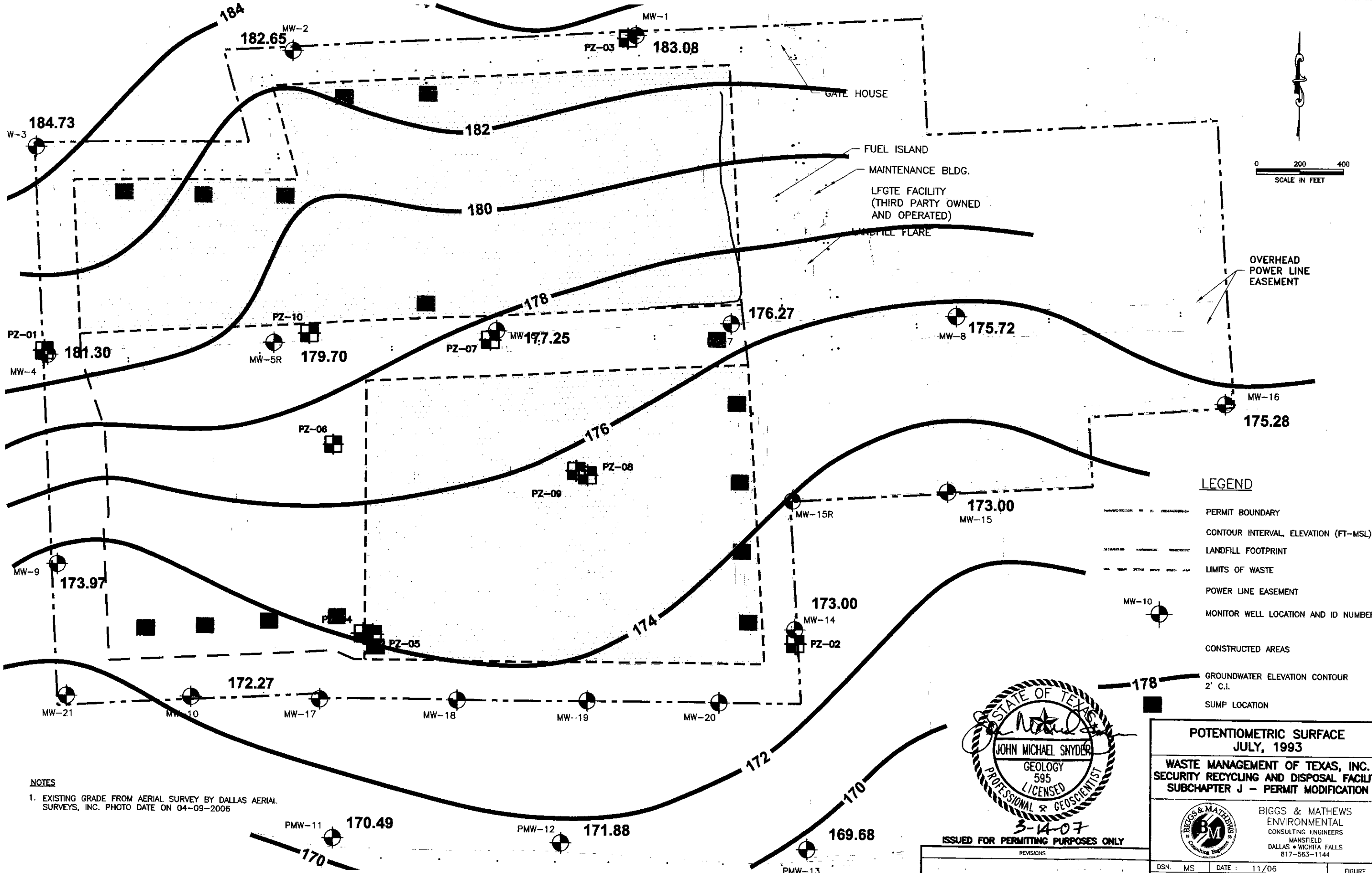
ISOPACH MAP
NET THICKNESS-STRATUM III GRAVEL

WASTE MANAGEMENT OF TEXAS, INC.
SECURITY RECYCLING AND DISPOSAL FACILITY
SUBCHAPTER J - PERMIT MODIFICATION

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

DSN. MS	DATE : 1/07	FIGURE
DWN. GLW	SCALE : GRAPHIC	F.4
CHK. EAS	DWG : ISOPACHMAP.dwg	

J:\101\16\101\ISOPACHMAP.dwg Layout: SectionLocation User: rpowledge



NOTES

1. EXISTING GRADE FROM AERIAL SURVEY BY DALLAS AERIAL SURVEYS, INC. PHOTO DATE ON 04-09-2006

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST
3-14-07

ISSUED FOR PERMITTING PURPOSES ONLY

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

POTENTIOMETRIC SURFACE JULY, 1993

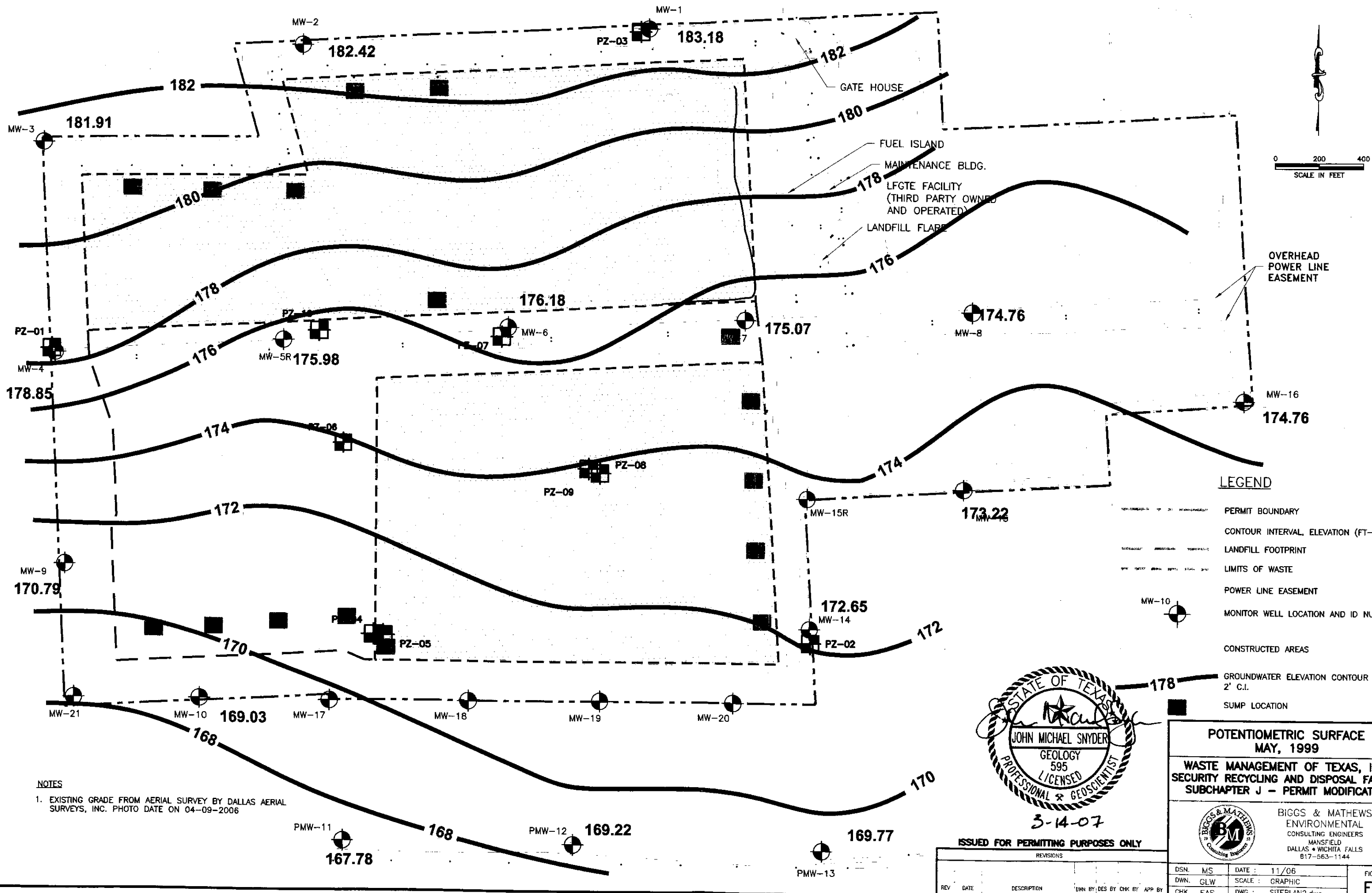
WASTE MANAGEMENT OF TEXAS, INC. SECURITY RECYCLING AND DISPOSAL FACILITY SUBCHAPTER J – PERMIT MODIFICATION

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

DSN.	MS	DATE :	11/06
DWN.	GLW	SCALE :	GRAPHIC
CHK.	EAS	DWG :	SITEPLAN2.dwg

FIGURE F.5

J:\101\16\101\SITEPLAN2.dwg Layout: July93 User: rpawledge



NOTES

1. EXISTING GRADE FROM AERIAL SURVEY BY DALLAS AERIAL SURVEYS, INC. PHOTO DATE ON 04-09-2006

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST

3-14-07

ISSUED FOR PERMITTING PURPOSES ONLY

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

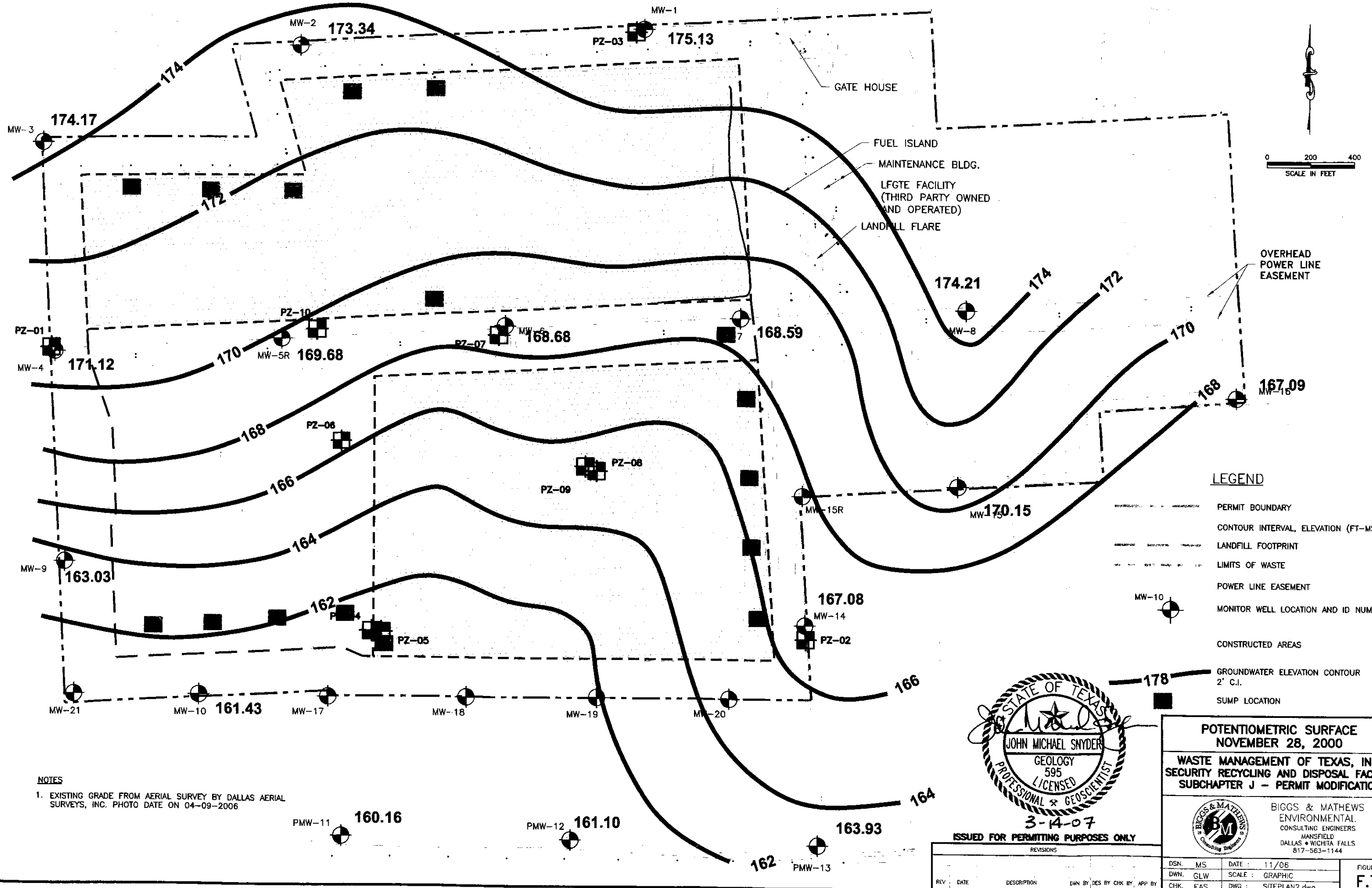
POTENTIOMETRIC SURFACE
MAY, 1999

WASTE MANAGEMENT OF TEXAS, INC.
SECURITY RECYCLING AND DISPOSAL FACILITY
SUBCHAPTER J – PERMIT MODIFICATION

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

DSN. MS	DATE : 11/06	FIGURE
DWN. GLW	SCALE : GRAPHIC	F.6
CHK. EAS	DWG : SITEPLAN2.dwg	

J:\101\16\101\SITEPLAN2.dwg Layout: May1999 User: rpowledge



NOTES

1. EXISTING GRADE FROM AERIAL SURVEY BY DALLAS AERIAL SURVEYS, INC. PHOTO DATE ON 04-09-2006

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST

3-14-07

ISSUED FOR PERMITTING PURPOSES ONLY

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

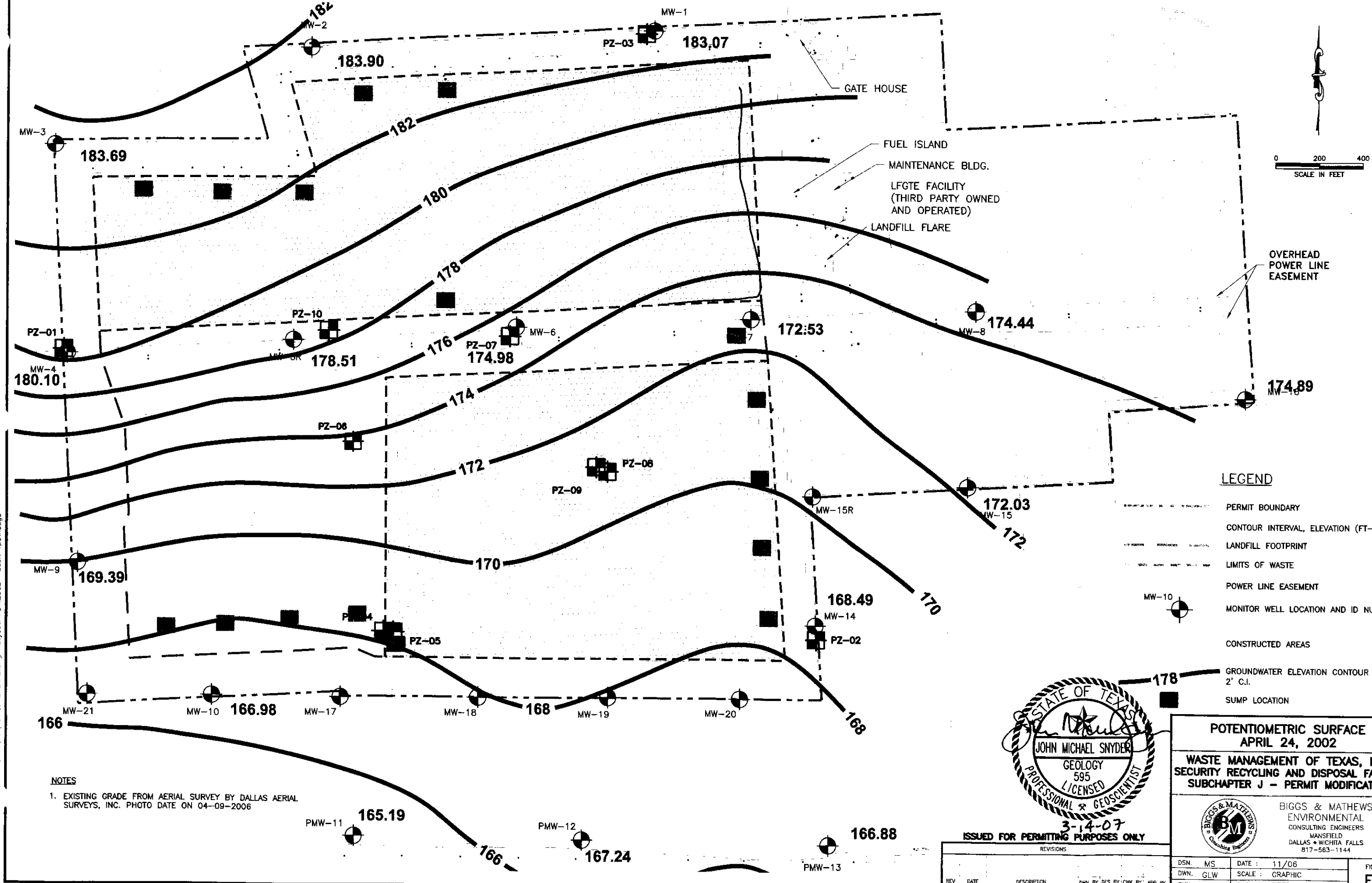
POTENTIOMETRIC SURFACE NOVEMBER 28, 2000

WASTE MANAGEMENT OF TEXAS, INC.
SECURITY RECYCLING AND DISPOSAL FACILITY
SUBCHAPTER J – PERMIT MODIFICATION

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

DSN. MS	DATE : 11/06	FIGURE
DWN. GLW	SCALE : GRAPHIC	F.7
CHK. EAS	DWG : SITEPLAN2.dwg	

J:\101\16\101\SITEPLAN2.dwg Layout: Nov2000 User: rpowledge



NOTES

1. EXISTING GRADE FROM AERIAL SURVEY BY DALLAS AERIAL SURVEYS, INC. PHOTO DATE ON 04-09-2006

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST
3-14-07

ISSUED FOR PERMITTING PURPOSES ONLY

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

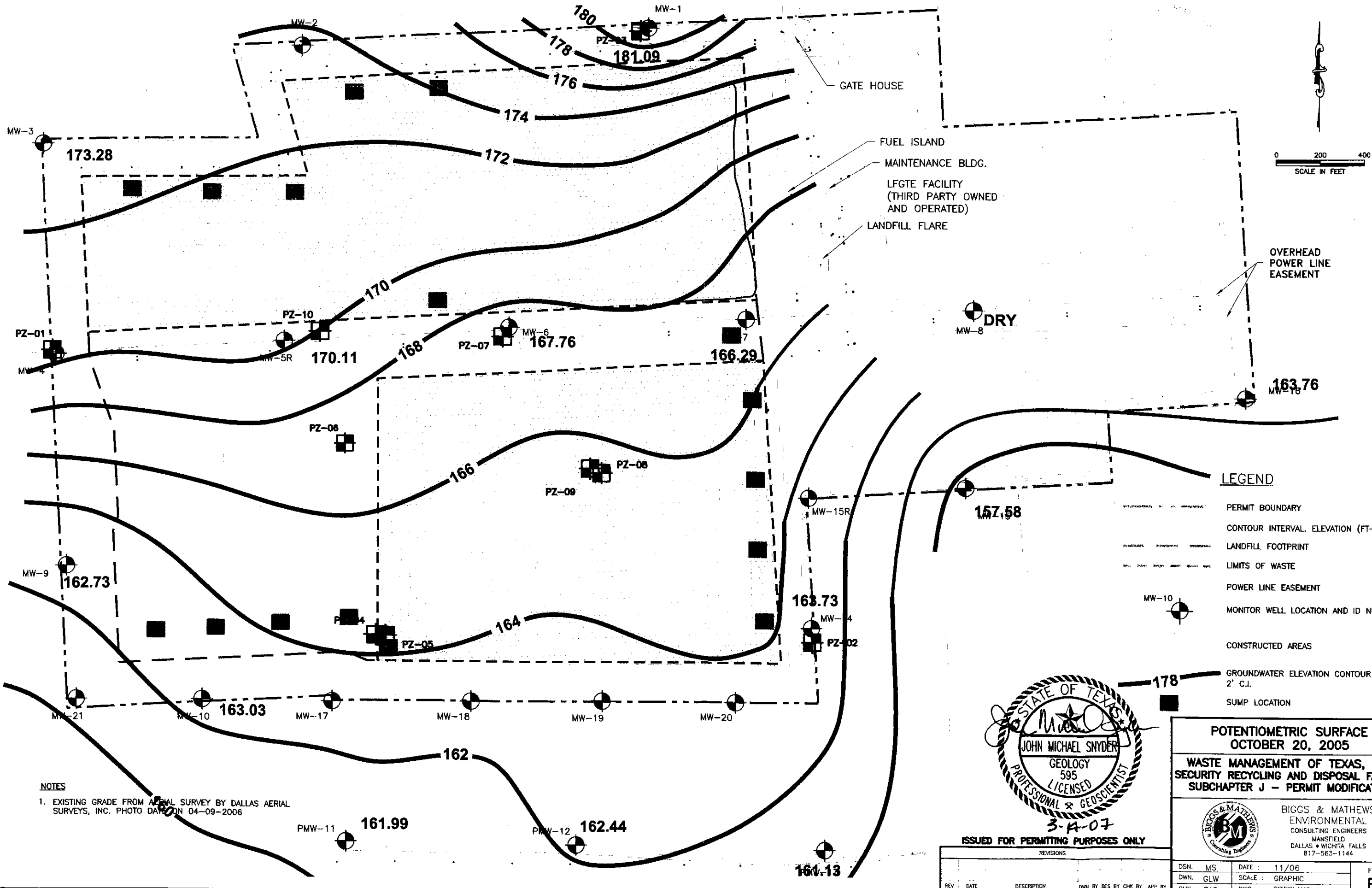
POTENTIOMETRIC SURFACE APRIL 24, 2002

WASTE MANAGEMENT OF TEXAS, INC. SECURITY RECYCLING AND DISPOSAL FACILITY SUBCHAPTER J – PERMIT MODIFICATION

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

DSN. MS	DATE : 11/06	FIGURE	
DWN. GLW	SCALE : GRAPHIC	F.8	
CHK. EAS	DWG : SITEPLAN2.dwg		

J:\101\16\101\SITEPLAN2.dwg Layout: April2002 User: rpowledge



NOTES

1. EXISTING GRADE FROM AERIAL SURVEY BY DALLAS AERIAL SURVEYS, INC. PHOTO DATED ON 04-09-2006

LEGEND

- PERMIT BOUNDARY
- CONTOUR INTERVAL, ELEVATION (FT-MSL)
- LANDFILL FOOTPRINT
- LIMITS OF WASTE
- POWER LINE EASEMENT
- MW-10 — MONITOR WELL LOCATION AND ID NUMBER
- CONSTRUCTED AREAS
- 178 — GROUNDWATER ELEVATION CONTOUR 2' C.I.
- SUMP LOCATION

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST
3-A-07

ISSUED FOR PERMITTING PURPOSES ONLY

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

POTENTIOMETRIC SURFACE OCTOBER 20, 2005

WASTE MANAGEMENT OF TEXAS, INC. SECURITY RECYCLING AND DISPOSAL FACILITY SUBCHAPTER J – PERMIT MODIFICATION

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

DSN.	MS	DATE :	11/06
DWN.	GLW	SCALE :	GRAPHIC
CHK.	EAS	DWG :	SITEPLAN2.dwg

FIGURE F.9

J:\101\16\101\SITEPLAN2.dwg Layout: October2005 User: rpowledge

UP MW-1 172.09

MW-2 172.58

PZ-03

UP MW-3 172.26

172

170

GATE HOUSE

FUEL ISLAND

MAINTENANCE BLDG.

LFGTE FACILITY (THIRD PARTY OWNED AND OPERATED)

LANDFILL FLARE

0 200 400
SCALE IN FEET

OVERHEAD POWER LINE EASEMENT

164

PZ-10

PZ-01 MW-4 169.79

169.50 MW-5R

168

PZ-07 MW-6

167.37

166.24

MW-8 DRY

MW-16

162

PZ-08

166

PZ-09

PZ-08

MW-15R

157.49 MW-15

160

158

MW-9 160.72

164

163.81 MW-1

PZ-04

PZ-05

PZ-02

MW-21 MW-10 160.72 MW-17 MW-18 MW-19 MW-20

162

178

PMW-11 160.72

PMW-12 161.35

161.75 PMW-13

LEGEND

- PERMIT BOUNDARY
- CONTOUR INTERVAL, ELEVATION (FT-MSL)
- LANDFILL FOOTPRINT
- LIMITS OF WASTE
- POWER LINE EASEMENT
- MW-10 MONITOR WELL LOCATION AND ID NUMBER
- CONSTRUCTED AREAS
- 178 GROUNDWATER ELEVATION CONTOUR 2' C.I.
- SUMP LOCATION

NOTES

1. EXISTING GRADE FROM AERIAL SURVEY BY DALLAS AERIAL SURVEYS, INC. PHOTO DATE ON 04-09-2006

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST
3-14-07

ISSUED FOR PERMITTING PURPOSES ONLY

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

POTENTIOMETRIC SURFACE FEBRUARY 6, 2006

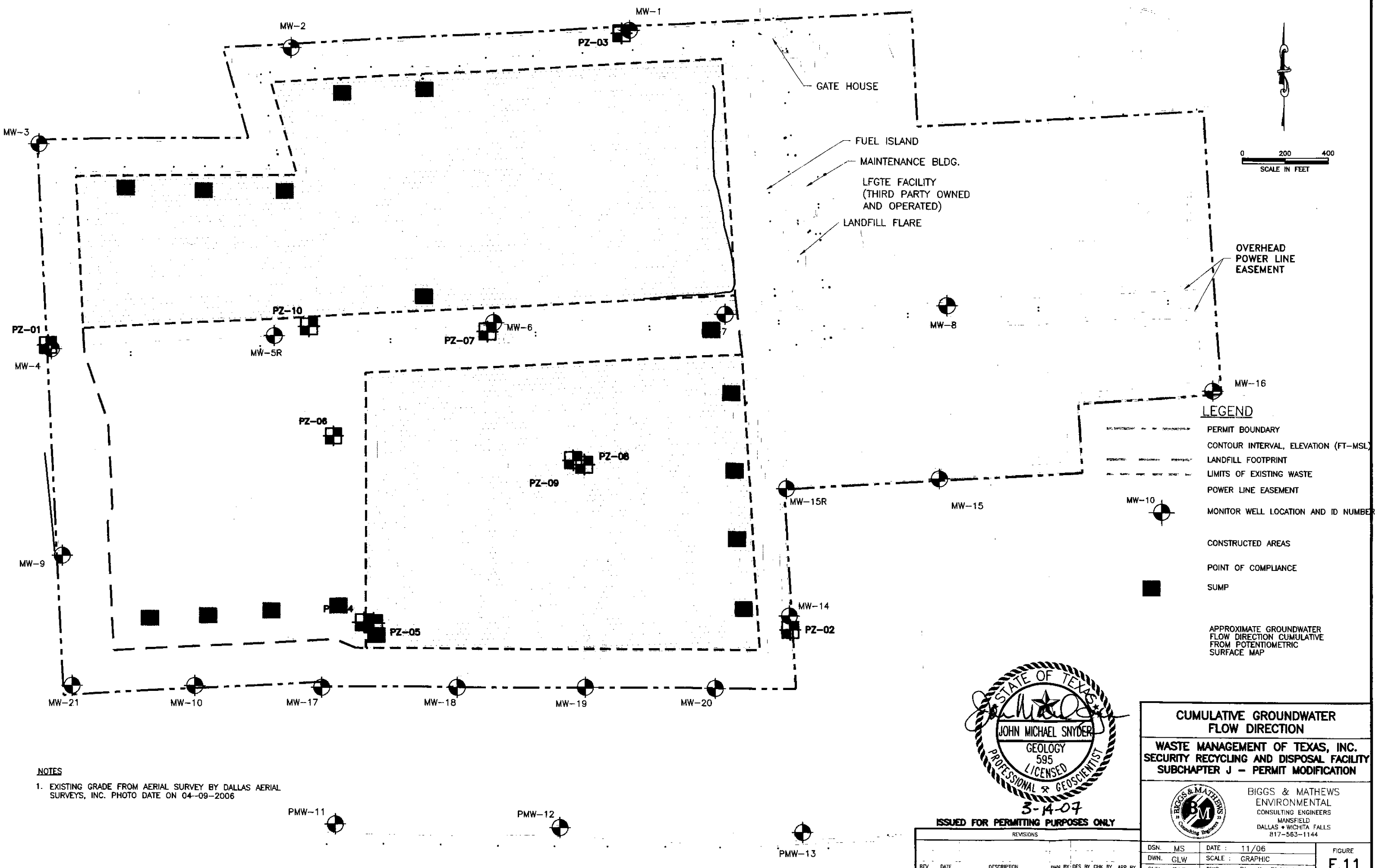
WASTE MANAGEMENT OF TEXAS, INC. SECURITY RECYCLING AND DISPOSAL FACILITY SUBCHAPTER J – PERMIT MODIFICATION

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

DSN.	MS	DATE :	11/06
DWN.	GLW	SCALE :	GRAPHIC
CHK.	EAS	DWG :	SITEPLAN2.dwg

FIGURE F.10

J:\101\16\101\SITEPLAN2.dwg Layout: February 2006 User: rpowledge



NOTES

1. EXISTING GRADE FROM AERIAL SURVEY BY DALLAS AERIAL SURVEYS, INC. PHOTO DATE ON 04--09--2006

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST
3-14-07

ISSUED FOR PERMITTING PURPOSES ONLY

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

CUMULATIVE GROUNDWATER FLOW DIRECTION

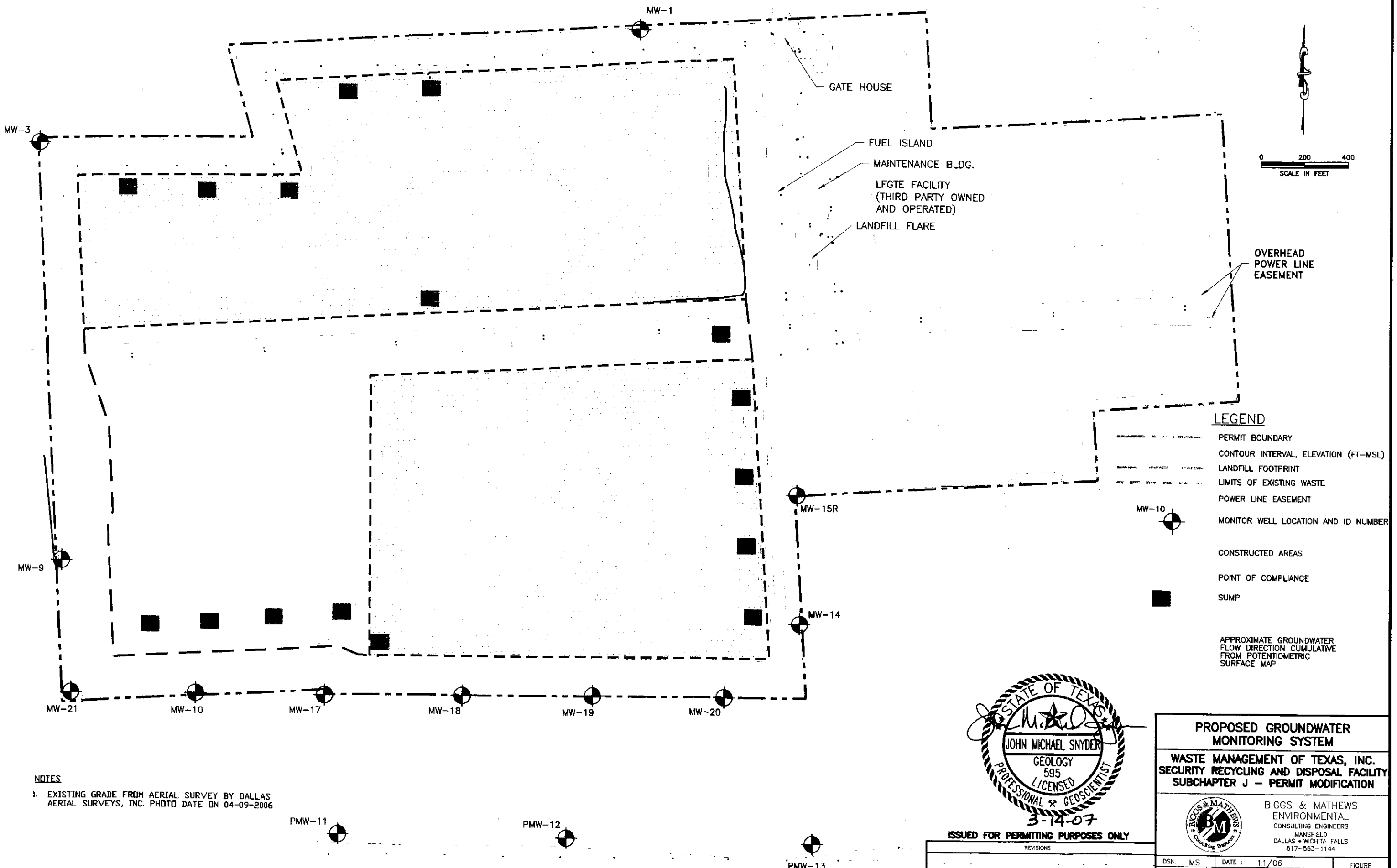
WASTE MANAGEMENT OF TEXAS, INC. SECURITY RECYCLING AND DISPOSAL FACILITY SUBCHAPTER J – PERMIT MODIFICATION

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

DSN.	MS	DATE :	11/06
DWN.	GLW	SCALE :	GRAPHIC
CHK.	EAS	DWG :	DirectionPLAN.dwg

FIGURE F.11

J:\101\16\101\DirectionPLAN.dwg Layout: DirectionPlan User: rpowledge



LEGEND

- PERMIT BOUNDARY
- CONTOUR INTERVAL, ELEVATION (FT-MSL)
- LANDFILL FOOTPRINT
- LIMITS OF EXISTING WASTE
- POWER LINE EASEMENT
- MONITOR WELL LOCATION AND ID NUMBER
- CONSTRUCTED AREAS
- POINT OF COMPLIANCE
- SUMP

APPROXIMATE GROUNDWATER FLOW DIRECTION CUMULATIVE FROM POTENTIOMETRIC SURFACE MAP

NOTES

1. EXISTING GRADE FROM AERIAL SURVEY BY DALLAS AERIAL SURVEYS, INC. PHOTO DATE ON 04-09-2006

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST
3-14-07

ISSUED FOR PERMITTING PURPOSES ONLY

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

PROPOSED GROUNDWATER MONITORING SYSTEM

WASTE MANAGEMENT OF TEXAS, INC. SECURITY RECYCLING AND DISPOSAL FACILITY SUBCHAPTER J – PERMIT MODIFICATION

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

DSN.	MS	DATE :	11/06
DWN.	GLW	SCALE :	GRAPHIC
CHK.	EAS	DWG :	CompliancePLAN.dwg

FIGURE F.12

J:\101\16\101\CompliancePLAN.dwg Layout: Compliance User: rpowledge

MW-1
MW-2
MW-3
MW-4
MW-5R
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-15
MW-15R
MW-16
MW-17
MW-18
MW-19
MW-20
MW-21
GP-1
GP-2
GP-3
GP-4
GP-5
GP-6
GP-7
GP-8
GP-9
GP-10
GP-11
GP-12
GP-13
GP-14
GP-15
GP-16
GP-17
GP-18
GP-19
GP-20
GP-21
GP-22
GP-23
GP-24
GP-25
GP-26
GP-27
GP-28
L-4
PMW-11
PMW-12
PMW-13

GATE HOUSE
FUEL ISLAND
MAINTENANCE BLDG.
LFGTE FACILITY
(THIRD PARTY OWNED
AND OPERATED)
LANDFILL FLARE
OVERHEAD
POWER LINE
EASEMENT

LEGEND

- PERMIT BOUNDARY
- CONTOUR INTERVAL, ELEVATION (FT-MSL)
- LANDFILL FOOTPRINT
- LIMITS OF WASTE
- POWER LINE EASEMENT
- MW-10 — MONITOR WELL LOCATION AND ID NUMBER
- MW-10 — MONITOR WELLS TO BE PLUGGED
- PMW-12 — WATER LEVEL PIEZOMETERS
- MW-15R — MONITOR WELLS TO BE INSTALLED
- CONSTRUCTED AREAS

NOTES

1. EXISTING GRADE FROM AERIAL SURVEY BY DALLAS AERIAL SURVEYS, INC. PHOTO DATE ON 04-09-2006

STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST
3-14-07

ISSUED FOR PERMITTING PURPOSES ONLY

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

MONITORING SYSTEM STATUS

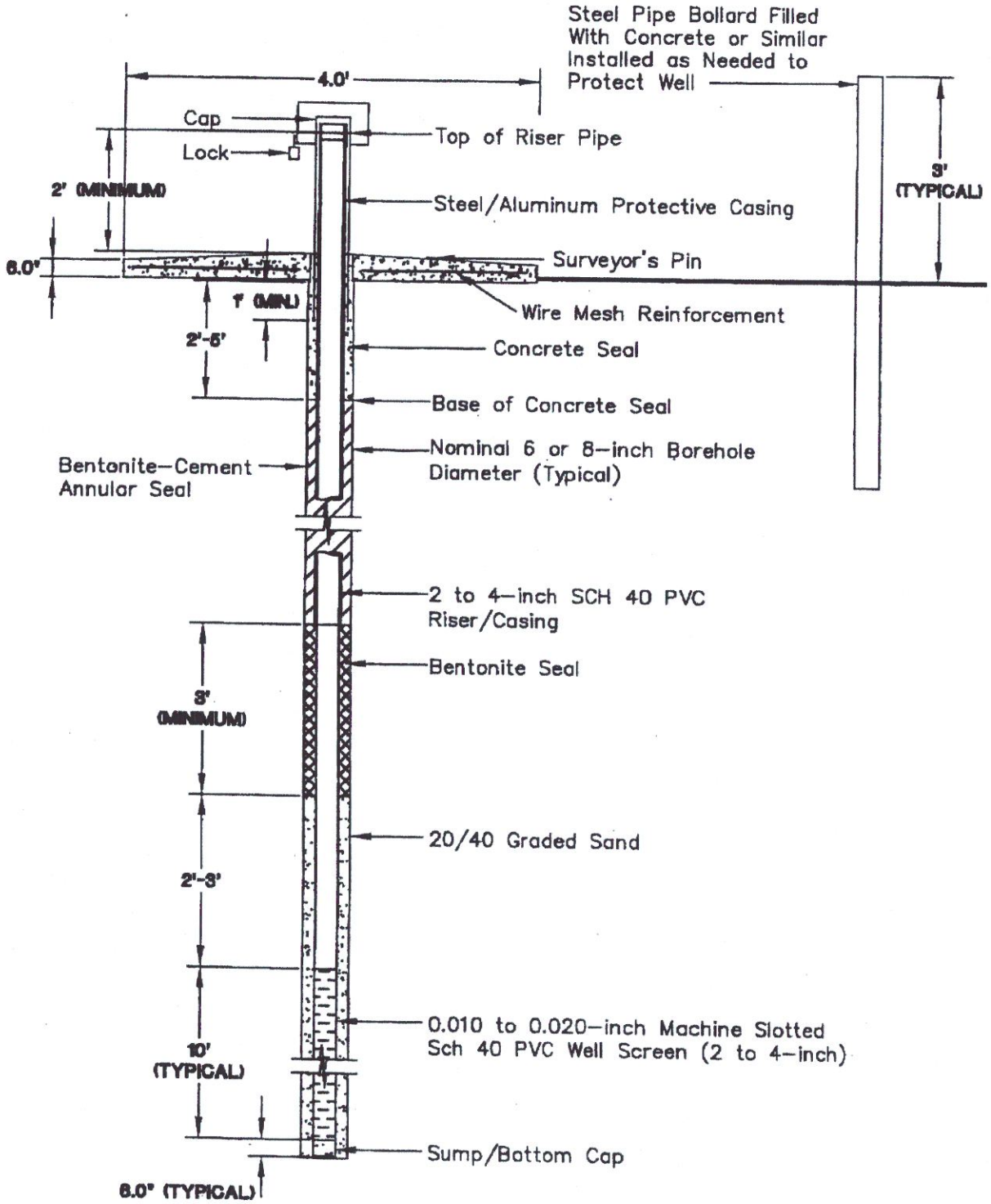
WASTE MANAGEMENT OF TEXAS, INC.
SECURITY RECYCLING AND DISPOSAL FACILITY
SUBCHAPTER J – PERMIT MODIFICATION

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

DSN.	MS	DATE :	11/06
DWN.	GLW	SCALE :	GRAPHIC
CHK.	MS	DWG :	MWPLAN.dwg

FIGURE F.13

J:\101\16\101\MWPLAN.dwg Layout: Layout1 User: rpowledge



STATE OF TEXAS
JOHN MICHAEL SNYDER
GEOLOGY
595
LICENSED
PROFESSIONAL GEOSCIENTIST

3-14-07

J:\101\16\101\MWDETAIL.dwg Layout: Layout1 User: rpowledge

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

MONITORING WELL DETAIL

WASTE MANAGEMENT OF TEXAS, INC.
SECURITY RECYCLING AND DISPOSAL FACILITY
SUBCHAPTER J – PERMIT MODIFICATION

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

DSN. MS	DATE : 11/06	FIGURE
DWN. GLW	SCALE : GRAPHIC	F.14
CHK. MS	DWG : MWDETAIL.dwg	

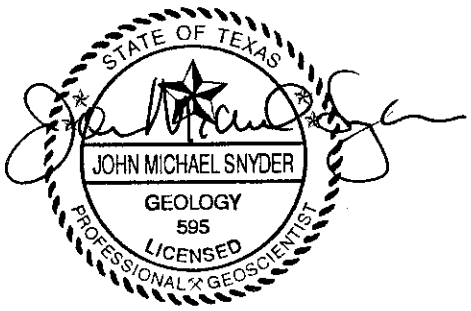
Groundwater Sampling and Analysis Plan (GWSAP) for Security RDF, Montgomery County, Texas

MSW Permit No. 1752B

Prepared for:

WASTE MANAGEMENT

Waste Management of Texas, Inc.
100 Genoa Red Bluff
Houston, Texas 77034



3-14-07

Prepared by:

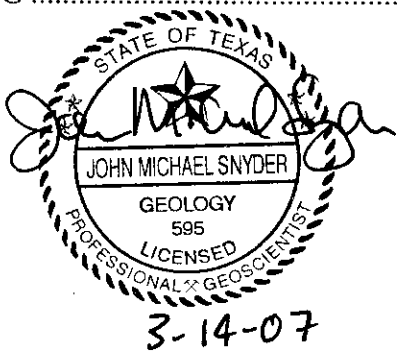
Biggs & Mathews Environmental
1700 Robert Rd., Suite 100
Mansfield, Texas 76063

Revision 3.0 March 2007

TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1
2.0 GROUNDWATER SAMPLING PROCEDURES 2
2.1 Well Inspection 2
2.2 Health and Safety 2
2.3 Sample Collection 2
2.3.1 Water Level Measurements 2
2.3.2 Equipment Decontamination 3
2.3.3 Purging/Bailing 3
2.5 Sample Preservation 4
2.6 Sample Shipment 4
2.6.1 Chain of Custody 5
3.0 GROUNDWATER ANALYSIS PROCEDURES 6
3.1 Analytical Methods/Procedures 6
3.2 Quality Assurance/Quality Control - §330 Subchapter F 6
4.0 ESTABLISHMENT OF BACKGROUND GROUNDWATER QUALITY 13
5.0 DETECTION MONITORING 15
5.1 Groundwater Detection Monitoring Parameters 15
5.2 Groundwater Detection Monitoring Frequency 15
5.3 Statistical Analysis 15
5.3.1 Statistical Methodology 16
5.4 Reporting Requirements 18
6.0 ASSESSMENT MONITORING 20



LIST OF TABLES

2-1 Groundwater Sample Collection, Preservation and Holding Times

2-2 Analytical Methodologies

3-1 Reporting Limits

4-1 Background Parameters

5-1 Detection Monitoring Parameters

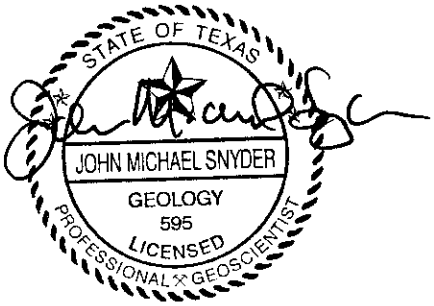
6-1 Water Quality Parameters

LIST OF APPENDICES

Appendix A Field Information Form

Appendix B Chain of Custody Form

Appendix C Laboratory Review Checklist



3-14-07

1.0 INTRODUCTION

On October 9, 1993, the state of Texas promulgated regulations governing all aspects of municipal solid waste management (30 Texas Administrative Code, Chapter 330). Subchapter I, §330.233 required that the owners or operators of Municipal Solid Waste Landfills (MSWLFs) prepare and submit a Groundwater Sampling and Analysis Plan (GWSAP) to the Texas Commission on Environmental Quality (TCEQ). On March 27, 2006, TCEQ promulgated changes to the Chapter 330 rules including renaming the applicable groundwater section to Subchapter J (§330.401 through §330.421). The revised Subchapter J rules require a permit modification with public notice to revise any inconsistent permit provisions between the site's approved GWSAP and the new rules be submitted by March 27, 2008 (§330.401(b)). The purpose of this document is to satisfy the requirements of the above listed regulations as they pertain to Security Recycling and Disposal Facility (RDF).

In addition, Waste Management is proposing to adopt the 40 Code of Federal Regulations (CFR) Part 258, Appendix I Subtitle D, Appendix I list for detection monitoring parameters and to eliminate the statistical analysis of the analytical results for the water quality parameters. The TCEQ has previously indicated its support of removing the water quality parameters from statistical analysis. Security RDF already samples for unfiltered metals.

The facility GWSAP document provides information concerning the Detection Monitoring program which includes sampling and analysis methodologies, the establishment of background groundwater quality, and detection monitoring procedures. The Commission's "Guidelines for Preparing a Groundwater Sampling and Analysis Plan", dated May 1994 and "MSW Groundwater Monitoring Regulatory Procedures", dated May 1998 were used to assist in the preparation of this GWSAP.

2.0 GROUNDWATER SAMPLING PROCEDURES

2.1 Well Inspection

Prior to performing any purging or sampling, each monitoring well will be inspected to assess its integrity. The condition of each well will be evaluated for any physical damage that may have been caused by the operation of site equipment of other vehicular traffic. The security of each well will be assessed to confirm that no outside source constituents have been introduced to the well. All inspection information, as well as the date and time, general weather conditions, and sampling personnel identification, will be documented on the Field Information Form (Appendix A). If it has been determined that the integrity of the well has been, or may have been, compromised the necessary information will be documented and the Commission notified within 45 days of discovery of the compromised monitoring well.

2.2 Health and Safety

A Health and Safety Document for sampling personnel will be reviewed by the sampling personnel prior to field activities.

2.3 Sample Collection

Each monitoring well in the groundwater monitoring system will have a dedicated sampling device (e.g., an air driven bladder pump or a Teflon™ or stainless steel bailer). If a non-dedicated sampling device is used it will be properly decontaminated prior to use unless it is for single use (disposable).

2.3.1 Water Level Measurements

Prior to groundwater purging and sampling, water level measurements will be taken at each well location utilizing a portable water level indicator, fiberglass tape, or other suitable measuring device. Water levels should be measured from the same location on each well for each sampling event. Depth to water will be measured to the nearest 0.01 foot. Water level measurements will be collected over a period of time short enough to avoid temporal variations in water levels.

If site wells are known to be contaminated, water level measurements will be proceed from wells least likely to be contaminated to those wells known to be contaminated, regardless of recorded high/low water levels. To further prevent cross-contamination between sampling points, the measuring instrument will be decontaminated between well locations following the procedures discussed in Section 2.3.2.

2.3.2 Equipment Decontamination

All equipment used for the collection of groundwater samples will be decontaminated prior to use at each well location unless the equipment is disposable or dedicated to a specific well. An appropriate decontamination procedure will be sufficient to avoid (and prevent) the introduction of any contaminant into a well and to not allow any contaminant to be transported between wells that will create false sample results or otherwise harm the environment. The decontamination will include a thorough final rinse with distilled or deionized water. Decontamination fluids will be managed appropriately for disposal.

2.3.3 Purging/Bailing

Prior to sampling at each well location, water will be evacuated until a minimum of three well volumes has been purged, until the well has been pumped or bailed dry, or until an appropriate amount of water has been purged to achieve the collection of a representative sample. If bailers are used, they should have a bottom emptying device to minimize aeration. Similarly, if pumps are used, they should be designed to prevent inadvertent contamination and unnecessary aeration. Care should be taken to prevent potential contamination, and disposable gloves (e.g., latex or nitrile) will be worn during purging. The gloves will be changed between each well.

If the well contains less than three well volumes, the well will be pumped or bailed dry, allowed to recover and immediately sampled. If sufficient water is not available for sampling within 48 hours of purging for slowly recovering wells, the well will be considered dry. As discussed previously a dedicated sampling device or bailer will be utilized for this task. Purge water will be managed appropriately for disposal.

If low flow (minimal drawdown) purge and sample techniques are to be used, TCEQ *Guidelines for Low-Flow Purging and Sampling of Groundwater Monitor Wells*, which are generally in accordance with guidance contained in EPA publication EPA/540/S-95/504, *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures* (April 1996) will be followed. Groundwater will be considered representative once pH, specific conductance, turbidity, and temperature have stabilized. This will insure that samples are drawn from the water bearing unit and not from stagnant water left in the well screen between sampling events.

Data collected prior to sampling will be recorded on a prepared Field Information Form (Appendix A). This data should include the well inspection, initial depth to water from the top of the well casing, well depth, height of water column, well diameter, well volume, purging rate and time, volume of purged water, pH, specific conductance, and temperature during purging.

2.4 Timing and Order of Sampling

The elapsed time for sampling will be minimized, to the extent possible, to reduce the potential for temporal variations. If contamination is known to be present in one or more wells, these wells will be the last sampled to minimize the potential for cross contamination. Where no contamination is known, sampling will begin in the upgradient portions of the site and proceed to downgradient wells.

2.5 Sample Preservation

The appropriate sample container and preservative requirement for each analyte is listed on Table 2-1. Pre-labeled containers may be supplied by the laboratory or sampling personnel for each sampling event. The appropriate preservatives will be added to each sample container based on the required analytical method.

2.6 Sample Shipment

After collection and sample preservation, the sample bottles will be wiped clean, labeled and placed into an insulated, plastic-shelled cooler or other suitable container with frozen ice

packs or ice. The temperature of the samples will be recorded when the cooler arrives at the analytical laboratory to assure that the appropriate sample temperature was maintained during shipment. All samples included in the cooler will be packed in such a manner to minimize the potential for container breakage. VOA vials and TOX bottles will never be placed directly on the ice packs. A Field Information Form (Appendix A) and Chain of Custody Form (Appendix B) will be sealed in a water resistant bag and placed with the appropriate sample bottle set. The coolers will then be sealed with a tamper proof custody seal and sent to the designated analytical laboratory. All shipments will be scheduled for next day delivery. The Bill of Lading or receipt for cooler shipment will be attached to the Chain of Custody form upon arrival at the analytical laboratory.

2.6.1 Chain of Custody

Appropriate Chain of Custody procedures for samples will be implemented to ensure sample integrity and to provide technically and legally defensible groundwater quality data. At the time each sample is collected, Chain-of-Custody (Appendix B) and Field Information Forms (Appendix A) will be completed and placed in the cooler. The Field Information Form will include general sampling event information including location, time, weather conditions, sampler identification, well integrity, any numerical field data values, and well purging procedures. The cooler will then be sealed with a tamper proof custody seal provided with the cooler. Upon arrival of the cooler at the laboratory, the cooler will be opened and the Chain of Custody forms will be signed and time/dated by the person taking custody of the samples. If the cooler is shipped, this person will affix the bill of lading or receipt to the Chain of Custody form.

3.0 GROUNDWATER ANALYSIS PROCEDURES

3.1 Analytical Methods/Procedures

Table 2-2 presents the methodologies used by WM's designated laboratory for each parameter or group of parameters. Analytical methods listed on Table 2-2 may change in response to improvements in analytical technology. The TCEQ will be notified if a change in analytical methods results in higher reporting limits (RLs). All methods are USEPA approved. Minimum reporting limits for each constituent are identified on Table 3-1.

3.2 Quality Assurance/Quality Control - §330 Subchapter F

Security RDF 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 and/or a Laboratory Review Checklist will be performed and submitted in accordance with Chapter 330 Subchapter F, Analytical Quality Assurance and Quality Control, until its expiration on January 1, 2009 at which time facility will submit laboratory data and analysis prepared by a TCEQ accredited environmental testing laboratory and in accordance with acceptable accreditation standards (e.g. NELAC). NELAC standards require that laboratories have an established quality system that includes a comprehensive laboratory quality manual (LQM) and an authorized quality assurance officer. The new laboratory specific requirements of Subchapter F are currently and have been historically addressed through this system. A copy of the LQM will be maintained in the Security RDF 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 Security RDF may ensure that all sample collection, preparation and analyses, and data management activities have been conducted in accordance with

Subchapter F. 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 Security RDF 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. To comply with the laboratory QA/QC requirements of Subchapter F, either a completed version of the laboratory review checklist (included as Appendix C), 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 noted in Subchapter F for 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.

Field Sampling QA/QC

Field and Trip Blanks. Trip and field blanks will be utilized during each round of sampling at the site. The trip blank, containing laboratory-grade distilled water, will remain unopened and be packaged and sent from and to the laboratory in the same manner as the site environmental samples. The analytical laboratory supplying the sample bottles and shipping containers will provide the trip blank. Trip blanks will be analyzed for VOCs only. The field blank will be prepared in the field by pouring the supplied laboratory-grade distilled water into one of the clean sample containers opened in the field. The field blank will then be sealed and shipped in the same manner as the environmental samples and typically analyzed for the same parameters.

If non-dedicated sampling equipment is used, an equipment blank will be collected by pouring supplied laboratory-grade distilled water or deionized water through the sampling device after sampling and decontamination into a clean, laboratory provided, sample container opened in the field. The equipment blank will then be sealed, shipped, and analyzed for the same parameters as the groundwater sample.

Laboratory QA/QC

Analytical Blanks and Spikes. The selected laboratory will use TCEQ approved Method Quality Control (QC) procedures. Duplicate samples, method blanks, instrument/reagent blanks, matrix spikes, blank/water reagent spikes and surrogate spikes are typical quality control checks performed throughout the analytical laboratory. With the exception of instrument/reagent blanks and surrogate spikes, these checks are performed at frequency of 5% or 10% (i.e., 1 in 20 samples, 1 in 10 samples). Instrument/reagent blanks and surrogate spikes are performed on a daily or per sample (where required by Method) frequency. Each of the above applied QC checks will be compared against the Acceptance Criterion for each QC checks to ensure that analytical quality is maintained.

The method blank is a blank solution which is treated as a sample for the parameter being measured, including all pretreatment/preparation procedures, and is analyzed in the same manner as the environmental samples to assess analytical accuracy and the potential for sample contamination. Instrument/reagent blanks are used on a daily basis (where used) to detect contamination or interferences in the sample treatment solvents and chemicals to ensure that none of these applied chemicals could systematically bias sample results.

Matrix spikes are environmental samples fortified with known concentrations of analytes expected to be in the sample. The percent recovery of any spiked analyte is taken as a measure of the bias of the analytical method caused by the sample matrix. Blank/reagent water spikes are blank solutions fortified with known concentrations of analytes expected to be in environmental samples. These spikes may (reagent water spikes) or may not (blank spike) be taken through the full analytical procedure prior to analysis. The percent recovery of any spiked analyte is taken as a measure of control on the analytical procedure. A

surrogate spike is performed on every sample and QC sample where the analytical method requires it. A surrogate spike is made by adding a known compound that is not expected to be in the environmental sample and adding it to the sample. Volatile Organic Compound analysis uses this type of spike to measure method extraction efficiency.

Instrument Calibration. Instruments are calibrated using calibration standards and method specified calibration criteria. A solution containing various compounds of known concentrations is diluted and analyzed to establish calibration curves. Calibration is performed daily or per the Method to monitor the accuracy and precision of the instrument. Instrument calibration is verified by analyzing a solution containing a known concentration of the pure compound(s) of interest and comparing it against the calibration curve. This standard compound is taken from the same stock as that used to develop the calibration curve. Calibration verification is done at a 5% frequency, or as the Method requires, to check the stability of the calibration curve as well as the accuracy and precision of the system or analyst.

All standards and reagents used in laboratory procedures will be inventoried, labeled, logged, and documented in accordance with the designated laboratory's documentation procedures. All stock standards are purchased as certified primary solutions from reputable, commercial lab suppliers, and are prepared from neat chemicals with certified purity. Stock standards are combined and/or diluted into secondary dilution standards, which are then diluted into working standards.

Instrument Maintenance. Routine maintenance is performed and documented for all major instruments. Maintenance schedules to be followed for the major instruments are summarized in the analytical laboratory LSOP provided to the TCEQ.

Method Detection Limits (MDLs). The analytical laboratory uses the procedures described in Appendix B to 40 CFR 136 to determine MDLs. Each year, Method specific upper and lower precision and accuracy limits are developed from historical matrix spike and duplicate data. MDLs will be checked on an annual basis to determine if a statistical difference exists

between the former year's MDL and the yearly update. An appropriate outlier test will be used by the designated laboratory to determine if a statistical difference exists between the two years' mean values.

4.0 ESTABLISHMENT OF BACKGROUND GROUNDWATER QUALITY

Background groundwater quality will be established for all upgradient and downgradient wells in the groundwater monitoring system.

Constituents to be monitored for the establishment of background are listed in Table 4-1. This background constituent list, as required by §330.419, consists of all constituents listed in 40 CFR Part 258, Appendix I.

To establish background concentrations for each constituent listed in Table 4-1, eight (8) statistically independent samples will be collected from each monitoring well (upgradient and downgradient) in the groundwater monitoring system. Background monitoring samples will be collected and analyzed on a quarterly basis for two years.

The statistical independence of samples will be achieved through the assignment of a proper sampling interval. Pursuant to the TCEQ guidance document, the appropriate time interval between sampling events can be estimated through the use of site-specific groundwater velocities to determine what time "fresh" formation groundwater will be found in the monitoring well after initial sampling. These calculated groundwater velocities can be calculated for the water bearing unit beneath the site using the standard average linear velocity formula (Freeze and Cherry, 1979):

$$V_h = \frac{K_h}{n_e}(i_h) \qquad (1)$$

Where:

V_h = horizontal groundwater velocity

K_h = average hydraulic conductivity for the uppermost aquifer

i_h = average horizontal gradient

n_e = estimated effective porosity (Freeze & Cherry, 1979)

The horizontal hydraulic gradient (i_h) is calculated using the formula:

$$i_h = (d_h / d_l) \quad (2)$$

Where: i_h = horizontal hydraulic gradient (ft/ft)

d_h = difference in hydraulic head (feet)

d_l = distance between wells

The average horizontal hydraulic gradient (i_h) in the shallow flow system was calculated to be 0.0043 ft/ft. Using the horizontal hydraulic gradient of 0.0043 ft/ft, and an average hydraulic conductivity (K_h) of 1.4 x 10^{-3} cm/sec (3.97 ft/day), and an effective porosity (n_e) of 0.4 (Applied Hydrogeology, C. W. Fetter, 1988, pp.68), the average linear velocity (V_h) within the shallow flow system is estimated to be 0.043 ft/day (15.6 ft/yr).

Using a groundwater velocity of 0.043 ft/day and a monitoring well casing diameter of 4 inches indicates that samples taken at 3-month intervals are probably independent. Therefore, background samples will be taken at intervals no less than 3 months apart at each monitoring well.

Background constituent concentrations for each parameter listed in Table 4-1 will be derived from the analytical results using the site-specific statistical methods. For the constituents that show a flat or decreasing trend or if an increasing trend is unrelated to a release of leachate from the MSWLF unit, the background data set will be updated to control or correct for seasonal and spatial variability as well as temporal correlation in the data (30 TAC §330.407.(a)(1)) approximately every two (2) years with TCEQ approval.

5.0 DETECTION MONITORING

The Detection Monitoring Program is summarized in the following subsections.

5.1 Groundwater Detection Monitoring Parameters

In accordance with §330.419, parameters that will be monitored during Detection Monitoring are found in 40 CFR Part 258, Appendix I. The site specific detection monitoring constituent list has been included as Table 5-1.

In addition to the parameter list required for statistical analysis, Waste Management will continue to monitor the following water quality parameters listed in Table 6-1 that will not be included in statistical analyses:

Calcium	Magnesium	Sodium
Potassium	Chloride	Sulfate
Total Alkalinity	Iron	Manganese
Ammonia, Nitrogen	Total Dissolved Solids	

With TCEQ approval, additional deletions/additions may occur to this list as more leachate and groundwater quality data are collected.

5.2 Groundwater Detection Monitoring Frequency

After the establishment of background groundwater quality (refer to Section 4.0), the detection monitoring frequency for all constituents found in 40 CFR Part 258, Appendix I will be semiannual during the active life, closure, and post-closure care periods of the site unless an alternate frequency is approved by the TCEQ.

5.3 Statistical Analysis

The intra-well statistical analysis program for inorganic parameters described below will be based on the combined Shewhart-CUSUM control charts at all compliance point wells. Future analytical measurements that do not exceed the statistical control limits, have no verified statistically significant increases (SSI) (that have not been addressed and approved through an ASD), and show no increasing trend related to a release of leachate from the

MSWLF unit will be combined with background data to update these estimates not more often than every two years with TCEQ approval.

5.3.1 Statistical Methodology

The statistical approach presented in this GWSAP was developed through the interaction of a qualified statistician (Dr. Robert Gibbons, professor at the University of Illinois, Chicago) and the Waste Management Corporate Director of Hydrogeology. The use of intra-well statistical comparisons for evaluation of groundwater chemistry data is supported by the USEPA and in widespread use.

5.3.1.1 Volatile Organic Compounds

It is well known that when a landfill facility actually produces a release to groundwater, multiple constituents contained in the leachate are associated with the source fluids and are subsequently detected by the groundwater monitoring program. A single constituent at very low concentration (i.e., below the RL) typically is not the signature that is produced from an actual release from a MSWLF unit.

VOCs represent very effective indicators of a release from a MSWLF unit. Because these compounds are rarely detected in background groundwater samples, establishing monitor well-specific limits for VOCs is generally not an option. Therefore, detection decision rules based on laboratory-specific RLs will be used. Although this simple comparison to a fixed limit is not statistically based, the RLs used by the lab represent a concentration limit consistent with EPA guidance that considers specified precision and accuracy during routine operating conditions and potential matrix interferences.

5.3.1.2 Inorganic Parameters

The statistical analysis methodology for inorganic parameters listed in 40 CFR Part 258, Appendix I, with a detection frequency greater than 25% will be based on a combined Shewhart-cumulative sum (CUSUM) control chart that is capable of detecting both sudden

and gradual changes in groundwater chemistry (Gibbons, 1992; Gibbons, 1994). Combined Shewhart-CUSUM control charts will be constructed for each well and parameter monitored to provide a statistical/visual tool for detecting trends and abrupt changes in inorganic groundwater chemistry. For inorganic parameters with a detection frequency less or equal to 25%, calculation of non-parametric or Poisson prediction limits will be conducted. Some facilities may require alternate methods (such as normal prediction limits) based on the number of statistical comparisons required for the site and the alternatives allowed to manage the site-wide false positive and false negative rates.

The combined Shewhart-CUSUM procedure requires a minimum of eight historical independent samples (i.e., background data) to provide a reliable estimate of the mean and standard deviation of each constituent in each well. The combined Shewhart-CUSUM control chart procedure assumes that the data are independent and normally distributed with a fixed mean and constant variance. Shewhart-CUSUM control charts are not recommended for data sets less than 8 independent samples except as time-series plots and evaluation of trends. Once background data are obtained from each detection monitor well, subsequent sample results are statistically compared to the estimated control limit both in terms of their absolute magnitude and in terms of cumulative sum. If necessary, the statistical method will include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

If all inorganic parameter data collected during the background period (minimum of 8 independent events) are not detected in concentrations greater than the respective RLs, the RL will be used as the non-parametric prediction limit. The collection of thirteen (13) samples in background for this detection frequency provides a 99% confidence non-parametric prediction limit with one re-sample. Note, that 99% confidence is equivalent to a 1% false positive rate and pertains to a single comparison (that is, well and constituent) and not the site-wide error rate (all wells and constituents) this is set to 5%. If the detection frequency is greater than zero but less than 25%, the non-parametric prediction limit is the

largest of the 13 background samples (for 1 verification re-sample) or 8 background samples if a pass "1 of 2" verification re-sampling program is implemented.

5.4 Reporting Requirements

Within 60 days of each groundwater sampling event, a determination will be made whether an apparent or verified exceedance of a statistically calculated background limit. A statistically significant increase (SSI) over background of any tested constituent is not recorded until the initial exceedance has been verified in accordance with verification re-sampling portion of the statistical methodology described in Section 5.3.1.2. If an apparent SSI is observed, the executive director and any local pollution agency with jurisdiction that has requested notification, will be notified in writing within 14 days of the SSI determination. If a SSI of any tested constituent at any monitoring well has occurred, the following actions will be initiated, as appropriate for each separate SSI incident, in accordance with 30 TAC §330.407(b).

(1) The facility shall immediately place a notice in the site operating record describing the release and establish an assessment monitoring program meeting the requirements of §330.409 within 90 days of the date of the notice to the TCEQ, except as provided in (2) and (3) below:

(2) The facility shall submit results of resampling as appropriate for the statistical method within 60 days of determining the apparent SSI. The resample data may be used to statistically confirm or disprove the apparent SSI.

(3) If a statistically significant increase over background of any tested constituent at any monitoring well has occurred and the owner or operator has reasonable cause to think that a source other than a landfill unit caused the contamination or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality, then the owner may submit a report documenting the error or alternate source in accordance with §330.407(b)(3), as follows:

(A) Notify, in writing, the executive director and any local pollution agency with jurisdiction that has requested to be notified within 14 days of determining the SSI.

(B) Submit the demonstration, prepared and certified by a qualified groundwater scientist, within 90 days of SSI determination.

(C) Do not filter the sample for constituents addressed by the demonstration prior to laboratory analysis.

(D) Continue detection monitoring.

If the report is approved, then the landfill may return to detection monitoring. If the owner/operator does not make a demonstration satisfactory to the executive director within 90 days after the date of notice, as evidenced by a letter of denial from the TCEQ, the owner/operator shall initiate an assessment monitoring program.

5.4.1 Annual Report

Annually, within 90 days after the facility's last groundwater monitoring event in a calendar year, a report will be submitted that includes the following information gathered since the previous annual report:

(1) A statement regarding SSI(s) in any well and the status of same.

(2) The facility will submit either the laboratory case narrative and a laboratory checklist or a copy of the laboratory QA/QC and analytical data. All analytical data will be submitted in either electronic or in hard copy format

(3) Groundwater flow rate and direction in the uppermost aquifer, using the previous year's data collected, including documentation used to determine the flow rate and direction.

(4) Contour map(s) of piezometric water levels in the uppermost aquifer based on concurrent measurements at all monitoring wells, including supporting data.

(5) Any recommendations for changes to the groundwater monitoring program.

(6) Any other items requested by the executive director.

6.0 ASSESSMENT MONITORING

Assessment monitoring will be performed on a site-specific basis in accordance with 30 TAC §330.409 and with the concurrence of the executive director. These activities may include:

Assessment of Corrective Measures (30 TAC §330.411) shall be initiated within 90 days of finding that any of the assessment constituents have been detected at a statistically significant level exceeding the groundwater protection standards defined under 30 TAC §330.409(h) or (i). Such an assessment shall be completed within a reasonable period of time approved by the executive director. The owner or operator shall continue to monitor in accordance with the assessment monitoring program as specified in 30 TAC §330.409. The assessment shall include analysis of the effectiveness of potential corrective measures in meeting all of the requirements and objectives of the remedy as described under 30 TAC §330.413. The owner or operator shall discuss the results of the corrective measures assessment, prior to the selection of a remedy, in a public meeting with interested and affected parties. The owner or operator shall arrange for the meeting and provide notice in accordance with 30 TAC §330.411(d) and §39.501(e)(3).

Based on the results of the corrective measures assessment, the owner or operator shall select a remedy that, at a minimum, meets the standards set forth under 30 TAC §330.413(b). Within 30 days of completing the Assessment of Corrective Measures the owner or operator shall submit a report to the executive director for review and approval and place it in the operating record of the site.

Based on the established schedule (30 TAC §330.413(b)) the owner or operator shall establish and implement a corrective action groundwater monitoring program that meets the requirements specified in 30 TAC §330.415 as it relates to Corrective Action Implementation.

Table 2-1

Sample Collection, Preservation, and Holding Times

PARAMETER[1]	SAMPLE COLLECTION[2] AND CONTAINER	SAMPLE[3, 4] PRESERVATION	RECOMMENDED[5] HOLDING TIME
Acid Extractables	1000 ml Glass only (Amber) w/Teflon liner	Cool, 4°C	Extract within 7 days; analyze within 40 days
Alkalinity	100 ml P, G	Cool, 4°C	14 days
Ammonia	125 ml P, G	Cool, 4°C H_2SO_4 to pH <2	28 days
Base/Neutral Extractables (priority pollutants)	1000 ml Glass only (Amber) w/Teflon liner	Cool, 4°C	Extract within 7 days; analyze within 40 days
Biochemical Oxygen demand, 5 day (BOD5)	1000 ml P, G		48 hours
Calcium	500 ml P	HNO_3 to pH <2	6 months
Chemical Oxygen Demand (COD)	125 ml P, G	Cool, 4°C H_2SO_4 to pH <2	28 days
Chloride	250 ml P, G	Cool, 4°C	28 days
Coliform, fecal and total	100 ml P, G sterilized		24 hours
Cyanide	1000 ml P, G	Cool, 4°C NaOH to pH >12 0.6g ascorbic acid[6]	14 days[7]
Fluoride	250 ml P	Cool, 4°C	28 days
Hardness	100 ml P, G	HNO_3 to pH <2	6 months
Metals			
Chromium (hexavalent)	200 ml P, G	Cool, 4°C	24 hours
Mercury (total)	1000 ml P, G	HNO_3 to pH <2	28 days

Table 2-1 (Cont'd)

Sample Collection, Preservation, and Holding Times

PARAMETER[1]	SAMPLE COLLECTION[2] AND CONTAINER	SAMPLE[3, 4] PRESERVATION	RECOMMENDED[5] HOLDING TIME
Other metals, (total) (Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, Zinc)	1000 ml P, G	HNO_3 to pH <2	6 months
Nitrate[7]	125 ml P, G	Cool, 4°C	28 days
Nitrite	125 ml P, G	Cool, 4°C	48 hours
Oil and Grease	1000 ml, G only	Cool, 4°C H_2SO_4 to pH <2	28 days
PCB (priority pollutant)	1000 ml, Glass only (Amber w/Teflon liner	Cool, 4°C	Extract within 7 days; analyze within 40 days
Pesticides Endrin, Lindane, Toxaphene, Methoxychlor	1000 ml, Glass only (Amber) w/Teflon liner	Cool, 4°C pH 5 - 9	Extract within 7 days; analyze within 40 days
pH (field)	25 ml P, G	None required	Analyze immediately
Phenols	500 ml G only	Cool, 4°C H_2SO_4 to pH <2	28 days
Phosphorous (total)	125 ml P, G	Cool 4°C H_2SO_4 to pH <2	28 days

Table 2-1 (Cont'd)

Sample Collection, Preservation, and Holding Times

PARAMETER[1]	SAMPLE COLLECTION[2] AND CONTAINER	SAMPLE[3, 4] PRESERVATION	RECOMMENDED[5] HOLDING TIME
Semi-volatile Organics	1000 ml, G	Cool, 4°C	7 days
Specific Conductance (field)	100 ml P, G	None required	Analyze immediately
Sulfate	50 ml P, G	Cool, 4°C	28 days
Temperature (field)	1000 ml P, G	None required	Analyze immediately
Total Dissolved Solids residue on evaporation (TDS/ROE) @ 180° C	1000 ml P	Cool, 4°C	7 days
Total Organic Carbon (TOC)	2-40 ml P	Cool, 4°C H_2SO_4 to pH <2	28 days
Total Suspended Solids (TSS)	1000 ml P	Cool, 4°C	7 days
Volatile Organic Acids, priority pollutants	4-40 ml glass vial w/septum caps	Cool, 4°C HCl to pH < 2	14 days
Volatile Organics w/septum caps	4-40 ml glass vial HCl to pH < 2	Cool, 4°C	14 days

1. Table may include more parameters than required for groundwater sampling. A general discussion on sampling water and industrial wastewater may be found in ASTM, Part 31, pages 72-81 (1976) Method D-3370.

2. Plastic (P) or Glass (G). For metals, polyethylene with a polypropylene cap (no liner) is preferred.

3. Sample preservation should be performed immediately upon sample collection. For composite samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then maintaining at 4°C until compositing may preserve samples and sample splitting is completed.

4. When any sample is to be shipped by common carrier or sent through the United States mail, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirements of Table 5-4, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid (HCl) in water solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less (pH about 1.15 or greater); Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).

5. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still considered valid. Samples may be held for longer periods only if the permittee, or monitoring laboratory, has data on file to show that the specific types of sample under study are stable for the longer time, and has received a variance from the Regional Administrator. Some samples may not be stable for the maximum time period given in the table. A permittee, or monitoring laboratory, is obligated to hold the sample for a shorter time if knowledge exists to show this is necessary to maintain sample stability.

6. Should only be used in the presence of residual chlorine.

7. Maximum holding time is 24 hours when sulfide is present. Optionally, all samples may be tested with lead acetate paper before the pH adjustment in order to determine if sulfide is present. If sulfide is present, it can be removed by the addition of cadmium nitrate powder until a negative spot test is obtained. The sample is filtered and then NaOH is added to pH 12.

8. Sample preservation, handling, and analysis will meet the specifications described by "Test Methods for Evaluating Solid Waste Physical/Chemical Methods, third edition (as revised)" (EPA Publication Number SW-846, 1986, December, 1987, as revised) or an equivalent substitute

Table 2-2

Methodologies for Testing and Analysis*

PARAMETER	METHOD DESCRIPTION	METHOD*
Acid Extractables (priority pollutants)	GC/MS	8270(D)
Alkalinity	Colorimetric, Automated Methyl Orange	(A)310.1
Ammonia	Colorimetric; Automated Phenate	(A)350.1
Base/Neutral Extractables (priority pollutants)	GC/MS	8270(D)
Biochemical Oxygen demand, 5 day (BOD5)	BOD (5 day, 20°C)	(A)405.1
Calcium	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Chemical Oxygen demand (COD)	Colorimetric	(A)410.4
Chloride	Colorimetric, Automated Ferricyanide	(A)325.2/9252/300.0A
Coliform (fecal)	Delayed Incubation Procedure	(B)909C
Coliform (total)	Standard Membrane Filter Procedure	(B)909A
Cyanide (total)	Colorimetric, Automated UV	(A)335.3/9012(D)
Fluoride	Potentiometric, Ion Selective Electrode	(A)340.2
Hardness	Calculation	(C)2340B

Table 2-2 (Cont'd)

Methodologies for Testing and Analysis

PARAMETER	METHOD DESCRIPTION	METHOD*
Metals, total		
Antimony	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Arsenic	Atomic Absorption, furnace technique, ICP	(A)206.2/6010(D)
Barium	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Beryllium	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Boron	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Cadmium	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Chromium	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Cobalt	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Copper	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Iron	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Lead	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Magnesium	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Manganese	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Mercury	Atomic Emission Spectrometric, ICP	(A)245.2/7470(D)
Nickel	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Potassium	Atomic Absorption, direct aspiration, ICP	(A)258.1/6010(D)
Selenium	Atomic Absorption, furnace technique, ICP	(A)270.2/6010/6020(D)
Silver	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Sodium	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Thallium	Atomic Absorption, furnace technique, ICP	(A)279.2/6020/6010(D)
Vanadium	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Zinc	Atomic Emission Spectrometric, ICP	(A)200.7/6010(D)
Nitrate	Colorimetric, Automated, Hydrazine Reduction	(A)353.1/353.2
Nitrite	Colorimetric, Automated, Hydrazine Reduction	(A)353.1
Oil and Grease	Gravimetric, Separatory Funnel Extraction or Spectrometric, Infrared	(A)413.1/9070(D)/(A)413.2
PCB (priority pollutants)	Gas Chromatograph	8270(B)/8080(D)
Pesticides	Gas Chromatograph	8270(B)/8080(D)
pH (field)	Electrometric	(A)150.1
Phenols	Colorimetric, Automated 4-AAP with Distillation	(A)420.2/9066(D)

Table 2-2◆ (Cont'd)

Methodologies for Testing and Analysis

PARAMETER	METHOD DESCRIPTION	METHOD*
Phosphorous	Colorimetric, Automated Ascorbic Acid	(A)365.4
Semi-volatile Organics	GC/MS Acids & Base Neutrals	8270(D)
Specific Conductance (field)	Wheatstone bridge	(A)120.1
Sulfate	Turbidimetric	(A)375.2/9038/300.0A
Temperature (field)	Reversing Thermometer	(B)212
Total Dissolved Solids Residue on Evaporation (TDS/ROE)	Gravimetric, Dried at 180°C	(A)160.1
Total Organic Carbon (TOC)	Combustion or Oxidation	(A)415.1
Total Suspended Solids (TSS)	Gravimetric, Dried at 103°-105°C	(A)160.2
Volatile Organic Acids (PP/VOA), priority pollutants	Purge and Trap/GC/MS	8240(D)/8260(D)
Volatile Organics	Purge and Trap/GC/MS	8240(D)/8260(D)
DBCP, EDB	Microextraction	8260(D)

**NOTE: On occasion, the analytical methods listed above may be substituted provided that they are appropriate for groundwater sampling and they accurately measure hazardous constituents and other monitoring parameters in groundwater samples.*

References:

A: Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-0920, EMSL, Cincinnati, Revision (March 1983)

B: Standard Methods for the Examination of Water and Wastewaters, 15th Edition, APHA-AQWQA-WPCF, 1980

C*: Standard Methods for the Examination of Water and Wastewaters, 18th Edition, APHA-AWWA-WEF, 1992

D: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition, Final Update 1, July 1992 (as revised).

Table 3-1

Reporting Limits

	Common Name		RL* (ug/L)
Inorganic Constituents:			
(1)	Alkalinity		5000
(2)	Ammonia as nitrogen		500
(3)	Chloride		3000
(4)	Sulfate		5000
(5)	Calcium	(total)	5000
(6)	Magnesium	(total)	5000
(7)	Manganese	(total)	15
(8)	Iron	(total)	100
(9)	Potassium	(total)	5000
(10)	Sodium	(total)	5000
(11)	Total Dissolved Solids		5400
(12)	Antimony	(total)	6.0
(13)	Arsenic	(total)	10.0
(14)	Barium	(total)	10.0
(15)	Beryllium	(total)	4.0
(16)	Cadmium	(total)	5.0
(17)	Chromium	(total)	10.0
(18)	Cobalt	(total)	50.0
(19)	Copper	(total)	25.0
(20)	Lead	(total)	9.0
(21)	Nickel	(total)	40.0
(22)	Selenium	(total)	15.0
(23)	Silver	(total)	25.0
(24)	Thallium	(total)	2.0
(25)	Vanadium	(total)	50.0
(26)	Zinc	(total)	20.0
Organic Constituents:			
(27)	Acetone		34.0
(28)	Acrylonitrile		100.0
(29)	Benzene		5.0
(30)	Bromochloromethane		10.0
(31)	Bromodichloromethane		5.0
(32)	Bromoform; Tribromomethane		5.0
(33)	Carbon disulfide		5.0
(34)	Carbon tetrachloride		5.0
(35)	Chlorobenzene		5.0
(36)	Chloroethane; Ethyl chloride		10.0
(37)	Chloroform; Trichloromethane		5.0
(38)	Dibromochloromethane; Chlorodibromomethane		5.0
(39)	1,2-Dibromo-3-chloropropane; DBCP		1.0
(40)	1,2-Dibromoethane; Ethylene dibromide; EDB		1.0

Table 3-1 (Cont'd)

Reporting Limits

	Organic Constituents(Cont'd):	RL* (ug/L)
(41)	o-Dichlorobenzene; 1,2-Dichlorobenzene	10.0
(42)	p-Dichlorobenzene; 1,4-Dichlorobenzene	10.0
(43)	trans-1,4-Dichloro-2-butene	10.0
(44)	1,1-Dichloroethane; Ethylidene chloride	5.0
(45)	1,2-Dichloroethane; Ethylene dichloride	5.0
(46)	1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride	5.0
(47)	cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	10.0
(48)	trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene	10.0
(49)	1,2-Dichloropropane; Propylene dichloride	5.0
(50)	cis-1,3-Dichloropropene	5.0
(51)	trans-1,3-Dichloropropene	5.0
(52)	Ethylbenzene	5.0
(53)	2-Hexanone; Methyl butyl ketone	10.0
(54)	Methyl bromide; Bromomethane	10.0
(55)	Methyl chloride; Chloromethane	10.0
(56)	Methylene bromide; Dibromomethane	10.0
(57)	Methylene chloride; Dichloromethane	5.0
(58)	Methyl ethyl ketone; MEK; 2-Butanone	10.0
(59)	Methyl iodide; Iodomethane	10.0
(60)	4-Methyl-2-pentanone; Methyl isobutyl ketone	10.0
(61)	Styrene	5.0
(62)	1,1,1,2-Tetrachloroethane	5.0
(63)	1,1,2,2-Tetrachloroethane; Tetrachloroethylene; Tetrachloroethene;	5.0
(64)	Perchloroethylene	5.0
(65)	Toluene	5.0
(66)	1,1,1-Trichloroethane; Methylchloroform	5.0
(67)	1,1,2-Trichlolroethane	5.0
(68)	Trichloroethylene; Trichloroethene	5.0
(69)	Trichlorofluoromethane; CFC-11	10.0
(70)	1,2,3-Trichloropropane	10.0
(71)	Vinyl acetate	10.0
(72)	Vinyl chloride	2.0
(73)	Xylenes	10.0

*Note: On rare occasions some of the reporting limits (RLs) may not be achievable by a competent laboratory. In such cases, any RL used in a statistical analysis will be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility.

TABLE 4-1: Background Groundwater Quality Parameter List

	COMMON NAME	
Inorganic Constituents:		*CAS RN*
(1)	Antimony	(Total)
(2)	Arsenic	(Total)
(3)	Barium	(Total)
(4)	Beryllium	(Total)
(5)	Cadmium	(Total)
(6)	Chromium	(Total)
(7)	Cobalt	(Total)
(8)	Copper	(Total)
(9)	Lead	(Total)
(10)	Nickel	(Total)
(11)	Selenium	(Total)
(12)	Silver	(Total)
(13)	Thallium	(Total)
(14)	Vanadium	(Total)
(15)	Zinc	(Total)
Organic Constituents:		*CAS RN*
(16)	Acetone	67-64-1
(17)	Acrylonitrile	107-13-1
(18)	Benzene	71-43-2
(19)	Bromochloromethane	74-97-5
(20)	Bromodichloromethane	75-27-4
(21)	Bromoform (tribromomethane)	75-25-2
(22)	Carbon disulfide	75-15-0
(23)	Carbon tetrachloride	56-23-5
(24)	Chlorobenzene	108-90-7
(25)	Chloroethane (ethyl chloride)	75-00-3
(26)	Chloroform (trichloromethane)	67-66-3
(27)	Dibromochloromethane (chlorodibromomethane)	124-48-1
(28)	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8
(29)	1,2-Dibromoethane (ethylene dibromide, EDB)	106-93-4

	COMMON NAME	
(30)	o-Dichlorobenzene (1,2-dichlorobenzene)	95-50-1
(31)	p-Dichlorobenzene (1,4-diclllorobenzene)	106-46-7
(32)	trans- 1,4-Dichloro-2-butene	110-57-6
(33)	1,1-Dichloroethane (ethyldidene chloride)	75-34-4
(34)	1,2-Dichloroethane (ethylene dichloride)	107-06-2
(35)	1,1-Dichloroethylene (1,1-dichloroethene, vinylidene chloride)	75-35-4
(36)	cis- 1,2-Dichloroethylene (cis- 1.2-dichloroethene)	156-59-2
(37)	trans- 1,2-Dichloroethylene (trans- 1,2-dichloroethene)	156-60-5
(38)	1.2-Dichloropropane (Propylene dichloride)	78-87-5
(39)	cis- 1,3-Dichloropropene	10061-01-5
(40)	trans- 1,3-Dichloropropene	10061-02-6
(41)	Ethylbenzene	100-41-4
(42)	2-Hexanone (methyl butyl ketone)	591-78-6
(43)	Methyl bromide (bromomethane)	74-83-9
(44)	Methyl chloride (chloromethane)	74-87-3
(45)	Methylene bromide (dibromomethane)	74-95-3
(46)	Methylene chloride (dichloromethane)	75-09-2
(47)	Methyl ethyl ketone (MEK, 2-butanone)	78-93-3
(48)	Methyl iodide (iodomethane)	74-88-4
(49)	4-Methyl-2-pentanone (methyl isobutyl ketone)	108-10-1
(50)	Styrene	100-42-5
(51)	1,1,1,2-Tetrachloroethane	630-20-6
(52)	1,1,2,2-Tetrachloroethane	79-34-5
(53)	Tetrachloroethylene (tetrachloroethene, perchloroethylene)	127-18-4
(54)	Toluene	108-88-3
(55)	1,1,1-Trichloroethane (methylchloroform)	71-55-6
(56)	1,1,2-Trichloroethane	79-00-5
(57)	Trichloroethylene (trichloroethene)	79-01-6
(58)	Trichlorofluoromethane (CFC-11)	75-69-4
(59)	1,2,3-Trichloropropane	96-18-4
(60)	Vinyl acetate	108-05-4
(61)	Vinyl chloride	75-01-4
(62)	Xylenes (total)	1330-20-7

TABLE 5-1: Detection Monitoring Parameter List

COMMON NAME		
Inorganic Constituents:		*CAS RN*
(1)	Antimony	(Total)
(2)	Arsenic	(Total)
(3)	Barium	(Total)
(4)	Beryllium	(Total)
(5)	Cadmium	(Total)
(6)	Chromium	(Total)
(7)	Cobalt	(Total)
(8)	Copper	(Total)
(9)	Lead	(Total)
(10)	Nickel	(Total)
(11)	Selenium	(Total)
(12)	Silver	(Total)
(13)	Thallium	(Total)
(14)	Vanadium	(Total)
(15)	Zinc	(Total)
Organic Constituents:		*CAS RN*
(16)	Acetone	67-64-1
(17)	Acrylonitrile	107-13-1
(18)	Benzene	71-43-2
(19)	Bromochloromethane	74-97-5
(20)	Bromodichloromethane	75-27-4
(21)	Bromoform (tribromomethane)	75-25-2
(22)	Carbon disulfide	75-15-0
(23)	Carbon tetrachloride	56-23-5
(24)	Chlorobenzene	108-90-7
(25)	Chloroethane (ethyl chloride)	75-00-3
(26)	Chloroform (trichloromethane)	67-66-3
(27)	Dibromochloromethane (chlorodibromomethane)	124-48-1
(28)	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8
(29)	1,2-Dibromoethane (ethylene dibromide, EDB)	106-93-4
(30)	o-Dichlorobenzene (1,2-dichlorobenzene)	95-50-1
(31)	p-Dichlorobenzene (1,4-diclllorobenzene)	106-46-7
(32)	trans-1,4-Dichloro-2-butene	110-57-6
(33)	1,1-Dichloroethane (ethyldidene chloride)	75-34-4
(34)	1,2-Dichloroethane (ethylene dichloride)	107-06-2

	COMMON NAME	
(35)	1,1-Dichloroethylene (1,1-dichloroethene, vinylidene chloride)	75-35-4
(36)	cis- 1,2-Dichloroethylene (cis- 1.2-dichloroethene)	156-59-2
(37)	trans- 1,2-Dichloroethylene (trans- 1,2-dichloroethene)	156-60-5
(38)	1.2-Dichloropropane (Propylene dichloride)	78-87-5
(39)	cis- 1,3-Dichloropropene	10061-01-5
(40)	trans- 1,3-Dichloropropene	10061-02-6
(41)	Ethylbenzene	100-41-4
(42)	2-Hexanone (methyl butyl ketone)	591-78-6
(43)	Methyl bromide (bromomethane)	74-83-9
(44)	Methyl chloride (chloromethane)	74-87-3
(45)	Methylene bromide (dibromomethane)	74-95-3
(46)	Methylene chloride (dichloromethane)	75-09-2
(47)	Methyl ethyl ketone (MEK, 2-butanone)	78-93-3
(48)	Methyl iodide (iodomethane)	74-88-4
(49)	4-Methyl-2-pentanone (methyl isobutyl ketone)	108-10-1
(50)	Styrene	100-42-5
(51)	1,1,1,2-Tetrachloroethane	630-20-6
(52)	1,1,2,2-Tetrachloroethane	79-34-5
(53)	Tetrachloroethylene (tetrachloroethene, perchloroethylene)	127-18-4
(54)	Toluene	108-88-3
(55)	1,1,1-Trichloroethane (methylchloroform)	71-55-6
(56)	1,1,2-Trichloroethane	79-00-5
(57)	Trichloroethylene (trichloroethene)	79-01-6
(58)	Trichlorofluoromethane (CFC-11)	75-69-4
(59)	1,2,3-Trichloropropane	96-18-4
(60)	Vinyl acetate	108-05-4
(61)	Vinyl chloride	75-01-4
(62)	Xylenes (total)	1330-20-7

TABLE 6-1: Water Quality Parameters List

Water Quality Parameters	*CAS RN*
Calcium	(Total)
Magnesium	(Total)
Sodium	(Total)
Potassium	(Total)
Chloride	
Sulfate	
Total Alkalinity	
Iron	(Total)
Manganese	(Total)
Ammonia, Nitrogen	
Total Dissolved Solids	

APPENDIX A

FIELD INFORMATION FORM

(For informational purposes only. Actual may vary.)

FIELD INFORMATION FORM

WASTE MANAGEMENT

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:

PURC INFO

PURGE DATE (MM DD YY)	PURGE TIME (2400 Hr Clock)	ELAPSED HRS (hrs: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

Purging Device

Sampling Device

A- Submersible Pump
B-Peristaltic Pump
C-QED Bladder Pump
D-Bailer
E-Piston Pump
F-Dipper/Bottle

X-Other:

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

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 Site/Permit. Well Elevation, DTW, and Groundwater Elevation must be current.

STABILIZ 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):

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

APPENDIX B

CHAIN OF CUSTODY

(For informational purposes only. Actual may vary.)

Chain of Custody Record

SEVERN TRENT SERVICES

Severn Trent Laboratories, Inc.

STL-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.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Special Instructions/ Conditions of Receipt

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

APPENDIX C

LABORATORY REVIEW CHECKLIST

(For informational purposes only. Actual may vary.)

Laboratory Data Package Cover Page

This data package consists of:

☐ This signature page, the laboratory review checklist, and the following reportable data:

☐ 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, and
   e) if required for the project, tentatively identified compounds (TICs).

☐ R4 Surrogate recovery data including:
   a) Calculated recovery (%R), and
   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, and
   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), and
   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, and
   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 "No" or "Not Reviewed (NR)" item in laboratory review checklist.

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 (for example, the APAR) 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 (printed)	Date

Laboratory Review Checklist: Reportable Data									
Laboratory Name:			LRC Date:						
Project Name:			Laboratory Job Number:						
Reviewer Name:			Prep Batch Number(s):						
#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]		
R1	OI	**Chain-of-custody (C-O-C)**							
		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	OI	**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	OI	**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?							
		Were % 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	OI	**Test reports/summary forms for blank samples**							
		Were appropriate type(s) of blanks analyzed?							
		Were blanks analyzed at the appropriate frequency?							
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?							
		Were blank concentrations < MQL?							
R6	OI	**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	OI	**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	OI	**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	OI	**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	OI	**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?							

Laboratory Review Checklist: Supporting Data								
Laboratory Name:			LRC Date:					
Project Name:			Laboratory Job Number:					
Reviewer Name:			Prep Batch Number(s):					
#[1]	A[2]	Description	Yes	No	NA [3]	NR [4]	ER#[5]	
S1	OI	**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	OI	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank[6] :**						
		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	OI	**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?						
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	OI	**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	OI	**Proficiency test reports:**						
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?						
S12	OI	**Standards documentation**						
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?						
S13	OI	**Compound/analyte identification procedures**						
		Are the procedures for compound/analyte identification documented?						
S14	OI	**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	OI	**Verification/validation documentation for methods** (NELAC Chap 5)						
		Are all the methods used to generate the data documented, verified, and validated, where applicable?						
S16	OI	**Laboratory standard operating procedures (SOPs):**						
		Are laboratory SOPs current and on file for each method performed?						

Laboratory Review Checklist: Exception Reports	
Laboratory Name:	LRC Date:
Project Name:	Laboratory Job Number:
Reviewer Name:	Prep Batch Number(s):

ER #[5]	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 (and general chemistry, when applicable);
3. NA = Not applicable;
4. NR = Not reviewed;
5. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

CCB = Continuing Calibration Blank