ATASOCOCITA RECYCLING AND DISPOSAL FACILITY

APPENDIX IID
WETLANDS DOCUMENTATION

CONTENTS

NATIONWIDE PERMIT 39

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1229
GALVESTON, TEXAS 77553-1229

REPLY TO ATTENTION OF:

January 17, 2003

Compliance Section

SUBJECT: D-14128; Waste Management of Texas, Delineation Verification, intersection of Atascocita and Wilson roads in Harris County, Texas.

Clay Lawson
Project Manager
Berg ♦ Oliver Associates, Inc.
14701 St. Mary's Lane
Houston, Texas 77079

Dear Mr. Lawson:

This concerns your request for a jurisdictional determination on behalf of Waste Management of Texas, for the proposed Waste Management of Texas Atascocita Recycling and Disposal Site expansion. The project area is located at the intersection of Atascocita and Wilson roads in Harris County, Texas.

Based on a desk review of the information you submitted, U.S.G.S. Topographic Map, Harris County Flood Insurance Rate Map, aerial photographs, and our December 16, 2002 site visit, we conclude that 0.25 acres of jurisdictional waters of the U.S., 0.08 acres of jurisdictional headwaters of the U.S. and 2.54 acres of adjacent wetland areas are located within the project site. Therefore, the discharges of dredged or fill material within these waters of the United States are subject to Section 404 of the Clean Water Act and will require a Department of the Army permit

This determination has been conducted to identify the limits of the Corps Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

This approved jurisdictional determination is valid for 5 years from the date of this letter unless new information warrants a revision prior to the expiration date. Please see the enclosed sheet regarding the administrative appeal process for jurisdictional determinations.

If you have any questions concerning this matter, please reference file number D-14128 and contact Jayson M. Hudson at the letterhead address or by telephone at 409-766-3108 or email at jayson.m.hudson@swg02.usace.army.mil.

Sincerely,

Kenny Jaynes
Leader, North Compliance Unit

Enclosures

Applicant: **Waste Management of Texas**	File Number: **D-14128**	Date: **01-17-03**
Agent: **Berg ♦ Oliver Associates, Inc.**		

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of Permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of Permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I: The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved jurisdictional determination (JD) or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION

If you have questions regarding this decision and/or the appeal process you may contact:	If you only have questions regarding the appeal process you may also contact:
Mr. Jayson M. Hudson Project Manager, Compliance Section U.S. Army Corps of Engineers P.O. Box 1229 Galveston, Texas 77553-1229 409-766-3108	Mr. James Gilmore Appeal Review Officer, CESWD-ETO-R U.S. Army Corps of Engineers 1100 Commerce Street, Room 8E9 Dallas, Texas 75242-0216 214-767-2457

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

	Date:	Telephone number:
Signature of appellant or authorized agent.		

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1229
GALVESTON, TEXAS 77553-1229

REPLY TO ATTENTION OF.

May 21, 2003

Evaluation Section

SUBJECT: Permit SWG-03-39-004

Mr. Chuck Rivette
Waste Management of Texas, Inc.
3623 Wilson Road
Houston, Texas 77396

Dear Mr. Rivette:

You may proceed with the discharge of fill material into 0.21 acres of jurisdictional waters of the United States, including adjacent wetlands, as proposed in a letter, dated April 02, 2003, submitted on your behalf by Berg Oliver Associates, Inc., provided that the activity complies with the enclosed project plans, general/regional conditions, and Texas Commission on Environmental Quality's best management practice guidelines for Nationwide Permit Number 39. Your letter resulted in the initiation of the pre-construction notification procedure specified for Nationwide Permit 39. The project site is located in waters of the United States, including wetlands adjacent to Garners Bayou, south of Atascocita Road and east of Wilson Road, at the existing Atascocita Recycling and Disposal Facility, in Harris County, Texas.

Nationwide Permit 39 authorizes discharges of dredged or fill material into non-tidal waters of the United States, excluding non-tidal wetlands adjacent to tidal waters, for the construction or expansion of residential, commercial, and institutional building foundations and building pads, and attendant features that are necessary for the use and maintenance of the structures.

A copy of your plans in 4 sheets is enclosed. This authorization is based on an approved jurisdictional determination and remains valid for 2 years from the date of this letter. The following special conditions have been added to your authorization:

1. The permittee will purchase the appropriate number of credits, pending the outcome of a WET II analysis from the Greens Bayou Wetland Mitigation Bank prior to the start of construction in the permit area.

2. The permittee will submit documentation to the Corps Galveston District, verifying that the appropriate number of credits were purchased from the Greens Bayou Wetland Mitigation Bank, prior to the start of construction in the permit area.

Please let me know when you complete your project by returning the enclosed pre-addressed postcard. If you have any questions concerning this matter, please contact Kimberly McLaughlin at the letterhead address or by telephone at 409-766-3936.

Sincerely,

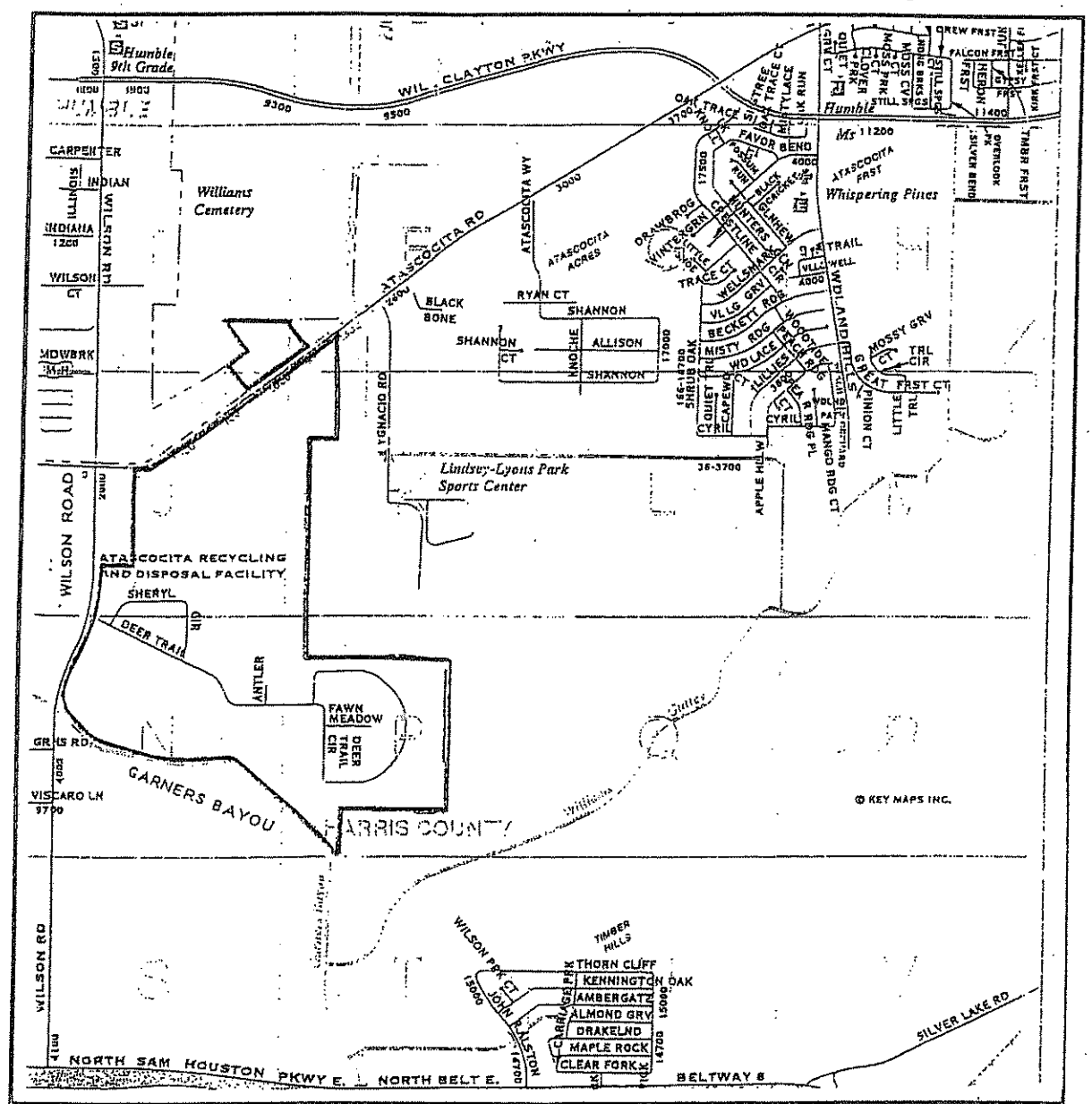
Bruce H. Bennett

Bruce H. Bennett
Leader, North Evaluation Unit

Enclosures

Copy Furnished:

Mr. Clay Lawson
Berg Oliver Associates, Inc.
14701 St. Mary's Lane, Suite 400
Houston, Texas 77079



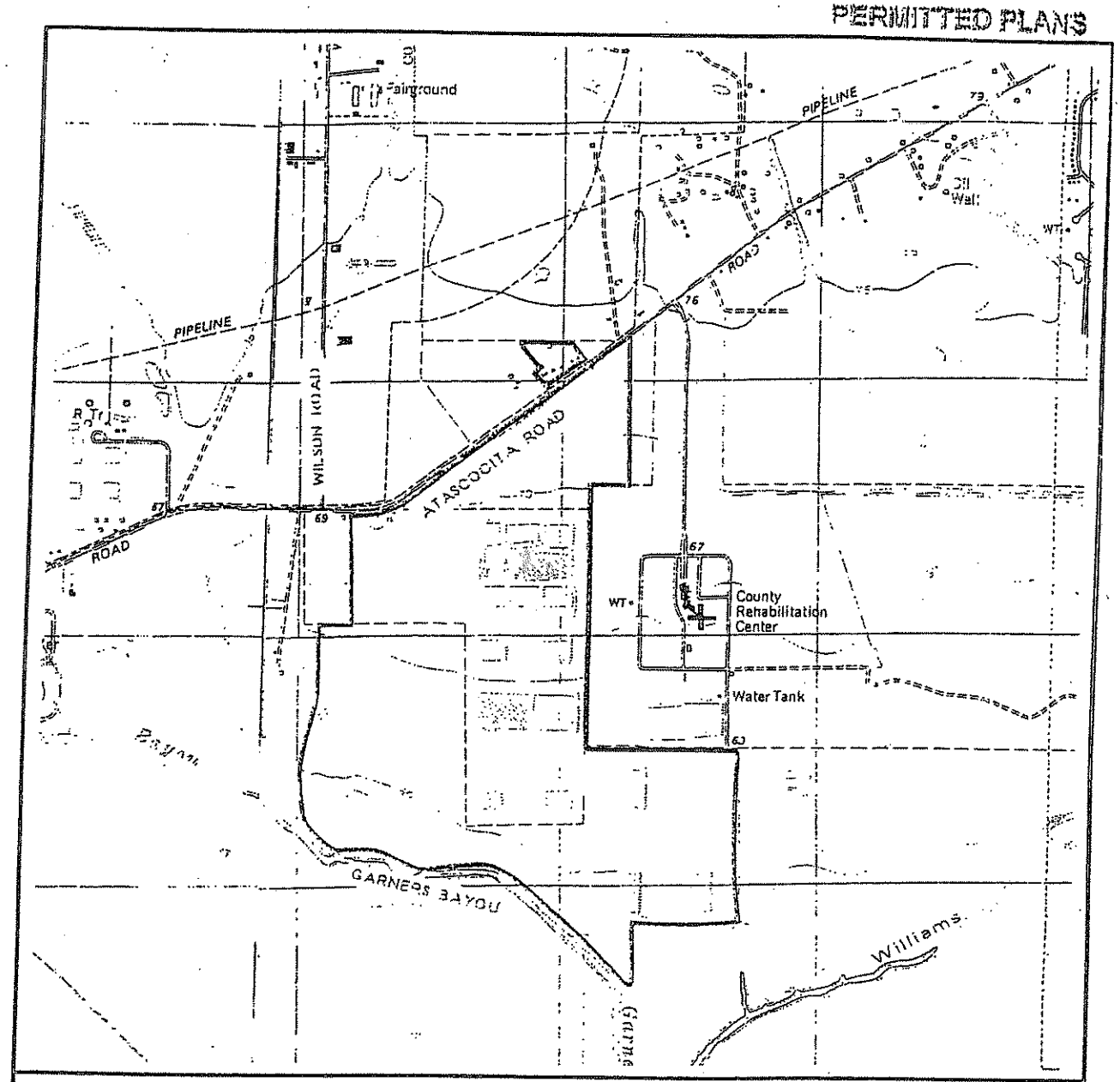
HARRIS COUNTY KEY MAP

Page 376

SCALE 1"=2640'

Permit # SWG-03-39-004
WASTE MGMT of TEXAS
Page 1 of 4

BERG ◊OLIVER ASSOCIATES, INC.



U.S. DEPARTMENT OF INTERIOR GEOLOGICAL SURVEY

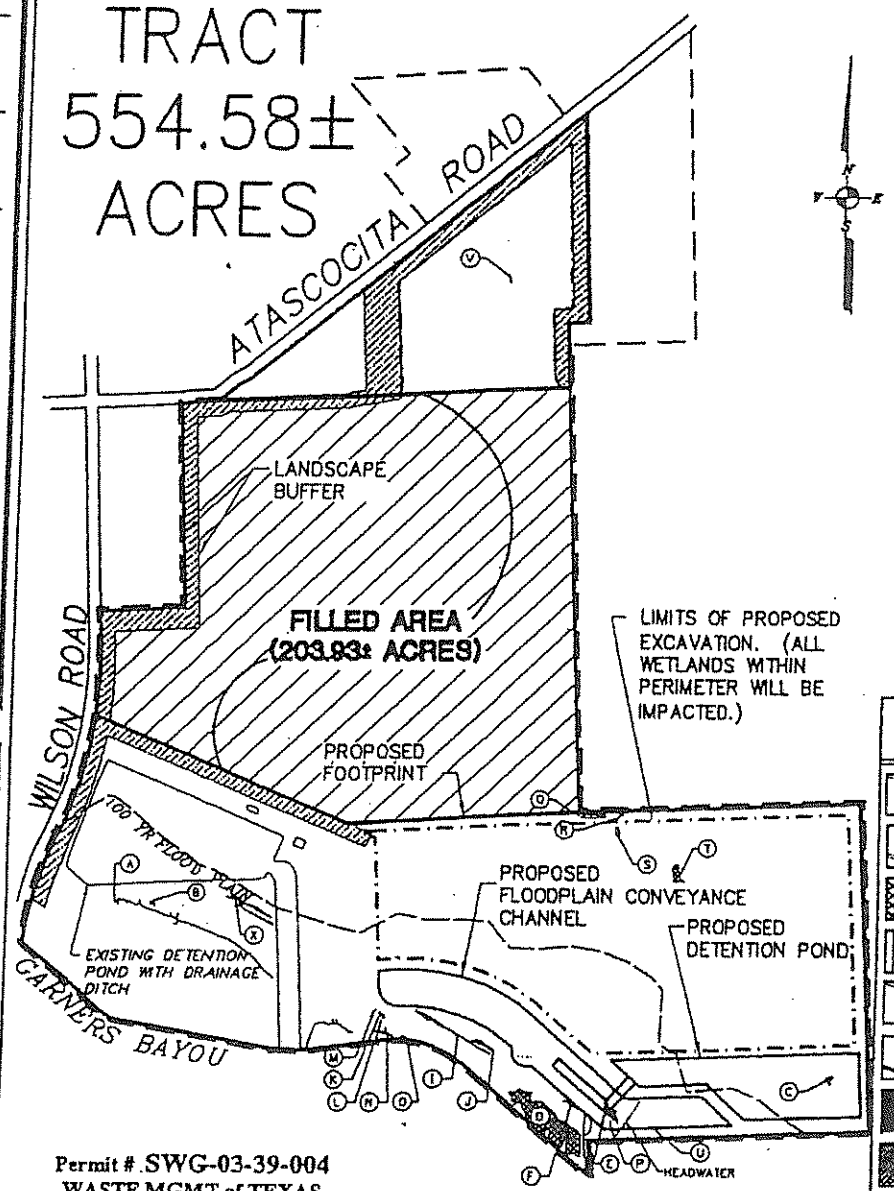
HARMASTON AND HUMBLE QUADRANGLES
HARRIS COUNTY, TEXAS

7.5 MINUTE SERIES (TOPOGRAPHIC)

SCALE 1"=2000'

N

PROPOSED SITE DEVELOPMENT
WETLAND OVERLAY MAP



ADJACENT WETLANDS TABLE		
WETLAND	STATUS	ACRES
A	AVOID	0.01
B	AVOID	0.02
D	AVOID	1.79
E	IMPACT	0.17
F	AVOID	0.02
I	AVOID	0.19
J	AVOID	0.06
K	AVOID	0.01
L	AVOID	0.01
M	AVOID	0.01
N	AVOID	0.03
O	AVOID	0.03
P	IMPACT	0.01
U	IMPACT	0.01
X	AVOID	0.17
TOTAL		2.54

ISOLATED WETLANDS TABLE		
WETLAND	STATUS	ACRES
C	IMPACT	0.03
Q	AVOID	0.06
R	AVOID	0.02
S	IMPACT	0.03
T	IMPACT	0.13
V	IMPACT	0.02
TOTAL		0.29

LEGEND	AC.
JURISDICTIONAL WATERS OF THE U.S. TO BE AVOIDED	0.25
JURISDICTIONAL HEADWATERS OF THE U.S. TO BE AVOIDED	0.06
ADJACENT WETLAND AREAS TO BE AVOIDED	2.35
ISOLATED WETLAND AREAS NON-JURISDICTIONAL TO BE AVOIDED	0.08
JURISDICTIONAL WATERS OF THE U.S. TO BE IMPACTED	0.00
JURISDICTIONAL HEADWATERS OF THE U.S. TO BE IMPACTED	0.02
ADJACENT WETLAND AREAS TO BE IMPACTED	0.19
ISOLATED WETLAND AREAS NON-JURISDICTIONAL TO BE IMPACTED	0.21
USACE NATIONWIDE 39 PERMIT APPLICATION BOUNDARY	554.58
T.C.E.Q. PROPOSED PERMITTED LANDFILL BOUNDARY	503.69
LANDSCAPE BUFFER	

Permit # SWG-03-39-004
WASTE MGMT of TEXAS
Page 3 of 4

0 600 1200 2400 3600 FT.
SCALE

PROPOSED SITE DEVELOPMENT
WETLAND OVERLAY MAP

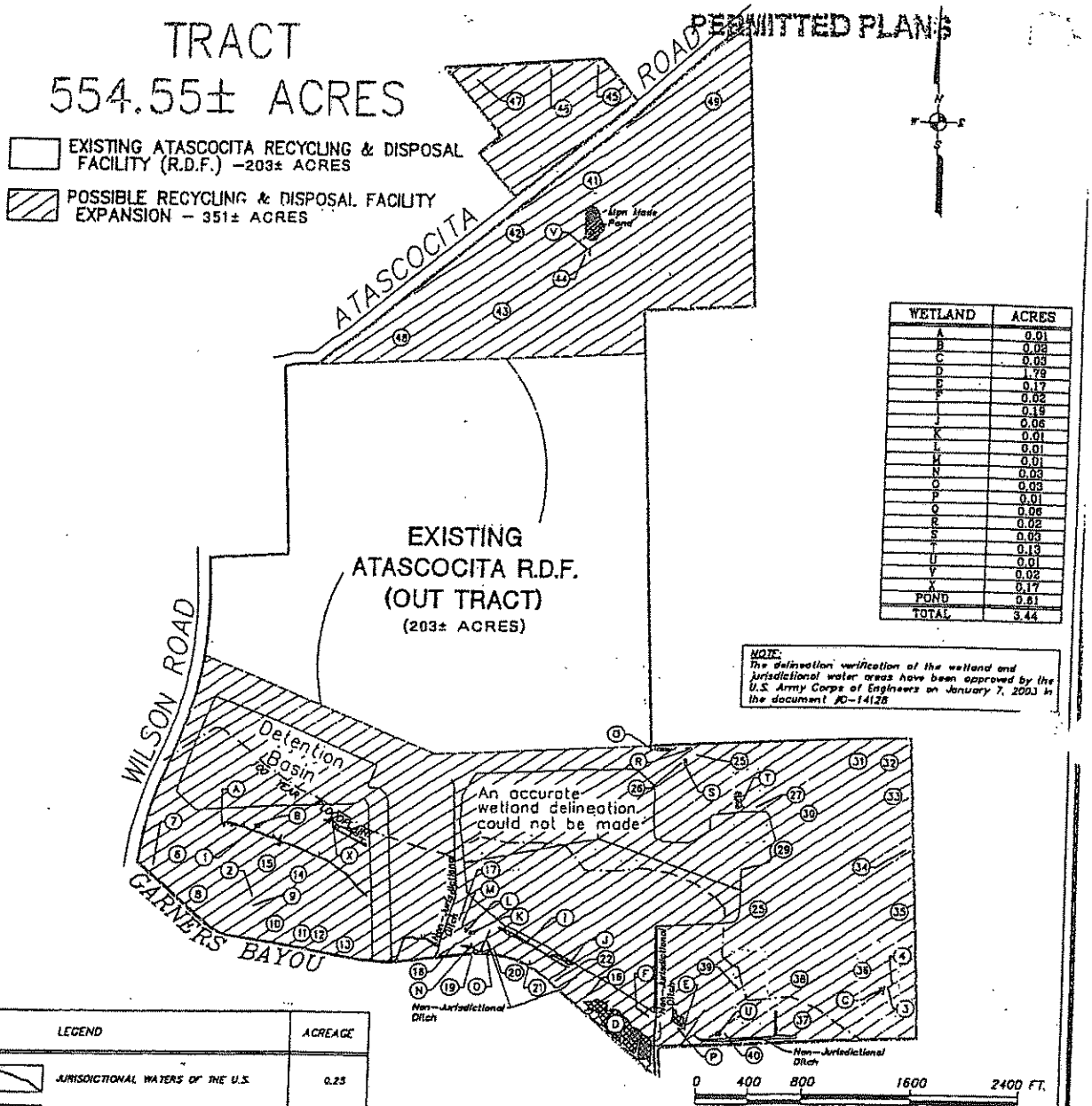
PROJECT #: 3611PM03
FOR: DANNENBAUM ENGINEERING CORP.
LOCATION: 554.55± ACRES – ATASCOSITA LANDFILL
HARRIS COUNTY, TEXAS

REVISIONS:
Jan. 27, 2003 by K. M. H.
March 18, 2003 by K. M. H.

BERG•OLIVER ASSOCIATES, INC.
ENVIRONMENTAL SCIENCE, ENGINEERING & LAND USE CONSULTANTS
14701 ST. MARY'S LANE, SUITE 400 HOUSTON, TX 77079
PHONE (281) 589-0898 http://www.bergoliver.com

J:\Dannenbaum\3611\3611 PM.dwg
F:\DATA\ENG

WATERS OF THE UNITED STATES
WETLAND DELINEATION MAP



WETLAND	ACRES
A	0.01
B	0.02
C	0.03
D	1.79
E	0.17
F	0.02
I	0.19
J	0.06
K	0.01
L	0.01
M	0.01
N	0.03
O	0.03
P	0.01
Q	0.06
R	0.02
S	0.03
T	0.13
U	0.01
V	0.02
X	0.17
POND	0.61
TOTAL	3.44

NOTE:
The delineation verification of the wetland and jurisdictional water areas have been approved by the U.S. Army Corps of Engineers on January 7, 2003 in the document #0-14128

LEGEND	ACREAGE
JURISDICTIONAL WATERS OF THE U.S.	0.25
HEADWATERS OF THE U.S JURISDICTIONAL	0.08
ADJACENT WETLAND AREAS JURISDICTIONAL	2.54
TOTAL	2.87
ISOLATED WETLAND AREAS NON-JURISDICTIONAL	0.90
UPLAND AREAS	338.72
HISTORICAL DRILLING ACTIVITY SLUDGE PITS	
(A) (S) SAMPLE POINTS	

Permit # SWG-03-39-004
WASTE MGMT of TEXAS
Page 4 of 4

Wetland and jurisdictional water areas depicted, have been classified as "isolated" or "adjacent" based upon Berg•Oliver Associates, Inc.'s assessment of the jurisdictional designation of wetland and water areas. The actual designations should be verified by the Corps of of Engineers, the final authority on jurisdictional status.

The boundaries of the jurisdictional areas identified were collected using a Trimble TSC1 data logger and a Trimble Pro-XRS integrated GPS/Beacon Receiver. Data was collected using real time kinematics (RTK) by the use of the OmniStar satellite system. Features were generated utilizing Pathfinder Office GPS software. Approximately 1358 point positions (coordinates) were collected and used to generate the features shown on this map. The GPS units were "localized" or oriented to a local coordinate system for the perimeter boundary corners of the subject property. Monitoring of the residuals and other pertinent data provided by the software, confirmed that the positional accuracy of the collected points relative to the boundary corners were sub-meter. If needed, data for all GPS positions collected, can be furnished by Berg•Oliver Associates, Inc., upon the USACE's request.

WATERS OF THE UNITED STATES
WETLAND DELINEATION MAP

PROJECT #: 361WDOE
FOR: DANNENBAUM ENGINEERING CORP.
LOCATION: 554.55± ACRES – ATASCOSITA LANDFILL
HARRIS COUNTY, TEXAS

REVISIONS:

BERG•OLIVER ASSOCIATES, INC.
ENVIRONMENTAL SCIENCE, ENGINEERING & LAND USE CONSULTANTS
14701 ST. MARY'S LANE, SUITE 400
HOUSTON, TEXAS 77079 PHONE (281) 589-0888 http://www.bergoliver.com

INDIVIDUAL PERMIT APPLICATION

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT *(33 CFR 325)*	OMB APPROVAL NO. 0710-0003 EXPIRES: 31 August 2012

Public reporting burden for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
SWG-1993-01967			

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME:	8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
First - Charles Middle - Last – Rivolta	First - Carlos Middle - o. Last – Hinojosa
Company – Waste Management of Texas, Inc.	Company – Knudson, LP
E-mail Address – crivolta@wm.com	E-mail Address – chinojosa@knudsonservices.com
6. APPLICANT'S ADDRESS. Address - 800 Gessner, Suite 1100	9. AGENT'S ADDRESS Address - 8588 Katy Freeway, Suite 441
City – Houston State – Texas Zip – 77024 Country – Harris	City – Houston State – Texas Zip – 77024 Country – Harris
7. APPLICANT'S PHONE NOs. W/AREA CODE.	10. AGENT'S PHONE NOs. W/AREA CODE
Residence b. Business (713) 647-5542 c. Fax (713) 647-5549	a. Residence b. Business (713) 932-4003 c. Fax (713) 463-8011

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Knudson, LP to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

Charles A. Rivolta — 6.18.2010

APPLICANT'S SIGNATURE — DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

Atascocita Landfill Expansion
Harris County, Texas

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Wetlands, HCFCD P130-02-01, tributary to Williams Gully, and Williams Gully	Address
15. LOCATION OF PROJECT	City - State – Zip -
Latitude: °N 29.950620 Longitude: °W -95.225880	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

State Tax Parcel ID Municipality
Section – Township – Range –

17. DIRECTIONS TO THE SITE

From Houston, travel north on U.S. Highway 59 to Old Humble Road, and turn right. Old Humble Road will turn in to Atascocita Road. Proceed to Ygnacio Road, and turn right. Travel approximately 1.2 miles to the most southern point on the road to the project location. From the confluence of Williams Gully and Garners Bayou, the project is located 1.4 river miles upstream. Please refer to Exhibit 1.

18. Nature of Activity (Description of project, include all features)

See Tab, Block 18.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

See Tab, Block 19.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

See Tab, Block 20.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
See Tab, Block 21.		

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres See Tab, Block 22.
Or
Liner Feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)

See Tab, Block 23.

24. Is Any Portion of the Work Already Complete? Yes ☐ No ☑ IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

Address – See Tab, Block 25.

City – State – Zip –

26. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
Texas Historical Commission	No Historic Properties Affected	"The Scanlin Property"	October 19, 2009	November 20, 2009	

* Would include but is not restricted to zoning, building, and flood plain permits

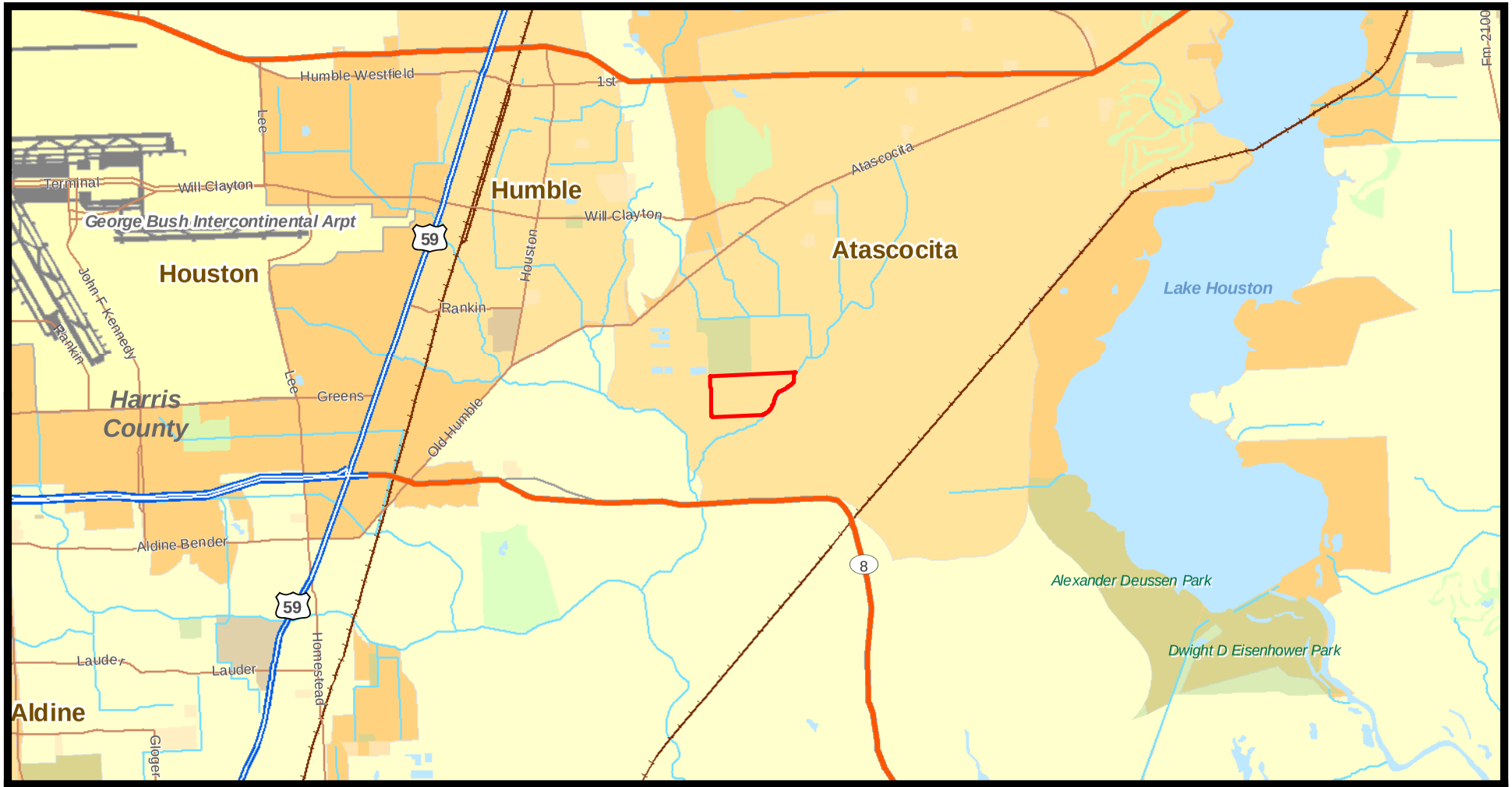
27. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

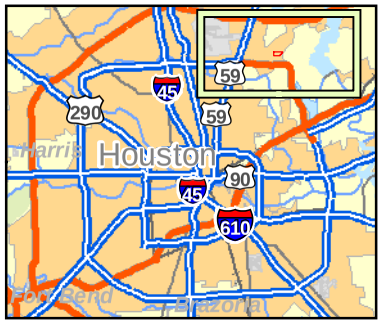
Charles A. Russell — SIGNATURE OF APPLICANT
6-18-2010 — DATE
[signature] — SIGNATURE OF AGENT
06/18/2010 — DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

ENG FORM 4345, SEPT 2009





Source: ESRI Data & Maps 9.3

190 Acre Project Area

0 2 4 Miles

N

8588 Katy Freeway Suite 441
Houston, TX 77024
Phone (713) 463-8200

Exhibit 1
Vicinity Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Sep 22, 2009
ESRI Data & Maps 9.3	Scale:1 in = 2 miles
J:\Projects\07-0819 Waste Mgmt\Sec 3.0 Project Information\3.4 GPS\Arcmap\EX_1_Vicinity	

Block 18. Nature of Activity

Waste Management of Texas, Inc. (WMTX) is proposing an expansion of the existing approximate 503-acre Atascocita Recycling and Disposal Facility (Atascocita RDF) located in Harris County, Texas. The expansion area will extend east into an approximate 190-acre (Project) portion of a 300-acre tract (Scanlin Tract) owned by WMTX and lies adjacent to the existing Atascocita RDF. The Project is located between the existing eastern permit boundary of the Atascocita RDF and Williams Gully. The Atascocita RDF landfill expansion will be authorized by the Texas Commission of Environmental Quality (TCEQ) through a major permit amendment application procedure.

In order to prepare the site for construction activities, approximately 17.95 acres and 950 linear feet of jurisdictional waters of the United States (U.S.), including wetlands, would be excavated and/or filled for the Project. Conversely, approximately 1.2 acres and 3,200 linear feet of jurisdictional waters of the U.S., including wetlands, will be avoided.

WMTX proposes to expand the existing Atascocita RDF through construction of a landfill expansion, wet detention pond, perimeter drainage system, sedimentation pond (Williams Pond), two outfall structures, and realign Harris County Flood Control District (HCFCD) P130-02-01 (diversion channel). Prior to initiation of any land disturbances, sediment and erosion control devices will be installed in accordance with the approved permit. The plan will incorporate typical standard devices, e.g., silt fences, diversions, hay bales, gabions, sediment traps, etc.

Additionally, the facility has been designed to prevent the discharge of pollutants into waters of the U.S. or state of Texas, as defined by the Federal Clean Water Act and the Texas Water Code, respectively. WMTX submitted a notice of intent (NOI) to comply with Texas Pollutants Discharge Elimination System (TPDES) General Permit No. TXR050000 relating to stormwater discharge associated with industrial activity (Multi-Sector General Permit) and received Permit No. TXR05N515. A copy of the TPDES permit is included in the TCEQ section following the Tier II Alternatives Analysis Checklist.

Below are descriptions of construction designs and techniques used to avoid and/or minimize impacts within each area of the Project. For Project drawings, please refer to the Exhibits following the descriptions of construction design and techniques.

LANDFILL

The Atascocita RDF is an existing Type I Municipal Solid Waste (MSW) Disposal Facility owned and operated by WMTX. The Project is immediately adjacent to and east of the current permitted easternmost permit boundary. The Project will add approximately 170 acres to the existing permit boundary.

The primary function of the facility and Project is MSW disposal. The major classifications of solid waste to be accepted at the facility include MSW, special waste, and Class 2 and 3 industrial wastes.

MSW regulations require that landfill design must include provisions providing effective erosion stability to external top slopes and side slopes during all phases of landfill operation, closure, and post-closure

care. The perimeter drainage channels and detention/sedimentation ponds for the landfill expansion are designed and will be constructed to become integrated into the current Atascocita RDF surface water management system. The Atascocita RDF perimeter drainage channels and detention/sedimentation ponds will be constructed as the landfill development progresses. Erosion will be minimized in these structures by the establishment of vegetation or through the use of rock rip-rap, gabions, or other materials for these permanent structures.

Management of soil for use in and around the landfill area will be an ongoing process at Atascocita RDF and the Project. In general, soil for use as daily cover, intermediate cover, final cover, and other uses will be available adjacent to the active area. Soil will be obtained from excavation that is ongoing as part of the initial development of future landfill cells or from other suitable sources.

At least 6 inches of well-compacted soil cover material that has not been previously mixed with garbage, rubbish, or other solid waste, or other approved alternate daily cover material (ADC) will be placed over all solid waste at the end of each operating day.

All areas that receive waste and then become inactive for longer than 180 days will be covered with an additional 6 inches of well-compacted earthen material, for a total cover thickness of at least 12 inches. The intermediate cover will be graded to prevent erosion and ponding of water. The additional 6 inches of earthen material will be capable of sustaining native plant growth and will be seeded or sodded following its application for erosion control. Plant growth and other erosion control features placed as part of the intermediate cover will be maintained.

Final cover areas will consist of a minimum 24-inch thick soil cover with the top 6 inches capable of sustaining native vegetation. Upon placement of final cover, drainage swales and down-chutes will be constructed to direct surface water runoff from the final cover areas to minimize erosion. These areas will be seeded with native and introduced grasses immediately following application of final cover.

Landfill surfaces will be inspected weekly and following rainfall events of 0.5 inches or more for potential areas of erosion and will restored or repaired as soon as possible following rainfall events. Best Management Practices will be utilized throughout the active life of the landfill and throughout the post-closure period.

REALIGNMENT OF P130-02-01 (DIVERSION CHANNEL)

At the present time WMTX is utilizing an area within the Atascocita RDF to provide cover material for the existing landfill. As additional cover materials are needed, excavation would continue eastward through the footprint of P130-02-01 that forms the western boundary of the Project.

Consultants for WMTX performed a drainage analysis to determine the feasibility and mitigation requirements for realigning the existing HCFCD P130-02-01 channel to the east via a diversion channel. In the current permitted condition, stormwater runoff from P1300201A flows onto the Project through P130-02-01 south, continues off of the Project, and discharges into Williams Gully.

In the post-development condition, the diversion channel will redirect the stormwater runoff from the adjacent properties north of the Project to the east which outfalls into Williams Gully. The diversion channel maintains a 6-foot bottom width with 4:1 side slopes, an inline slope of 0.05 percent, and an average depth of 7.5 feet. The diversion channel will cross a power easement owned by Houston Lighting & Power where an 8-foot by 6-foot box culvert will be placed to convey the flow.

In an effort to maximize the available volume for the wet detention pond (see Detailed Engineering Drawings), the depth of the diversion channel increases to approximately 16 feet downstream of the easement crossing, with a slope of 0.1 percent. A drop structure will provide the means to drop the flowline by the required 8.5 feet. The diversion channel includes berms on each side for maintenance purposes (25 feet on the north side and 20 feet on the south side). Including the maintenance berms, the total right-of-way (ROW) required upstream of the culvert crossing at the power line easement is 110 feet, while 180 feet is required downstream of the culvert crossing. The total ROW area for the diversion channel is approximately 12.4 acres.

WET DETENTION POND

Due to HCFCD mitigation requirements, a wet detention pond (detention pond) will be constructed at the downstream end of the diversion channel. The flow of the diversion channel will be diverted into the detention pond through a notched lateral weir. One 18-inch outfall pipe allows the detention pond to drain back into the diversion channel before reaching Williams Gully. One inline restrictor is also included to prevent the water in the diversion channel from reaching the outfall to Williams Gully too quickly. The diversion channel will be filled with a box culvert to convey water downstream. The culvert will be a 4 feet by 10 feet precast reinforced concrete box. One (1) foot of width will be unobstructed to restrict the flow of water at the allowable rate. The inline structure allows the detention pond to retain water for a longer period of time, helping to delay the peak of the P130-02-01 hydrograph. The detention pond has a maximum volume of 88 acre-feet at its top elevation. The pond is approximately 16 feet deep with 4:1 side slopes. A 15-foot berm will be constructed around the detention pond for maintenance access. Where the pond is adjacent to the diversion channel on the northern side, the maintenance berm will be shared by both the detention pond and the diversion channel. The detention pond, including the maintenance berms, requires a total surface area of 6.3 acres.

PERIMETER DRAINAGE

The perimeter drainage system is designed to convey the 25-year runoff from the developed landfill consistent with TCEQ regulations. In addition, the perimeter channels have been designed to convey the runoff from a 100-year rainfall event. The perimeter drainage channel directs the surface water runoff from the landfill surface to existing detention/sedimentation ponds and the proposed Williams Pond. These ponds provide both detention of surface water and sediment controls before runoff exits the landfill.

At the base of the proposed landfill and within the Project, a 100-foot wide [top-of-bank (TOB) to TOB] perimeter channel of approximately 8,000 feet in length is proposed to capture internal rainfall runoff. This perimeter channel is designed as an extension of the existing Atascocita RDF drainage system.

SEDIMENTATION POND (WILLIAMS POND)

An approximate 7-acre detention/sedimentation pond is proposed to be located between the southeast corner of the Project and Williams Gully. The perimeter drainage channel directs a portion of the landfill surface water runoff contained within the perimeter channel into Williams Pond. Williams Pond is designed to receive surface runoff from the perimeter drainage system, sequester sediments, and detain surface runoff from the landfill during excessive flow events. The pond will outfall at-grade with the Williams Gully ordinary high water mark (OHWM) via an approved outfall structure in accordance with HCFCD standards.

OUTFALL STRUCUTRES

WMTX proposes to construct two outfalls as part of the Project. Outfall Number (No.) 1 is associated with the diversion channel; Outfall No. 2 is associated with Williams Pond.

Outfall No. 1

The proposed excavation and fill activities associated with the construction of Outfall No. 1 will result in the placement of rock rip-rap, paved slope, and grass slope. The total volume of impacts below the OHWM for Outfall No. 1 is 32,900 cubic feet.

The calculations for the volume of fill material for Outfall No. 1 are based on the following components:

Total approximate area within waters of the U.S. to be filled:	9,400 sq. ft.
Number of cubic feet in one yard:	27 cf/cy
Approximate fill volume to be placed in potentially jurisdictional waters:	32,900 cu. ft.

9,400 sq. ft. X 3.5 ft. = 32,900 cf / 27 cf/cy = 1,219 cubic yards

Outfall No. 2

The proposed excavation and fill activities associated with the construction of Outfall No. 2 will result in the placement of rip-rap/gabion protection for Williams Gully. The total volume of impacts below the OHWM for Outfall No. 2 is 600 cubic yards.

The calculations for the volume of fill material for Outfall No. 2 are based on the following components:

Total approximate area within waters of the U.S. to be filled:	5,400 sq. ft.
Number of cubic feet in one yard:	27 cf/cy
Approximate fill volume to be placed in potentially jurisdictional waters:	16,200 cu. ft.

5,400 sq. ft. X 3 ft. = 16,200 cf / 27 cf/cy = 600 cubic yards

J:\101\17\102\Wetlands\Wet-1.dwg Layout: Layout1 User: scundiff

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MANSFIELD, TEXAS

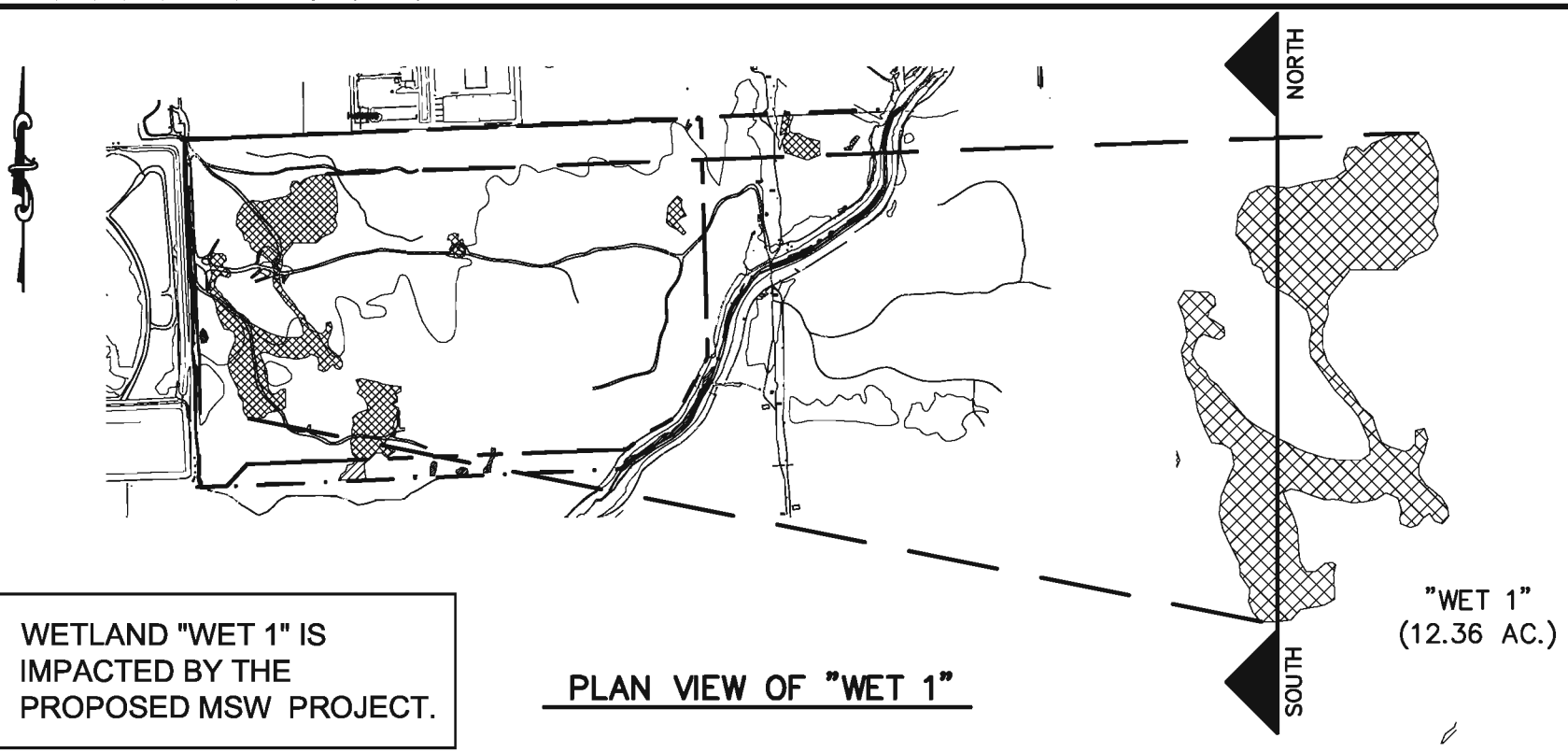
WETLAND AREA "WET 1"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA ROF
WETLAND DELINEATION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
		ISSUED FOR PERMITTING PURPOSES				
		REVISIONS				

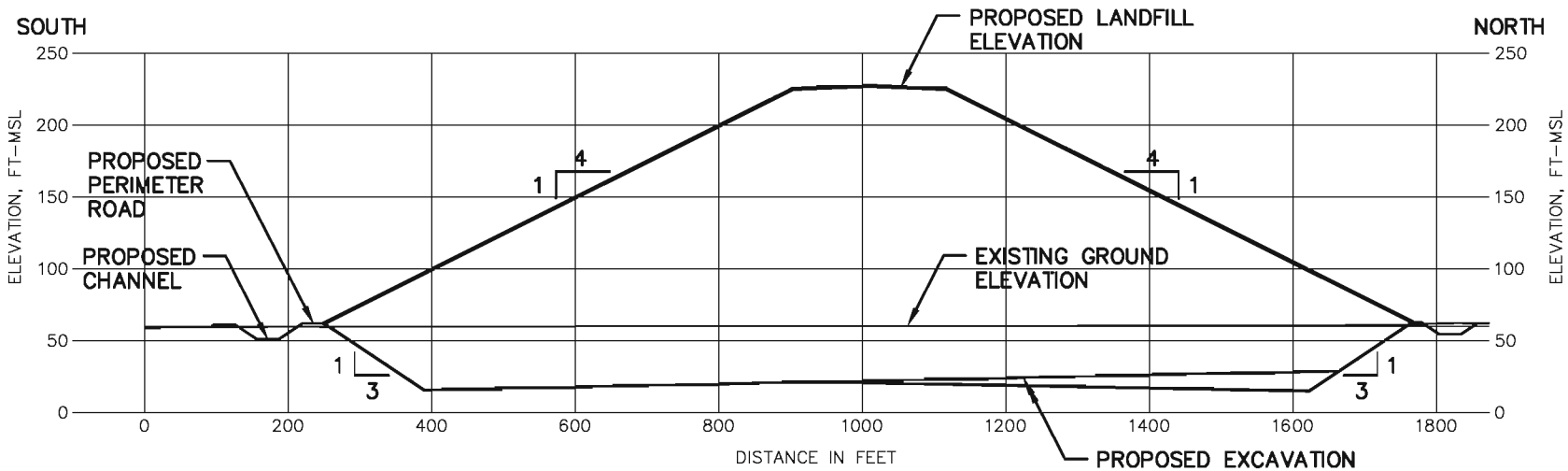
DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-1.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 1



WETLAND "WET 1" IS IMPACTED BY THE PROPOSED MSW PROJECT.

PLAN VIEW OF "WET 1"



CROSS SECTION OF "WET 1"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

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WETLAND AREA "WET 2"

WASTE MANAGEMENT OF TEXAS, INC.
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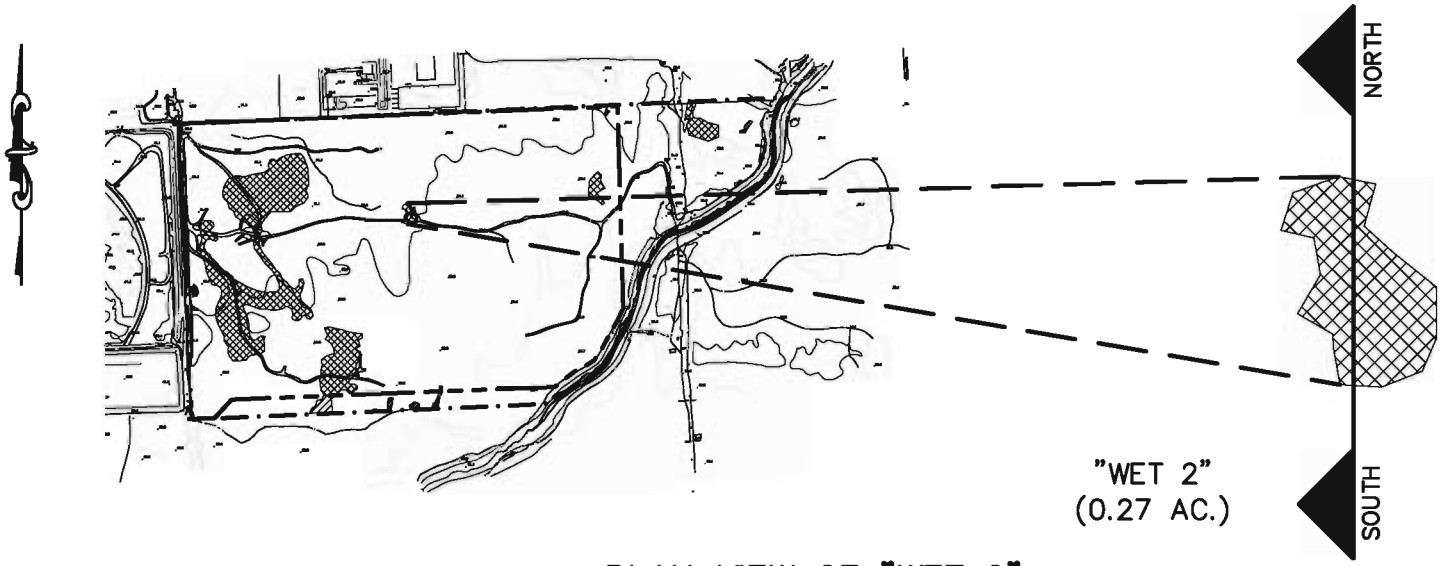
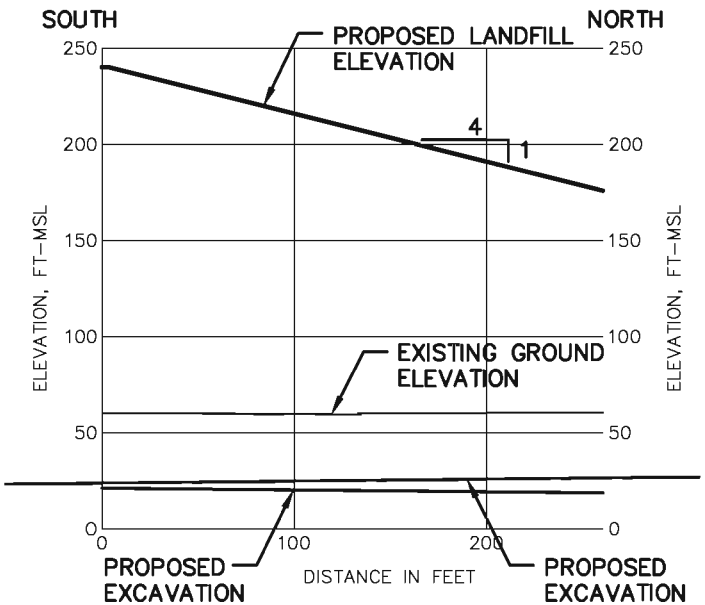
DWG : Wet-2.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 2



PLAN VIEW OF "WET 2"

WETLAND "WET 2" IS IMPACTED BY THE PROPOSED MSW PROJECT.



CROSS SECTION OF "WET 2"

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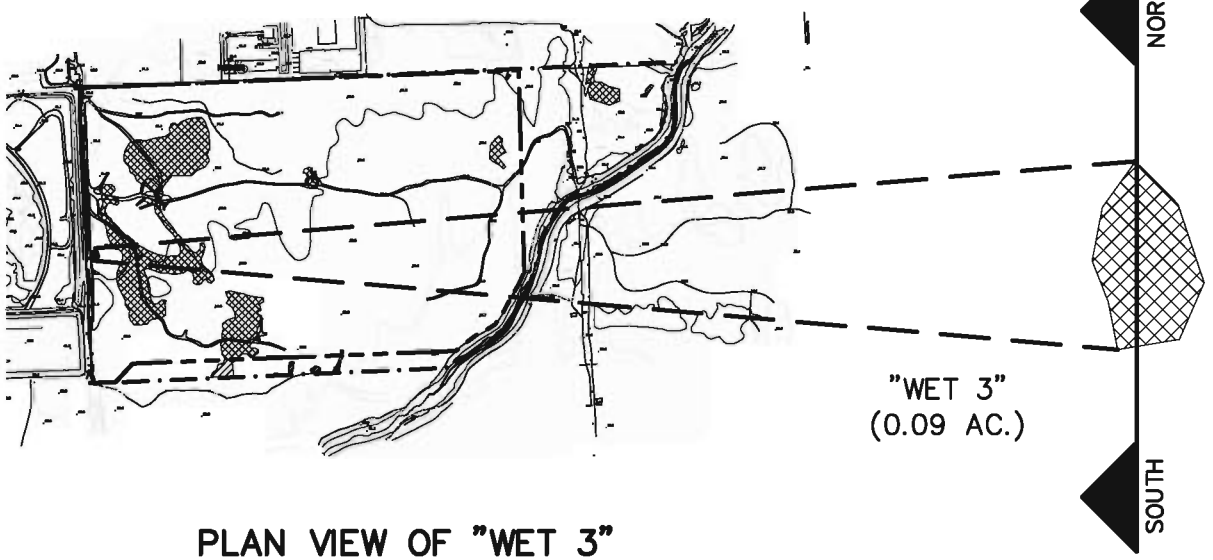
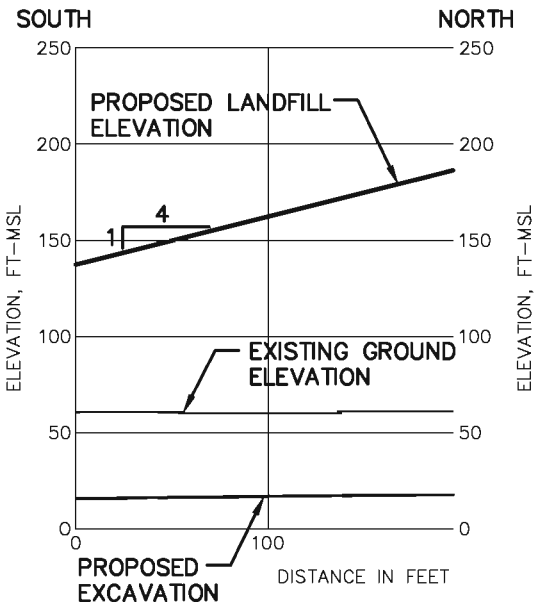


PLAN VIEW OF "WET 3"



CROSS SECTION OF "WET 3"

WETLAND "WET 3" IS IMPACTED BY THE PROPOSED MSW PROJECT.

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WETLAND AREA "WET 3"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

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DATE : 10/09
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DWG : Wet-3.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 3

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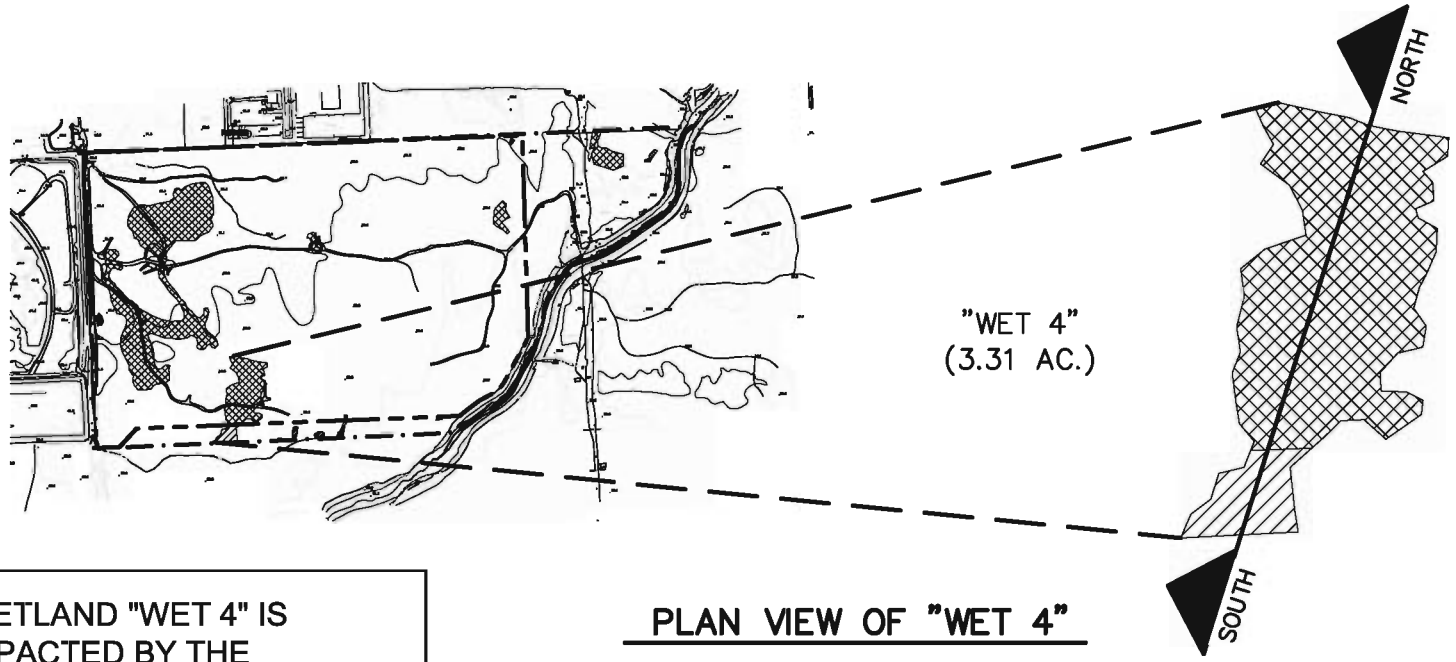

PLAN VIEW OF "WET 4"

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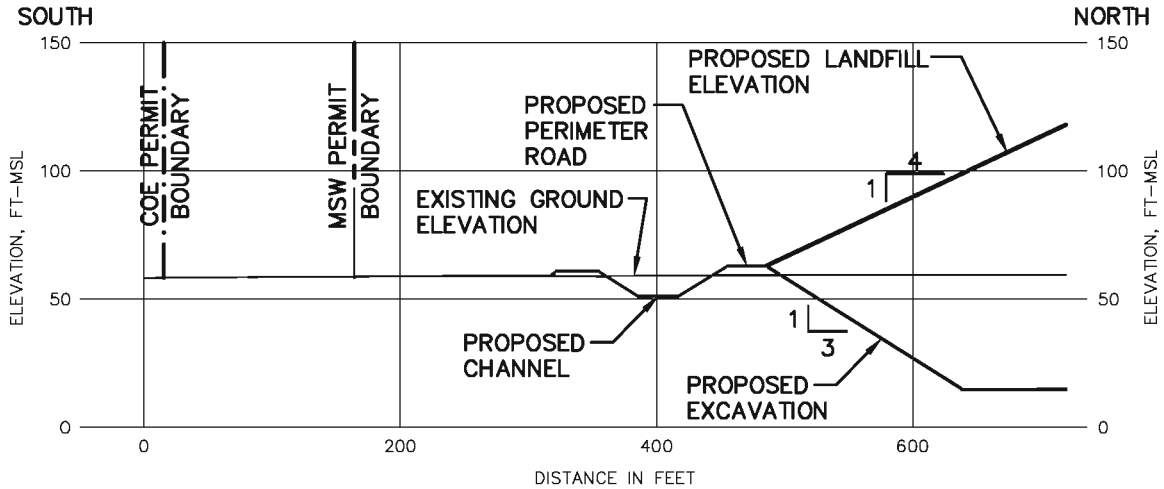
IMPACTED: 2.92 AC.
NOT IMPACTED: 0.39 AC.



CROSS SECTION OF "WET 4"
VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND AREA "WET 4"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

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DWG : Wet-4.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 4

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WETLAND AREA "WET 5"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

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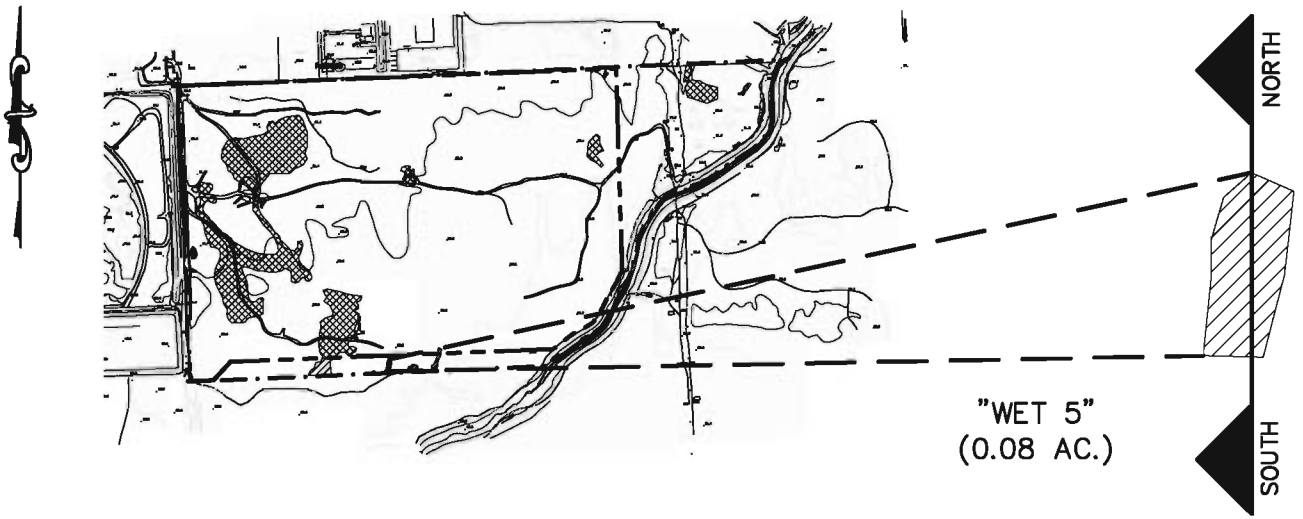
SCALE : GRAPHIC
DWG : Wet-5.dwg
DSN. KJW
DWN. SRC
CHK. KJW

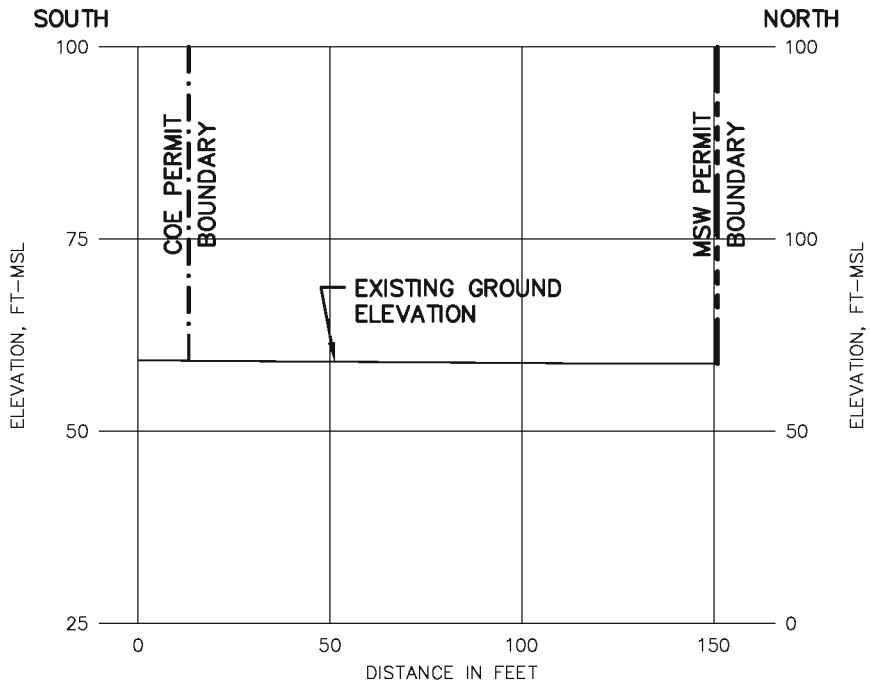
ISSUED FOR PERMITTING PURPOSES

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

FIGURE 5



PLAN VIEW OF "WET 5"



CROSS SECTION OF "WET 5"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 5" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

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WETLAND AREA "WET 6"

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		REVISIONS				

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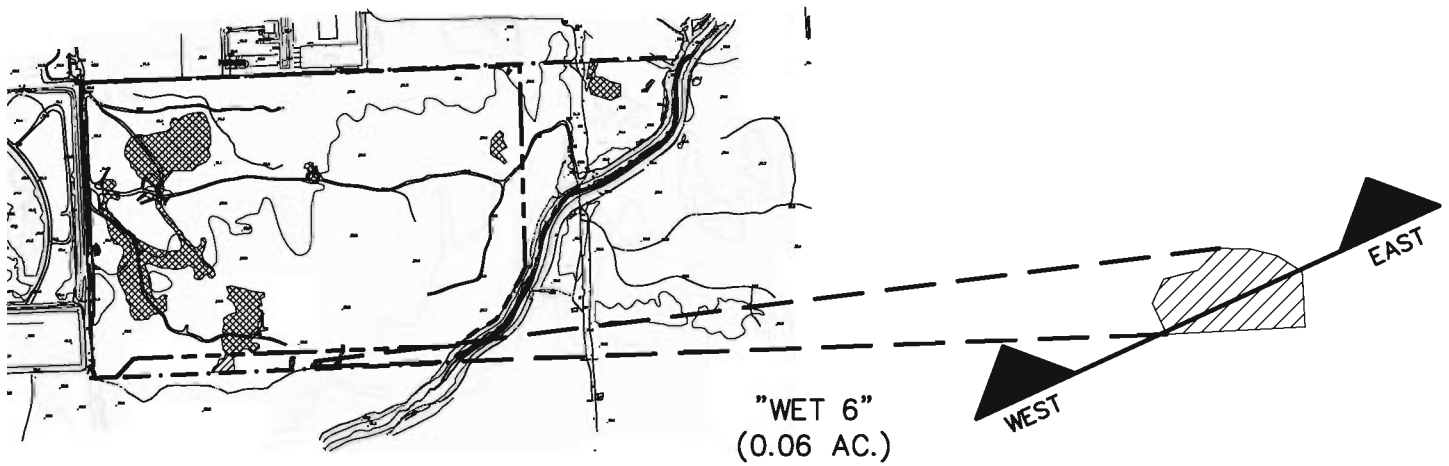
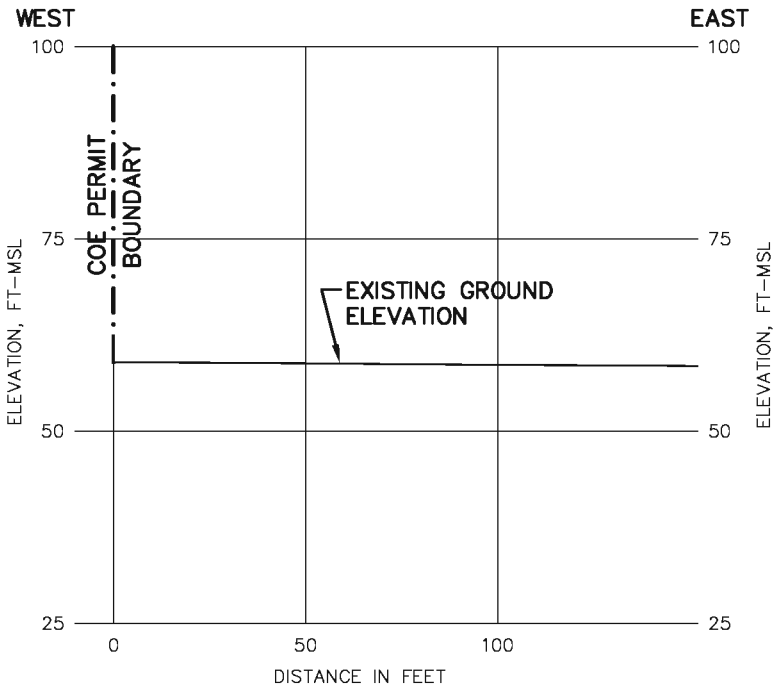
SCALE : GRAPHIC
DWG : Wet-6.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 6



PLAN VIEW OF "WET 6"



CROSS SECTION OF "WET 6"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 6" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

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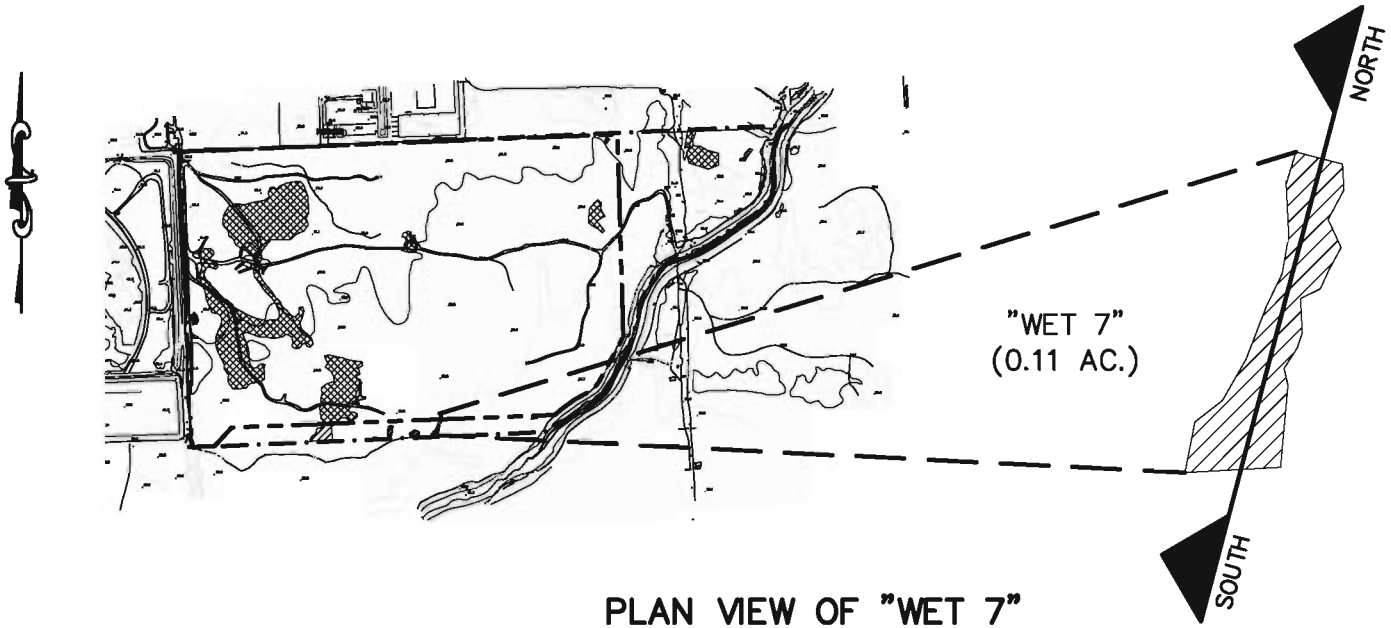
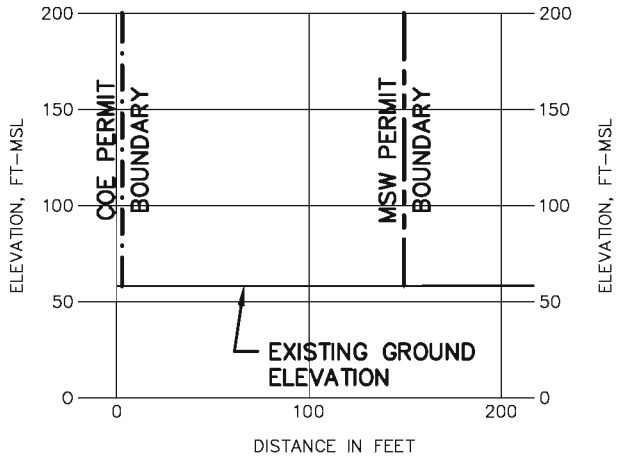


PLAN VIEW OF "WET 7"



CROSS SECTION OF "WET 7"

WETLAND "WET 7" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

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WETLAND AREA "WET 7"

WASTE MANAGEMENT OF TEXAS, INC.
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		REVISIONS				

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-7.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 7

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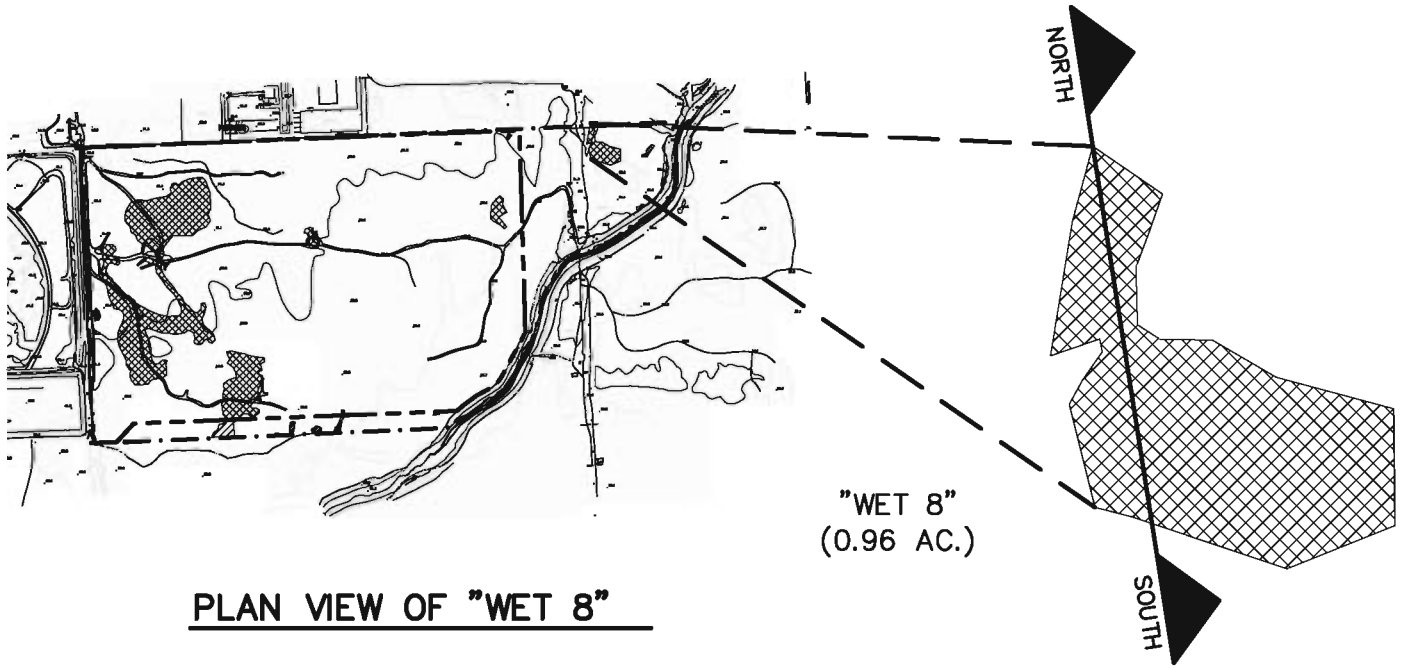
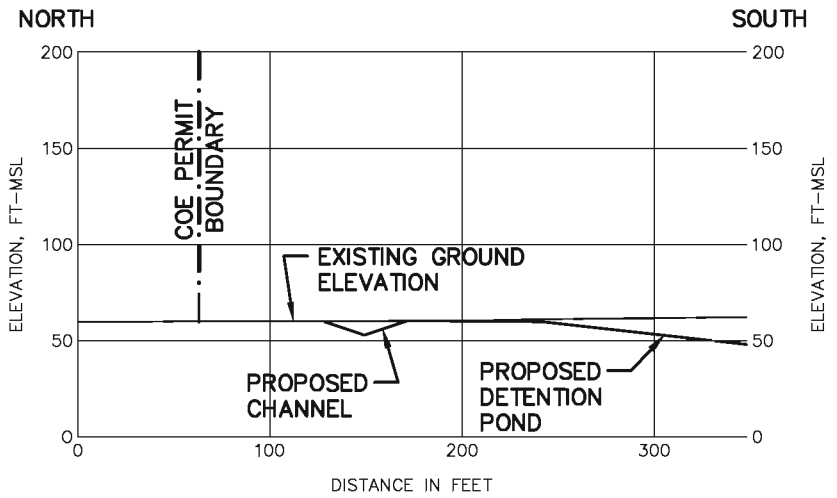


PLAN VIEW OF "WET 8"



CROSS SECTION OF "WET 8"

WETLAND "WET 8" IS IMPACTED BY THE PROPOSED MSW PROJECT.

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WETLAND AREA "WET 8"

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ATASCOCITA ROF
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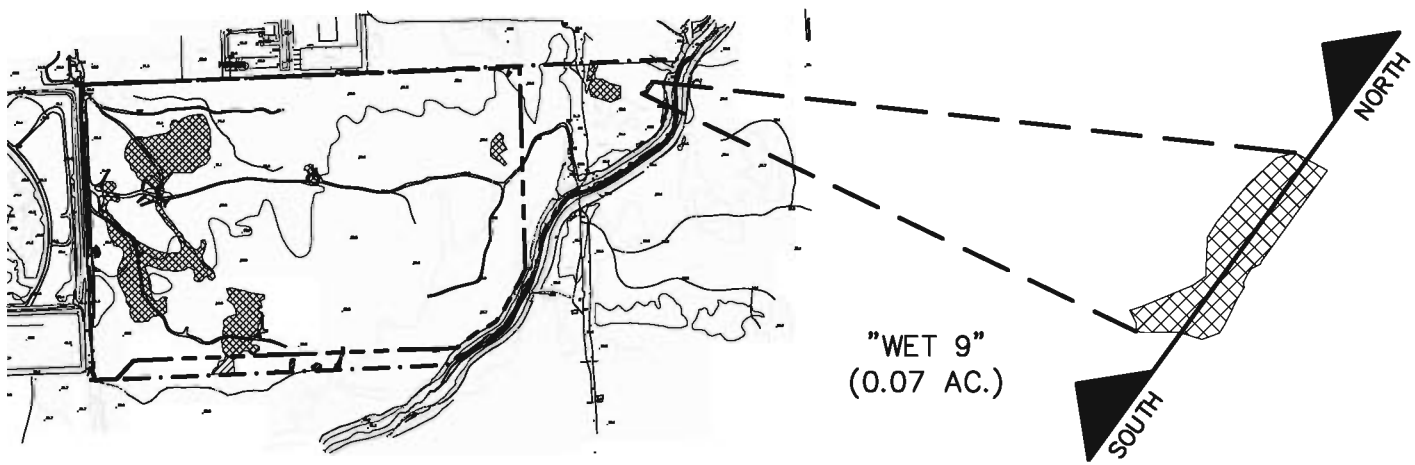
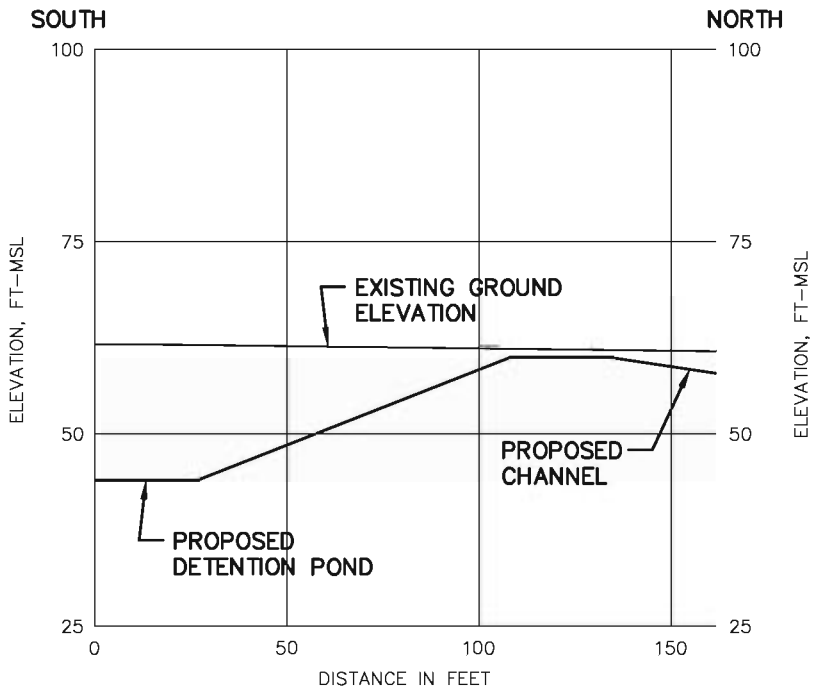
SCALE : GRAPHIC | DWN. SRC
DWG : Wet-8.dwg | CHK. KJW

FIGURE 8

J:\101\17\102\Wetlands\Wet-9.dwg Layout: Layout1 User: scundiff



PLAN VIEW OF "WET 9"



CROSS SECTION OF "WET 9"

VERTICAL SCALE EXAGGERATED 2X HORIZONTAL SCALE

WETLAND "WET 9" IS IMPACTED BY THE PROPOSED MSW PROJECT.

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WETLAND AREA "WET 9"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

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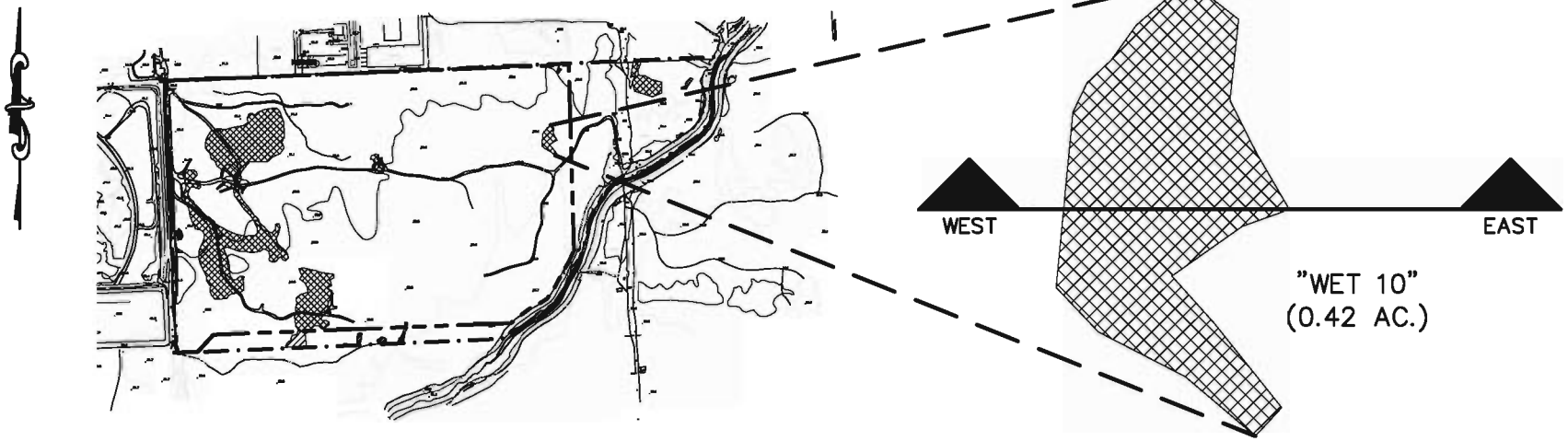
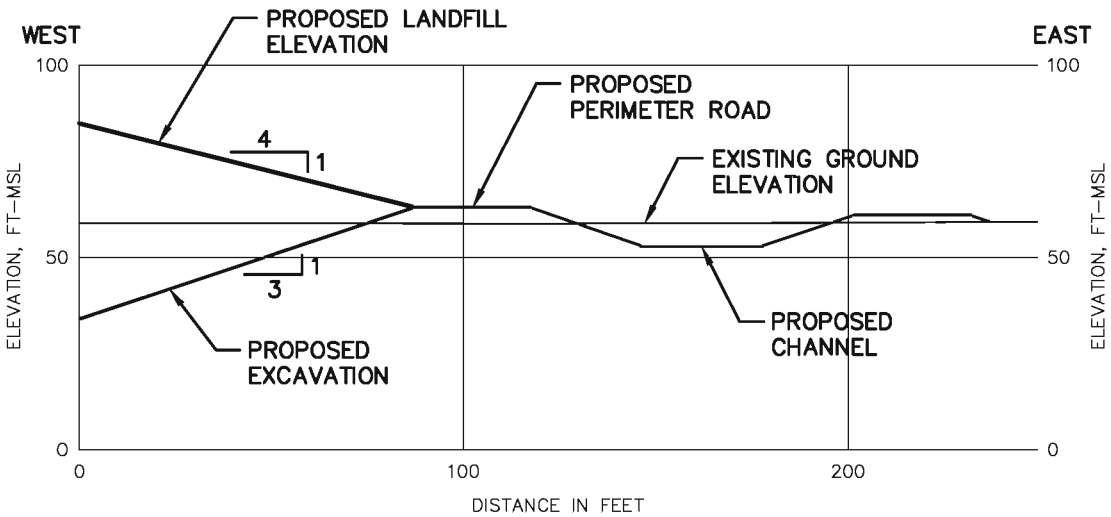
DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-9.dwg
DSN. KJW
DWN. SRC
CHK. KJW

DRAWING 9

J:\101\17\102\Wetlands\Wet-10.dwg Layout: Layout1 User: scundiff



PLAN VIEW OF "WET 10"



CROSS SECTION OF "WET 10"

WETLAND "WET 10" IS IMPACTED BY THE PROPOSED MSW PROJECT.

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WETLAND AREA "WET 10"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

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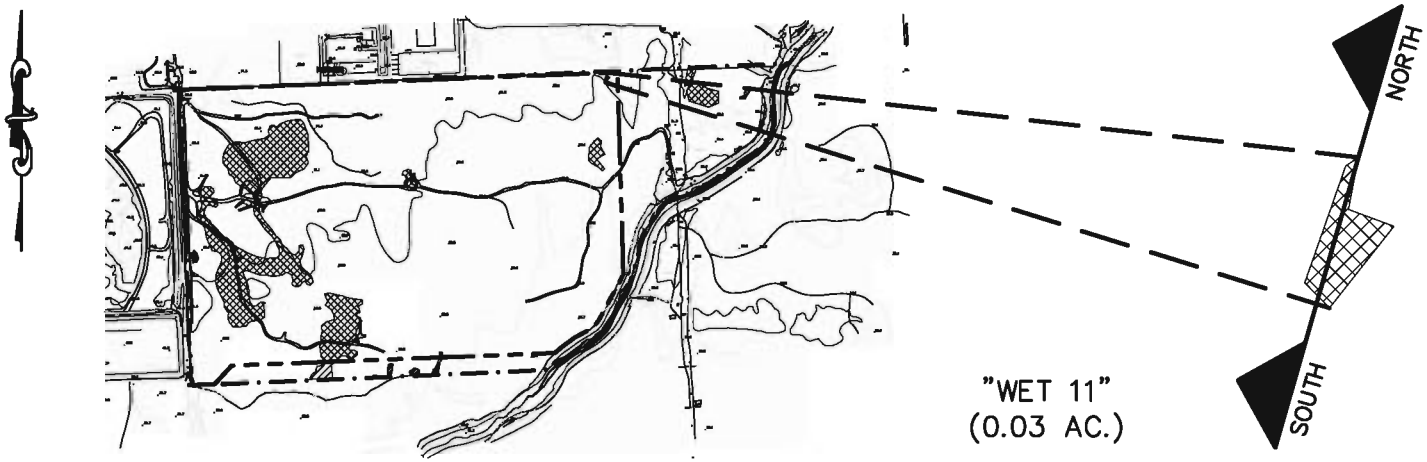
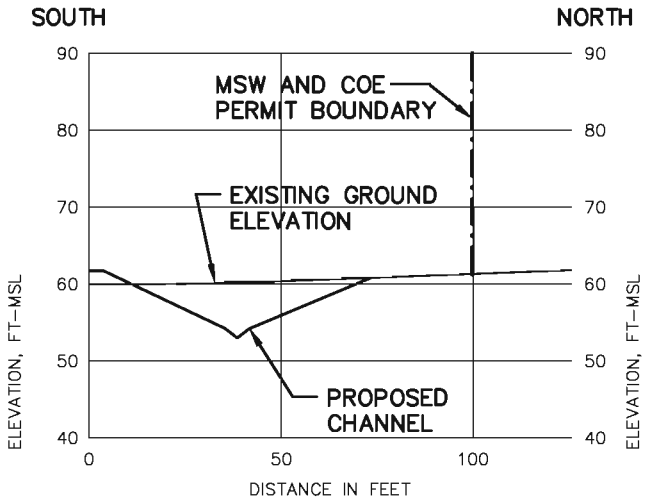
FIGURE 10

J:\101\17\102\Wetlands\Wet-11.dwg Layout: Layout1 User: scundiff



PLAN VIEW OF "WET 11"



CROSS SECTION OF "WET 11"

VERTICAL SCALE EXAGGERATED 2X HORIZONTAL SCALE

WETLAND "WET 11" IS IMPACTED BY THE PROPOSED MSW PROJECT.

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MANSFIELD, TEXAS

WETLAND AREA "WET 11"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

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SCALE : GRAPHIC | DWN. SRC
DWG : Wet-11.dwg | CHK. KJW

FIGURE 11

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WETLAND AREA "WET 12"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

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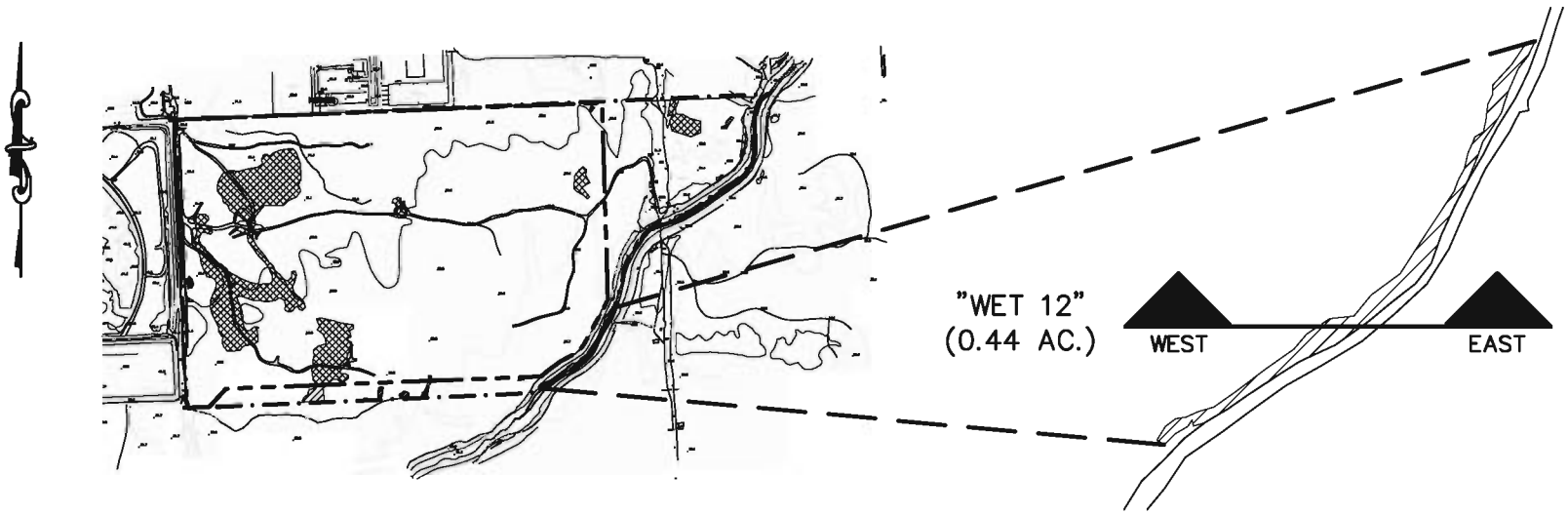
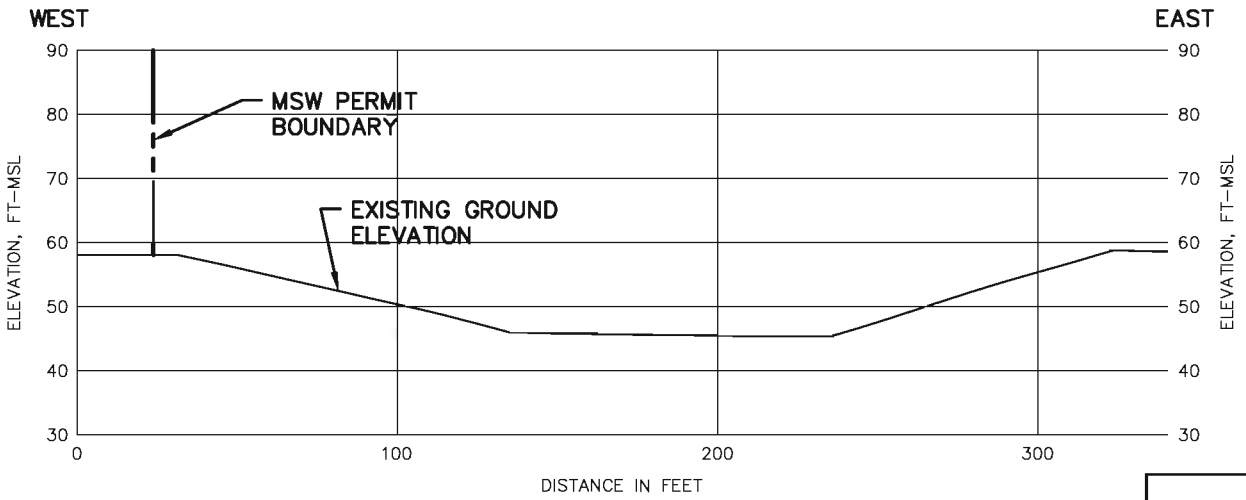
DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-12.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 12



PLAN VIEW OF "WET 12"



CROSS SECTION OF "WET 12"

VERTICAL SCALE EXAGGERATED 2X HORIZONTAL SCALE

WETLAND "WET 12" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

J:\101\17\102\Wetlands\Wet-13.dwg Layout: Layout1 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT T. ROAD
MANSFIELD, TEXAS

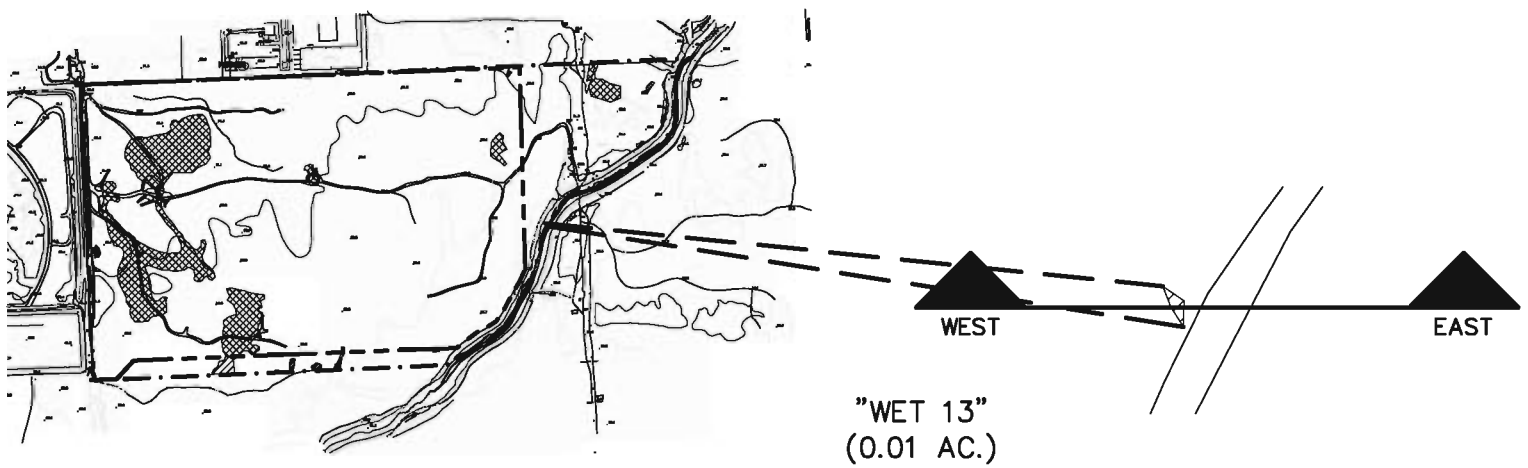
WETLAND AREA "WET 13"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

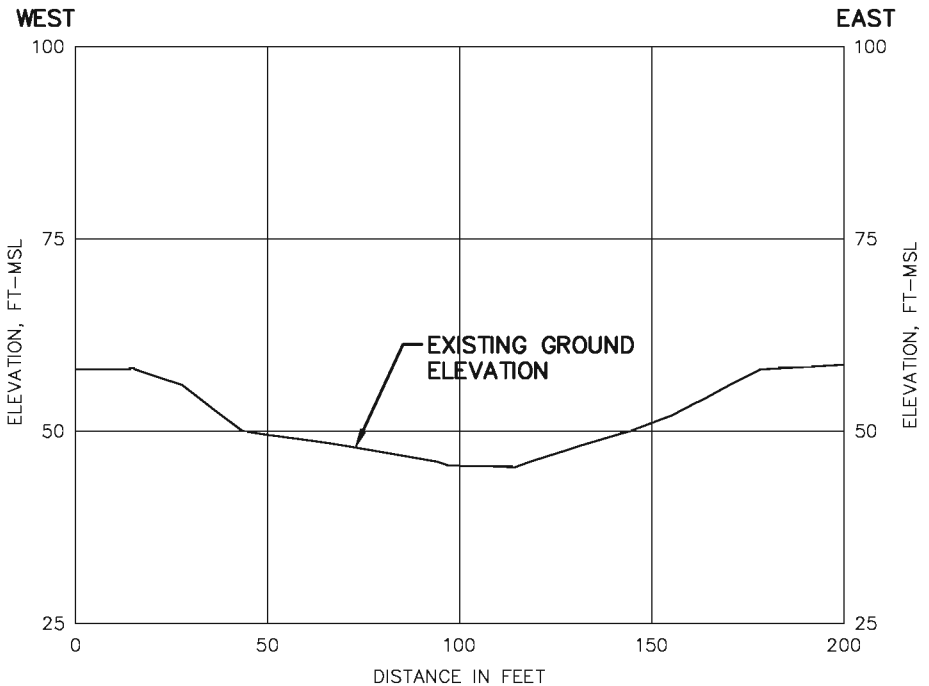
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
		ISSUED FOR PERMITTING PURPOSES				
		REVISIONS				

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-13.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 13



PLAN VIEW OF "WET 13"



CROSS SECTION OF "WET 13"

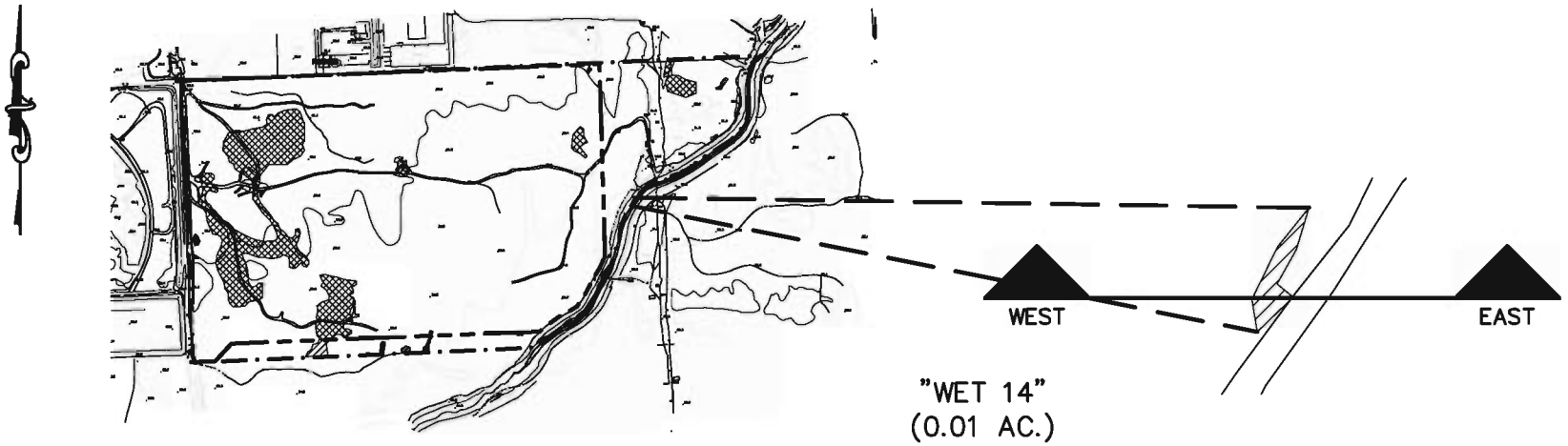
VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 13" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

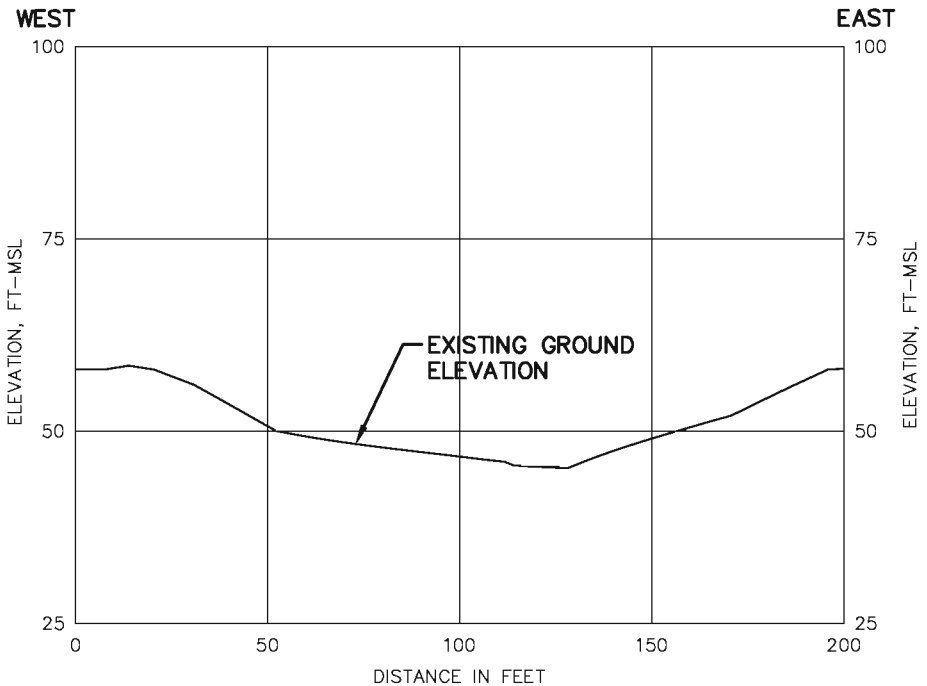
BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT T. ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 14"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION



PLAN VIEW OF "WET 14"



CROSS SECTION OF "WET 14"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

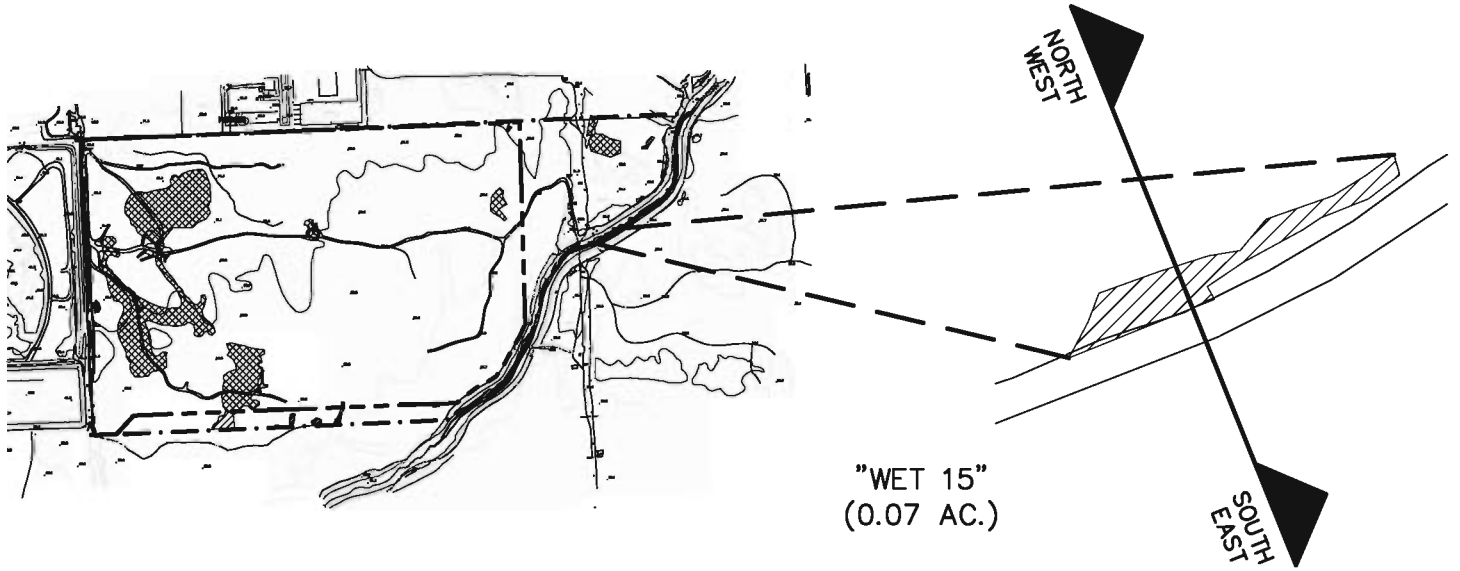
WETLAND "WET 14" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
		ISSUED FOR PERMITTING PURPOSES				
		REVISIONS				

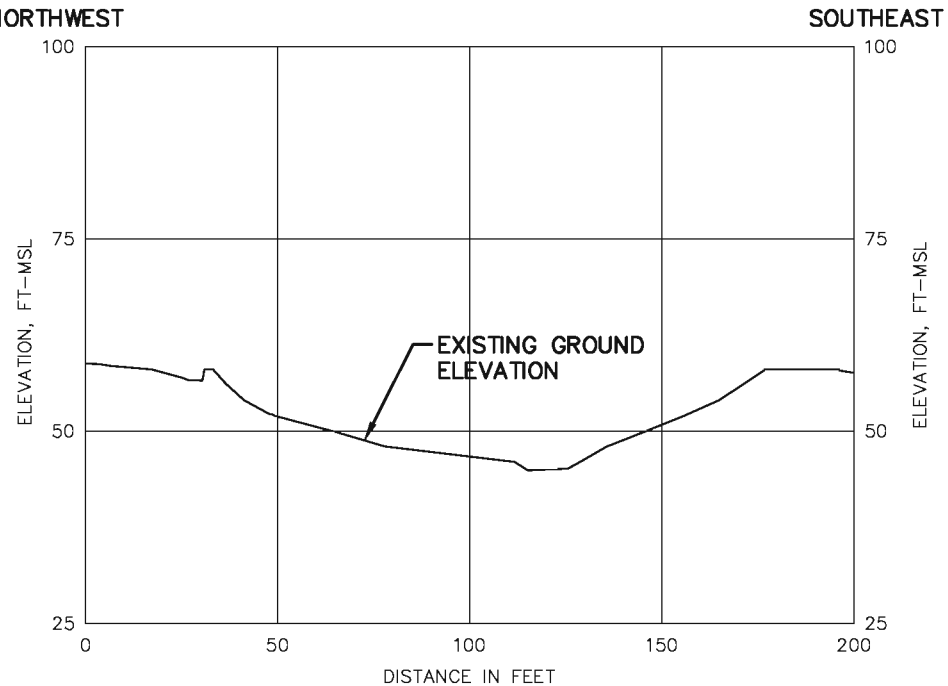
DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-14.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 14

J:\101\17\102\Wetlands\Wet-15.dwg Layout: Layout1 User: scundiff



PLAN VIEW OF "WET 15"



CROSS SECTION OF "WET 15"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 15" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 15"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
		ISSUED FOR PERMITTING PURPOSES				
		REVISIONS				

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-15.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 15

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 16"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

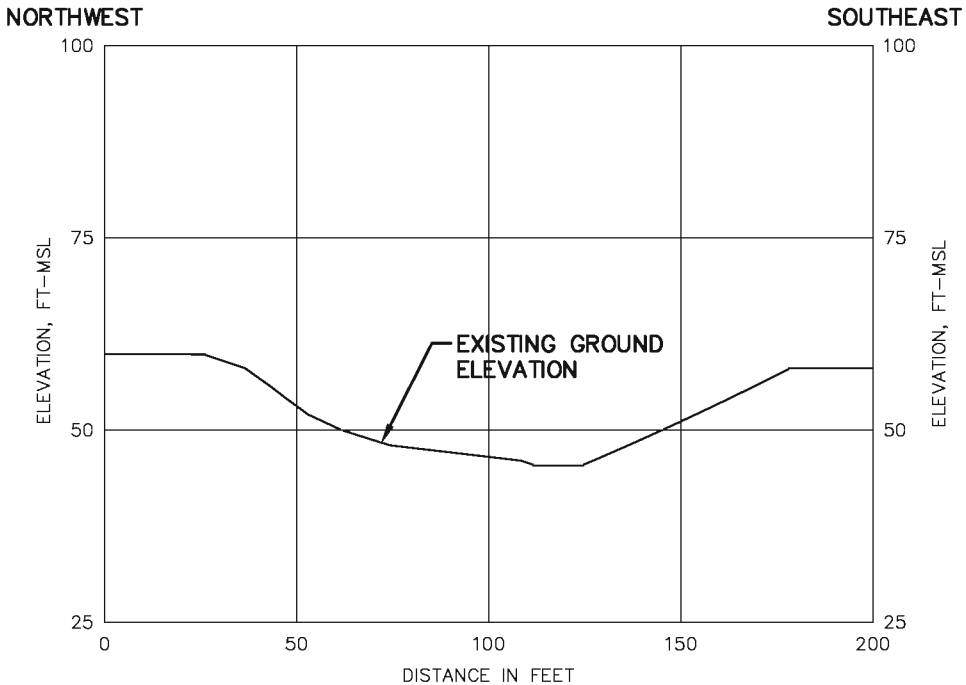
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
		REVISIONS				

ISSUED FOR PERMITTING PURPOSES

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-16.dwg
CHK. KJW
DSN. KJW
DWN. SRC

FIGURE 16

PLAN VIEW OF "WET 16"

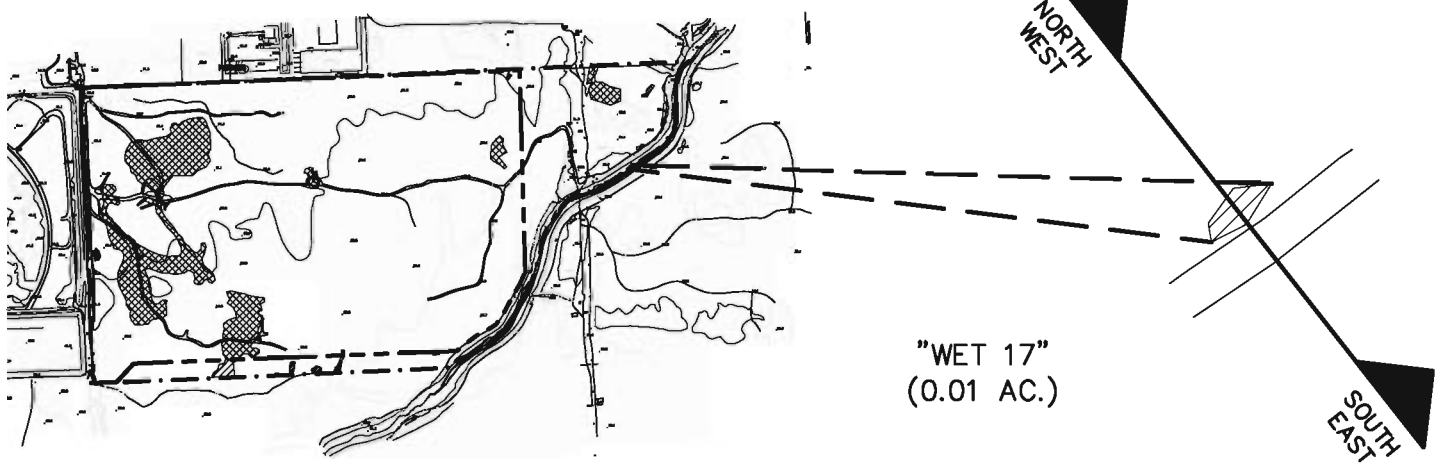


CROSS SECTION OF "WET 16"

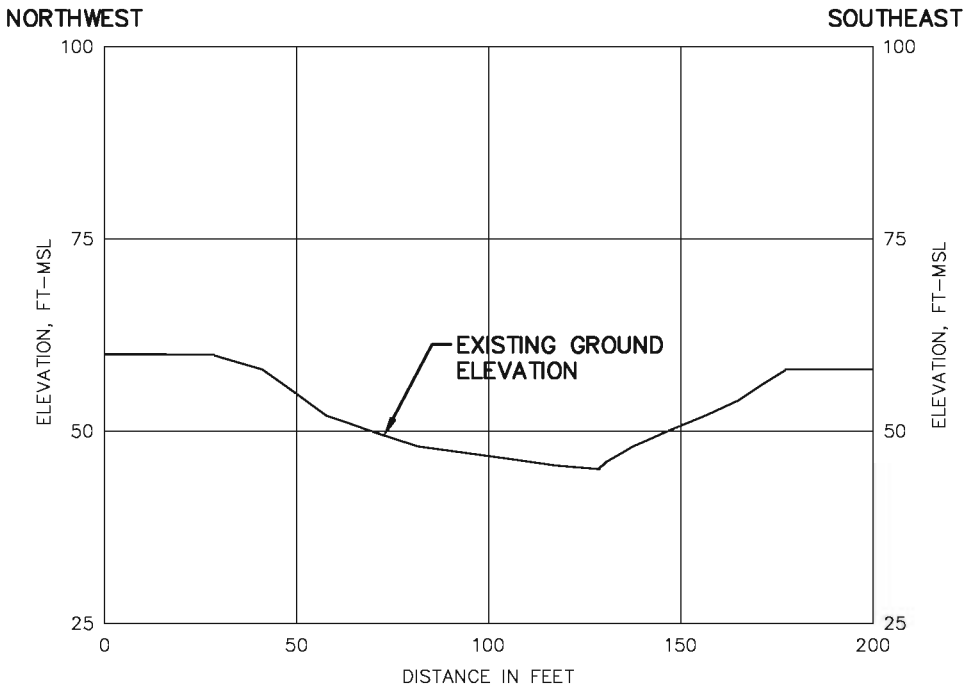
VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 16" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

J:\101\17\102\Wetlands\Wet-17.dwg Layout: Layout1 User: scundiff



PLAN VIEW OF "WET 17"



CROSS SECTION OF "WET 17"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 17" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT T. ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 17"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
		ISSUED FOR PERMITTING PURPOSES				
		REVISIONS				

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-17.dwg
CHK. KJW
DWN. SRC
DSN. KJW

FIGURE 17

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT T. ROAD
MANSFIELD, TEXAS

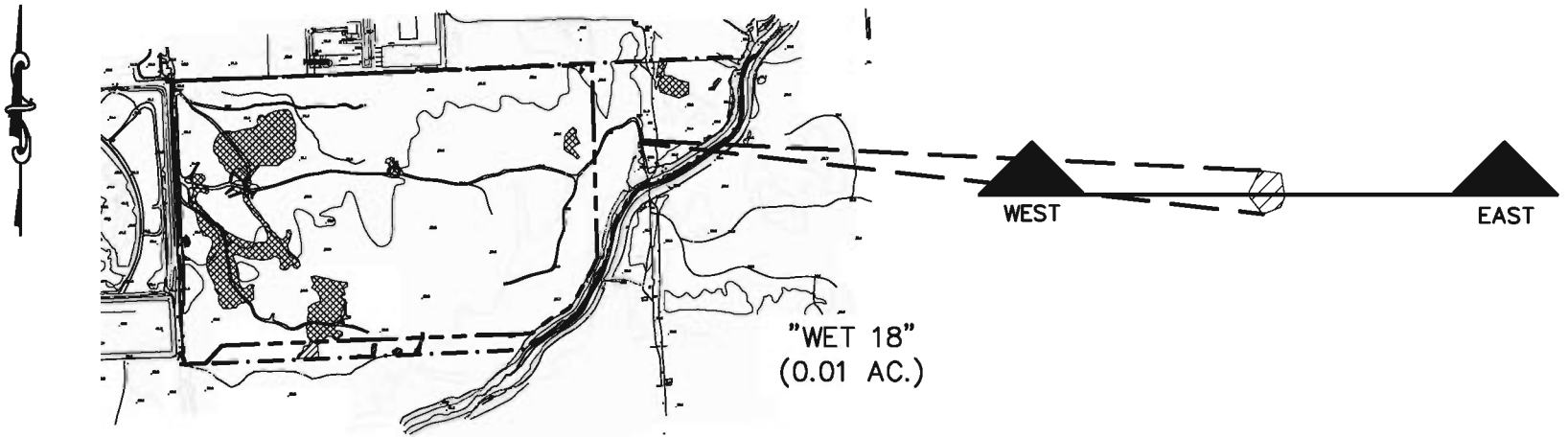
WETLAND AREA "WET 18"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

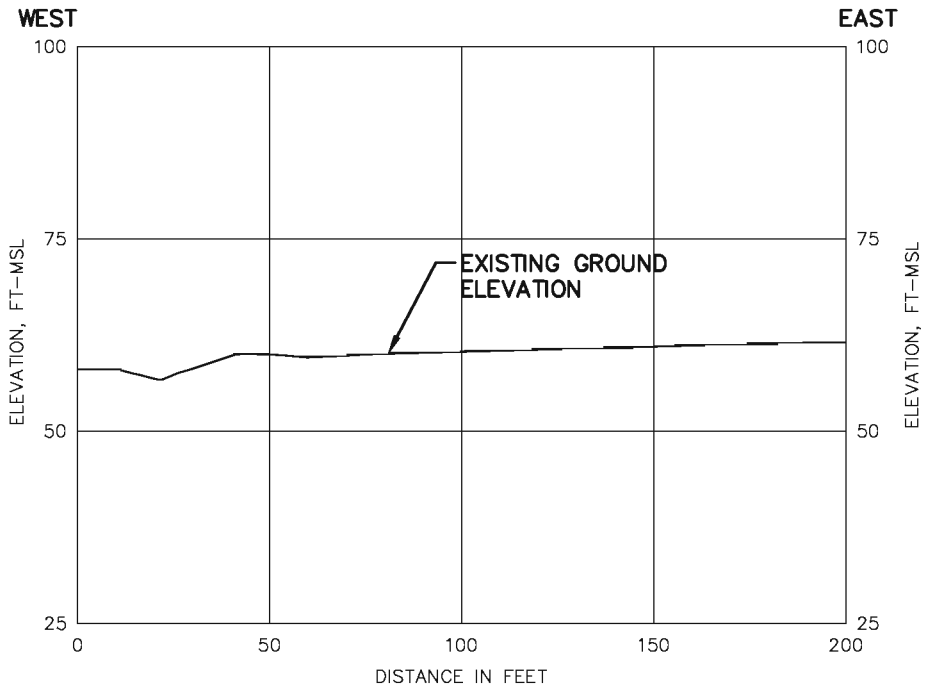
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
		ISSUED FOR PERMITTING PURPOSES				
		REVISIONS				

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-18.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 18



PLAN VIEW OF "WET 18"

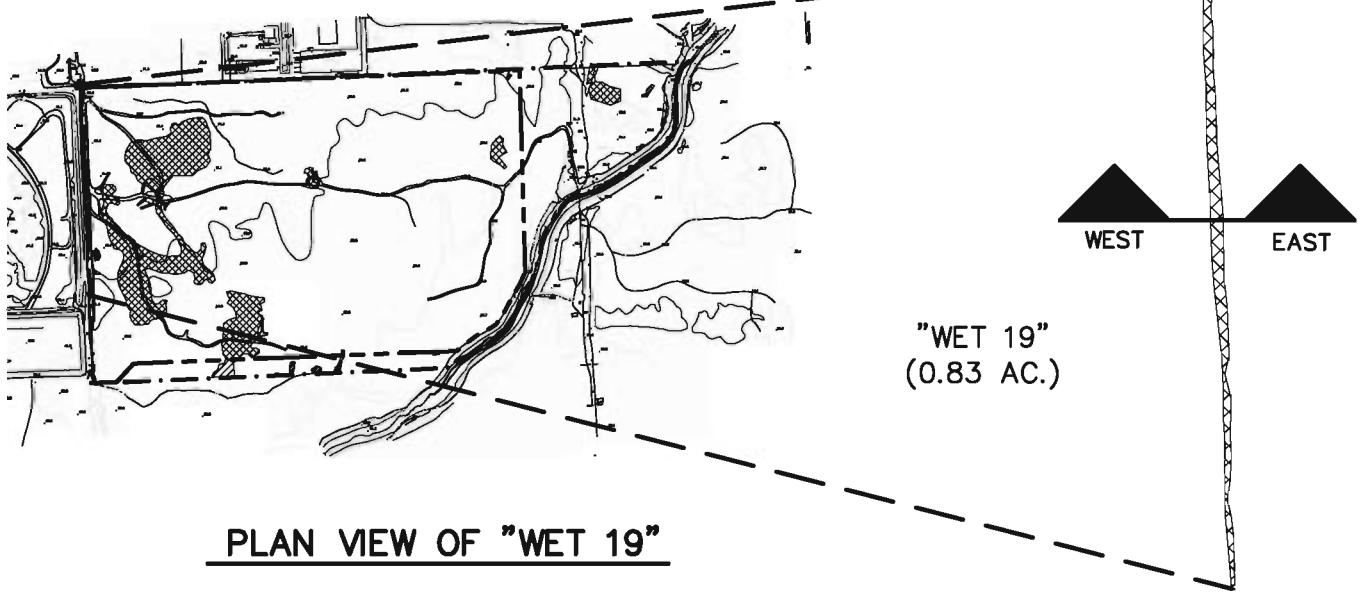


CROSS SECTION OF "WET 18"

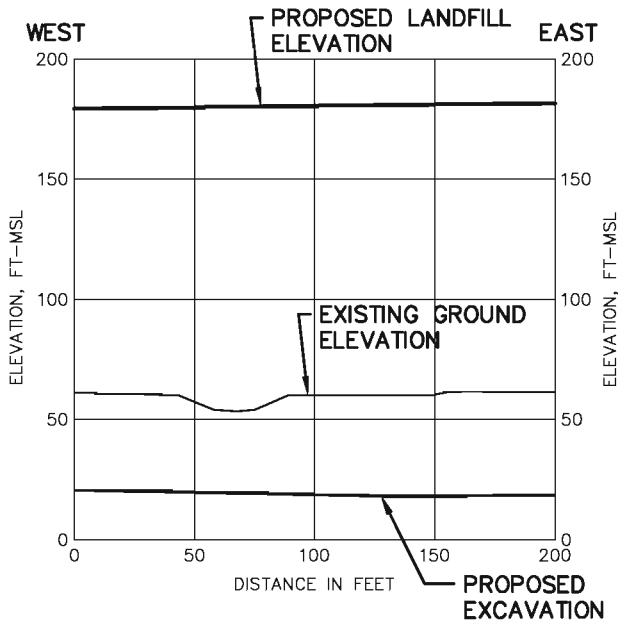
VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 18" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

J:\101\17\102\Wetlands\Wet-19.dwg Layout: Layout1 User: scundiff



PLAN VIEW OF "WET 19"



CROSS SECTION OF "WET 19"

WETLAND "WET 19" IS IMPACTED BY THE PROPOSED MSW PROJECT.

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT T. ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 19"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
		ISSUED FOR PERMITTING PURPOSES				
		REVISIONS				

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-19.dwg
CHK. KJW
DWN. SRC
DSN. KJW

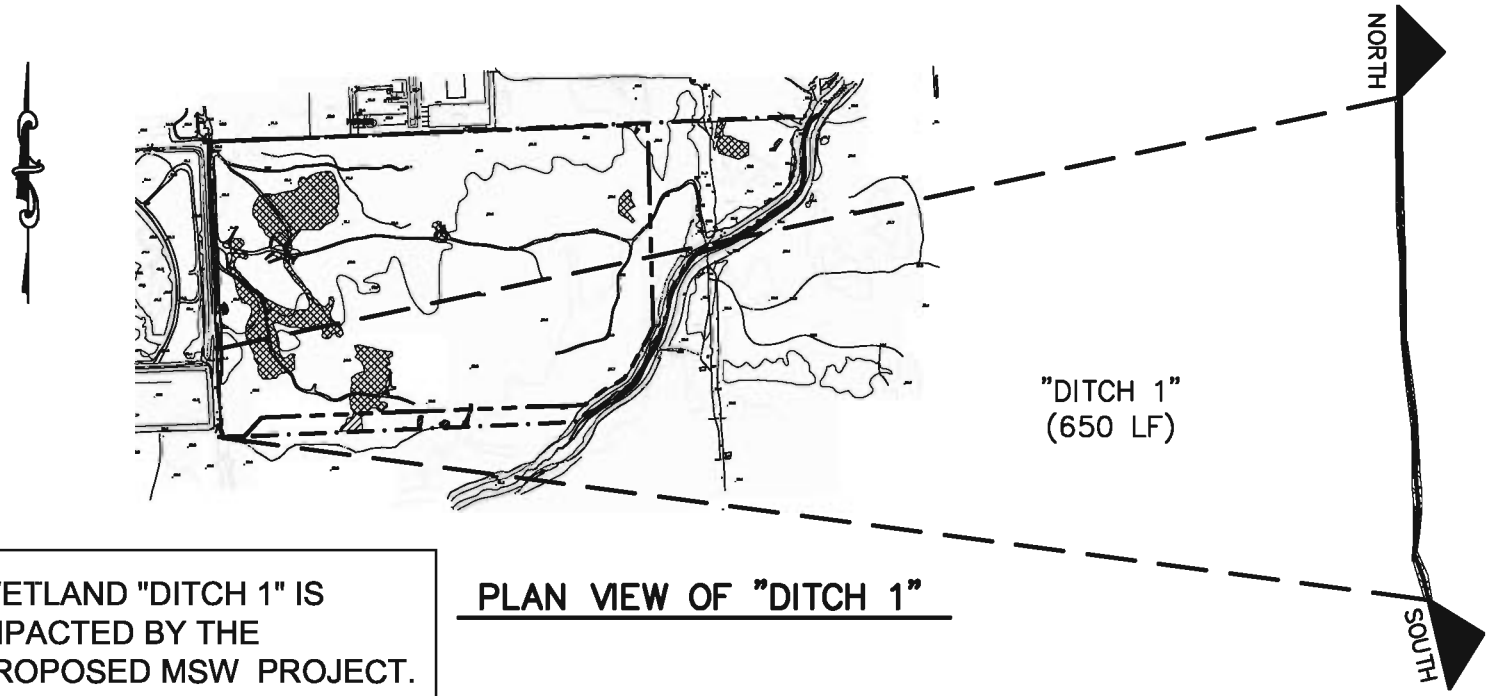
FIGURE 19

J:\101\17\102\Wetlands\Ditch-1.dwg Layout: Layout1 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT T. ROAD
MANSFIELD, TEXAS

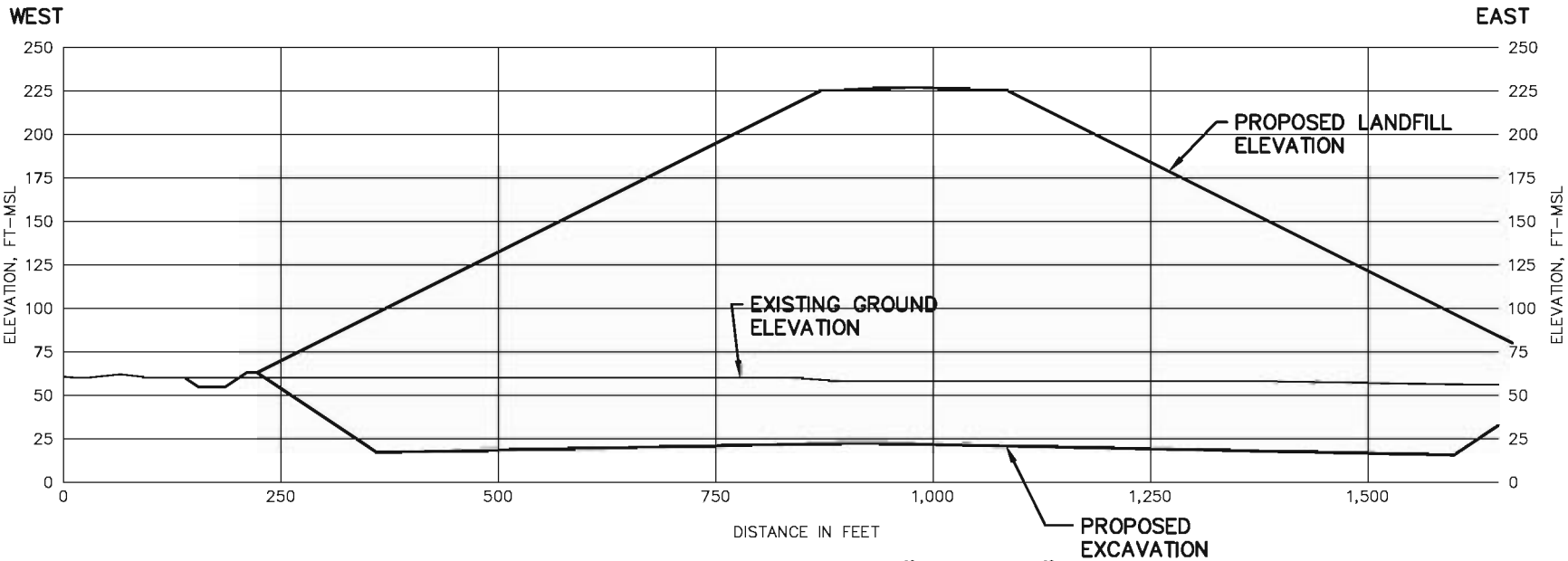
WETLAND AREA "DITCH 1"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION



WETLAND "DITCH 1" IS IMPACTED BY THE PROPOSED MSW PROJECT.

PLAN VIEW OF "DITCH 1"



CROSS SECTION OF "DITCH 1"

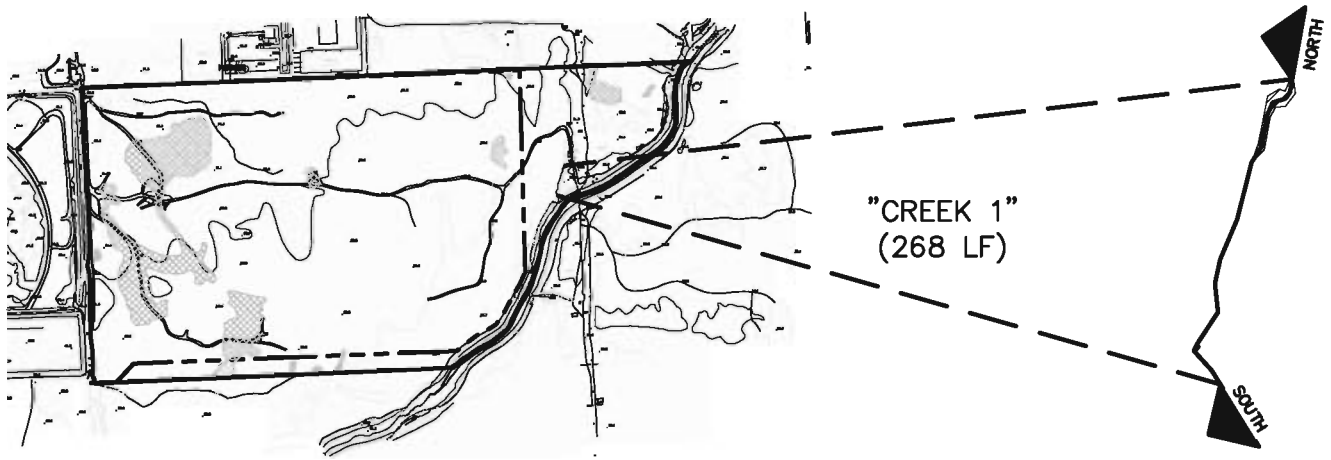
VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
		ISSUED FOR PERMITTING PURPOSES				
		REVISIONS				

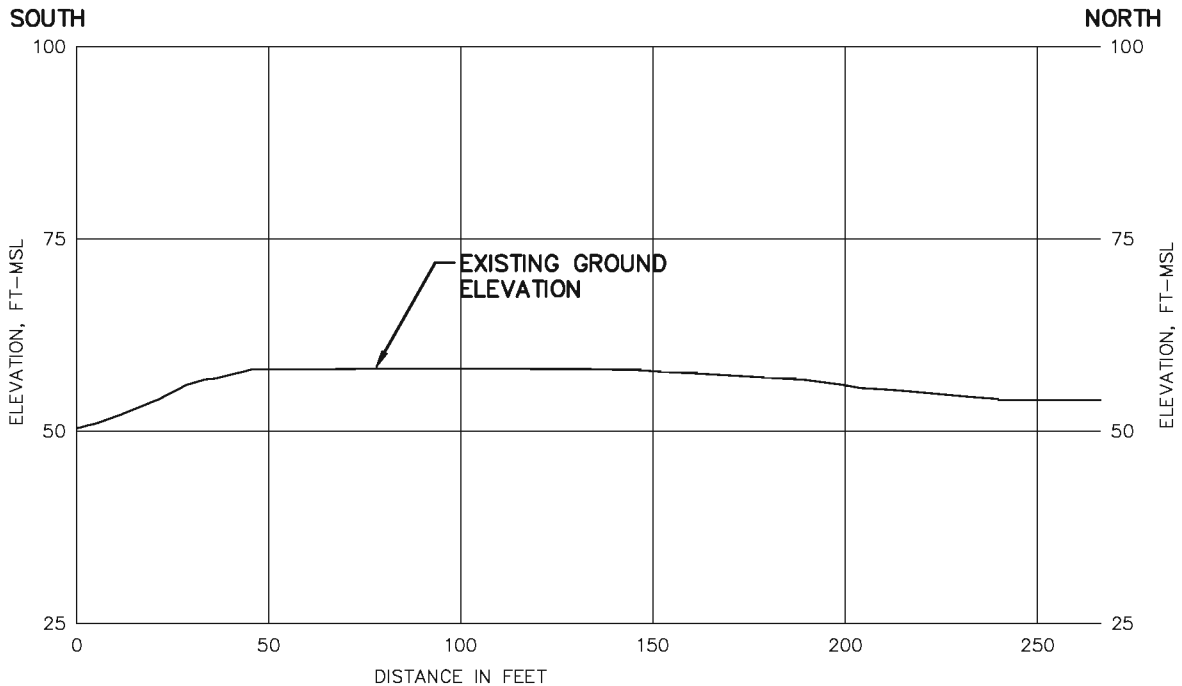
DATE : 10/09
SCALE : GRAPHIC
DWG : Ditch-1.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 20

J:\101\17\102\Wetlands\Creek-1.dwg Layout: Layout1 User: scundiff



PLAN VIEW OF "CREEK 1"



CROSS SECTION OF "CREEK 1"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

"CREEK 1" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT T. ROAD
MANSFIELD, TEXAS

WETLAND AREA "CREEK 1"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA ROF
WETLAND DELINEATION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
		ISSUED FOR PERMITTING PURPOSES				
		REVISIONS				

DATE : 10/09
SCALE : GRAPHIC
DWG : Creek-1.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 21

J:\101\17\102\Wetlands\CompletionPlan.dwg Layout: 22 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

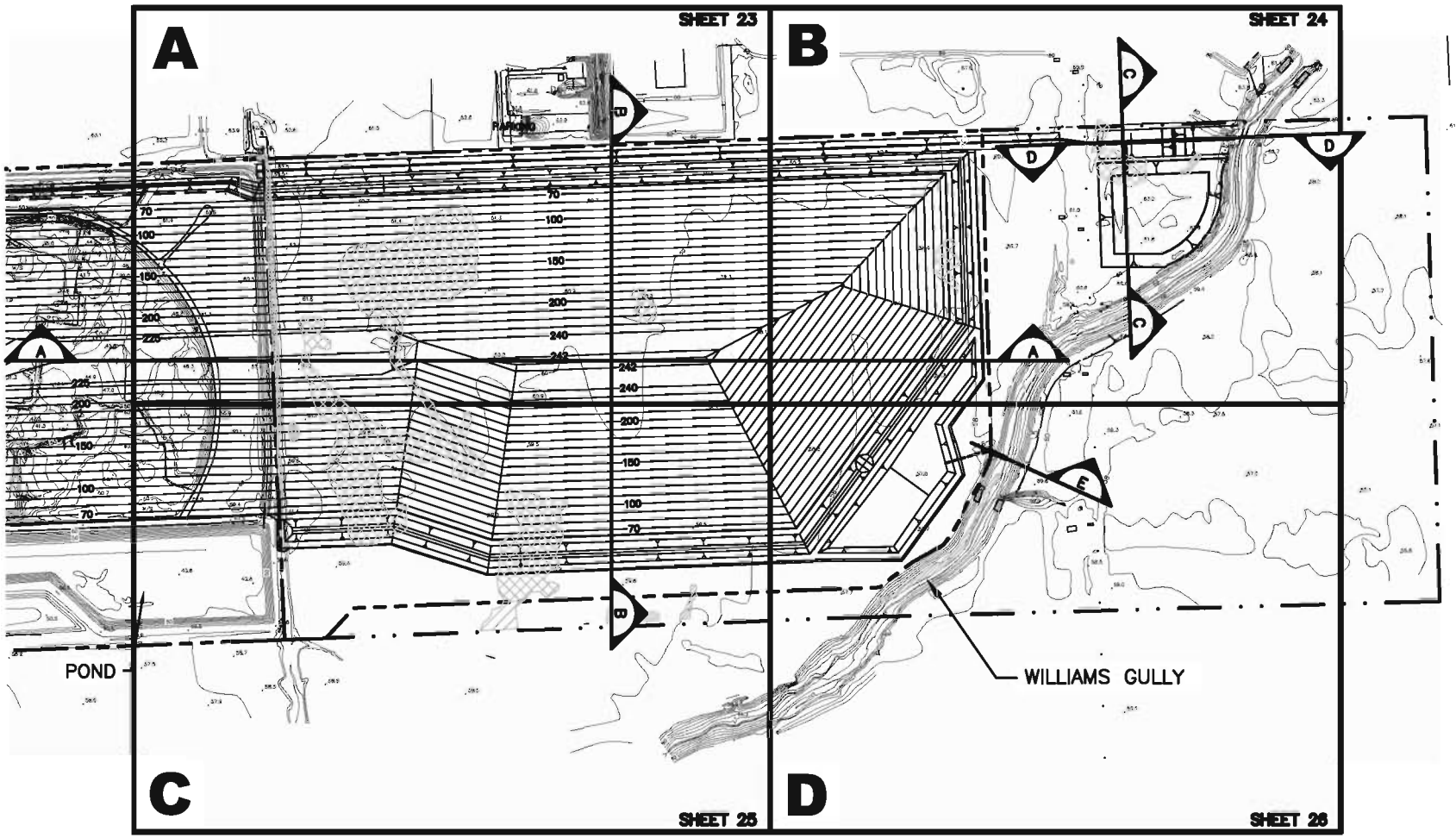
0 400 800
SCALE IN FEET

LEGEND

- EXISTING PERMIT BOUNDARY
- PROPOSED PERMIT BOUNDARY
- 60 EXISTING CONTOUR
- 100 PROPOSED FINAL CONTOUR
- DELINEATED WETLAND AFFECTED
- DELINEATED WETLAND UNAFFECTED

NOTE:

1. EXISTING CONTOURS AND ELEVATIONS COMPILED BY DALLAS AERIAL SURVEYS FROM AERIAL SURVEY FLOWN APRIL 13, 2009.



IMPACTS OF WETLAND AREAS

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
DSN. KJW
DWN. SRC
CHK. KJW

ISSUED FOR PERMITTING PURPOSES

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

FIGURE 22

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

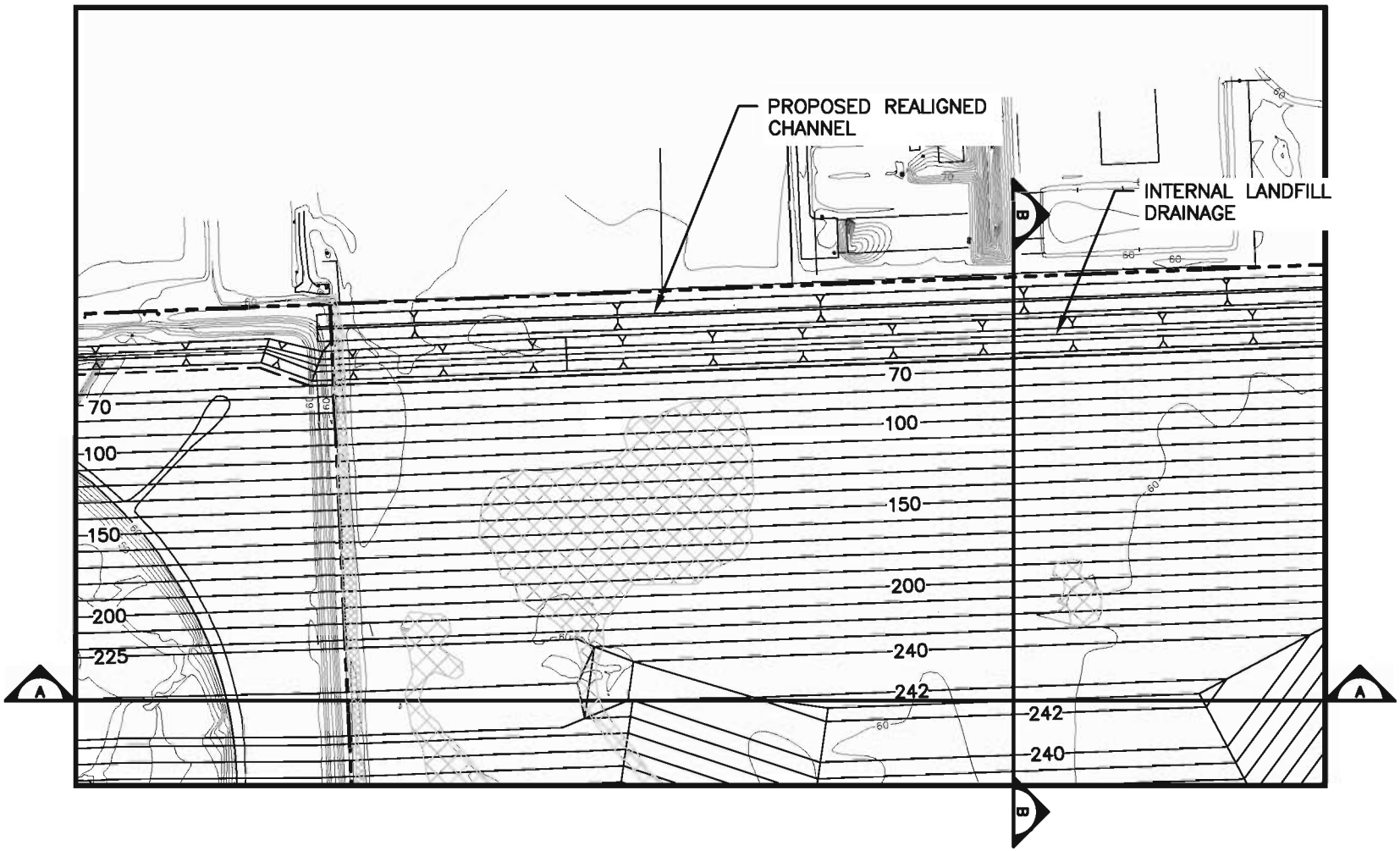
0 200 400
SCALE IN FEET

LEGEND

- EXISTING PERMIT BOUNDARY
- PROPOSED PERMIT BOUNDARY
- 60 EXISTING CONTOUR
- 100 PROPOSED FINAL CONTOUR
- DELINEATED WETLAND AFFECTED

NOTE:

1. EXISTING CONTOURS AND ELEVATIONS COMPILED BY DALLAS AERIAL SURVEYS FROM AERIAL SURVEY FLOWN APRIL 13, 2009.



IMPACTS OF WETLAND AREAS AREA "A"

WASTE MANAGEMENT OF TEXAS, INC. ATASCOCITA RDF WETLAND DELINEATION

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
DSN. KJW
DWN. SRC
CHK. KJW

ISSUED FOR PERMITTING PURPOSES

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

FIGURE 23

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

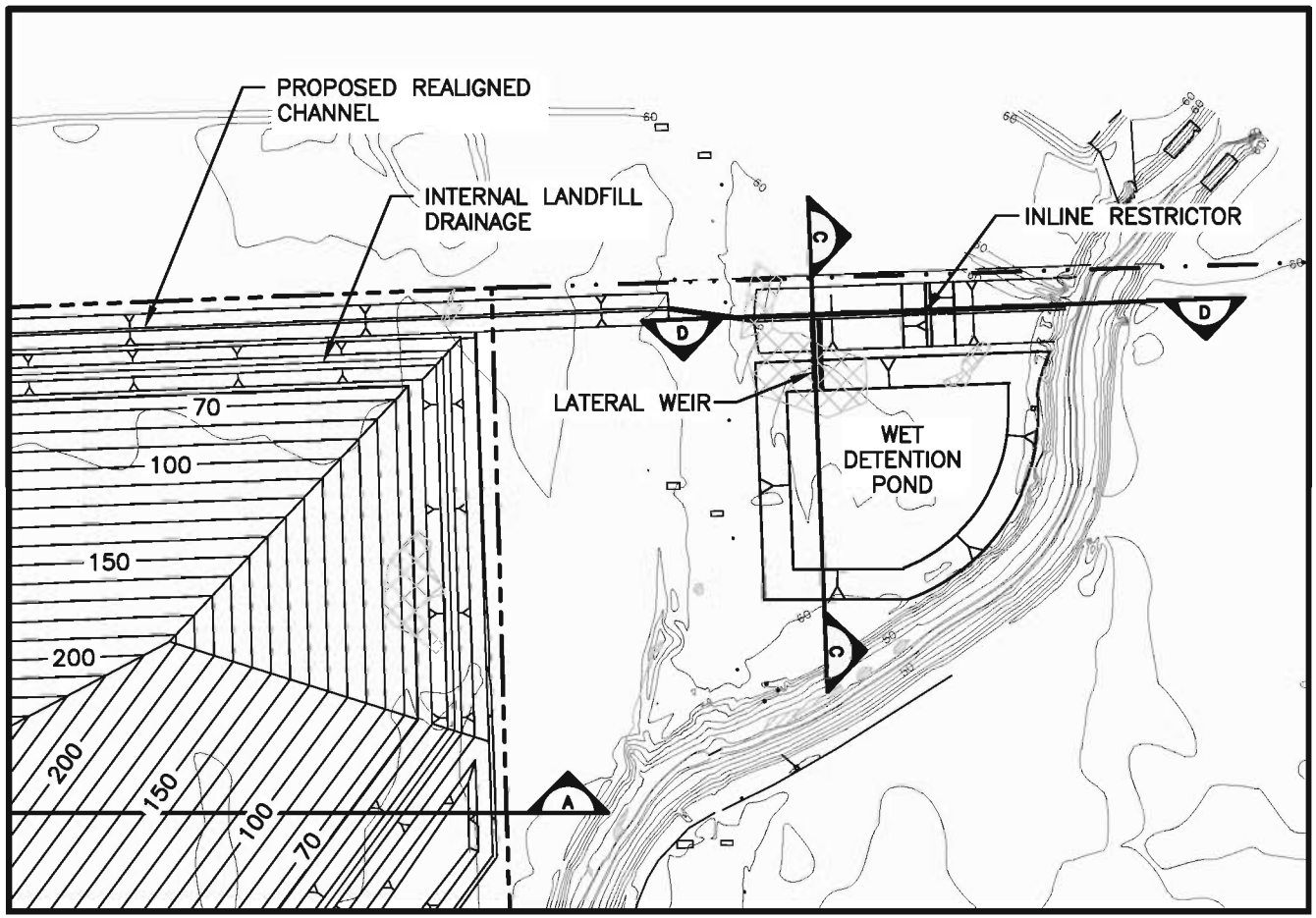
0 200 400
SCALE IN FEET

LEGEND

- EXISTING PERMIT BOUNDARY
- PROPOSED PERMIT BOUNDARY
- 60 EXISTING CONTOUR
- 100 PROPOSED FINAL CONTOUR
- DELINEATED WETLAND AFFECTED
- DELINEATED WETLAND UNAFFECTED

NOTE:

1. EXISTING CONTOURS AND ELEVATIONS COMPILED BY DALLAS AERIAL SURVEYS FROM AERIAL SURVEY FLOWN APRIL 13, 2009.



IMPACTS OF WETLAND AREAS
AREA "B"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

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

ISSUED FOR PERMITTING PURPOSES

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
CHK. KJW
DSN. KJW
DWN. SRC

FIGURE 24

J:\101\17\102\Wetlands\CompletionPlan.dwg Layout: 25 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

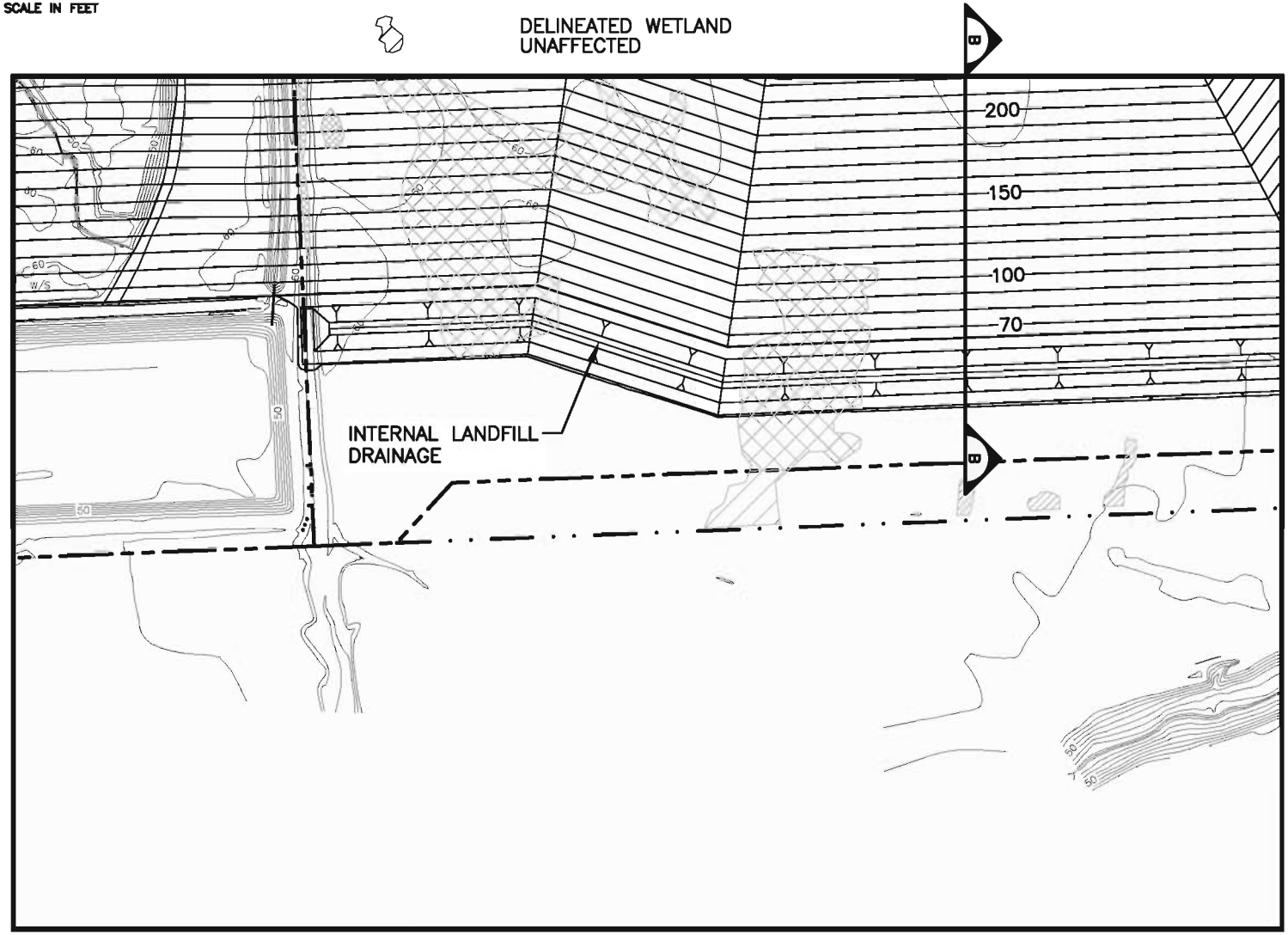
0 200 400
SCALE IN FEET

LEGEND

- EXISTING PERMIT BOUNDARY
- PROPOSED PERMIT BOUNDARY
- 60 EXISTING CONTOUR
- 100 PROPOSED FINAL CONTOUR
- DELINEATED WETLAND AFFECTED
- DELINEATED WETLAND UNAFFECTED

NOTE:

1. EXISTING CONTOURS AND ELEVATIONS COMPILED BY DALLAS AERIAL SURVEYS FROM AERIAL SURVEY FLOWN APRIL 13, 2009.



IMPACTS OF WETLAND AREAS AREA "C"

WASTE MANAGEMENT OF TEXAS, INC. ATASCOCITA RDF WETLAND DELINEATION

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
DSN. KJW
DWN. SRC
CHK. KJW

ISSUED FOR PERMITTING PURPOSES

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

FIGURE 25

J:\101\17\102\Wetlands\CompletionPlan.dwg Layout: 26 User: scundiff

NOTE:

1. EXISTING CONTOURS AND ELEVATIONS COMPILED BY DALLAS AERIAL SURVEYS FROM AERIAL SURVEY FLOWN APRIL 13, 2009.

LEGEND

- EXISTING PERMIT BOUNDARY
- PROPOSED PERMIT BOUNDARY
- EXISTING CONTOUR (60)
- PROPOSED FINAL CONTOUR (100)
- DELINEATED WETLAND AFFECTED
- DELINEATED WETLAND UNAFFECTED

0 200 400 SCALE IN FEET

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

IMPACTS OF WETLAND AREAS
AREA "D"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

DATE : 12/09	DSN. KJW
SCALE : GRAPHIC	DWN. SRC
DWG : CompletionPlan.dwg	CHK. KJW

ISSUED FOR PERMITTING PURPOSES

REVISIONS

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

FIGURE 26

LANDFILL CROSS SECTION A

(NOT TO SCALE)

SECTION KEY

J:\101\17\102\Wetlands\CompletionPlan.dwg Layout: 27 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

TYPICAL CROSS SECTION A

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

DATE : 12/09	DSN. KJW
SCALE : GRAPHIC	DWN. SRC
DWG : CompletionPlan.dwg	CHK. KJW

ISSUED FOR PERMITTING PURPOSES

REVISIONS

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

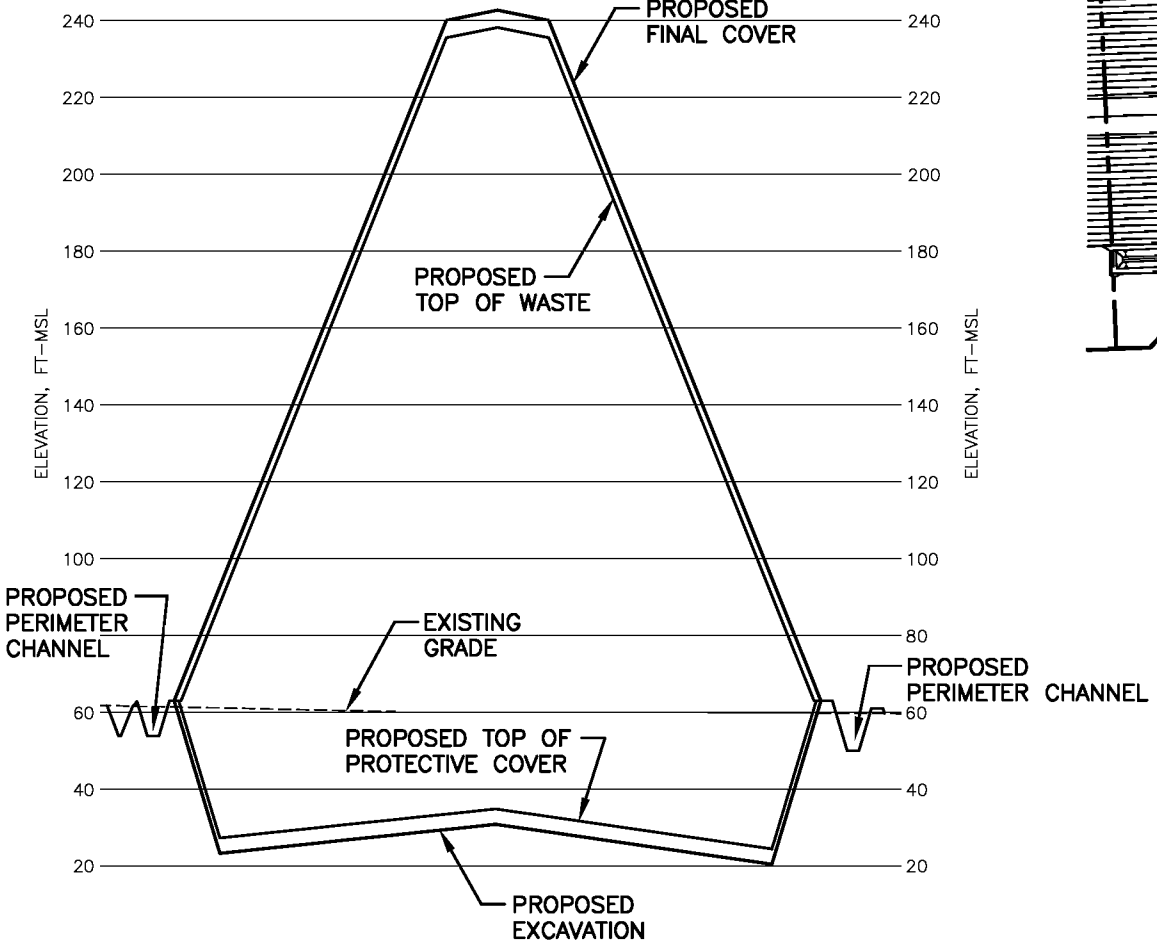
FIGURE

27

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

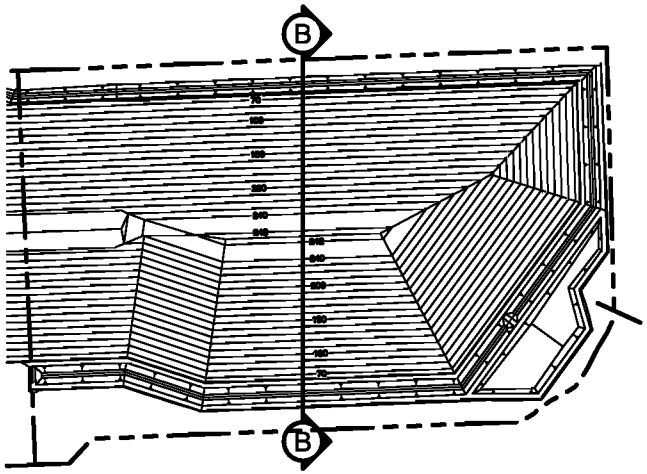
TYPICAL CROSS SECTION B

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION



LANDFILL CROSS SECTION B

(NOT TO SCALE)



SECTION KEY

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

REVISIONS

ISSUED FOR PERMITTING PURPOSES

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
CHK. KJW
DWN. SRC
DSN. KJW

FIGURE 28

J:\101\17\102\Wetlands\CompletionPlan.dwg Layout: 29 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WILLIAMS GULLY CROSS SECTION
INTERNAL DETENTION POND OUTFALL STRUCTURE

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

DATE : 12/09	DSN. KJW
SCALE : GRAPHIC	DWN. SRC
DWG : CompletionPlan.dwg	CHK. KJW

ISSUED FOR PERMITTING PURPOSES

REVISIONS

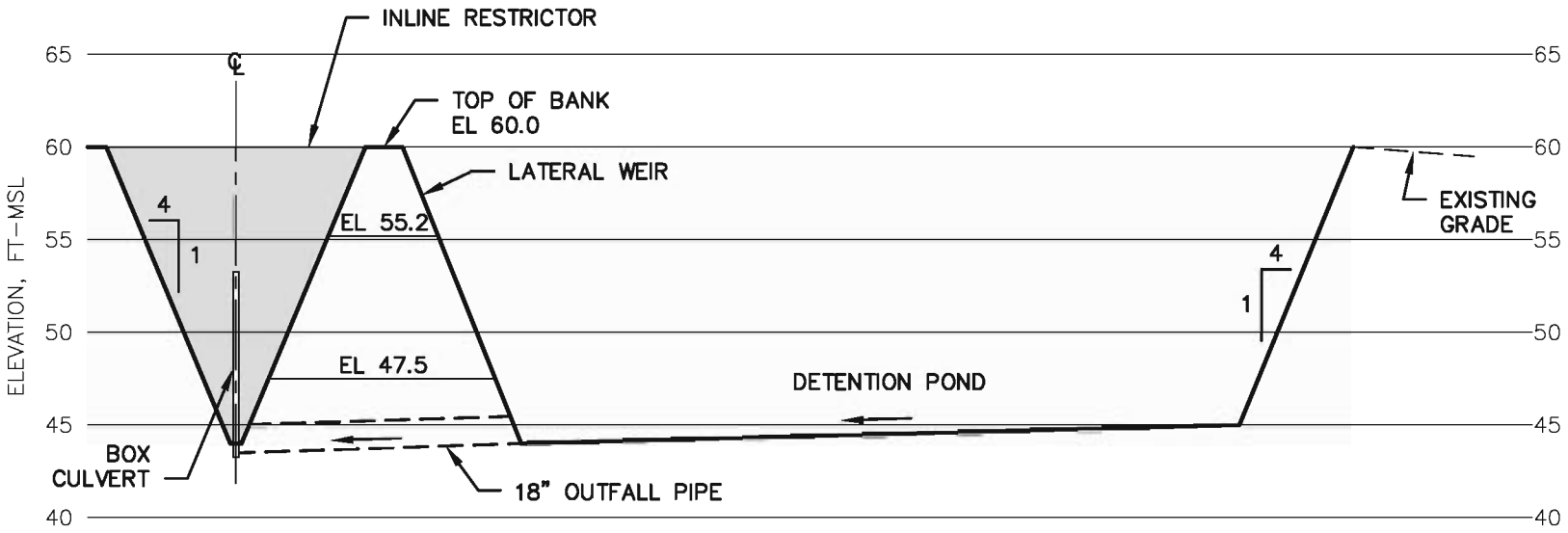
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

FIGURE
29

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

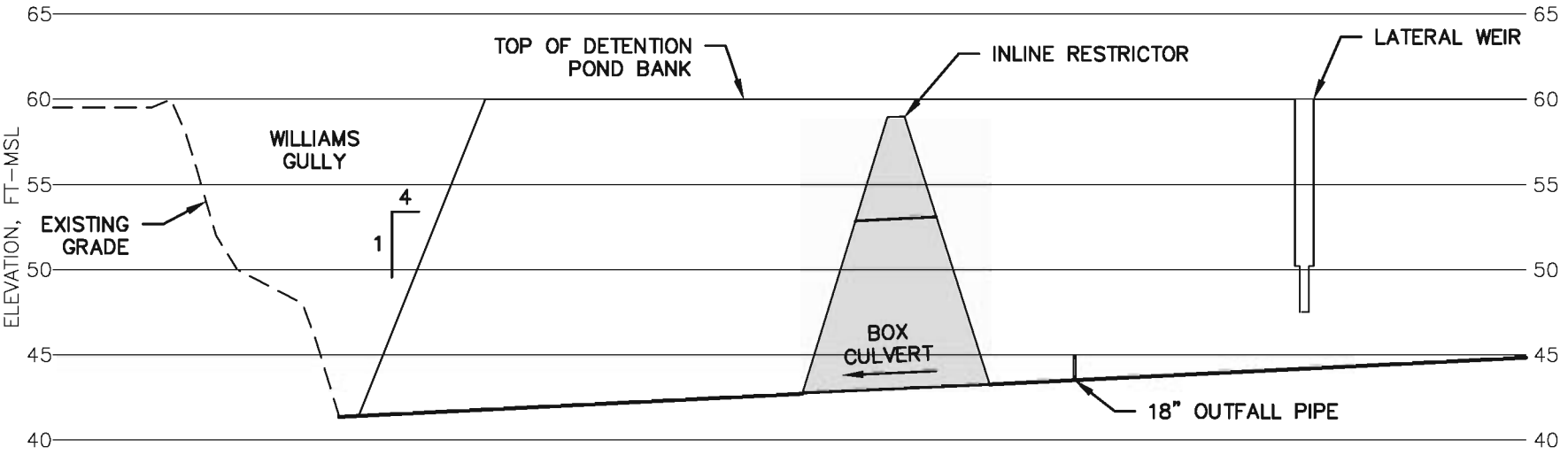
DETENTION POND AND DIVERSION CHANNEL CROSS-SECTIONS

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION



SECTION C

NOT TO SCALE



SECTION D

NOT TO SCALE

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

ISSUED FOR PERMITTING PURPOSES

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
CHK. KJW
DWN. SRC
DSN. KJW

FIGURE 30

Block 19. Project Purpose

The regional per capita waste disposal rate for the Year 2008 was 7.74 pounds/person/day. At this rate of waste disposal and a lack of consideration for growth in population, the Houston-Galveston Area Council (H-GAC) of Governments region will exceed the remaining MSW landfill capacity within 20 years (*Municipal Solid Waste in Texas: A Year in Review FY2008 Data Summary and Analysis*. TCEQ, 2009).

H-GAC, as mandated by the TCEQ, issued an update to its Regional Solid Waste Management Plan that was adopted by the TCEQ on May 31, 2007. As stated in this plan within Goal No. 2, H-GAC will promote the planning for adequate MSW disposal, handling, and management facilities. As part of this overall goal, H-GAC's stated objectives encourage expansion and redevelopment of existing MSW facilities, where feasible, over siting of new facilities.

The existing, active Atascocita RDF owned and operated by WMTX is located west of the Project. WMTX is currently borrowing soil from an adjacent tract to provide cover material for the landfill. As additional cover materials are needed, WMTX is proposing to expand the existing borrow pit. Excavation will continue eastward through P130-02-01 that forms the western boundary of the Project and onto the parcel. The Project will include excavation of the borrow pit and the subsequent fill during future landfill expansion.

Population growth and regional demands dictate landfill needs. Service to the community must advance with the dynamic growth of Harris and surrounding counties. The length of operation time for this Project will be determined by the waste disposal needs of the Houston area. The Project is the only feasible location for the expansion of the existing landfill due to existing and proposed development within surrounding areas.

Block 20. Reason(s) for Discharge

Population growth and regional demands dictate landfill needs. Service to the community must advance with the dynamic growth of Harris and surrounding counties. H-GAC stated objectives encourage expansion and redevelopment of existing MSW facilities, where feasible, over siting of new facilities. Therefore, WMTX is proposing an expansion of the existing Atascocita RDF.

Upon completion of the diversion channel and as additional cover material is needed, excavation would continue eastward from the existing Atascocita RDF through the footprint of P130-02-01 that forms the western boundary of the Project. Continuing eastward, construction activities would impact approximately 17.95 acres of wetlands within the Project. Approximately 950 linear feet of streams will be impacted as a result of the Project. Of the 950 linear feet of stream impacts, approximately 300 linear feet would be to Williams Gully to provide adequate structures for the outfalls.

Block 21. Types(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

The expansion of the Atascocita RDF will result in collectively excavating approximately 6.5 million cubic yards (CY) of soil within the Project. Compacted earth fill material (i.e., liner, final cover, perimeter berms) consists of approximately 2.5 million CY. Additionally, the expected volume of waste resulting from the Project is approximately 22 million CY.

Block 22. Surface Area in Acres of Wetlands or Other Waters Filled

The Project will impact approximately 17.95 acres of wetlands and 950 linear feet of streams. Approximately 0.83 acre is palustrine emergent (PEM) wetlands, 0.42 acre is palustrine sapling and shrub (PSS) wetlands, and 16.70 acres are palustrine forested (PFO) wetlands. Of the approximate 950 linear feet of streams, a 650 linear foot section is the HCFCD P130-02-01 channel and two sections (Outfall 1 and 2) total 300 linear feet of Williams Gully. The excavation and fill activities associated with the construction of the outfall structures will result in the placement of rock rip-rap, paved slope, gabion protection, and grass slope. The flow and adjacent bank of the Williams Gully will not incur impacts at the outfall structures. Surface area of wetlands and linear feet of other waters are listed below in Table 1. For a depiction of each wetland location, please refer to Appendix A (Exhibits) within the Wetland Report.

Table 1
Waters of the U.S., Including Wetlands

Wetland/Waterbody ID	Water Type/Class[1]	Wetland (acres)[2]	Length (linear feet)	Construction Impacts
Wetland 1A	PFO	3.07	–	Yes
Wetland 1B	PFO	9.29		Yes
Wetland 2	PFO	0.27	–	Yes
Wetland 3	PFO	0.09	–	Yes
Wetland 4	PFO	2.92	–	Yes
Wetland 4	PFO	0.39	–	No
Wetland 5	PFO	0.08	–	No
Wetland 6	PSS	0.06	–	No
Wetland 7	PSS	0.11	–	No
Wetland 8	PFO	0.96	–	Yes
Wetland 9	PFO	0.07	–	Yes
Wetland 10	PSS	0.42	–	Yes
Wetland 11	PFO	0.03	–	Yes
Wetland 12	PEM	0.44	–	No
Wetland 13	PEM	0.01	–	No
Wetland 14	PEM	0.01	–	No
Wetland 15	PEM	0.07	–	No
Wetland 16	PEM	0.01	–	No
Wetland 17	PEM	0.01	–	No
Wetland 18	PSS	0.01	–	No
Wetland 19	PEM	0.83	–	Yes
Ditch 1	Ephemeral	–	650	Yes
CRK 1	Ephemeral	–	268	No
Williams Gully	Perennial	–	300	Yes
Williams Gully	Perennial	–	2,922	No
Avoided Features	**PEM (6)**	**0.55**	**–**	
	PSS (3)	**0.18**		
	PFO (2)	**0.47**	**–**	
	Ephemeral	**–**	**268**	
	Perennial	**–**	**2,922**	
Total Avoidances		**1.20**	**3,190**	
Impacted Features	**PEM (1)**	**0.83**	**–**	
	PSS(1)	**0.42**	**–**	
	PFO (8)	**16.70**	**–**	
	Ephemeral	**–**	**650**	
	Perennial	**–**	**300**	
Total Impacts		**17.95**	**950**	

Block 23. Description of Avoidance, Minimization, and Compensation

Approximately 1.20 acres of wetlands, 0.55 acre of PEM wetlands, 0.18 acre of PSS wetlands, and 0.47 acre of PFO wetlands, and 3,200 linear feet of Williams Gully and a tributary will be avoided due to construction design and techniques. Wetlands and other waters of the U.S. being minimized or avoided are listed below in Table 2. For a depiction of each wetland location, please refer to Appendix A (Exhibits) within the Wetland Delineation.

Table 2
Avoided Waters of the U.S., Including Wetlands

Wetland/Waterbody ID	Water Type/Class[1]	Wetland (acres)[2]	Length (linear feet)	Construction Impacts
Wetland 4	PFO	0.39	–	No
Wetland 5	PFO	0.08	–	No
Wetland 6	PSS	0.06	–	No
Wetland 7	PSS	0.11	–	No
Wetland 12	PEM	0.44	–	No
Wetland 13	PEM	0.01	–	No
Wetland 14	PEM	0.01	–	No
Wetland 15	PEM	0.07	–	No
Wetland 16	PEM	0.01	–	No
Wetland 17	PEM	0.01	–	No
Wetland 18	PSS	0.01	–	No
CRK 1	Ephemeral	–	268	No
Williams Gully	Perennial	–	2,922	No
Avoided Features	**PEM (6)**	**0.55**	**–**	
	PSS (3)	**0.18**		
	PFO (2)	**0.47**	**–**	
	Ephemeral	**–**	**268**	
	Perennial	**–**	**2,922**	
Total Avoidances		**1.20**	**3,190**	

To minimize the short-term and long-term turbidity and suspended solids in impacted waters, the Project will incorporate Best Management Practices (BMP) at appropriate stages during construction. Hay bales, silt fences, and other appropriate BMP devices will be placed to alleviate impacts below the Project. The proposed surface water improvements will be constructed to minimize turbidity to waters of the U.S., including wetlands, that will remain on-site after construction is complete.

The Conceptual Compensatory Mitigation Plan (following the Cultural Resources Tab) outlines WMTX goals to provide for the replacement of the physical, biological, and chemical functions of wetlands and other aquatic resources impacted by the Project. The plan is designed to compensate for the approximate 17.95 acres of impacts to jurisdictional waters of the U.S., including wetlands, which includes 16.70 acres of PFO wetlands, 0.42 acre of PSS wetlands, and 0.83 acre of PEM wetlands.

Mitigation for unavoidable impacts to wetlands will be resolved through the proposed purchase of 32.9 Functional Capacity Unit (FCU) credits from the Mill Creek Wetland Mitigation Bank, a U.S. Army Corps of Engineers – Galveston District approved mitigation bank. Because the Project is located outside the primary service area of Mill Creek Wetland Mitigation Bank, a 1.5 multiplier is applied to the 21.9 FCU credits of impacted wetlands to total 32.9 FCU credits. Should coordination efforts through

Mill Creek WMB be unsuccessful, the applicant has discussed ILF mitigation alternatives with Legacy Land Trust for the Project

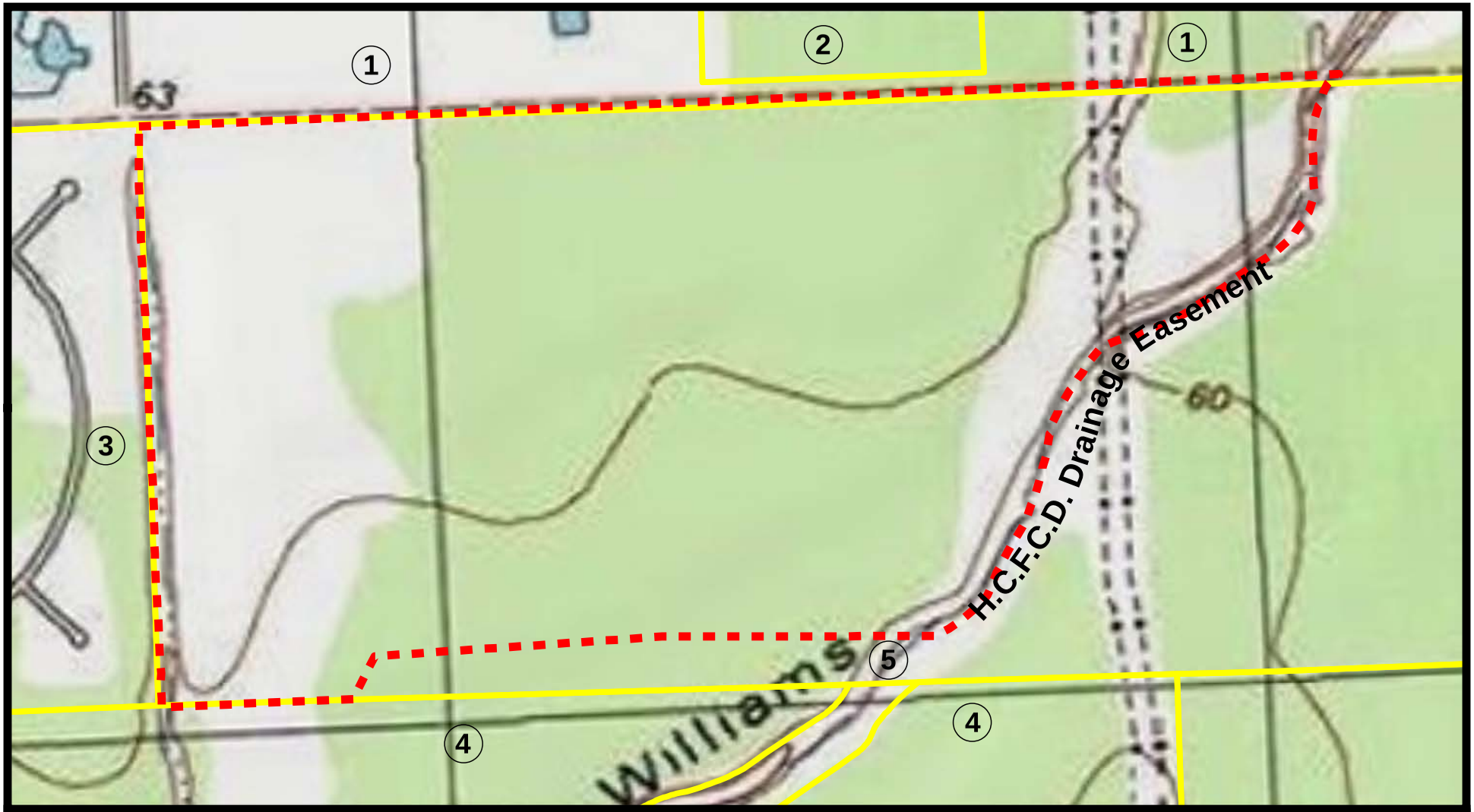
In the post-development condition, the diversion channel will redirect the stormwater runoff from the adjacent properties north of the Project to the east which outfalls into Williams Gully. Totaling approximately 4,650 feet, the realignment of ditch P130-02-01 (diversion channel) will constitute a net increase in length of approximately 4,000 feet. Additional channel length and a shallower upstream outfall into Williams Gully will allow for a gentler slope to be established in the diversion channel, reducing the opportunity for erosion and increasing ponding effects of riffle and pool stream structures. The low flow wastewater outflow from the adjacent correctional facility that currently flows through the existing channel will be diverted to the diversion channel.

A meandering pilot channel with a riffle and pool stream structure will be established along the bottom of the diversion channel to increase functions and services of the tributary. Conceptual cross-section and conceptual plan views of the diversion channel can be found on Figures 22 – 24, 29, and 30 in Tab Block 18.

Block 25. Addresses of Adjoining Property Owners, Lessees, etc., Whose Property Adjoins the Waterbody

Index ID*	HCAD ID	Property Owner	Mailing Address	Property Address/Legal Description
1	0401580910034	Harris County Prison Farm	2310 Atascocita Road Humble, Texas 77396	0 YGNACIO RD HUMBLE TX 77396/LTS 1 2 3 & 6 & TRS 4A & 5A, LYONS, ABST 2 V BLANCO
2	0401580910154	Texas Department of Criminal Justice Deputy Director Administrative Services	P.O. Box 99 Huntsville, TX, 77342-0099	0 YGNACIO RD HUMBLE TX 77396/TRS 4 & 5, LYONS ABST 2 V BLANCO
3	1149050000001	Waste Management of Texas, Inc.	P.O. Box 1450 Chicago, IL 60690-1450	ALL LTS & STREETS, DEER TRAILS U/R
4	0401580910082	Land Tejas Park Lakes 1023 LP	2450 Fondren Road Suite 210 Houston, TX 77063-2323	0 WILSON RD HUMBLE TX 77396/TRS 1 2 3 & 4 BLK A LTS 3 & 4 TRS 1 2 BLK B DOOLEY PARTITION ABST 2 V BLANCO
5	N/A	Harris County Flood Control District	9900 Northwest Freeway, Houston, TX 77092	N/A

*See Adjoining Property Owners Exhibit for site location.



190-acre Project

Harris County Parcels

0 675 1,350 Feet

N

Sources
Aerial: H-GAC, 2008
Parcels: HCAD, 2009

8588 Katy Freeway Suite 441
Houston, TX 77024
Phone (713) 463-8200

Adjoining Property Owners
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: June 18, 2010
USGS Harmaston Quadrangle	Scale:1 in = 583 feet
J:\Projects\07-0819 Waste Mgmt\Sec 3.0 Project Information\3.4 GPS\Arcmap\HGM\AdjoiningPropertyOwners	

Texas Commission on Environmental Quality

Tier II
401 Certification Questionnaire

Applicant and Project
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas
SWG-1993-01967

Contact Information
Charles Rivette, P.E.
800 Gessner, Suite 100
Houston, Texas 77024
(713) 647-5542

The following questions seek to determine how adverse impacts will be avoided during construction or upon completion of the project. If any of the following questions are not applicable to your project, write not applicable ("NA") and continue.

Please include the applicant's name as it appears on the Corps of Engineers' permit application (and permit number, if known) on all material submitted. The material should be sent to:

Texas Commission on Environmental Quality
Attn: 401 Coordinator (MC-150)
P.O. Box 13087
Austin, TX 78711-3087

I. Impacts to surface water in the state, including wetlands

A. **What is the area of surface water in the state, including wetlands that will be disturbed, altered or destroyed by the proposed activity?**

BACKGROUND INFORMATION

Waste Management of Texas, Inc. (WMTX) is proposing an expansion of the existing approximate 503-acre Atascocita Recycling and Disposal Facility (Atascocita RDF) located in Harris County, Texas. The expansion area will extend east into an approximate 190-acre (Project) portion of a 300-acre tract (Scanlin Tract) adjacent to the Atascocita RDF owned by WMTX. The Project is located between the existing eastern permit boundary of the Atascocita RDF and Williams Gully. The Atascocita RDF landfill expansion will be authorized by the Texas Commission of Environmental Quality (TCEQ) through a major permit amendment application procedure.

PROJECT DESCRIPTION

WMTX proposes to expand the existing Atascocita RDF through construction of a landfill expansion, wet detention pond, perimeter drainage system, sedimentation pond (Williams Pond), two outfall structures, and realign P130-02-01 (diversion channel). Prior to initiation of any land disturbance, sediment and erosion control devices will be installed in accordance with the approved permit. The plan will incorporate typical standard devices of silt fences, diversions, hay bales, gabions, sediment traps, etc.

Additionally, the facility has been designed to prevent the discharge of pollutants into waters of the state of Texas or waters of the United States (U.S.), as defined by the Texas Water Code and the Federal Clean Water Act, respectively. WMTX submitted a notice of intent (NOI) to comply with Texas Pollutants Discharge Elimination System (TPDES) General Permit No. TXR050000 relating to stormwater discharge associated with industrial activity (Multi-Sector General Permit) and received Permit No. TXR05N515. A copy of the TPDES permit can be found following Tier II Alternatives Analysis Checklist.

LANDFILL

The Atascocita RDF is an existing Type I Municipal Solid Waste (MSW) Disposal Facility owned and operated by WMTX. The Project is immediately adjacent to and east of the current permitted easternmost permit boundary. The Project will add approximately 170 acres to the existing permit boundary.

The primary function of the facility and Project is MSW disposal. The major classifications of solid waste to be accepted at the facility include MSW, special waste, and Class 2 and 3 industrial wastes.

MSW regulations require the landfill design to include provisions for providing effective erosion stability to external top slopes and side slopes during all phases of landfill operation, closure, and post-closure care. The perimeter drainage channels and detention/sedimentation ponds for the landfill expansion are designed and will be constructed to become integrated into the current Atascocita RDF surface water management system. The Atascocita RDF perimeter drainage channels and detention/sedimentation ponds will be constructed as the landfill development progresses. Erosion will be minimized in these structures by the establishment of vegetation or by placement of rock rip-rap, gabions, or other materials for these permanent structures.

Management of soil for use in and around the landfill area will be an ongoing process at Atascocita RDF and the Project. In general, soil for use as daily cover, intermediate cover, final cover, and other uses will be available adjacent to the active area. Soil will be obtained from excavation that is ongoing as part of the initial development of future landfill cells or from other suitable sources.

At least 6 inches of well-compacted soil cover material that has not been previously mixed with garbage, rubbish, or other solid waste, or other approved alternate daily cover material (ADC) will be placed over all solid waste at the end of each operating day.

All areas that receive waste and then become inactive for longer than 180 days will be covered with an additional 6 inches of well-compacted earthen material, for a total cover thickness of at least 12 inches. The intermediate cover will be graded to prevent erosion and ponding of water. The additional 6 inches of earthen material will be capable of sustaining native plant growth and will be seeded or sodded following its application for erosion control. Plant growth and other erosion control features placed as part of the intermediate cover will be maintained.

Final cover areas will consist of a minimum 24-inch thick soil cover with the top 6 inches capable of sustaining native vegetation. Upon placement of final cover, drainage swales and down-chutes will be constructed to direct surface water runoff from the final cover areas to minimize erosion. These areas will be seeded with native and introduced grasses immediately following application of final cover.

Landfill surfaces will be inspected weekly and following rainfall events of 0.5 inches or more for potential areas of erosion and will be restored or repaired as soon as possible following rainfall events. Best Management Practices will be utilized throughout the active life of the landfill and throughout the post-closure period.

REALIGNMENT OF P130-02-01 (DIVERSION CHANNEL)

At the present time WMTX is utilizing an area within the Atascocita RDF to provide cover material for the existing landfill. As additional cover materials are needed, excavation would continue eastward through the footprint of P130-02-01 that forms the western boundary of the Project.

Consultants for WMTX performed a drainage analysis to determine the feasibility and mitigation requirements for realigning the existing Harris County Flood Control District (HCFCD) P130-02-01 channel to the east via a diversion channel. In the current permitted condition, stormwater runoff from P1300201A flows onto the Project through P130-02-01 south, continues off of the Project, and discharges into Williams Gully.

In the post-development condition, the diversion channel will redirect the stormwater runoff from the adjacent properties north of the Project to the east which outfalls into Williams Gully. The diversion channel maintains a 6-foot bottom width with 4:1 side slopes, an inline slope of 0.05 percent, and an average depth of 7.5 feet. The diversion channel will cross a power easement owned by Houston Lighting & Power where an 8-foot by 6-foot box culvert will be placed to convey the flow. In an effort to maximize the available volume for the wet detention pond (see below), the depth of the diversion channel increases to approximately 16 feet downstream of the easement crossing, with an inline slope of 0.1 percent. A drop structure will provide the means to drop the flowline by the required 8.5 feet. The diversion channel includes berms on each side for maintenance purposes (25 feet on the north side and 20 feet on the south side). Including the maintenance berms, the total right-of-way (ROW) required upstream of the culvert crossing at the power line easement is 110-feet, while 180 feet is required downstream of the culvert crossing. The total ROW area for the diversion channel is approximately 12.4 acres.

WET DETENTION POND

Due to HCFCD mitigation requirements, a wet detention pond (detention pond) will be constructed at the downstream end of the diversion channel. The flow of the diversion channel will be diverted into the detention pond through a notched lateral weir. One 18-inch outfall pipe allows the detention pond to drain back into the diversion channel before reaching Williams Gully. One inline restrictor is also included to prevent the water in the diversion channel from reaching the outfall to Williams Gully too quickly. The diversion channel will be filled with a box culvert to convey water downstream. The culvert will be a 4 feet by 10 feet precast reinforced concrete box. One (1) foot of width will be unobstructed to restrict the flow of water at the allowable rate. The inline structure allows the detention pond to retain water for a longer period of time, helping to delay the peak of the P130-02-01 hydrograph. The detention pond has a maximum volume of 88 acre-feet at its top elevation. The pond is approximately 16 feet deep with 4:1 side slopes. A 15-foot berm will be constructed around the detention pond for maintenance access. Where the pond is adjacent to the diversion channel on the northern side, the maintenance berm will be shared by both the detention pond and the diversion channel. The detention pond, including the maintenance berms, requires a total surface area of 6.3 acres.

PERIMETER DRAINAGE

The perimeter drainage system is designed to convey the 25-year runoff from the developed landfill consistent with TCEQ regulations. In addition, the perimeter channels have been designed to convey the runoff from a 100-year rainfall event. The perimeter drainage channel directs the surface water runoff from the landfill surface to existing detention/sedimentation ponds and the proposed Williams Pond. These ponds provide both detention of surface water and sediment controls before runoff exits the landfill.

At the base of the proposed landfill and within the Project, a 100-foot wide [top-of-bank (TOB) to TOB] perimeter channel of approximately 8,000 feet in length is proposed to capture internal rainfall runoff. This perimeter channel is designed as an extension of the existing Atascocita RDF drainage system.

SEDIMENTATION POND (WILLIAMS POND)

An approximate 7-acre detention/sedimentation pond is proposed to be located between the southeast corner of the Project and Williams Gully. The perimeter drainage channel directs a portion of the landfill surface water runoff contained within the perimeter channel into Williams Pond. Williams Pond is designed to receive surface runoff in conjunction with the existing sedimentation ponds on the existing facility from the perimeter drainage system, sequester sediments, and detain surface runoff from the landfill during excessive flow events. The sedimentation pond will outfall at-grade with the Williams Gully ordinary high water mark (OHWM) via an approved outfall structure in accordance with HCFCD standards.

OUTFALL STRUCUTRES

WMTX proposes to construct two outfalls as part of the Project. Outfall Number (No.) 1 is associated with the diversion channel; Outfall No. 2 is associated with Williams Pond.

Outfall No. 1

The proposed excavation and fill activities associated with the construction of Outfall No. 1 will result in the placement of rock rip-rap, paved slope, and grass slope. The total volume of impacts below the OHWM for Outfall No. 1 is 32,900 cubic feet.

The calculations for the volume of fill material for Outfall No. 1 are based on the following components:

Total approximate area within waters of the U.S. to be filled:	9,400 sq. ft.
Number of cubic feet in one yard:	27 cf/cy
Approximate fill volume to be placed in potentially jurisdictional waters :	32,900 cu. ft.

9,400 sq. ft. X 3.5 ft. = 32,900 cf / 27 cf/cy = 1,219 cubic yards

Outfall No. 2

The proposed excavation and fill activities associated with the construction of Outfall No. 2 will result in the placement of rip-rap/gabion protection for Williams Gully. The total volume of impacts below the OHWM for Outfall No. 2 is 600 cubic yards.

The calculations for the volume of fill material for Outfall No. 2 are based on the following components:

Total approximate area within waters of the U.S. to be filled:	5,400 sq. ft.
Number of cubic feet in one yard:	27 cf/cy
Approximate fill volume to be placed in potentially jurisdictional waters :	16,200 cu. ft.

5,400 sq. ft. X 3 ft. = 16,200 cf / 27 cf/cy = 600 cubic yards

In order to prepare the site for construction activities, approximately 17.95 acres and 950 linear feet of jurisdictional waters of the U.S., including wetlands, would be filled and/or excavated for the Project. The Project will avoid approximately 1.2 acres and 3,200 linear feet of jurisdictional waters of the U.S., including wetlands [Wetland 4 (portion) through Wetland 7 and Wetland 12 through Wetland 18, and the majority of Williams Gully OHWM]. Table 1 below details impacts to waters of the U.S., including wetlands for the Project.

Table 1
Wetlands and Other Waters of the U.S.
Indentified within the Project
Harris County, Texas

Wetland/Waterbody ID	Water Type/Class[1]	Wetland (acres)[2]	Length (linear feet)	Construction Impacts
Wetland 1A	PFO	3.07	–	Yes
Wetland 1B	PFO	9.29		Yes
Wetland 2	PFO	0.27	–	Yes
Wetland 3	PFO	0.09	–	Yes
Wetland 4	PFO	2.92	–	Yes
Wetland 4	PFO	0.39	–	No
Wetland 5	PFO	0.08	–	No
Wetland 6	PSS	0.06	–	No
Wetland 7	PSS	0.11	–	No
Wetland 8	PFO	0.96	–	Yes
Wetland 9	PFO	0.07	–	Yes
Wetland 10	PSS	0.42	–	Yes
Wetland 11	PFO	0.03	–	Yes
Wetland 12	PEM	0.44	–	No
Wetland 13	PEM	0.01	–	No
Wetland 14	PEM	0.01	–	No
Wetland 15	PEM	0.07	–	No
Wetland 16	PEM	0.01	–	No
Wetland 17	PEM	0.01	–	No
Wetland 18	PSS	0.01	–	No
Wetland 19	PEM	0.83	–	Yes
Ditch 1	Ephemeral	–	650	Yes
CRK 1	Ephemeral	–	268	No
Williams Gully	Perennial	–	300	Yes
Williams Gully	Perennial	–	2,922	No
Avoided Features	**PEM (6)**	**0.55**	**–**	
	PSS (3)	**0.18**		
	PFO (2)	**0.47**	**–**	
	Ephemeral	**–**	**268**	
	Perennial	**–**	**2,922**	
Total Avoidances		**1.20**	**3,190**	
Impacted Features	**PEM (1)**	**0.83**	**–**	
	PSS(1)	**0.42**	**–**	
	PFO (8)	**16.70**	**–**	
	Ephemeral	**–**	**650**	
	Perennial	**–**	**300**	
Total Impacts		**17.95**	**950**	

1 PEM = palustrine emergent, PSS = palustrine sapling and shrub, PFO = palustrine forest

For a depiction of each wetland location, please refer to Appendix A (Exhibits) within the Wetland Delineation.

B. Is compensatory mitigation proposed? If yes, submit a copy of the mitigation plan. If no, explain why not.

Yes, please refer to the Conceptual Compensatory Mitigation Plan.

C. Please complete the attached Alternatives Analysis Checklist

Please reference the attached Alternatives Analysis Checklist.

II. Disposal of waste materials

A. Describe the methods for disposing of materials recovered from the removal or destruction of existing structures.

There are no existing structures on site that will be removed for the expansion of the Atascocita RDF; therefore, there will be no requirement for disposal of materials.

B. Describe the methods for disposing of sewage generated during construction. If the proposed work establishes a business or a subdivision, describe the method for disposing of sewage after completing the project.

The Project involves the expansion of a MSW disposal facility. Sewage will not be generated during construction.

C. For marinas, describe plans for collecting and disposing of sewage from marine sanitation devices. Also, discuss provisions for the disposing of sewage generated from day-to-day activities.

NA

III. Water quality impacts

A. Describe the methods to minimize the short-term and long-term turbidity and suspended solids in the waters being dredged and/or filled. Also, describe the type of sediment (sand, clay, etc.) that will be dredged or used for fill.

To minimize the short-term and long-term turbidity and suspended solids in impacted waters, the Project will incorporate Best Management Practices (BMP) at appropriate stages during construction. Hay bales, silt fences, and other appropriate BMP devices will be placed to alleviate impacts below the Project. The proposed surface water improvements will be constructed to minimize turbidity to waters of the U.S., including wetlands that will remain on site after construction is complete.

Fill materials will consist of local material, excavated onsite, comprised of silty clay loams and silt loams.

B. Describe measures that will be used to stabilize disturbed soil areas, including: dredge material mounds, new levees or berms, building sites, and construction work areas. The description should address both short-term (construction related) and long-term (normal operation or maintenance) measures. Typical measures might include containment structures, drainage modifications, sediment fences, or vegetative cover.

Special construction techniques intended to minimize soil or sediment disruption should also be described.

All un-vegetated areas, excluding those associated with the active disposal and borrow sites, will be over-seeded with a sod-forming species, such as Bermuda grass (*Cynodon dactylon)*, to minimize erosion. Hay bales and/or silt fencing will be used as appropriate to control erosion prior to development of vegetative cover. All stormwater generated within active areas will be contained within the active borrow pit.

C. Discuss how hydraulically dredged materials will be handled to ensure maximum settling of solids before discharging the decant water. Plans should include a calculation of minimum settling times with supporting data. (Reference: Technical Report, DS-7810, Dredge Material Research Program, GUIDELINES FOR DESIGNING, OPERATING, AND MAINTAINING DREDGED MATERIAL CONTAINMENT AREAS) If future maintenance dredging will be required, the disposal site should be designed to accommodate additional dredged materials. If not, please include plans for periodically removing the dried sediments from the disposal area.

NA

D. Describe any methods used to test the sediments for contamination, especially when dredging in an area known or likely to be contaminated, such as downstream of municipal or industrial wastewater discharges.

NA

Tier II
Alternatives Analysis Checklist

I. Alternatives

A. How could you satisfy your needs in ways which do not affect surface water in the state?

Population growth and regional demands dictate landfill needs. Service to the community must advance with the dynamic growth of Harris and surrounding counties.

The regional per capita waste disposal rate for the Year 2008 was 7.74 pounds/person/day. At this rate of waste disposal and a lack of consideration for growth in population, the Houston-Galveston Area Council (H-GAC) of Governments region will exceed the remaining MSW landfill capacity within 20 years (*Municipal Solid Waste in Texas: A Year in Review FY2008 Data Summary and Analysis*. TCEQ, 2009).

H-GAC, as mandated by the TCEQ, issued an update to its Regional Solid Waste Management Plan that was adopted by the TCEQ on May 31, 2007. As stated in this plan within Goal No. 2, H-GAC will promote the planning for adequate MSW disposal, handling, and management facilities. As part of this overall goal, H-GAC's stated objectives include: 2B) encourage development of facilities that reduce, reuse, or recycle waste materials; 2C) encourage appropriate distribution of facilities to minimize transportation costs; 2D) encourage the development of larger regional facilities to the extent practical and where such facilities would be the best alternative; and 2E) encourage expansion and redevelopment of existing MSW facilities, where feasible, over siting of new facilities. Furthermore, the H-GAC plan and the Regional Solid Waste Characterization Study authorized by H-GAC in June 2005 states that the waste generation rate for the H-GAC area ranges from about 7.09 to 8.84 pounds/person/day and the remaining MSW disposal capacity ranges from 18 to 26 years.

H-GAC acknowledges that assuring landfill capacity is an important and ongoing endeavor that needs to be addressed by both governmental and privately owned and operated facilities. As large amounts of waste will continue to be generated, the need for disposal in an adequate and proper manner is imminent. The disposal needs of the H-GAC area require additional landfill space; project size is determined by these needs. Reduction in size of the proposed area for expansion of Atascocita RDF, or a failure to expand its capacity would result in a failure to meet the needs of the public and would reduce the service life of the facility.

B. How could the project be re-designed to fit the site without affecting surface water in the state?

WMTX is proposing to expand the limits of the existing Atascocita RDF into the Project. WMTX originally purchased the 300-acre tract for expansion of the existing Atascocita RDF. The use of the 300-acre tract for landfill development has been reduced to 190-acres, extending from the existing Atascocita RDF eastern most permit boundary to Williams Gully. Additionally, the Project has been further reduced to a permit boundary of approximately 170 acres to avoid and minimize impacts to waters of the U.S., including wetlands along the southern property boundary and along Williams Gully.

TCEQ regulations require a minimum buffer distance between the disposal area and the permit boundary of 125 feet. Designing an expansion plan pursuant to this requirement, considering the need for facilities that service the disposal area, and with regard to the location of waters of the U.S., including wetlands would prevent the use of the most beneficial site development plan. Re-designing around these constraints without affecting surface water of the State would decrease the amount of cover material available for the permitted area (material that is excavated).

In addition, it would decrease the amount of land available for further landfill expansion and the service life of the existing and future landfill cells. The emphasis of the landfill expansion design criteria is to maximize site development potential while minimizing impacts to waters of the State. Maximizing development potential provides the most economical and efficient means to benefit the public by extending the life of the existing facility.

C. How could the project be made smaller and still meet your needs?

As previously stated, the size of the Atascocita RFD expansion is determined by the waste disposal needs of the H-GAC area of Texas. Reducing the size of the Project would not serve the public need and would reduce the service life of the existing facility. Later expansions would be required to meet these disposal needs. As the landfill permit process is lengthy and costly, it is neither cost nor time efficient to submit multiple landfill expansion permits to meet projected needs.

D. What other sites were considered?

1. What geographical area was searched for alternative sites?

WMTX conducted searches for large-acreage tracts to service the H-GAC Texas region. For several years during the mid 1990s, the City of Houston searched unsuccessfully for new locations. Although tracts of suitable size were located, each contained impediments greater than those associated with the expansion of an existing facility. Consequently, no new Type I MSW landfills have been permitted in Harris County since 1983.

Due to limited availability of new landfill sites and a responsibility to meet the disposal needs of Harris County and surrounding areas, the H-GAC has stated their preference for the expansion of existing facilities. Approved by TCEQ, Objective 2E of the H-GAC Regional Solid Waste Management Plan is to "encourage expansion and redevelopment of existing municipal solid waste facilities, where feasible, over siting of new facilities" (*H-GAC Regional Solid Waste Management Plan, Approved TCEQ May 31, 2007*).

2. How did you determine whether other non-wetland sites are available for development in the area?

Critical elements of the site requirement include proximity to service area, size, accessibility, environmental constraints, proximity to residential development, site elements, meets future waste disposal needs, and meets H GAC Objective 2E. See Section IV.

These considerations, as well as the fact that WMTX has owned the Atascocita RDF for over 30 years and has demonstrated to the TCEQ and other state and federal agencies the suitability of the site for previous landfill expansions should preclude any justification for consideration of another site to meet current and projected regional waste disposal demands. Therefore, the expansion of the Atascocita RDF into the Project has been determined to be the practical and practicable site for meeting future waste disposal needs.

3. In recent years, have you sold or leased any lands located within the vicinity of the project? If so, why were they unsuitable for the project?

The Applicant currently owns several properties adjacent to or in the vicinity of the currently permitted approximate 503-acre landfill boundary, including the Scanlin tract. The unsuitability of the majority of these sites, with the exception of the Project, to meet the purpose and need are twofold. First, these properties (excluding the Project) are not currently

contiguous to the approximate 503-acre permitted landfill boundary or current waste disposal footprint.

To use these properties for the Project would require substantial technical, logistic, and cost constraints, thereby making such an alternative impracticable. Moreover, these properties are unsuitable for the Project because they represent the non-regulated buffer between the landfill and local citizens, community resources, wildlife enhancement, or they lie within the 100-year floodplain. Use of these properties would result in cumulative adverse impacts on the human environment, in particular the residents of the surrounding area.

E. What are the consequences of not building the project?

Population growth and regional demands dictate landfill needs. Landfill needs and its service to the community must advance with the dynamic growth of the Harris County and surrounding areas within the H-GAC region of Texas. Not building the Project would reduce the service life of the exiting Atascocita RDF and result in a failure of the facility to meet the needs of the public. Eventually waste disposal needs would outgrow existing facilities.

II. Comparison of alternatives

Four alternatives were evaluated for the Project. The following is a description of each of the alternatives.

- Alternative No. 1 – No-Action Alternative is considered an impractical alternative due to the need for additional waste disposal area within Harris County and the surrounding H-GAC areas. Selection of Alternative No. 1 will fail to achieve the necessary expansion of the Atascocita RDF into the Project and would require the purchase of undeveloped acreage that could represent greater impacts to aquatic environments and the surrounding community. Therefore, Alternative No. 1 is considered the least practicable alternative.

- Alternative No. 2 **–** Alternative No. 2 is an approximate 1,100-acre tract of undeveloped land located approximately five miles east/southeast of Bush Intercontinental Airport, west of the confluence of Garners Bayou and Greens Bayou (Figure 1). Alternative No. 2 is located in the floodway and 100-year floodplain of Greens Bayou. Based on infrared color aerial photography, the site appears to contain an extensive amount of palustrine forested (PFO) wetlands requiring greater impacts to waters of the U.S. and potential impacts to threatened and endangered species and cultural resources. Furthermore, new construction would contradict the H-GAC preference for the expansion of an existing facility. Therefore, Alternative No. 2 is considered a less practicable alternative.

- Alternative No. 3 **–** Alternative No. 3 involves the build out of the Scanlin tract (300 acres) owned by WMTX (Figure 2). The MSW design would encroach upon the TCEQ minimum 125-foot buffer between the waste disposal area and the proposed MSW permit boundary. In addition, this alternative would significantly increase impacts to waters of the U.S., involve fill within the 100-year floodplain of Garners Bayou and Williams Gully, and reduce the buffer between the waste disposal area and Garners Bayou, Williams Gully, and other developments. Therefore, Alternative No. 3 is considered a less practicable alternative.

- Alternative No. 4 – Alternative No. 4 is an approximate 190-acre tract located between the existing eastern MSW permit boundary of the Atascocita RDF and Williams Gully (Figure 3).

Approximately 170 acres of the site would be incorporated into the existing approximate 503-acre Atascocita RDF requiring modification of the current TCEQ permitted waste disposal area. The Project would result in 17.95 acres of permanent impacts to waters of the U.S., including wetlands.

The expansion area would provide ample space for on-site facilities and is located outside of the 100-year floodplain of Garners Bayou and Williams Gully. Alternative No. 4 complies with the H-GAC preference toward the expansion of an existing facility as opposed to construction of a new facility. Alternative No. 4 demonstrates avoidance and minimization of impacts to waters of the U.S., including wetlands. Therefore, Alternative No. 4 is considered the most practical and practicable alternative for the Project.

A. How do the costs compare for the alternatives considered above?

Construction of a new waste disposal facility would require extensive coordination with local governments and landowners, and involves a lengthy permitting process with the TCEQ. Under Alternative No. 2, costs associated with acquiring the property, permitting, public negotiation, and construction of new facilities would far exceed those to be incurred by the Project. Furthermore, the H-GAC has stated a preference for expansion of existing permitted facilities. The expansion of the Atascocita RDF into the Project will allow the H-GAC to continue to meet the stated goal of disposing of waste at an existing permitted facility.

Even though costs associated with the complete build-out of the permitted landfill boundary under Alternative No. 3 would actually be more cost-effective than Alternative No. 4 on a per unit volume gained basis, WMTX is committed to reducing impacts to waters of the U.S., including wetlands.

B. Are there logistical (location, access, transportation, etc.) reasons that limit the alternatives considered?

Alternative No. 2 is located in an area situated within the floodway and 100-year floodplain of Greens Bayou which could pose significant environmental issues during extreme rainfall and flooding events. Under Alternatives No. 3 and No. 4, there are no differences in logistics because they would be located at the existing Atascocita RDF. Atascocita RDF is convenient to major thoroughfares and freeway systems, and provides adequate buffering from adjacent residential developments.

C. Are there technological limitations for the alternatives considered?

Alternative No. 2 potentially contains a variety of known and unknown geological, biological, intermodal, and existing development impediments. All limitations are known under Alternatives No. 3 and No. 4.

D. Are there other reasons certain alternatives are not feasible?

NA

III. If you have not chosen an alternative which would avoid impacts to surface water in the state, explain:

A. Why your alternative was selected?

Four alternatives were evaluated for this analysis:

- Alternative No. 1 – The No-Action Alternative
- Alternative No. 2 – Approximate 1,100-acre tract in Harris County, Texas (Figure 1)
- Alternative No. 3 – Approximate 300-acre (Scanlin) tract in Harris County, Texas (Figure 2)
- Alternative No. 4 – Approximate 190-acre (Project) tract in Harris County, Texas (Figure 3)

Criteria used for selection of the 190-acre tract were based on the following critical elements: (1) proximity to service area, (2) size, (3) accessibility, (4) environmental constraints, (5) proximity to residential development, (6) site elements, (7) meets future waste disposal needs, and (8) meets H-GAC Objective 2E.

Criteria used for selection of each element were given a score of 1 (Yes) or 2 (No).

- Proximity to service area was determined by adjacency to the H-GAC area.

- Size score was determined by alternatives that could accommodate all facilities required for the Project.

- Accessibility score was determined based on the alternative's access to a major thoroughfare.

- Environmental constraints score was determined based on impediments (i.e., hazardous materials, wetlands [does not include open waters], threatened and endangered species, historical resources, etc.,) that would not impact the amount of developable acreage.

- Proximity to development was determined by existing and planned residential/commercial development that would provide adequate buffering.

- Site elements provide an efficient site plan based on existing features and amount of undevelopable acreage.

- Meets future waste disposal needs for HGAC area.

- Meets H-GAC Objective 2E to encourage expansion and redevelopment of existing MSW facilities, where feasible, over siting of new facilities.

See the Table 2 below (Section IV) for the analysis of the alternatives.

B. What do you plan to do to minimize adverse effects on the surface water in the state impacted?

BMP devices will be used during the construction of the Project. Stormwater runoff will be diverted to the detention areas and erosion and sediment control structures to minimize turbidity impacts to the avoided wetland areas and Garners Bayou and Williams Gully. Hay bales, silt fencing and other BMP devices will be placed downstream of new construction to alleviate impacts below the Project.

IV. Please provide a comparison of each criteria (from Part II) for each site evaluation in the alternatives analysis.

Alternative No. 4 is a 190-acre tract of land located in Harris County, Texas. Selection of this tract will permit WMTX to develop a location that meets all the critical elements listed above.

While the Project will impact waters of the U.S., including wetlands, the Project has demonstrated avoidance, minimization, and mitigation for unavoidable impacts. Alternative No. 4 possesses attributes that identify the tract as the most practicable, has the least impact on environmental

resources, and meets the future waste disposal needs and the H-GAC expansion criteria, and is therefore the preferred alternative.

"Practicable" means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project objective (40 CFR 332.1(c)(2)).
While technology of site development does not appear to be distinctive, cost and logistics were strongly analyzed when determining site selection. Specifically, the logistics of the site are ideal for access to major thoroughfares and the existing facility.

While additional on-site avoidance seems neither practicable nor practical, mitigation of impacts to waters of the U.S., including wetlands will result in an effect of "No Net Loss."

Table 2
Alternative Analysis of Potential Actions
Harris County, Texas

Criteria (1 = Yes) (2 = No)	No Action Alternative (No Action)	Alternative No. 2 (1,100-acre Tract)	Alternative No. 3 (300-acre Tract)	Alternative No. 4 (190-acre Tract)
Proximity to service area	1	1	1	1
Size	2	2	1	1
Accessibility	1	2	1	1
Environmental constraints	1	2	2	1
Proximity to development	2	1	2	1
Site elements	2	2	2	1
Meets future waste disposal needs	2	1	1	1
Meets H-GAC Objective 2E	2	2	1	1
Total	**13**	**13**	**11**	**8**

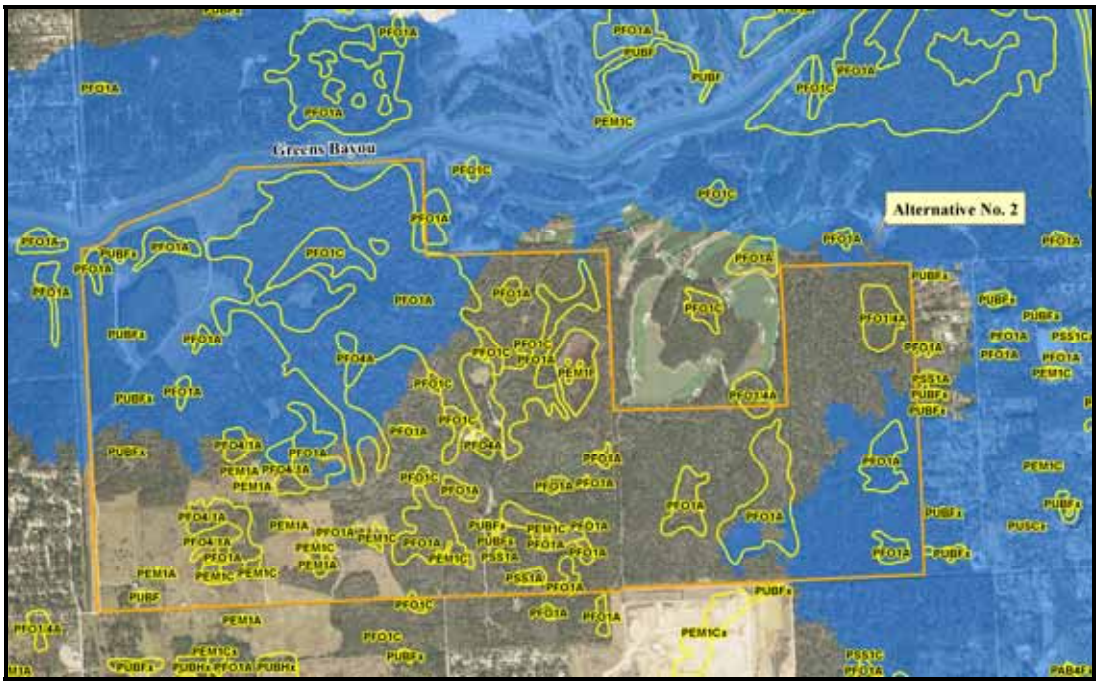


Figure 1: Alternative No. 2 – Approximate 1,100-acre Tract.

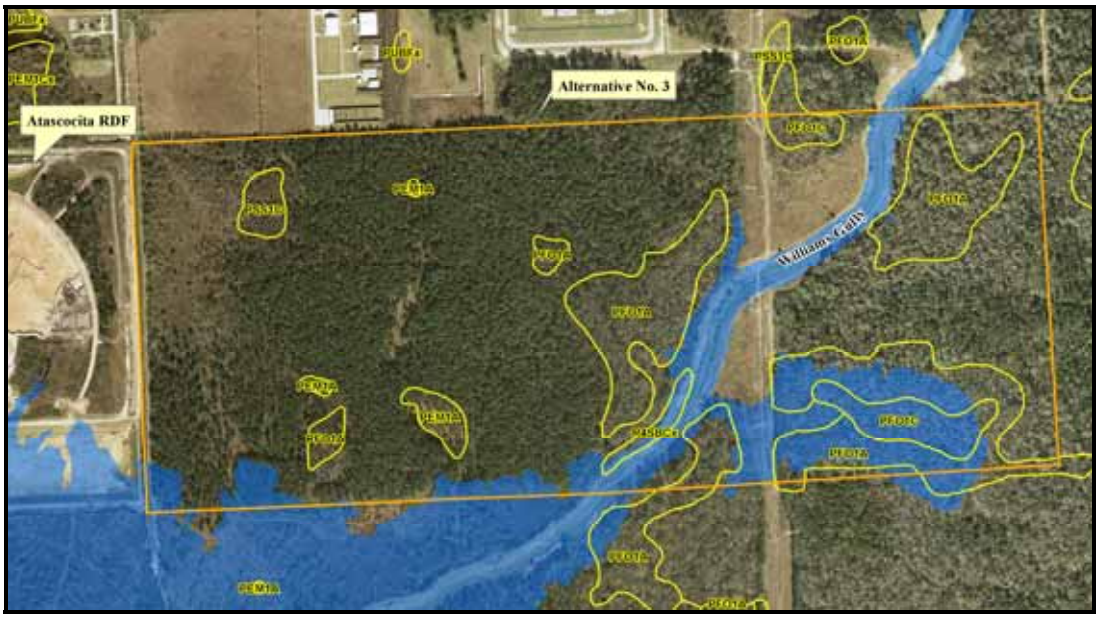


Figure 2: Alternative No. 3 – Approximate 300-acre Tract.

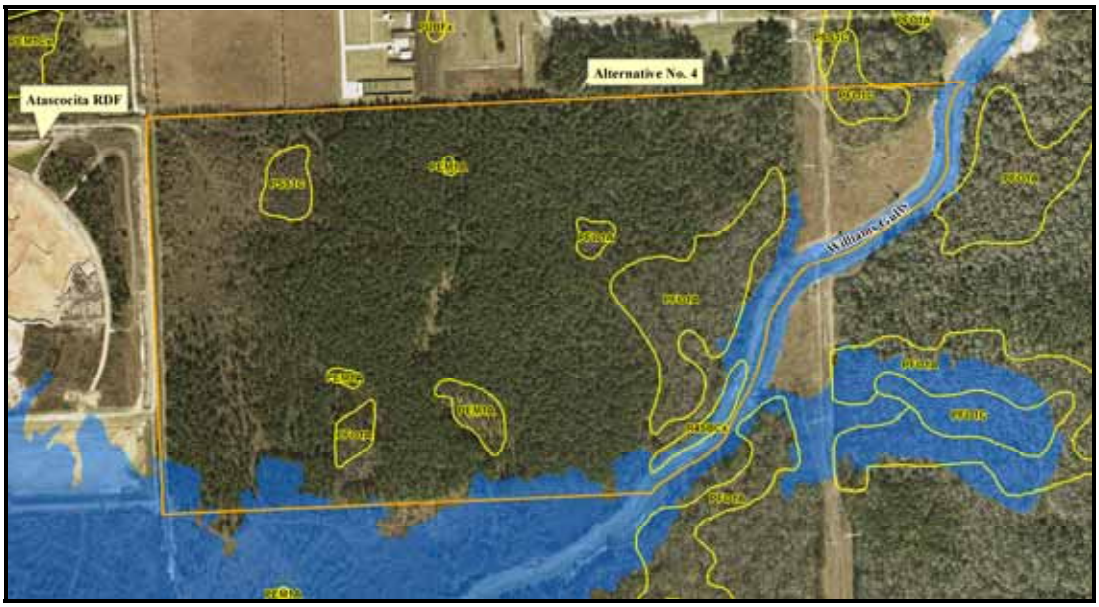


Figure 3: Alternative No. 4 – Approximate 190-acre Tract.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

November 01, 2002

WASTE MANAGEMENT OF TEXAS INC
10611 GENOA RED BLUFF RD
HOUSTON, TX 77034-3909

RE: Permit Number TXR05N515 for the facility located at:
3623 WILSON RD, HUMBLE, TX 77396-3645

Dear Permittee:

Your notice of intent for authorization under the general permit for discharge of storm water associated with industrial activities has been received. Enclosed is a certificate that includes the permit number that was assigned to your facility.

Please be aware that the current permit will be amended to include additional reporting requirements. Public notice of the amendment will be published in the Texas Register, but you will not be directly contacted, when the amended permit is issued. A copy of the revised permit and information regarding the revisions will be included on the Texas Commission on Environmental Quality (TCEQ) storm water web page.

The permit was amended in order to meet federal storm water permit program requirements. Facilities that are currently required to sample and meet the numeric effluent limitations in Part V of the permit titled ("Specific Requirements for Industrial Activities") will be required to submit the results of laboratory analyses on Discharge Monitoring Reports (DMR) each year. All facilities that are currently required to sample and meet the numeric effluent limitations for hazardous metals in Part III, Section D of the permit titled ("Numeric Effluent Limitations") will be required to record results. If the results of the laboratory analyses exceed the limitations in the permit, the DMR form must be submitted on an annual basis. These DMR forms will now be included as a part of the amended permit, and you may duplicate these forms as needed. The revised permit, the accompanying DMR forms, and additional information is available at the following web site: www.tnrcc.state.tx.us/permitting/waterperm/ww/perm/industry.html.

If you have any questions regarding the coverage of your storm water permit, you may contact the Storm Water & General Permits Team at (512) 239-3700, or obtain information on the storm water web site listed above.

Sincerely,

Michael D. Cowan, Director
Water Quality Division

Enclosure

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Texas Pollutant Discharge Elimination System
Storm Water Multi-Sector General Permit

November 06, 2002

The Notice of Intent (NOI) for the facility listed below was received on May 23, 2002. The intent to discharge storm water associated with industrial activity under the terms and conditions imposed by the Texas Pollutant Discharge Elimination System (TPDES) storm water multi-sector general permit TXR050000 is acknowledged. Your facility's TPDES multi-sector storm water general permit number is:

TXR05N515

TCEQ's storm water multi-sector general permit requires certain storm water pollution prevention and control measures, possible monitoring and reporting, and periodic inspections. Among the conditions and requirements of this permit, you must have prepared and implemented a storm water pollution prevention plan (SWP3) that is tailored to your industrial site. As a facility authorized to discharge under the storm water multi-sector general permit, all terms and conditions must be complied with to maintain coverage and avoid possible penalties.

FACILITY:
3623 WILSON RD
HUMBLE, TX 77396-3646

OWNER/OPERATOR:
WASTE MANAGEMENT OF TEXAS INC
100 GENOA RED BLUFF RD
HOUSTON, TX 77034-3909

This permit expires on August 20, 2006, unless otherwise amended. For additional information, see the TCEQ web site at www.tceq.state.tx.us or contact the Storm Water and General Permits Team by telephone at (512) 239-3700. A copy of this document should be kept with your SWP3.

WETLAND DELINEATION FOR THE ATASCOCITA LANDFILL EXPANSION HARRIS COUNTY, TEXAS

Prepared for:

Waste Management of Texas, Inc.
800 Gessner Road, Suite 1100
Houston, Texas 77024

Prepared by:

Knudson, LP
8588 Katy Freeway, Suite 441
Houston, Texas 77024

September 2009
Updated May 2010

Contents

Tables

Appendix

Acronyms and Abbreviations

Manual	1987 Corps of Engineers Wetland Delineations Manual
Supplement	2008 Atlantic and Gulf Coastal Plain Interim Regional Supplement
CWA	Clean Water Act
DGPS	differentially-corrected global positioning system
GIS	Geographical Information System
Knudson	Knudson, LP
NRCS	Natural Resources Conservation Service
OHWM	ordinary high water mark
PEM	palustrine emergent
PFO	palustrine forested
PSS	palustrine sapling and shrub
SCS	Soil Conservation Service
USACE SWG	U.S. Army Corps of Engineer, Galveston District
USGS	U.S. Geological Survey
WMTX	Waste Management of Texas, Inc.

1.0 INTRODUCTION

A delineation of waters of the U.S., including wetlands, was conducted on the proposed approximate 190-acre expansion area ("Project") of the 300-acre Scanlin Tract between August 3 and September 16, 2009, in response to a United States Army Corps of Engineers, Galveston District ("USACE SWG") request for additional information. Specifically, the USACE SWG requested in a letter dated July 2, 2009, a wetland delineation be conducted per the 1987 Corps of Engineers Wetland Delineation Manual ("Manual") and the 2008 Interim Regional Supplement for the Atlantic and Gulf Coastal Plain ("Supplement"). The Project is located southeast of Humble near the confluence of Williams Gully and Garners Bayou in northeast Harris County, Texas (Appendix). More specifically, the Project is located on the Harmaston, Texas, U.S. Geological Survey ("USGS") 7.5-minute series topographic map.

Northrup Associates, Inc. ("NAI"), now operating as Knudson, LP ("Knudson") conducted the original delineation on an approximate 182-acre parcel within the Project. USACE SWG verified the wetland boundaries on May 14, 2003, and issued an approved determination [D-5292] for the Project. This determination expired on May 14, 2008. On the client's behalf, PBS&J submitted an Individual Permit Application on March 25, 2009, for the original approximate 182-acre parcel and an abutting additional approximate 8-acre parcel within the northeast portion of the Project.

Knudson conducted the most recent and approximate 190-acre investigations on behalf of Waste Management of Texas, Inc. ("WMTX") for the purpose of identifying and delineating waters of the U.S., including wetlands, per the Manual and the Supplement. The updated investigations of the Project are provided to support any required regulatory permitting requirements associated with the USACE SWG.

2.0 METHODS

A formal wetland delineation was conducted within the Project between August 3 and September 16, 2009. This wetland delineation includes evaluations for emergent, sapling and shrub, and forested wetlands. In addition, the Project was assessed for other potential waters of the U.S. which includes, but is not limited to lakes, rivers, ponds, mud flats and perennial, intermittent, and ephemeral stream channels. The delineation of such waters was based on the "ordinary high water mark" ("OHWM") as defined in 33 CFR 328.3e.

As required by existing regulations or regional general permits, potential wetlands were evaluated based on the Supplement to the Manual. The Supplement methodology includes additional indicators and procedures for sampling vegetation, hydrology, and soils parameters not included in the Manual.

During field surveys, all plant species were recorded based on the methodology within the Supplement to assess the vegetation component of the Project. The *National List of Plant Species that Occur in Wetlands: South Plains (Region 6)* (Reed, 1988) or WetDataShed (Lichvar and Levasseur, 2004), wetland watershed data analysis software for the USACE, were used to determine the indicator status of the plant species. For species listed as NI (reviewed but given no regional indicator) or NO (no known occurrence in the region at the time the listed was complied), ecologists applied the indicator status assigned to the species in the nearest adjacent region (Region 2). If the species was listed as NI or NO but no adjacent regional indicator was assigned, the species was not used to calculate hydrophytic vegetation indicators. Dominant plant species were based on the 50/20 Rule within the Supplement. Taxonomy of plant species follows Reed (1988), Correll and Johnston (1996), Gould (1975), and Vines (1990).

Direct observations of inundation, saturation and other indicators of wetland hydrology (i.e., water marks, drift lines, oxidized rhizospheres, sediment deposits, etc.) were used to determine if the wetland hydrology parameter was satisfied. Soils at each data point were evaluated and described notating the depth, matrix color (if any), mottle abundance and contrast, texture, etc. (Environmental Laboratory, 1987 and 2008). The moist matrix color and moist mottle color of the soil were determined utilizing the *Munsell Soil Color Chart* (Kollmorgan Instruments Corporation, 2000). A total of 121 data points were established and evaluated to characterize the approximate 190-acre tract.

The boundary for each water of the U.S., including wetlands, was determined through combined observation, correlation and aerial photo interpretation, in conjunction with field results regarding hydrophytic vegetation, indicators of wetland hydrology and the presence of hydric soil indicator data collected at each data point location. All coordinates and boundaries collected from 2007 to September 16, 2009, were mapped with a differentially-corrected global positioning system ("DGPS") using a Trimble GeoXH DGPS receiver and post processed to sub-meter accuracy.

The points were downloaded into ArcView™ Geographic Information System ("GIS") software and used to create maps of the wetland boundaries. The USACE SWG Standard Operating Procedure for recording jurisdictional delineation using DGPS, was used during this wetland delineation. Prior information represented in this report has been previously verified and approved [D-5292] by the USACE SWG.

3.0 RESULTS

Field surveys were conducted to confirm previous findings and to further identify additional locations and the extent of waters of the U.S., including wetlands, subject to USACE jurisdiction under Section 404 of the Clean Water Act ("CWA") and/or Section 10 of the Rivers and Harbors Act. The vegetation, hydrology and soil characteristics were recorded at each data point.

3.1 SITE DESCRIPTION

The Project is located north of the confluence of Williams Gully and Garners Bayou near Humble, Harris County, Texas. The geographic coordinates at the approximate centermost point of the Project are latitude 29° 57' 1.72" and longitude -95° 13' 28.78". The site is nearly level, sloping gently south-southeast toward Williams Gully with both convex and concave landscape positions. The Project area is under active silvicultural management and is therefore undergoing vegetation changes from recent timber harvesting. Pine forest originally dominated the central portion of the Project with hardwoods being located along Williams Gully. Additionally, scattered within the original pine forest were meadows exhibiting a predominance of native grasses. Currently, remnant stands of pines and hardwoods are scattered within the Project. However, the majority of the Project now contains areas dominated by sapling and shrub and herbaceous communities.

The Project is fenced along the northern boundary and is bounded to the east by Williams Gully. The western boundary is the Harris County Flood Control District P130-02-01 channel with spoil material side-cast along the eastern bank. P130-02-01 flows from north to south and drains into Williams Gully. P130-02-01 originally began near Atascocita Road and was routed in a series of linear channels to Williams Gully. A Harris County Correctional Facility wastewater treatment plant is located approximately 600 feet upstream of the Project. P130-02-01 was designed to carry storm water runoff from roadside borrow ditches and cleaned wastewater from the treatment plant. At Williams Gully, runoff flows through a predominantly obstructed backslope drain/culvert that has collapsed from the weight of the overlying spoil. Due to the relatively level landscape, no surface ditch features are depicted on the 1920, 1944, or 1982 USGS topographic maps which indicate that construction of the ditch was not part of enhancing a natural drainage feature. Linear channels are depicted on the 1920 Harmaston, Texas USGS topographic map. North of the Project location, the channels appear to have been constructed through upland areas for agricultural management purposes and for the removal of storm water from developed areas.

3.2 VEGETATION

During field surveys, observations revealed the majority of the tract was under active silvicultural management; therefore, many data point locations were discovered to have disturbed vegetation

communities. Within the Project lies closed, depressional areas that exhibit a predominance of wetland vegetation species. However, the majority of the Project consists of upland communities. Typical dominant wetland and upland vegetation species observed within the Project are listed in Table 1 below.

Table 1
Typical Dominant Wetland and Upland Vegetation Species within the Project
Harris County, Texas

Common name	Scientific name	Indicator Status
trident red maple	*Acer rubrum*	FAC
alligator weed	*Alternanthera philoxeroides*	OBL
naked-spike ragweed	*Ambrosia psilostachya*	FAC-
pepper-vine	*Ampelopsis arborea*	FAC
bushy bluestem	*Andropogon glomeratus*	FACW+
broom-sedge	*Andropogon virginicus*	FACU+
egg-leaf Indian-plantain	*Arnoglossum ovatum*	FAC
Drummond's aster	*Aster texanus*	UPL
eastern false-willow	*Baccharis halimifolia*	FACW-
coastal water-hyssop	*Bacopa monnieri*	OBL
Alabama supple-jack	*Berchemia scandens*	FAC+
American beauty-berry	*Callicarpa americana*	FACU
trumpet-creeper	*Campsis radicans*	FAC
Cherokee sedge	*Carex cherokeensis*	FACW-
sugar-berry	*Celtis laevigata*	FAC
slender spikegrass	*Chasmanthium laxum*	FAC
Paraguayan windmill grass	*Chloris canterai*	UPL
parsley hawthorn	*Crataegus marshallii*	FAC-
green hawthorn	*Crataegus viridis*	FAC
hogwart	*Croton capitatus*	UPL
Bermuda grass	*Cynodon dactylon*	FACU+
green flatsedge	*Cyperus virens*	FACW
panic grass	*Dichanthelium acuminatum*	FAC
Heller's witchgrass	*Dichanthelium oligosanthes*	FACU
broom panic grass	*Dichanthelium scoparium*	FACW-
starbrush white-top-sedge	*Dichromena colorata*	FACW
southern crabgrass	*Digitaria ciliaris*	UPL
common persimmon	*Diospyros virginiana*	FAC
black-fruit spikerush	*Eleocharis melanocarpa*	FACW
sand spikerush	*Eleocharis montevidensis*	FACW+
small spikerush	*Eleocharis parvula*	OBL

Common name	Scientific name	Indicator Status
small dog-fennel thorough-wort	*Eupatorium capillifolium*	FACU
late-flowering thorough-wort	*Eupatorium serotinum*	FAC-
white ash	*Fraxinus americana*	FACU
green ash	*Fraxinus pennsylvanica*	FACW-
Lindheimer's beeblossom	*Gaura lindheimeri*	UPL
honey-locust	*Gleditsia triacanthos*	FAC
American holly	*Ilex opaca*	FACU
yaupon	*Ilex vomitoria*	FAC-
annual sumpweed	*Iva annua*	FAC
soft rush	*Juncus effusus*	OBL
round-head rush	*Juncus validus*	FACW
club-head cutgrass	*Leersia hexandra*	OBL
slender gayfeather	*Liatris acidota*	FAC+
cattail gayfeather	*Liatris pycnostachya*	FAC+
sweet gum	*Liquidambar styraciflua*	FAC
Japanese honeysuckle	*Lonicera japonica*	FAC
climbing hempweed	*Mikania scandens*	FACW+
southern bayberry	*Myrica cerifera*	FAC
torpedo grass	*Panicum repens*	FAC+
Virginia creeper	*Parthenocissus quinquefolia*	FAC
Bahia grass	*Paspalum notatum*	FAC
brown-seed paspalum	*Paspalum plicatulum*	FAC
Vasey grass	*Paspalum urvillei*	FAC
purple passion-flower	*Passiflora edulis*	FACU
common frog-fruit	*Phyla nodiflora*	FACW
common pokeweed	*Phytolacca americana*	FAC-
loblolly pine	*Pinus taeda*	FAC-
salt marsh camphor-weed	*Pluchea camphorata*	FACW-
swamp smartweed	*Polygonum hydropiperoides*	OBL
water oak	*Quercus nigra*	FAC+
falling beakrush	*Rhynchospora caduca*	OBL
serrate-leaf blackberry	*Rubus argutus*	FACU+
southern dewberry	*Rubus trivialis*	FAC
dwarf palmetto	*Sabal minor*	FACW
Chinese tallow-tree	*Sapium sebiferum*	FACU+
Drummond's rattle-bush	*Sesbania drummondii*	FACW
saw greenbrier	*Smilax bona-nox*	FAC
common greenbrier	*Smilax rotundifolia*	FAC
Johnson grass	*Sorghum halepense*	FACU

Common name	Scientific name	Indicator Status
gulf cordgrass	*Spartina spartinae*	FACW+
St. Augustine grass	*Stenotaphrum secundatum*	FAC+
French tamarisk	*Tamarix gallica*	FACW-
powdery thalia	*Thalia dealbata*	OBL
American elm	*Ulmus americana*	FAC
muscadine grape	*Vitis rotundifolia*	FAC-

3.3 SOILS

3.3.1 Mapped Soils

The U.S. Department of Agriculture *Soil Survey of Harris County, Texas* (Soil Conservation Service ["SCS"], 1976) was referenced to determine the types of mapped soils within the Project. In addition, the Natural Resources Conservation Service ("NRCS") (2009) list of hydric soils for Harris County was referenced. A brief description of each mapped soil type within the Project is provided below.

Addicks loam (Ad) is a nearly level soil in broad areas on upland prairies, with a 0.3 percent average slope. These soils were formed in calcareous, loamy sediments and are poorly drained with moderate permeability (SCS, 1976). The Ad map unit is listed on the Harris County hydric soils list (NRCS, 2009).

Aldine very fine sandy loam (Am) is a nearly level soil in broad, oblong and oval, wooded areas, with a 0.6 percent average slope. These soils were formed in thick beds of clayey sediments under forest vegetation. Aldine soils are somewhat poorly drained. Surface runoff is slow, and permeability is very slow (SCS, 1976). The Am map unit is not listed on the Harris County hydric soils list (NRCS, 2009).

Bernard-Edna complex (Be) consists of deep, neutral, nearly level to gently sloping, loamy soils on upland prairies, with a 0.8 percent average slope. These soils formed in clayey unconsolidated sediments and are somewhat poorly drained with very slow surface runoff (SCS, 1976). The Be map unit is listed on the Harris County hydric soils list (NRCS, 2009).

Edna fine sandy loam (Ed) is a nearly level soil on the prairie, with 0.8 percent average slope. These soils formed in thick loamy and clayey unconsolidated sediments of marine origin. Edna soils are poorly drained with very slow runoff, and are saturated for long periods, especially during winter and spring (SCS, 1976). The Ed map unit is listed on the Harris County hydric soils list (NRCS, 2009).

Gessner loam (Ge) is a nearly level soil in broad, irregular areas and in small, round depressions, with a 0.5 percent average slope. These soils formed in thick beds of unconsolidated loamy sediment and are poorly drained with very slow to ponded runoff. The soils are saturated with water during winter and spring and for short periods following summer rains (SCS, 1976). The Ge map unit is listed on the Harris County hydric soils list (NRCS, 2009).

3.3.2 Observed soils

During the 2009 field surveys, typical soil samples to a depth of approximately 20 inches revealed sandy clay loam soils with a 10YR matrix and values/chromas ranging from 3/1 (very dark gray) to 7/3 (very pale brown). When present, mottles typically ranged from 10YR 4/4 (dark yellowish brown) to 10YR 5/8 (yellowish brown). Some soil samples exhibited slight concentrations of iron-manganese masses and calcium carbonate, $CaCO_3$. A restrictive layer of compacted soils was observed at a few data locations generally along Williams Gully. Typical hydric soils consisted of a depleted matrix. The USACE technical criteria (Environmental Laboratory, 2008 and 1987) was used as the basis for determining hydric soils. Hydric conditions were not prominent in upland communities. At locations where soils had previously been determined by a registered geoscientist, soils samples revealed similar characteristics matching the previous profile descriptions from the 2003 delineation.

3.4 HYDROLOGY

Hydrology at the Project location is driven by precipitation rather than by subsurface movement of water. Overall, the site is relatively level and expresses very little topographical relief. Level topography impedes the rapid removal of storm water runoff. Consequently, precipitation falling on the site is slow to be removed either through percolation into the soil or through surface conveyance. Two natural drainageways in the vicinity of the site include Williams Gully through the eastern half of the property and Garners Bayou to the southwest.

Field surveys determined a very slight north to south gradient which provides some drainage to the site, but the Project area revealed many closed depressional areas with no surface drainage. Hydrology within wetlands included water marks, geomorphic position, surface cracks, crayfish burrows, algal crust, water-stained leaves, moss trim lines, and buttressed trees.

During the previous USACE verification [D-5292], wetlands within the interior of the 182-acre site were determined to be isolated and outside the 100-year floodplain. Following Tropical Storm Allison, Harris County floodplains were remapped during the Tropical Storm Allison Recovery Project and adopted by the Federal Emergency Management Agency ("FEMA") on June 18, 2007. The revised FEMA floodplain maps of the subject property now depict areas mapped within the 100-year floodplain along a minor portion of the southern boundary (Appendix).

The revised 100-year floodplain now partially or fully overlaps nine wetlands along the southern and eastern Project boundaries. These wetlands include: Wet 4, Wet 6, Wet 7, and Wet 12 through Wet 17, inclusive. Additionally, historic topographic maps indicate two wetlands (Wet 8 and Wet 9) may at one time have been hydrologically connected to Williams Gully.

Along the western bank of Williams Gully lies a bottomland hardwood area with a slight eastern tilt to the general north-south drainage characteristic of the western parcel. The hydrology in this bottomland area appears to have been influenced by a natural phenomenon through which Williams Gully is actually creating subsurface drainage from this area – a phenomenon which has provided an express drainage pattern to this area, further preventing the wetland hydrology criteria from being met.

Although there are other areas on the site that appear slow to drain, these areas do not support a predominance of hydrophytic vegetation, a condition that indicates a lack of sufficient inundation and/or saturation to meet the wetland hydrology criterion.

3.5 WATERS OF THE U.S., INCLUDING WETLANDS

Results of the delineation of waters of the U.S., including wetlands, within the Project revealed the presence of areas meeting the three mandatory wetland criteria (predominance of hydrophytic vegetation, hydric soil, and wetland hydrology). These wetland areas consist of palustrine emergent (PEM) wetlands scattered along Williams Gully and a drainage ditch (Ditch 1), palustrine forested (PFO) wetlands and palustrine sapling and shrub (PSS) wetlands within the interior of the Project. The wetlands are typically depressional features underlain by soils generally exhibiting hydric characteristics. Saturation or inundation for extended periods of time support vegetative communities dominated by hydrophytic species.

A man-altered drainage features (P130-02-01) is located along the western property boundary of the Project. While a northern section of P130-02-01 has no discernable OHWM, an OHWM appears to the south (Ditch 1) for approximately 650 feet and becomes more evident progressing southward approaching Williams Gully. An ephemeral creek and tributary (CRK 1) to Williams Gully was located in the southeast section of the Project. Williams Gully is a perennial stream that defines the Project boundary to the east.

A list of wetlands and waterbodies identified within the Project is provided in Table 2. Exhibits in Appendix depict the locations of wetlands and waterbodies within the Project.

Table 2
Wetlands and Waterbodies
Indentified within the Project
Harris County, Texas

Wetland/Waterbody ID	Water Type/Class[1]	Wetland (acres)[2]	Length (linear feet)
Wetland 1A	PFO	3.07	–
Wetland 1B	PFO	9.29	
Wetland 2	PFO	0.27	–
Wetland 3	PFO	0.09	–
Wetland 4	PFO	3.31	–
Wetland 5	PFO	0.08	–
Wetland 6	PSS	0.06	–
Wetland 7	PSS	0.11	–
Wetland 8	PFO	0.96	–
Wetland 9	PFO	0.07	–
Wetland 10	PSS	0.42	–
Wetland 11	PFO	0.03	–
Wetland 12	PEM	0.44	–
Wetland 13	PEM	0.01	–
Wetland 14	PEM	0.01	–
Wetland 15	PEM	0.07	–
Wetland 16	PEM	0.01	–
Wetland 17	PEM	0.01	–
Wetland 18	PSS	0.01	–
Wetland 19	PEM	0.83	–
Ditch 1	Ephemeral	–	650
CRK 1	Ephemeral	–	268
Williams Gully	Perennial	–	3,222
Summation of Wetlands and Waterbodies	**PEM (7)** **PSS (4)** **PFO (9)**	**1.38** **0.60** **17.17**	**4,140**
Total Wetlands and Waterbodies	**23**	**19.15**	**4,140**

1 PEM = palustrine emergent wetland, PSS = palustrine sapling and shrub, PFO = palustrine forested
2 Wetlands delineated less than 0.01-acre are rounded up to 0.01 acre.

4.0 CONCLUSION

The previous determination for WMTX expired on May 14, 2008 [D-5292]. The USACE SWG requested in a letter dated July 2, 2009, a wetland delineation be conducted using the Manual and the Supplement. Knudson conducted the investigations on the Project for the purpose of identifying and delineating waters of the U.S., including wetlands, based on the new approved guidelines.

Wetlands within the Project determined to be jurisdictional were based on adjacency and proximity to the 100-year floodplain of Williams Gully and associated tributaries. Jurisdictional waterbodies were determined based on observations of direct or indirect connections to regulated waters of the U.S.

Results of the delineation of waters of the U.S., including wetlands, within the Project revealed 19.15 acres of wetlands. Approximately 1.38 acres are PEM wetlands, 0.60 acre is PSS wetlands, and 17.17 acres are PFO wetlands (Table 2).

Additionally, three waterbodies (Ditch 1, CRK 1, and Williams Gully), extending for a combined length of 4,140 feet, were identified as the result of the delineation.

Based on the July 2, 2009 letter, the revised wetland delineation report will be submitted to the USACE SWG for evaluation of the wetland delineation as part of the Individual Permit application. Coordination with the USACE SWG Compliance Section has been initiated and a site visit by USACE SWG personnel is expected to occur for the verification of the wetland delineation.

5.0 REFERENCES

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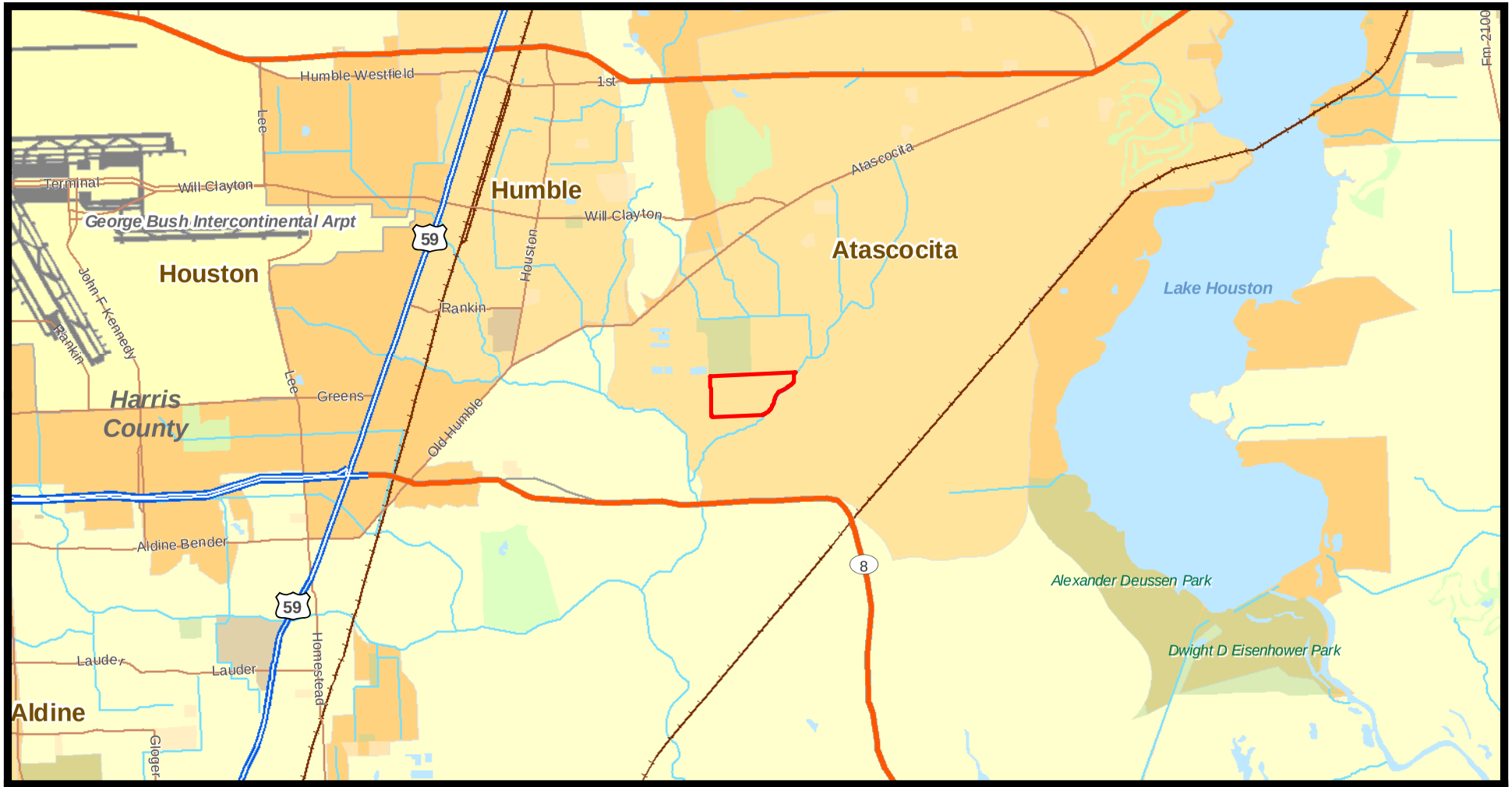
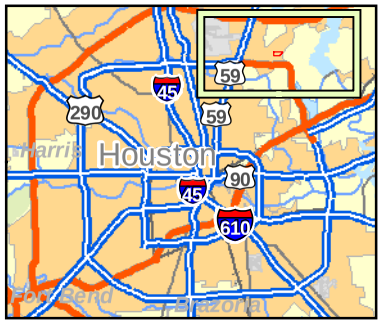
Vines, R.A. 1990. *Trees, Shrubs, and Woody Vines of the Southwest*. Seventh Printing. University of Austin Press. Original publication date 1960.

Appendix

Exhibits





Source: ESRI Data & Maps 9.3

190 Acre Project Area

0 2 4 Miles

N

8588 Katy Freeway Suite 441
Houston, TX 77024
Phone (713) 463-8200

Exhibit 1
Vicinity Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Sep 22, 2009
ESRI Data & Maps 9.3	Scale:1 in = 2 miles
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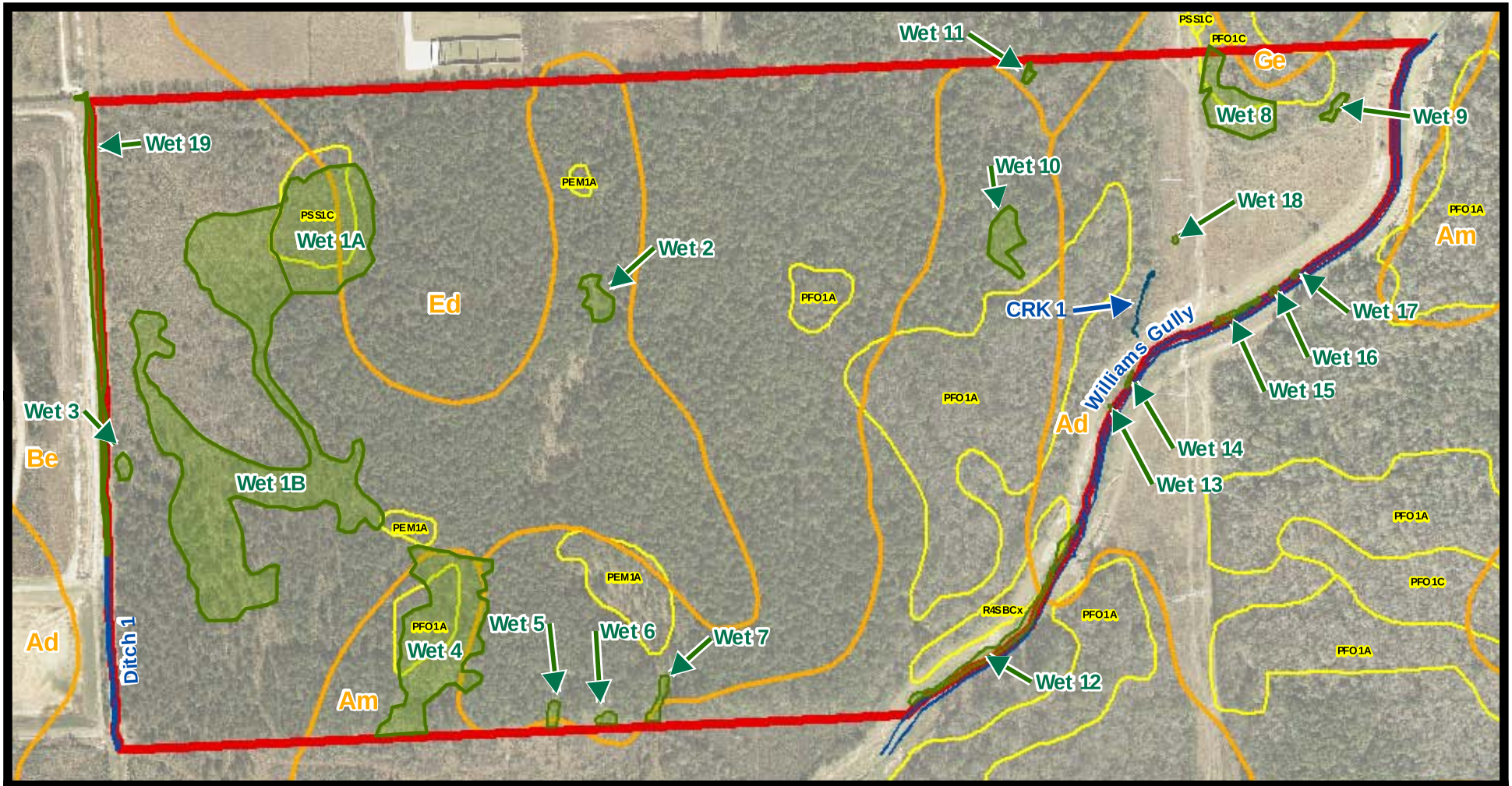

Sources
Aerial: H-GAC, 2008
Solils: NRCS, 2008
NWI: USFWS, 2009

Wetlands
Water Bodies
Soils
NWI

0 500 1,000 Feet

N

8588 Katy Freeway Suite 441
Houston, TX 77024
Phone (713) 463-8200

Exhibit 2
2008 Aerial Photograph Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: May 14, 2010
USGS Harmaston Quadrangle	Scale:1 in = 536 feet

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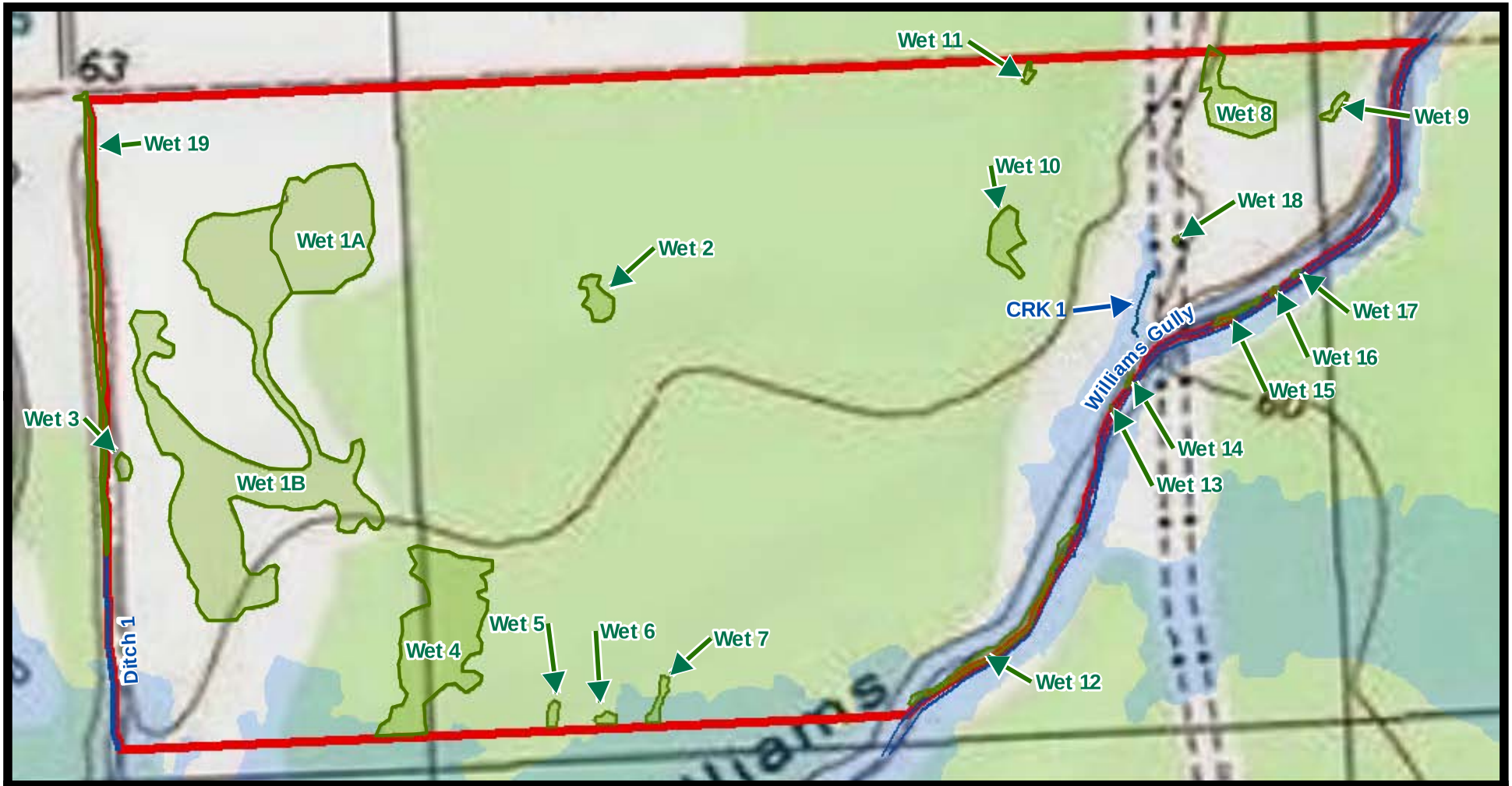

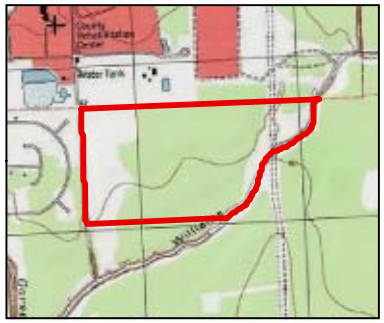

Wetlands

Water Bodies

100-Year Floodplain

N

0 500 1,000 Feet

Sources
Floodplain: TSARP, 2008
Topo: USGS, 1984

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Houston, TX 77024
Phone (713) 463-8200

Exhibit 3
Topographic Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: May 14, 2010
USGS Harmaston Quadrangle	Scale:1 in = 536 feet

J:\Projects\07-0819 Waste Mgmt\Sec 3.0 Project Information\3.4 GPS\Arcmap\EX3_100517

Protected Species Literature Review

Knudson conducted an updated review of the Texas Parks and Wildlife Department (TPWD) Natural Diversity Database (NDD) in October 2009 for existing records regarding threatened and endangered species, candidates for listing as threatened or endangered species, sensitive natural communities, and other features of concern known or suspected to occur in the Project. Additionally, U.S. Fish and Wildlife Service (USFWS) annotated county lists of rare species were referenced. In addition to the file review, the Project was evaluated for these federally-listed threatened and endangered species (Table 1) and their associated habitats during detailed field surveys. A description of each species potentially occurring within the Project is provided below.

Table 1
Federally-listed Endangered and Threatened Species
Potentially Occurring within the Project
Harris County, Texas

Common Name (Scientific Name)	**Status[1]**
Birds	
Bald eagle (*Haliaeetus leucocephalus*)	DM
Plants	
Texas prairie dawn-flower (*Hymenoxys texana*)	E

1 E = endangered, DM = Delisted Taxon, Recovered, Being Monitored First Five Years.
2 The bald eagle has been delisted. Bald eagles will continue to be regulated under the *Bald Eagle and Golden Eagle Protection Act* (USFWS, 2006).

Birds

Bald eagle (*Haliaeetus leucocephalus*) – The bald eagle is no longer federally-listed as threatened in Harris County; however, disturbances to the bald eagle will continue to be regulated under the *Bald Eagle and Golden Eagle Protection Act* (USFWS, 2006a). Bald eagles are associated with aquatic habitats (i.e., coastal areas, rivers, lakes, and reservoirs) for both breeding and wintering. Large, higher-canopy trees that are open and accessible are required for both roosting and nesting. Bald eagles nest in Texas from October to July, and the large nests are often reused for several years (Campbell, 1995). Based on review of the NDD and subsequent field investigations, no impacts to this species are anticipated as a result of construction or operation the Project.

Plants

Texas prairie dawn-flower *(Hymenoxys texana)* – Texas prairie dawn is federally-listed as endangered in Harris County. This species is a delicate annual 1 to 6 inches tall that flowers in March to early April and disappears by mid-summer. Texas prairie dawn's yellow flower heads that are less than 1/2 inch in diameter stand out brightly in the patches of dull gray, barren sand in which the species is normally found. Because this suitable habitat is limited to such a small geographic area, Texas prairie dawn was not encountered by botanists for almost 100 years after its original discovery and was thought to be extinct. It

inhabits sparsely vegetated areas ("slick spots") at the base of mima mounds ("pimple mounds") or other nearly barren areas on slightly saline soils in coastal prairie grasslands of southeast Texas (TPWD, 2007). Based on TPWD NDD file review and multiple field investigations, no known sites supporting the Texas prairie dawn occur within the Project. Additionally, no areas of suitable habitat (i.e., high sand content soils or mima mounds) were identified during field investigations. Therefore, no impacts to the Texas prairie dawn are anticipated as a result of construction or operation of the Project.

REFERENCES

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U.S. Fish and Wildlife Service. 2006a. *Draft National Bald Eagle Management Guidelines*. Arlington, Virginia: Division of Migratory Bird Management.

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October 19, 2009

Mr. Bill Martin
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

Re: Intensive Archeological Survey of
The Scanlin Property in
Harris County, Texas

Dear Mr. Martin:

The purpose of this correspondence is to clarify the June 17, 2009 submittal from Knudson, LP requesting concurrence from the Texas Historical Commission (THC) for the above referenced property. Knudson submitted a report prepared by GTI Environmental, Inc. (GTI) entitled, "*An Intensive Archeological Survey of The Scanlin Property in Harris County, Texas*" for review and comment. We have received from the Texas Historical Commission concurrence that there are "No Historic Properties Affected – Project May Proceed" and "Draft Report Acceptable" stamps dated July 15, 2009. A copy of this concurrence is attached.

The Scanlin Property, owned by Waste Management of Texas, Inc. (WM), consists of 300 acres as defined in the above referenced report. WM plans to develop a portion of the overall property as an expansion of its existing Atascocita Recycling and Disposal Facility (RDF), in addition to the proposed waste water treatment plant as described in the referenced report. The Atascocita RDF is an existing Type I municipal solid waste disposal facility, regulated by the Texas Commission on Environmental Quality (TCEQ) Permit No. 1307C.

The proposed expansion of the Atascocita RDF and proposed waste water treatment facility will be located within the 300 acre Scanlin Property. Please confirm your previous approval in the form of a letter stating the THC's acceptance and concurrence of these proposed projects.

Sincerely,

KNUDSON, LP

Carlos O. Hinojosa
Project Manager

NO HISTORIC
PROPERTIES AFFECTED
PROJECT MAY PROCEED
by _____
for Mark Wolfe
State Historic Preservation Officer
Date 11/30/09
Track# _____

Appendix: Correspondence dated June 17, 2009

cc: Chuck Rivette, P.E., Waste Management
Betsy Arriola – Knudson, LP
Katie Northrup

PN 07-0819

CONCEPTUAL COMPENSATORY MITIGATION PLAN
FOR THE
ATASCOCITA LANDFILL EXPANSION PROJECT
IN
HARRIS COUNTY, TEXAS

Prepared for:

Waste Management of Texas, Inc.
800 Gessner Road, Suite 1100
Houston, Texas 77024

Prepared by:

Knudson, LP
8588 Katy Freeway, Suite 441
Houston, Texas 77024

April 2010

Contents

Tables

Figures

Acronyms and Abbreviations

Atascocita RDF	Atascocita Recycling and Disposal Facility
$CaCO_3$	calcium carbonate
CWA	Clean Water Act
CFR	Code of Federal Regulations
FCU	functional capacity unit
HCFCD	Harris County Flood Control District
HGM	Hydrogeomorphic Model
ILF	in-lieu fee mitigation
KLP	Knudson, LP
MOA	Memorandum of Agreement
Mill Creek WMB	Mill Creek Wetland Mitigation Bank
MSW	Municipal Solid Waste
NRCS	Natural Resources Conservation Service
PEM	palustrine emergent
PFO	palustrine forested
PSS	palustrine sapling and shrub
PERM	permittee-responsible compensatory mitigation
Project	proposed approximate 190-acre parcel
SSURGO	Soil Survey Geographic Database
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
EPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
WMTX	Waste Management of Texas, Inc.

1.0 INTRODUCTION

In accordance with 40 Code of Federal Regulations ("CFR") Part 332 (40 CFR 332) of the Clean Water Act ("CWA"), the design and intent of the following draft mitigation plan is to establish a preferred alternative prior to the development of the final plan. To be considered complete, Part 332 requires specific elements. Knudson, LP ("KLP") has endeavored to incorporate those elements to the maximum extent based on presently known details. As additional information becomes available, the plan can be updated and refined to comply fully with 40 CFR 332.

This conceptual mitigation plan is presented in two broad sections:

1. Project information for the impact site

2. Required elements as identified in 40 CFR 332.4(c)

2.0 PROJECT INFORMATION

2.1 PURPOSE AND NEED

Waste Management of Texas, Inc. ("WMTX") is proposing an expansion of the existing approximate 503-acre Atascocita Recycling and Disposal Facility ("Atascocita RDF") located in Harris County, Texas. The expansion area will extend east into an approximate 190-acre ("Project") portion of a 300-acre tract (Scanlin Tract) adjacent to the Atascocita RDF owned by WMTX. The Project is located between the existing eastern permit boundary of the Atascocita RDF and Williams Gully. The Atascocita RDF landfill expansion will be authorized by the Texas Commission of Environmental Quality (TCEQ) through a major permit amendment application procedure.

WMTX proposes to expand the existing Atascocita RDF through construction of a landfill expansion, wet detention pond, perimeter drainage system, sedimentation pond (Williams Pond), two outfall structures, and realign P130-02-01 (diversion channel).

Population growth and regional demands dictate landfill needs. Service to the community must advance with the dynamic growth of Harris and surrounding counties.

The regional per capita waste disposal rate for the Year 2008 was 7.74 pounds/person/day. At this rate of waste disposal and a lack of consideration for growth in population, the Houston-Galveston Area Council (H-GAC) of Governments region will exceed the remaining MSW landfill capacity within 20 years (*Municipal Solid Waste in Texas: A Year in Review FY2008 Data Summary and Analysis*. TCEQ, 2009).

H-GAC, as mandated by the TCEQ, issued an update to its Regional Solid Waste Management Plan that was adopted by the TCEQ on May 31, 2007. As stated in this plan within Goal No. 2, H-GAC will promote the planning for adequate MSW disposal, handling, and management facilities. As part of this overall goal, H-GAC's stated objectives include: 2B) encourage development of facilities that reduce, reuse, or recycle waste materials; 2C) encourage appropriate distribution of facilities to minimize transportation costs; 2D) encourage the development of larger regional facilities to the extent practical and where such facilities would be the best alternative; and 2E) encourage expansion and redevelopment of existing MSW facilities, where feasible, over siting of new facilities. Furthermore, the H-GAC plan and the Regional Solid Waste Characterization Study authorized by H-GAC in June 2005 states that the waste generation rate for the H-GAC area ranges from about 7.09 to 8.84 pounds/person/day and the remaining MSW disposal capacity ranges from 18 to 26 years.

H-GAC acknowledges that assuring landfill capacity is an important and ongoing endeavor that needs to be addressed by both governmental and privately owned and operated facilities. As large amounts of waste will continue to be generated, the need for disposal in an adequate and proper manner is imminent.

The disposal needs of the H-GAC area require additional landfill space; project size is determined by these needs. Reduction in size of the proposed area for expansion of Atascocita RDF, or a failure to expand its capacity would result in a failure to meet the needs of the public and would reduce the service life of the facility.

2.2 ALTERNATIVES ANALYSIS

WMTX conducted searches for large-acreage tracts to service the H-GAC Texas region. For several years during the mid 1990s, the City of Houston searched unsuccessfully for new locations. Although tracts of suitable size were located, each contained impediments greater than those associated with the expansion of an existing facility. Consequently, no new Type I MSW landfills have been permitted in Harris County since 1983.

Due to limited availability of new landfill sites and a responsibility to meet the disposal needs of Harris County and surrounding areas, the H-GAC has stated their preference for the expansion of existing facilities. Approved by TCEQ, Objective 2E of the H-GAC Regional Solid Waste Management Plan is to "encourage expansion and redevelopment of existing municipal solid waste facilities, where feasible, over siting of new facilities" (*H-GAC Regional Solid Waste Management Plan, Approved TCEQ May 31, 2007*).

The selection criteria for the proposed expansion site was based on proximity to service area, size, accessibility, environmental constraints, proximity to residential development, site elements, meets future waste disposal needs, and meets H GAC Objective 2E. Four alternatives were evaluated for the Project. Descriptions of the alternatives considered are listed below.

2.2.1 Alternative No. 1 – No-Action Alternative

Alternative No. 1, the No-Action Alternative, is considered an impractical alternative due to the need for additional waste disposal area within Harris County and the surrounding H-GAC areas. Selection of Alternative No. 1 will fail to achieve the necessary expansion of the Atascocita RDF into the Project and would require the purchase of undeveloped acreage that could represent greater impacts to aquatic environments and the surrounding community. Therefore, Alternative No. 1 is considered the least practicable alternative.

2.2.2 Alternative No. 2 – Approximate 1,100-Acre Tract

Alternative No. 2 is an approximate 1,100-acre tract of undeveloped land located approximately five miles east/southeast of Bush Intercontinental Airport, west of the confluence of Garners Bayou and Greens Bayou (Figure 1). Alternative No. 2 is located in the floodway and 100-year floodplain of Greens Bayou.

Based on infrared color aerial photography, the site appears to contain an extensive amount of palustrine forested ("PFO") wetlands requiring greater impacts to waters of the U.S. and potential impacts to threatened and endangered species and cultural resources. Furthermore, new construction would contradict the H-GAC preference for the expansion of an existing facility. Therefore, Alternative No. 2 is considered a less practicable alternative.

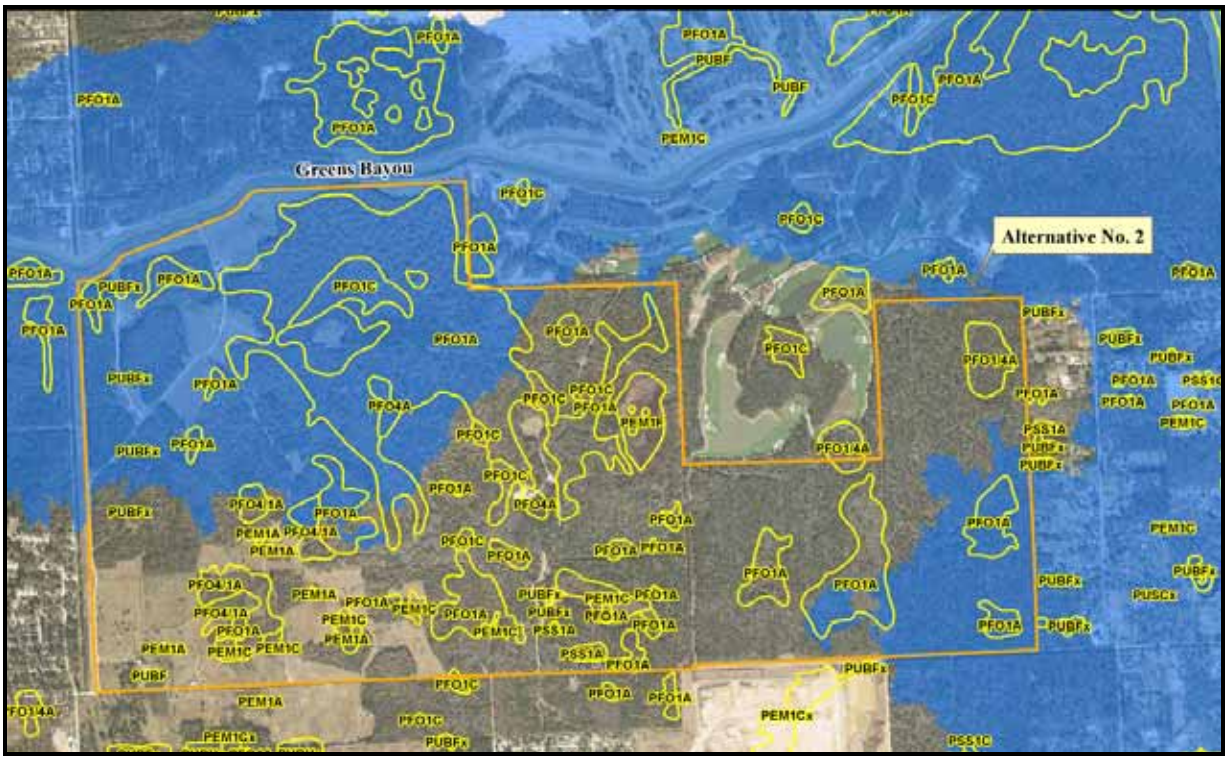

Figure 1: Alternative No. 2 – Approximate 1,100-acre Tract.

2.2.3 Alternative No. 3 – Approximate 300-Acre (Scanlin) Tract

Alternative No. 3 involves the build out of the Scanlin tract (300 acres) owned by WMTX (Figure 2). The MSW design would encroach upon the TCEQ minimum 125-foot buffer between the waste disposal area and the proposed MSW permit boundary. In addition, this alternative would significantly increase impacts to waters of the U.S., involve fill within the 100-year floodplain of Garners Bayou and Williams Gully, and reduce the buffer between the waste disposal area and Garners Bayou, Williams Gully, and other developments. Therefore, Alternative No. 3 is considered a less practicable alternative.

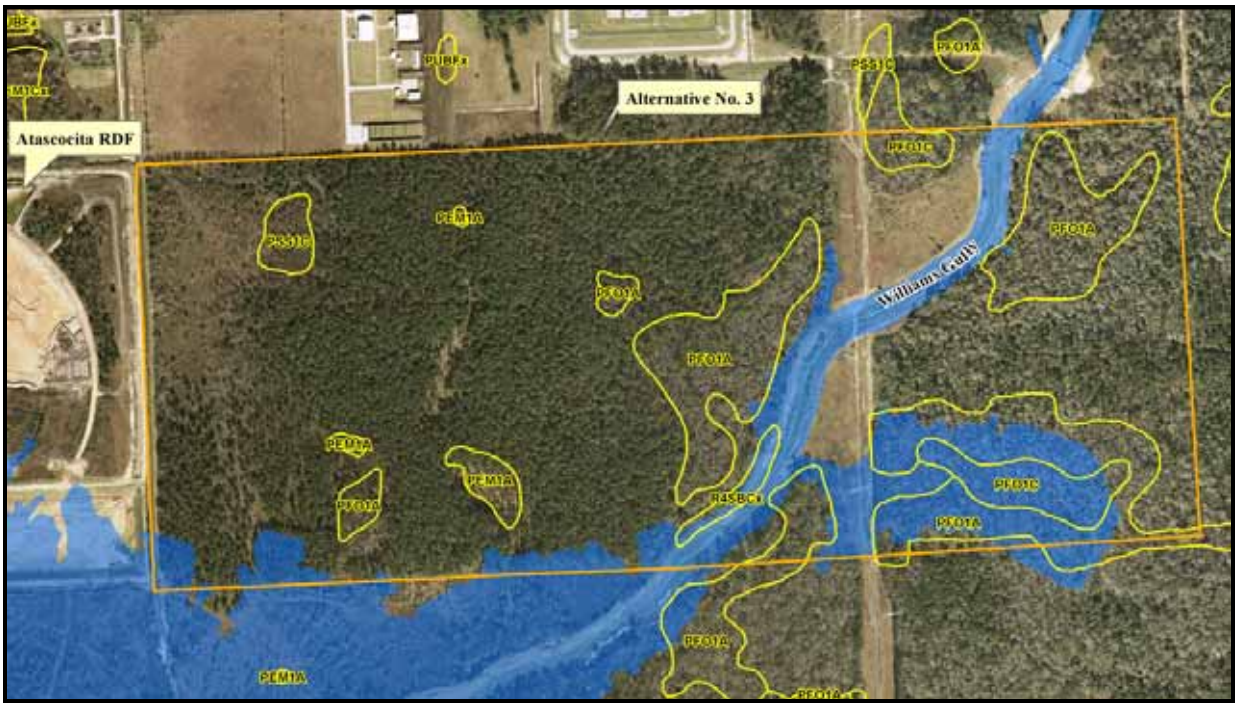

Figure 2: Alternative No. 3 – Approximate 300-acre Tract.

2.2.4 Alternative No. 4 – Approximate 190-Acre (Project) Tract

Alternative No. 4 is an approximate 190-acre tract located between the existing eastern MSW permit boundary of the Atascocita RDF and Williams Gully (Figure 3). Approximately 170 acres of the site would be incorporated into the existing approximate 503-acre Atascocita RDF requiring modification of the current TCEQ permitted waste disposal area. The Project would result in 17.95 acres of permanent impacts to waters of the U.S., including wetlands.

The expansion area would provide ample space for on-site facilities and is located outside of the 100-year floodplain of Garners Bayou and Williams Gully. Alternative No. 4 complies with the H-GAC preference toward the expansion of an existing facility as opposed to construction of a new facility. Alternative No. 4 demonstrates avoidance and minimization of impacts to waters of the U.S., including wetlands. Therefore, Alternative No. 4 is considered the most practical and practicable alternative for the Project.

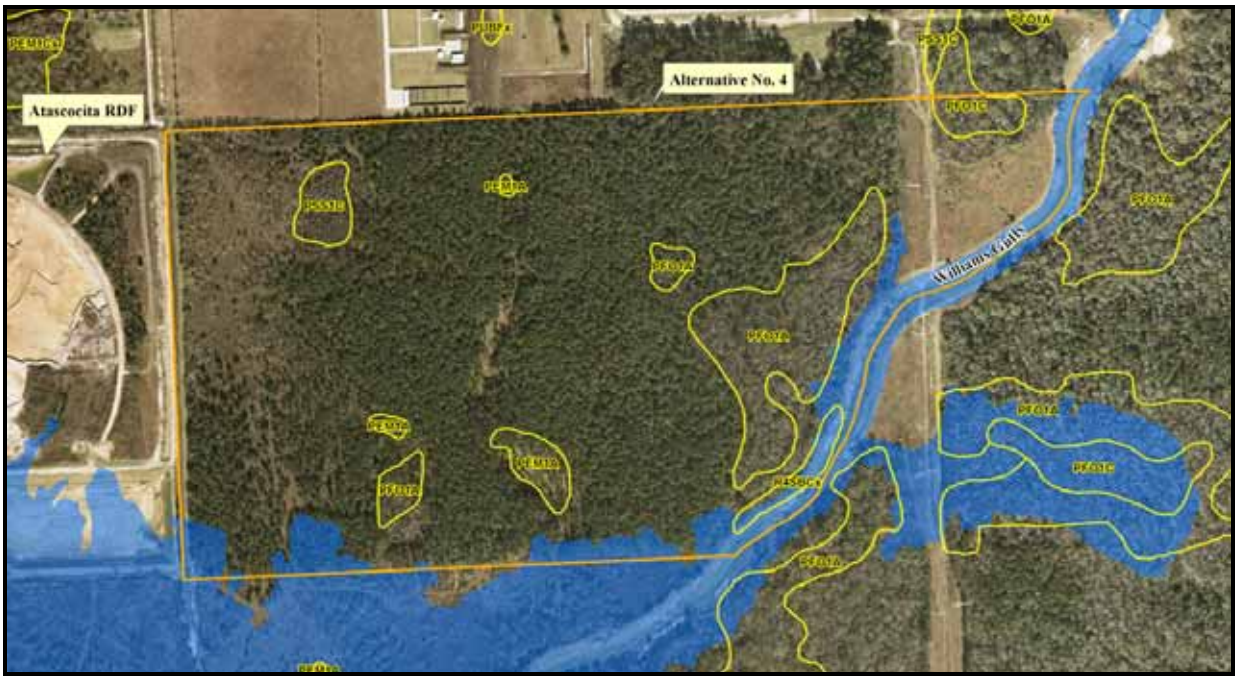

Figure 3: Alternative No. 4 – Approximate 190-acre Tract.

2.2.5 Alternative Analysis Evaluation Summary

Criteria used for selection of the 190-acre tract were based on the following critical elements: (1) proximity to service area, (2) size, (3) accessibility, (4) environmental constraints, (5) proximity to residential development, (6) site elements, (7) meets future waste disposal needs, and (8) meets H-GAC Objective 2E.

Criteria used for selection of each element were given a score of 1 (Yes) or 2 (No).

- Proximity to service area was determined by adjacency to the H-GAC area.
- Size score was determined by alternatives that could accommodate all facilities required for the Project.
- Accessibility score was determined based on the alternative's access to a major thoroughfare.
- Environmental constraints score was determined based on impediments (i.e., hazardous materials, wetlands [does not include open waters], threatened and endangered species, historical resources, etc.,) that would not impact the amount of developable acreage.
- Proximity to development was determined by existing and planned residential/commercial development that would provide adequate buffering.
- Site elements provide an efficient site plan based on existing features and amount of undevelopable acreage.
- Meets future waste disposal needs for HGAC area.
- Meets H-GAC Objective 2E to encourage expansion and redevelopment of existing MSW facilities, where feasible, over siting of new facilities.

See the Table 1 below for the analysis of the alternatives.

Table 1
Alternative Analysis of Potential Actions
Harris County, Texas

Criteria (1 = Yes, 2 = No)	No Action Alternative (No Action)	Alternative No. 2 (1,100-acre Tract)	Alternative No. 3 (300-acre Tract)	Alternative No. 4 (190-acre Tract)
Proximity to service area	1	1	1	1
Size	2	2	1	1
Accessibility	1	2	1	1
Environmental constraints	1	2	2	1
Proximity to development	2	1	2	1
Site elements	2	2	2	1
Meets future waste disposal needs	2	1	1	1
Meets H-GAC Objective 2E	2	2	1	1
Total	**13**	**13**	**11**	**8**

2.3 PROJECT SITE DESCRIPTION

The Project is an approximate 190-acre tract located approximately 3 miles southeast of Humble, Harris County, Texas, off Wilson Road near the confluence of Williams Gully and Garners Bayou (Wetland Delineation, Appendix A, Exhibit 1). The Project is situated on a nearly level to gently undulating landscape within an area under silvicultural management. The Project is located on the Harmaston, Texas, United States ("U.S.") Geological Survey ("USGS") 7.5-minute series topographic quadrangle map. The approximate geographic coordinates at the centermost point are latitude 29º 57′ 1.72″ and longitude 95º 13′ 28.78″. Topographic and aerial-based map excerpts depicting the Project are provided in Appendix A of the Wetland Delineation Report.

The Project is fenced along the northern boundary. Williams Gully and Harris County Flood Control District ("HCFCD") ditch P130-02-01 define the eastern and western boundaries, respectively. The adjacent property defining the southern boundary is under silvicultural management.

The nearly level site slopes gently south-southeast to Williams Gully and contains subtle convex and concave landscape features. Previously, the central portion of the Project was predominantly pine forest with hardwoods growing along Williams Gully. These areas have subsequently been harvested as part of the silvicultural operations.

Prior to timber harvest, closed, depressional meadows scattered within portions of the former pine forest exhibited a predominance of native grasses. A meadow that previously comprised the westernmost portion of the Project has transitioned to sapling, shrub, and salt marsh species. The eastern portion of the Project contains meadows of native grasses, occasional shrubs, pine-hardwood forest, and forested wetlands.

HCFCD P130-02-01, which forms the western boundary of the tract, flows from north to south and drains into Williams Gully. Originating near Atascocita Road, P130-02-01 was previously routed to Williams Gully in a series of linear channels. P130-02-01 is now comprised of roadside borrow ditches designed to carry stormwater runoff from the Harris County Correctional Facility's wastewater treatment plant located approximately 600 feet north of the Project. At Williams Gully, overlying spoil obstructs the backslope drain/culvert of P130-02-01.

All aquatic resources to be impacted by the Project have been identified according to Cowardin, et al., (1979), evaluated using the 2008 Atlantic and Gulf Coastal Plain Interim Regional Supplement to the Corps of Engineers Wetland Delineations Manual (1987), and classified according to the most recent U.S. Army Corps of Engineers ("USACE") and U.S. Environmental Protection Agency ("EPA") joint guidance.

The Project, as proposed, will impact approximately 650 feet of P130-02-01, 0.83 acre of palustrine emergent ("PEM") wetlands, 0.42 acre of palustrine sapling/shrub ("PSS") wetlands, and 16.70 acres of palustrine forest ("PFO") wetlands.

3.0 MITIGATION PLAN 40 CFR 332.4 (c)

3.1 OBJECTIVES

The objective of the mitigation plan is to provide for the replacement of the physical, biological, and chemical functions of wetlands and other aquatic resources impacted by the Project. The conceptual mitigation plan is designed to compensate for impacts totaling 17.95 acres of jurisdictional waters of the U.S., including wetlands, which includes: 16.70 acres of PFO wetlands, 0.42 acre of PSS wetlands, and 0.83 acre of PEM wetlands.

Mitigation for unavoidable impacts to wetlands will be resolved through the purchase of wetland credits from the Mill Creek Wetland Mitigation Bank ("Mill Creek WMB"), a U.S. Army Corps of Engineers – Galveston District approved mitigation bank.

Each wetland proposed to be impacted within the Project was subjected to a hydrogeomorphic ("HGM") model evaluation to determine the functional capacity unit ("FCU") scores for each physical, biological, and chemical function. Physically modifying elements at the Mill Creek WMB that comprise the HGM variables will enhance those wetlands by providing a "lift" in functional capacity above the current capacity. The lift generated by enhancement and creation of wetlands at the Mill Creek WMB will provide compensatory mitigation functioning at a higher capacity than that which currently exists within the Project.

Table 2
Summary of Impacted Wetlands
Functional Capacity Units

	Physical	Biological	Chemical	Totals
PFO	3.93	9.64	6.10	**19.67**
PSS	0.11	0.28	0.12	**0.51**
PEM	0.66	0.58	0.46	**1.70**
Totals	**4.70**	**10.50**	**6.68**	**21.88***

***** The overall sum of 21.88 is rounded up to 21.9

In the absence of any proactive land management practices, Chinese tallow (*Sapium sebiferum*) presently encroaches upon a large percentage of the wetlands within the Project with scrub-shrub and herbaceous or emergent habitats being likely candidates for its aggressive domination. Table 2 provides a breakdown of the functional capacities of impacted wetlands.

In the post-development condition, the diversion channel will redirect the stormwater runoff from the adjacent properties north of the Project to the east, which outfalls into Williams Gully. Totaling approximately 4,650 feet, the realignment of ditch P130-02-01 (diversion channel) will constitute a net increase in length of approximately 4,000 feet. Additional channel length and a shallower upstream

outfall into Williams Gully will allow for a gentler slope to be established in the diversion channel, reducing the opportunity for erosion and increasing ponding effects of riffle and pool stream structures. The low flow wastewater outflow from the adjacent correctional facility that currently flows through the existing channel will be diverted to the diversion channel.

3.2 SITE SELECTION

The mitigation rule from the USACE and EPA (40 CFR 322) requires evaluation of mitigation alternatives with a stated preference for mitigation banks, in lieu fee ("ILF") mitigation, and permittee-responsible compensatory mitigation ("PERM"). Although not located within the same watershed, the Project is located within the service area of the Mill Creek WMB. Due to the current status (reserved, sold out, suspended, etc.,) of approved mitigation banks servicing the Galveston District, the Mill Creek WMB is the only practical and practicable mitigation banking option for the Project. WMTX proposes to purchase 32.9 FCU credits at the Mill Creek WMB to compensate for unavoidable impacts to 17.95 acres of wetlands.

3.2.1 Mitigation Banks

During previous permitting actions, the Project experienced a multitude of setbacks which included permit withdrawal, regulatory changes, and floodplain alteration (a result of the Tropical Storm Allison Recovery Project). During that time, WMTX had discussed the purchase of wetland credits from the Greens Bayou Wetland Mitigation Bank (GBWMB) and/or Katy-Cypress Wetland Mitigation Bank (KCWMB), both with available credits for purchase at the time. Currently, GBWMB and KCWMB have reserved (not sold) their remaining credits for other proposed projects. Due to these circumstances, the Mill Creek WMB is the only practical and practicable mitigation banking option for the Project; therefore, WMTX proposes to purchase the required credits from Mill Creek WMB.

The conceptual wetland mitigation plan entails the purchase of 32.9 FCU credits at the Mill Creek WMB (bank number MB022) to mitigate for 17.95 acres of wetland impacts. Because the Project is located outside the primary service area of Mill Creek WMB, a 1.5 multiplier is applied to the 21.9 FCU credits of impacted wetlands to total 32.9 FCU credits. Compensation for wetland impacts associated with the Project will be resolved according to the 2008 Memorandum of Agreement ("MOA") between the Mill Creek WMB and members of the Mitigation Bank Review Team, which consists of the USACE, EPA, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Texas Parks and Wildlife Department, Texas General Land Office, and the Texas Commission on Environmental Quality.

3.2.2 In-Lieu Fee Mitigation

Should coordination efforts through Mill Creek WMB be unsuccessful, the applicant has discussed ILF mitigation alternatives with Legacy Land Trust for the Project.

3.2.3 Permittee-Responsible Compensatory Mitigation

There will be no need for permittee-responsible compensatory mitigation on this Project.

3.3 SITE PROTECTION INSTRUMENT

The Mill Creek WMB is an existing bank authorized in June 2008. It is operated by Larry Gremminger of Gremminger and Associates, Inc., and sponsored by Wetlands Conservation Partners.

3.4 BASELINE INFORMATION

The Mill Creek WMB baseline information was collected during the HGM as required in the MOA.

The descriptions of aquatic resources within the Project are provided in Section 2.0, Project Information, of this mitigation plan. Baseline information for the Project is described below.

3.4.1 Project Site Hydrology

Hydrology within the Project is driven by direct precipitation rather than by subsurface water movement. Overall, the site is relatively level with minor topographical relief. Level topography impedes rapid removal of stormwater. Consequently, precipitation falling on site is slow to be removed through soil percolation or surface conveyance. Two relatively permanent natural drainageways within the vicinity include Williams Gully (eastern Project boundary) and Garners Bayou to the southwest.

Along the western bank of Williams Gully lies a hardwood area with a slight eastern gradient to the general north-south drainage characteristic of the western parcel. Hydrology within this bottomland area appears to be controlled by a natural phenomenon through which Williams Gully is creating subsurface drainage. This natural condition creates a drainage pattern sufficient to prevent the development of characteristic wetland hydrology parameters.

The HCFCD P130-02-01 drainage channel along the western Project boundary receives precipitation runoff from surrounding upstream developed areas and discharges associated with a water treatment plant that services the adjacent Harris County correctional facility.

3.4.2 Project Site Soils

Harris County is in the Western Gulf section of the Coastal Plain (Aronow). The uppermost formations from which parent materials of the soils in the County weathered are of Pliocene, Pleistocene, and Holocene in age. These formations originally consisted of fluvial, deltaic coastal marsh, and lagoonal soil materials and shallow sea deposits. Among the geologic and geomorphic features in the County are

sedimentary deposits broken by normal faults, salt domes, pimple mounds, non-draining depressions, and scarps.

According to the Soil Survey Geographic Database ("SSURGO") database, Harris County, Texas, issued August 25, 1999, by the U.S. Department of Agriculture ("USDA") Natural Resources Conservation Service ("NRCS"), soils mapped on this site included the Addicks, Aldine, Bernard, Edna, and Gessner series. Intensive investigations performed on December 10, 2002, and January 20 – 22, 2003, confirmed the presence of Aldine-like, Beaumont, Bernard-like, Edna-like, and Lake Charles soils (Touchet, 2003). Soils of the Addicks and Gessner series were not detected in field evaluation.

Re-investigation of 10 representative soil stations (four hydric and six non-hydric soils) revealed that soil colors vary slightly from documented soils observed during the 2003 delineations. Although slight matrix color variations within soil map units are common, current vegetative succession on the site indicates that the site is becoming drier, even considering recent years of well above average rainfall.

The Project Area consists of soils developed in the Pleistocene-Montgomery formation in fluvial deposits with pimple mounds and non-draining or closed depressions and in clayey deposits (Touchet, 2003).

Both the fluvial and clayey deposits on the site were originally rich in lime that was weathered and translocated into the sub-soils and now occurs as calcium carbonate ("$CaCO_3$") concretions. Bioturbation, principally crawfish, actively recycle the carbonate to the surface layer of the soils. Pale streaks in the surface layer are attributed to this process.

OBSERVED SOILS

Aldine-like soils occur on both normal, slightly convex landscapes and in concave, closed depressions. On normal, slightly convex landscape positions, there are dark grayish fine sandy loam surface layers 4 to 8 inches thick on grayish-brown to dark grayish-brown fine sandy loam sub-surface layers 4 to 22 inches thick that overlie grayish-brown and light brownish-gray sandy clay loam sub-soils with $CaCO_3$ concretions. Aldine-like soils on the normal, slightly convex landscape have chromas of 2 with no mottles, are non-hydric, and classify as Aquic Hapludalfs or Typic Hapludalfs. These soils have negative wetland hydrology, but some areas contain a predominance of hydrophytic vegetation (Touchet, 2003).

The Aldine-like soils that occur in concave, closed depressions have dark gray to gray fine sandy loam surface layers 5 to 7 inches thick on top of gray fine sandy loam subsurface layers 6 to 15 inches thick that overlie gray sandy clay loam sub-soils with $CaCO_3$ concretions. These soils have chromas of 1, are hydric, and classify as Typic Ochraqualfs and Typic Glossaqualfs. Some areas have positive wetland hydrology, while some have negative wetland hydrology. Vegetation within these concave, closed depressions is represented by a predominance of hydrophytic species.

Beaumont soils occur in concave, closed depressions and have dark gray to gray silty clay loam surface layers 5 to 7 inches thick on top of gray silty clay sub-soils. These soils have chromas of 1, are hydric, and classify as Typic Epiaquerts. Some areas have ponded wetland hydrology while some areas lack positive wetland hydrology. Hydrophytic vegetation is predominant only in ponded areas.

Bernard-like soils occur on normal, slightly convex topography and have very dark gray to very dark grayish-brown fine sandy loam surface layers ranging from 10 to 14 inches thick that overlie dark grayish-brown to grayish-brown sandy clay loam sub-soils with $CaCO_3$ concretions. These soils have chromas of 2 with no mottles, are not hydric, and classify as Typic Argiudolls and Aquic Argiudolls. Although these soils lack wetland hydrology, most areas indicate a predominance of hydrophytic vegetation.

Edna-like soils occur on normal, slightly convex landscapes, mounds, and concave, closed depressions. They are very similar to the Aldine-like soils. On normal and slightly convex landscapes, Edna-like soils have gray fine sandy loam to silty clay loam surface layers 4 to 6 inches thick on top of grayish-brown fine sandy loam to silty clay loam sub-surface layers 0 to 10 inches thick that overlie grayish-brown sandy clay loam sub-soils with $CaCO_3$ concretions. These soils have chromas of 2 with no mottles, are non-hydric, and classify as Vertic Hapludalfs, Typic Hapludalfs, and Aquic Hapludalfs. These soils lack wetland hydrology and can demonstrate a predominance of both hydrophytic or non-hydrophytic vegetation.

Edna-like soils that occur in concave, closed depressions have dark gray to gray fine sandy loam to silty clay loam surface layers 4 to 9 inches thick on top of gray fine sandy loam to silty clay loam sub-surface layers 0 to 17 inches thick that overlie gray to dark gray sandy clay loam to silty clay loam sub-soils with $CaCO_3$ concretions. These soils have chromas of 1, are hydric, and classify as Vertic Albaqualfs, Typic Haplaqualfs, and Typic Ochraqualfs. Most of these areas exhibit positive wetland hydrology, although a few do exhibit negative indicators of wetland hydrology. Vegetation in these concave, closed depressions consists of a predominance of hydrophytic species.

Lake Charles soils occur on normal, slightly convex landscape positions and have very dark gray to very dark grayish-brown silty clay loam to silty clay surface layers 5 to 8 inches thick on top of very dark grayish-brown to grayish-brown silty clay and clay sub-soils with $CaCO_3$ concretions. These soils have chromas of 2, are non-hydric, and classify as Typic Hapluderts. Wetland hydrology is negative, but the hardwood forest on these soils contains a predominance of hydrophytic vegetation.

3.4.3 Project Site Vegetation

The majority of the tract consisted of upland forest until 2008, at which time silvicultural activities commenced, harvesting a majority of the merchantable pine and hardwoods. Scattered within the former

upland forest are closed, depressional wetlands and meadows that exhibit a predominance of native grasses. The following habitat descriptions represent the vegetative cover observed prior to the timber harvest of 2008.

Typical tree, shrub, and vine species observed within upland forests in 2008 include loblolly pine (*Pinus taeda*), water oak (*Quercus nigra*), sweet gum (*Liquidambar styraciflua*), Chinese tallow, American holly (*Ilex opaca*), yaupon holly (*I. vomitoria*), dwarf palmetto (*Sabal minor*), wax myrtle (*Myrica cerifera*), American beautyberry (*Callicarpa americana*), Alabama supple-jack (*Berchemia scandens*), and southern dewberry (*Rubus trivialis*).

While the woody species' canopy cover is generally heavy enough to shade out herbaceous species within heavily wooded areas, interspersed wetland and upland meadows tend to be dominated by bushy bluestem (*Andropogon glomeratus*) and chalky bluestem (*Andropogon virginicus* var. *glaucus*). Occasional stands of eastern false willow (*Baccharis halimifolia*) and Gulf cordgrass (*Spartina spartinae*) occur within the meadows. Chinese tallow and Gulf cordgrass continue to encroach into these meadows.

Typical forested wetlands within the Project are dominated by green ash (*Fraxinus pennsylvanica*), loblolly pine, water oak, sweet gum, green hawthorn (*Crataegus viridis)*, sugarberry (*Celtis laevigata*), slender woodoats, (*Chasmanthium laxum*), Cherokee sedge (*Carex cherokeensis*), soft rush (*Juncus effusus*), and American elm (*Ulmus americana*). Currently, these areas are being encroached upon by Chinese tallow.

Situated in the western section of the Project is a large forested wetland and upland meadow which exhibits a predominance of the halophytic species, eastern false willow and Gulf cordgrass. Appearing in greater abundance since the site visits of 2003 is the readily adaptive Chinese tallow. Also of note, yaupon holly is now in evidence along perimeters of the saline area.

The herbaceous vegetation observed within P130-02-01 along the western boundary is common to similarly maintained ditches throughout the region. Areas within P130-02-01 exhibiting indicators of wetland hydrology are dominated by bull tongue arrow head (*Sagittaria lancifolia*), alligator weed (*Alternanthera philoxeroides*), and swamp smartweed (*Polygonum hydropiperoides*). Those areas lacking indicators of wetland hydrology are dominated by common Bermuda grass (*Cynodon dactylon*) and St. Augustine grass (*Stenotaphrum secundatum*).

The eastern portion of the Project consists of upland meadow, upland forest (pre-harvest), and forested wetland. The upland meadow community is dominated by chalky bluestem, Bermuda grass, annual marsh elder (*Iva annua*), and woolly croton (*Croton capitatus*), with occasional stands of eastern false willow, salt cedar (*Tamarix gallica*), and yaupon holly.

3.5 DETERMINATION OF CREDITS

An HGM was conducted on-site to determine the functional capacity of wetlands. Analysis of the functional capacity of wetlands provides a target functional value. By replacing, at a minimum, the same amount of FCUs being impacted, created/enhanced wetlands are designed to function at the same or greater capacity as impacted wetlands. However, because the Project is located outside the primary service area of Mill Creek WMB, a 1.5 multiplier is applied to the 21.9 FCU credits of impacted wetlands to total 32.9 FCU credits. Efforts carried out by the Mill Creek WMB will provide an overall wetland functional capacity that exceeds that of the Project site as previously existed. Therefore, the preferred mitigation option for this Project is the purchase of 32.9 FCUs credits from the Mill Creek WMB.

3.6 MITIGATION WORK PLAN

Mitigation accomplished through the Mill Creek WMB will be implemented according to the Mill Creek WMB MOA.

3.7 MAINTENANCE PLAN

A maintenance plan has been prepared for Mill Creek WMB as part of the MOA approval process.

3.8 PERFORMANCE STANDARDS

Performance standards are established for Mill Creek WMB through the approved MOA.

3.9 MONITORING REQUIREMENTS

Monitoring requirements are established for Mill Creek WMB through the approved MOA.

3.10 LONG-TERM MANAGEMENT PLAN

A long-term management plan has been established for Mill Creek WMB through the approved MOA.

3.11 ADAPTIVE MANAGEMENT PLAN

An adaptive management plan is not appropriate in the context of mitigation bank use. FCU credits are debited at a specific time based on the assessment protocol established in the MOA. No adaptive management should be required for the Mill Creek WMB component of this mitigation plan.

No other foreseeable logistics or technical issues are known at this time.

3.12 FINANCIAL ASSURANCES

For the Mill Creek WMB, applicants are charged a fee based on the FCUs impacted within a project. The HGM is used to determine the debit. Proposed wetland impacts are calculated to require the purchase of 32.9 FCUs of mitigation credits.

4.0 REFERENCES

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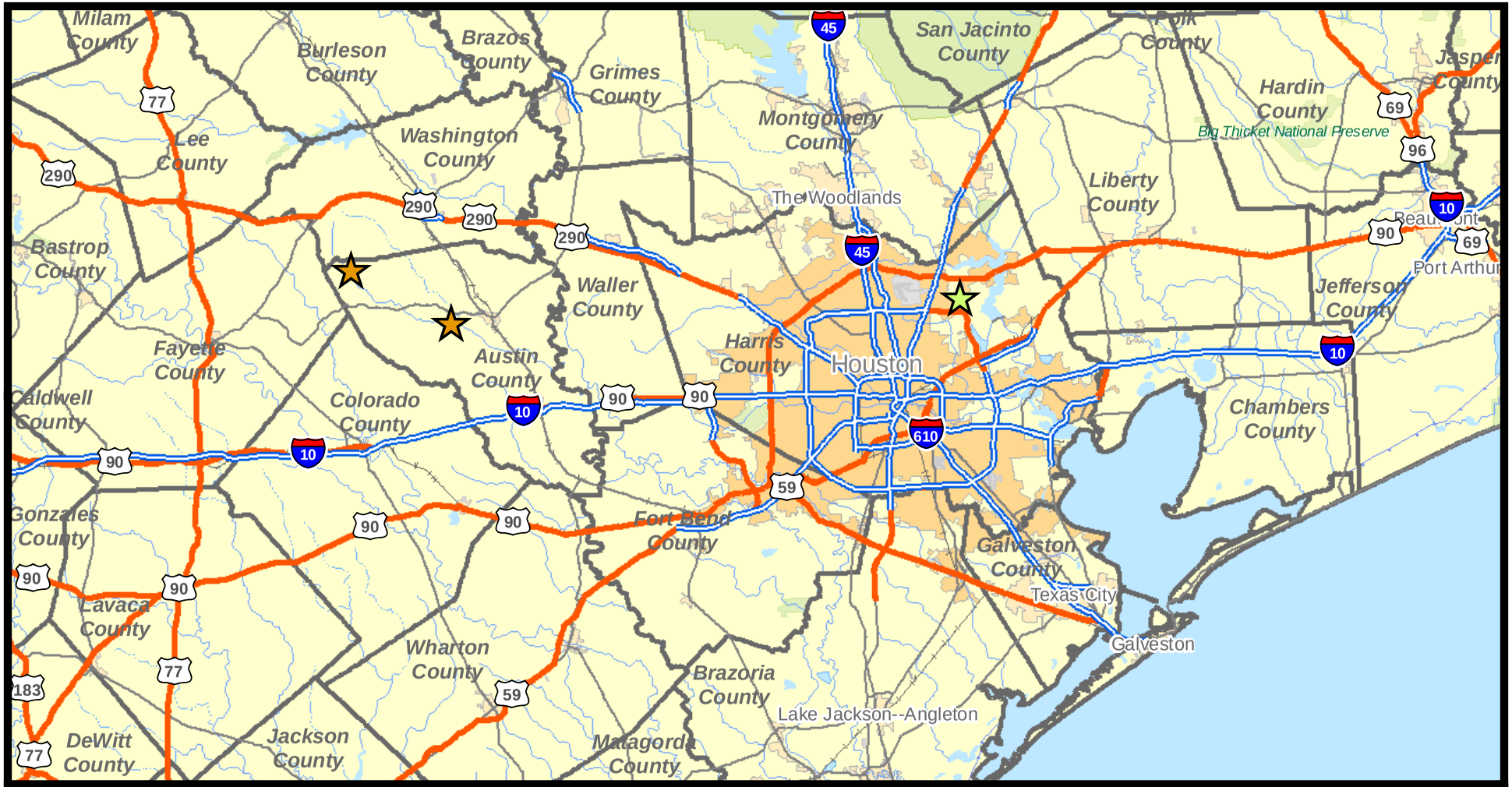

Source: ESRI Data & Maps 9.3

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Phone (713) 463-8200

Proposed Mitigation Vicinity Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: May 27, 2010
ESRI Data & Maps 9.3	Scale:1 in = 20 miles

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HYDROGEOMORPHIC ASSESSMENT
FOR THE
ATASCOCITA LANDFILL EXPANSION PROJECT
IN
HARRIS COUNTY, TEXAS

Prepared for:

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April 2010

Contents

Acronyms and Abbreviations

Manual	1987 Corps of Engineers Wetlands Delineation Manual
Supplement	2008 Interim Regional Supplement for the Atlantic and Gulf Coastal Plain
Atascocita RDF	Atascocita Recycling and Disposal Facility
$CaCO_3$	calcium carbonate
°F	degrees Fahrenheit
dbh	diameter at breast height
DGPS	differentially-corrected global positioning system
FCI	functional capacity index
FCU	functional capacity unit
FEMA	Federal Emergency Management Agency
HCFCD	Harris County Flood Control District
HGM	hydrogeomorphic model
Knudson	Knudson, LP
MOA	Memorandum of Agreement
Mill Creek WMB	Mill Creek Wetland Mitigation Bank
NAI	Northrup Associates, Inc.
NRCS	Natural Resources Conservation Service
PEM	palustrine emergent
PFO	palustrine forested
PSS	palustrine sapling and shrub
Project	proposed approximate 190-acre parcel
SSURGO	Soil Survey Geographic Database
U.S.	United States
TPWD	Texas Parks and Wildlife Department
USACE	U.S. Army Corps of Engineers
Galveston District	USACE, Galveston District
USGS	U.S. Geological Survey
WMTX	Waste Management of Texas, Inc.
WAA	Wetland Assessment Area

EXECUTIVE SUMMARY

Waste Management of Texas, Inc. ("WMTX") is proposing an expansion of the existing approximate 503-acre Atascocita Recycling and Disposal Facility ("Atascocita RDF") located in Harris County, Texas. The expansion area will extend east into an approximate 190-acre ("Project") portion of a 300-acre tract ("Scanlin Tract") owned by WMTX and lies adjacent to the existing Atascocita RDF. The Project is located between the existing eastern permit boundary of the Atascocita RDF and Williams Gully. The Atascocita RDF landfill expansion will be authorized by the Texas Commission of Environmental Quality ("TCEQ") through a major permit amendment application procedure.

Between December 2002 and January 2003, Northrup Associates, Inc. ("NAI") conducted a preliminary jurisdictional determination and delineation of waters of the United States ("U.S."), including wetlands, on the Project using the Environmental Laboratory *1987 Corps of Engineers Wetlands Delineation Manual* ("Manual"). All studies were acknowledged and verified by the U.S. Army Corps of Engineers ("USACE"), Galveston District ("Galveston District") on May 14, 2003. The Galveston District issued an approved determination [D-5292] for the Project. This determination expired on May 14, 2008.

A more recent delineation of waters of the U.S., including wetlands, was conducted on the Project between August 3 and September 16, 2009, in response to a Galveston District request for additional information. Specifically, the Galveston District requested in a letter dated July 2, 2009, a wetland delineation be conducted per the Manual and the Environmental Laboratory *2008 Interim Regional Supplement for the Atlantic and Gulf Coastal Plain* ("Supplement").

Within the Project there are approximately 17.95 acres of proposed wetland impacts. These wetlands consist of approximately 0.83 acres are palustrine emergent ("PEM") wetlands, 0.42 acre is palustrine sapling and shrub ("PSS") wetlands, and 16.70 acres are palustrine forested ("PFO") wetlands. As of March 2010, no approved determination has been issued and a preliminary jurisdictional determination has been requested; however, the wetland types have not been finalized.

Impacts to wetlands from the Project will be mitigated through the Mill Creek Wetland Mitigation Bank ("Mill Creek WMB"). WMTX recognizes the importance of not only wetland functions and preservation, but also the goals of the Mill Creek WMB accomplished by creation and restoration of previously-existing wetlands that are currently croplands.

The Galveston District requested that the Riverine Forested and Herbaceous/Shrub Interim Hydrogeomorphic ("HGM") functional assessments be conducted on the Project to establish the wetland functional capacity of waters of the U.S. Additionally, an HGM analysis was previously conducted at

Mill Creek WMB to determine the functional capacity of wetlands located within the mitigation bank. Due to silvicultural activities within the Project, the Galveston district recommended using the 2003 wetland delineation data to complete the HGM analyses. For the additional wetlands identified during the 2009 delineation to the Supplement standards, the HGM will be conducted using the newer information.

The following wetland functions were assessed during this investigation:

- Temporary storage and detention of surface water
- Maintenance of plant and animal community
- Removal and sequestration of elements and compounds

Based on the results of the HGM, the Wetland Assessment Area ("WAA") pre-Project impacts, exhibited the greatest Functional Capacity Indices ("FCI") across all WAAs. However, the relatively lower FCIs of the PFO WAAs indicate the lower grading variables (i.e., duration, frequency, mast producing trees, richness, herbaceous, etc.) due to conditions observed within each WAA. After implementation of the Project the Project Area will no longer contain wetlands; therefore, a post-Project impact analysis is not necessary. The Functional Capacity Units ("FCU") of the WAAs were higher in some impacted WAAs due to larger acreages associated with that WAA.

Based on the results of the HGM, there are approximately 21.9 FCUs of impacted wetlands within the Project. Because the Project is located outside the primary service area of Mill Creek WMB, a 1.5 multiplier is applied to the 21.9 FCU credits of impacted wetlands to total 32.9 FCU credits. Compensation for wetland impacts associated with the Project will be resolved according to the 2008 Memorandum of Agreement ("MOA") between the Mill Creek WMB and members of the Mitigation Bank Review Team, which consists of the USACE, EPA, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Texas Parks and Wildlife Department, Texas General Land Office, and the Texas Commission on Environmental Quality.

1.0 INTRODUCTION

WMTX currently owns an approximate 300-acre tract located north of the confluence of Williams Gully and Garners Bayou near Humble, Harris County, Texas (Appendix A, Exhibit 1). WMTX is proposing expansion of the existing Atascocita RDF onto the adjacent Project within the 300-acre property. WMTX is currently borrowing soil from an adjacent tract to provide cover material for the landfill. As additional cover material is needed, WMTX is proposing to expand the existing borrow pit. Excavation will continue eastward through the existing, channelized ditch that forms the western boundary of the Project Area and onto the parcel. The Project Area will be excavated during the borrow pit expansion and subsequently filled during future landfill expansions. The Project can be found on the Harmaston, Texas, U.S. Geological Survey ("USGS") 7.5-minute topographic map (Appendix A, Exhibit 2). The Project is located at approximately N 29°57'01.72" Latitude; W 95°13'28.78" Longitude.

Historical use of the Project has principally been for silvicultural operations. The most recent timber harvesting activities occurred within the Project in 2008. WMTX intends to expand the borrow pit to the Project Area through various stages over a period of approximately 20 to 25 years.

Between December 2002 and January 2003, NAI conducted a preliminary jurisdictional determination and delineation of waters of the U.S., including wetlands, on the Project using the Manual. All studies were acknowledged and verified by the Galveston District on May 14, 2003. The Galveston District issued an approved determination [D-5292] for the Project. This determination expired on May 14, 2008.

The Project is nearly level but slopes gently south-southeast toward Williams Gully with both convex and concave landscape positions noted within Project boundaries. The majority of elevation ranges from approximately 59 to 62 feet above sea level.

A more recent delineation of waters of the U.S., including wetlands, was conducted on the Project between August 3 and September 16, 2009, in response to a Galveston District request for additional information. Specifically, the Galveston District requested in a letter dated July 2, 2009, a wetland delineation be conducted per the Manual and the Supplement.

All aquatic resources to be impacted by the Project have been identified according to Cowardin, et al., (1979), evaluated using the Supplement to the Manual, and classified according to the most recent USACE and U.S. Environmental Protection Agency ("EPA") joint guidance.

Results of the most recent delineation of waters of the U.S., including wetlands, within the Project revealed approximately 17.95 acres of potentially jurisdictional, impacted wetlands, of which approximately 0.83 acres of are PEM wetlands, 0.42 acre of are PSS wetlands, and 16.70 acres of are

PFO wetlands. As of March 2010, no approved determination has been issued and a preliminary jurisdictional determination has been sought.

Impacts to wetlands from the Project will be mitigated through the Mill Creek WMB. WMTX recognizes the importance of not only wetland function and preservation, but also the goals of the Mill Creek WMB accomplished by creation and restoration of previously-existing wetlands that are currently croplands.

The Galveston District suggested the Riverine Forested and Herbaceous/Shrub Interim HGM functional assessments be conducted on the Project to establish the wetland functional capacity of waters of the U.S., including wetlands. Additionally, an HGM analysis was previously conducted at Mill Creek WMB to determine the functional capacity of wetlands located within the bank. Due to silvicultural activities within the Project, the Galveston district recommended using the 2003 wetland delineation data to conduct the HGM analyses. For the additional wetlands identified during the 2009 delineation based on the Supplement standards, the HGM will be conducted using the newer information.

The following wetland functions were assessed during this investigation:

- Temporary storage and detention of surface water
- Maintenance of plant and animal community
- Removal and sequestration of elements and compounds

Based on the results of the HGM, there are 21.9 communal FCUs of impacted wetlands within the Project. Because the Project is located outside the primary service area of Mill Creek WMB, a 1.5 multiplier is applied to the 21.9 FCU credits of impacted wetlands to total 32.9 FCU credits.

WMTX is currently in the process of applying for an Individual Permit from the Galveston District for the Project.

2.0 METHODOLOGY

2.1 HYDROGEOMORPHIC MODEL ASSESSMENT

Recommended to Knudson, LP ("Knudson") by the Galveston District, methods used to collect and analyze data for the HGM reasonably follow the "Riverine Forested Interim HGM" and the "Riverine Herbaceous/Shrub Interim HGM" models that are provided in Appendix B. Based on topographic maps, recent aerial imagery, soil surveys, stream gauge data, field reconnaissance, and other available documents, Knudson evaluated the Project. However, due to silviculture activities within the Project, the Galveston district recommended using the 2003 wetland delineation data to conduct the HGM analyses. For the additional wetlands identified during the 2009 delineation based on the Supplement standards, the HGM will be conducted using the newer information.

A total of 15 model variables were evaluated during the course of this assessment. Data collection for model variables 1–5 included an overall field reconnaissance and desktop reviews of available literature for each WAA. These variables included:

1. Duration of Flooding (*Vdur*)
2. Frequency of Flooding (*Vfreq*)
3. Topography (*Vtopo*)
4. Woody Vegetation (*Vwood*)
5. Connectivity to Other Habitat Types (*Vconnect*)

Detailed site-specific information (i.e., variables 6-15) was collected at each data point location or from site photographs. This information was obtained during the on-site field investigation as available. The variables determined at each HGM data point location included:

6. Coarse Woody Debris (*Vcwd*)
7. Tree Species (*Vtree*)
8. Tree Richness/Density (*Vrich*)
9. Tree Basal Area (*Vbasal*)
10. Tree Density (*Vdensity*)
11. Midstory Layer (*Vmid*)
12. Herbaceous Layer (*Vherb*)
13. Detritus Layer (*Vdetritus*)
14. Redoxymorphic Process (*Vredox*)
15. Sorptive Soil Properties (*Vsorpt*)

The data required for the 2002-2003 wetland delineation was not intended for a HGM analysis. Additionally, the data recorded in 2009 on the new Supplemental data forms is more detailed than the earlier delineation, but not collected for the purpose of a HGM. In instances where there are multiple sources of information, the data which is most environmentally beneficial (i.e., a high HGM score) was used to offset the lack of complete data and calculate for the best possible HGM index within the WAA. Sub-indices for HGM sampling plots were determined from site photographs by extrapolation to a 0.1 acre circular plot (37.2-foot radius). Please refer to Appendix C for a HGM site layout diagram, Appendix D for field data sheets, and Appendix E for site photographs.

For each 0.1 acre circular plot, the estimated number of trees and tree species that had a diameter at breast height ("dbh") of 3 inches or greater and a vertical height of 20 feet or higher were notated. The percentage of canopy cover was estimated for midstory species, and dominant vegetation in the midstory. The herbaceous stratum was also recorded in each 0.1 acre circular plot (Correll and Johnston, 1996).

Photographs were used to estimate the percentage of ground surface covered by estimating herbaceous vegetation. Additionally, photographs were used to estimate the down and dead woody debris measuring 3 inches or greater in diameter along an approximate 100-foot transect line. The presence or absence of organic matter in the soil ("O" horizon or "A" horizon with Munsell value of 4 or less) was determined from field data sheets.

Soil samples were extracted to a depth of at least 12 inches at the data point locations to document soil properties. At each sample location, the soil color and soil texture were recorded and the percentage of redoximorphic features occurring in the top 4 inches of soil was visually estimated.

Once the above-mentioned model variables were tabulated, the FCI of each WAA was determined by using a suite of the model variables. The FCI represents an index of the ability of a wetland to perform specific functions at its current state. The output of each FCI is a score ranging from 0.0 to 1.0 with an index of 1.0, indicating that a wetland performs a function at the highest sustainable capacity. Three functions were evaluated for the HGM assessment. These functions included:

- Temporary storage and detention of surface water
- Maintenance of plant and animal community
- Removal and sequestration of elements and compounds

Sections 2.1.1 through 2.1.3 define each function and illustrate the equations used to determine FCI values. Once FCIs were computed for each WAA, the FCI value was multiplied by the size of the WAA in acres to establish the amount of FCUs contained within each WAA. The total amount of FCUs contained within the Project was calculated by adding the FCUs measured for each WAA.

2.1.1 Temporary Storage and Detention of Surface Water

This function is defined as the capacity of a riverine wetland to temporarily store and convey floodwaters that inundate riverine wetlands during overbank flood events. However, other potential sources include precipitation, surface water runoff, and groundwater influences. This function is calculated using the following model variables: duration of flooding, frequency of flooding, topography, coarse woody debris, and woody vegetation.

The assessment model for calculating the FCI for forested wetlands is as follows:

$$FCI = \sqrt{\left[\sqrt{(V_{dur} * V_{freq})} * \frac{(V_{topo} + V_{cwd} + V_{wood})}{3}\right]}$$

The assessment model for calculating the FCI for emergent/shrub wetlands is as follows:

$$FCI = \sqrt{\left[\sqrt{(V_{dur} * V_{freq})} * \left[V_{topo} + \frac{(V_{herb} + V_{mid})}{2}\right]\right]}$$

2.1.2 Maintain Plant and Animal Community

This function is defined as the capacity of the riverine wetland to provide the environment necessary for a characteristic plant community to develop and be maintained, and the ability of a riverine wetland to support the wildlife species that utilize these wetlands during some part of their life cycle. A potential quantitative measure of this function is based on vegetation species composition and abundance. This function is calculated using the following model variables: tree species, coarse woody debris, tree richness/density, tree basal area, tree density, midstory layer, herbaceous layer, and connectivity to other habitat types.

The assessment model for calculating this FCI for forested wetlands is as follows:

$$FCI = \frac{\left[V_{tree} + V_{cwd} + V_{rich} + \frac{[V_{basal} + V_{density}]}{2} + \left[\frac{(V_{mid} + V_{herb})}{2}\right] + V_{connect}\right]}{6}$$

The assessment model for calculating this FCI for emergent/shrub wetlands is as follows:

$$FCI = \frac{\left[V_{mid} + V_{herb} + V_{connect}\right]}{3}$$

2.1.3 Removal and Sequestration of Elements and Compounds

This function is defined as the ability of the riverine wetland to permanently remove or temporarily immobilize nutrients, metals, and other elements and compounds that are imported to the riverine wetland from upland sources and via overbank flooding. A potential quantitative measure of this function is the quantity of one or more imported elements and compounds removed or sequestered per unit during a specified period of time. This function is calculated using the following model variables: woody vegetation, frequency of flooding, duration of flooding, topography, coarse woody debris, detritus layer, redoximorphic process, and sorptive soil properties.

The assessment model for calculating this FCI for forested wetlands is as follows:

$$FCI = \frac{\left[V_{wood} + V_{freq} + V_{dur} + \left[\frac{\left(V_{topo} + V_{cwd} + V_{wood}\right)}{3}\right] + \left[\frac{\left(V_{detritus} + V_{redox} + V_{sorpt}\right)}{3}\right]\right]}{5}$$

The assessment model for calculating this FCI for emergent/shrub wetlands is as follows:

$$FCI = \frac{\left[V_{wood} + V_{freq} + V_{dur} + \left[\frac{\left(V_{topo} + V_{herb} + V_{mid}\right)}{3}\right] + \left[\frac{\left(V_{detritus} + V_{redox} + V_{sorpt}\right)}{3}\right]\right]}{5}$$

2.2 PROJECT IMPACT ANALYSIS

Upon review of recent aerial imagery, vegetation habitat analysis, soil surveys, and the results of delineations, the Project was divided into 10 WAAs based on vegetation composition, hydrology, and the delineation of waters of the U.S. (Appendix A, Exhibit 2 and 3). HGM plots were established using representative photographs to extrapolate the views to 0.1 acre circular information locations within the WAAs and were used to represent the wetlands within the Project. Additionally, Exhibits 2 and 3 in Appendix A depict the HGM information locations. Once the WAAs and the information locations were established, HGM model variables were evaluated.

After Project implementation the Project site will no longer contain wetlands; therefore, a post-Project impact analysis is not necessary.

2.3 MITIGATION ANALYSIS

Methods used to collect and analyze data for the HGM at Mill Creek WMB follow the routine outlined in the "Riverine Forested Interim HGM" (Appendix B), as set forth within the mitigation bank Memorandum of Agreement ("MOA"), approved by the Galveston District in June 2008. Based on results of the HGM and inquiries of remaining credits at Mill Creek WMB, there is a total of 56.03 FCUs available.

Table 2-1
Available Functional Capacity Units
At the Mill Creek WMB

Function	Riverine Forested
Temporary storage and detention of surface water	19.43
Maintain plant and animal community	22.41
Removal and sequestration of elements and compounds	14.19
Total	**56.03**

3.0 BASELINE INFORMATION

3.1 REGIONAL HISTORY

The Project lies within the Pine-Hardwood Forest Vegetational Area which forms the eastern edge of Texas along the northern geographic extent of the Big Thicket [Texas Parks and Wildlife Department ("TPWD"), 1984). The landscape of the pre-settlement Pineywoods was a mosaic of vegetation types which corresponded to varying patterns of soils, topography, and disturbance. Pre-settlement vegetation types within the region included longleaf pine (*Pinus palustris*) communities, shortleaf pine (*Pinus echinata*) communities, upland hardwood communities, mixed deciduous hardwood-pine forests, bottomland forests, and other minor vegetation types (Diggs, et al., 2006).

Due to the abundance of woody vegetation in the region, logging became the primary industry and land use in East Texas in the early 1800's. Economically valuable tree species such as longleaf pine were abundant throughout the region, and early logging activities had little impact on East Texas forests. However, large-scale lumber mills and the establishment of an extensive railroad network by the late 1880's led to an increase in lumber production and subsequent loss of pre-settlement forests. Thus, the majority of old-growth forests had been depleted by the mid 1930's (Diggs, et al., 2006).

Other human activities, such as oil and gas exploration and the impoundment of streams and rivers to flood bottomland hardwood forests, further altered the East Texas region's pre-settlement vegetation communities (Schmidly, 2002).

3.2 SITE HISTORY AND CURRENT USE

Knudson obtained aerial photographs of the Project and surrounding areas. The photographs depict the site as it appeared in 1976, 1995, 1996, 2000, 2004, 2006, and 2008. The aerial photographs have been included in Appendix A, Exhibit 4, Shot Location Maps.

Aerial photographs indicate the Project has undergone naturalization from a semi-predominant riparian forest site. A pine and Chinese tallow forest has dominated the central and western portions of the Project with hardwoods being located predominately along Williams Gully. The eastern portion of the Project contains meadows consisting of native grasses and occasional shrubs, pine-hardwood forest, and forested wetlands.

WMTX currently owns and manages the 300-acre property which was purchased from the Scanlin family in 2003. By 2008, the entire tract was somewhat heavily wooded with what appears to be stands of mature forest. Silvicultural activities occurred within the Project sometime in the summer or fall of 2008.

3.3 SITE DESCRIPTION

The Project Area of expansion is identified as 190 acres out of the approximate 300-acre tract which is located north of the confluence of Williams Gully and Garners Bayou. The Project is located in Harris County, Texas, 1.5 miles southeast of Wilson Road and Atascocita Road intersection, and approximately 1.3 miles upstream from the confluence of Williams Gully and Garners Bayou. Williams Gully represents the eastern Project boundary. The property to the west is the existing Atascocita Recycling and Disposal Facility owned and operated by WMTX; to the north are Harris County facilities (Texas Department of Criminal Justice); to the east and across Williams Gully is owned by WMTX; and to the south is owned by Land Tejas Park Lakes 1023, LP.

One overhead transmission line bisects the Project from north to south approximately 800 feet from the easternmost Project boundary. There are also several improved earthen roads throughout the Project that were created for ingress and egress of equipment associated with the silvicultural activities. Excluding these developments, the Project is occupied by a few small grazing pastures intermingled with stands of young, midsuccessional, mature pine stands, and mature hardwood timber. Prior to select-cut harvesting in 2008, the Project was composed primarily of mature stands of pine and hardwood timber, as evidenced by review of the 2008 aerial photograph and field confirmation.

3.4 PHYSIOGRAPHY

The Project Area is nearly level but slopes gently south-southeast toward Williams Gully with both convex and concave landscape positions noted within Project boundaries. A minor portion of the Project is located within the floodplain with the majority within the elevation range of approximately 59 to 62 feet above sea level (Appendix A, Exhibit 2).

3.5 GEOLOGY

According to the "Geologic Atlas of Texas, Houston Sheet" (Bureau of Economic Geology, 1982), surface geology of the Project Area consists primarily of the Beaumont Formation (Qb); mostly clay, silts, and sands; with minor parts of the Lissie Formation (Ql), like the Beaumont Formation but includes very minor siliceous gravel of granules and small pebble size gravel. The main formation consists of soil material deposited by running water along the floodplain of major tributaries (Appendix A, Exhibit 5).

According to *Major and Minor Aquifers of Texas*, the Project Area overlies the Gulf Coast aquifer. The Chicot aquifer, or the upper part of the Gulf Coast aquifer system, is comprised of the Lissie, Beaumont, Montgomery, Bentley, and Willis Formations. Maximum total sand thickness ranges from 700 feet to 1,300 feet. The Evangeline aquifer extends from the base of the Chicot aquifer to approximately 2,000 feet below surface (Texas Water Development Board, 1995).

3.6 SOILS

Harris County is in the Western Gulf section of the Coastal Plain. The uppermost formations from which the parent materials of the soils in the county weathered are of Pliocene, Pleistocene, and Holocene in age. These formations originally consisted of fluvial, deltaic coastal marsh, and lagoonal soil materials and shallow sea deposits. Among the geologic and geomorphic features in the county are sedimentary deposits broken by normal faults, salt domes, pimple mounds, un-drained depressions and scarps.

According to the National Resources Conservation Service ("NRCS") Soil Survey Geographic Database ("SSURGO") database and the NRCS Soil Survey of Harris County, Texas, soils mapped on this site include the Addicks, Aldine, Bernard, Edna and Gessner series (Appendix A, Exhibit 3). Soils mapped within the Project Area are described in Table 3-1.

Table 3-1
Mapped Soils within the Project Area

	Soil Characteristics				
Soil Name[1]	**Slope (%)**	**Drainage Class**	**Permeability**	**Runoff Potential**	**Erosion Hazard**
Addicks loam (Ad)[2]	0 to 1	Poorly	Moderate	Slow	N/A
Aldine very fine sandy loam (Am)	0 to 1	Somewhat poorly	Very slow	Slow	N/A
Bernard-Edna complex (Be)[2]	0 to 2	Somewhat poorly to poorly	Very slow	Very slow	N/A
Edna fine sandy loam (Ed)[2]	0 to 2	Poorly	Very slow	Very slow	N/A
Gessner loam (Ge)[2]	0 to 1	Poorly	Moderate	Very slow to ponded	N/A

1 Soil Survey of Harris County, Texas, 1976.
2 These soils are listed on the National Hydric Soils List (NRCS, 2010) as meeting the definition of a hydric soil.

Intensive investigations performed between December 2002 and January 2003 confirmed the presence of Aldine-like, Beaumont, Bernard-like, Edna-like, and Lake Charles soils. Soils of the Addicks and Gessner series were not detected in field evaluation. Re-investigation of ten (10) representative soil stations (four hydric and six non-hydric soils) revealed that soil colors vary slightly from documented soils observed during the 2003 delineations. Although slight matrix color variations within soil map units are common, current vegetative succession on the site indicate that the site is becoming drier, even considering recent years of well above average rainfall.

The Project Area consists of soils developed in the Pleistocene-Montgomery formation in fluvial deposits with pimple mounds and un-drained or closed depressions and in clayey deposits.

Both the fluvial and clayey deposits on the site were originally rich in lime which was weathered and translocated into the sub-soils and now occur as calcium carbonate ("$CaCO_3$") concretions. Bioturbation,

principally crawfish, actively recycle the carbonate to the surface layer of the soils. Pale streaks in the surface layer are attributed to this process.

Aldine-like soils occur on both normal, slightly convex landscapes and in concave, closed depressions. On normal, slightly convex landscape positions, there are dark grayish fine sandy loam surface layers 4 to 8 inches thick on grayish brown to dark grayish brown fine sandy loam sub-surface layers 4 to 22 inches thick that overlies grayish brown and light brownish gray sandy clay loam sub-soils with $CaCO_3$ concretions. Aldine-like soils on the normal, slightly convex landscape have chromas of 2 with no mottles, are non-hydric, and classify as Aquic Hapludalfs or Typic Hapludalfs. They have negative wetland hydrology, but some areas contain a predominance of hydrophytic vegetation.

The Aldine-like soils that occur in concave, closed depressions have dark gray to gray fine sandy loam surface layers 5 to 7 inches thick on top of gray fine sandy loam subsurface layers 6 to 15 inches thick that overlies gray sandy clay loam sub-soils with $CaCO_3$ concretions. These soils have chromas of 1, are hydric, and classify as Typic Ochraqualfs and Typic Glossaqualfs. Some areas have positive wetland hydrology, while some have negative wetland hydrology. Vegetation within these concave, closed depressions is represented by a predominance of hydrophytic species.

Beaumont soils occur in concave, closed depressions and have dark gray to gray silty clay loam surface layers 5 to 7 inches thick on top of gray silty clay sub-soils. These soils have chromas of 1, are hydric, and classify as Typic Epiaquerts. Some areas have ponded wetland hydrology, while some areas lack positive wetland hydrology. Hydrophytic vegetation is predominant in ponded areas, but areas without positive wetland hydrology lack a predominance of hydrophytic vegetation.

Bernard-like soils occur on normal, slightly convex topography and have very dark gray to very dark grayish brown fine sandy loam surface layers ranging from 10 to 14 inches thick that overlie dark grayish brown to grayish brown sandy clay loam sub-soils with $CaCO_3$ concretions. These soils have chromas of 2 with no mottles, are not hydric, and classify as Typic Argiudolls and Aquic Argiudolls. They have negative wetland hydrology, but most areas have a predominance of hydrophytic vegetation.

Edna-like soils occur on normal, slightly convex landscapes, mounds, and concave closed depressions. They are very similar to the Aldine-like soils. On normal and slightly convex landscapes, Edna-like soils have gray fine sandy loam to silty clay loam surface layers 4 to 6 inches thick on top of grayish brown fine sandy loam to silty clay loam sub-surface layers 0 to 10 inches thick that overlie grayish brown sandy clay loam sub-soils with $CaCO_3$ concretions. The soils have 2 chromas with no mottles, are non-hydric, and classify as Vertic Hapludalfs, Typic Hapludalfs and Aquic Hapludalfs. These soils have negative wetland hydrology and can have both a predominance of hydrophytic or non-hydrophytic vegetation.

Edna-like soils that occur in concave, closed depressions have dark gray to gray fine sandy loam to silty clay loam surface layers 4 to 9 inches thick on top of gray fine sandy loam to silty clay loam sub-surface layers 0 to 17 inches thick that overlies gray to dark gray sandy clay loam to silty clay loam sub-soils with $CaCO_3$ concretions. These soils have chromas of 1, are hydric, and classify as Vertic Albaqualfs, Typic Haplaqualfs and Typic Ochraqualfs. Most of these areas have positive wetland hydrology, while a few have negative wetland hydrology. Vegetation in these concave closed depressions consists of a predominance of hydrophytic species.

Lake Charles soils occur on normal, slightly convex landscape positions and have very dark gray to very dark grayish brown silty clay loam to silty clay surface layers 5 to 8 inches thick on top of very dark grayish brown to grayish brown silty clay and clay sub-soils with $CaCO_3$ concretions. These soils have chromas of 2, are non-hydric, and classify as Typic Hapluderts. Wetland hydrology is negative, but the hardwood forest on these soils contains a predominance of hydrophytic vegetation.

3.7 CLIMATE

The climate of Harris County is predominantly marine. Prevailing winds are from the southeast and south, except in January when frequent high pressure areas bring invasions of polar air and prevailing northerly winds (NRCS, 1976).

The NRCS soil survey of Harris County indicates that the average rainfall for the general area is 45.95 inches per year. Because thundershowers are the main source of rainfall, precipitation may vary substantially in different sections of Houston on a day-to-day basis. Destructive windstorms are fairly infrequent, but both thundersqualls and tropical storms occasionally pass through the area (NRCS, 1976).

The mean daily minimum temperature for Harris County is 59.3 degrees Fahrenheit ("F") and the mean daily maximum temperature is 79.0°F (NRCS, 1976).

Temperatures are moderated by the influence of winds from the Gulf, which results in mild winters and relatively cool summer nights. Another effect of the nearness of the Gulf is abundant rainfall, except for rare extended dry periods. Polar air penetrates the area frequently enough to provide stimulating variability in the weather. (NRCS, 1976).

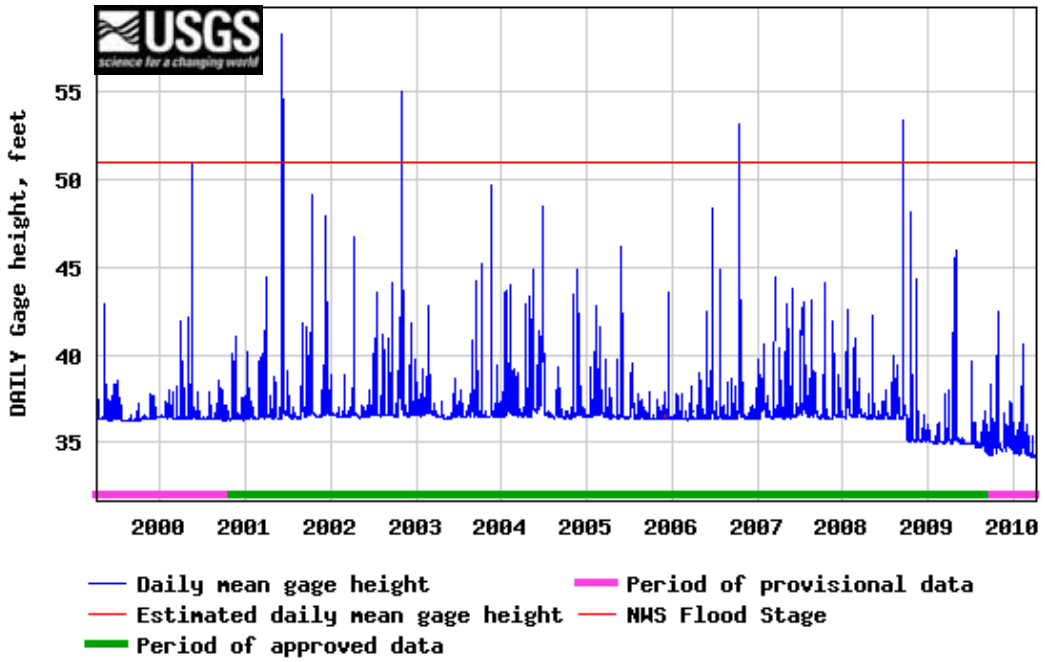
3.8 WATERSHED CHARACTERISTICS

Williams Gully rises approximately 2.5 miles northeast of the Project near Atascocita Road in northeast Harris County and flows southwest 4.0 miles to its confluence with Garners Bayou to the southwest of the Project. Williams Gully contributes to the Greens Bayou Sub-Watershed, which is within the Buffalo-San Jacinto Watershed [Harris County Flood Control District ("HCFCD"), 2010].

The Buffalo-San Jacinto Watershed has an estimated drainage basin area of 1,000 square miles. Tributaries of the Buffalo-San Jacinto Watershed include Bear Creek, Berry Bayou, Boggy Bayou, Brays Bayou, Buffalo Bayou, Carpenters Bayou, Cole Creek, Cotton Patch Bayou, Garners Bayou, Greens Bayou, Halls Bayou, Horsepen Creek, Houston Ship Channel, Hunting Bayou, Jackson Bayou, Keegans Bayou, Langham Creek, Little Vince Bayou, Little White Oak Bayou, Mason Creek, Panther Creek, Patricks Bayou, Reinhardt Bayou, San Jacinto River, Sims Bayou, South Mayde Creek, Upper Buffalo Bayou, Vince Bayou, Vogel Creek, White Oak Bayou, and Willow Waterhole (HCFCD, 2010).

Following Tropical Storm Allison, Harris County floodplains were remapped during the Tropical Storm Allison Recovery Project and adopted by the Federal Emergency Management Agency ("FEMA"). The revised FEMA floodplain maps of the Project Area now depict areas mapped within the 100-year floodplain along a minor portion of the southern boundary and within the channel of Williams Gully (Appendix A, Exhibit 2). Stream gauge data from April 1999 to April 2010 for Garners Bayou at the North Sam Houston Parkway East near Humble, Texas, is shown in Table 3-2, which illustrates the heights the bayou attained during this period. The drainage area at this location is approximately 31.0 square miles, including the Project Area. The elevation at this stream gauge is approximately 58 feet.

Table 3-2
USGS Stream Gauge Data for Garners Bayou near Porter, Texas



Hydrology at the Project location is driven by precipitation rather than by subsurface movement of water. Overall, the site is relatively level and expresses very little topographical relief. Level topography

impedes the rapid removal of storm water runoff. Consequently, precipitation falling on the site is slow to be removed either through percolation into the soil or through surface conveyance.

3.9 FLUVIAL GEOMORPHOLOGY

The principle water body adjacent to the Project is Williams Gully which borders the eastern boundary of the Project. The site is nearly level but slopes gently south-southeast toward Williams Gully with both convex and concave landscape positions.

A relict meander scar is located in the southeastern portion of the Project. The western boundary is bordered by a channelized ditch with spoil material side-cast along the eastern bank of the ditch. This channelized ditch flows from north to south and drains into Williams Gully. The ditch originally began near Atascocita Road and was routed in a series of linear channels to Williams Gully. The ditch was designed to carry storm water runoff from roadside borrow ditches and cleaned wastewater from the treatment plant. North of the Project location, the channels appear to have been constructed through upland areas for agricultural management purposes and for the removal of storm water from developed areas.

3.10 HYDROLOGIC REGIMES

The Williams Gully, also known as Williams Bayou, area is characterized by flat to rolling terrain covered by a combination of pine-hardwood forest and mesquite, grasses, and cacti. The soils are moderately well to poorly drained loams with some cracking clayey subsoils (Handbook of Texas Online, 2010). Pines for the most part formerly dominated the uplands while hardwoods formerly dominated the bottomlands. Although the Project is located within Harris County on the border of the TPWD Oak-Prairie region, the Project is more similar to the abutting Pineywoods region. The current, most common pine species in this region are the loblolly and the shortleaf pine (TPWD, 2010).

4.0 HGM ASSESSMENT AREAS

4.1 PROJECT IMPACT ASSESSMENT AREAS

After a review of recent aerial imagery, vegetational habitat analysis, soil surveys, and the results of delineations, a total of 10 WAAs were established within the Project Area. The WAAs were delineated into areas based on vegetation composition, hydrology, and delineation of waters of the U.S. Each WAA was evaluated based on the dominate components: Forested Wetland, Sapling and Shrub Wetland, and Herbaceous Wetland. The following describes the WAAs.

4.1.1 Forested Wetland Assessment Area

Comprising collectively of at least five percent of tree species, eight Forested WAAs, WWAs 1 through 8, are located within the Project Area. Forested WAAs (16.70 acres) are areas dominated by hydrophytic woody plants, excluding woody vines, approximately 20 feet or more in height and 3 inches or larger in dbh, where soil is at least periodically saturated or inundated by water (Supplement). Tree species located throughout the Forested WAAs typically included sugar-berry (*Celtis laevigata*), green hawthorn (*Crataegus viridis*), green ash (*Fraxinus pennsylvanica*), sweet gum (*Liquidambar styraciflua*), loblolly pine (*Pinus taeda*), water oak (*Quercus nigra*), Chinese tallow (*Sapium sebiferum*), and American elm (*Ulmus americana*). Soil samples in the Forested WAAs typically revealed sandy clay loam soils with a 10YR matrix and values/chromas ranging from 3/1 (very dark gray) to 7/3 (very pale brown). When present, mottles typically ranged from 10YR 4/4 (dark yellowish brown) to 10YR 5/8 (yellowish brown). Some soil samples exhibited slight concentrations of iron-manganese masses and $CaCO_3$. Indicators of hydrology observed in the Forested WAAs included inundation/surface water, saturated in upper 12 inches/saturation, water marks, FAC-neutral test, water-stained leaves, geomorphic position, high water table, and sediment deposits.

4.1.2 Sapling and Shrub Wetland Assessment Area

Comprising collectively of at least five percent of sapling and/or shrub species and less than five percent collectively within the tree stratum, the 0.42 acre Sapling and Shrub Wetland WAA (WAA 9) is an area dominated by hydrophytic woody plants, excluding woody vines, approximately 3 to 20 feet in height and/or approximately 20 feet or more in height and less than 3 inches dbh (Supplement). Soil in this area is at least periodically saturated or covered by water. Sapling and shrub species located within WAA 9 included dwarf palmetto (*Sabal minor*) and Chinese tallow. A soil sample in WAA 9 revealed silty clay loam soil with a 10YR matrix and values/chromas ranging from 3/1 (very dark gray) to 5/2 (grayish brown). A redoximorphic feature color of 10YR 4/6 (dark yellowish brown) was also identified within

the soil profile below four inches to an approximate depth of 16 inches. Indicators of hydrology observed in WAA 9 included algal mat or crust and geomorphic position.

4.1.3 Herbaceous Wetland Assessment Area

With less than five percent collectively within the tree and sapling and shrub strata each, the 0.83 acre Herbaceous WAA (WAA 10) is an area dominated by erect, rooted, hydrophytic herbaceous (non-woody) plants, including herbaceous vines, regardless of size where soil is at least periodically saturated or covered by water; and includes woody plants, except woody vines, less than approximately 3 feet in height (Supplement). Herbaceous species located within WAA 10 included alligatorweed (*Alternanthera philoxeroides*), Bermuda grass (*Cynodon dactylon*), mountain spikerush (*Eleocharis montana*), climbing hempweed (*Mikania scandens*), Vasey grass (*Paspalum urvillei*), swamp smartweed (*Polygonum hydropiperoides*), and bulltongue arrowhead (*Sagittaria lancifolia*). Soil samples in WAA 10 revealed clay and clay loam soils with a gley 1 matrix and a value/chroma of 6/10Y (greenish gray) and 10YR matrix and values/chromas ranging from 2/1 (black) to 5/1 (gray). When present, mottles typically ranged from 10YR 4/4 (dark yellowish brown) to 10YR 6/4 (light yellowish brown). Indicators of hydrology observed in WAA 10 included inundation and saturated in upper 12 inches.

5.0 RESULTS OF HGM ASSESSMENT

5.1 RESULTS OF HGM ASSESSMENT FOR PROJECT IMPACTS

Results of the model variables were calculated for the Project impact WAAs and are presented in Table 5-1. FCI values for on-site conditions of the Project are presented in Table 5-2. FCU values for each WAA are presented in Table 5-3. A summation of FCUs for each wetland type (Forested and Herbaceous/Shrub) are presented in Table 5-4.

Table 5-1
Summary of WAA Sub-Indice Variables

	Wetland Assessment Areas									
Variable	**WAA 1**	**WAA 2**	**WAA 3**	**WAA 4**	**WAA 5**	**WAA 6**	**WAA 7**	**WAA 8**	**WAA 9**	**WAA 10**
V_{dur}	0.1	0.1	0	0.1	0.1	0	0	0	0.1	1
V_{freq}	0.25	0.25	0	0.25	0.5	0	0	0	0.25	0.25
V_{topo}	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1
V_{wood}	0.75	0.5	0.5	0.5	0.75	0.75	0.25	0.25	0.1	0.1
$V_{connect}$	1	1	1	1	1	1	1	0.75	0.75	1
V_{cwd}	1	0.3	0.5	0.3	0.5	0.5	0.5	1	N/A	N/A
V_{tree}	0.3	0.3	0.3	0.3	0.5	0.5	0.3	0.3	N/A	N/A
V_{rich}	0.6	0.4	0.4	0.4	1	0.8	0.4	0.4	N/A	N/A
V_{basal}	1	0.4	0.8	0.4	0.6	0.4	0.4	0.4	N/A	N/A
$V_{density}$	0.6	0.4	0.4	0.4	0.6	1	0.6	0.4	N/A	N/A
V_{mid}	0.5	0.75	0.75	0.75	1	0.75	0.25	0.5	0.25	0.1
V_{herb}	0.5	0.3	0.5	1	0.3	0.3	0.3	0.3	1	1
$V_{detritus}$	1	0.5	0.3	0.3	1	0.3	0.3	0.3	1	1
V_{redox}	0.1	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.1
V_{sorpt}	1	0.5	0.5	0.5	0.5	1	1	1	0.5	1

Table 5-2
Summary of WAA Functional Capacity Indices

	Wetland Assessment Areas									
Function	**WAA 1**	**WAA 2**	**WAA 3**	**WAA 4**	**WAA 5**	**WAA 6**	**WAA 7**	**WAA 8**	**WAA 9**	**WAA 10**
Temporary storage and detention of surface water	0.31	0.22	0.00	0.22	0.32	0.00	0.00	0.00	0.26	0.80
Maintenance of plant and animal community	0.70	0.49	0.57	0.55	0.71	0.67	0.50	0.54	0.67	0.70
Removal and sequestration of elements and compounds	0.48	0.30	0.23	0.29	0.47	0.33	0.26	0.23	0.29	0.55

Table 5-3
Summary of WAA Functional Capacity Units

	Wetland Assessment Areas									
Function	**WAA 1 (3.07-ac.)**	**WAA 2 (9.29-ac.)**	**WAA 3 (0.27-ac.)**	**WAA 4 (0.09-ac.)**	**WAA 5 (2.92-ac.)**	**WAA 6 (0.96-ac.)**	**WAA 7 (0.07-ac.)**	**WAA 8 (0.03-ac.)**	**WAA 9 (0.42-ac.)**	**WAA 10 (0.83-ac.)**
Temporary storage and detention of surface water	0.96	2.02	0.00	0.02	0.93	0.00	0.00	0.00	0.11	0.66
Maintenance of plant and animal community	2.15	4.53	0.15	0.05	2.07	0.64	0.03	0.02	0.28	0.58
Removal and sequestration of elements and compounds	1.48	2.82	0.06	0.03	1.36	0.32	0.02	0.01	0.12	0.46

Table 5-4
Summation of WAA Functional Capacity Units

	Wetland Assessment Area Type		
Function	**Riverine Forested (WAAs 1–8)**	**Riverine Herbaceous/ Shrub (WAAs 9 and 10)**	**Totals***
Temporary storage and detention of surface water	3.93	0.77	4.7
Maintenance of plant and animal community	9.64	0.86	10.5
Removal and sequestration of elements and compounds	6.10	0.58	6.7
			21.9

* Totals are rounded up to the next tenth.

Once all FCUs were calculated, an overall sum of 21.9 FCUs was tabulated for the Project.

5.2 RESULTS OF HGM ASSESSMENT FOR POST-PROJECT IMPACTS

All areas within the Project will be utilized for construction or maintenance of the Project. No wetlands will remain within the Project Area after construction of the Project; therefore, the FCU value post-Project is zero (0).

6.0 CONCLUSION

Knudson ecologists performed a HGM functional assessment to determine the current wetland functional capacity of ten (10) WAAs located within the Project Area. Three functions –temporary storage and detention of surface water, maintenance of plant and animal community, and removal and sequestration of elements and compounds– were assessed during the investigation.

Based on the results of the HGM, the higher sub-indices (i.e., $V_{connect}$, V_{sorpt}, V_{wood}, V_{cwd}, and V_{mid}) of the WAAs indicate the importance of those variables to the overall functionality of the area (see Table 5-1).

However, the WAAs within the Project exhibited relatively low to medium FCIs across the majority of the assessed areas (see Table 5-2). This was due largely to the WAA locations relative to the waterway (Williams Gully) and plant communities of less quality within and surrounding the areas.

The FCUs were higher in some of the WAAs (see Table 5-3) due to higher acreages associated with the impacted wetland areas.

In summary of the HGM functional assessment, the Project exhibits an overall sum of 21.9 FCUs of impacted wetland areas (see Table 5-4). Because the Project is located outside the primary service area of Mill Creek WMB, a 1.5 multiplier is applied to the 21.9 FCU credits of impacted wetlands; therefore, WMTX is currently proposing to purchase 32.9 FCU credits (7.05 for the temporary storage and detention of surface water, 15.75 for the maintenance of plant and animal community, and 10.05 for the removal and sequestration of elements and compounds) of riparian forested habitat within the Mill Creek WMB.

7.0 REFERENCES

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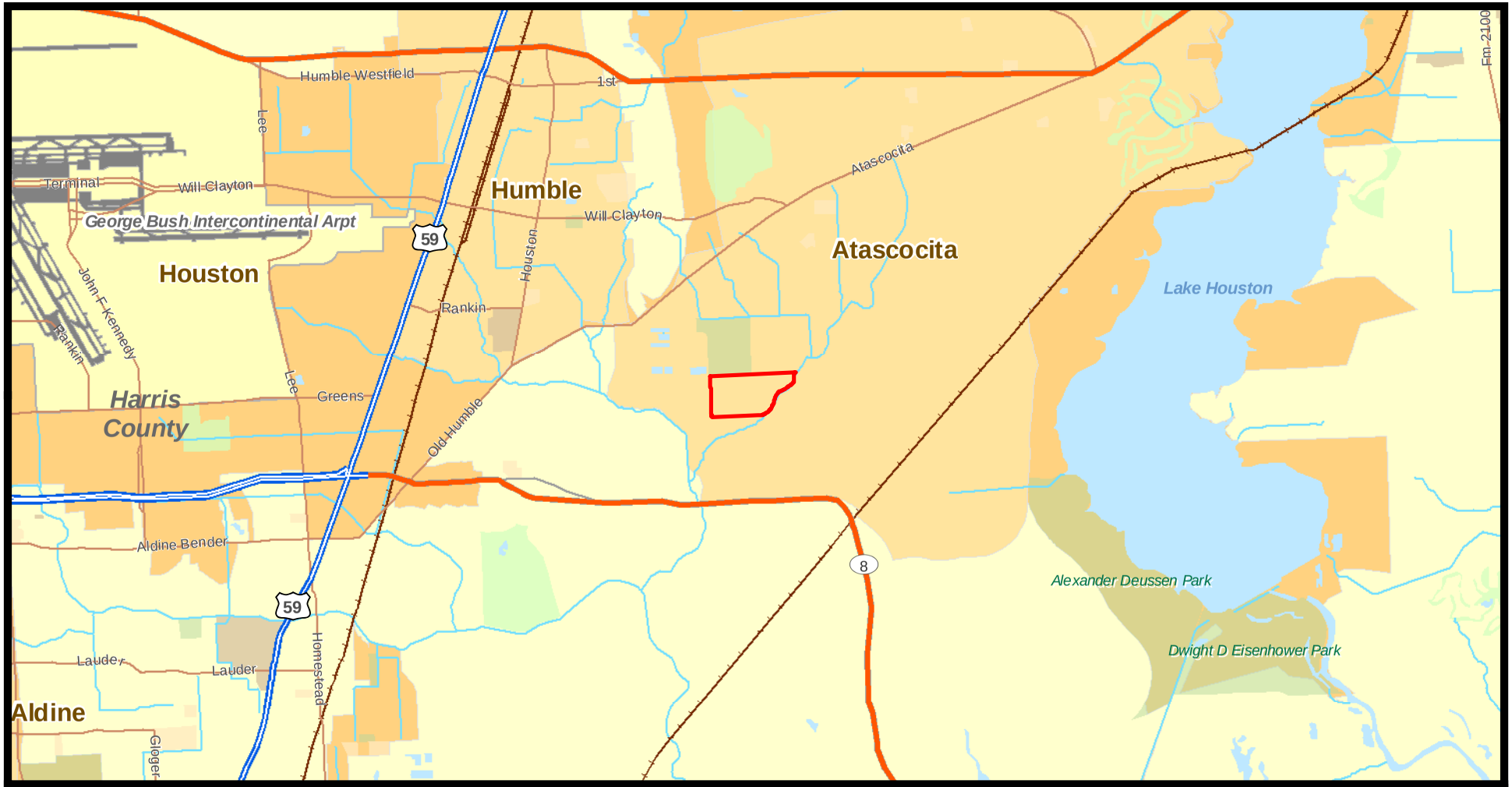
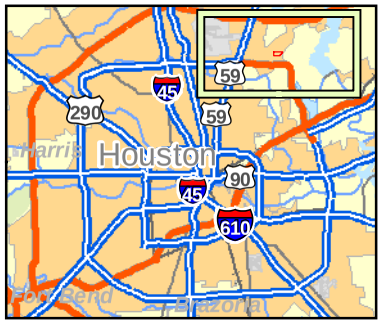
Appendix A

Exhibits





Source: ESRI Data & Maps 9.3

190 Acre Project Area

0 2 4 Miles

N

8588 Katy Freeway Suite 441
Houston, TX 77024
Phone (713) 463-8200

Exhibit 1
Vicinity Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Sep 22, 2009
ESRI Data & Maps 9.3	Scale:1 in = 2 miles
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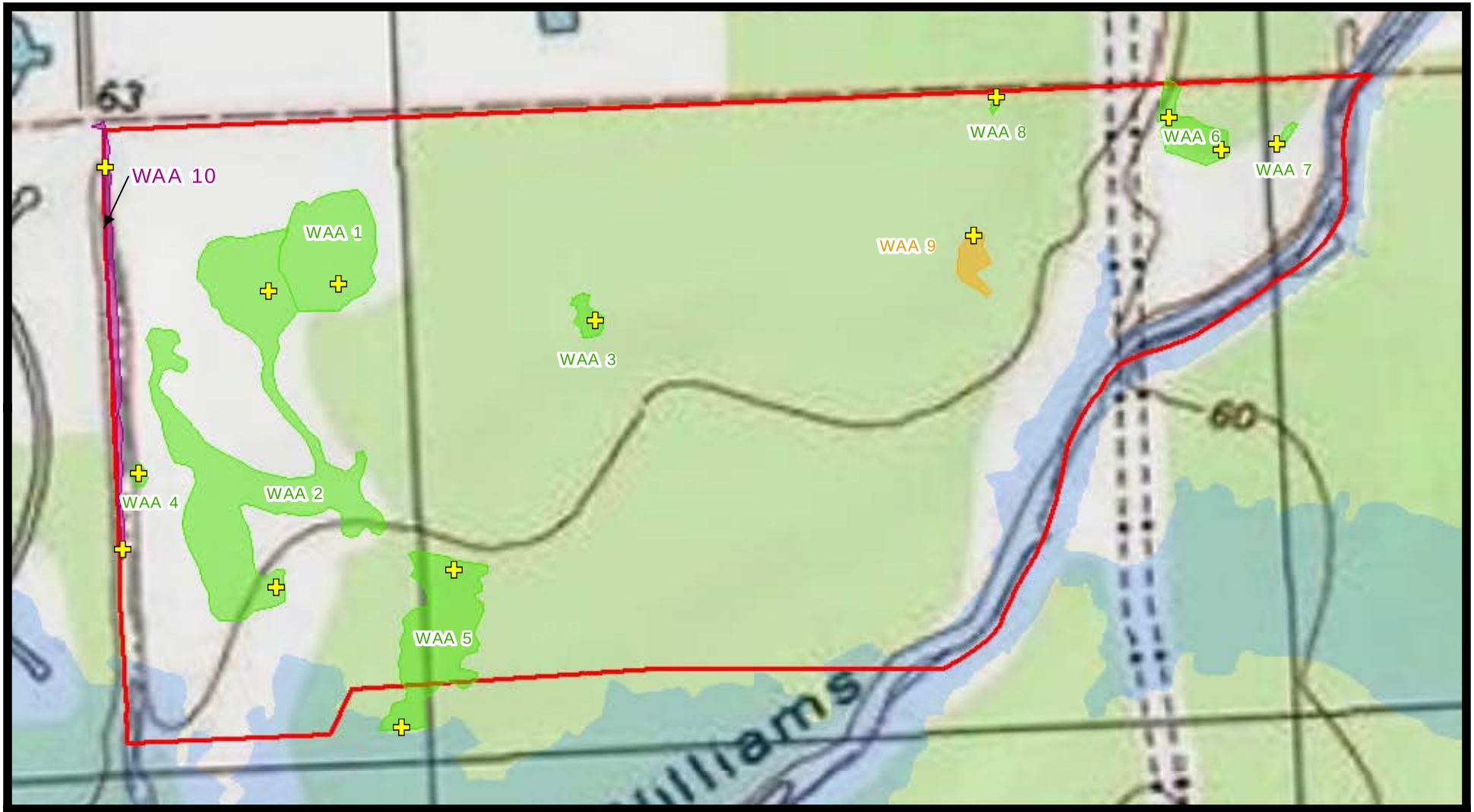

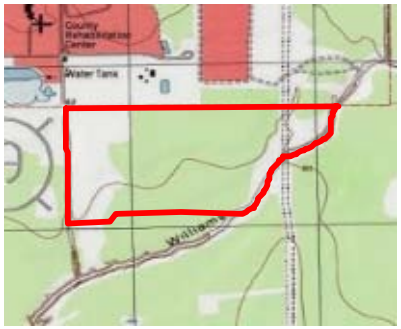

HGM Plot
Palustrine Forested (WAA 1-8)
Palustrine Emergent Wetland (WAA 10)
Palustrine Scrub-Shrub (WAA 9)
190 Acre Project Area
TSARP 100-Year Floodplain

Sources
Floodplain: TSARP, 2004
Topo: USGS, 1984

0 600 1,200 Feet

N

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Exhibit 2
Topographic Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Apr 12, 2010
USGS Harmaston Quadrangle	Scale:1 in = 553 feet

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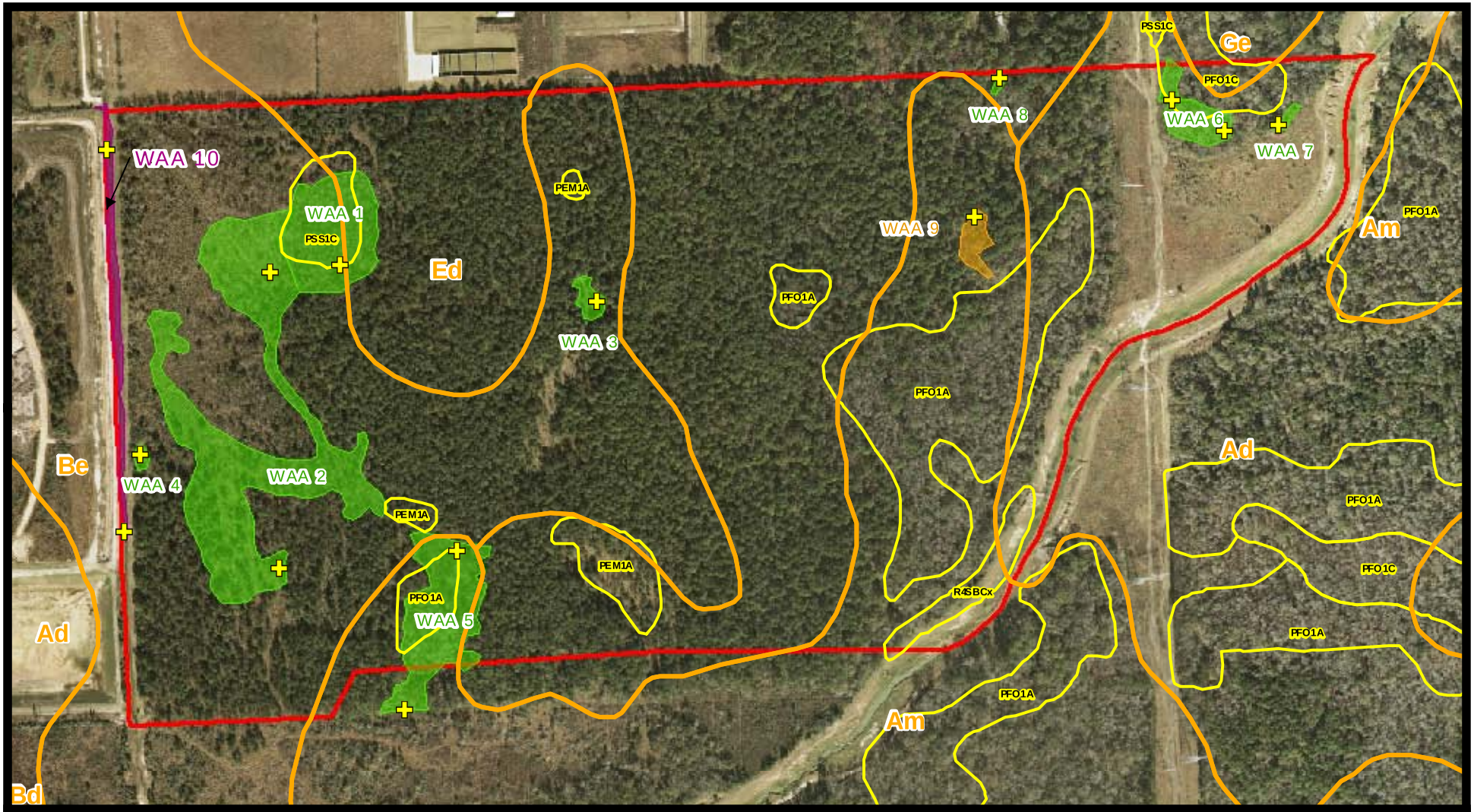

HGM Plot

Palustrine Forested (WAA 1-8)

Palustrine Emergent Wetland (WAA 10)

Palustrine Scrub-Shrub (WAA 9)

Soils

NWI

Sources
Aerial: H-GAC, 2008
Solils: NRCS, 2008
NWI: USFWS, 2009

0 600 1,200 Feet

N

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Exhibit 3
2008 Aerial Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Apr 12, 2010
USGS Harmaston Quadrangle	Scale:1 in = 553 feet

J:\Projects\07-0819 Waste Mgmt\Sec 3.0 Project Information\3.4 GPS\Arcmap\HGM\EX_3_Aerial

190 Acre Project Area

Sources
Aerial: Texas General Land Office, 1976

0 600 1,200 Feet

N

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Houston, TX 77024
Phone (713) 463-8200

Exhibit 4
1976 Shot Location Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Apr 12, 2010
USGS Harmaston Quadrangle	Scale:1 in = 553 feet

J:\Projects\07-0819 Waste Mgmt\Sec 3.0 Project Information\3.4 GPS\Arcmap\HGM\EX_4_1976

190 Acre Project Area

Sources
Aerial: USGS, 1995

0 600 1,200 Feet

N

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Exhibit 4
1995 Shot Location Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Apr 12, 2010
USGS Harmaston Quadrangle	Scale:1 in = 553 feet

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190 Acre Project Area

Sources
Aerial: TNRIS, 1996

0 600 1,200 Feet

N

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Exhibit 4
1996 Shot Location Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Apr 12, 2010
USGS Harmaston Quadrangle	Scale:1 in = 553 feet

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190 Acre Project Area

Sources
Aerial: H-GAC, 2000

0 600 1,200 Feet

N

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Exhibit 4
2000 Shot Location Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Apr 12, 2010
USGS Harmaston Quadrangle	Scale:1 in = 553 feet

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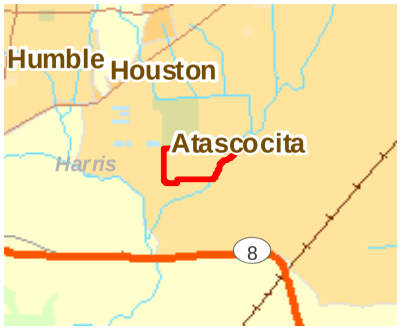

190 Acre Project Area

Sources
Aerial: H-GAC, 2002

0 600 1,200 Feet

N

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Houston, TX 77024
Phone (713) 463-8200

Exhibit 4
2002 Shot Location Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Apr 12, 2010
USGS Harmaston Quadrangle	Scale:1 in = 553 feet

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190 Acre Project Area

Sources
Aerial: H-GAC, 2004

0 600 1,200 Feet

N

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Houston, TX 77024
Phone (713) 463-8200

Exhibit 4
2004 Shot Location Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Apr 12, 2010
USGS Harmaston Quadrangle	Scale:1 in = 553 feet

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190 Acre Project Area

Sources
Aerial: H-GAC, 2006

0 600 1,200 Feet

N

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Houston, TX 77024
Phone (713) 463-8200

Exhibit 4
2006 Shot Location Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Apr 12, 2010
USGS Harmaston Quadrangle	Scale:1 in = 553 feet

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190 Acre Project Area

Sources
Aerial: H-GAC, 2008

0 600 1,200 Feet

N

8588 Katy Freeway Suite 441
Houston, TX 77024
Phone (713) 463-8200

Exhibit 4
2008 Shot Location Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Apr 12, 2010
USGS Harmaston Quadrangle	Scale:1 in = 553 feet

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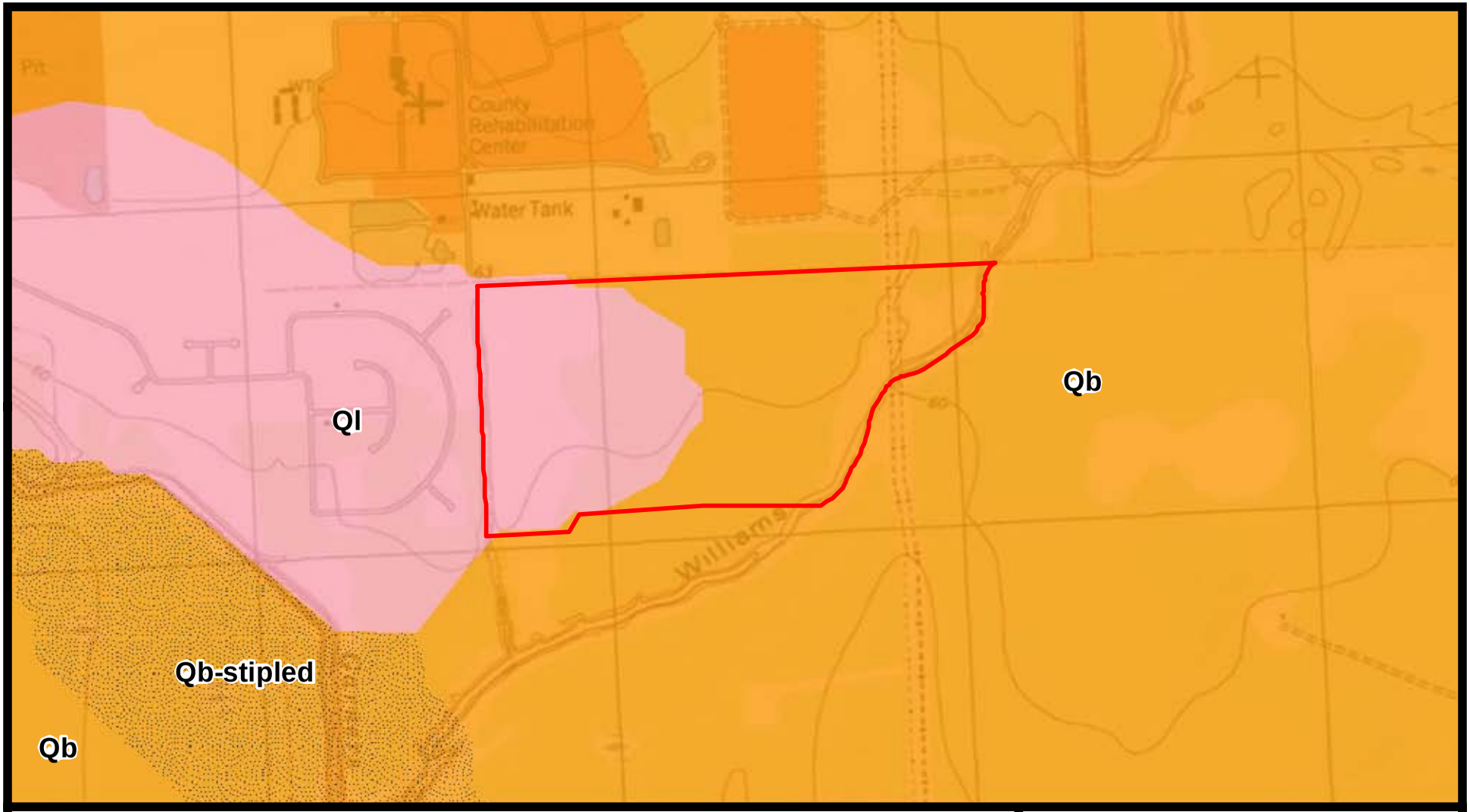

Sources
Geology: Texas Water Development Board, U.S. Geological Survey 1976-2007

190 Acre Project Area

RockUnit

Qb	Beaumont Formation
Qb-stipled	Beaumont Formation
Ql	Lissie Formation

0 1,500 3,000 Feet

N

8588 Katy Freeway Suite 441
Houston, TX 77024
Phone (713) 463-8200

Exhibit 5
Geologic Map
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Apr 12, 2010
USGS Harmaston Quadrangle	Scale:1 in = 1,348 feet

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IID-161

Appendix B

Riverine Interim HGM Documents

Riverine Forested HGM Interim Equations
Functional Capacity Index (FCI)

Physical:
Temporary Storage & Detention of Storage Water:

$$\sqrt{\left[\sqrt{(V_{dur} * V_{freq})} * \frac{(V_{topo} + V_{cwd} + V_{wood})}{3}\right]}$$

Biological:
Maintain Plant & Animal Communities:

$$\frac{\left[V_{tree} + V_{cwd} + V_{rich} + \frac{[V_{basal} + V_{density}]}{2} + \left[\frac{(V_{mid} + V_{herb})}{2}\right] + V_{connect}\right]}{6}$$

Chemical:
Removal & Sequestration of Elements & Compounds:

$$\frac{\left[V_{wood} + V_{freq} + V_{dur} + \left[\frac{(V_{topo} + V_{cwd} + V_{wood})}{3}\right] + \left[\frac{(V_{detritus} + V_{redox} + V_{sorpt})}{3}\right]\right]}{5}$$

V_{dur}
V_{freq}
V_{topo}
V_{cwd}
V_{wood}
V_{tree}
V_{rich}
V_{basal}
$V_{density}$
V_{mid}
V_{herb}
$V_{detritus}$
V_{redox}
V_{sorpt}
$V_{connect}$

The Forested Riverine Interim HGM model is limited to the use of estimated potential impacts to wetlands that are located along floodplains and/or floodways located along riparian corridors. These wetlands share a surface hydrology connection with the waters of the riverine system at least for a portion of the time. This type of model should be used for a rapid non-controversial estimate of the potential impacts to forested riparian wetlands and to see if the proposed mitigation will adequately address the wetland functions that are being impacted.

Forested Riverine Interim HGM

The techniques used to determine which functional capacity index (FCI) will be used for each variable rare typically based on standard techniques described in detail in the 1987 Corps Wetland Delineation Manual, the NRCS 3rd Edition to the National Food Security Act Manual (NFSAM) and/or the "A Regional Guidebook for Application of Hydrogeomorphic Assessments to Riverine Low Gradient Wetlands (Ainslie et al. 1997). These sources will hereafter be referred to as the 87 WDM, NFSAM, and the Kentucky Riverine Guidebook, respectively.

Documentation should be made for each variable as to which method, indicator, and plot size was used for each variable. The number of sample plots is related to the variability of the site. Significantly different timber age classes or species types should be sampled separately. One of two sample plots might be sufficiently in a small uniform site, whereas, numerous sample plots would be required for a large diverse site. The following is a general definition and guidance on the methodology for each variable.

V_{dur}: **Duration of Flooding:** Indicators as described in the Wetland Hydrology Section of the 87 WDM (paragraphs 46-49) will be utilized to estimate duration of flooding. NOTE: unlike the criteria for hydrology for wetland delineation, growing season is not a factor in the variable. Those indicators associated with saturation should not be used.

V_{freq}: **Frequency of Flooding:** Indicators as described in the Wetland Hydrology Section of the 87 WDM (paragraphs 46-49) will be utilized to estimate frequency of flooding. Utilization of the county soil survey is a particularly good tool. NOTE: unlike the criteria for hydrology for wetland delineation, growing season is not a factor in the variable.

V_{topo}: **Topography:** To determine percent for these criteria, visual estimate will be conducted. Those areas with significant topographic features will be shown on a reference map, briefly described (i.e. ridge/slough, mounds, undulations, channels/burn, etc.), and measured to determine acreage. Percent of site containing topographic features can then be determined.

V_{cwd}: **Coarse Woody Debris:** This variable is measured by the point intercept method along a 100 foot transect. For more information regarding this technique refer to Kentucky Riverine Guidebook.

V_{wood}: **Woody vegetation:** Percentage of the WAA that is covered by woody vegetation will be determined by the use of recent aerial photography. Field verification is needed to ensure land use changes have not occurred. Size and density of woody vegetation impedes water flow. For example; a few large trees in a pasture would NOT constitute "covered with woody vegetations" nor would 1 year old seedlings. It should also be noted that an area clear cut with stumps, sprouts, and shrubs removed would NOT constituted "woody vegetation" and the functions should be assessed using an herbaceous model.

V_{tree}: **Tree species:** Percentage of the stand can be percent canopy cover, percent stems, percent basal area, or another quantitative method BUT it must be used consistently for

the entire modeling effort that is being employed for the proposed project. It is recommended that the procedures described in the Kentucky Riverine Model be used.

V_{rich}: **Tree richness/diversity:** This variable is determined using the same methodology employed in the determination of the tree species variable. NOTE: for a species to be considered for this variable it MUST compose at least 5% of the stand.

V_{basal}: **Tree basal area:** Basal area measurements should be taken in the same data plots used for the tree species and coarse woody debris variables. Basal area can be determined in the field by using standard forestry tools, i.e. prisms, gauges, actual tree measurements, etc.

$V_{density}$: **Tree density:** At each data plot/location trees per acre should be determined. Trees must have at least a 3 inch dbh for this variable.

V_{mid}: **Midstory (Shrubs/saplings/woody vines):** The midstory layer is the layer of botanical specie located between the herbaceous and forest/tree canopy. This would include shrubs, saplings, smaller trees, small trees, and large woody vines. A measure is taken at each plot and/or a visual estimate is performed at each sample location(s).

V_{herb}: **Herbaceous layer:** Herbaceous layers are made at each data location/plot as is described it in the 87 WDM. It is recommended that 2-5 sub-plots be taken at each location to account for vegetative variability.

$V_{detritus}$: **Detritus:** This variable is a measure of the percentage of areas with detritus at the soil surface. Plowed areas or areas "washed" by high velocity flood water should not be considered as areas having detritus. Determination of an A (with organic) or O horizon should be determined for the entire site by on site field information. For this variable, the A (with organic) must have a Munsell value of 4 or less. Refer to the Kentucky Riverine Model for additional details regarding this variable.

V_{redox}: **Redoximorphic process:** This variable is an indicator of periodic aerobic and anaerobic process within the top 10-12 inches of the soil surface. Redoximorphic features should be document for each sample plot/location and any other soil investigation conducted on the site. At least 50%of the must meet this criteria to be a 1.00 in the sub-index.

V_{sorpt}: **Sorptive Soil Properties:** This variable is a general indicator of the potential that the soil has in regards to its absorptive properties. This information can be obtained by the use of the county soil survey in conjunction with the field data.

$V_{connect}$: **Connectivity to other habitat types:** This variable concentration on the geo-location of the WAA in relationship to other habitat type within 600 feet from the perimeter of the WAA.

Variables for Forested Riverine Interim HGM

V_{dur}: The percentage of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of a nearby waterway.

Criteria	Variable Sub-Index
In an average year at least 80% of the WAA either floods and/or ponds for at least 14 consecutive days.	**1.00**
In an average year at least 80% of the WAA either floods and/or ponds for at least 7 consecutive days.	**0.75**
In an average year 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days.	**0.50**
In an average year 25-50% of the WAA either floods and/or ponds for at lease 7 consecutive days.	**0.25**
In an average year all or portions of the WAA either floods and/or ponds for at least 1-7 consecutive days.	**0.10**
The area is NOT subject to flooding.	**0.00**

V_{freq}: The frequency that the WAA is flooded and/or ponded by the nearby waterway.

Criteria	Variable Sub-Index
Floods or ponds annually 5 out of 5 years (floodway).	**1.00**
Floods or ponds 3 or 4 out of 5 years (Elevation data reveals area is in floodway and mapped w/n 100 yr floodplain).	**0.75**
Floods or ponds 2 out of 5 years (100-year floodplain).	**0.50**
Floods or ponds less than 2 out of 5 years (100-500 yr floodplain).	**0.25**
The area is not subject to flooding or ponding (500 yr floodplain).	**0.00**

V_{topo}: The roughness associated with the WAA.

Criteria	Variable Sub-Index
Greater than 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features.	**1.00**
15 - 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features.	**0.70**
Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features.	**0.40**
Smooth, flat, or very gentle undulating with little or no topographic features.	**0.10**

V_{cwd}: Coarse Woody Debris within the WAA.

Criteria	Variable Sub-Index
More than 7 pieces of coarse woody debris greater than 3" diameter along a 100' transect.	**1.00**
From 3 -7 pieces of coarse woody debris greater than 3" diameter along a 100' transect.	**0.50**
Less than 3 pieces of coarse woody debris greater than 3" diameter along a 100' transect.	**0.30**
Area is open land (pasture or cropland).	**0.10**

V_{wood}: Percentage of the WAA that is covered by woody vegetation.

Criteria	Variable Sub-Index
Greater than 90% of the WAA is covered with woody vegetation.	**1.00**
67 to 90% of the WAA is covered with woody vegetation.	**0.75**
34 to 66% of the WAA is covered with woody vegetation.	**0.50**
11 to 33% of the WAA is covered with woody vegetation.	**0.25**
0-10% if the WAA is covered with woody vegetation.	**0.10**

V_{tree}: Percentage of the trees in the WAA that are mast producers.

Criteria	Variable Sub-Index
At least 60% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 5% of the stand.	1.00
At least 40% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 10% of the stand.	0.80
More than 20% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 15% of the stand.	0.50
Less than 20% of the stand is oak, hickory, cypress, maple and/or elm.	0.30
The area is open land (non-forested).	0.10

V_{rich}: The diversity of the species within the WAA (To be considered the species must comprise at least 5% of the stand).

Criteria	Variable Sub-Index
Five or more tree species present.	1.00
Four tree species present.	0.80
Three tree species present.	0.60
One-two tree species present.	0.40
The area is open land (non-forested).	0.10

V_{basal}: The average/mean basal area of the trees in the WAA per acre.

Criteria	Variable Sub-Index
The average basal area of the WAA is greater than 100 square ft/acre.	1.00
The average basal area of the WAA is between 80-100 square ft/acre.	0.80
The average basal area of the WAA is between 60-80 square ft/acre.	0.60
The average basal area of the WAA is less than 60 square ft /acre.	0.40
The site is open land (non-forested).	0.10

$V_{density}$: The average density of the WAA stand (Tree is 20 feet tall with a ≥3" dbh).

Criteria	Variable Sub-Index
The WAA averages a tree density of 100-250 trees per acre.	1.00
The WAA averages a tree density of 250-500 trees per acre OR 50-100 trees per acre.	0.60
The WAA averages less than 49 trees per acre or greater than 500 trees per acre.	0.40
The site is open land (non-forested).	0.10

V_{mid}: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA.

Criteria	Variable Sub-Index
Midstory coverage of the WAA is more than 50%.	1.00
Midstory coverage of the WAA is between 31-50%.	0.75
Midstory coverage of the WAA is between 11-30%.	0.50
Midstory coverage of the WAA is less than 10%.	0.25
The site is open land (non-forested).	0.10

V_{herb}: The average/mean coverage of the WAA by the herbaceous layer.

Criteria	Variable Sub-Index
Herbaceous cover in the WAA averages between 5-30%.	1.00
Herbaceous cover in the WAA averages between 31-50%.	0.50
Herbaceous cover in the WAA is less than 5% or greater than 50%.	0.30
The WAA is dominated by temperate pasture species or is active cropland.	0.10

$V_{detritus}$: The amount of the detritus on the WAA (A horizon must have a Munsell value of 4 or less).

Criteria	Variable Sub-Index
Greater than 85% of the area possesses an O or A horizon.	**1.00**
From 11-84% of the area possesses an O or A horizon.	**0.50**
Less than 10% of the area possesses an O or A horizon.	**0.30**
Site is plowed.	**0.10**

V_{redox}: The amount of the WAA that exhibits redoximorphic features an indication of the chemical exchange.

Criteria	Variable Sub-Index
Redoximorphic concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature is masked due to parent material but conditions are conducive to redoximorphic processes.	**1.0**
Redoximorphic features represent less than 20% of the pedon within the top 4 inches of the soil surface.	**0.1**

V_{sorpt}: The absorptive properties of the soils in the WAA (Soils must be present in ≥50% of the WAA be a 1.00).

Criteria	Variable Sub-Index
The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic content (2/1, 2/2, or 3/1)	**1.00**
WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays	**0.50**
The WAA is dominated by sandy soils (sands, loamy fine sands, loamy sands)	**0.10**

$V_{connect}$: The number of habitat types within a 600' of the perimeter of the WAA (To be counted, the total habitat size has to be ≥5% of the WAA size).

Habitat Types:
1. Wetland
2. Forested
3. Shrub/Sapling
4. Herbaceous/Prairie/Abandoned field
5. Open water
6. Mudflat
7. Active agricultural field
8. Lawn

Criteria:	Variable Sub-Index
Wetland plus forest	**1.00**
Wetland plus two or more habitat types (other than forested) OR three or more habitat types	**0.75**
Wetland plus one other habitat types or two other habitat types	**0.50**
One habitat type (other than urban)	**0.25**
Surround by urban (homes, lawn, concrete, etc.)	**0.10**

Forested Riverine Interim HGM Worksheet

WAA No.

Variable	Sub-Index
V_{dur}	
V_{freq}	
V_{topo}	
V_{cwd}	
V_{wood}	
V_{tree}	
V_{rich}	
V_{basal}	
$V_{density}$	
V_{mid}	
V_{herb}	
$V_{detritus}$	
V_{redox}	
V_{sorpt}	
$V_{connect}$	

WAA No.

Variable	Sub-Index
V_{dur}	
V_{freq}	
V_{topo}	
V_{cwd}	
V_{wood}	
V_{tree}	
V_{rich}	
V_{basal}	
$V_{density}$	
V_{mid}	
V_{herb}	
$V_{detritus}$	
V_{redox}	
V_{sorpt}	
$V_{connect}$	

Riverine Herbaceous/Shrub Interim HGM Equations
Functional Capacity Index (FCI)

Physical:

Temporary Storage & Detention of Storage Water:

$$\sqrt{\left[\sqrt{(V_{dur} * V_{freq})} * \left[V_{topo} + \frac{\frac{(V_{herb} + V_{mid})}{2}}{2}\right]\right]}$$

Biological:

Maintain Plant & Animal Communities:

$$\frac{[V_{mid} + V_{herb} + V_{connect}]}{3}$$

Chemical:

Removal & Sequestration of Elements & Compounds:

$$\frac{\left[V_{wood} + V_{freq} + V_{dur} + \left[\frac{(V_{topo} + V_{herb} + V_{mid})}{3}\right] + \left[\frac{(V_{detritus} + V_{redox} + V_{sorpt})}{3}\right]\right]}{5}$$

$V_{\mathbf{dur}}$
$V_{\mathbf{freq}}$
$V_{\mathbf{topo}}$
$V_{\mathbf{wood}}$
$V_{\mathbf{mid}}$
$V_{\mathbf{herb}}$
$V_{\mathbf{connect}}$
$V_{\mathbf{detritus}}$
$V_{\mathbf{redox}}$
$V_{\mathbf{sorpt}}$

* The Riverine model is designed to be used to produce an assessment of the potential function of wetlands that share a surface hydrologic connection (at least periodically during anticipated high flows) with a riverine system {i.e. it is limited to wetlands located in the floodplain and/or floodway}. This model is to be used for a rapid non-controversial estimate of the potential impacts to forested riparian wetlands and to see if the proposed mitigation will adequately address the wetland functions that are being impacted.

Riverine Herbaceous/Shrub HGM Interim

The techniques used to determine which functional capacity index (FCI) will be used for each variable rare typically based on standard techniques described in detail in the 1987 Corps Wetland Delineation Manual, the NRCS 3rd Edition to the National Food Security Act Manual (NFSAM) and/or the "A Regional Guidebook for Application of Hydrogeomorphic Assessments to Riverine Low Gradient Wetlands (Ainslie et al. 1997). These sources will hereafter be referred to as the 87 WDM, NFSAM, and the Kentucky Riverine Guidebook, respectively.

Documentation should be made for each variable as to which method, indicator, plot size was used for each variable. The number of sample plots is related to the variability of the site. Significantly different timber age classes or species types should be sampled separately. One of two sample plots might be sufficiently in a small uniform site, whereas, numerous sample plots would be required for a large diverse site. The following is a general definition and guidance on the methodology for each variable.

V_{dur}: **Duration of Flooding:** Indicators as described in the Wetland Hydrology Section of the 87 WDM (paragraphs 46-49) will be utilized to estimate duration of flooding. NOTE: unlike the criteria for hydrology for wetland delineation, growing season is not a factor in the variable. Those indicators associated with saturation should not be used.

V_{freq}: **Frequency of Flooding:** Indicators as described in the Wetland Hydrology Section of the 87 WDM (paragraphs 46-49) will be utilized to estimate frequency of flooding. Utilization of the county soil survey is a particularly good tool. NOTE: unlike the criteria for hydrology for wetland delineation, growing season is not a factor in the variable.

V_{topo}: **Topography:** To determine percent for these criteria, visual estimate will be conducted. Those areas with significant topographic features will be shown on a reference map, briefly described (i.e ridge/slough, mounds, undulations, channels/burn, etc.) and measured to determine acreage. Percent of site containing topographic features can then be determined.

V_{wood}: **Woody vegetation:** Percentage of the WAA that is covered by woody vegetation will be determined by the use of recent aerial photography. Field verification is needed to ensure land use changes have not occurred. Size and density of woody vegetation impedes water flow. For example; a few large trees in a pasture would NOT constitute "covered with woody vegetations" nor would 1 year old seedlings. It should also be noted that an area clear cut with stumps, sprouts and shrubs removed would NOT constituted "woody vegetation" and the functions should be assessed using a herbaceous model.

V_{mid}: **Midstory (Shrubs/saplings/woody vines):** The midstory layer is the layer of botanical specie located between the herbaceous and forest/tree canopy. This would included shrubs, saplings, smaller trees, small trees, and large woody vines. A measure is taken at each plot and/or a visual estimate is performed at each sample location(s).

$V_{herb:}$ **: Herbeceous layer:** Herbaceous layers are made at each data location/plot as is described it in the 87 WDM. It is recommended that 2-5 sub plots be taken at each location to account for vegetative variability.

$V_{detritus:}$ **Detritus:** This variable is a measure of the percentage of areas with detritus at the soil surface. Plowed areas or areas "washed" by high velocity flood water should not be considered as areas having detritus. Determination of an A (with organic) or O horizon should be determined for the entire site by on site field information. For this variable, the A (with organic) must have a Munsell value of 4 or less. Refer to the Kentucky Riverine Model for additional details regarding this variable.

$V_{redox:}$ **Redoximorphic process:** This variable is an indicator of periodic aerobic and anaerobic process within the top 10-12 inches of the soil surface. Redox features should be document for each sample plot/location and any other soil investigation conducted on the site. At least 50%of the must meet this criteria to be a 1 in the sub index.

$V_{sorpt:}$ **Sorptive Soil Properties:** This variable is a general indicator of the potential that the soil has in regards to it's absorptive properties. This information can be obtained by the use of the county soil survey in conjunction with the field data.

$V_{connect:}$ **Connectivity to other habitat types:** This variable concentration on the geo-location of the WAA in relationship to other habitat type within 600 feet from the perimeter of the WAA.

Variables for HGM (Interim) Herbaceous/Shrub Riverine

V_{dur}: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway

Criteria	Variable Sub index
In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days	1.00
In an average year at 80% of the WAA either floods and/or ponds for at least 7 consecutive days	0.75
In an average year at 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days	0.50
In an average year at 25-50% of the WAA either floods and/or ponds for at lease 7 consecutive days	0.25
In an average year all or portions of the WAA either floods and/or ponds for at least 1-7 consecutive days	0.10
The area is NOT subject to flooding	0.00

V_{freq}: The frequency that the WAA is flooded and/or ponded by nearby waterway .

Criteria	Variable Sub index
Floods or pond annually 5 out of 5 years (floodway)	1.00
Floods or ponds 3 or 4 out of 5 years (elevation data reveals in floodway and mapped w/n 100 yr floodplain)	0.75
Floods or ponds 2 out of 5 years (100- year floodplain)	0.50
Floods or ponds less than 2 out of 5 years (100-500 yr floodplain grey w/out elevations)	0.25
The area is not subject to flooding or ponding (500 yr floodplain)	0.00

V_{topo}: The roughness associated with the WAA

Criteria	Variable Sub Index
Greater than 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	1.00
15 - 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	0.70
Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	0.40
Smooth, flat, or very gentle undulating with little or no topographic features	0.10

V_{wood}: Percentage of the WAA that is covered by woody vegetation

Criteria	Variable Sun Index
Greater than 90% of the WAA is covered with woody vegetation	1.00
67 to 90 % of the WAA is covered with woody vegetation	0.75
34 to 66% of the WAA is covered with woody vegetation	0.50
11 to 33% of the WAA is covered with woody vegetation	0.25
0-10% if the WAA is covered with woody vegetation	0.10

V_{mid}: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA

Criteria	Variable Sub Index
Midstory coverage of the WAA is more than 75%	1.00
Midstory coverage of the WAA is between 50-75 %	0.75
Midstory coverage of the WAA is between 25-50%	0.50
Midstory coverage of the WAA is between 1-25%	0.25
Midstory coverage of the WAA is equal to or less than1%	0.10

V_{herb}: The average/mean coverage of the WAA by the herbaceous layer

Criteria	Variable Sub Index
Herbaceous cover in the WAA averages greater than 75%	1.00
Herbaceous cover in the WAA averages between 50-75%	0.75
Herbaceous cover in the WAA averages between 25-50%	0.50
Herbaceous cover in the WAA average is between 1-25%	0.25
Herbaceous cover in the WAA is equal to or less than 1% (barren soil or all shrub)	0.10

$V_{connect}$: the number of habitat types within a 600' of the parameter of the WAA

(Habitat to be counted has to be at a minimum 5% of the size of the WAA)

Habitat Types:

Forested	Shrub/Sapling
Herbaceous/Prairie/Abandoned Ag field	Active Agricultural Field
Open water	Wetland
Mudflat	Lawn

Criteria:	Variable Sub Index
Wetland plus four habitats and/or surrounded by forested	1.00
Wetland plus two or more habitat type (other than forested) OR three or more habitat types	0.75
Wetland plus one other habitat types or two other habitat types	0.50
One other habitat types other than urban habitat	0.25
Surround by urban (homes, lawn, concrete, etc.)	0.10

$V_{detritus}$: The amount of the detritus on the WAA

(A horizon has to have a value of 4 or less)

Criteria	Variable Sub Index
Greater than 85% of the area possesses an O or A horizon	1.00
From 11-84% of the area possesses an O or A horizon	0.50
Less than 10% of the area possesses an O or A horizon	0.30
Site is plowed	0.10

V_{redox}: The amount of the WAA that exhibits redox features an indication of the chemical exchange

Criteria	Variable Sub Index
Redox concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature masked due to parent material but conditions are conducive to redoximorphic processes. (many mottles)	1.0
Redox features less than 20%	0.1

V_{sorpt}: The absorptive properties of the soils in the WAA

Criteria	Variable Sub Index
The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, or 3/1)	1.00
WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays	0.50
The WAA is dominated by sandy soils (sands, loamy fine sands, loamy sands)	0.10

Riverine Herb/Shrub HGM (Interim) Worksheet

WAA #

Variable	Subindex
V_{dur}	
V_{freq}	
V_{topo}	
V_{wood}	
V_{mid}	
V_{herb}	
$V_{detritus}$	
V_{redox}	
V_{sorpt}	
$V_{connect}$	

WAA #

Variable	Subindex
V_{dur}	
V_{freq}	
V_{topo}	
V_{wood}	
V_{mid}	
V_{herb}	
$V_{detritus}$	
V_{redox}	
V_{sorpt}	
$V_{connect}$	

WAA #

Variable	Subindex
V_{dur}	
V_{freq}	
V_{topo}	
V_{wood}	
V_{mid}	
V_{herb}	
$V_{detritus}$	
V_{redox}	
V_{sorpt}	
$V_{connect}$	

Appendix C

HGM Plot Layout

HGM Interim

Study Plot Layout

HGM Lite 1/10th acre plot

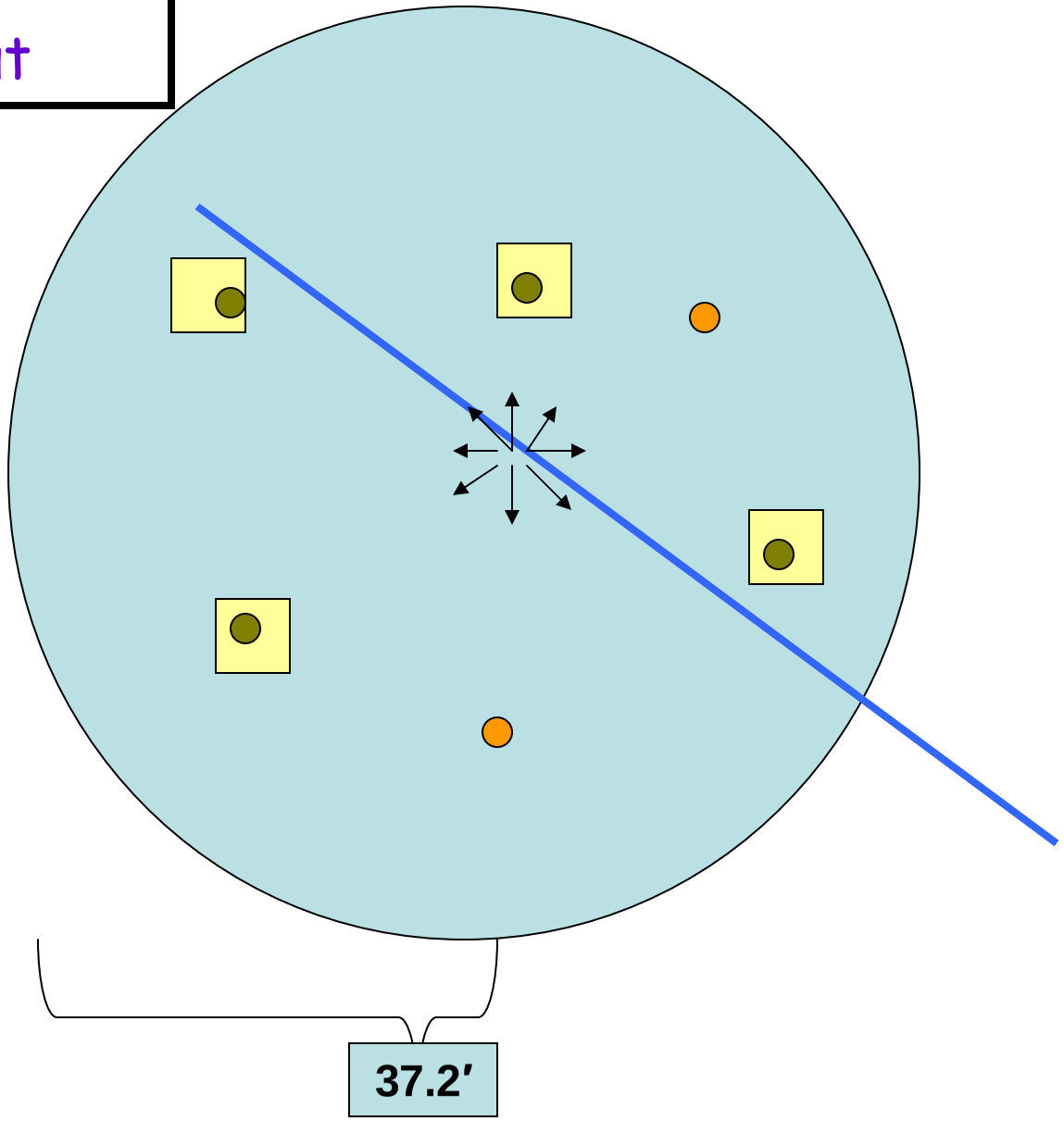
V_{cwd} 100 ft transect

V_{herb} 1m^2

$V_{detritus}$ sample

V_{redox}, V_{sorpt} sample

Photo Direction



Appendix D

Field Data Sheets

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Scanlin Property Applicant/Owner: Waste Management of Texas Investigator(s): Northrup Associates, Inc., Arville Touchet, Jimmy White	Date: January 21, 2003 County: Harris State: TX
Do Normal Circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical Situation)? Yes ____ No X Is the area a potential Problem Area? Yes ____ No X (If needed, explain.)	Community ID: ____ Transect ID: ____ Plot ID: HGM 1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Fraxinus pennsylvanica*	T	FAC+	9. Associated Species		
2. *Liquidambar styraciflua*	S/S	FAC	10. *Liquidambar styraciflua*	T	FAC
3. *Juncus effusus*	H	OBL	11. *Sapium sebiferum*	T	FACU+
4.			12. *Sabal minor*	S/S	FACW
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

>50%

HYDROLOGY

X Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- X Aerial Photographs
- X Other
- No Recorded Data Available

Field Observations:

Depth of Surface Water: 7 (in.)

Depth to Free Water in Pit: +7 (in.)

Depth to Saturated Soil: None (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Y*1 Inundated
- N Saturated in Upper 12 Inches
- Y Water Marks
- N Drift Lines
- N Sediment Deposits
- N Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- N Oxidized Root Channels in Upper 12 Inches
- N Water Stained Leaves
- N Local Soil Survey Data
- Y FAC-Neutral Test
- N Other (Explain in Remarks)

Remarks: *1 - Heavy rainfall 4 days prior (01-17-03).

SOILS HGM 1

Map Unit Name
(Series and Phase): Bernard-Edna (Inclusion of Ponded Beaumont) Drainage Class: VPD

Field Observations
Taxonomy (Subgroup): Typic Epiaquerts Confirm Mapped Type? Yes ____ No X

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0 - 5	A	10YR 3/1, 4/1	-	-	clay; 1fine subangular blocky
5 - 14	Bss1	10YR 3/1	-	-	clay; 2 medium angular blocky
14 - 42	Bss2	10YR 5/1, 3/1	-	-	clay; 2 medium angular blocky

Hydric Soil Indicators:

- N Histosol
- N Histic Epipedon
- N Sulfidic Odor
- - Aquic Moisture Regime
- - Reducing Conditions
- Y Gleyed or Low-Chroma Colors /1 chroma
- N Concretions
- N High Organic Content in Surface Layer in Sandy Soils
- N Organic Streaking in Sandy Soils
- Y Listed on Local Hydric Soils List
- Y Listed on National Hydric Soils List
- N Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____
Hydric Soils Present? Yes X No ____

Is this Sampling Point Within a Wetland? Yes X No ____

Remarks: This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 1.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Scanlin Property Applicant/Owner: Waste Management of Texas Investigator(s): Northrup Associates, Inc., Arville Touchet, Jimmy White	Date: January 21, 2003 County: Harris State: TX
Do Normal Circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical Situation)? Yes ____ No X Is the area a potential Problem Area? Yes ____ No X (If needed, explain.)	Community ID: ____ Transect ID: ____ Plot ID: HGM 2

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Sapium sebiferum*	T	FACU+	9. Associated Species		
2. *Baccharis halimifolia*	S/S	FACW-	10. *Pinus taeda*	T	FAC-
3. *Rubus trivialis*	WV	FAC	11. *Juncus effusus*	H	FACW
4. *Spartina spartinae*	H	FACW+	12.		
5. *Eleocharis parvula*	H	OBL	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

>50%

HYDROLOGY

X Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- X Aerial Photographs
- X Other
- No Recorded Data Available

Field Observations:

Depth of Surface Water: 1 (in.)

Depth to Free Water in Pit: +1 (in.)

Depth to Saturated Soil: Surface (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Y*1 Inundated
- Y Saturated in Upper 12 Inches
- Y Water Marks
- N Drift Lines
- N Sediment Deposits
- N Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- N Oxidized Root Channels in Upper 12 Inches
- N Water Stained Leaves
- N Local Soil Survey Data
- Y FAC-Neutral Test
- N Other (Explain in Remarks)

Remarks: *1 - Heavy rainfall 4 days prior (01-17-03).

SOILS HGM 2

Map Unit Name
(Series and Phase): Bernard-Edna (Inclusion of Beaumont) Drainage Class: PD

Field Observations
Taxonomy (Subgroup): Typic Epiaquerts Confirm Mapped Type? Yes ____ No X

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0 - 5	A	10YR 4/1	-	-	silty clay loam
5 - 42	Bss	10YR 5/1	-	-	silty clay

Hydric Soil Indicators:

- N Histosol
- N Histic Epipedon
- N Sulfidic Odor
- - Aquic Moisture Regime
- - Reducing Conditions
- Y Gleyed or Low-Chroma Colors /1 Chroma
- N Concretions
- N High Organic Content in Surface Layer in Sandy Soils
- N Organic Streaking in Sandy Soils
- Y Listed on Local Hydric Soils List
- Y Listed on National Hydric Soils List
- N Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____
Hydric Soils Present? Yes X No ____

Is this Sampling Point Within a Wetland? Yes X No ____

Remarks: This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 2.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Scanlin Property Applicant/Owner: Waste Management of Texas Investigator(s): Northrup Associates, Inc., Arville Touchet, Jimmy White	Date: January 22, 2003 County: Harris State: TX
Do Normal Circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical Situation)? Yes ____ No X Is the area a potential Problem Area? Yes ____ No X (If needed, explain.)	Community ID: ____ Transect ID: ____ Plot ID: HGM 3

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	T	FAC-	9.		
2. *Baccharis halimifolia*	S/S	FACW-	10.		
3. *Spartina spartinae*	H	FACW+	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

>50%

HYDROLOGY

X Recorded Data (Describe in Remarks):
Stream, Lake, or Tide Gauge
X Aerial Photographs
X Other
No Recorded Data Available

Field Observations:

Depth of Surface Water: 1/2 (in.)

Depth to Free Water in Pit: +1/2 (in.)

Depth to Saturated Soil: Surface (in.)

Wetland Hydrology Indicators:
Primary Indicators:
Y*1 Inundated
Y Saturated in Upper 12 Inches
N Water Marks
N Drift Lines
N Sediment Deposits
N Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
N Oxidized Root Channels in Upper 12 Inches
N Water Stained Leaves
N Local Soil Survey Data
Y FAC-Neutral Test
N Other (Explain in Remarks)

Remarks: 1* - Heavy rainfall 5 days prior (01-17-2003). No watermarks.

SOILS HGM 3

Map Unit Name
(Series and Phase): Bernard-Edna (Inclusion - Edna-like soil w/ Silty Clay Loam subsoil) Drainage Class: PD

Taxonomy (Subgroup): Typic Ochraqualfs Field Observations Confirm Mapped Type? Yes ____ No X

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0 - 5	A1	10YR 5/1, 6/2	-	-	fine sandy loam; 1 fine granular
5 - 8	A2	10YR 4/1	-	-	fine sandy loam; 1 medium granular
8 - 36	Bt1	10YR 4/1, 4/2	-	-	sandy clay loam; 2 medium subangular blocky
36 - 42	Btca	10YR 4/2, 4/1, 7/2	-	-	sandy clay loam; 2 medium subangular blocky

Hydric Soil Indicators:

N	Histosol	Y*1	Concretions
N	Histic Epipedon	N	High Organic Content in Surface Layer in Sandy Soils
N	Sulfidic Odor	N	Organic Streaking in Sandy Soils
-	Aquic Moisture Regime	Y	Listed on Local Hydric Soils List
-	Reducing Conditions	Y	Listed on National Hydric Soils List
Y	Gleyed or Low-Chroma Colors /1 Chroma	N	Other (Explain in Remarks)

Remarks: *1 - $CaCO_3$ at 36 inches.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	
Hydric Soils Present?	Yes X No ____	Is this Sampling Point Within a Wetland? Yes X No ____

Remarks: This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 3.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Scanlin Property Applicant/Owner: Waste Management of Texas Investigator(s): Northrup Associates, Inc., Arville Touchet, Jimmy White	Date: January 21, 2003 County: Harris State: TX
Do Normal Circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical Situation)? Yes ____ No X Is the area a potential Problem Area? Yes ____ No X (If needed, explain.)	Community ID: ____ Transect ID: ____ Plot ID: HGM 4

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Pinus taeda*	T	FAC-	9. Associated Species		
2. *Baccharis halimifolia*	S/S	FACW-	10. *Ilex vomitoria*	S/S	FAC-
3. *Spartina spartinae*	H	FACW+	11. *Andropogon glomeratus*	H	FACW+
4.			12. *Rubus trivialis*	WV	FAC
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

>50%

HYDROLOGY

X Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- X Aerial Photographs
- X Other
- No Recorded Data Available

Field Observations:

Depth of Surface Water: None (in.)

Depth to Free Water in Pit: 16 (in.)

Depth to Saturated Soil: 12 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- N Inundated
- Y*1 Saturated in Upper 12 Inches
- N Water Marks
- N Drift Lines
- N Sediment Deposits
- N Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- N Oxidized Root Channels in Upper 12 Inches
- N Water Stained Leaves
- N Local Soil Survey Data
- Y FAC-Neutral Test
- N Other (Explain in Remarks)

Remarks: *1 - Heavy rainfall 4 days prior (01-17-03).

SOILS HGM 4

Map Unit Name
(Series and Phase): Bernard - Edna (Inclusion of Edna w/ Sandy Clay Loam subsoil) Drainage Class: PD

Taxonomy (Subgroup): Typic Ochraqualfs

Field Observations
Confirm Mapped Type? Yes ____ No X

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0 - 4	A	10YR 5/1, 6/2	-	-	fine sandy loam; 1 fine granular
4 - 13	E	10YR 4/1, 5/2	-	-	fine sandy loam; 1 medium granular
13 - 21	Bt1	10YR 5/1, 6/2	-	-	sandy clay loam; 2 medium subangular blocky
21 - 42	Btca	10YR 6/2, 7/2	-	-	sandy clay loam; 2 medium subangular blocky

Hydric Soil Indicators:

N Histosol
N Histic Epipedon
N Sulfidic Odor
- Aquic Moisture Regime
- Reducing Conditions
Y Gleyed or Low-Chroma Colors /1 Chroma

Y*1 Concretions
N High Organic Content in Surface Layer in Sandy Soils
N Organic Streaking in Sandy Soils
Y Listed on Local Hydric Soils List
Y Listed on National Hydric Soils List
N Other (Explain in Remarks)

Remarks: *1 - $CaCO_3$ at 21 inches.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____
Hydric Soils Present? Yes X No ____

Is this Sampling Point Within a Wetland? Yes X No ____

Remarks: This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 4.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Scanlin Property Applicant/Owner: Waste Management of Texas Investigator(s): Northrup Associates, Inc., Arville Touchet, Jimmy White	Date: January 21, 2003 County: Harris State: TX
Do Normal Circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical Situation)? Yes ____ No X Is the area a potential Problem Area? Yes ____ No X (If needed, explain.)	Community ID: ____ Transect ID: ____ Plot ID: HGM 5

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Sapium sebiferum*	T	FACU+	9.		
2. *Sesbania drummondii*	S/S	FAC	10.		
3. *Sapium sebiferum*	S/S	FACU+	11.		
4. *Juncus effusus*	H	FACW	12.		
5. *Myriophyllum brasiliense*	SF	OBL	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

>50%

HYDROLOGY

X Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- X Aerial Photographs
- X Other
- No Recorded Data Available

Field Observations:

Depth of Surface Water: 4 (in.)

Depth to Free Water in Pit: +4 (in.)

Depth to Saturated Soil: Surface (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Y*1 Inundated
- Y Saturated in Upper 12 Inches
- N Water Marks
- N Drift Lines
- N Sediment Deposits
- N Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- N Oxidized Root Channels in Upper 12 Inches
- N Water Stained Leaves
- N Local Soil Survey Data
- N FAC-Neutral Test
- N Other (Explain in Remarks)

Remarks: *1 - Heavy rainfall 4 days prior (01-17-03).

SOILS HGM 5

Map Unit Name
(Series and Phase): Bernard-Edna (Edna-like Soil w/ Less Clayey subsoil) Drainage Class: PD

Field Observations
Taxonomy (Subgroup): Typic Ochraqualfs Confirm Mapped Type? Yes ____ No X

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0 - 5	A	10YR 5/1	-	-	silt loam; 1 fine granular
5 - 22	Bt1	10YR 4/1, 4/2	-	-	silty clay loam; 2 medium subangular blocky
22 - 42	Btca	10YR 5/1, 5/2, 7/2	-	-	silty clay loam; 2 medium subangular blocky

Hydric Soil Indicators:

- N Histosol
- N Histic Epipedon
- N Sulfidic Odor
- - Aquic Moisture Regime
- - Reducing Conditions
- Y Gleyed or Low-Chroma Colors /1 Chroma
- Y*1 Concretions
- N High Organic Content in Surface Layer in Sandy Soils
- N Organic Streaking in Sandy Soils
- Y Listed on Local Hydric Soils List
- Y Listed on National Hydric Soils List
- N Other (Explain in Remarks)

Remarks: *1 - $CaCO_3$ at 22 inches.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____
Hydric Soils Present? Yes X No ____

Is this Sampling Point Within a Wetland? Yes X No ____

Remarks: This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 5.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Scanlin Property Applicant/Owner: Waste Management of Texas Investigator(s): Northrup Associates, Inc., Arville Touchet, Jimmy White	Date: January 22, 2003 County: Harris State: TX
Do Normal Circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical Situation)? Yes ____ No X Is the area a potential Problem Area? Yes ____ No X (If needed, explain.)	Community ID: ____ Transect ID: ____ Plot ID: HGM 6

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Quercus nigra*	T	FAC+	9. Associated Species		
2. *Liquidambar styraciflua*	T	FAC	10. *Callicarpa americana*	H	FACU
3. *Celtis laevigata*	T	FAC	11. *Ilex opaca*	H	FACU
4. *Ilex vomitoria*	S/S	FAC-	12.		
5. *Sabal minor*	S/S	FAC	13.		
6. *Pinus taeda*	H	FAC-	14.		
7. *Ilex vomitoria*	H	FAC-	15.		
8. Leaf litter	H		16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

>50%

HYDROLOGY

X Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- X Aerial Photographs
- X Other
- No Recorded Data Available

Field Observations:

Depth of Surface Water: None (in.)

Depth to Free Water in Pit: 10 (in.)

Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- N Inundated
- Y*1 Saturated in Upper 12 Inches
- N Water Marks
- N Drift Lines
- N Sediment Deposits
- N Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- N Oxidized Root Channels in Upper 12 Inches
- N Water Stained Leaves
- N Local Soil Survey Data
- N FAC-Neutral Test
- N Other (Explain in Remarks)

Remarks: 1* - Heavy rainfall 5 days prior (01-17-03). No watermarks.

SOILS HGM 6

Map Unit Name
(Series and Phase): Aldine Very Fine Sandy Loam (Inclusion of Bernard-like soil w/ Silty Clay Loam subsoil) Drainage Class: PD

Taxonomy (Subgroup): Typic Argiaquolls

Field Observations
Confirm Mapped Type? Yes ____ No X

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0 - 5	A1	10YR 3/1, 6/2	-	-	fine sandy loam; 1 fine granular
5 - 10	A2	10YR 3/1	-	-	fine sandy loam; 2 medium granular
10 - 19	Bt1	10YR 4/1, 4/2	-	-	sandy clay loam; 2 medium subangular blocky
19 - 42	Btca	10YR 5/2, 7/2	-	-	sandy clay loam; 2 medium subangular blocky

Hydric Soil Indicators:

- N Histosol
- N Histic Epipedon
- N Sulfidic Odor
- - Aquic Moisture Regime
- - Reducing Conditions
- Y Gleyed or Low-Chroma Colors /1 Chroma
- Y*1 Concretions
- N High Organic Content in Surface Layer in Sandy Soils
- N Organic Streaking in Sandy Soils
- Y Listed on Local Hydric Soils List
- Y Listed on National Hydric Soils List
- N Other (Explain in Remarks)

Remarks: *1 - $CaCO_3$ at 19 inches.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____
Hydric Soils Present? Yes X No ____

Is this Sampling Point Within a Wetland? Yes X No ____

Remarks: This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 6.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Scanlin Property Applicant/Owner: Waste Management of Texas Investigator(s): Northrup Associates, Inc., Arville Touchet, Jimmy White	Date: January 22, 2003 County: Harris State: TX
Do Normal Circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical Situation)? Yes ____ No X Is the area a potential Problem Area? Yes ____ No X (If needed, explain.)	Community ID: ____ Transect ID: ____ Plot ID: HGM 7

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Fraxinus pennsylvanica*	T	FACW-	9.		
2. *Sapium sebiferum*	T	FACU+	10.		
3. *Sapium sebiferum*	S/S	FACU+	11.		
4. *Spartina spartinae*	H	FACW+	12.		
5. *Carex cherokeensis*	H	FACW-	13.		
6. *Phanopyrum gymnocarpon*	H	OBL	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

>50%

HYDROLOGY

X Recorded Data (Describe in Remarks):
Stream, Lake, or Tide Gauge
X Aerial Photographs
X Other
No Recorded Data Available

Field Observations:

Depth of Surface Water: 2 (in.)

Depth to Free Water in Pit: +2 (in.)

Depth to Saturated Soil: Surface (in.)

Wetland Hydrology Indicators:
Primary Indicators:
Y Inundated
N Saturated in Upper 12 Inches
Y Water Marks
N Drift Lines
N Sediment Deposits
N Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
N Oxidized Root Channels in Upper 12 Inches
N Water Stained Leaves
N Local Soil Survey Data
Y FAC-Neutral Test
N Other (Explain in Remarks)

Remarks: 1* - Heavy rainfall 5 days prior (01-17-03).

SOILS

Map Unit Name
(Series and Phase): Aldine Very Fine Sandy Loam (Inclusion of Ponded Aldine-like soil)

Drainage Class: PD

Taxonomy (Subgroup): Typic Ochraqualfs

Field Observations
Confirm Mapped Type? Yes ____ No X

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0 - 5	A	10YR 4/1	-	-	fine sandy loam; 2 medium granular
5 - 11	E	10YR 5/1	-	-	fine sandy loam; 2 medium granular
11 - 42	Bt	10YR 5/1, 5/2	-	-	sandy clay loam; 2 medium subangular blocky

Hydric Soil Indicators:

- N Histosol
- N Histic Epipedon
- N Sulfidic Odor
- - Aquic Moisture Regime
- - Reducing Conditions
- Y Gleyed or Low-Chroma Colors /1 Chroma
- N Concretions
- N High Organic Content in Surface Layer in Sandy Soils
- N Organic Streaking in Sandy Soils
- Y Listed on Local Hydric Soils List
- Y Listed on National Hydric Soils List
- N Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____
Hydric Soils Present? Yes X No ____

Is this Sampling Point Within a Wetland? Yes X No ____

Remarks: This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 7.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Atascocita Landfill Expansion City/County: Harris County Sampling Date: 11-21-2008

Applicant/Owner: Waste Management of Texas, Inc. State: TX Sampling Point: HGM 8

Investigator(s): C. Cox/ J. Marshall Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): Western Gulf Coast Flatwoods Lat: 29.95342 Long: -95.21865 Datum: NAD 83

Soil Map Unit Name: Addicks loam NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No _____ Hydric Soil Present? Yes X No _____ Wetland Hydrology Present? Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____

Remarks: Please see Hydrology "Remarks" for explanation of climatic/hydrological conditions. This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 8.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- _____ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- _____ Water Marks (B1)
- X Sediment Deposits (B2)
- _____ Drift Deposits (B3)
- _____ Algal Mat or Crust (B4)
- _____ Iron Deposits (B5)
- _____ Inundation Visible on Aerial Imagery (B7)
- _____ Water-Stained Leaves (B9)
- _____ Aquatic Fauna (B13)
- _____ Marl Deposits (B15) (**LRR U**)
- _____ Hydrogen Sulfide Odor (C1)
- _____ Oxidized Rhizospheres on Living Roots (C3)
- _____ Presence of Reduced Iron (C4)
- _____ Recent Iron Reduction in Tilled Soils (C6)
- _____ Thin Muck Surface (C7)
- _____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- _____ Surface Soil Cracks (B6)
- _____ Sparsely Vegetated Concave Surface (B8)
- _____ Drainage Patterns (B10)
- _____ Moss Trim Lines (B16)
- _____ Dry-Season Water Table (C2)
- _____ Crayfish Burrows (C8)
- _____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- _____ Shallow Aquitard (D3)
- _____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes X No _____ Depth (inches): 20

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 8

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology was observed at this data point.

Climatic and hydrologic conditions were obtained from one WETS Station within Harris County (Houston WSCMO AP, TX4300). Based on the 10-year (1991–2000) and historical (1971 – 2000) rainfall averages reported by the USDA - NRCS (http://www.wcc.nrcs.usda.gov/climate/wetlands.html for historical data) in Harris County, Texas, at the WETS Station, the project site exhibits typical climatic/hydrologic conditions. For the month of November, the 10-year-average rainfall is reported at 4.53 inches and the historical average is reported at 4.18 inches; 3.92 inches of rainfall was recorded in Harris County for November 2008 (http://webgis.tamu.edu/default.aspx).

VEGETATION – Use scientific names of plants. Sampling Point: HGM 8

Tree Stratum (Plot sizes: 30-foot radius)	Absolute % Cover	Dominant Species	Indicator Status
1. *Sapium sebiferum*	5	N	FACU+
2. *Celtis laevigata*	25	Y	FAC
3. *Ulmus americana*	25	Y	FAC
4. *Crataegus viridis*	20	Y	FAC
5.			
6.			
7.			
Total Cover:	75		
Sapling Stratum ( )			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
Total Cover:			
Shrub Stratum (30-foot radius)			
1. *Ilex vomitoria*	10	Y	FAC-
2. *Sabal minor*	30	Y	FACW
3.			
4.			
5.			
6.			
7.			
Total Cover:	40		
Herb Stratum (30-foot radius)			
1. *Chasmanthium laxum*	30	Y	FAC
2. *Panicum repens*	20	Y	FAC+
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
Total Cover:	50		
Woody Vine Stratum (30-foot radius)			
1. *Rubus trivialis*	10	Y	FAC
2. *Smilax bona-nox*	5	N	FAC
3. *Berchemia scandens*	10	Y	FAC+
4. *Vitis rotundifolia*	10	Y	FAC-
5.			
Total Cover:	35		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Test is ≤3.0[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: The herb stratum sampling radius contained both an open canopy area adjacent to open water that supports *Panicum repens* and a closed canopy area that supports *Chasmanthium laxum*. This data point contains a predominance of hydrophytic vegetation.

SOIL

Sampling Point: HGM 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 20	5 Y 2.5/1	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Organic Bodies (A6) (**LRR P, T, U**)
- ____ 5m Mucky Mineral (A7) (**LRR P, T, U**)
- ____ Muck Presence (A8) (**LRR U**)
- ____ 1 cm Muck (A9) (**LRR P, T**)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Coastal Prairie Redox (A16) (**MLRA 150A**)
- ____ Sandy Mucky Mineral (S1) (**RLRR O, S**)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7) (**LRR P, S, T, U**)
- ____ Polyvalue Below Surface (S8) (**LRR S, T, U**)
- ____ Thin Dark Surface (S9) (**LRR S, T, U**)
- ____ Loamy Mucky Mineral (F1) (**LRR O**)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ Marl (F10) (**LRR U**)
- ____ Depleted Ochric (F11) (**MLRA 151**)
- ____ Iron-Manganese Masses (F12) (**LRR O, P, T**)
- ____ Umbric Surface (F13) (**LRR P, T, U**)
- ____ Delta Ochric (F17) (**MLRA, 151**)
- ____ Reduced Vertic (F18) (**MLRA 150A, 150B**)
- ____ Piedmont Floodplain Soils (F19) (**MLRA 149A**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 149A, 153C, 153D**)

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) (**LRR O**)
- ____ 2 cm Muck (A10) (**LRR S**)
- ____ Reduced Vertic (F18) (**outside MLRA 150A,B)**
- ____ Piedmont Floodplain Soils (F19) (**LRR P, S, T**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 153B**)
- ____ Red Parent Material (TF2)
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: The soils observed at this data point were indicative of hydric conditions.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Atascocita Landfill Expansion City/County: Harris County Sampling Date: 11-21-2008

Applicant/Owner: Waste Management of Texas, Inc. State: TX Sampling Point: HGM 9

Investigator(s): C. Cox/ J. Marshall Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): Western Gulf Coast Flatwoods Lat: 29.95308 Long: -95.21804 Datum: NAD 83

Soil Map Unit Name: Addicks loam NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____ Hydric Soil Present? Yes X No ____ Wetland Hydrology Present? Yes X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____

Remarks: Please see Hydrology "Remarks" for explanation of climatic/hydrological conditions. This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 9.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) (**LRR U**)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology was observed at this data point.

Climatic and hydrologic conditions were obtained from one WETS Station within Harris County (Houston WSCMO AP, TX4300). Based on the 10-year (1991–2000) and historical (1971 – 2000) rainfall averages reported by the USDA - NRCS (http://www.wcc.nrcs.usda.gov/climate/wetlands.html for historical data) in Harris County, Texas, at the WETS Station, the project site exhibits typical climatic/hydrologic conditions. For the month of November, the 10-year-average rainfall is reported at 4.53 inches and the historical average is reported at 4.18 inches; 3.92 inches of rainfall was recorded in Harris County for November 2008 (http://webgis.tamu.edu/default.aspx).

VEGETATION – Use scientific names of plants. Sampling Point: HGM 9

Tree Stratum (Plot sizes: 30-foot radius)	Absolute % Cover	Dominant Species	Indicator Status
1. *Sapium sebiferum*	5	N	FACU+
2. *Celtis laevigata*	10	Y	FAC
3. *Crataegus viridis*	10	Y	FAC
4. *Ulmus americana*	20	Y	FAC
5.			
6.			
7.			
Total Cover:	45		
Sapling Stratum ( )			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
Total Cover:			
Shrub Stratum (30-foot radius)			
1. *Ilex vomitoria*	10	Y	FAC-
2. *Sabal minor*	20	Y	FACW
3.			
4.			
5.			
6.			
7.			
Total Cover:	30		
Herb Stratum (30-foot radius)			
1. *Chasmanthium laxum*	20	Y	FAC
2. *Panicum repens*	10	N	FAC+
3. *Lonicera japonica*	5	N	FAC
4. *Carex cherokeensis*	30	Y	FACW-
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
Total Cover:	65		
Woody Vine Stratum (30-foot radius)			
1. *Vitis rotundifolia*	10	Y	FAC-
2. *Berchemia scandens*	20	Y	FAC+
3.			
4.			
5.			
Total Cover:	30		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Test is ≤3.0[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: This data point contains a predominance of hydrophytic vegetation.

SOIL

Sampling Point: HGM 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10 YR 4/1	100					LC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Organic Bodies (A6) (**LRR P, T, U**)
- ____ 5m Mucky Mineral (A7) (**LRR P, T, U**)
- ____ Muck Presence (A8) (**LRR U**)
- ____ 1 cm Muck (A9) (**LRR P, T**)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Coastal Prairie Redox (A16) (**MLRA 150A**)
- ____ Sandy Mucky Mineral (S1) (**RLRR O, S**)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7) (**LRR P, S, T, U**)
- ____ Polyvalue Below Surface (S8) (**LRR S, T, U**)
- ____ Thin Dark Surface (S9) (**LRR S, T, U**)
- ____ Loamy Mucky Mineral (F1) (**LRR O**)
- ____ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ Marl (F10) (**LRR U**)
- ____ Depleted Ochric (F11) (**MLRA 151**)
- ____ Iron-Manganese Masses (F12) (**LRR O, P, T**)
- ____ Umbric Surface (F13) (**LRR P, T, U**)
- ____ Delta Ochric (F17) (**MLRA, 151**)
- ____ Reduced Vertic (F18) (**MLRA 150A, 150B**)
- ____ Piedmont Floodplain Soils (F19) (**MLRA 149A**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 149A, 153C, 153D**)

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) (**LRR O**)
- ____ 2 cm Muck (A10) (**LRR S**)
- ____ Reduced Vertic (F18) (**outside MLRA 150A,B)**
- ____ Piedmont Floodplain Soils (F19) (**LRR P, S, T**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 153B**)
- ____ Red Parent Material (TF2)
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: The soils observed at this data point were indicative of hydric conditions.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Atascocita Landfill Expansion City/County: Harris County Sampling Date: 11-21-2008

Applicant/Owner: Waste Management of Texas, Inc. State: TX Sampling Point: HGM 10

Investigator(s): C. Cox/ J. Marshall Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): Western Gulf Coast Flatwoods Lat: 29.95312 Long: -95.21739 Datum: NAD 83

Soil Map Unit Name: Addicks loam NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: Please see Hydrology "Remarks" for explanation of climatic/hydrological conditions. This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 10.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- _____ High Water Table (A2)
- X Saturation (A3)
- _____ Water Marks (B1)
- _____ Sediment Deposits (B2)
- _____ Drift Deposits (B3)
- _____ Algal Mat or Crust (B4)
- _____ Iron Deposits (B5)
- _____ Inundation Visible on Aerial Imagery (B7)
- _____ Water-Stained Leaves (B9)
- _____ Aquatic Fauna (B13)
- _____ Marl Deposits (B15) (**LRR U**)
- _____ Hydrogen Sulfide Odor (C1)
- _____ Oxidized Rhizospheres on Living Roots (C3)
- _____ Presence of Reduced Iron (C4)
- _____ Recent Iron Reduction in Tilled Soils (C6)
- _____ Thin Muck Surface (C7)
- _____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- _____ Surface Soil Cracks (B6)
- _____ Sparsely Vegetated Concave Surface (B8)
- _____ Drainage Patterns (B10)
- _____ Moss Trim Lines (B16)
- _____ Dry-Season Water Table (C2)
- _____ Crayfish Burrows (C8)
- _____ Saturation Visible on Aerial Imagery (C9)
- _____ Geomorphic Position (D2)
- _____ Shallow Aquitard (D3)
- _____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No _____	Depth (inches): 6
Water Table Present?	Yes X	No _____	Depth (inches): At Surface
Saturation Present? (includes capillary fringe)	Yes Y	No _____	Depth (inches): At Surface

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology was observed at this data point.

Climatic and hydrologic conditions were obtained from one WETS Station within Harris County (Houston WSCMO AP, TX4300). Based on the 10-year (1991–2000) and historical (1971 – 2000) rainfall averages reported by the USDA - NRCS (http://www.wcc.nrcs.usda.gov/climate/wetlands.html for historical data) in Harris County, Texas, at the WETS Station, the project site exhibits typical climatic/hydrologic conditions. For the month of November, the 10-year-average rainfall is reported at 4.53 inches and the historical average is reported at 4.18 inches; 3.92 inches of rainfall was recorded in Harris County for November 2008 (http://webgis.tamu.edu/default.aspx).

VEGETATION – Use scientific names of plants. Sampling Point: HGM 10

Tree Stratum (Plot sizes: 30-foot radius)	Absolute % Cover	Dominant Species	Indicator Status
1. *Sapium sebiferum*	20	Y	FACU+
2. *Fraxinus pennsylvanica*	30	Y	FACW-
3.			
4.			
5.			
6.			
7.			
Total Cover:	50		
Sapling Stratum ( )			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
Total Cover:			
Shrub Stratum ( )			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
Total Cover:			
Herb Stratum (30-foot radius)			
1. *Eleocharis montevidensis*	30	Y	FACW+
2. *Carex cherokeensis*	40	Y	FACW-
3. *Juncus effusus*	30	Y	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
Total Cover:	100		
Woody Vine Stratum (30-foot radius)			
1. *Berchemia scandens*	5	Y	FAC+
2.			
3.			
4.			
5.			
Total Cover:	5		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Test is ≤3.0[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: This data point does contain a predominance of hydrophytic vegetation.

SOIL

Sampling Point: HGM 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10 YR 6/2	80	10 YR 7/8	20	RM	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Organic Bodies (A6) (**LRR P, T, U**)
- ____ 5m Mucky Mineral (A7) (**LRR P, T, U**)
- ____ Muck Presence (A8) (**LRR U**)
- ____ 1 cm Muck (A9) (**LRR P, T**)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Coastal Prairie Redox (A16) (**MLRA 150A**)
- ____ Sandy Mucky Mineral (S1) (**RLRR O, S**)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7) (**LRR P, S, T, U**)
- ____ Polyvalue Below Surface (S8) (**LRR S, T, U**)
- ____ Thin Dark Surface (S9) (**LRR S, T, U**)
- ____ Loamy Mucky Mineral (F1) (**LRR O**)
- ____ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ Marl (F10) (**LRR U**)
- ____ Depleted Ochric (F11) (**MLRA 151**)
- ____ Iron-Manganese Masses (F12) (**LRR O, P, T**)
- ____ Umbric Surface (F13) (**LRR P, T, U**)
- ____ Delta Ochric (F17) (**MLRA, 151**)
- ____ Reduced Vertic (F18) (**MLRA 150A, 150B**)
- ____ Piedmont Floodplain Soils (F19) (**MLRA 149A**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 149A, 153C, 153D**)

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) (**LRR O**)
- ____ 2 cm Muck (A10) (**LRR S**)
- ____ Reduced Vertic (F18) (**outside MLRA 150A,B)**
- ____ Piedmont Floodplain Soils (F19) (**LRR P, S, T**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 153B**)
- ____ Red Parent Material (TF2)
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: The soils observed at this data point were indicative of hydric conditions.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Atascocita Landfill Expansion City/County: Harris Sampling Date: 08-12-09

Applicant/Owner: Waste Management of Texas, Inc. State: TX Sampling Point: HGM 11

Investigator(s): C. Hinojosa and T. Rodriguez Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): plane Local relief (concave, convex, none): concave Slope (%): 0 – 1

Subregion (LRR or MLRA): Western Gulf Coast Flatwoods Lat: 29.9537 Long: -95.2207 Datum: NAD 83

Soil Map Unit Name: Edna fine sandy loam NWI classification: –

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Please see Hydrology "Remarks" for explanation of climatic/hydrological conditions. This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 11.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- X Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) (**LRR U**)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology was observed at this data point.

Based on the 10-year (1992 – 2001) and historical (1971 – 2000) rainfall averages reported by the USDA – NRCS (http://www.wcc.nrcs.usda.gov/climate/wetlands.html) for historic data in Harris County, Texas, the project site exhibits typical climatic/hydrological conditions. Furthermore, the site is within the reported "30% chance will have less than" amount which is listed as 2.03 inches and "30% chance will have more than" which is listed as 5.32 inches for July; which constitutes the rainfall as average. The 10-year-average rainfall is reported at 2.70 inches and the historic average is reported at 4.36 inches; 4.56 inches of rainfall was recorded in Harris County for July 2009 (http://www.hcoem.org/RainGauge.aspx?G=1650; P130 Garners Bayou at Rankin Road).

Based on the 10-year (1992 – 2001) and historical (1971 – 2000) rainfall averages reported by the USDA – NRCS (http://www.wcc.nrcs.usda.gov/climate/wetlands.html) for historic data in Harris County, Texas, the project site does not exhibit typical climatic/hydrological conditions. Furthermore, the site is below the reported "30% chance will have less than" amount which is listed as 4.06 inches for June; which constitutes the rainfall as below average. The 10-year-average rainfall is reported at 6.33 inches and the historic average is reported at 6.84 inches; 0.20 inches of rainfall was recorded in Harris County for June 2009 (http://www.hcoem.org/RainGauge.aspx?G=1650; P130 Garners Bayou at Rankin Road).

Based on the 10-year (1992 – 2001) and historical (1971 – 2000) rainfall averages reported by the USDA – NRCS (http://www.wcc.nrcs.usda.gov/climate/wetlands.html) for historic data in Harris County, Texas, the project site does not exhibit typical climatic/hydrological conditions. Furthermore, the site is below the reported "30% chance will have less than" amount which is listed as 2.38 for May; which constitutes the rainfall as below average. The 10-year-average rainfall is reported at 5.81 inches and the historic average is reported at 5.11 inches; 0.94 inches of rainfall was recorded in Harris County for May 2009 (http://www.hcoem.org/RainGauge.aspx?G=1650; P130 Garners Bayou at Rankin Road).

VEGETATION – Use scientific names of plants. Sampling Point: HGM 11

Tree Stratum (Plot sizes: 30-ft. radius)	Absolute % Cover	Dominant Species	Indicator Status
1. *Sapium sebiferum*	10	Y	FACU+
2.			
3.			
4.			
5.			
6.			
7.			
Total Cover:	10		
Sapling Stratum ( )			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
Total Cover:			
Shrub Stratum (30-ft. radius)			
1. *Sabal minor*	5	Y	FACW
2. *Ilex vomitoria*	5	Y	FAC-
3.			
4.			
5.			
6.			
7.			
Total Cover:	10		
Herb Stratum (30-ft. radius)			
1. *Polygonum hydropiperoides*	35	Y	OBL
2. *Sesbania drummondii*	10	N	FACW
3. *Eupatorium serotinum*	7	N	FAC-
4. *Cyperus virens*	5	N	FACW
5. *Centella asiatica*	1	N	FACW
6. *Gaura lindheimeri*	1	N	UPL
7.			
8.			
9.			
10.			
11.			
12.			
Total Cover:	59		
Woody Vine Stratum ( )			
1.			
2.			
3.			
4.			
5.			
Total Cover:			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Test is ≤3.0[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes X No

Remarks: This data point exhibits a predominance of hydrophytic vegetation.

SOIL

Sampling Point: HGM 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 5/2	99	10YR 4/6	1	C	M	sicl	
4 - 12	10YR 5/1	93	10YR 4/6	2	C	M	cl	
	10YR 7/2	5						
12 - 20	10YR 5/2	98	10YR 4/6	2	C	M	c	CaCO3 noted in layer

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Organic Bodies (A6) (**LRR P, T, U**)
- ____ 5m Mucky Mineral (A7) (**LRR P, T, U**)
- ____ Muck Presence (A8) (**LRR U**)
- ____ 1 cm Muck (A9) (**LRR P, T**)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Coastal Prairie Redox (A16) (**MLRA 150A**)
- ____ Sandy Mucky Mineral (S1) (**RLRR O, S**)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7) (**LRR P, S, T, U**)
- ____ Polyvalue Below Surface (S8) (**LRR S, T, U**)
- ____ Thin Dark Surface (S9) (**LRR S, T, U**)
- ____ Loamy Mucky Mineral (F1) (**LRR O**)
- ____ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ Marl (F10) (**LRR U**)
- ____ Depleted Ochric (F11) (**MLRA 151**)
- ____ Iron-Manganese Masses (F12) (**LRR O, P, T**)
- ____ Umbric Surface (F13) (**LRR P, T, U**)
- ____ Delta Ochric (F17) (**MLRA, 151**)
- ____ Reduced Vertic (F18) (**MLRA 150A, 150B**)
- ____ Piedmont Floodplain Soils (F19) (**MLRA 149A**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 149A, 153C, 153D**)

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) (**LRR O**)
- ____ 2 cm Muck (A10) (**LRR S**)
- ____ Reduced Vertic (F18) (**outside MLRA 150A,B)**
- ____ Piedmont Floodplain Soils (F19) (**LRR P, S, T**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 153B**)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12) (**LRR T, U)**
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: The soils observed at this data point were indicative of hydric conditions.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Atascocita Landfill Expansion City/County: Harris Sampling Date: 08-11-09

Applicant/Owner: Waste Management of Texas, Inc. State: TX Sampling Point: HGM 12

Investigator(s): C. Hinojosa and T. Rodriguez Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): plane Local relief (concave, convex, none): concave Slope (%): 2 – 5

Subregion (LRR or MLRA): Western Gulf Coast Flatwoods Lat: 29.9523 Long: -95.2211 Datum: NAD 83

Soil Map Unit Name: Aldine very fine sandy loam NWI classification: –

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Please see Hydrology "Remarks" for explanation of climatic/hydrological conditions. This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 12.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) (**LRR U**)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology was observed at this data point.

Based on the 10-year (1992 – 2001) and historical (1971 – 2000) rainfall averages reported by the USDA – NRCS (http://www.wcc.nrcs.usda.gov/climate/wetlands.html) for historic data in Harris County, Texas, the project site exhibits typical climatic/hydrological conditions. Furthermore, the site is within the reported "30% chance will have less than" amount which is listed as 2.03 inches and "30% chance will have more than" which is listed as 5.32 inches for July; which constitutes the rainfall as average. The 10-year-average rainfall is reported at 2.70 inches and the historic average is reported at 4.36 inches; 4.56 inches of rainfall was recorded in Harris County for July 2009 (http://www.hcoem.org/RainGauge.aspx?G=1650; P130 Garners Bayou at Rankin Road).

Based on the 10-year (1992 – 2001) and historical (1971 – 2000) rainfall averages reported by the USDA – NRCS (http://www.wcc.nrcs.usda.gov/climate/wetlands.html) for historic data in Harris County, Texas, the project site does not exhibit typical climatic/hydrological conditions. Furthermore, the site is below the reported "30% chance will have less than" amount which is listed as 4.06 inches for June; which constitutes the rainfall as below average. The 10-year-average rainfall is reported at 6.33 inches and the historic average is reported at 6.84 inches; 0.20 inches of rainfall was recorded in Harris County for June 2009 (http://www.hcoem.org/RainGauge.aspx?G=1650; P130 Garners Bayou at Rankin Road).

Based on the 10-year (1992 – 2001) and historical (1971 – 2000) rainfall averages reported by the USDA – NRCS (http://www.wcc.nrcs.usda.gov/climate/wetlands.html) for historic data in Harris County, Texas, the project site does not exhibit typical climatic/hydrological conditions. Furthermore, the site is below the reported "30% chance will have less than" amount which is listed as 2.38 for May; which constitutes the rainfall as below average. The 10-year-average rainfall is reported at 5.81 inches and the historic average is reported at 5.11 inches; 0.94 inches of rainfall was recorded in Harris County for May 2009 (http://www.hcoem.org/RainGauge.aspx?G=1650; P130 Garners Bayou at Rankin Road).

VEGETATION – Use scientific names of plants. Sampling Point: HGM 12

Tree Stratum (Plot sizes:)	Absolute % Cover	Dominant Species	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
Total Cover:			
Sapling Stratum (30-ft. radius)			
1. *Sapium sebiferum*	10	Y	FACU+
2.			
3.			
4.			
5.			
6.			
7.			
Total Cover:	10		
Shrub Stratum (30-ft. radius)			
1. *Sabal minor*	3	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
Total Cover:	3		
Herb Stratum (30-ft. radius)			
1. *Polygonum hydropiperoides*	50	Y	OBL
2. *Cyperus virens*	30	Y	FACW
3. *Sesbania drummondii*	10	N	FACW
4. *Eupatorium capillifolium*	3	N	FACU
5. *Juncus effusus*	3	N	OBL
6. *Eupatorium serotinum*	1	N	FAC-
7. *Sagittaria lancifolia*	1	N	OBL
8. *Spartina spartinae*	1	N	FACW+
9.			
10.			
11.			
12.			
Total Cover:	99		
Woody Vine Stratum ( )			
1.			
2.			
3.			
4.			
5.			
Total Cover:			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Test is ≤3.0[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes X No

Remarks: This data point exhibits a predominance of hydrophytic vegetation.

SOIL

Sampling Point: HGM 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 1	10YR 3/1	100					sil	
1 - 4	10YR 5/2	80					sil	
	10YR 3/1	20						
4 - 8	10YR 5/2	98	10YR 4/6	2	C	M	sicl	
8 -16	10YR 5/1	99	10YR 4/6	1	D	PL	cl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Organic Bodies (A6) (**LRR P, T, U**)
- ____ 5m Mucky Mineral (A7) (**LRR P, T, U**)
- ____ Muck Presence (A8) (**LRR U**)
- ____ 1 cm Muck (A9) (**LRR P, T**)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Coastal Prairie Redox (A16) (**MLRA 150A**)
- ____ Sandy Mucky Mineral (S1) (**RLRR O, S**)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7) (**LRR P, S, T, U**)
- ____ Polyvalue Below Surface (S8) (**LRR S, T, U**)
- ____ Thin Dark Surface (S9) (**LRR S, T, U**)
- ____ Loamy Mucky Mineral (F1) (**LRR O**)
- ____ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ Marl (F10) (**LRR U**)
- ____ Depleted Ochric (F11) (**MLRA 151**)
- ____ Iron-Manganese Masses (F12) (**LRR O, P, T**)
- ____ Umbric Surface (F13) (**LRR P, T, U**)
- ____ Delta Ochric (F17) (**MLRA, 151**)
- ____ Reduced Vertic (F18) (**MLRA 150A, 150B**)
- ____ Piedmont Floodplain Soils (F19) (**MLRA 149A**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 149A, 153C, 153D**)

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) (**LRR O**)
- ____ 2 cm Muck (A10) (**LRR S**)
- ____ Reduced Vertic (F18) (**outside MLRA 150A,B)**
- ____ Piedmont Floodplain Soils (F19) (**LRR P, S, T**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 153B**)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12) (**LRR T, U)**
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: The soils observed at this data point were indicative of hydric conditions.

DATA FORM
ROUTINE WETLAND DELINEATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Atascocita Landfill Expansion Applicant/Owner: Waste Management of Texas Investigator(s): W. Abbott & R. Salazar	Date: 9/20/07 County: Harris State: Texas
Do Normal Circumstances exist on the site? ☒YES ☐NO Is the site significantly disturbed (Atypical Situation)? ☐YES ☒NO Is the area a potential Problem Area? ☐YES ☒NO (If needed, explain on reverse.)	Community ID: Transect ID: Plot ID: HGM 13

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Cynodon dactylon	H	FACU+			
Alternanthera philoxeroides	H	OBL			
Eleocharis montana	H	OBL			

Percentage of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): = 66 %

Remarks: This data point exhibits a predominance of hydrophytic vegetation.

HYDROLOGY

☒Recorded Data (Describe In Remarks)
- ☐Stream, Lake, or Tide Gauge
- ☒Aerial Photographs- CIR, 1995
- ☒Other

☐No Recorded Data Available

Field Observations:

Depth of Surface Water: 4 (in)

Depth to Free Water in Pit: 0 (in)

Depth to Saturated Soil: 0 (in)

Wetland Hydrology Indicators:

Primary Indicators:
- ☒Inundated
- ☒Saturated in upper 12 inches
- ☐Water Marks
- ☐Drift Lines
- ☐Sediment Deposits
- ☐Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
- ☐Oxidized Root Channels in upper 12 inches
- ☐Water-Stained Leaves
- ☐Local Soil Survey Data
- ☐FAC-Neutral Test (0)
- ☐Other (Explain in Remarks)

Remarks: Wetland hydrology was observed at this data point.

SOILS (, continued)

Map Unit Name
(Series and Phase): (Bernard)-Edna complex
Taxonomy (Subgroup): Vertic Argiaquolls

Drainage Class: SPD
Field Observations

Confirmed Mapped Type:
☐YES ☒NO

Profile Description:

Depth (inches)	Horizon	Matrix Color Munsell Moist	Mottle Colors Munsell Moist	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6	A	10YR 3/1	10YR 4/6	F2D	clay
6-15	Bt1	Gley 1 6/10Y			clay
15-23	Bt2	Gley 1 6/10Y	10YR 6/4	C2D	clay

Hydric Soils Indicators:

- ☐Histosols
- ☐Histic Epipedon
- ☐Sulfidic Odor
- ☐Aquic Moisture Regime
- ☐Reducing Conditions
- ☒Gleyed or Low-Chroma Colors
- ☐Concretion(s)
- ☐Low-Chroma Colors
- ☐High Organic Content
- ☐Organic Streaking in Sandy Soils
- ☐Listed on Local Hydric Soils List
- ☐Listed on National Hydric Soils List
- ☐Other (Explain in Remarks)

Remarks: The soils observed at this data point were indicative of hydric conditions.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒YES ☐NO
Wetland Hydrology Present? ☒YES ☐NO
Hydric Soils Present? ☒YES ☐NO

Is the Sampling Point within a Wetland? ☒YES ☐NO
Indicate size of wetland:

Remarks: This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 13.

Modified 10/31/97. Taken from Approved HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DELINEATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Atascocita Landfill Expansion Applicant/Owner: Waste Management of Texas Investigator(s): W. Abbott & R. Salazar	Date: 9/20/07 County: Harris State: Texas
Do Normal Circumstances exist on the site? ☒YES ☐NO Is the site significantly disturbed (Atypical Situation)? ☐YES ☒NO Is the area a potential Problem Area? ☐YES ☒NO (If needed, explain on reverse.)	Community ID: Transect ID: Plot ID: HGM 14

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Paspalum urvillei	H	FAC			
Polygonum hydropiperoides	H	OBL			
Sagittaria lancifolia	H	OBL			
Mikania scandens	V	FACW+			

Percentage of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): = 100 %

Remarks: This data point exhibits a predominance of hydrophytic vegetation.

HYDROLOGY

☒Recorded Data (Describe In Remarks)
- ☐Stream, Lake, or Tide Gauge
- ☒Aerial Photographs- CIR, 1995
- ☒Other

☐No Recorded Data Available

Field Observations:

Depth of Surface Water: 4 (in)

Depth to Free Water in Pit: 0 (in)

Depth to Saturated Soil: 0 (in)

Wetland Hydrology Indicators:

Primary Indicators:
- ☒Inundated
- ☒Saturated in upper 12 inches
- ☐Water Marks
- ☐Drift Lines
- ☐Sediment Deposits
- ☐Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
- ☐Oxidized Root Channels in upper 12 inches
- ☐Water-Stained Leaves
- ☐Local Soil Survey Data
- ☐FAC-Neutral Test (0)
- ☐Other (Explain in Remarks)

Remarks: Wetland hydrology was observed at this data point.

SOILS (, continued)

HGM 14

Map Unit Name
(Series and Phase): (Bernard)-Edna complex
Taxonomy (Subgroup): Vertic Argiaquolls

Drainage Class: SPD
Field Observations

Confirmed Mapped Type:
☐YES ☐NO

Profile Description:

Depth (inches)	Horizon	Matrix Color Munsell Moist	Mottle Colors Munsell Moist	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-16	A	10YR 2/1			cl
16-24	Bt1	10YR 5/1	10YR 4/4	C2D	c

Hydric Soils Indicators:

- ☐Histosols
- ☐Histic Epipedon
- ☐Sulfidic Odor
- ☐Aquic Moisture Regime
- ☐Reducing Conditions
- ☒Gleyed or Low-Chroma Colors
- ☐Concretion(s)
- ☐Low-Chroma Colors
- ☐High Organic Content
- ☐Organic Streaking in Sandy Soils
- ☐Listed on Local Hydric Soils List
- ☐Listed on National Hydric Soils List
- ☐Other (Explain in Remarks)

Remarks: The soils observed at this data point were indicative of hydric conditions.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒YES ☐NO
Wetland Hydrology Present? ☒YES ☐NO
Hydric Soils Present? ☒YES ☐NO

Is the Sampling Point within a Wetland? ☒YES ☐NO
Indicate size of wetland:

Remarks: This data point met the technical criteria to be considered a wetland. Please refer to the Exhibits in Appendix A for spatial data associated with HGM 14.

Modified 10/31/97. Taken from Approved HQUSACE 3/92

Appendix E

HGM Plot Photographs

Photo 1: Typical view of Hydrogeomorphic (HGM) 1 located within Wetland Assessment Area (WAA) 1.

Photo 2: Typical view of HGM 2 located within WAA 2.

Waste Management of Texas, Inc.	
Appendix E Atascocita Landfill Expansion Project HGM Plot Photographs Harris County, Texas	
Prepared By: klp/coh	8588 Katy Freeway, Sweet 441 Houston, Tx. 77024 713-463-8200
Project No: 07-0819	

Photo 3: Typical view of HGM 3 located within WAA 2.

Photo 4: Typical view of HGM 4 located within WAA 3.

Waste Management of Texas, Inc.	
Appendix E Atascocita Landfill Expansion Project HGM Plot Photographs Harris County, Texas	
Prepared By: klp/coh	8588 Katy Freeway, Sweet 441 Houston, Tx. 77024 713-463-8200
Project No: 07-0819	

Photo 5: Typical view of HGM 5 located within WAA 4.

Photo 6: Typical view of HGM 6 located within WAA 5.

Waste Management of Texas, Inc.	
Appendix E Atascocita Landfill Expansion Project HGM Plot Photographs Harris County, Texas	
Prepared By: klp/coh	8588 Katy Freeway, Sweet 441 Houston, Tx. 77024 713-463-8200
Project No: 07-0819	

Photo 7: Typical view of HGM 7 located within WAA 5.

Photo 8: Typical view of HGM 8 located within WAA 6.

Waste Management of Texas, Inc.	
Appendix E Atascocita Landfill Expansion Project HGM Plot Photographs Harris County, Texas	
Prepared By: klp/coh	8588 Katy Freeway, Sweet 441 Houston, Tx. 77024 713-463-8200
Project No: 07-0819	

Photo 9: Typical view of HGM 9 located within WAA 6.

Photo 10: Typical view of HGM 10 located within WAA 7.

Waste Management of Texas, Inc.	
Appendix E Atascocita Landfill Expansion Project HGM Plot Photographs Harris County, Texas	
Prepared By: klp/coh	8588 Katy Freeway, Sweet 441 Houston, Tx. 77024 713-463-8200
Project No: 07-0819	

Photo 11: Typical view of HGM 11 located within WAA 8.

Photo 12: Typical view of HGM 12 located within WAA 9.

Waste Management of Texas, Inc.	
Appendix E Atascocita Landfill Expansion Project HGM Plot Photographs Harris County, Texas	
Prepared By: klp/coh	8588 Katy Freeway, Sweet 441 Houston, Tx. 77024 713-463-8200
Project No: 07-0819	

Photo 13: Typical view of HGM 13 located within WAA 10.

Photo 14: Typical view of HGM 14 located within WAA 10.

Waste Management of Texas, Inc.	
Appendix E Atascocita Landfill Expansion Project HGM Plot Photographs Harris County, Texas	
Prepared By: klp/coh	8588 Katy Freeway, Sweet 441 Houston, Tx. 77024 713-463-8200
Project No: 07-0819	

PUBLIC NOTICE

Public Notice

U.S. Army Corps Of Engineers
Galveston District

Permit Application No:	SWG-1993-01967
Date Issued:	25 June 2010
Comments Due:	26 July 2010

U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT
AND
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

PURPOSE OF PUBLIC NOTICE: To inform you of a proposal for work in which you might be interested. It is also to solicit your comments and information to better enable us to make a reasonable decision on factors affecting the public interest.

AUTHORITY: This application will be reviewed pursuant to Section 404 of the Clean Water Act.

APPLICANT:
Waste Management of Texas, Inc.
800 Gessner Road, Suite 100
Houston, Texas 77024-4497
Telephone: 713-647-5542
POC: Mr. Charles Rivette

AGENT:
Knudson Services
8588 Katy Freeway, Suite 441
Houston, Texas 77024-1820
Telephone: 713-932-4003
POC: Mr. Carlos Hinojosa

LOCATION: The project site is located in Williams Gully and wetlands adjacent to Williams Gully near Humble, in Harris County, Texas. The project is located between the existing eastern permit boundary of the Atascocita Recycling and Disposal Facility (Atascocita RDF) and Williams Gully. The existing Atascocita RDF is located at 3623 Wilson Road, Humble, Texas, at the southeast corner of the intersection of Atascocita Road and Wilson Road. The project site can be located on the U.S.G.S. quadrangle map titled: Harmaston, Texas. Approximate UTM Coordinates in NAD 83 (meters): Zone 15; Easting: 285205; Northing: 3315505.5.

PROJECT DESCRIPTION: The applicant proposes to expand an existing 503-acre landfill into a new 190-acre portion of a 300-acre tract adjacent to the existing landfill. The expansion of the existing landfill includes constructing a new wet detention pond, perimeter drainage system, detention/sedimentation pond (Williams Pond), two outfall structures in Williams Gully, and the realignment of HCFCD P130-02-01 for creation of a diversion channel needed to redirect stormwater runoff from the adjacent properties north of the Project. Erosion controls within the perimeter drainage channels and detention/sedimentation ponds will include the use of rock riprap, gabions, or other suitable materials. The existing waters and wetlands on the expansion tract will be impacted by excavation activities to provide cover material for the existing landfill and become part of the initial development of future landfill cells.

The proposed wet detention pond is to be constructed 16 feet deep with 4:1 side slopes. A 15-foot berm will be constructed around the detention pond for maintenance access. Where the pond is adjacent to the diversion channel on the northern side, the maintenance berm will be shared by both the detention pond and the diversion channel. The detention pond, including the maintenance berms, requires a total surface area of 6.3 acres.

At the base of the proposed landfill a 100-foot-wide perimeter channel approximately 8,000 feet in length is proposed to capture internal rainfall runoff. This perimeter channel is designed as an extension of the existing landfill drainage system.

A proposed 7-acre detention/sedimentation pond (Williams Pond) is to be located between the southeast corner of the project and Williams Gully. The sedimentation pond is designed to receive a portion of surface runoff from the perimeter drainage system, sequester sediments, and detain surface runoff from the landfill during excessive flow events. The sedimentation pond will outfall into Williams Gully.

Two outfall structures will be constructed within Williams Gully as follows: Outfall Number 1 is connected to the proposed diversion channel. Excavation and fill associated with construction of outfall number 1 will result in 1,219 cubic yards of rock riprap and paved slope placed within Williams Gully. Outfall Number 2 is connected to the proposed detention/sedimentation pond (Williams Pond). Excavation and fill associated with construction of outfall number 2 will result in 600 cubic yards of riprap/gabion protection placed within Williams Gully.

The proposed diversion channel will be constructed along the northern property boundary running from the western edge of the property to the eastern edge of the property. In the post-development condition, the diversion channel will redirect the stormwater runoff from the adjacent properties north of the project to the east which outfalls into Williams Gully. The proposed channel will have a 6-foot-bottom width, 4:1 side slopes and an average depth of 7.5 feet. This channel will connect to an 8- by 6-foot box culvert used to cross an existing Houston Lighting and Power utility easement. The diversion channel will expand to a depth of 16 feet at the eastern property boundary to assist in maximizing the available volume for the wet detention pond. The flow of this channel will be diverted into the detention pond through a notched lateral weir. The flow then continues out of the detention pond into an 18-inch outfall pipe. The flow will continue through the 18-inch outfall pipe to an inline restrictor, placed within the diversion channel, before reaching the outfall to Williams Gully.

This proposed project will impact 16.7 acres of palustrine forested wetlands, 0.83 acre of palustrine emergent wetlands, 0.42 acre of palustrine scrub/shrub wetlands and 950 linear feet of waters of the U.S. by excavation or fill activities. The proposed project will avoid impacting 1.2 acres of jurisdictional wetlands and 3,200 linear feet of waters of the U.S.

MITIGATION PLAN: The applicant proposes to mitigate for the impacts by purchasing the appropriate number of mitigation credits at either the Mill Creek Wetland Mitigation Bank (MB022) or at another U.S. Army Corps of Engineers (Corps)-approved location.

ENVIRONMENTAL SETTING: Humble is located along U.S. Highway 59 (US 59) northeast of Houston in northeastern Harris County. This area is characterized by the meeting of the Big Thicket with the coastal plain. The community of Humble serves as the retail and shipping center for an agricultural and lumbering section of the Cypress Creek valley at the center of the Humble oilfield. This community developed in 1904 when the Humble oilfield was discovered. The population of this community fluctuated through the years until the Eastex Freeway, US 59, was constructed and helped to stabilize the population of the area. The city's proximity to Houston Intercontinental Airport (IAH) and Lake Houston produced a population increase and spurred construction of new subdivisions and summer homes. Atascocita is a large development located north and south along Farm Road 1960 east of Humble. This young community is bordered on the east by Lake Houston and supports numerous businesses, parks, golf courses, a state jail and a residential probation program. Williams Gully, also known as Williams Bayou, is located east of Humble. Williams Gully flows into Garner's Bayou through flat to rolling terrain covered by a combination of pine-hardwood forest and mesquite, grasses and cacti. The soil is moderately well to poorly drained loams with some cracking clayey subsoils.

ALTERNATIVE ANALYSIS: A key provision of the 404(b)(1) guidelines is the "practicable alternative test" which requires that "no discharge of fill material shall be permitted if there is a practicable alternative to the proposed fill which would have a less adverse impact on the aquatic ecosystem." This is especially true when the proposed project is not water dependent. The applicant must demonstrate that there are no less damaging sites available and that all onsite impacts to waters of the United States have been avoided to the maximum practicable extent possible. For an alternative to be considered "practicable", it must be available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose. The applicant considered the following siting criteria to determine the preferred alternative: 1) proximity to service area, 2) size, 3) accessibility, 4) environmental constraints, 5) proximity to residential development, 6) site elements, 7) future waste disposal needs, and 8) Houston –Galveston Area Council (H-GAC) Objectives. Four alternatives were considered by the applicant based on the above siting criteria.

(1) No Action Alternative. This alternative involves permit denial. The No Action Alternative is considered an impractical alternative due to the need for additional waste disposal area within Harris County and the surrounding H-GAC areas. Selection of the No Action Alternative will fail to achieve the necessary expansion of the Atascocita Recycling and Disposal Facility (RDF) into the Project and would require the purchase of undeveloped acreage that could represent greater impacts to aquatic environments and the surrounding community.

(2) Offsite Alternative. The Offsite Alternative is an approximate 1,100-acre tract of undeveloped land located approximately five miles east/southeast of IAH, west of the confluence of Garners Bayou and Greens Bayou. The Offsite Alternative is located in the floodway and 100-year floodplain of Greens Bayou. Based on infrared color aerial photography, the site appears to contain an extensive amount of palustrine forested wetlands requiring greater impacts to waters of the U.S. and potential impacts to threatened and endangered species and cultural resources. Furthermore, new construction would contradict the H-GAC preference for the expansion of an existing facility.

(3) Onsite Alternative 1. Onsite Alternative 1 involves the build-out of the Scanlin tract (300 acres) owned by Waste Management of Texas, Inc. (WMTX). The Municipal Solid Waste (MSW) design would encroach upon the Texas Commission on Environmental Quality (TCEQ) minimum 125-foot buffer between the waste disposal area and the proposed MSW permit boundary. In addition, this alternative would significantly increase impacts to waters of the U.S., involve fill within the 100-year floodplain of Garners Bayou and Williams Gully, and reduce the buffer between the waste disposal area and Garners Bayou, Williams Gully, and other developments.

(4) Onsite Alternative 2 (Applicant's Preferred Alternative). Onsite Alternative 2 (Applicant's Preferred Alternative) is an approximate 190-acre tract located between the existing eastern MSW permit boundary of the Atascocita RDF and Williams Gully. Approximately 170 acres of the site would be incorporated into the existing approximate 503-acre Atascocita RDF requiring modification of the current TCEQ permitted waste disposal area. The project would result in 17.95 acres of permanent impacts to waters of the U.S., including wetlands. The expansion area would provide ample space for on-site facilities and is located outside of the 100-year floodplain of Garners Bayou and Williams Gully. Onsite Alternative 2 complies with the H-GAC preference toward the expansion of an existing facility as opposed to construction of a new facility. Onsite Alternative 2 demonstrates avoidance and minimization of impacts to waters of the U.S., including wetlands.

This public notice is being issued based on information furnished by the applicant. The applicant's project plans are enclosed in 31 sheets. The wetland delineation has been completed and was verified by the U.S. Army Corps of Engineers (Corps) on 7 April 2010 (SWG-1993-01967).

A preliminary review of this application indicates that an Environmental Impact Statement (EIS) is not required. Since permit assessment is a continuing process, this preliminary determination of EIS requirement will be changed if data or information brought forth in the coordination process is of a significant nature.

Our evaluation will also follow the guidelines published by the U.S. Environmental Protection Agency pursuant to Section 404 (b) (1) of the Clean Water Act (CWA).

OTHER AGENCY AUTHORIZATIONS: The project site is not located within the Texas Coastal Zone and therefore, does not require certification from the Texas Coastal Management Program.

This project would result in a direct impact of greater than three acres of waters of the state or 1500 linear feet of streams (or a combination of the two is above the threshold), and as such would not fulfill Tier I criteria for the project. Therefore, TCEQ certification is required. Concurrent with Corps processing of this application, the TCEQ is reviewing this application under Section 401 of the CWA and in accordance with Title 30, Texas Administrative Code Section 279.1-13 to determine if the work would comply with State water quality standards. By virtue of an agreement between the Corps and the TCEQ, this public notice is also issued for the purpose of advising all known interested persons that there is pending before the TCEQ a decision on water quality certification under such act. Any comments concerning this application may be submitted to the Texas Commission on Environmental Quality, 401 Coordinator, MSC-150, P.O. Box 13087, Austin, Texas 78711-3087. The public comment period extends 30 days from the date of publication of this notice. A copy of the public notice with a description of work is made available for review in the TCEQ's Austin office. The complete application may be reviewed in the Corps office listed in this public notice. The TCEQ may conduct a public meeting to consider all comments concerning water quality if requested in writing. A request for a public meeting must contain the following information: the name, mailing address, application number, or other recognizable reference to the application; a brief description of the interest of the requester, or of persons represented by the requester; and a brief description of how the application, if granted, would adversely affect such interest.

NATIONAL REGISTER OF HISTORIC PLACES: The staff archaeologist has reviewed the latest published version of the National Register of Historic Places, lists of properties determined eligible, and other sources of information. The following is current knowledge of the presence or absence of historic properties and the effects of the undertaking upon these properties:

> A historic properties investigation has been conducted within the permit area. No sites determined eligible for or listed on the National Register of Historic Places are within the permit area or affected area. The permit area was inventoried for historic properties and none were identified as documented in the report titled *"An Intensive Archeological Survey of the Scanlin Property in Harris County, Texas"* dated 2007, and prepared by GTI Environmental, Inc.

THREATENED AND ENDANGERED SPECIES: Preliminary indications are that no known threatened and/or endangered species or their critical habitat will be affected by the proposed work.

PUBLIC INTEREST REVIEW FACTORS: This application will be reviewed in accordance with 33 CFR 320-332, the Regulatory Programs of the Corps of Engineers, and other pertinent laws, regulations and executive orders. The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments.

All factors, which may be relevant to the proposal, will be considered: among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs and, in general, the needs and welfare of the people.

SOLICITATION OF COMMENTS: The Corps is soliciting comments from the public, Federal, State, and local agencies and officials, Indian tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Impact Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

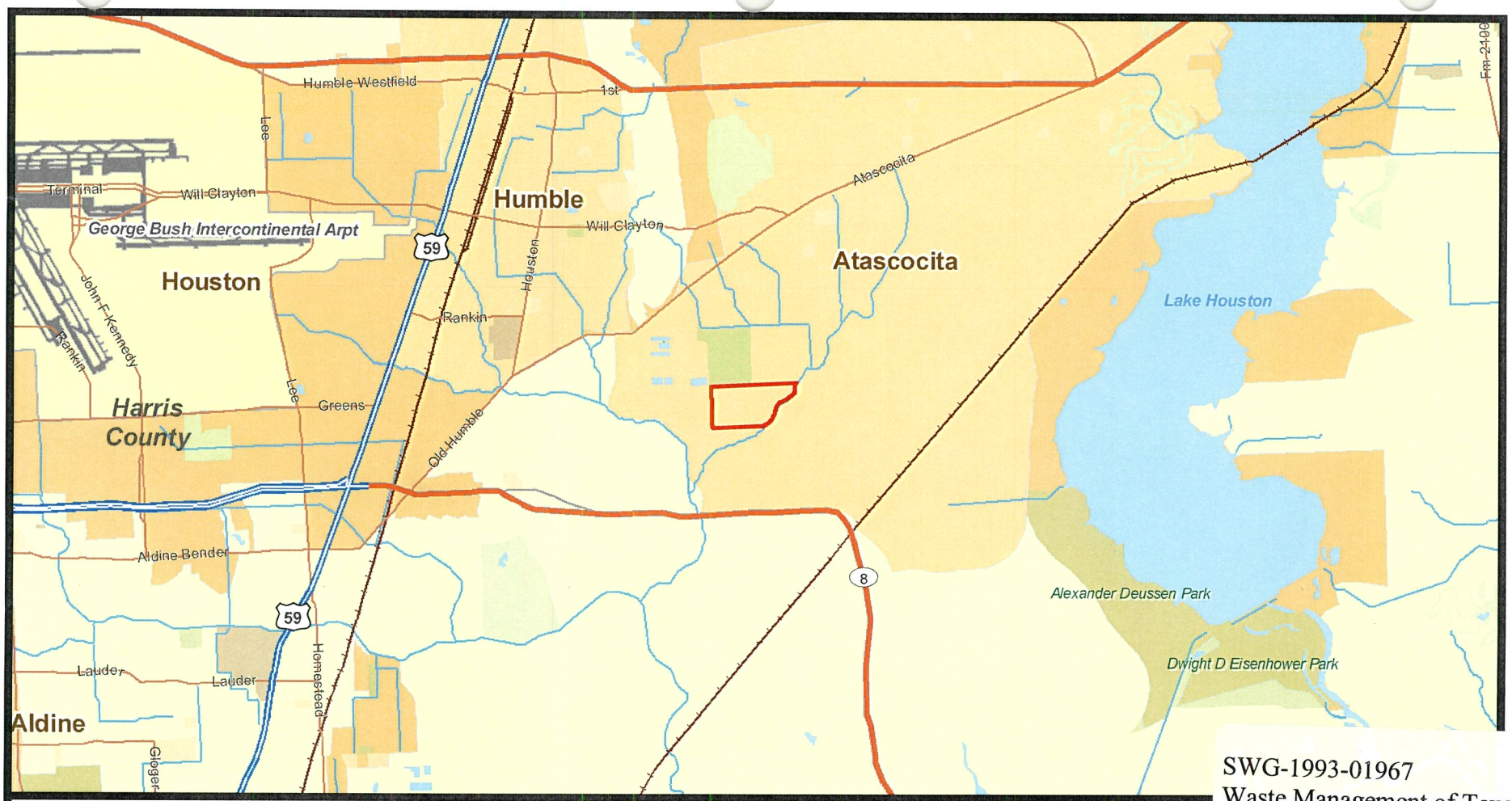
This public notice is being distributed to all known interested persons in order to assist in developing facts upon which a decision by the Corps may be based. For accuracy and completeness of the record, all data in support of or in opposition to the proposed work should be submitted in writing setting forth sufficient detail to furnish a clear understanding of the reasons for support or opposition.

PUBLIC HEARING: Prior to the close of the comment period any person may make a written request for a public hearing setting forth the particular reasons for the request. The District Engineer will determine whether the issues are substantial and should be considered in the permit decision. If a public hearing is warranted, all known interested persons will be notified of the time, date, and location.

CLOSE OF COMMENT PERIOD: All comments pertaining to this Public Notice must reach this office on or before **26 July 2010**. Extensions of the comment period may be granted for valid reasons provided a written request is received by the limiting date. **If no comments are received by that date, it will be considered that there are no objections**. Comments and requests for additional information should be submitted to:

Elizabeth Shelton
Regulatory Branch, CESWG-PE-RE
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229
409-766-3937 Phone; 409-766-6301 Fax

DISTRICT ENGINEER
GALVESTON DISTRICT
CORPS OF ENGINEERS



Source: ESRI Data & Maps 9.3

190 Acre Project Area

0 2 4 Miles

N

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Waste Management of Texas, Inc.
06/02/2010
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Exhibit 1
Proposed Impacts Map
Vicinity
Waste Management of Texas, Inc.
Atascocita Landfill Expansion
Harris County, Texas

PROJ #: Waste Mgmt 070819	Date: Sep 22, 2009
ESRI Data & Maps 9.3	Scale:1 in = 2 miles
J:\Projects\07-0819 Waste Mgmt\Sec 3.0 Project Information\3.4 GPS\Arcmap\EX_1_Vicinity	

SEP 24 2009

IID-227

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BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

0 400 800
SCALE IN FEET

LEGEND

- EXISTING PERMIT BOUNDARY
- PROPOSED PERMIT BOUNDARY
- 60 EXISTING CONTOUR
- 100 PROPOSED FINAL CONTOUR
- DELINEATED WETLAND AFFECTED
- DELINEATED WETLAND UNAFFECTED

NOTE:

1. EXISTING CONTOURS AND ELEVATIONS COMPILED BY DALLAS AERIAL SURVEYS FROM AERIAL SURVEY FLOWN APRIL 13, 2009.

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Waste Management of Texas, Inc
06/02/2010
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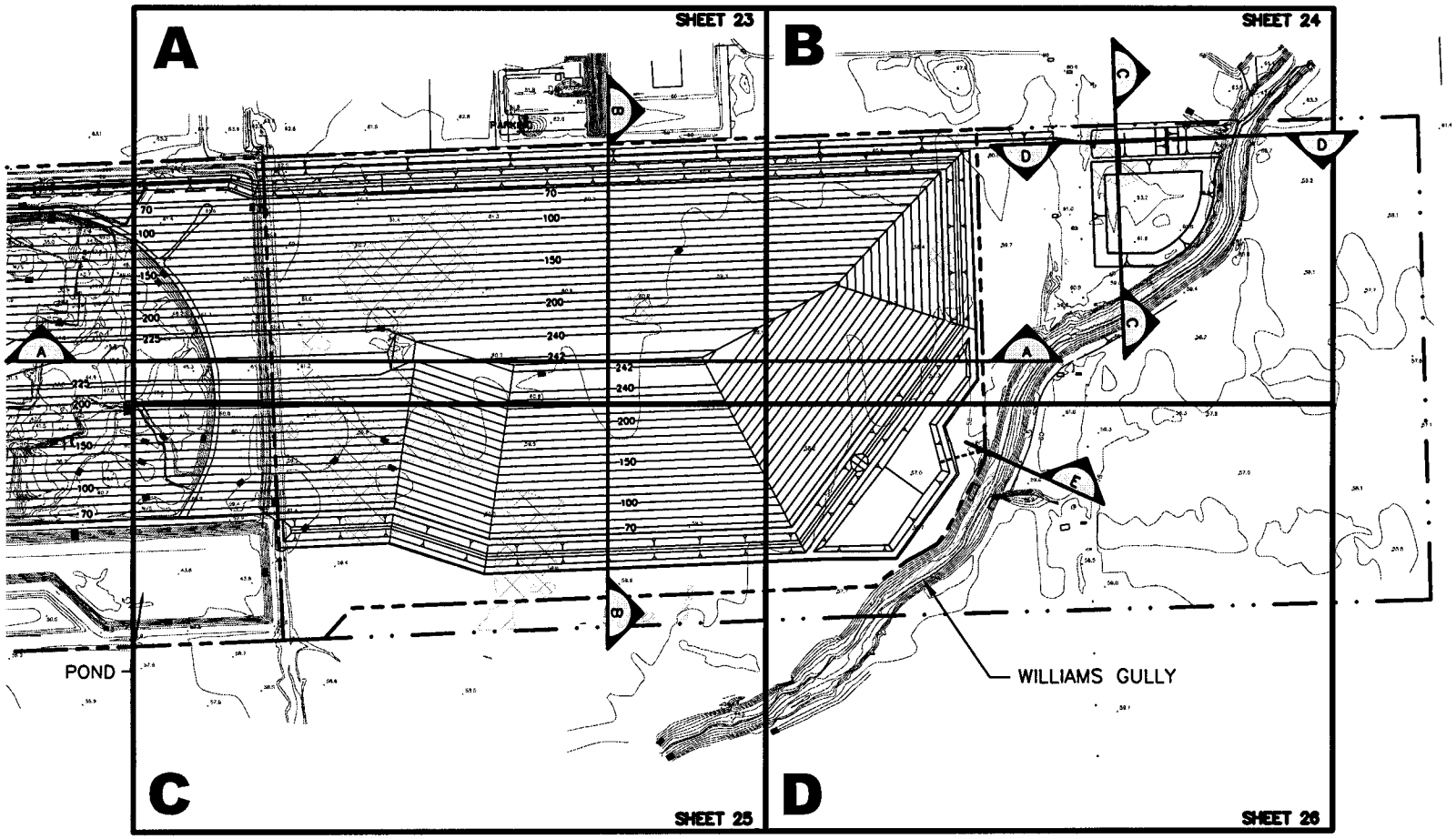

IMPACTS OF WETLAND AREAS

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

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

ISSUED FOR PERMITTING PURPOSES

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 22

IID-228

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BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

0 200 400
SCALE IN FEET

LEGEND

- EXISTING PERMIT BOUNDARY
- PROPOSED PERMIT BOUNDARY
- 60 EXISTING CONTOUR
- 100 PROPOSED FINAL CONTOUR
- DELINEATED WETLAND AFFECTED

NOTE:

1. EXISTING CONTOURS AND ELEVATIONS COMPILED BY DALLAS AERIAL SURVEYS FROM AERIAL SURVEY FLOWN APRIL 13, 2009.

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Waste Management of Texas, Inc.
06/02/2010
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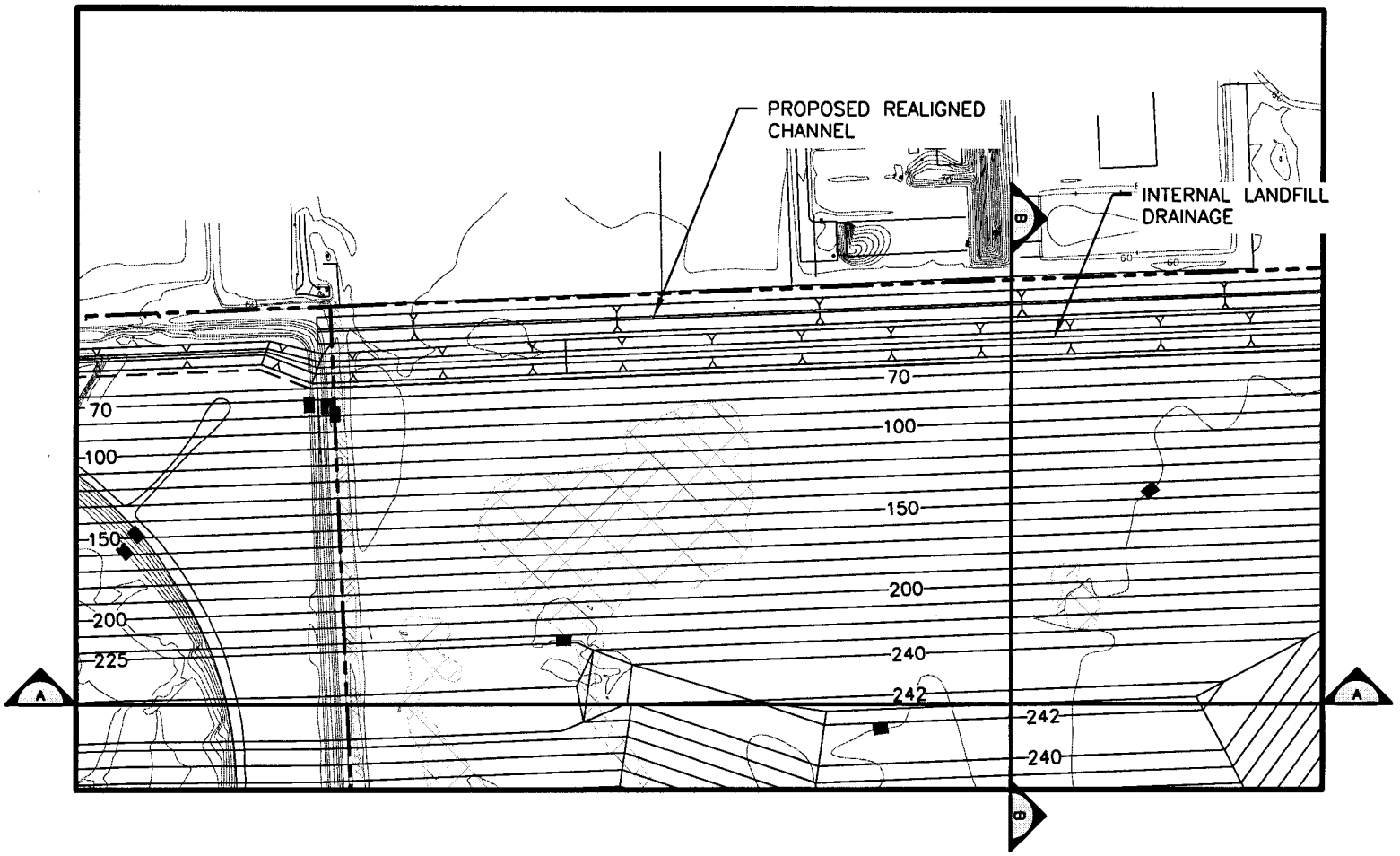

IMPACTS OF WETLAND AREAS
AREA "A"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

REVISIONS

ISSUED FOR PERMITTING PURPOSES

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
CHK. KJW
DWN. SRC
DSN. KJW

FIGURE 23

IID-229

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BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

0 200 400
SCALE IN FEET

LEGEND

- EXISTING PERMIT BOUNDARY
- PROPOSED PERMIT BOUNDARY
- 60 EXISTING CONTOUR
- 100 PROPOSED FINAL CONTOUR
- DELINEATED WETLAND AFFECTED
- DELINEATED WETLAND UNAFFECTED

NOTE:

1. EXISTING CONTOURS AND ELEVATIONS COMPILED BY DALLAS AERIAL SURVEYS FROM AERIAL SURVEY FLOWN APRIL 13, 2009.

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Waste Management of Texas, Inc.
06/02/2010
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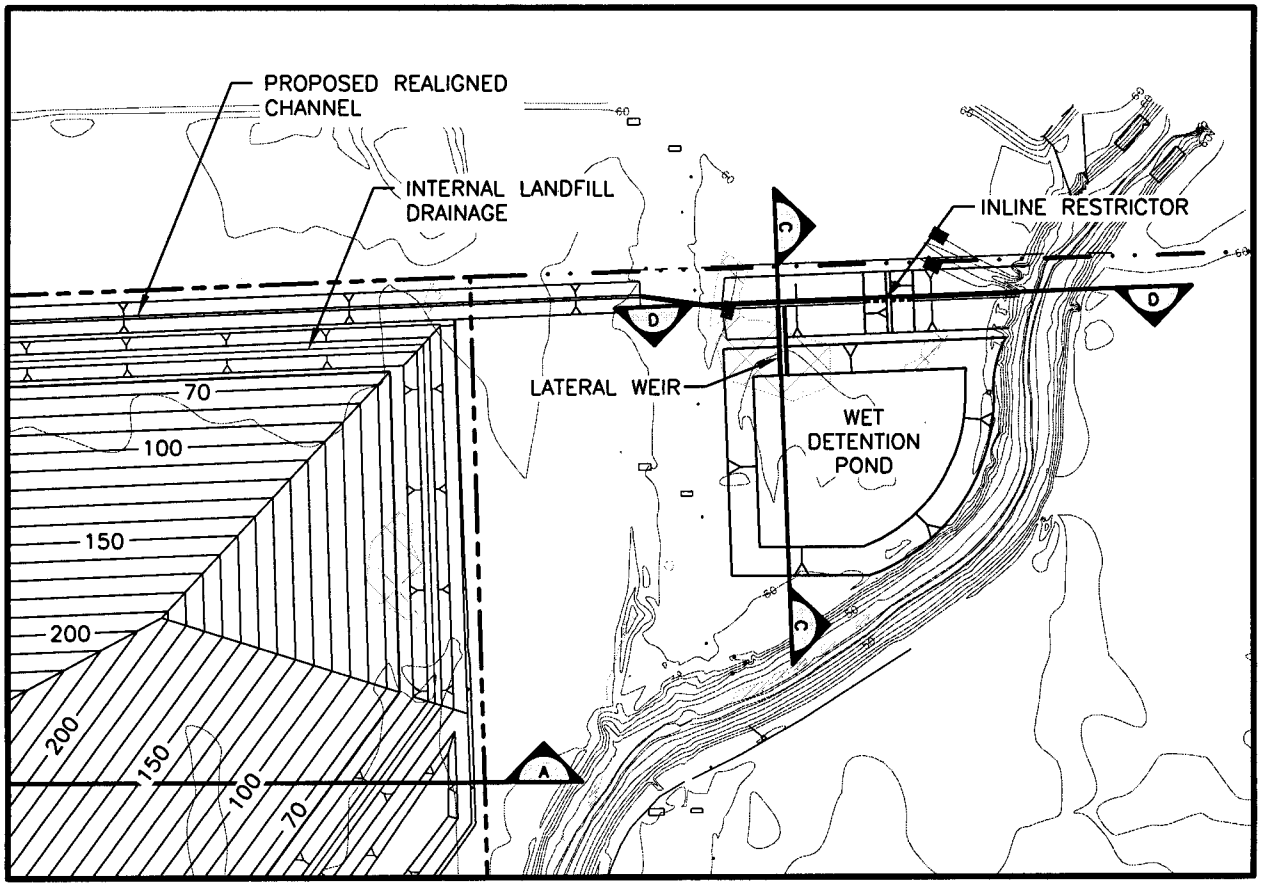

IMPACTS OF WETLAND AREAS
AREA "B"
WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
DSN. KJW
DWN. SRC
CHK. KJW

ISSUED FOR PERMITTING PURPOSES

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

FIGURE 24

IID-230

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BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

0 200 400
SCALE IN FEET

LEGEND

- EXISTING PERMIT BOUNDARY
- PROPOSED PERMIT BOUNDARY
- 60 EXISTING CONTOUR
- 100 PROPOSED FINAL CONTOUR
- DELINEATED WETLAND AFFECTED
- DELINEATED WETLAND UNAFFECTED

NOTE:

1. EXISTING CONTOURS AND ELEVATIONS COMPILED BY DALLAS AERIAL SURVEYS FROM AERIAL SURVEY FLOWN APRIL 13, 2009.

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Waste Management of Texas, Inc
06/02/2010
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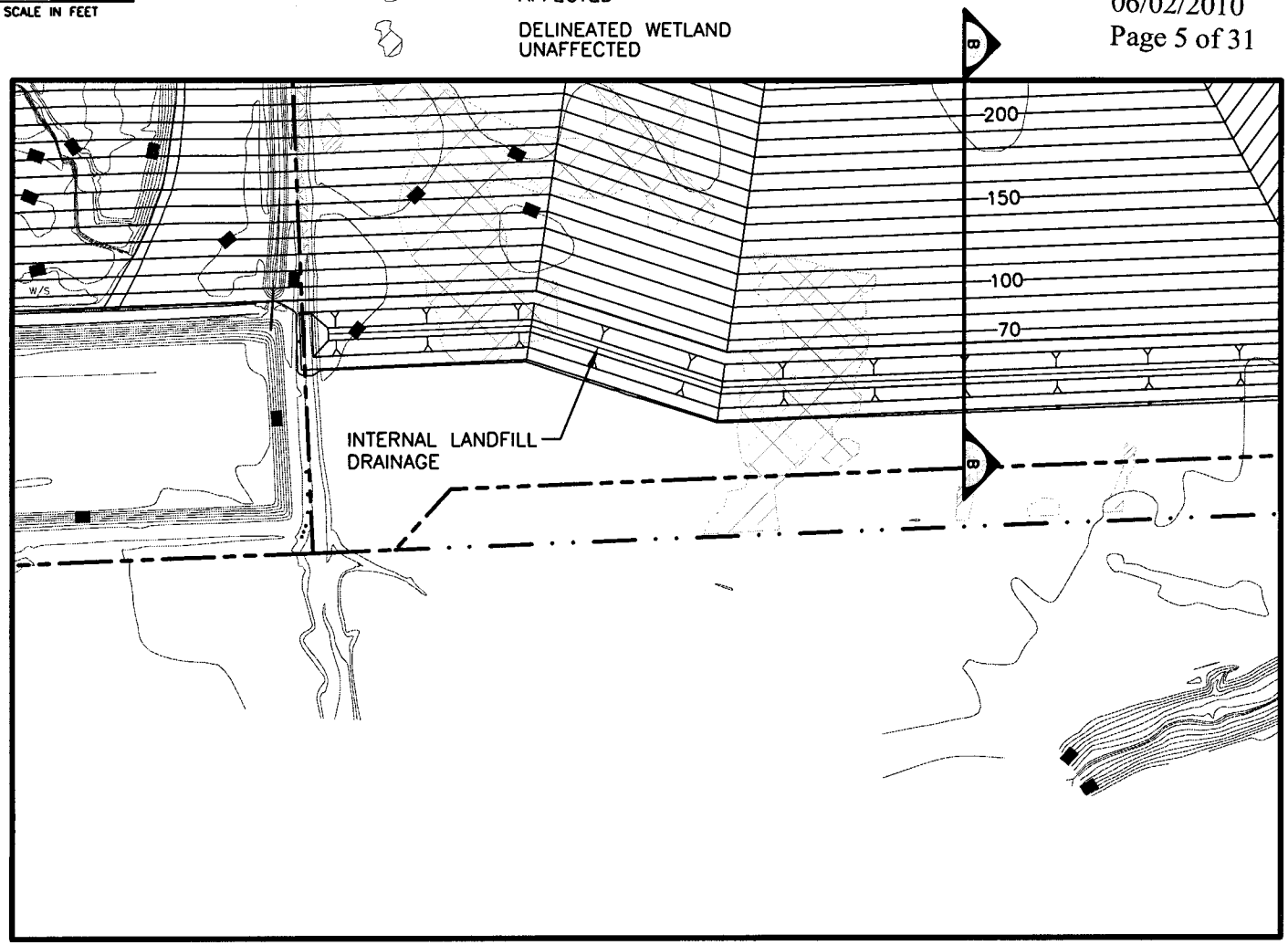

IMPACTS OF WETLAND AREAS
AREA "C"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

REVISIONS

ISSUED FOR PERMITTING PURPOSES

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
CHK. KJW
DSN. KJW
DWN. SRC

FIGURE 25

IID-231

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BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
11700 ROBERT ROAD
MANSFIELD, TEXAS

0 200 400
SCALE IN FEET

LEGEND

- EXISTING PERMIT BOUNDARY
- PROPOSED PERMIT BOUNDARY
- 60 EXISTING CONTOUR
- 100 PROPOSED FINAL CONTOUR
- DELINEATED WETLAND AFFECTED
- DELINEATED WETLAND UNAFFECTED

NOTE:

1. EXISTING CONTOURS AND ELEVATIONS COMPILED BY DALLAS AERIAL SURVEYS FROM AERIAL SURVEY FLOWN APRIL 13, 2009.

SWG-1993-01967
Waste Management of Texas, Inc.
06/02/2010
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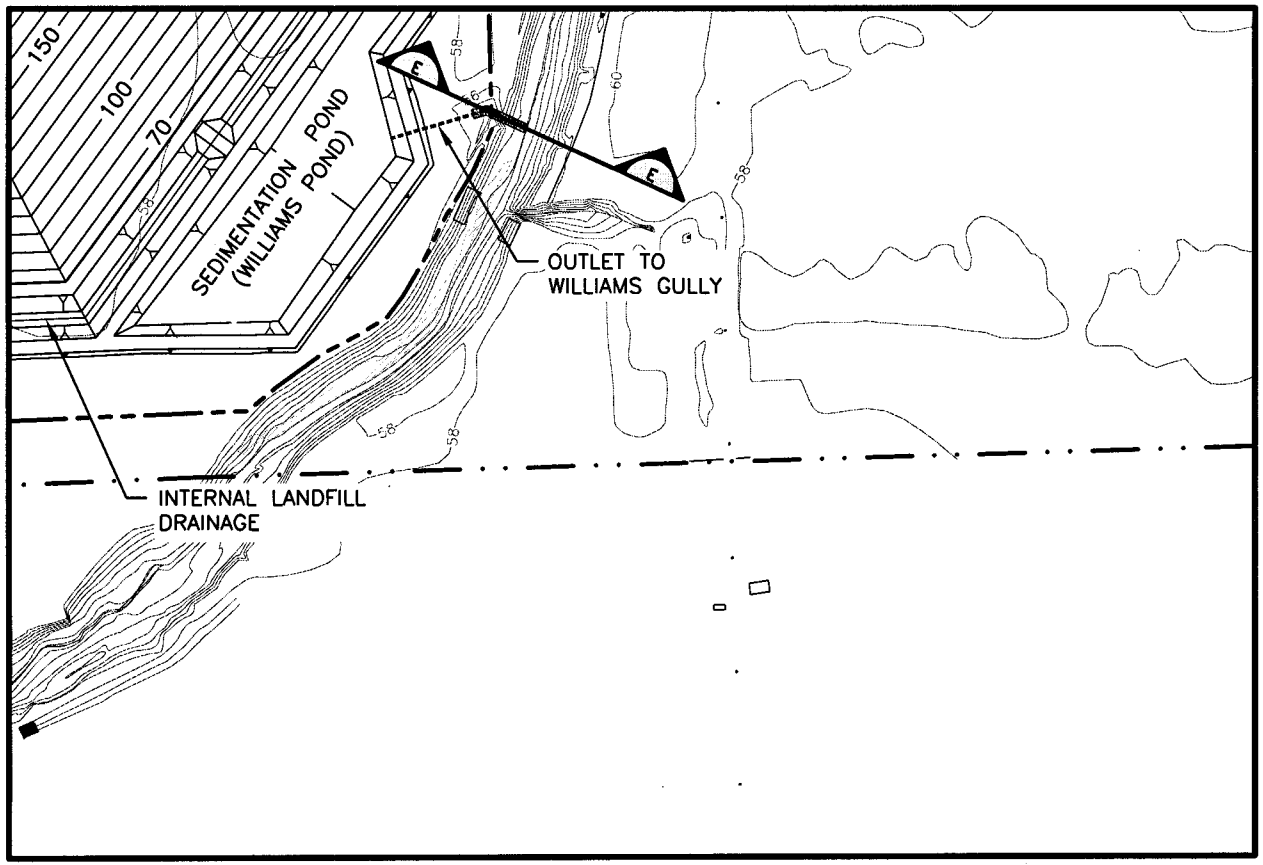


IMPACTS OF WETLAND AREAS
AREA "D"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

ISSUED FOR PERMITTING PURPOSES
REVISIONS

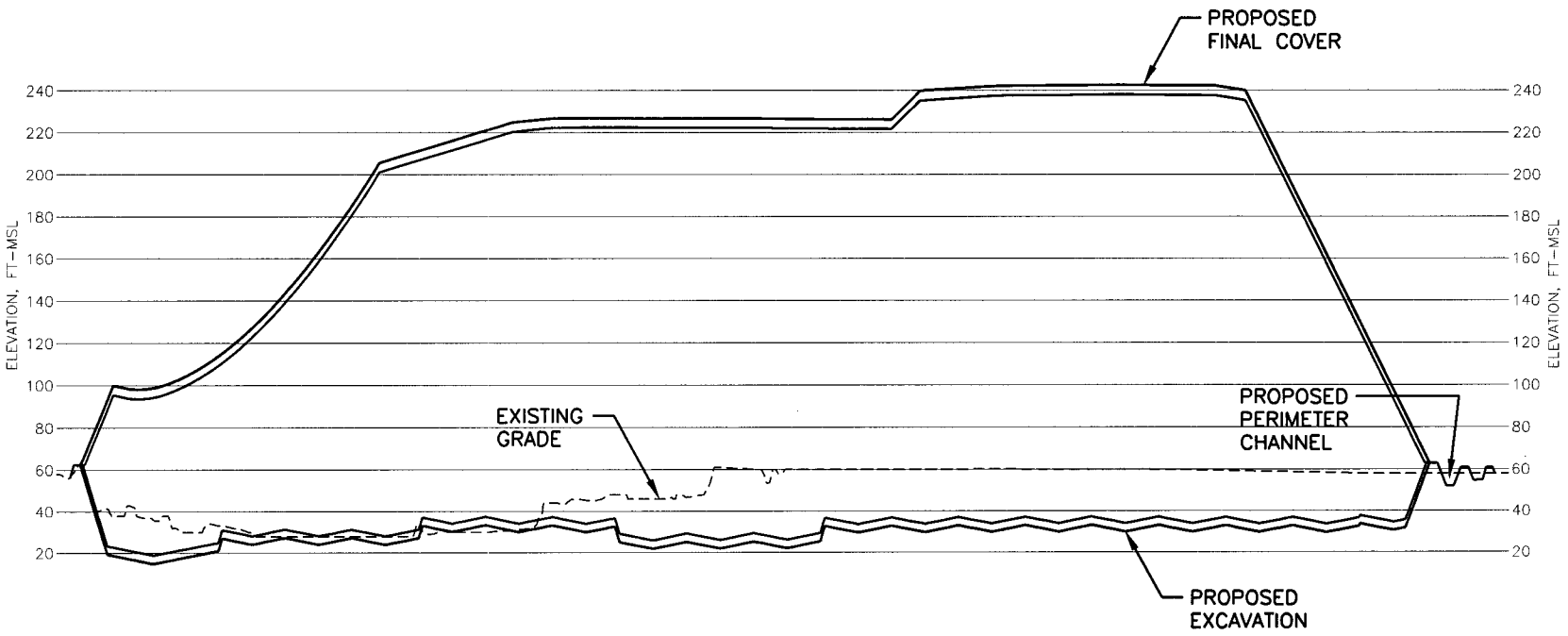
DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
CHK. KJW
DWN. SRC
DSN. KJW

FIGURE 26

IID-232

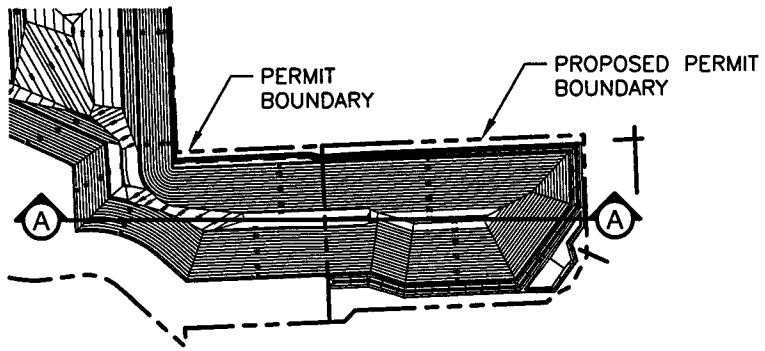
J:\101\17\102\Wetlands\CompletionPlan.dwg Layout: 27 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT T. ROAD
MANSFIELD, TEXAS



LANDFILL CROSS SECTION A
(NOT TO SCALE)

SWG-1993-01967
Waste Management of Texas, Inc.
06/02/2010
Page 7 of 31



SECTION KEY

TYPICAL CROSS SECTION A

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

ISSUED FOR PERMITTING PURPOSES

REVISIONS

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DSN. KJW
DWN. SRC
CHK. KJW
DWG : CompletionPlan.dwg
SCALE : GRAPHIC
DATE : 12/09

FIGURE 27

IID-233

J:\101\17\102\Wetlands\CompletionPlan.dwg Layout: 28 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

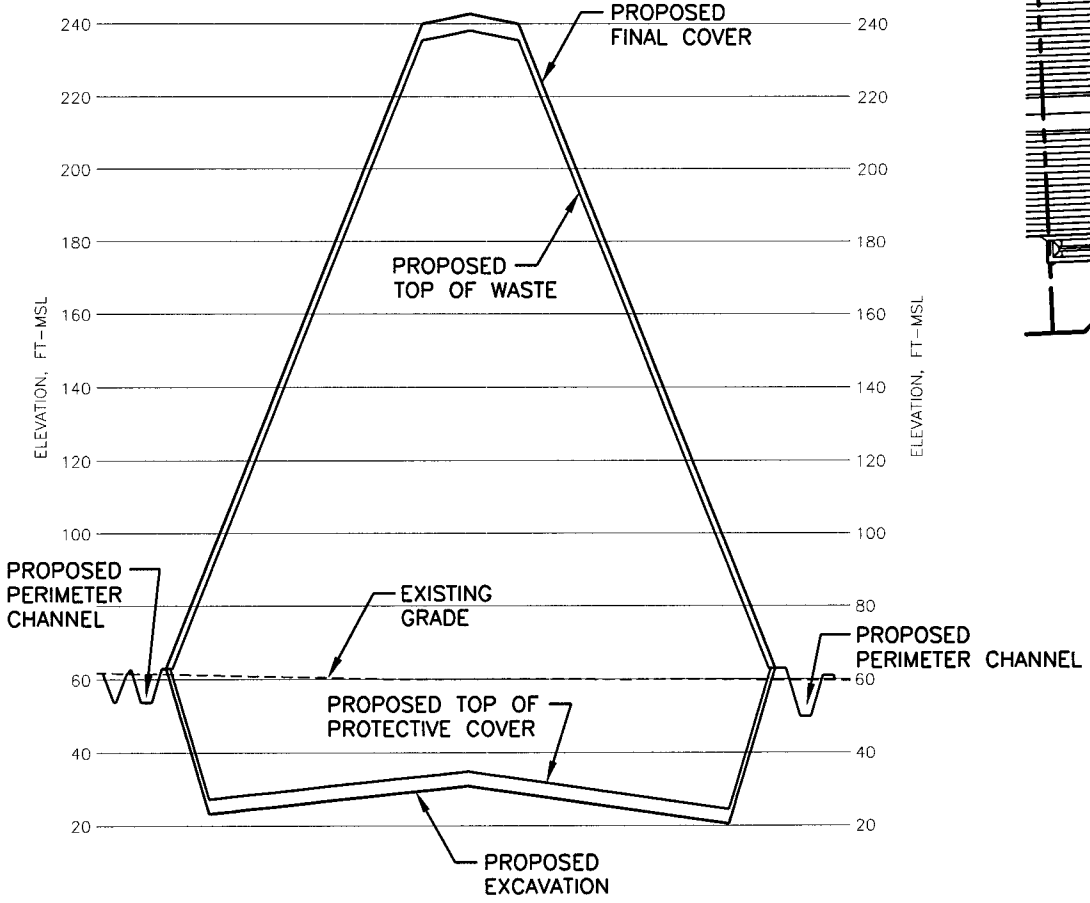
TYPICAL CROSS SECTION B

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

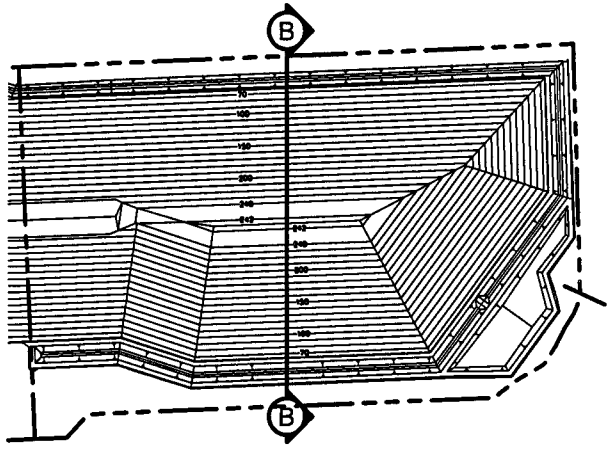
ISSUED FOR PERMITTING PURPOSES
REVISIONS

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
CHK. KJW
DWN. SRC
DSN. KJW

FIGURE 28



LANDFILL CROSS SECTION B
(NOT TO SCALE)



SECTION KEY

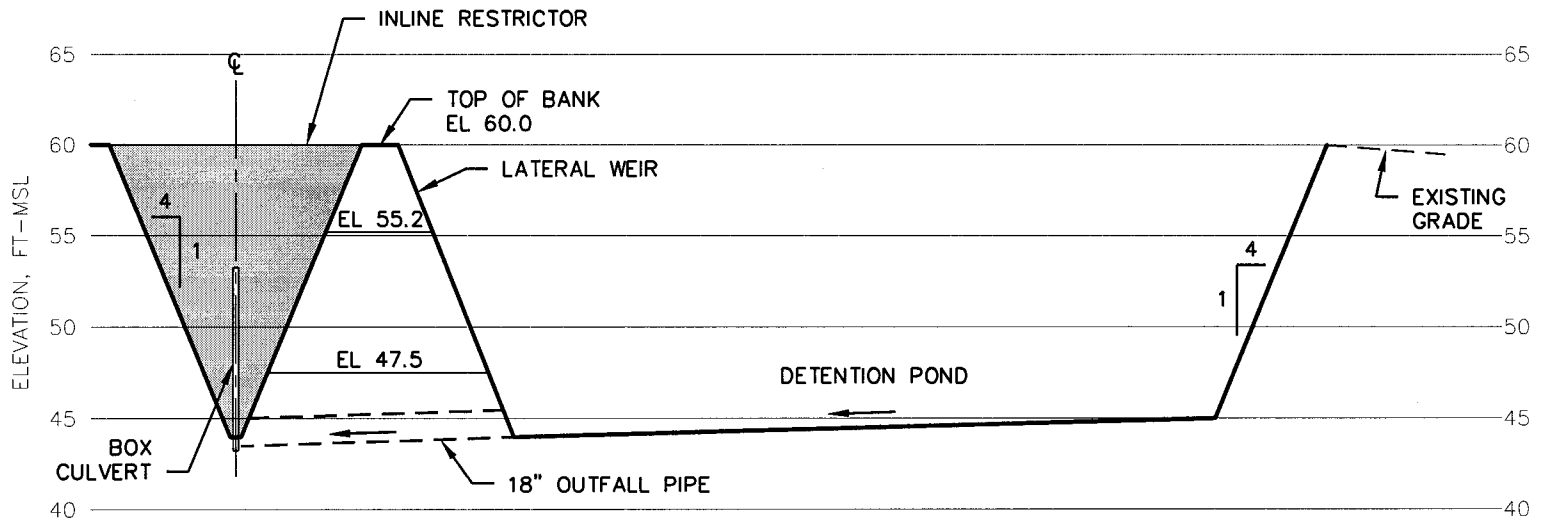
IID-234

J:\101\17\102\Wetlands\CompletionPlan.dwg Layout: 30 User: scundiff

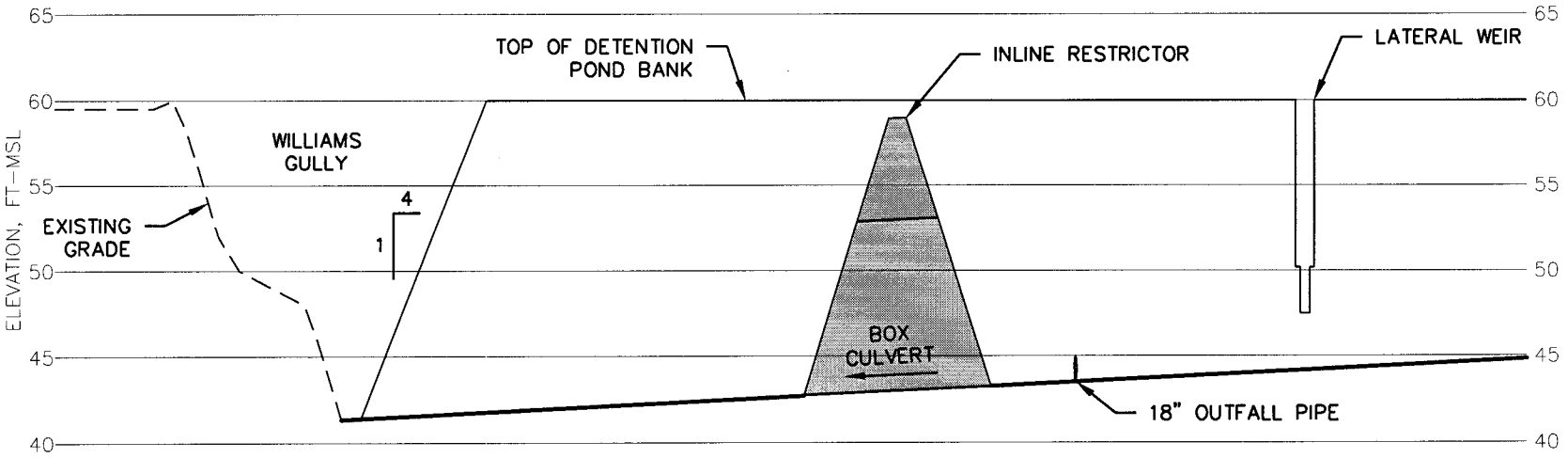
BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

DETENTION POND AND DIVERSION CHANNEL CROSS-SECTIONS

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION



SECTION C
NOT TO SCALE



SECTION D
NOT TO SCALE

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

ISSUED FOR PERMITTING PURPOSES

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 30

IID-235

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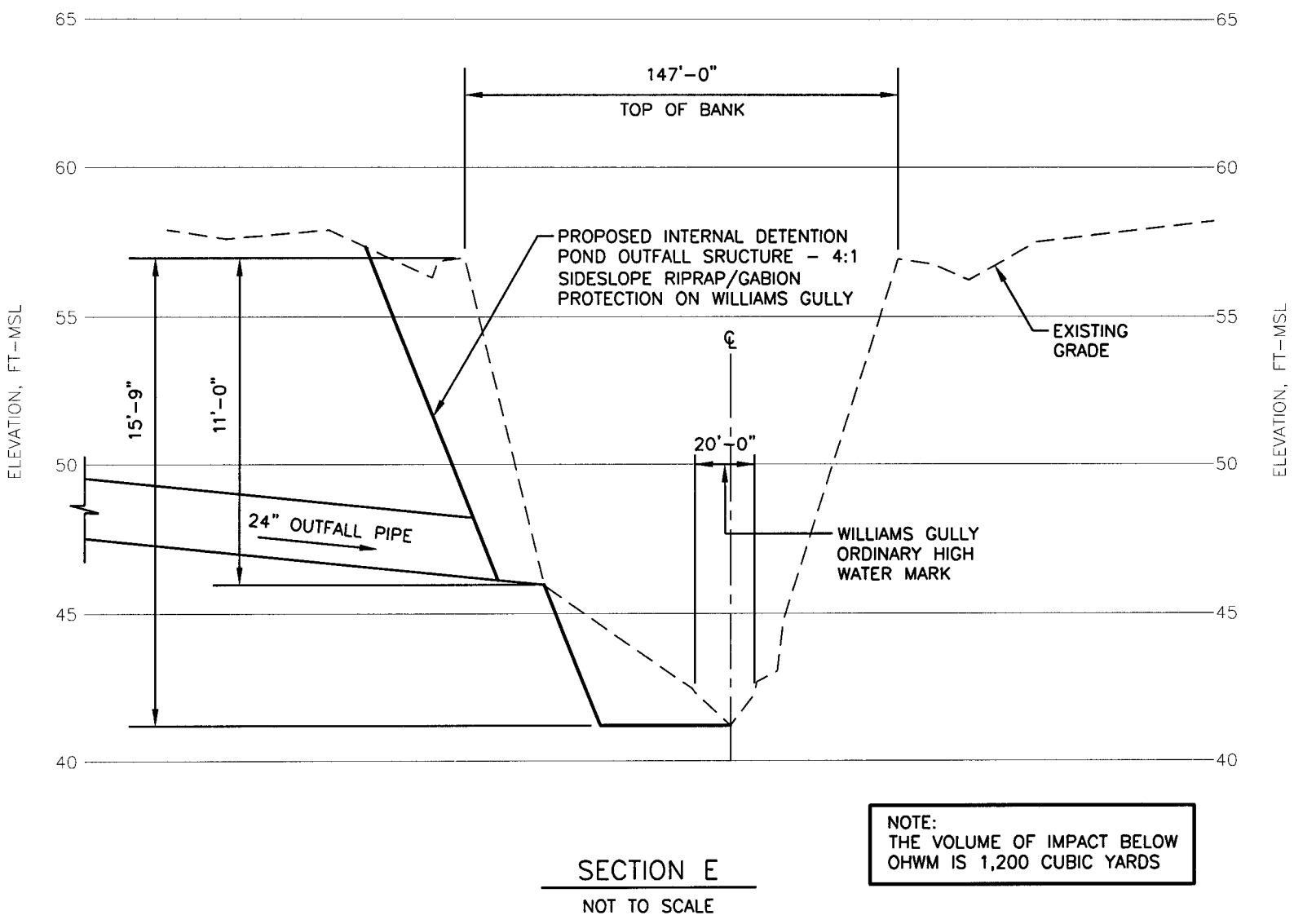
Waste Management of Texas, Inc.
06/02/2010
Page 9 of 31

J:\101\17\102\Wetlands\CompletionPlan.dwg Layout: 29 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WILLIAMS GULLY CROSS SECTION
INTERNAL DETENTION POND OUTFALL STRUCTURE

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION



SECTION E
NOT TO SCALE

NOTE:
THE VOLUME OF IMPACT BELOW OHWM IS 1,200 CUBIC YARDS

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

ISSUED FOR PERMITTING PURPOSES
REVISIONS

DATE : 12/09
SCALE : GRAPHIC
DWG : CompletionPlan.dwg
CHK. KJW
DWN. SRC
DSN. KJW

FIGURE 29

IID-236

J:\101\17\102\Wetlands\Wet-1.dwg Layout: Layout1 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
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MANSFIELD, TEXAS

WETLAND AREA "WET 1"

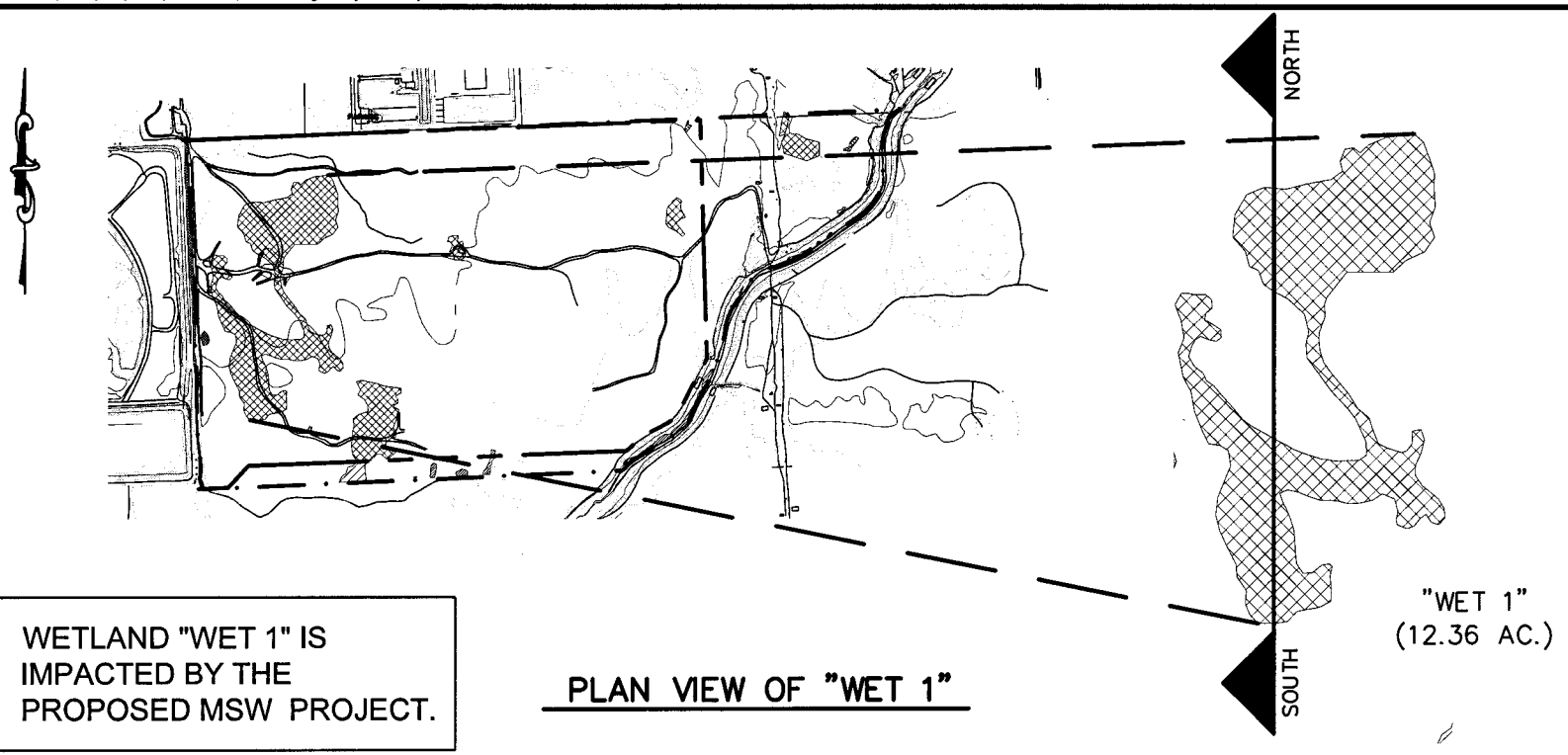
WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

ISSUED FOR PERMITTING PURPOSES
REVISIONS

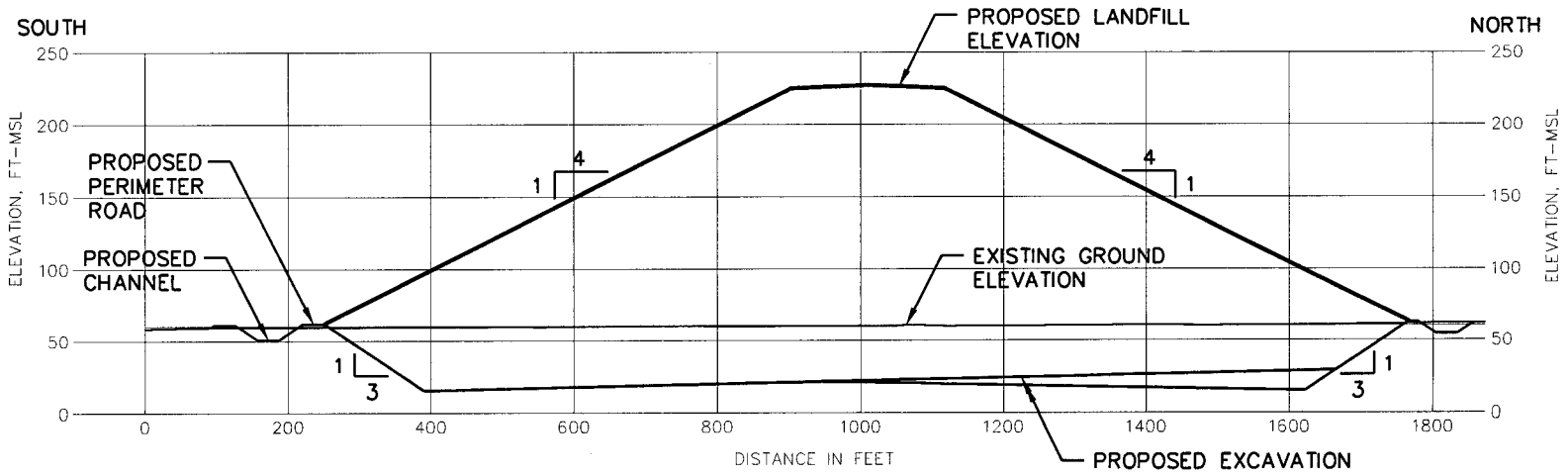
DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-1.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 1



WETLAND "WET 1" IS IMPACTED BY THE PROPOSED MSW PROJECT.

PLAN VIEW OF "WET 1"



CROSS SECTION OF "WET 1"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

IID-237

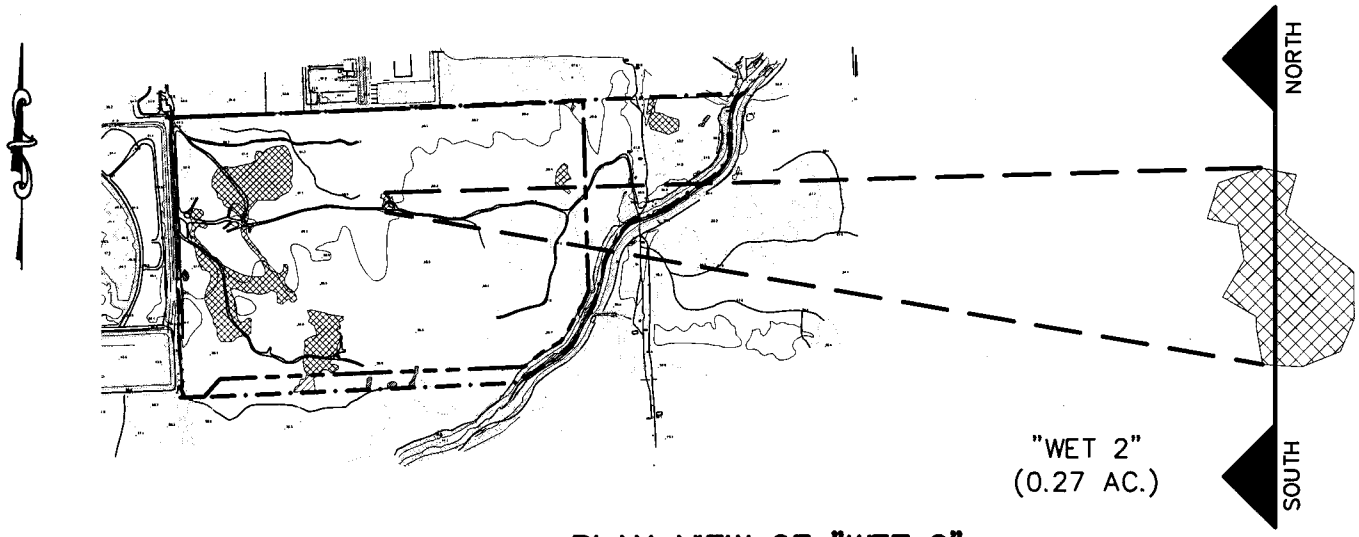
SWG-1993-01967
Waste Management of Texas, Inc
06/02/2010

J:\101\17\102\Wetlands\Wet-2.dwg Layout: Layout1 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

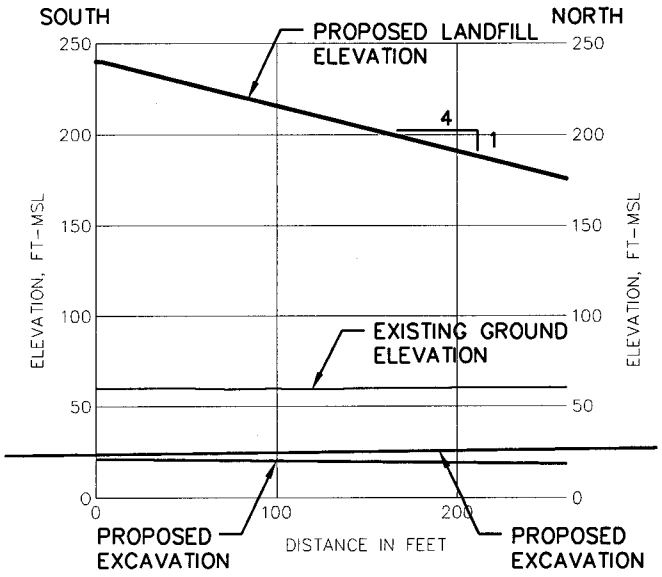
WETLAND AREA "WET 2"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA ROF
WETLAND DELINEATION



PLAN VIEW OF "WET 2"

WETLAND "WET 2" IS IMPACTED BY THE PROPOSED MSW PROJECT.



CROSS SECTION OF "WET 2"

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

ISSUED FOR PERMITTING PURPOSES
REVISIONS

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-2.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 2

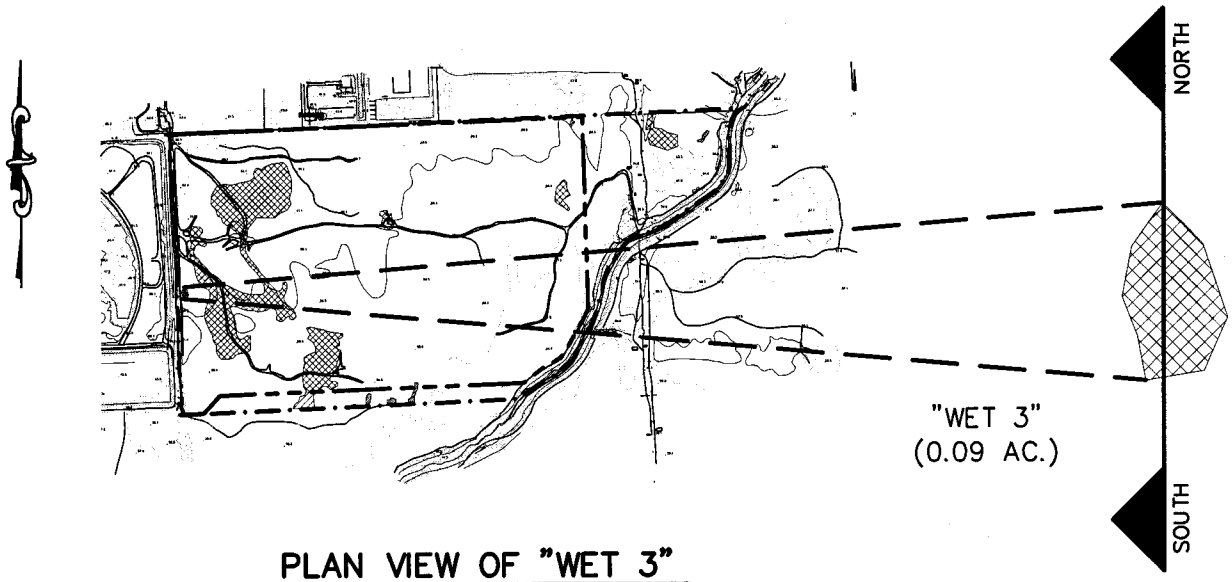
IID-238

J:\101\17\102\Wetlands\Wet-3.dwg Layout: Layout1 User: scundiff

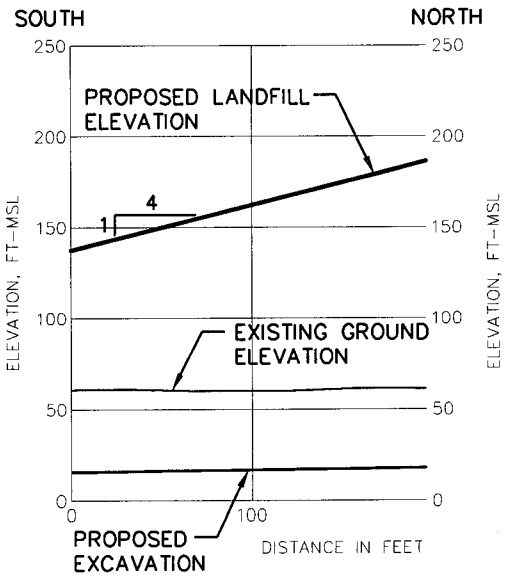
BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 3"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION



PLAN VIEW OF "WET 3"



CROSS SECTION OF "WET 3"

WETLAND "WET 3" IS IMPACTED BY THE PROPOSED MSW PROJECT.

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

ISSUED FOR PERMITTING PURPOSES

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-3.dwg
CHK. KJW
DWN. SRC
DSN. KJW

FIGURE 3

IID-239

J:\101\17\102\Wetlands\Wet-4.dwg Layout: Layout1 User: scundiff

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MANSFIELD, TEXAS

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA ROF
WETLAND DELINEATION

WETLAND AREA "WET 4"

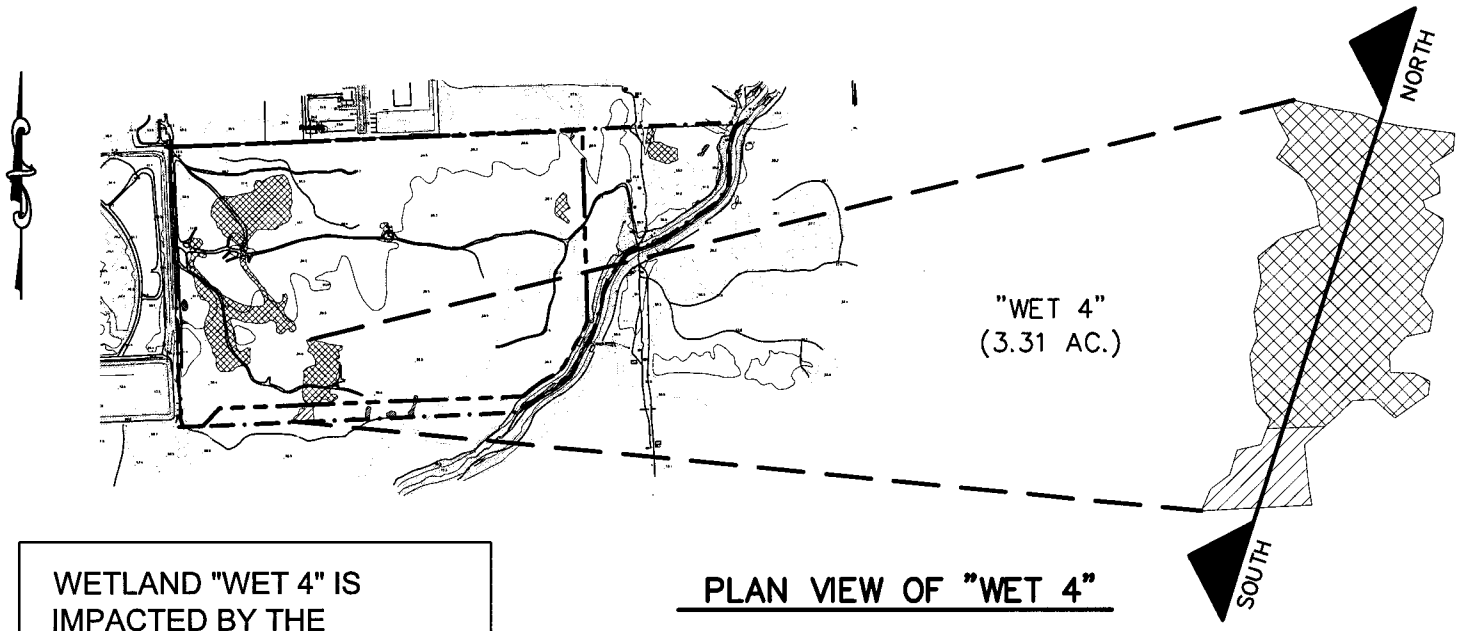
DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-4.dwg
DSN. KJW
DWN. SRC
CHK. KJW

ISSUED FOR PERMITTING PURPOSES

REVISIONS

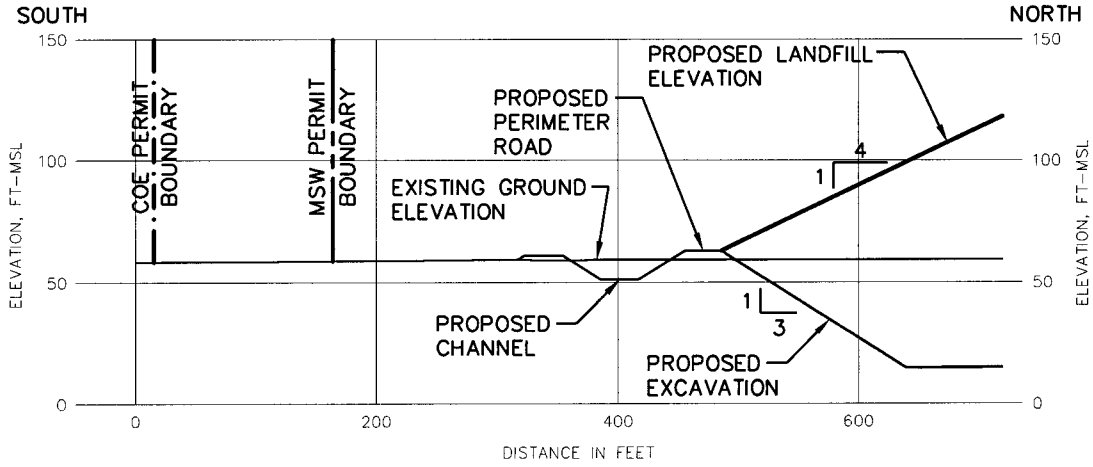
REV.	DATE	DESCRIPTION	DWN. BY	DES. BY	CHK. BY	APP. BY

FIGURE 4



PLAN VIEW OF "WET 4"

WETLAND "WET 4" IS IMPACTED BY THE PROPOSED MSW PROJECT.
IMPACTED: 2.92 AC.
NOT IMPACTED: 0.39 AC.



CROSS SECTION OF "WET 4"
VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

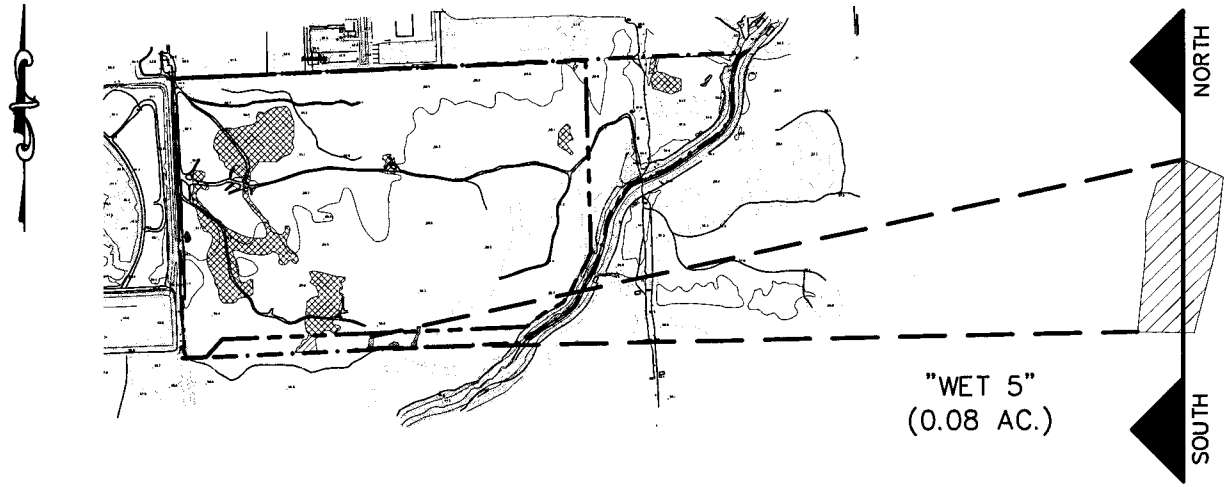
IID-240

J:\101\17\102\Wetlands\Wet-5.dwg Layout: Layout1 User: scundiff

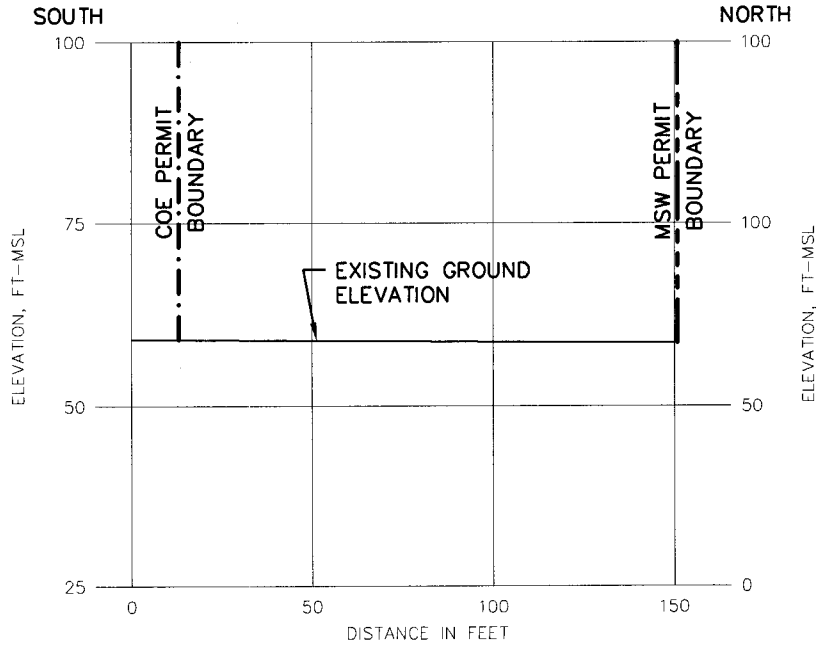
BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT T. ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 5"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION



PLAN VIEW OF "WET 5"



CROSS SECTION OF "WET 5"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 5" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
		ISSUED FOR PERMITTING PURPOSES				
		REVISIONS				

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-5.dwg
DSN. KJW
DWN. SRC
CHK. KJW

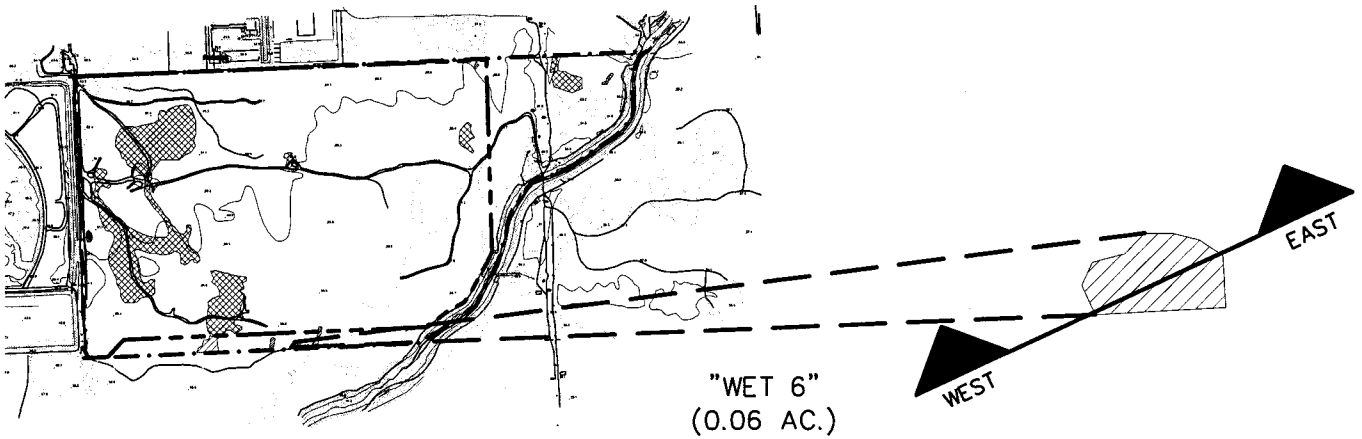
FIGURE 5

J:\101\17\102\Wetlands\Wet-6.dwg Layout: Layout1 User: scundiff

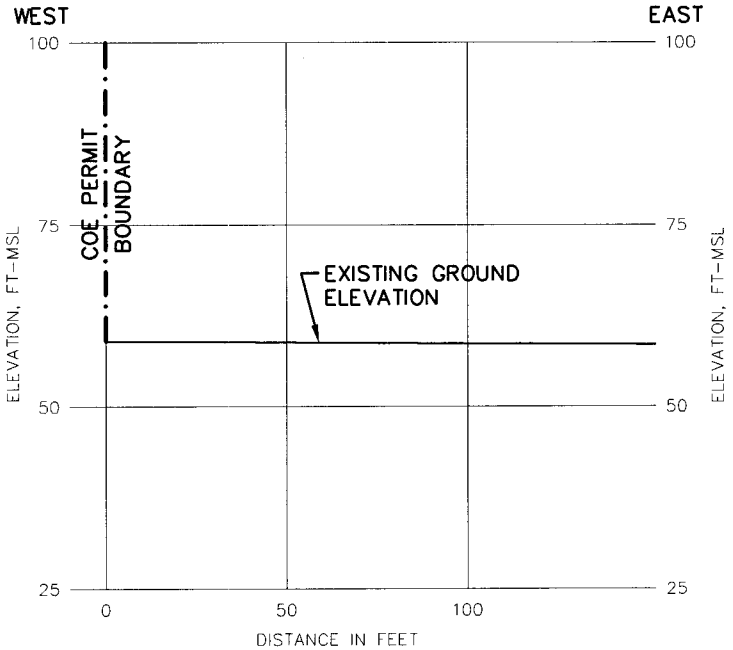
BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 6"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA ROF
WETLAND DELINEATION



PLAN VIEW OF "WET 6"



CROSS SECTION OF "WET 6"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 6" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY
		ISSUED FOR PERMITTING PURPOSES				
		REVISIONS				

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-6.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 6

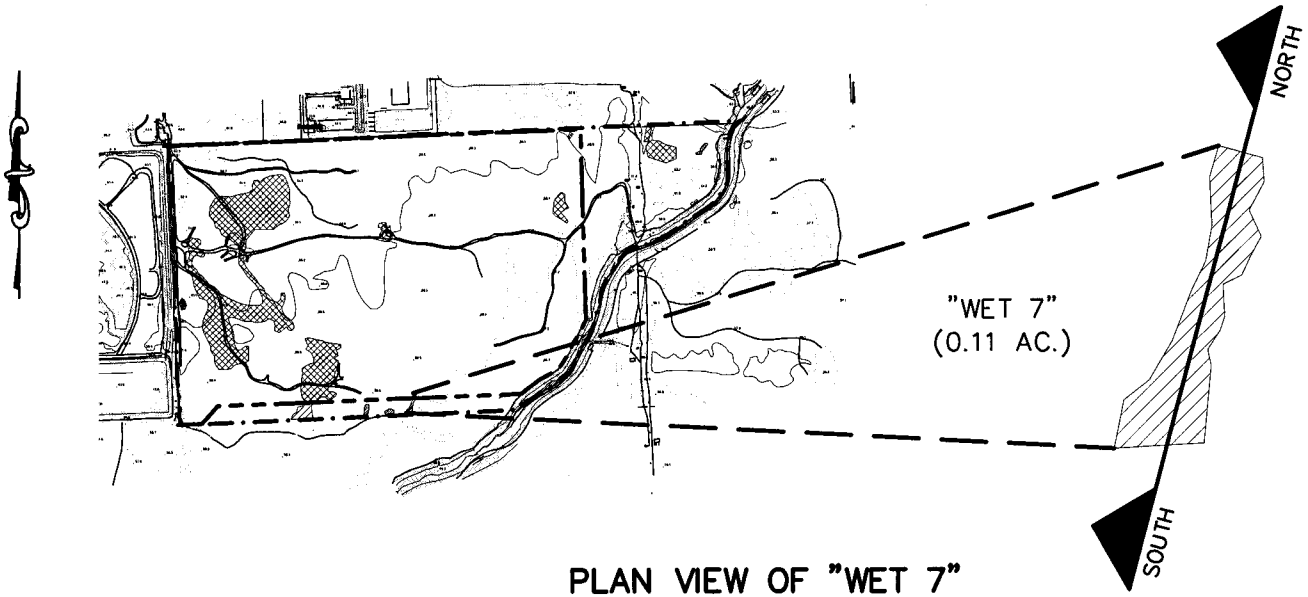
IID-242

J:\101\17\102\Wetlands\Wet-7.dwg Layout: Layout1 User: scundiff

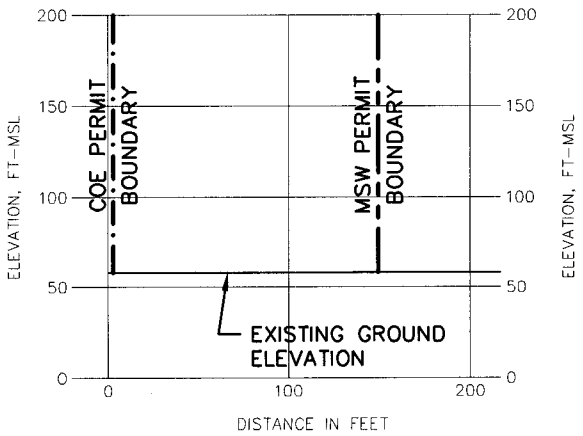
BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 7"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION



PLAN VIEW OF "WET 7"



CROSS SECTION OF "WET 7"

WETLAND "WET 7" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

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

ISSUED FOR PERMITTING PURPOSES

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-7.dwg
DSN. KJW
DWN. SRC
CHK. KJW

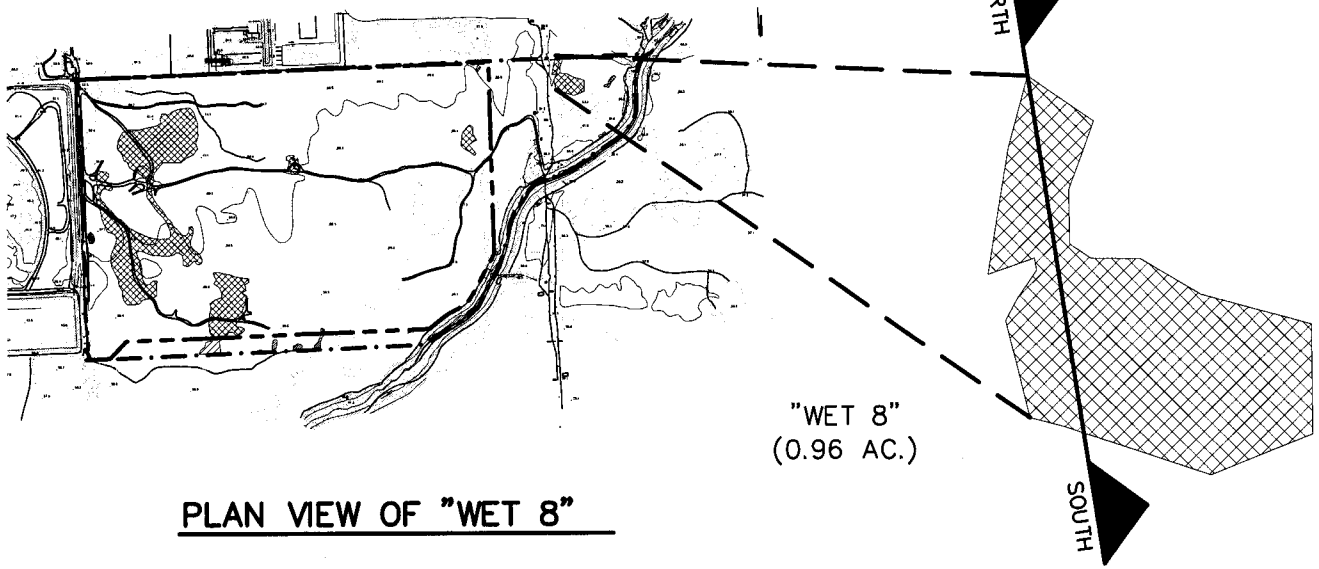
FIGURE 7

J:\101\17\102\Wetlands\Wet-8.dwg Layout: Layout1 User: scundiff

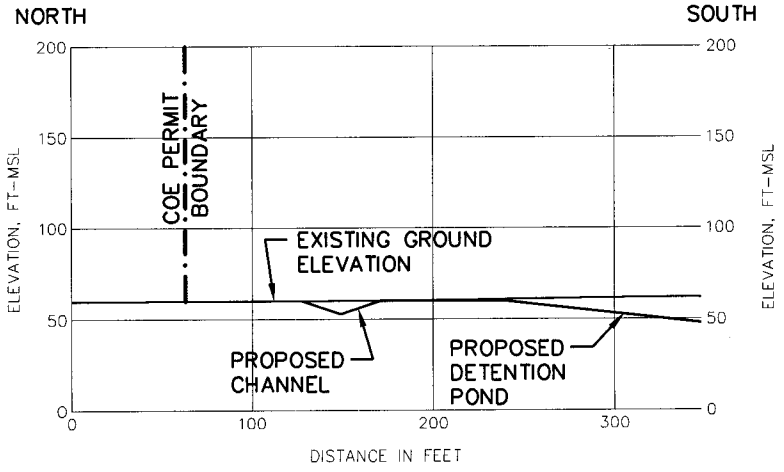
BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 8"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION



PLAN VIEW OF "WET 8"



CROSS SECTION OF "WET 8"

WETLAND "WET 8" IS IMPACTED BY THE PROPOSED MSW PROJECT.

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

ISSUED FOR PERMITTING PURPOSES

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-8.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 8

IID-244

J:\101\17\102\Wetlands\Wet-9.dwg Layout: Layout1 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 9"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

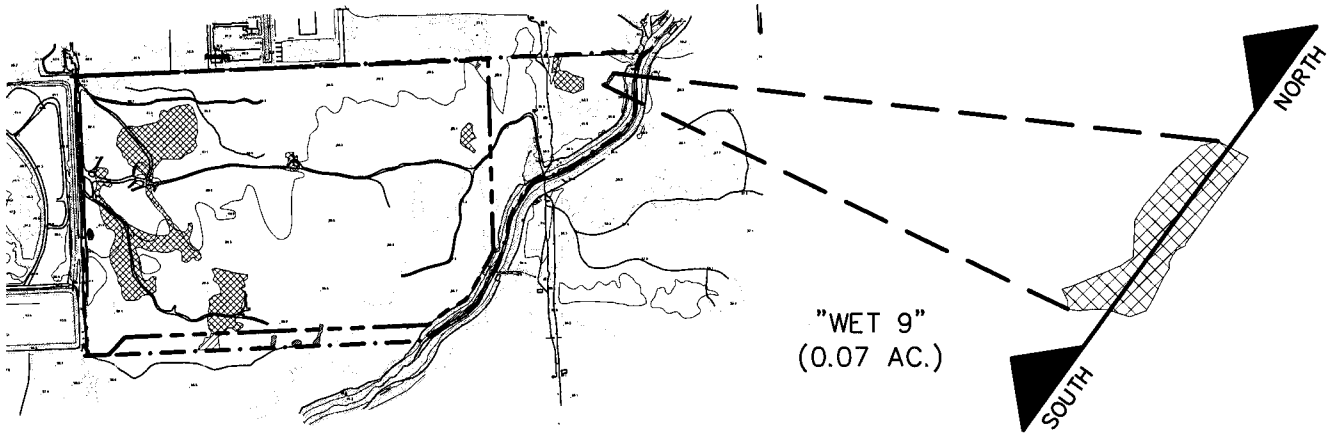
REV	DATE	DESCRIPTION	DWN. BY	DES. BY	CHK. BY	APP. BY

REVISIONS

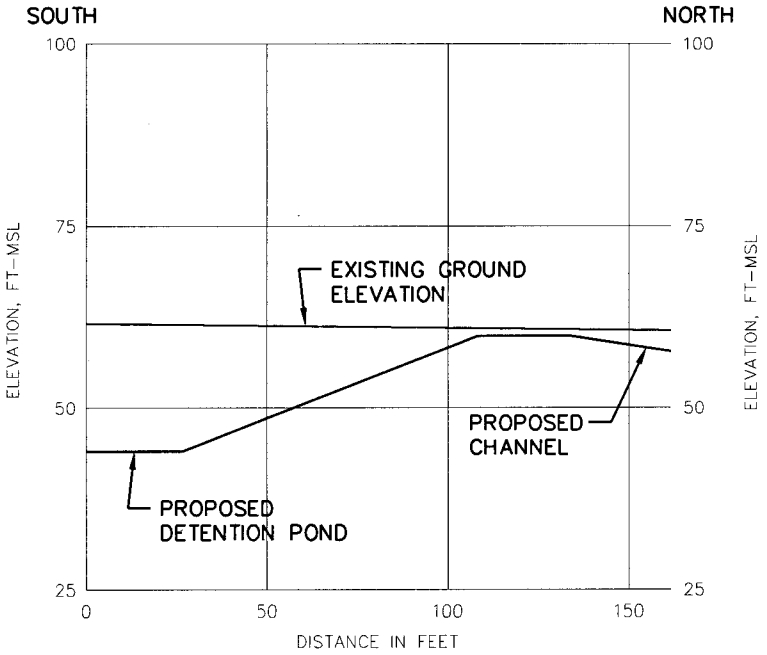
ISSUED FOR PERMITTING PURPOSES

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-9.dwg
DSN. KJW
DWN. SRC
CHK. KJW

DRAWING 9



PLAN VIEW OF "WET 9"



CROSS SECTION OF "WET 9"

VERTICAL SCALE EXAGGERATED 2X HORIZONTAL SCALE

WETLAND "WET 9" IS IMPACTED BY THE PROPOSED MSW PROJECT.

IID-245

J:\101\17\102\Wetlands\Wet-10.dwg Layout: Layout1 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT T. ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 10"

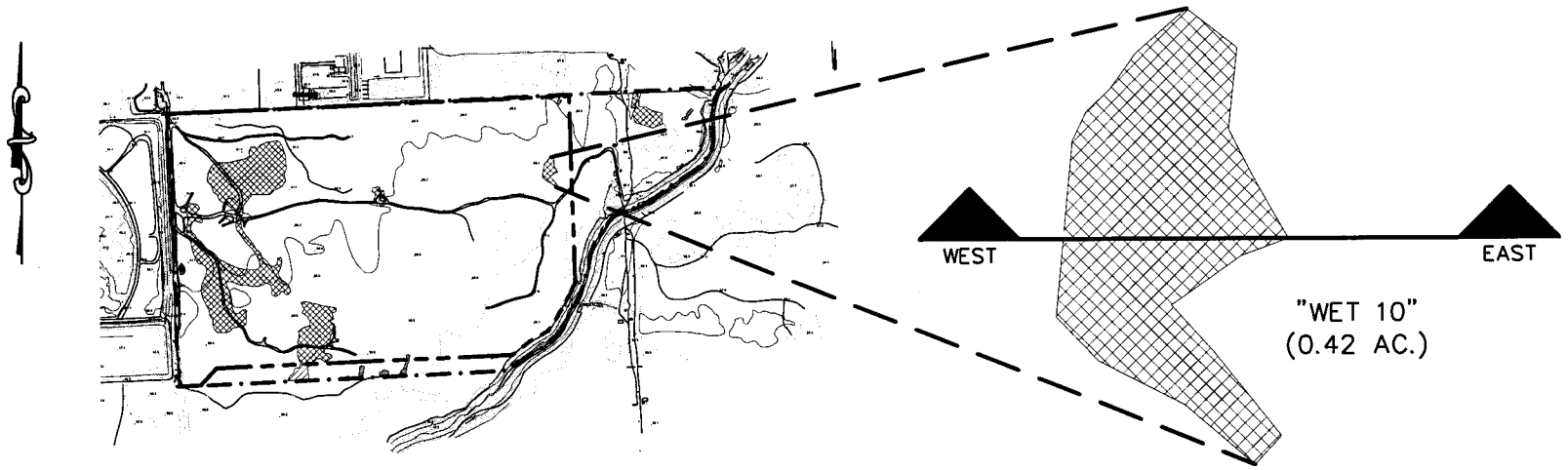
WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA ROF
WETLAND DELINEATION

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

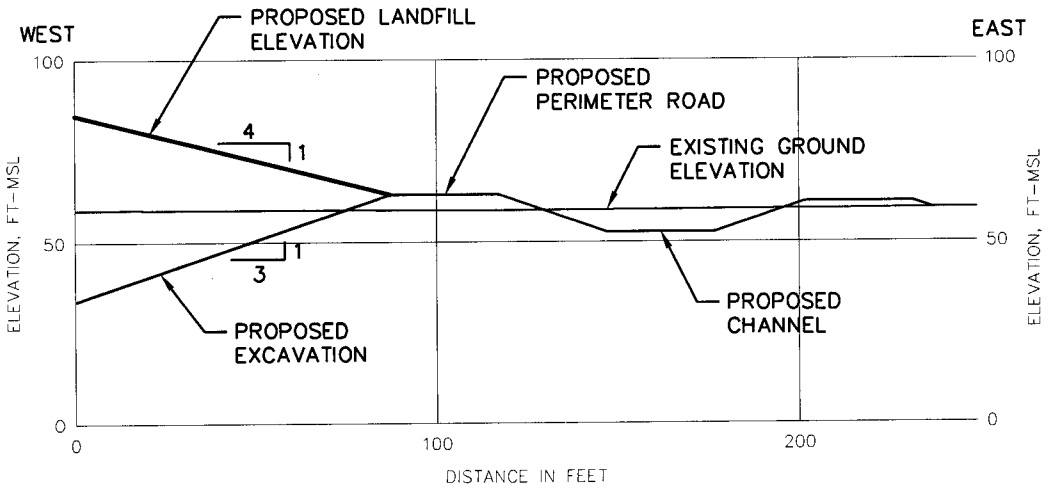
ISSUED FOR PERMITTING PURPOSES

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-10.dwg
CHK. KJW
DWN. SRC
DSN. KJW

FIGURE 10



PLAN VIEW OF "WET 10"



CROSS SECTION OF "WET 10"

WETLAND "WET 10" IS IMPACTED BY THE PROPOSED MSW PROJECT.

IID-246

J:\101\17\102\Wetlands\Wet-11.dwg Layout: Layout1 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 11"

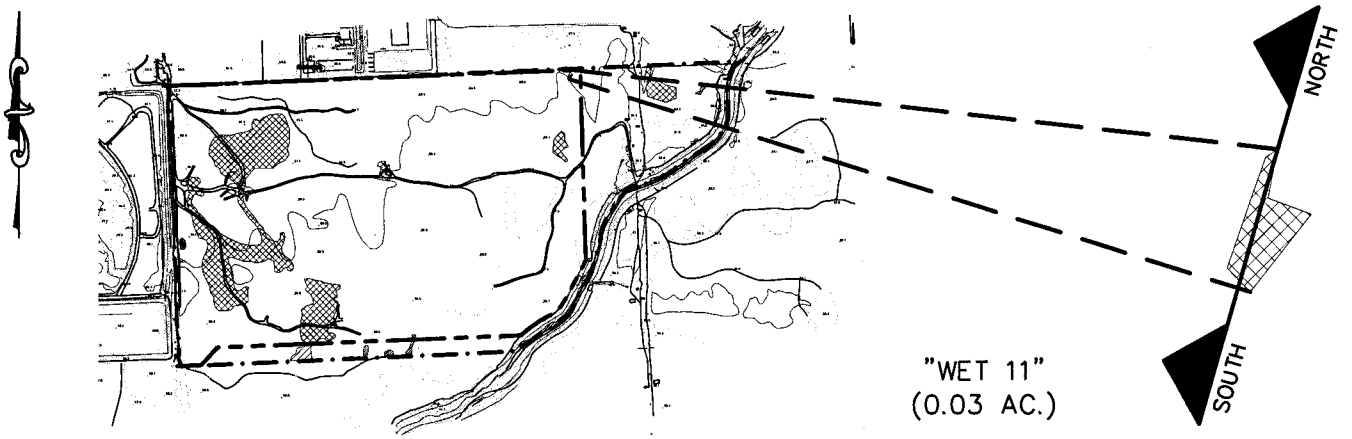
WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA ROF
WETLAND DELINEATION

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

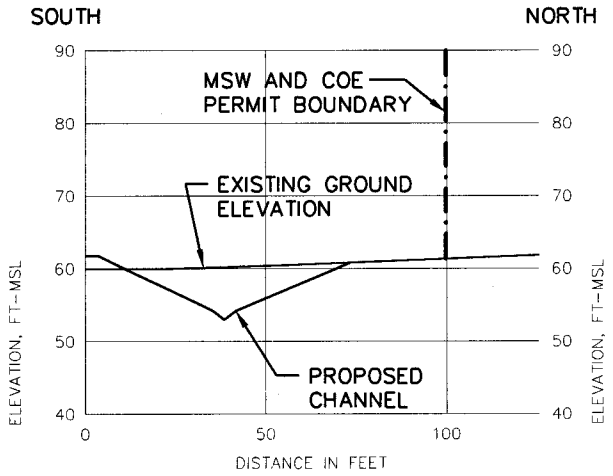
ISSUED FOR PERMITTING PURPOSES

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-11.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 11



PLAN VIEW OF "WET 11"



CROSS SECTION OF "WET 11"

VERTICAL SCALE EXAGGERATED 2X HORIZONTAL SCALE

WETLAND "WET 11" IS IMPACTED BY THE PROPOSED MSW PROJECT.

IID-247

J:\101\17\102\Wetlands\Wet-12.dwg Layout: Layout1 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 12"

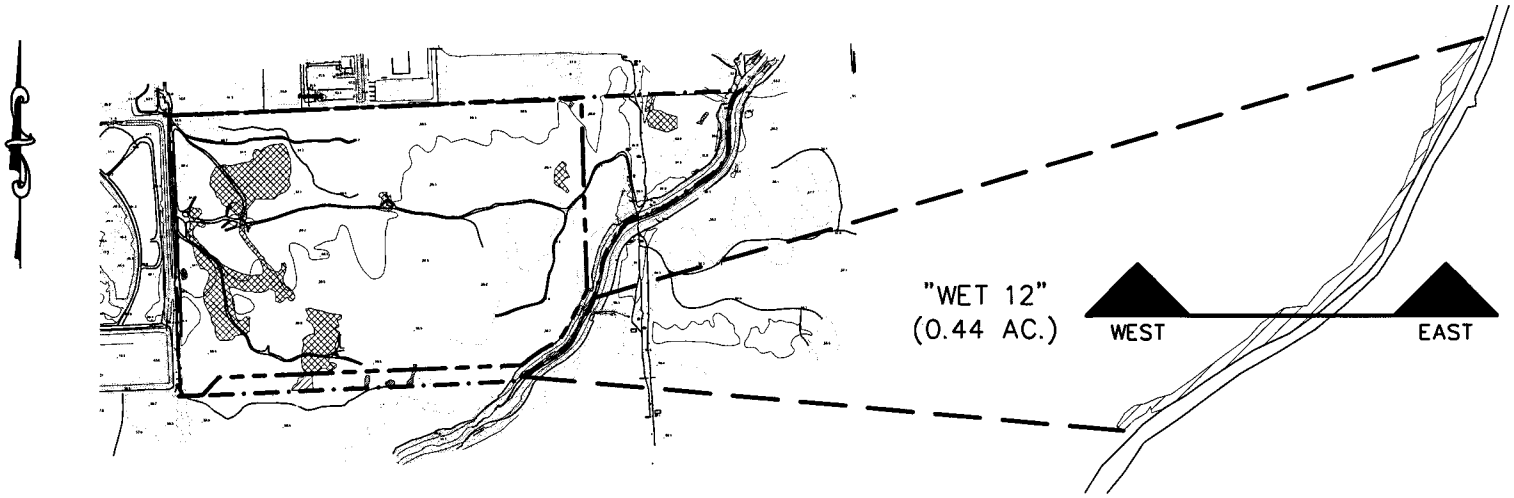
WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-12.dwg
DSN. KJW
DWN. SRC
CHK. KJW

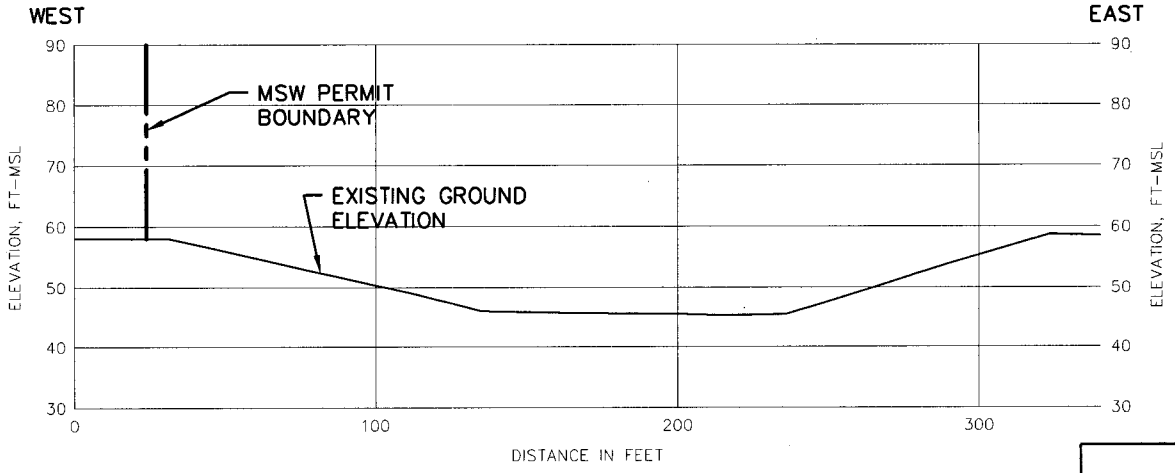
ISSUED FOR PERMITTING PURPOSES

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

FIGURE 12



PLAN VIEW OF "WET 12"



CROSS SECTION OF "WET 12"

VERTICAL SCALE EXAGGERATED 2X HORIZONTAL SCALE

SWG-1993-01967
Waste Management of Texas, Inc.
06/02/2010
Page 22 of 31

WETLAND "WET 12" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

IID-248

J:\101\17\102\Wetlands\Wet-13.dwg Layout: Layout1 User: scundiff

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WETLAND AREA "WET 13"

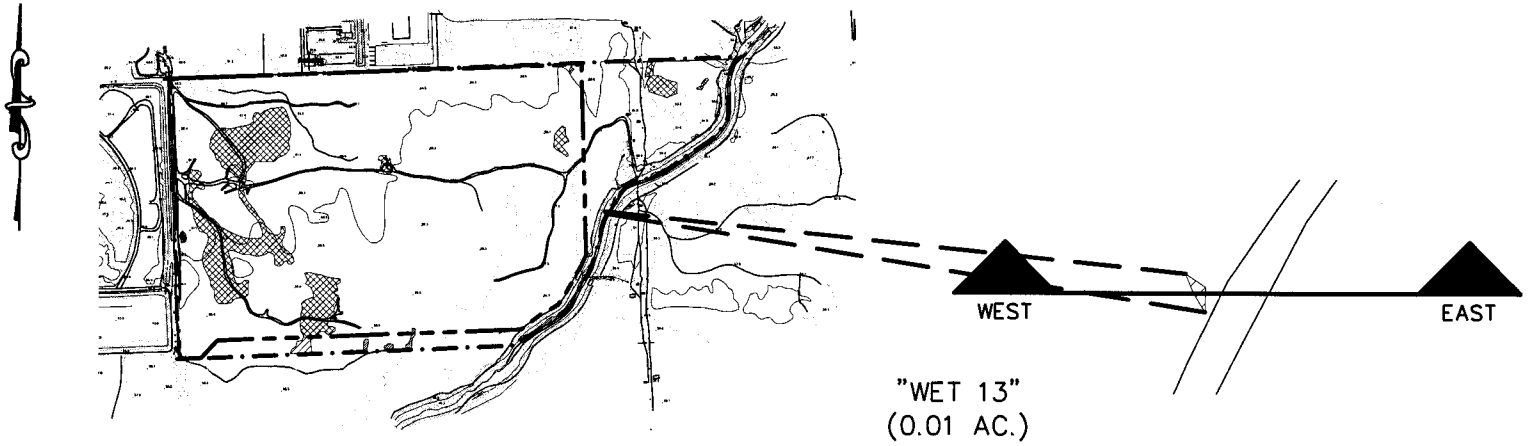
WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA ROF
WETLAND DELINEATION

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-13.dwg
DSN. KJW
DWN. SRC
CHK. KJW

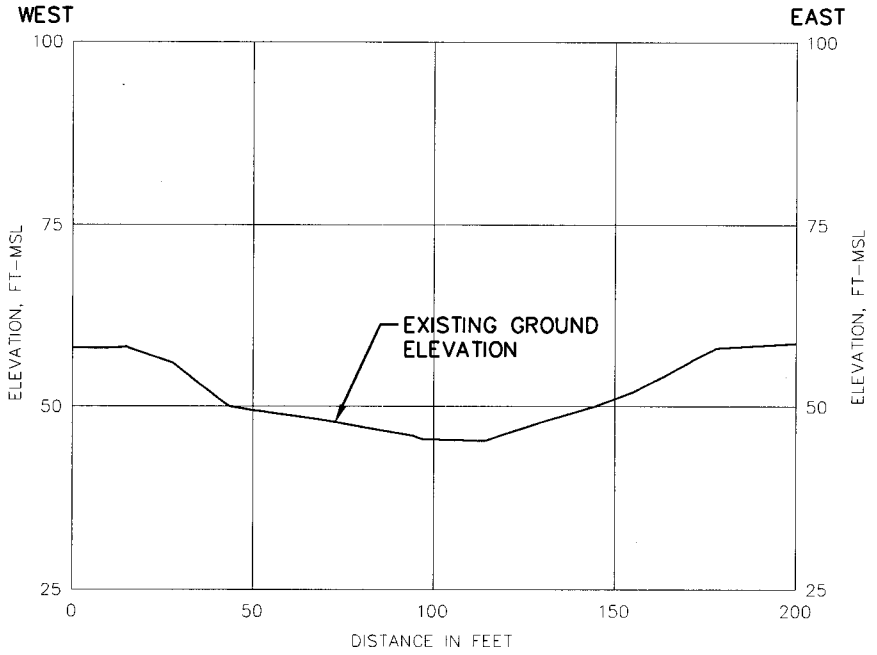
ISSUED FOR PERMITTING PURPOSES

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

FIGURE 13



PLAN VIEW OF "WET 13"



CROSS SECTION OF "WET 13"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 13" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

IID-249

J:\101\17\102\Wetlands\Wet-14.dwg Layout: Layout1 User: scundiff

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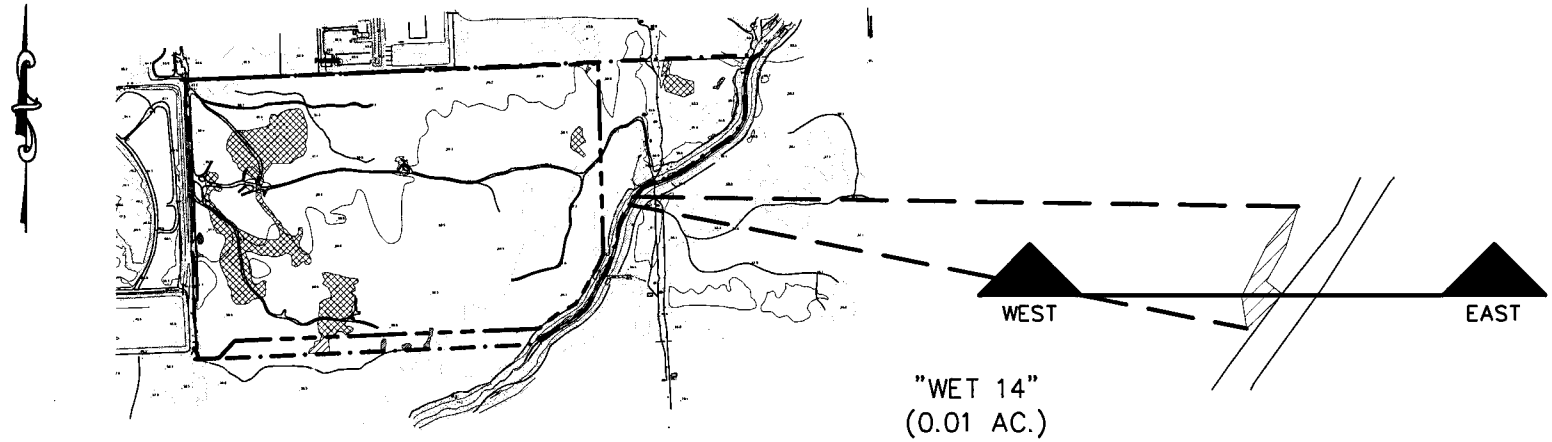
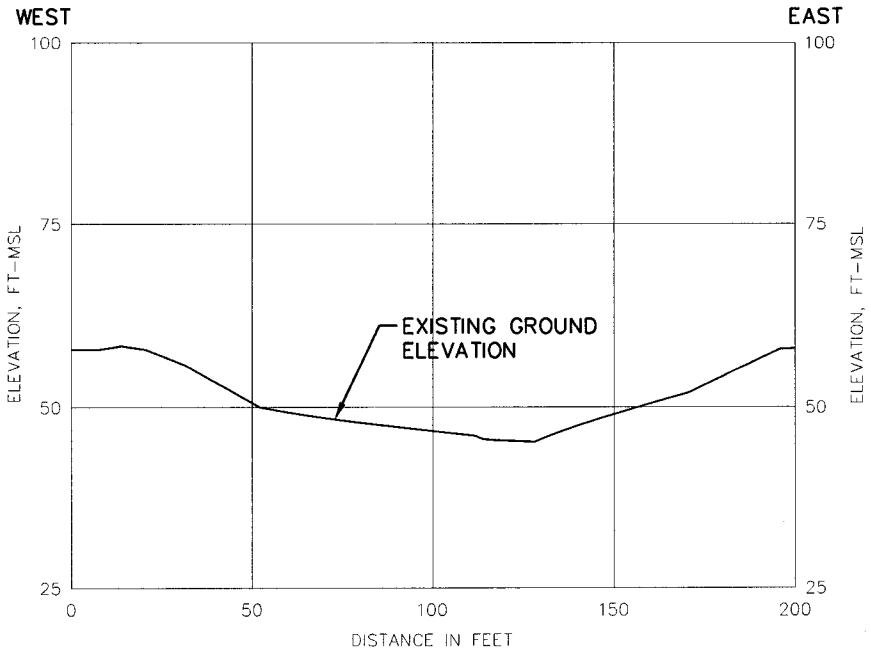
MANSFIELD, TEXAS

WETLAND AREA "WET 14"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION



PLAN VIEW OF "WET 14"



CROSS SECTION OF "WET 14"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 14" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

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

ISSUED FOR PERMITTING PURPOSES

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-14.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 14

IID-250

J:\101\17\102\Wetlands\Wet-15.dwg Layout: Layout1 User: scundiff

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WETLAND AREA "WET 15"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA ROF
WETLAND DELINEATION

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

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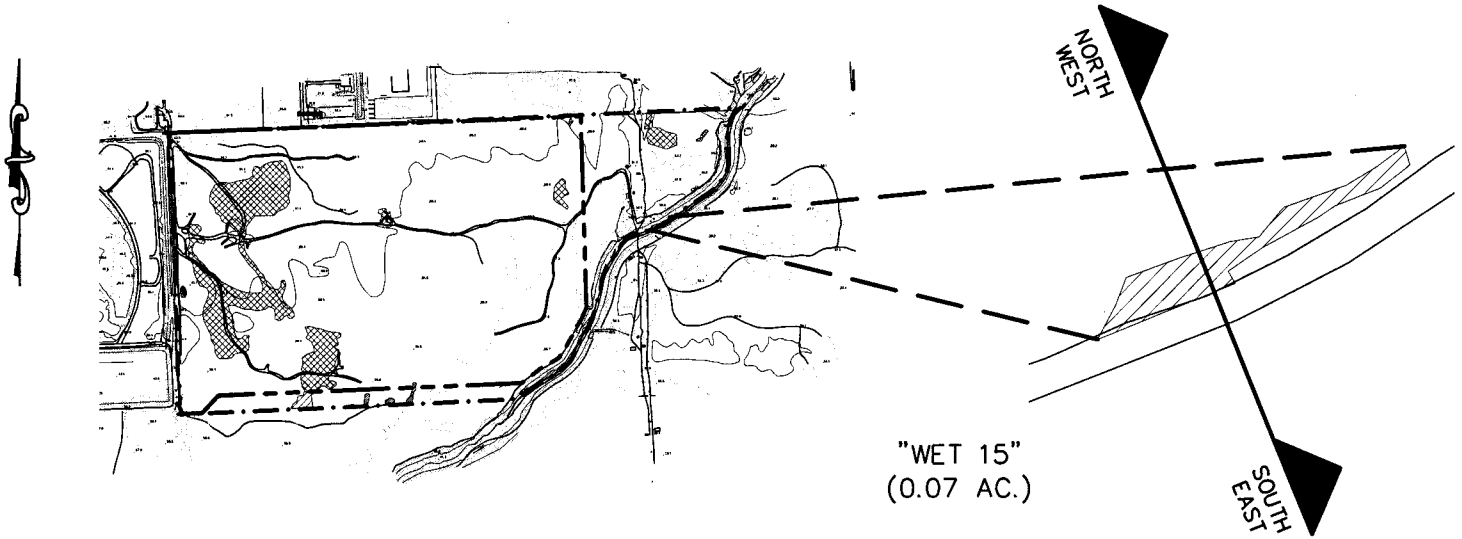
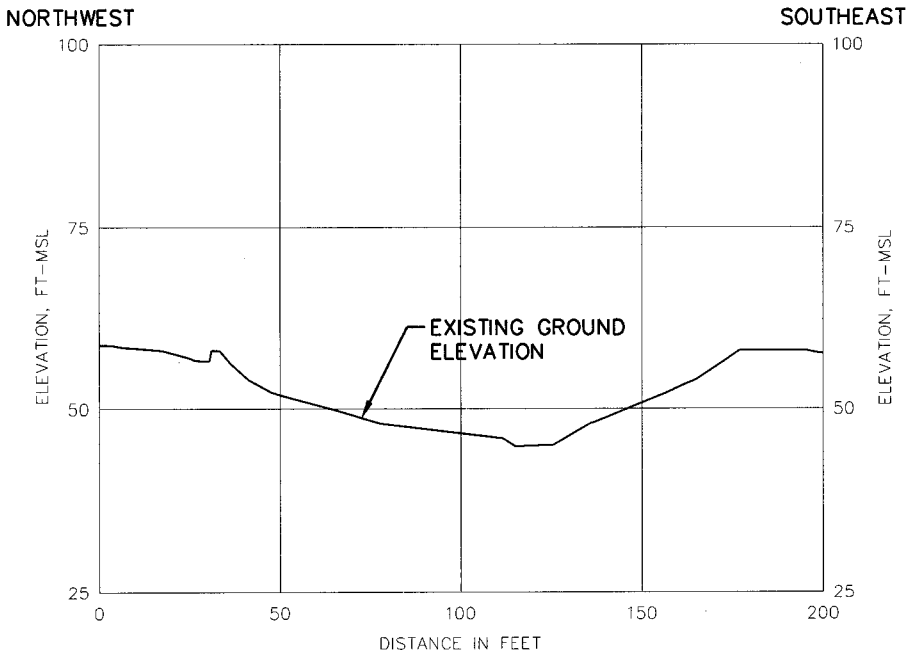
DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-15.dwg
DSN. KJW
DWN. SRC
CHK. KJW

FIGURE 15



PLAN VIEW OF "WET 15"



CROSS SECTION OF "WET 15"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 15" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

IID-251

J:\101\17\102\Wetlands\Wet-16.dwg Layout: Layout1 User: scundiff

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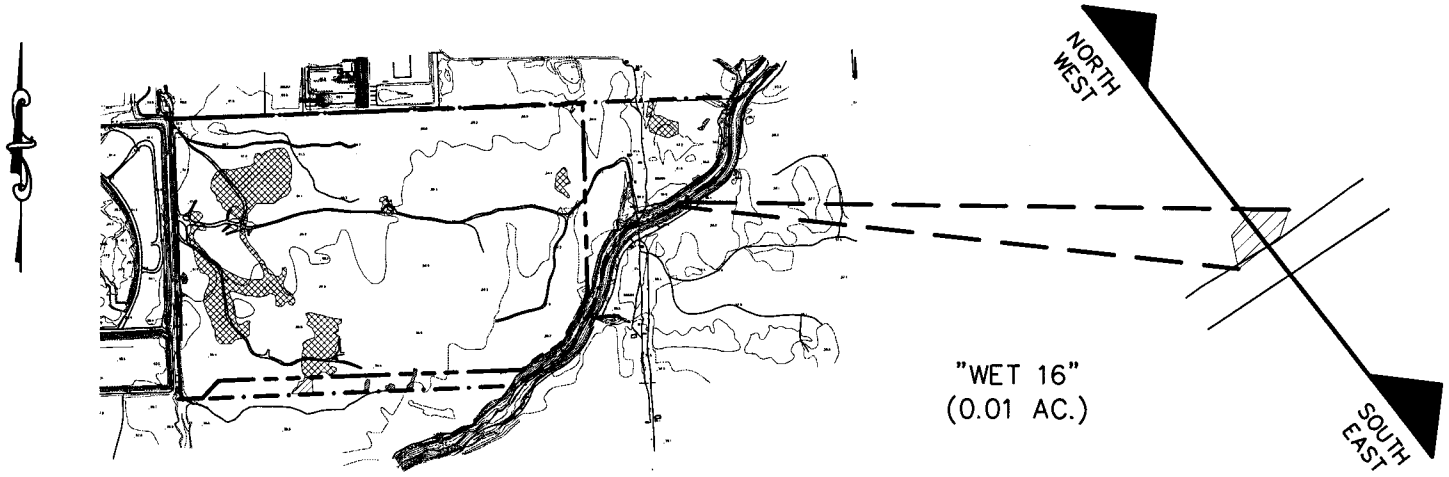
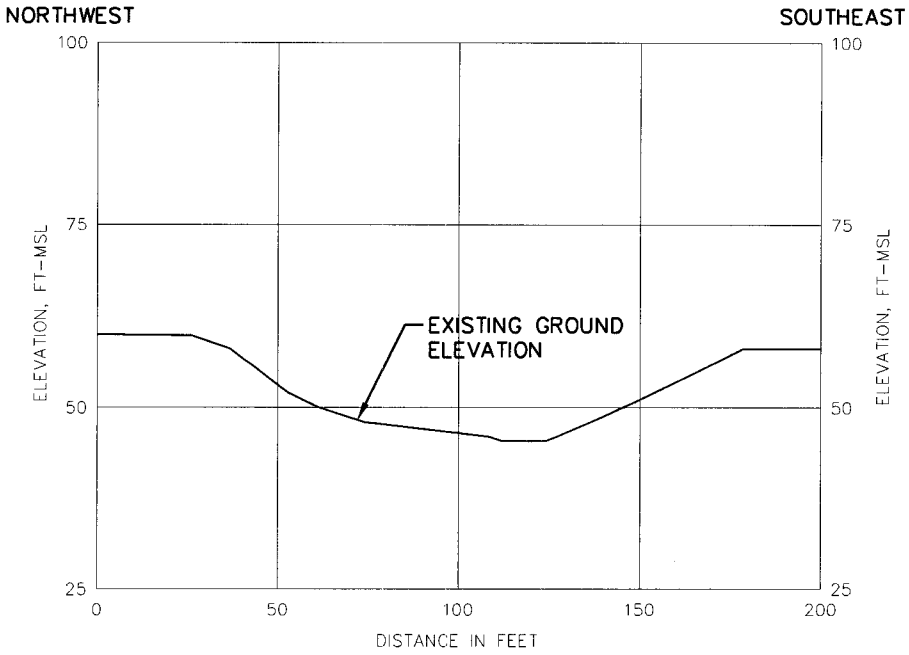
MANSFIELD, TEXAS

WETLAND AREA "WET 16"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION



PLAN VIEW OF "WET 16"



CROSS SECTION OF "WET 16"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 16" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

ISSUED FOR PERMITTING PURPOSES
REVISIONS

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-16.dwg
CHK. KJW
DWN. SRC
DSN. KJW

FIGURE 16

IID-252

J:\101\17\102\Wetlands\Wet-17.dwg Layout: Layout1 User: scundiff

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MANSFIELD, TEXAS

WETLAND AREA "WET 17"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

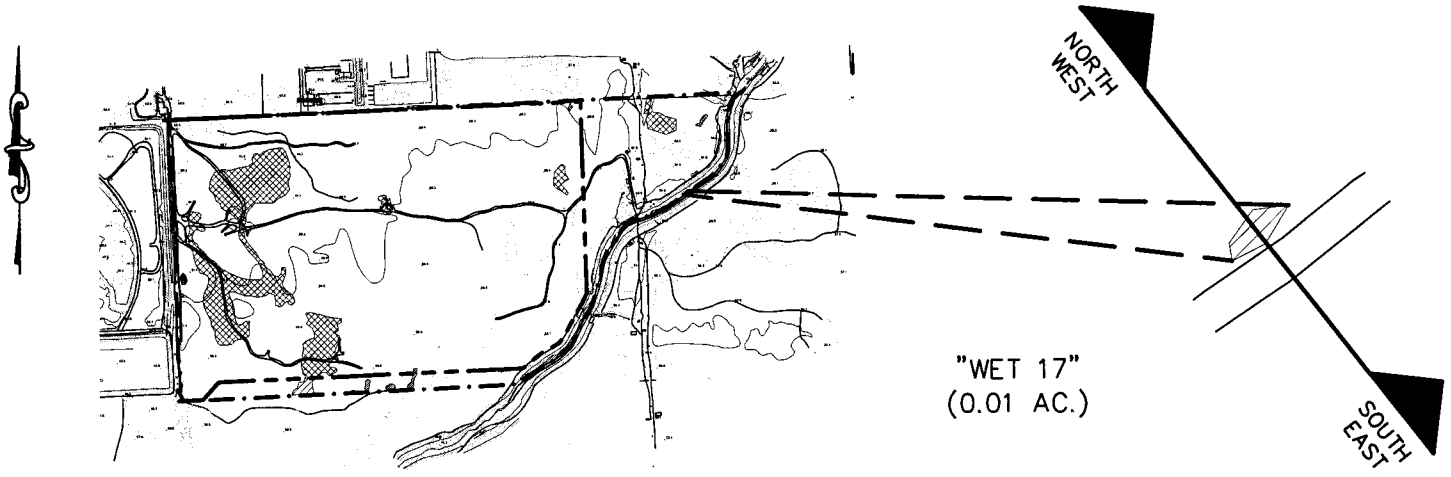
DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-17.dwg
DSN. KJW
DWN. SRC
CHK. KJW

ISSUED FOR PERMITTING PURPOSES

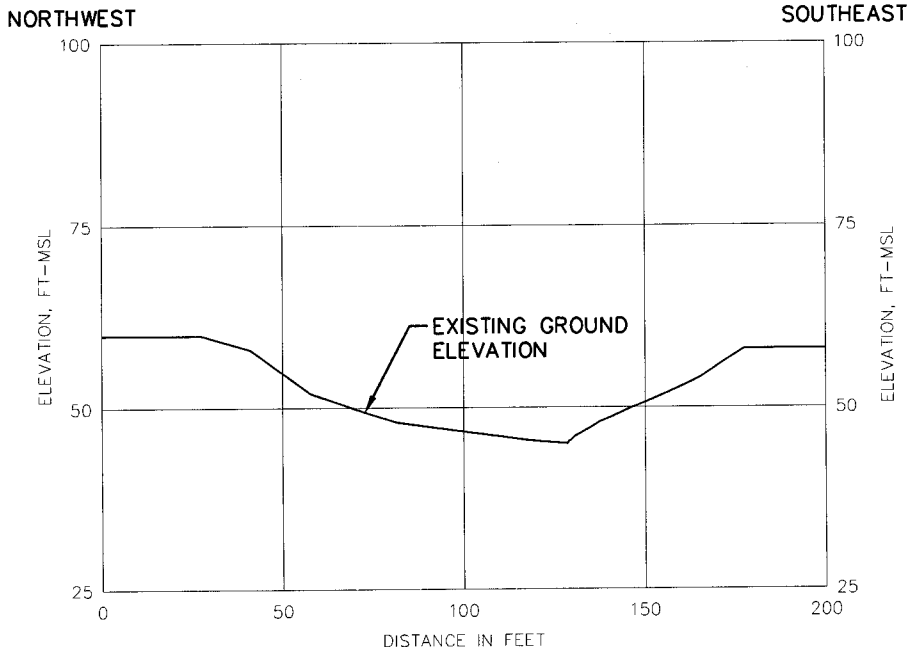
REVISIONS

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

FIGURE 17



PLAN VIEW OF "WET 17"



CROSS SECTION OF "WET 17"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 17" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

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MANSFIELD, TEXAS

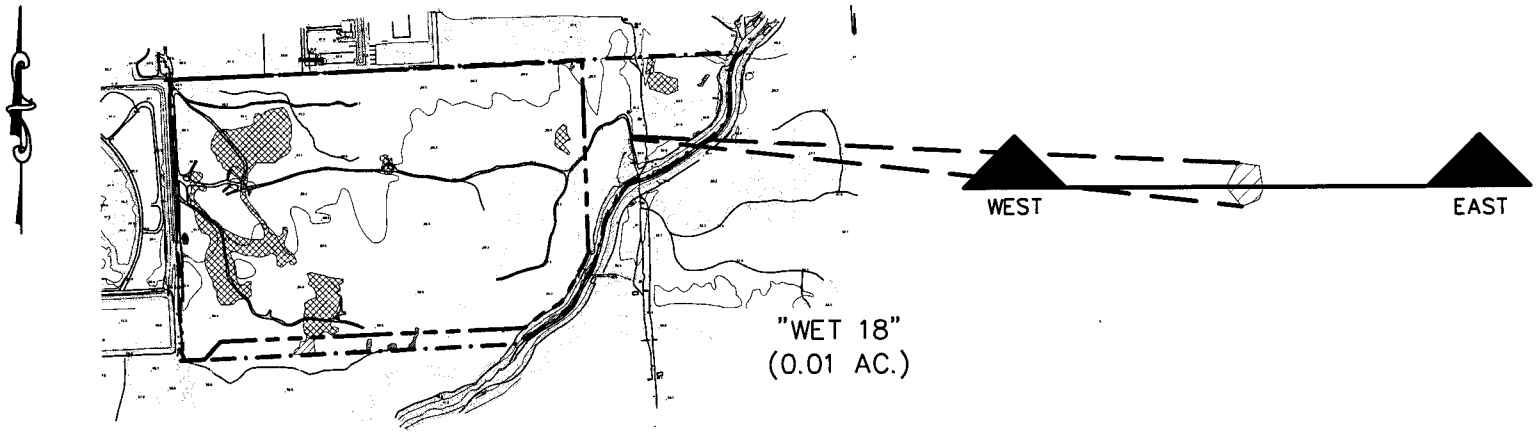
WETLAND AREA "WET 18"

WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

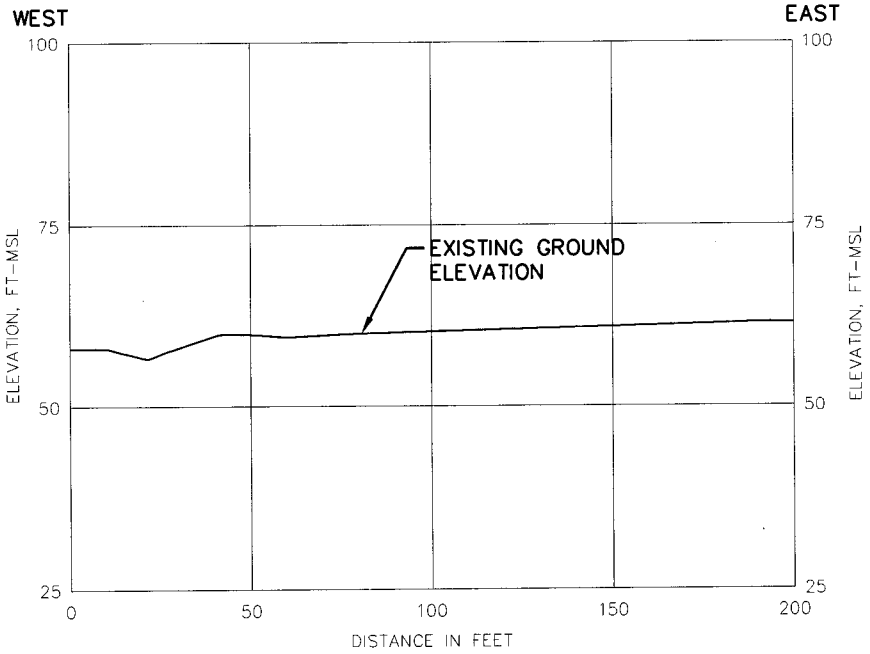
REV	DATE	DESCRIPTION	DWN. BY	DES. BY	CHK. BY	APP. BY
		ISSUED FOR PERMITTING PURPOSES				

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-18.dwg
DSN. KJW
DWN. SRC
CHK. KJW
REVISIONS

FIGURE 18



PLAN VIEW OF "WET 18"



CROSS SECTION OF "WET 18"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

WETLAND "WET 18" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.

IID-254

J:\101\17\102\Wetlands\Wet-19.dwg Layout: Layout1 User: scundiff

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MANSFIELD, TEXAS

WETLAND AREA "WET 19"

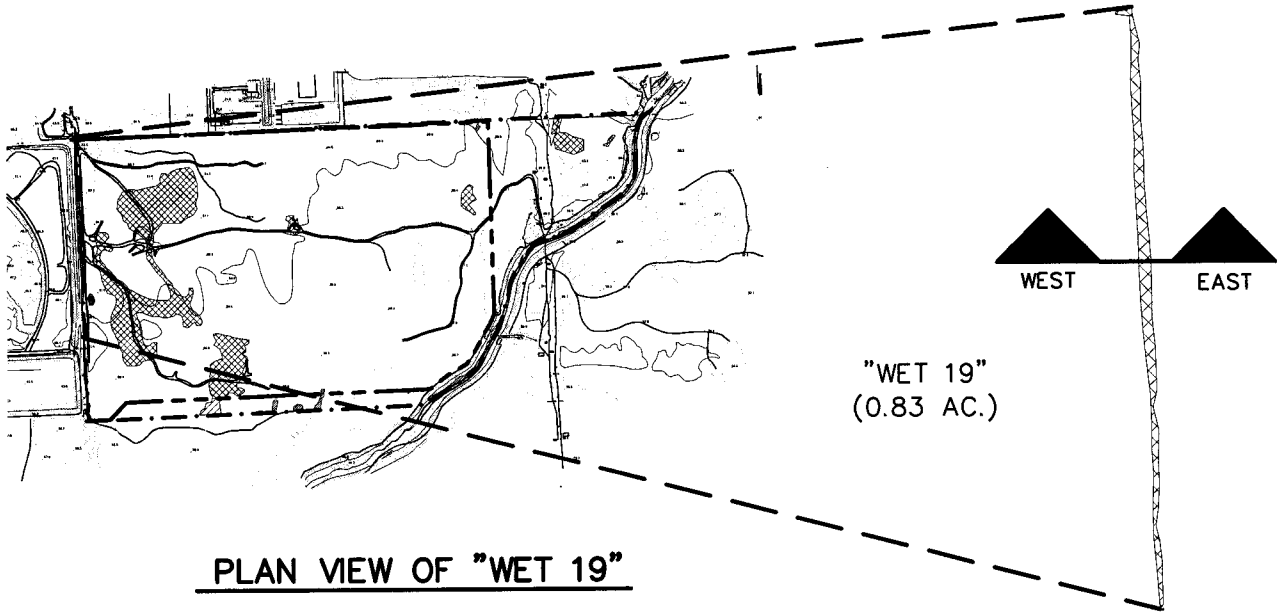
WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA RDF
WETLAND DELINEATION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

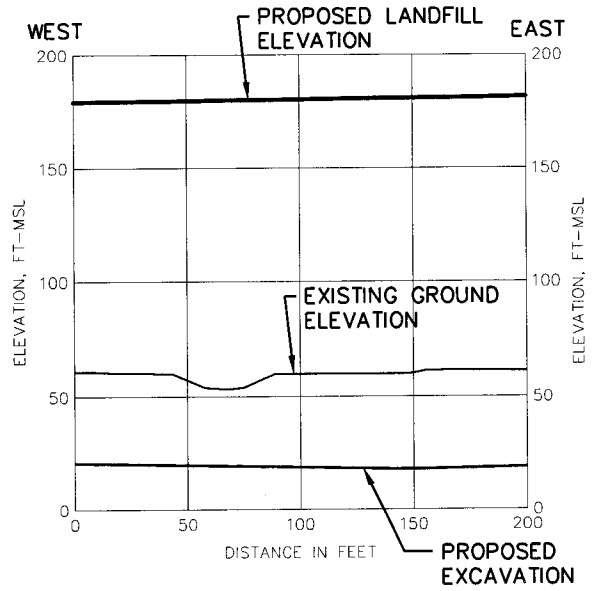
ISSUED FOR PERMITTING PURPOSES
REVISIONS

DATE : 10/09
SCALE : GRAPHIC
DWG : Wet-19.dwg
CHK. KJW
DWN. SRC
DSN. KJW

FIGURE 19



PLAN VIEW OF "WET 19"



CROSS SECTION OF "WET 19"

WETLAND "WET 19" IS IMPACTED BY THE PROPOSED MSW PROJECT.

IID-255

J:\101\17\102\Wetlands\Ditch-1.dwg Layout: Layout1 User: scundiff

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1700 ROBERT ROAD
MANSFIELD, TEXAS

WETLAND AREA "DITCH 1"

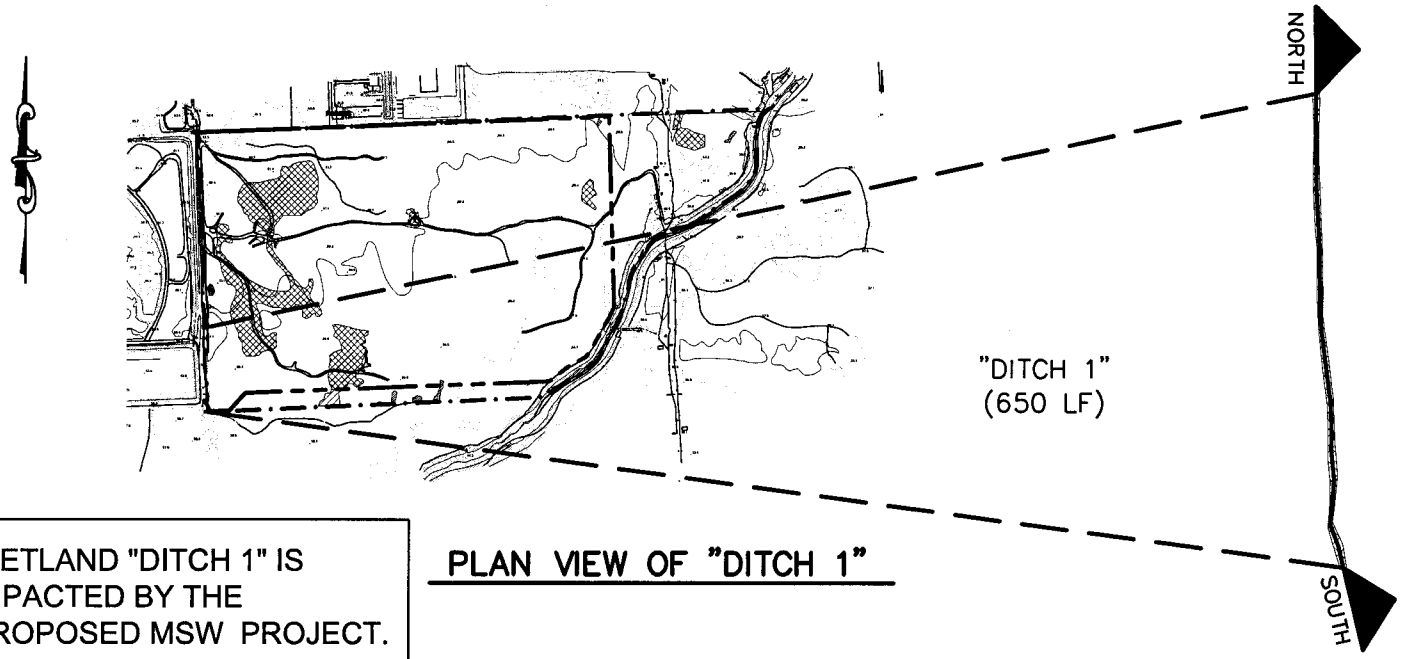
WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA ROF
WETLAND DELINEATION

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

ISSUED FOR PERMITTING PURPOSES

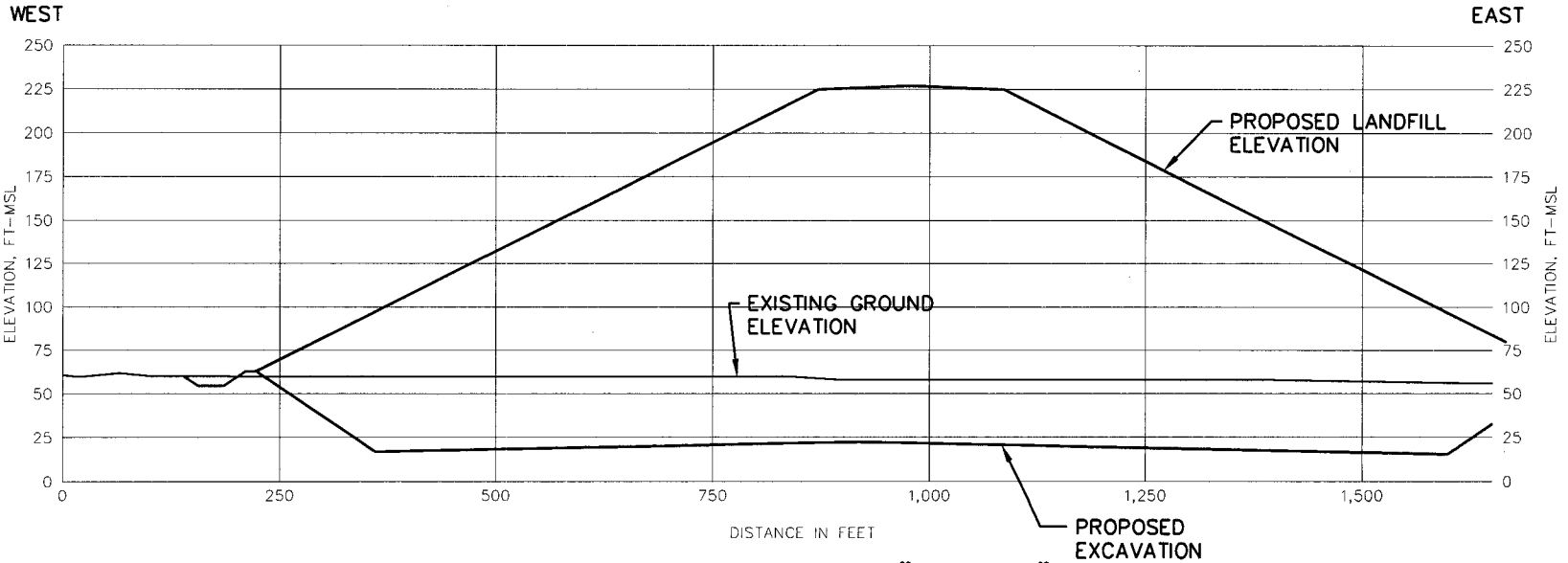
DATE : 10/09
SCALE : GRAPHIC
DWG : Ditch-1.dwg
CHK. KJW
DWN. SRC
DSN. KJW

FIGURE 20



WETLAND "DITCH 1" IS IMPACTED BY THE PROPOSED MSW PROJECT.

PLAN VIEW OF "DITCH 1"



CROSS SECTION OF "DITCH 1"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

IID-256

J:\101\17\102\Wetlands\Creek-1.dwg Layout: Layout1 User: scundiff

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CONSULTING ENGINEERS
1700 ROBERT ROAD
MANSFIELD, TEXAS

WETLAND AREA "CREEK 1"

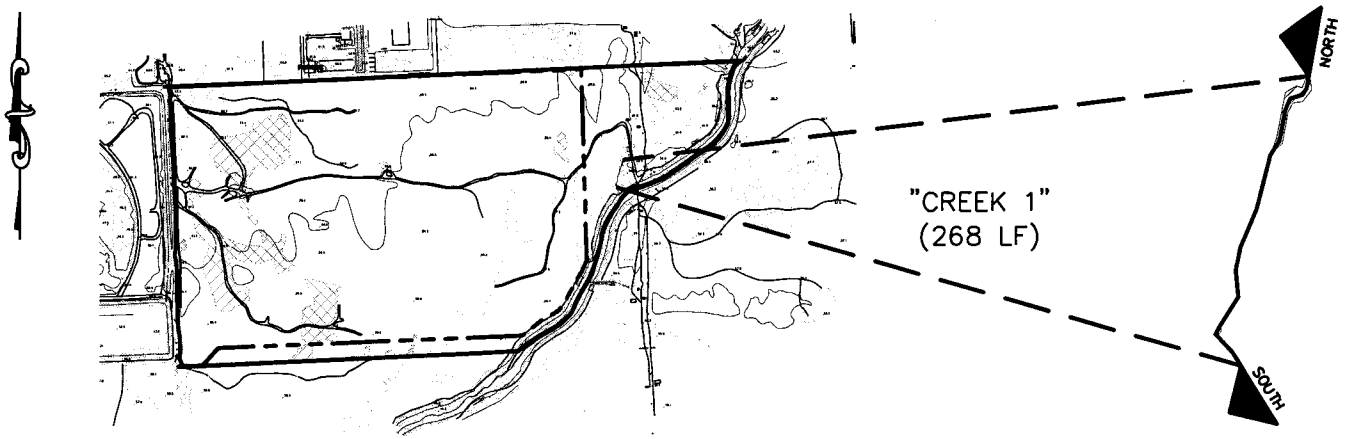
WASTE MANAGEMENT OF TEXAS, INC.
ATASCOCITA ROF
WETLAND DELINEATION

DATE : 10/09
SCALE : GRAPHIC
DWG : Creek-1.dwg
DSN. KJW
DWN. SRC
CHK. KJW

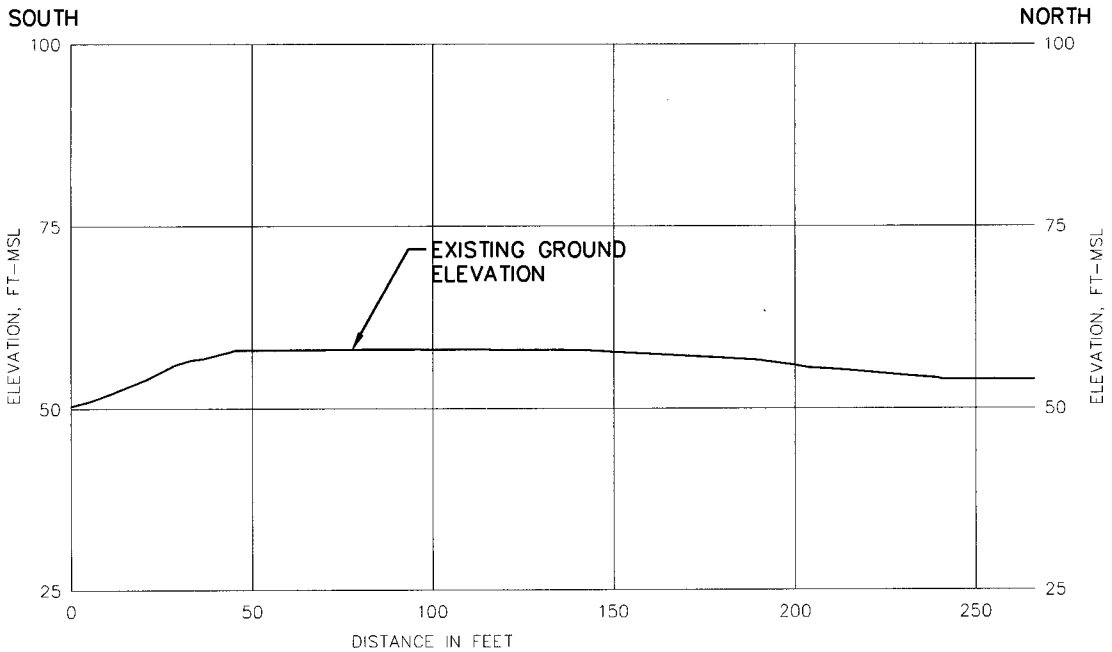
ISSUED FOR PERMITTING PURPOSES

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

FIGURE 21



PLAN VIEW OF "CREEK 1"



CROSS SECTION OF "CREEK 1"

VERTICAL SCALE EXAGGERATED 2 X HORIZONTAL SCALE

"CREEK 1" IS NOT IMPACTED BY THE PROPOSED MSW PROJECT.