PUBLIC NOTICE
LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY (LDEQ)
HARRELSON MATERIALS MANAGEMENT, INC.
TYPE III CONSTRUCTION AND DEMOLITION DEBRIS/WOODWASTE LANDFILL
TECHNICALLY COMPLETE SOLID WASTE PERMIT APPLICATION

The LDEQ, Office of Environmental Services, has determined that a Type III solid waste permit application for Harrelson Materials Management, Inc., 1101 Russell Road, Shreveport, Louisiana 71107 for the construction and demolition debris and woodwaste landfill is technically complete and acceptable for public review. **The facility is located at 1101 Russell Road, Shreveport, Louisiana in Caddo Parish.**

Harrelson Materials Management, Inc. requested a permit for a construction and demolition debris landfill. Harrelson Materials Management, Inc. is an existing facility operating under an Order to Upgrade for the site that is currently disposing of construction and demolition debris and woodwaste.

Written comments, written requests for a public hearing or written requests for notification of the final decision regarding this permit action may be submitted to Ms. Soumaya Ghosn at LDEQ, Public Participation Group, P.O. Box 4313, Baton Rouge, LA 70821-4313. **Written comments and/or written requests must be received by 12:30 p.m., Wednesday, January 23, 2008.** Written comments will be considered prior to a final permit decision.

If LDEQ finds a significant degree of public interest, a public hearing will be held. LDEQ will send notification of the final permit decision to the applicant and to each person who has submitted written comments or a written request for notification of the final decision.

The technically complete solid waste permit application is available for review at the LDEQ Public Records Center, Room 127, 602 North 5th Street, Baton Rouge, LA. Viewing hours are from 8:00 a.m. to 4:30 p.m., Monday through Friday (except holidays). **The available information can also be accessed electronically on the Electronic Document Management System (EDMS) on the DEQ public website at www.deq.louisiana.gov.**

Additional copies may be reviewed at Shreve Memorial Library-Headquarters, 424 Texas Street. Shreveport, LA., City of Shreveport Mayor's Office, 505 Travis Street, Suite 200, Shreveport, LA and the LDEQ-Northwest Regional Office, 1525 Fairfield Avenue, Room 529, Shreveport, LA.

Inquiries or requests for additional information regarding this permit action should be directed to Curt A. Auzenne, LDEQ, Waste Permits Division, P.O. Box 4313, Baton Rouge, LA 70821-4313, phone (225) 219-3060.

Persons wishing to be included on the LDEQ permit public notice mailing list or for other public participation related questions should contact the Public Participation Group in writing at LDEQ, P.O. Box 4313, Baton Rouge, LA 70821-4313, by email at deqmaillistrequest@la.gov or contact the LDEQ Customer Service Center at (225) 219-LDEQ (219-5337).

Permit public notices including electronic access to general information from the technically complete solid waste permit application can be viewed at the LDEQ permits public notice webpage at www.deq.louisiana.gov/apps/pubNotice/default.asp and general information related to the public participation in permitting activities can be viewed at www.deq.louisiana.gov/portal/tabid/2198/Default.aspx.

Alternatively, individuals may elect to receive the permit public notices via email by subscribing to the LDEQ permits public notice List Server at www.doa.louisiana.gov/oes/listservpage/ldeq_pn_listserv.htm

All correspondence should specify AI Number 28118, Permit Number OU-0269, and Activity Number PER19950001.

Publication date: December 19, 2007

PUBLIC NOTICE
LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY (LDEQ)
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All correspondence should specify AI Number 28118, Permit Number OU-0269, and Activity Number PER19950001.

Publication date: December 19, 2007

DEPARTMENT OF ENVIRONMENTAL QUALITY
KATHLEEN BABINEAUX BLANCO
GOVERNOR
MIKE D. McDANIEL, Ph.D.
SECRETARY

CERTIFIED MAIL 7003 2260 0005 9323 6466
RETURN SERVICE REQUESTED

Mr. Michael Harrelson
Harrelson Materials Management, Inc.
1101 Russell Road
Shreveport, LA 71107

RE: Notice of Technical Completeness
Harrelson Materials Management, Inc.
Type III Construction and Demolition Debris and Woodwaste Landfill
D-017-2688/AI# 28118/PER19950001/OU-0269
Caddo Parish

Dear Mr. Harrelson:

The Waste Permits Division is in receipt of the final copies of your submittal dated June 29, 2007. After review of this submittal, it has been determined that your permit renewal is technically complete and ready for public review.

The Environmental Assistance Division will distribute copies of your application for public review and place public notices in the appropriate newspapers in accordance with LAC 33:VII.513.F.3. Please contact Ms. Soumaya Ghosn at (225) 219-3276 for the date of publication and the dates for the comment period. At the conclusion of the comment period, the Waste Permits Division will consider all comments and a decision will be made regarding your application.

Please reference Agency Interest Number 28118, Permit Activity Number PER19950001 and Site Identification Number D-017-2688 on all future correspondence pertaining to this facility. If you have any questions concerning this matter, please contact Mr. Curt A. Auzenne of the Waste Permits Division at (225) 219-3060.

Sincerely,

Bijan Sharafkhani, P.E.
Administrator
Waste Permits Division

caa

c: Northwest Regional Office
George Cramer, II, PG, Arcadis US Inc.

ENVIRONMENTAL **SERVICES**
: PO BOX 4313, BATON ROUGE, LA 70821-4313
P:225-219-3181 F:225-219-3309
WWW.DEQ.LOUISIANA.GOV

original to IOSW
copy to SW/G1/Tomsc
AVG

ARCADIS
Infrastructure, environment, facilities

LDEQ RECEIPT
COPY
2007 JUN 29 PM 3 28

ARCADIS U.S., Inc.
10352 Plaza Americana Drive
Baton Rouge
Louisiana 70816
Tel 225 292 1004
Fax 225 218 9677
www.arcadis-us.com

Mr. Bijan Sharafkhani, Administrator
Waste Permits Division
Office of Environmental Services
Louisiana Department of Environmental Quality
P. O. Box 4313
Baton Rouge, Louisiana 70821-4313

RECEIVED
JUN 29 2007
LDEQ

ENVIRONMENT

Subject:
Solid Waste Permit Application
Harrelson Materials Management C&D Landfill
Agency Interest No. 28118/D-017-2688/PER19950001
Caddo Parish, Louisiana

Date:
29 June 2007

Contact:
George H. Cramer, P.G.

Extension:
228

Email:
george.cramer@arcadis-us.com

Our ref:
LA002706.0001.00002
Harrelson/2706.1/C/Harrelson Landfill/3/bbn

Dear Mr. Sharafkhani:

ARCADIS is pleased to submit six copies of the above-referenced solid waste permit application in accordance with the Order to Upgrade, OU-0269, issued by Dr. Brown on May 31, 2007. The application addresses all the comments and requests generated during the technical review.

If there are any questions concerning this submittal, please contact any of the undersigned or Mr. Michael Harrelson at (318) 286-6882.

Sincerely,

ARCADIS U.S., Inc.

George H. Cramer, II, P.G.
Associate Vice President/Principal Hydrogeologist

Rudy J. Guichard
Senior Vice President/Area Manager

GHC:RJG:bbn

Copies:
Ms. Linda M. Brown, LDEQ
Mr. Curt Auzenne, LDEQ
Mr. Michael Harrelson (HMM)
Mr. John Shortess (Phelps Dunbar)

ARCADIS
Infrastructure, environment, facilities

Imagine the result

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JUN 29 2007
LDEQ

Solid Waste Permit Application

Harrelson Materials Management, Inc., Landfill
1101 Russell Road
Shreveport, Louisiana 71107

29 June 2007

Dana A. Lawton, P.E.
Principal Engineer/Civil

George H. Cramer, II, P.G.
Associate Vice President/Principal Scientist

Rudy J. Guichard
Senior Vice President/Area Manager

Solid Waste Permit Application

Harrelson Materials
Management, Inc., Landfill
1101 Russell Road
Shreveport, Louisiana 71107

Prepared for:
Harrelson Materials Management, Inc.

Prepared by:
ARCADIS U.S., Inc.
10352 Plaza Americana Drive
Baton Rouge
Louisiana 70816
Tel 225 292 1004
Fax 225 218 9677

Our Ref.:
LA002706.0001.00002

Date:
29 June 2007

This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential, and exempt from disclosure under applicable law. Any dissemination, distribution, or copying of this document is strictly prohibited.

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Introduction

The following permit application has been prepared on behalf of Harrelson Materials Management, Inc. (HMM), for the Harrelson Materials Management, Inc., Landfill (HMM Landfill) located in Caddo Parish, Louisiana. This document is intended to comply with requirements outlined in Louisiana Administrative Code (LAC) 33:VII for solid waste permit applications associated with Type III waste disposal operations. The original permit application was submitted in 1995 on behalf of the previous landfill owner (Chandler Bros. Landfill) and there have been numerous additional submittals over the past decade. The application includes information addressing various Louisiana Department of Environmental Quality (LDEQ) requests for updated letters, plans, and Notices of Deficiency and complies with LDEQ's Order to Upgrade OU-0269 issued May 31, 2007, in which LDEQ ordered HMM to submit this final application.

Part I – Solid Waste Standard Permit Application Louisiana Administrative Code (LAC) 33:VII.519

(The form shall be completed in accordance with the instructions found in Louisiana Administrative Code [LAC] 33:VII.513.A.1.)

A. Applicant (Permit Holder): Harrelson Materials Management, Inc.

B. Facility Name: Harrelson Materials Management, Inc., Landfill

C. Facility Location/Description: Shreveport, Louisiana

D. Location: **Section** 21 & 22 **Township** 18N **Range** 14W

Parish Caddo Parish

Coordinates: **Latitude -**

Degrees 32 **Minutes** 31 **Seconds** 51.2

Longitude -

Degrees 93 **Minutes** 47 **Seconds** 53.2

E. Mailing Address: 1101 Russell Road

Shreveport, Louisiana 71107

F. Contact: Michael D. Harrelson

G. Telephone: (318) 425-3218

H. Type and Purpose of Operation: (check each applicable line)

Type I

Industrial Landfill _____

Industrial Surface Impoundment _____

Industrial Landfarm _____

Type I-A

Industrial Incinerator Waste Handling Facility _____

Industrial Shredder/Compactor/Baler _____

Industrial Transfer Station _____

Type II

Sanitary Landfill	_____
Residential/Commercial Surface Impoundment	_____
Residential Commercial Landfarm	_____

Type II-A

Residential/Commercial Incinerator Waste Handling Facility	_____
Residential/Commercial Shredder/Compactor/Baler	_____
Residential/Commercial Transfer Station	_____
Residential/Commercial Refuse-Derived Fuel	_____

Type III

Construction/Demolition-Debris Landfill	X
Woodwaste Landfill	X
Compost Facility	_____
Resource Recovery/Recycling Facility	_____

Other – Describe: _____

I. **Site Status:** **Owned** X **Leased** _____ **Lease Term** _____ **Years**
(Note: If leased, provide copy of lease agreement)

J. **Operation Status:** **Existing** X **Proposed** _____

K. **Total Acres** 28.9 **Processing Acres** 1 **Disposal Acres** 24.8

L. **Environmental Permits: (list)**

LAR05N093 (Stormwater Permit)

MVK-JCB-2003-620 (U.S. Army Corps of Engineers)

D-017-2688/OU-0269

M. Conformity with Regional Plans. Attach letter from the Louisiana Resource Recovery and Development Authority (LRRDA) stating that the facility is an acceptable part of the state-wide program.

See Appendix B:11

(Note: In accordance with R.S. 30:2307.B, LRRDA authority does not apply to solid waste disposal activity occurring entirely within the boundaries of a plant, industry, or business which generates such solid waste.)

N. Zoned: **Yes** X **No** _____ **Zoning Requested** _____

Zone Classification: R-1H, R-1D, R-A, and Non-Conforming Right to Operate Landfill

(See 10/26/98 letter from Shreveport Metropolitan Planning Commission – Appendix B:10)

(Note: If zoned, include zoning affidavit and/or other documentation stating that the proposed use does not violate existing land-use requirements.)

O. Types, Quantities, and Sources of Waste:

	Processing		Disposal	
	On-Site	Off-Site	On-Site	Off-Site
Residential				
Industrial				
Commercial				
Other: C/D & Woodwaste		542*		1,000*

*wet weight tons, weekly average

P. Service Area: Unlimited

List of Louisiana Parishes: N/A

Statewide _____ **Unlimited** X

Q. Proof of Operator's Public Notice – Attach proof of publication of the notice regarding the permit submittal as required by LAC 33:VII.513.A.

Appendix B:1

R. Certification: I have personally examined and am familiar with the information submitted in the attached document, and I hereby certify under penalty of law that this information is true, accurate, and complete to the best of my knowledge. I am aware that there are significant penalties for submitting false information, including the possibility of fine and/or imprisonment.

Signature: _____

Date: 6-27-07

Type Name and Title: Michael D. Harrelson, President

(Note: Attach proof of the legal authority of the signee to sign for the applicant, if applicable.)

Media Type (check one)
Hazardous Waste ☐ Air ☐
Solid Waste ☒ Water ☐
Radiation Licensing ☐

Agency Interest Number: 28118
Is this a copy of a previously submitted form? Yes ☐ No ☒
If yes, indicate the original submittal date: ____
If yes, indicate the original permit number: ____

Department of Environmental Quality Permits Division P.O. Box 4313 Baton Rouge, LA 70821-4313 (225) 219-3181	**Addendum to Permit Applications per LAC 33:I.1701**	

Please Type Or Print	Company Name	☒ Owner ☐ Operator	For Permits Division Use Only
	Harrelson Materials Management, Inc.,		
	Parent Company (if Company Name given above is a division) N/A		
	Plant name (if any) Harrelson Materials Management, Inc., Landfill		
	Nearest town Shreveport, Louisiana	Parish where located Caddo	

1. Does the company or owner have federal or state environmental permits identical to, or of a similar nature to, the permit for which you are applying in other states? (This requirement applies to all individuals, partnerships, corporations, or other entities who own a controlling interest of 50% or more in your company, or who participate in the environmental management of the facility for an entity applying for the permit or an ownership interest in the permit.)

   ☒ Permits in Louisiana. List Permit Numbers: LAR05N093 (Water Discharge Permit), MVK-JCB-2003-620 (USACE), D-017-2688/OU-0269

   ☐ Permits in other states (list states): None

2. Do you owe any outstanding fees or final penalties to the Department? No☒ Yes☐
   If yes, please explain. _____

3. Is your company a corporation or limited liability company? No☐ Yes☒ If yes, attach a copy of your company's Certificate of Registration and/or Certificate of Good Standing from the Secretary of State.

Certification:

I certify, under provisions in Louisiana and United States law which provide criminal penalties for false statements, that based on information and belief formed after reasonable inquiry, the statements and information contained in this Addendum to the Permit Application, including all attachments thereto are true, accurate, and complete.

Responsible Official

Name	City	State	Zip
Michael Harrelson	Shreveport	Louisiana	71107
Title President	Business phone (318) 425-3218		
Company Harrelson Materials Management, Inc.	Signature of responsible official(s)		
Suite, mail drop, or division	Date 6-27-07		
Street or P.O. Box 1101 Russell Road			

United States of America
State of Louisiana

As Secretary of State, Al Ater, I do hereby Certify that

HARRELSON MATERIALS MANAGEMENT, INC.

A corporation domiciled in SHREVEPORT, LOUISIANA,

Filed charter and qualified to do business in this State on February 27, 1985,

I further certify that the records of this Office indicate the corporation has paid all fees due the Secretary of State, and so far as the Office of the Secretary of State is concerned is in good standing and is authorized to do business in this State.

I further certify that this Certificate is not intended to reflect the financial condition of this corporation since this information is not available from the records of this Office.

In testimony whereof, I have hereunto set
My hand and caused the Seal of my Office
To be affixed at the City of Baton Rouge on,
December 15, 2005

Secretary of State
34168466D

Certificate ID: 20051215001851

To validate this certificate, visit the following web site, go to **Commercial Division, Validate Certificate**, then follow the instructions displayed.
www.sos.louisiana.gov

§521 Part II-Supplementary Information, All Processing and Disposal Facilities

The following information is required in the permit application for solid waste processing and disposal facilities. All responses and exhibits must be identified in the following sequence to facilitate the evaluation. Additionally, all applicable sections of LAC 33:VII.Chapter 7 must be addressed and incorporated into the application responses. If a section does not apply, the applicant must state that it does not apply and explain why.

521.A. Location Characteristics. Standards pertaining to location characteristics are contained in LAC 33.VII.709.A (Type I and II facilities), LAC 33:VII.717.A (Type I-A and II-A facilities, and LAC 33:VII.719.A (Type III facilities).

1. The following information on location characteristics is required for all facilities:

   a. Area Master Plans. A location map showing the facility, road network, major drainage systems, drainage flow patterns, location of closest population center(s), location of the public-use airport(s) used by turbojet aircraft or piston-type aircraft, proof of notification of affected airport and Federal Aviation Administration as provided in LAC 33:VII.709.A.2, location of the 100-year flood plain, and other pertinent information. The scale of maps and drawings must be legible, and engineering drawings are required.

   An engineering drawing depicting roads, ditches, the nearest population center is in Appendix A:1. A map consisting of a combination of two FEMA maps of flood plains in and around the HMM Landfill is also included in Appendix A:5. The nearest public use airport is 5.95 miles from the facility.

   Access to the facility is gained by an all-weather road (Russell Road) that is adequate to meet the demands of the facility. Russell Road has an asphalted concrete surface. There are no sharp turns, obstructions, or other hazards conducive to accidents. The roadway is sufficient to handle the weight of the transport vehicles, and there is no problem with congestion (City of Shreveport Letter – 1/18/2005 – Appendix B:2). A well-rocked road provides ingress and egress to the facility from Russell Road. This access road is approximately 0.2 mile long. This is sufficient length to eliminate tracking of sediment onto Russell Road.

   This facility does not compost putrescible solid waste.

   b. A letter from the appropriate agency or agencies regarding those facilities receiving waste generated off-site, stating that the facility will not have significant adverse impact on the traffic flow in the area roadways and that the construction, maintenance, or proposed upgrading of such roads is adequate to withstand the weight of the vehicles.

The required letter dated January 18, 2005, from the City of Shreveport City Engineer is included. Refer to Appendix B:2.

c. Existing Land Use. A description of the total existing land use within three miles of the facility (by approximate percentage) including, but not limited to:

The Northwest Louisiana Council of Governments provided the most recent spatial analysis description of land use within three miles of the HMM Landfill facility (Appendix B:3).

The land use within three miles of the landfill, in terms of percentage, is primarily as follows:

Vacant, unused, waterbody, or unclassifiable activity	***63.6%***
Residential	***22.1%***
Transportation, parking, or public utility	***6.0%***
Recreation and leisure activities	***3.3%***
F.LR.E, education, religious, or professional services	***2.6%***
Wholesale trade and service activities	***1.4%***
Industrial, manufacturing, or waste-related	***0.6%***
Natural Resource and Agriculture Related Activities	***0.2%***
Shopping, commercial, or retail trade activities	***0.1%***

The nearest residence is 0.3 mile from the landfill (single-family residence located on Gain Street). The nearest school is 1.6 miles from the landfill (J.S. Clark Middle School). The nearest healthcare facility is 3.1 miles away (Willis-Knighton Hospital North).

d. Aerial Photograph. A current aerial photograph, representative of the current land use, of a one-mile radius surrounding the facility. The aerial photograph shall be of sufficient scale to depict all pertinent features. (The administrative authority may waive the requirement of an aerial photograph for Type III facilities.)

An aerial photograph is provided in Appendix A:2.

e. Environmental Characteristics. The following information on environmental characteristics.

i. a list of all known historic sites, recreation areas, archaeological sites, designated wildlife-management areas, swamps and marshes, woodlands, habitats for endangered species, and other sensitive ecologic areas within 1,000 feet of the facility perimeter or as otherwise appropriate;

There are no such historic sites, recreation areas, archeological sites, designated wildlife-management areas, or habitats for endangered species within 1,000 feet of the facility perimeter. Two recreational areas were indicated in the State of Louisiana Department of Culture, Recreation & Tourism Office of State Parks letter in Appendix B:5. A review of Shreveport and Caddo Parish Maps indicates that David Raines Park is almost 2 miles northwest of the HMM Landfill and Hawkin-Lear is over 3.5 miles away.

The site has been evaluated by the Corps of Engineers and professional wetland consultants. A permit has been issued by the Army Corps of Engineers under the authority of Section 404 of the Clean Water Act as documented in Appendix B:6.

A review of information available from the U.S. Fish and Wildlife Service (USFWS) and the Louisiana Natural Heritage Program (LNHP) on the Internet indicates that no area conducive to habitation by federal or state listed endangered species is present in the immediate vicinity of the project site. Additionally, no historic or archaeological sites are shown to be located in the vicinity of the project area according to the historic register listing for Caddo Parish.

ii. documentation from the appropriate state and federal agencies substantiating the historic sites, recreation areas, archaeological sites, designated wildlife-management areas, wetlands, habitats for endangered species, and other sensitive ecologic areas within 1,000 feet of the facility, and

The U.S. Army Corps of Engineers has reviewed the facility wetland delineation report and mitigation plan and these documents and an approval letter and permit from the U.S. Army Corps of Engineers are found in Appendix B:6. Please see Appendix B:4 and Appendix B:5 for letters from the Louisiana Department of Wildlife and Fisheries and the Louisiana Department of Culture, Recreation, and Tourism.

A review of information available from the U.S. Fish and Wildlife Service (USFWS) and the Louisiana Natural Heritage Program (LNHP) in conjunction with the U.S. Army Corps Permit indicates that habitat conducive to the federal or state listed endangered species is not present in the immediate vicinity of the project site. A Section 404 Permit was required for this project and coordination with the State Historic Preservation Office, USFWS, and LNHP is required for permit approval. Studies were conducted to determine potential impacts to these resources and were necessary for the Section 404 permit application to be processed (Permit MVK-JCB-2003-620). The table

below provides the federal list of endangered species for Caddo Parish.

Eagle, Bald	***Bird***
Sturgeon, Pallid	***Fish***
Tern, Interior Least	***Bird***

iii. a description of the measures planned to protect the areas listed from the adverse impact of operation at the facility;

There are no sensitive ecologic sites within 1,000 feet of the facility perimeter. Please refer to Appendix B:6.

Wetland areas will be protected from any impact by this site's activities through the design of the facility, which directs surface runoff to the facility Louisiana Pollutant Discharge Elimination System (LPDES) outfalls and in compliance with the U.S. Army Corps of Engineers Permit MVK-JCB-2003-620.

f. A wetlands demonstration, if applicable, as provided in LAC 33:VII.709.A.4.

As stated previously, the U.S. Army Corps of Engineers in Vicksburg, Mississippi, issued a permit MVK-JCB-2003-620 for current and future development. Please refer to Appendix B:6.

The facility is committed as required under Section 404 of the Clean Water Act to undertake such steps as necessary to achieve no net loss of wetlands, by first avoiding impacts to wetlands to the maximum extent practicable; then by minimizing unavoidable wetland impacts through all appropriate and practicable compensatory mitigation actions.

g. Demographic Information. The estimated population density within a three-mile radius of the facility boundary based on the latest census figures.

Based on figures taken from the current 2000 census, the population within three miles of the facility is approximately 35,131. The area covered in a circle with a radius of three miles is 28.3 square miles. Hence, the population density would be approximately 1,243 persons per square mile. The Northwest Louisiana Council of Governments (NLCOG) provided these figures in 2005 and they are the most recent available (Appendix B:3).

2. The following information regarding wells, faults and utilities is required for Type I and II facilities:

The proposed facility is a Type III construction and debris landfill. Therefore, this section is not applicable.

521.B. Facility Characteristics. Standards concerning facility characteristics are contained in LAC 33.VII.709.B (Type I and II facilities), LAC 33.VII.717.B (Type I-A and II-A facilities), and LAC 33:VII.719.B (Type III facilities). A facility plan, including drawings and a narrative describing the information required below must be provided.

1. The following information is required for all facilities:

   a. elements of the process or disposal system employed, including as applicable, property lines, original contours (shown at not greater than five-foot intervals), buildings, units of the facility, drainage, ditches, and roads;

   The site was previously used for the excavation of borrow material, so pits were already open on the site. Draining ditches had already been provided for excavation of the borrow material per LaDOTD specifications. Contours of the borrow pit area are shown at two-foot intervals on the Facility Plan.

   Elements of the process or disposal system employed at the HMM Landfill include the permanent office building, a support storage trailer (shed), a security trailer, a material compactor, levee and drainage control system, and a designated area for concrete processing. These items, levee system property boundaries, roads, and disposal units of the facility are shown on Figures 2 through 7 in Appendix A:1.

   b. the perimeter barrier and other control measures;

   The facility is bounded on the northwest side by the right-of-way of Interstate 220. This property line is marked with a 5-foot chain-link fence. The ditches on the southeast and southern side of the facility are approximately 4 feet deep, and the banks have a 1:1 slope; these characteristics make the ditches a barrier to vehicular traffic. There is also a barbed wire fence along the eastern property line. The southeastern to southwestern sides of the property are marked with a 6-foot chain-link fence. The gate at Russell Road is the only entrance to the facility. The perimeter barrier around the facility prevents unauthorized ingress or egress except by willful entry.

   During operating hours, the single entrance to the facility is continuously manned and monitored by a certified solid waste operator. During non-operating hours, the single entrance is locked.

   A readable sign is posted at the single entrance to the facility identifying the facility and the types of waste that are accepted. HMM Landfill only accepts

for disposal woodwaste, various construction/demolition debris and yard trash.

Also, please refer to Figures 2 through 7 in Appendix A:1 for the facility engineering drawings.

c. a buffer zone;

A minimum 50-foot buffer zone is maintained between the waste storage, processing, and disposal areas and the property boundary. As shown on Drawing 4, and as illustrated on Detail 1 of Drawing 7, the flood control levees are positioned such that no waste will be stored, processed, or disposed within 50 feet of the property line.

d. fire-protection measures:

The City of Shreveport Fire Department provides fire protection for this facility (please refer to Appendix B:7). "911" emergency medical care is available. There is a hospital (Willis-Knighton) located 3.1 miles from the facility (please refer to Appendix B:8). Additionally, each employee at the facility receives an emergency training program. Please refer to Appendix E.

e. landscaping and other beautification efforts;

HMM Landfill is surrounded on all sides (except on the northwest side, which borders Interstate 220) by wooded areas. Every effort has been and is being made to preserve the tree lines on the perimeter of the facility. Additional landscaping will be provided as necessary to improve the aesthetics of the facility.

f. devices or methods to determine, record, and monitor incoming waste;

The facility supervisor and the equipment operators at HMM Landfill have been trained to identify the types of waste that can and cannot be disposed of at the facility. A certified solid waste operator who monitors and records the incoming waste mans the entrance. The quantity, source, and type of the incoming waste are recorded before the material is allowed to proceed to the disposal site. Both the supervisor and the equipment operators will refuse any waste that is not acceptable for a Type III facility.

The estimated volume of waste entering the facility will be used to estimate the wet-weight of the waste for the purposes of recordkeeping. Waste enters the facility at an approximate average of 185 pounds per cubic yard that is recorded at the gate. Therefore, conversion into wet-weight tons would be by multiplying total gate yards by 10.

g. NPDES discharge points (existing and proposed).

Water that collects in the excavated areas is pumped out with portable pumps. Because this facility accepts only woodwaste, construction/ demolition debris, and yard trash there is no potential for the generation of hazardous leachate. Consequently, there is no need for treatment prior to discharge.

HMM has coverage for storm water discharges under the LPDES Multi-Sector General Permit (MSGP). A copy of the MSGP coverage letter is included in Appendix B:9. Additionally, HMM submitted in 2005 a Notice of Intent (NOI) for coverage under the LPDES General Permit LAG780000 but this NOI was not processed prior to that general permit expiring. Two discharge points are designated on the Facility Master Plan (Sheet 4 of 7) as LPDES Outfall 001 and Outfall 002.

Storm water Outfall 001 discharges water collected within the bermed areas of the landfill and Outfall 002 will discharge storm water from the rock crushing operation's watershed. Currently, storm water is detained within the landfill bermed perimeter and, if necessary, will be released manually via a pipe equipped with a shutoff device. Water from the rock crushing area flows off site to Twelve Mile Bayou.

2. The following information is required for Type I and II facilities:

This section is not applicable because the facility is a Type III facility.

521.C. Facility Surface Hydrology. Standards governing facility surface hydrology are contained in LAC 33.VII.711.A (Type I and II landfills), LAC 33.VII.713.A (Type I and II surface impoundments), LAC 33.VII.715.A (Type I and II landfills), LAC 33.VII.717.C (Type I-A and II-A facilities), and LAC 33.VII.719.C (Type III facilities).

1. The following information regarding surface hydrology is required for all facilities.

a. a description of the method to be used to prevent surface drainage through the operating areas of the facility.

The 100-year flood elevation for the area is 167 FMSL (RE: Flood Insurance Rate Map – Caddo Parish, Louisiana and Incorporated Areas – Map #22017C0366 F dated April 6, 2000). The perimeter levee system has been improved to an elevation of 170 FMSL in order to provide a minimum of 3 feet of freeboard during a 100-year storm event. As per 719.C.1, the landfill will be filled to a final elevation that is above the 100-year flood elevation for the area. The perimeter levee system will provide adequate protection for the landfill during flood conditions.

Drawing 4 shows that the existing waste disposal area is completely surrounded by an earthen berm that has a minimum elevation of 170 FMSL, protecting this area from flooding.

b. a description of the facility runoff/run-on collection system;

The landfill site is generally situated within a 100-year food plain area. Therefore, the active waste disposal area is protected using a flood control levee. The levee prevents the intrusion of run-on surface water from up-gradient sources. That water is diverted to the eastern side of the site, where it flows in a northeasterly direction along the outside of the levee to Twelve Mile Bayou.

The run-on control ditch is designed to consider a 25-year, 24-hour storm event. Typical drainage-related details are in the Engineering Drawings (see Drawing 7 in Appendix A:1).

A 36-inch diameter outlet pipe (CMP or equivalent) controls discharges of storm water from the area within the levee. A flood gate has been installed on the pipe and restricts releases of storm water during flood conditions. Once the flood level recedes to a level that is below the discharge pipe invert elevation, the pond may be discharged to the receiving ditch. There have been no discharges to date from the facility. If the facility experiences problems meeting discharge standards in the future, the flow through the outlet pipe can be reduced (at the inlet inside the levee) to increase detention time. Provisions for stabilization of the levee, drainage channels, and outfall location have been incorporated to control erosion.

In accordance with 719.C.3, inactive waste disposal areas (areas that have not received final cover) will be shaped and graded in a manner that promotes positive drainage off of and away from the landfill. When necessary, temporary ditches and berms will be installed up gradient of the active waste disposal area to divert run-off away from and around the active waste disposal area. This process will be ongoing and will be part of the routine daily operations.

Within the levee area storm water run-off will be diverted away from the waste disposal area. This will be accomplished by grading the surrounding areas away from the waste area while maintaining a minimum slope of 0.5 percent. When necessary, temporary ditches and berms will be constructed to divert storm water run-off while maintaining separation from the active waste disposal area. During a significant storm event or flood condition, the elevated level of the receiving ditch outside of the flood control levee will restrict discharges which will cause accumulation of storm water on the landfill side of the levee. The landfill will maintain a storm water pump system

to lift the accumulated storm water over the levee during these wet periods. The pump system will be activated when necessary to ensure that accumulated storm water is maintained at levels that are at least 50 feet from the toe of the active waste disposal area.

c. the maximum rainfall from a 24-hour/25-year storm event;

The maximum rainfall from a 25-year, 24-hour storm event is roughly 8.5 inches according to the United States Department of Agriculture (RE: TR-55 design manual) (Appendix B:16).

8.5 inches is less than 9 inches specified by LAC 33:VII. 719. All ditches and drainage conveyances to control run-on (outside the levee system) and run-off (inside the levee system) have been designed to manage a 25-year, 24-hour storm event or anticipated rainfall of 9 inches. The perimeter levee system is designed to consider a 100-year event and includes 3 feet of freeboard.

d. the location of aquifer recharge areas in the proposed facility area or within 1,000 feet of the facility perimeter, along with a description of the measures planned to protect those areas from adverse impact of operations at the facility; and

Based on available site information and investigations, there are no known aquifer recharge areas located within 1,000 feet of the site perimeter. The Shreveport Quadrangle Aquifer Recharge Potential Map – 1988 prepared for the LDEQ by the Louisiana Geological Survey (Appendix A:3) indicates that the HMM Landfill is in an area with low recharge potential.

e. if the facility is located in a flood plain, a plan to ensure that the facility does not restrict the flow of the 100-year base flood or significantly reduce the temporary water-storage capacity of the flood plain, and documentation indicating that the design of the facility is such that the flooding does not affect the integrity of the facility or result in the washout of solid waste.

Most of the site is situated within the 100-year flood plain. The landfill will not restrict the flow of the 100-year flood or significantly reduce the temporary water-storage capacity of the flood plain. A perimeter levee system has been constructed to protect the landfill operations from a 100-year flood event. Specifically, the levee has been constructed with a minimum elevation of 170 FMSL, which is 3 feet above the base flood elevation for the Red River Valley flood basin (See Note 3 on Drawing 7 – Appendix A:1). As shown on Drawings 1-7 (Appendix A:1), a flood gate has been installed on the storm water pipe at the discharge outfall to assist in separating the landfill operations from flood conditions. The levee system and drainage conveyances are also detailed on Drawings 1-7 of Appendix A:1. This design

will ensure that flooding does not affect the integrity of the facility or result in the washout of solid waste.

The net impact on the overall flood storage capacity is considered negligible when considering the size of the flood basin (Twelve Mile Bayou, Cross Lake, and Red River). The existing contours in the vicinity of the landfill range in elevation between 158 and 188 FMSL (RE: Drawing 3 in Appendix A:1).

A 3-dimensional model, included in Appendix A:6, was generated based on the contours shown on Drawing 3 using CAD and Eagle Point design software. The volume between the three dimensional model elevations and the flood elevation (167 FMSL) was computed as 815,180 cubic yards (22 million cubic feet). The Red River flood basin base elevation of 167 FMSL encompasses over 3500 acres not including the HMM Landfill site. Distributing the 22 million cubic feet of displaced flood capacity within the remaining 3,500-acre flood storage area results in a net increase in the base flood elevation of less than 2 inches.

521.D. Facility Geology. Standards governing facility geology are contained in LAC 33.VII.709.C (Type I and II facilities), LAC 33.VII.717.D (Type I-A and II-A facilities), and LAC 33.VII.719.D (Type III facilities).

1. The following information regarding geology is required for Type I and Type II facilities:

   This section is not applicable because the facility is a Type III facility.

2. The following information regarding geology is required by Type III woodwaste and construction/demolition debris facilities:

   a. general description of the soils provided by a qualified professional (geotechnical engineer, soil scientist, or geologist) along with a description of the method used to determine soil characteristics; and

      This section is addressed with the documents provided in Appendix C. A geologic map of the state is included as Appendix A:4.

      A comprehensive subsurface geotechnical investigation was conducted by representatives of Genesis Environmental Consulting, Inc. (a Terracon Company), in 2002. The results of the investigation are summarized in a report prepared by Genesis and dated December 2002 (Appendix C).

      The near surface soils (upper 40 feet) generally consist of a thick clay confining unit (average thickness of roughly 25 feet) underlain by a water-bearing zone consisting of various sand and silty sand materials.

The clay confining unit generally consists of fat high plasticity materials with a low in situ hydraulic conductivity (less than 1.0 X 1^{-8} cm/s). The majority of the clay materials encountered in the upper 30 feet are suitable and supportive of a waste disposal operation.

Fill material is present (average thickness of roughly 10 feet) over much of the southern portion of the facility including the area currently used for rock crushing operations. The fill material generally consists of crushed brick mixed with soil.

The soil profile in the study zone (upper 40 feet) is consistent over most of the site with the exception of the extreme northern end of the property. In this area (refer to Borings P-3 and HB-7), sandy material was encountered in the upper 15 feet. The lateral and vertical extent of the northern shallow sandy lenses is limited and is underlain by relatively impermeable clay layers. The sandy materials were removed to the underlying clay unit in these areas while adhering to the grading plan shown on the drawings included in Appendix A:1. The underlying clay unit meets and exceeds the requirements of Section 719.D. Much of the material considered unsuitable as natural bottom liner material and future final cover material may be used as an interim cover material.

Groundwater was encountered in several borings at depths ranging from 16 to 34 feet below ground surface (bgs). The average depth to groundwater encountered is approximately 26 feet bgs. Based on information obtained from temporary Piezometers P-1, P-2 and P-3, static water levels were documented at depths ranging from 7 to 17 feet bgs. The general groundwater flow direction is northerly.

Refer to Appendix C which, in addition to the Genesis investigation, contains the initial geotechnical investigation performed by Construction Testing Laboratories, Inc., of Shreveport, Louisiana. The soils encountered in the borings were stiff clays, silty sandy clays, and a very finely grained sandstone. These materials are stable and have low permeability. They are of the type of soils that would prevent surface spills from entering groundwater aquifers or any other water-bearing stratum in the vicinity of the facility.

In the future if any soil type is encountered at the facility that does not meet the requirements of Section 719.D it will be removed to the underlying clay unit or, if excavation to a depth at which low permeability soils are encountered is not practicable, then HMM will either not use that area for disposal or that area will be lined with a liner system approved by the administrative authority.

Additionally, no liquid wastes are accepted for disposal at this facility. The potential danger arising from environmentally adverse spills is extremely low. Please refer to Appendix C.

b. logs of all known soil borings taken at the facility and a description of the methods used to seal abandoned soil borings.

Logs of all known borings and figures exhibiting locations of all borings were submitted to LDEQ in 1995, 1998, and 2002 in response to LDEQ's comments. Soil borings were extended beyond the excavation depth.

Logs of all known soil borings taken at the facility are contained in Appendix C. The boreholes were backfilled in accordance with LaDOTD regulations.

The first set of borings were taken in the floor of the borrow pits and extended 15 feet below the lowest elevation on the floor of the pits. The second set of borings was taken from the tops of the containment levees which form the walls of the pits. The soils were classified according to moisture content, gradation, and Atterberg limits.

As noted previously, a comprehensive subsurface geotechnical investigation was conducted by Genesis Environmental Consulting, Inc. (a Terracon Company) in 2002. The results of the investigation are summarized in a report entitled "Geotechnical Report" prepared by Genesis dated December 2002 (Appendix C).

The 1995 study was conducted for H&W Demolition, Inc., and consisted of two borings. These borings are referred to in the Genesis 2002 Geotechnical Report as $B1_{1995}$ and $B2_{1995}$ and were advanced to depths of 15 feet bgs. Physical properties analyses of the soil materials encountered were not conducted associated with the 1995 investigation.

The 1995 and 1998 studies were conducted within areas previously used as a borrow source associated with the construction of Interstate 220. These borrow pits have since been filled with waste material derived from regional construction and demolition waste products. Because the previous borings were not accurately located, it is difficult to relate the 1995 soil profiles with the most recent investigation (GEC, 2002). However, because the borings were advanced within borrow pits that were later filled, it is reasonable to assume that the borings were advanced to at least 15 feet below the bottom of the waste which corresponds to the bottom of the borrow pits. The

approximate locations of all borings from the 1995, 1998, and 2002 studies are depicted on Drawing 3 of the Engineering Drawings.

As shown on Figure 4 of the Genesis Report (December 2002), borings were advanced over the entire site to depths ranging from 15 to 40 feet bgs.

The surface elevation associated with the subject property ranges from +/-158 to 188 FMSL including the active waste disposal area. At least six borings (2002 study) were advanced to an elevation depth below 135 FMSL. At least one boring (P-2) was advanced to an elevation depth below 125 FMSL.

The 12 borings documented in the 2002 study were advanced using hollow stem augers. Three of the borings were completed as piezometers for the purpose of determining static groundwater levels and general groundwater flow direction. Shelby tube samples were collected from various intervals for soil classification and physical properties analysis. Borings associated with the 1995 and 1998 investigations were advanced using a combination of augers and Shelby tube sampling.

Boring abandonment procedures are not well-documented associated with the 1995 and 1998 studies. However, based on information provided by the previous landowner, it is understood that the borings were properly grouted and abandoned. In addition, the 1995 logs include a notation that states "Borehole backfilled in accordance with LA DOTD regulations". All of the borings (and piezometers) associated with the 2002 study were plugged and abandoned in accordance with ASTM procedures. More specifically, the 2002 borings were grouted from the bottom of the borings to the surface using a mixture of sodium bentonite and Portland cement grout. Please refer to Appendix C.

521.E. Facility Subsurface Hydrology. Standards governing facility subsurface hydrology are contained in LAC 33:VII.715.A (Type I and II landfills).

This section is not applicable because the facility is a Type III facility.

521.E.2.

This section is not applicable because the facility is a Type III facility.

521.F. Facility Plans and Specifications. Standards governing facility plans and specifications are contained in LAC 33.VII.711.B (Type I and II landfills), LAC 33.VII.713.B (Type I and II surface impoundments), LAC 33.VII.715.B (Type I and II landforms), LAC 33.VII.715.E (Type I-A and II-A facilities), LAC 33.VII.721.A (Type III construction and demolition debris and woodwaste

landfills), LAC 33.VII.723.A (Type III composting facilities), and LAC 33.VII.725.A (Type III separation facilities). Standards for groundwater monitoring are contained in LAC 33.VII.709.E (Type I and II facilities).

1. Certification. The person who prepared the permit application must provide the following certification:

   "I certify under penalty of law that I have personally examined and I am familiar with the information submitted in this permit application and that the facility as described in this permit application meets the requirements of the solid waste rules and regulations. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment."

   Certifications are provided in Appendix B:13.

2. The following information on plans and specifications is required for Type I and II facilities:

   This section is not applicable because the facility is a Type III facility.

3. The following information on plans and specifications is required for Type I, II and III landfills:

   a. approximate dimensions of daily fill and cover;

      Based on information provided by Harrelson Materials Management (HMM), the current landfill utilization rate is roughly 30,000 cubic yards per year. This corresponds to roughly 2,500 cubic yards per month. Waste is typically placed in lifts with an average thickness of 15 feet. This corresponds to an approximated surface area requiring cover of roughly 4,500 square feet per month (2500 c.y. x 27 c.f./c.y. divided by 15 feet). As required by the regulations, the landfill must place at least 12 inches of interim cover every 30 days. This will require approximately 167 cubic yards (in place) of interim cover per month. Assuming an estimated 7 years remaining in the life of the landfill, this corresponds to roughly 14,100 in-place cubic yards of interim cover material that will be required.

      The final cover system shall consist of 24 inches of compacted clay overlain by 6 inches of topsoil of sufficient quality and type to support vegetative cover. This will require roughly 80,500 cubic yards of in-place compacted clay barrier layer material and 20,000 cubic yards of topsoil.

   b. The type of cover material and its source for daily, interim, and final cover. Calculations shall be submitted demonstrating that an adequate volume of material is available for daily, interim, and final cover.

The current waste disposal area is approximately 24.9 acres. The additional 29-acre site development includes a bottom grading plan that calls for an average excavation depth of 13 feet. This will result in roughly 608,225 cubic yards of available borrow material for use in conjunction with the landfill operations.

Calculations:

29 Acres x 43,560 square feet/acre x 13 feet / 27 cubic feet/cubic yard = 608,225 cubic yards

As noted previously, roughly 14,100 cubic yards (in place) of interim cover material is needed during the remaining life of the facility. In addition, roughly 80,500 cubic yards of liner quality clay will be needed to construct the 24-inch barrier layer for the final cover system. Approximately 20,000 cubic yards are needed for the topsoil layer (final cover). The perimeter levee system will involve roughly 64,400 cubic yards. Thus, the total amount of soil needed to continue to support, operate, and close the landfill is approximately 179,000 cubic yards.

Calculations:

Interim Cover Required:

- *Average Landfill Utilization Rate: 30,000 cubic yards per year (2,500 cubic yards per month)*
- *Surface Area Requiring Cover Per Month: 2,500 cy x 27 cf/cy /15 feet = 4,500 s.f.*
- *Cover Needed per Month: 4,500 s.f. x 1 foot/27 cf/cy = 167 cubic yards*
- *Cover Needed per Year 167 cy/month x 12 months = 2004 cy/year*
- *Cover Needed Over Life: 7 Years x 2004 cubic yards per year = +/-14,000 cubic yards*

Soil Needed for Final Cover System:

- *Clay Barrier Layer (24"): 24.9 Acres x 43,560 sf/acre x 2.0 feet/27 cubic feet per cubic yard = +/-80,500 cy*
- *Top Soil Layer: 24.9 Acres x 43,560 sf/acre x 0.5 foot/27 cubic feet per cubic yard = +/-20,000 cy*

Soil Needed for Levee System = 64,400 cubic yards

Total Soil Needed to Support, Operate, and Close Landfill = 14,100 cy + 85,500 cy + 20,000 cy + 64,400 cy = 179,000 cubic yards

When comparing the available soil (roughly 608,225 cubic yards) with the soil needed (approximately 179,000 cubic yards), the facility has a net surplus of approximately 429,225 available cubic yards of material.

4. The following information on plans and specifications for the prevention of groundwater contamination must be submitted for Type I and II facilities:

   This section is not applicable because the facility is a Type III facility.

5. The following information on plans and specifications for groundwater monitoring must be provided for Type I and II facilities:

   This section is not applicable because the facility is a Type III facility.

6. The facility plans and specifications for Type I and II landfills and surface impoundments (surface impoundments with on-site closure and a potential to produce gases) must provide a gas collection and treatment or removal system.

   This section is not applicable because the facility is a Type III facility.

521.G. Facility Administrative Procedures. Standards governing facility administrative procedures are contained in LAC 33:VII.711.G (Type I and II landfills), LAC 33:VII.713.G (Type I and II surface impoundments), LAC 33:VII.715.G (Type I and II landfills), LAC 33:VII.717.F (Type I-A and II-A facilities), LAC 33:VII.721.B (Type III construction and demolition debris and woodwaste landfills), LAC 33:VII.723.B (Type III composting facilities), and LAC 33:VII.725.B (Type III separation facilities).

1. The following information on administrative procedures is required for all facilities:

   a. recordkeeping system; types of records to be kept; and the use of records by management to control operations;

      All Type III construction and demolition debris and woodwaste landfills are required to maintain the recordkeeping and report requirements outlined in LAC 33:VII.721B(1) and LAC 33:VII.725B(1);

      Annual reports will be submitted to the administrative authority (Office of Management and Finance, Financial Services Division) indicating quantities and types of solid waste (expressed in wet-weight tons per year), received from in-state generators and from out-of-state generators during the reporting period and disposed on site. All calculations used to determine the solid waste amounts and percentage of waste from in-state sources received at the facility during the annual reporting period will be submitted to the administrative authority. The reporting will incorporate the proper forms from

the Office of Management and Finance. Additionally, in accordance with LAC 33:VII.725B(a)(v), the annual report shall have quantities (in wet-weight tons per year) and types of solid waste transported for disposal. The report shall also identify the permitted facility used for disposal of the waste.

The annual reporting period will be from July 1 through June 30, and annual reports will be submitted to the administrative authority by August 1 of each reporting year.

All records necessary for the effective management of the facility and for preparing required reports are maintained at the site, including:

- *Individual tickets for each customer that include the following information: waste receipt date, waste type, transporter name/solid waste identification number, waste quantities, and whether waste generated in-state or out-of-state (LAC 33:VII.721B(1)(b) and 33:VII.725B(1)(b));*
- *A logbook documenting rejected loads;*
- *Annual solid waste reports;*
- *A copy of the current Louisiana Solid Waste Rules and Regulations;*
- *The permit;*
- *The permit application; and*
- *Permit modifications.*

These records will be maintained for the life of the facility and will be kept on file for at least 3 years after closure.

b. an estimate of the minimum personnel, listed by general job classification, required to operate the facility;

The facility will have the number and levels of certified operators employed at the facility as required by the Louisiana Administrative Code, Title 46, Part XXIII and the Department's regulations.

The Board of Certification and Training for Solid Waste Disposal System Operators and the Office of Environmental Services, Permits Division will be notified within 30 days of any changes in the employment status of certified operators.

The facility maintains sufficient personnel necessary for the operational requirements of the facility <u>including</u> separations activities (LAC 33:VII.721B(1)(b)(3)). Operator certificates are prominently displayed at the facility. At a minimum, the facility maintains the following specific personnel:

- ***One Level A Operator, who will be in charge of the overall operations at the facility.***
- ***One Level A or Level B operator, who will be present at the facility during operating hours.***

Please refer to Appendix B:14 for the operator's certifications.

c. maximum days of operation per week and per facility operating day (maximum hours of operation within a 24-hour period);

The maximum days and hours of operation will be 6:30 AM to 9:00 PM Monday through Saturday. At all other times, the entrance to the facility will be locked, thus eliminating access when the facility is closed. Normal operational hours will be 7:00 AM to 5:30 PM, Monday through Friday, and 7:30 AM to 3:30 PM on Saturday. The normal operational hours will be posted at the gate. Should circumstances warrant the facility to adjust its normal operation hours, the facility will provide LDEQ with written notice of the extenuating circumstances and obtain approval for operation within the maximum limits set forth here.

2. Administrative procedures for Type III facilities shall include the number of facility operators certified by the Louisiana Solid Waste Operator Certification and Training Program (R.S. 37.3151 et. *seq.)*

This section is not applicable because the facility is a Type III facility.

521.H. Facility Operation Plans. Standards governing facility operation plans are contained in LAC 33:VII.711.D (Type I and II landfills), LAC 33:VII.713.C (Type I and II surface impoundments), LAC 33:VII.715.D (Type I and II landfills), LAC 33:VII.717.G (Type I-A and II-A facilities), LAC 33:VII.721.C (Type III construction and demolition debris and woodwaste landfills), LAC 33:VII.723.C (Type III composting facilities), and LAC 33:VII.725.C (Type III separation facilities).

1. The following information on operational plans is required for all facilities:

a. types of waste (including chemical, physical, and biological characteristics of industrial wastes generated on-site), maximum quantities of wastes per year, and sources of waste to be processed or disposed of at the facility;

The following information is based upon the requirements outlined in LAC 33:VII.721C and 33:VII.725C.

The following types of waste will be accepted for disposal and recycling at the site:

- ***Construction and demolition debris as defined in LAC 33:VII:115;***

- ***Woodwastes as defined in LAC 33:VII.115; and***
- ***Yard trash as defined in LAC 33:VII.115.***

Sources of waste may include, but are not limited to, the following in the service area identified in §519.P:

- ***Land clearing operations;***
- ***Municipal, commercial, and residential demolition sites;***
- ***Municipal, commercial, and residential construction sites; and***
- ***Lawn, yard, and tree maintenance services.***

The following activities are prohibited/prevented:

- ***Receipt/disposal of hazardous waste or any other wastes that present special handling or disposal problems as excluded by the administrative authority;***
- ***Open burning, unless authorization is first obtained from the administrative authority and other applicable federal, state, and local authorities;***
- ***Salvaging, unless approved by the administrative authority. The HMM Landfill does separate and recycle wood, concrete and asphalt, and recyclable metals;***
- ***Scavenging; and***
- ***Disposal of liquid waste, infectious waste, residential waste, industrial waste, commercial waste, putrescible waste of any kind and friable asbestos.***

The maximum quantity of waste that will be accepted per year is estimated to be 75,000 wet tons.

As identified in §519.P, the <u>entire</u> HMM Landfill's service area is unlimited by either state or distance.

b. waste-handling procedures from entry to final disposition, which could include shipment of recovered materials to a user;

The process/disposal/separation system employed at the facility consists of the following steps:

1. ***The waste enters the facility through a gate off Russell Road. This is the only entrance into the facility.***

2. ***The transporter stops at the security office just inside the entrance and gives one of the certified operators his/her name, what type of***

material is being disposed, the source of the material, the time of day (in and out), and the quantity of material.

3. *The material is visually inspected and unacceptable waste can be removed at this point. Any waste that meets the definition of normal putrescible household solid waste is removed at this point and placed in a 30-yard roll-off box. Additionally, any "clean" concrete can also be segregated at this point. If a large percentage of the waste appears to be of the putrescible variety upon closer inspection, the entire load may be refused.*

4. *If the material is deemed acceptable after visual inspection, the transporter proceeds down an all-weather access road to the disposal area working face.*

5. *The material is unloaded at the landfill working face where final separation and disposal occurs. As the wastes are being unloaded, the equipment operator ensures that only authorized wastes are accepted for disposal. This system of double-checking prevents the disposition of unauthorized or hazardous wastes. Any waste that meets the definition of normal putrescible household solid waste is removed at this point and placed in a 30-yard roll-off box kept near the landfill's working face.*

6. *All separation activities occur in the vicinity of the landfill working face. A separate 30-yard roll-off box is kept nearby for metals and white goods which are also reclaimed at this point by a designated landfill crew. Clean wood and concrete are also segregated at this point and staged for recycling.*

7. *Wood that is separated at the working face is chipped and stored in designated areas to await transfer from the site by third parties. Concrete is stockpiled and transferred daily to the material crushing operation located in the southwestern portion of the facility.*

8. *Once recyclable materials have been recovered and separated from the load of incoming Type III waste, the C&D materials are moved to the landfill's working face and compacted.*

9. *Woodchips and crushed concrete are sold to various end users who utilize these products in lieu of new materials or fuels. Metals and white goods are recycled or disposed of in a properly permitted municipal landfill.*

If the operator at the security office deems the material unacceptable, or if it is discovered to be unacceptable when unloaded, the material is loaded back up, sent out, and marked "Rejected". Sanitary dumpsters are maintained at the facility, and any unauthorized material discovered is placed therein. These closed containers are emptied at least every 7 days. Records of disposal dates and volumes are maintained by the facility.

Tires are removed from the disposal working face and are managed and stored as required by LAC 33:VII.10519. The tires are removed from the site and transported as required by the Department's regulations to a site permitted or authorized to receive waste tires. The facility will maintain records documenting the removal of these wastes.

No disposal will occur in standing water. The facility will maintain a minimum side slope of 3:1. The waste is deposited in the smallest practical area and compacted each day. The wastes are covered with silty clays applied a minimum of 12 inches thick, at least every 30 days.

c. minimum equipment to be furnished at the facility;

The minimum equipment to be furnished at the facility will be a dozer, an excavator, a compactor and a dump truck. Currently at the facility are:

- *1 Dozer*
- *1 Loader*
- *1 Compactor*
- *2 Excavators*
- *1 Dump truck*

The equipment furnished will be adequate to ensure that the facility is properly maintained according to permit guidelines regarding drainage, cover, and access. The minimum equipment will be provided and maintained at the facility to meet the facilities' operational needs. All minimum equipment must be in operative condition during hours of facility operations.

d. plan to segregate wastes, if applicable;

By monitoring the waste at the entrance gate and at the disposal site, the on-site personnel prevent unacceptable wastes from being disposed of altogether. If the problem is detected prior to disposition, they load it back on the truck it arrived in and send it out marked "Rejected". In the event that something is missed in a load of incoming waste, and any unauthorized material is subsequently discovered, the material is loaded with site equipment and placed in one of several sanitary dumpsters kept on-site.

These dumpsters are kept closed and are emptied at least every 7 days. Records of disposal dates and volumes are maintained by the facility.

Tires are removed from the disposal working face and are managed and stored as required by LAC 33:VII.10519. The tires are removed from the site and transported as required by the Department's regulations to a site permitted or authorized to receive waste tires.

White goods are removed and segregated from the disposal working face materials and they are stored on-site in a separate area for a period of 90 days or less. The white goods are transported to a facility permitted or authorized to receive such waste at least every 90 days.

Wood, concrete, and metals are removed and segregated from the facility working face materials utilizing the equipment listed in LAC 33:VII.521H(1)(c). Clean concrete is also segregated from the waste stream at the facility gate where it is closer to the material crushing facility.

The waste is deposited in the smallest practical area and compacted each day. The wastes are covered with silty clays applied a minimum of 12 inches thick, at least every 30 days.

e. procedures planned in case of breakdowns, inclement weather, and other abnormal conditions (including detailed plans for wet-weather access and operations);

In case of breakdowns, the facility has backup equipment that could be brought into service. In the case of inclement weather, the facility will provide changes in operational plans and methods to allow all-weather use of the facility. In wet weather the waste can be unloaded near the entrance, then reloaded by the loader into the dump truck and taken to the disposal area where the waste could be covered by the dozer and the excavator.

f. procedures, equipment, and contingency plans for protecting employees and the general public from accidents, fires, explosions, etc., and provisions for emergency care should an accident occur (including proximity to a hospital, fire and emergency services, and training programs); and

Fire Protection for this facility is provided by the City of Shreveport Fire Department (please refer to Appendix B:7). "911" emergency medical care is available. There is a hospital (Willis-Knighton) located 3.1 miles from the facility (please refer to Appendix B:8).

This facility has an Emergency Response Plan (ERP; Appendix E) and a personnel training program. This was filed with the City of Shreveport Fire Department and Willis-Knighton Hospital and will be updated when needed. This ERP was amended in June 2007 and this version is included with this application.

Training sessions concerning the procedures outlined in the Emergency Plan will be conducted annually for all employees working at the facility. These sessions consist of an intense review of the Emergency Plan, including some emergency drills, followed by a written exam over the material. These sessions will be conducted by a certified Solid Waste Operator. The training program will be conducted in accordance with OSHA Publication 3088 "How to Prepare for Workplace Emergencies" (Appendix E).

g. provisions for controlling vectors, dust, litter, and odors.

Due to the nature of the waste disposed of at this facility (construction/ demolition debris, woodwaste, yard trash), minimal problems are encountered with vectors, litter, and odors. Any unacceptable waste brought into the site is segregated and placed into closed, sanitary dumpsters that are emptied at least once a week. Employees have been instructed to watch for windborne litter that may enter the site from the Interstate 220 right-of-way. Any litter seen is to be promptly removed and placed in the sanitary dumpsters. If a problem with vectors does occur a licensed exterminator will be contracted to rectify the situation.

Dust from the access road or cover material that is generated in drier weather is controlled by means of light films of water.

2. The following information on operational plans is required for Type I and II facilities:

   This section is not applicable because the facility is a Type III facility.

3. The following information on operational plans is required for Type I and II facilities:

   This section is not applicable because the facility is a Type III facility.

4. The following information on operational plans is required for Type I-A and incinerator waste-handling facilities and refuse-derived energy facilities:

   This section is not applicable because the facility is a Type III facility.

5. The following information on operational plans is required for Type I-A and II-A refuse-derived fuel facilities and Type III separation and composting facilities:

   This section is not applicable because the facility is a Type III facility.

6. The operational plans for Type I-A and II-A refuse-derived fuel facilities and Type III separation and composting facilities must include a description of marketing procedures and control.

   This section is not applicable because the facility is a Type III facility.

521.I. Implementation Plan. Standards governing implementation plans are contained in LAC 33:VII.709.D (Type I and II facilities), LAC 33:VII.717.H (Type I-A and II-A facilities), and LAC 33:VII.719.E (Type III facilities).

1. The implementation plans for all facilities must include the following:

   a. a construction schedule for existing facilities, which shall include beginning and ending timeframes and timeframes for the installation of all major features such as monitoring wells and liners. (Timeframes must be specified in days, with day one being the date 01: standard permit issuance.)

      As noted, much of the subject property has already received waste. The current rock crushing operation was previously filled to an approximated elevation of roughly 158-160 FMSL.

      The waste disposal area has received waste and was constructed prior to current regulations. This area was formerly used as a borrow area during the construction of Interstate 220. For this reason, preparation of this area generally involved grading and excavation and did not include a compacted clay liner system. Based on available information derived from the 1995, 1998, and 2002 studies, the material underlying the existing waste disposal areas generally consists of clay to depths of between 5 to 15 feet below the waste. Based on information derived from the 1995, 1998, and 2002 site studies, it is reasonable to assume that the clay materials below the existing waste disposal area are similar to relatively impermeable clayey materials encountered over most of the site.

      In terms of a current construction schedule, there are no monitoring wells, liners or other large construction projects currently scheduled. The time limit for completing all mitigation work in the USACE Permit MVK-JCB-2003-620 is July 19, 2010. The closure of the waste disposal unit is highly dependent upon future waste acceptance rates.

b. details on phased implementation if any proposed facility is to be constructed in phases.

The current landfill utilization rate is approximately 30,000 cubic yards per year. It is estimated that approximately 210,000 cubic yards of capacity is remaining.

2. The implementation plans for Type I and Type II facilities must include a plan for closing and upgrading existing operating areas if the application is for expansion of a facility or construction of a replacement facility.

This facility is a Type III construction and debris landfill. Therefore, this section is not applicable.

521.J. Facility Closure. Standards governing facility closure are contained in LAC 33:VII.711.E (Type I and II landfills), LAC 33:VII.713.E (Type I and II surface impoundments), LAC 33:VII.715.E (Type I and II landforms), LAC 33:VII.717.I (Type I-A and II-A facilities), LAC 33:VII.721.D (Type III construction and demolition debris and woodwastes landfills), LAC 33:VII.723.D (Type III composting facilities), and LAC 33:VII.725.D (Type III separation facilities).

1. The closure plan for all facilities must include the following:

a. the date of final closure;

The estimated landfill capacity until final closure is estimated to be 7 years based on the current landfill utilization rate (+/-30,000 cubic yards/year). However, final cover and vegetative cover will be added to areas reaching final waste grades as soon as possible and practical.

b. the method to be used and steps necessary for closing the facility; and

1. ***Ninety days prior to the closing of the facility, HMM Landfill will notify the administrative authority in writing of the intent to close the facility, providing the date of the planned closing, the changes requested in the approved closure plan, and the closure schedule and estimate cost***

2. ***Final machine compacting and grading will be completed. Standing water will be solidified or removed. Surface water will be directed to the discharge point shown in the Facility Plan. The perimeter drainage system is designed to function both during operation and after the facility is closed.***

3. *Insect and rodent inspection will be made and documented prior to the installation of final cover. Extermination measures will be provided as necessary.*

4. *Additional closure requirements in §725D(2)(c) requiring that separations activities verify that the facility has not been contaminated by activities will be performed. Additionally, all remaining separation and recycled materials will be removed for processing or will be disposed of on-site.*

5. *Within 30 days after final grades are reached, the final cover shall be applied. In-situ materials will be used and the cover will be graded to a maximum elevation of 235 MSL. Final cover will consist of a minimum of 24 inches of silty clay (the geotechnical investigation indicates that the on-site materials are suitable for cap material and 6 inches of topsoil cover for supporting vegetative growth). The side slopes will be no steeper than 3(H):l(V). There will be a minimum of a 4 percent slope on the top of the final cap.*

6. *After the closure inspection and approval, a ground cover will be planted to prevent erosion and return the facility to a more natural appearance.*

7. *The parish mortgage and conveyance records will be updated by entering the specific location and specifying that the property was used for the disposal of solid waste. The form to be used for this purpose is shown in Appendix D. A true copy of the completed document certified by the Parish Clerk of Court will be provided to the Department as required by 721.D.3.c.*

8. *Post-closure maintenance will be provided to maintain the integrity of the final cap, the walls of the containment levees, and the vegetative cover. This maintenance will continue for no less than three years after the approved closure of the facility. This maintenance will include filling declivities, grading, shaping, repairing eroded areas, and seeding areas lacking ground cover. Annual reports concerning the integrity of the cap will be submitted to the administrative authority for 3 years after the approved closure of the facility.*

Item Description	# of Units	Unit Cost	Cost
Contractor Mobilization/Demobilization	1 LS (Est)	$10,000	$10,000
Site Shaping, Grading, and Subgrade Preparation	+/- 70 acres (Est)	$500 per acre	$35,000
Placement, Spreading, and Compaction of 24" Compacted Clay Barrier Layer In Lifts (3 – 6" compacted lifts) – Available On-Site	95,500 yards (Est)	$3.00 per cubic yard	$286,500
Placement, Spreading of Top-Soil Layer (6" thick) – Available On-Site	20,000 cubic yards (Est)	$2.00 per cubic yard	$40,000
Seeding. Mulching, and Fertilizer	+/- 70 acres (Est)	$1,000 per acre	$70,000
Drainage Improvements – Ditches. Berms, Culverts, etc.	1 LS (Est)	$15,000	$15,000
Erosion Control – Silt Fence, Hay Bales, and Stone Filtering Berms	1 LS (Est)	$10,000	$10,000
Insect and Rodent Inspection	1 LS (Est)	$1,000	$1,000
Engineering, Consulting, Construction Quality Assurance, Surveying, and Certification	1 LS (Est)	$60,000	$60,000
TOTAL ESTIMATED COST OF CLOSURE			**$527,500**

Please refer to Figure Nos. 2 through 7 in Appendix A:1.

c. the estimated cost of closure of the facility based on the cost of hiring a third party to close the facility at the point in the facility's operating life when the extent and manner of its operation would make closure the most expensive.

Note: All costs shown assume that a third party will complete the closure of the facility. Closure costs and post-closure costs will be reviewed annually and updated as the result of facility operational changes and expected costs.

2. The closure plan for Type I and II landfills and surface impoundments must include:

HMM ***Landfill is a Type III facility. Therefore, this section is not applicable.***

3. The closure plan for all Type I and II facilities and Type III woodwaste and construction/ demolition debris facilities shall include the following:

   a. the sequence of final closure of each unit of the facility, as applicable;

      HMM Landfill will be closed as one unit, and the sequence of events for the closure of the facility are outlined above.

   b. a drawing showing final contours of the facility: and

      Refer to Appendix A:1.

   c. a copy of the document that will be filed upon closure of the facility with the official parish record keeper indicating the location and use of the property for solid waste disposal, unless the closure plan specifies a clean closure.

      The parish mortgage and conveyance records will be updated by entering the specific location and specifying that the property was used for the disposal of solid waste. The form to be used for this purpose is shown in Appendix D. A true copy of the completed document certified by the Parish Clerk of Court will be provided to LDEQ.

521.K. Facility Post-Closure. Standards governing post-closure requirements are contained in LAC 33:VII.711.F (Type I and II landfills), LAC 33:VII.713.F (Type I and II surface impoundments), LAC 33:VII.715.F (Type I and II landfills), and LAC 33:VII.721.E (Type III construction and demolition debris and woodwaste landfills).

1. The post-closure plan for all facilities must include the following:

   a. specification of the long term use of the facility after closure, as anticipated; and.

      It is anticipated that upon closure, the facility will be maintained as an open green area. Post-closure maintenance of the integrity of the grade and cap will continue for at least 3 years after the approved closure of the facility.

   b. the cost of conducting post-closure of the facility, based on the estimated cost of hiring a third party to conduct post-closure activities in accordance with the closure plan.

      It is not anticipated that extensive post-closure care for this facility will be required given the nature of the waste materials, the size of the site, and the anticipated long-term use of the facility. Should post-closure be required, the following unit costs reflect the estimated cost of hiring a third party to conduct post-closure activities:

It is assumed that a Third Party Contractor will spend 3 days (roughly 16 hours) every quarter mowing and maintaining the HMM Landfill during the post-closure period.

The cost shown below is an annual cost estimate.

Item Description	# of Units	Unit Cost	Annual Cost Estimate
Contractor Mobilization/ Demobilization	1 LS (Est)	$2,000 (Est)	$ 2,000
Mowing Equipment and Operator	64 hours per year	$100 per hour (Est)	$6,400
Ditch Maintenance	16 hours per year	$100 per hour (Est)	$1,600
Erosion Control – Silt Fence, Hay Bales, and Stone Filtering Berms	1 LS (Est)	$1,000 per year (Est)	$1,000
TOTAL ESTIMATED COST OF POST-CLOSURE CARE $11,000/YEAR TIMES 3 YEARS			**$33,000**

Note: All costs shown assume that a third party will complete the closure of the facility.

2. The post-closure plan for Type I and II facilities must include the following:

HMM Landfill is a Type III facility. Therefore, this section is not applicable.

521.L. Financial Responsibility. Standards governing financial responsibility are contained in LAC 33:VII.727. A section documenting financial responsibility according to LAC 33:VII.727, which contains the following information, must be included for all facilities.

1. the name and address of the person who currently owns the land and the name and address of the person who will own the land if the standard permit is granted (if different from the permit holder, provide a copy of the lease or document which evidences the permit holder's authority to occupy the property); or

Harrelson Materials Management, Inc.
P.O. Box 78102
1101 Russell Road
Shreveport, Louisiana 71137-8102

2. the name of the agency or other public body that is requesting the standard permit; or, if the agency is a public corporation, its published annual report; or, if otherwise, the names of principal owners, stockholders, general partners, or officers;

   Harrelson Materials Management, Inc. (HMM), is applying for the standard permit. Mr. Michael Harrelson is President of HMM (Appendix B:12).

3. evidence of liability coverage, including:
   a. personal injury, employees, and the public (coverage, carriers, and any exclusion or limitations);
   b. property damage (coverage and carrier);
   c. environmental risks; and

   Please refer to the Solid Waste Facility Liability Endorsement in Appendix B:15. The facility will secure and maintain insurance as required by LAC 33:VII.727.A.1.

4. evidence of a financial assurance mechanism for closure and/or post-closure and for corrective action for known corrective releases when needed.

   The facility will utilize a Solid Waste Facility Trust Fund for closure and post-closure costs. Please refer to the "Solid Waste Facility Trust Agreement" in Appendix B:17. This is an existing fund.

§523. Part III: Additional Supplementary Information

The following supplementary information is required for all solid waste processing and disposal facilities. All responses and exhibits must be identified in the following sequence to facilitate the evaluation:

A. a discussion demonstrating that the potential and real adverse environmental effects of the facility have been avoided to the maximum extent possible;

Waste Characterization. ***The wastes disposed at this facility will be nonhazardous, solid (no liquids or sludges), construction and demolition (C&D) debris and woodwastes. Most waste will be from off-site sources (i.e., in excess of 99%). The anticipated on-site waste sources are clippings from landscaping. C&D debris and woodwastes disposed at the site will remain on the site permanently.***

If C&D debris and woodwastes are not handled at this facility, or a similar Type III facility, they would be placed in a Type I/II facility. The hazards to human health and the environment associated with C&D debris and woodwastes do not warrant disposal in a Type I/II facility, and would unnecessarily consume disposal space required for other types of wastes.

Potential Adverse Environmental Effects. The potential for a release that would endanger human health or the environment as a result of C&D debris and woodwaste disposal activities is considered minimal to nonexistent. Potential release pathways from land disposal facilities typically occur through the following mechanisms:

- ***Air: Releases to air from C&D debris disposal facilities generally occur in the form of odors, dust, and other wind blown materials. C&D debris and woodwastes are not subject to decomposition processes that would produce odors. Additionally, C&D debris and woodwastes typically do not contain materials that are easily subject to movement by wind. Application of cover soils/material further prevents releases of potential odors and wind-blown debris. Dust at the facility will be controlled by several methods including, but not limited to, planting vegetation (i.e., grass), spreading gravel, and wetting down areas.***

- ***Water: Releases to water from C&D debris disposal facilities can potentially occur from waste disposal area surface runoff, and potentially contact water seeping in the groundwater. Surface runoff will be managed within the facility as discussed in the permit application and monitored/discharged in compliance with a Louisiana Pollutant Discharge Elimination System (LPDES) permit. The likelihood of adverse environmental impacts resulting from surface water discharges, given the LPDES permit controls, is minimal.***

The geophysical logs of shallow and deep wells in Caddo Parish indicate that freshwater is present to depths ranging from approximately 230 feet to 530 feet below land surface.

Of the three aquifers of Quaternary Age in Caddo Parish, the Red River alluvial, terrace, and unnamed Pleistocene deposits, the Red River alluvial aquifer has the greatest areal extent and provides more than 20 percent of all groundwater used in the parish. The Red River alluvial, due to its salinity and high iron concentrations, is used for irrigation purposes. The Sparta Aquifer which crops out in northern Caddo Parish contains water that is generally soft. The Cane River Aquifer crops out in northern Caddo Parish and contains a large quantity of freshwater that is generally soft.

The Carrizo-Wilcox aquifer is the most important aquifer in Caddo Parish due to the aquifer's parish-wide areal extent and because the aquifer contains some freshwater at almost all locations in the parish.

The subsurface/geotechnical investigations conducted at the HMM Landfill indicate the presence of a very stiff, high plasticity, clay stratum beneath the facility ranging in depth from 25 to 30 feet below land surface. Shallow groundwater at the facility was encountered at 25 to 34 feet below land surface. The above-referenced clay stratum acts as a natural clay liner for this Type III (C&D) landfill and prevents any potential impacted surface water from seeping into underlying permeable zones.

- *Soil: All point discharges from the site will be monitored in accordance with an LPDES permit that will ensure that site water discharges are protective of human health and the environment.*

Real Adverse Environmental Impacts. Previously, the site was a large, open excavation with existing concrete and woodwastes. The disposal of relatively similar material will present no additional adverse environmental impact. Compliance with waste acceptance protocols and incoming waste inspection requirements established by the proposed solid waste permit will ensure that the adverse environmental effects are avoided to the maximum extent possible.

Summary. From the above evaluation, it is clear that the potential and real adverse environmental effects of the facility have been avoided to the maximum extent possible. It is also clear that development of the site as a C&D debris and woodwaste disposal facility is more beneficial than leaving the site in its previous condition.

B. a cost-benefit analysis demonstrating that the social and economic benefits of the facility outweigh the environmental-impact costs;

Facility Justification and Service Area. The facility location is in a portion of Caddo Parish experiencing growth. This facility fits local needs by providing contractors with a

cost-effective way to manage C&D debris and woodwastes generated during site clearing and construction. The majority of the debris received at the site is transported to the site by truck. Truck traffic on local roads will be of a similar nature being experienced during the site's operation under the existing Interim Operational Plan (IOP). The Louisiana Department of Transportation and Development has determined that the local roads can handle the anticipated facility truck traffic.

Positive Social and Economic Benefits. Positive social and economic benefits are associated with the HMM Landfill facility.

1. *This facility has created several well paying jobs in the nearby community.*

2. *This facility provides work for local subcontractors, many of whom are minority citizens and economically disadvantaged. Several subcontractors from the community, such as welders, truckers, and food service operators, have benefited because of the facility's location. There would be no outlet for these services were the facility not located here.*

3. *The facility provides credit to minority contractors in the local community. If the landfill were located elsewhere, these local contractors would not qualify for credit.*

4. *The facility provides support, currently in the form of donations to a local church assisting those in need in the community. Future plans include the company's sponsorship of children and families in dire need in this particular community, as well as construction assistance for the church.*

The presence of this facility allows local contractors an environmentally regulated method of disposing of waste at a reasonable cost. If the facility was not located in this area, illegal dumping in the north area of Shreveport and northern Caddo Parish would likely be the result. The facility's location may attract other industry to this impoverished area by offering the incentive of lower construction costs to companies considering building in the area, especially industry in need of construction and demolition disposal.

One of the possible alternatives to this site would be the City of Shreveport's Type I/II Landfill. By keeping construction and demolition waste out of that landfill, the City of Shreveport will extend the life of the existing method of household waste disposal. Contractors and developers will save money by using a construction and demolition landfill for their waste rather than using the City of Shreveport's synthetically lined site.

Truck traffic will be of a similar nature being experienced during the site's operation under the existing IOP. The Louisiana Department of Transportation and Development has determined that Russell Road can handle the anticipated facility truck traffic.

Environmental Impact Costs

1. *The facility accepts only non-putrescible, inert waste. Therefore, there will be no odor.*

2. *There should be no increase in public costs for police protection, fire protection, medical facilities, schools, or roads associated with facility operation. The hazards of working at this facility will be no more than those of any other low-risk C&D site. Site traffic will be of a similar nature being experienced during the site's operation under the IOP.*

3. *The facility will not preclude economic development by business, industry, or residential concerns. The operation of the proposed Type III facility could actually stimulate business development in this impoverished area.*

Long-Term Facility Plans. Permitting this site as a C&D debris and woodwaste disposal facility will allow HMM to cost-effectively achieve final grades in an environmentally safe manner. The estimated landfill capacity until final closure is estimated to be seven years based on the current landfill utilization rate. To ensure that the site will be closed and documented properly, the applicable regulatory requirements will be followed by HMM including the following:

- *Established closure and post-closure financial assurance mechanisms in accordance with LAC 33:VII.727 so that these tasks can be completed at any time during the anticipated facility operation by an independent third party regardless of the permit holder's status;*

- *Upon closure, prepare a certification report documenting that the facility has been closed in accordance with the approved closure plan;*

- *Upon closure, update the parish mortgage and conveyance records by entering the specific facility location and specifying that the property was used for C&D debris and woodwaste disposal; and*

- *Have the final closure inspected and approved by the LDEQ.*

Summary: The cost-benefit analysis demonstrates that the environmental, social and economic benefits of developing this facility outweigh the environmental-impact costs associated with keeping the site as an open borrow pit.

C. a discussion and description of possible alternative projects which would offer more protection to the environment without unduly curtailing non-environmental benefits;

Technology Selection. ***Permitting this site as a C&D debris and woodwaste disposal facility will replace depleted, aesthetically displeasing, and functionless borrow pits with useable real estate in an environmentally safe and cost-effective manner.***

C&D debris and woodwastes may be disposed by a number of different methods; however, Type III landfilling is the best technology presently available. Type III landfills secure debris within a known area in an environmentally safe manner without the design, construction, and operational expenses of a Type III facility. Additionally, Type III facilities help prolong the life of Type I/II facilities by diverting Type III wastes from these facilities. Because C&D debris typically represents wasted resources (i.e., lumber, brick), recovery/recycling typically has already been considered and applied prior to receipt at the disposal facility (i.e., if a contractor or other party could cost-effectively recover the resource, it would not be a waste.

Technology Reliability and Sequence. ***C&D debris and woodwaste land disposal facility technology is simple, and is practiced throughout the state with reliable and environmentally safe results. There will be no treatment operations performed at this facility, and no residual materials generated as a result of disposal operations. The technology is as follows:***

- ***Waste will be received at the facility, in this case via truck, and visually inspected at the check-in station prior to acceptance for conformance with C&D debris and woodwastes;***
- ***Unacceptable waste will be rejected from the site and returned to the generator on the vehicle it was brought in on, without unloading;***
- ***Acceptable waste will be logged in at the site by recording various information such as the date, type of waste, quantity of waste, and transporter name/solid waste identification number;***
- ***Trucks will be directed to the working face where the contents will be unloaded and incorporated into the facility;***
- ***Interim cover will be applied every 30 days;***
- ***A two-foot clay cap with an additional six inches of topsoil will be placed over the C&D debris and woodwastes; and***
- ***A vegetative or other protective cover will be provided to prevent cap erosion.***

Alternative Products Generating Waste. ***The consumer activities generating the wastes that will be disposed in this facility result from economic growth (i.e., development and construction), and present low risk to human health and the environment. There are currently no alternative generating practices that would entail less risk to human health and the environment.***

Summary. ***There are no alternative technologies that would offer more protection to the environment than the proposed facility. Additionally, developing this site should be considered a desirable alternative technology that recovers the land resources depleted by clay borrow pits operations.***

D. a discussion of possible alternative sites which would offer more protection to the environment without unduly curtailing non-environmental benefits; and

Site Selection. ***When considering possible alternative sites, it is important to consider that the facility purpose is to regain acreage at this site that was lost because of past borrow pit operations. This facility will replace depleted, aesthetically displeasing, and functionless borrow pits, with useable real estate in an environmentally safe and cost-effective manner. More simply, the existing site status is less desirable to both the current site owners and adjacent property owners than recovery of useable acreage through operation of a C&D debris and woodwaste disposal facility.***

The site was selected because it is closer to the source of the waste generation than other sites in the Shreveport/Caddo Parish area. Other sites would add extra distance to transport the waste resulting in added trucking costs to the contractors. Because the selected site is closer to the source of the waste, less truck miles will be required to get the waste property disposed. This will result in less traffic in residential areas where the chance of harm to residents is greater.

This site was also selected for its close proximity to Interstate 220, which is the proper traffic venue for transportation of C&D waste. In less than one mile, waste transporters can be in and out of the selected site.

Furthermore, the selection of this site was made based on the distance of the site to other developments (residential areas, businesses, etc.). The site is bordered on one side by Interstate 220 and on the other by the City of Shreveport's Wastewater Treatment Plant. The proposed facility handles only construction/demolition debris and woodwaste, so there is not danger of adverse environmental impacts. The site had already been used for the excavation of borrow material and was unfit for other types of development in such a state. The surface clays at the site are ideal for preventing problems with groundwater and soil pollution. In addition, it was considered that filling the borrow pits with woodwaste and other inert materials (rock, concrete, etc.) would actually improve the site to such an extent that it could have development value in the future.

Environmentally Sensitive Areas. The site is not in, nor will it adversely affect, any wetlands, estuaries, critical habitats, or historically/culturally significant areas.

Zoning and Existing Land Use. The site is adjacent to Interstate 220 on the west and undeveloped Residence-Agriculture on the east. The Metropolitan Shreveport Zoning Master Plan designates this property as Rural Low Density Residential. Chandler Bros, Inc. (now known as HMM) obtained a non-conforming right to operate a landfill at this location in accordance with the provisions contained in LSA-R.S. 9:5625.

The site is adjacent to Interstate 220 on the west and undeveloped land on the east. The nearest development on the east is the City of Shreveport Wastewater Treatment Plant. The Metropolitan Shreveport Zoning Board described the property as "rural low density residential." Based on the sparse nature of the population in this area and the adjacent land uses, the potential impact on human health would be minimal. The site is not in a wetland or in an archaeologically/historically sensitive area.

Flood and Storm Susceptibility. The site is located in a flood zone (Zone AE, as per FIRM Map 220036 0021C, having a base flood elevation of 167 feet). Upon closure, the majority of this facility will be filled to a level far enough above the 100-flood elevation to obtain a Letter of Map Amendment from FEMA to remove the site from the flood zone.

The facility is not subject to storm surge associated with a hurricane. A contingency plan is included in the Permit to address weather such as a hurricane or flood.

Groundwater Protection. The subsurface/geotechnical investigations conducted at the HMM Landfill facility indicate the presence of a very stiff, high plasticity clay stratum beneath the facility ranging in depth from 25 to 30 feet below land surface. Shallow groundwater at the facility was encountered at 25 to 34 feet below land surface. The above-referenced clay stratum acts as a natural clay liner for this Type III (C&D) landfill and prevents any potential impacted surface water to seep into underlying permeable zones.

Potential Health Risks. There are no prime agricultural areas, schools, day-care centers, hospitals, prisons, food storage areas, or existing community health problems in close proximity to the site. Residents in the neighborhood were notified of the intent to develop this site as a C&D debris and woodwaste disposal facility, and generally were in favor of the plan. The facility, operated in accordance with the solid waste regulations, should not create any health risks in the community.

Air Quality Protection. The facility is not located within an ozone or air quality non-attainment area. The potential for air quality problems associated with the disposal of C&D debris and woodwastes is minimal. The use of cover soils to minimize any wind-blown debris or odors will be sufficient to protect air quality.

Summary. ***No alternative site would offer more protection to the environment than the proposed site without unduly curtailing nonenvironmental benefits. The use of this site has been thoroughly investigated in accordance with the protocols established for LAC 33:VII. The alternative to developing this site as a C&D debris and woodwaste disposal facility is to leave the site in its existing condition. Leaving the site in its existing condition is probably less protective of human health and the environment that developing the site as a C&D debris and woodwaste disposal facility.***

E. a discussion and description of the mitigating measures which would offer more protection to the environment than the facility, as proposed, without unduly curtailing non-environmental benefits;

Solid Waste Management Plan Compatibility. ***The facility service area primarily includes areas that must ship their municipal, commercial, and industrial wastes (i.e., Type I/II waste) to Woolworth Landfill (Caddo Parish Landfill). The proposed facility will assist Woolworth Landfill's needs by diverting C&D debris and woodwastes from this facility, providing additional landfill capacity for municipal and commercial wastes.***

The facility will serve primarily the Bienville, Bossier, Caddo, Claiborne, Desoto, and Red River Parishes. A formal submittal to the LRRDA Board was made to confirm that the C&D debris and woodwaste disposal facility conforms to the state solid waste management plan.

Integrated Waste Management. ***Type III facilities help prolong the life of local and regional Type I/II facilities by diverting C&D debris and woodwastes from these facilities. Because C&D debris typically represents wasted resources (i.e., lumber, brick), recovery/recycling typically has already been considered and applied prior to receipt at the disposal facility (i.e., if a contractor or other party could cost-effectively recover the resource, it would not be a waste).***

Disposal Alternatives and Mitigating Measures. ***C&D debris and woodwastes may be disposed by a number of different methods; however, Type III landfilling is the best technology presently available. Type III landfills secure debris within a known area in an environmentally safe manner without the design, construction, and operational expenses of a Type I/II facility.***

Virgin fill material could be used to fill the site but being cost prohibitive would not offer more protection to the environment without unduly curtailing non-environmental benefits.

Quality Assurance Control. ***The waste acceptable at this facility is limited. C&D debris and woodwastes are clearly defined and easily identified through a visual inspection of incoming waste loads. Waste not conforming to the definition of C&D debris or woodwastes will be rejected from the site without unloading. All incoming wastes will be visually inspected at the facility waste receiving station, and also at the face of the landfill by a certified landfill operator.***

Wastes that, for unforeseen reasons, are accepted at the site but are not permitted for disposal will be removed from the site within seven days.

Trained personnel are located on the site to monitor and record the incoming waste. Waste that is not appropriate for a Type III landfill will not be allowed into the facility. The following waste-handling procedure employed at the HMM Landfill is designed to closely monitor the incoming waste.

1. *The waste enters the facility through a gate off Russell Road. This is the only entrance to the facility. Every vehicle must pass the security office.*

2. *The transporter stops at the security office, and a certified operator examines the load for type and quantity of waste. The driver gives his name and the source of the material.*

3. *If the material is deemed acceptable, the transporter then proceeds to the disposal area.*

4. *As the material is unloaded, the equipment operator(s) ensure that the material is nothing more than construction/demolition debris or woodwaste.*

5. *If the operator at the security office deems the material unacceptable, the load is refused. If, during the course of unloading, the equipment operator finds any unacceptable material, the material is loaded back up, sent out, and the ticket is marked "rejection." Sanitary dumpsters are maintained near the security office, and any unauthorized material discovered subsequent to unloading is placed therein. These containers are emptied once a week.*

Because this facility accepts only woodwaste and construction/demolition debris, there is no potential for generation of hazardous leachate. Consequently, there is no need for treatment prior to discharge.

During normal operations, no materials are brought onto the site that could potentially pollute the groundwater. Additionally, the soils at the site are mostly heavy clays with low permeability.

Dust from the access road or cover material that is generated in drier weather is controlled with light films of water.

The possibilities of real or potential environmental hazards resulting from the normal operation of the HMM Landfill are minimal given the type of waste handled and the current operating practices.

Innovative Techniques. *Burial of C&D debris and woodwastes is an innovative solution to reclaim exhausted borrow pit facilities. Exhausted borrow pits present numerous problems with few cost-effective solutions. This innovative solution saves airspace in the regional Type I/II facilities and has other benefits in this particular site application.*

Summary. *The C&D debris and woodwaste facility is consistent with the state solid waste management plan in that it provides both local and regional benefits. Additionally, the rather limited definition of C&D debris and woodwastes and simplified operational requirements of Type III disposal facilities limit potential adverse environmental impacts.*

APPENDIX A

FIGURES

A:1 Facility Master Plan Drawings

ENGINEERING DRAWINGS FOR

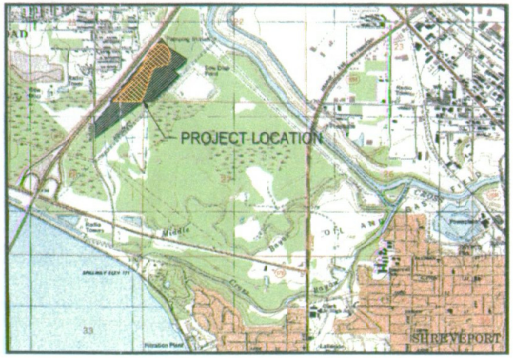
FACILITY MASTER PLAN
HARRELSON LANDFILL

VICINITY MAP
N.T.S.

PREPARED FOR

HMM
HARRELSON
MATERIAL MANAGEMENT
CONSTRUCTION & DEMOLITION DEBRIS SPECIALISTS

HARRELSON MATERIALS MANAGEMENT
1101 RUSSELL ROAD
SHREVEPORT, LOUISIANA 71107
(318) 425-3218



NOTE IMAGE SHOWN WAS TAKEN FROM NORTH HIGHLANDS 7.5 MINUTE QUADRANGLE MAP, LOUISIANA.

SITE LOCATION MAP
SCALE: 1" = 2000'±

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
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FAX: 225-218-9677
WWW.ARCADIS-US.COM

DRAWINGS ARE MODIFICATIONS OF ORIGINAL FACILITY MASTER PLAN AND ENGINEERING DESIGN PREPARED BY EDWARDS ENGINEERING, P.A DATED APRIL 5, 2005 AND ARE FOR PERMITTING PURPOSES ONLY.

NOT RELEASED FOR CONSTRUCTION

STATE OF LOUISIANA
DANA A. LAWTON
REG. No. 28812
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING
4/1/05

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INDEX OF DRAWINGS

DRAWING NO.	TITLE
-	COVER SHEET
1	INDEX SHEET
2	BOUNDARY SURVEY
3	EXISTING CONDITIONS
4	GENERAL BOTTOM GRADING PLAN
5	GENERAL FINAL CAP GRADING PLAN
6	TYPICAL CROSS SECTION
7	MISCELLANEOUS DETAILS

ABBREVIATIONS AND SYMBOLS

ABBREVIATIONS

AFG	ABOVE FINISHED GRADE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
BLDG	BUILDING
CB	CATCH BASIN
CF	CUBIC FEET
CFS	CUBIC FEET PER SECOND
CO	CLEANOUT
CONC	CONCRETE
℄	CENTERLINE
C TO C	CENTER TO CENTER
DIA	DIAMETER
DWG	DRAWING
ELEV	ELEVATION
EXIST	EXISTING
FT	FEET
GAL	GALLONS
GPM	GALLONS PER MINUTE
HDPE	HIGH DENSITY POLYETHYLENE
HORZ	HORIZONTAL
ID	INSIDE DIAMETER
IN	INCHES
INV	INVERT
LB	POUNDS
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MSL	MEAN SEA LEVEL
NOM	NOMINAL
NTS	NOT TO SCALE
OD	OUTSIDE DIAMETER
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE (PLASTIC)
RAD	RADIUS
SCHED	SCHEDULE
SDR	STANDARD DIMENSION RATIO
SPEC	SPECIFICATION
TYP	TYPICAL
VERT	VERTICAL

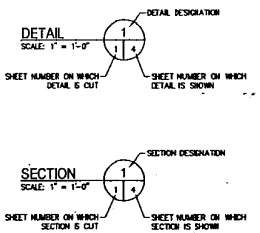
SYMBOLS

- PROPERTY LINE
- EXISTING FENCE
- EXISTING BUILDING
- EXISTING GRAVEL ROAD
- EXISTING ASPHALT
- DRAINAGEWAY
- 320 EXISTING INDEX CONTOUR
- 318 EXISTING INTERMEDIATE CONTOUR
- 320 PROPOSED INDEX CONTOUR
- PROPOSED INTERMEDIATE CONTOUR
- GAS LINE
- OHE OVERHEAD ELECTRIC
- UGE BURIED ELECTRIC
- RAILROAD TRACK
- FILL-SLOPE INDICATOR
- CUT-SLOPE INDICATOR
- PROPOSED ACCESS ROAD (GRAVEL)
- W WATERLINE
- WS=1254.6 WATER SURFACE ELEVATION
- E 325.6' EXISTING SPOT ELEVATION
- BM-1 PERMANENT SURVEY BENCHMARK
- SITE GRID MARKER (1000 FT INTERVALS)
- B-15 GEOTECHNICAL BORING
- P-5 GROUNDWATER PIEZOMETER
- BM-1 SURVEY CONTROL POINT
- FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- POWER POLE
- DRAINAGE CULVERT
- MANHOLE
- CATCH BASIN INLET
- BOLLARD OR GUARD POST
- PREPARED SUBGRADE
- GENERAL FILL
- COMPACTED CLAY LINER OR BARRIER LAYER
- GRAVEL
- CONCRETE
- EXISTING WASTE
- INTERIM COVER
- TOPSOIL
- RIP-RAP

GENERAL NOTES

1. THIS SET OF ENGINEERING DRAWINGS CONSTITUTES A FACILITY MASTER PLAN FOR THE HARRELSON LANDFILL LOCATED IN SHREVEPORT, LOUISIANA. THE FACILITY MASTER PLAN WAS PREPARED AND IS BEING SUBMITTED TO LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY - SOLID WASTE MANAGEMENT DIVISION AS PART OF A TYPE II LANDFILL SOLID WASTE DISPOSAL PERMIT APPLICATION TO COMPLY WITH LOUISIANA TITLE 33 - PART VII, SUBPART 1 - SOLID WASTE REGULATIONS.
2. THE HARRELSON LANDFILL WAS PREVIOUSLY REFERRED TO AS THE CHANDLER BROTHERS LANDFILL.
3. THE ENTIRE PROPERTY TO BE PERMITTED FOR SOLID WASTE DISPOSAL (TYPE II MATERIALS ONLY) CONSISTS OF 85.941 ACRES OF WHICH 24.87 ACRES WILL BE USED FOR WASTE DISPOSAL.
4. THE HARRELSON LANDFILL IS AN ACTIVE WASTE DISPOSAL FACILITY.
5. THE INFORMATION CONTAINED HEREIN IS CONSIDERED SUPPLEMENTAL TO PREVIOUS SUBMITTALS TO THE LDEQ.
6. LDEQ REFERENCE NUMBERS:
   ACTIVITY NUMBER: PER19950001
   FACILITY IDENTIFICATION NUMBER: D-017-3568
   AGENCY INTEREST NUMBER: AI#28118
7. THESE DRAWINGS CONSTITUTE A CONCEPTUAL MASTER PLAN FOR THE HARRELSON LANDFILL. THESE DRAWINGS ARE NOT INTENDED FOR CONSTRUCTION PURPOSES.

SECTION/DETAIL KEY



OWNER:
HARRELSON MATERIALS MANAGEMENT, INC.
ATTENTION: MICHAEL HARRELSON, OWNER
1501 RUSSELL ROAD
SHREVEPORT, LOUISIANA 71107
(318) 425-3218

ENGINEER:
ARCADIS
ATTENTION: DANA LAWTON, P.E., PRINCIPAL PROJECT ENGINEER
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
PHONE: (225) 292-1004
FAX: (225) 218-9677

REGULATORY AUTHORITY:
LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF ENVIRONMENTAL SERVICES
PHONE: (225) 219-3181

DRAWINGS ARE MODIFICATIONS OF ORIGINAL FACILITY MASTER PLAN AND ENGINEERING DESIGN PREPARED BY EDWARDS ENGINEERING, P.A DATED APRIL 5, 2005 AND ARE FOR PERMITTING PURPOSES ONLY.

NOT RELEASED FOR CONSTRUCTION

REV	DATE	BY	DESCRIPTION

ARCADIS
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HMM HARRELSON MATERIALS MANAGEMENT

INDEX SHEET

FACILITY MASTER PLAN

HARRELSON MATERIALS MANAGEMENT, INC.

HARRELSON LANDFILL

SHREVEPORT LOUISIANA

DRAWING 1

DESIGNED BY:	DAL
DRAWN BY:	SMEN
APPRD. BY:	CHC
SCALE:	NONE
DATE:	2007
JOB NO.	2706-42
ACAD NO.	2706
SHEET NO.:	1 OF 7

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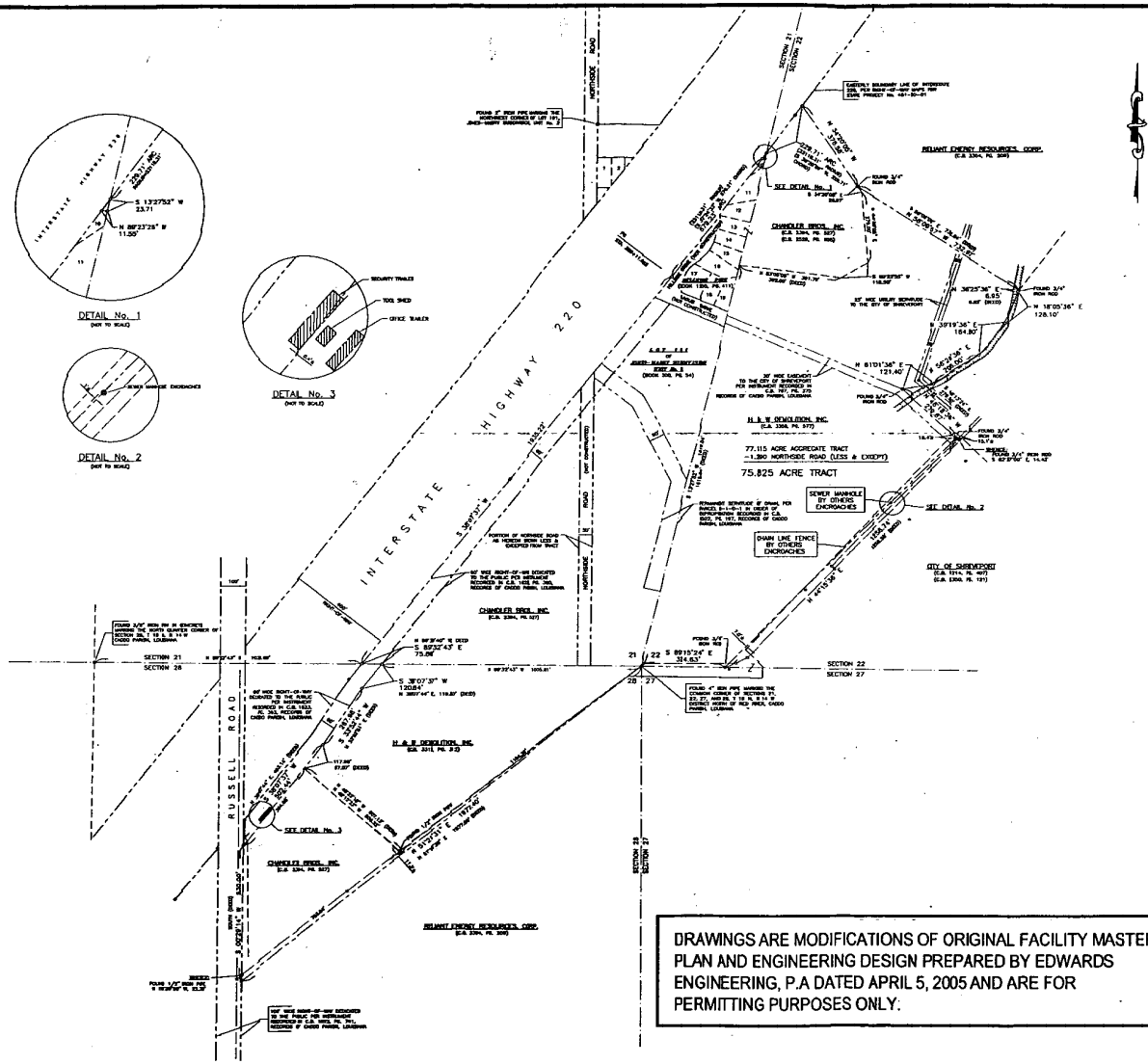

LEGAL DESCRIPTION

A certain tract or parcel of land situated in Fractional Sections 21, 22 and 28, Township 18 North, Range 14 West, District North of Red River, Caddo Parish, Louisiana, and being more particularly described as follows, to-wit:

Commencing at a found four (4) inch iron pipe marking the southwest corner of Section 22, Township 18 North, Range 14 West, District North of Red River, Caddo Parish, Louisiana, for the POINT OF BEGINNING OF HEREIN DESCRIBED 75.825 ACRE TRACT OF LAND; and proceed South 89 degrees 15 minutes 24 seconds East along the south boundary line of said Fractional Section 22, a distance of 324.63 feet to a found three-quarter (3/4) inch iron pipe;

thence, proceed North 44 degrees 15 minutes 38 seconds East along the west line of that certain 1.31 acre tract of land acquired by the City of Shreveport per Exchange Deed recorded in Conveyance Book 2350, Page 121, of the Official Records of Caddo Parish, Louisiana; a distance of 1258.14 feet (deed-1256.58 feet) to a found three-quarter (3/4) inch iron pin lying on the south boundary line of that certain 122.44 acre tract of land acquired by City of Shreveport per Cash Sale Deed recorded in Conveyance Book 1314, Page 107, of the Official Records of Caddo Parish, Louisiana;

thence, proceed North 48 degrees 18 minutes 38 seconds West along the south boundary line of said 122.44 acre tract, a distance of 279.87 feet (deed-South 48 degrees 13 minutes 24 seconds East, distance of 279.88 feet) to a found three-quarter (3/4) inch iron pin;

thence, proceed North 81 degrees 01 minutes 38 seconds East along the westerly boundary line of said 122.44 acre tract, a distance of 121.40 feet to a set five-eighth (5/8) inch iron pin;

thence, proceed North 56 degrees 26 minutes 38 seconds East along the westerly boundary line of said 122.44 acre tract, a distance of 206.00 feet to a set five-eighth (5/8) inch iron pin;

thence, proceed North 39 degrees 19 minutes 36 seconds East along the westerly boundary line of said 122.44 acre tract, a distance of 164.80 feet to a set five-eighth (5/8) inch iron pin;

thence, proceed North 18 degrees 05 minutes 36 seconds East along the westerly boundary line of said 122.44 acre tract, a distance of 128.10 feet to a set five-eighth (5/8) inch iron pin;

thence, proceed North 38 degrees 25 minutes 36 seconds East along the westerly boundary line of said 122.44 acre tract, a distance of 6.95 feet (deed-6.82 feet) to a found three-quarter (3/4) inch iron pin;

thence, proceed North 56 degrees 08 minutes 57seconds West, a distance of 732.97 feet (deed-South 56 degrees 08 minutes 60 seconds East, a distance of 732.84 feet) to a found three-quarter (3/4) inch iron pin lying on the northerly boundary line of that certain 4.702 acre tract of land acquired by Chandler Bros., Inc. per deed recorded in Conveyance Book 2384, Page 527, of the Official records of Caddo Parish, Louisiana;

thence, proceed North 34 degrees 20 minutes 05 seconds West along the northerly boundary line of said 4.702 acre tract of land, a distance of 378.26 feet to a set five-eighth (5/8) inch iron pin lying on the easterly boundary line of Interstate Highway 220 as per Right-of-Way Maps for State Project No. 451-30-01 dated June 27, 1968;

thence, proceed along the easterly boundary line of Interstate 220 being a curve to the right having a radius 23118.31 feet, and arc distance of 228.71 feet (chord bearing of South 36 degrees 26 minutes 48 seconds West, distance of 228.71 feet) to a set five-eighth (5/8) inch iron pin lying on the east line of said Section 21;

thence, proceed South 13 degrees 27 minutes 52 seconds West along the east line of said Section 21, a distance of 23.71 feet to a set five-eighth (5/8) inch iron pin lying on the north boundary line of Lot 10 of Hillside Park Subdivision per plat recorded in Conveyance Book 1200, Page 411, of the Official Records of Caddo Parish, Louisiana;

thence, proceed North 89 degrees 23 minutes 28 seconds West along the north boundary line of said Lot 10, a distance of 11.55 feet to a set five-eighth (5/8) inch iron pin lying on the easterly boundary line of Interstate 220;

thence, proceed along the easterly boundary line of Interstate 220 being a curve to the right having a radius 23118.31 feet, and arc distance of 579.21 feet (chord bearing of South 37 degrees 24 minutes 33 seconds West, distance of 579.21 feet) to a set five-eighth (5/8) inch iron pin marking PC of curve at Station 328+11.983 per said Right-of-Way Map for State Project No. 451-30-01 dated June 27, 1968;

thence, proceed South 38 degrees 07 minutes 37 seconds West along the easterly boundary line of Interstate 220, a distance of 1836.22 feet to a set five-eighth (5/8) inch iron pin lying on the south line of said Section 21;

thence, proceed South 89 degrees 32 minutes 43 seconds East (deed-North 89 degrees 38 minutes 34 seconds West) along the south line of said Section 21, a distance of 75.80 feet to a set five-eighth (5/8) inch iron pin lying;

thence, proceed South 38 degrees 07 minutes 37 seconds West along the easterly boundary line of said 60 foot wide Right-of-Way, a distance of 120.84 feet (deed-North 38 degrees 07 minutes 44 seconds East, distance of 119.80 feet) to a set five-eighth inch iron pin;

thence, proceed South 33 degrees 52 minutes 44 seconds West (deed-North 33 degrees 52 minutes 51 seconds East) along the easterly boundary line of said 60 foot wide Right-of-Way, a distance of 26798 feet to a set five-eighth inch iron pin;

thence, proceed South 38 degrees 07 minutes 37 seconds West along the easterly boundary line of said 60 foot wide Right-of-Way, a distance of 502.44 feet (deed-North 38 degrees 07 minutes 44 seconds East, distance of 463.14 feet) to a set five-eighth inch iron pin lying on the east right-of-way line of Russell Road (100 foot wide right-of-way) per Right-of-Way instrument recorded in Conveyance Book 8023, Page 741, of the Official Records of Caddo Parish;

thence, proceed South 00 degrees 28 minutes 14 seconds West (deed-South) along the easterly right-of-way line of Russell Road, a distance of 530.06 feet to a set five-eighth inch iron pin;

thence, proceed North 51 degrees 21 minutes 31 seconds East, a distance of 1977.41 feet (deed-North 51 degrees 18 minutes 38 seconds East, distance of 1977.00 feet) to the POINT OF BEGINNING and LESS AND EXCEPT all that portion of Northside Road (50 feet wide right-of-way) being 1.290 acres lying between the south line of said Section 21 and the westerly boundary line of Interstate 220, containing 75.825 acres, more or less, and being subject to all rights-of -ways, easements, servitude's and restrictions of record or use.

NOTES:
1. SURVEY IS BASED ON INFORMATION PROVIDED BY THE CLIENT.
2. BEARINGS ARE BASED FROM PLAT OF SURVEY BY DAVID L. PIERCE, JR. P.L.S. NO. 4465, TITLED "MAP OF SURVEY FOR HARRELSON MATERIALS, INC." DATED NOVEMBER 1999 AND RECORDED IN C.B. 3388, PG. 876, RECORDS OF CADDO PARISH, LOUISIANA.
3. NO WELL BOREHOLES WERE PERFORMED OR RECOGNIZED AS BY MONUMENTS OR CONSPICUOUS THAT MAY AFFECT THIS SURVEY.
4. THIS SURVEY IS IN ACCORDANCE WITH THE "MINIMUM STANDARDS FOR PROPERTY BOUNDARY SURVEYS" AS SET FORTH IN TITLE 46, CHAPTER 29, SECTION 2929 OF THE LOUISIANA ADMINISTRATIVE CODE PROMULGATED FOR DIRECTION AND LAND SURVEYORS. THIS IS A CLASS "B" SURVEY.

LEGEND
- INDICATES 5/8" IRON PIN SET
- INDICATES MONUMENTATION FOUND
- INDICATES CONCRETE D.O.T.D. MONUMENT FOUND
- INDICATES EXISTING SEWER MANHOLE
- INDICATES SANITARY SEWER LINE
- INDICATES EXISTING POWER POLE
- INDICATES EXISTING POWER POLE
- INDICATES EXISTING FENCE LINE

NOTE:
BOUNDARY SURVEY SHOWN IS AS PREPARED BY WAYNE ACREE, LOUISIANA PLS NO. 4465.

STATE OF LOUISIANA
DANA A. LAWTON
REG. NO. 25877
REGISTERED PROFESSIONAL ENGINEER
IN CIVIL ENGINEERING
4/3/07

DRAWINGS ARE MODIFICATIONS OF ORIGINAL FACILITY MASTER PLAN AND ENGINEERING DESIGN PREPARED BY EDWARDS ENGINEERING, P.A DATED APRIL 5, 2005 AND ARE FOR PERMITTING PURPOSES ONLY.

NOT RELEASED FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION

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FAX 225-218-9677
WWW.ARCADIS-US.COM

HARRELSON MATERIALS MANAGEMENT

BOUNDARY SURVEY

FACILITY MASTER PLAN

HARRELSON MATERIALS MANAGEMENT, INC.

HARRELSON LANDFILL

SHREVEPORT LOUISIANA

DRAWING 2

DESIGNED BY:	DAL
DRAWN BY:	SMEN
APP'VD. BY:	GHE
SCALE:	1" = 200'
DATE:	2007
JOB NO.	
ACAD NO.	2705
SHEET NO.:	2 OF 7

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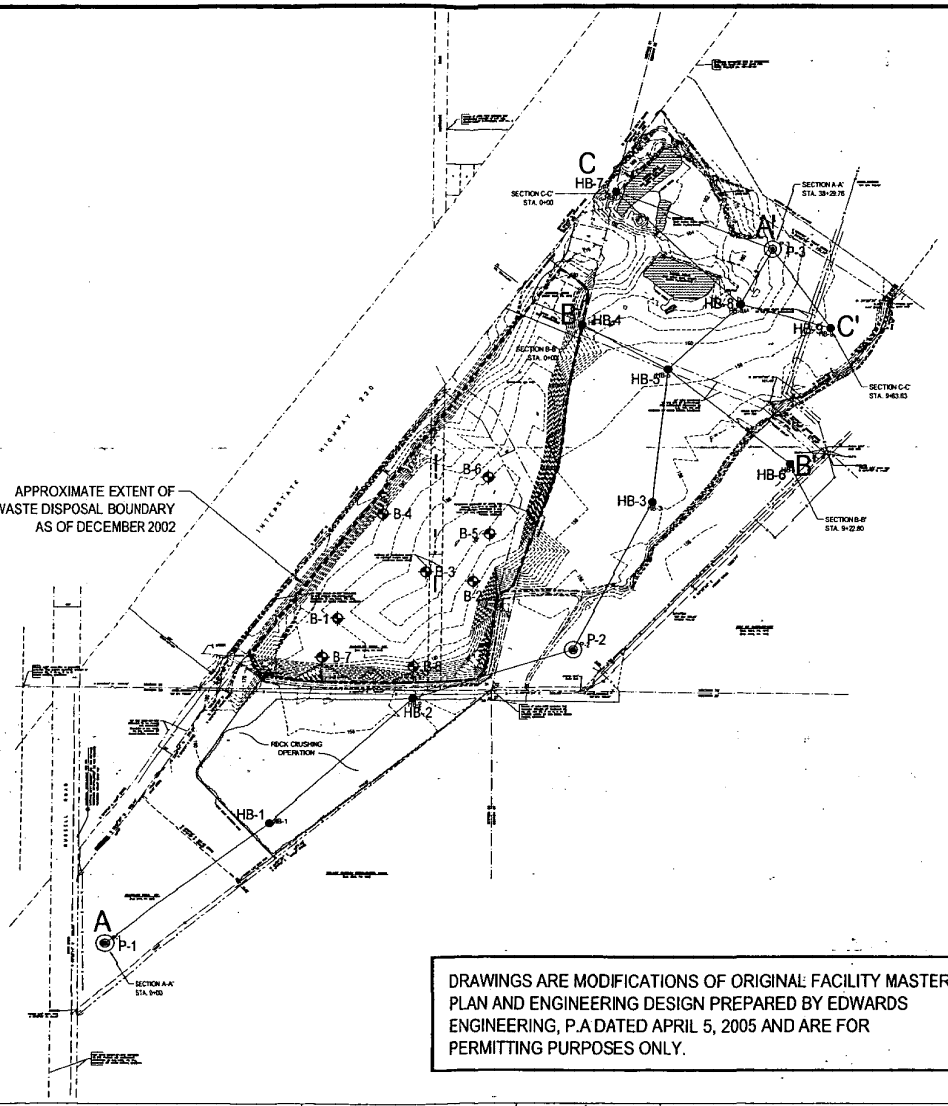

NOTES:

1. THE LOCATIONS FOR BORINGS, PIEZOMETERS, AND GEOLOGICAL SECTIONS ARE SHOWN FOR REFERENCE IN RELATION TO THE FACILITY MASTER PLAN. A DETAILED DESCRIPTION OF THE FACILITY SUB-SURFACE CONDITIONS IS PROVIDED IN THE GEOTECHNICAL REPORT AS PREPARED BY GENESIS ENVIRONMENTAL CONSULTING, INC. (DECEMBER 2002).
2. THE EXISTING CONTOURS SHOWN WERE DERIVED FROM A TOPOGRAPHIC SURVEY PREPARED BY WAYNE ACREE, LOUISIANA P.L.S. # 4465. TOPOGRAPHIC CONDITIONS WITHIN THE EXISTING WASTE DISPOSAL AREA ARE SUBJECT TO CHANGE AND ARE TO BE FIELD VERIFIED.

DRAWINGS ARE MODIFICATIONS OF ORIGINAL FACILITY MASTER PLAN AND ENGINEERING DESIGN PREPARED BY EDWARDS ENGINEERING, P.A DATED APRIL 5, 2005 AND ARE FOR PERMITTING PURPOSES ONLY.

STATE OF LOUISIANA
DANIAL L. MANN
REG. NO. 28872
REGISTERED
PROFESSIONAL ENGINEER
CIVIL ENGINEERING

NOT RELEASED FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION

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FAX: 225-218-9677
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HARRELSON MATERIALS MANAGEMENT

EXISTING CONDITIONS

MASTER PLAN

HARRELSON MATERIALS MANAGEMENT, INC.

HARRELSON LANDFILL

SHREVEPORT LOUISIANA

DRAWING	3
DESIGNED BY:	DAL
DRAWN BY:	SMDH
APPVD. BY:	DHC
SCALE:	1" = 200'
DATE:	2007
JOB NO.	
ACAD NO.	2706
SHEET NO.:	3 OF 7

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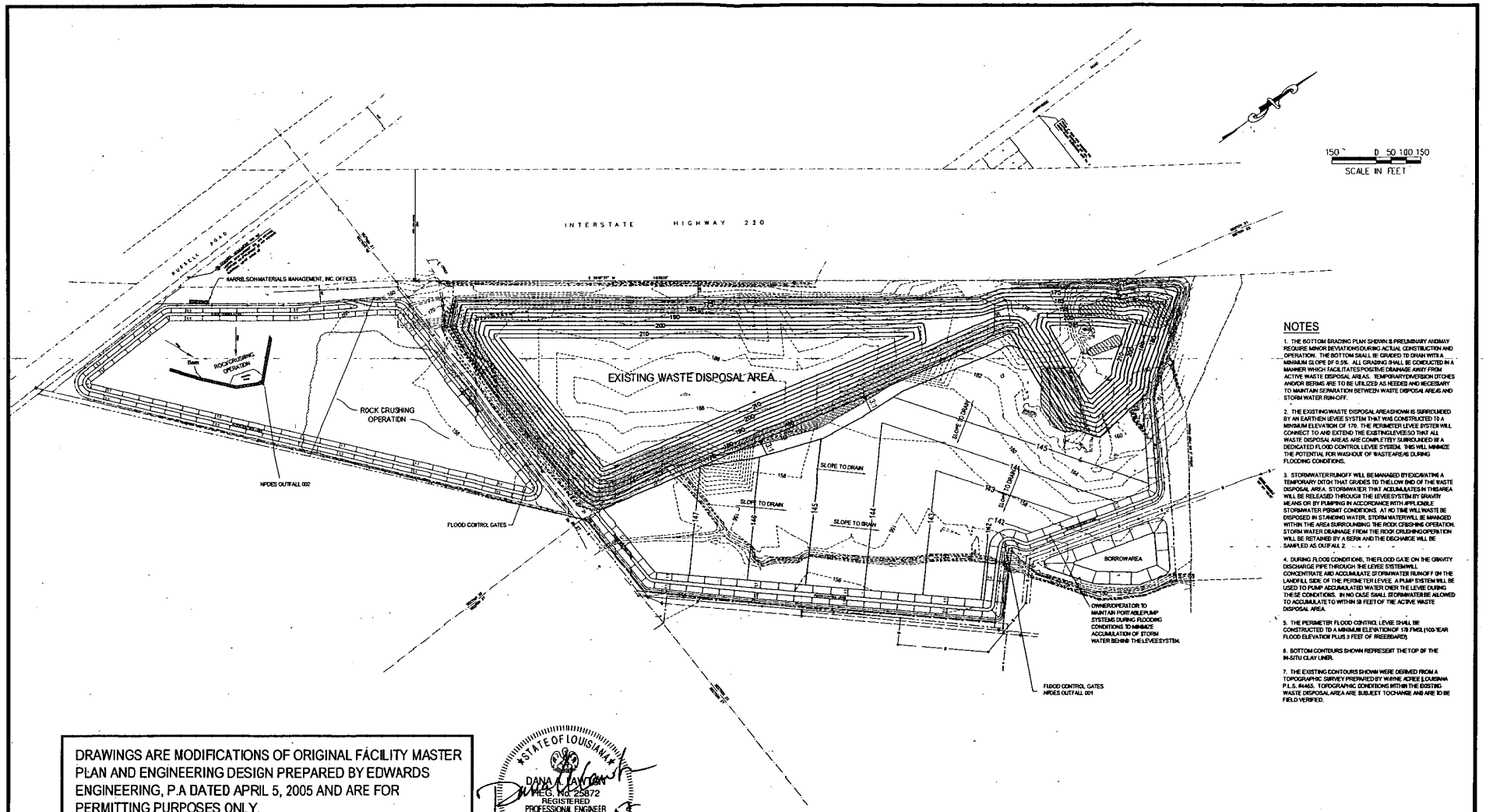


NOTES

1. THE BOTTOM GRADING PLAN SHOWN IS PRELIMINARY AND MAY REQUIRE MINOR DEVIATIONS DURING ACTUAL CONSTRUCTION AND OPERATION. THE BOTTOM SHALL BE GRADED TO DRAIN WITH A MINIMUM SLOPE OF 0.5%. ALL GRADING SHALL BE CONDUCTED IN A MANNER WHICH FACILITATES POSITIVE DRAINAGE AWAY FROM ACTIVE WASTE DISPOSAL AREAS. TEMPORARY DIVERSION DITCHES AND/OR BERMS ARE TO BE UTILIZED AS NEEDED AND NECESSARY TO MAINTAIN SEPARATION BETWEEN WASTE DISPOSAL AREAS AND STORM WATER RUN-OFF.

2. THE EXISTING WASTE DISPOSAL AREA SHOWN IS SURROUNDED BY AN EARTHEN LEVEE SYSTEM THAT WAS CONSTRUCTED TO A MINIMUM ELEVATION OF 179. THE PERIMETER LEVEE SYSTEM WILL CONNECT TO AND EXTEND THE EXISTING LEVEES SO THAT ALL WASTE DISPOSAL AREAS ARE COMPLETELY SURROUNDED BY A DEDICATED FLOOD CONTROL LEVEE SYSTEM. THIS WILL MINIMIZE THE POTENTIAL FOR WASHOUT OF WASTE AREAS DURING FLOODING CONDITIONS.

3. STORMWATER RUNOFF WILL BE MANAGED BY EXCAVATING A TEMPORARY DITCH THAT GRADES TO THE LOW END OF THE WASTE DISPOSAL AREA. STORMWATER THAT ACCUMULATES IN THIS AREA WILL BE RELEASED THROUGH THE LEVEE SYSTEM BY GRAVITY MEANS OR BY PUMPING IN ACCORDANCE WITH APPLICABLE STORMWATER PERMIT CONDITIONS. AT NO TIME WILL WASTE BE DISPOSED IN STANDING WATER. STORM WATER WILL BE MANAGED WITHIN THE AREA SURROUNDING THE ROCK CRUSHING OPERATION. STORM WATER DRAINAGE FROM THE ROCK CRUSHING OPERATION WILL BE RETAINED BY A BERM AND THE DISCHARGE WILL BE SAMPLED AS OUTFALL 2.

4. DURING FLOOD CONDITIONS, THE FLOOD GATE ON THE GRAVITY DISCHARGE PIPE THROUGH THE LEVEE SYSTEM WILL CONCENTRATE AND ACCUMULATE STORMWATER RUNOFF ON THE LANDFILL SIDE OF THE PERIMETER LEVEE. A PUMP SYSTEM WILL BE USED TO PUMP ACCUMULATED WATER OVER THE LEVEE DURING THESE CONDITIONS. IN NO CASE SHALL STORMWATER BE ALLOWED TO ACCUMULATE TO WITHIN 5 FEET OF THE ACTIVE WASTE DISPOSAL AREA.

5. THE PERIMETER FLOOD CONTROL LEVEE SHALL BE CONSTRUCTED TO A MINIMUM ELEVATION OF 178 FMSL (100-YEAR FLOOD ELEVATION PLUS 3 FEET OF FREEBOARD).

6. BOTTOM CONTOURS SHOWN REPRESENT THE TOP OF THE IN-SITU CLAY LINER.

7. THE EXISTING CONTOURS SHOWN WERE DERIVED FROM A TOPOGRAPHIC SURVEY PREPARED BY WAYNE ACREE LOUISIANA P.L.S. #4455. TOPOGRAPHIC CONDITIONS WITHIN THE EXISTING WASTE DISPOSAL AREA ARE SUBJECT TO CHANGE AND ARE TO BE FIELD VERIFIED.

DRAWINGS ARE MODIFICATIONS OF ORIGINAL FACILITY MASTER PLAN AND ENGINEERING DESIGN PREPARED BY EDWARDS ENGINEERING, P.A DATED APRIL 5, 2005 AND ARE FOR PERMITTING PURPOSES ONLY.

STATE OF LOUISIANA
DANA A. LAWTON
REG. NO. 25872
REGISTERED PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
4-20-07

NOT RELEASED FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION
1	05/01/06	B.E.	REVISIONS & NOTE ADDITIONS TO CONSIDER LDEQ COMMENTS

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL.: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

HMM Harrelson Materials Management

GENERAL BOTTOM GRADING PLAN

MASTER PLAN

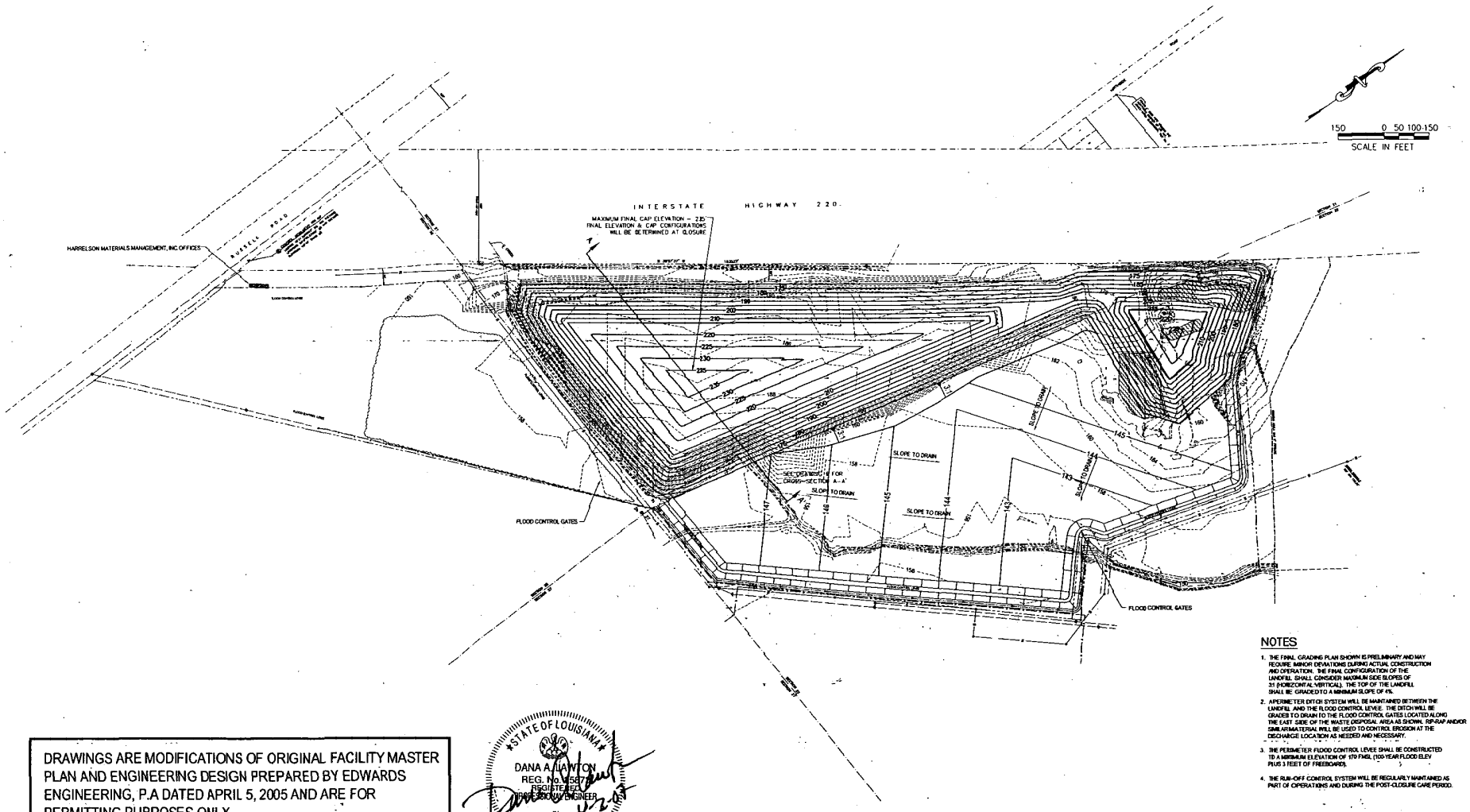
HARRELSON MATERIALS MANAGEMENT, INC.

HARRELSON LANDFILL

SHREVEPORT LOUISIANA

DRAWING 4	
DESIGNED BY:	DAL
DRAWN BY:	SMCH
APP'VD. BY:	GHC
SCALE:	1" = 50'
DATE:	2007
JOB NO.	2706
ACAD NO.	2706
SHEET NO.:	4 OF 7

LDEQ-EDMS Document 36473764, Page 61 of 438



NOTES

1. THE FINAL GRADING PLAN SHOWN IS PRELIMINARY AND MAY REQUIRE MINOR DEVIATIONS DURING ACTUAL CONSTRUCTION AND OPERATION. THE FINAL CONFIGURATION OF THE LANDFILL SHALL CONSIDER MAXIMUM SIDE SLOPES OF 3:1 (HORIZONTAL:VERTICAL). THE TOP OF THE LANDFILL SHALL BE GRADED TO A MINIMUM SLOPE OF 4%.
2. A PERIMETER DITCH SYSTEM WILL BE MAINTAINED BETWEEN THE LANDFILL AND THE FLOOD CONTROL LEVEE. THE DITCH WILL BE GRADED TO DRAIN TO THE FLOOD CONTROL GATES LOCATED ALONG THE EAST SIDE OF THE WASTE DISPOSAL AREA AS SHOWN. RIP-RAP AND/OR SIMILAR MATERIAL WILL BE USED TO CONTROL EROSION AT THE DISCHARGE LOCATION AS NEEDED AND NECESSARY.
3. THE PERIMETER FLOOD CONTROL LEVEE SHALL BE CONSTRUCTED TO A MINIMUM ELEVATION OF 170 FMSL (100-YEAR FLOOD ELEV PLUS 3 FEET OF FREEBOARD).
4. THE RUN-OFF CONTROL SYSTEM WILL BE REGULARLY MAINTAINED AS PART OF OPERATIONS AND DURING THE POST-CLOSURE CARE PERIOD.

DRAWINGS ARE MODIFICATIONS OF ORIGINAL FACILITY MASTER PLAN AND ENGINEERING DESIGN PREPARED BY EDWARDS ENGINEERING, P.A DATED APRIL 5, 2005 AND ARE FOR PERMITTING PURPOSES ONLY.

STATE OF LOUISIANA
DANA A. LAWTON
REG. No. 35878
REGISTERED PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
4-2-07

NOT RELEASED FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

HMM Harrelson Materials Management

GENERAL FINAL CAP GRADING PLAN

MASTER PLAN

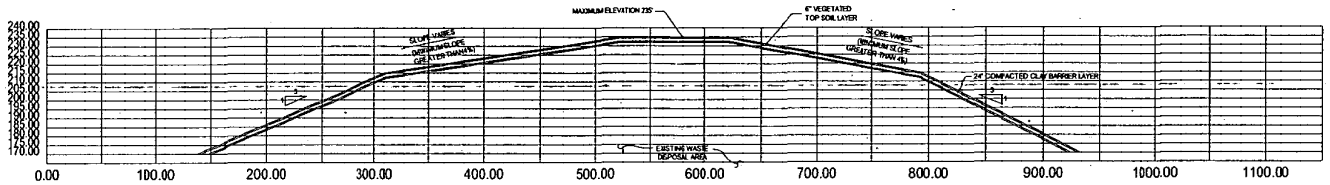
HARRELSON MATERIALS MANAGEMENT, INC.

HARRELSON LANDFILL

SHREVEPORT LOUISIANA

DRAWING 5	
DESIGNED BY:	DAL
DRAWN BY:	SMEM
APPVD. BY:	GHC
SCALE:	1" = 150'
DATE:	2007
JOB NO.:	2706
ACAD NO.	2706
SHEET NO.:	5 OF 7

LDEQ-EDMS Document 36473764, Page 62 of 438



CROSS SECTION A - A'

DRAWINGS ARE MODIFICATIONS OF ORIGINAL FACILITY MASTER PLAN AND ENGINEERING DESIGN PREPARED BY EDWARDS ENGINEERING, P.A DATED APRIL 5, 2005 AND ARE FOR PERMITTING PURPOSES ONLY.

STATE OF LOUISIANA
DANA A. LAWTON
REG. NO. 26872
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING
4-2-07

NOT RELEASED FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

HMM HARRELSON MATERIALS MANAGEMENT

TYPICAL CROSS SECTION

NASTER PLAN

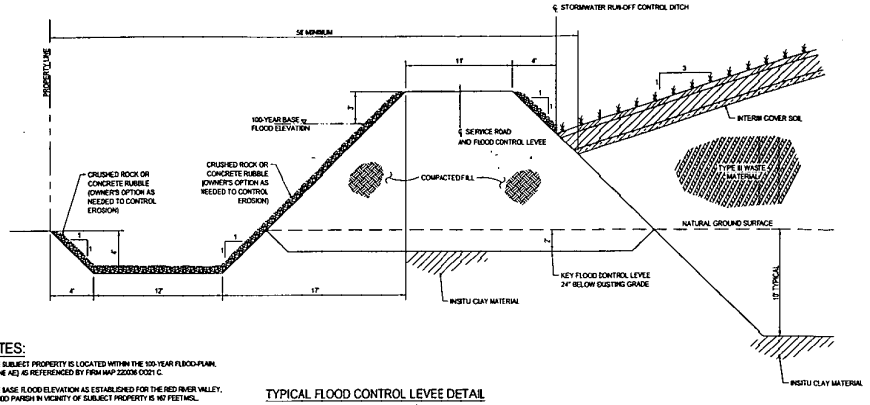
HARRELSON MATERIALS MANAGEMENT, INC.

HARRELSON LANDFILL

SHREVEPORT LOUISIANA

DRAWING 6	
DESIGNED BY:	DAL
DRAWN BY:	SMDN
APPVD. BY:	GHC
SCALE:	AS SHOWN
DATE:	2007
JOB NO.	2706
ACAD NO.	2706
SHEET NO.:	6 OF 7

LDEQ-EDMS Document 36473764, Page 63 of 438

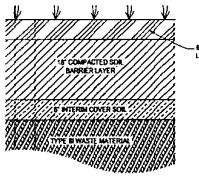


NOTES:

1. THE SUBJECT PROPERTY IS LOCATED WITHIN THE 100-YEAR FLOOD-PLAIN. (ZONE AE) AS REFERENCED BY FIRM MAP 220036 0021 C.
2. THE BASE FLOOD ELEVATION AS ESTABLISHED FOR THE RED RIVER VALLEY, CADDO PARISH IN VICINITY OF SUBJECT PROPERTY IS 167 FEET MSL.
3. THE FLOOD CONTROL LEVEE SHALL BE CONSTRUCTED WITH A MINIMUM FREEBOARD OF 3 FEET ABOVE THE BASE FLOOD ELEVATION AS PER FEMA STANDARDS FOR RECOGNIZED FLOOD CONTROL LEVEES. THIS WILL RESULT IN A MINIMUM LEVEE ELEVATION OF 170 FEET MSL.
4. SANDY SOIL MAY BE ENCOUNTERED IN THE UPPER 15 FEET IN SOME AREAS ALONG THE NORTHEAST PROPERTY BOUNDARY. AREAS WITHIN THE LIMITS OF THE FLOOD CONTROL LEVEE INCLUDING INTERNAL WASTE BISPOIN AREAS SHALL BE UNDERCUT TO A DEPTH OF AT LEAST 24" BELOW THE BASE CLAY UNIT WHEN SANDY SOILS ARE ENCOUNTERED. COMPACTED CLAY FILL SHALL BE USED AS NECESSARY TO RE-ESTABLISH THE DESIGN ELEVATIONS SHOWN ON DRAWING 4.
5. THE DIMENSIONS SHOWN FOR RUN-ON AND RUN-OFF CONTROL SYSTEMS ARE PRELIMINARY. IN ALL CLASSES, THE STORMWATER RUN-ON AND RUN-OFF CONTROL SYSTEMS INCLUDING ALL DITCHES, BERMS, AND CULVERTS SHALL BE DESIGNED AND CONSTRUCTED TO HANDLE A 25-YEAR, 24-HOUR STORM EVENT.

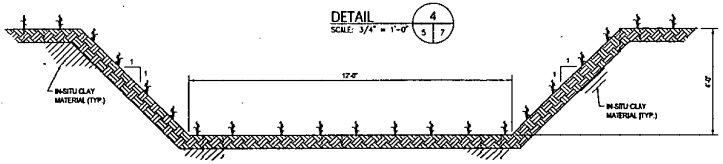
TYPICAL FLOOD CONTROL LEVEE DETAIL

DETAIL 1 (5 | 7)
SCALE: 1" = 5'



TYPICAL FINAL COVER DETAIL

DETAIL 4 (5 | 7)
SCALE: 3/4" = 1'-0"

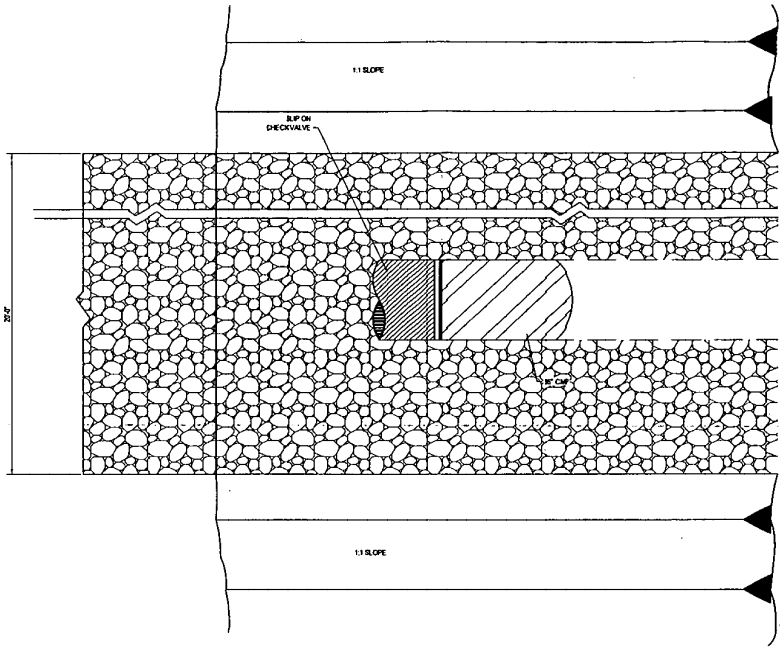


STORMWATER RUN-ON CONTROL DITCH (TYPICAL)

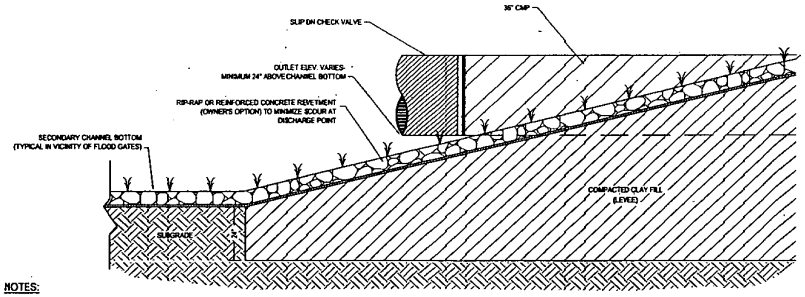
DETAIL 3 (5 | 7)
SCALE: 1/2" = 1'-0"

DRAWINGS ARE MODIFICATIONS OF ORIGINAL FACILITY MASTER PLAN AND ENGINEERING DESIGN PREPARED BY EDWARDS ENGINEERING, P.A DATED APRIL 5, 2005 AND ARE FOR PERMITTING PURPOSES ONLY.

STATE OF LOUISIANA
DANA A. LAWTON
REG. NO. 29012
REGISTERED PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING



PLAN VIEW



PROFILE VIEW

NOTES:

1. BACK-FLOW PREVENTION SLIP ON CHECK VALVES ARE TO BE INSTALLED ON THE EXTERIOR SIDE OF THE LEVEE FOR EACH 36" CMP CULVERT.
2. FLOOD GATES ARE TO BE INSTALLED EVERY 500 FEET.
3. SLIP ON CHECK VALVES ARE TO BE TIDEFLEX TF-2 OR EQUIVALENT AS MANUFACTURED BY REDVALVE COMPANY INCARNEGIE, PA 15106 OR APPROVED EQUAL (870) 862-6692
4. AT THE OWNER'S OPTION, A MECHANICAL FLOW CONTROL GATE MAY BE INSTALLED ON THE UP-GRADIENT SIDE OF DISCHARGE RIPRAP TO DETAIN STORMWATER RUN-OFF FROM THE WASTE DISPOSAL OPERATIONS.

TYPICAL EROSION PREVENTION AT FLOOD GATES

DETAIL 2 (5 | 7)
SCALE: 1/2" = 1'-0"

REV.	DATE	BY	DESCRIPTION

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

HARRELSON MATERIALS MANAGEMENT

MISCELLANEOUS DETAILS

MASTER PLAN

HARRELSON MATERIALS MANAGEMENT, INC.

HARRELSON LANDFILL

SHREVEPORT LOUISIANA

DRAWING 7

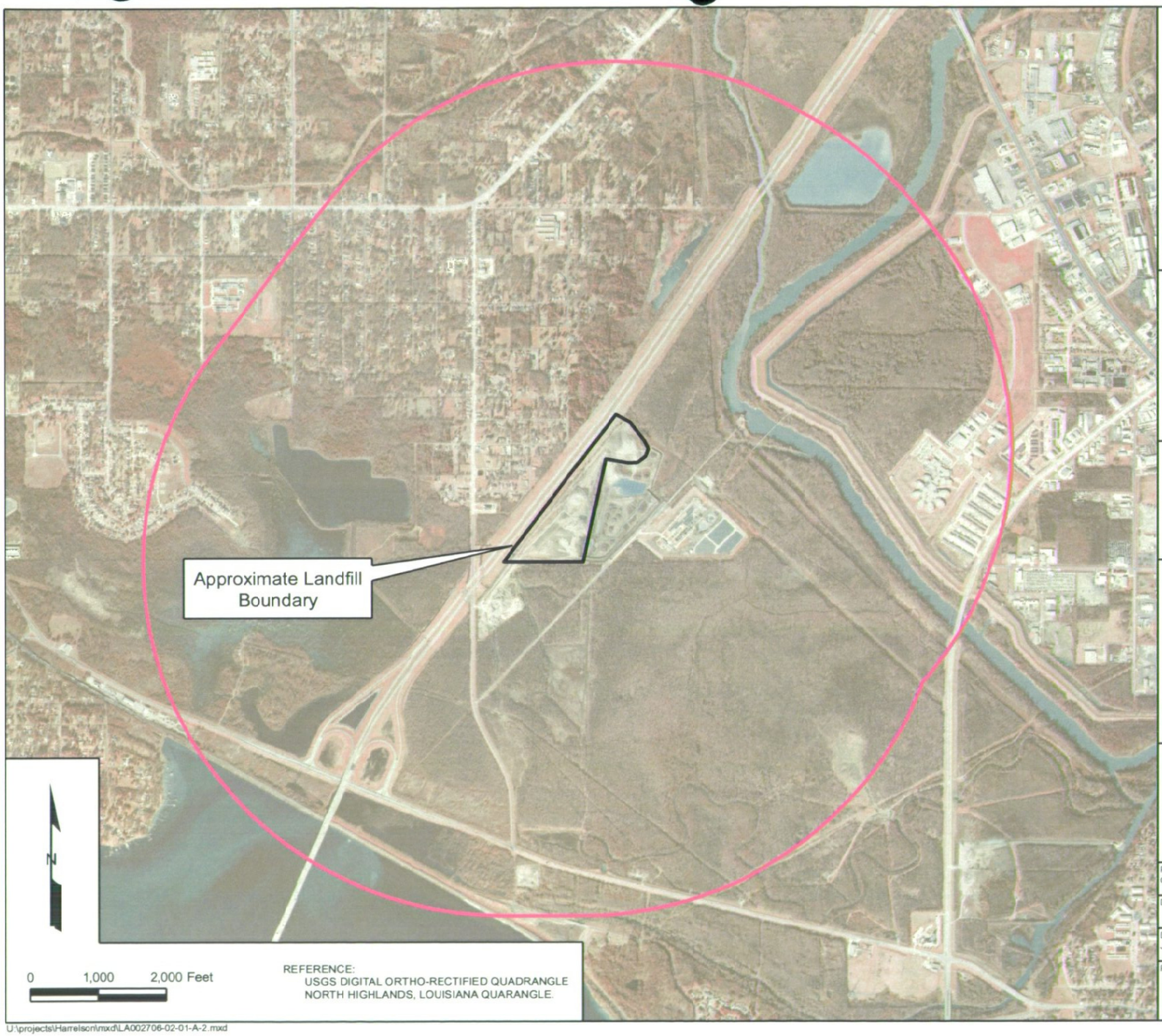
DESIGNED BY:	DAL
DRAWN BY:	SMEH
APPVD. BY:	CHC
SCALE:	AS SHOWN
DATE:	2007
JOB NO.	2706
ACAD NO.	2706
SHEET NO.:	7 OF 7

LDEQ-EDMS Document 36473764, Page 64 of 438

APPENDIX A

FIGURES

A:2 *Aerial Photograph of Site*



U:\projects\Harrelson\mxd\LA002706-02-01-A-2.mxd

Legend

- Approximate Landfill Boundary
- One-Mile Radius

HARRELSON MATERIALS MANAGEMENT INC. LANDFILL TYPE III SOLID WASTE PERMIT APPLICATION

USGS COLOR INFRARED AERIAL PHOTOGRAPHY - 2004

HARRELSON MATERIALS MANAGEMENT INC.
1101 Russell Road
Shreveport, Louisiana 71107
(318) 425-3218

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

PROJECT MANAGER: GHC	CHECKED BY: BN
DRAWING FILE:	GIS FILE: LA002706-01-02-A-2.mxd
DRAWING BY: JEC	DATE: 06-26-07
PROJECT NUMBER: LA002706.0001	DRAWING NUMBER:

LDEQ-EDMS Document 36473764, Page 66 of 438

APPENDIX A

FIGURES

A:3 Aquifer Recharge Areas

LDEQ-EDMS Document 36473764, Page 68 of 438

Prepared by the
Louisiana Geological Survey

SHREVEPORT

Prepared for the
Louisiana Department of Environmental Quality

LOCATION DIAGRAM

AQUIFER	SYSTEM	ACE	FORMATION	DESCRIPTION

GENERALIZED INTERVAL TIME STRATIGRAPHIC CORRELATION CHART

AQUIFER RECHARGE POTENTIAL

HIGH RECHARGE POTENTIAL

MODERATE RECHARGE POTENTIAL

LOW RECHARGE POTENTIAL

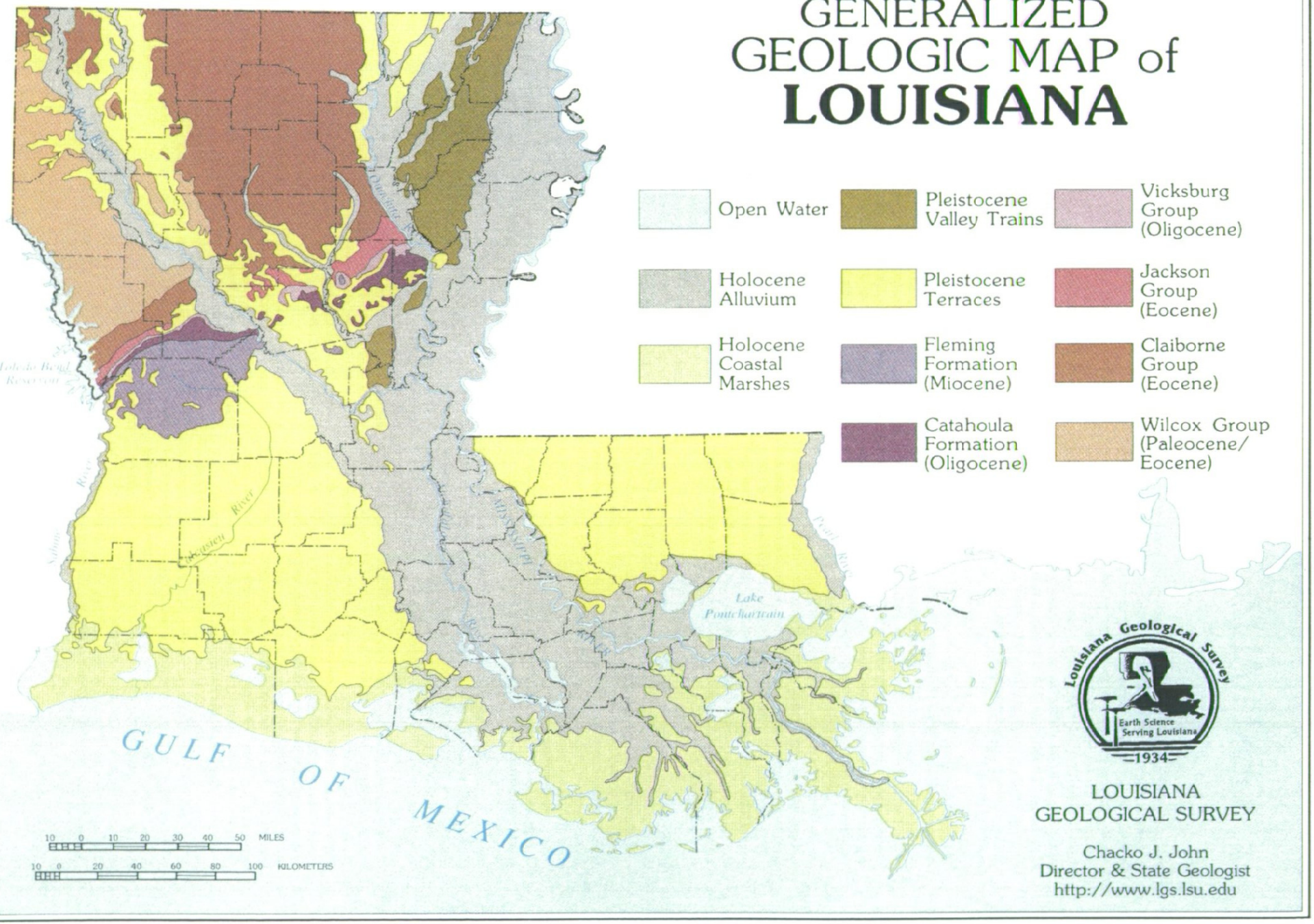
Aquifer Recharge Potential
of the
Shreveport Quadrangle

APPENDIX A

FIGURES

A:4 Geological Map of Louisiana

GENERALIZED GEOLOGIC MAP of **LOUISIANA**



Louisiana Geological Survey
Earth Science Serving Louisiana
1934

LOUISIANA
GEOLOGICAL SURVEY

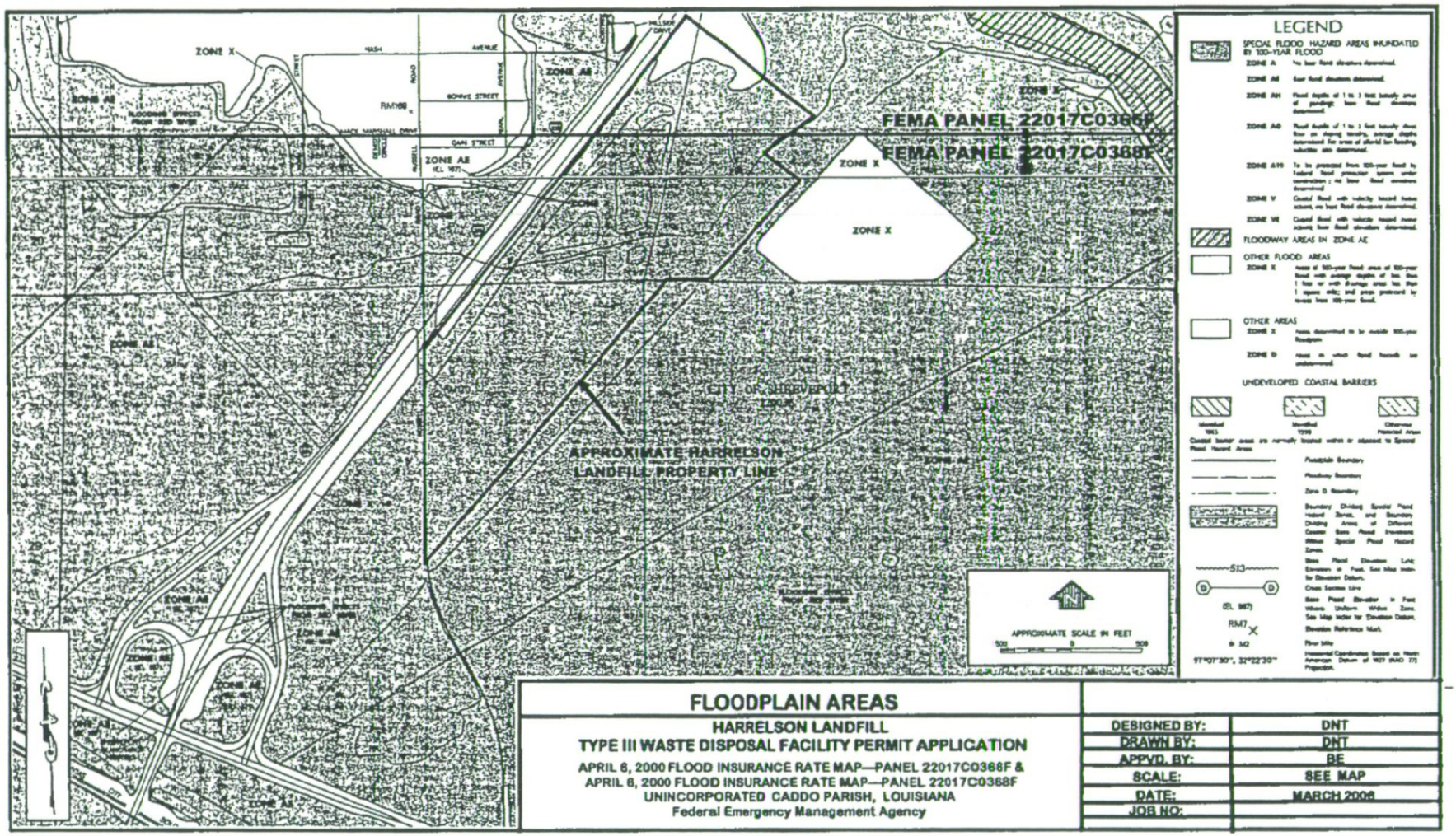
Chacko J. John
Director & State Geologist
http://www.lgs.lsu.edu

LLDEQ-EDMS Document 36473764, Page 70 of 438

APPENDIX A

FIGURES

A:5 Flood Zone Map



FLOODPLAIN AREAS

HARRELSON LANDFILL
TYPE III WASTE DISPOSAL FACILITY PERMIT APPLICATION
APRIL 6, 2000 FLOOD INSURANCE RATE MAP—PANEL 22017C0366F &
APRIL 6, 2000 FLOOD INSURANCE RATE MAP—PANEL 22017C0368F
UNINCORPORATED CADDO PARISH, LOUISIANA
Federal Emergency Management Agency

DESIGNED BY:	DNT
DRAWN BY:	DNT
APPVD. BY:	BE
SCALE:	SEE MAP
DATE:	MARCH 2006
JOB NO:	

LDEQ-EDMS Document 36473764, Page 72 of 438

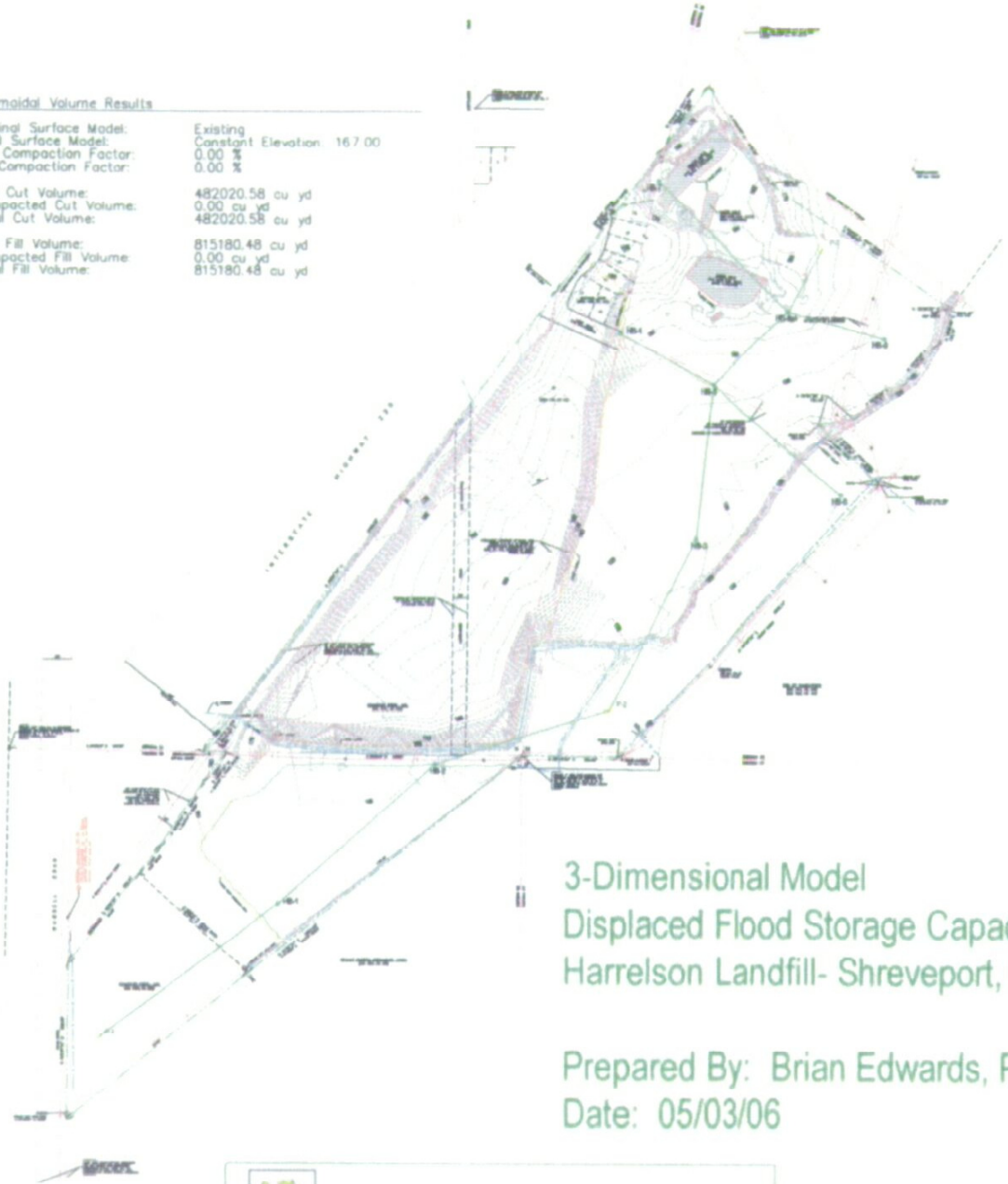
APPENDIX A

FIGURES

A:6 Flood Zone Modeling

Prismoidal Volume Results

Original Surface Model:	Existing
Final Surface Model:	Constant Elevation: 167.00
Cut Compaction Factor:	0.00 %
Fill Compaction Factor:	0.00 %
Raw Cut Volume:	482020.58 cu yd
Compacted Cut Volume:	0.00 cu yd
Total Cut Volume:	482020.58 cu yd
Raw Fill Volume:	815180.48 cu yd
Compacted Fill Volume:	0.00 cu yd
Total Fill Volume:	815180.48 cu yd



3-Dimensional Model
Displaced Flood Storage Capacity
Harrelson Landfill- Shreveport, LA

Prepared By: Brian Edwards, P.E.
Date: 05/03/06

EDWARDS ENGINEERING, P.A.
CIVIL AND ENVIRONMENTAL ENGINEERING, PLANNING, AND CONSULTING

APPENDIX B

SUPPORTING DOCUMENTATION

B:1 Proof of Publication

CLIPPING OF
AD HERE

PUBLIC NOTICE

Notice is hereby give that Chandler Brothers, Inc. does intend to submit to the Deparment of Environmental Quality, Office of Solid and Hazardous Waste Division, an appliecation for a permit to operate a Type III Facility in Caddo Parish, Range 14 West, township 18 North, Sections 21 and 22 which is located at 1101 Russell Road, Shreveport, LA. Comments concerning the facility may be filed with the Secretary of the Louisiana Department of Environmental Quality at the following address:

Louisiana Department of Environmental Quality
Office of Solid and Hazardous Waste
Solid Waste Division
Permit Section
Post Office Box 82178
Baton Rouge, Louisiana 70884-2178

CADDO CITIZEN: December 29, 1994

PROOF OF PUBLICATION

State of Louisiana
Parish of Caddo

Before me, the undersigned authority, personally came and appeared *Linda Murray*, personally known to me, who being duly sworn, deposes and says that she is the Publisher of the Caddo Citizen, and that

E. J. French & Son

Notice - Intent to Submit to DE

as per copy of advertisement hereto annexed, was published in the Caddo Citizen in its issue of:

Dec. 29, 1994

Signed _____

Sworn and subscribed before me

this 29 day of December, 1994

_____
Notary Public

MARGARET S. CHANDLER
NOTARY - CADDO PARISH, LA.
MY COMMISSION IS FOR LIFE

PUBLIC NOTICE

Notice is hereby give that Chandler Brothers, Inc. does intend to submit to the Department of Environmental Quality, Office of Solid and Hazardous Waste Division, an application for a permit to operate a Type III Facility in Caddo Parish, Range 14 West, Township 18 North, Sections 21 and 2, which is located at 1101 Russell Road, Shreveport, LA.

Comments concerning the facility may be filed with the Secretary of the Louisiana Department of Environmental Quality at the following address:

Louisiana Department of Environmental Quality
Office of Solid and Hazardous Waste
Solid Waste Division
Permit Section
Post Office Box 82178
Baton Rouge, Louisiana 70884-2178

21760-dec 29-1t

CAPITAL CITY PRESS

Publisher of

THE ADVOCATE

PROOF OF PUBLICATION

The hereto attached notice was published in THE ADVOCATE, a daily newspaper of general circulation, published in Baton Rouge, Louisiana, and the Official Journal of the State of Louisiana, the City of Baton Rouge and the Parish of East Baton Rouge, in the issues of:

DECEMBER 29, 1994

Vicki Thompson
Advertising Representative

Sworn and subscribed before me by the person whose signature appears above in Baton Rouge, La. on this

29 day of DECEMBER 19 94 AD.

Vicki D. Hola
Notary Public

My Commission Expires: Indefinite

21760
CHANDLER BROTHERS

APPENDIX B

SUPPORTING DOCUMENTATION

B:2 Impact on Road Infrastructure

Shreveport
All-America City

CITY OF SHREVEPORT

P.O. BOX 31109 SHREVEPORT, LA 71130
web site: www.ci.shreveport.la.us

January 18, 2005

Mr. E. J. French. Sr.. P.E.. P.L.S.
E.J. FRENCH & SON
Consulting Civil Engineers & Land Surveyors
P.O. Box 5301
Shreveport, LA 71135

RE: Solid Waste Disposal Facility Permit Application
Chandler Bros., Inc. Landfill
1101 Russell Road
Shreveport, Caddo Parish, Louisiana

Dear Mr. French:

This is written for incorporation in your application on behalf of Chandler Bros., Inc. for a Type III Solid Waste Permit at their Russell Road site. It is my understanding that this site will be utilized for disposal of construction and demolition material generated in the Shreveport/Caddo Parish area.

In this regard, please be advised that this facility will not have a significant adverse impact on the traffic flow of area roadways and that the construction maintenance or proposed upgrading of such roads is adequate to withstand the weight of the vehicles using the facility.

If I can provide any additional assistance, please let me know.

Sincerely,

Ron Norwood, P.E.
City Engineer

RN:ps

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
Post Office Box 38
Shreveport, Louisiana 71161-0038
(318) 746-6100
FAX (318) 741-7334

M. J. "MIKE" FOSTER, JR.
GOVERNOR

JOHN BASILICA, JR.
ACTING SECRETARY

November 16, 1998

MR. E. J. FRENCH, SR., P.E.
E. J. FRENCH & SON
P. O. BOX 5301
SHREVEPORT, LA 71135

Subject: SOLID WASTE DISPOSAL FACILITY
CHANDLER BROS., INC. LANDFILL
CADDO PARISH

Dear Mr. French:

This letter serves as notice that your solid waste disposal facility, to be located at 1101 Russell Road in Shreveport, LA, will not have significant adverse impact on the traffic flow on local state highways. The area roadways and the construction, maintenance, or proposed upgrading of the affected roadways is adequate to withstand the weight of the proposed vehicles.

Should additional information be needed, please advise.

Sincerely,

Victor N. Pavloff, Jr., P.E.
District Maintenance Engineer

VNPjr/cbf

cc: Mr. S. Bruce Easterly, P. E.

APPENDIX B

SUPPORTING DOCUMENTATION

B:3 Land Use – Northwest Louisiana Council of Governments

NLCOG
Northwest Louisiana Council Of Governments
401 Market Street, Suite 460
Shreveport, Louisiana 71101
Phone: (318) 841-5950
Fax: (318) 841-5952
www.nwlainfo.com

December 22, 2005

Mr. David Neal Taylor
Edwards Engineering, P.A.
9802 Maumelle Blvd.
North Little Rock, AR. 72113

Re: Data Request – current land use percentages within 3 miles of the Harrelson Landfill site.

Mr. Taylor -

As per your request, I've performed the spatial analysis that meets your application's (section c) requirements. Please note, there are discrepancies between the current land use percentage calculations and the previously submitted land use percentage breakouts. These discrepancies can be attributed to the following factors.

- Utilization of a nationally recognized Land Based Classification System (LBCS - APA) that consists of different land use category definitions (activity based land use)
- The LBCS is applied to individual land parcels (ownership). In this case, this approach dramatically increases the amount of land use classified as Category 9 (Vacant, unused, water body, or unclassifiable activity)

For your reference, I've enclosed hardcopies of the land use percentage table, as well as, a 11"x17" map depicting the 3 mile spatial analysis of the Harrelson Landfill site. Further, a CD containing the digital version (Adobe – pdf format) of these products is included in the mailer. If there are questions regarding the data, feel free to contact me at (318-841-5957 or cpetro@nlcog.org).

Best Regards,

Chris M. Petro, AICP
Transportation Planning Mgr.

Landuse Analysis - Landuse Type By Area and Acreage Within Three Miles of the Proposed Site

Site Location: Harrelson Landfill - 1101 Russell Rd., Shreveport, LA. 71137

General Landuse Category*	Area (sq. ft.)	Acres	Total (%)	Adjust** Area (sq.ft.)	Adjust** Acres
1 - Residential activities	164,808,737.28	3,783.49	22.1%	174,370,404.94	4,002.99
2 - Shopping, commercial, or retail trade activities	947,865.60	21.76	0.1%	1,002,857.68	23.02
3 - Industrial, manufacturing, or waste-related	4,714,237.44	108.22	0.6%	4,987,742.19	114.50
4 - Transportation, parking, or public utility	44,493,926.40	1,021.44	6.0%	47,075,319.50	1,080.70
5 - Wholesale trade and service activities	10,649,548.80	244.48	1.4%	11,267,401.03	258.66
6 - F.I.R.E., education, religious, or professional services	19,130,158.08	439.17	2.6%	20,240,027.72	464.65
7 - Recreation and leisure activities	24,733,716.48	567.81	3.3%	26,168,686.38	600.75
8 - Natural resource and agriculture related activities	1,597,432.32	36.67	0.2%	1,690,110.15	38.80
9 - Vacant, unused, water body, or unclassifiable activity	473,943,951.36	10,880.26	63.6%	501,440,640.11	11,511.49
- Category 9 that is water area	120,108,510.72	2,757.31	16.1%	127,076,816.42	2,917.28
Initial landuse area and Acre calculation:	745,019,573.76	17,103.30	94.5%		
Unaccounted for land area and acreage:	43,223,615.95	992.28	5.5%		
Total Area and Acres for 3 mile radius:	788,243,189.71	18,095.57	100.0%	788,243,189.71	18,095.57

Proximity to the proposed site (facility)	Distance (mi.)	Description
Nearest resident:	0.3	Single-Family residence located on Gain St.
school/educational facility:	1.6	J.S. Clark Middle School
healthcare facility:	3.1	Willis-Knighton Hospital North

Notes:

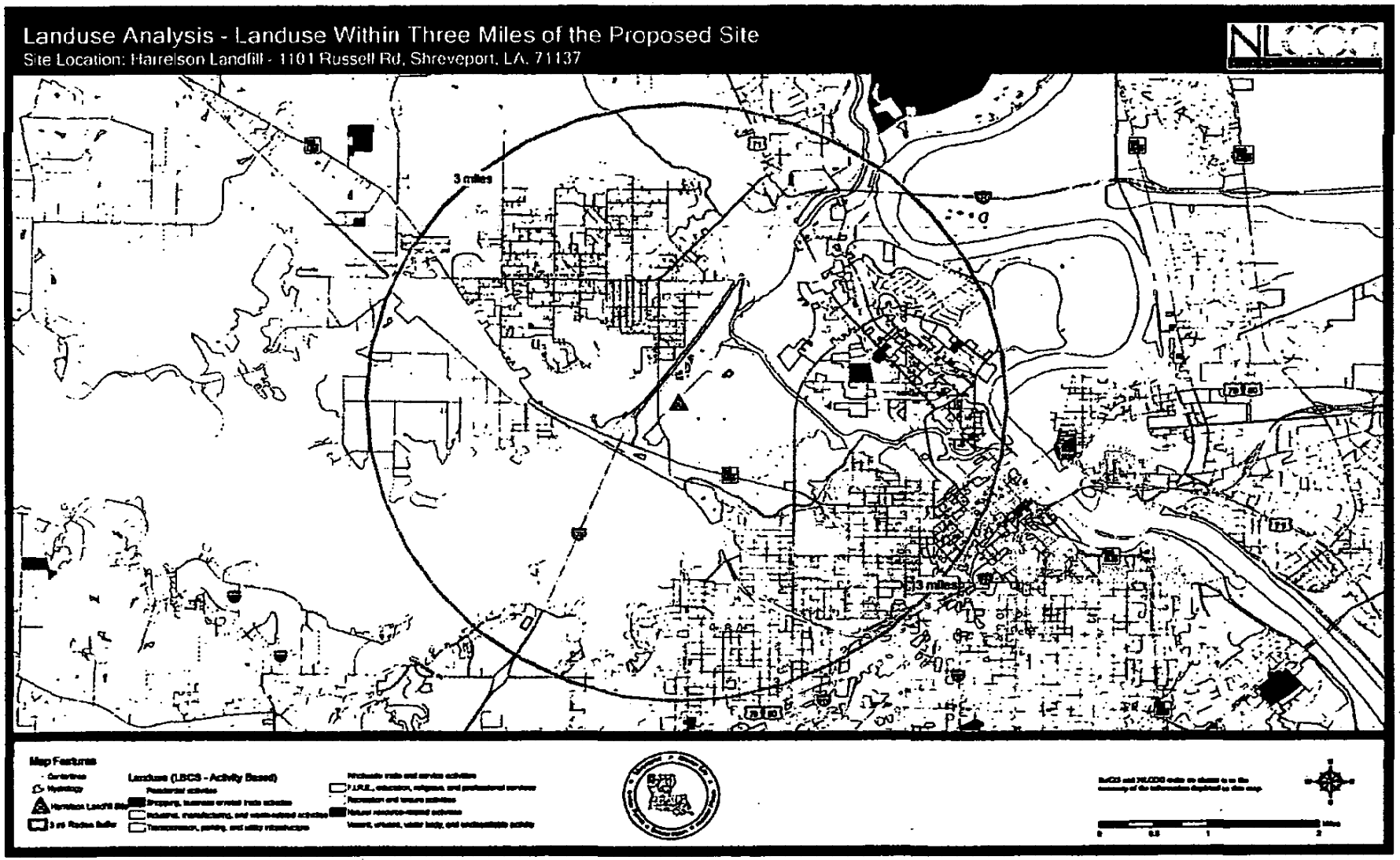
* General Landuse Categories are based upon the Land Based Classification System (LBCS), Activity landuse coding scheme, developed through the American Planning Association (APA), 2001. (http://www.planning.org/LBCS/GeneralInfo/)

** The analysis revealed approximately 5.5% of the land area within three miles of the site has a landuse that is undetermined. The adjusted area and acre data is calculated by utilizing the initial "Percent Total" and multiplying it by the "Total Area and Acres" data.

Landuse Source data: NLCOG landuse data collection effort for Caddo Parish; 1/98 and the landuse update effort; 9/05.

Northwest Louisiana Council of Governments - NLCOG
401 Market St. Suite 460 Shreveport Louisiana 71101 ph. 318.841.5950 fax 318.841.5952

LDEQ-EDMS Document 36473764, Page 84 of 438



APPENDIX B

SUPPORTING DOCUMENTATION

B:4 Impact Statement – Louisiana Department of Wildlife and Fisheries

State of Louisiana

KATHLEEN BABINEAUX BLANCO
GOVERNOR

DEPARTMENT OF WILDLIFE AND FISHERIES

DWIGHT LANDRENEAU
SECRETARY

Name	David Neal Taylor
Company	Edwards Engineering
Street Address	9802 Maumelle Blvd
City, State, Zip	North Little Rock, AR 72113
Project	Harrelson Materials Management - Harrelson Landfill Solid Waste Disposal Facility Permit Application Secs. 21, 22 & 28; T18N-R14W; Caddo Parish, LA
Date	March 22, 2005
Invoice Number	05032207

Personnel of the Habitat Section of the Fur and Refuge Division have reviewed the preliminary data for the captioned project. In reviewing our database, no rare, threatened, or endangered species or critical habitats were found within the areas of the captioned project that lie in Louisiana. No state or federal parks, wildlife refuges, scenic streams, or wildlife management areas are known at the specified sites within Louisiana's boundaries.

The Louisiana Natural Heritage Program has compiled data on rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features throughout the state of Louisiana. Heritage reports summarize the existing information known at the time of the request regarding the location in question. The quantity and quality of data collected by the LNHP are dependent on the research and observations of many individuals. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Louisiana have not been surveyed. This report does not address the occurrence of wetlands at the site in question. Heritage reports should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The Louisiana Natural Heritage Program requires that this office be acknowledged in all reports as the source of all data provided here. If you have any questions or need additional information, please call Louisiana Natural Heritage Program Data Manger Jill Kelly at (225) 765-2643.

Sincerely,

Joshua Comeaux for

Gary Lester, Coordinator
Natural Heritage Program

cc: Michael Harrelson, Harrelson Materials Management

APPENDIX B

SUPPORTING DOCUMENTATION

B:5 Impact Statement – Louisiana Department of Culture, Recreation, and Tourism

MITCHELL J. LANDRIEU
LIEUTENANT GOVERNOR

State of Louisiana
OFFICE OF THE LIEUTENANT GOVERNOR
DEPARTMENT OF CULTURE, RECREATION & TOURISM
OFFICE OF STATE PARKS

ANGÈLE DAVIS
SECRETARY

STUART JOHNSON, PH.D.
ASSISTANT SECRETARY

February 15, 2005

Mr. Michael Harrelson
1101 Russell Road
Shreveport, LA 71137

Re: Solid Waste Disposal Facility Permit Application
Harrelson Landfill
1101 Russell Road
Caddo Parish, Louisiana

Dear Mr. Harrleson:

We have reviewed your request to update our letter dated March 16, 1995. Our comments remain the same as noted below.

There are two public outdoor recreation areas listed on the Division of Outdoor Recreation inventory which may be located within 1,000 feet of the perimeter of the referenced facility.

The facilities are:

1. Hawkins-Lear Park which is operated by the Caddo Parish Police Jury.

2. David Raines Park which is owned and operated by the City of Shreveport, which has Land & Water Conservation Funds. There are also several parks located within the 3 mile radius.

Please consult local officials to determine and verify the exact locations. If they are within 1,000 feet, all necessary steps will have to be taken to insure that no adverse impacts are made to the sites.

If you have any questions concerning this matter, please contact Cleve Hardman, Acting Director, Division of Outdoor Recreation at (225)342-8186.

Sincerely,

Kenny Lang
Assistant Chief of Resource Development

KL:dr
c: Cleve Hardman

9802 Maumelle Blvd
North Little Rock, AR 72113
Phone: (501) 219-2808
Fax: (501) 219-2809
Mobile: (501) 912-6868

Edwards

Edwards Engineering, P.A.

Fax

Date: 2-9-05

No known archaeological sites or historic properties will be affected by this undertaking. This effect determination could change should new information come to our attention.

Pam Breaux: Pam Breaux
State Historic Preservation Officer

To:	Pam Breaux	**From:**	David Neal Taylor
Fax:	(225) - 219-9772	**Date:**	02/11/05
Phone:	(225) 342-8200	**Pages:**	4
Re:	Request for Letter	**CC:**	

☑ Urgent ☑ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

•Comments:

Ms. Breaux,

I spoke with a person from your office yesterday and they suggested that I send this request to you. The LDEQ solid waste division is requesting that we update the attached letter from your office for a pending solid waste permit application. The application is for the Harrelson Landfill (the same landfill referenced in the March 24, 1995 letter) and the updated later should be addressed to Michael Harrelson, 1101 Russell Road, Shreveport, LA 71137.

I have faxed you a copy of the original letter with a topo and site location map. If you need any additional information to expedite our request please give me a call at 501-219-2808

Thanks!

David Neal Taylor

Project Manager

RECEIVED
FEB 11 2005
DIV. OF ARCHAEOLOGY

APPENDIX B

SUPPORTING DOCUMENTATION

B:6 Impact Statement and Wetland Information

DEPARTMENT OF THE ARMY PERMIT

Permittee: Mr. Michael Harrelson

Permit No.: MVK-JCB-2003-620

Issuing Office: CEMVK-OD-F

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: See maps and drawings (enclosure 1).

Discharge of dredged and/or fill material associated with the construction of an expansion of an existing landfill.

Acres Impacted: 13.5 acres wetlands and intermittent stream

Acres Mitigated: 18.27 acres wetlands and intermittent stream

Project Location: Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on JUL 19 2010. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least 1 month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General

ENCL 1

Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions (enclosure 2).

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. The permittee shall implement best management practices such as silt curtains and hay bales to protect adjacent waters from erosion and sedimentation during project construction.

2. The permittee shall implement the approved mitigation plan (as modified) (enclosure 3) and shall provide a water management plan for approval no later than 6 months following construction of Wetland Area 3.

3. The mitigation areas shall be placed under a restrictive covenant, as stated in the mitigation plan, prior to issuance of the final permit.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Lynn Kitchen 7/15/05

(PERMITTEE) (DATE)

for MR. MICHAEL HARRELSON

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

for (DISTRICT ENGINEER) 7-19-05

(DATE)

ANTHONY C. VESAY
Colonel, Corps of Engineers

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) (DATE)

US Army Corps of Engineers
Vicksburg District
4155 Clay Street
Vicksburg, MS 39183-3435

Public Notice

APPLICATION NO.:	JCB-MVK-2003-620
EVALUATOR:	Joyce Butler
PHONE NO.:	(601) 631-5294
FAX NO.:	(601) 631-5459
E-MAIL:	regulatory@mvk02.usace.army.mil
DATE:	September 16, 2004
EXPIRATION DATE:	October 6, 2004

Interested parties are hereby notified that the U.S. Army Corps of Engineers, Vicksburg District, and the Louisiana Department of Environmental Quality, Office of Environmental Services are considering an application for a Department of the Army permit and State water quality certification for the work described herein. A water quality certification is required in accordance with statutory authority contained in the LRS 30:2074 A(3) and provisions of the Clean Water Act. Comments should be forwarded to the Vicksburg District, ATTN: CEMVK-OD-F, at the above address and the Louisiana Department of Environmental Quality, Office of Environmental Services, Post Office Box 4313, Baton Rouge, LA 70821-4313.

The Louisiana Department of Environmental Quality has a copy of the application on file in their office in Baton Rouge and may be inspected at any time between 8:00 a.m. and 4:30 p.m. weekdays. Copies may be obtained from the Louisiana Department of Environmental Quality upon payment of cost of printing. The Louisiana Department of Environmental Quality will make a final decision on the water quality certification pertaining to this application within 30 days after expiration of this notice.

Law Requiring a Permit: Section 404 of the Clean Water Act (33 U.S.C. 1344), which applies to discharges of dredged or fill material into waters of the United States.

ENCL 1

Name of Applicant:

Mr. Michael Harrelson
Harrelson Material Management, Inc.
Post Office Box 78102
Shreveport, Louisiana 71137-8102

Name of Agent:

Mr. Lynn M. Kitchen, Ph.D.
Adams Environmental, Inc.
12018 Las Nubes
San Antonio, Texas 78233

Location of Work: Sections 21 and 22, T18N-R14W, latitude 32.52919°, longitude 93.79914°, within the Red River drainage basin, Caddo Parish, near Shreveport, Louisiana.

Description of Work: (See enclosed map and drawings.)

The following descriptions of the proposed project and associated impacts are based upon information provided by the applicant.

The applicant is applying for an after-the-fact Department of the Army permit for a 37-acre expansion of an existing landfill that includes 13.5 acres of wetlands and an intermittent stream. The purpose of the project was to provide 50 to 100 years additional life to the existing landfill and allow the business to continue during that time.

The existing landfill is approved by the State of Louisiana, Department of Environmental Quality (LDEQ) as a landfill for construction and demolition materials. The landfill is currently at capacity and an application has been submitted to the LDEQ requesting the expansion. The additional capacity is needed to accommodate the growing quantity of construction and demolition waste being generated due to city growth.

The project involved construction of a berm and mechanical clearing of the wetlands and an intermittent stream to prepare the land surface for landfill construction. Additional wetlands were filled by expansion of a wood chipping facility. Approximately 70,000 cubic yards of backfill and base materials (not including the waste material to be deposited in the future) would be placed in the intermittent stream and wetlands to prepare the land surface for use as a landfill. The fill material is necessary because proper base material must be placed under the landfill to protect groundwater and prevent contamination of surface waters from waste materials.

The placement of dredged and/or fill material in waters of the United States associated with the mechanized land clearing and levee construction requires a Department of the Army Permit.

Upon reviewing this notice, you should write to this office to provide your opinion of the impacts this work will have on the natural and human environment and address any mitigation you believe is necessary to offset these impacts. Other comments are welcome, but the above information will further our review of the applicant's plan as proposed. Comments of a general nature are not as helpful as those specific to the impacts of the subject project.

State Water Quality Permit: The State Pollution Control Agency must certify that the described work will comply with the State's water quality standards and effluent limitations before a Corps permit is issued.

Cultural Resources: An initial review indicates that the proposed project would not affect any of the sites in Caddo Parish listed in the National Register of Historic Places. Copies of this notice have been sent to the State Historic Preservation Officer, Federally Recognized Tribes, the Corps archaeologists, and other interested parties for comment on potential effects to cultural resources that could result from this activity.

Endangered Species: Our initial finding is that the proposed work would not affect any endangered species or their critical habitat. This proposal is being coordinated with the U.S. Fish and Wildlife Service, and any comments regarding endangered species or their critical habitat will be addressed in our evaluation of the described work.

Flood Plain: In accordance with 44 CFR Part 60 (Flood Plain Management and Use), participating communities are required to review all proposed development to determine if a flood plain development permit is required. Flood plain administrators should review the proposed development described in this public notice and apprise this office of any flood plain development permit requirements.

Evaluation Factors: The decision whether or not to issue a permit will be based upon an evaluation of the probable impact 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 may be expected to accrue from the proposal must be balanced against its expected adverse effects. All factors which may be relevant to the proposal will be considered; among these are conservation, economics, aesthetics, general environmental concerns, historic values, fish and wildlife values, flood damage prevention, land use classification, navigation, recreation, water supply, water

quality, energy needs, safety, food requirements and, in general, the needs and welfare of the people. Evaluation of the proposed activity will include application of the guidelines published by the Environmental Protection Agency under authority of Section 404(b) of the Clean Water Act.

Public Involvement: The purpose of this notice is to solicit comments from the public; Federal, State, and local agencies and officials; Indian Tribes; and other interested parties. These comments will be used to evaluate the impacts of this project. All comments will be considered and used to help determine whether to issue the permit, deny the permit, or issue the permit with conditions, and to help us determine the amount and type of mitigation necessary. This information will be used in our Environmental Assessment or Impact Statement. Comments are also used to determine the need for a public hearing.

Opportunity for a Public Hearing: Any person may make a written request for a public hearing to consider this permit application. This request must be submitted by the public notice expiration date and must clearly state why a hearing is necessary. Failure of any agency or individual to comment on this notice will be interpreted to mean that there is no objection to the proposed work. Please bring this announcement to the attention of anyone you know who might be interested in this matter.

Notification of Final Permit Actions: Each month, the final permit actions from the preceding month are published on the Vicksburg District Regulatory web page. To access this information, you may follow the link from the Regulatory web page, http://www.mvk.usace.army.mil/offices/od/odf/main.asp, or go directly to the Final Permit Actions web page at http://www.mvk.usace.army.mil/offices/od/odf/PubNotice/MonthlyNotice/pnmain.asp.

W. Harold Lee
Team Leader
Evaluation Section

BEST COPY OF THE NEXT 2 PAGES

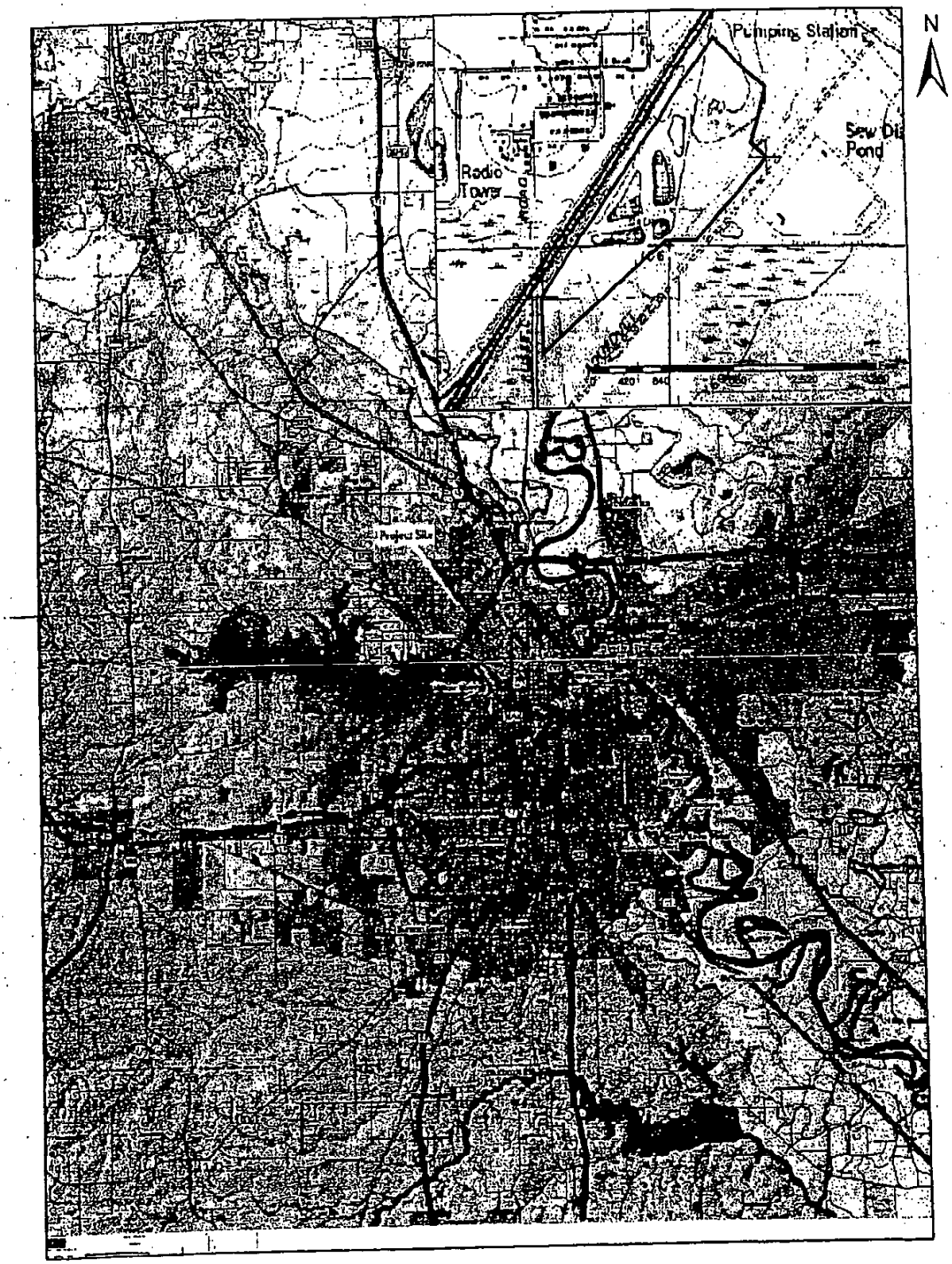


Figure 1. Topographic maps showing the location of the HMM C&D Landfill project area

CEMVK-OD-FE JCB-MVK-2003-620

MR MICHAEL HARRELSON
HARRELSON MATERIAL MANAGEMENT

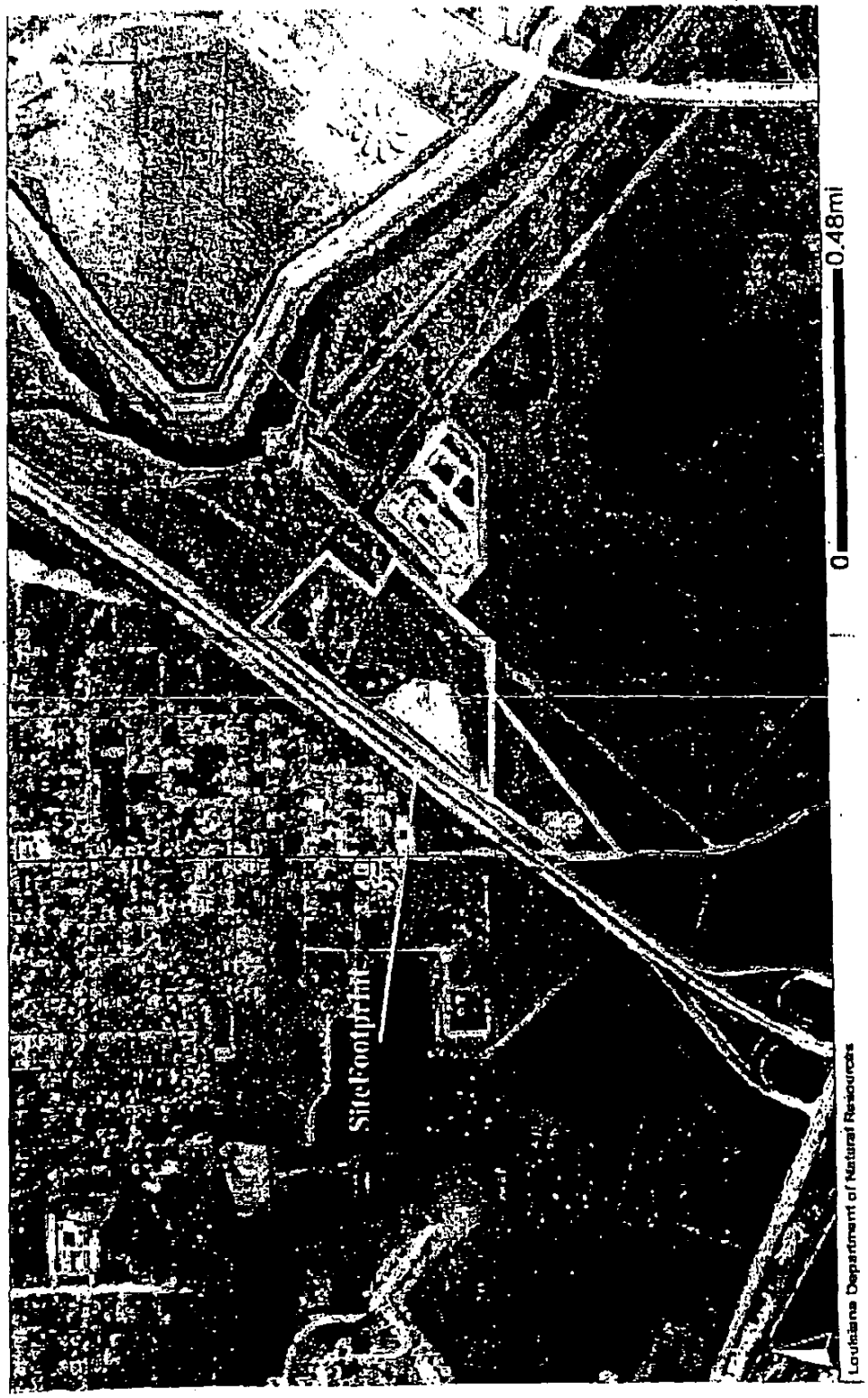
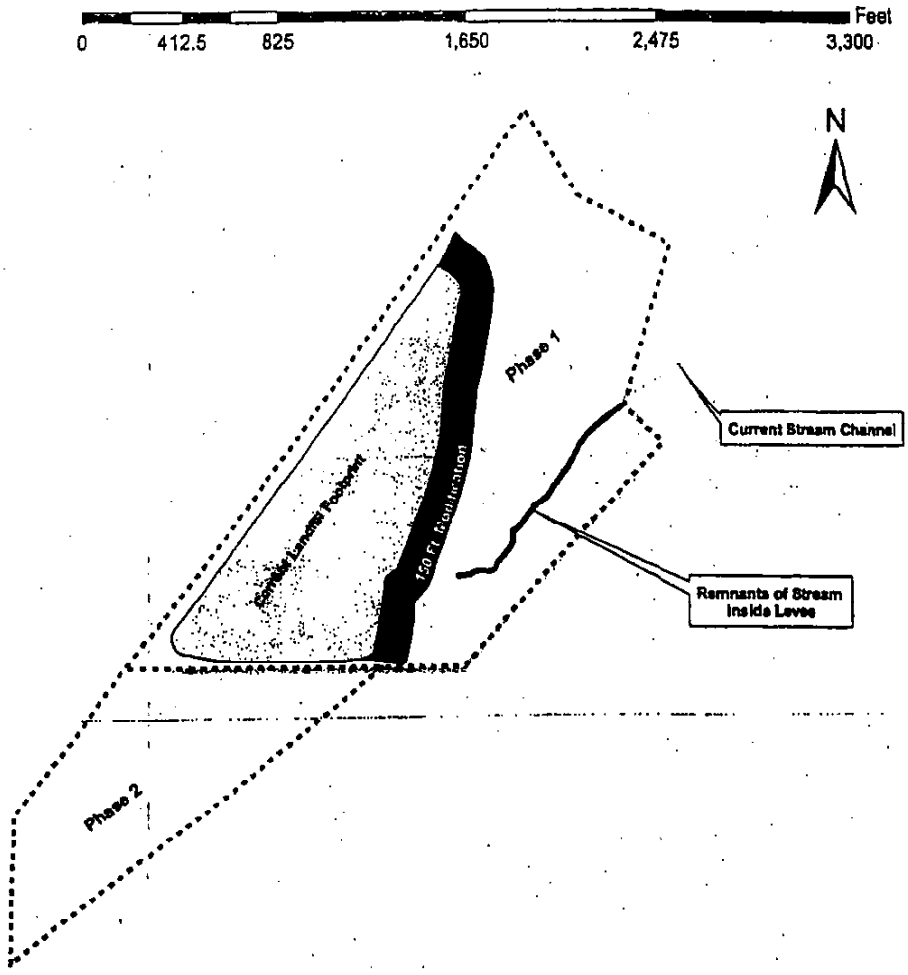


Figure 2. Infrared aerial photograph of the project area taken in 2000.

CEMVK-OD-FE JCB-MVK-2003-620

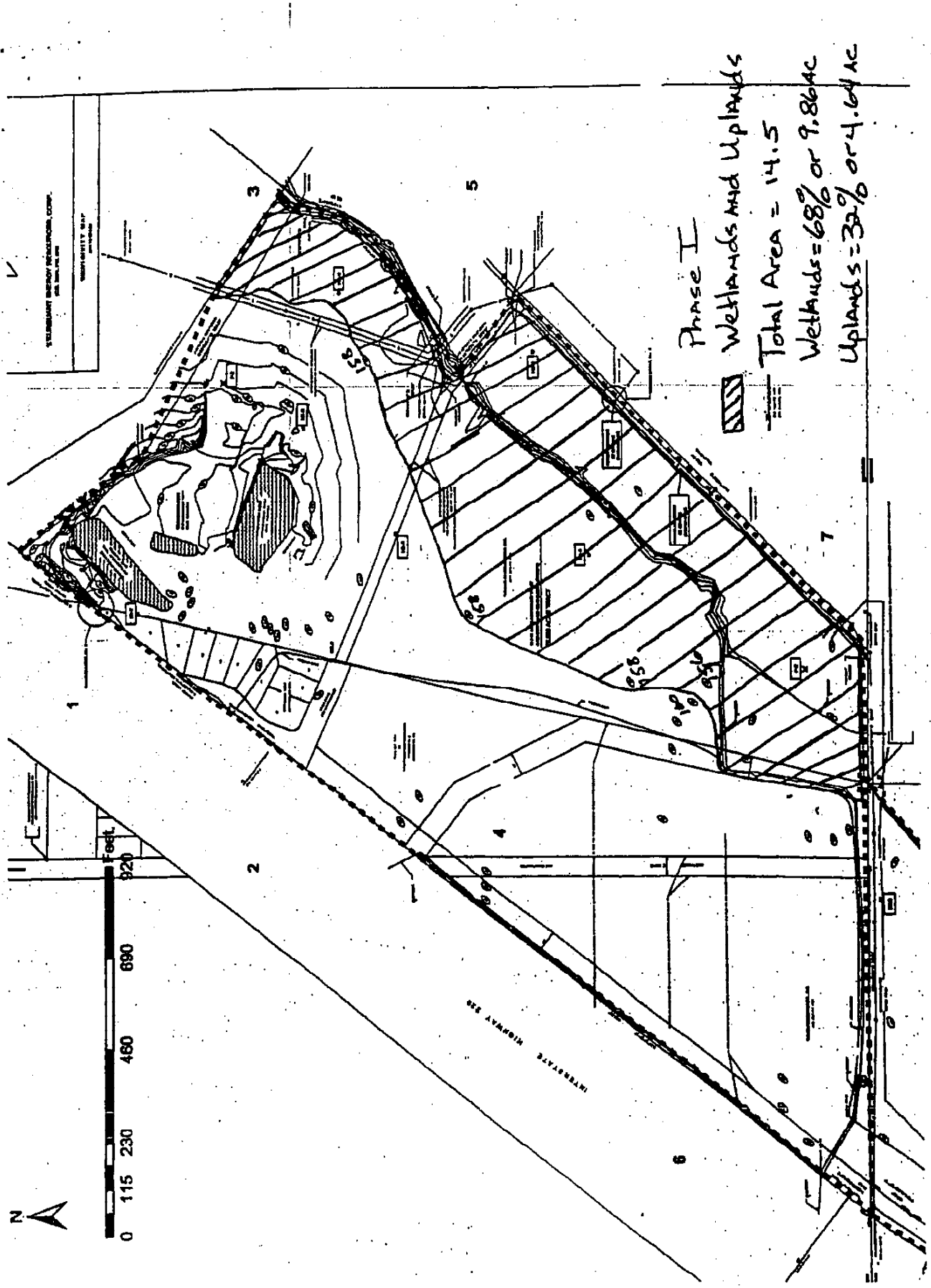
MR MICHAEL HARRELSON
HARRELSON MATERIAL MANAGEMENT



Drawing of the HMM C&D Landfill showing
the 150 ft. modification in the landfill footprint located in Shreveport, Louisiana.

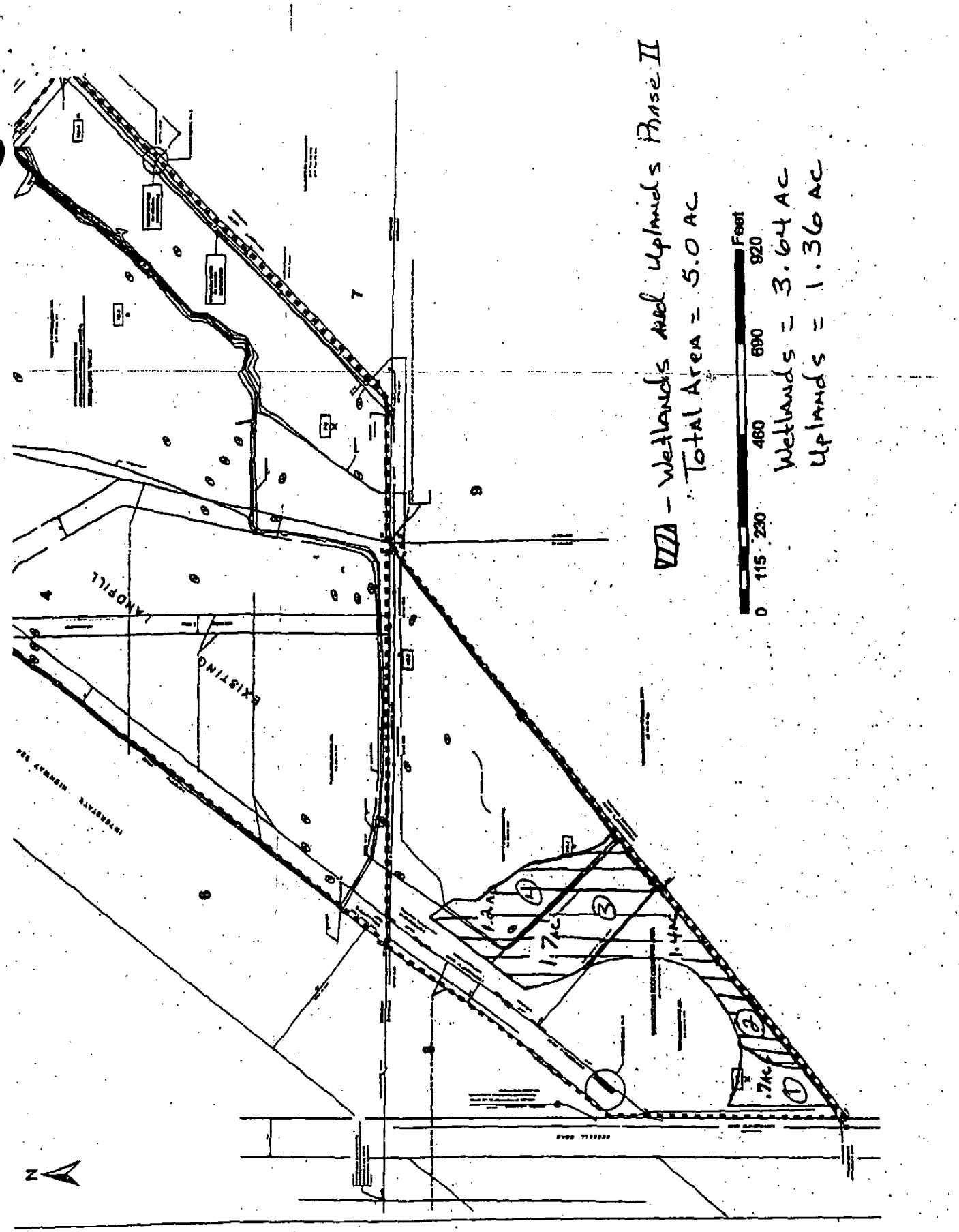
CEMVK-OD-FE JCB-MVK-2003-620

MR MICHAEL HARRELSON
HARRELSON MATERIAL MANAGEMENT



CEMVK-OD-FE JCB-MVK-2003-620

MR MICHAEL HARRELSON
HARRELSON MATERIAL MANAGEMENT



W/// - Wetlands and Uplands Phase II
Total Area = 5.0 AC
Wetlands = 3.64 AC
Uplands = 1.36 AC

CEMVK-OD-FE JCB-MVK-2003-620

MR MICHAEL HARRELSON
HARRELSON MATERIAL MANAGEMEN

State of Louisiana

Department of Environmental Quality

KATHLEEN BABINEAUX BLANCO
GOVERNOR

MIKE D. McDANIEL, Ph.D.
SECRETARY

November 9, 2004

Adams Environmental, Inc.
12018 Las Nubes
San Antonio, TX 78233

Attention: Mr. Lynn M. Kitchen, Agent for Mr. Michael Harrelson

RE: Water Quality Certification (RL 040917-03/AI 28118/CER 20040001)
Corps of Engineers Permit (JCB-MVK-2003-620)
Caddo Parish

Dear Mr. Kitchen:

The Department has received an application for an after-the-fact permit for the expansion of an existing landfill on Russell Road in Shreveport, Louisiana.

The requirements for Water Quality Certification have been met in accordance with LAC 33:IX.1507.A-B. Based on the information provided in your application, we have determined that the placement of the fill material will not violate the water quality standards of Louisiana provided for under LAC 33:IX.Chapter 11. Therefore, the Department has no objection to this project.

Sincerely,

Jodi G. Miller
Environmental Scientist Manager
Registrations and Certifications Section

JGM/rl

c: Corps of Engineers, New Orleans, LA

ENCL 2

EDWARDS ENGINEERING, P.A.
CIVIL AND ENVIRONMENTAL ENGINEERING, PLANNING, AND CONSULTING

March 3, 2006

SENT VIA E-MAIL

Louisiana Department of Environmental Quality
Environmental Services Permit Division
Attn: Timothy Smith (Timothy.Smith@LA.GOV)
P.O. Box 4313
Baton Rouge, La. 70821-4313

SUBJECT: **Wetland Mitigation Plan**
Harrelson Landfill - Type III Waste Disposal Facility Permit Application
Caddo Parish, Louisiana
AI 28118/D-017-2688/OU-0158/PER19950001

Mr. Smith:

Attached with this letter is a complete copy (PDF) of Adams Environmental, Inc. (AEI)'s Wetland Mitigation Plan for the Harrelson Landfill. This information is intended to replace information previously submitted in conjunction with Harrelson's Type III Waste Disposal Facility Permit Application.

If you have any questions, or if you need additional information, please do not hesitate to give us a call (501) 219-2808.

Sincerely,

David Neal Taylor
EEPA Project Engineer

Brian Edwards, P.E.
President

cc: Michael Harrelson (HMM, Inc), Steve Levine (Phelps Dunbar, LLP)

Enclosure: AEI 2005 Wetland Mitigation Plan (PDF)

ADAMS ENVIRONMENTAL, INC.
12403 Nacogdoches Road, Suite 106
San Antonio, Texas 78217

www.adamsenvironmental.com

June 24, 2005

Ms. Joyce Butler
U.S. Army Corps of Engineers, Vicksburg District
4155 Clay Street
Vicksburg, MS 39183-3435

RE: Corrections for the Mitigation Plan for Harrelson Materials Management Landfill Section 404 Permit USACE Permit No.: JCB-MVK-2003-620

Dear Joyce:

Please find attached the corrected sections for the mitigation plan for the Harrelson Materials Management Landfill Section 404 Permit as requested by Patti Holland with the USFWS. Let me know if you have any further comments or requirements. As I discussed with you on the telephone, I would like to get an approved permit as soon as possible to prevent further complaints from the city of Shreveport about erosion along the stream and to allow us to begin work on the plan while conditions are dry during July and August. I will provide you with a FedEx account number to expedite shipping of the permit for signature. I am authorized as an agent to sign for the permit, so you can send it to me at the address listed on this letterhead. Note that my address has changed because we have moved our office.

MITIGATION SITE 2 CONCEPTUAL DESIGN

As shown in Figure 4, the mitigation area will be divided into four different areas. All three of these areas will support similar plant communities, with wetland plants being located along the stream channel and dryer plants in the upland areas along the slopes of the levee. The base of the levee will be moved approximately 50 to 75 ft. to the west of its current location. This places the top of the levee approximately 100 ft. from the center of the stream channel. The slope along the stream side of the levee will be changed to 1:3 to accommodate the establishment of forest vegetation and prevent erosion and subsidence. The active stream corridor containing the stream channel and adjacent wetlands will be widened to approximately 50 ft. The stream channel will also be increased to 10 to 15 ft. wide and allowed to be much shallower. Sediments will be dredged out of the current stream channel and replaced with fragmented rock where erosion problems appear to be imminent. The city of Shreveport has requested that the eastern streambank be protected from erosion to prevent further damage to the fence separating their property from the landfill. Rock rip rap will be used on this bank only in areas where erosion has been an historic problem. Otherwise, the streambank will be stabilized using root wads, logs and tree trunks. A 10 ft. buffer area along the fence will require periodic maintenance and should be kept clear of brush. Thus, only herbaceous

plants will be planted along the eastern bank of the stream. The upland plant community on the eastern bank of the stream will be extended approximately 10 ft. from the base of the fence and protected from erosion by a layer of compacted fragmented rock and clay in areas where erosion is currently a problem. However, the remainder of the stream will be protected from further erosion by strategic placement of root masses and large tree trunks and logs. The logs and root masses will be stabilized by tying them to wooden or steel stakes. Anchored logs and root wads will be strategically placed in the stream to provide additional erosion control and habitat for fish and other aquatic wildlife. The stream bank will then be planted with woody plants and seeded with native grasses to prevent further erosion.

The stream channel will also be configured in a slightly sinuous course with pools and riffles created along the way. Sinuosity will be supported by both initial channel design and strategic placement of rip rap, root wads, tree trunks, logs and woody vegetation. The stream will then be allowed to run its course and form a natural channel under the hydraulic forces provided by nature. Pools and riffles will be created using root wads, anchored logs and tree trunks imbedded into the clay bottom of the channel. Rip rap will only be used in areas where there has been historic problems with erosion. Low-lying areas within the stream channel will be planted with wetland woody and herbaceous plants. The eastern bank of the stream will be planted with herbaceous species on the top of the bank and buttonbush and other woody plants along the stream channel. The western banks will be planted in herbaceous and woody plants listed in Table 7 of the mitigation plan.

MITIGATION SITE 3 CONCEPTUAL DESIGN

The goal of this mitigation area is to restore the past hydrologic conditions to this area, thus enhancing its wetland characteristics and improving the plant community. A 4 - 5 ft. high berm will be constructed along the northern boundary of this mitigation area. The berm will be constructed of fragmented rock covered with compacted clay and seeded with native grasses. The berm should significantly impede flow from the mitigation area and result in more widespread inundation of the plant communities. A concrete dam with a gate will be constructed on the west side of the berm where the site currently drains through a small stream. The gate will be designed to raise and lower water levels in the mitigation area. The final design for the gate will be submitted the USACE for their review and approval. The gate will allow for changes in water depth in the mitigation area to be varied between the current level and 3 ft higher placing the surface of the water 1 – 1.5 ft. below the top of the berm. Last, the area will be preserved in perpetuity via a deed restriction.

I appreciate your help and cooperation on this project and look forward to your comments. Please call me at 210-317-7267 if you have any questions.

Very truly yours,

Lynn Kitchen

Lynn M. Kitchen, Ph.D.
Principal Scientist

Copy: Michael Harrelson, Harrelson Materials Management
Marsha Harrelson, Harrelson Materials Management

MITIGATION PLAN
for
HARRELSON MATERIALS MANAGEMENT
C&D LANDFILL EXPANSION
SHREVEPORT, CADDO PARISH, LOUISIANA

TO MEET THE REQUIRMENTS OF
A STANDARED INDIVIDUAL PERMIT

USACE Project Number JCB-MVK-2003-620

Prepared for:
Harrelson Material Management, Inc.
And
U.S. Army Corps of Engineers, Vicksburg District
Vicksburg, Mississippi

By

Adams Environmental, Inc.
San Antonio, Texas

May, 2005

MITIGATION PLAN
HARRELSON MATERIALS MANAGEMENT
C&D LANDFILL EXPANSION
SHREVEPORT, CADDO PARISH, LOUISIANA

INTRODUCTION

Adams Environmental, Inc. (AEI) was retained by Harrelson Materials Management, Inc. (HMM) to prepare Standard Individual Permit (IP) and mitigation plan for a project that involved increasing the capacity and lifetime of an existing construction and demolition (C&D) landfill. As part of the permitting process, AEI must address mitigation for impacts of the project to waters of the U.S. This plan will discuss the project, analyze mitigation options, and provide a final mitigation plan to compensate for unavoidable impacts to waters of the U.S.

PROJECT DESCRIPTION

The project is located east of Interstate 220 on the northwest side of Shreveport in Caddo Parish, Louisiana just north of Russell Road. The location of the site and details on the project are included in the Section 404 Permit Application.

Directions to the site are as follows:

> From IH-35 on the west side of Shreveport, take IH-220 north approximately 5 miles. Exit at State Highway 123 (Blanchard Highway). Turn right (east) on Russell Road. Turn left (north) and travel almost back to IH-220. The entrance of the landfill is on the right just before IH-220.

Northwest of the site, the adjacent area has been developed for residential homes and some commercial businesses. Most of the land immediately adjacent to the landfill is not developed with the exception of a City of Shreveport wastewater treatment plant located on the southeast border of the project area and Interstate 220 located on the northwest side of the landfill. Field observations and aerial photographs indicate that wetlands exist to the southeast of the site. Wetlands are probably associated with Twelve-Mile Bayou located to the northeast of the site.

In 1998, Chandler Brothers, Inc. prepared a permit to be submitted to the Louisiana Department of Environmental Quality (LaDEQ) for the construction and operation of a C&D landfill on a parcel of land located on the northwest side of Shreveport, Louisiana. The landfill was to be located on an existing borrow pit that had been used to provide fill material for the construction of Interstate 220 located adjacent to the property. This portion of the landfill was eventually permitted and is currently in operation. In 1994, LaDEQ requested that the facility prepare a "Mandatory Permit Modification" under the new EPA Subtitle D Solid Waste Regulations. In 1995, Chandler Brothers submitted the first draft of the facility permit modification to LaDEQ for review. Between 1995 and 2000, a series of Notices of Deficiencies (NODs) were issued to Chandler Brothers by LaDEQ. In 2000, LaDEQ verbally agreed to the current limited expansion of the landfill under the current interim operating permit (IOP) under which the facility is currently operating. During the year 2000 and prior to purchase of the facility by the current owner, an intermittent stream flowing through the site was rechanneled to allow for further expansion of the landfill.

In January of 2003, a landfill expansion permit was prepared and submitted to LaDEQ. During the processing of the permit, it was assumed that wetlands and surface waters of the U.S.

would not be impacted because of a misinterpretation of letters that were sent to the site by the U.S. Army Corps of Engineers (USACE) in 1988 and 1994. On January 14, 1988, Kenneth P. Moseley of the USACE Vicksburg District wrote a letter to Mr. Lou Chandler, Jr. explaining that the proposed project had been reviewed and that a Section 10/404 permit would not be required for the proposed work. This letter was in reference to the original footprint of the landfill, which was located in an abandoned borrow pit. On April 20, 1994, Mr. Cicero F. Chandler of Chandler Brothers, Inc. (the owner/operator of the landfill at that time) submitted a letter requesting reevaluation of the permit requirements for the build-up of an existing levee surrounding the three borrow pits that were being used for disposal sites. In response to that letter, Mr. Moseley of the USACE indicated that, "Based upon the information provided and that obtained from our field investigation, we have determined that a Department of the Army Section 10/404 permit will not be required, since build-up of the levee would not result in the discharge of dredged or fill material into wetlands or other jurisdictional waters of the U.S..." It is important to note that this letter was only referencing build-up of a levee, which was located on the original landfill.

Michael Harrison, current owner and operator of the HMM C&D Landfill, recently submitted a permit to LaDEQ for the expansion of the landfill. The permit was processed through LaDEQ and work was initiated for construction of the levee surrounding the landfill. Mr. Robert Ulmer of the USACE, Vicksburg District was notified of the activity for construction of the landfill and visited the site to determine if the activity was in violation of Section 404 of the Clean Water Act. Upon investigation of the site, Mr. Ulmer determined that there were violations and that wetlands were being filled by the actions onsite. He notified Michael Harrelson that a cease and desist order would be issued for the landfill to resolve any Section 404 violation issues. At that time, Mr. Ulmer requested that Mr. Harrison enlist the assistance of a wetland biologist to investigate the site and determine if wetlands were present on the site prior to construction and the approximate acreage of wetlands impacted by construction activities. Subsequently, Adams Environmental has worked with Robert Ulmer to determine the area of wetlands impacted by the filling activities and prepare of an "after-the-fact" Section 404 Individual Permit. After careful investigation of surrounding plant communities, topographic maps and aerial photographs, it was mutually decided between the USACE and HMM that 13.5 acres of bottomland hardwood wetland and stream complex were filled by landfill expansion activities. A recent wetland delineation indicated that an additional 0.4589 acres of wetlands and intermittent stream will be filled.

ADVERSE IMPACTS

WILDLIFE, THREATENED, AND ENDANGERED SPECIES

The project, as constructed, expanded the spatial area and operational lifetime of the existing landfill facility. Consistent with the public notice requirements associated with Section 404 Individual Permits, The U.S. Fish and Wildlife Service (USFWS) submitted a letter (dated October 5, 2004) to the USACE regarding potential impacts to on-site wildlife and threatened/endangered species. The letter states:

> *According to interagency onsite accounts, the wetland portions of the site were comprised of seasonally flooded forested wetlands and a previously altered intermittent stream. Wildlife species expected to have utilized the project site include resident and migratory songbirds, wading birds, large and small game mammals, furbearers, reptiles, and amphibians. Some of the migratory bird species expected to occur within the project area (i.e. little blue heron, red-headed woodpecker, wood thrush, worm-eating warbler, and painted bunting) have experienced population declines due to habitat loss and fragmentation and are considered by the Service to be species of*

special concern. In addition to its habitat value, the project-area wetlands provided floodplain functional values such as floodwater storage and water quality maintenance.

The letter further states:

While the project has been designed to mitigate wetland impacts by utilizing some non-wetland areas, we believe that all non-wetland areas should be fully utilized for landfill purposes prior to impacting substantial wetland areas. Accordingly, we recommended that the applicant be required to justify why onsite uplands can not be utilized for the landfill operation and why the proposed activity must be located within the site's wetlands. If it is demonstrated that the landfill expansion must occur as proposed, the Service would not object to permit issuance provided that adequate compensatory mitigation is required as a condition of the issued permit. The assessment of the project-area habitat value should be based on the value of the site prior to any unauthorized activity. The mitigation project shall be coordinated, selected, and designed in consultation with the Corps of Engineers, the Fish and Wildlife Service, and other interested natural resource agencies, and shall be implemented concurrently with project construction.

A copy of the USFWS response letter is included in Appendix A.

VEGETATIVE COMMUNITIES

Because the majority of the vegetative communities impacted by this project were destroyed prior to permit preparation, the exact nature and characteristics of those communities could only be predicted by plant communities located in adjacent areas. As previously discussed, the area and characteristics of the wetlands impacted by the expansion of the landfill was agreed upon by the USACE and HMM. In the paragraphs that follow, the nature of the planned communities potentially impacted by landfill expansion will be discussed.

Most of the wetlands located adjacent to the project area support bottomland hardwood plant communities. The plant communities appear to be varied in composition with the greatest influence being age of the community and depth of water. The current age of most of the trees in these plant communities indicated that they may have been cleared for lumber or agriculture approximately 80 to 100 years ago. Areas that were periodically inundated or saturated are currently dominated by sugarberry and honey locust. The understory was probably dominated by sugarberry, black mulberry, and deciduous yaupon. These plant communities were probably located just below the elevation associated with relatively frequent flooding.

Wetlands that remained inundated and saturated for longer periods of time were probably dominated by sugarberry, American elm, water elm, and eastern hophornbeam and chokecherry. Herbaceous vegetation was probably sparse and dominated by sedges and spike rush. These areas were probably in close proximity to the stream that originally traversed the project site.

The remainder of the project area was probably permanently inundated with 2 to 24 inches of water and dominated by water elm, green ash, black willow, swamp privet, and honey locust. Herbaceous plants probably included spike rush and various species of sedge.

Uplands adjacent to the wetlands were probably dominated by sugarberry, honey locust, redbud, and hawthorn. Various upland grasses were established in the understory of these trees and saplings. In recently cleared areas, uplands were dominated by red clover, giant ragweed, and annual sumpweed.

WETLANDS AND STREAMS

Using historic data and field observations, it was determined that approximately 13.5 acres of bottomland hardwood wetlands were filled by the proposed project. This acreage included the riparian corridor of a stream that flowed across the site prior to construction activities. Recently, a wetland delineation was conducted to quantify and characterize the additional wetlands and streams potentially impacted, expansion of the landfill. These wetlands and streams were located in an area previously excavated for borrow for the construction of Interstate 220. A discussion of this delineation is provided in the paragraphs that follow.

On February 9, 2005 surface waters of the U. S. potentially impacted by the future expansion of the Harrelson Materials Management Landfill were characterized and delineated in general accordance with the 1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual. The delineation was conducted as part of an "after the fact" Section 404 Individual Permit prepared for the inadvertent filling of 13.5 acres of wetlands during the expansion of the landfill. The wetlands delineated for this report were not filled by previous activities, but will be filled by the planned expansion of the landfill.

Methodology. On February 9, 2005 Dr. Lynn Kitchen conducted a field investigation to delineate potential jurisdictional wetlands and other jurisdictional waters on the project area. Boundaries of the wetlands found on the project area were delineated using the Routine Wetland Determination Method and Guidance provided in the USACE March, 1992 Technical Memorandum Regarding Clarification of the 1987 Manual. The plants were categorized according to vegetative strata including trees, saplings, shrubs, woody vines, and herbaceous vegetation. Dominant species in each stratum were identified and the foliar cover of each was visually estimated within a 30 to 50 foot radius. Only one sampling site and its adjacent upland site were required for this wetland delineation. Plant composition was determined at each sampling point within each plant community. This data was recorded on data forms for dominant vegetation determination and subsequently subjected to standard analysis to determine dominant species.

Using a sharpshooter shovel, a small pit was excavated approximately 15 to 18 inches deep for the purpose of describing the soils and hydrology at each sampling site. Soils were then characterized according to texture, color, and mottling, and the depth of saturated soils and/or the water table was measured. When the sampling was completed, the boundaries between the upland areas and wetland areas were mapped using a GeoExplorer XT (NAD 1983, UTM Zone 14N). GPS data was subjected to differential correction and the final horizontal precision level for the data was 0.5 m. GPS features were converted into shape files and incorporated into ArcView GIS for preparation of figures.

For the ephemeral stream, the boundaries of the ordinary high water mark were mapped based on the location of identifying characteristics of the stream channel. Portions of the streambed were comprised of wetlands. The ordinary high water mark of the stream was determined as the boundary of the wetland in those areas where wetlands were present. Wetlands adjacent and directly connected to the stream were considered part of the stream and treated as stream habitat.

At least two photographs were taken at each sampling site. These included a photograph of the soil profile and soil pit, and a photograph of the plant community in general. Information was recorded on wetland determination sheets and later summarized for use in this report. Datasheets are provided as an attachment to this report. For the purposes of this report, photos of wetlands will be included with the descriptions. A map showing the location of sampling sites and surface water features is provided as Figure1. Scientific names of plants are provided on the data sheets.

Results. The wetland and stream complex subjected to this delineation is located adjacent to the northern boundary of the project site. The stream flows southeast from the wetland, exits the landfill site, and then flows in a southerly direction where it eventually enters the unnamed tributary to 6-Mile Bayou (Figure 1). In the paragraphs that follow, each wetland and stream segment will be described in detail.

Wetland 1. Wetland 1 is a 0.3081 acre herbaceous palustrine emergent wetland located on the northwest side of the landfill. The site is dominated by spike sedge, narrow-leaf cattail, and hemp sesbania with scattered populations of bushybeard bluestem, rattlepod, and purple nutsedge. Scattered populations of black willow and sandbar willow were observed on the southwest edge of this wetland. Hydrology for the entire wetland/stream complex originates from a seep located on the northeast boundary of the project site along Interstate Highway 220. Water from the seep saturates soils in the area of Wetland 1, eventually accumulating into a stream with a flow of approximately ten to twenty gallons per minute. Soils on the site are completely inundated and saturated with the depth of surface water averaging 0 - 2 in. Primary indicators of hydrology included inundation, saturation in the upper 12 in. of the soil profile, and drainage patterns in wetlands. Because the site had been previously quarried, soils could not officially be used in the determination of wetlands. However, as is consistent with the 1987 Manual, on-site soils were evaluated and hydric indicators were observed in the soils. These indicators included gleying, reducing conditions, high organic content, and organic streaking of sands. It was determined that this was a wetland based on the fact that it met the vegetation, hydrology, and hydric soil criteria.

Photograph 1. Overall view of Wetland 1 vegetative community Photo Point 1)

Photograph 2. Another view of Wetland 1 from the north side.

Photograph 3. Soil pit and soils found in Wetland 1.

The upland adjacent to wetland one was dominated by mostly facultative species including sparse populations of goldenrod, cocklebur, Johnsongrass, dallisgrass, crown vetch, giant ragweed (FAC), and hemp sesbania (FACW-). Apparently the site had been previously excavated having only 25 to 30% vegetative cover. No indicators of hydrology were observed in this area and soils no longer showed hydric characteristics. Dominant plant determination data sheets and wetland determination data sheets for these sites are attached to this report.

Photograph 4. Upland area located adjacent to Wetland 1.

Wetlands 2, 3, & 4. These wetlands are small, isolated pockets which are actually connected to each other and to the stream. Vegetation found in Wetlands 2 and 3 is similar to that of Wetland 1. However, spike rush is much more dominant in these wetlands. Wetland 4 is connected to Wetlands 2 and 3, but it is bounded by a well established stand of black willows. Total area of wetland contributed by Wetlands 2, 3, and 4 is 0.0554 acres.

Streams. For the purposes of this report, the intermittent stream located on the project area is divided into stream segments. Segment 1 appears to be the main stream channel with an average channel width of 2 ft. and length of 277 linear ft. Again, flow within this stream is approximately 10 - 20 gallons per minute. Segment 3 is approximately 1 ft. wide, 113 linear ft. long, and flows from Wetland 2 to combine with Segment 1 to form Segment 2. Stream flow and depth decreases significantly at Segment 2 which is about 0.0424 acres in size and a much broader stream supporting wetland vegetation. This wetland is very similar to Wetland 1 with vegetation being dominated by spike rush and scattered populations of narrow-leaf cattail. The stream becomes more defined at Segment 4, flows through a break in the levee surrounding the project area, and eventually combines with the unnamed tributary to 6-Mile Bayou. The active stream channel in Segment 4 is approximately 2 ft. wide and 915 ft. long, but the stream is fringed with wetlands in many cases. This causes the distance between ordinary high water marks to average about 8 ft. Fringe wetlands associated with this segment include cattails and spike rush. In one small section of Segment 4, very young sandbar willows are present. Only 186 linear ft. of this stream will be filled by expansion of the landfill. However, when the landfill is completed, the source of hydrology for the stream will be removed from the stream potentially changing it from intermittent to ephemeral. Mitigation plans are to convert this area to a forested wetland. The stream will be left in place, but will probably only be ephemeral. Therefore, its acreage will be added to the total required for compensatory mitigation.

Conclusion. In conclusion, the expansion of the Harrelson Materials Management Landfill will result in filling of approximately 0.053 acres or 576 linear ft. of intermittent stream. Additionally, 0.4059 acres of herbaceous wetlands will also be filled. The area of stream lost indirectly by the landfill expansion will be 729 ft. or 0.134 acres (assuming an average width of 8 ft.). Thus, the

total area of surface waters filled by this project will be 0.5929 acres, which, combined with the 13.5 acres filled prior to the permit is 14.0929 acres or approximately 14.1 acres of wetlands and other waters of the U.S.

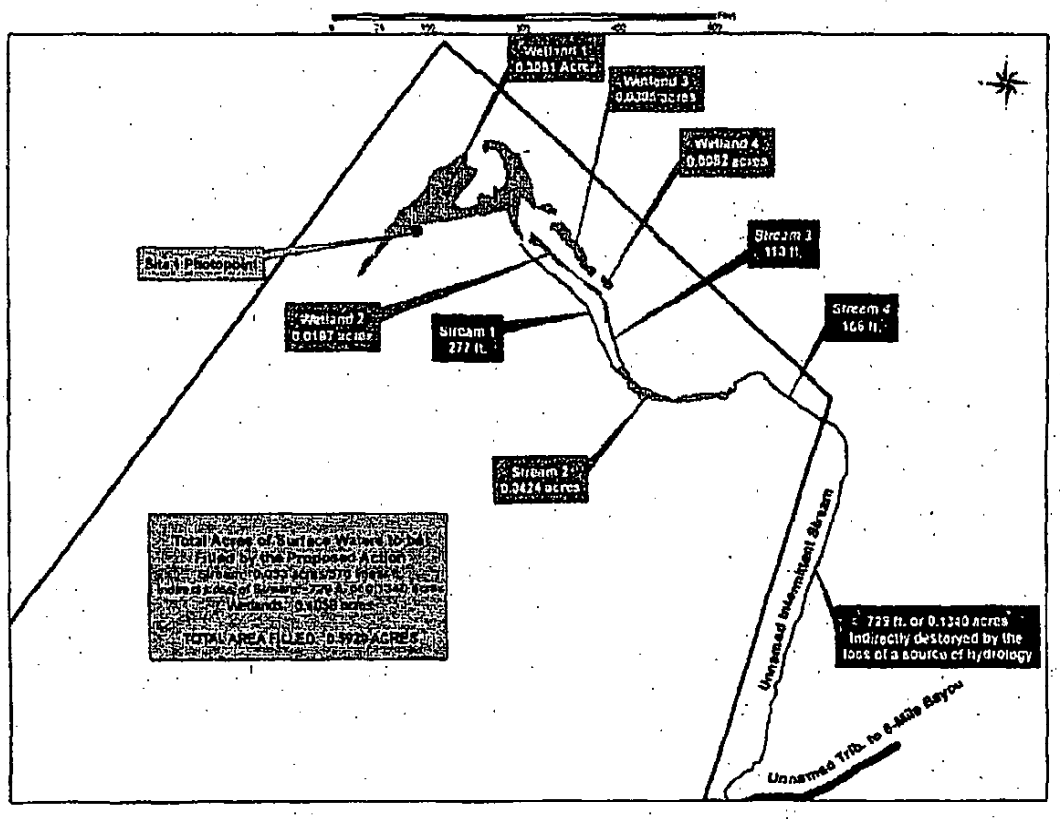


Figure 1. Wetlands and other waters of the U.S. potentially filled by the expansion of the Harrelson Materials Management Landfill.

BENEFICIAL IMPACTS

Currently, the existing landfill is at capacity for the portion that has been permitted. A new permit has been submitted to the Louisiana Department of Environmental Quality requesting the expansion. This will provide 50 to 100 years of operational lifetime to the landfill and allow the business to continue during this time. C&D landfills are necessary in the Shreveport area to accommodate the growing quantity of C&D waste being generated by construction and city growth. Additionally, expansion of existing facilities will decrease the amount of environmental impacts and potential impacts to waters of the U.S. by illegal dumping and littering.

IMPACT ANALYSES (CHARLESTON METHOD)

For the purposes of this mitigation plan, the 13.5 acres of wetland agreed upon as the impacts prior to the action will be considered relatively mature bottomland hardwood wetlands. We are designating this site as impaired for the following reasons:

- *Rechanneling of the stream (apparently completed prior to the purchase of the property by HMM)*
- Historic borrow/excavation activities on the north and west side of the project area
- Gas pipeline right of way (ROW) on the northern boundary
- Sewerline ROW on the northeast side of the property
- Wastewater treatment plant located east of the project area.

The dominant impacts imposed on the bottomland hardwood wetland were excavation, filling and draining. Because the project is permanent, the duration of impacts would be considered as greater than ten years, and no recovery of the wetlands would be expected.

The wetlands currently located in the footprint of the landfill expansion with the potential to be filled by the project are herbaceous emergent wetlands supported by a spring and small intermittent stream. The wetland/stream complex has become established in an area previously used as a borrow pit or quarry to provide fill material for IH-220. As evidenced by the field photographs previously shown, the area is very impaired by past excavation and the lack of fertile topsoils. Because of its current condition, the lost type for this wetland was determined to be a manmade pond. In fact, a pond was located in this area when the site was previously active as a borrow pit. As with the bottomland hardwood wetland, this site will also be impacted by filling, excavation, and draining. Additionally, the segment of the stream located outside of the landfill footprint will lose its source of hydrology when the landfill construction is completed. Table 1 summarizes information used to develop the total required credits for loss of the wetlands and streams caused by this project. It was determined that a total of 140.8 credits would be required for compensatory mitigation.

Table 1. Summary of the factors used to calculate scores and required credits for impacts of the proposed action on wetlands and streams on the project area.

Characteristic	Bottomland Hardwood Forest		*Herbaceous Wetland/Riparian* System	
	Factor	Score	Factor	Score
Existing Condition	Impaired	1.0	Very Impaired	0.1
Dominant Impact	*Filling*	3.0	*Filling*	3.0
Lost Type	Type A: Bottomland Hardwood	3.0	Type C: Man-made pond	0.2
Priority Category	Tertiary Bottomland Hardwood	0.5	None	0.5
Duration	Over 10 Years	2.0	Over 10 Years	2.0
Cumulative Impacts		0.675		0
Sum of r Factors		10.175		5.8
Impacted Area		13.5		0.5929
R x AA		137.4		3.4
Total Impacted Acres	14.0929			
Total Required Credits	140.8			

MITIGATION PLAN

GOALS AND OBJECTIVES

The goal of this mitigation plan is to compensate for the unavoidable impacts imposed by the proposed action on surface waters of the U.S. Specifically, the plan will accomplish the following to compensate for the loss of streams and wetlands:

1. Create a new wetland on the northeast side of the landfill (Mitigation Area 1).
2. Move the levee on the east side of the landfill approximately 50 to 75 ft. west to allow for reconfiguration and revegetation of the rechanneled stream currently flowing in that area (Mitigation Area 2).
3. Preserve and enhance the wetlands currently located in Mitigation Area 3.
4. Restore wetlands in area historically filled in Mitigation Area 4.
5. Contribute to a mitigation bank in the area to compensate for credits not achieved by on-site mitigation.

Figure 2 shows the location and configuration of each of the proposed areas for on-site mitigation.

Figure 2. Location of the proposed sites for compensatory mitigation for waters of the U.S. filled by the construction and expansion of the Harrelson Materials Management C&D Landfill.

DESCRIPTION OF COMPENSATORY MITIGATION AREA 1

Current Conditions. Mitigation Area 1 is located on 3.48 acres of land adjacent to the northeast side of the landfill. The majority of the site was cleared several years ago and is now

dominated by early successional upland and facultative upland plants. As previously discussed, an intermittent stream flows along the west boundary of this area at the base of the levee surrounding the landfill. Field investigations showed that 50% or less of the dominant plants were FAC, FACW, or OBL, and the site was determined to not meet the vegetation criteria. Additionally, no indicators of hydrology were observed. The soil appeared to be disturbed due to construction and clearing activities, making soil identification difficult. However, field observations indicate that the soil is a Gallion silty clay loam, which is a listed hydric soil. No indicators of hydric soils were observed on this site. It was determined that this site was not a wetland due to the fact that the vegetation and hydrology criteria for wetlands were not met.

Field observations definitely indicate that the site was probably a wetland in the past. However, it appears that the stream flowing on the east side of the area is probably draining the site of any surface and groundwater potentially accumulating to support wetlands. It is our belief that Excavation of this area in a manner to capture shallow groundwater and floodwaters from the intermittent stream will result in the restoration of wetlands and this area. Figure 3 shows the general configuration and conceptual design for Mitigation Area 1.

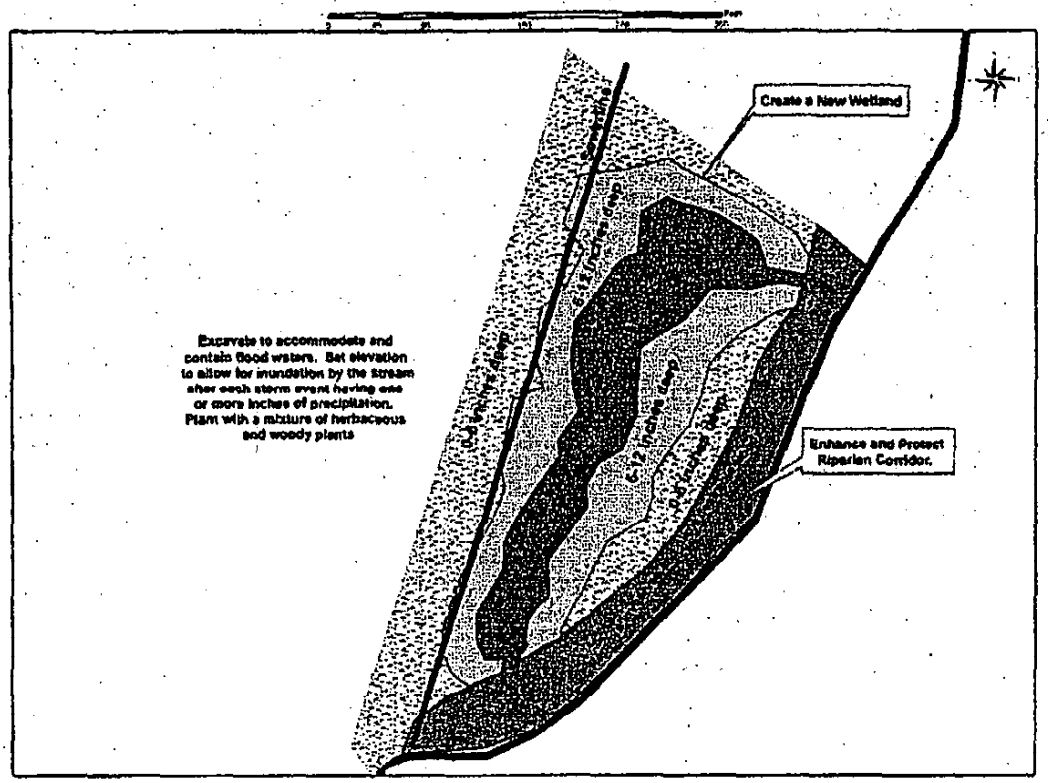


Figure 3. General plan for Mitigation Area 1 at the Harrelson Materials Management C&D Landfill.

Conceptual Design. As shown in Figure 3, the mitigation area will be divided into four different plant communities whose composition will be controlled by hydrology. The actual shape and configuration of each of these plant communities may be somewhat different from this design depending on conditions encountered during excavation activities. At the present time, the

elevation of the majority of this site is between 156 and 160 ft. MSL. At that elevation, relatively frequent flooding of the site would be expected. The base of the stream channel on the east side of this mitigation area is currently at 148 ft. MSL.

Initially, the entire mitigation area with the exception of that shown as the riparian corridor would be excavated approximately 4ft. below the existing grade to an elevation of 154 ft. MSL. Those areas designated as 0 - 6 in. deep in Figure 3 would remain at this elevation. Areas designated as 6 – 12 in. deep would be excavated to 153 ft. MSL. Last, the areas designated as twelve to 36in. deep would be excavated to 151 ft. MSL. Two inlets would also be excavated through the riparian corridor to allow flow of water from the stream to the mitigation area. The elevation of the bottom of these inlets would be 153 MSL. The inlets would be lined with large fragmented rock and covered with clay to minimize erosion damage caused by flooding. Also, the inlets would be planted with herbaceous and woody plants.

Hydrology and Substrate. Field observations indicate that this site would be provided ample hydrology from both floodwaters originating from the stream to the east as well as ground waters originating from the northern portions of the property. Additionally, soils appear to be Gallion silty clay loams, which are listed hydric soils and would probably hold water for sufficient time to produce wetland conditions.

Planting Plan. The forest community located along the riparian corridor of the stream will be preserved and enhanced in place. Field observations indicate that some invasive plants are present and will be removed. These plants that will be replaced with more desirable species listed in Table 4. Any trash and debris accumulating in the stream and riparian area will be periodically removed during the monitoring period of this project.

The remainder of this mitigation area will be planted in woody species adapted to the hydrologic regimes anticipated on the site. The woody species will be planted by hand on 10 ft. centers. A standard mixture of wetland herbaceous plants will be hydro-seeded or drilled across the site to minimize erosion and soil loss and to provide for natural succession eventually culminating in a forested wetland. Table 4 provides a list of the plants to be used for each hydrologic regime.

Table 4. Plant species to be planted in Mitigation Area 1. All woody plants will be bare root seedlings no more than 18 inches tall.

Plant Community	Common Name	Scientific Name
Riparian Corridor (only in open areas or areas where invasives are removed)	Southern Pecan	*Carya illinoinensis*
	Cedar Elm	*Ulmus crassifolia*
	Redbud	*Cercis canadensis*
	American Elm	*Ulmus americana*
	Live Oak	*Quercus virginiana*
0 – 6 in. Inundation	Rough Dogwood	*Cornus drummondii*
	Black Gum	*Nyssa sylvatica*
	American Elm	*Ulmus americana*
	Buttonbush	*Cephalanthus occidentalis*
	Water Oak	*Quercus nigra*
	Boxelder	*Acer negundo*
6 – 12 in. Inundation	Rough Dogwood	*Cornus drummondii*
	Black Gum	*Nyssa sylvatica*

Plant Community	Common Name	Scientific Name
	American Elm	*Ulmus americana*
	Buttonbush	*Cephalanthus occidentalis*
	Water Elm	*Planera aquatica*
	Water Oak	*Quercus nigra*
	Green Ash	*Fraxinus pennsylvanica*
12 – 36 in. Inundation	Buttonbush	*Cephalanthus occidentalis*
	Water Elm	*Planera aquatica*
	Swamp Privet	*Forestiera acuminata*
	Green Ash	*Fraxinus pennsylvanica*

Calculated Credits for Mitigation. Table 5 provides information used for the calculation of mitigation credits for wetlands restored in Mitigation Area 1. Overall, the net improvement to the site will be excellent. The site will be protected by a deed restriction approved by the USACE. Because this site is compensating for a bottomland hardwood, it will take approximately ten to twenty years for restoration to a young forested wetland. This mitigation will be in kind and on site. Unfortunately, mitigation will be initiated after impacts have occurred.

Table 5. Calculation of wetland restoration credits earned by Mitigation Area 1.

Factor	Option	Score
Net Improvement	Excellent	4.0
Control	Deed Restriction	0.1
Temporal Lag	10 – 20 Years	-0.2
Credit Schedule	Schedule 5—After Impacts have occurred	0
Kind	Category 1	0.4
Location	Zone 1—On-Site	0.4
Sum of m Factors		**4.7**
Mitigation Area		**2.8 acres**
M x A		**13.1**

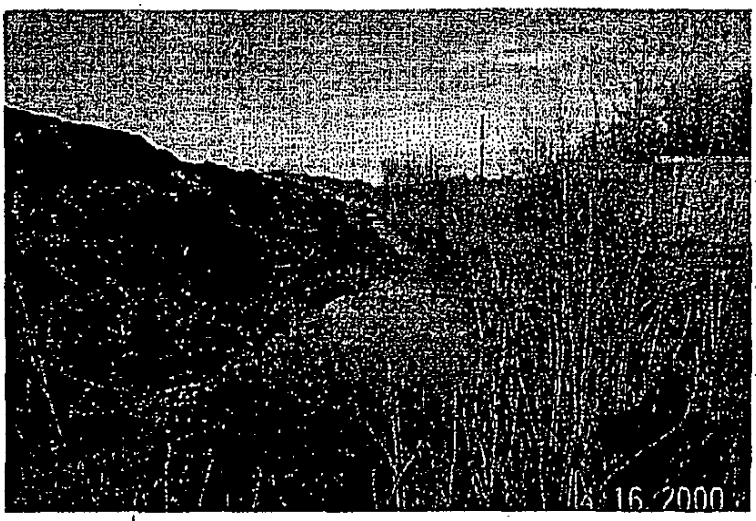
This same mitigation area includes preservation and enhancement of a riparian corridor associated with the intermittent stream flowing on the east side of the project area. Only one side of the stream is under the control of HMM. Because this side is adjacent to the landfill, the minimum buffer must be at least 100 ft. The average distance of the stream to the landfill is approximately 200 ft. We estimate that 61 to 90% of the area will be restored to forest, most of this being a forested wetland. The controls, credit schedule, kind, and location factors are the same as those for the wetland in Table 6.

Table 6. Calculation of stream preservation credits earned by Mitigation Area 1.

Factor	Option	Score
Net Improvement (Only one side)	Tertiary Priority Category; 2 x minimum width; 61 – 90% area restored	0.45
Control	Covenant—Private	0.05
Credit Schedule	Mitigation occurs after filling	0
Kind	Category 1 (In-Kind; On-Site)	0.1
Location	On-Site	0.3
Sum of Factors		0.9
Linear Feet		682
Reach Multiplier		0.75
Mitigation Area		0.68 Acres
M x L x RM		480

DESCRIPTION OF COMPENSATORY MITIGATION AREA 2

Current Conditions. Mitigation Area 2 is located on 3.9 acres of land and 1,330 linear ft. of stream on the east side of the landfill. Prior to the purchase of the property by HMM, the stream previously flowing through the landfill area was rechanneled around the periphery of the property. The stream channel was designed in a typical straight trapezoid configuration. At the present time, the stream has created a relatively deep channel that is severely eroding the eastern bank, causing damage to a chain link fence separating the landfill from the wastewater treatment plant. Photographs 5 and 6 illustrate the current condition of the stream and damage to the eastern streambank.



Photograph 5. Current condition of the intermittent stream flowing along the east side of the landfill. Note the lack of vegetation along the levee of the landfill.

Photograph 6. Damage to a chain link fence caused by storm flow of the intermittent stream located on the east side of the landfill.

Several conditions have resulted in a degraded state for the intermittent stream on the east side of the landfill. First, the eastern bank of the stream has experienced severe erosion resulting in the release of settlements into the stream bottom and damage to the chain link fence. The stream bottom contains deep deposits of sediment resulting in little or no stability and a high degree of embeddedness. The stream channel and is not sinuous, resulting in very poor riffle and pool complex development. The levee separating the stream from the landfill was constructed with 1:1 slopes, causing significant subsidence of the levee into the stream. This not only significantly increased the sediments deposited in the stream, but also has resulted in very poor development of plant communities in and along the stream channel. The goal of this mitigation area is to create a healthy and stable stream channel supporting a forested riparian corridor.

Conceptual Design. As shown in Figure 4, the mitigation area will be divided into four different areas. All three of these areas will support similar plant communities, with wetland plants being located along the stream channel and dryer plants in the upland areas along the slopes of the levee. The base of the levee will be moved approximately 50 to 75 ft. to the west of its current location. This places the top of the levee approximately 100 ft. from the center of the stream channel. The slope along the stream side of the levee will be changed to 1:3 to accommodate the establishment of forest vegetation and prevent erosion and subsidence. The actual stream corridor containing the stream channel will be widened to approximately 50 ft. The stream channel will also be increased to 10 to 15 ft. wide and allowed to be much shallower. Sediments will be dredged out of the current stream channel and replaced with fragmented rock where erosion problems appear to be imminent. The eastern bank of the stream will be extended approximately 10 ft. from the base of the fence and protected from erosion by a layer of compacted fragmented rock and clay. The stream bank will then be planted with woody plants and seeded with native grasses to prevent further erosion.

The stream channel will also be configured in a slightly sinuous course with pools and riffles created along the way. Sinuosity will be supported by both initial channel design and strategic placement of rip rap and woody vegetation. The stream will then be allowed to run its course.

and form a natural channel under the hydraulic forces provided by nature. Pools and riffles will be created using large fragmented rock imbedded into the clay bottom of the channel. Large rock fragments will also be placed strategically along the channel to encourage the development of fish habitat and variations in stream flow. Low-lying areas within the stream channel will be planted with wetland woody and herbaceous plants. Table 7 lists some of the species that will be the planted in an along the stream and this mitigation area.

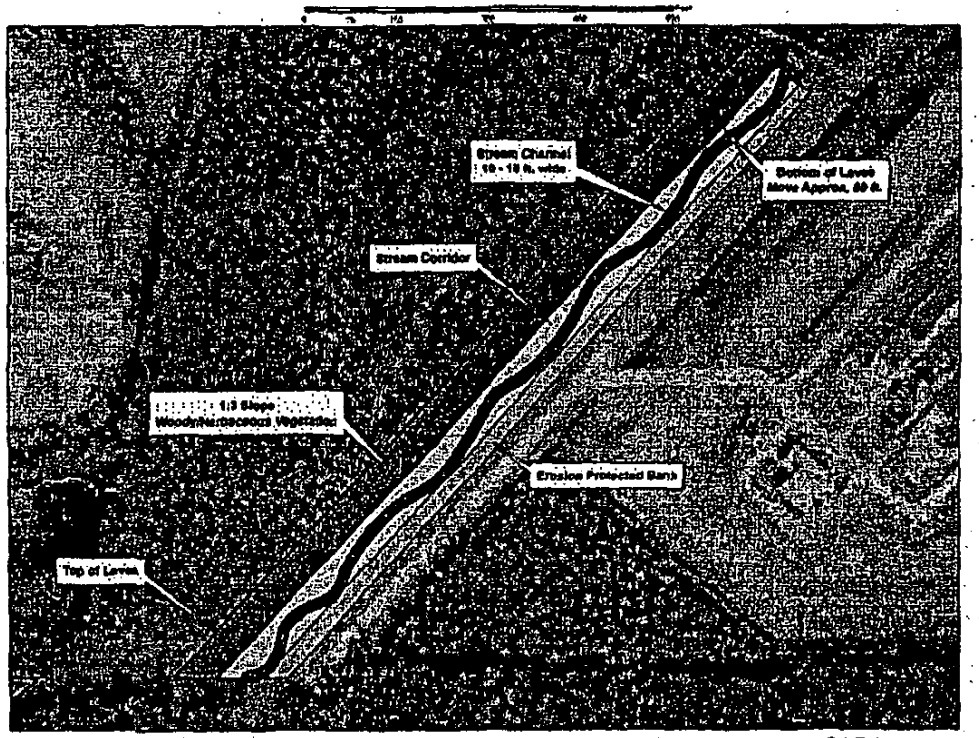


Figure 4. General plan for Mitigation Area 2 at the Harrelson Materials Management C&D Landfill.

Hydrology and Substrate. The source of hydrology for this stream will not be changed and should continue in its current state. In addition, the substrate for the stream will remain unchanged or will be supplemented with fragmented rock to improve stability.

Planting Plan. The entire riparian corridor will be hydro-mulched with native grass and herbaceous plant seeds following the completion of excavation activities necessary for the restoration and improvement of the stream. As previously discussed, areas located along the active stream channel will be planted with wetland plants. The east streambed and stream channel will be planted with shrubs and herbaceous plant species while the western bank and levee will be planted with shrubs, trees and herbaceous plants (Table 7). Natural populations of non-invasive species will also be encouraged.

Table 7. Plant species to be planted in Mitigation Area 2. All woody plants will be bare root seedlings no more than 18 inches tall.

Plant Community	Common Name	Scientific Name
Levee and Other Upland Areas	Southern Pecan	*Carya illinoinensis*
	Cedar Elm	*Ulmus crassifolia*
	Redbud	*Cercis canadensis*
	American Elm	*Ulmus americana*
	Live Oak	*Quercus virginiana*
Stream Channel and Western Bank	Rough Dogwood	*Cornus drummondii*
	Black Gum	*Nyssa sylvatica*
	American Elm	*Ulmus americana*
	Buttonbush	*Cephalanthus occidentalis*
	Water Elm	*Planera aquatica*
	Swamp Privet	*Forestiera acuminata*
	Green Ash	*Fraxinus pennsylvanica*
	Water Oak	*Quercus nigra*
	Boxelder	*Acer negundo*
	Bulrush	*Scirpus sp.*
	Sedges	*Carex sp.*
	Barnyardgrass	*Echinochloa sp.*
	Fall Panicum	*Panicum dichotomiflorum*
Herbaceous Plants and Shrubs on East Bank	Water Elm	*Planera aquatica*
	Swamp Privet	*Forestiera acuminata*
	Buttonbush	*Cephalanthus occidentalis*
	Bulrush	*Scirpus sp.*
	Sedges	*Carex sp.*
	Barnyardgrass	*Echinochloa sp.*
	Fall Panicum	*Panicum dichotomiflorum*
	Water Elm	*Planera aquatica*
	Swamp Privet	*Forestiera acuminata*
	Green Ash	*Fraxinus pennsylvanica*

Calculated Credits for Mitigation. Table 8 provides information used for the calculation of mitigation credits for the riparian corridor created in Mitigation Area 2. For the determination of credits, the net improvement for both sides of the stream were considered to be the same with a minimum width of buffer and 91 – 100% of the area restored. The site will be protected by a deed restriction approved by the USACE. Because this site is compensating for a bottomland hardwood, it will take approximately ten to twenty years for restoration to a young forested wetland. This mitigation will be in kind and on-site. Mitigation will be initiated after impacts have occurred.

Table 8. Calculation of stream enhancement and restoration credits earned by Mitigation Area 2.

Factor	Option	Score
Net Improvement West Side	Tertiary Priority Category; 1 x minimum width; 91 – 100% area restored	0.25
Net Improvement East Side	Tertiary Priority Category; 1 x minimum width; 91 – 100% area restored	0.25
Control	Covenant—Private	0.05
Credit Schedule	Mitigation occurs after filling	0
Kind	Category 1 (In-Kind; On-Site)	0.1
Location	On-Site	0.3
Sum of Factors		0.95
Linear Feet		1330
Reach Multiplier		1.25
Mitigation Area		0.45 acres
M x L x RM		1579

Factor	Option	Score
Net Improvement	Good	2.0
Control	Covenant—Private	0.05
Credit Schedule	Mitigation occurs after filling	0
Kind	Category 1 (In-Kind; On-Site)	0.1
Location	On-Site	0.3
Sum of Factors		2.45
Linear Feet		1330
Mitigation Area		3.45 acres
M x L x RM		3259

DESCRIPTION OF COMPENSATORY MITIGATION AREA 3

Current Conditions. Mitigation Area 3 is a bottomland hardwood wetland that was apparently cleared 30 – 50 years ago and has experienced some recent losses of hydrology due to rechanneling of the intermittent stream flowing north of the area. It appears that the loss of hydrology has caused a decrease in the incidence of wetlands in this parcel from 100% to approximately 70%. The site is currently dominated by water elm, sugarberry, water locust, green ash, and swamp privet. Herbaceous plants are mostly spike rush and several species of sedges.

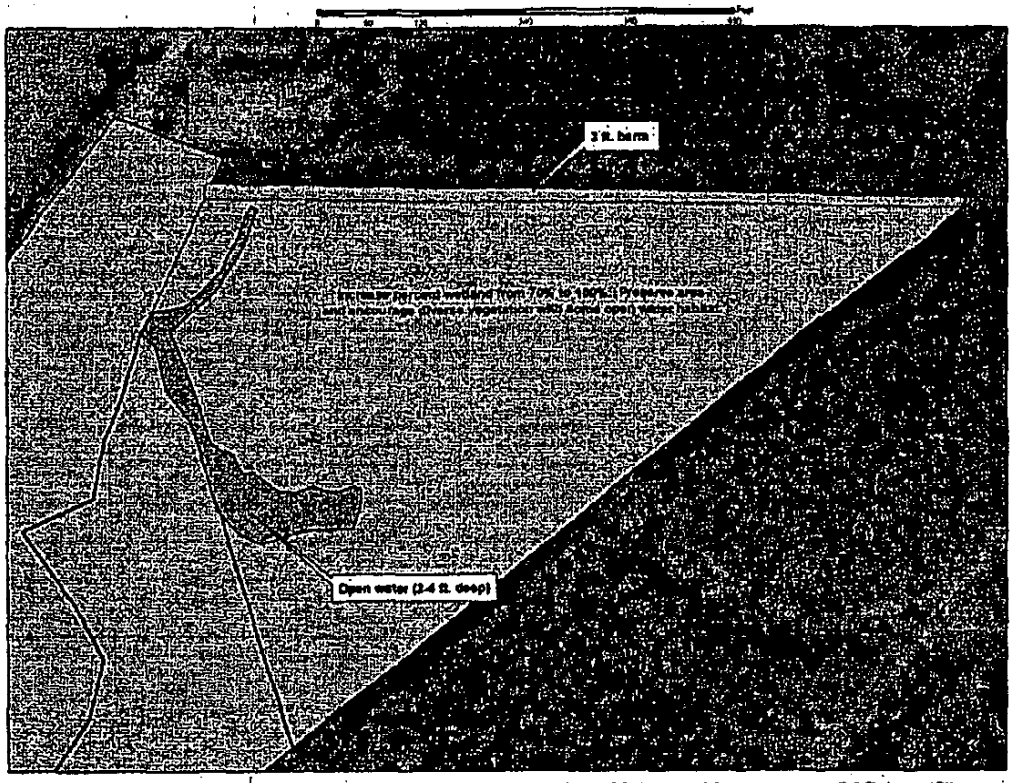


Figure 5. General plan for Mitigation Area 3 at the Harrelson Materials Management C&D Landfill.

Conceptual Design. *The goal of this mitigation area is to restore the past hydrologic conditions* to this area, thus enhancing its wetland characteristics and improving the plant community. A 3ft. high berm will be constructed along the northern boundary of this mitigation area. The berm will be constructed of fragmented rock covered with compacted clay and seeded with native grasses. The berm should significantly impede flow from the mitigation area and result in more widespread inundation of the plant communities. Last, the area will be preserved in perpetuity via a deed restriction.

Hydrology and Substrate. Field observations indicate that this site would be provided ample hydrology from floodwaters originating from wetlands to the south and precipitation from storm events in the local area.

Planting Plan. The site will not be planted. The native plant community currently present on the site will be protected and allowed to grow and mature naturally.

Calculated Credits for Mitigation. Table 9 provides information used for the calculation of mitigation credits for wetlands enhanced in Mitigation Area 3. Continuation of existing conditions would probably result in continued degradation of the wetland. The existing soils on the site are adequate for wetland development and will be used for mitigation. The site will be protected by a deed restriction approved by the USACE. Because this site is an established bottomland hardwood forest, lag time for development is not a factor, but the site will need some

time to mature into a healthy forested wetland. This mitigation will be in kind and on site. As with the other sites, mitigation will be initiated after impacts have occurred.

Table 9. Calculation of wetland creation credits earned by Mitigation Area 3.

Factor	Option	Score
Net Improvement	Excellent	4.0
Soil	Existing Suitable Soil	0.4
Control	Deed Restriction	0.1
Temporal Lag	0 - 5 Years	0
Credit Schedule	Schedule 5—After impacts have occurred	0
Kind	Category 1	0.4
Location	Zone 1—On-Site	0.4
Sum of m Factors		5.3
Mitigation Area		6.46 acres
M X A		34.2

DESCRIPTION OF COMPENSATORY MITIGATION AREA 4

Current Conditions. Mitigation Area 4 is 4.42 acres of land currently used for rock grinding and brush/tree grinding. In the past, this area was probably 90 to 100% wetland. Judging by the adjacent wetland located to the east and by aerial photographs, the area was probably a relatively young bottomland hardwood forest.

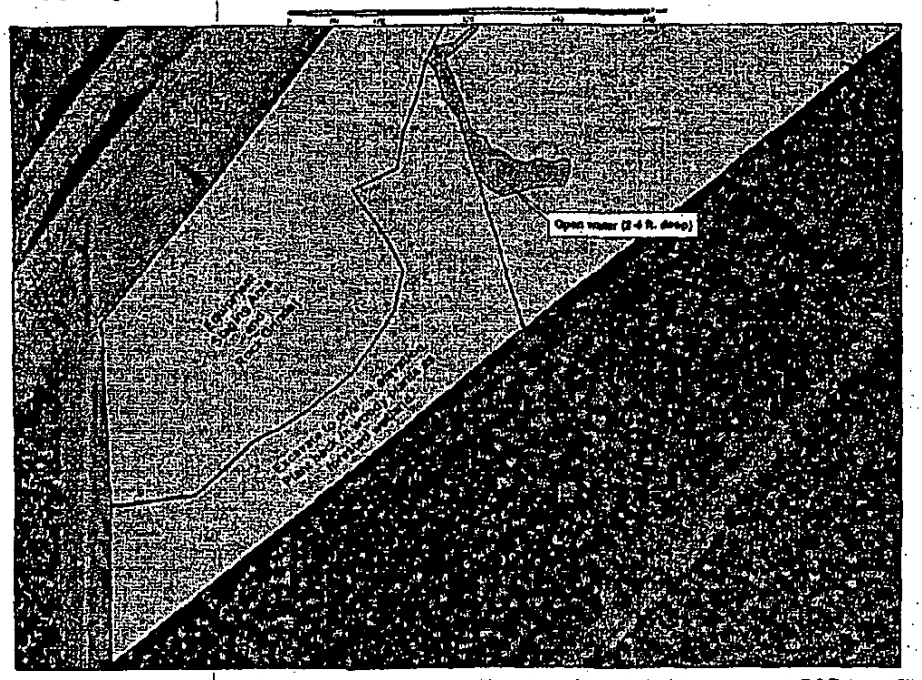


Figure 6. General plan for Mitigation Area 4 at the Harrelson Materials Management C&D Landfill.

Conceptual Design. This mitigation area will be designed to restore past wetlands to the area currently covered with fill material. Field observations indicate that original hydrologic conditions can be obtained for the site simply by removal of the fill material. Thus, the site will be excavated to the original elevation of 158 to 160ft. MSL. Following excavation, the area will be replanted with trees and shrubs listed in Table 10. Herbaceous plants will be allowed to encroach on the site naturally. It is estimated that it will take approximately 10 – 20 years for the site to return to near original conditions.

Hydrology and Substrate. Field observations indicate that this site would be provided ample hydrology from precipitation, groundwater, and runoff from adjacent wetlands. Soils underlying the fill material are probably hydric soils, as is the case for soils on adjacent wetland areas.

Planting Plan. The mitigation area planted in woody species will be planted by hand on 10 ft. centers. Table 10 provides a list of the plants to be planted across the site.

Table 10. Plant species to be planted in Mitigation Area 4. All woody plants will be bare root seedlings no more than 18 inches tall.

Common Name	Scientific Name
Rough Dogwood	*Cornus drummondii*
Black Gum	*Nyssa sylvatica*
American Elm	*Ulmus americana*
Buttonbush	*Cephalanthus occidentalis*
Water Oak	*Quercus nigra*
Water Elm	*Planera aquatica*
Water Elm	*Planera aquatica*
Swamp Privet	*Forestiera acuminatat*
Green Ash	*Fraxinus pennsylvanica*

Calculated Credits for Mitigation. Table 11 provides information used for the calculation of mitigation credits for wetlands created in Mitigation Area 4. For the determination of credits, vegetation was determined to be planted, even though natural vegetation will be allowed to encroach on the site. The existing soils on the site are adequate for wetland development and will be used for mitigation. The site will be protected by a deed restriction approved by the USACE. Because this site is compensating for a bottomland hardwood, it will take approximately ten to twenty years for restoration to a young forested wetland. This mitigation will be in kind and on site. Mitigation will be initiated after impacts have occurred.

Table 11. Calculation of wetland creation credits earned by Mitigation Area 4.

Factor	Option	Score
Net Improvement	Excellent	4.0
Control	Deed Restriction	0.1
Temporal Lag	10 – 20 Years	-0.2
Credit Schedule	Schedule 5—After impacts have occurred	0
Kind	Category 1	0.4

Factor	Option	Score
Location	Zone 1—On-Site	0.4
Sum of m Factors		4.7
Mitigation Area		4.42
M X A		20.77

TOTAL MITIGATION CREDITS AFFORDED BY ON-SITE COMPENSATORY MITIGATION

The total credits afforded by on-site mitigation for this project are listed in Table 12. It is important to note that the credits required for mitigation are exclusively tied to wetlands and not streams. However, the entire site is a riparian wetland. The exact number of credits afforded by riparian enhancement and restoration must be considered before additional credits required from off-site mitigation banks can be determined.

Table 12. Total wetland and stream mitigation credits afforded by on-site mitigation.

Mitigation Area	Type of Mitigation Credit	Credits	Acres
Mitigation Area 1	Wetland Restoration	13.1	2.8
	Riparian Enhancement	460	0.68
Mitigation Area 2	Riparian Buffer Enhancement	1578	3.45
	Riparian Restoration	3259	0.46
Mitigation Area 3	Wetland Enhancement	34.2	6.48
Mitigation Area 4	Wetland Restoration	20.8	4.42
Total Stream Credits		5298	
Total Wetland Credits		67.1	
Total Mitigation Acres Approximately a 1:1:4 replacement ratio			18.27

PLANTING SUCCESS CRITERIA

A minimum of 70% survival of woody plants after 5 years will be used as success criteria for planting of woody plants. Woody species plantings will be supplemented as necessary if this goal is not attained. No one woody species will be allowed to attain greater than 30% composition of the surviving plantings. Native desirable plants will be allowed to reestablish on the site.

PERFORMANCE CRITERIA

The mitigation area included in this plan will be maintained until documentation to, and verification from, the USACE is received indicating that areas within the mitigation site meet the following criteria:

a. waters of the United States meet the definition of a waters of the United States under the Regulatory Program regulations applicable at that time;

b. both wetland and waters of the United States meet the definition of a wetland under the Regulatory Program regulations applicable on the date of this permit;

c. waters of the United States are functioning as the intended type of waters of the United States and at the level of ecological performance prescribed in this mitigation plan; and

d. buffer and riparian zones and other areas integral to the enhancement of the aquatic ecosystem are functioning as the intended type of ecosystem component and at the level of ecological performance prescribed in this mitigation plan.

Table 13 lists the performance criteria to be used to measure the success of the mitigation project over the 5-year monitoring period. If the criteria are not met within 5 years, monitoring will be continued until the criteria are met. Once these criteria are attained, the project will be considered successful.

Table 6. Performance criteria for each mitigation site.

Site	Attribute	Year 1	Year 2	Year 3	Year 4	Year 5
Mitigation Area 1—Wetland	Percent foliar cover of planted woody species	1	2	4	5	10
	Mean height of planted woody species (in the pool)	12	18	24	30	36
	Percent foliar cover of herbaceous species	50	75	90	95	95
	Mean visual obstruction (inches)	0	2	8	12	18
	Percent survival of planted woody plants	70	70	70	70	70
	Percent foliar cover of hydrophytic species	30	40	50	60	80
	Percent foliar cover of invasive plants	<1	<1	<1	<1	<1
	Wildlife Species Observed	Steady increase				
	Plant Species Observed	Steady increase				
Mitigation Area 1—Stream Corridor	Percent foliar cover of woody species	75	80	85	85	85
	Percent foliar cover of herbaceous species	5	10	15	18	20
	Mean visual obstruction (inches)	0	2	3	4	5
	Percent Streambank Eroded	10	7	5	2	1
	Stream QHEI	25	32	36	39	45
	Percent foliar cover of invasive plants	<1	<1	<1	<1	<1
	Plant Species Observed	Steady increase				
	Wildlife Species Observed	Steady increase				
Mitigation Area 2	Percent foliar cover of planted woody species	1	2	4	5	10
	Mean height of planted woody species	12	18	24	30	36

Site	Attribute	Year 1	Year 2	Year 3	Year 4	Year 5
	Percent foliar cover of herbaceous species	50	75	90	95	95
	Mean visual obstruction (inches)	0	2	8	12	18
	Percent survival of planted woody plants	70	70	70	70	70
	Percent foliar cover of hydrophytic species	5	10	20	30	35
	Stream QHEI	25	32	36	39	45
	Erosion along Streambank	10	7	5	2	1
	Percent foliar cover of invasive plants	<1	<1	<1	<1	<1
	Wildlife Species Observed	Steady Increase				
	Plant Species Observed	Steady Increase				
Mitigation Area 3	Percent foliar cover of woody species	75	80	85	85	85
	Percent foliar cover of herbaceous species	10	20	25	30	35
	Mean visual obstruction (inches)	0	2	3	5	7
	Percent of area inundated in March	70	80	90	90	95
	Percent foliar cover of invasive plants	<1	<1	<1	<1	<1
	Wildlife Species Observed	Steady Increase				
	Plant Species Observed	Steady Increase				
Mitigation Area 4	Percent foliar cover of planted woody species	1	2	4	5	10
	Mean height of planted woody species	12	18	24	30	36
	Percent foliar cover of herbaceous species	50	75	90	95	95
	Mean visual obstruction (inches)	0	2	8	12	18
	Percent survival of planted woody plants	70	70	70	70	70
	Percent foliar cover of hydrophytic species	20	30	40	50	60
	Percent foliar cover of invasive plants	<1	<1	<1	<1	<1
	Wildlife Species Observed	Steady Increase				
	Plant Species Observed	Steady Increase				

EXPECTED ECOLOGICAL BENEFITS OF THE MITIGATION PROJECT

The project site is currently in poor condition, being degraded by erosion, sediment deposition, construction activities, and borrow pit excavation. This mitigation project compensates for the loss of wetlands and ephemeral streams with restoration and enhancement of on-site streams and wetlands. These wetland and stream areas will significantly improve the wildlife habitat in

the area and provide additional function in improving the overall surface water quality in the area.

ENDANGERED AND THREATENED SPECIES

Field observations and correspondence with the USFWS indicate that the mitigation site does not currently support species of concern. Correspondence with the USFWS was previously discussed in an earlier section of this report. Mitigation activities will provide additional quality habitat for species of concern in the future.

AFFECT OF MITIGATION PLAN ON OTHER RESOURCES

All current information and field studies indicate that the project will have no detrimental impacts on cultural resources, ecologically sensitive areas, or local/regional hydrology. The quality of water flowing from the area should be significantly improved compared to the current conditions.

PROTECTION OF SURFACE WATERS ADJACENT TO CONSTRUCTION AREAS

Section 401 Water Quality Certification was sought from the State of Louisiana Department of Environmental Quality regarding state water quality standards associated with the impacts at this site. The Department responded with a letter dated November 9, 2004. The letter stated:

> *The requirements for Water Quality Certification have been meet in accordance with LAC 33:IX.1507.A-E. Based on the information provided in your application, we have determined that the placement of the fill material will not violate the water quality standards of Louisiana provided for under LAC 33:IX.Chapter 11. Therefore, the Department has no objection to this project.*

Surface waters adjacent to construction areas will be protected using standard Best Management Practices (BMPs). These practices include the following:

Erosion Control. Disturbed areas will be stabilized to prevent the introduction of sediment to adjacent wetlands or surface waters during wet weather conditions. *At least one* of the following BMPs will be maintained and remain in place until the area has been stabilized:

- Temporary Vegetation
- Blankets/Matting
- Mulch
- Sod
- Interceptor Swale
- Diversion Dike

Sedimentation Control. Prior to project initiation, the project area will be isolated from adjacent wetlands and water bodies by the use of BMPs to confine sediment. Dredged material will be placed in such a manner that prevents sediment runoff into water in the state, including wetlands. Surface waters will be isolated by the use of one or more of the required BMPs identified for sedimentation control. These BMP's will be maintained and will remain in place until the dredged material is stabilized.

- Sand Bag Berm
- Rock Berm
- Silt Fence
- Hay Bale Dike

- Triangular Filter Dike
- Brush Berms
- Stone Outlet Sediment Traps
- Sediment Basins

LONG TERM OPERATION AND MANAGEMENT PLAN

On the short term, the site will be maintained to encourage proper growth and development of riparian and wetland plant communities. The site will be protected from human intervention during the early establishment of plant communities. Sediment and erosion control devices will be removed when no longer required. Trash accumulating on-site will be removed.

Long-term maintenance will be restricted to allowing the site to develop with little or no intervention by man. The site will be protected to the maximum extent practicable to avoid disturbances to the vegetation community.

MONITORING PLAN

A site reconnaissance will be conducted at least once each month during the first and one every two months during second growing season to visually evaluate growth and development of the stream. During the third through fifth growing season, the site will be evaluated every 3 months. *During each site reconnaissance, general growth patterns, dominant plant species, plant health,* and visual appearance of water quality will be observed and general impressions concerning the development of the site will be recorded. Photographs will be taken of each mitigation site from permanent photo points to pictorially document the development of the site over a 5-year period. Any significant problems that are identified during these visits will be addressed immediately.

In late August of the first year after construction and every year thereafter for five years, the following data will be collected to assist in documenting the overall health of the site:

- ***Qualitative Habitat Evaluation Index (QHEI):*** *A QHEI (as used in Ohio stream* evaluations) will be determined for the stream. It is the intent for the mitigation site to realize a steady increase in QHEI values over the 5-year period.
- **Percent Canopy Cover – Herbaceous Vegetation:** The percent canopy cover of herbaceous vegetation will be visually estimated.
- ***Percent Canopy Cover – Woody Vegetation:*** *The percent canopy cover of shrubs and* woody vegetation will also be visually estimated.
- **Mean Visual Obstruction:** The mean visual obstruction will be measured at ten random locations in each mitigation area to determine the level of cover available for small mammals. This measurement is simply the height above the ground surface where foliage density is sufficiently sparse for a yardstick measurement to be read 10 feet away. The yardstick is placed on the ground and a person 10 ft. away identifies the first readable measurement on the yardstick as it emerges from the plant canopy.
- ***Wildlife Species Observed:*** *During surveys, wildlife observed on the site will be counted* and identified. Indirect evidence of wildlife activity, including abandoned nests, tracks, and burrows will also be recorded.
- **Vegetation Species Diversity:** The number of different species of plants will be monitored during the 5-year evaluation period to ensure that species diversity on the site is being encouraged.
- **Percent Survival:** Percent survival of plants will be measured each year. If the survival rate drops below 70%, new plants will be planted to compensate for the loss.
- ***Percent Foliar Cover of Hydrophytic Vegetation:*** *Foliar cover of wetland plants will be* visually estimated.

- **Percent of Streambank Eroded:** The percent of the total streambank eroded by water will be visually estimated.
- **Percent of Area Inundated in March:** The percent of the mitigation area inundated in March of each year will be visually estimated to determine if the berm is effectively changing the hydrology of the site or changes in berm height should be considered.

REPORTING PROGRAM

Compliance reports will be prepared according to the schedule below and will include any schedule changes; a summary of all activities that occurred during the reporting period, including demonstration of compliance with the permit conditions; and documentation of the progress and/or completion of all authorized work, including mitigation plan activities. Each report will show, as appropriate, that disturbed areas are revegetating adequately and not suffering erosion damage. Compliance reports will also include photographs, maps, and a description of the impacts to waters of the United States. Compliance reports will be submitted to the Vicksburg District USACE office according to the following schedule:

- Baseline Report: Due on October 1 in the year of completion of all mitigation construction activities, including grading, earthwork, planting and seeding. The report will not detail pre-construction conditions of the project area as this was provided in the delineation report for the site.
- Mid-term Report: Due on October 1 in the third year following completion of all mitigation construction activities. The Mid-term Report will describe any potential problems with achieving performance criteria, and any and all corrective actions taken.
- Final Report: Due on October 1 in the fifth year following completion of all mitigation construction activities. The Final Report will include a discussion of whether the performance criteria were achieved and any further recommendations for remedial measures, if necessary.

Compliance reports will be submitted even if no work is conducted during the reporting period and will continue as requested by the USACE until the USACE verifies that all compensatory mitigation plan requirements, including planting success requirements, have been successfully completed, and performance standards and the project has complied with all terms and conditions of the permit, including special conditions.

QUALIFIED MITIGATION SPECIALIST

At the current time, Lynn M. Kitchen will be retained for overseeing project construction, planting, and monitoring. A complete resume for Dr. Kitchen is provided in Appendix B of this report. If Dr. Kitchen cannot perform the duties, the permittee will submit the qualifications of a replacement for approval by the USACE. Contact information for Dr. Kitchen is as follows:

Address:	5222 Leonhardt Road San Antonio, Texas 78233
Business Phone:	(210) 691-2221
Cellular Phone:	(210) 317-7267
FAX:	(210) 691-2041

SCHEDULE FOR IMPLEMENTATION OF THE MITIGATION PLAN

Construction of the mitigation area will be initiated when the site is sufficiently dry to allow for excavation of stream and wetland areas. Mitigation area 3 can be initiated within 3 months of

permit approval. During the first season, the major effort will be to control invasive plants. The area will be planted in woody plants in November of the first year. Herbaceous plants will be seeded as soon as excavation activities are completed. The first year of monitoring is anticipated to begin at the time trees are planted with the first monthly evaluation being made one month after planting.

As previously discussed, following construction, a 5-year monitoring program will be established to ensure proper development wetland and riparian plant communities. After initial planting, the site will be visited once every thirty days until the end of the first growing season. Monthly site visits after planting will be used to monitor water quality and establishment and health of plants. Should any serious problems be noted during these visits, steps will be taken immediately to determine the cause of the problem and to correct it.

Starting with the second growing season and continuing through the fifth season the site will be subjected to formal monitoring data collection once annually near the end August of each growing season.

DEED RESTRICTION

The site will be protected as a natural plant community and allowed to continue through natural stages of succession perpetually as described in the deed restrictions for this land, guaranteeing preservation of wetland and wildlife resources. The deed restrictions will state that the mitigation areas will not be adversely impacted and a certified copy of the recorded deed restriction will be provided to the Corps upon execution. Example wording of the restriction is as follows:

> *"The permittee will dedicate in perpetuity as a wetland and stream preserve, the approximately _____-acre mitigation area identified in this mitigation plan "Mitigation Plan for HMM C&D Landfill Project in Shreveport, Caddo Parish, Louisiana" dated April 2005. The only exceptions to the deed restriction shall be easements in existence on May 1, 2005. The mitigation area will not be disturbed, except by those activities that would not adversely affect the intended extent, condition, and function of the mitigation area or by those activities specifically provided for in the approved mitigation plan or in the special conditions for this permit. Livestock grazing and similar activities will not be allowed in the mitigation area. This restriction will not be removed from the deed or modified without written approval of the USACE. Conveyance of any interest in the property will be subject to this deed restriction."*

The permittee will survey the mitigation area, develop an appropriate deed restriction for the surveyed area, submit the draft deed restriction to the USACE for review and approval, and then record the USACE-approved deed restriction with the parish clerk. The permittee will provide a copy of the recorded deed restriction to the Regulatory Branch.

ADAMS ENVIRONMENTAL, INC.
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April 15, 2004

Mr. Robert Ulmer
U.S. Army Corps of Engineers, Vicksburg District
4155 Clay Street
Vicksburg, MS 39183-3435

RE: Cease and Desist Order for the HMM C&D Landfill Near Shreveport, Louisiana
Project 200310660

Dear Mr. Ulmer:

On March 15 and 16, 2004 Mr. Michael Harrelson of Harrelson Materials Management, Inc. (HMM) retained Adams Environmental, Inc. (AEI) to conduct a wetland assessment on tracts in and adjacent to the HMM Landfill. The intent of the assessment and delineation was to determine if recent excavation activities at the C&D landfill placed fill material in wetlands or other surface waters of the U.S. and to provide information as requested by the Cease and Desist Order. This letter is a summary of the findings of the field investigation as well as a review of historic data available both onsite and in other sources.

BRIEF HISTORY OF THE LANDFILL OPERATION

In 1998, Chandler Brothers, Inc. prepared a permit to be submitted to the Louisiana Department of Environmental Quality (LaDEQ) for the construction and operation of a C&D landfill on a parcel of land located on the northwest side of Shreveport, Louisiana (Figure 1). The landfill was to be located on an existing borrow pit that had been used to provide fill material for the construction of Interstate 220 located adjacent to the property. This portion of the landfill was eventually permitted and is currently in operation. In 1994, LaDEQ requested that the facility prepare a "mandatory Permit Modification" under the new EPA Subtitle D Solid Waste Regulations. In 1995, Chandler Brothers submitted the first draft of the facility permit modification to LaDEQ for review. Between 1995 and 2000, a series of Notices of Deficiencies (NODs) were issued to Chandler Brothers by LaDEQ. In 2000, LaDEQ verbally agreed to the current limited expansion of the landfill under the current interim operating permit (IOP) under which the facility is currently operating. During the year 2000 prior to purchase of the facility by the current owner, an intermittent stream flowing through the site was rechanneled to allow for further expansion of the landfill.

In January of 2003, a landfill expansion permit was prepared and submitted to LADEQ. During the processing of the permit, it was assumed that wetlands and surface waters of the U.S. would not be impacted because of a misinterpretation of letters that were sent to the site by the U.S. Army Corps of Engineers (USACE) in 1988 and 1994. On January 14, 1988 Kenneth P.

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Moseley of the USACE Vicksburg District wrote a letter to Mr. Lou Chandler, Jr. explaining that the proposed project had been reviewed and that a Section 10/404 permit would not be required for the proposed work. This letter was in reference to the original footprint of the landfill, which was located in an abandoned borrow pit. On April 20, 1994 Mr. Cicero F. Chandler of Chandler Brothers, Inc. (the owner/operator of the landfill at that time) submitted a letter requesting reevaluation of the permit requirements for the build-up of an existing levee surrounding the three borrow pits that were being used for a disposal site. In response to that letter, Mr. Moseley of the USACE indicated that, "Based upon the information provided and that obtained from our field investigation, we have determined that a Department of the Army Section 10/404 permit will not be required, since build-up of the levee would not result in the discharge of dredged or fill material into wetlands or other jurisdictional waters of the U.S..." It is important to note that this letter was only referencing build-up of a levee, which was located on the original landfill.

Michael Harrison, current owner and operator of the HMM C&D Landfill, recently submitted a permit to LaDEQ for the expansion of the landfill. The permit was processed through LADEQ and work was initiated for construction of the levee surrounding the landfill. Mr. Robert Ulmer of the USACE, Vicksburg District was notified of the activity for construction of the landfill and visited the site to determine if the activity was in violation of Section 404 of the Clean Water Act. Upon investigation of the site, Mr. Ulmer determined that there were violations and that wetlands were being filled by the actions onsite. He notified Michael Harrelson that a cease and desist order would be issued for the landfill to resolve any Section 404 violation issues. At that time, Mr. Ulmer requested Mr. Harrison to enlist the assistance of a wetland biologist to investigate the site and determine if wetlands were present on the site prior to construction, and the approximate acreage of wetlands impacted by construction activities. At the time of this letter, the cease and desist order has not been received by HMM.

In response to Mr. Ulmer's request, HMM retained AEI to conduct a wetland determination and delineation of areas adjacent to the landfill. The wetland determination and delineation was conducted on March 15 and 16, 2004. The following paragraphs provide the findings and conclusions of the delineation.

PROJECT AREA DESCRIPTION

The project area is located on the southeast side of Interstate 220 on the northwest side of Shreveport, Louisiana. Northwest of the site, the area has been developed for residential homes and some commercial businesses. Most of the land immediately adjacent to the landfill is not developed with the exception of a City of Shreveport wastewater treatment plant located on the southeast border of the project area and Interstate 220 located on the northwest side of the landfill. Figure 1 is a map showing the approximate location of the project site and Figure 2 is an aerial photograph of the site taken in the year 2000, showing the actual boundaries of the project area. Figure 3 is the most recent site plan for the design of the landfill. Figure 4 also shows the location of the landfill on a SPOT image satellite photograph taken in the year 2000. All of these aerial photographs and topographic maps indicate that the land surrounding the landfill was basically undeveloped. Field observations indicate that the area is still mostly undeveloped. Most maps and aerial photographs indicate that wetlands may exist to the southeast of the site. Wetlands are probably associated with Twelve-Mile Bayou located to the northeast of the site.

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According to the Soil Survey for Caddo Parish, the project site is dominated by the Buxin clay mapping unit. A small portion of the northwest corner of the project area is shown to contain Ruston fine sandy loams and Forbing silt loams. Field investigations indicated that most of the soils on adjacent properties were either Buxin clays or inclusions commonly found in Buxin clays such as Moreland, Armistead, and Gallion soils. With the exception of Armistead soils, all other soils associated with Buxin clays are considered hydric soils under frequently flooded conditions. These soils are typical red soils of western Louisiana, which are considered problem soils because they typically do not manifest easily observed hydric characteristics used for determination of wetlands.

REVIEW OF HISTORIC AERIALS

For the purposes of this study, historic aerial photographs were obtained of the project area to determine if wetlands existed in the area prior to construction of the site. The 1936 aerial photograph (Figure 6) showed that the northern half of the project area was used for agricultural production at that time. This would indicate that either wetlands were drained for crop production or that wetlands were not present at that time. The intermittent stream currently flowing around the site can be easily observed in this photograph. At this time, that stream flowed only along the southeastern boundary of the property. The stream currently flowing across the property is not easily observed in this photograph.

In 1950, the area continued to be under agricultural production with no real change since 1936 (Figure 7). However, in this photograph the intermittent stream crossing the site can be observed. In addition, the stream that appeared to flow along the southeastern edge of the property can also be more easily observed. This stream apparently originated from the east, flowed across the south edge of the property, left the property boundary, and then entered again on the southeast edge of the property.

In 1966, urban development had occurred in the northwest portion of the photograph (Figure 8). However, most of the northwestern portion of the project area was still under agricultural production. An area to the southeast of the property had been cleared of all woody plants and appeared to be in use as a borrow pit. The streams can be easily observed in this photograph. Most of these streams were fairly well defined.

The 1979 aerial photograph (Figure 9) showed early construction of Interstate 220 on the northwest boundary of the property. In addition, borrow pits can be observed on the northwest corner of the property. The remainder of the project area contained three or four ponds, probably formed from collection of borrow for construction of Interstate 220. This photograph also indicated that the area may have been harvested for lumber, resulting in removal of many of the large trees on the project area. The wastewater treatment plant had not been constructed at that time, but a large pond was located in the present footprint of the wastewater treatment plant.

The 1981 aerial photograph (Figure 10) showed continued use of the area for borrow, especially on the northwest and west side of the property. In addition, the wastewater treatment plant located to the southeast was under construction at that time. The southern portion of the project area appeared to be disturbed to a certain extent around the stream and along two apparent

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pipeline or utility rights-of-way. Clearing activities to the southeast of the property appeared to have ceased, and vegetation was beginning to recover and grow in that area.

The 1984 aerial photograph (Figure 11) showed little or no changes compared to 1981. It is important to note that the wastewater treatment plant appeared to have been completed at that time. By 1994 (Figure 12), the area to the southeast had recovered quite well from clearing activities and now supported a young woodland area. The original footprint for the landfill can be seen in this photograph, and the stream traversing the site can be clearly observed. Several open water borrow pits can be observed to the south of the original landfill footprint. In addition, an area on the southern portion of the property had been cleared, probably for parking and equipment staging areas associated with the landfill and borrow pits.

The most recent aerial photograph taken of this site was an infrared photograph taken in the year 2000 (Figure 2). This figure clearly shows the footprint of the original landfill. It also shows that the intermittent stream located immediately adjacent to the landfill is continuing to flow across the site. Several borrow pits filled with water can also be observed on this photograph. Two of these ponds are located immediately adjacent to and south of the original landfill. Two to three borrow pits can also be observed in the northwest corner of the property. A small portion of land located in the southern tip of the property was also cleared and potentially filled, again probably for use as a staging area for construction equipment associated with the landfill and borrow pits.

The aerial photographs clearly indicate that an intermittent stream crossed the property in the past. Remnants of this stream were observed during the field investigation. This stream was eventually rechanneled and filled on portions of the property. Another intermittent stream appears to flow across the southern portion of the project area. Field observations indicate that this stream is no longer a flowing stream due to changes in hydrology and drainage patterns probably caused by construction of Interstate 220.

The conclusion from recent aerials is that the vegetation community located within the excavated area in the landfill footprint was similar to the areas to the west of the site. These areas were upland plant communities even up to the banks of the stream. This was further supported by field observations discussed in the next section.

FIELD INVESTIGATION

Figure 13 shows the location of seven different sampling sites that were used to determine the presence or absence of wetlands on land adjacent to the property. Wetland determination within the footprint of the landfill was difficult, if not impossible because vegetation had been removed and soils associated with this site were "red" soils that typically do not readily show indicators of hydric soils and aerobic conditions of wetlands. Therefore, it was determined that sampling sites would be taken on lands immediately adjacent to the property and the condition of those lands, in combination with the use of aerial photographs, would be used to determine presence of wetlands on the site. In the paragraphs that follow, each of the sites will be described and summarize. In addition, field determination sheets are provided in Appendix B for more detail. Field photographs are also provided to supplement this information (Appendix A).

SITE 1

Site 1 was a relatively young forest dominated by sugarberry and honey locust. The understory was dominated by sugarberry, black mulberry, and deciduous yaupon. Approximately 57% of the vegetation was OBL, FACW, or FAC, indicating that the vegetation criterion for wetlands was met. However, no indicators of wetland hydrology were observed including presence of surface water, a shallow water table, or saturated soils. This was especially important because the field investigation occurred during the winter months, when weather conditions are typically wet and water tables are at their highest levels. The soil was determined to be a Moreland clay. This soil is a red soil that does not manifest hydric characteristics very well. As expected, no indicators of hydric soils were observed in the field, possibly because of the soil itself. However, this soil is not listed as a hydric soil except under frequently flooded conditions and field observations indicate that this area was located in an upland that did not experience frequent flooding. Therefore, it was determined that this site was not a wetland, based on the fact that it did not meet the hydrology or the hydric soil criteria.

SITE 2

Site 2 was located in an area that had been recently cleared of woody vegetation, probably in the last two years. The site was dominated by red clover and annual sumpweed. Because 50% or less of the dominant plants were FAC, FACW, or OBL, the site was determined to not meet the vegetation criteria. Additionally, no indicators of hydrology were observed. The soil appeared to be disturbed due to construction and clearing activities, making soil identification difficult. However, field observations indicate that the soil was a Gallion silty clay loam, which is a listed hydric soil. No indicators of hydric soils were observed on this site. It was determined that this site was not a wetland due to the fact that the vegetation and hydrology criteria for wetlands were not met.

SITE 3

Site 3 appeared to be an upland area located adjacent to the undisturbed portion of the intermittent stream that had been rechanneled several years ago to flow around the C&D landfill. This portion of the stream was undisturbed and in its original state. The plant community found in Site 3 was dominated by sugarberry, honey locust, redbud, and an unidentified species of hawthorn. Fifty percent of these dominant species were OBL, FACW, or FAC. Thus, it was determined that the site probably did not meet the vegetation criteria for wetlands, since most hawthorns are FACU and UPL. The site did not support hydrology indicative of wetlands. It appeared that the site was approximately 5 to 6 feet above the water table associated with the stream flowing through the area. This resulted in the site being well drained. No evidence of pooling or accumulation of water in a perched water table was observed. The soil found on the site was determined to be a Buxin clay, occasionally flooded. This soil is a listed hydric soil, but it did not show hydric characteristics. Again, this would be expected due to the fact that this is a problem soil that typically does not exhibit hydric indicators. It was determined that the site was not a wetland due to the fact that the hydrology criteria and the vegetation criteria were not met. It appears that this area is probably a riparian corridor that supports some wetland plants that are able to extend roots into the water table located probably 4 to 6 feet below the ground surface.

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SITE 4

Site 4 was an upland plant community located immediately adjacent to an area that appeared to be a wetland. This site was very similar to the other forested areas with sugarberry, honey locust, black mulberry, and hawthorn dominating the site. Only 44% of the plants dominating the site were FAC, FACW, or OBL, suggesting that the site did not meet the vegetation criteria. In addition, no indicators of hydrology were observed. However, the soil was determined to be a Buxin clay, which is a listed hydric soil. The location of the soil with respect to the water table, and the drainage characteristics of the area, suggest that hydric characteristics may not be present. Thus, it was determined that this site was not a wetland because the vegetation, hydrology, and hydric soil criteria were not met.

SITE 5

Site 5 was located in an inundated and saturated area dominated by sugarberry, American elm, and chokecherry. Eighty percent of the dominant species were either OBL or FACW, indicating that the vegetation criteria was met. In addition, the site was inundated and soils were saturated in the upper 12 inches, which meant that hydrology criteria were met. The soils were Buxin clays, which are listed hydric soils. As with other sites, these soils did not show hydric characteristics; however, in this case the location of the soils with respect to a shallow groundwater table and areas of inundation indicate that the hydric characteristics probably are present. It was determined that this site was a wetland because all criteria for wetland determination were met.

SITE 6

Site 6 was an upland area located on the southeast side of the wetland observed in Site 5. This site was dominated by sugarberry, American elm, water elm, and eastern hophornbean. Because greater than 70% of the vegetation was FAC, FACW, or OBL, it was determined that the vegetation criteria for wetlands were met. However, no indicators of wetland hydrology were observed in the area. In spite of the fact that it was the wet season, no inundated areas were observed, and the depth to saturated soils and free water in the soil pit exceeded 18 inches. The soil on the site was a Buxin clay, but hydrology characteristics would indicate that it was not frequently or even occasionally flooded. Therefore, it was determined that this site was not a wetland. The vegetation criteria were probably met due to the fact that either the area was a wetland in the past and drainage characteristics were changed by construction of Interstate 220, or the vegetation was being supported by groundwater located well below 18 inches.

SITE 7

Site 7 was a plant community dominated by water elm, swamp privet, and honey locust. In addition, herbaceous plants included spike rush and Canada wildrye. One hundred percent of the plants were found to be OBL, FACW, or FAC. Thus, the vegetation criteria for wetlands were met. In addition, the site was inundated and saturated and showed drainage patterns typical of wetlands. Again, this indicates that the hydrology criteria were met. It was also determined that the soil was a Buxin clay, which is a listed hydric soil when frequently flooded.

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Field observations indicated that this site was frequently flooded and would meet that criteria. Therefore, it was determined that this site was a wetland.

Discussion of Results

Figure 14 summarizes the results of the field investigation and review of aerial photographs. Wetlands were delineated if found offsite. The wetland located in Site 5 was delineated using the fence as a reference point. The location of this wetland can be observed in Figure 14. The wetland located to the southeast of the site was rather extensive. Thus, it was determined that transects would be walked across this site to determine the percentage of wetlands found in the area and to provide a preliminary map. However, because of excessive rainfall and the lack of green vegetation (winter season) it was determined that a delineation of this area should be conducted in June or July when conditions are more conducive to a more accurate determination. Figure 14 clearly shows the pattern of wetlands in the area. It is important to note that adjacent to the intermittent stream, the typical plant communities were not wetlands but upland communities. In addition, where wetlands were observed, this appeared to be the initiation of a wetland area located to the southeast of the property.

All of the historic and recent aerial photographs indicate that there is very little change in vegetation across the site compared to the adjacent properties. **None of the wetlands located offsite appear to extend into the area that was impacted by construction activities.**

It is our opinion that the only potential compliance issue that occurred on the site was filling and rechanneling of the intermittent stream that previously traversed the landfill area. Thus, it is concluded that 2150 feet of intermittent stream was filled during construction of the levees surrounding the landfill. Remnants of this stream can be observed and are shown in Photographs 26 and 27. It is important to note that the stream was rechanneled prior to purchase of the property by the current owner, leaving the original channel in tact, but with flow only originating from the area within the new landfill footprint.

In contrast to the new construction activities, it appears that the area located on the southern end of the property probably contained wetlands prior to fill activities. **Fill activities on this portion of the property took place many years ago, prior to the current ownership.** At the time of the field investigation, the area had experienced significant precipitation, the soil surface was inundated and wetland determination was very difficult. This difficulty was further complicated by the fact that the field investigation was accomplished in the winter when trees did not have leaves and herbaceous plants had not emerged. We recommend that this area be delineated in June or July and an approximate percentage of wetlands versus upland areas be estimated at that time.

We request that the USACE allow current landfill activities be continued at this time because they do not impact waters of the U.S. Current activities should not impact the rechanneled stream and should only have minor impacts to the remnants of the past stream. HMM will cooperate fully with the USACE in determining any Section 404 requirements for the site.

We sincerely appreciate your review of this report, and we look forward to your comments and suggestions.

Very truly yours,

Lynn M. Kitchen, Ph.D.
Principal Scientist

Appendix A

Figure 1 Topographic maps showing the location of the HMM C&D Landfill project area

Figure 2. Infrared aerial photograph of the project area taken in 2000.

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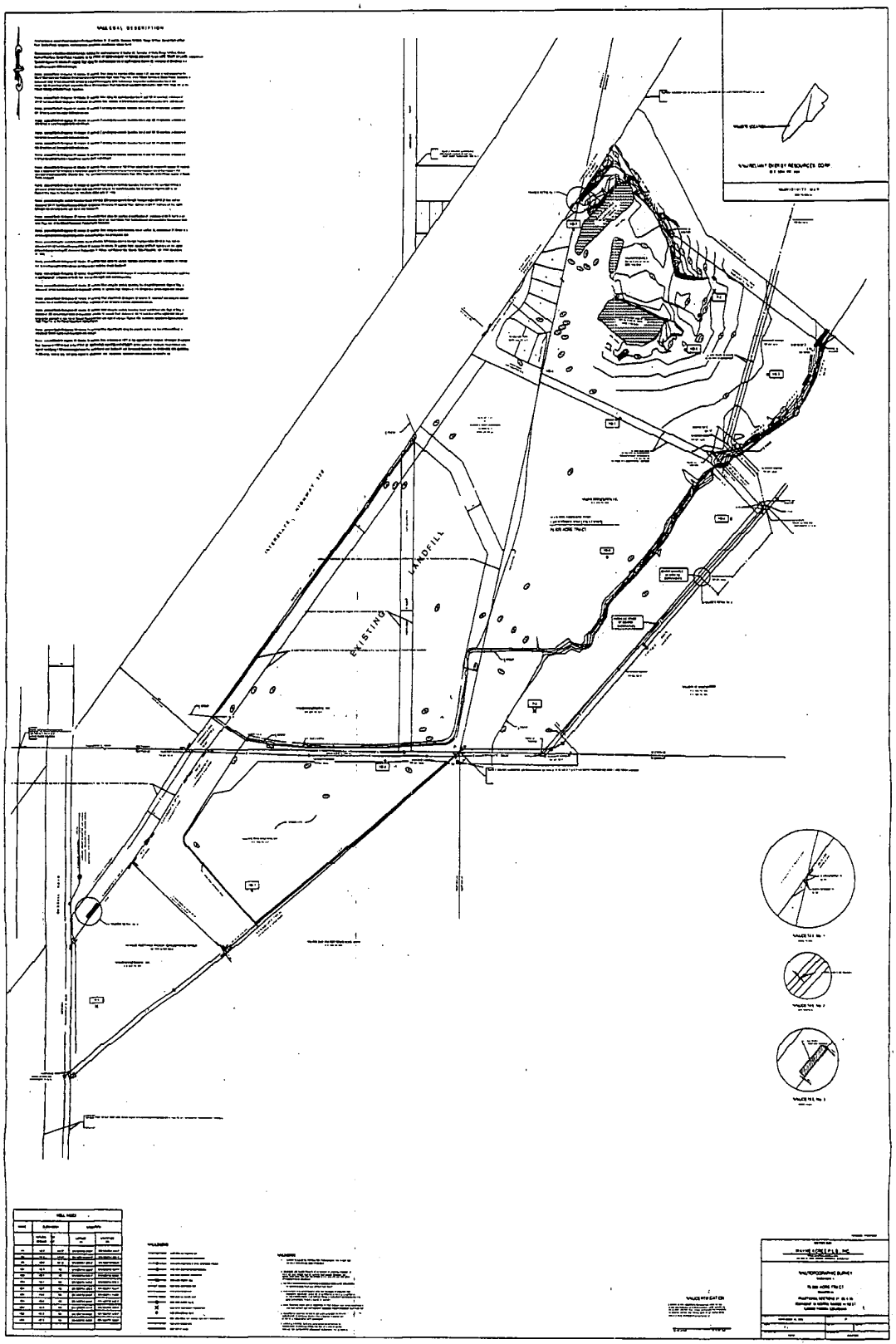

Figure 3. Drawing of the HMM C&D Landfill located in Shreveport, Louisiana.

Figure 4. Spot Image satellite photograph of the project area taken in 2000.

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Figure 5. Soil survey aerial photograph showing the soil mapping units found on the HMM C&D Landfill project area

Source: Edwards, J.P., P.G. Martin, W.W. Kilpatrick, and C. Henry. 1980. Soil Survey of Caddo Parish, Louisiana. Natural Resource Conservation Service

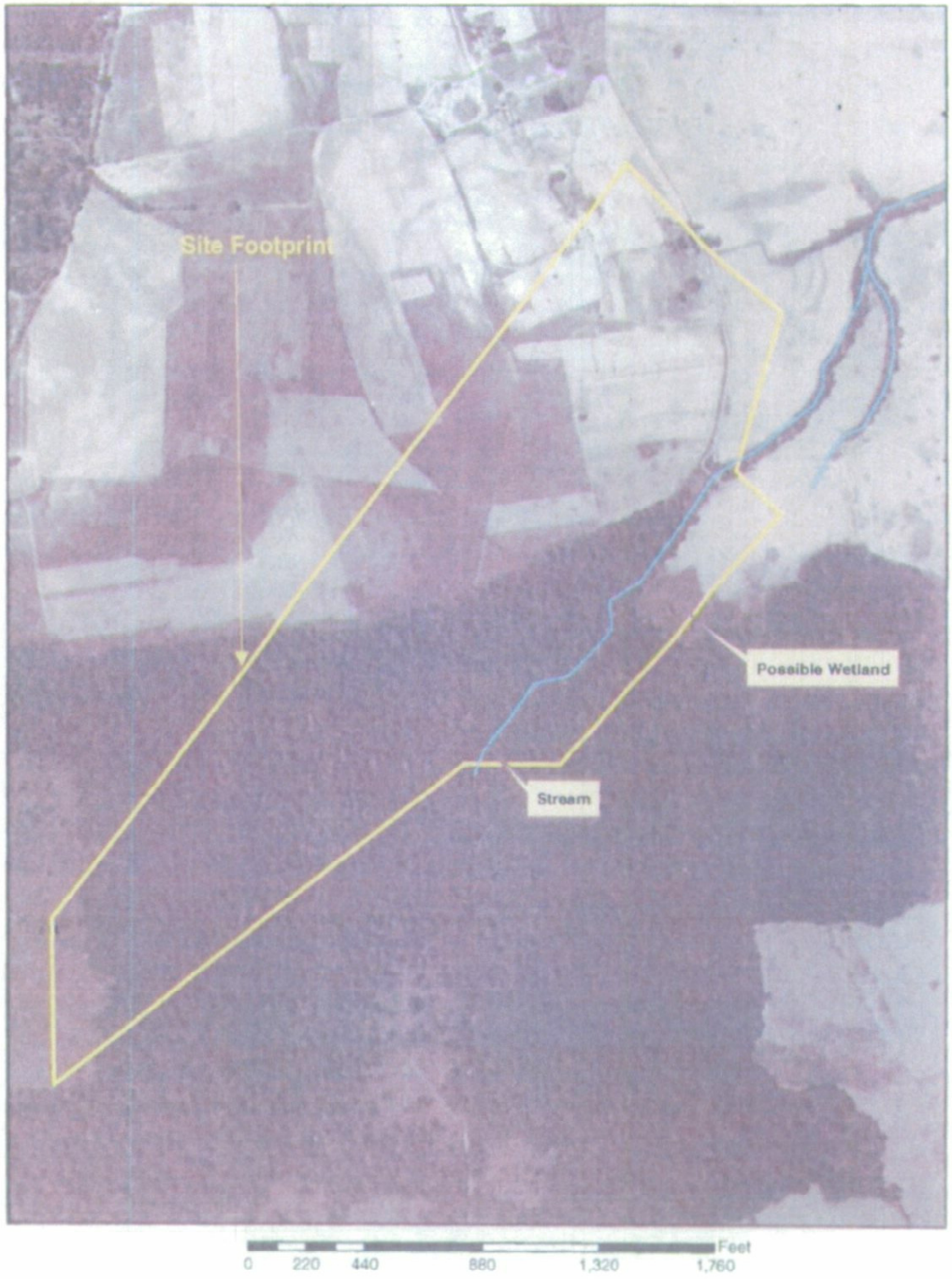


Figure 6. 1936 Aerial photograph of the HMM C&D Landfill Project Area.

Source: Tobin International, LTD.

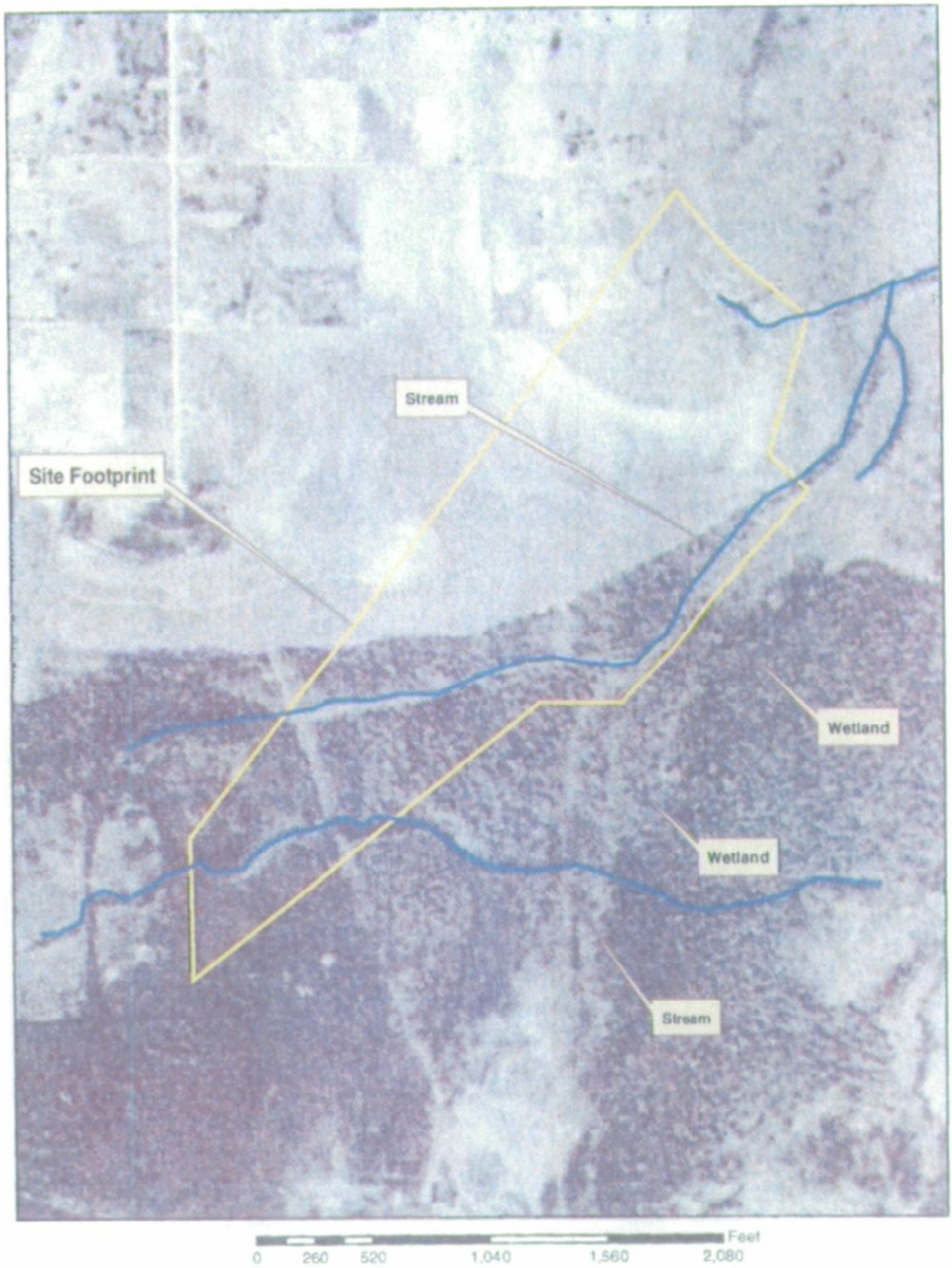


Figure 7. 1950 Aerial photograph of the HMM C&D Landfill Project Area

Source: Natural Resource Conservation Service

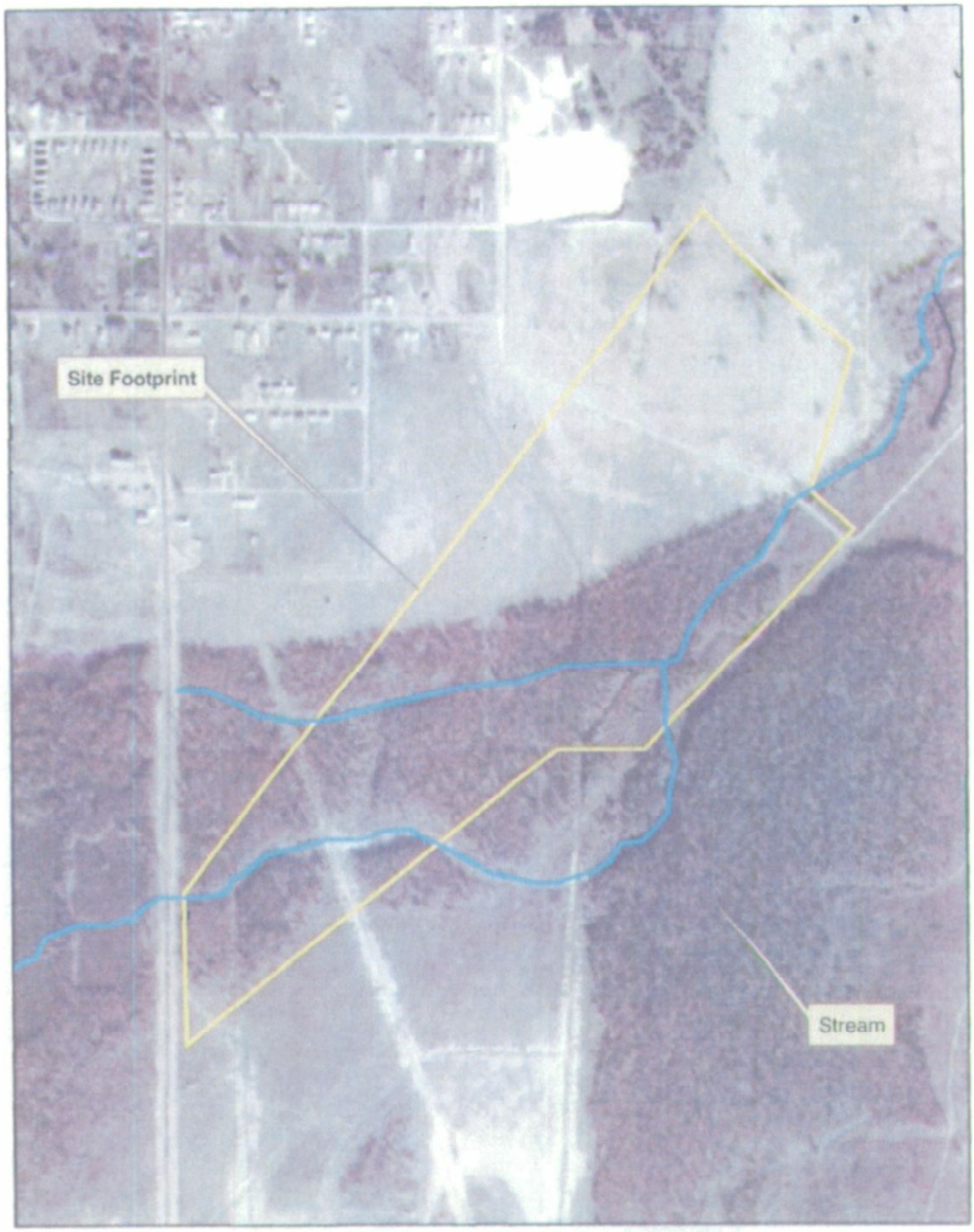


Figure 8. 1966 aerial photograph of the HMM C&D Landfill Project Area.

Source: Tobin International, LTD.

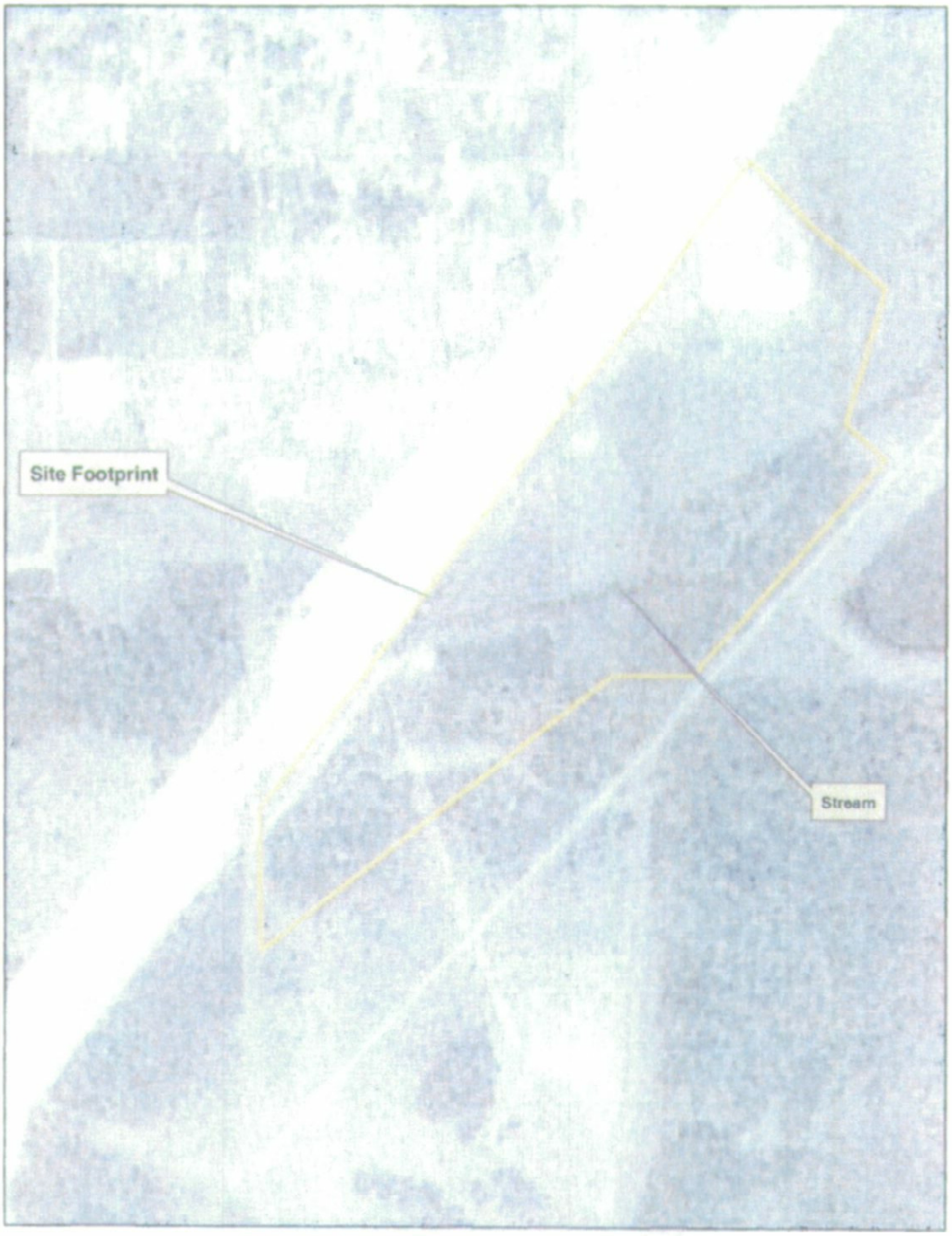


Figure 9. 1979 aerial photograph of the HMM C&D Landfill Project Area.

Source: Natural Resource Conservation Service

Figure 10. 1981 aerial photograph of the HMM C&D Landfill Project Area.

Source ASCS

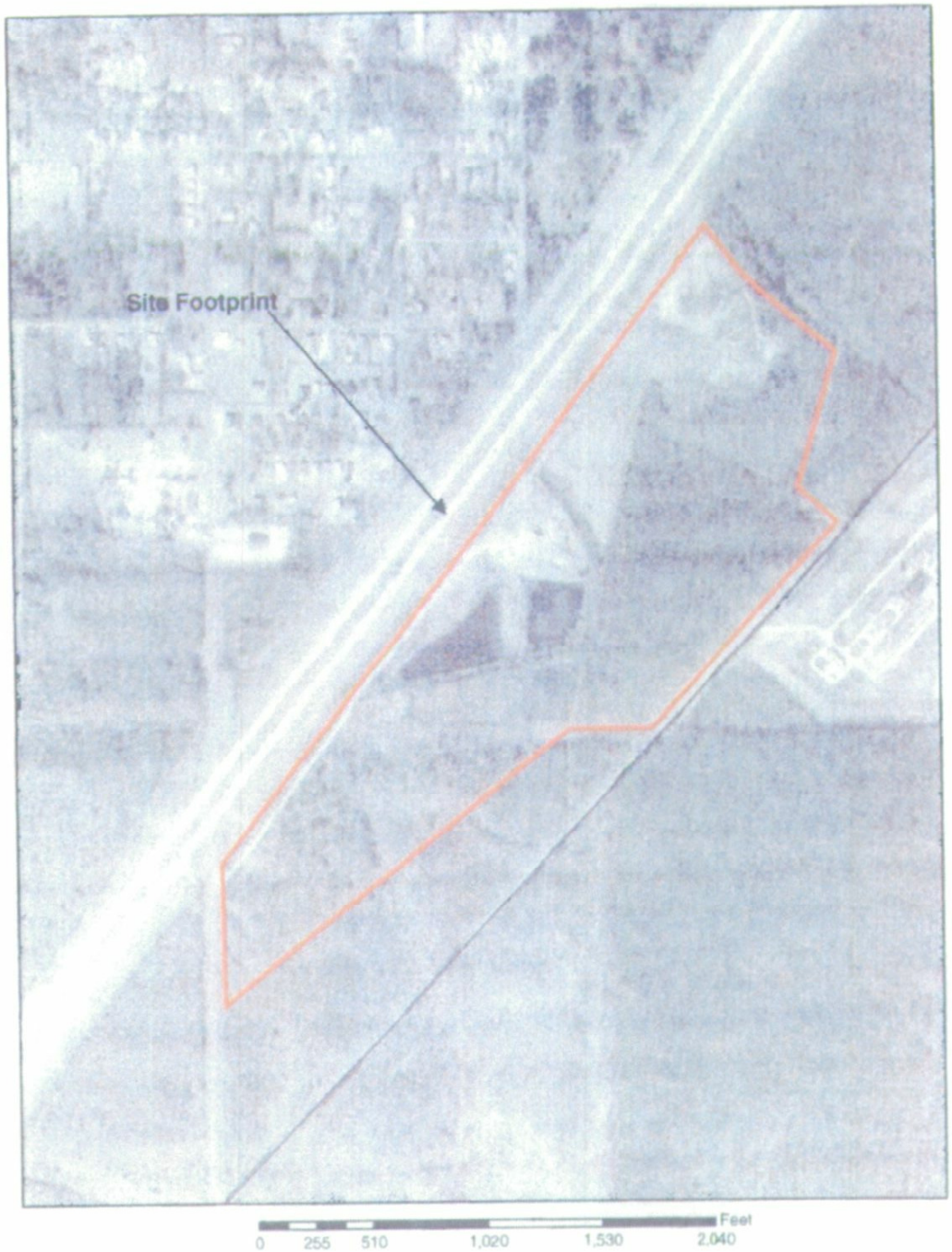


Figure 11. 1984 aerial photograph of the HMM C&D Landfill Project Area.

Source: ASCS

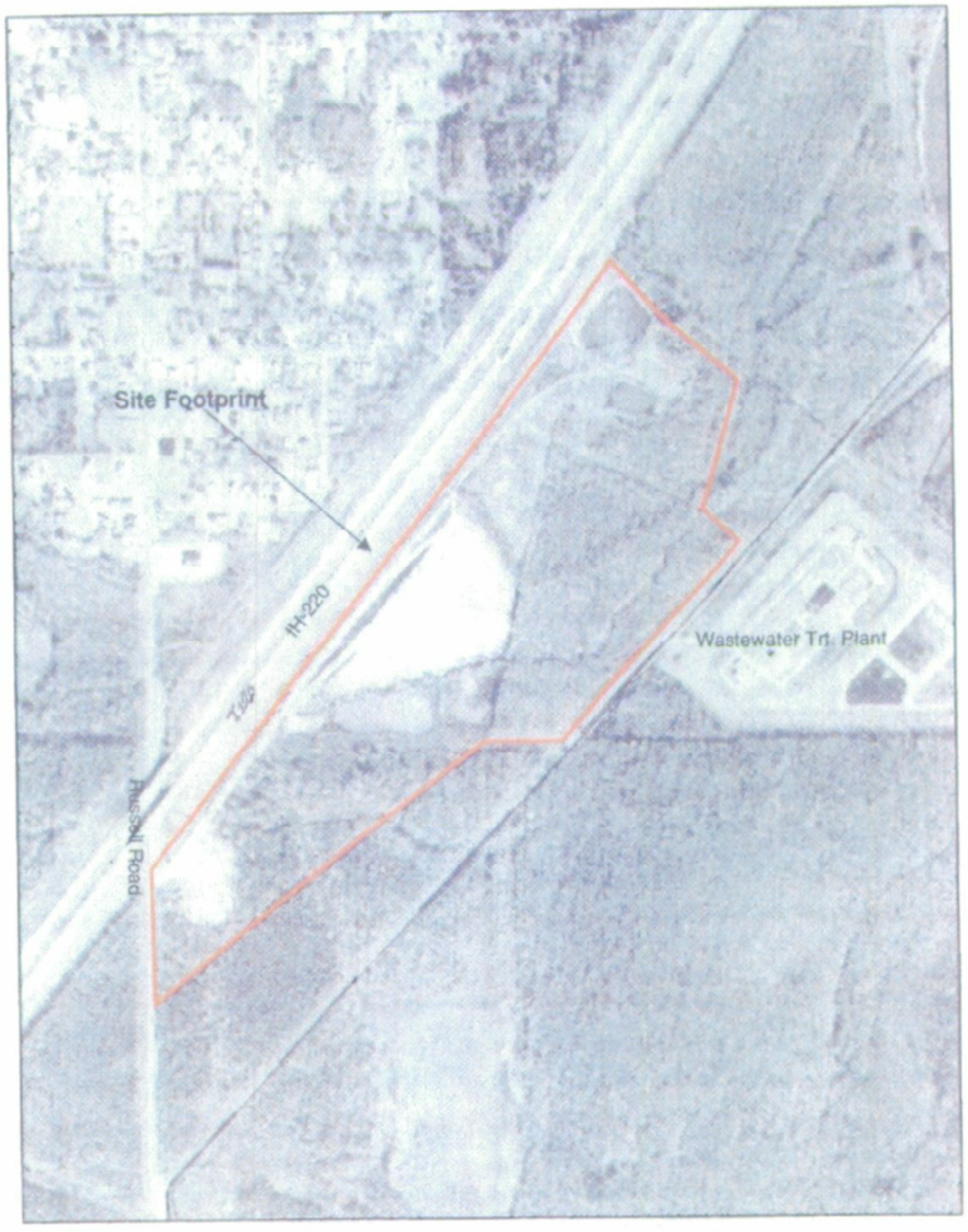


Figure 12. 1994 aerial photograph of the HMM C&D Landfill Project Area.

Source: ASCS

Figure 13. Location of sampling sites and transects for the determination of wetlands at the HMM C&D Landfill on March 15 and 16, 2004.

Figure 14. Location of potential jurisdictional wetlands along land adjacent to the HMM C&D Landfill on March 15 and 16, 2004.

Appendix B

Photograph 1. Soil profile at Sample Site 1.

Photograph 2. Soil pit at Sample Site 1.

Photograph 3. Overall view of Sample Site 1.

Photograph 4. Soil profile at Sample Site 2.

Photograph 5. Soil pit at Sample Site 2.

Photograph 6. Overall view of Sample Site 2.

Photograph 7. Soil profile at Sample Site 3.

Photograph 8. Soil pit at Sample Site 3.

Photograph 9. Overall view of Sample Site 3.

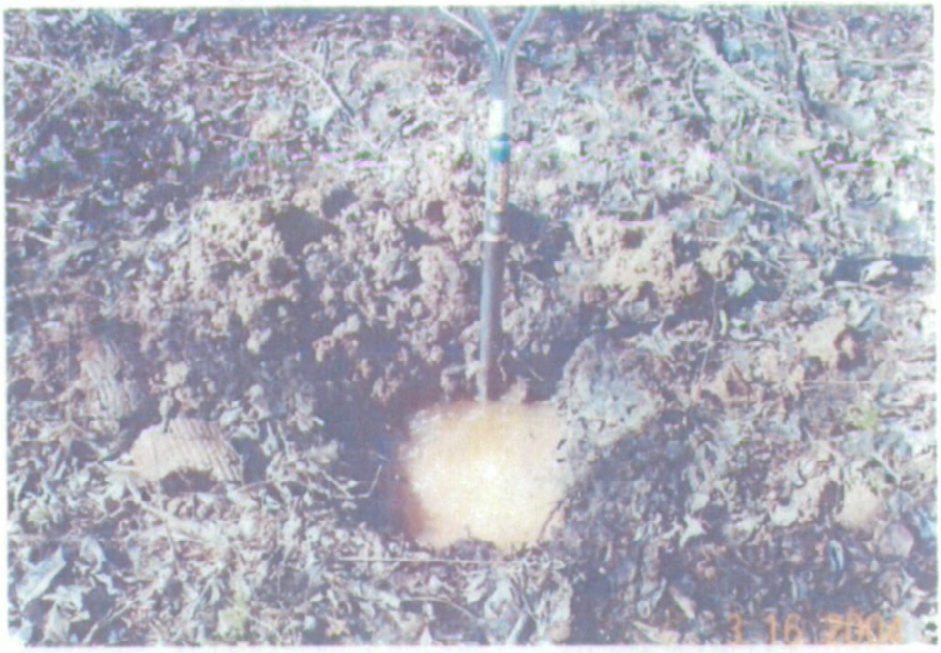
Photograph 10. Stream flowing adjacent to Sample Site 3..

Photograph 11. Soil profile at Sample Site 4.

Photograph 12. Soil pit at Sample Site 4.

Photograph 13. Overall view of Sample Site 4.

Photograph 14. Soil profile at Sample Site 5.



Photograph 15. Soil pit at Sample Site 5.

Photograph 16. Overall view of Sample Site 5. Green vegetation was located on areas above the water table.

Photograph 17. Soil profile at Sample Site 6.

Photograph 18. Soil pit at Sample Site 5.

Photograph 19. Overall view of Sample Site 5.

Photograph 20. Soil profile at Sample Site 7.

Photograph 21. Soil pit at Sample Site 7.

Photograph 22. Overall view of Sample Site 7.

Photograph 23. Typical wetland area located on the southeast side of the C&D Landfill.

Photograph 24. Another wetland area located on the southeast side of the C&D Landfill. Note the moss dominating this site.

Photograph 25. Another wetland area located on the southeast side of the C&D Landfill. This was disturbed in the past and is now dominated by green ash.

Photograph 26. Upstream view of the remnants of the original stream that was rechanneled at the C&D Landfill.

Photograph 27. Downstream view of the remnants of the original stream that was rechanneled at the C&D Landfill.

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

Project/Site: HMM C&D Landfill
Date: 3/15/2004
Applicant/Owner: Harrelson Materials Management
County: Caddo
Investigator: Lynn Kitchen
State: Louisiana

Do Normal Circumstances exist on the site?	Yes	Community ID:
Is the site significantly disturbed (Atypical Situation)?	No	Transect ID:
Is the area a potential Problem Area?	Yes	Plot ID: 1
(if needed, explain on reverse)		
Red soils which do not show hydric characteristics		

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Sugarberry	Tree	FACW			
2. Honey Locust	Tree	FAC			
3. Sugarberry	Sapling	FACW			
4. Black Mulberry	Sapling	UPL			
5. Deciduous Yaupon	Shrub	FACW-			
6. Japanese Honeysuckle	Vine	FAC-			
7. Wild Carrot	Herb	UPL			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 57%

Remarks: The site meets the vegetation criteria for wetlands because greater than 50% of the dominant plants are FAC, FACW, or OBL.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

_X_ No Recorded Data Available

Field Observations:

Depth of Surface Water: None (in.)

Depth to Free Water in Pit: >15 (in.)

Depth to Saturated Soil: >15 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- _____ Inundated
- _____ Saturated in Upper 12 in.
- _____ Water Marks
- _____ Drift Lines
- _____ Sediment Deposits
- _____ Drainage Patterns in Wetlands

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

Remarks: The site did not meet the hydrology criteria for wetlands because no primary or secondary indicators of wetland hydrology were observed.

SOILS

Map Unit Name
(Series and Phase): Moreland Clay

Drainage Class: Somewhat Poorly Drained

Field Observations
Taxonomy (Subgroup): Fine, Mixed, Thermic Vertic Hapludolls
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2	O	5YR 3/2	5YR 3/3	40	Clay Mostly humus and OM
2-8	Ap	5YR 3/3	None	---	Clay-Blocky Structure
8-16	A1	5YR 3/3	None	---	Clay--Fragmented

Hydric Soil Indicators:

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

Remarks: The site does not meet the hydric soil criteria because no hydric soil indicators were observed. Moreland soils are listed as hydric soils only when frequently flooded and this area is not frequently flooded.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes		
Wetland Hydrology Present?	No		
Hydric Soils Present?	No	Is this Sampling Point within a Wetland?	No

Remarks: The site is not a wetland because the hydrology and hydric soil criteria were not met.

DATA FORM
DOMINANT VEGETATION DETERMINATION

Field Investigator: Lynn Kitchen Date: 3/15/2004
Project/Site: HMM C&D Landfill State: LA County: Caddo
Applicant/Owner: Harrelson Materials Management Sample Site: 1

	Tree Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Sugarberry (*Celtis laevigata*)	FACW	50	4	38	1*
2.	Honey Locust (*Gleditsia triacanthos*)	FAC	15	2	10.5	2*
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	49	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	24.5	9.80

	Sapling Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Sugarberry (*Celtis laevigata*)	FACW	10	2	10.5	1*
2.	Deciduous Yaupon (*Ilex decidua*)	FACW-	3	1	3	2
3.	Black Mulberry (*Morus nigra*)	UPL	10	2	10.5	1*
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	24	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	12	4.80

DATA FORM
DOMINANT VEGETATION DETERMINATION

	Shrub Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Deciduous Yaupon (*Ilex decidua*)	FACW-	20	3	20.5	1*
2.	Southern Dewberry (*Rubus trivialis*)	FAC	3	1	3	2
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						

Sum of Midpoints	24	20% Midpoint
Dominance Threshold Number Equals 50% x Sum of Midpoints	12	4.80

	Woody Vine Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Japanese Honeysuckle (*Lonicera japonica*)	FAC-	5	1	3	1*
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						

Sum of Midpoints	3	20% Midpoint
Dominance Threshold Number Equals 50% x Sum of Midpoints	1.5	0.60

DATA FORM
DOMINANT VEGETATION DETERMINATION

	Herbaceous Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Canada Wildrye (*Elymus canadensis*)	FAC	15	2	10.5	2
2.	Wild Carrot (*Daucus carrota*)	UPL	40	4	38	1*
3.	Common Chickweed (*Stellaria media*)	FACU	5	1	3	3
4.	Langlois Violet (*Viola langloisii*)	FACW-	10	2	10.5	2
5.	Bedstraw (*Galium aparine*)	FACU	10	2	10.5	2
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						
25.						
				Sum of Midpoints	73	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	36.5	14.60

[1]Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0)

[2]To determine the dominants, first rank the species by their midpoints. Next, cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) plus any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

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

Project/Site: HMM C&D Landfill
Date: 3/15/2004
Applicant/Owner: Harrelson Materials Management
County: Caddo
Investigator: Lynn Kitchen
State: Louisiana

Do Normal Circumstances exist on the site?	Yes	Community ID:
Is the site significantly disturbed (Atypical Situation)?	No	*Transect ID:*
Is the area a potential Problem Area?	Yes	Plot ID: 2
(if needed, explain on reverse)		
Red soils which do not show hydric characteristics		

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Red Clover	Herb	FACU-			
2. Annual Sumpweed	Herb	FAC			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 50%

Remarks: The site does not meet the vegetation criteria for wetlands because 50% or less of the dominant plants are FAC, FACW, or OBL.

HYDROLOGY

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

Field Observations:
- Depth of Surface Water: None (in.)
- Depth to Free Water in Pit: >18 (in.)
- Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 in.
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

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

Remarks: The site did not meet the hydrology criteria for wetlands because no primary or secondary indicators of wetland hydrology were observed.

SOILS

Map Unit Name
(Series and Phase): Gallion Silty Clay Loam

Drainage Class: Well Drained

Field Observations
Taxonomy (Subgroup): Typic Hapludalfs

Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2	O	5YR 4/3	—	—	SiCl mixed with OM
2-10	Ap	10YR 4/3	10YR 6/1 10YR 5/8 5YR 5/8	5 20 5	SaCl
10-18	A1	5YR 4/3	None	—	Clay

Hydric Soil Indicators:

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

Remarks: The site does not meet the hydric soil criteria because no hydric soil indicators were observed. Gallion soils are listed as hydric soils, but no hydric characteristics were observed. The soils were also greatly disturbed by excavation several years ago and profile characteristics were lost.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	No		
Wetland Hydrology Present?	No		
Hydric Soils Present?	No	Is this Sampling Point within a Wetland?	No

Remarks: The site is not a wetland because the vegetation, hydrology and hydric soil criteria for wetland determination were not met.

DATA FORM
DOMINANT VEGETATION DETERMINATION

Field Investigator: Lynn Kitchen Date: 3/15/2004
Project/Site: HMM C&D Landfill State: LA County: Caddo
Applicant/Owner: Harrelson Materials Management Sample Site: 2

Tree Species:		Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	None					
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	0	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	0.0	0.00

Sapling Species:		Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	None					
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	0	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	0.0	0.00

DATA FORM
DOMINANT VEGETATION DETERMINATION

	Shrub Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Southern Dewberry (*Rubus trivialis*)	FAC	20	3	20.5	1*
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						

Sum of Midpoints	21	20% Midpoint
Dominance Threshold Number Equals 50% x Sum of Midpoints	10.5	4.20

	Woody Vine Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	None					
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						

Sum of Midpoints	0	20% Midpoint
Dominance Threshold Number Equals 50% x Sum of Midpoints	0.0	0.00

DATA FORM
DOMINANT VEGETATION DETERMINATION

	Herbaceous Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Bedstraw (*Galium aparine*)	FACU	5	1	3	5
2.	*Carex* spp.	FAC?	25	3	20.5	3
3.	Purple Vetch (*Vicia dasycarpa*)	UPL	10	2	10.5	4
4.	Carolina Geranium (*Geranium carolinianum*)	UPL	2	1	3	5
5.	Curly Dock (*Rumex crispus*)	FAC	1	1	3	5
6.	Red Clover (*Trifolium pratense*)	FACU-	30	4	38	2*
7.	Annual Sumpweed (*Iva annua*)	FAC	90	6	85.5	1*
8.	Giant Ragweed (*Ambrosia trifida*)	FAC	15	2	10.5	4
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						
25.						
				Sum of Midpoints	174	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	87	34.80

[1]Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0)

[2]To determine the dominants, first rank the species by their midpoints. Next, cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) plus any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

DATA FORM
DOMINANT VEGETATION DETERMINATION

Field Investigator: Lynn Kitchen Date: 3/15/2004
Project/Site: HMM C&D Landfill State: LA County: Caddo
Applicant/Owner: Harrelson Materials Management Sample Site: 3

	Tree Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Sugarberry (*Celtis laevigata*)	FACW	30	4	38	1*
2.	Honey Locust (*Gleditsia triacanthos*)	FAC	30	4	38	1*
3.	Black Mulberry (*Morus nigra*)	UPL	5	1	3	3
4.	Redbud (*Cercis canadensis*)	FACU-	25	3	20.5	2*
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						

Sum of Midpoints	100	20% Midpoint
Dominance Threshold Number Equals 50% x Sum of Midpoints	50	20.00

	Sapling Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Hawthorn (*Crataegus sp.*)	FACU?	25	3	20.5	1*
2.	Honey Locust (*Gleditsia triacanthos*)	FAC	10	2	10.5	2*
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						

Sum of Midpoints	31	20% Midpoint
Dominance Threshold Number Equals 50% x Sum of Midpoints	15.5	6.20

DATA FORM
DOMINANT VEGETATION DETERMINATION

Shrub Species:		Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	None					
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	0	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	0.0	0.00

Woody Vine Species:		Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Green Briar (*Smilax rotundifolia*)	FAC	15	2	10.5	1*
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	11	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	5.5	2.20

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

Project/Site: HMM C&D Landfill
Applicant/Owner: Harrelson Materials Management
Investigator: Lynn Kitchen

Date: 3/15/2004
County: Caddo
State: Louisiana

Do Normal Circumstances exist on the site?	Yes	Community ID:
Is the site significantly disturbed (Atypical Situation)?	No	Transect ID:
Is the area a potential Problem Area?	Yes	Plot ID: 3
(if needed, explain on reverse)		

Red soils which do not show hydric characteristics

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Sugarberry	FACW	Tree			
2. Honey Locust	FAC	Tree			
3. Redbud	FACU-	Tree			
4. Hawthorn	FACU?	Sapling			
5. Honey Locust	FAC	Sapling			
6. Green Briar	FAC	Vine			
7. Bedstraw	FACU	Herb			
8. Wild Carrot	UPL	Herb			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 50%

Remarks: The site does not meet the vegetation criteria for wetlands because 50% or less of the dominant plants are FAC, FACW, or OBL.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

_X_ No Recorded Data Available

Field Observations:

Depth of Surface Water: None (in.)

Depth to Free Water in Pit: ≥18 (in.)

Depth to Saturated Soil: ≥18 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- _____ Inundated
- _____ Saturated in Upper 12 in.
- _____ Water Marks
- _____ Drift Lines
- _____ Sediment Deposits
- _____ Drainage Patterns in Wetlands

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

Remarks: The site did not meet the hydrology criteria for wetlands because no primary or secondary indicators of wetland hydrology were observed.

SOILS

Map Unit Name
(Series and Phase): Buxin Clay, Occasionally Flooded

Drainage Class: Poorly Drained

Field Observations

Taxonomy (Subgroup): Vertic Hapludolls

Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2	O	5YR 3/3	---	---	SiCl
2-18	A	5YR 3/4	—	—	Cl

Hydric Soil Indicators:

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

Remarks: The site does not meet the hydric soil criteria because no hydric soil indicators were observed. Buxin soils are listed as hydric soils, but no hydric characteristics were observed. These soils are problem soils because of the red color and hydric characteristics are difficult to observe. However, the location of the soil with respect to the water table and the drainage characteristics of the area suggest that hydric characteristics are not present.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	No		
Wetland Hydrology Present?	No		
Hydric Soils Present?	No	Is this Sampling Point within a Wetland?	No

Remarks: The site is not a wetland because the vegetation, hydrology and hydric soil criteria for wetland determination were not met. The site is located adjacent to a stream, but approximately 5-6 ft. above the ordinary high water mark of the stream. Development of a wetland in this area is possible if drainage is captured by topography, but no indications of accumulations of water on the surface or in a shallow water table were observed.

DATA FORM
DOMINANT VEGETATION DETERMINATION

	Herbaceous Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Canada Wildrye (*Elymus canadensis*)	FAC	15	2	10.5	3
2.	Wild Carrot (*Daucus carrota*)	UPL	20	3	20.5	2*
3.	Carolina Geranium (*Geranium carolinianum*)	UPL	5	1	3	4
4.	Langlois Violet (*Viola langloisii*)	FACW-	1	1	3	4
5.	Bedstraw (*Gallium aparine*)	FACU	30	4	38.0	1*
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						
25.						
				Sum of Midpoints	75	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	37.5	15.00

[1]Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).

[2]To determine the dominants, first rank the species by their midpoints. Next, cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) plus any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

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

Project/Site: HMM C&D Landfill
Applicant/Owner: Harrelson Materials Management
Investigator: Lynn Kitchen

Date: 3/15/2004
County: Caddo
State: Louisiana

Do Normal Circumstances exist on the site?	Yes	Community ID:
Is the site significantly disturbed (Atypical Situation)?	No	Transect ID:
Is the area a potential Problem Area?	Yes	Plot ID: 4
(if needed, explain on reverse)		
Red soils which do not show hydric characteristics		

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Sugarberry	FACW	Tree	9. Bedstraw	Herb	FACU
2. Honey Locust	FAC	Tree			
3. Black Mulberry	UPL	Tree			
4. Hawthorn	FACU?	Sapling			
5. Sugarberry	FACW	Sapling			
6. Chinese Elm	UPL	Shrub			
7. Southern Dewberry	FAC	Shrub			
8. Wild Carrot	UPL	Herb			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 44%

Remarks: The site does not meet the vegetation criteria for wetlands because 50% or less of the dominant plants are FAC, FACW, or OBL.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

_X_ No Recorded Data Available

Field Observations:

Depth of Surface Water: None (in.)

Depth to Free Water in Pit: >18 (in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 in.
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

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

Remarks: The site did not meet the hydrology criteria for wetlands because no primary or secondary indicators of wetland hydrology were observed.

SOILS

Map Unit Name
(Series and Phase): Buxin Clay, Occasionally Flooded

Drainage Class: Poorly Drained

Field Observations
Confirm Mapped Type? (Yes) No

Taxonomy (Subgroup): Vertic Hapludolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2	O	7.5YR 5/2	---	---	Cl
2-8	A	5YR 3/3	---	---	Cl, Some shell fragments
8-18	B	5YR 3/3	5YR 4/1	10	Cl

Hydric Soil Indicators:

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

Remarks: The site does not meet the hydric soil criteria because no hydric soil indicators were observed. Buxin soils are listed as hydric soils, but no hydric characteristics were observed. These soils are problem soils because of the red color and hydric characteristics are difficult to observe. However, the location of the soil with respect to the water table and the drainage characteristics of the area suggest that hydric characteristics are not present.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	No		
Wetland Hydrology Present?	No		
Hydric Soils Present?	No	Is this Sampling Point within a Wetland?	No

Remarks: The site is not a wetland because the vegetation, hydrology and hydric soil criteria for wetland determination were not met. The site is located adjacent to a wetland area where the water table is shallow and even standing water is present. No water table was evident on this site, in spite of the fact that the investigation took place during the wet season after recent rains.

DATA FORM
DOMINANT VEGETATION DETERMINATION

Field Investigator: Lynn Kitchen Date: 3/15/2004
Project/Site: HMM C&D Landfill State: LA County: Caddo
Applicant/Owner: Harrelson Materials Management Sample Site: 4

	Tree Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Sugarberry (*Celtis laevigata*)	FACW	10	2	10.5	2*
2.	Honey Locust (*Gleditsia triacanthos*)	FAC	10	2	10.5	2*
3.	Black Mulberry (*Morus nigra*)	UPL	20	3	20.5	1*
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						

Sum of Midpoints	42	20% Midpoint
Dominance Threshold Number Equals 50% x Sum of Midpoints	21	8.40

	Sapling Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Hawthorn (*Crataegus sp.*)	FACU?	10	2	10.5	2*
2.	Sugarberry (*Celtis laevigata*)	FACW	25	3	20.5	1*
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						

Sum of Midpoints	31	20% Midpoint
Dominance Threshold Number Equals 50% x Sum of Midpoints	15.5	6.20

DATA FORM
DOMINANT VEGETATION DETERMINATION

	Shrub Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Chinese Elm (*Ulmus parvifolia*)	UPL	5	1	3	1*
2.	Southern Dewberry (*Rubus trivialis*)	FAC	1	1	3	1*
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	6	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	3	1.20

	Woody Vine Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	None					
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	11	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	5.5	2.20

DATA FORM
DOMINANT VEGETATION DETERMINATION

	Herbaceous Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Henbit (*Lamium amplexicaule*)	UPL	1	1	3	2
2.	Wild Carrot (*Daucus carrota*)	UPL	40	4	38	1*
3.	Langlois Violet (*Viola langloisii*)	FACW-	1	1	3	2
4.	Bedstraw (*Galium aparine*)	FACU	40	4	38	1*
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						
25.						
				Sum of Midpoints	82	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	41	16.40

[1]Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0)

[2]To determine the dominants, first rank the species by their midpoints. Next, cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) plus any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

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

Project/Site: HMM C&D Landfill
Applicant/Owner: Harrelson Materials Management
Investigator: Lynn Kitchen

Date: 3/16/2004
County: Caddo
State: Louisiana

Do Normal Circumstances exist on the site?	Yes	Community ID:
Is the site significantly disturbed (Atypical Situation)?	No	Transect ID:
Is the area a potential Problem Area?	Yes	Plot ID: 5
(if needed, explain on reverse)		
Red soils which do not show hydric characteristics		

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Sugarberry	FACW	Tree			
2. American Elm	FACW	Tree			
3. Sugarberry	FACW	Sapling			
4. Choke Cherry	FACU	Shrub			
5. Spike Rush	FACW	Herb			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 80%

Remarks: The site meets the vegetation criteria for wetlands because greater than 50% of the dominant plants are FAC, FACW, or OBL.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

_X_ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0-6 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 in.
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

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

Remarks: The site met the hydrology criteria for wetlands because at two primary indicators of wetland hydrology were observed.

SOILS

Map Unit Name
(Series and Phase): Buxin Clay, Occasionally Flooded

Drainage Class: Poorly Drained

Field Observations
Taxonomy (Subgroup): Vertic Hapludolls

Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	O	10YR 3/2	---	---	Mostly OM, then clay
4-10	A	5YR 3/3	---	---	Cl--Tight
10-18	B	5YR 3/3	---	---	Cl--Fragmented

Hydric Soil Indicators:

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

Remarks: The site probably meets the hydric soil criteria even though no obvious hydric soil indicators were observed. Buxin soils are listed as hydric soils, and the hydrology to support hydric soils was present. These soils are problem soils because of the red color and hydric characteristics are difficult to observe. However, the location of the soil with respect to the water table and the drainage characteristics of the area suggest that hydric soils are present. The site may be a transitional area with weak hydric indicators.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes		
Wetland Hydrology Present?	Yes		
Hydric Soils Present?	Yes	Is this Sampling Point within a Wetland?	Yes

Remarks: The site is a wetland because the vegetation, hydrology and hydric soil criteria for wetland determination were met. Field observations indicate that the site is probably wet early in the year and then dries out during the summer or drier periods of weather.

DATA FORM
DOMINANT VEGETATION DETERMINATION

Field Investigator: Lynn Kitchen **Date:** 3/15/2004
Project/Site: HMM C&D Landfill **State:** LA **County:** Caddo
Applicant/Owner: Harrelson Materials Management **Sample Site:** 5

Tree Species:		Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Sugarberry (*Celtis laevigata*)	FACW	30	4	38	1*
2.	American Elm (*Ulmus americana*)	FACW	40	4	38	1*
3.	Black Willow (*Salix nigra*)	OBL	5	1	3	2
4.	Winged Elm (*Ulmus alata*)	FACU+	5	1	3	2
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	82	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	41	16.40

Sapling Species:		Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Black Tupelo (*Nyssa sylvatica*)	FAC	5	1	3	2
2.	Sugarberry (*Celtis laevigata*)	FACW	20	3	20.5	1*
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	24	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	12	4.80

DATA FORM
DOMINANT VEGETATION DETERMINATION

	Shrub Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Choke Cherry (*Prunus virginiana*)	FACU	30	4	38	1*
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	38	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	19	.7.60

	Woody Vine Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	None					
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	11	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	5.5	2.20

DATA FORM
DOMINANT VEGETATION DETERMINATION

	Herbaceous Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	*Eleocharis* sp.	FACW	5	1	3	1*
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						
25.						
				Sum of Midpoints	3	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	1.5	0.60

[1]Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0)

[2]To determine the dominants, first rank the species by their midpoints. Next, cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) plus any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

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

Project/Site: HMM C&D Landfill
Applicant/Owner: Harrelson Materials Management
Investigator: Lynn Kitchen

Date: 3/16/2004
County: Caddo
State: Louisiana

Do Normal Circumstances exist on the site?	Yes	Community ID:
Is the site significantly disturbed (Atypical Situation)?	No	Transect ID:
Is the area a potential Problem Area?	Yes	Plot ID: 6
(if needed, explain on reverse)		
Red soils which do not show hydric characteristics		

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Sugarberry	Tree	FACW			
2. American Elm	Tree	FACW			
3. Water Elm	Sapling	OBL			
4. Eastern Hophornbeam	Sapling	FACU-			
5. Water Elm	Shrub	OBL			
6. Canada Wildrye	Herb	FAC			
7. Unknown grass	Herb	?			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): >70%

Remarks: The site meets the vegetation criteria for wetlands because greater than 50% of the dominant plants are FAC, FACW, or OBL.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

_X_ No Recorded Data Available

Field Observations:

Depth of Surface Water: None (in.)

Depth to Free Water in Pit: >18 (in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- _____ Inundated
- _____ Saturated in Upper 12 in.
- _____ Water Marks
- _____ Drift Lines
- _____ Sediment Deposits
- _____ Drainage Patterns in Wetlands

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

Remarks: The site did not meet the hydrology criteria for wetlands because no primary or secondary indicators of wetland hydrology were observed.

SOILS

Map Unit Name
(Series and Phase): Buxin Clay, Occasionally Flooded

Drainage Class: Poorly Drained

Field Observations
Confirm Mapped Type? (Yes) No

Taxonomy (Subgroup): Vertic Hapludolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1	O	5YR 3/3	---	---	Cl or ClLo
1-8	A	5YR 3/3	---	---	Cl
8-18	B	5YR 3/3	---	---	Cl

Hydric Soil Indicators:

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

Remarks: The site meets the hydric soil criteria even though no obvious hydric soil indicators were observed. Buxin soils are listed as hydric soils, and the hydrology to support hydric soils was present. These soils are problem soils because of the red color and hydric characteristics are difficult to observe.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes		
Wetland Hydrology Present?	No		
Hydric Soils Present?	Yes	Is this Sampling Point within a Wetland?	No

Remarks: The site is not a wetland because the hydrology criteria for wetland determination was not met. Field observations indicate that the site is probably wet early in the year and then dries out during the summer or drier periods of weather. Because of the presence of wetland vegetation, the site may be a transitional zone, just on the upland edge. Several of the tree species could not be confirmed because of the lack of foliage in the winter. A spring evaluation may provide a more definitive determination.

DATA FORM
DOMINANT VEGETATION DETERMINATION

Field Investigator: Lynn Kitchen **Date:** 3/16/2004
Project/Site: HMM C&D Landfill **State:** LA **County:** Caddo
Applicant/Owner: Harrelson Materials Management **Sample Site:** 6

	Tree Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Sugarberry (*Celtis laevigata*)	FACW	30	4	38	1*
2.	American Elm (*Ulmus americana*)	FACW	20	3	20.5	2*
3.	Honey Locust (*Gleditsia triacanthos*)	FAC	15	2	10.5	3
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	69	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	34.5	13.80

	Sapling Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Water Elm (*Planera aquatica*)	OBL	40	4	38	1*
2.	Swamp Privet (*Forestiera acuminata*)	OBL	15	2	10.5	2
3.	Eastern Hophornbeam (*Ostrya virginiana*)	FACU-	30	4	38	1*
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	87	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	43.5	17.40

DATA FORM
DOMINANT VEGETATION DETERMINATION

Shrub Species:		Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Water Elm (*Planera aquatica*)	OBL	5	1	3	1*
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	3	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	1.5	0.60

Woody Vine Species:		Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	None					
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	11	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	5.5	2.20

DATA FORM
DOMINANT VEGETATION DETERMINATION

	Herbaceous Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Spike Rush (*Eleocharis* sp.)	FACW	20	3	20.5	3
2.	Canada Wildrye (*Elymus canadensis*)	FAC	40	4	38	2*
3.	Unknown Grass	?	60	5	63	1*
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						
25.						
				Sum of Midpoints	122	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	61	24.40

[1]Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0)

[2]To determine the dominants, first rank the species by their midpoints. Next, cumulatively sum the midpoints of the ranked species until *50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance* threshold number) plus any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

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

Project/Site: HMM C&D Landfill
Applicant/Owner: Harrelson Materials Management
Investigator: Lynn Kitchen

Date: 3/16/2004
County: Caddo
State: Louisiana

Do Normal Circumstances exist on the site?	Yes	Community ID:
Is the site significantly disturbed (Atypical Situation)?	No	Transect ID:
Is the area a potential Problem Area?	Yes	Plot ID: 7
(if needed, explain on reverse)		
Red soils which do not show hydric characteristics		

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Water Elm	Tree	OBL			
2. Water Elm	Sapling	OBL			
3. Swamp Privet	Sapling	OBL			
4. Honey Locust	Sapling	FAC			
5. Water Elm	Shrub	OBL			
6. Spike Rush	Herb	FACW			
7. Canada Wildrye	Herb	FAC			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: The site meets the vegetation criteria for wetlands because greater than 50% of the dominant plants are FAC, FACW, or OBL.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

_X_ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0-1 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- _X_ Inundated
- _X_ Saturated in Upper 12 in.
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- _X_ Drainage Patterns in Wetlands

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

Remarks: The site met the hydrology criteria for wetlands because three primary indicators of wetland hydrology were observed.

SOILS

Map Unit Name
(Series and Phase): Buxin Clay, Occasionally Flooded
Drainage Class: Poorly Drained
Field Observations
Taxonomy (Subgroup): Vertic Hapludolls
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1	O	5YR 3/1	—	---	SiLo
1-6	A	5YR 3/3	—	—	Cl
6-18	B	5YR 3/3	—	---	Cl

Hydric Soil Indicators:

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

Remarks: The site meets the hydric soil criteria even though no obvious hydric soil indicators were observed. Buxin soils are listed as hydric soils, and the hydrology to support hydric soils was present. These soils are problem soils because of the red color and hydric characteristics are difficult to observe.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes		
Wetland Hydrology Present?	Yes		
Hydric Soils Present?	Yes	Is this Sampling Point within a Wetland?	Yes

Remarks: The site is a wetland because the hydric soil, vegetation, and hydrology criteria for wetland determination were met. It is similar to Site 6, except that the hydrology criteria was met.

DATA FORM
DOMINANT VEGETATION DETERMINATION

Field Investigator: Lynn Kitchen Date: 3/16/2004
Project/Site: HMM C&D Landfill State: LA County: Caddo
Applicant/Owner: Harrelson Materials Management Sample Site: 7

	Tree Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Sugarberry (*Celtis laevigata*)	FACW	5	1	3	2
2.	Water Elm (*Planera aquatica*)	OBL	10	2	10.5	1*
3.	Honey Locust (*Gleditsia triacanthos*)	FAC	3	1	3	2
4.	Hawthorn (*Crataegus sp.*)	FACU?	5	1	3	2
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	20	20% Midpoint
	Dominance Threshold Number Equals 50% x Sum of Midpoints				10	4.00

	Sapling Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Water Elm (*Planera aquatica*)	OBL	15	2	10.5	1*
2.	Swamp Privet (*Forestiera acuminata*)	OBL	10	2	10.5	1*
3.	Hawthorn (*Crataegus sp.*)	FACU?	5	1	3	2
4.	Honey Locust (*Gleditsia triacanthos*)	FAC	15	2	10.5	1*
5.	Winged Elm (*Ulmus alata*)	FACU+	5	1	3	2
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	38	20% Midpoint
	Dominance Threshold Number Equals 50% x Sum of Midpoints				19	7.60

DATA FORM
DOMINANT VEGETATION DETERMINATION

	Shrub Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Water Elm (*Planera aquatica*)	OBL	3-4	1	3	1*
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	3	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	1.5	0.60

	Woody Vine Species:	Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	None					
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
				Sum of Midpoints	11	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	5.5	2.20

DATA FORM
DOMINANT VEGETATION DETERMINATION

Herbaceous Species:		Indicator Status	Percent Foliar Cover	Cover Class[1]	Midpoint of Cover Class[1]	Dominant?[2]
1.	Spike Rush (*Eleocharis* sp.)	FACW	40	4	38	1*
2.	Canada Wildrye (*Elymus canadensis*)	FAC	20	3	20.5	2*
3.	Bedstraw (*Galium aparine*)	FACU	5	1	3	3
4.						
5.						
6.						
7.						
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9.						
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				Sum of Midpoints	62	20% Midpoint
				Dominance Threshold Number Equals 50% x Sum of Midpoints	31	12.40

[1]Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-85% (85.5); 7 = 96-100% (98.0)

[2]To determine the dominants, first rank the species by their midpoints. Next, cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) plus any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

Appendix C

Lynn M. Kitchen, Ph.D.
Principal Scientist

EDUCATION

B.S.	Wildlife and Fisheries Sciences	Texas A&M University	1976
M.S.	Range Science	Texas A&M University	1977
Ph.D.	Agronomy-Crop Science	University of Kentucky	1980

PROFESSIONAL BACKGROUND

Dr. Kitchen is an environmental scientist with broad-based experience in several aspects of environmental studies. His area of expertise includes environmental assessments, solid and hazardous waste management, wetland delineations and mitigation, and environmental compliance audits. For last 10 years, he has concentrated his efforts in the area of natural resource management with an emphasis on wetland and stream studies. He has successfully prepared Section 404 Permits and Nationwide permits for several locations in Texas, Louisiana, Mississippi, and Ohio. He served as project manager for many projects with an emphasis on GIS, environmental assessments, wetland delineations and mitigation, stream rechanneling and biological studies. He is currently the Principal Scientist at Adams Environmental, Inc.

MEMBERSHIPS

Society of Wetland Scientists
President, Ground Zero Youth Outreach, Inc.
Youth Program Director/Minister for Sonrise Fellowship Church
Member Air and Waste Management Association
Board of Directors, Bexar Land Trust, Inc.

WETAND AND STREAM PROJECT EXPERIENCE

- Prepared the Section 404 Individual Permit and mitigation plan for construction of a shopping center in Kyle, Texas
- Currently preparing a Nationwide Permit 39 and mitigation plan for construction of a shopping center in Leander, Texas.
- Prepared the application for a Section 404 Permit for the construction of a new landfill near Wilmot, OH. Currently, the antidegradation report and mitigation plan are being developed for impacts to a stream and 11.8 acres of wetlands. The project is currently in the final permitting phase and a mitigation plan involving the creation of about 7,000 ft. of intermittent stream and 17.4 acres of wetlands has been submitted to the USACE.
- Prepared the Nationwide Permit 12 pre-construction notification and Section 401 Certification for the installation of a 12-mile long sewer line along a stream and river in

Muskingum County, Ohio. The alignment was subsequently changed and an amendment was prepared for the changes.

- Assessed impacts to surface waters for the construction of a shopping center in northwest San Antonio, Texas. The assessment resulted in design changes to prevent significant impacts and Section 404 permitting for the project.
- Assessed a wetland and stream for the construction of a shopping center in Georgetown, Texas.
- Assessed a stream for jurisdictional status for the construction of a shopping center in Laredo, Texas.
- Investigated the causes of algal infestations and leakage of ponds located at the Lajitas Resort in Lajitas, Texas.
- Preparing the Nationwide Permit 14 and endangered species assessment for the construction of a 3-mile road section in Northeast Bexar County for Bexar County. The road crosses several ephemeral and intermittent streams.
- Assessed a wetland adjacent to a landfill in Bedford, Ohio to avoid impacts that might require Section 404 Permitting.
- Prepared Nationwide Permit 3 notifications for 29 excavation/inspection sites for a pipeline for Colonial Pipeline Company in south Louisiana. The work included coordination with the New Orleans District of the U.S. Army Corps of Engineers, Louisiana Department of Natural Resources, and the U.S. Fish and Wildlife Service.
- Coordinated with the New Orleans District of the USACE to obtain an after the fact NWP-3 and Coastal Use Permit for a pipeline repair for Colonial Pipeline Company at a site on the southwest side of Lake Borgne near Shell Beach, LA. The permit is currently being reviewed.
- Coordinated with the Galveston and New Orleans District of the USACE to obtain a NWP-3 and Coastal Use Permit for a pipeline repair for Colonial Pipeline Company at a site adjacent to the Intracoastal Canal and the Sabine River just southest of Orange, Texas. The permit is currently being reviewed.
- Coordinated with the New Orleans District of the USACE to obtain an after the fact NWP-3 and Coastal Use Permit for a pipeline repair for Colonial Pipeline Company at a site on the north side of Lake Lery near Kenilworth, LA.
- Coordinated with the New Orleans District of the USACE to obtain an after the fact NWP-3 and Coastal Use Permit for a pipeline repair for Colonial Pipeline Company at a site on the south side of Lake Lery near Kenilworth, LA.
- Prepared a Nationwide Permit 12 and endangered species assessment for the construction of a 2-mile sewer line for the Southside Independent School District in San Antonio, Texas. The sewer line was to be bored under the Medina River.
- Conducted a surface water assessment for the proposed construction of a park in Live Oak, Texas.
- Conducted and endangered species (Golden Cheeked Warbler) and wetland assessment for the construction of a sports complex on the west side of San Antonio, Texas.

- Conducted an Endangered species and surface water assessment for the proposed site for construction of the Alamo Community College Northeast Campus.
- Prepared a surface water assessment for the rehabilitation of the San Antonio River at Brackenridge Park in San Antonio, Texas. It was determined that no wetlands would be impacted by the project. Construction along the river qualified for NWP-3 that allows for maintenance and repair activities along surface waters.
- Conducted a wetland and endangered species assessment for a 2300 acre parcel of land on Padre Island approximately 15 miles north of South Padre Island. Least tern habitat was observed and several issues identified including seagrass beds in Laguna Madre, coastal wetlands, coastal management zone, and jurisdictional areas below the mean high tide mark.
- Conducted a wetland and endangered species assessment for the replacement of a pipeline crossing an unnamed tributary to Black River near Bovina, Mississippi. The site was found to have no endangered species issues and fell under NWP-12 with no required notification.
- Conducted a wetland assessment for a 480 ft. guy wire antenna tower south of Port Isabel.
- Conducted a wetland assessment and stream jurisdictional determination for a parcel of land on the northwest side of San Antonio for H-E-B Grocery Company.
- Prepared a wetland delineation and Nationwide Permit 12 for the installation of a sewer line in Laredo, Texas.
- Served as technical advisor for the design of a wetland stormwater treatment system and wetland mitigation plan for the construction of a power plant near Jackson, OH.
- Conducted a wetland assessment and delineation for the construction of a retail grocery store in Friendswood, Texas. Two small wetlands were found on the site and it was determined that the site qualified for a post construction notice under Nationwide Permit 39.
- Conducted a wetland delineation for the expansion of a retail grocery store in Waco, Texas. A wetland was found on the site, but the wetland was determined to be potentially isolated and may not require permitting. Otherwise, a NWP-39 pre-construction notification would be required. The delineation is currently being prepared for USACE review.
- Conducted a wetland assessment for excavation and maintenance of a pipeline in Beaumont, Texas. It was determined that the excavation would not impact or fill wetlands and a Section 404 Permit would not be required.
- Assisted in the development of the wetland plant design for a 10-acre constructed wetland to be used for treatment of wastewater from the City of Lajitas, Texas. The project is currently in the design phase and construction is expected to be completed by September 2001.
- Conducted a wetland delineation for an 80 acre parcel of land near Krotz Springs, LA. The site consisted of a matrix of small wetlands which were mapped using transects and eventually topographic analyses. Specific mapping was used to locate an upland area for expansion of an oil refining facility.

- Currently preparing a Section 404 Permit for the construction of a parking lot for the Veterans Administration Hospital in San Antonio, Texas. Project involves filling of an ephemeral stream and compensation for impacts by enhancement of the existing stream channel.
- Reviewed a wetland delineation prepared for the construction of a new store in Plano, Texas. Found that an upland ditch had been improperly designated as jurisdictional waters of the U.S. Subsequently rewrote the wetland delineation to reflect changes.
- Prepared a Section 404 permit for the Hancock County Landfill near Findlay Ohio. The project included preparation of the Antidegradation Report and Section 401 Certification and development of a formal mitigation plan for construction of a new stream and 4.0 acre wetland. The site is now in the 5-year monitoring phase for mitigation.
- Delineated a 0.6 acre pond and prepared a report for the USACE to have a 1995 determination by the USACE to be extended for a future site of a grocery store. The site is a well-developed urban area in Rockport, Texas and the client desires to fill the pond to allow for construction of the store and parking facility.
- Conducted a wetland assessment and endangered species habitat survey (Black-Capped Vireo and Golden Cheeked Warbler) for a 1000-acre ranch near Canyon Lake, Texas.
- Preparing the Section 404 Permit for the rechanneling of Chippewa Creek near a Type IV landfill in Cleveland, Ohio. The project is currently in the pre-application phase.
- Conducted a Golden-Cheeked Warbler/Black-Capped Vireo habitat assessment for a 1000-acre ranch near Canyon Lake, Texas.
- Developed a GIS model to predict the establishment of new wetlands around a proposed reservoir in King William, Virginia. Data was collected from established reservoirs in the area and used as a basis for the model.
- Assisted in the design and construction of a treatment wetland system at a carbon black plant near Addis, LA. The system was used to treat sewage originating from bathrooms and showers in the plant.
- Delineated wetlands and determined level of damage caused by the release of sediments from a newly constructed landfill at Stewart Air National Guard Base in Newburgh, New York.
- Conducted a field reconnaissance to determine if a proposed pipeline to be installed by the San Antonio Water System would impact waters of the U.S. or if construction might require Section 404 Permitting. The project included documentation of vegetation communities associated with the impacted riparian areas and methods used to avoid and/or mitigate impacts.
- Conducted a wetland delineation for an electric cogeneration plant and associated pipeline for a confidential client in Geismar, Louisiana.
- Prepared a report to determine the status of a wastewater treatment lagoon as jurisdictional waters of the U.S. for a confidential client in Terra Haute, Indiana.
- Assisted in designing a constructed wetland for treatment of wastewater from East Central High School in Bexar County, Texas.

- Prepared a wetland delineation report and Nationwide Permit 26 for the Hancock County Landfill Expansion project near Findlay OH.
- Prepared a wetland delineation report and Section 404 permit application for the Franklin County Landfill Expansion near Columbus OH.
- Prepared a wetland delineation report and Section 404 permit for expansion of a water supply plant near Akron OH. Developed a mitigation banking site for compensation of lost wetland acreages associated with the water supply plant expansion.
- Prepared a Section 404 Permit and wetland delineation for the construction of a paint shop for Ford Motor Company in Lorain County, OH.
- Conducted wetland field reconnaissance study for a land parcel to be acquired by Abbott Laboratories - Columbus OH.
- Provided technical assistance in the development of a remedial design for contaminated wetlands for an industrial client - Jackson MS.
- Assisted in a wetland field reconnaissance study for a wastewater pump station to be constructed for the City - Houston TX.
- Provided biological monitoring services to ensure compliance of McCarthy Brothers Co. to recommendations in the EA and FONSI for the Pharr-Reynosa International Bridge. Included the restoration of a prior converted wetland into a wetland to collect stormwater from the bridge - Pharr TX.
- Audited pipeline, well, and compressor facility documentation for a client to determine if the *sites were in compliance with Section 404 Permitting regulations of the Clean Water Act* - Tuscaloosa County AL.
- Assisted the Jackson Office of Malcolm Pirnie by reviewing a wetland delineation and EPA wetland mitigation opinion for a Superfund site - Columbia MS.
- Conducted a wetland field reconnaissance study for GATX to locate potential wetland areas on a facility location. Completed a wetland assessment followed by a delineation for the Metropolitan Transit Authority - Houston TX.
- Conducted a habitat survey for Black-Capped Vireos and Golden-Cheeked Warblers, two federally endangered species, for a confidential client in San Antonio TX.

DEPARTMENT OF THE ARMY
VICKSBURG DISTRICT, CORPS OF ENGINEERS
4155 CLAY STREET
VICKSBURG, MISSISSIPPI 39183-3435

REPLY TO
ATTENTION OF:

July 22, 2004

Operations Division
Regulatory

SUBJECT: Regulatory Requirements - Unauthorized Land Clearing and Filling in Wetlands, Caddo Parish, Louisiana

Mr. Mike Harrelson
Harrelson Materials Management
Post Office Box 78102
1101 Russell Road
Shreveport, Louisiana 71137-8102

Dear Mr. Harrelson:

I am in receipt of the information you provided in response to our previous cease and desist directive for the unauthorized discharge of dredged/fill material into wetlands in conjunction with land clearing activities to facilitate the expansion of an existing debris disposal site in sections 21 and 22, T18N-R14W, Caddo Parish, Louisiana. The location of the work is depicted on the attached map (enclosure 1).

Information pertinent to the subject activity has been gathered for use in reviewing the work and determining what course of action should be taken. Our initial investigation is now complete, and I have decided not to pursue additional enforcement action at this time, provided you submit an application for an after-the-fact permit for the completed work in wetlands (enclosure 2), as well as for any additional work you may propose to do in this area. Before we can accept the after-the-fact permit application, however, you must sign and return the enclosed tolling agreement (enclosure 3). For your convenience, I have enclosed an application for a Department of the Army permit (ENG Form 4345) with instructions (enclosure 4). The completed application, along with signed copies of both the tolling agreement and certification of legal interest, should be submitted to this office within 21 days of the date of this letter. To expedite the evaluation process, please refer to identification No. 200310660 when submitting the application. For your information, I have enclosed a copy of the basis of our determination (enclosure 5) and appeals form, in the event you wish to appeal this jurisdictional determination (enclosure 6).

Meanwhile, any work you conduct outside the limits of my regulatory jurisdiction will be performed at your own risk and should not be undertaken if it is dependent upon work requiring authorization from the Corps of Engineers. Until such time as you may be granted a Department of the Army permit, further work in wetlands or other waters of the United States is prohibited.

You should also be aware that following my public interest review, modifications, protective measures, mitigation or possibly even restoration of the area may be necessary.

By a copy of this letter, I am advising the appropriate offices of the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the U.S. Attorney, and appropriate State agencies of this enforcement action. Their comments will be sought during my public interest review of the activity.

If you have any questions concerning this matter, please contact Mr. Robert Ulmer of my Regulatory Branch, telephone (601) 631-5637, fax (601) 631-5459 or e-mail address: regulatory@mvk02.usace.army.mil.

Sincerely,

for Jason LANGAN, LTC
Anthony C. Vesay
Colonel, Corps of Engineers
District Engineer

Enclosures

Copies Furnished:

Chief
Marine and Wetlands Section (6WQ-EM)
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, Texas 75202-2733

U.S. Fish and Wildlife Service
646 Cajundome Boulevard, Suite 400
Lafayette, Louisiana 70506-4290

Honorable Donald W. Washington
United States Attorney
Western District of Louisiana
Federal Building, Room 3201
300 Fannin Street
Shreveport, Louisiana 71101

Administrator
Louisiana Department of
Environmental Quality
Office of Water Resources
Water Pollution Control Division
Post Office Box 82215
Baton Rouge, Louisiana 70884-2215

Secretary
Louisiana Department of Wildlife
and Fisheries
Environmental Section
Post Office Box 98000
Baton Rouge, Louisiana 70898-9000

CEMVK-OD-RM
CEMVK-CD-V

APPENDIX B

SUPPORTING DOCUMENTATION

B:7 Correspondence from Shreveport Fire Department

SHREVEPORT FIRE DEPARTMENT

263 N. Common Street
Shreveport, Louisiana 71101
(318) 673-6650 • FAX: (318) 673-6656

Kelvin J. Cochran, Fire Chief

September 06, 2007

Mr. George Cramer
Arcadis G&M, Inc.
10352 Plaza Americana Drive
Baton Rouge, La. 70816

Dear Mr. Cramer:

In response to your request dated July 23, 2007, this letter is to confirm that the Shreveport Fire Department, City of Shreveport Louisiana, is the sole provider for the Emergency Medical Services within the city limits of Shreveport including treatment and transport of emergency patients.

It has been determined that 1101 Russell Road, Shreveport La. 71107 does fall within the city limits of Shreveport and all fire/ems related responses will be made to this address by the Shreveport Fire Department.

The Shreveport Fire Department is a Class 1 rated fire department and meets the requirements of NFPA Sections 472 and 473 of the Life Safety Code. Also, the Shreveport Fire Department is capable of responding to a hazardous material incident in accordance with the definitions of 29 CFR 1910.120(a)(3):

> 1910.120(a)(3)
> ***Emergency response*** or ***responding to emergencies*** means a response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance.

If you should need any additional information, please feel free to call my office at 318-673-6720

Nathan Tabor
Assistant Chief of EMS
Shreveport Fire Department

APPENDIX B

SUPPORTING DOCUMENTATION

B:8 Correspondence from Willis-Knighton Health System

WILLIS-KNIGHTON HEALTH SYSTEM

RECEIVED
SEP 2 4 2007
ARCADIS Geraghty & Miller

JAMES K. ELROD
President
CORPORATE OFFICES
2600 Greenwood Road
Shreveport, LA 71103
(318) 212-4785

WILLIS-KNIGHTON MEDICAL CENTER
Shreveport

WILLIS-KNIGHTON SOUTH
Shreveport

WK BOSSIER HEALTH CENTER
Bossier City

WK PIERREMONT HEALTH CENTER
Shreveport

WILLIS-KNIGHTON CANCER CENTER
Shreveport

WILLIS-KNIGHTON HEART HOSPITAL
Shreveport

WK PROGRESSIVE CARE CENTER
Shreveport

WK CLAIBORNE REGIONAL HEALTH CENTER
Homer

WORK KARE LOCATIONS
Medical Center South
Bossier
Pierremont

FITNESS & WELLNESS LOCATIONS
Medical Center South
Bossier
Pierremont
Allendale/Pierre Avenue
Claiborne

PROJECT NEIGHBORHEALTH NEIGHBORHOOD LOCATIONS
Shreveport, Louisiana
Martin Luther King
Allendale
Cedar Grove
Plain Dealing, Louisiana
Bradley, Arkansas

WEB SITE
www.wkhs.com

September 21, 2007

Arcadis U.S., Inc.
10352 Plaza Americana Drive
Baton Rouge, LA 70818

Re: HMM C&D Landfill
1101 Russell Road
Shreveport, LA 71107

To Whom It May Concern:

This is to verify that Willis Knighton Health System operates a full service Emergency Department at Willis Knighton Medical Center, located at 2600 Greenwood Road in Shreveport, Louisiana. This facility does have the ability to accept and treat victims contaminated with hazardous materials. The first line of treatment, however, should be calling EMS (911) as they have units and personnel available to begin decontamination at the scene.

Willis Knighton is happy to assist you with this process to the best of our abilities. Please feel free to contact me at 318-212-4706 if I can be of any further assistance in this matter.

Sincerely,

Susan Cash, RN
Director, Emergency Services
Willis Knighton Health System

APPENDIX B

SUPPORTING DOCUMENTATION

B:9 Multi-Sector General Permit Coverage Letter

DEPARTMENT OF ENVIRONMENTAL QUALITY
KATHLEEN BABINEAUX BLANCO
GOVERNOR
MIKE D. McDANIEL, Ph.D.
SECRETARY

MAY 2 4 2006

Permit #: LAR05N093
AI #: 28118

Harrelson Materials Management
1101 Russell Rd
Shreveport, LA 71107

Subject: Reissuance of LPDES Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activities (LAR050000) for facility location: 1101 Russell Rd, Shreveport, Caddo Parish

Dear Permittee:

The Louisiana Pollutant Discharge Elimination System (LPDES) Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activities has been reissued effective May 1, 2006. Pursuant to the Louisiana Environmental Quality Act (La. R.S. 30:2001 et seq.), automatic authorization under the reissued permit is granted for discharges from the facility identified above. If you are no longer operating or if ownership has changed, you should provide that information in a letter to this Office so that we can take appropriate action concerning your permit.

A copy of the reissued permit is available on the DEQ web page at http://www.deq.louisiana.gov/portal/Portals/0/permits/lpdes/MSGP%202006.pdf. You may also request a printed copy of the document by calling 225-219-3181. Please note that Part 4.7 of the permit requires that a copy of permit requirements be included in the SWPPP.

Effective three days after the postmark date of this notice, the reissued permit replaces and cancels the version of the permit which was previously issued to your facility. Please note that your permit authorization number remains the same. Future correspondence regarding the permit should reference your permit number and the Agency Interest number given above.

Although the conditions and requirements found in the reissued permit are very similar to the prior permit, you will find there are some differences. You should read the entire permit to become familiar with any new requirements. The following are major changes to which you might need to pay particular attention. Additional changes are included in the comprehensive list which is attached to this letter as Addendum A.

- Monitoring years were set for a calendar year beginning on January 1st and ending on December 31st (Part 5.3.1). Benchmark Monitoring years 2 and 4 are defined as January 1, 2007 to December 31, 2007, and January 1, 2009 to December 31, 2009, respectively (Part 5.4.1).

ENVIRONMENTAL SERVICES
PO BOX 4313, BATON ROUGE, LA 70821-4313
P:225-219-3181 F:225-219-3309
WWW.DEQ.LOUISIANA.GOV

AUTOMATIC REAUTHORIZATION – Page 2
MSGP 2006

- The Benchmark Monitoring Requirement for Total Suspended Solids (TSS) was added to each sector where it was not otherwise included in the MSGP 2001. It should be noted that monitoring for this parameter is required for the sectors and subsectors that did not have any benchmark monitoring requirements in the MSGP 2001, in addition to those sectors and subsectors that did have benchmark monitoring requirements in the MSGP 2001. These sectors and subsectors that previously did not have benchmark monitoring requirements are listed below.

  I. Oil and Gas Extraction and Refining
  P. Land Transportation and Warehousing
  R. Ship and Boat Building and Repairing Yards
  T. Treatment Works
  V. Textile Mills, Apparel, and Other Fabric Product Manufacturing; Leather and Leather Products
  W. Furniture and Fixtures
  X. Printing and Publishing
  Y. Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries
  Z. Leather Tanning and Finishing
  AA. Fabricated Metal Products
  AB. Transportation Equipment, Industrial or Commercial Machinery
  AC. Electronic, Electrical, Photographic, and Optical Goods

- New benchmarks for chromium (1.8 mg/l) and phenols (0.016 mg/l) were added to the wood preserving (SIC 2491) Subsector of Sector A, Timber Products.

- New benchmarks for ammonia nitrogen (19 mg/l), lead (0.082 mg/l), nickel (0.47 mg/l), zinc (0.12 mg/l), and nitrate+nitrite nitrogen (0.68 mg/l) were added to Sector I, Oil and Gas Extraction and Refining.

- A new benchmark for lead (0.082 mg/l) was added to the Rubber Manufacturing Subsectors of Sector Y, Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries: Tires and Inner Tubes; Rubber Footwear; Gaskets, Packing and Sealing Devices; Rubber Hoses and Belting; and Fabricated Rubber Products, Not Elsewhere Classified (SIC 3011-3069, rubber manufacturing only).

- New benchmarks for copper (0.014 mg/l) and lead (0.082 mg/l) were added to the Electronic and Electrical Equipment and Components Except Computers (SIC 3612-3699) Subsector of Sector AC, Electronic, Electrical Equipment and Components, Photographic, and Optical Goods.

- For Sector G, Metal Mining, total recoverable Manganese was removed as a benchmark parameter.

Monitoring results will continue to be reported to the Enforcement Division on a Discharge Monitoring Report (DMR) form as specified in the reissued permit. A copy of the DMR form is attached for your use. Copies of DMRs must be sent to the LDEQ regional office which has jurisdiction at the discharge point. Attached for your use is a copy of the current addresses list for the Enforcement Division and the LDEQ regional offices.

Your facility will continue to be assessed an Annual Maintenance and Surveillance Fee in the amount of $99.00, to be invoiced separately by the agency. Annual fee amounts are subject to adjustment at a later date by promulgation of changes in the Louisiana Administrative Code. Pursuant to LAC 33:IX.1309.I, LAC 33:IX.6509.A.1 and LAC 33.I.1701, you must pay any outstanding fees to the Department. Therefore, you are encouraged to verify your facility's fee status by contacting LDEQ's Office of Management and Finance, Financial Services Division at (225) 219-3863. **Any outstanding fees must be remitted via a check to the Louisiana Department of Environmental Quality within thirty (30) days after the effective date of authorization under the permit.** Failure to pay the full amount due in the manner and time prescribed could result in applicable enforcement actions as prescribed in the Environmental Quality Act, including, but not limited to, revocation or suspension of the applicable permit, and/or a civil penalty against you.

Should you have any questions concerning the reissued general permit, please feel free to contact Darlene Bernard at the address on the first page of this letter, by telephone at (225) 219-3082, by e-mail at darlene.bernard@la.gov, or Hal Bailey at (225) 219-3091, e-mail hal.bailey@la.gov.

Sincerely,

Tom Killeen

Tom Killeen, Environmental Scientist Manager
Municipal and General Water Permits Section

Attachments: ADDENDUM A, DMR form, CURRENT ADDRESSES list

c: IO-W

ADDENDUM A

2006 MSGP CHANGES FROM 2001 MSGP

1. Monitoring years were set for a calendar year beginning on January 1st and ending on December 31st (Part 5.3.1). Benchmark Monitoring years 2 and 4 are defined as January 1, 2007 to December 31, 2007, and January 1, 2009 to December 31, 2009, respectively (Part 5.4.1).

2. Added a specific section to clarify the requirement to take immediate corrective action when there is an exceedance of an effluent limitation, a water quality standard, or other limitation stipulated in Part 5; when inspections or evaluations identify inadequacies in storm water controls; or when the SWPPP review following a benchmark exceedance (average of 4 monitoring events) reveals inadequacies (Part 5.7)

3. Added follow-up monitoring requirements for pollutants with effluent limitation guidelines, coal pile runoff and wasteload allocations (pollutants for which only annual monitoring is otherwise required) when results indicate discharge exceeds the numeric effluent limitation, or when the discharge has been found to cause or contribute to a water quality standard exceedance, to verify that BMPs have been adequately modified to protect water quality (Part 5.8)

4. Added requirements for reporting results of follow-up monitoring exceedances (Part 5.8)

5. The Benchmark Monitoring Requirement for Total Suspended Solids (TSS) was added to each sector where it was not otherwise included in the MSGP 2001. It should be noted that monitoring for this parameter is required for the sectors and subsectors that did not have any benchmark monitoring requirements in the MSGP 2001 in addition to those sectors and subsectors that did have benchmark monitoring requirements in the MSGP 2001. These sectors and subsectors that previously did not have benchmark monitoring requirements are listed below.

    I. Oil and Gas Extraction and Refining
    P. Land Transportation and Warehousing
    R. Ship and Boat Building and Repairing Yards
    T. Treatment Works
    V. Textile Mills, Apparel, and Other Fabric Product Manufacturing; Leather and Leather Products
    W. Furniture and Fixtures
    X. Printing and Publishing
    Y. Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries
    Z. Leather Tanning and Finishing
    AA. Fabricated Metal Products
    AB. Transportation Equipment, Industrial or Commercial Machinery
    AC. Electronic, Electrical Equipment and Components, Photographic, and Optical Goods

6. New benchmarks for chromium (1.8 mg/l) and phenols (0.016 mg/l) were added to the wood preserving (SIC 2491) Subsector of Sector A, Timber Products.

7. New benchmarks for ammonia nitrogen(19 mg/l), lead (0.082 mg/l), nickel (0.47 mg/l), zinc (0.12 mg/l), and nitrate+nitrite nitrogen (0.68 mg/l) were added to Sector I, Oil and Gas Extraction and Refining.

8. A new benchmark for lead (0.082 mg/l) was added to the Rubber Manufacturing Subsectors of Sector Y, Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries: Tires and Inner Tubes; Rubber Footwear; Gaskets, Packing and Sealing Devices; Rubber Hoses and Belting; and Fabricated Rubber Products, Not Elsewhere Classified (SIC 3011-3069, rubber manufacturing only).

9. New benchmarks for copper (0.014 mg/l) and lead (0.082 mg/l) were added to the Electronic and Electrical Equipment and Components Except Computers (SIC 3612-3699) Subsector of Sector AC, Electronic, Electrical, Photographic, and Optical Goods.

10. For Sector G, Metal Mining, total recoverable Manganese was removed as a benchmark parameter.

11. Added information to include inspection of areas where hazardous materials including mercury switches, and general automotive fluids are stored (Part 6.M.3.4)

12. Updated employee training to include proper handling of mercury-containing contact switches (Part 6.M.3.5)

13. Added suggestion for mercury spill kits for spills from storage of mercury switches as a good housekeeping measure for scrap and waste recycling facilities as part of the Scrap and Waste Material Stockpiles and Storage (Covered or Indoor Storage)(Part 6.N.4.2.4)

14. Added suggestion for removal of mercury switches from anti-lock brake systems, and switch storage areas (Part 6.N.4.2.5)

15. Added suggestion for mercury spill kit and emphasis on not vacuuming spilled or leaking mercury to BMP options for waste recycling facilities as part of the Waste Material Storage (Indoor) (Part 6.N.4.3.1)

16. Updated text to include illicit plumbing connections between shop floor drains and the storm water conveyance system(s) (Part 6.P.3.11)

17. Requirement added for describing the controls used for collecting or containing contaminated melt water from collection areas used for disposal of contaminated snow (Part 6.S.5.4.2)

18. Added electrical and electronic equipment and components (Part 6.AC.2.5)

19. Sector AD was removed from the permit as not needed, not applicable, and not supported by the regulations.

20. A definition for "outfall" was added (Part 12).7

PERMITTEE NAME/ADDRESS
(Include Facility Name/Location if different)

NAME
ADDRESS

FACILITY
LOCATION

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

(2-16) PERMIT NUMBER	*(17-19)* DISCHARGE NUMBER

Check Appropriate Box: ☐ Major Facility ☐ Minor Facility

☐ Check here if No Discharge

NOTE: Read Instructions before completing this form

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			
	(20-21)	*(22-23)*	*(24-25)*		*(26-27)*	*(28-29)*	*(30-31)*

PARAMETER *(32-37)*		*(3 Card Only)* QUANTITY OR LOADING			*(4 Card Only)* QUALITY OR CONCENTRATION				NO. EX *(52-53)*	FREQUENCY OF ANALYSIS *(54-58)*	SAMPLE TYPE *(59-70)*
		(46-53) AVERAGE	*(54-61)* MAXIMUM	UNITS	*(38-45)* MINIMUM	*(46-53)* AVERAGE	*(54-61)* MAXIMUM	UNITS			
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
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	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.		TELEPHONE		DATE		
			AREA CODE	NUMBER	YEAR	MO	DAY
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT					

COMMENT AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

LDEQ-EDMS Document 36473764, Page 232 of 438
LDEQ-EDMS Document 34262724, Page 6 of 8

DMR Instructions

(from back of DMR)

PAPER WORK REDUCTION ACT NOTICE

Public reporting burden for this collection of information is estimated to vary from a range of 10 hours as an average per response for some minor facilities, to 110 hours as an average per response for some major facilities, with a weighted average for major and minor facilities of 18 hours per response, including 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 the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460; and to the Office of Information and

GENERAL INSTRUCTIONS

1. If form has been partially completed by preprinting, disregard instructions directed at entry of that information already pre-printed.
2. Enter "Permittee Name/Mailing Address (and facility name/ location, if different)," "Permit Number," and "Discharge" where indicated. (A separate form is required for each discharge.)
3. Enter dates beginning and ending "Monitoring Period" covered form where indicated.
4. Enter each "Parameter" as specified in monitoring requirements of permit.
5. Enter "Sample Measurement" data for each parameter under "Quantity" and "Quality" in units specified in permit. "Average" is normally arithmetic average (geometric average for bacterial parameters) of all sample measurements for each parameter obtained during "Monitoring Period"; "Maximum" and "Minimum" are normally extreme high and low measurements obtained during "Monitoring Period". (Note to municipals and secondary treatment requirement: Enter 30-day average of sample measurements under "Average", and enter maximum 7-day average of sample measurements obtained during monitoring period under "Maximum.")
6. Enter "Permit Requirement" for each parameter under "Quantity" and "Quality" as specified in permit.
7. Under "No Ex" enter number of sample measurements during monitoring period that exceeded maximum (and/or minimum or 7-day average as appropriate) permit requirement for each parameter. If none, enter "0".
8. Enter "Frequency of Analysis" both as "Sample Measurement" (actual frequency of sampling and analysis used during monitoring period) and as "Permit Requirement" specified in permit. (e.g. Enter "Cont," for continuous monitoring, "1/7" for one day per week, "1/30" for one day per month, "1/90" for one day per quarter, etc.)
9. Enter "Sample Type" both as "Sample Measurement" (actual sample type used during monitoring period) and as "Permit Requirement", (e.g. Enter "Grab" for individual sample, "24HC" for 24-hour composite, "CONT" for continuous monitoring, etc.)
10. Where violations of permit requirements are reported, attach a brief explanation to describe cause and corrective actions taken, and reference each violation by date.
11. If "No Discharge" occurs during monitoring period, check the box for "No Discharge", or if no box is present please write the words "NO DISCHARGE" across the DMR Form.
12. Enter "Name/Title of Principal Executive Officer" with "Signature of Principal Executive Officer or Authorized Agent", "Telephone Number", and "Date" at bottom of form.
13. Mail signed Report to Office(s) by date(s) specified in permit. Retain copy for your records.
14. More detailed instructions for use of this Discharge Monitoring Report (DMR) form may be obtained from Office(s) specified in permit.
15. Facilities using the digital form of the DMR must first obtain approval from the NPDES authority in their state. The parameters and data on the form must be mono-spaced (e.g. Courier) and have a size of 10 pitch (12 points). Approval for EPA Region 6 can be obtained by contacting Cathy Bius at (214)665-6456. Permitees holding a storm water general permit in New Mexico, Texas, or Oklahoma do not need approval if they use the correct type as specified above. THE FORM MAY NOT BE ALTERED IN ANY MANNER.

LEGAL NOTICE

This report is required by law (33 U.S.C. 1318; 40 C.F.R. 125.27). Failure to report or failure to report truthfully can result in civil penalties not to exceed $10,000 per day of violation; or in criminal penalties not to exceed $25,000 per day of violation, or by imprisonment for not more than one year, or by both.

CURRENT ADDRESSES
Enforcement Division
Office of Environmental Compliance
Department of Environmental Quality
P. O. Box 4312
Baton Rouge, Louisiana 70821-4312

Mailing Addresses For Regional Offices	Jurisdictional Parishes For Each Regional Office
Acadiana Regional Office Surveillance Division Office of Environmental Compliance 111 New Center Drive Lafayette, Louisiana 70508 (337) 262-5584	Acadia, Evangeline, Iberia (west of the Atchafalaya River), Lafayette, St. Landry, St. Martin (west of the Atchafalaya River), St. Mary, Vermilion
Capital Regional Office Surveillance Division Office of Environmental Compliance P. O. Box 4312 Baton Rouge, Louisiana 70821 (225) 219-3600	Ascension, Assumption, East Baton Rouge, East Feliciana, Iberia (East of the Atchafalaya River), Iberville, Livingston, Pointe Coupee, St. Helena, St. James, St. Martin (East of the Atchafalaya River), Tangipahoa, West Baton Rouge, West Feliciana
Northeast Regional Office Surveillance Division Office of Environmental Compliance 1823 Highway 546 West Monroe, Louisiana 71292 (318) 362-5439	Avoyelles, Caldwell, Catahoula, Concordia, East Carroll, Franklin, Grant, Jackson, La Salle, Lincoln, Madison, Morehouse, Ouachita, Rapides, Richland, Tensas, Union, West Carroll, Winn
Northwest Regional Office Surveillance Division Office of Environmental Compliance 1525 Fairfield Avenue, Room 11 Shreveport, Louisiana 71130 (318) 676-7476	Bienville, Bossier, Caddo, Claiborne, De Soto, Natchitoches, Red River, Sabine, Webster
Southeast Regional Office Surveillance Division Office of Environmental Compliance 201 Evans Road, Bldg. 4, Suite 420 New Orleans, LA 70123-5230 (504) 736-7701	Jefferson, Lafourche, Orleans, Plaquemines, St. Bernard, St. Charles, St. John the Baptist, St. Tammany, Terrebonne, Washington
Southwest Regional Office Surveillance Division Office of Environmental Compliance 1301 Gadwall Street Lake Charles, Louisiana 70615-5176 (337) 491-2667	Allen, Beauregard, Calcasieu, Cameron, Jefferson Davis, Vernon

APPENDIX B

SUPPORTING DOCUMENTATION

B:10 Zoning Approval – Shreveport Metropolitan Planning Commission

HARRELSON MATERIALS MANAGEMENT
CONSTRUCTION & DEMOLITION DEBRIS SPECIALISTS

Zoning Affidavit

I, Michael Harrelson, as President of Harrelson Materials Management, Inc. and its majority stockholder, do hereby acknowledge the "Non-conforming Right to Operate a Landfill" zoning granted the property located at 1101 Russell Road, Shreveport, Louisiana, from the Metropolitan Planning Commission. I hereby agree to abide by the terms and conditions of such zoning, on behalf of Harrelson Materials Management, Inc.

Harrelson Materials Management, INC.

Michael Harrelson
President

State of Louisiana
Parish of Caddo

Before me, a Notary Public in and for the State and the County Mentioned, personally appeared, Michael Harrelson, with whom I am personally acquainted (or who proved to me on the basis of satisfactory evidence), and who, upon oath, acknowledged such person to be President of Harrelson Materials Management, Inc., the within named maker, a corporation, and that such President as such President, executed the foregoing instrument for the purpose therein contained, by signing the instrument on behalf of the company as its President.

Witness my hand and seal, at office this 11-30, 2005.

Notary Public

My commission expires: Life

Jennie Allison
Notary Public, ID# 22760
Bossier Parish, LA
My Commission is for Life

METROPOLITAN
PLANNING COMMISSION
Shreveport / Caddo Parish

1234 Texas
P.O. Box 31109
Shreveport, LA 71130
Tel (318) 673-6480
Fax (318) 673-6475

October 28, 1998

Mr. William M. Comegys, III
Attorney at Law
401 Market Street, Suite 600
Shreveport, La. 71101-3287

Dear Mr. Comegys:

Subject: Case No. C-70-94; Chandler Brothers Inc., applicant.
Property located on the east side of I-20, southeast of Nash Street

This is to confirm that the subject property, as shown on the attached vicinity map, is currently zoned R-1H, One-Family Residence District, R-1D, One-Family Residence District, and R-A, Residence / griculture District, however, Chandler Brothers, Inc. has obtained a non-conforming right to operate a landfill at the subject location in accordance with the provisions contained in LSA-R.S. 9:5625.

If we can be of further assistance, please let us know.

Sincerely,

Ione F. Dean

Ione F. Dean
Planner

METROPOLITAN SHREVEPORT ZONING BOARD OF APPEALS
CITY HALL 1234 TEXAS AVENUE
P. O. BOX 31109
SHREVEPORT, LOUISIANA 71130
PHONE (318) 226-6480

August 16, 1994

Chandler Bros., Inc.
P.O. Box 5774
Bossier City, LA 71171

Dear Applicant:

Subject: CASE NO. BAC-94-94: Property located on the east side of I-220 SE of Nash

Your application for approval of a Special Exception Use and/or variance(s) on the above referenced site was considered by the Metropolitan Shreveport Zoning Board of Appeals following a public hearing August 11, 1994.

Attached is a copy of the Land Use Report stating the Zoning Board of Appeals' decision and outlining stipulations (if applicable) pertaining to the above referenced case.

If you have any questions regarding this decision, please contact the MPC Office at 226-6480.

Sincerely,

Judith Anne Battle

Judith Anne Battle
Assistant Director, MPC

JAB/sad

Attachment

ZONING BOARD OF APPEALS
LAND USE REPORT - AUGUST 11, 1994

I-D

DISTRICT: A - Glover

CASE NO.: ~~BAC-94-94:~~ 1101 Russell Road
APPLICANT: CHANDLER BROTHERS, INC.
LAND OWNER: Arthur Chandler, Jr. & Cicero Chandler
LOCATION: East side of I-220 SE of Nash
ZONING: Special Exception Use in an I-2 District
PROPOSED: Landfill

PURPOSE OF REQUEST

- The applicant is requesting approval to permit a landfill for construction and demolition materials to be located at this site. An application for rezoning from R-A to I-2 is pending. The Planning Commission held a Public Hearing for the rezoning on August 3rd and voted to defer the case to September 7th.

ZONING/USES ADJACENT TO SITE

- The site is adjacent to the I-220 on the west and undeveloped R-A to the east.
- Surrounding the property on all sides is a combination of different residential zoning classifications.

SITE ANALYSIS

- The site has approximately 2,700 feet of frontage along the I-220.
- Entrance to the site is from the south off of Russell Road.
- The site consists of 29.86 acres of land.

POLICY GUIDELINES

- The Master Plan designates this property as Rural Low Density Residential.

OTHER CONSIDERATIONS

- The site is at an elevation that would allow it to be seen from the I-220.
- While the site is presently in a flood plain, when filled, the site may be appropriate for residential development.
- By the time the site is filled, there may be other development in the area which would justify a commercial or industrial classification, but right now the request for I-2 would be considered "spot" zoning.
- According to the applicant, the site has been in operation for about 5 years.
- The applicant is requesting rezoning at this time due to the fact that they are applying for DEQ approval of a type #3 landfill and DEQ now requires proof of compliance with the local zoning laws.

STAFF OBSERVATIONS

- If approved, due to the change in the elevation of the I-220 it would appear that the standard screen stipulation would be of no use. A vegetative screening of fast growing trees might address the problem of screening and be a preferable option.

Special Exception Uses and variance requests possess such characteristics of unique or special form that each specific use shall be considered an individual case and shall be subject to the Zoning Board of Appeals approval as authorized by R.S. 33:140.32.

The information stated above is the result of discussion by a staff review team. The staff assessment is made without benefit of information which may be presented at the public hearing, and is therefore subject to change. The Board members use all information available to them in making their decision.

LDEQ-EDMS Document 36473764, Page 240 of 438

PUBLIC ASSESSMENT

There was no opposition present.

ZBA's DECISION

- *Citing that since the proposed request appears to be consistent with current guidelines and compatible with* development, the Board voted to approve the application, subject to compliance with the following stipulations:

1. A revised plot plan showing a buffer of fast growing trees on the west side of the property where the request abuts the I-220 to be approved by the Planning Director prior to the issuance of any permits.
2. A full review of the screening stipulation, at no cost to the applicant, shall be required when adjacent properties are developed to determine what kind of screening fence will be required between this site and the adjacent development.
3. Approval is contingent upon the MPC's granting approval of the appropriate base zoning.

DEPARTMENT OF THE ARMY
VICKSBURG DISTRICT, CORPS OF ENGINEERS
2101 NORTH FRONTAGE ROAD
VICKSBURG MISSISSIPPI 39180-5191

REPLY TO ATTENTION OF:

July 15, 1994

Operations Division
Regulatory

SUBJECT: Determination of Permit Requirements

Mr. Cicero F. Chandler
Chandler Brothers, Incorporated
Post Office Box 5834
Bossier City, Louisiana 71171-5834

Dear Mr. Chandler:

I refer to your letter of April 20, 1994, concerning the reevaluation of permit requirements for the build-up of an existing levee that surrounds 3 borrow pits currently being used as a disposal site for construction and demolition debris. The project is located in section 21, T18N-R14W, Caddo Parish, Louisiana.

Based upon the information provided and that obtained from our field investigation, we have determined that a Department of the Army Section 10/404 permit will not be required, since the build-up of the levee would not result in the discharge of dredged or fill material into wetlands or other jurisdictional waters of the United States and provided the discharge of the construction and demolition debris is permitted under Section 402 of the Clean Water Act. If the nature or the extent of the work is changed, you should again contact this office for a determination of possible permit requirements.

This determination of permit requirements is applicable for a period not to exceed 5 years from the date of this letter unless superseded by law, regulation, or change of policy. If the proposed work is not completed by this time, you should contact this office for a reevaluation of permit requirements and reference the number CELMK-OD-FS 941005890-EDJ when submitting the information. This determination of Department of the Army regulatory requirements does not convey any property rights, either in real estate or material or any exclusive privileges, and does not authorize any injury to property or invasion of rights or local laws or regulations, or obviate the requirement to obtain State or local assent required by law for the activity discussed herein.

Thank you for advising us of your plans. If we may be of any further assistance in this matter, please contact Mr. Eric Jenkins, telephone (601) 631-7528 or telefax (601) 631-5459.

Sincerely,

Kenneth P. Mosley
Chief, Enforcement Section
Regulatory Branch

Copies Furnished:

U.S. Environmental Protection Agency
Wetlands Protection Section (6E-F)
1445 Ross Avenue
Dallas, Texas 75203-2733

State of Louisiana
Department of Environmental Quality
Office of Water Resources
Post Office Box 82215
Baton Rouge, Louisiana 70884-2215

METROPOLITAN
PLANNING COMMISSION
Shreveport / Caddo Parish

1234 Texas
P.O. Box 31109
Shreveport, LA 71130
Tel (318) 673-6480
Fax (318) 673-6475

September 22, 1994

Chandler Bros., Inc.
P.O. Box 5774
Bossier City, LA 71171

Dear Applicant:

Subject: CASE NO. C-70-94: Property located on the east side of I-220, SE of Nash

During their meeting on September 21, 1994, the Shreveport Metropolitan Planning Commission considered your application.

Attached is a copy of the Land Use Report which states the decision of the Planning Commission and any stipulations which must be adhered to.

This recommendation along with supporting documents and file data, will be forwarded to the City Council for their consideration and final disposition. Please note that approval of a zoning change does not necessarily constitute approval of site development plans. Also note that after final disposition by the governing body there will be a 10 day delay before the ordinance becomes final. After this 10 day period you may apply for the appropriate permits at the Zoning Administration Office (226-3695) or the Parish Zoning Office (226-6930).

If you have any questions regarding this matter, please contact the MPC Office at 226-6480.

Sincerely,

Judith Anne Battle
for
Charles H. Kirkland
Executive Director, MPC

CHK:dt

Attachment

METROPOLITAN PLANNING COMMISSION
LAND USE REPORT - AUGUST 3, 1994

CASE NO: C-70-94; 1101 Russell Road **DISTRICT:** A/Glover
APPLICANT: CHANDLER BROS., INC.
LAND OWNER: Same
LOCATION: East side of I-220, southeast of Nash
ZONING: R-A, R-1H & R-1D to I-2
PROPOSED: Landfill

PURPOSE OF REQUEST:

- The applicant is requesting approval of I-2 zoning to permit a landfill for construction and demolition materials to be located at this site. An application for ZBA approval of this proposed landfill will be heard by the Board on August 11th.

ZONING/USES ADJACENT TO SITE:

- The site is adjacent to the I-220 on the west and undeveloped R-A to the east.
- Surrounding the property on all sides is a combination of different residential zoning classifications.

SITE ANALYSIS:

- The site has approximately 2,700 feet of frontage along the I-220.
- Entrance to the site is from the south off of Russell Road.
- The site consists of 29.86 acres of land.

MASTER PLAN AND POLICY GUIDELINES:

- The Master Plan designates this property as Rural Low Density Residential.

OTHER CONSIDERATIONS:

- The site is at an elevation that would allow it to be seen from the I-220.
- While the site is presently in a flood plain, when filled, the site may be appropriate for residential development.
- By the time the site is filled, there may be other development in the area which would justify a commercial or industrial classification, but right now the request is considered "spot" zoning.
- According to the applicant, the site has been in operation for about 5 years.
- The applicant is requesting rezoning at this time due to the fact that they are applying for DEQ approval of a type #3 landfill and DEQ now requires proof of compliance with the local zoning laws.

STAFF ASSESSMENT:

- It would be spot zoning to locate a large I-2 District in the middle of an established residential area.
- Considering the fact that this is a landfill and at some point in time would be filled and ready for development, it would appear appropriate to grant an "E" classification and allow the applicant to apply for rezoning when a permanent use is anticipated.

LDEQ-EDMS Document 36473764, Page 245 of 438

The information stated above is the result of discussion by a staff review team. The staff assessment is made without benefit of information which may be presented at the public hearing, and is therefore subject to change. **The Board members use all information available to them in making their decision.**

ALTERNATIVES:

1. Approve as submitted.

2. Deny application.

PUBLIC'S ASSESSMENT

8/3/94: There was no opposition present.
9/7/94: A representative of the MLK Civic Club spoke in opposition; 11 stood in opposition to the request.

MPC'S DECISION

8/3/94: **The Board voted unanimously to defer this application to the September 7, 1994 meeting in order to allow time for staff to obtain requested information and to notify a larger radius of surrounding property owners.**

9/7/94: **Inasmuch as the Board directed staff to work with the applicant and the neighborhood on various items related to this application, the Board voted (7-1) to defer this application to the September 21, 1994 meeting.**

9/21/94: **Considering the fact that this is an existing landfill and at some point in time would be filled and ready for development, the Board voted (6-1) to grant R-1D-E zoning limited to "a Type 3 landfill" only, and subject to compliance with the following stipulations:**

1. **Compliance with all DEQ requirements which apply to Type 3 landfills.**

2. **Site is to be fenced with a controlled access gate and not open to the public.**

3. **Approval is granted for a 1 year period only, after which time the applicant must reapply with application fee subject to refund if the Board approves the reapplication at that time.**

FILED

JAN 24 1995

DEPUTY CLERK

CHANDLER BROTHERS, INC.	:	NUMBER 402,443 - F
VERSUS	:	FIRST JUDICIAL DISTRICT COURT
THE CITY OF SHREVEPORT	:	CADDO PARISH, LOUISIANA

ORDER

Pursuant to a conference on the 19th day of January, 1995;

IT IS HEREBY ORDERED, ADJUDGED AND DECREED that the hearing on the merits for the appeal by plaintiff, CHANDLER BROTHERS, INC., is set for the 28th day of February, 1995, beginning at 9:30 a.m. with an alternate date of March 27, 1995.

IT IS FURTHER ORDERED, ADJUDGED AND DECREED that plaintiff, CHANDLER BROTHERS, INC. is hereby granted a preliminary injunction against defendant, CITY OF SHREVEPORT, prohibiting and enjoining CITY OF SHREVEPORT from taking any action against plaintiff directly or indirectly with respect to plaintiff's lawful use of its property at 1101 Russell Road, Shreveport, Caddo Parish, Louisiana as a Type III Landfill. It is noted that CITY OF SHREVEPORT enters its objection to the granting of the preliminary injunction.

THUS DONE AND SIGNED this 20th day of January, 1995, in Shreveport, Caddo Parish, Louisiana.

LEON L. EMANUEL, III

JUDGE LEON EMANUEL

ENDORSED, FILED Jan. 24 1995

W. L. McClelee

CADDO PARISH DEPUTY CLERK

A TRUE COPY - ATTEST

CADDO PARISH DEPUTY CLERK

APPENDIX B

SUPPORTING DOCUMENTATION

B:11 Approval – Louisiana Resource Recovery and Development Authority

State of Louisiana

Department of Environmental Quality

Edwin W. Edwards
Governor

William A. Kucharski
Secretary

SEPTEMBER 1, 1994

Mr. Cicero F. Chandler
Chandler Bros. Landfill
Post Office Box 5774
Bossier City, Louisiana 71171

Re: Chandler Bros. Landfill
Caddo Parish

Dear Mr. Chandler:

The above-referenced facility does not conflict with any plans or proposed facilities of the Louisiana Resource Recovery and Development Authority (LRRDA), as of this date.

If you have any questions concerning this matter, please contact me at (318) 898-4206.

Sincerely,

R. Brady Broussard
Chairman, LRRDA

RBB:JCR:sb

OFFICE OF SOLID AND HAZARDOUS WASTE SOLID WASTE DIVISION P.O. BOX 82178 BATON ROUGE, LOUISIANA 70884-2178
TELEPHONE (504) 765-0249 FAX (504) 765-0299

AN EQUAL OPPORTUNITY EMPLOYER

Louisiana keep it Beautiful

Louisiana Resource Recovery and Development Authority
Questionnaire for Letter of Compliance Applicants

check one

_ New Facility _ Expand Existing Facility _ DEQ Required Modification
x Construction and Demolition Debris _ Beneficial Use _ Compost Facility

1. Facility Name/type Chandler Bros. Landfill Type III
2. Location 1101 Russell Rd. Sport, La 71107
3. Parish Caddo
4. Contact Cicero R. Chandler
5. Purpose of Project Upgrade existing landfill to permitted landfill.
6. Name local governments contacted City of Shreveport, Corp of Engineers, Metropolitan Planning Commission, Dept. of Envir. Quality, Envir. Prot. Agency
7. State how the proposed facility is in conformance with the Solid Waste Management Plan. Facility is an existing C. & D. Landfill monitored regularly by the local DEQ.
8. State how the proposed facility does not conflict with local solid waste activities or plans
The city owned SANITARY LANDFILL is delighted to have a C & D landfill in the area because our landfill will be able to take the larger, bulky, debris that would take up the City's valuable landfill area.
9. Will the facility compete with any local goverment operated/owned solid waste facilities in the area ? YES, but only in regard to DEMOLITION & CONSTRUCTION WOODWASTE DEBRIS.
10. State how the public interest, health, and environment will be protected by this project.
The C & D landfill has a earthen levee protecting all waste from contaminating any adjoining properties. All rainwater runoff is collected and tested before being pumped from the site. We were granted a temporary wastewater permit while our application for a permanent wastewater permit is being processed.

NOTE: THE CORP OF ENGINEERS, CITY OF SHREVEPORT: ENGINEERING DEPT & STREETS AND DRAINAGE DEPT., AND THE SHREVEPORT METROPOLITAN PLANNING COMMISSION HAVE ALL GIVEN APPROVAL OF THE SITE.

Staff Comments:

Staff Recommendation:
_ Grant Letter
_ Withhold Letter
_ Additional information needed

Board Action:
_ Granted, letter did
_ Withheld, letter did
_ Additional information requested did

TOTAL P.02

APPENDIX B

SUPPORTING DOCUMENTATION

B:12 Proof of Legal Authority of Signee to Sign Permit

W. Fox McKeithen
Secretary of State

NOTICE OF CHANGE OF REGISTERED OFFICE AND/OR CHANGE OF REGISTERED AGENT

(R.S. 12:104 & 12:236)

Domestic Corporation
(Business or Non-Profit)
Enclose $20.00 filing fee
Make remittance payable to
Secretary of State
Do Not Send Cash

Return to: Commercial Division
P. O. Box 94125
Baton Rouge, LA 70804-9125
Phone (225) 925-4704
Web Site: www.sec.state.la.us

Corporation Name: Harrelson Materials Management, Inc.

FOX McKEITHEN
SECRETARY OF STATE
RECEIVED & FILED
Date JAN 29 2003

CHANGE OF LOCATION OF REGISTERED OFFICE

Notice is hereby given that the Board of Directors of the above named corporation has authorized a change in the location of the corporation's registered office. The new registered office is located at:

1101 Russell Road, Shreveport, Louisiana 71107

✓ [signature] 1-24-03

To be signed by one (1) officer or two (2) directors — Date

President

Date

CHANGE OF REGISTERED AGENT(S)

Notice is hereby given that the Board of Directors of the above named corporation has authorized the change of the corporation's registered agent(s). The name(s) and address(es) of the new registered agent(s) is/are as follows: Arthur R. Carmody, Jr., 400 Travis Street, Suite 1700, Shreveport, Louisiana 71101

✓ [signature] 1-24-03

President, Vice President or Secretary — Date

AGENT'S AFFIDAVIT AND ACKNOWLEDGEMENT OF ACCEPTANCE

I hereby acknowledge and accept the appointment of registered agent(s) for and on behalf of the above named corporation.

✓ [signature]

Arthur R. Carmody, Jr.

Sworn to and subscribed before me, the undersigned Notary Public, on this date: January 24, 2003

✓ [signature]

Notary

354 Rev. 1/01

(see instructions on back)

APPENDIX B

SUPPORTING DOCUMENTATION

B:13 Certifications

Harrelson Landfill
Type III Disposal Facility Application
Standard Permit Application

§521.F.1 Certification

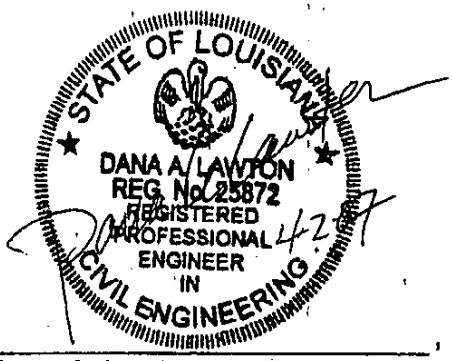
I certify under penalty of law that I have personally examined and I am familiar with the information submitted in this permit application and that the facility as described in this permit application meets the requirements of the solid waste rules and regulations. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment.

George H. Cramer, II, P.G.
Associate Vice President/Principal Scientist
ARCADIS U.S., Inc.

June 27, 2007
Date

Engineering Certification

I certify under the penalty of the law that I have personally examined and I am familiar with the information submitted in this permit application and that the facility as described in this permit application meets the Solid Waste rules and regulations. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fines and imprisonment.



_____, P. E.

Dana A. Lawton

Louisiana Registration No. 25872

APPENDIX B

SUPPORTING DOCUMENTATION

B:14 Solid Waste Operators' Certificates

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08/04/2004 03:42 3184255161
LDEQ-EDMS Document 36473764, Page 256 of 438

Department of Environmental Quality

Louisiana Board of Certification and Training for Solid Waste Management System Operators

SOLID WASTE OPERATOR CERTIFICATE

This is to certify that

MICHAEL D. HARRELSON

has complied with all requirements of the Louisiana Board of Certification and Training for Solid Waste Management System Operators and is hereby awarded a Class C-I, Level A Solid Waste Operator's Certificate, and is hereby entitled to practice solid waste management up to this level of certification within the State of Louisiana until expiration or revocation.

This certificate awarded the Sixth day of July, 2003, is issued for a period of four years, and shall be re-issued upon expiration, if all renewal requirements are met. This certificate expires on July 6, 2007

RECOMMENDED FOR CERTIFICATION BY THE
BOARD OF CERTIFICATION AND TRAINING FOR
SOLID WASTE MANAGEMENT SYSTEM OPERATORS

Gary W. Bourlier

CHAIRMAN, BOARD OF CERTIFICATION AND TRAINING
FOR SOLID WASTE MANAGEMENT SYSTEM OPERATORS

SECRETARY, DEPARTMENT OF ENVIRONMENTAL QUALITY

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PAGE 85
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Department of Environmental Quality

Louisiana Board of Certification and Training for Solid Waste Management System Operators

SOLID WASTE OPERATOR CERTIFICATE

This is to certify that

MARSHA L. HARRELSON

has complied with all requirements of the Louisiana Board of Certification and Training for Solid Waste Management System Operators and is hereby awarded a Class C-I, Level B Solid Waste Operator's Certificate, and is hereby entitled to practice solid waste management up to this level of certification within the State of Louisiana until expiration or revocation.

This certificate awarded the Fifth day of April 2004, is issued for a period of four years, and shall be re-issued upon expiration, if all renewal requirements are met. This certificate expires on April 5, 2008

RECOMMENDED FOR CERTIFICATION BY THE
BOARD OF CERTIFICATION AND TRAINING FOR
SOLID WASTE MANAGEMENT SYSTEM OPERATORS

CHAIRMAN, BOARD OF CERTIFICATION AND TRAINING
FOR SOLID WASTE MANAGEMENT SYSTEM OPERATORS

SECRETARY, DEPARTMENT OF ENVIRONMENTAL QUALITY

1935

LDEQ-EDMS Document 36473764, Page 257 of 438

Department of Environmental Quality

Louisiana Board of Certification and Training for Solid Waste Management System Operators

SOLID WASTE OPERATOR CERTIFICATE

This is to certify that

MELVIN R. WYNN

has complied with all requirements of the Louisiana Board of Certification and Training for Solid Waste Management System Operators and is hereby awarded a C & D, Level B Solid Waste Operator's Certificate, and is hereby entitled to practice solid waste management up to this level of certification within the State of Louisiana until expiration or revocation.

This certificate awarded the tenth day of October, 2006 is issued for a period of four years, and shall be re-issued upon expiration, if all renewal requirements are met. This certificate expires on October 10, 2010.

RECOMMENDED FOR CERTIFICATION BY THE
BOARD OF CERTIFICATION AND TRAINING FOR
SOLID WASTE MANAGEMENT SYSTEM OPERATORS

CHAIRMAN, BOARD OF CERTIFICATION AND TRAINING
FOR SOLID WASTE MANAGEMENT SYSTEM OPERATORS

Mike D. McDaniel

SECRETARY, DEPARTMENT OF ENVIRONMENTAL QUALITY

1824E1

LDEQ-EDMS Document 36473764, Page 258 of 438

Department of Environmental Quality

Louisiana Board of Certification and Training for Solid Waste Management System Operators

SOLID WASTE OPERATOR CERTIFICATE

This is to certify that

ALONZO SMITH

has complied with all requirements of the Louisiana Board of Certification and Training for Solid Waste Management System Operators and is hereby awarded a C & D, Level B Solid Waste Operator's Certificate, and is hereby entitled to practice solid waste management up to this level of certification within the State of Louisiana until expiration or revocation.

This certificate awarded the tenth day of October, 2006 is issued for a period of four years, and shall be re-issued upon expiration, if all renewal requirements are met. This certificate expires on October 10, 2010.

RECOMMENDED FOR CERTIFICATION BY THE
BOARD OF CERTIFICATION AND TRAINING FOR
SOLID WASTE MANAGEMENT SYSTEM OPERATORS

CHAIRMAN, BOARD OF CERTIFICATION AND TRAINING
FOR SOLID WASTE MANAGEMENT SYSTEM OPERATORS

Mike D. McDaniel

SECRETARY, DEPARTMENT OF ENVIRONMENTAL QUALITY

1821E1

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APPENDIX B

SUPPORTING DOCUMENTATION

B:15 Certificate of Insurance

Appendix B

SOLID WASTE FACILITY
CERTIFICATE OF LIABILITY INSURANCE

Secretary
Louisiana Department of Environmental Quality
Post Office Box 4313
Baton Rouge, Louisiana 70821-4313

Attention: Office of Environmental Services,
Waste Permits Division

RE: Harrelson Materials Management, Inc. Landfill, Agency Interest #28118, PER19950001

Dear Sir:

1. Evanston Insurance Company, the "insurer," of Ten Parkway North, Deerfield, IL 60015 hereby certifies that it has issued liability insurance covering bodily injury and property damage to Harrelson Materials Management, Inc. the "insured," of 1101 Russell Road, Shreveport, LA 71107 in connection with the insured's obligation to demonstrate financial responsibility under LAC 33:VII.1301. The coverage applies at Harrelson Materials Management, Inc., Landfill, Agency Interest #28118, Site Id. No. D-017-2688, Facility Permit No. PER 19950001, 1101 Russell Road, Shreveport, LA 71107 for sudden and accidental occurrences. The limits of liability are $1,000,000 per each occurrence and $2,000,000 annual aggregate, per site, exclusive of legal-defense costs. The coverage is provided under policy number 07PKG01288, issued on *07/14/07. The effective date of said policy is 07/14/07.*

2. The insurer further certifies the following with respect to the insurance described in Paragraph 1:

(a). Bankruptcy or insolvency of the insured shall not relieve the insurer of its obligations under the policy.

(b). The insurer is liable for the payment of amounts within any deductible applicable to the policy, with a right of reimbursement by the insured for any such payment made by the insurer. This provision does not apply with respect to that amount of any deductible for which coverage is demonstrated, as specified in LAC 33:VII.1301.B.2, 3, or 4.

(c). Whenever requested by the administrative authority, the insurer agrees to furnish to *him a signed duplicate original of the policy and all endorsements.*

(d). Cancellation of the insurance, whether by the insurer or the insured, will be effective only upon written notice and upon lapse of 60 days after a copy of such written notice is received by the administrative authority.

(e). Any other termination of the insurance will be effective only upon written notice and upon lapse of 30 days after a copy of such written notice is received by the administrative authority.

3. I hereby certify that the wording of this certificate is identical to the wording specified in LAC 33:VII.1399.Appendix B as such regulations were constituted on the date first written above, and that the insurer is licensed to transact the business of insurance, or eligible to provide insurance as an excess or surplus lines insurer, in one or more states, and is admitted, authorized, or eligible to conduct insurance business in the state of Louisiana.

Scott McDougall
AVP & Assistant Manager – Environmental Department
310 Highway 35 South, Red Bank NJ 07701

ACORD CERTIFICATE OF LIABILITY INSURANCE

OP ID UA HARRE-9 | DATE (MM/DD/YYYY) 04/30/07

PRODUCER

CT Insurance Agency, Inc-SH
20 E. 70th Street, Suite 304
hreveport LA 71105
Phone: 318-797-7400 Fax: 318-797-7470

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED

Harrelson & Associates, LLC.
Louisiana Environmental Servcs
Harrelson Materials Managemt
CrocPot, LLC, Mt Zion C&D LLC
PO Box 78102
Shreveport LA 71137-8102

INSURERS AFFORDING COVERAGE		NAIC #
INSURER A:	Evanston Insurance Co	35378
INSURER B:	The Hanover Ins Company	22292
INSURER C:	LEMIC Insurance Co	
INSURER D:	Clarendon America Ins Co	43095
INSURER E:		

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
		GENERAL LIABILITY				EACH OCCURRENCE	$1,000,000.
A		X COMMERCIAL GENERAL LIABILITY	06PKG01288	07/14/06	07/14/07	DAMAGE TO RENTED PREMISES (Ea occurrence)	$50,000.
		CLAIMS MADE X OCCUR				MED EXP (Any one person)	$5,000.
A		X CLAIMS MADE	SITE POLLUTION LIABILITY	07/14/06	07/14/07	PERSONAL & ADV INJURY	$1,000,000.
			INCLUDED			GENERAL AGGREGATE	$2,000,000.
		GEN'L AGGREGATE LIMIT APPLIES PER:				PRODUCTS - COMP/OP AGG	$2,000,000
		POLICY PRO-JECT LOC					
		AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT (Ea accident)	$1,000,000.
D		ANY AUTO	DSA018983	07/14/06	07/14/07		
		ALL OWNED AUTOS				BODILY INJURY (Per person)	$
		X SCHEDULED AUTOS					
		X HIRED AUTOS				BODILY INJURY (Per accident)	$
		X NON-OWNED AUTOS					
						PROPERTY DAMAGE (Per accident)	$
		GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	$
		ANY AUTO				OTHER THAN AUTO ONLY: EA ACC	$
						AGG	$
		EXCESS/UMBRELLA LIABILITY				EACH OCCURRENCE	$
		OCCUR CLAIMS MADE				AGGREGATE	$
							$
		DEDUCTIBLE					$
		RETENTION $					$
C		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	777-07089-06-CAP	06/09/06	06/09/07	X WC STATU-TORY LIMITS OTH-ER	
		ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED?				E.L. EACH ACCIDENT	$1000000
		If yes, describe under SPECIAL PROVISIONS below				E.L. DISEASE - EA EMPLOYEE	$1000000
						E.L. DISEASE - POLICY LIMIT	$1000000
		OTHER					
B		Equipment Floater	IHO836504900	07/14/06	07/14/07	Per Sched	$2,500 Ded
D		Auto Phys Dam	DSA018983	07/14/06	07/14/07	Per Sched	Per Sched

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

Coverage is subject to policy terms, conditions and limitations unless otherwise cancelled.

CERTIFICATE HOLDER

LADEB34

LA Dept. Environmental Quality
Solid Waste Division
P. O. Box 82178
Baton Rouge LA 70884

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 10 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

William D. Quinton

© ACORD CORPORATION 1988

APPENDIX B

SUPPORTING DOCUMENTATION

B:16 24-Hour 25-Year Rainfall Information

Figure B-5 10-year, 24-hour rainfall

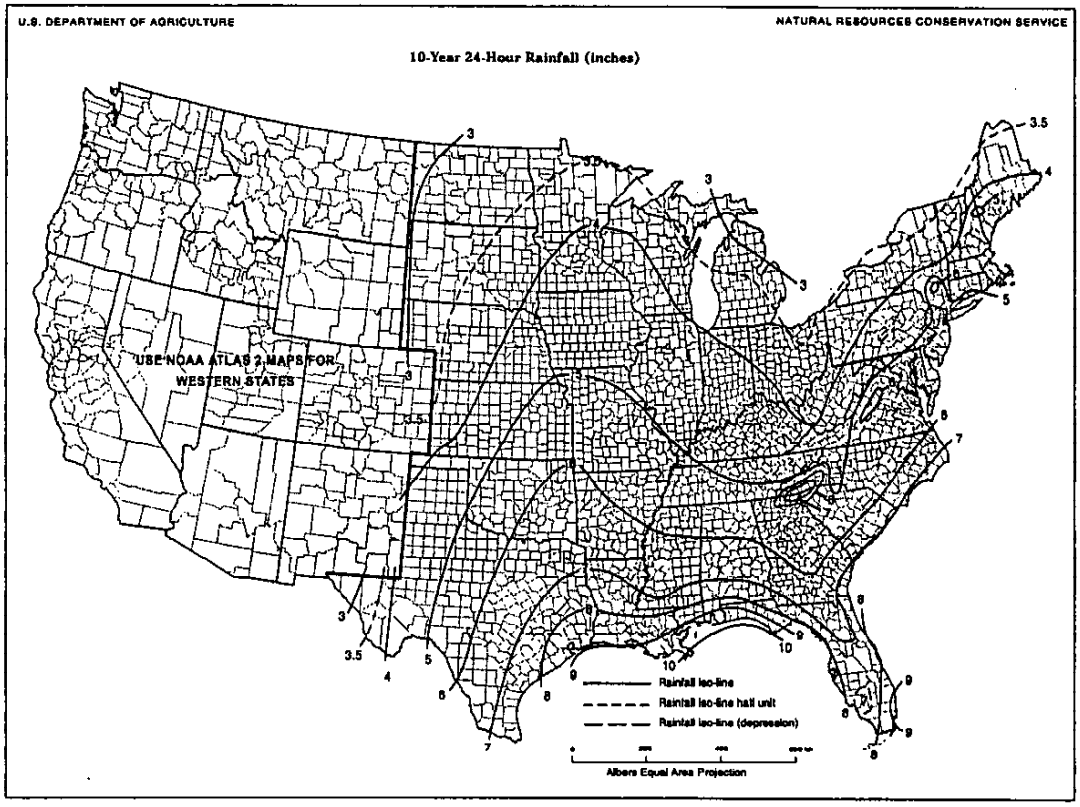
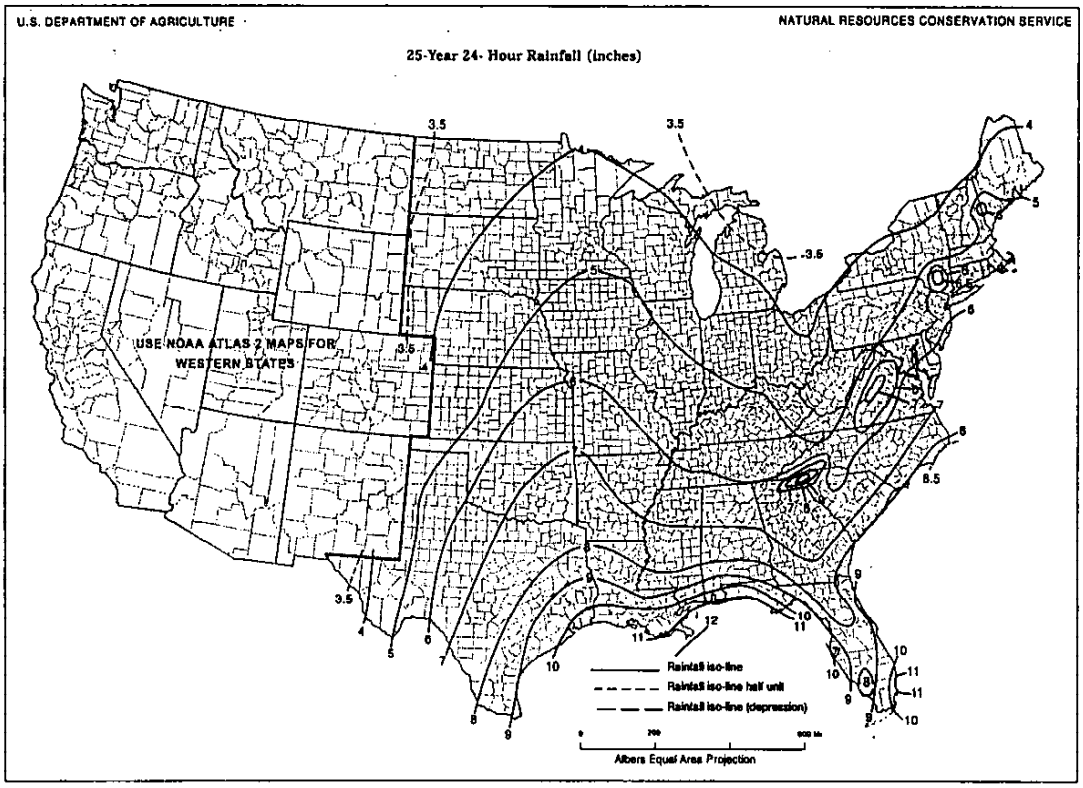


Figure B-6 25-year, 24-hour rainfall



SOLID WASTE FACILITY
TRUST AGREEMENT

Harrelson Materials Management, Inc., Landfill, Agency Interest Number 28118, D-017-2688/PER19950001

This Trust Agreement, the "Agreement" is entered into as of September 28, 2007 by and between Harrelson Materials Management, Inc., a Louisiana corporation, the "Grantor," and Trust One Bank, incorporated in the state of Tennessee, the "Trustee."

WHEREAS, the Department of Environmental Quality of the State of Louisiana, an agency of the state of Louisiana, has established certain regulations applicable to the Grantor, requiring that a permit holder or applicant for a permit of a solid waste processing or disposal facility shall provide assurance that funds will be available when needed for closure and/or post-closure care of the facility;

WHEREAS, the Grantor has elected to establish a trust to provide all or part of such financial assurance for the facility identified herein;

WHEREAS, the Grantor, acting through its duly authorized officers, has selected the Trustee to be the trustee under this Agreement, and the Trustee is willing to act as trustee.

NOW, THEREFORE, the Grantor and the Trustee agree as follows:

SECTION 1. DEFINITIONS

As used in this Agreement:

(a). The term *Grantor* means the permit holder or applicant who enters into this Agreement and any successors or assigns of the Grantor.

(b). The term *Trustee* means the Trustee who enters into this Agreement and any successor trustee.

(c). The term *Secretary* means the Secretary of the Louisiana Department of Environmental Quality.

(d). The term *Administrative Authority* means the Secretary or his designee or the appropriate assistant secretary or his designee.

SECTION 2. IDENTIFICATION OF FACILITIES AND COST ESTIMATES

This Agreement pertains to the facilities and cost estimates identified on attached Schedule A.

SECTION 3. ESTABLISHMENT OF FUND

The Grantor and the Trustee hereby establish a trust fund, the "Fund", for the benefit of the Louisiana Department of Environmental Quality. The Grantor and the Trustee intend that no third party shall have access to the Fund except as herein provided. The Fund is established initially as consisting of the property, which is acceptable to the Trustee, described in Schedule B attached hereto. Such property and any other property subsequently transferred to the Trustee is referred to as the Fund, together with all earnings and profits thereon, less any payments or distributions made by the Trustee pursuant to this Agreement. The Fund shall be held by the Trustee, in trust, as hereinafter provided. The Trustee shall not be responsible nor shall it undertake any responsibility for the amount or adequacy of, nor any duty to collect from the Grantor, any payments necessary to discharge any liabilities of the Grantor established by the administrative authority.

SECTION 4. PAYMENT FOR CLOSURE AND/OR POST-CLOSURE CARE OR LIABILITY COVERAGE

The Trustee shall make payments from the Fund as the administrative authority shall direct, in writing, to provide for the payment of the costs of closure and/or post-closure care of the facility covered by this Agreement. The Trustee shall reimburse the Grantor or other persons as specified by the administrative authority from the Fund for closure and/or post-closure expenditures in such amounts as the administrative authority shall direct in writing. In addition, the Trustee shall refund to the Grantor such amounts as the administrative authority specifies in writing. Upon refund, such funds shall no longer constitute part of the Fund as defined herein.

SECTION 5. PAYMENTS COMPRISED BY THE FUND

Payments made to the Trustee for the Fund shall consist of cash or securities acceptable to the Trustee.

SECTION 6. TRUSTEE MANAGEMENT

The Trustee shall invest and reinvest the principal and income of the Fund and keep the Fund invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the Grantor may communicate in writing to the Trustee from time to time, subject, however, to the provisions of this Section. In investing, reinvesting, exchanging, selling, and managing the Fund, the Trustee shall discharge his duties with respect to the trust fund solely in the interest of the beneficiary and with the care, skill, prudence, and diligence under the circumstances then prevailing which persons of prudence, acting in a like capacity and familiar with such matters, would use in the conduct of an enterprise of like character and with like aims, except that:

(a). Securities or other obligations of the Grantor, or any owner of the facility or any of their affiliates, as defined in the Investment Company Act of 1940, as amended, 15 U.S.C. 80a-2.(a), shall not be acquired or held, unless they are securities or other obligations of the federal or a state government;

(b). The Trustee is authorized to invest the Fund in time or demand deposits of the Trustee, to the extent insured by an agency of the federal or state government; and

(c). The Trustee is authorized to hold cash awaiting investment or distribution, uninvested for a reasonable time and without liability for the payment of interest thereon.

SECTION 7. COMMINGLING AND INVESTMENT

The Trustee is expressly authorized, at its discretion:

(a). To transfer from time to time any or all of the assets of the Fund to any common, commingled, or collective trust fund created by the Trustee in which the Fund is eligible to participate, subject to all provisions thereof, to be commingled with the assets of other trusts participating therein; and

(b). To purchase shares in any investment company registered under the Investment Company Act of 1940, 15 U.S.C. 80a-1, et seq., including one which may be created, managed, or underwritten, or one to which investment advice is rendered or the shares of which are sold by the Trustee. The Trustee may vote such shares at its discretion.

SECTION 8. EXPRESS POWERS OF TRUSTEE

Without in any way limiting the powers and discretion conferred upon the Trustee by the other provisions of this Agreement or by law, the Trustee is expressly authorized and empowered:

(a). To sell, exchange, convey, transfer, or otherwise dispose of any property held by it, by public or private sale. No person dealing with the Trustee shall be bound to see to the application of the purchase money or to inquire into the validity or expediency of any such sale or other disposition;

(b). To make, execute, acknowledge, and deliver any and all documents of transfer and conveyance and any and all other instruments that may be necessary or appropriate to carry out the powers herein granted;

(c). To register any securities held in the Fund in its own name or in the name of a nominee and to hold any security in bearer form or in book entry, or to combine certificates representing such securities with certificates of the same issue held by the Trustee in other fiduciary capacities, or to deposit or arrange for the deposit of such securities in a qualified central depository even though, when so deposited, such securities may be merged and held in bulk in the name of the nominee of such depository with other securities deposited therein by another person, or to deposit or arrange for the deposit of any securities issued by the United States Government, or any agency or instrumentality thereof, with a Federal Reserve Bank, but the books and records of the Trustee shall at all times show that all securities are part of the Fund;

(d). To deposit any cash in the Fund in interest-bearing accounts maintained or savings certificates issued by the Trustee, in its separate corporate capacity, or in any other banking institution affiliated with the Trustee, to the extent insured by an agency of the federal or state government; and

(e). To compromise or otherwise adjust all claims in favor of, or against, the Fund.

SECTION 9. TAXES AND EXPENSES

All taxes of any kind that may be assessed or levied against or in respect of the Fund and all brokerage commissions incurred by the Fund shall be paid from the Fund. All other expenses incurred by the Trustee in connection with the administration of this Trust, including fees for legal services rendered to the Trustee, the compensation of the Trustee to the extent not paid directly by the Grantor, and other proper charges and disbursements of the Trustee shall be paid from the Fund.

SECTION 10. ANNUAL VALUATION

The Trustee shall annually, at least 30 days prior to the anniversary date of establishment of the Fund, furnish to the Grantor and to the administrative authority a statement confirming the value of the Trust. Any securities in the Fund shall be valued at market value as of no more than 60 days prior to the anniversary date of establishment of the Fund. The failure of the Grantor to object in writing to the Trustee, within 90 days after the statement has been furnished to the Grantor and the administrative authority, shall constitute a conclusively binding assent by the Grantor, barring the Grantor from asserting any claim or liability against the Trustee with respect to matters disclosed in the statement.

SECTION 11. ADVICE OF COUNSEL

The Trustee may from time to time consult with counsel, who may be counsel to the Grantor, with respect to any questions arising as to the construction of this Agreement or any action to be taken hereunder. The Trustee shall be fully protected, to the extent permitted by law, in acting upon the advice of counsel.

SECTION 12. TRUSTEE COMPENSATION

The Trustee shall be entitled to reasonable compensation for its services, as agreed upon in writing from time to time with the Grantor.

SECTION 13. SUCCESSOR TRUSTEE

The Trustee may resign or the Grantor may replace the Trustee, but such resignation or replacement shall not be effective until the Grantor has appointed a successor trustee and this successor accepts the appointment. The successor trustee shall have the same powers and duties as those conferred upon the Trustee hereunder. Upon the successor trustee's acceptance of the appointment, the Trustee shall assign, transfer, and pay over to the successor trustee the funds and properties then constituting the Fund. If for any reason the Grantor cannot or does not act in the event of the resignation of the Trustee, the Trustee may apply to a court of competent jurisdiction for the appointment of a successor trustee or for instructions. The successor trustee shall, in writing, specify to the Grantor, the administrative authority, and the present Trustee, by certified mail 10 days before such change becomes effective, the date on which it assumes administration of the trust. Any expenses incurred by the Trustee as a result of any of the acts contemplated by this Section shall be paid as provided in Section 9.

SECTION 14. INSTRUCTIONS TO THE TRUSTEE

All orders, requests, and instructions by the Grantor to the Trustee shall be in writing, signed by the persons designated in the attached Exhibit A or such other persons as the Grantor may designate by amendment to Exhibit A. The Trustee shall be fully protected in acting without inquiry in accordance with the Grantor's orders, requests, and instructions. All orders, requests, and instructions by the administrative authority to the Trustee shall be in writing and signed by the administrative authority. The Trustee shall act and shall be fully protected in acting in accordance with such orders, requests, and instructions. The Trustee shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or termination of the authority of any person to act on behalf of the Grantor or administrative authority hereunder has occurred. The Trustee shall have no duty to act in the absence of such orders, requests, and instructions from the Grantor and/or administrative authority, except as provided for herein.

SECTION 15. NOTICE OF NONPAYMENT

The Trustee shall notify the Grantor and the administrative authority, by certified mail, within 10 days following the expiration of the 30-day period after the anniversary of the establishment of the Trust, if no payment is received from the Grantor during that period. After the pay-in period is completed, the Trustee shall not be required to send a notice of nonpayment.

SECTION 16. AMENDMENT OF AGREEMENT

This Agreement may be amended by an instrument, in writing, executed by the Grantor, the Trustee, and the administrative authority, or by the Trustee and the administrative authority, if the Grantor ceases to exist.

SECTION 17. IRREVOCABILITY AND TERMINATION

Subject to the right of the parties to amend this Agreement, as provided in Section 16, this Trust shall be irrevocable and shall continue until terminated at the written agreement of the Grantor, the Trustee, and the administrative authority, or by the Trustee and the administrative authority, if the Grantor ceases to exist. Upon termination of the Trust, all remaining trust property, less final trust administration expenses, shall be delivered to the Grantor.

SECTION 18. IMMUNITY AND INDEMNIFICATION

The Trustee shall not incur personal liability of any nature in connection with any act or omission, made in good faith, in the administration of this Trust, or in carrying out any direction by the Grantor or the administrative authority issued in accordance with this Agreement. The Trustee shall be indemnified and saved harmless by the Grantor or from the Trust Fund, or both, from and against any personal liability to which the Trustee may be subjected by reason of any act or conduct in its official capacity, including all reasonable expenses incurred in its defense in the event that the Grantor fails to provide such defense.

SECTION 19. CHOICE OF LAW

This Agreement shall be administered, construed, and enforced according to the laws of the state of Louisiana.

SECTION 20. INTERPRETATION

As used in this Agreement, words in the singular include the plural and words in the plural include the singular. The descriptive headings for each Section of this Agreement shall not affect the interpretation or the legal efficacy of this Agreement.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed by their respective officers duly authorized, and their corporate seals to be hereunto affixed, and attested to as of the date first above written. The parties below certify that the wording of this Agreement is identical to the wording specified in LAC 33:VII.1399.Appendix D, on the date first written above.

WITNESSES: GRANTOR:

Julia Pilcher Michael Harr

Susan Griggs By: Michael Harrelson

Its: ~~Co-Mgr~~ President

[Seal]

TRUSTEE:
Trust One Bank
By: [signature]
Its: Tom Simpson, SVP

[Seal]

THUS DONE AND PASSED in my office in Tennessee, on the 28th day of Sept., 20 07, in the presence of Susan Briggs and Julia Pilcher, competent witnesses, who hereunto sign their names with the said appearers and me, Notary, after reading the whole.

Windee James
Notary Public

WINDEE JAMES
STATE OF TENNESSEE NOTARY PUBLIC
SHELBY COUNTY

CERTIFICATION OF ACKNOWLEDGEMENT

STATE OF LOUISIANA

PARISH OF CADDO

BE IT KNOWN, that on this 28TH day of SEPT., 2007, before me, the undersigned Notary Public, duly commissioned and qualified within the State and Parish aforesaid, and in the presence of the witnesses hereinafter named and undersigned, personally came and appeared MICHAEL HARPER SR., to me well known, who declared and acknowledged that he had signed and executed the foregoing instrument as his act and deed, and as the act and deed of the HARPER MATHIAS MGMT, INC., a corporation, for the consideration, uses, and purposes and on terms and conditions therein set forth.

And the said appearer, being by me first duly sworn, did depose and say that he is the PRESIDENT of said corporation and that he signed and executed said instrument in his said capacity, and under authority of the Board of Directors of said corporation.

Thus done and passed in the State and Parish aforesaid, on the day and date first hereinabove written, and in the presence of Julia Pilcher and Susan Griggs, competent witnesses, who have hereunto subscribed their name as such, together with said appearer and me, said authority, after due reading of the whole.

WITNESSES:

Julia Pilcher

Susan Griggs

NOTARY PUBLIC:

Windee James

WINDEE JAMES
STATE OF TENNESSEE NOTARY PUBLIC
SHELBY COUNTY

Schedule A

Harrelson Materials Management, Inc., Landfill
1101 Russell Road
Shreveport, LA 71107

Agency Interest Number 28118, D-017-2688/PER19950001

Current Closure Estimate: $527,500.00
Current Post Closure Estimate: $$33,000.00

Schedule B

Property Deposited in Trust: $80,081.43

As evidenced by See attached

Harrelson Materials

1118420 096 COMMERCIAL PREMIUM MMA

Account Identification				
Harrelson Materials	Home:	901-759-3500	Tax ID:	
Management Financial Assurance	Work:	901-759-3500	Last deposit:	20,000.00, 10/29/2007
Suite 100	Branch:	1 - Renaissance Center	Current bal:	80,061.43
1715 Aaron Brenner Dr	Prim officer:	237 - Tom Simpson		
Memphis TN 38120				

Balances

Ledger:	64,117.48	Todays activity:	15,943.95
Current:	80,061.43	Holds:	0.00
Total available:	80,061.43	Float:	0.00
Closing:	80,139.01	Available PRA:	0.00
		Related available:	0.00
		Total holds:	0.00
		ESP score:	

Account Overview

Deposit category:	M - Money market	Branch:	1 - Renaissance Center
Account type:	96 - Commercial Prem MM	Cost center:	1
Service charge:	96 - Comm Prem MM	Primary officer:	237 - Tom Simpson
Charge option:	1 - Charge	Phone:	901-759-3500
Package/tier:			
Opened:	09/14/2007	Birth date:	
Closed:		Retirement plan:	
Entered:	09/14/2007	Withholding status:	
Reopened:			

Statement/Analysis Information

Next statement:	10/31/2007	Next analysis:	10/31/2007
Last statement:	09/30/2007	Last analysis:	09/30/2007
Last statement bal:	44,877.48	Analysis cycle:	31 - End Of Month(A)
Statement cycle:	31 - End Of Month(A)	Bulk file:	T - Check safekeeping
Pending stmt cycle:		Pending bulk file:	

Status Information

Posting restriction:		Dormant or inactive:	
Escheat status:		Account statuses:	U - Do not close
Special referral:			X - No signature on file

Interest Information

Interest plan:	96 - Business Mmia	Interest paid YTD:	38.66
Accrued interest:	77.577470670	Rate:	2.177
Bonus accrual:	0.000000000	Yield:	2.200

Activity Information

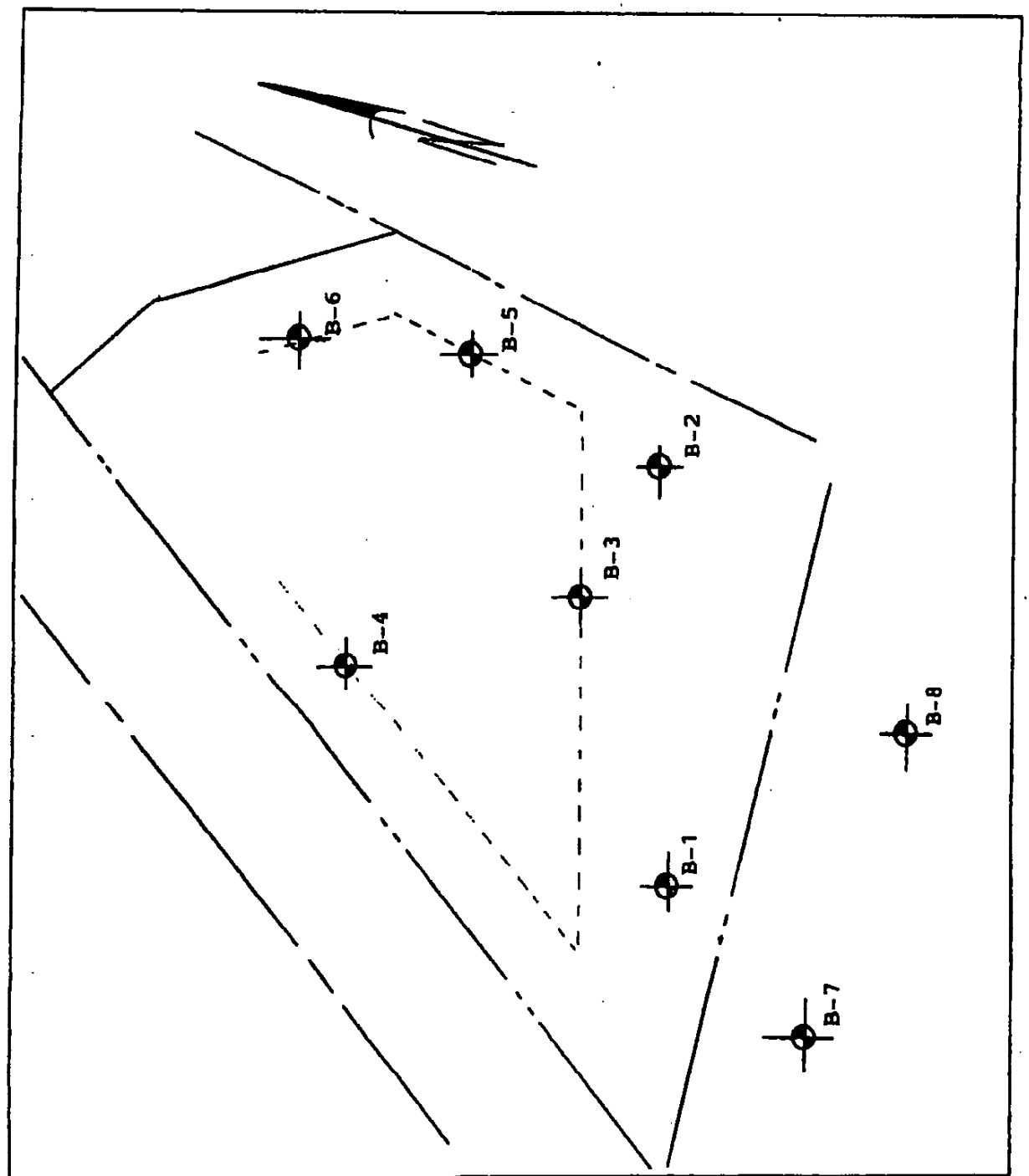
Deposit date:	10/29/2007	Customer contact:	10/29/2007
Deposit amount:	20,000.00	Maintenance:	10/19/2007

Exhibit A

Michael D. Harrelson

APPENDIX C

GEOTECHNICAL INVESTIGATION



CTL CONSTRUCTION TESTING LAB, INC.

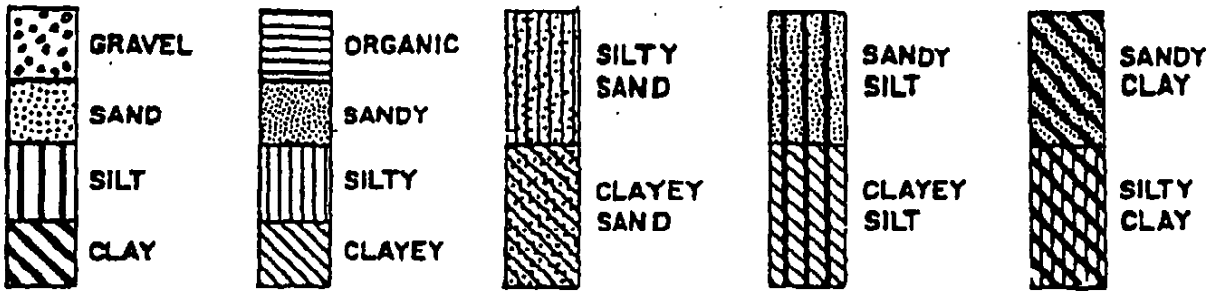
SCALE: NTS	DRAWN BY RJ
DATE: 10/5/98	

Chandler Brothers Landfill
1101 Russell Road

BORING LOCATION DIAGRAM	DRAWING NUMBER 98265

KEY TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES



CONSISTENCY OF COHESIVE SOILS

DESCRIPTIVE TERM	UNCONFINED COMPRESSIVE STRENGTH TON/SQ. FOOT
Very Soft	Less than 0.25
Soft	0.25-0.50
Plastic	0.50-1.00
Stiff	1.00-2.00
Very Stiff	2.00-4.00
Hard	More than 4.00

RELATIVE DENSITY OF COHESIONLESS SOILS

DESCRIPTIVE TERM	STD. PENETRATION RESISTANCE BLOWS/FOOT
Loose	0-10
Firm	10-30
Dense	30-50
Very Dense	More than 50

SOIL STRUCTURE

CALCAREOUS – Containing deposits of calcium carbonate ; generally nodular.

SLICKENSIDED – Having inclined planes of weakness that are slick and glossy in appearance.

LAMINATED – Composed of thin layers of varying color and texture.

FISSURED – Containing shrinkage cracks frequently filled with fine sand or silt. Usually more or less vertical.

INTERBEDDED – Composed of alternate layers of different soil types.

TEST DATA AND SAMPLER SYMBOLS

30% FINER – Percent finer than no. 200 sieve.

▽ – Static water level.

▼ – Hydrostatic water level.

UNDISTURBED SAMPLE | DISTURBED SAMPLE | NO RECOVERY

95042

LOG OF BORING

PROJECT: Landfill - Russell Rd.
CLIENT: H & W Demolition Inc.

BORING NO: B1
LOCATION: Southside center of existing landfill

Date: 2-23-95 Type: Auger Ground Elevation:

Legend: ■ Sample X Penetration ▼ Water

Depth, Feet	Symbol	Sample	Description of Stratum
			Stiff reddish brown clay
5			Stiff gray & reddish brown clay
			Medium brown clay
			Medium light brown & gray clay
10			Medium reddish brown silty clay
			Medium tan & gray silty clay with sand seams
15			Bottom of boring at 15'
			No water encountered
20			Borehole backfilled in accordance with LA DOTD regulations
25			
30			
35			
40			
45			
50			

95042

LOG OF BORING

PROJECT: Landfill - Russell Rd.
CLIENT: H & W Demolition Inc.

BORING NO: B2
LOCATION: Northside center of existing

Date: 2-23-95 Type: Auger Ground Elevation: landfill

Legend: ■ Sample X Penetration ▼ Water

Depth, Feet	Symbol	Sample	Description of Stratum
			Stiff dark reddish brown clay
5			Stiff dark gray & brown clay
			with sand seams below 10'
10			
			Medium light gray and reddish brown silty clay
15			Bottom of boring at 15'
			No water encountered
20			Borehole backfilled in accordance with LA DOTD regulations
25			
30			
35			
40			
45			
50			

LOG OF BORING NO. B-3

PROJECT: Chandler Brothers Landfill

SHEET 1 of 1

CLIENT: EJ French & Son

LOCATION: Shreveport, La.

DATE: 9/8/98

SURFACE ELEV: Existing

DRILLING METHOD(S): Auger Drilled

GROUNDWATER INFORMATION: No water was encountered.

FIELD DATA				LABORATORY DATA									
SOIL & ROCK	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLAST. INDEX, %	-#200 SIEVE, %	COMPRESSIVE STRENGTH, PSF	FAILURE STRAIN, %	CONFINING PRESS. PSI	DESCRIPTION OF STRATUM
			P=2.5	38.1	82.3	79	28	51		2049	3.5		Stiff gray clay
			P=3.0	20.2									--very stiff tan and gray
	5												
			P=3.5	22.7	103.9	51	25	26		3182	5.0		
	10												
			P=4.5	23.3		61	26	35					--hard
	15												15.0
													Bottom of Boring at Fifteen (15) Feet.
	20												
	25												

REMARKS:

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

GLF 65 9/16/98

98265

CTL CONSTRUCTION TESTING LAB, Inc.

LOG OF BORING NO. B-4

PROJECT: Chandler Brothers Landfill — SHEET 1 of 1

CLIENT: EJ French & Son — LOCATION: Shreveport, La.

DATE: 9/8/98 — SURFACE ELEV: Existing

DRILLING METHOD(S): Auger Drilled

GROUNDWATER INFORMATION: No water was encountered.

FIELD DATA			LABORATORY DATA									
SOIL & ROCK	DEPTH (FT)	SAMPLE TYPE N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLAST. INDEX, %	-#200 SIEVE, %	COMPRESSIVE STRENGTH, PSF	FAILURE STRAIN, %	CONFINING PRESS. PSI	DESCRIPTION OF STRATUM
	0	P=4.5	21.2	108.4	65	26	39		12430	2.5		Fill and gravel — 0.5 Very hard brown clay
		P=4.5	20.0									--hard
	5											
		P=4.5	30.8	94.4	78	29	49		2740	2.0		--reddish brown
	10											
		P=3.0	34.7									--very stiff
	15											15.0 Bottom of Boring @ Fifteen (15) Feet.
	20											
	25											

REMARKS:

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

GLF 5 7/16/98

98265

CTL CONSTRUCTION TESTING LAB, Inc.

LOG OF BORING NO. B-7

PROJECT: Chandler Brothers Landfill — SHEET 1 of 1

CLIENT: EJ French & Son — LOCATION: Shreveport, La.

DATE: 9/8/98 — SURFACE ELEV: Existing

DRILLING METHOD(S): Auger Drilled

GROUNDWATER INFORMATION: No water was encountered.

SOIL & ROCK	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLAST. INDEX, %	-#200 SIEVE, %	COMPRESSIVE STRENGTH, PSF	FAILURE STRAIN, %	CONFINING PRESS. PSI	DESCRIPTION OF STRATUM
			P=3.0	30.4		61	27	34					Very stiff brown clay
			P=2.0	36.3	86.1					1342	2.5		--medium stiff and gray
	5												
			P=2.0	30.7		87	30	57					--stiff brown
	10												
			P=3.0	31.2	92.4	91	30	61		1949	3.0		--very stiff gray
													15.0
	15												Bottom of Boring @ Fifteen (15) Feet.
	20												
	25												

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

REMARKS:

GLF 9/16/98

98265

CTL CONSTRUCTION TESTING LAB, Inc.

LOG OF BORING NO. B-8

PROJECT: Chandler Brothers Landfill

SHEET 1 of 1

CLIENT: EJ French & Son

LOCATION: Shreveport, La.

DATE: 9/8/98

SURFACE ELEV: Existing

DRILLING METHOD(S): Auger Drilled

GROUNDWATER INFORMATION: No water was encountered.

SOIL & ROCK	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLAST. INDEX, %	-#200 SIEVE, %	COMPRESSIVE STRENGTH, PSF	FAILURE STRAIN, %	CONFINING PRESS. PSI	DESCRIPTION OF STRATUM
			P=4.5	20.5									Hard brown clay
	5		P=3.5	42.7	78.1	78	26	52		1936	2.5		--very stiff
	10		P=2.5	39.1	82.7	73	26	47		1656	3.5		--stiff brown and gray
	15		P=3.0	34.0	88.3					1709	2.0		--gray
													15.0
													Bottom of Boring at Fifteen (15) Feet.
	20												
	25												

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

REMARKS:

GLB 9/16/98

98265

CTL CONSTRUCTION TESTING LAB, Inc.

LOG OF BORING NO. B-1

PROJECT: Chandler Brothers Landfill — SHEET 1 of 1

CLIENT: EJ French & Son — LOCATION: Shreveport, La.

DATE: 9/8/98 — SURFACE ELEV: Existing

DRILLING METHOD(S): Auger Drilled

GROUNDWATER INFORMATION: No water was encountered.

SOIL & ROCK	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLAST. INDEX, %	-#200 SIEVE, %	COMPRESSIVE STRENGTH, PSF	FAILURE STRAIN, %	CONFINING PRESS. PSI	DESCRIPTION OF STRATUM
			P=4.0	24.2									Very stiff red silty clay with organics and gravel
													3.0
			P=2.0	27.8	94.1	58	25	33		2451	5.0		Stiff tan and gray clay
	5												5.0
													Bottom of Boring at Five (5) Feet.
	10												
	15												
	20												
	25												

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

REMARKS:

GLF 9/16/98

98265

CTL CONSTRUCTION TESTING LAB, Inc.

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LOG OF BORING NO. B-2

PROJECT: Chandler Brothers Landfill — SHEET 1 of 1

CLIENT: EJ French & Son — LOCATION: Shreveport, La.

DATE: 9/8/98 — SURFACE ELEV: Existing

DRILLING METHOD(S): Auger Drilled

GROUNDWATER INFORMATION: No water was encountered.

SOIL & ROCK	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLAST. INDEX, %	-#200 SIEVE, %	COMPRESSIVE STRENGTH, PSF	FAILURE STRAIN, %	CONFINING PRESS. PSI	DESCRIPTION OF STRATUM
			P=2.0	35.4	85.9	98	30	68		2321	3.0		Stiff gray clay
			P=2.0	30.9	91.2					1822	4.0		--medium, tan and gray
	5												5.0
													Bottom of Boring at Five (5) Feet.
	10												
	15												
	20												
	25												

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

REMARKS:

9/16/98 GLF

98265

CTL CONSTRUCTION TESTING LAB, Inc.

GEOTECHNICAL REPORT

HMM
HARRELSON
MATERIALS MANAGEMENT
CONSTRUCTION & DEMOLITION DEBRIS SPECIALISTS

Prepared For:

Harrelson Materials Management, Inc.

Harrelson Landfill
Shreveport, Louisiana

Prepared By:

GENESIS ENVIRONMENTAL CONSULTING, INC.
11400 WEST BASELINE ROAD
LITTLE ROCK, AR 72209
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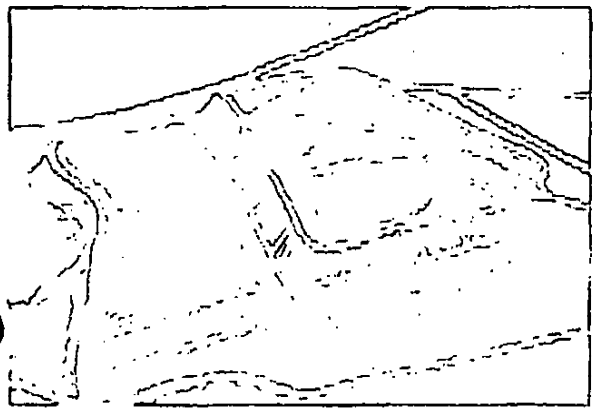

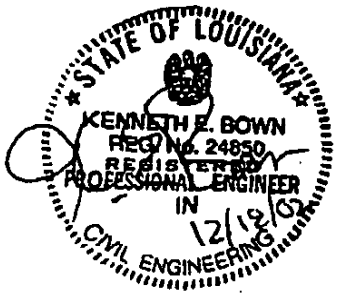

December 2002

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1.0 GENERAL SITE LOCATION AND LAYOUT 2
2.0 REGIONAL GEOLOGY 2
3.0 REGIONAL HYDROLOGY 3
4.0 PREVIOUS SITE SUB-SURFACE INVESTIGATIONS 3
5.0 GEC SITE SUB-SURFACE INVESTIGATION (2002) 4
6.0 SUMMARY OF GENERAL SITE SUB-SURFACE CONDITIONS 5

FIGURES

FIGURE 1 SITE LOCATION MAP
FIGURE 2 GENERAL SITE LAYOUT
FIGURE 3 REGIONALIZED GEOLOGY MAP OF LOUISIANA
FIGURE 4 GEOLOGIC CROSS-SECTIONS

APPENDICES

ATTACHMENT A PREVIOUS SITE INVESTIGATIONS
ATTACHMENT B BORING LOGS (GEC 2002)
ATTACHMENT C PHOTO LOG OF SOIL MATERIALS ENCOUNTERED
ATTACHMENT D SOIL PHYSICAL PROPERTIES ANALYSIS

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GEOTECHNICAL REPORT
HARRELSON MATERIALS MANAGEMENT, INC.
HARRELSON LANDFILL
SHREVEPORT, LOUISIANA

The following information has been prepared on behalf of Harrelson Materials Management, Inc. (HMM) for a Type III Landfill (Facility) located in Shreveport, Louisiana. This report is intended to provide a general overview of sub-surface conditions in support of current and proposed waste disposal operations at the Facility. Specifically the soil materials within 30 feet of the existing ground surface have been identified, classified, and analyzed for engineering physical properties. This information is intended to comply with *Section 719.D Facility Geology (Subchapter D. Minor Processing and Disposal Facilities; Title 33; Part VII, Subpart 1- Solid Waste Regulations).*

1.0 GENERAL SITE LOCATION AND LAYOUT

The HMM Facility is located along Interstate 220 (I-220) approximately 1.5 miles north of the I-220/I-20 Interchange in Shreveport, Louisiana (Caddo Parish). **FIGURE 1** shows the general geographic location of the Facility.

The subject property consists of roughly 75.8 acres which is oriented in a long narrow strip that parallels I-220 (Southwest to Northeast). A sewer utility trending west to east generally divides the property. The northern property is currently being used for disposal of waste materials generally derived from construction and demolition projects in and around the City. The southern portion of the site includes the HMM Facility offices, scale house, and rock crushing operation (owned and operated by HMM). Portions of the HMM Facility were previously used as a borrow area during the construction of I-220.

The site is accessible via Russell Road which borders the site to the south. I-220 borders the site to the west. Adjacent property to the north is owned by Reliant Energy and is generally undeveloped. The City of Shreveport (City) owns the adjacent property to the east which includes the City's wastewater treatment facility (WWTF). **FIGURE 2** illustrates the general layout and orientation of the HMM Facility in relation to the surrounding areas.

2.0 REGIONAL GEOLOGY

Like most of Louisiana, Caddo Parish is underlain by geologically young sedimentary sequences that were deposited in or adjacent to rivers and deltas in a coastal plain setting. Near surface soils in the vicinity of the HMM Facility are generally described as Holocene Alluvium derived from the changing flow patterns of the Red River. The

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alluvium consists of sandy and gravelly channel deposits mantled by sandy clay natural levee deposits.

Some remnants of Pleistocene Terraces are known to exist in the vicinity of the HMM Facility while paralleling the Red River Valley which trends northwest to southeast towards the Gulf of Mexico. The terraces generally consist of sand, gravel, and mud but underlie raised, flat surfaces with varying degrees of tilt and dissection depending on their relative ages. The surfaces are remnants of preexisting flood plains that form a trend along the Red River Valley. This trend was raised due to tilting of the coastal plain in association with down-warping of the crustal floor of the Gulf of Mexico (RE: *Louisiana Geologic Survey – Louisiana State University*).

Portions of Northwest Louisiana include strata of Tertiary age, principally associated with the Sabine Uplift. Within this area, Cretaceous rocks are present in a few small exposures on the tops of salt domes that have surface expression. Strata belonging to the Wilcox Group predominate the Sabine Uplift. A copy of the general geologic map for Louisiana is included as **FIGURE 3**.

3.0 REGIONAL HYDROLOGY

The HMM Facility lies within the Red River Valley northeast of Cross Lake (See **FIGURE 1**). Drainage across the site is generally northeasterly to a tributary of Twelve Mile Bayou. Twelve Mile Bayou is located less than 0.25 miles northeast of the subject property. The bayou acts as a diversion channel for the Red River beginning near the I-71 and I-220 Interchange and generally flowing southeasterly where it rejoins the Red River close to the I-71 and I-20 Interchange. The Red River is approximately 2 miles northeast of the HMM Facility at the initiation of Twelve Mile Bayou and 3 miles east of the site where the Bayou empties into the Red River.

The HMM Facility is situated within a designated 100-year flood plain. As such, development of the Facility for continued waste disposal operations will include provisions for a flood control levee system.

4.0 PREVIOUS SITE SUB-SURFACE INVESTIGATIONS

Previous geotechnical studies were conducted at the HMM Facility in 1995 for H&W Demolition, Inc. and in 1998 for Chandler Brothers (See **ATTACHMENT A**). These studies were included in supplemental information for a *Type III Landfill Permit Application* as submitted to the Louisiana Department of Environmental Quality (LDEQ) by French & Son on behalf of Chandler Brothers (previous Facility owner).

The 1995 and 1998 studies were conducted within areas previously used as a borrow source associated with the construction of I-220. These borrow pits have since been filled with waste material derived from regional construction and demolition projects. Because the previous borings were not accurately located, it is difficult to relate the

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given soil profiles to the most recent investigation (GEC, 2002) with any accuracy. However, the soil conditions reported associated with the 1995 and 1998 studies should be representative of soil strata directly underlying existing waste disposal areas (See **FIGURE 2**). Materials encountered are generally described as "stiff clay" or "silty clay".

The 1995 study involved two borings ($B1_{1995}$ and $B2_{1995}$) which were advanced to depths of 15 feet below ground surface. Physical properties analysis of the soil materials encountered was not conducted associated with the 1995 investigation.

The 1998 study conducted by Construction Testing Lab, Inc. (CTL) for French & Son involved eight (8) borings with depths ranging from 5 feet ($B\text{-}1_{1998}$ and $B\text{-}2_{1998}$) to 15 feet below ground surface ($B\text{-}3_{1998}$ through $B\text{-}8_{1998}$). Some limited soil material physical properties analysis was conducted on soil samples obtained during the 1998 study (See **ATTACHMENT A**). Specifically, Atterberg Limits, dry density, moisture content, and compressive strength data were acquired at various depth intervals for the purpose of characterizing the engineering properties of the soil materials. **TABLE 1** summarizes the various geotechnical properties reported by CTL associated with the 1998 study.

TABLE 1
SOIL MATERIAL PHYSICAL PROPERTIES SUMMARY
1998 INVESTIGATION BY CTL & FRENCH & SON

DEPTH BELOW GROUND SURFACE (FEET)	HAND PENET. READING (TSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	COMPR. STRENGTH (PSF)
0-5	4.0, 2.0, 2.0, 2.0, 2.5, 3.0, 4.5, 4.5, 3.0, 2.0, 4.5, 3.5	24.2, 27.8, 35.4, 30.9, 38.1, 20.2, 21.2, 20.0, 30.4, 36.3, 20.5, 42.7	94.1, 85.9, 91.2, 82.3, 108.4, 86.1, 78.1	58, 98, 79, 65, 61, 78	25, 30, 28, 26, 27, 26	33, 68, 51, 39, 34, 52	2451, 2321, 1822, 2049, 12430, 1342, 1936
5-10	3.5, 4.5, 2.0, 2.5	22.7, 30.8, 40.7, 39.1	103.9, 94.4, 82.7	51, 78, 87, 73	25, 29, 30, 26	26, 49, 57, 47	3182, 2740, 1658
10-15	4.5, 3.0, 3.0	23.3, 34.7, 31.2	92.4	61, 91	26, 30,	35, 61	1949, 1709

RE: CTL 9/8/98 (See ATTACHMENT A)

5.0 GEC SITE SUB-SURFACE INVESTIGATION – 2002

During the 4th quarter of 2002, HMM contracted with Genesis Environmental Consulting, Inc. (GEC) to conduct a sub-surface investigation associated with the undeveloped areas at the HMM Facility. The investigation was initiated to characterize the near surface soils while determining physical properties for engineering analysis and design.

Borings were advanced at 12 locations across the site using hollow stem augers to depths of up to 40 feet below existing ground surface (as of November 2002). Three of the boring locations ($PZ\text{-}1_{2002}$, $PZ\text{-}2_{2002}$, and $PZ\text{-}3_{2002}$ were completed as temporary

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piezometers for the purpose of determining static ground water levels and general groundwater flow direction. All of the boring and piezometer locations have since been plugged and abandoned using a bentonite/grout mixture. Boring logs for the 12 boring locations are included in **ATTACHMENT B** of this report. A photographic log of the various soil materials encountered is included in **ATTACHMENT C.**

Samples were obtained at various depth intervals for visual and physical properties analysis. Soils encountered were generally classified in accordance with the Unified Soil Classification System (USCS). The soils were also analyzed for in-situ and remolded hydraulic conductivity, Atterberg Limits, percent passing a #200 sieve, and shear strength. Results associated with the laboratory physical properties analyses are provided in **ATTACHMENT D.**

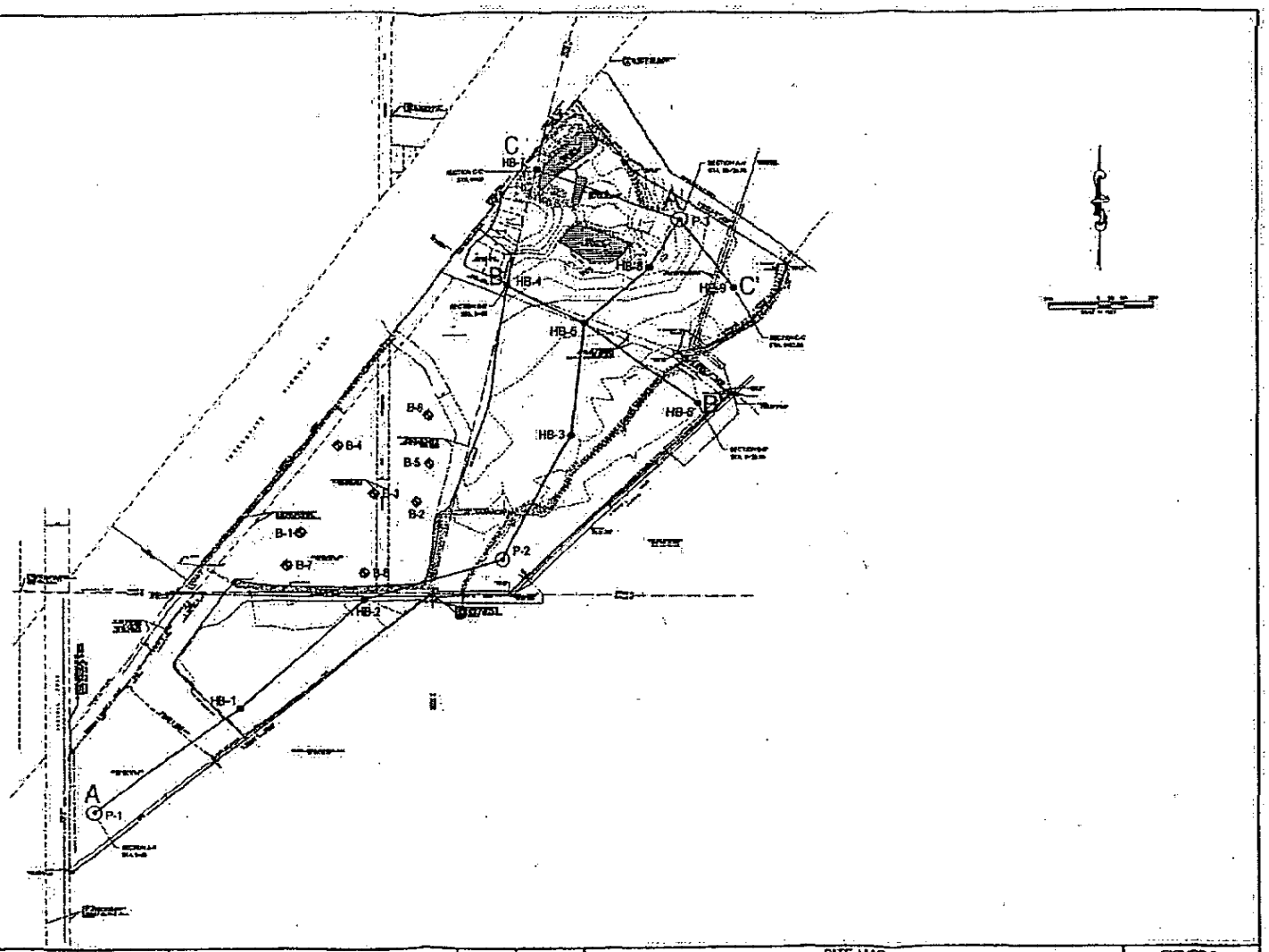
6.0 SUMMARY OF GENERAL SUB-SURFACE CONDITIONS

The near surface soils (upper 40 feet) generally consist of a thick clay confining unit (average thickness of roughly 25 feet) underlain by a water bearing zone consisting of various sand and silty sand materials. The clay confining unit generally consists of fat, high plasticity materials with a low in-situ hydraulic conductivity (less than 1.0×10^{-8} cm/s). The majority of the clay materials encountered in the upper 30 feet are suitable and supportive of a waste disposal operation.

Fill material is present (average thickness of roughly 10 feet) over much of the southern portion of the Facility including the area currently used for rock crushing operations. The fill material generally consists of crushed brick mixed with soil.

The soil profile in the study zone (upper 40 feet) is consistent over most of the site with the exception of the extreme northern end of the property. In this area (refer to Borings P-3 and HB-7), sandy material was encountered in the upper 15 feet. The lateral and vertical extent of the northern shallow sandy lenses is limited and is underlain by relatively impermeable clay layers. This area will likely require some undercutting of unsuitable materials in constructing the flood control levee system and the northern portion of the planned waste disposal area. Much of the material considered unsuitable as a natural bottom liner material and future final cover material may be used as an interim cover material. **FIGURE 4** illustrates the general soil profiles encountered at the Facility.

Groundwater was encountered in several borings at depths ranging from 16 to 34 feet below ground surface (bgs). The average depth to groundwater encountered is approximately 26 feet bgs. Based on information obtained from temporary Piezometers P-1, P-2, and P-3, static water levels were documented at depths ranging from 7 to 17 feet bgs. The general groundwater flow direction is northerly.



REV.	DATE	BY	DESCRIPTION

GEC// GENESIS ENVIRONMENTAL CONSULTING, INC.
11400 West Broadway Road
Little Rock, AR 72204
(501) 455-7196

HARRELSON

SITE MAP

GEOTECHNICAL REPORT

HARRELSON MATERIALS MANAGEMENT, INC.

HARRELSON LANDFILL

SHREVEPORT LOUISIANA

FIGURE 2

SHEET NO. 1 OF 1

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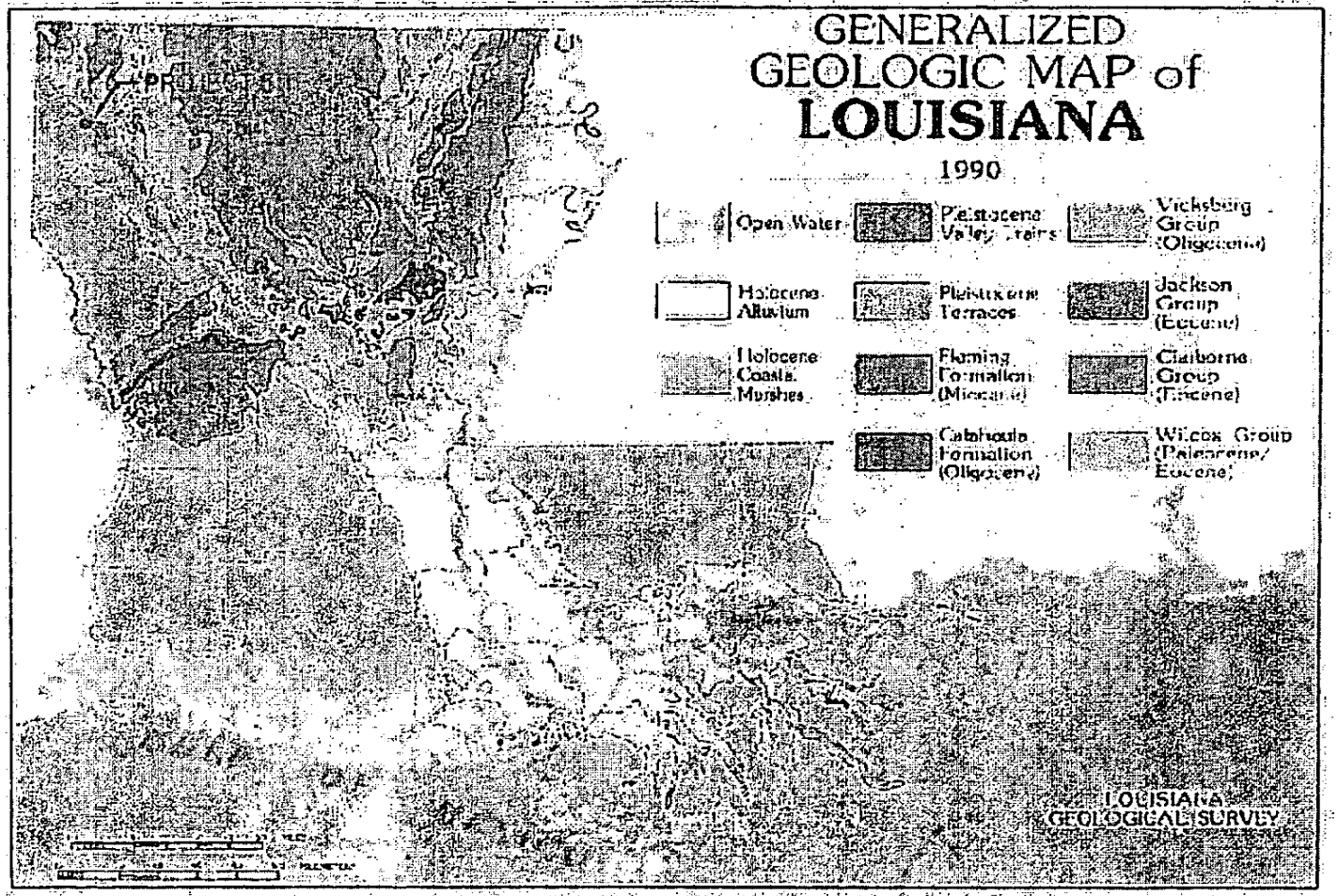

FIGURE 3

GENERALIZED GEOLOGIC MAP OF LOUISIANA

GEOTECHNICAL REPORT - HARRELSON LANDFILL
HARRELSON MATERIALS MANAGEMENT, INC.

SHREVEPORT — LOUISIANA

DESIGNED BY:	BE
CHECKED BY:	KEB
DRAWN BY:	TSW
MONTH/YEAR:	DEC., 2002

GEC
GENESIS ENVIRONMENTAL CONSULTING, INC.
11400 West Bonifay Road
Little Rock, AR 72209
(501) 455-2199

PROJECT NO.:	114-001-02082
DATE:	12/18/02
SCALE:	N.T.S.
ACAD NO.:	022

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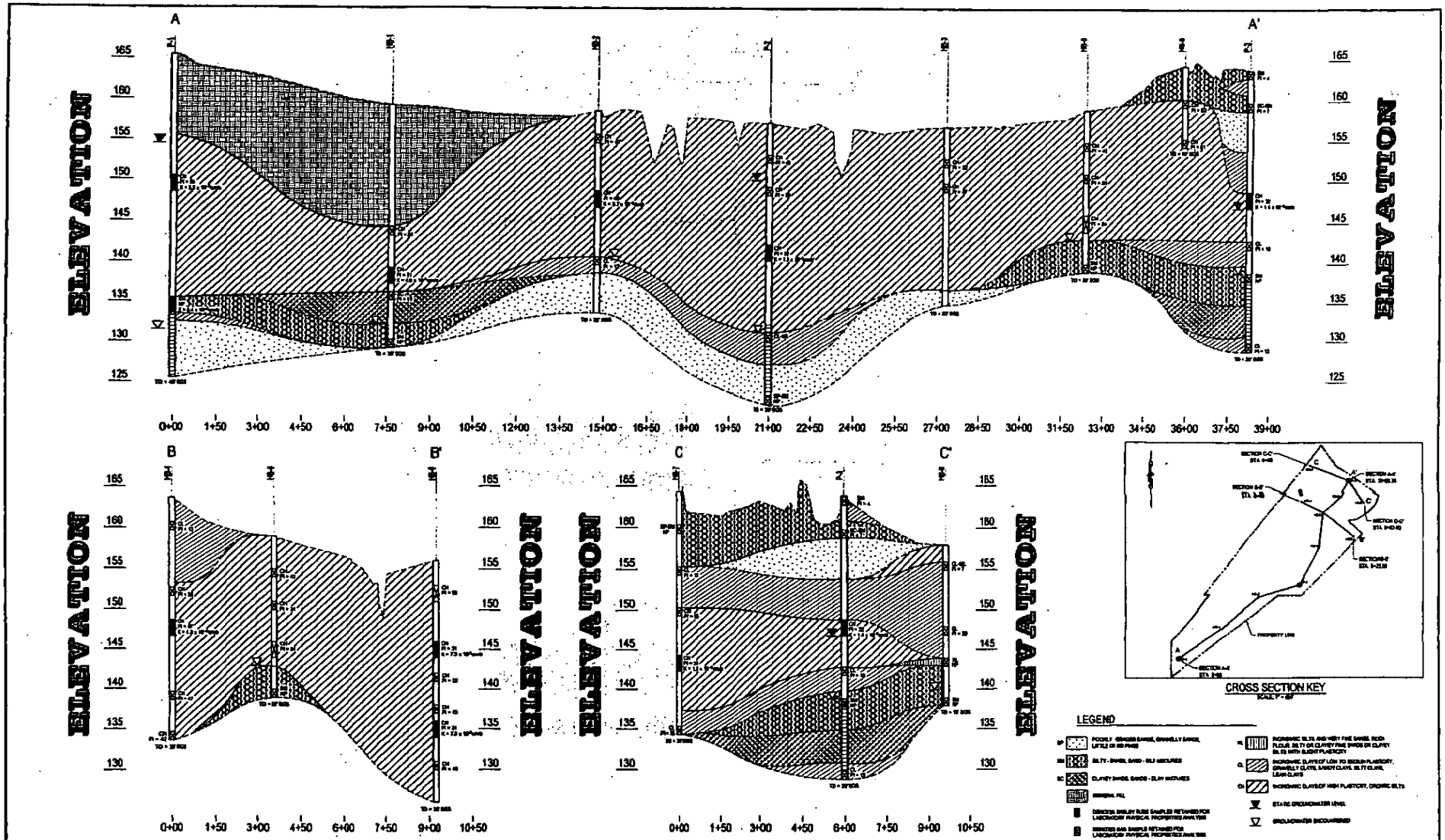

GEOLOGIC CROSS SECTIONS

GEOTECHNICAL REPORT

HARRELSON MATERIALS MANAGEMENT, INC.

HARRELSON LANDFILL

FIGURE 4

GEC GENESIS ENVIRONMENTAL CONSULTING, INC.
11400 West Baseline Road
Little Rock, AR 72209
(501) 455-2199

HMM HARRELSON MATERIALS MANAGEMENT

REV	DATE	BY	DESCRIPTION

DESIGNED BY:	[illegible]
DRAWN BY:	[illegible]
APPVD. BY:	[illegible]
SCALE:	AS SHOWN
DATE:	12/18/02
JOB NO.	114-901-02082
ACAD NO.	020

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ATTACHMENT A
PREVIOUS INVESTIGATIONS

LOG OF BORING NO. B-1

PROJECT: Chandler Brothers Landfill

SHEET 1 of 1

CLIENT: EJ French & Son

LOCATION: Shreveport, La.

DATE: 9/8/98

SURFACE ELEV: Existing

DRILLING METHOD(S): Auger Drilled

GROUNDWATER INFORMATION: No water was encountered.

SOIL & ROCK	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLAST. INDEX, %	-#200 SIEVE, %	COMPRESSIVE STRENGTH, PSF	FAILURE STRAIN, %	CONFINING PRESS. PSI	DESCRIPTION OF STRATUM
			P=4.0	24.2									Very stiff red silty clay with organics and gravel
													3.0
			P=2.0	27.8	94.1	58	25	33		2451	5.0		Stiff tan and gray clay
	5												5.0
													Bottom of Boring at Five (5) Feet.
	10												
	15												
	20												
	25												

REMARKS:

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

JS 9/16/98

GLF

98265

CTL CONSTRUCTION TESTING LAB, Inc.

LOG OF BORING NO. B-2

PROJECT: Chandler Brothers Landfill

SHEET 1 of 1

CLIENT: EJ French & Son

LOCATION: Shreveport, La.

DATE: 9/8/98

SURFACE ELEV: Existing

DRILLING METHOD(S): Auger Drilled

GROUNDWATER INFORMATION: No water was encountered.

SOIL & ROCK	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLAST. INDEX, %	-#200 SIEVE, %	COMPRESSIVE STRENGTH, PSF	FAILURE STRAIN, %	CONFINING PRESS. PSI	DESCRIPTION OF STRATUM
			P=2.0	35.4	85.9	98	30	68		2321	3.0		Stiff gray clay
			P=2.0	30.9	91.2					1822	4.0		--medium, tan and gray
	5												5.0 Bottom of Boring at Five (5) Feet.
	10												
	15												
	20												
	25												

REMARKS:

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

9/16/98

98265

CTL CONSTRUCTION TESTING LAB, Inc.

LOG OF BORING NO. B-3

PROJECT: Chandler Brothers Landfill

SHEET 1 of 1

CLIENT: EJ French & Son

LOCATION: Shreveport, La.

DATE: 9/8/98

SURFACE ELEV: Existing

DRILLING METHOD(S): Auger Drilled

GROUNDWATER INFORMATION: No water was encountered.

SOIL & ROCK	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLAST. INDEX, %	-#200 SIEVE, %	COMPRESSIVE STRENGTH, PSF	FAILURE STRAIN, %	CONFINING PRESS. PSI	DESCRIPTION OF STRATUM
	0		P=2.5	38.1	82.3	79	28	51		2049	3.5		Stiff gray clay
			P=3.0	20.2									--very stiff tan and gray
	5												
			P=3.5	22.7	103.9	51	25	26		3182	5.0		
	10												
			P=4.5	23.3		61	26	35					--hard
	15												15.0
													Bottom of Boring @ Fifteen (15) Feet.
	20												
	25												

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

REMARKS:

GLF 65 9/16/98

98265

CTL CONSTRUCTION TESTING LAB, Inc.

LOG OF BORING NO. B-4

PROJECT: Chandler Brothers Landfill

SHEET 1 of 1

CLIENT: EJ French & Son

LOCATION: Shreveport, La.

DATE: 9/8/98

SURFACE ELEV: Existing

DRILLING METHOD(S): Auger Drilled

GROUNDWATER INFORMATION: No water was encountered.

FIELD DATA				LABORATORY DATA								
SOIL & ROCK	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLAST. INDEX, %	-#200 SIEVE, %	COMPRESSIVE STRENGTH, PSF	FAILURE STRAIN, %	CONFINING PRESS. PSI
			P=4.5	21.2	108.4	65	26	39		12430	2.5	
	5		P=4.5	20.0								
			P=4.5	30.8	94.4	78	29	49		2740	2.0	
	10		P=3.0	34.7								
	15											
	20											
	25											

DESCRIPTION OF STRATUM

Fill and gravel — 0.5

Very hard brown clay

--hard

--reddish brown

--very stiff

15.0

Bottom of Boring at Fifteen (15) Feet.

REMARKS:

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

98265

CTL CONSTRUCTION TESTING LAB, Inc.

LOG OF BORING NO. B-7

PROJECT: Chandler Brothers Landfill

SHEET 1 of 1

CLIENT: EJ French & Son

LOCATION: Shreveport, La.

DATE: 9/8/98

SURFACE ELEV: Existing

DRILLING METHOD(S): Auger Drilled

GROUNDWATER INFORMATION: No water was encountered.

SOIL & ROCK	DEPTH (FT)	SAMPLE TYPE / N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLAST. INDEX, %	-#200 SIEVE, %	COMPRESSIVE STRENGTH, PSF	FAILURE STRAIN, %	CONFINING PRESS. PSI	DESCRIPTION OF STRATUM
		P=3.0	30.4		61	27	34					Very stiff brown clay
		P=2.0	36.3	86.1					1342	2.5		--medium tan and gray
	5											
		P=2.0	40.7		87	30	57					--tan brown
	10											
		P=3.0	31.2	92.4	91	30	61		1949	3.0		--very stiff gray
	15											15.0
												Bottom of Boring at Fifteen (15) Feet.
	20											
	25											

REMARKS:

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

98265

CTL CONSTRUCTION TESTING LAB, Inc.

LOG OF BORING NO. B-8

PROJECT: Chandler Brothers Landfill

SHEET 1 of 1

CLIENT: EJ French & Son

LOCATION: Shreveport, La.

DATE: 9/8/98

SURFACE ELEV: Existing

DRILLING METHOD(S): Auger Drilled

GROUNDWATER INFORMATION: No water was encountered.

SOIL & ROCK	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLAST. INDEX, %	-#200 SIEVE, %	COMPRESSIVE STRENGTH, PSF	FAILURE STRAIN, %	CONFINING PRESS. PSI	DESCRIPTION OF STRATUM
	0		P=4.5	20.5									Hard brown clay
			P=3.5	42.7	78.1	78	26	52		1936	2.5		--very stiff
	5												
			P=2.5	39.1	82.7	73	26	47		1656	3.5		--stiff brown and gray
	10												
			P=3.0	34.0	88.3					1709	2.0		--gray
	15												15.0 Bottom of Boring at Fifteen (15) Feet.
	20												
	25												

TYPE SAMPLE: AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

REMARKS:

GLL 265 9/16/98

98265

CTL CONSTRUCTION TESTING LAB, Inc.

95042

LOG OF BORING

PROJECT: Landfill - Russell Rd.
CLIENT: H & W Demolition Inc.

BORING NO: B1
LOCATION: Southside center of existing landfill

Date: 2-23-95 Type: Auger Ground Elevation:

Legend: ■ Sample X Penetration ▼ Water

Depth, Feet	Symbol	Sample	Description of Stratum
			Stiff reddish brown clay
5			Stiff gray & reddish brown clay
			Medium brown clay
			Medium light brown & gray clay
10			Medium reddish brown silty clay
			Medium tan & gray silty clay with sand seams
15			Bottom of boring at 15'
			No water encountered
20			Borehole backfilled in accordance with LA DOTD regulations
25			
30			
35			
40			
45			
50			

95042

LOG OF BORING

PROJECT: Landfill - Russell Rd.
CLIENT: H & W Demolition Inc.

BORING NO: B2
LOCATION: Northside center of existing

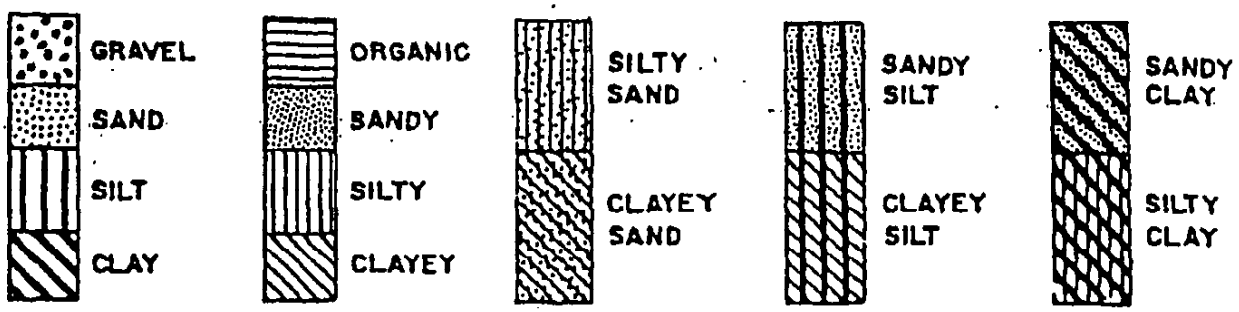
Date: 2-23-95 Type: Auger Ground Elevation: landfill

Legend: ■ Sample X Penetration ▼ Water

Depth, Feet	Symbol	Sample	Description of Stratum
			Stiff dark reddish brown clay
5			Stiff dark gray & brown clay
			with sand seams below 10'
10			
			Medium light gray and reddish brown silty clay
15			Bottom of boring at 15'
			No water encountered
20			Borehole backfilled in accordance with LA DOTD regulations
25			
30			
35			
40			
45			
50			

KEY TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES



CONSISTENCY OF COHESIVE SOILS

DESCRIPTIVE TERM	UNCONFINED COMPRESSIVE STRENGTH TON/SQ. FOOT
Very Soft	Less than 0.25
Soft	0.25 – 0.50
Plastic	0.50 – 1.00
Stiff	1.00 – 2.00
Very Stiff	2.00 – 4.00
Hard	More than 4.00

RELATIVE DENSITY OF COHESIONLESS SOILS

DESCRIPTIVE TERM	STD. PENETRATION RESISTANCE BLOWS/FOOT
Loose	0 – 10
Firm	10 – 30
Dense	30 – 50
Very Dense	More than 50

SOIL STRUCTURE

CALCAREOUS – Containing deposits of calcium carbonate ; generally nodular.

SLICKENSIDED – Having inclined planes of weakness that are slick and glossy in appearance.

LAMINATED – Composed of thin layers of varying color and texture.

FISSURED – Containing shrinkage cracks frequently filled with fine sand or silt. Usually more or less vertical.

INTERBEDDED – Composed of alternate layers of different soil types.

TEST DATA AND SAMPLER SYMBOLS

30% FINER – Percent finer than no. 200 sieve.

▽ – Static water level.

▼ – Hydrostatic water level.

UNDISTURBED SAMPLE | DISTURBED SAMPLE | NO RECOVERY

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ATTACHMENT B
BORING LOGS

Boring #: P-1	GEC // GENESIS ENVIRONMENTAL CONSULTING, INC. 11400 West Baseline Road Little Rock, AR 72209	Location: SHREVEPORT, LOUISIANA	
Date: 11/19/02		Drilling Method: HOLLOW STEM AUGER	
Elev: 165.5'		Driller: ANDERSON ENGINEERING	
Job No.: 114-001-02082	Client: HARRELSON LANDFILL	Logged By: MATT EDMONDS	Sheet No.: 1 of 1

Depth (feet)	Northing: 739552.65 / Easting: 2879457.89 DESCRIPTION	Litho. Symbol	USCS Classification	Remarks
	General fill			Continuous sampling with hollow stem auger
10	Reddish brown clay, moist			▼ Static water level on 11/22/02 @ 10.96' BGS
15	Reddish brown clay, moist, high plasticity, stiff, very cohesive, fat		CH	15' - 17'
	Brown, silty clay, some fine sand		PI = 54	Push shelby tube
	Brownish clay, moist, stiff, high plasticity			
20	Brownish gray clay with tan mottles, very stiff, high plasticity, moist			
	Brownish gray clay with tan mottles, very stiff			
25	Brownish gray clay with tan mottles, very stiff, moist, with some silt			
	Tan to gray clay with silt, stiff, moist			
	Brownish gray clay, stiff, fat, moist, very cohesive			
30	Grayish brown, fine sand, and clayey silt		SM NP	30' - 32' Push shelby tube
	Gray silty clay, stiff, with some fine sand, very moist			
	Gray fine to medium grained sand, with some gray clay, very moist			▽ Hit water @ 34' BGS
35	Gray fine to medium grained sand, wet			
40	Total Depth = 40' Below Ground Surface (BGS)			Set piezometer @ 40' BGS
	☒ Denotes bag sample retained for laboratory physical properties analysis			
45	■ Denotes shelby tube samples retained for laboratory physical properties analysis			

Boring #: P-2	GEC // GENESIS ENVIRONMENTAL CONSULTING, INC. 11400 West Baseline Road Little Rock, AR 72209	Location: SHREVEPORT, LOUISIANA	
Date: 11/20/02		Drilling Method: HOLLOW STEM AUGER	
Elev: 157.2'		Driller: ANDERSON ENGINEERING	
Job No.: 114-001-02082	Client: HARRELSON LANDFILL	Logged By: MATT EDMONDS	Sheet No.: 1 of 1

Northing: 740666.92 Easting: 2881196.58

Depth (feet)	DESCRIPTION	Litho. Symbol	USCS Classification	Remarks
	Dark brown clay, very stiff, moist			Continuous sampling with hollow stem auger
5	Dark brown silty clay, trace fine sand		CH PI = 49	
	Brownish gray clay, very stiff, slightly moist, high plasticity		CH PI = 52	▼ Static water level on 11/22/02 @ 7.21' BGS
10				
15	Tan to gray silty clay, very stiff, high plasticity, slightly moist Yellowish brown and gray, silty clay, some fine sand Tan to gray silty clay with gypsum and ferrous nodules, very stiff, high plasticity, slightly moist		CH PI = 32	15' - 17' Push shelby tube
20	Yellowish gray, thick fat clay, high plasticity, moist			
25	Tan to gray clay with silt, very moist			▽ Hit water @ 26' BGS
	Gray and brown, silty clay and fine sand		CL-ML	
30	Tan to gray fine to medium grained sand, wet			
	Light olive brown, fine sand, little clayey silt		SP-SM NP	
35	Total Depth = 35' Below Ground Surface (BGS)			Set piezometer @ 35' BGS
40				
45	☒ Denotes bag sample retained for laboratory physical properties analysis ■ Denotes shelby tube samples retained for laboratory physical properties analysis			

Boring #: P-3	GEC // GENESIS ENVIRONMENTAL CONSULTING, INC. 11400 West Baseline Road Little Rock, AR 72209	Location: SHREVEPORT, LOUISIANA	
Date: 11/20/02		Drilling Method: HOLLOW STEM AUGER	
Elev: 163.8'		Driller: ANDERSON ENGINEERING	
Job No.: 114-001-02082	Client: HARRELSON LANDFILL	Logged By: MATT EDMONDS	Sheet No.: 1 of 1

Depth (feet)	Northing: 742185.19 Easting: 2881911.05 DESCRIPTION	Litho. Symbol	USCS Classification	Remarks
	Reddish brown fine sand and clayey silt		SM	Continuous sampling with hollow stem auger
	Reddish brown clay with some silt, hard, dry		PI = 4	
5	Yellowish brown, fine sand, and silty clay		SC-SM	
	Sand, fine to medium grained		PI = 7	
10	Orangish brown silty clay, dry			
	Orange silty clay and fine sand			
	Reddish brown silty clay with gray fine sand lenses, dry, very stiff			
15	Yellowish brown, silty clay, trace fine sand		CH	15' - 17' Push shelby tube
	Orange clay, slightly moist, stiff, medium plasticity with some silt and fine sand		PI = 32	▼ Static water level on 11/22/02 @ 17.04' BGS
20	Reddish brown tan clay with some silt and fine sand lenses, stiff, plastic			
	Brown and gray silty clay with some fine sand, moist		CL PI = 19	
25	Gray fine sand, and clayey silt		SM NP	▽ Hit water @ 25' BGS
30	Gray clayey sand, very moist			
	Gray silty clay and fine sand, moist		CL PI = 12	
35	Total Depth = 35' Below Ground Surface (BGS)			Set piezometer @ 35' BGS
40				
45	☒ Denotes bag sample retained for laboratory physical properties analysis ■ Denotes shelby tube samples retained for laboratory physical properties analysis			

Boring #: HB-1	GEC // GENESIS ENVIRONMENTAL CONSULTING, INC.		Location: SHREVEPORT, LOUISIANA
Date: 11/22/02	11400 West Baseline Road Little Rock, AR 72209		Drilling Method: HOLLOW STEM AUGER
Elev: 159.3'			Driller: ANDERSON ENGINEERING
Job No.: 114-001-02082	Client: HARRELSON LANDFILL		Logged By: MATT EDMONDS Sheet No.: 1 of 1

Northing: 740008.49 Easting: 2880073.34

Depth (feet)	DESCRIPTION	Litho. Symbol	USCS Classification	Remarks
	General fill			Continuous sampling with hollow stem auger
15	Grayish brown silty clay, some fine sand		CH PI = 34	20' - 22' Push shelby tube
20	Yellowish brown and gray, silty clay, some fine sand		CH PI = 31	
	Brownish yellow, fine sand and silty clay		SC PI = 11	
25	Gray fine to medium grained sand with silt, wet			▽ Hit water @ 27' BGS
	Olive gray, fine sand, and clayey silt		SM NP	
30	Total Depth = 30' Below Ground Surface (BGS)			
35				
40				
45				

☒ Denotes bag sample retained for laboratory physical properties analysis

■ Denotes shelby tube samples retained for laboratory physical properties analysis

Boring #: HB-2	GEC // GENESIS ENVIRONMENTAL CONSULTING, INC. 11400 West Baseline Road Little Rock, AR 72209	Location: SHREVEPORT, LOUISIANA
Date: 11/21/02		Drilling Method: HOLLOW STEM AUGER
Elev: 158.7'		Driller: ANDERSON ENGINEERING
Job No.: 114-001-02082	Client: HARRELSON LANDFILL	Logged By: MATT EDMONDS Sheet No.: 1 of 1

Northing: 740484.25 Easting: 2880602.53

Depth (feet)	DESCRIPTION	Litho. Symbol	USCS Classification	Remarks
	Dark brown clay, very stiff, blocky, very cohesive, fat, moist			Continuous sampling with hollow stem auger
5	☒ Reddish brown, silty clay, some fine sand		CH PI = 47	
	Tan to gray clay, high plasticity, firm, moist			
10	■ Reddish brown and gray, silty clay, some fine sand		CH PI = 40	10' - 12' Push shelby tube
15	Reddish gray clay, moist, stiff, high plasticity			
	☒ Gray and yellowish brown, silty clay, and fine sand, very moist		CL PI = 12	▽ Hit water @ 20' BGS
20	Fine to medium sand, wet			
25	Total Depth = 25' Below Ground Surface (BGS)			
30				
35				
40				
45				

☒ Denotes bag sample retained for laboratory physical properties analysis

■ Denotes shelby tube samples retained for laboratory physical properties analysis

Boring #: HB-3	GEC // GENESIS ENVIRONMENTAL CONSULTING, INC. 11400 West Baseline Road Little Rock, AR 72209	Location: SHREVEPORT, LOUISIANA	
Date: 11/21/02		Drilling Method: HOLLOW STEM AUGER	
Elev: 156.7'		Driller: ANDERSON ENGINEERING	
Job No.: 114-001-02082	Client: HARRELSON LANDFILL	Logged By: MATT EDMONDS	Sheet No.: 1 of 1

Northing: 741227.29 Easting: 2881484.86

Depth (feet)	DESCRIPTION	Litho. Symbol	USCS Classification	Remarks
	Dark brown clay, very stiff, blocky, very moist			Continuous sampling with hollow stem auger
5	☒ Dark brown, silty clay, trace fine sand		CH PI = 52	
	☒ Gray, brown and yellow, silty clay, trace fine sand, high plasticity, firm, moist		CH PI = 47	
10				
15	Brownish gray, thick, fat clay with mineral grains, moist, plastic			
	Tan and gray silty clay and fine sand, wet			
20	Sand, fine to medium grained, wet			
	Total Depth = 22' Below Ground Surface (BGS)			
25				
30				
35				
40				
	☒ Denotes bag sample retained for laboratory physical properties analysis			
45				

Boring #: HB-4	GEC // GENESIS ENVIRONMENTAL CONSULTING, INC. 11400 West Baseline Road Little Rock, AR 72209	Location: SHREVEPORT, LOUISIANA	
Date: 11/21/02		Drilling Method: HOLLOW STEM AUGER	
TW: 163.7'		Driller: ANDERSON ENGINEERING	
Job No.: 114-001-02082	Client: HARRELSON LANDFILL	Logged By: MATT EDMONDS	Sheet No.: 1 of 1

Northing: 741901.29 Easting: 2881226.15

Depth (feet)	DESCRIPTION	Litho. Symbol	USCS Classification	Remarks
	Red to brown silty clay, moist			Continuous sampling with hollow stem auger
5	Brownish red, silty clay, and fine sand		CL PI = 13	
10	Tan to gray sandy silty clay, moist			
	Reddish brown silty clay with some fine sand, moist, very stiff		CH PI = 39	
15	Reddish brown, silty clay and some fine sand		CH PI = 47	15' - 17' Push shelby tube
20	Reddish brown fat clay, stiff, moist, highly plastic			
25	Reddish brown, silty clay, some fine sand		CH PI = 47	25' - 27' Push shelby tube
30	Reddish brown, silty clay, some fine sand		CH PI = 42	
	Total Depth = 30' Below Ground Surface (BGS)			
35				
40				
45				

☒ Denotes bag sample retained for laboratory physical properties analysis

■ Denotes shelby tube samples retained for laboratory physical properties analysis

Boring #: HB-5	GEC // GENESIS ENVIRONMENTAL CONSULTING, INC. 11400 West Baseline Road Little Rock, AR 72209	Location: SHREVEPORT, LOUISIANA	
Date: 11/21/02		Drilling Method: HOLLOW STEM AUGER	
Elev: 158.9'		Driller: ANDERSON ENGINEERING	
Job No.: 114-001-02082	Client: HARRELSON LANDFILL	Logged By: MATT EDMONDS	Sheet No.: 1 of 1

Northing: 741731.86 Easting: 2881539.40

Depth (feet)	DESCRIPTION	Litho. Symbol	USCS Classification	Remarks
	Grayish brown clay, very stiff, slightly moist, fat			Continuous sampling with hollow stem auger
5	☒ Dark brown, silty clay, some fine sand		CH PI = 43	
	☒ Reddish brown silty clay with sand, moist, plastic, very stiff		CH PI = 34	
10				
	☒ Yellowish brown, silty clay, little fine sand		CH PI = 54	15' - 17' Push shelby tube
15	Tan clay, moist, highly plastic, stiff			▽ Hit water @ 16' BGS
	Tan, fine to medium silty sand, wet			
	☒ Brownish gray, fine sand, and some clayey silt, wet		SM NP	
20	Total Depth = 20' Below Ground Surface (BGS)			
25				
30				
35				
40				
45	☒ Denotes bag sample retained for laboratory physical properties analysis			

Boring #: HB-6	GEC // GENESIS ENVIRONMENTAL CONSULTING, INC.		Location: SHREVEPORT, LOUISIANA
Date: 11/20/02	11400 West Baseline Road Little Rock, AR 72209		Drilling Method: HOLLOW STEM AUGER
Elev: 156.0'			Driller: ANDERSON ENGINEERING
Job No.: 114-001-02082	Client: HARRELSON LANDFILL		Logged By: MATT EDMONDS Sheet No.: 1 of 1

Northing: 741370.59 Easting: 2881975.94

Depth (feet)	DESCRIPTION	Litho. Symbol	USCS Classification	Remarks
	Dark brown clay, very stiff, dry, slightly moist			Continuous sampling with hollow stem auger
5	Dark brown, silty clay, some fine sand		CH PI = 58	
	Tan clay, very stiff, high plasticity, slightly moist			
10	Olive brown, silty clay, some fine sand		CH PI = 31	10' - 12' Push shelby tube
15	Dark grayish silty clay, very stiff, plastic, some fine sand, slightly moist		CH PI = 32	
	Olive brown silty clay with mineral grains and some fine sand, very stiff, high plasticity		CH PI = 43	
20	Brownish yellow silty clay, trace fine sand		CH PI = 34	20' - 22' Push shelby tube
25	Olive brown silty clay, some fine sand, moist		CH PI = 40	
30	Yellowish gray stiff fat clay with ferrous nodules, moist			
	Total Depth = 30' Below Ground Surface (BGS)			
35				
40				
45				

⊠ Denotes bag sample retained for laboratory physical properties analysis

■ Denotes shelby tube samples retained for laboratory physical properties analysis

Boring #: HB-7	GEC // GENESIS ENVIRONMENTAL CONSULTING, INC. 11400 West Baseline Road Little Rock, AR 72209		Location: SHREVEPORT, LOUISIANA
Date: 11/21/02			Drilling Method: HOLLOW STEM AUGER
Elev: 164.3'			Driller: ANDERSON ENGINEERING
Job No.: 114-001-02082	Client: HARRELSON LANDFILL		Logged By: MATT EDMONDS Sheet No.: 1 of 1

Depth (feet)	Northing: 742404.43 Easting: 2881796.59 DESCRIPTION	Litho. Symbol	USCS Classification	Remarks
	Tan silt and fine sand at surface			Continuous sampling with hollow stem auger
5	Yellowish brown fine sand, some clayey silt, wet		SP-SM NP	
10	Reddish brown silty clay and some fine sand		CL PI = 11	
15	Reddish brown and gray silty clay with some fine sand, stiff, high plasticity		CH PI = 55	
	Brown, silty clay, trace fine sand			20' - 22' Push shelby tube
25	Grayish brown clay with trace silt, stiff, high plasticity, very moist		CH PI = 34	
30	Grayish brown silty clay with trace fine sand, very moist to wet		CL PI = 28	
	Total Depth = 30' Below Ground Surface (BGS)			
35				
40				
45				

☒ Denotes bag sample retained for laboratory physical properties analysis

■ Denotes shelby tube samples retained for laboratory physical properties analysis

Boring #: HB-8	GEC // GENESIS ENVIRONMENTAL CONSULTING, INC. 11400 West Baseline Road Little Rock, AR 72209	Location: SHREVEPORT, LOUISIANA	
Date: 11/22/02		Drilling Method: HOLLOW STEM AUGER	
Elev: 164.3'		Driller: ANDERSON ENGINEERING	
Job No.: 114-001-02082	Client: HARRELSON LANDFILL	Logged By: MATT EDMONDS	Sheet No.: 1 of 1

Northing: 741976.61 Easting: 2881796.59

Depth (feet)	DESCRIPTION	Litho. Symbol	USCS Classification	Remarks
	Silty sand, fine to medium grained			Continuous sampling with hollow stem auger
5	☒ Reddish brown, silty clay with trace fine sand, very stiff, slightly moist, blocky		CH PI = 53	
10	☒ Reddish brown and yellow, silty clay with trace fine sand		CH PI = 61	
	Total Depth = 10' Below Ground Surface (BGS)			
15				
20				
25				
30				
35				
40				
45				

☒ Denotes bag sample retained for laboratory physical properties analysis

Boring #: HB-9	GEC // GENESIS ENVIRONMENTAL CONSULTING, INC. 11400 West Baseline Road, Little Rock, AR 72209	Location: SHREVEPORT, LOUISIANA	
Date: 11/22/02		Drilling Method: HOLLOW STEM AUGER	
Elev: 157.9'		Driller: ANDERSON ENGINEERING	
Job No.: 114-001-02082	Client: HARRELSON LANDFILL	Logged By: MATT EDMONDS	Sheet No.: 1 of 1

Depth (feet)	Northing: 741886.46 / Easting: 2682121.08 DESCRIPTION	Litho. Symbol	USCS Classification	Remarks
	Dark red clay, blocky, stiff			Continuous sampling with hollow stem auger
	☒ Light brown and olive, silty clay, and fine sand		CL-ML PI = 7	
5				
10	☒ Light brown and red, silty clay and fine sand, dry		CL PI = 20	
	☒ Gray and brown, clayey silt, and fine sand		ML NP	
15	Yellowish gray fine to medium grained silty sand with trace clay, very moist to wet			▽ Hit water @ 18' BGS
20	☒ Gray and brown fine sand, and clayey silt		SM NP	
	Total Depth = 20' Below Ground Surface (BGS)			
25				
30				
35				
40				
	☒ Denotes bag sample retained for laboratory physical properties analysis			
45				

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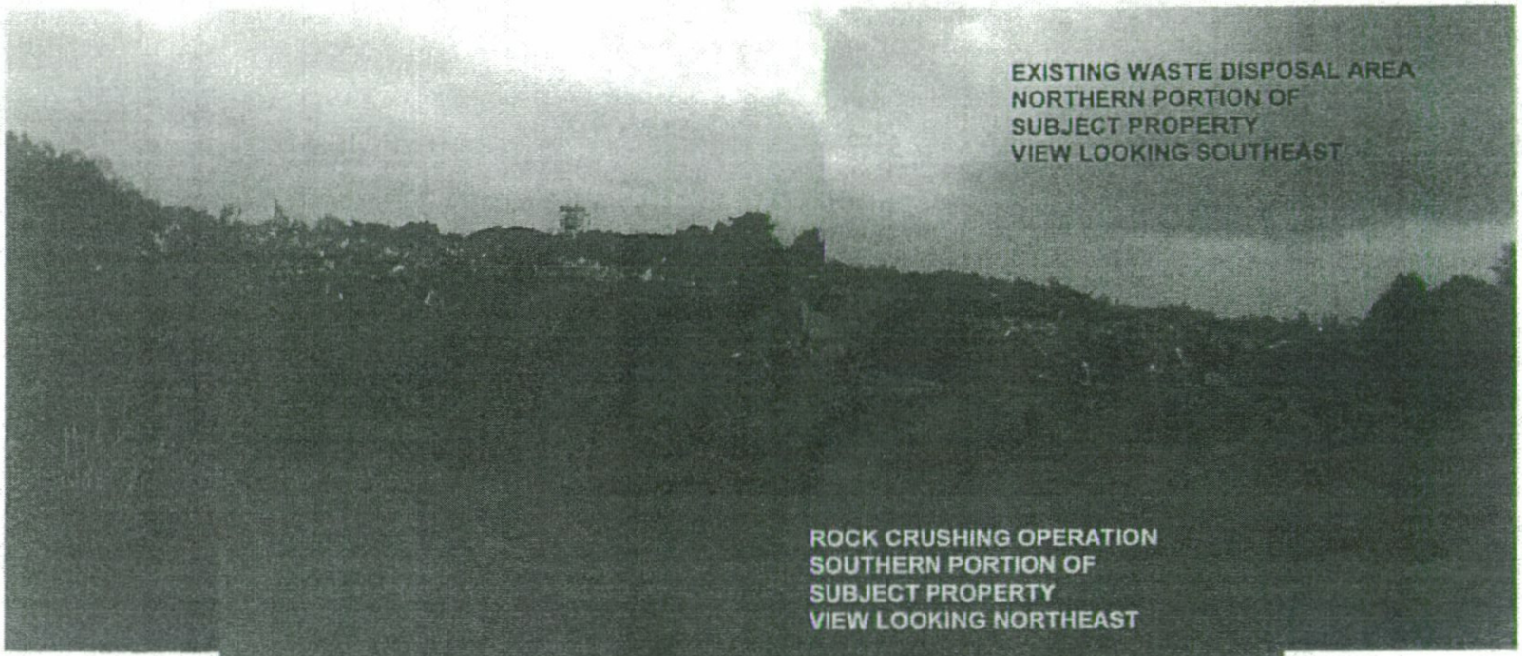
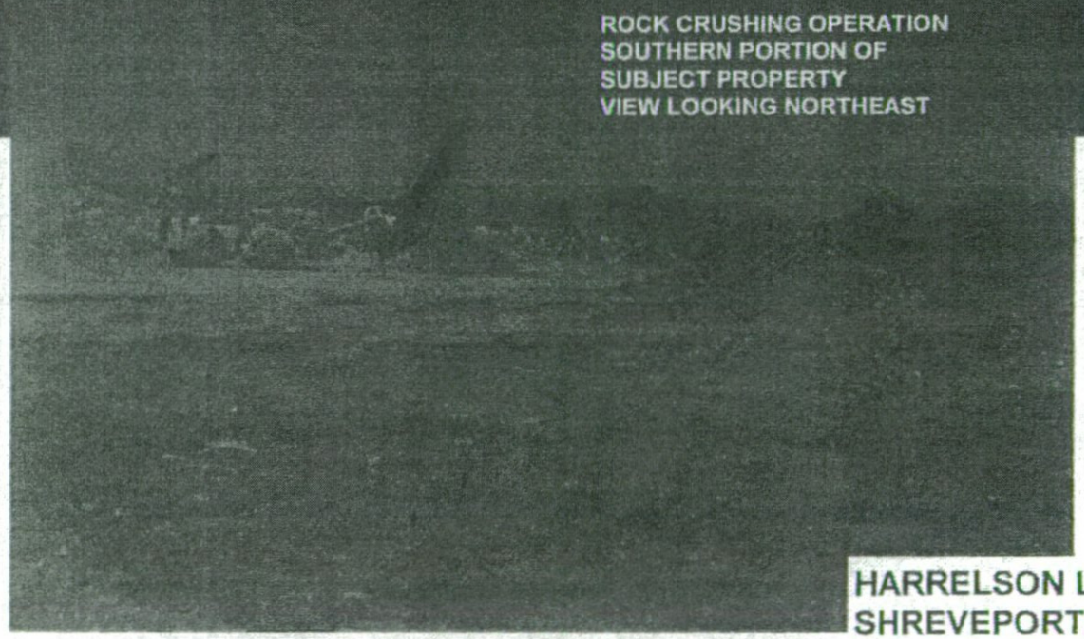
ATTACHMENT C
PHOTOGRAPHIC LOG OF SOILS ENCOUNTERED



EXISTING WASTE DISPOSAL AREA
NORTHERN PORTION OF
SUBJECT PROPERTY
VIEW LOOKING SOUTHEAST



ROCK CRUSHING OPERATION
SOUTHERN PORTION OF
SUBJECT PROPERTY
VIEW LOOKING NORTHEAST

HARRELSON LANDFILL
SHREVEPORT, LOUISIANA
NOVEMBER 2002

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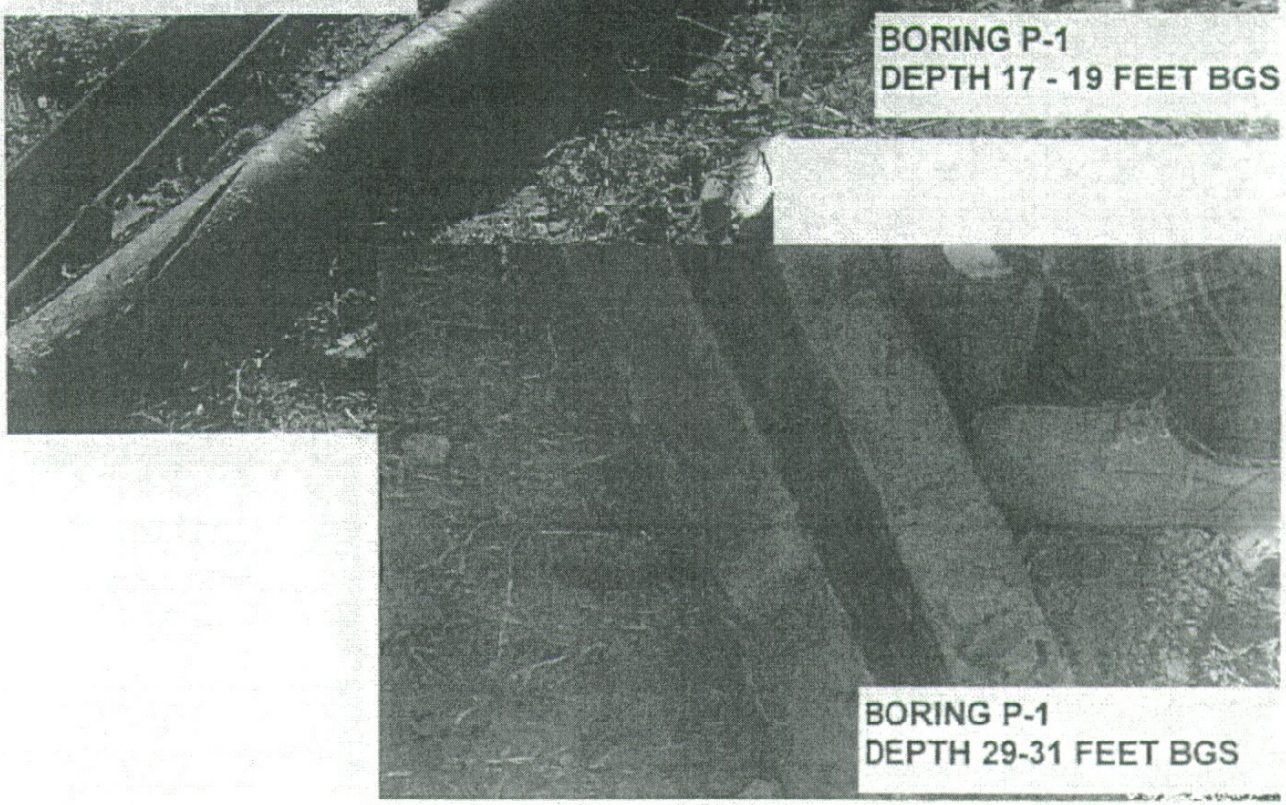
HARRELSON LANDFILL
SHREVEPORT, LOUISIANA

TYPICAL SOILS ENCOUNTERED
SOUTHERN PORTION OF SUBJECT PROPERTY
NOVEMBER 2002

BORING P-1
DEPTH 14 - 15 FEET BGS

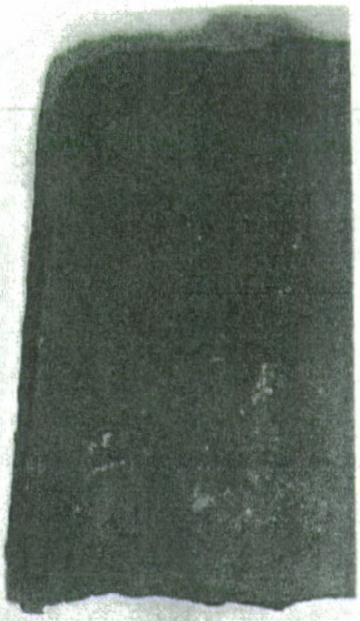
BORING P-1
DEPTH 23-24 FEET BGS

BORING P-1
DEPTH 17 - 19 FEET BGS



BORING P-1
DEPTH 29-31 FEET BGS

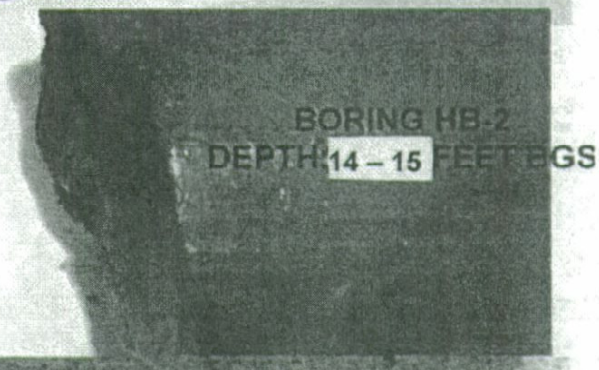
BORING HB-7
DEPTH: 4 - 5 FEET BGS



BORING HB-6
DEPTH: 4 - 5 FEET BGS

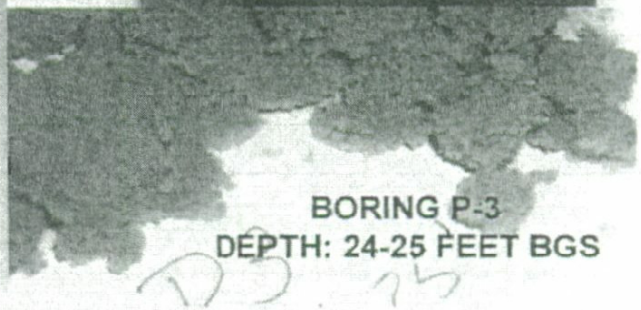
BORING HB-6
DEPTH: 14 - 15 FEET BGS

BORING P-3
DEPTH: 19-20 FEET BGS



BORING HB-2
DEPTH: 14 – 15 FEET BGS

BORING P-3
DEPTH: 34-35 FEET BGS



BORING P-3
DEPTH: 24-25 FEET BGS

HARRELSON LANDFILL
SHREVEPORT, LOUISIANA

TYPICAL SOILS ENCOUNTERED
NORTHERN PORTION OF
SUBJECT PROPERTY
NOVEMBER 2002

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ATTACHMENT D
SOIL MATERIAL PHYSICAL PROPERTIES ANALYSIS

Golder Associates Inc.

3730 Chamblee Tucker Road
Atlanta, GA USA 30341
Telephone (770) 496-1893
Fax (770) 934-9476

Golder Associates

TRANSMITTAL LETTER

To: Brian Edwards
Genesis Environmental Consulting, Inc.
11400 West Baseline Road
Little Rock, Arkansas 72209

Date: December 12, 2002
Project No: 023-3459

Sent by:

- ☐ Mail
- ☐ Air Freight
- ☐ Hand Carried
- ☐ Under Separate Cover
- ☐ Enclosed
- ☒ Over Night Courier (Fed Ex - Std)

Quantity	Item	Description
1	Copy of Results	HMM Type III LF – Shreveport (Soils)

Mr. Edward:

Golder Associates, Inc. is very pleased to have had the opportunity to perform the laboratory testing for Genesis Environmental Consulting, Inc. If you need additional information, have any questions, or if we can be of any service, please contact us at (770) 492-8280.

Sincerely,

Henry Mock
Laboratory Manager and Associate

HM:hm

DECEMBER 2002

023-3459

GENESIS/HMM.TYPE III LF-SHREVEPORT/LA
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction			Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %	Gs	Moisture %	Dry (lb/cuft)		
P-1	UD	15.0-17.0'	CH	38.2	88	34	54	0.09	-	92.7	-	-	-	2.82	38.2	82.7	3.3E-08	-
P-1	UD	30.0-32.0'	SM	22.1	NP	NP	NP	NP	-	41.6	-	-	-	2.69	22.2	101.5	8.4E-05	-
P-2	UD	15.0-17.0'	CH	23.9	55	23	32	0.02		89.0				2.83	23.9	102.6	1.9E-08	U
P-3	UD	15.0-17.0'	CH	34.6	56	24	32	0.32	-	99.6	-	-	-	2.70	34.6	87.3	1.4E-08	-

ABBREVIATIONS: LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (LI)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES: T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

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DECEMBER 2002

023-3459

GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
P-2	Bag	4.0-5.0'	CH	30.6	81	32	49	0.03	-	99.4	-	-	-	-	-	-	-	-
P-2	Bag	8.0-9.0	CH	31.4	81	29	52	0.05	-	97.8	-	-	-	-	-	-	-	-
P-2	Bag	26.0-27.0'	CL-ML	21.2	25	19	6	0.27	-	52.9	-	-	-	-	-	-	-	-
P-2	Bag	34.0-35.0'	SP-SM	21.0	NP	NP	NP	NP	-	6.2	-	-	-	-	-	-	-	-
P-3	Bag	0.0-1.0'	SM	15.7	22	18	4	-0.72	-	44.0	-	-	-	-	-	-	-	-
P-3	Bag	4.0-5.0'	SC-SM	6.4	22	15	7	-1.28	-	48.5	-	-	-	-	-	-	-	-
P-3	Bag	21.0-22.0'	CL	22.1	34	15	19	0.40	-	89.2	-	-	-	-	-	-	-	-
P-3	Bag	26.0-27.0'	SM	15.9	NP	NP	NP	NP	-	37.2	-	-	-	-	-	-	-	-
P-3	Bag	34.0-35.0'	CL	30.7	35	23	12	0.63	-	60.4	-	-	-	-	-	-	-	-

ABBREVIATIONS: LIQUID LIMIT (LL)
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LDEQ-EDMS Document 36473764, Page 324 of 438

GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
HB-1	Bag	15.0-16.0'	CH	30.9	55	21	34	0.29	-	84.4	-	-	-	-	-	-	-	-
HB-1	Bag	23.0-24.0'	SC	20.2	30	19	11	0.08	-	44.3	-	-	-	-	-	-	-	-
HB-1	Bag	29.0-30.0'	SM	23.9	NP	NP	NP	NP	-	43.9	-	-	-	-	-	-	-	-
HB-2	Bag	4.0-5.0'	CH	31.8	82	35	47	-0.06	-	94.4	-	-	-	-	-	-	-	-
HB-2	Bag	18.0-19.0'	CL	22.6	30	18	12	0.43	-	57.1	-	-	-	-	-	-	-	-
HB-3	Bag	4.0-5.0'	CH	32.7	87	35	52	-0.04	-	98.7	-	-	-	-	-	-	-	-
HB-3	Bag	7.0-8.0'	CH	30.0	70	23	47	0.15	-	95.4	-	-	-	-	-	-	-	-
HB-4	Bag	4.0-5.0'	CL	15.5	27	14	13	0.08	-	52.8	-	-	-	-	-	-	-	-
HB-4	Bag	11.0-12.0'	CH	27.4	60	21	39	0.16	-	90.9	-	-	-	-	-	-	-	-
HB-4	Bag	24.0-25.0'	CH	25.6	72	25	47	0.02	-	99.2	-	-	-	-	-	-	-	-
HB-4	Bag	29.0-30.0'	CH	30.1	65	23	42	0.16	-	97.8	-	-	-	-	-	-	-	-
HB-5	Bag	4.0-5.0'	CH	33.4	72	29	43	0.11	-	96.8	-	-	-	-	-	-	-	-
HB-5	Bag	8.0-9.0'	CH	23.5	51	17	34	0.19	-	76.4	-	-	-	-	-	-	-	-
HB-5	Bag	13.0-14.0'	CH	31.3	80	26	54	0.09	-	92.5	-	-	-	-	-	-	-	-
HB-5	Bag	19.0-20.0'	SM	21.1	NP	NP	NP	NP	-	29.5	-	-	-	-	-	-	-	-

ABBREVIATIONS: LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
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P = pH

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DECEMBER 2002

023-3459

GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
HB-6	Bag	4.0-5.0'	CH	29.8	91	33	58	-0.05	-	93.1	-	-	-	-	-	-	-	-
HB-6	Bag	14.0-15.0'	CH	19.0	51	19	32	-0.01	-	91.0	-	-	-	-	-	-	-	-
HB-6	Bag	18.0-19.0'	CH	30.4	69	26	43	0.11	-	95.0	-	-	-	-	-	-	-	-
HB-6	Bag	24.0-25.0'	CH	32.3	69	29	40	0.09	-	95.9	-	-	-	-	-	-	-	-
HB-7	Bag	4.0-5.0'	SP-SM	24.1	NP	NP	NP	NP	-	11.2	-	-	-	-	-	-	-	-
HB-7	Bag	9.0-10.0'	CL	33.3	26	15	11	1.73	-	72.1	-	-	-	-	-	-	-	-
HB-7	Bag	14.0-15.0'	CH	38.2	86	31	55	0.13	-	92.8	-	-	-	-	-	-	-	-
HB-7	Bag	29.0-30.0'	CL	35.5	49	21	28	0.55	-	97.2	-	-	-	-	-	-	-	-
HB-8	Bag	4.0-5.0'	CH	24.7	76	23	53	0.04	-	97.7	-	-	-	-	-	-	-	-
HB-8	Bag	9.0-10.0'	CH	31.8	91	30	61	0.02	-	99.4	-	-	-	-	-	-	-	-
HB-9	Bag	2.0-3.0'	CL-ML	9.5	24	17	7	-1.08	-	62.7	-	-	-	-	-	-	-	-
HB-9	Bag	9.0-10.0'	CL	11.0	38	18	20	-0.35	-	61.2	-	-	-	-	-	-	-	-
HB-9	Bag	14.0-15.0'	ML	25.0	NP	NP	NP	NP	-	53.8	-	-	-	-	-	-	-	-
HB-9	Bag	19.0-20.0'	SM	23.7	NP	NP	NP	NP	-	46.6								

ABBREVIATIONS: LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
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DECEMBER 2002

023-3459

GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
HB-1	UD	20.0-22.0'	CH	27.1	52	21	31	0.21	-	78.6	-	-	-	2.74	27.2	96.4	4.6E-08	-
HB-2	UD	10.0-12.0	CH	27.9	63	23	40	0.13	-	83.4	-	-	-	2.76	27.9	96.1	3.7E-08	-
HB-4	UD	15.0-17.0'	CH	26.3	75	28	47	-0.04	-	90.2	-	-	-	2.74	26.3	96.0	4.8E-08	T
HB-6	UD	10.0-12.0'	CH	23.9	57	26	31	-0.06	-	98.3	-	-	-	2.77	23.9	97.7	7.3E-08	-
HB-6	UD	20.0-22.0	CH	28.9	73	26	47	0.05	-	97.8	-	-	-	2.80	28.9	95.4	7.8E-08	-
HB-7	UD	20.0-22.0'	CH	34.0	57	23	34	0.33	-	98.3	-	-	-	2.75	34.0	87.3	1.6E-08	-
																		-

ABBREVIATIONS: LIQUID LIMIT (LL)
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NOVEMBER 2002

023-3459

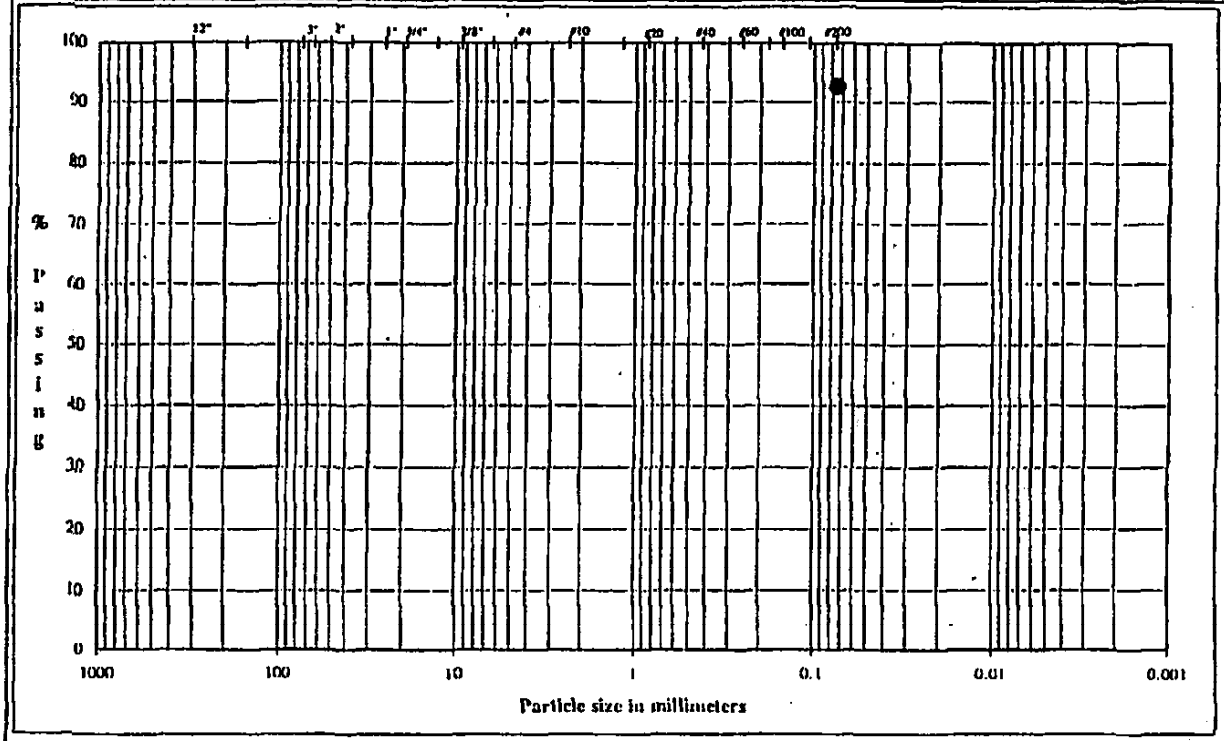
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA

SAMPLE ID: P-1 Depth: 15.0 - 17.0'

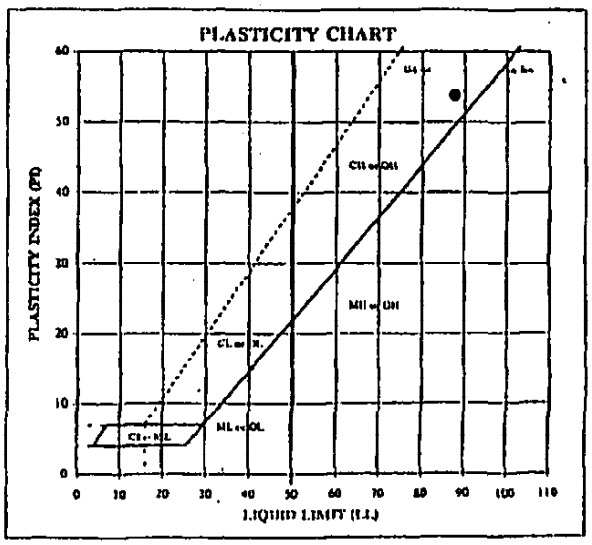
TYPE: UD



COBBLES	GRAVEL: Coarse	GRAVEL: Fine	SAND: Coarse	SAND: Medium	SAND: Fine	FINES: Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	92.65



ATTERBERG LIMITS

WL	LL	PL	PI	LI
38.2	88	34	54	0.08

DESCRIPTION: Brown, SILTY CLAY, little fine sand.

USCS: CH

TECH TJDH

DATE 11/27/02

CHECK JA

REVIEW

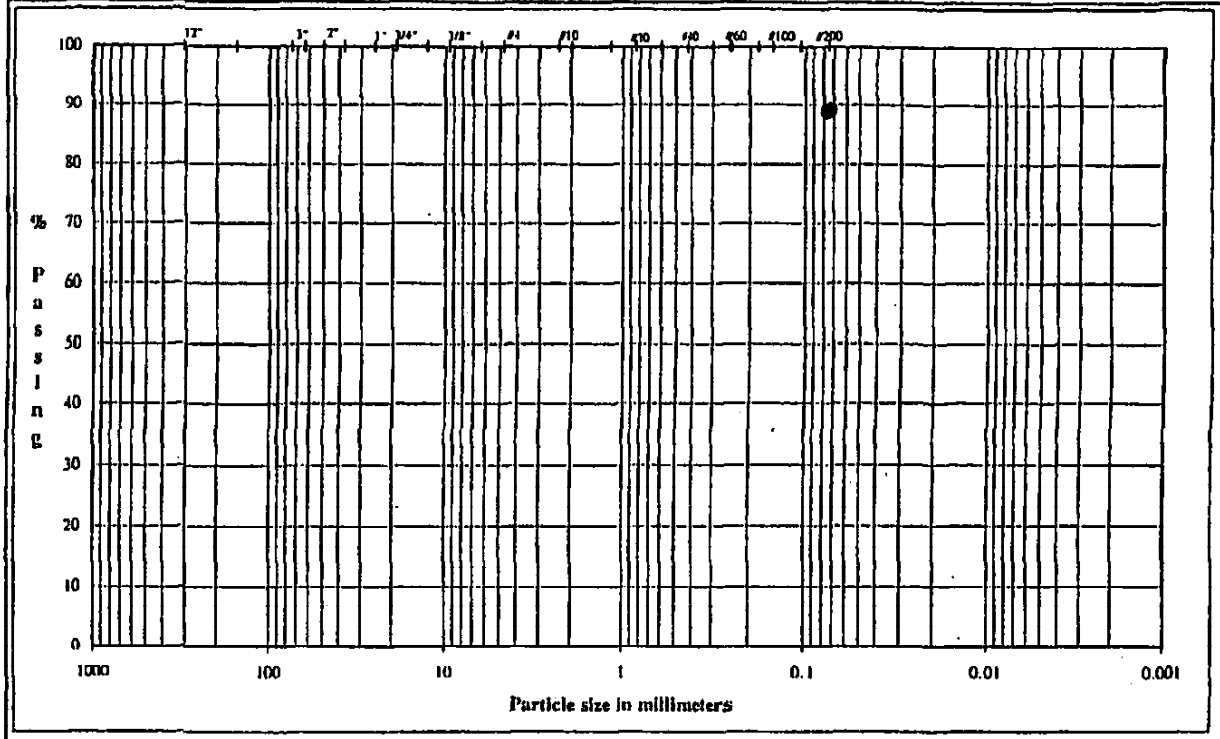
DECEMBER 2002

023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: P-2 Depth: 15.0 - 17.0'
TYPE: UD

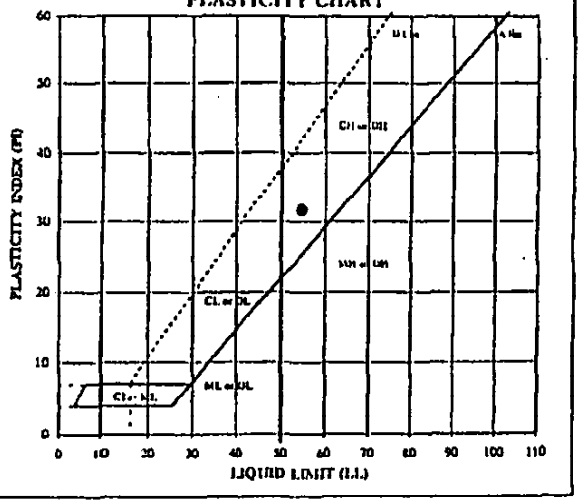


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	88.98

PLASTICITY CHART



ATTERBERG LIMITS

M_c	LL	PL	PI	LI
23.9	55	23	32	0.02

DESCRIPTION: Yellowish Brown and Gray, SILTY CLAY, little fine sand.

USCS: CH

TECH	TJ
DATE	12/4/02
CHECK	DL
REVIEW	

NOVEMBER 2002

023-3459

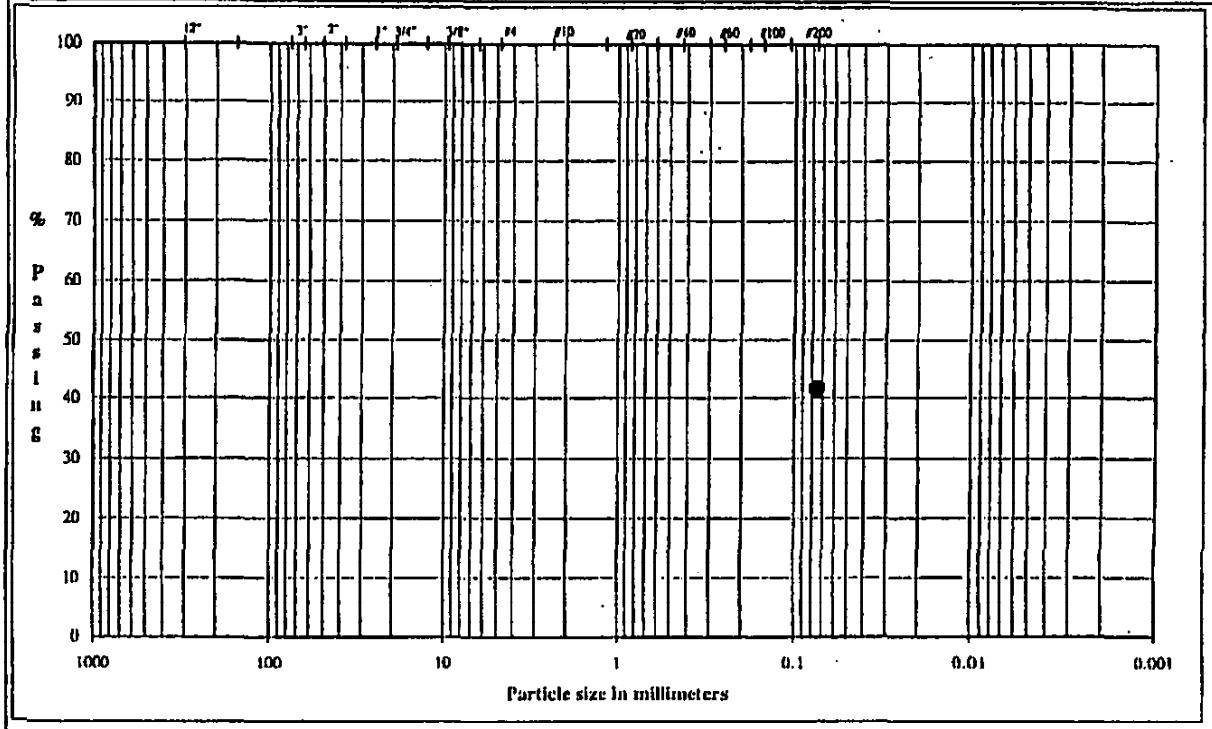
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA

SAMPLE ID: P-1 Depth: 30.0 - 32.0'

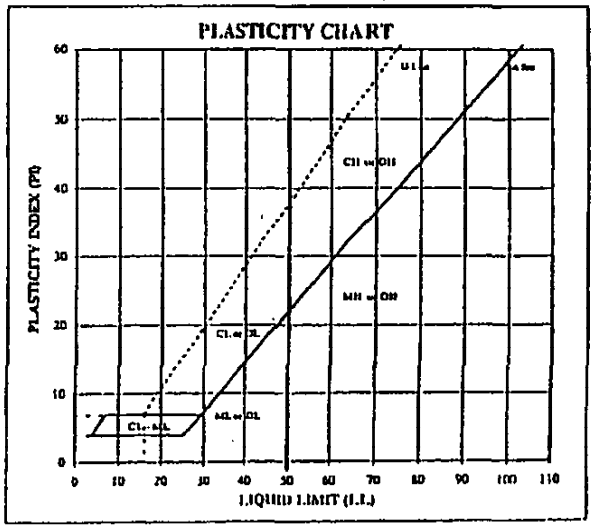
TYPE: UD



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	41.63



ATTERBERG LIMITS

M.	LL	PL	PI	LI
22.1	NP	NP	NP	NP

DESCRIPTION: Grayish Brown, FINE SAND, and clayey silt.

USCS: SM

TECH	TJ
DATE	11/28/02
CHECK	DJ
REVIEW	

DECEMBER 2002

023-3459

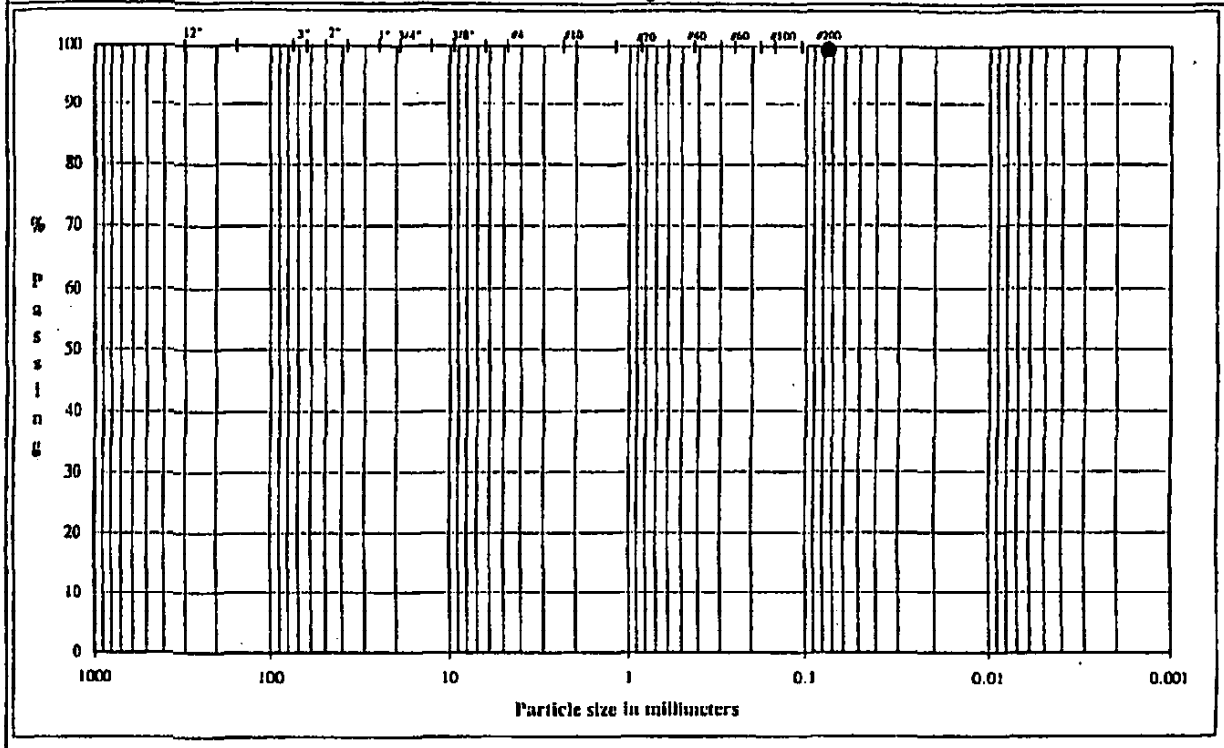
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA

SAMPLE ID: P-2 Depth: 4.0 - 5.0'

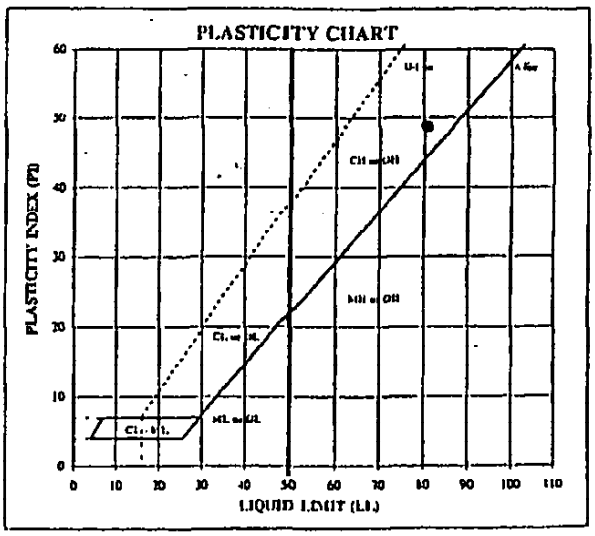
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	99.41



ATTERBERG LIMITS

AL	LL	PL	PI	LI
30.6	81	32	49	-0.03

DESCRIPTION: Dark Brown, SILTY CLAY, trace fine sand.

USCS: CH

TECH TI

DATE 12/3/02

CHECK DS

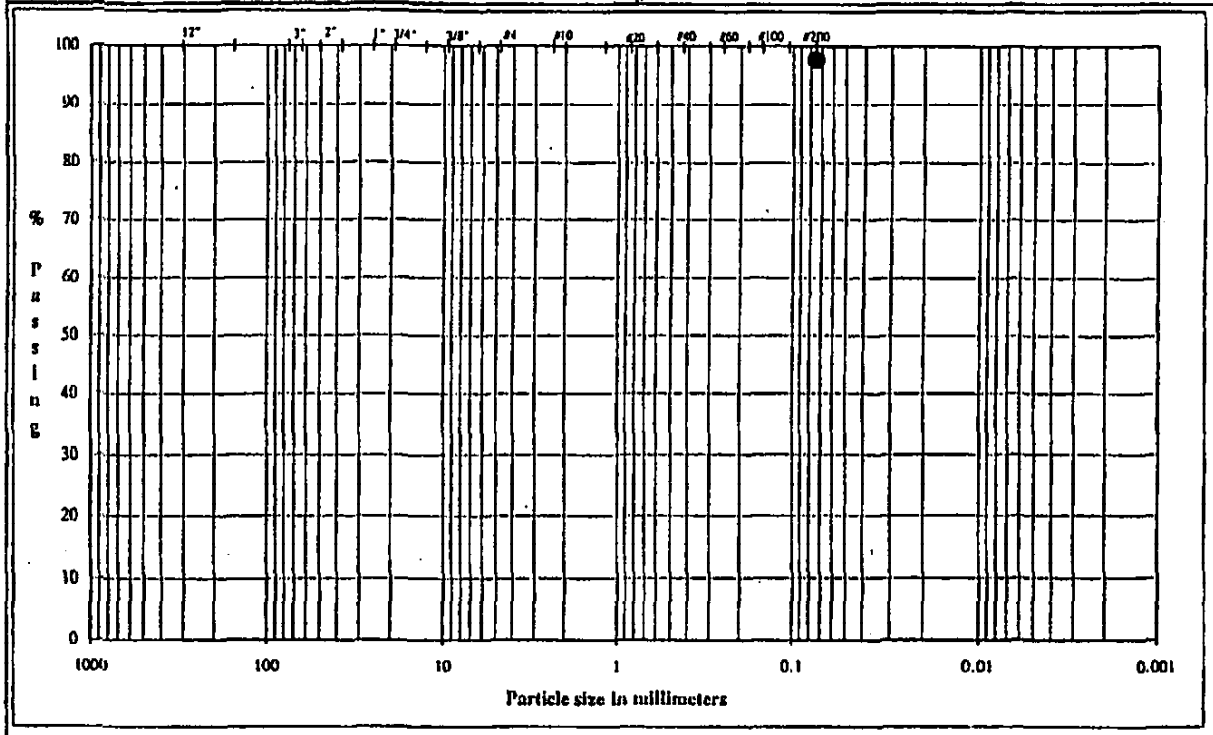
REVIEW

DECEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

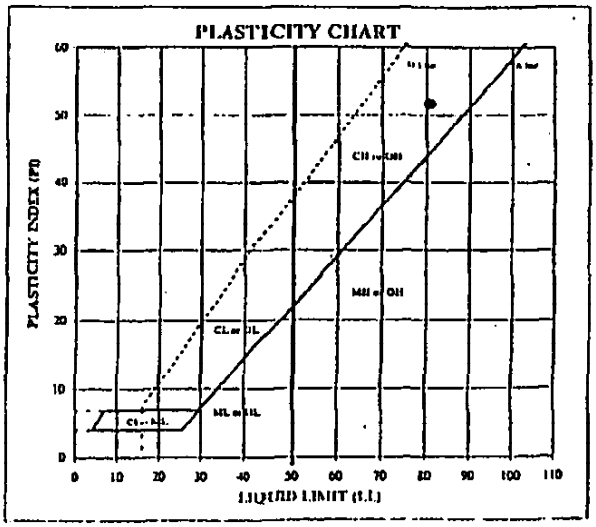
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: P-2 Depth: 8.0 - 9.0'
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	97.81



ATTERBERG LIMITS

W	LL	PL	PI	LI
31.4	81	29	52	0.05

DESCRIPTION: Brown, SILTY CLAY, trace fine sand.

USCS: CH

TECH TJ/DA
DATE 12/2/02
CHECK
REVIEW

DECEMBER 2002

023-3459

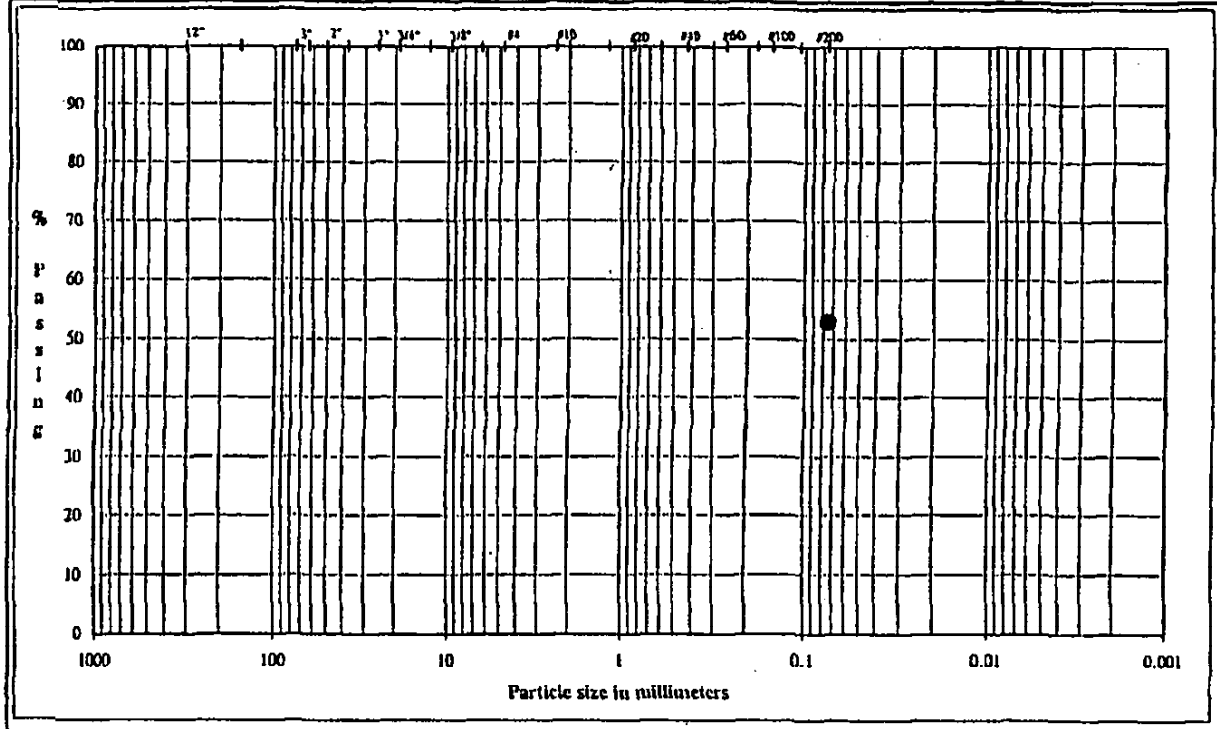
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/IIMM TYPE III LF-SHREVEPORT/LA

SAMPLE ID: P-2 Depth: 26.0 - 27.0'

TYPE: Bag

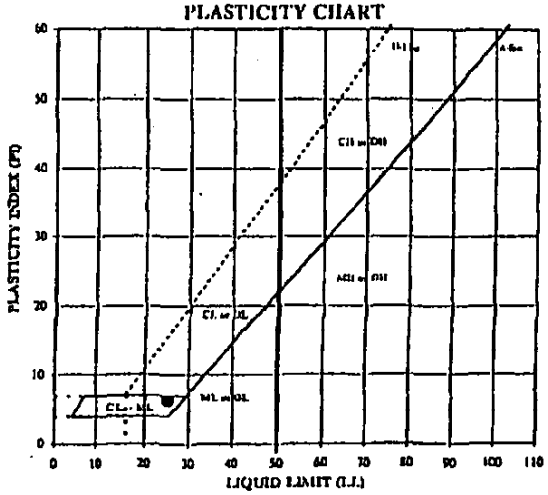


COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	52.90

PLASTICITY CHART



ATTERBERG LIMITS

P.L.	L.L.	P.I.	PI	LI
21.2	25	19	6	0.27

DESCRIPTION: Gray and Brown, SILTY CLAY, and fine sand.

USCS: CL-ML

TECH TI

DATE 12/2/02

CHECK DG

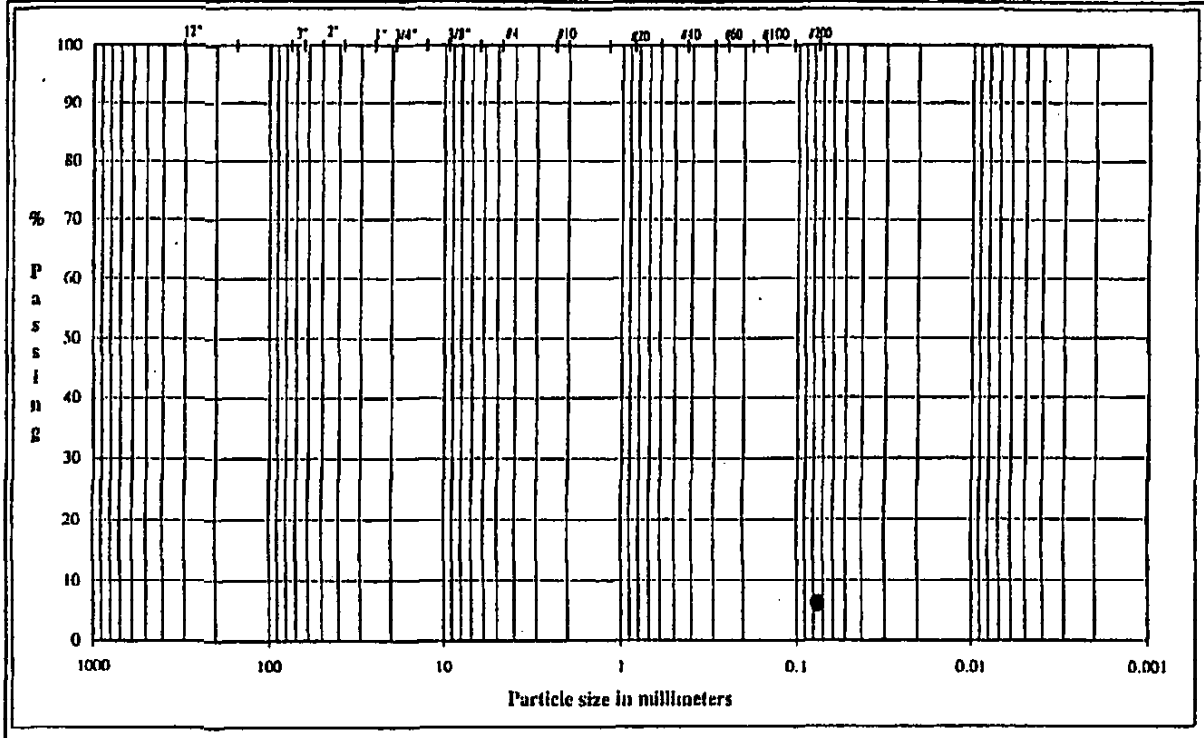
REVIEW

DECEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/IIMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: P-2 Depth: 34.0 - 35.0'
TYPE: Bag

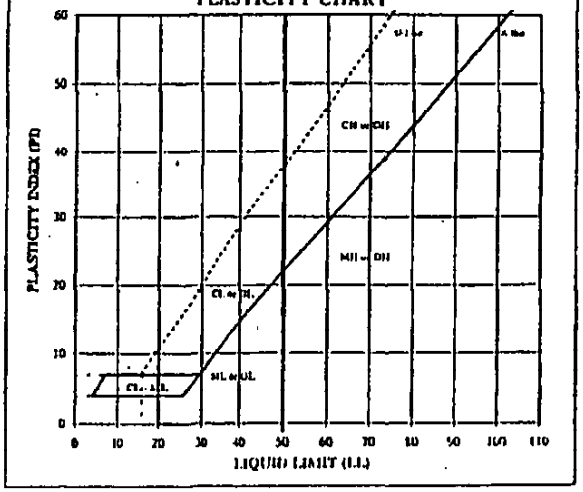


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	6.15

PLASTICITY CHART



ATTERBERG LIMITS

Nat.	L.L.	Pl.	PI	LI
21.0	NP	NP	NP	NP

DESCRIPTION: Light Olive Brown, FINE SAND, little clayey silt.
USCS: SP-SM

TECH TJ
DATE 12/2/02
CHECK DH
REVIEW

DECEMBER 2002

023-3459

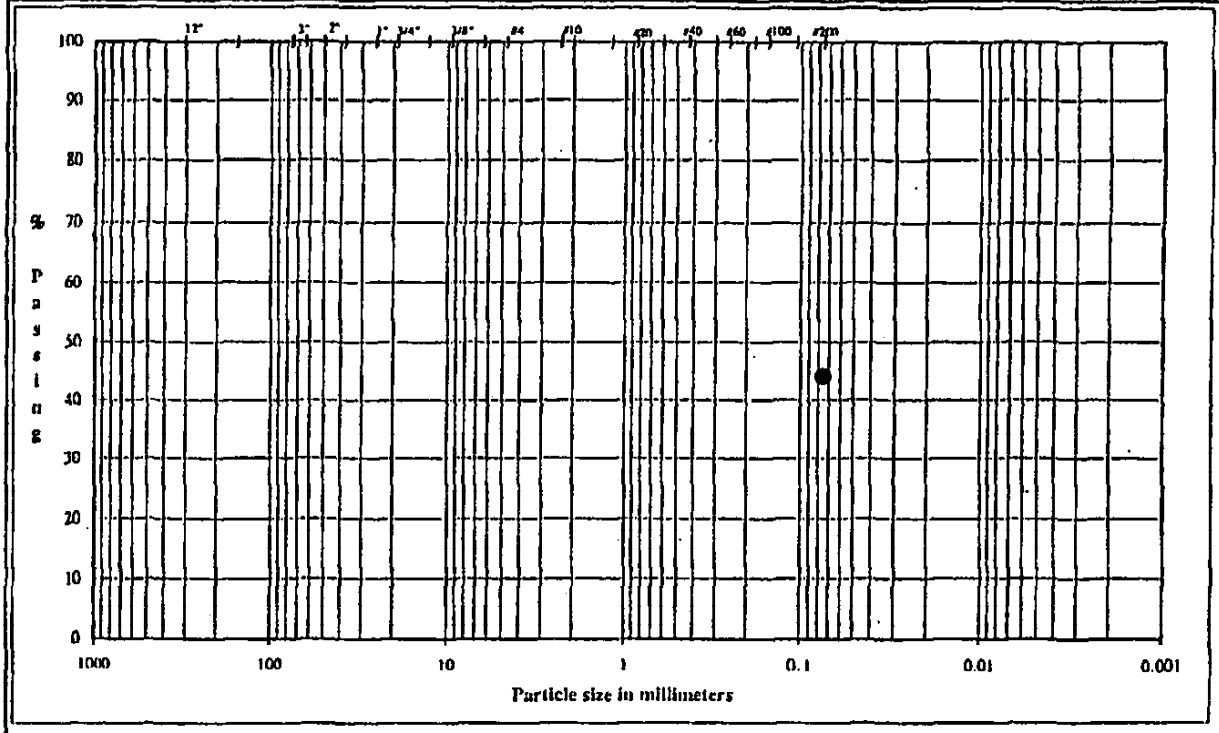
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA

SAMPLE ID: P-3 Depth: 0.0 - 1.0'

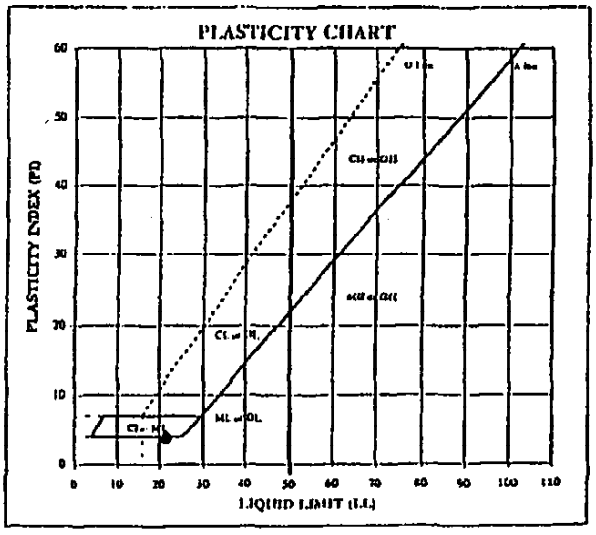
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	43.98



ATTERBERG LIMITS

AL	LL	PL	PI	LI
15.7	22	18	4	-0.72

DESCRIPTION: Reddish Brown, FINE SAND, and clayey silt.

USCS: SM

TECH	TJ
DATE	12/2/02
CHECK	
REVIEW	

DECEMBER 2002

023-3459

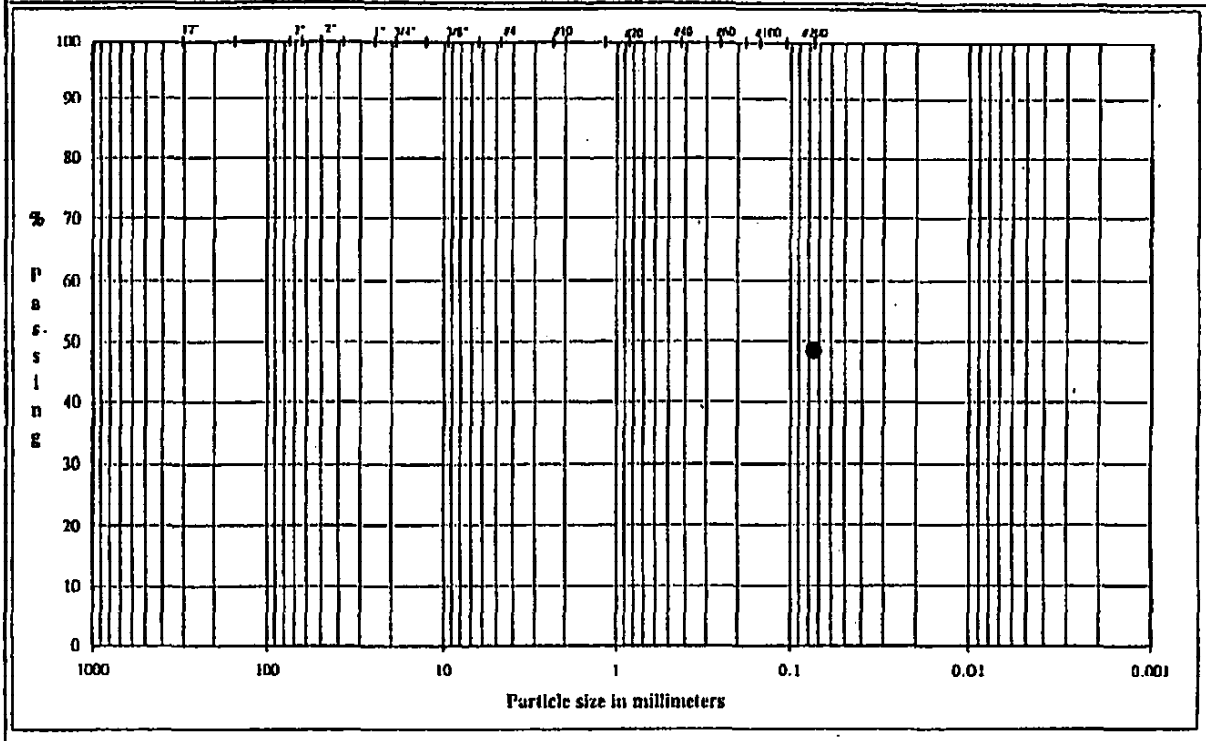
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/IMM TYPE III LF-SHREVEPORT/LA

SAMPLE ID: P-3 Depth: 4.0 - 5.0'

TYPE: Bag

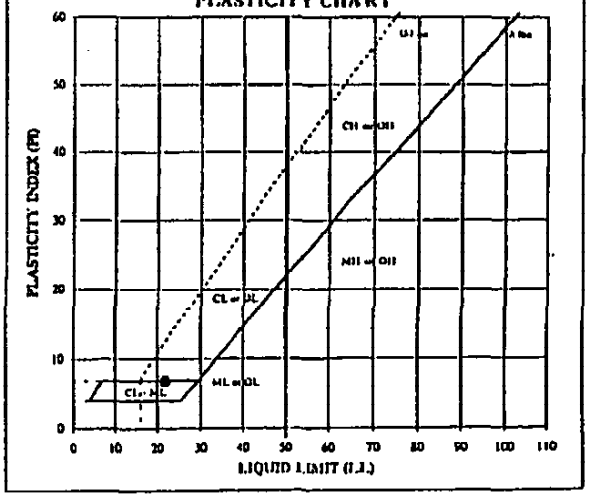


COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	48.48

PLASTICITY CHART



ATTERBERG LIMITS

NL	LL	PL	PI	LI
6.4	22	15	7	-1.28

DESCRIPTION: Yellowish Brown, FINE SAND, and silty clay.

USCS: SC-SM

TECH: TJ

DATE: 12/2/02

CHECK:

REVIEW:

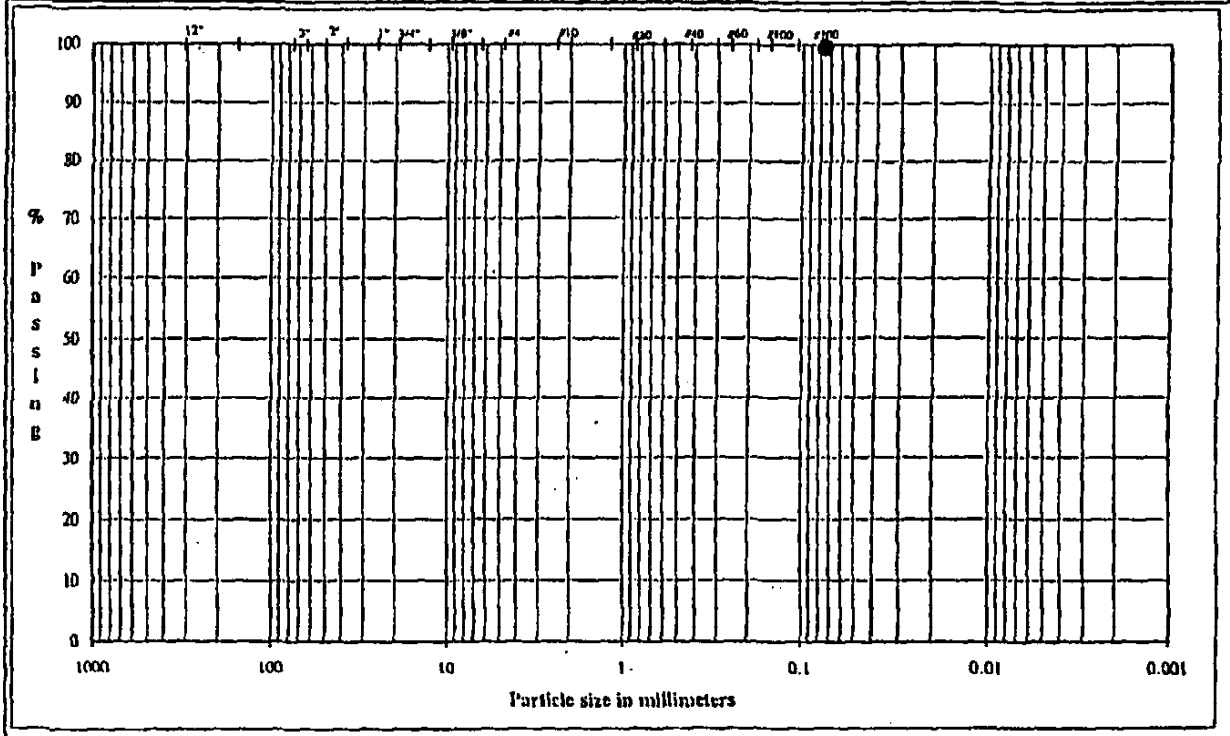
NOVEMBER 2002

023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

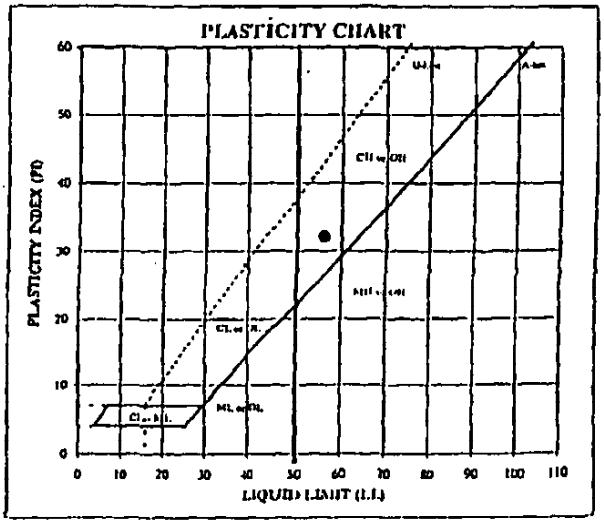
PROJECT NAME: GENESIS/IIMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: P-3 Depth: 15.0 - 17.0'
TYPE: UD



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	99.57



ATTERBERG LIMITS

LL	PL	PI	LI
56	24	32	0.32

DESCRIPTION: Yellowish Brown, SILTY CLAY, trace fine sand.

USCS: CH

TECH TJ/TH
DATE 11/28/02
CHECK DA
REVIEW

DECEMBER 2002

023-3459

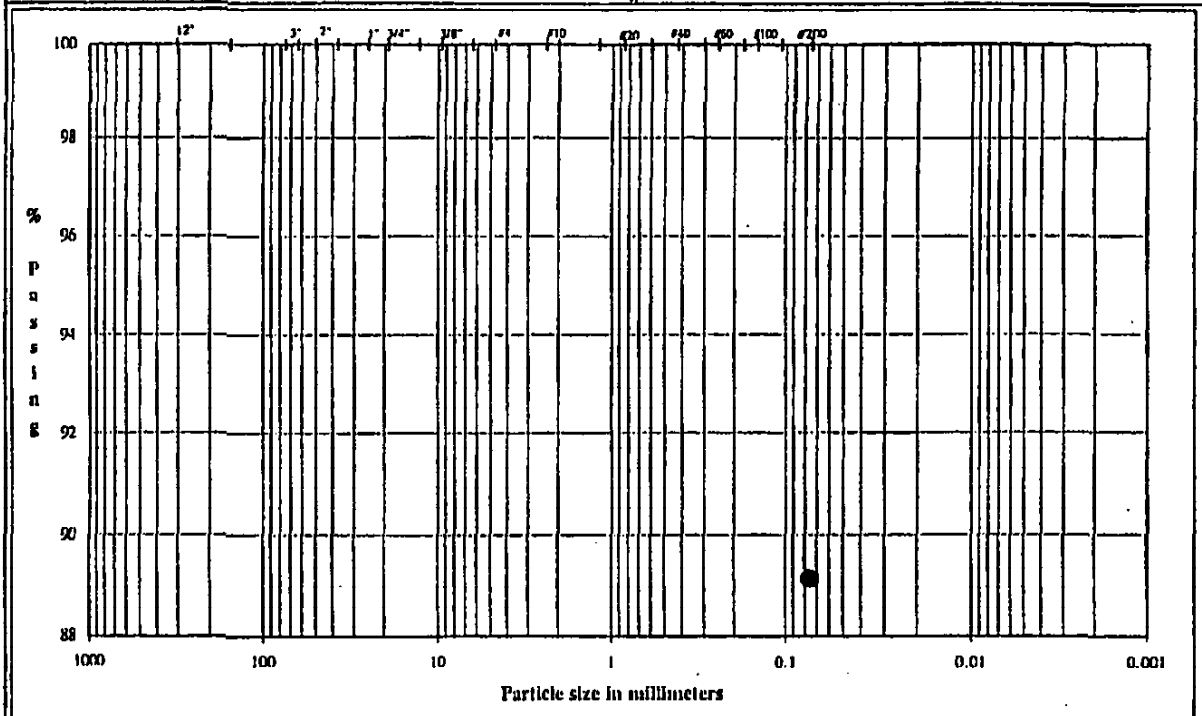
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/IIMM TYPE III LF-SHREVEPORT/LA

SAMPLE ID: P-3 Depth: 21.0 - 22.0'

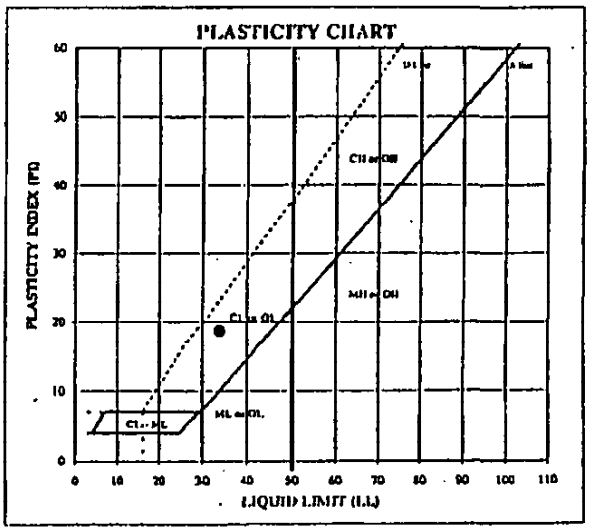
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
CLASSES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	89.15



ATTERBERG LIMITS

ML	LL	PL	PI	LI
22.1	34	15	19	0.40

DESCRIPTION: Brown and Gray, SILTY CLAY, little fine sand.

USCS: CL

TECH	TJ
DATE	12/2/02
CHECK	

DECEMBER 2002

023-3459

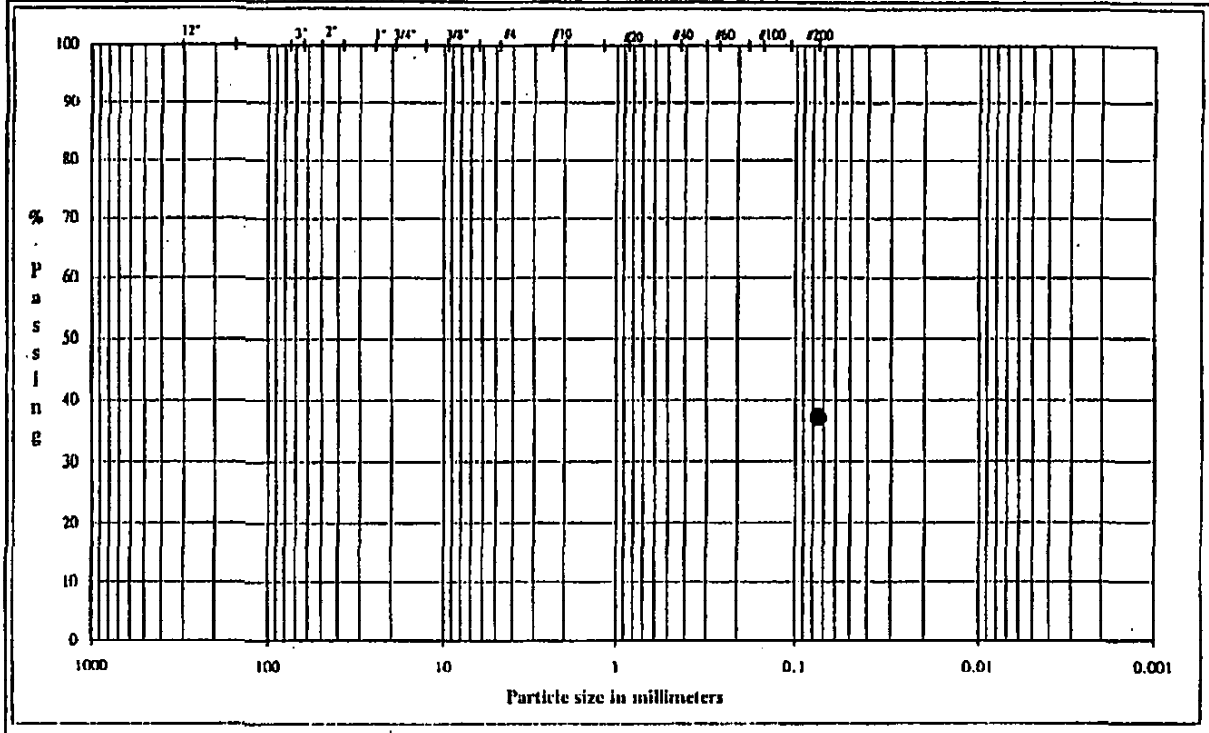
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA

SAMPLE ID: P-3 Depth: 26.0 - 27.0'

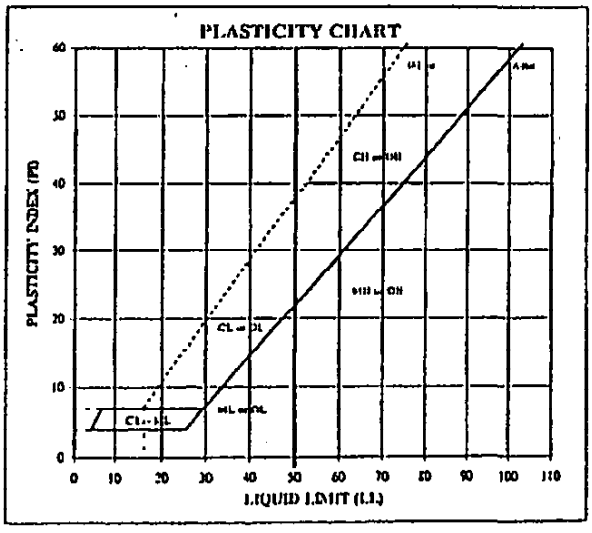
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	37.20



ATTERBERG LIMITS

Ms	LL	PL	PI	LI
15.9	NP	NP	NP	NP

DESCRIPTION: Gray, FINE SAND, and clayey silt.

USCS: SM

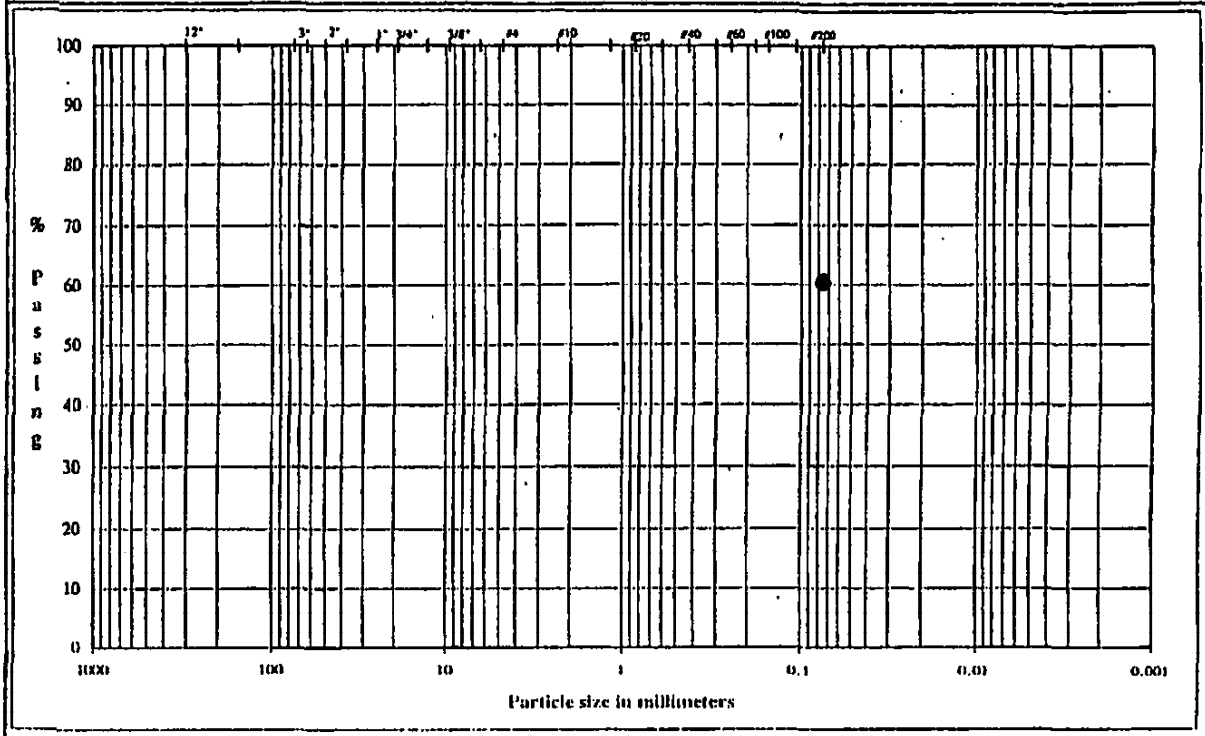
TECH	TJ
DATE	12/2/02
CHECK	DJ
REVIEW	[illegible]

DECEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

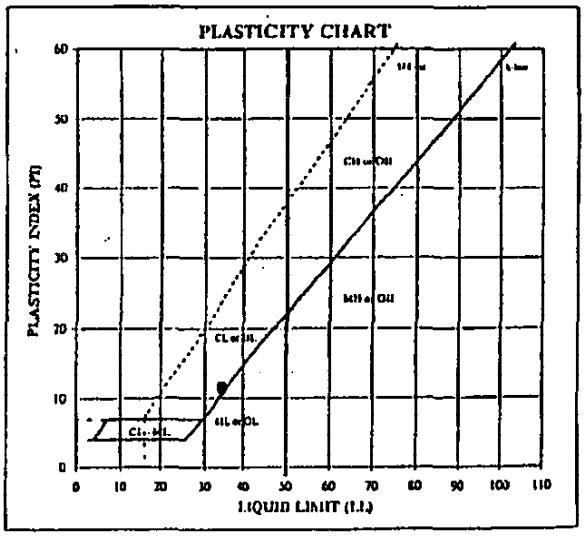
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: P-3 Depth: 34.0 - 35.0'
TYPE: Bag



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	60.43



ATTERBERG LIMITS

SL	LL	PL	PI	LI
30.7	35	23	12	0.03

DESCRIPTION: Gray, SILTY CLAY, and fine sand.

USCS: CL

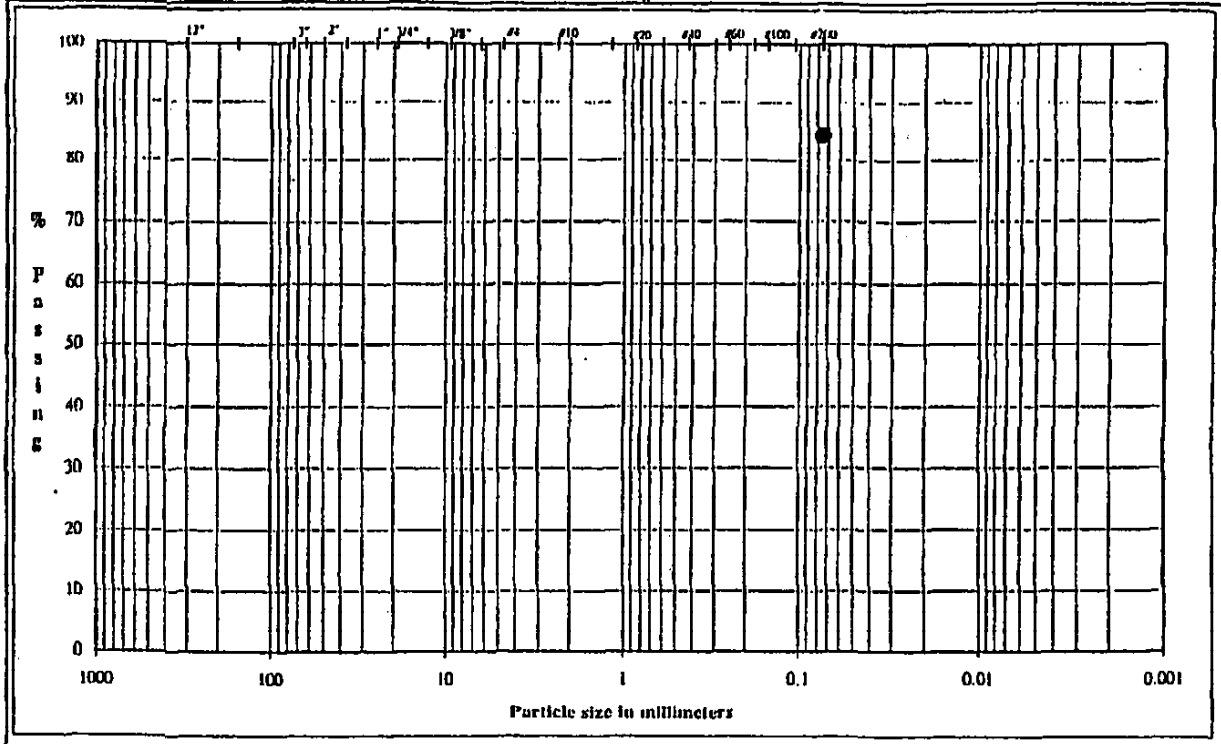
TECH	TI
DATE	12/2/02
CHECK	
REVIEW	

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

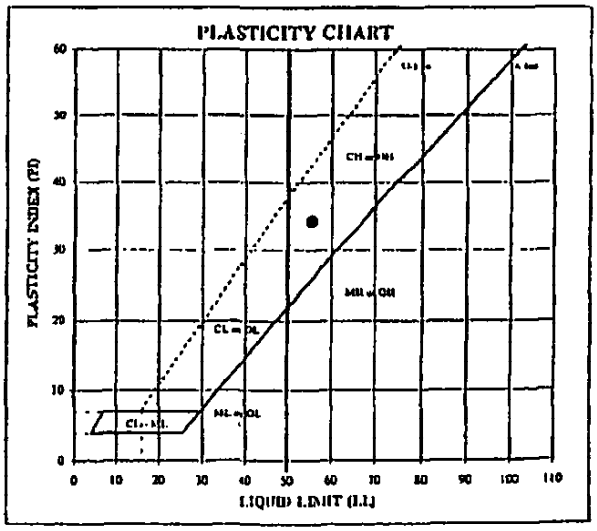
PROJECT NAME: GENESIS/IMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-1 Depth: 15.0 - 16.0'
TYPE: Bag



COBBLES	GRAVEL: Coarse	GRAVEL: Fine	SAND: Coarse	SAND: Medium	SAND: Fine	FINES: Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	84.37



ATTERBERG LIMITS

PL	LL	PI	PI	LI
30.9	55	21	34	0.29

DESCRIPTION: Grayish Brown, SILTY CLAY, some fine sand.

USCS: CH

TECH TT/TH
DATE 11/28/02
CHECK
REVIEW

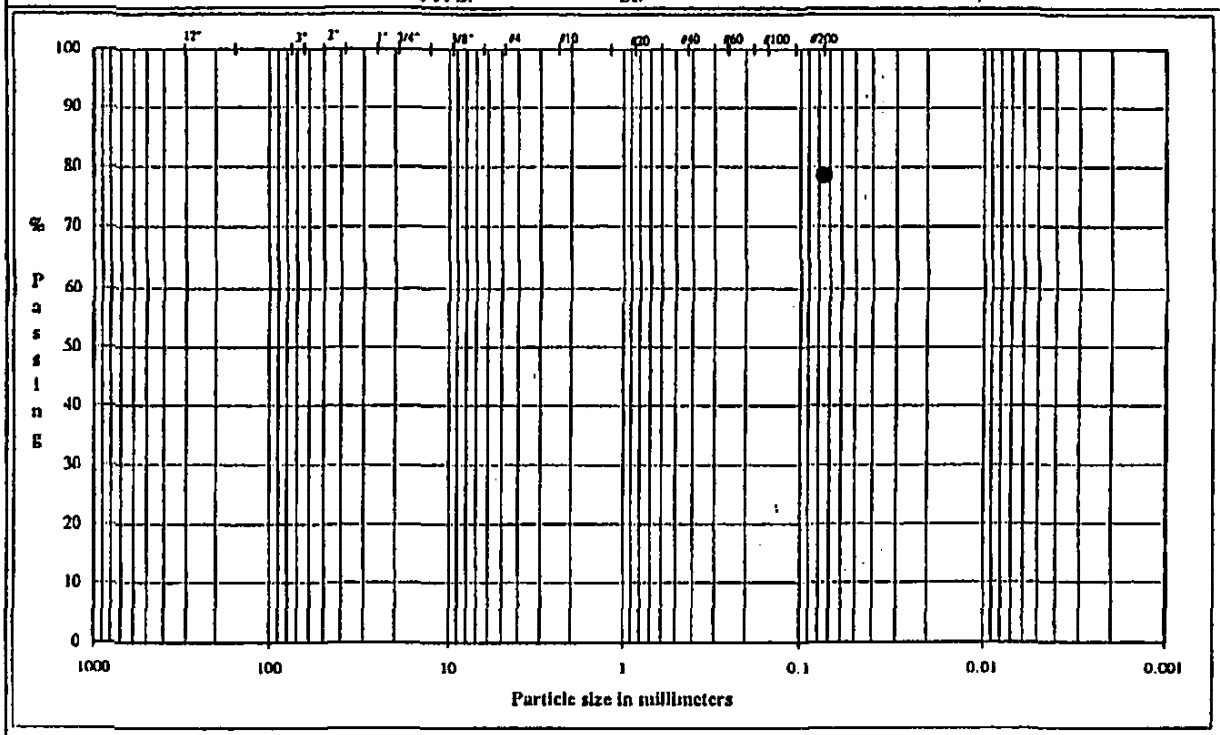
Golder Associates Inc.

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HD-1 Depth: 20.0 - 22.0'
TYPE: UD

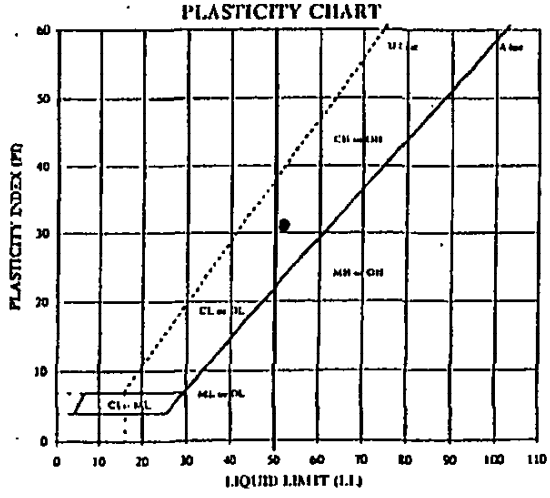


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	78.63

PLASTICITY CHART



ATTERBERG LIMITS

wt.	LL	PL	PI	LI
27.1	52	21	31	0.21

DESCRIPTION: Yellowish Brown and Gray, SILTY CLAY, some fine sand.

USCS: CH

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DATE 11/28/02
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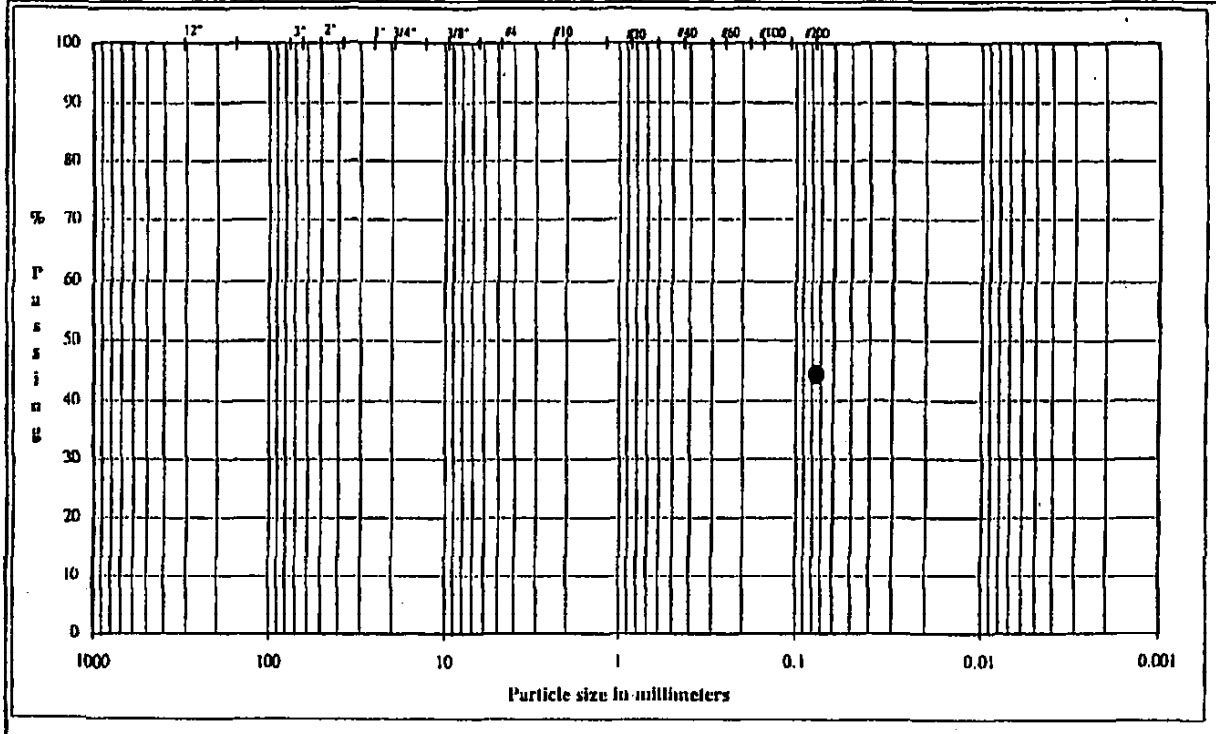
REVIEW

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-1 Depth: 23.0 - 24.0'
TYPE: Bag

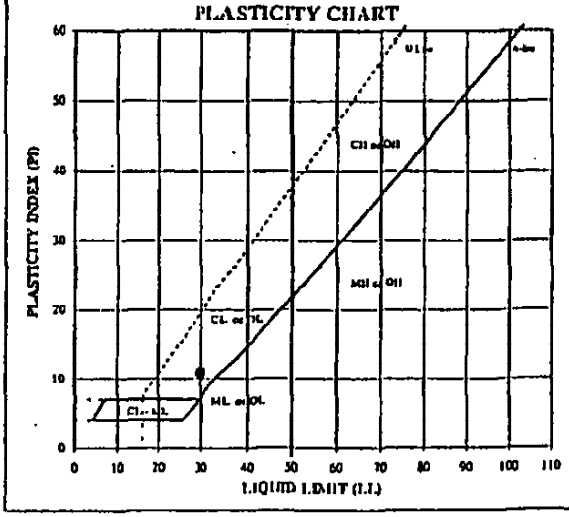


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	44.25

PLASTICITY CHART



ATTERBERG LIMITS

LL	PL	PI	LI
30	19	11	0.08

DESCRIPTION: Brownish Yellow, FINE SAND, and silty clay.

USCS: SC

TECH	TJ
DATE	11/28/01
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REVIEW	

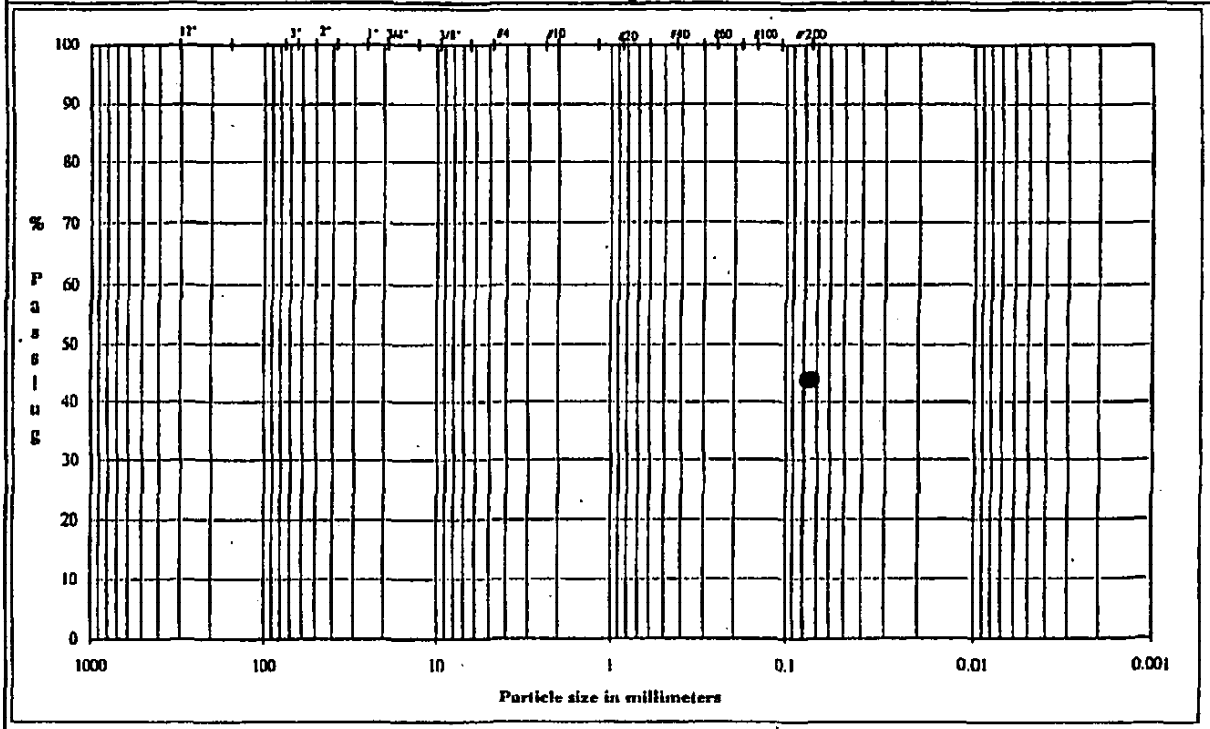
Golder Associates Inc.

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-1 Depth: 29.0-30.0'
TYPE: Bag

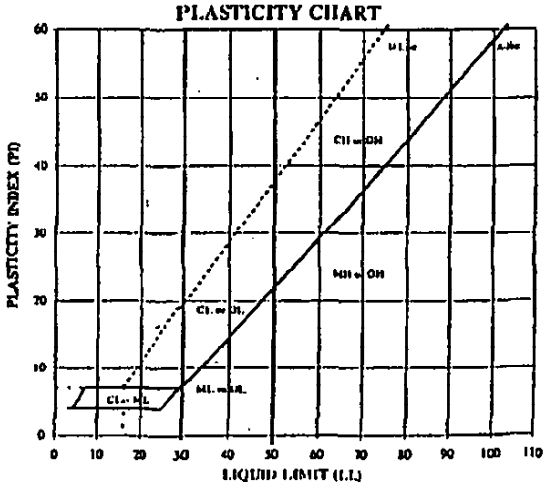


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	43.85

PLASTICITY CHART



ATTERBERG LIMITS

M.C.	L.L.	P.L.	P.I.	L.I.
23.9	NP	NP	NP	NP

DESCRIPTION: Olive Gray, FINE SAND, and clayey silt.

USCS: SM

TECH TJ
DATE 11/27/02
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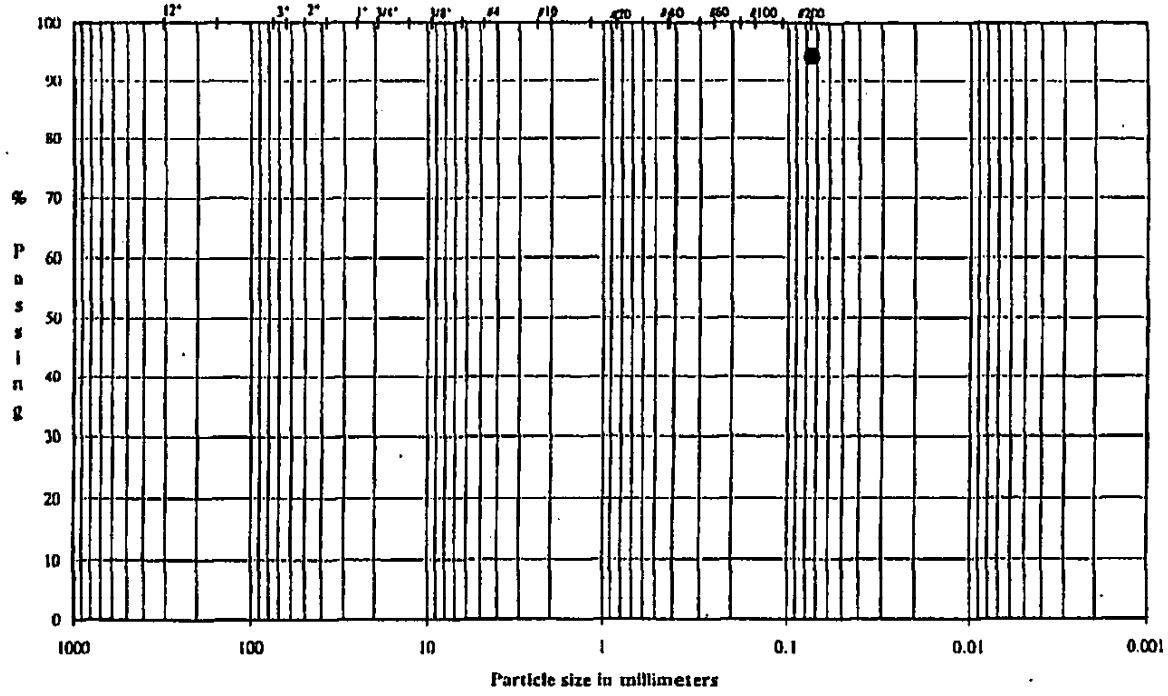
NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

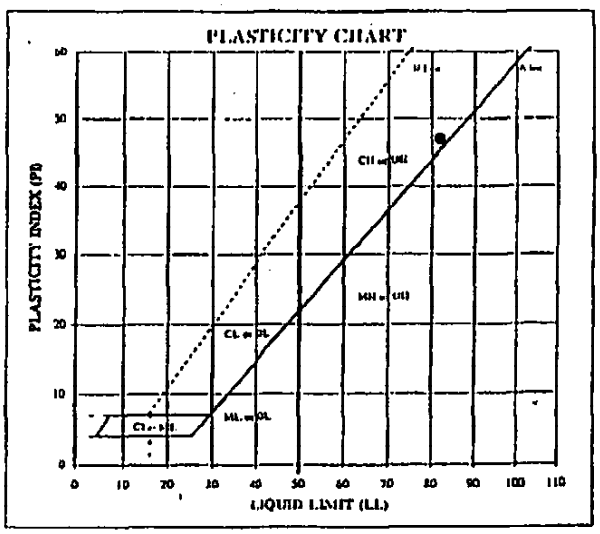
PROJECT NAME: GENESIS/IIMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-2 Depth: 4.0 - 5.0'
TYPE: Bag



COBBLES	GRAVEL: Coarse	GRAVEL: Fine	SAND: Coarse	SAND: Medium	SAND: Fine	FINES: Silt or Clay

U.S. Standard Sieves Sizes and Numbers

Particle Size (mm)		% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	94.43



ATTERBERG LIMITS

NL	LL	PL	PI	LI
31.8	82	35	47	-0.08

DESCRIPTION: Reddish Brown, SILTY CLAY, little fine sand.

USCS: CH

TECH TJ/TH
DATE 11/18/02
CHECK
REVIEW

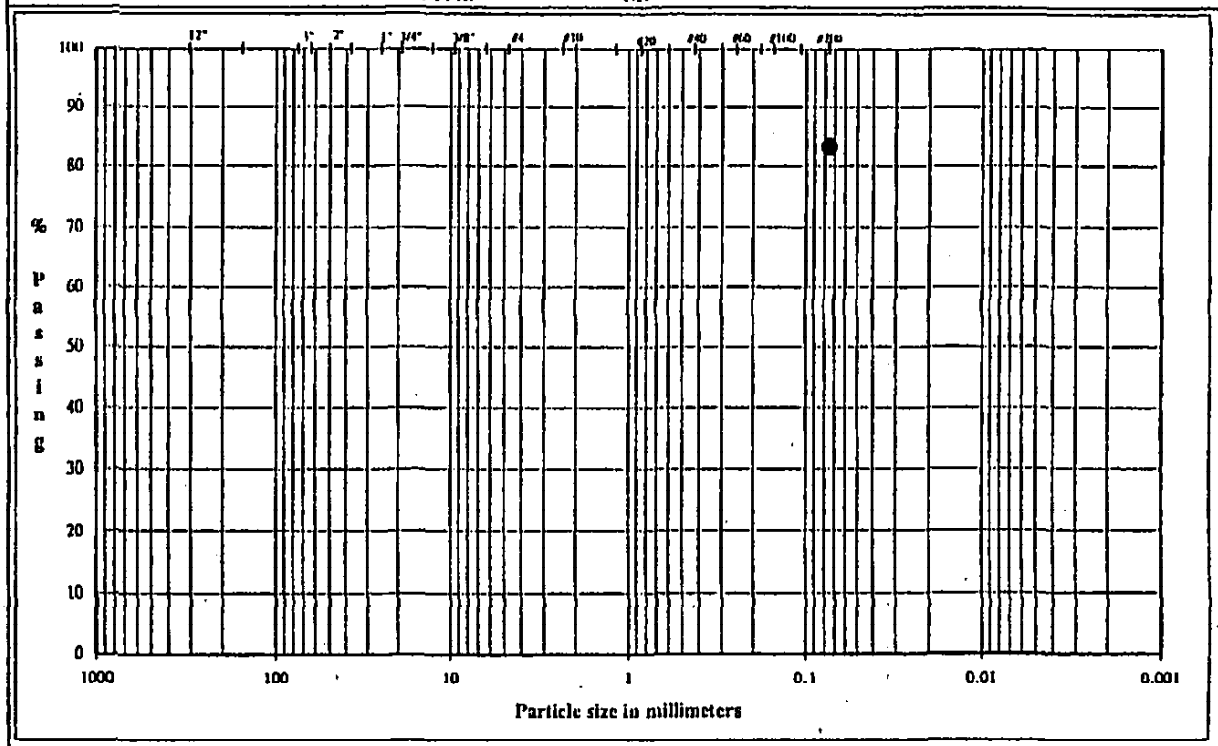
Golder Associates Inc.

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

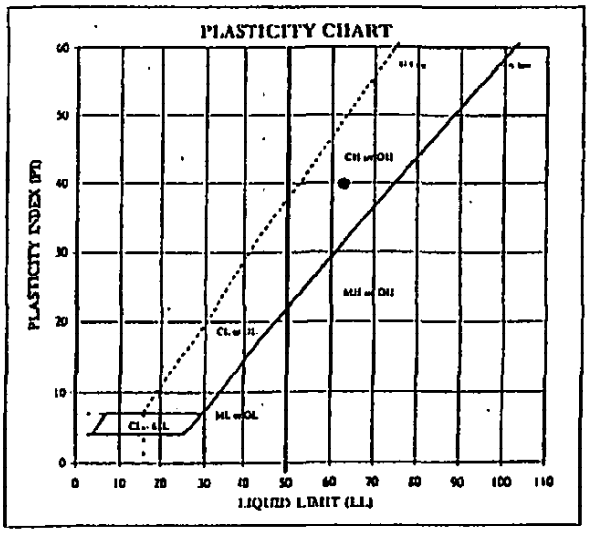
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HH-2 Depth: 10.0 - 12.0'
TYPE: HD



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	83.35



ATTERBERG LIMITS

PL	LL	PI	PI	LI
27.9	63	23	40	0.13

DESCRIPTION: Reddish Brown and Gray, SILTY CLAY, some fine sand.

USCS: CH

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DATE	11/28/02
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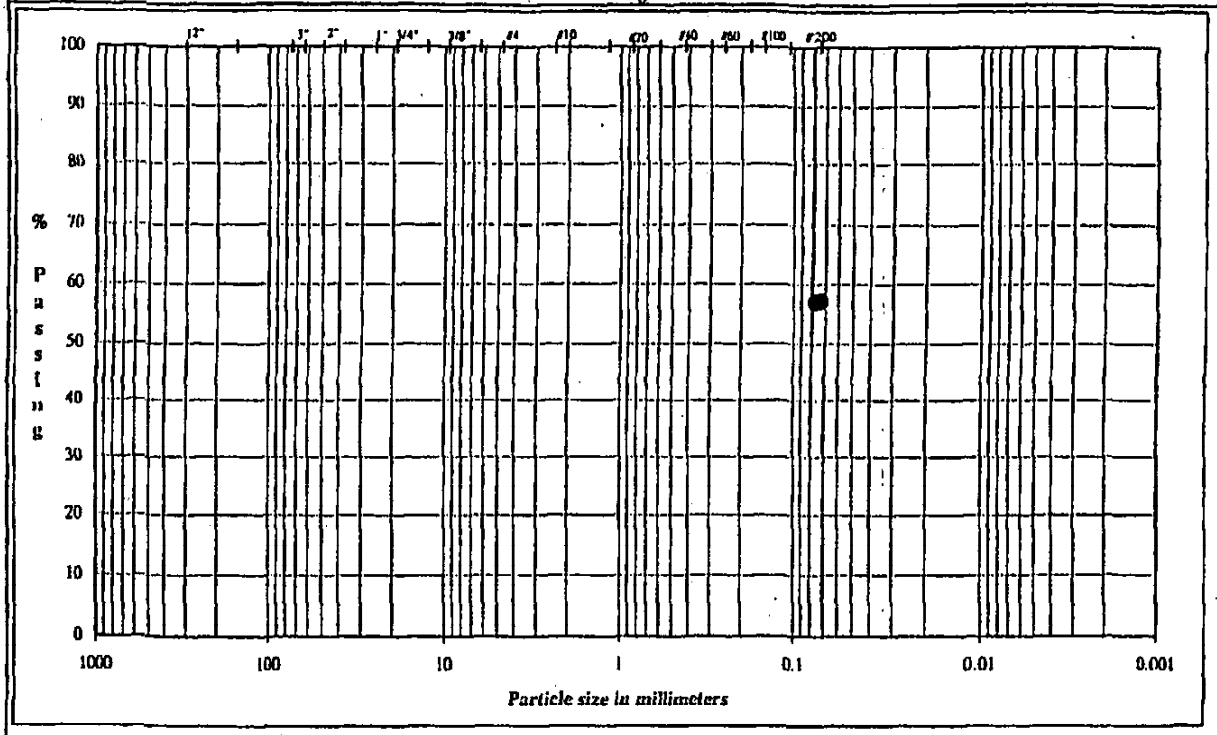
NOVEMBER 2002

023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/IRMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-2 Depth: 18.0 - 19.0'
TYPE: Bag

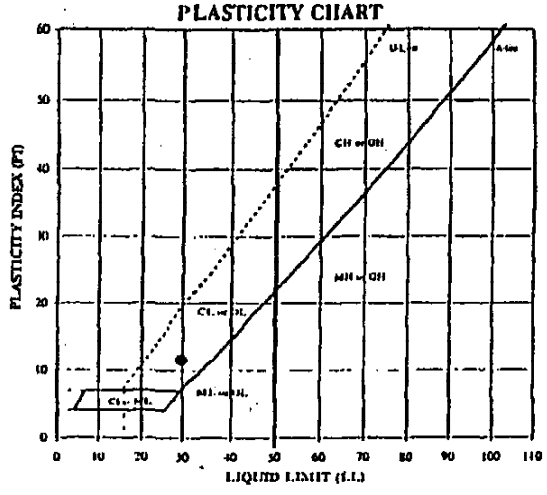


COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	57.13

PLASTICITY CHART



ATTERBERG LIMITS

NL	LL	PL	PI	LI
22.6	30	18	12	0.43

DESCRIPTION: Gray and Yellowish Brown, SILTY CLAY, and fine sand.

USCS: CL

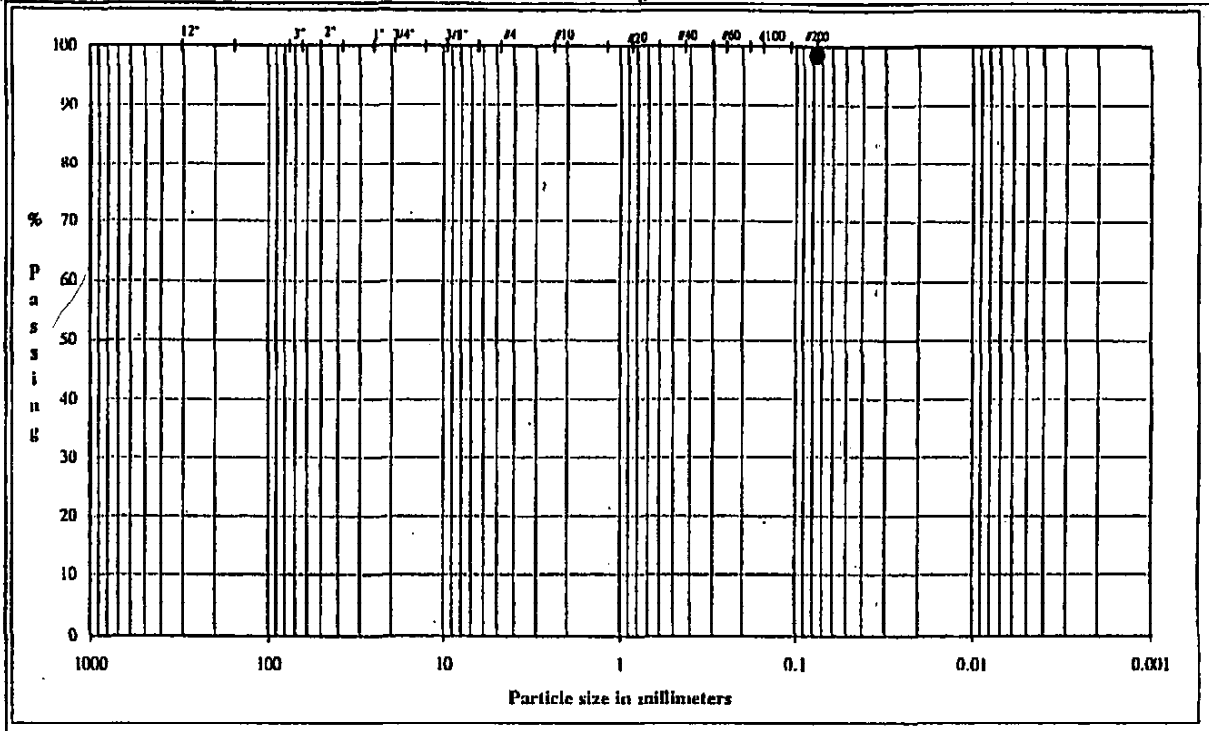
TECH TJ/TH
DATE 11/28/02
CHECK BJS
REVIEW

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-3 Depth: 4.0 - 5.0'
TYPE: Bag

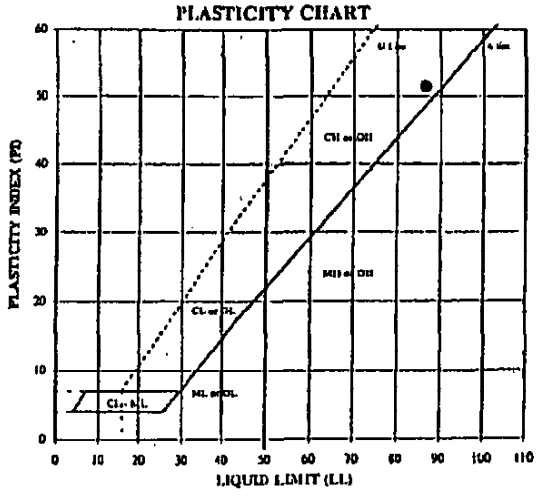


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	98.65

PLASTICITY CHART



ATTERBERG LIMITS

NL	LL	PL	PI	LI
31.7	87	35	52	-0.04

DESCRIPTION: Dark Brown, SILTY CLAY, trace fine sand.

USCS: CH

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DATE 11/28/02
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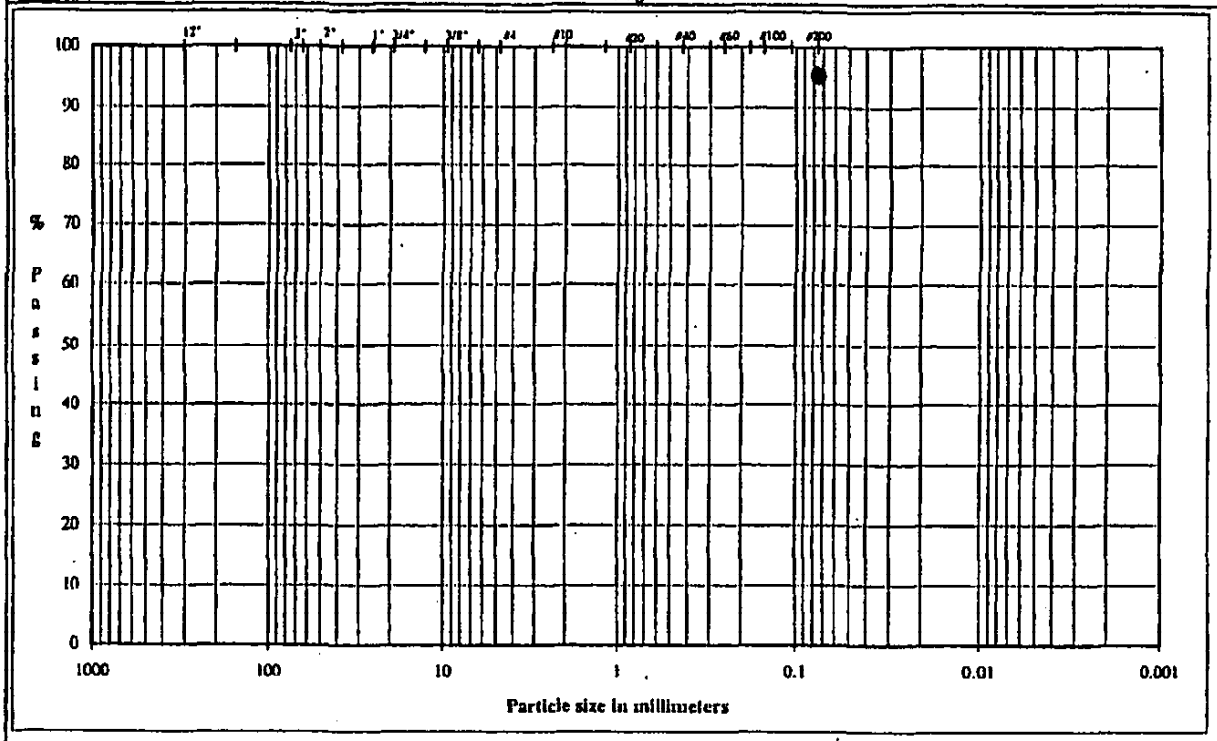
NOVEMBER 2002

023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

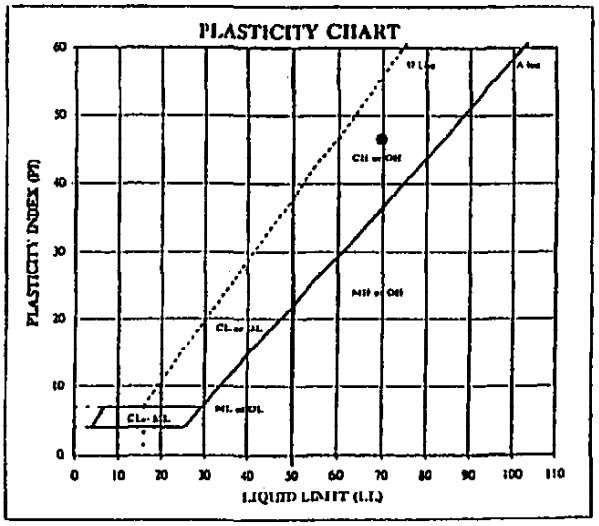
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-3 Depth: 7.0 - 8.0'
TYPE: Bag



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	95.38



ATTERBERG LIMITS

NL	LL	PL	PI	LI
30.0	70	23	47	0.15

DESCRIPTION: Gray, Brown and Yellow, SILTY CLAY, trace fine Sand.

USCS: CH

TECH	TI/TH
DATE	11/28/02
CHECK	
REVIEW	

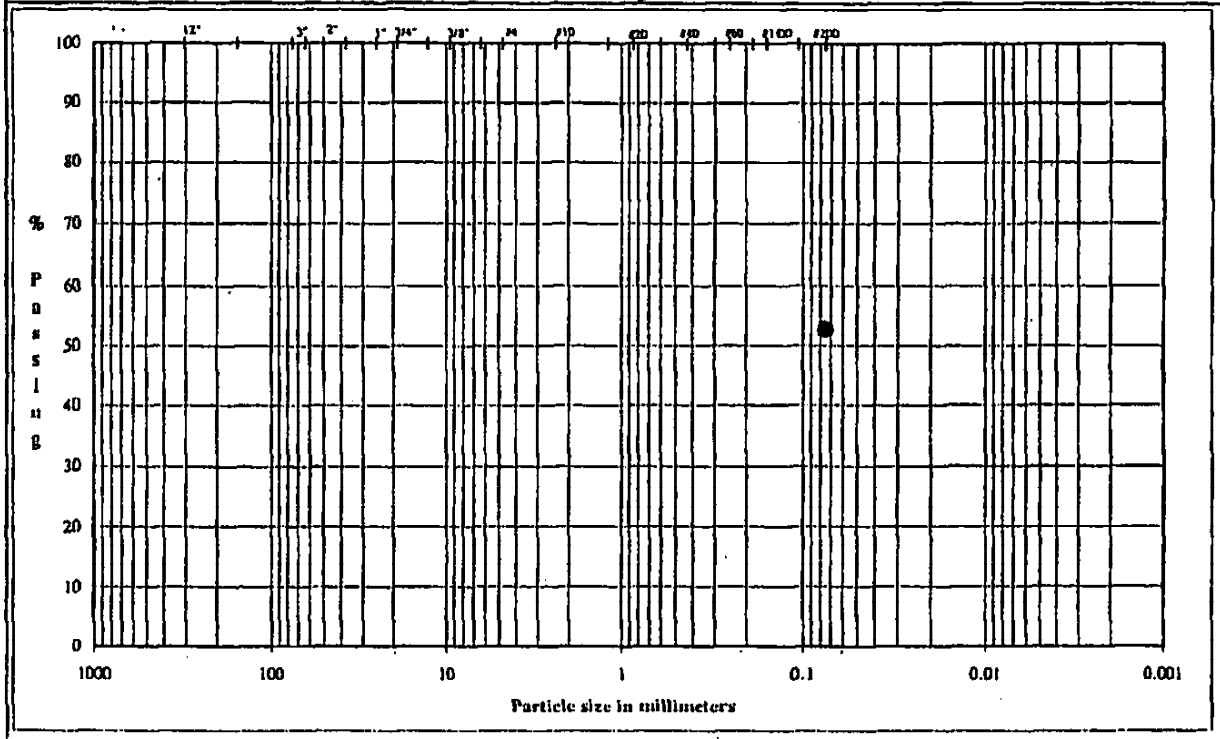
Golder Associates Inc.

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-4 Depth: 4.0 - 5.0'
TYPE: Bag

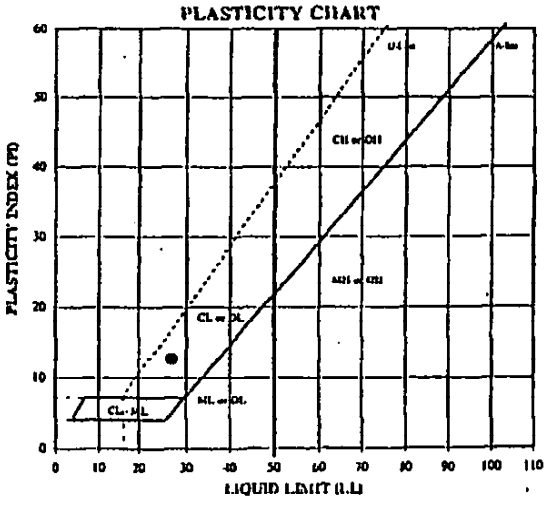


COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	52.78

PLASTICITY CHART



ATTERBERG LIMITS

W_n	LL	PL	PI	LI
15.5	27	14	13	0.08

DESCRIPTION: Brownish Red, SILTY CLAY, and fine sand.

USCS: CL

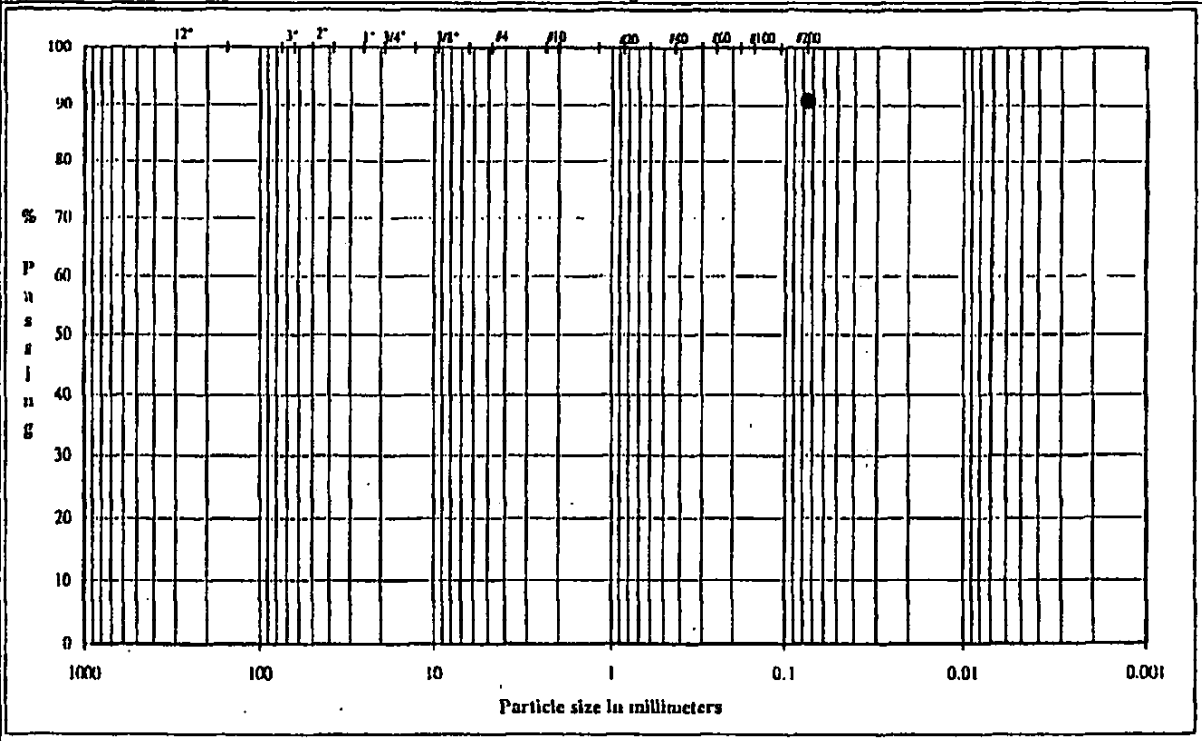
TECH	TJ/TH
DATE	11/28/02
CHECK	
REVIEW	

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-4 Depth: 11.0 - 12.0'
TYPE: Bag

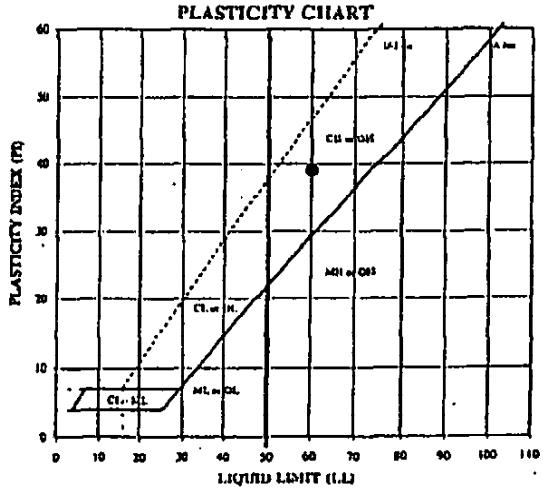


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	90.92

PLASTICITY CHART



ATTERBERG LIMITS

NL	LL	PL	PI	LI
27.4	60	21	39	0.16

DESCRIPTION: Reddish Brown, SILTY CLAY, little fine sand.

USCS: CH

TECH	TJ
DATE	11/28/02
CHECK	JPS
REVIEW	[illegible]

DECEMBER 2002

023-3459

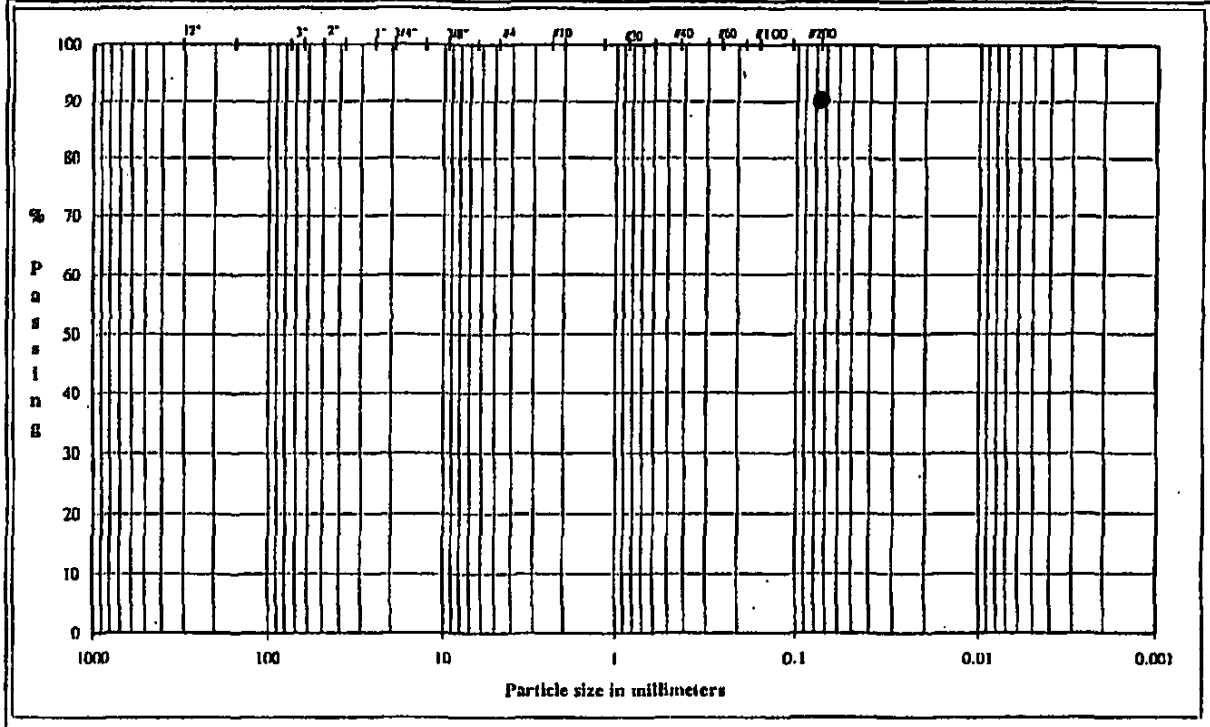
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA

SAMPLE ID: IIB-4 Depth: 15.0 - 17.0'

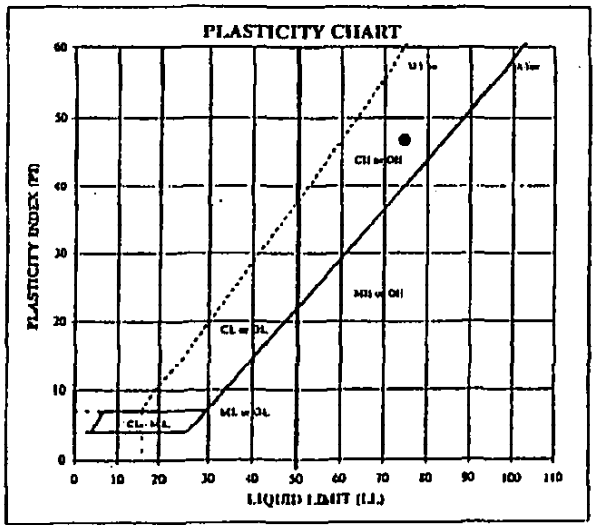
TYPE: UD



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	90.22



ATTERBERG LIMITS

NL	LL	PL	PI	LI
26.3	75	28	47	-0.04

DESCRIPTION: Reddish Brown, SILTY CLAY, little fine sand.

USCS: CH

TECH TJ/JH

DATE 12/2/02

CHECK DD

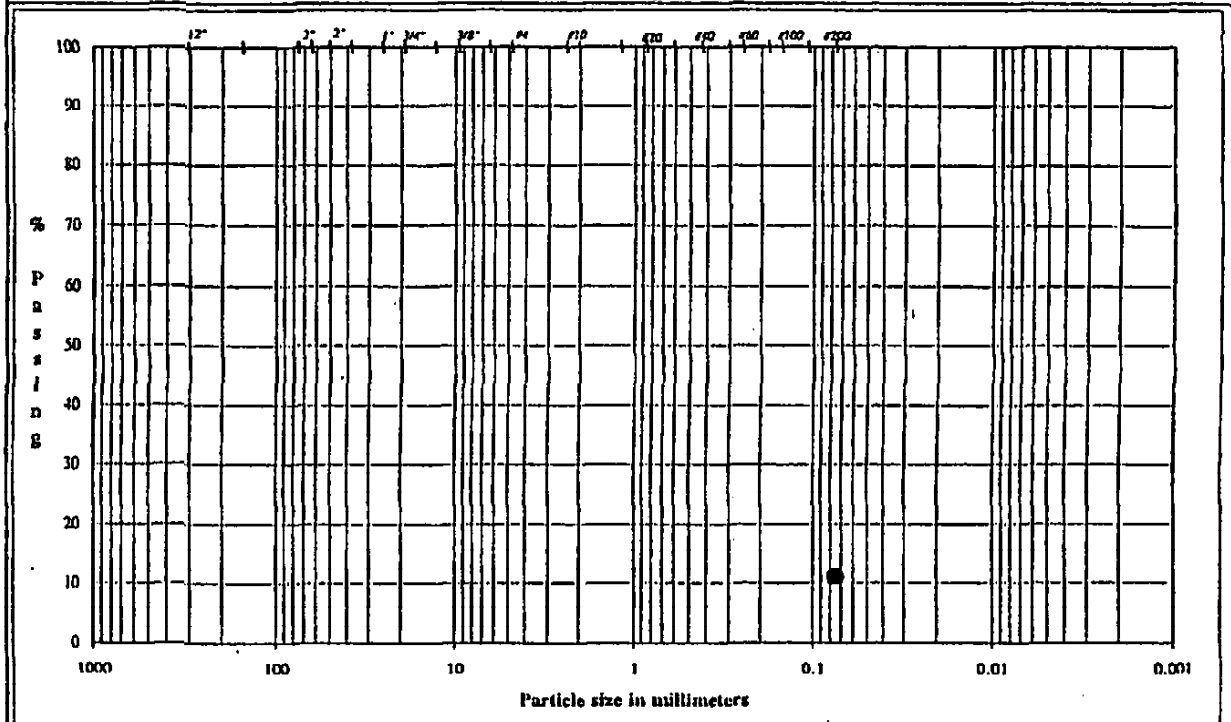
REVIEW

DECEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-7 Depth: 4.0 - 5.0'
TYPE: Bag

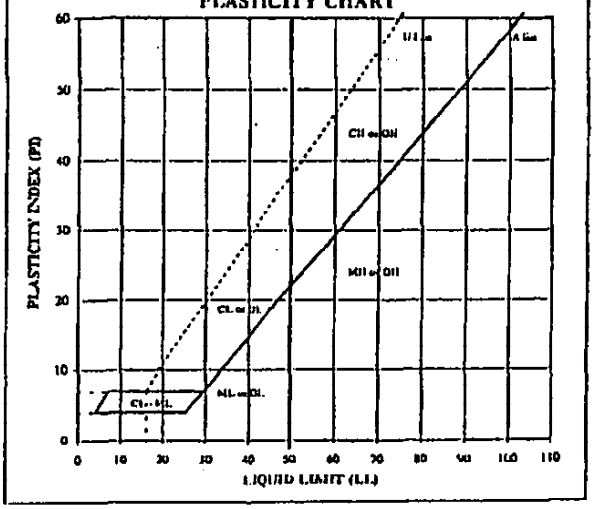


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	11.16

PLASTICITY CHART



ATTERBERG LIMITS

AL	LL	PL	PI	LI
21.1	NP	NP	NP	#P

DESCRIPTION: Yellowish Brown, FINE SAND, little clayey silt.

USCS: SP-SM

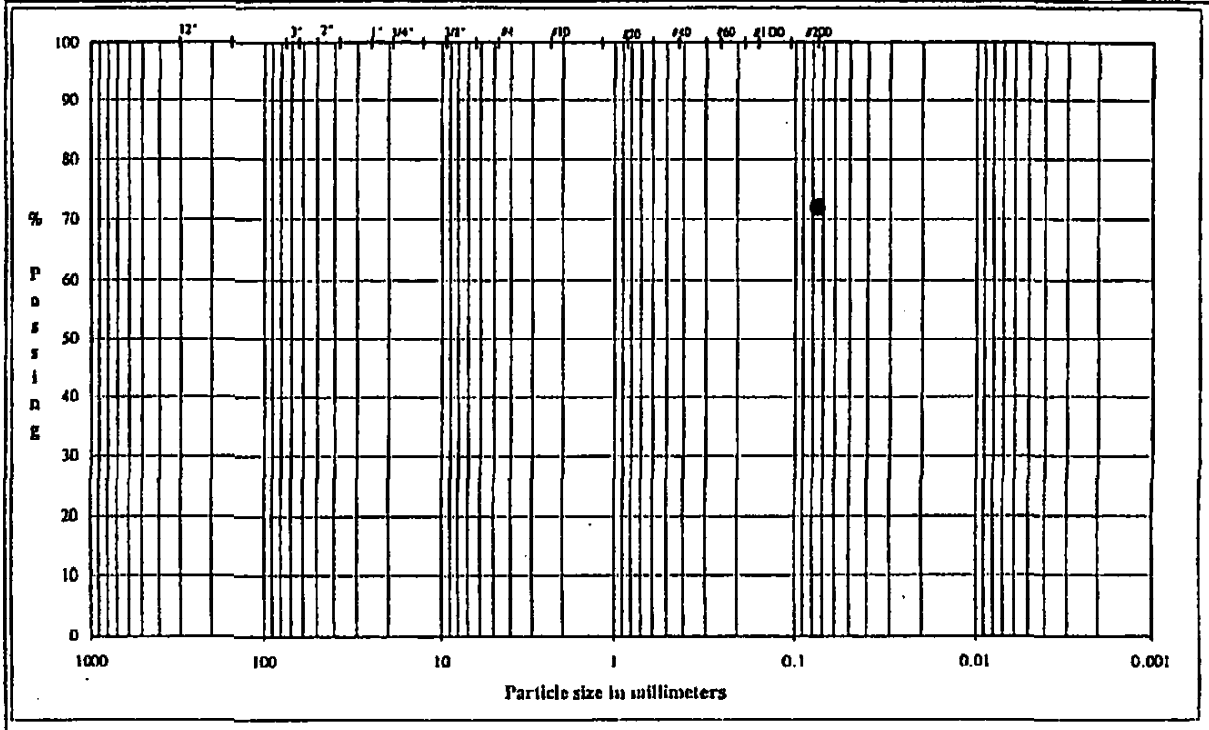
TECH	TJ
DATE	12/20/02
CHECK	DH
REVIEW	Turk

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/IIMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: IIB-7 Depth: 9.0 - 10.0'
TYPE: Bag

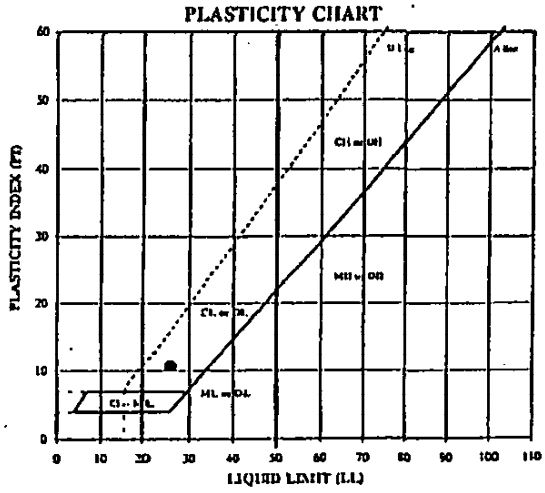


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	72.05

PLASTICITY CHART



ATTERBERG LIMITS

NL	LL	PL	PI	LI
33.3	26	15	11	6.73

DESCRIPTION: Reddish Brown, SILTY CLAY, some fine sand.

USCS: CL

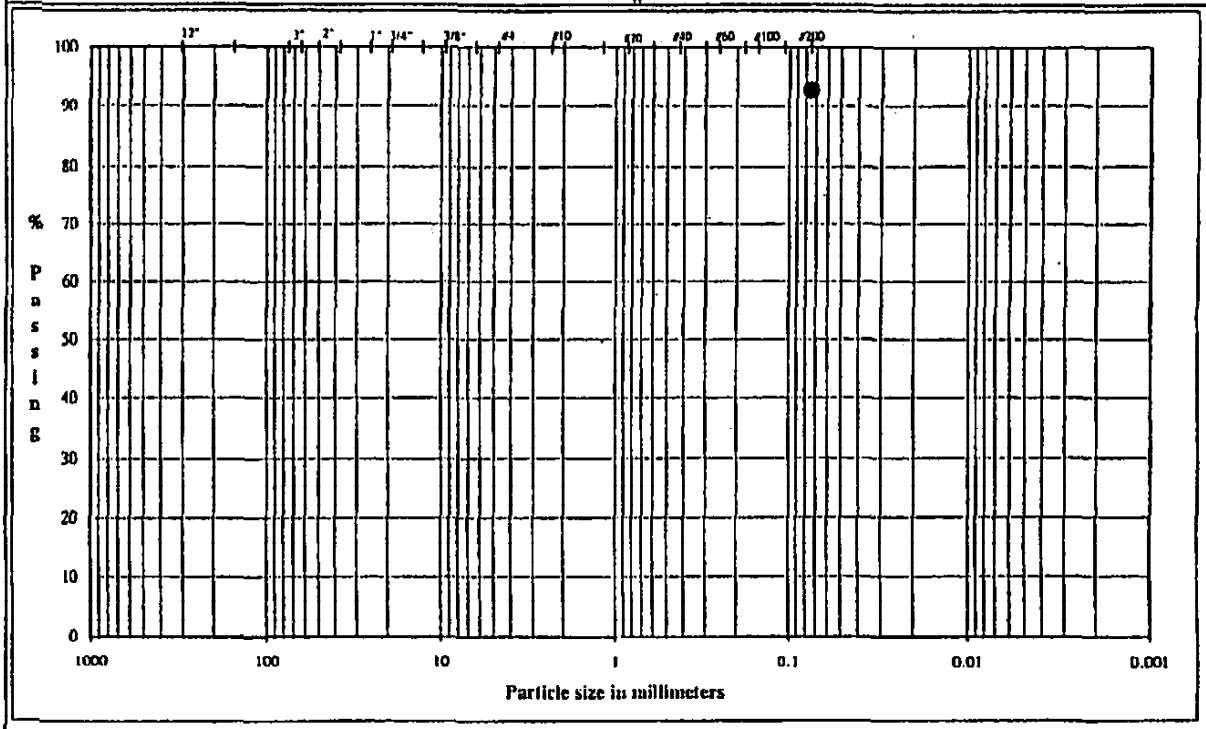
TECH TJ/TH
DATE 11/27/02
CHECK DA
REVIEW

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-7 Depth: 14.0 - 15.0'
TYPE: Bag

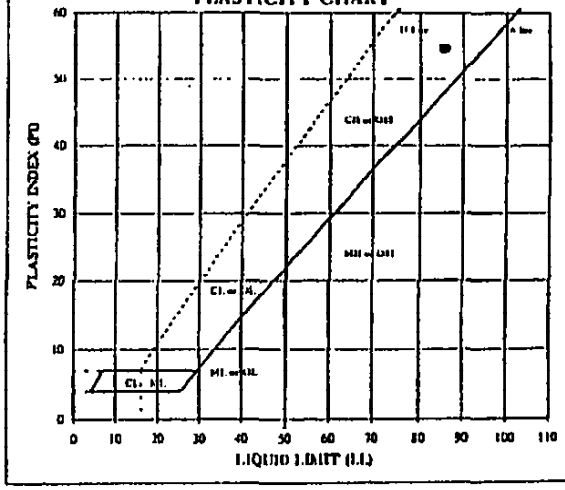


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	92.80

PLASTICITY CHART



ATTERBERG LIMITS

LL	PL	PI	#40	#200
86	31	55	0.43	0.13

DESCRIPTION: Reddish Brown and Gray, SILTY CLAY, little fine sand.

USCS: CH

TECH TJ/TH
DATE 11/28/02
CHECK
REVIEW

FLOW PUMP #2B

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GENESIS/HMM TYPE III LF-SHREVEPORT/LA		BOARD #	9	COMMENTS
PROJECT NUMBER	023-1459		CELL #	9	
SAMPLE ID	P-1	30.0-32.0'	Flow Pump Speed	1	
SAMPLE TYPE	UD		Technician	PWM	

Sample Data, Initial				Sample Data, Final	
Height, inches	2.979	B-Value, f	1.00	Height, inches	2.956
Diameter, inches	2.863	Cell Pres.	100.0	Diameter, inches	2.824
Area, cm²	41.53	Bot. Pres.	80.0	Area, cm²	40.41
Volume, cm³	314.27	Top Pres.	80.0	Volume, cm³	303.41
Mass, g	624.58	Tot. B.P.	80.0	Mass, g	622.29
Moisture Content, %	22.21	Head, max.	52.05	Moisture Content, %	21.76
Dry Density, pcf	101.48	Head, min.	52.05	Dry Density, pcf	105.11
Spec. Gravity	2.687	Max. Grad.	6.93	Volume Solids, cm³	190.21
Volume Solids, cm³	190.21	Min. Grad.	6.93	Volume Voids, cm³	113.20
Volume Voids, cm³	124.07			Void Ratio	0.60
Void Ratio	0.65			Saturation, %	98.2%
Saturation, %	91.5%				

Permeant: Deaired Tap Water

Flow Pump Rate: 2.38E-02 cm³/sec

USCS: SM

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	624.58	673.46
Wt Soil & Tare, f	g	511.08	562.41
Wt Tare	g	0.00	52.06
Wt Moisture Lost	g	113.50	111.05
Wt Dry Soil	g	511.08	510.35
Water Content	%	22.21%	21.76%

DESCRIPTION

Grayish Brown, FINE SAND, and clayey silt.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
12/2/02	37592	10	1	20.7	0	0	0	0	0.74	52.05	6.93	8.4E-05
12/2/02	37592	10	2	20.7	1	1	60	60	0.74	52.05	6.93	8.4E-05
12/2/02	37592	10	3	20.7	1	2	60	120	0.74	52.05	6.93	8.4E-05
12/2/02	37592	10	4	20.7	1	3	60	180	0.74	52.05	6.93	8.4E-05 *
12/2/02	37592	10	5	20.7	1	4	60	240	0.74	52.05	6.93	8.4E-05 *
12/2/02	37592	10	6	20.7	1	5	60	300	0.74	52.05	6.93	8.4E-05 *
12/2/02	37592	10	7	20.7	1	6	60	360	0.74	52.05	6.93	8.4E-05 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 8.4E-05 cm/sec **

DATE 12/2/02
CHECK DJA
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FLOW PUMP #1

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GENESIS/HMM TYPE III LF-SHREVEPORT/LA		BOARD #	2	COMMENTS
PROJECT NUMBER	023-3459		CELL #	2	
SAMPLE ID	P-2	15.0-17.0'	Flow Pump Speed	11	
SAMPLE TYPE	UD		Technician	JH	

Sample Data, Initial				Sample Data, Final	
Height, inches	2.945	B-Value, f	0.97	Height, inches	2.963
Diameter, inches	2.859	Cell Pres.	90.0	Diameter, inches	2.868
Area, cm²	41.42	Bot. Pres.	80.0	Area, cm²	41.68
Volume, cm³	309.82	Top Pres.	80.0	Volume, cm³	313.68
Mass, g	630.89	Tot. B.P.	80.0	Mass, g	637.01
Moisture Content, %	23.91	Head, max.	121.69	Moisture Content, %	25.11
Dry Density, pcf	102.55	Head, min.	121.69	Dry Density, pcf	101.29
Spec. Gravity	2.827	Max. Grad.	16.17	Volume Solids, cm³	180.11
Volume Solids, cm³	180.11	Min. Grad.	16.17	Volume Voids, cm³	133.57
Volume Voids, cm³	129.71			Void Ratio	0.74
Void Ratio	0.72			Saturation, %	95.7%
Saturation, %	93.8%				

Permeant: Deaired Tap Water

Flow Pump Rate: 1.28E-05 cm³/sec

USCS: CH

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	630.89	720.03
Wt Soil & Tare, f	g	509.17	592.27
Wt Tare	g	0.00	83.41
Wt Moisture Lost	g	121.72	127.76
Wt Dry Soil	g	509.17	508.86
Water Content	%	23.91%	25.11%

DESCRIPTION: Yellowish Brown and Gray, SILTY CLAY, trace fine sand.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
12/5/02	37595	8	0	20.8	0	0	0	0	1.73	121.69	16.17	1.9E-08
12/5/02	37595	8	5	20.8	5	5	300	300	1.73	121.69	16.17	1.9E-08
12/5/02	37595	8	10	20.8	5	10	300	600	1.73	121.69	16.17	1.9E-08
12/5/02	37595	8	15	20.8	5	15	300	900	1.73	121.69	16.17	1.9E-08 *
12/5/02	37595	8	20	20.8	5	20	300	1200	1.73	121.69	16.17	1.9E-08 *
12/5/02	37595	8	25	20.8	5	25	300	1500	1.73	121.69	16.17	1.9E-08 *
12/5/02	37595	8	30	20.8	5	30	300	1800	1.73	121.69	16.17	1.9E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 1.9E-08 cm/sec **

DATE 12/5/02
CHECK DA
REVIEW

FLOW PUMP #1

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GENESIS/HMM TYPE III LF-SHREVEPORT,LA		BOARD #	1	COMMENTS
PROJECT NUMBER	023-3459		CELL #	1	
SAMPLE ID	P-3	15.0-17.0'	Flow Pump Speed	11	
SAMPLE TYPE	UD		Technician	PWM	

Sample Data, Initial				Sample Data, Final	
Height, inches	2.943	B-Value, f	0.97	Height, inches	2.967
Diameter, inches	2.853	Cell Pres.	90.0	Diameter, inches	2.863
Area, cm²	41.24	Bot. Pres.	80.0	Area, cm²	41.53
Volume, cm³	308.31	Top Pres.	80.0	Volume, cm³	313.00
Mass, g	580.66	Tot. B.P.	80.0	Mass, g	588.70
Moisture Content, %	34.64	Head, max.	161.08	Moisture Content, %	36.51
Dry Density, pcf	87.28	Head, min.	161.08	Dry Density, pcf	85.97
Spec. Gravity	2.702	Max. Grad.	21.37	Volume Solids, cm³	159.61
Volume Solids, cm³	159.61	Min. Grad.	21.37	Volume Voids, cm³	153.40
Volume Voids, cm³	148.70			Void Ratio	0.96
Void Ratio	0.93			Saturation, %	102.6%
Saturation, %	100.5%				

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	580.66	673.47
Wt Soil & Tare, f	g	431.25	516.09
Wt Tare	g	0.00	85.02
Wt Moisture Lost	g	149.41	157.38
Wt Dry Soil	g	431.25	431.07
Water Content	%	34.64%	36.51%

Permeant: Deaired Tap Water

Flow Pump Rate 1.28E-05 cm³/sec

USCS CH

DESCRIPTION: Yellowish Brown, SILTY CLAY, trace fine sand.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
12/2/02	37592	11	30	20.8	0	0	0	0	2.29	161.08	21.37	1.4E-08
12/2/02	37592	11	35	20.8	5	5	300	300	2.29	161.08	21.37	1.4E-08
12/2/02	37592	11	40	20.8	5	10	300	600	2.29	161.08	21.37	1.4E-08
12/2/02	37592	11	45	20.8	5	15	300	900	2.29	161.08	21.37	1.4E-08 *
12/2/02	37592	11	50	20.8	5	20	300	1200	2.29	161.08	21.37	1.4E-08 *
12/2/02	37592	11	55	20.8	5	25	300	1500	2.29	161.08	21.37	1.4E-08 *
12/2/02	37592	12	0	20.8	5	30	300	1800	2.29	161.08	21.37	1.4E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 1.4E-08 cm/sec **

DATE 12/2/02
CHECK VA
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Golder Associates Inc.

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FLOW PUMP #2B

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GENESIS/HMM TYPE III LF-SHREVEPORT/LA		BOARD #	4	COMMENTS
PROJECT NUMBER	023-3459		CELL #	4	
SAMPLE ID	HB-1	20.0-22.0'	Flow Pump Speed	10	
SAMPLE TYPE	UD		Technician	PWM	

Sample Data, Initial				Sample Data, Final	
Height, inches	2.947	B-Value, f	0.99	Height, inches	2.909
Diameter, inches	2.849	Cell Pres.	100.0	Diameter, inches	2.821
Area, cm²	41.13	Bot. Pres.	80.0	Area, cm²	40.32
Volume, cm³	307.86	Top Pres.	80.0	Volume, cm³	297.95
Mass, g	604.63	Tot. B.P.	80.0	Mass, g	595.43
Moisture Content, %	27.15	Head, max.	90.74	Moisture Content, %	25.21
Dry Density, pcf	96.39	Head, min.	90.74	Dry Density, pcf	99.59
Spec. Gravity	2.743	Max. Grad.	12.28	Volume Solids, cm³	173.36
Volume Solids, cm³	173.36	Min. Grad.	12.28	Volume Voids, cm³	124.58
Volume Voids, cm³	134.50			Void Ratio	0.72
Void Ratio	0.78			Saturation, %	96.2%
Saturation, %	96.0%				

Permeant: Deaired Tap Water

Flow Pump Rate: 2.33E-05 cm³/sec

USCS: CH

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	604.63	646.81
Wt Soil & Tare, f	g	475.54	526.96
Wt Tare	g	0.00	51.59
Wt Moisture Lost	g	129.09	119.85
Wt Dry Soil	g	475.54	475.37
Water Content	%	27.15%	25.21%

DESCRIPTION: Yellowish Brown and Gray, SILTY CLAY, some fine sand.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
12/2/02	37592	16	0	20.8	0	0	0	0	1.29	90.74	12.28	4.6E-08
12/2/02	37592	16	5	20.8	5	5	300	300	1.29	90.74	12.28	4.6E-08
12/2/02	37592	16	10	20.8	5	10	300	600	1.29	90.74	12.28	4.6E-08
12/2/02	37592	16	15	20.8	5	15	300	900	1.29	90.74	12.28	4.6E-08 *
12/2/02	37592	16	20	20.8	5	20	300	1200	1.29	90.74	12.28	4.6E-08 *
12/2/02	37592	16	25	20.8	5	25	300	1500	1.29	90.74	12.28	4.6E-08 *
12/2/02	37592	16	30	20.8	5	30	300	1800	1.29	90.74	12.28	4.6E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 4.6E-08 cm/sec **

DATE 12/2/02
CHECK DA
REVIEW

Golder Associates Inc.

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FLOW PUMP #2B

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GENESIS/HMM TYPE III LF-SHREVEPORT/LA	BOARD #	6
PROJECT NUMBER	023-3459	CELL #	6
SAMPLE ID	HB-2 10.0-12.0'	Flow Pump Speed	10
SAMPLE TYPE	UD	Technician	PWM

COMMENTS:

Sample Data, Initial		B-Value, f	0.98
Height, inches	2.942	Cell Pres.	90.0
Diameter, inches	2.857	Bot. Pres.	80.0
Area, cm²	41.36	Top Pres.	80.0
Volume, cm³	309.07	Tot. B.P.	80.0
Mass, g	608.74	Head, max.	113.95
Moisture Content, %	27.93	Head, min.	113.95
Dry Density, pcf	96.07	Max. Grad.	15.23
Spec. Gravity	2.758	Min. Grad.	15.23
Volume Solids, cm³	172.52		
Volume Voids, cm³	136.54		
Void Ratio	0.79		
Saturation, %	97.3%		

Sample Data, Final	
Height, inches	2.945
Diameter, inches	2.863
Area, cm²	41.53
Volume, cm³	310.68
Mass, g	613.54
Moisture Content, %	28.94
Dry Density, pcf	95.57
Volume Solids, cm³	172.52
Volume Voids, cm³	138.16
Void Ratio	0.80
Saturation, %	99.7%

Permeant: Deaired Tap Water

Flow Pump Rate: 2.33E-05 cm³/sec

USCS: CH

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	608.74	669.93
Wt Soil & Tare, f	g	475.82	532.27
Wt Tare	g	0.00	56.64
Wt Moisture Lost	g	132.92	137.66
Wt Dry Soil	g	475.82	475.63
Water Content	%	27.93%	28.94%

DESCRIPTION: Reddish Brown and Gray, SILTY CLAY, some fine sand.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
12/3/02	37593	9	30	20.4	0	0	0	0	1.62	113.95	15.23	3.7E-08
12/3/02	37593	9	35	20.4	5	5	300	300	1.62	113.95	15.23	3.7E-08
12/3/02	37593	9	40	20.4	5	10	300	600	1.62	113.95	15.23	3.7E-08
12/3/02	37593	9	45	20.4	5	15	300	900	1.62	113.95	15.23	3.7E-08 *
12/3/02	37593	9	50	20.4	5	20	300	1200	1.62	113.95	15.23	3.7E-08 *
12/3/02	37593	9	55	20.4	5	25	300	1500	1.62	113.95	15.23	3.7E-08 *
12/3/02	37593	10	0	20.4	5	30	300	1800	1.62	113.95	15.23	3.7E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 3.7E-08 cm/sec **

DATE 12/3/02
CHECK DA
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Golder Associates Inc.

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FLOW PUMP #1

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GENESIS/HMM TYPE III LF-SHREVEPORT/LA		BOARD #	9	COMMENTS
PROJECT NUMBER	023-3459		CELL #	9	
SAMPLE ID	HB-4	15.0-17.0'	Flow Pump Speed	10	
SAMPLE TYPE	UD		Technician	PWM	

Sample Data, Initial				Sample Data, Final	
Height, inches	2.947	B-Value, f	0.90	Height, inches	2.967
Diameter, inches	2.867	Cell Pres.	95.0	Diameter, inches	2.873
Area, cm²	41.65	Bot. Pres.	80.0	Area, cm²	41.82
Volume, cm³	311.76	Top Pres.	80.0	Volume, cm³	315.20
Mass, g	605.96	Tot. B.P.	80.0	Mass, g	614.44
Moisture Content, %	26.32	Head, max.	92.85	Moisture Content, %	28.09
Dry Density, pcf	96.01	Head, min.	92.85	Dry Density, pcf	94.97
Spec. Gravity	2.740	Max. Grad.	12.32	Volume Solids, cm³	175.07
Volume Solids, cm³	175.07	Min. Grad.	12.32	Volume Voids, cm³	140.12
Volume Voids, cm³	136.69			Void Ratio	0.80
Void Ratio	0.78			Saturation, %	96.2%
Saturation, %	92.4%				

Permeant: Dealred Tap Water

Flow Pump Rate: 2.50E-05 cm³/sec

USCS: CH

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	605.96	698.22
Wt Soil & Tare, f	g	479.70	563.57
Wt Tare	g	0.00	84.21
Wt Moisture Lost	g	126.26	134.65
Wt Dry Soil	g	479.70	479.36
Water Content	%	26.32%	28.09%

DESCRIPTION: Reddish Brown, SILTY CLAY, little fine sand.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
12/2/02	37592	10	30	20.8	0	0	0	0	1.32	92.85	12.32	4.8E-08
12/2/02	37592	10	35	20.8	5	5	300	300	1.32	92.85	12.32	4.8E-08
12/2/02	37592	10	40	20.8	5	10	300	600	1.32	92.85	12.32	4.8E-08
12/2/02	37592	10	45	20.8	5	15	300	900	1.32	92.85	12.32	4.8E-08 *
12/2/02	37592	10	50	20.8	5	20	300	1200	1.32	92.85	12.32	4.8E-08 *
12/2/02	37592	10	55	20.8	5	25	300	1500	1.32	92.85	12.32	4.8E-08 *
12/2/02	37592	11	0	20.8	5	30	300	1800	1.32	92.85	12.32	4.8E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 4.8E-08 cm/sec **

DATE 12/2/02
CHECK DA
REVIEW

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FLOW PUMP #1B

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GENESIS/HMM TYPE III LF-SHREVEPORT/LA		BOARD #	7	COMMENTS
PROJECT NUMBER	023-3459		CELL #	7	
SAMPLE ID	HB-6 -	10.0- 12.0'	Flow Pump Speed	9	
SAMPLE TYPE	UD		Technician	JH	

Sample Data, Initial				Sample Data, Final	
Height, inches	2.951	B-Value, f	1.00	Height, inches	3.031
Diameter, inches	2.863	Cell Pres.	90.0	Diameter, inches	2.933
Area, cm²	41.53	Bot. Pres.	80.0	Area, cm²	43.59
Volume, cm³	311.32	Top Pres.	80.0	Volume, cm³	335.58
Mass, g	603.66	Tot. B.P.	80.0	Mass, g	634.36
Moisture Content, %	23.87	Head, max.	106.92	Moisture Content, %	30.17
Dry Density, pcf	97.68	Head, min.	106.92	Dry Density, pcf	90.61
Spec. Gravity	2.769	Max. Grad.	13.89	Volume Solids, cm³	175.99
Volume Solids, cm³	175.99	Min. Grad.	13.89	Volume Voids, cm³	159.59
Volume Voids, cm³	135.33			Void Ratio	0.91
Void Ratio	0.77			Saturation, %	92.1%
Saturation, %	86.0%				

Permeant: Deaired Tap Water

Flow Pump Rate: 4.46E-05 cm³/sec

USCS: CH

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	603.66	718.71
Wt Soil & Tare, f	g	487.32	571.76
Wt Tare	g	0.00	84.73
Wt Moisture Lost	g	116.34	146.95
Wt Dry Soil	g	487.32	487.03
Water Content	%	23.87%	30.17%

DESCRIPTION: Olive Brown, SILTY CLAY, little fine sand.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
12/5/02	37595	11	0	20.7	0	0	0	0	1.52	106.92	13.89	7.3E-08
12/5/02	37595	11	5	20.7	5	5	300	300	1.52	106.92	13.89	7.3E-08
12/5/02	37595	11	10	20.7	5	10	300	600	1.52	106.92	13.89	7.3E-08
12/5/02	37595	11	15	20.7	5	15	300	900	1.52	106.92	13.89	7.3E-08 *
12/5/02	37595	11	20	20.7	5	20	300	1200	1.52	106.92	13.89	7.3E-08 *
12/5/02	37595	11	25	20.7	5	25	300	1500	1.52	106.92	13.89	7.3E-08 *
12/5/02	37595	11	30	20.7	5	30	300	1800	1.52	106.92	13.89	7.3E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 7.3E-08 cm/sec **

DATE 12/5/02
CHECK JA
REVIEW

Golder Associates Inc.

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FLOW PUMP #1

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GENESIS/HMM TYPE III LF-SHREVEPORT/LA		BOARD #	6	COMMENTS
PROJECT NUMBER	023-3459		CELL #	6	
SAMPLE ID	HB-6	20.0 - 22.0'	Flow Pump Speed	9	
SAMPLE TYPE	UD		Technician	JH	

Sample Data, Initial				*Sample Data, Final*	
Height, inches	2.943	B-Value, f	0.98	Height, inches	2.964
Diameter, inches	2.811	Cell Pres.	95.0	Diameter, inches	2.844
Area, cm²	40.04	Bot. Pres.	80.0	Area, cm²	40.98
Volume, cm³	299.30	Top Pres.	80.0	Volume, cm³	308.55
Mass, g	590.17	Tot. B.P.	80.0	Mass, g	597.66
Moisture Content, %	28.94	Head, max.	120.28	Moisture Content, %	30.58
Dry Density, pcf	95.42	Head, min.	120.28	Dry Density, pcf	92.56
Spec. Gravity	2.796	Max. Grad.	15.98	Volume Solids, cm³	163.70
Volume Solids, cm³	163.70	Min. Grad.	15.98	Volume Voids, cm³	144.86
Volume Voids, cm³	135.60			Void Ratio	0.88
Void Ratio	0.83			Saturation, %	96.6%
Saturation, %	97.7%				

Permeant: Deaired Tap Water

Flow Pump Rate: 5.19E-05 cm³/sec

USCS: CH

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	590.17	683.05
Wt Soil & Tare, f	g	457.69	543.14
Wt Tare	g	0.00	85.63
Wt Moisture Lost	g	132.48	139.91
Wt Dry Soil	g	457.69	457.51
Water Content	%	28.94%	30.58%

DESCRIPTION: Brownish Yellow, SILTY CLAY, trace fine sand.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
12/5/02	37595	10	0	20.8	0	0	0	0	1.71	120.28	15.98	7.8E-08
12/5/02	37595	10	5	20.8	5	5	300	300	1.71	120.28	15.98	7.8E-08
12/5/02	37595	10	10	20.8	5	10	300	600	1.71	120.28	15.98	7.8E-08
12/5/02	37595	10	15	20.8	5	15	300	900	1.71	120.28	15.98	7.8E-08 •
12/5/02	37595	10	20	20.8	5	20	300	1200	1.71	120.28	15.98	7.8E-08 •
12/5/02	37595	10	25	20.8	5	25	300	1500	1.71	120.28	15.98	7.8E-08 •
12/5/02	37595	10	30	20.8	5	30	300	1800	1.71	120.28	15.98	7.8E-08 •

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 7.8E-08 cm/sec **

DATE 12/5/02
CHECK DA
REVIEW

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FLOW PUMP #2B

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GENESIS/HMM TYPE III LF-SHREVEPORT/LA		BOARD #	7	COMMENTS
PROJECT NUMBER	023-3459		CELL #	7	
SAMPLE ID	HB-7 -	20.0-22.0' -	Flow Pump Speed	11	
SAMPLE TYPE	UD		Technician	PWM	

Sample Data, Initial				Sample Data, Final	
Height, inches	2.948	B-Value, f	1.00	Height, inches	2.940
Diameter, inches	2.869	Cell Pres.	300.0	Diameter, inches	2.856
Area, cm²	41.71	Bot. Pres.	80.0	Area, cm²	41.33
Volume, cm³	312.31	Top Pres.	80.0	Volume, cm³	308.64
Mass, g	585.54	Tot. B.P.	80.0	Mass, g	584.02
Moisture Content, %	34.03	Head, max.	138.57	Moisture Content, %	33.68
Dry Density, pcf	87.29	Head, min.	138.57	Dry Density, pcf	88.33
Spec. Gravity	2.750	Max. Grad.	18.56	Volume Solids, cm³	158.87
Volume Solids, cm³	158.87	Min. Grad.	18.56	Volume Voids, cm³	149.77
Volume Voids, cm³	153.44			Void Ratio	0.94
Void Ratio	0.97			Saturation, %	98.2%
Saturation, %	96.9%				

Permeant: Deaired Tap Water

Flow Pump Rate: 1.22E-05 cm³/sec

USCS: CH

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	585.54	668.56
Wt Soil & Tare, f	g	436.89	521.52
Wt Tare	g	0.00	84.91
Wt Moisture Lost	g	148.65	147.04
Wt Dry Soil	g	436.89	436.61
Water Content	%	34.03%	33.68%

DESCRIPTION

Brown, SILTY CLAY, trace fine sand.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
12/2/02	37592	9	30	20.7	0	0	0	0	1.97	138.57	18.56	1.6E-08
12/2/02	37592	9	35	20.7	5	5	300	300	1.97	138.57	18.56	1.6E-08
12/2/02	37592	9	40	20.7	5	10	300	600	1.97	138.57	18.56	1.6E-08
12/2/02	37592	9	45	20.7	5	15	300	900	1.97	138.57	18.56	1.6E-08 *
12/2/02	37592	9	50	20.7	5	20	300	1200	1.97	138.57	18.56	1.6E-08 *
12/2/02	37592	9	55	20.7	5	25	300	1500	1.97	138.57	18.56	1.6E-08 *
12/2/02	37592	10	0	20.7	5	30	300	1800	1.97	138.57	18.56	1.6E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 1.6E-08 cm/sec **

DATE 12/2/02
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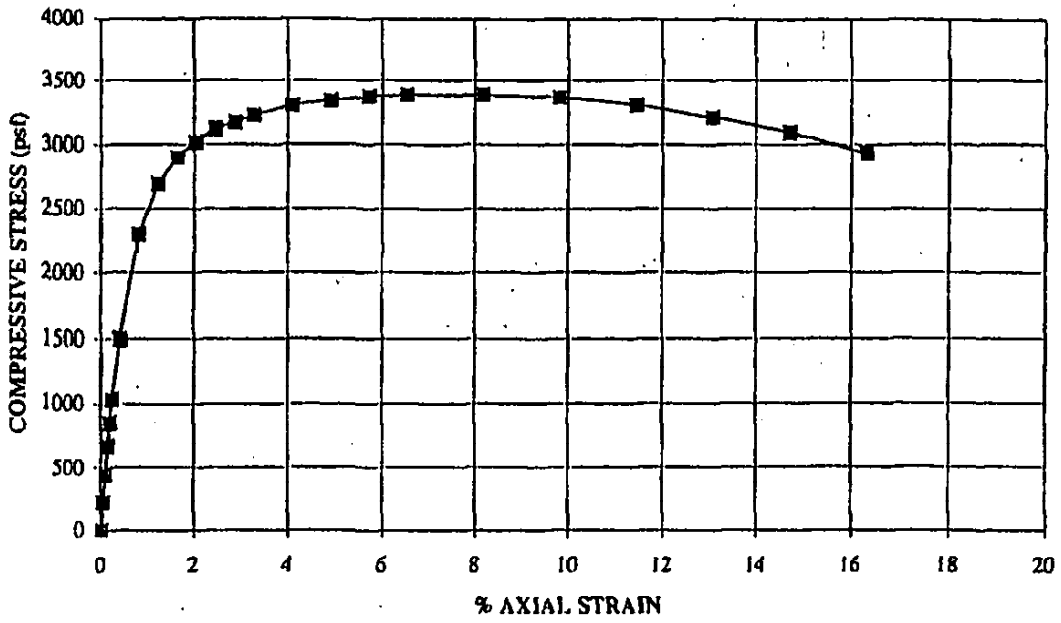
REVIEW

LLDEQ-EDMS Document 36473764, Page 364 of 438

UNCONFINED COMPRESSIVE STRENGTH OF SOILS
STRESS-STRAIN - ASTM D 2166



DESCRIPTION	LL	PL	PI	SAMPLE ID
Yellowish Brown and Gray, SILTY CLAY, some fine sand.	55	23	32	P - 2
	SAMPLE TYPE		UD	15.0 - 17.0'
USCS: CH				

SAMPLE DATA

Wet Density (pcf)	125.5	TIME TO FAILURE (min)	8.3
Dry Density (pcf)	100.1	STRAIN @ FAILURE (%)	8.2
Moisture Content	25.4%	TYPE OF FAILURE	SHEAR

UNCONFINED COMPRESSIVE STRENGTH (psf)	3387.4
SHEAR STRENGTH (psf)	1693.7

023-3459
GENESIS/HMM TYPE III LF-SHREVEPORT/LA

TECH	DA
DATE	12/5/01
CHECK	DA
REVIEW	[illegible]

UNCONFINED COMPRESSIVE STRENGTH OF SOILS

ASTM D 2166

PROJECT TITLE	GENESIS/HMM TYPE III LF-SHREVEPORT/LA	SAMPLE ID	P - 2
PROJECT NO.	023-3459	SAMPLE TYPE	UD
REMARKS		SAMPLE DEPTH	15.0 - 17.0'

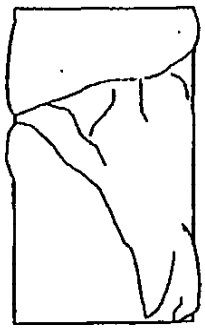
SAMPLE DATA	
Height (in)	6.116
Diameter (in)	2.855
Height/Diameter Ratio	2.14
Area (in^2)	6.40
Volume (ft^3)	0.0227
Weight (gm)	1290.36
Wet Density (pcf)	125.49
Dry Density (pcf)	100.10
Machine Speed (in/min)	0.06
Strain rate (%/min)	0.98

WATER CONTENT	BEFORE SHEAR (entire)	AFTER SHEAR (partial)
Tare No.	SQ-8	SQ-8
Wt. Wet Soil & Tare (gm)	1290.36	1373.16
Wt. Dry Soil & Tare (gm)	1029.23	1112.34
Wt. Tare (gm)	0.00	84.35
Wt. Moisture (gm)	261.13	260.82
Wt. Dry Soil (gm)	1029.23	1027.99
Moisture (%)	25.37%	25.37%

TIME (min)	DEFLECT (inch)	FORCE (lbs)	% STRAIN (in/in)	Ac (in^2)	COMPRESSIVE STRESS (psf)	COMPRESSIVE STRESS (psi)
0.0	0.000	0	0.00	6.40	0.00	0.00
0.1	0.003	10	0.05	6.40	224.83	1.56
0.1	0.006	20	0.10	6.41	449.43	3.12
0.2	0.009	30	0.15	6.41	673.82	4.68
0.2	0.012	38	0.20	6.41	853.08	5.92
0.3	0.015	46	0.25	6.42	1032.17	7.17
0.4	0.025	67	0.41	6.43	1500.92	10.42
0.8	0.050	103	0.82	6.45	2297.91	15.96
1.3	0.075	121	1.23	6.48	2688.36	18.67
1.7	0.100	131	1.64	6.51	2898.49	20.13
2.1	0.125	137	2.04	6.54	3018.65	20.96
2.5	0.150	142	2.45	6.56	3115.77	21.64
2.9	0.175	145	2.86	6.59	3168.26	22.00
3.3	0.200	148	3.27	6.62	3220.20	22.36
4.2	0.250	153	4.09	6.67	3300.86	22.92
5.0	0.300	156	4.91	6.73	3336.89	23.17
5.8	0.350	159	5.72	6.79	3371.83	23.42
6.7	0.400	161	6.54	6.85	3384.63	23.50
8.3	0.500	164	8.18	6.97	3387.38	23.52
10.0	0.600	166	9.81	7.10	3367.64	23.39
11.7	0.700	166	11.45	7.23	3306.59	22.96
13.3	0.800	164	13.08	7.37	3206.43	22.27
15.0	0.900	161	14.72	7.51	3088.56	21.45
16.7	1.000	156	16.35	7.65	2935.27	20.38
				UNCONFINED COMPRESSIVE STRENGTH	3387.38	23.52
				SHEAR STRENGTH	1693.69	11.76

TIME TO FAILURE (min)	8.3
STRAIN @ FAILURE (%)	8.2
TYPE OF FAILURE	SHEAR

FAILURE SKETCH



Description	Yellowish Brown and Gray, SILTY CLAY, some fine sand.
USCS	CH

LL	55
PL	23
PI	32

TECH	DA
DATE	12/5/02
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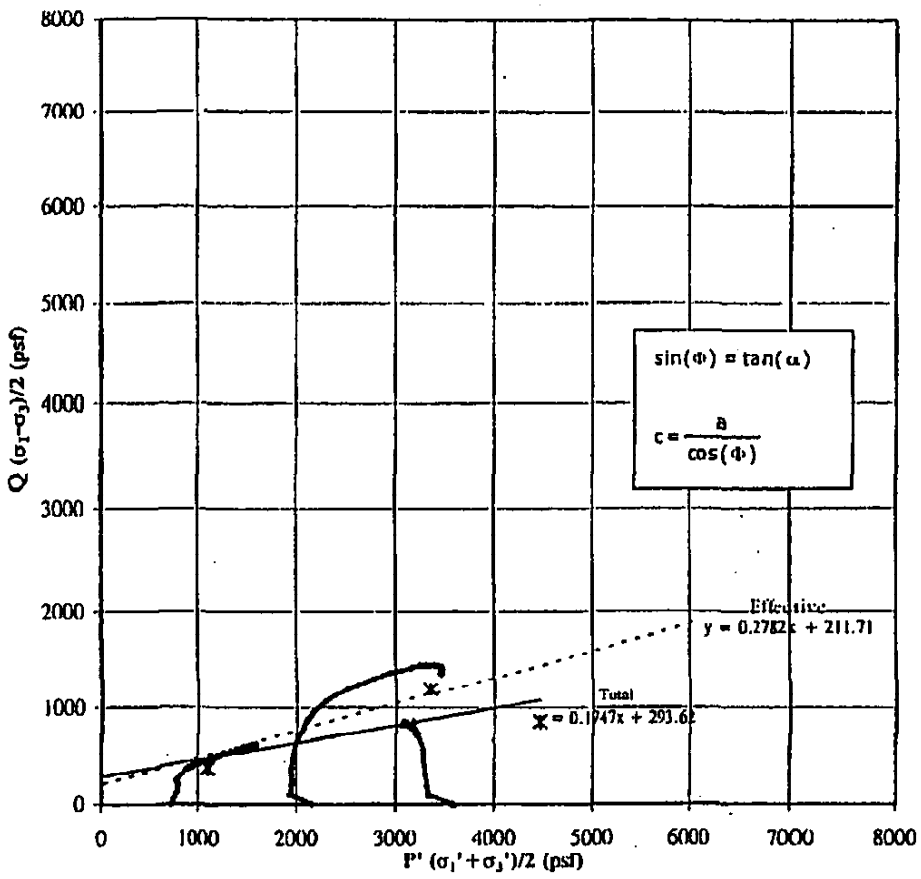
REVIEW	[illegible]

TRIAXIAL COMPRESSION TEST EFFECTIVE STRESS PATH
ASTM D 4767



*TOTAL STRENGTH PARAMETERS				*EFFECTIVE STRESS PARAMETERS			
α	9.9 °	ϕ =	10.1 °	α	15.5 °	ϕ' =	16.2 °
a	293.6 psf	C =	298.2 psf	a	211.7 psf	C' =	220.4 psf

DESCRIPTION: Reddish Brown, SILTY CLAY, little fine sand.

USCS: CH

LL	75
PL	28
PI	47
Gs	2.74

	1	2	3
EFFECTIVE CONSOLIDATION PRESS (psf)	720	2160	3600
INITIAL DRY DENSITY (pcf)	92.8	95.5	86.0
INITIAL WATER CONTENT %	28.4	28.1	35.2

PROJECT TITLE	GENESIS/IMM TYPE III LF-SHREVEPORT/LA
PROJECT NUMBER	023-3459
SAMPLE ID	HB-4 - 15.0 -17.0'
SAMPLE TYPE	UD

* Failure based on the maximum principal effective stress ratio or the stress at 15% strain.

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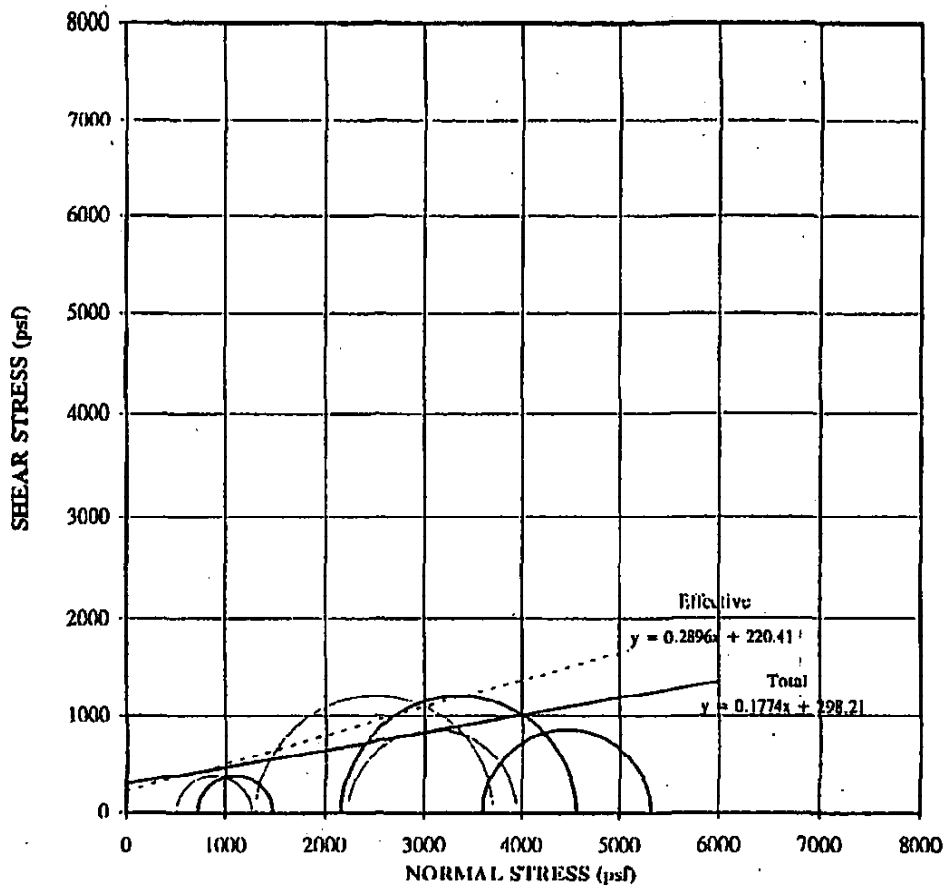
REVIEWED

TRIAXIAL COMPRESSION TEST TOTAL AND EFFECTIVE MOHR CIRCLES - ASTM D 4767



*TOTAL STRENGTH PARAMETERS	
ϕ =	10.1 °
C =	298.2 psf

*EFFECTIVE STRENGTH PARAMETERS	
ϕ' =	16.2 °
C' =	220.4 psf

DESCRIPTION	Reddish Brown, SILTY CLAY, little fine sand.
USCS	CH

LL	75
PL	28
PI	47
Gs	2.74

	1	2	3
EFFECTIVE CONSOLIDATION PRESS (psf)	720	2160	3600
INITIAL DRY DENSITY (pcf)	92.8	95.5	86.0
INITIAL WATER CONTENT, %	28.4	28.1	35.2

PROJECT TITLE	GENESIS/IMM TYPE III LF-SHREVEPORT/LA
PROJECT NUMBER	023-3459
SAMPLE ID	HB-4 - 15.0 -17.0'
SAMPLE TYPE	UD

* Failure based on the maximum principal effective stress ratio or the stress at 15% strain.

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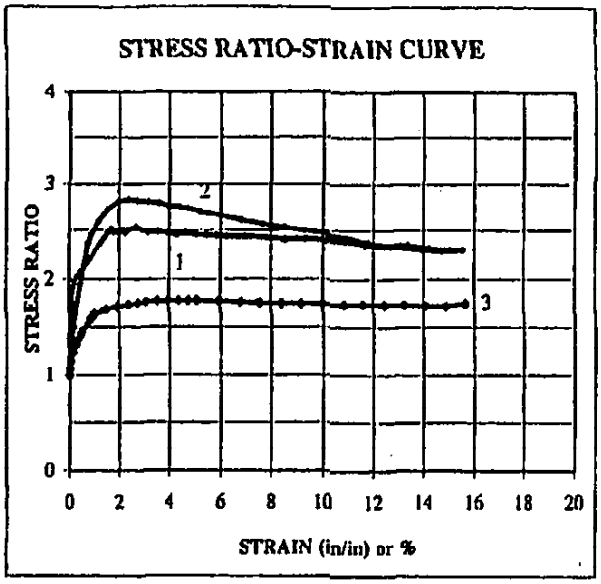
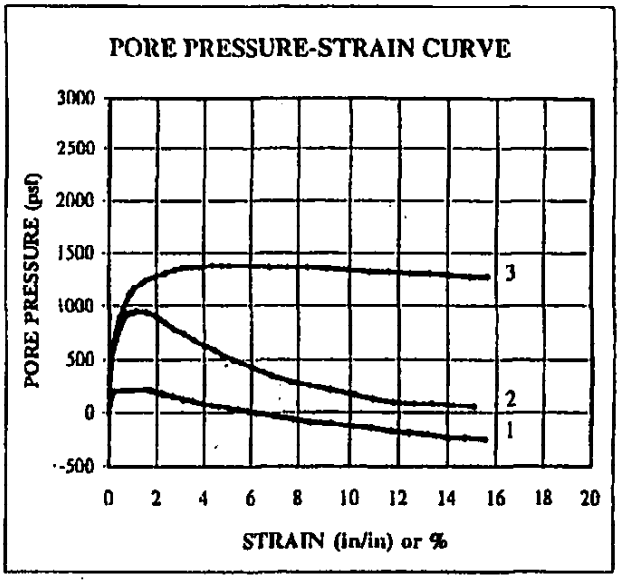
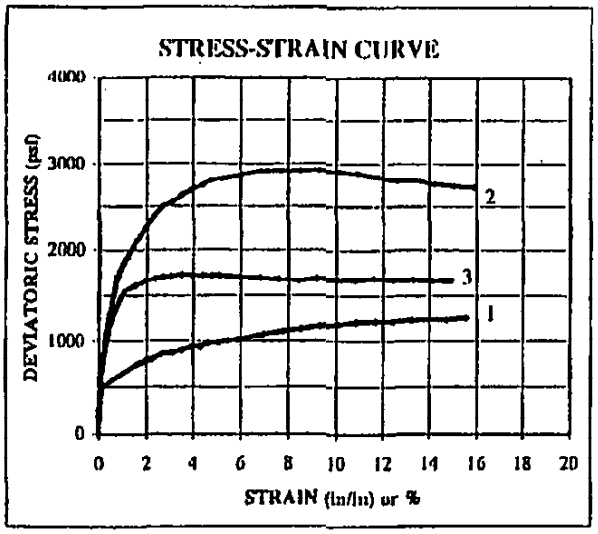
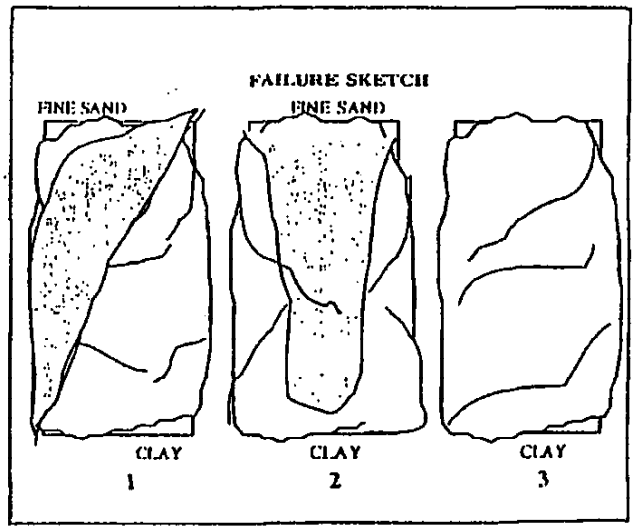
REVIEWED	

TRIAXIAL COMPRESSION TEST
CONSOLIDATED UNDRAINED WITH PORE PRESSURE









DESCRIPTION: Reddish Brown, SILTY CLAY, little fine sand.

USCS: CH

LL	75
PL	28
PI	47
Gs	2.74

	1	2	3
EFFECTIVE CONSOLIDATION PRESS (psf)	720	2160	3600
INITIAL DRY DENSITY (pcf)	92.8	95.5	86.0
INITIAL WATER CONTENT (%)	28.4	28.1	35.2
STRAIN RATE (%/min)	0.10	0.10	0.10

PROJECT NAME	GENESIS/HMM TYPE III LF-SHREVEPORT/LA
PROJECT NUMBER	023-3459
SAMPLE ID	HB-4 - 15.0 -17.0'
SAMPLE TYPE	UD

NOTE: Specimen "1" & "2" contained pockets of a fine sand and a reddish brown clay. Specimen "3" was a gray and reddish brown clay. Please note diagram

CHECKED

REVIEWED

TRIAXIAL COMPRESSION TEST (ASTM D-4767) CONSOLIDATED UNDRAINED WITH PORE PRESSURE

PROJECT TITLE	GENESIS/HMM TYPE III LF-SHREVEPORT/LA
PROJECT NUMBER	023-3459
SAMPLE ID	HB-4
SAMPLE TYPE	UD
DEPTH INTERVAL	15.0 -17.0'
MACHINE SPEED (in/min)	0.006
STRAIN RATE (%/min)	0.10
CELL PRESSURE (psi)	65.0
SAMPLE PRESSURE (psi)	60.0
EFF. CONSOLIDATION PRESSURE, σ_3 (psi)	5.0
PRESSURE, σ_3 (psf)	720.0
FINAL "B" VALUE	0.96
t_{50} (minutes)	0.06

INITIAL SAMPLE DATA	cm	in	corrected
HEIGHT	15.786	6.215	6.190
DIAMETER	7.283	2.868	2.849
AREA	41.66	6.46	6.38
VOLUME	657.72	40.14	39.47
WEIGHT (g)	1256.34		1268.34
% MOISTURE	28.4		29.60
SPECIFIC GRAVITY	2.74		
MOIST DENSITY (pcf)	119.2		
DRY DENSITY, calc (pcf)	92.8		
VOLUME OF SOLIDS	357.16		
VOLUME OF VOIDS	300.55		
VOID RATIO	0.841		
SATURATION	92.4		

CORRECTED SAMPLE DATA	
DRY DENSITY, calc (pcf)	94.4
VOLUME OF SOLIDS	357.16
VOLUME OF VOIDS	289.55
VOID RATIO	0.811

WATER CONTENT (% MOISTURE)	
WT SOIL & TARE, MOIST (g)	1268.34
WT SOIL & TARE, DRY (g)	978.63
WT TARE (g)	0.00
WT MOISTURE (g)	289.71
WT DRY SOIL (g)	978.63
% MOISTURE	29.60

TIME (MIN)	ACCUM. DEFLECT. (inches)	AXIAL LOAD (lbs)	PORE PRESS. (psi) = U	PWP change DU (psf) (acc)	ϵ % STRAIN (%)	(1-ϵ)	CORR. AREA (in 2)	CORR. HEIGHT (in)	DEV. STRESS (psf)	SIGMA 1 devstr+cp (σ_1)	SIGMA 1 EFF. (σ_1-dU)	SIGMA 3 EFF. (σ_3-dU)	EFF.PRN STR RATIO (σ_1'/σ_3')	$\frac{(\sigma_1'-\sigma_3')}{2}$ (P)	$\frac{(\sigma_1-\sigma_3)}{2}$ (Q)	(A)
0.0	0.000	15	61.4	0.0	0.00	1.00	6.38	6.190	0.0	720.0	720.0	720.0	1.00	720.0	0.0	0.00
0.2	0.001	24	61.9	72.0	0.02	1.00	6.38	6.189	252.9	972.9	900.9	648.0	1.39	774.5	126.5	0.28
0.8	0.005	32	62.4	144.0	0.08	1.00	6.38	6.185	433.3	1153.3	1009.3	576.0	1.75	792.7	216.7	0.33
2.2	0.013	36	62.8	201.6	0.21	1.00	6.39	6.177	509.4	1229.4	1027.8	518.4	1.98	773.1	254.7	0.40
16.5	0.099	47	62.9	216.0	1.60	0.98	6.48	6.091	751.2	1471.2	1255.2	504.0	2.49	879.6	375.6	0.29
17.5	0.105	47	62.9	216.0	1.70	0.98	6.49	6.085	763.8	1483.8	1267.8	504.0	2.52	885.9	381.9	0.28
18.5	0.111	48	62.8	201.6	1.79	0.98	6.49	6.079	769.7	1489.7	1288.1	518.4	2.48	903.2	384.8	0.26
19.5	0.117	48	62.8	201.6	1.89	0.98	6.50	6.073	780.0	1500.0	1298.4	518.4	2.50	908.4	390.0	0.26
20.7	0.124	49	62.7	187.2	2.00	0.98	6.51	6.066	790.2	1510.2	1323.0	532.8	2.48	927.9	395.1	0.24
21.5	0.129	49	62.7	187.2	2.08	0.98	6.51	6.061	798.4	1518.4	1331.2	532.8	2.50	932.0	399.2	0.23
22.5	0.135	49	62.7	187.2	2.18	0.98	6.52	6.055	804.2	1524.2	1337.0	532.8	2.51	934.9	402.1	0.23
23.2	0.139	50	62.6	172.8	2.25	0.98	6.52	6.051	808.1	1528.1	1355.3	547.2	2.48	951.2	404.0	0.21
24.0	0.144	50	62.6	172.8	2.33	0.98	6.53	6.046	820.7	1540.7	1367.9	547.2	2.50	957.5	410.3	0.21
27.5	0.165	52	62.5	158.4	2.67	0.97	6.55	6.025	861.8	1581.8	1423.4	561.6	2.53	992.5	430.9	0.18
32.2	0.193	53	62.3	129.6	3.12	0.97	6.58	5.997	875.3	1595.3	1465.7	590.4	2.48	1028.0	437.6	0.15
36.3	0.218	54	62.2	115.2	3.53	0.96	6.61	5.972	900.0	1620.0	1504.8	604.8	2.49	1054.8	450.0	0.13
40.5	0.243	56	62.0	86.4	3.93	0.96	6.64	5.947	935.2	1655.2	1568.8	633.6	2.48	1101.2	467.6	0.09
44.3	0.266	57	61.9	72.0	4.30	0.96	6.66	5.924	942.4	1662.4	1590.4	648.0	2.45	1119.2	471.2	0.08
47.7	0.286	58	61.8	57.6	4.62	0.95	6.68	5.904	978.0	1698.0	1640.4	662.4	2.48	1151.4	489.0	0.06
52.2	0.313	59	61.7	43.2	5.06	0.95	6.72	5.877	984.3	1704.3	1661.1	676.8	2.45	1168.9	492.1	0.04
56.3	0.338	60	61.6	28.8	5.46	0.95	6.74	5.852	1003.6	1723.6	1694.8	691.2	2.45	1193.0	501.8	0.03
60.3	0.363	61	61.5	14.4	5.86	0.94	6.77	5.827	1020.6	1740.6	1726.2	705.6	2.45	1215.9	510.3	0.01
64.5	0.387	62	61.4	0.0	6.25	0.94	6.80	5.803	1037.5	1757.5	1757.5	720.0	2.44	1238.8	518.8	0.00
72.2	0.433	64	61.2	-28.8	7.00	0.93	6.86	5.757	1077.6	1797.6	1826.4	748.8	2.44	1287.6	538.8	-0.03
80.3	0.482	66	61.0	-57.6	7.79	0.92	6.91	5.708	1110.1	1830.1	1887.7	777.6	2.43	1332.6	555.0	-0.05
88.0	0.528	68	60.8	-86.4	8.53	0.91	6.97	5.662	1134.2	1854.2	1940.6	806.4	2.41	1373.5	567.1	-0.08
96.3	0.578	70	60.7	-100.8	9.34	0.91	7.03	5.612	1159.0	1879.0	1979.8	820.8	2.41	1400.3	579.5	-0.09
104.7	0.628	72	60.5	-129.6	10.15	0.90	7.10	5.562	1187.2	1907.2	2036.8	849.6	2.40	1443.2	593.6	-0.11
112.5	0.675	73	60.4	-144.0	10.90	0.89	7.16	5.515	1203.4	1923.4	2067.4	864.0	2.39	1465.7	601.7	-0.12
120.7	0.724	74	60.2	-172.8	11.70	0.88	7.22	5.466	1214.6	1934.6	2107.4	892.8	2.36	1500.1	607.3	-0.14
128.3	0.770	74	60.1	-187.2	12.44	0.88	7.28	5.420	1214.3	1934.3	2121.5	907.2	2.34	1514.3	607.1	-0.15
136.5	0.819	76	60.0	-201.6	13.23	0.87	7.35	5.371	1226.8	1946.8	2148.4	921.6	2.33	1535.0	613.4	-0.16
144.8	0.869	77	59.8	-230.4	14.04	0.86	7.42	5.321	1226.8	1956.8	2187.2	950.4	2.30	1568.8	618.4	-0.19
152.2	0.913	77	59.8	-230.4	14.75	0.85	7.48	5.277	1230.4	1950.4	2180.8	950.4	2.29	1565.6	615.2	-0.19
160.5	0.963	79	59.7	-244.8	15.56	0.84	7.55	5.227	1255.0	1975.0	2219.8	964.8	2.30	1592.3	627.5	-0.20

DU @ FAILURE	216.0	DEVIATORIC STRESS @ FAILURE	763.8	EFFECTIVE PRINCIPLE STRESS RATIO @ FAILURE	2.52

TECH	PWM
DATE	12/4/02
CHECKED	
REVIEWED	

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TRIAXIAL COMPRESSION TEST (ASTM D-4767) CO[illegible]DATED UNDRAINED WITH PORE PRESSURE

PROJECT TT	GENESIS/HMM TYPE III LF-SHREVEPORT/LA
PROJECT NUMBER	023-3459
SAMPLE ID	HB-4
SAMPLE TYPE	UD
DEPTH INTERVAL	15.0 -17.0'
MACHINE SPEED (in/min)	0.006
STRAIN RATE (%/min)	0.10
CELL PRESSURE (psi)	75.0
SAMPLE PRESSURE (psi)	60.0
EFF. CONSOLIDATION PRESSURE, σ_3 (psi)	15.0
PRESSURE, σ_3 (psf)	2160.0
FINAL "B" VALUE	1.00
t_{50} (minutes)	1.83

INITIAL SAMPLE DATA	cm	in	corrected
HEIGHT	14.996	5.904	5.854
DIAMETER	7.300	2.874	2.838
AREA	41.85	6.49	6.32
VOLUME	627.64	38.30	37.02
WEIGHT (g)	1230.35		1216.35
% MOISTURE	28.1		26.67
SPECIFIC GRAVITY	2.74		
MOIST DENSITY (pcf)	122.3		
DRY DENSITY, calc (pcf)	95.5		
VOLUME OF SOLIDS	350.46		
VOLUME OF VOIDS	277.18		
VOID RATIO	0.791		
SATURATION	97.4		

CORRECTED SAMPLE DATA	
DRY DENSITY, calc (pcf)	98.8
VOLUME OF SOLIDS	350.46
VOLUME OF VOIDS	256.18
VOID RATIO	0.731

WATER CONTENT (% MOISTURE)	
WT SOIL & TARE, MOIST (g)	1216.35
WT SOIL & TARE, DRY (g)	960.27
WT TARE (g)	0.00
WT MOISTURE (g)	256.08
WT DRY SOIL (g)	960.27
% MOISTURE	26.67

TIME (MIN)	ACCUM. DEFLECT. (inches)	AXIAL LOAD (lbs)	PORE PRESS. (psi) = U	PWP change DU (psf) (acc)	ε % STRAIN (%)	(1-ε)	CORR. AREA (in 2)	CORR. HEIGHT (in)	DEV. STRESS (psf)	SIGMA 1 devstr+cp (σ_1)	SIGMA 1 EFF. (σ_1-dU)	SIGMA 3 EFF. (σ_3-dU)	EFF.PRN STR RATIO (σ_1'/σ_3')	$\frac{(\sigma_1'+\sigma_3')}{2}$ (P)	$\frac{(\sigma_1-\sigma_3)}{2}$ (Q)	(A)
0.0	0.000	17	60.4	0.0	0.00	1.00	6.32	5.854	0.0	2160.0	2160.0	2160.0	1.00	2160.0	0.0	0.00
0.2	0.001	26	62.6	316.8	0.02	1.00	6.32	5.853	193.5	2353.5	2036.7	1843.2	1.10	1940.0	96.8	1.64
0.5	0.003	36	63.5	417.6	0.05	1.00	6.33	5.851	441.5	2601.5	2183.9	1742.4	1.25	1963.2	220.8	0.95
1.5	0.009	51	64.5	590.4	0.15	1.00	6.33	5.845	768.5	2928.5	2138.1	1569.6	1.49	1953.8	384.2	0.77
2.5	0.015	60	65.1	676.8	0.26	1.00	6.34	5.839	983.5	3143.5	2466.7	1483.2	1.66	1974.9	491.7	0.69
4.3	0.026	74	66.0	806.4	0.44	1.00	6.35	5.828	1283.1	3443.1	2636.7	1353.6	1.95	1995.2	641.6	0.63
7.3	0.044	92	66.8	921.6	0.75	0.99	6.37	5.810	1692.7	3852.7	2931.1	1238.4	2.37	2084.8	846.4	0.54
8.5	0.051	95	66.9	936.0	0.87	0.99	6.38	5.803	1765.2	3925.2	2989.2	1224.0	2.44	2106.6	882.6	0.53
9.8	0.059	99	66.9	936.0	1.01	0.99	6.39	5.795	1839.4	3999.4	3063.4	1224.0	2.50	2143.7	919.7	0.51
11.2	0.067	102	67.0	950.4	1.14	0.99	6.40	5.787	1904.4	4064.4	3114.0	1209.6	2.57	2161.8	952.2	0.50
13.3	0.092	111	66.9	936.0	1.57	0.98	6.42	5.762	2115.8	4275.8	3339.8	1224.0	2.73	2281.9	1057.9	0.44
19.2	0.115	119	66.7	907.2	1.96	0.98	6.45	5.739	2270.3	4430.3	3523.1	1252.8	2.81	2388.0	1135.2	0.40
23.0	0.138	125	66.3	849.6	2.36	0.98	6.48	5.716	2396.9	4556.9	3707.3	1310.4	2.83	2508.8	1198.4	0.35
26.3	0.158	130	65.9	792.0	2.70	0.97	6.50	5.696	2492.6	4652.6	3860.6	1368.0	2.82	2614.3	1246.3	0.32
30.7	0.184	133	65.6	748.8	3.14	0.97	6.53	5.670	2547.4	4707.4	3958.6	1411.2	2.81	2684.9	1273.7	0.29
34.8	0.209	137	65.2	691.2	3.57	0.96	6.56	5.645	2632.8	4792.8	4101.6	1468.8	2.79	2785.2	1316.4	0.26
39.0	0.234	140	64.8	633.6	4.00	0.96	6.59	5.620	2697.6	4857.6	4224.0	1526.4	2.77	2875.2	1348.8	0.23
43.2	0.259	144	64.5	590.4	4.42	0.96	6.62	5.595	2753.1	4913.1	4322.7	1569.6	2.75	2946.2	1376.6	0.21
46.3	0.278	146	64.2	547.2	4.75	0.95	6.64	5.576	2804.5	4964.5	4417.3	1612.8	2.74	3015.0	1402.2	0.20
50.8	0.305	148	63.9	504.0	5.21	0.95	6.67	5.549	2816.8	4976.8	4472.8	1656.0	2.70	3064.4	1408.4	0.18
59.0	0.354	151	63.4	432.0	6.05	0.94	6.73	5.500	2866.8	5026.8	4594.8	1728.0	2.66	3161.4	1433.4	0.15
66.7	0.400	154	62.9	360.0	6.83	0.93	6.79	5.454	2906.5	5066.5	4706.5	1800.0	2.61	3253.2	1453.2	0.12
74.8	0.449	156	62.5	302.4	7.67	0.92	6.85	5.405	2914.0	5074.0	4771.6	1857.6	2.57	3314.6	1457.0	0.10
83.2	0.499	157	62.2	259.2	8.52	0.91	6.91	5.355	2914.1	5074.1	4814.9	1900.8	2.53	3357.9	1457.1	0.09
90.7	0.544	158	61.9	216.0	9.29	0.91	6.97	5.310	2918.6	5078.6	4862.6	1944.0	2.50	3403.3	1459.3	0.07
99.2	0.595	159	61.6	172.8	10.16	0.90	7.04	5.259	2906.9	5066.9	4894.1	1987.2	2.46	3440.6	1453.4	0.06
107.0	0.642	159	61.3	129.6	10.97	0.89	7.10	5.212	2887.0	5047.0	4917.4	2030.4	2.42	3473.9	1443.5	0.04
115.2	0.691	158	61.1	100.8	11.80	0.88	7.17	5.163	2839.8	4999.8	4899.0	2059.2	2.38	3479.1	1419.9	0.04
123.3	0.740	157	61.0	86.4	12.64	0.87	7.24	5.114	2790.9	4950.9	4864.5	2073.6	2.35	3469.1	1395.5	0.03
130.5	0.783	159	61.0	86.4	13.38	0.87	7.30	5.071	2803.0	4963.0	4876.6	2073.6	2.35	3475.1	1401.5	0.03
139.0	0.834	158	60.9	72.0	14.25	0.86	7.37	5.020	2757.2	4917.2	4845.2	2088.0	2.32	3466.6	1378.6	0.03
147.2	0.883	159	60.8	57.6	15.08	0.85	7.45	4.971	2740.0	4900.0	4842.4	2102.4	2.30	3472.4	1370.0	0.02
155.2	0.931	159	60.7	43.2	15.90	0.84	7.52	4.923	2721.2	4881.2	4838.0	2116.8	2.29	3477.4	1360.6	0.02
161.5	0.969	159	60.6	28.8	16.76	0.83	7.60	4.873	2687.8	4847.8	4819.0	2131.2	2.26	3475.1	1343.9	0.01
168.3	1.010	159	60.6	28.8	17.25	0.83	7.64	4.844	2675.6	4835.6	4806.8	2131.2	2.26	3469.0	1337.8	0.01

DU @ FAILURE	849.6	DEVIATORIC STRESS @ FAILURE	2396.9	EFFECTIVE PRINCIPLE STRESS RATIO @ FAILURE	2.83

TECH	PWM
DATE	12/4/02
CHECKED	[illegible]
REVIEWED	[illegible]

Golder Associates Inc.

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TRIAXIAL COMPRESSION TEST (ASTM D-4767) C[illegible] DATED UNDRAINED WITH PORE PRESSURE

PROJECT TITL[illegible]	GENESIS/HMM TYPE III LF-SHREVEPORT/LA
PROJECT NUMBER	023-3459
SAMPLE ID	HB-4
SAMPLE TYPE	UD
DEPTH INTERVAL	15.0 -17.0'
MACHINE SPEED (in/min)	0.006
STRAIN RATE (%/min)	0.10
CELL PRESSURE (psi)	85.0
SAMPLE PRESSURE (psi)	60.0
EFF. CONSOLIDATION PRESSURE, σ_3 (psi)	25.0
PRESSURE, σ_3 (psf)	3600.0
FINAL "B" VALUE	0.98
t_{50} (minutes)	2.1

INITIAL SAMPLE DATA	cm	in	corrected
HEIGHT	15.273	6.013	5.913
DIAMETER	7.289	2.870	2.850
AREA	41.73	6.47	6.38
VOLUME	637.34	38.89	37.73
WEIGHT (g)	1187.89		1175.89
% MOISTURE	35.2		33.83
SPECIFIC GRAVITY	2.74		
MOIST DENSITY (pcf)	116.3		
DRY DENSITY, calc (pcf)	86.0		
VOLUME OF SOLIDS	320.67		
VOLUME OF VOIDS	316.67		
VOID RATIO	0.988		
SATURATION	97.7		

CORRECTED SAMPLE DATA	
DRY DENSITY, calc (pcf)	88.7
VOLUME OF SOLIDS	320.67
VOLUME OF VOIDS	297.67
VOID RATIO	0.928

WATER CONTENT (% MOISTURE)	
WT SOIL & TARE, MOIST (g)	1175.89
WT SOIL & TARE, DRY (g)	878.64
WT TARE (g)	0.00
WT MOISTURE (g)	297.25
WT DRY SOIL (g)	878.64
% MOISTURE	33.83

TIME (MIN)	ACCUM. DEFLECT. (inches)	AXIAL LOAD (lbs)	PORE PRESS. (psi) = U	PWP change DU (psf) (sec)	ε % STRAIN (%)	(1-ε)	CORR. AREA (in 2)	CORR. HEIGHT (in)	DEV. STRESS (psf)	SIGMA 1 devsr÷cp (σ_1)	SIGMA 1 EFF. (σ_1-dU)	SIGMA 3 EFF. (σ_3-dU)	EFF.PRN STR RATIO (σ_1'/σ_3')	$\frac{(\sigma_1'+\sigma_3')}{2}$ (P')	$\frac{(\sigma_1-\sigma_3)}{2}$ (Q)	(A)
0.0	0.000	16	60.5	0.0	0.00	1.00	6.38	5.913	0.0	3600.0	3600.0	3600.0	1.00	3600.0	0.0	0.
0.2	0.001	25	62.9	345.6	0.02	1.00	6.38	5.912	191.8	3791.8	3446.2	3254.4	1.06	3350.3	95.9	1.80
0.5	0.003	35	63.9	419.6	0.05	1.00	6.38	5.910	433.0	4033.0	3543.4	3110.4	1.14	3326.9	216.5	1.13
1.3	0.008	46	64.9	633.6	0.14	1.00	6.39	5.905	682.8	4282.8	3649.2	2966.4	1.23	3307.8	341.4	0.93
2.5	0.015	56	65.8	763.2	0.25	1.00	6.40	5.898	907.1	4507.1	3743.9	2836.8	1.32	3290.3	453.5	0.84
3.7	0.022	64	66.4	849.6	0.37	1.00	6.41	5.891	1074.6	4674.6	3825.0	2750.4	1.39	3287.7	537.3	0.79
4.7	0.028	69	66.8	907.2	0.47	1.00	6.41	5.885	1190.3	4790.3	3883.1	2692.8	1.44	3288.0	595.2	0.76
8.7	0.052	82	68.2	1108.8	0.88	0.99	6.44	5.861	1467.3	5067.3	3958.5	2491.2	1.59	3224.8	733.6	0.76
9.5	0.057	84	68.4	1137.6	0.96	0.99	6.44	5.856	1513.0	5113.0	3975.4	2462.4	1.61	3218.9	756.5	0.75
10.3	0.062	85	68.6	1166.4	1.05	0.99	6.45	5.851	1560.7	5160.7	3974.3	2433.6	1.63	3203.9	770.3	0.76
14.8	0.089	88	69.1	1238.4	1.51	0.98	6.48	5.824	1606.9	5206.9	3968.5	2361.6	1.68	3165.1	803.5	0.77
19.2	0.115	91	69.4	1281.6	1.94	0.98	6.51	5.798	1650.6	5250.6	3969.0	2318.4	1.71	3143.7	825.3	0.78
23.3	0.140	92	69.6	1310.4	2.37	0.98	6.54	5.773	1676.6	5276.6	3966.2	2289.6	1.73	3127.9	838.3	0.78
27.0	0.162	93	69.8	1339.2	2.74	0.97	6.56	5.751	1694.3	5294.3	3955.1	2260.8	1.75	3108.0	847.2	0.79
30.2	0.181	94	69.9	1353.6	3.06	0.97	6.58	5.732	1701.9	5301.9	3948.3	2246.4	1.76	3097.3	850.9	0.80
34.7	0.208	95	70.0	1368.0	3.52	0.96	6.61	5.705	1717.8	5317.8	3949.8	2232.0	1.77	3090.9	858.9	0.80
39.0	0.234	95	70.0	1368.0	3.95	0.96	6.64	5.679	1716.5	5316.5	3948.5	2232.0	1.77	3090.2	858.2	0.80
43.2	0.259	96	70.1	1382.4	4.38	0.96	6.67	5.654	1715.4	5315.4	3933.0	2217.6	1.77	3075.3	857.7	0.81
47.2	0.283	96	70.1	1382.4	4.79	0.95	6.70	5.630	1708.1	5308.1	3925.7	2217.6	1.77	3071.6	854.0	0.81
50.2	0.301	96	70.1	1382.4	5.09	0.95	6.72	5.612	1713.3	5313.3	3930.9	2217.6	1.77	3074.3	856.7	0.81
58.7	0.352	96	70.1	1382.4	5.95	0.94	6.79	5.561	1697.8	5297.8	3915.4	2217.6	1.77	3066.5	848.9	0.81
67.2	0.403	96	70.0	1368.0	6.82	0.93	6.85	5.510	1682.2	5282.2	3914.2	2232.0	1.75	3073.1	841.1	0.81
74.7	0.448	96	70.0	1368.0	7.58	0.92	6.90	5.465	1670.6	5270.6	3902.6	2232.0	1.75	3067.3	835.3	0.82
83.0	0.498	96	70.0	1368.0	8.42	0.92	6.97	5.415	1657.3	5257.3	3889.3	2232.0	1.74	3060.7	828.7	0.83
90.5	0.543	98	69.9	1353.6	9.18	0.91	7.03	5.370	1674.3	5274.3	3920.7	2246.4	1.75	3083.6	837.2	0.81
98.7	0.592	98	69.8	1339.2	10.01	0.90	7.09	5.321	1667.1	5267.1	3927.9	2260.8	1.74	3094.4	833.6	0.80
107.0	0.642	99	69.7	1324.8	10.86	0.89	7.16	5.271	1663.5	5263.5	3938.7	2275.2	1.73	3107.0	831.8	0.80
114.5	0.687	100	69.7	1324.8	11.62	0.88	7.22	5.226	1683.3	5283.3	3958.5	2275.2	1.74	3116.8	841.6	0.79
122.8	0.737	100	69.6	1310.4	12.46	0.88	7.29	5.176	1665.2	5265.2	3954.8	2289.6	1.73	3122.2	832.6	0.79
130.8	0.785	101	69.6	1310.4	13.28	0.87	7.36	5.128	1665.4	5265.4	3955.0	2289.6	1.73	3122.3	832.7	0.79
139.0	0.834	102	69.5	1296.0	14.10	0.86	7.43	5.079	1657.2	5257.2	3961.2	2304.0	1.72	3132.6	828.6	0.78
147.2	0.883	102	69.4	1281.6	14.93	0.85	7.50	5.030	1658.5	5258.5	3976.9	2318.4	1.72	3147.7	829.3	0.77
154.5	0.927	107	69.4	1281.6	15.68	0.84	7.57	4.986	1723.9	5323.9	4042.3	2318.4	1.74	3180.4	862.0	0.74
163.0	0.978	110	69.2	1252.8	16.54	0.83	7.65	4.935	1774.1	5374.1	4121.3	2347.2	1.76	3234.2	887.0	0.71
171.2	1.027	107	69.1	1238.4	17.37	0.83	7.72	4.886	1691.2	5291.2	4052.8	2361.6	1.72	3207.2	845.6	0.73

	DEVIATORIC STRESS		EFFECTIVE PRINCIPLE STRESS	TECH	PWM
@ FAILURE	1368.0	@ FAILURE	1717.8	RATIO @ FAILURE	1.77	DATE	12/4/02
				CHECKED	
				REVIEWED	

Golder Associates Inc.

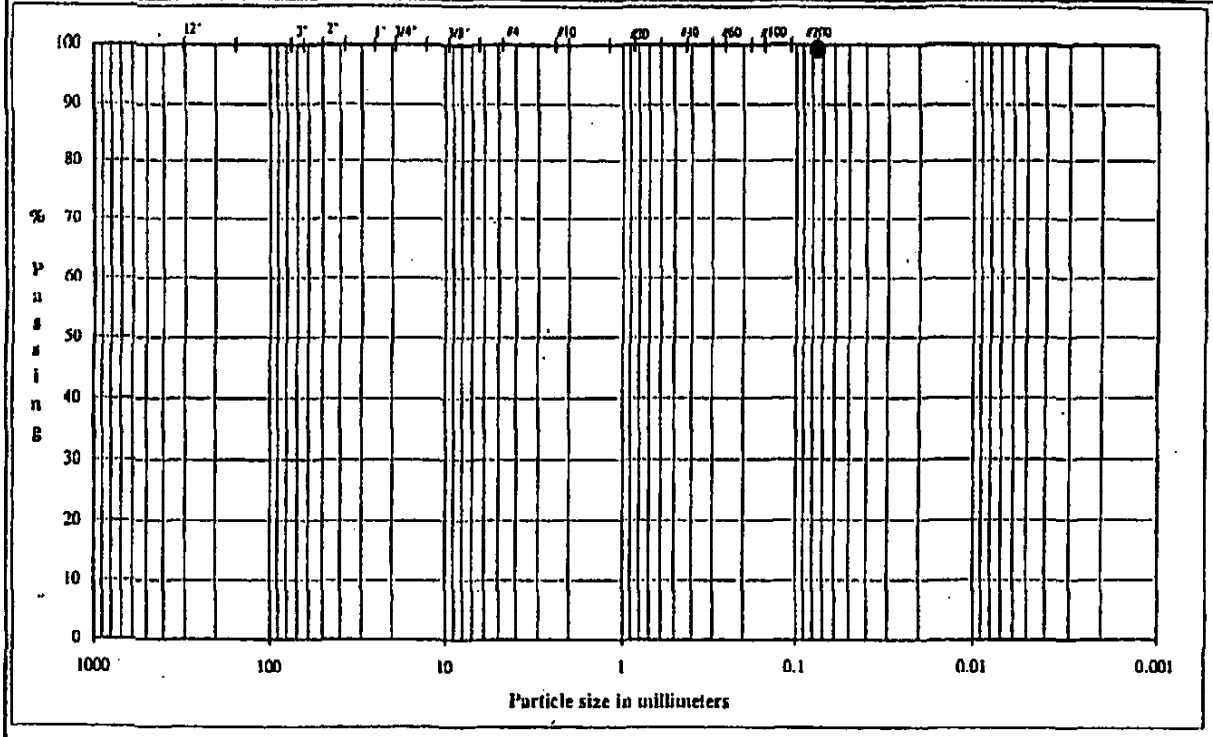
LDEQ-EDMS Document 36473764, Page 372 of 438

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

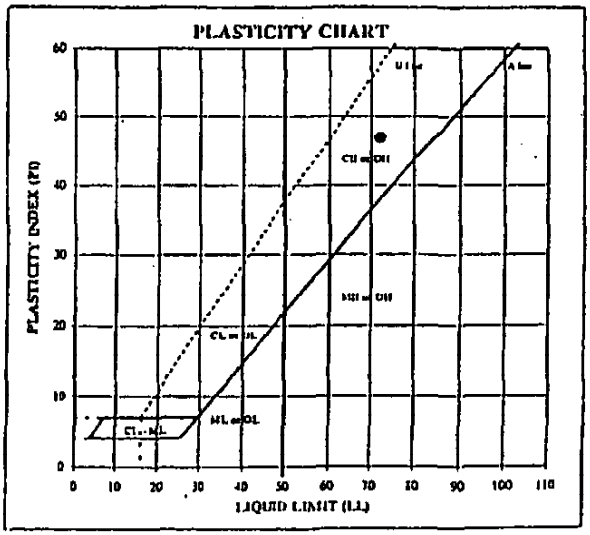
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-4 Depth: 24.0 - 25.0'
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5		Fine Gravel	
#4	4.8			
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	99.22



ATTERBERG LIMITS

AL	LL	PL	PI	LI
25.6	72	25	47	0.02

DESCRIPTION: Reddish Brown, SILTY CLAY, trace fine sand.

USCS: CH

TECH	TJ/TH
DATE	11/28/02
CHECK	
REVIEW	

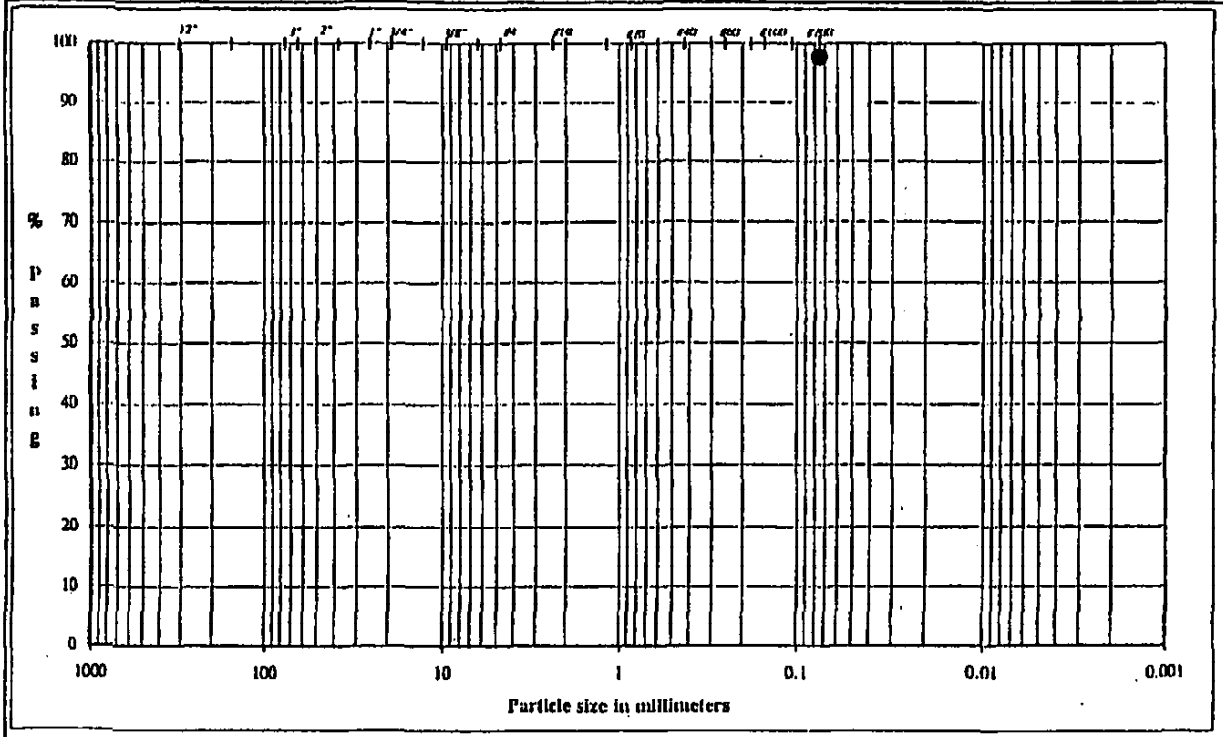
Golder Associates Inc.

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-4 Depth: 29.0 - 30.0'
TYPE: Bag

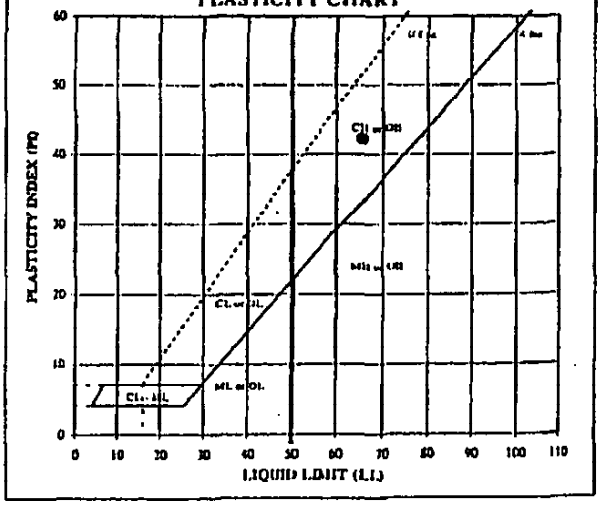


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	97.78

PLASTICITY CHART



ATTERBERG LIMITS

PL	LL	PI	PI	LI
30.1	65	23	42	0.16

DESCRIPTION: Reddish Brown, SILTY CLAY, trace fine sand.

USCS: CH

TECH TJ/DJ
DATE 11/27/02
CHECK
REVIEW

Golder Associates Inc.

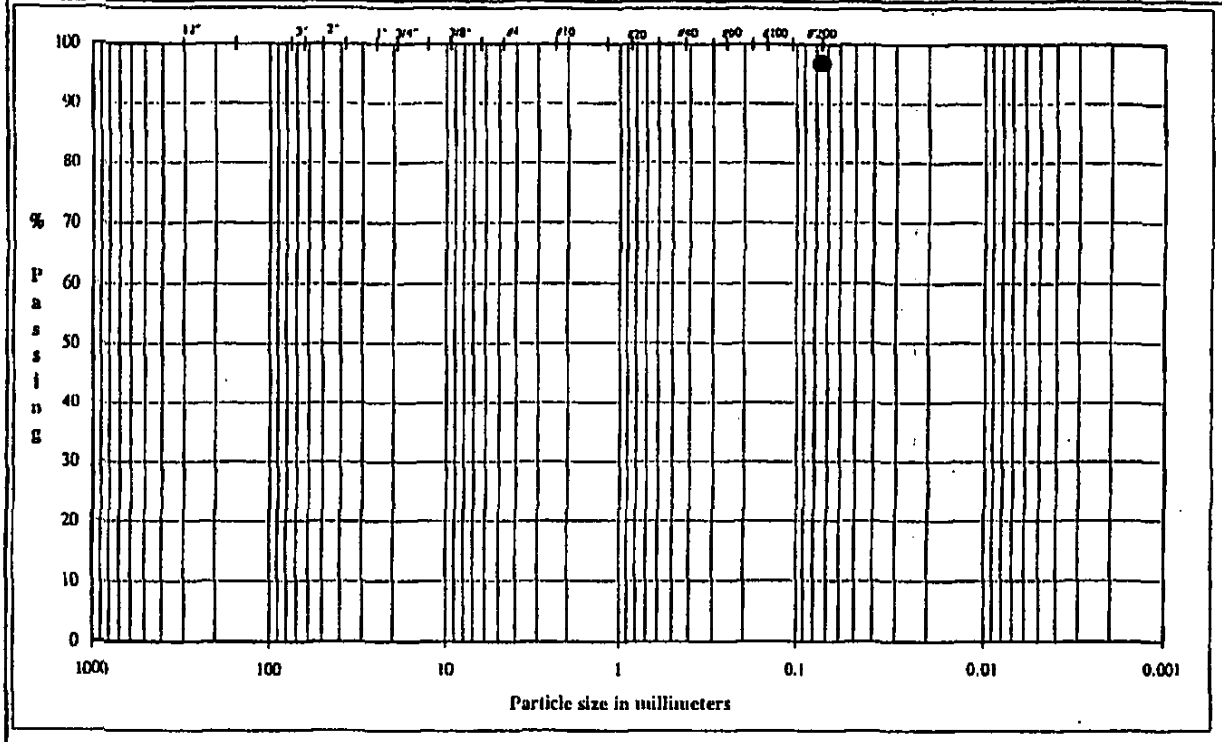
NOVEMBER 2002

023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

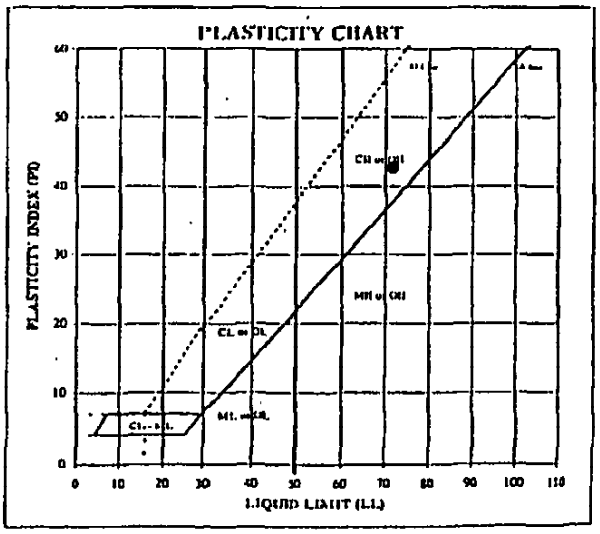
PROJECT NAME: GENESIS/IMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: IIB-5 Depth: 4.0 - 5.0'
TYPE: Bag



COBBLES	GRAVEL: Coarse	GRAVEL: Fine	SAND: Coarse	SAND: Medium	SAND: Fine	FINES: Silt or Clay

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	96.81



ATTERBERG LIMITS

Al.	LL	PL	PI	LI
33.4	72	29	43	0.11

DESCRIPTION: Dark Brown, SILTY CLAY, trace fine sand.

USCS: CH

TECH TJD/AJSW
DATE 11/28/02
CHECK [illegible]
REVIEW [illegible]

Golder Associates Inc.

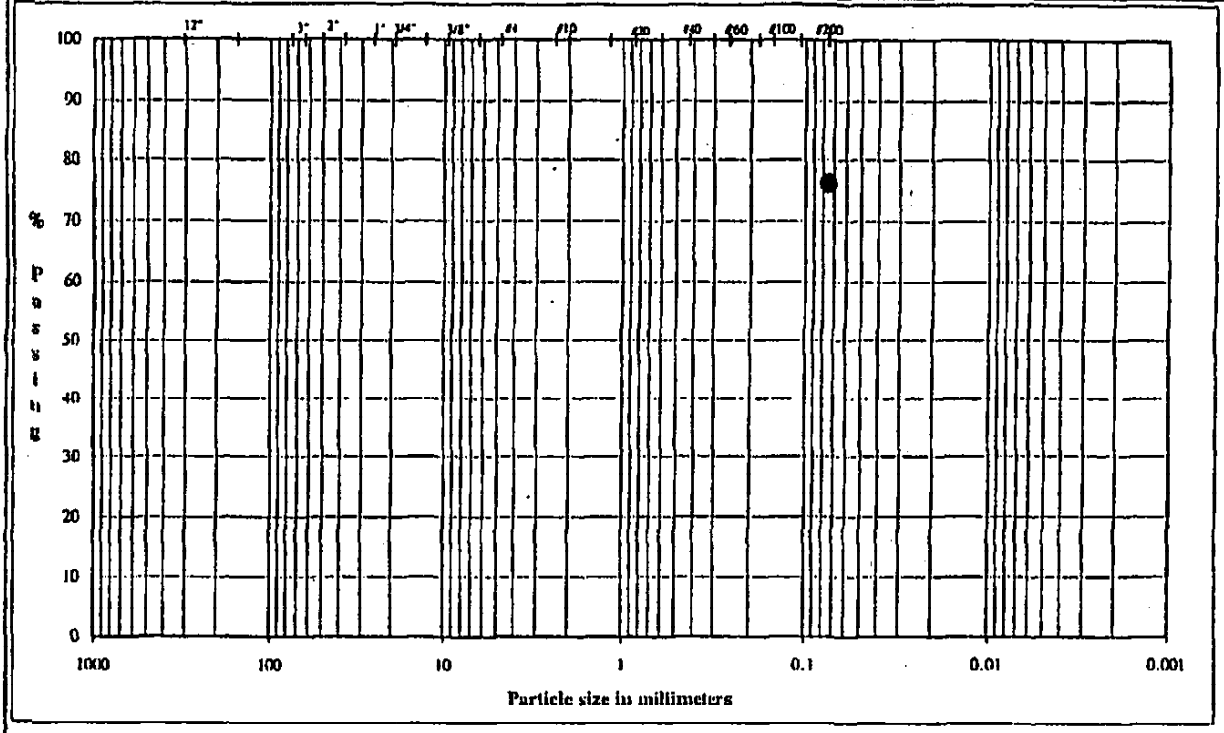
NOVEMBER 2002

023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: *GENESIS/HMM TYPE III LF-SHREVEPORT/LA*
SAMPLE ID: HB-5 Depth: 8.0 - 9.0'
TYPE: Bag

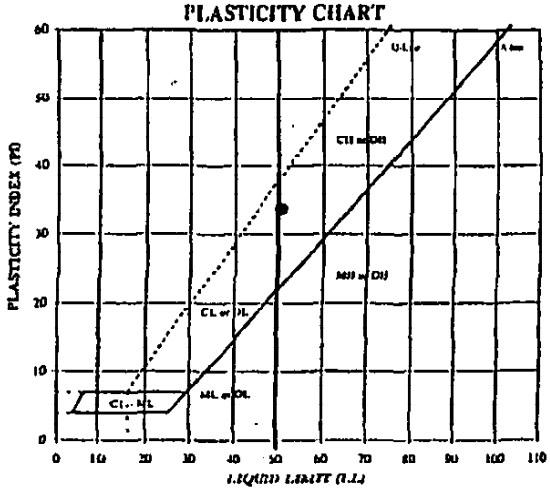


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	76.37

PLASTICITY CHART



ATTERBERG LIMITS

PL	LL	PI	PI	LI
23.5	51	17	34	0.19

DESCRIPTION: Reddish Brown, SILTY CLAY, some fine sand.

USCS: CH

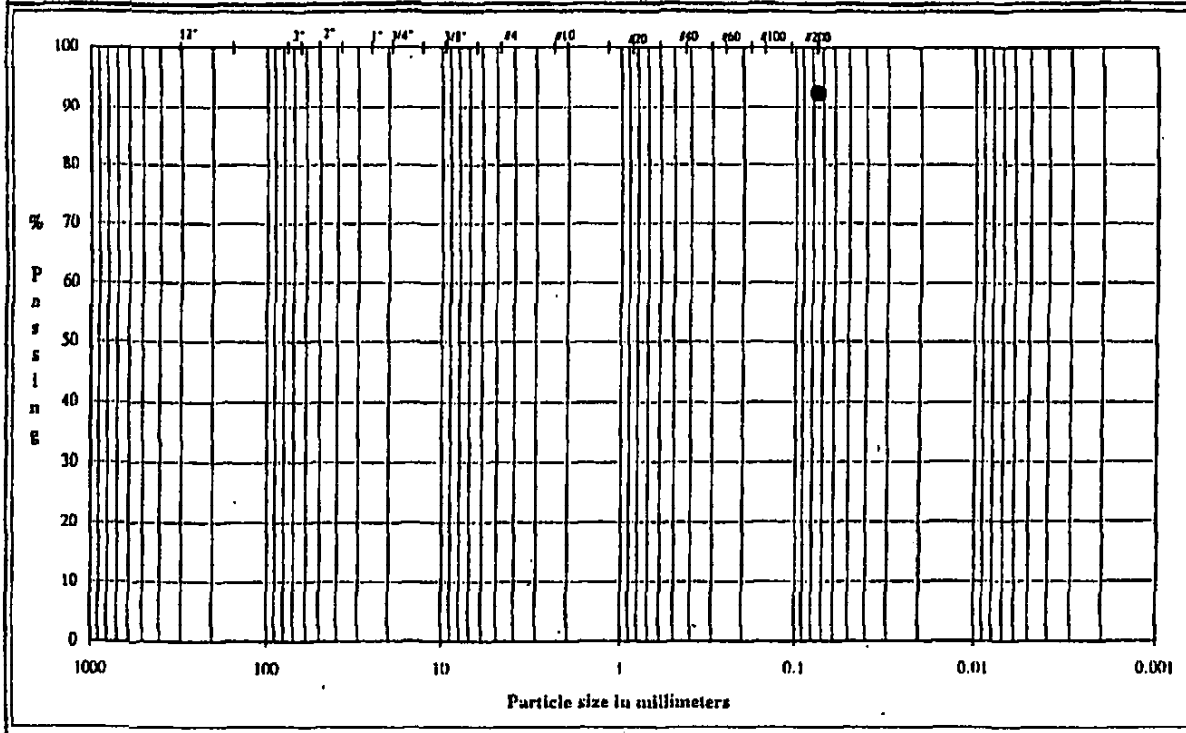
TECH TH/TH
DATE 11/28/02
CHECK [illegible]
REVIEW [illegible]

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-5 Depth: 13.0 - 14.0'
TYPE: Bag

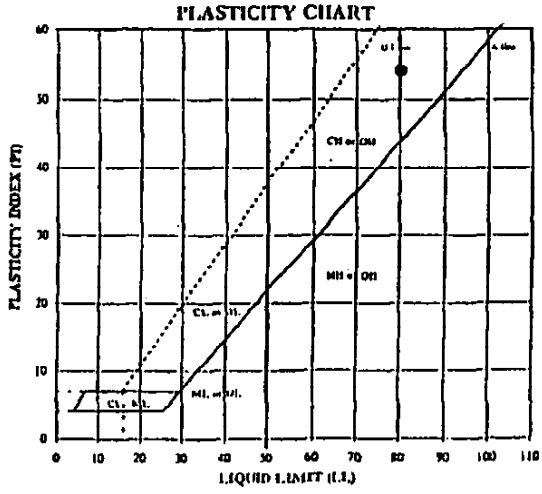


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size (mm)		% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#30	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	92.50

PLASTICITY CHART



ATTERBERG LIMITS

PL	LL	PL	PI	LI
31.3	80	26	54	0.09

DESCRIPTION: Yellowish Brown, SILTY CLAY, little fine sand.

USCS: CH

TECH TS/TH
DATE 11/28/02
CHECK
REVIEW

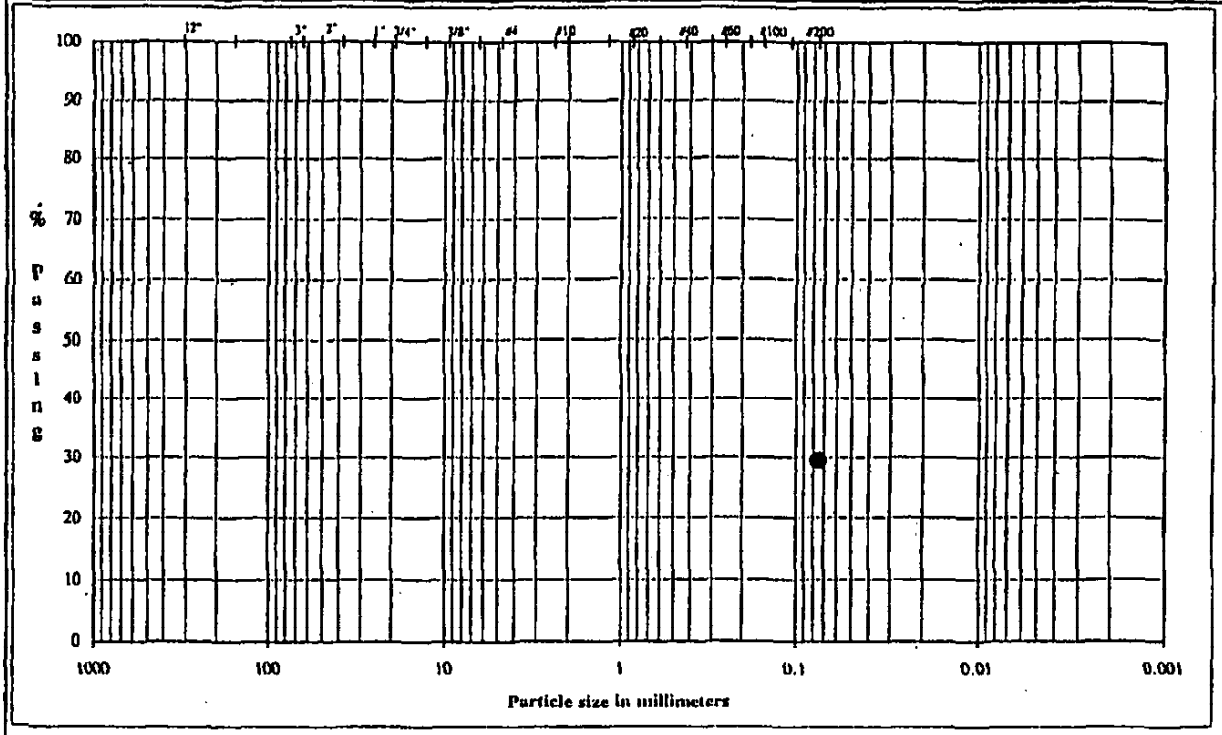
Golder Associates Inc.

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-5 Depth: 19.0 - 20.0'
TYPE: Bag

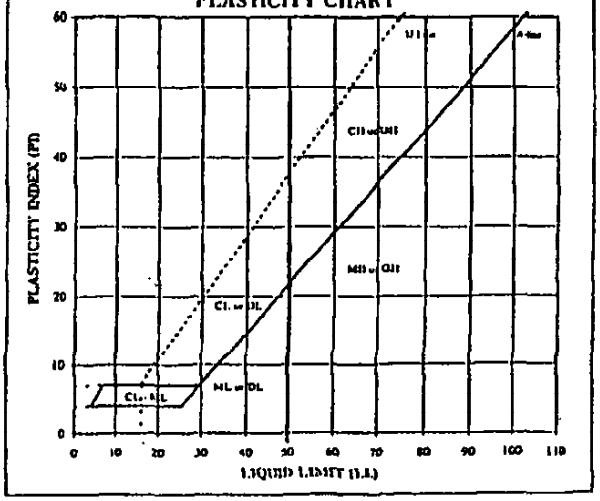


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieve Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	29.52

PLASTICITY CHART



ATTERBERG LIMITS

LL	PL	PI	LI
21.1	NP	NP	NP

DESCRIPTION: Brownish Gray, FINE SAND, some clayey silt.

USCS: SM

TECH TJ/EH
DATE 11/27/02
CHECK
REVIEW

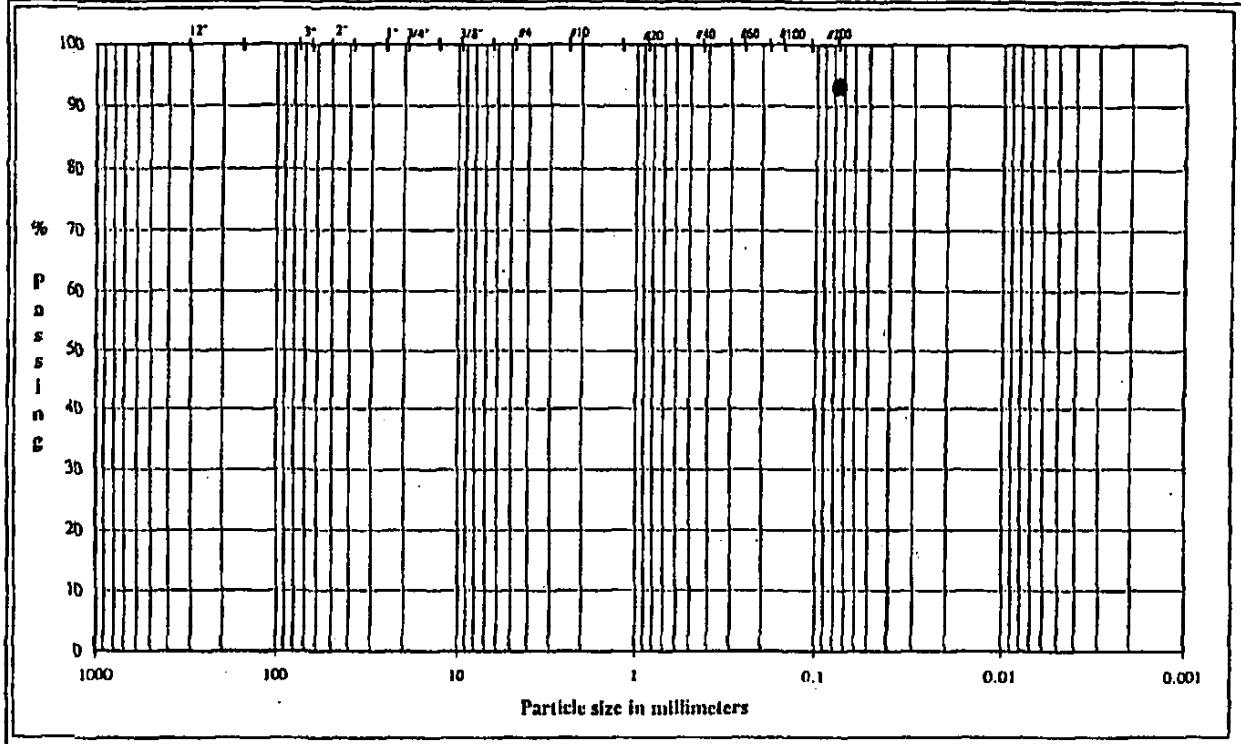
NOVEMBER 2002

023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

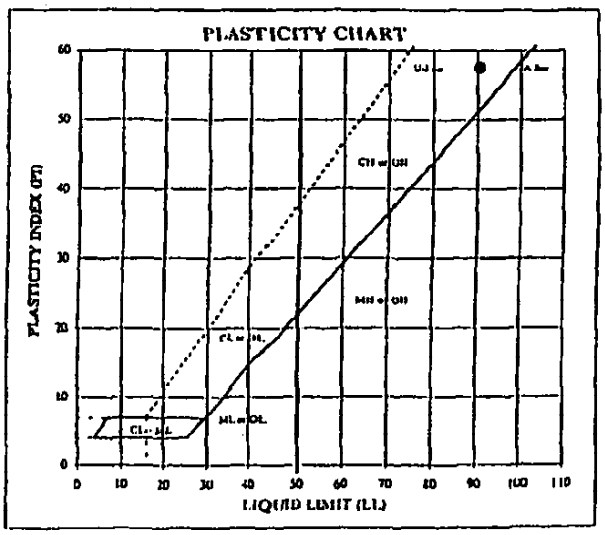
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-6 Depth: 4.0 - 5.0'
TYPE: Bag



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	93.13



ATTERBERG LIMITS

PL	LL	PL	PI	LI
29.8	91	33	58	-0.05

DESCRIPTION: Dark Brown, SILTY CLAY, little fine sand.

USCS: CH

TECH TJ/TH
DATE 11/2002
CHECK DA
REVIEW

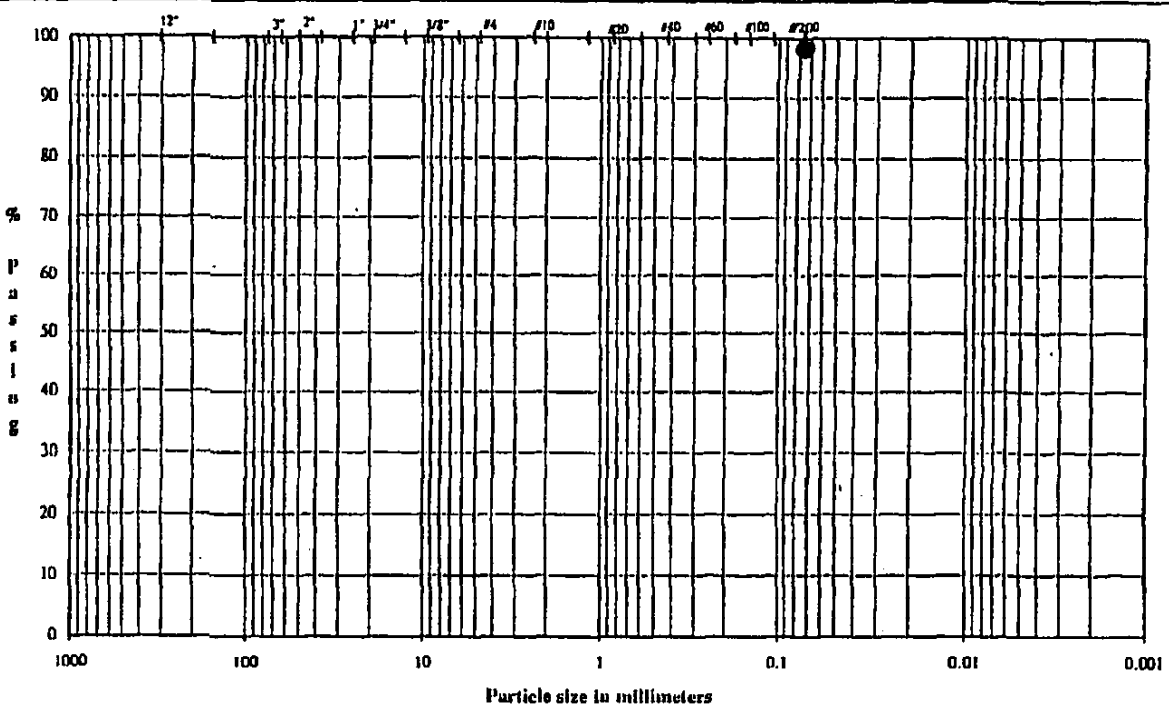
DECEMBER 2002

023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

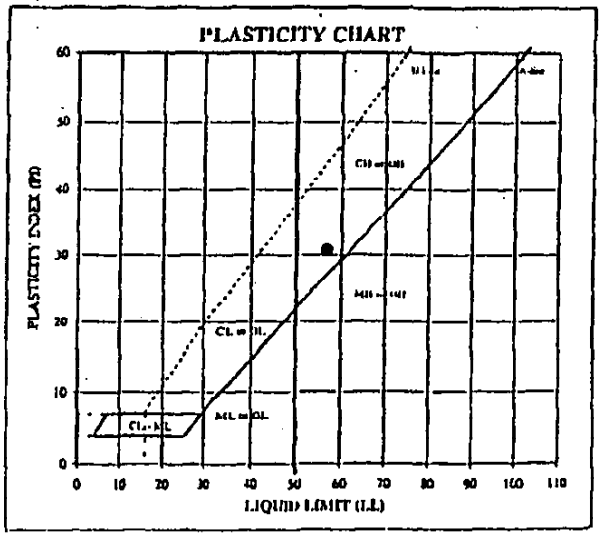
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-6 Depth: 10.0 - 12.0'
TYPE: UD



COBBLES	GRAVEL		SAND			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	98.29



ATTERBERG LIMITS

PL	LL	PI	PI	LI
23.9	57	26	31	-0.06

DESCRIPTION: Olive Brown, SILTY CLAY, little fine sand.

USCS: CH

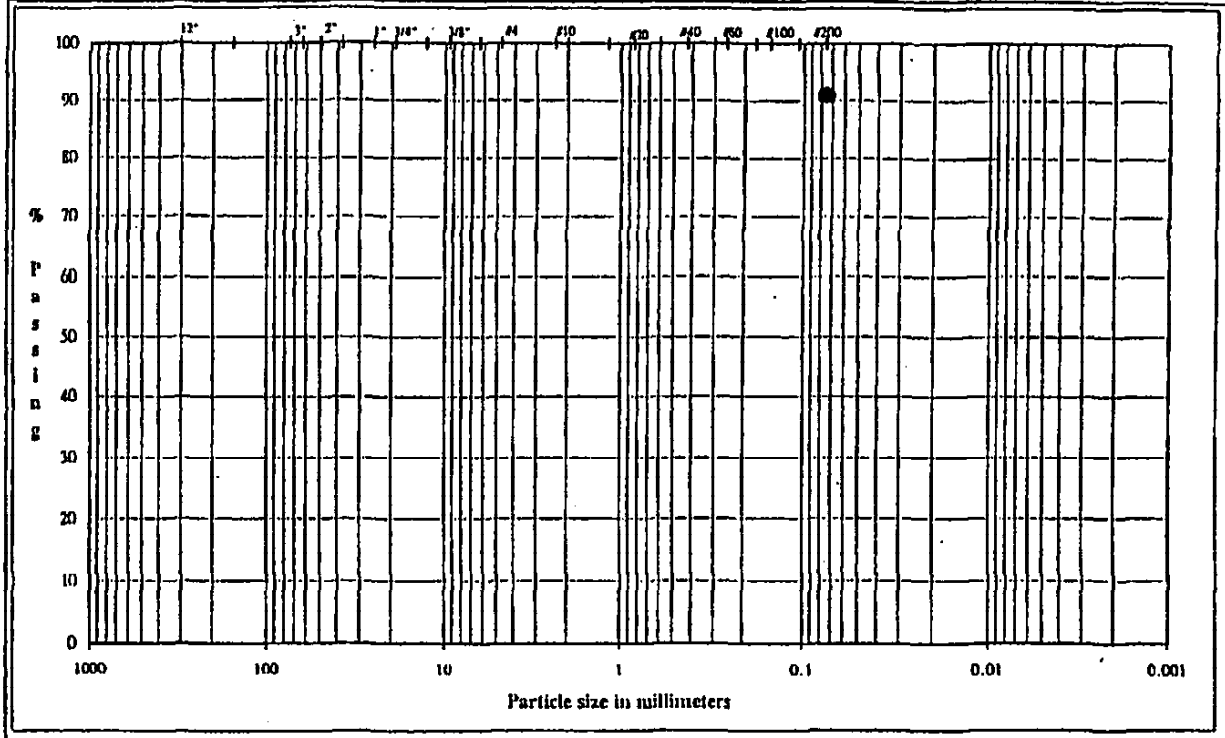
TECH	TJ/DA
DATE	12/4/02
CHECK	DA
REVIEW	

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/IIMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-6 Depth: 14.0 - 15.0'
TYPE: Bag

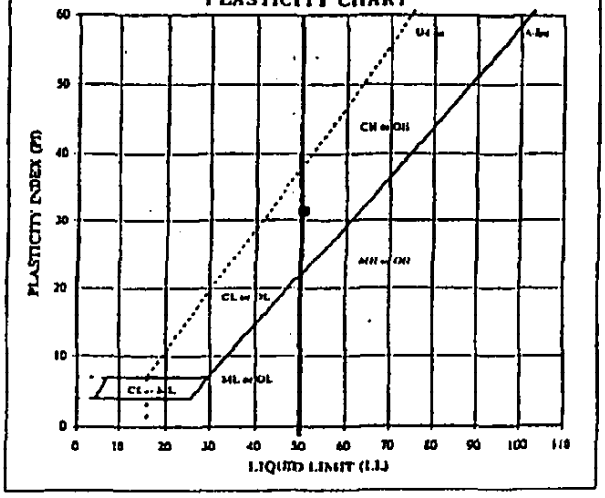


	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	90.99

PLASTICITY CHART



ATTERBERG LIMITS

NL	LL	PL	PI	LI
19.0	51	19	32	-0.01

DESCRIPTION: Dark Grayish Brown, SILTY CLAY, little fine sand.

USCS: CH

TECH: TJ/TH
DATE: 11/28/02
CHECK:
REVIEW:

NOVEMBER 2002

023-3459

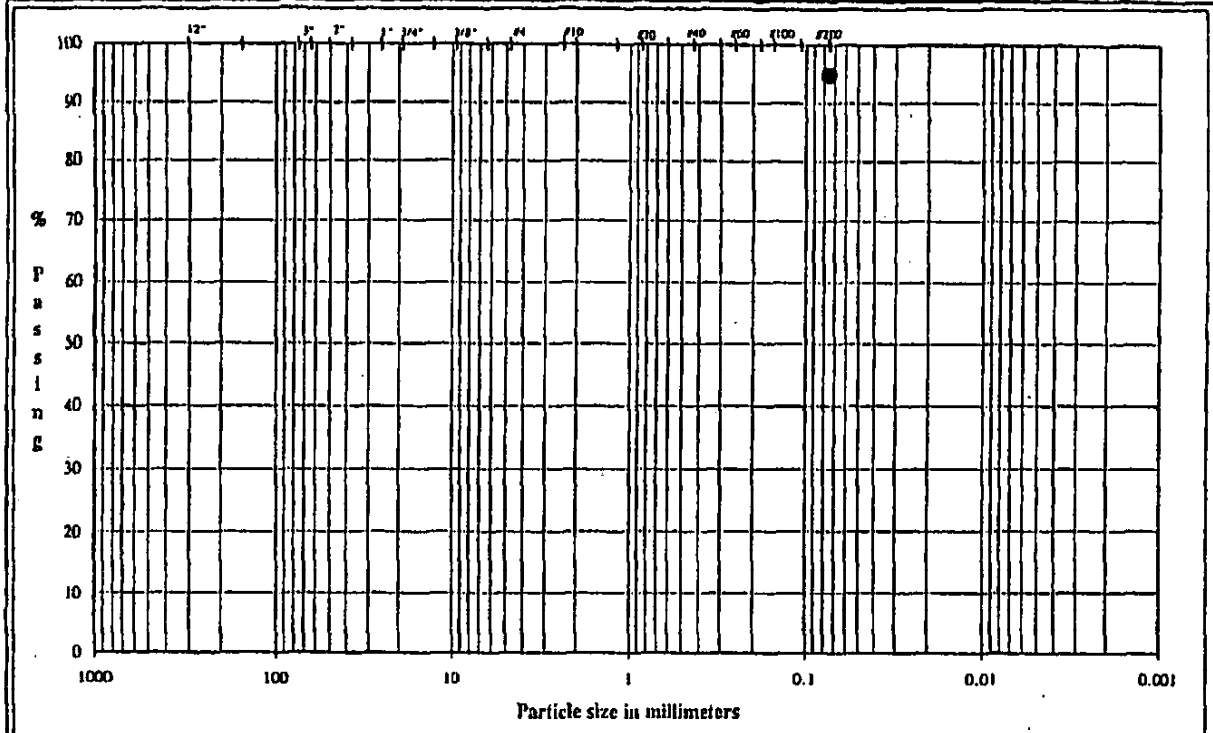
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA

SAMPLE ID: HB-6 Depth: 18.0 - 19.0'

TYPE: Bag

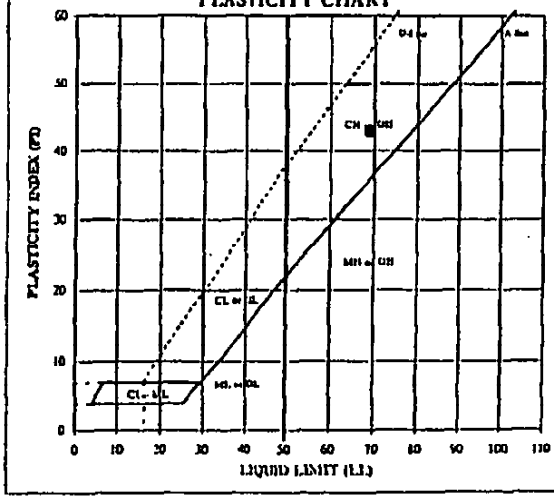


COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	94.99

PLASTICITY CHART



ATTERBERG LIMITS

NL	LL	PL	PI	LI
30.4	69	26	43	0.11

DESCRIPTION: Olive Brown, SILTY CLAY, little fine sand.

USCS: CH

TECH: TI/TH

DATE: 11/28/02

CHECK: DA

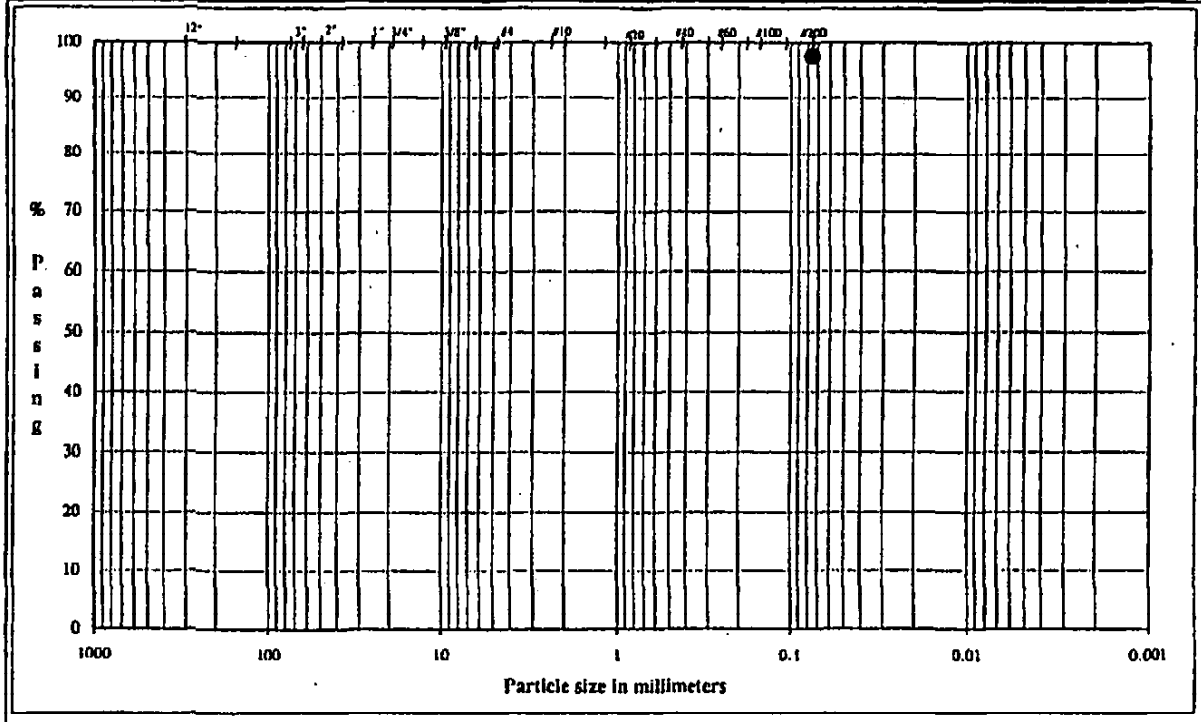
REVIEW:

DECEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

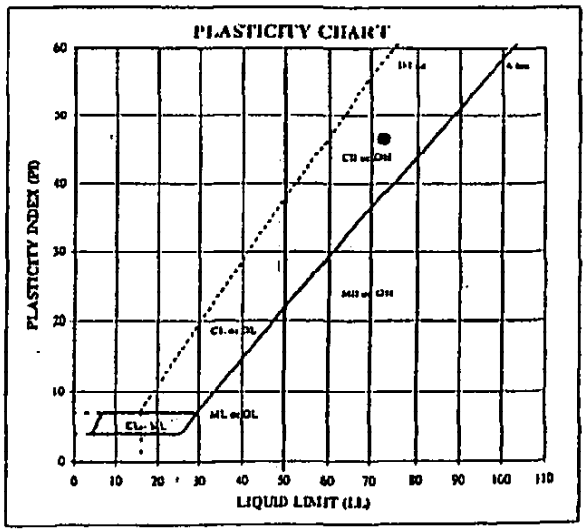
PROJECT NAME: GENESIS/IIMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: IIB-6 Depth: 20.0 - 22.0'
TYPE: UD



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	97.75



ATTERBERG LIMITS

AL	LL	PL	PI	LI
28.9	73	26	47	0.05

DESCRIPTION: Brownish Yellow, SILTY CLAY, trace fine sand.

USCS: CH

TECH TJ/DA
DATE 12/4/02
CHECK DA
REVIEW

LDEQ-EDMS Document 36473764, Page 384 of 438

NOVEMBER 2002

023-3459

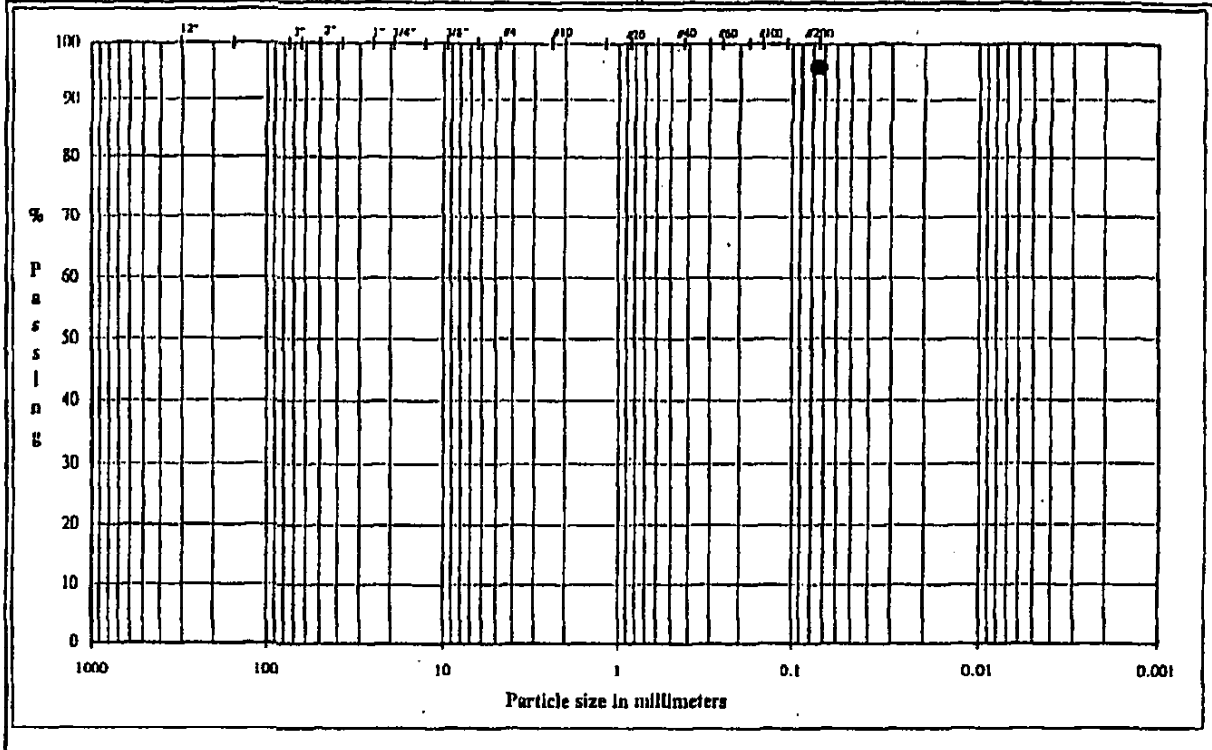
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA

SAMPLE ID: HB-6 Depth: 24.0 - 25.0'

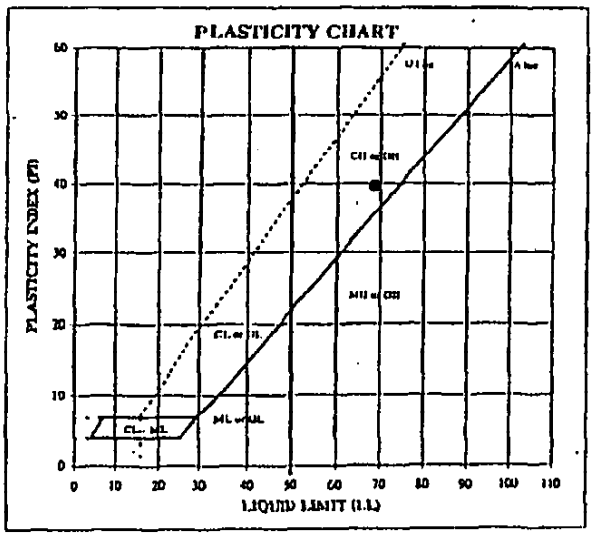
TYPE: Bag



COBBLES	GRAVEL: Coarse	GRAVEL: Fine	SAND: Coarse	SAND: Medium	SAND: Fine	FINES: Silt or Clay

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	95.92



ATTERBERG LIMITS

PL	LL	PI	PI	LI
32.3	69	29	40	0.09

DESCRIPTION: Olive Brown, SITLY CLAY, trace fine sand.

USCS: CH

TECH TJ/TH

DATE 11/28/02

CHECK DA

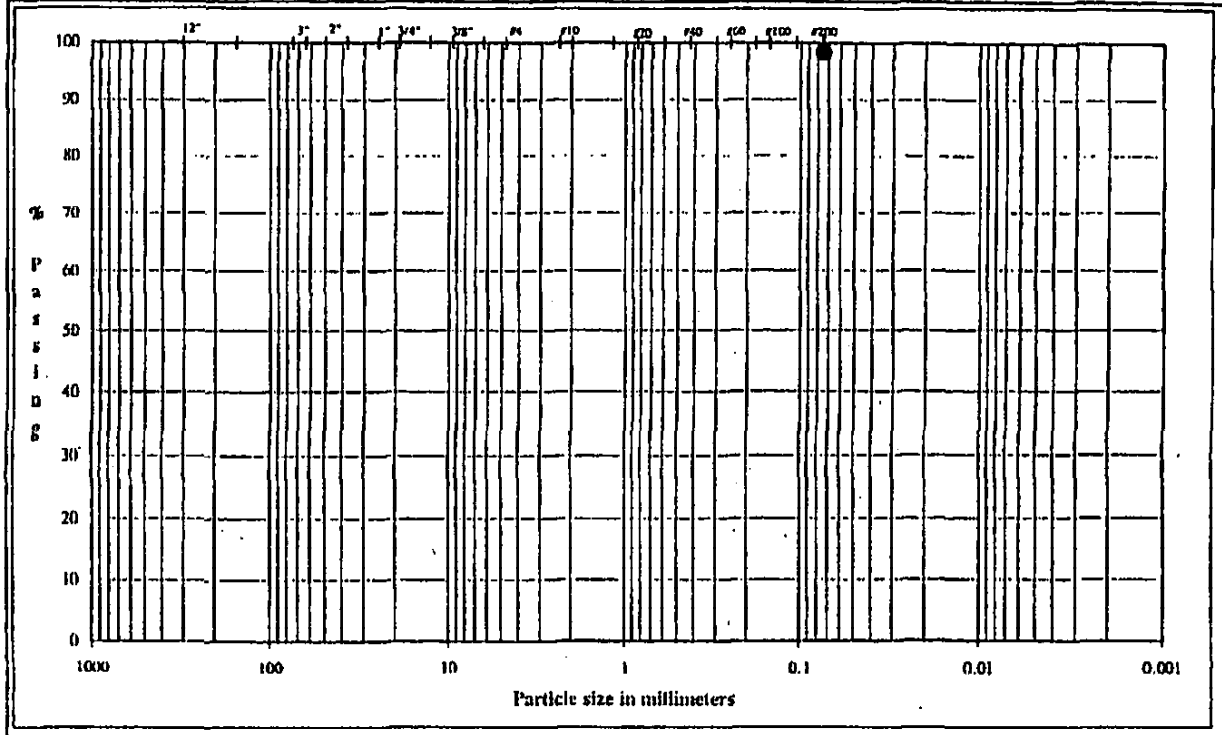
REVIEW

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-7 Depth: 20.0 - 22.0'
TYPE: UD

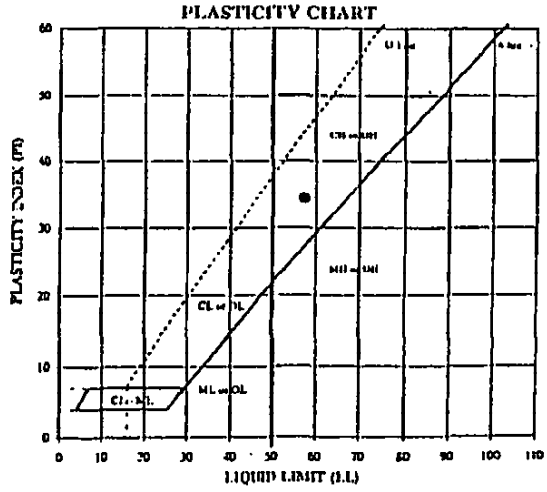


COBBLES	GRAVEL: Coarse	GRAVEL: Fine	SAND: Coarse	SAND: Medium	SAND: Fine	FINES: Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	98.33

PLASTICITY CHART



ATTERBERG LIMITS

PL	LL	PI	PI	LI
34.0	57	23	34	0.33

DESCRIPTION: Brown, SILTY CLAY, trace fine sand.

USCS: CH

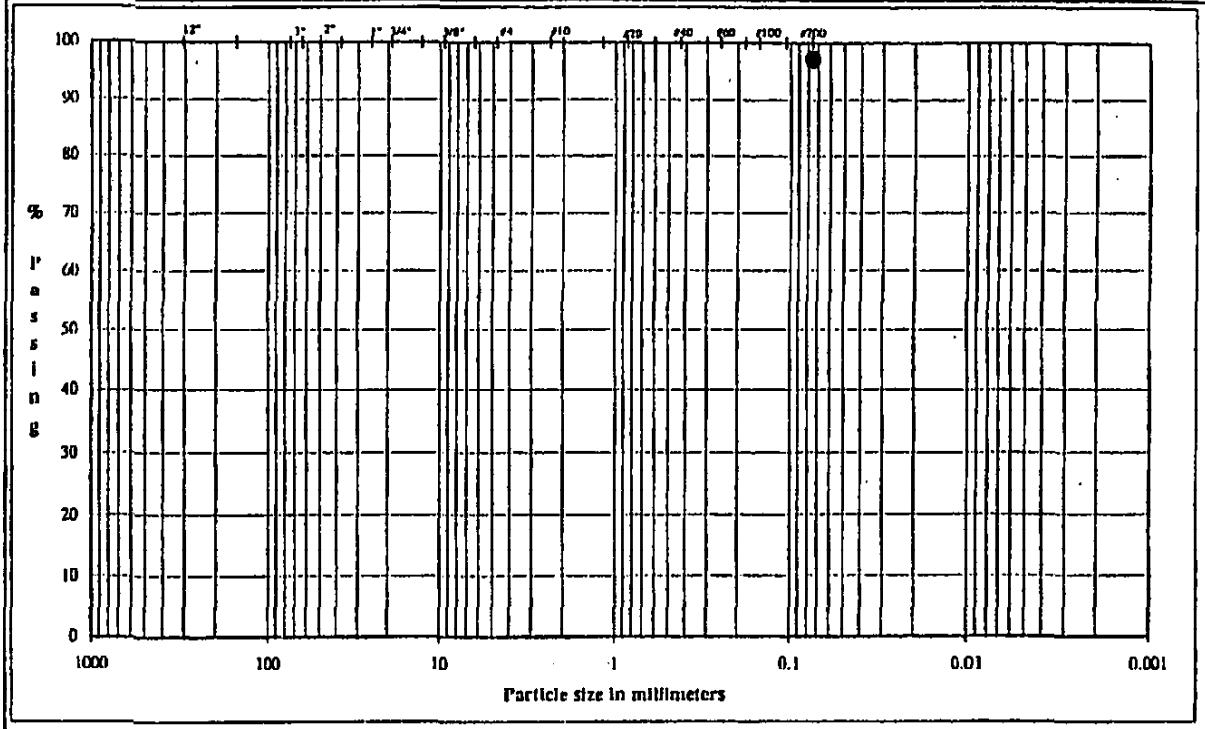
TECH TJ
DATE 11/28/02
CHECK
REVIEW

NOVEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

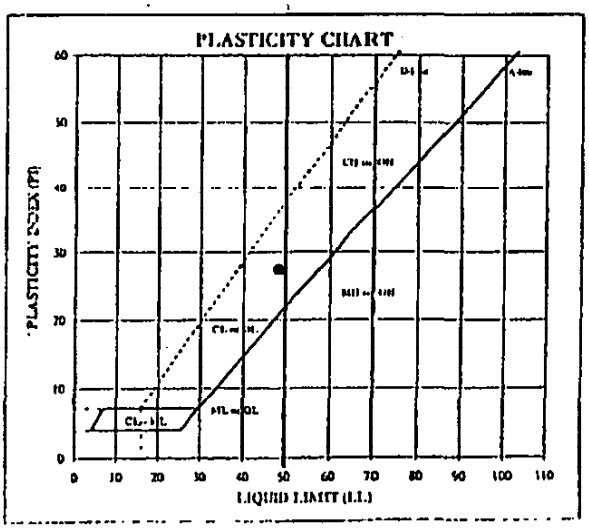
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-7 Depth: 29.0 - 30.0'
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	97.15



ATTERBERG LIMITS

M.	LL	PL	PI	LI
35.5	49	21	28	0.55

DESCRIPTION: Grayish Brown, SILTY CLAY, trace fine sand.

USCS: CL

TECH TJ/TH
DATE 11/28/02
CHECK DR
REVIEW [illegible]

DECEMBER 2002

023-3459

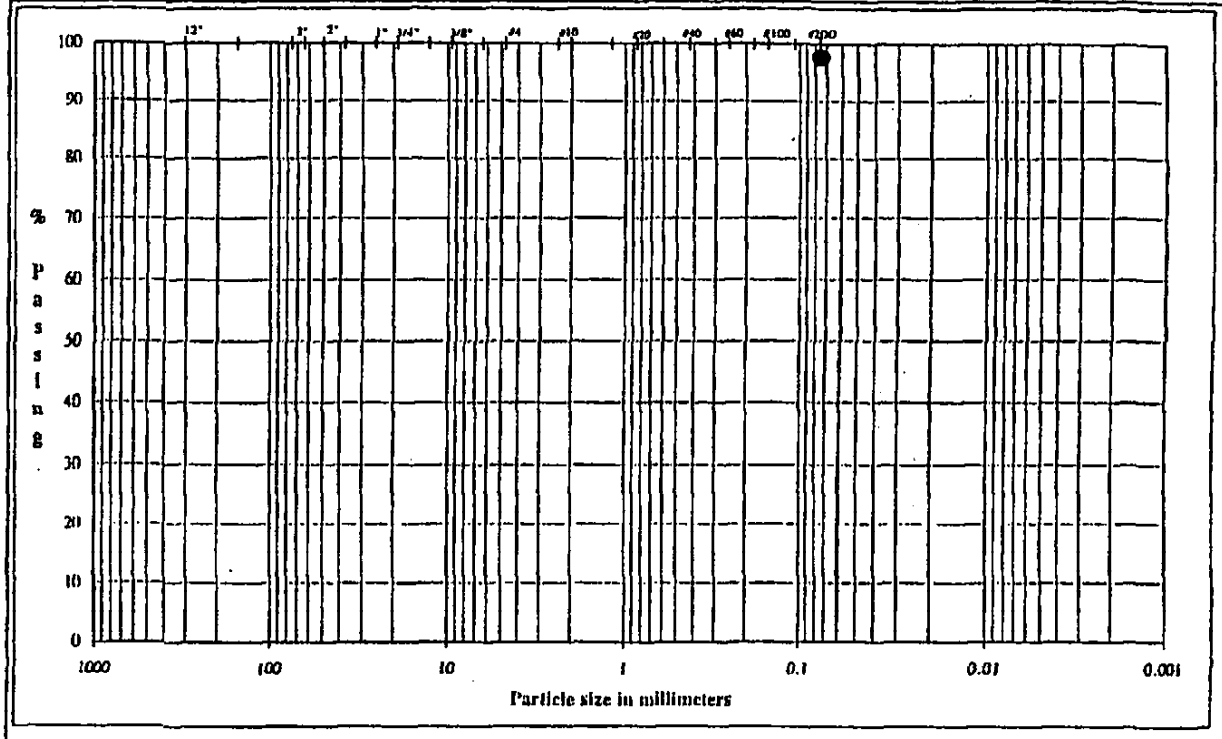
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA

SAMPLE ID: HB-8 Depth: 4.0 - 5.0'

TYPE: Bag

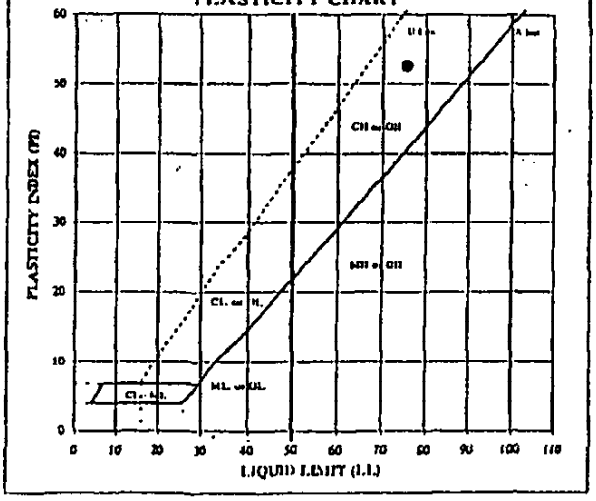


COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	97.66

PLASTICITY CHART



ATTERBERG LIMITS

LL	PL	PI	LI
24.7	76	21	53	0.04

DESCRIPTION: Reddish Brown, SILTY CLAY, trace fine sand.

USCS: CH

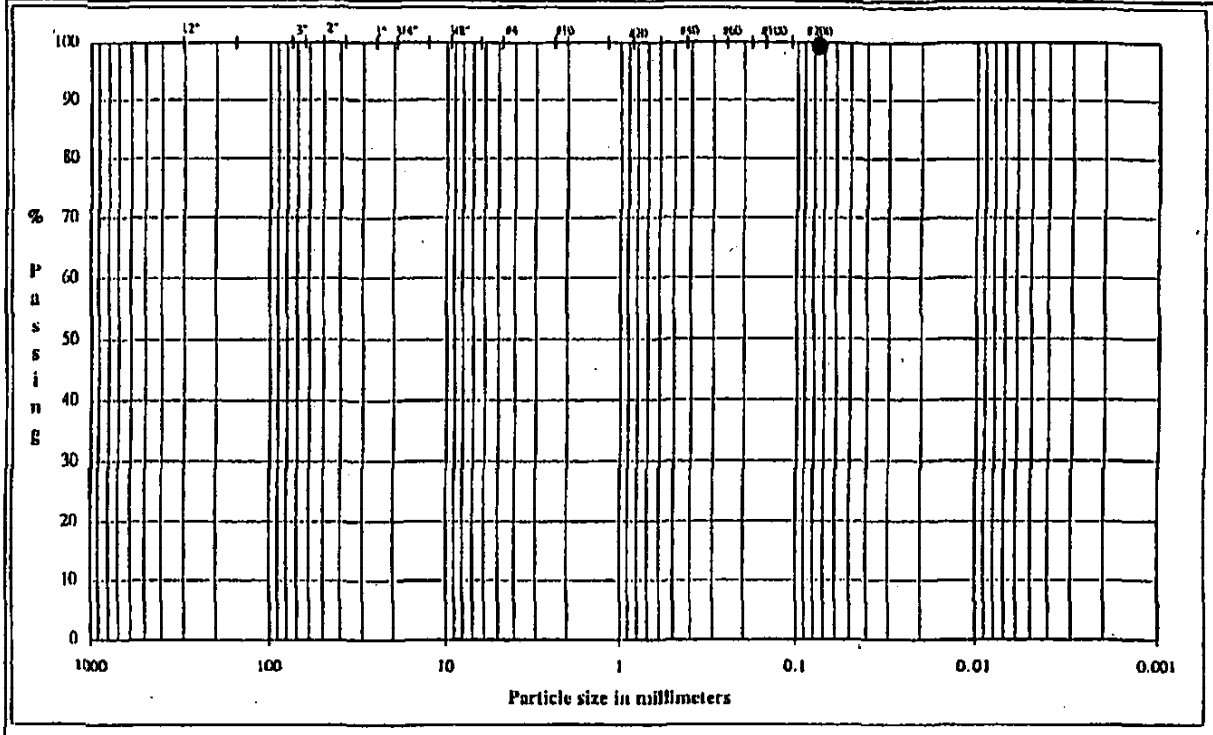
TECH	TMDA
DATE	12/2/02
CHECK	DR
REVIEW	[illegible]

DECEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

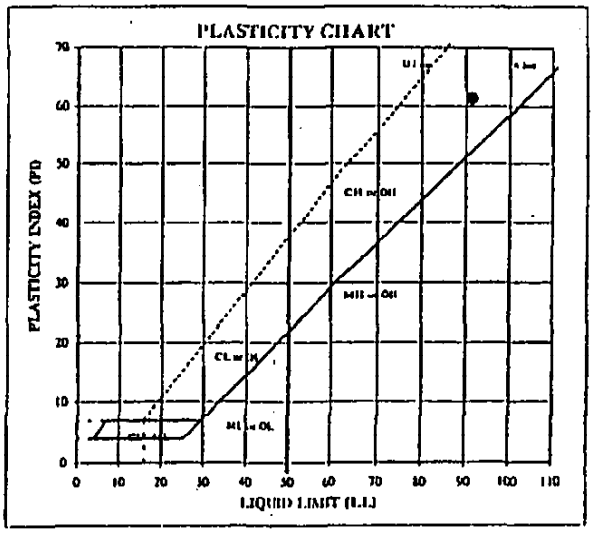
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-8 Depth: 9.0 - 10.0'
TYPE: Bag



COBBLES	GRAVEL		SAND			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	99.42



ATTERBERG LIMITS

AL	LL	PL	PI	LI
31.8	91	30	61	0.02

DESCRIPTION: Reddish Brown and Yellow, SILTY CLAY, trace fine sand.

USCS: CH

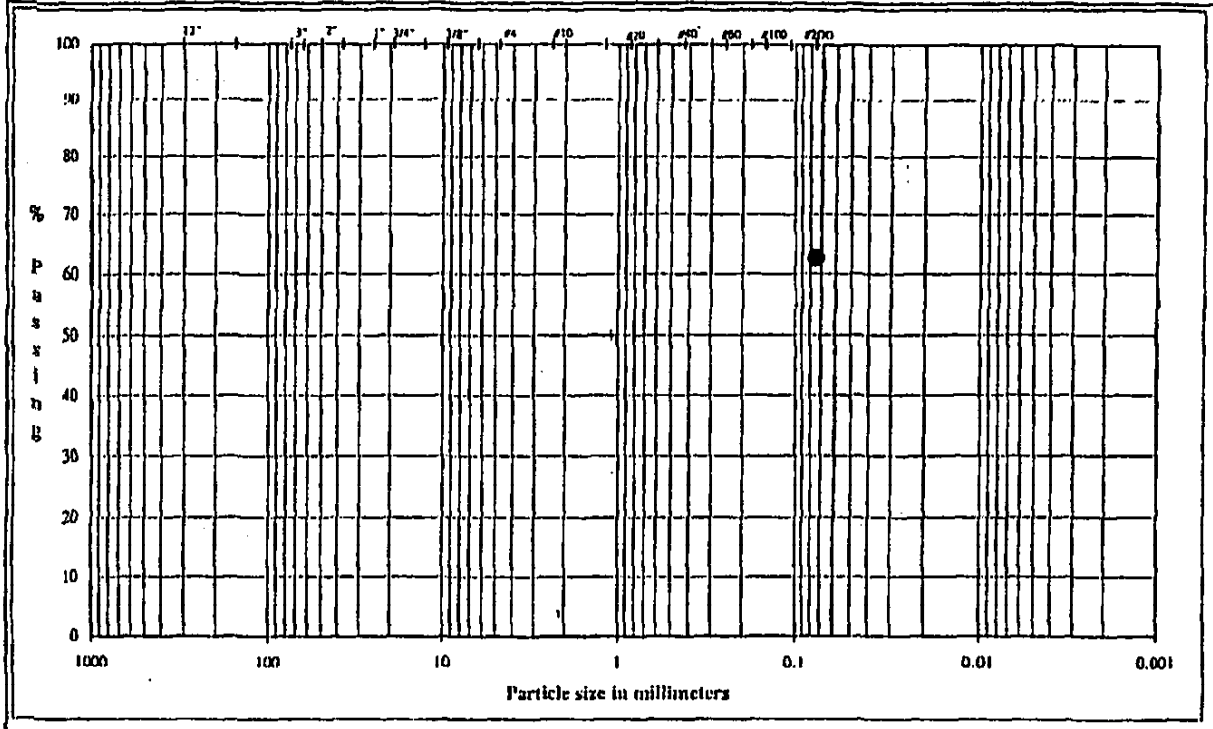
TECH TH/DA
DATE 12/2/02
CHECK DA
REVIEW

DECEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

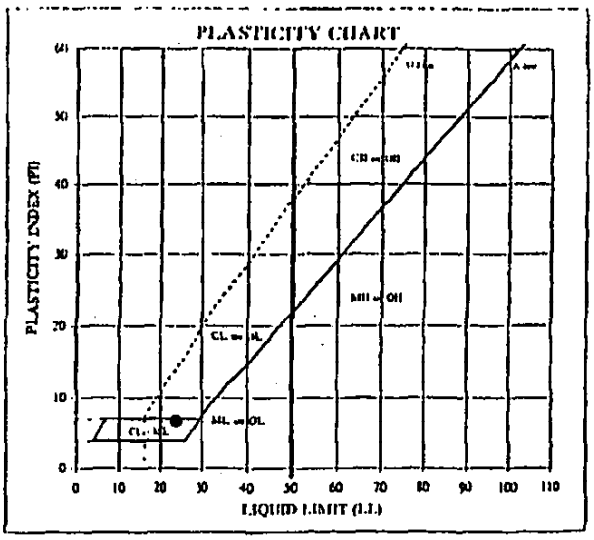
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-9 Depth: 2.0 - 3.0'
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	62.72



ATTERBERG LIMITS

W_n	LL	PL	PI	LI
9.5	24	17	7	-1.08

DESCRIPTION: Light Brown and Olive, SILTY CLAY, and fine sand.

USCS: CL-ML

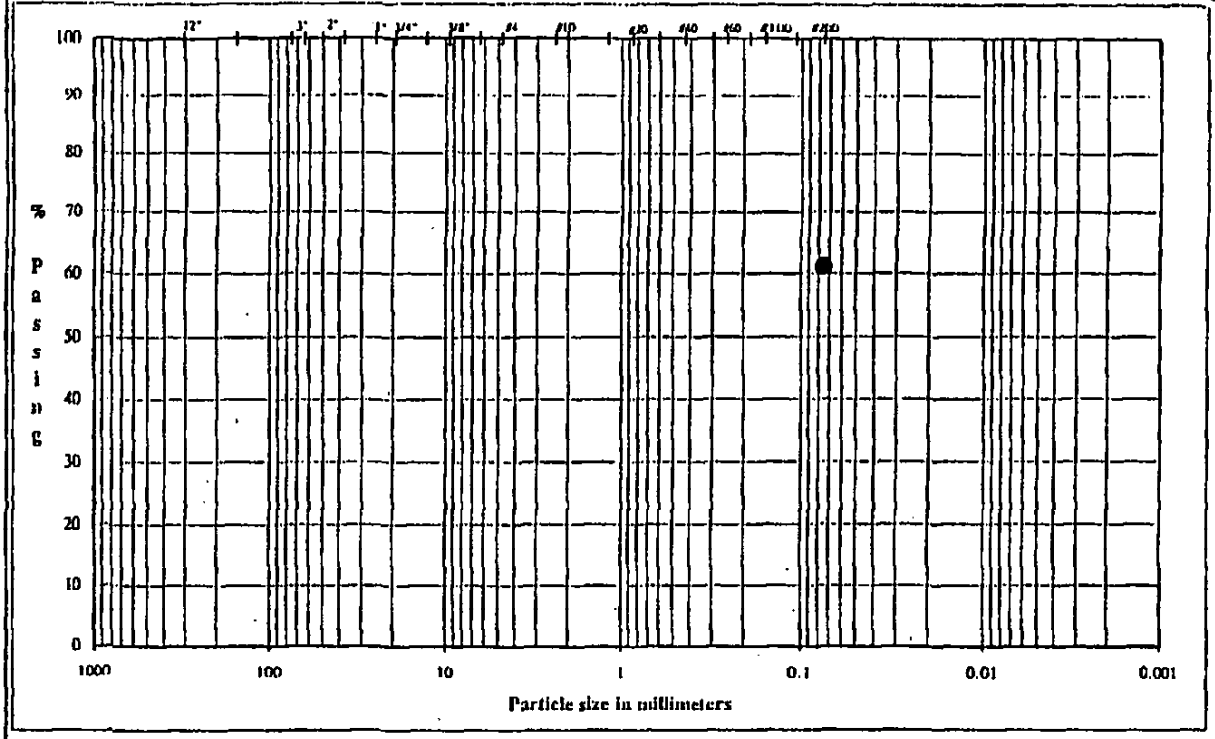
TECH TJ
DATE 12/12/02
CHECK DA
REVIEW

DECEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

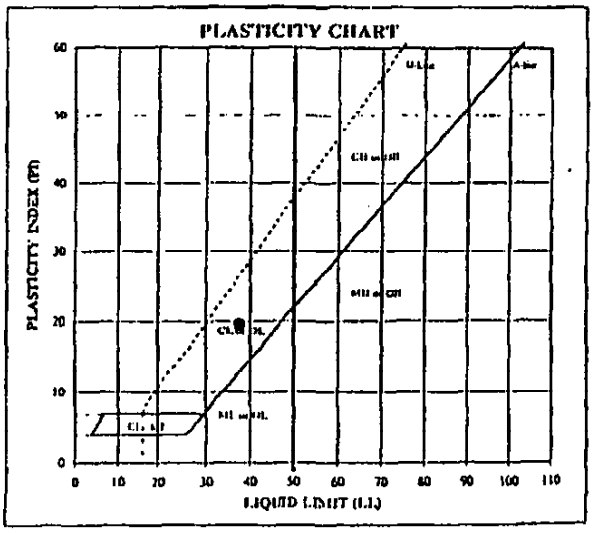
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HH-9 Depth: 9.0 - 10.0'
TYPE: Bag



COBBLES	GRAVEL		SAND			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	61.17



ATTERBERG LIMITS

NL	LL	PL	PI	LI
11.0	38	18	20	-0.35

DESCRIPTION: Light Brown and Red, SILTY CLAY, and fine sand.

USCS: CL

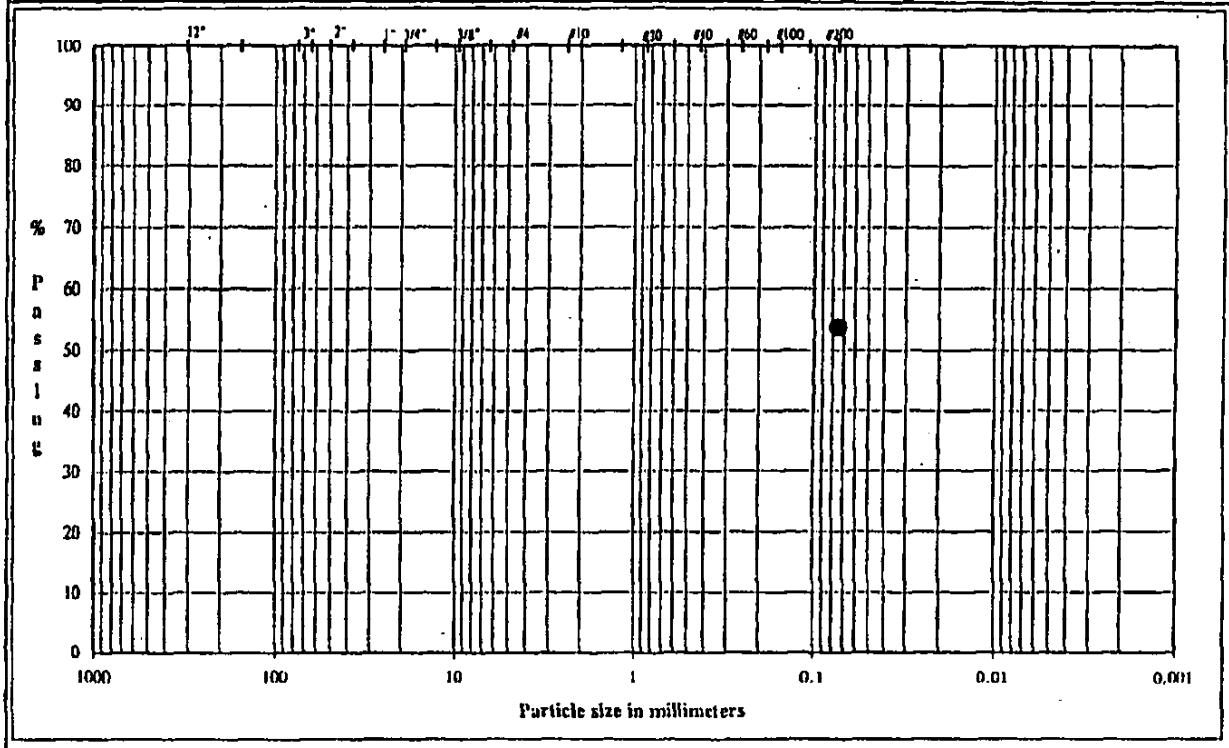
TECH TJ
DATE 12/2/02
CHECK
REVIEW

DECEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

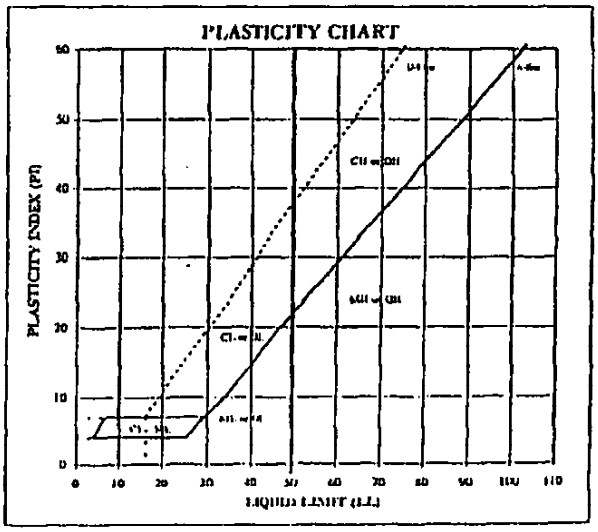
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-9 Depth: 14.0 - 15.0'
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

Particle Size	(mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	53.75



ATTERBERG LIMITS

PL	LL	PL	PI	LI
25.0	NP	NP	NP	NP

DESCRIPTION: Gray and Brown, CLAYEY SILT, and fine sand.

USCS: ML

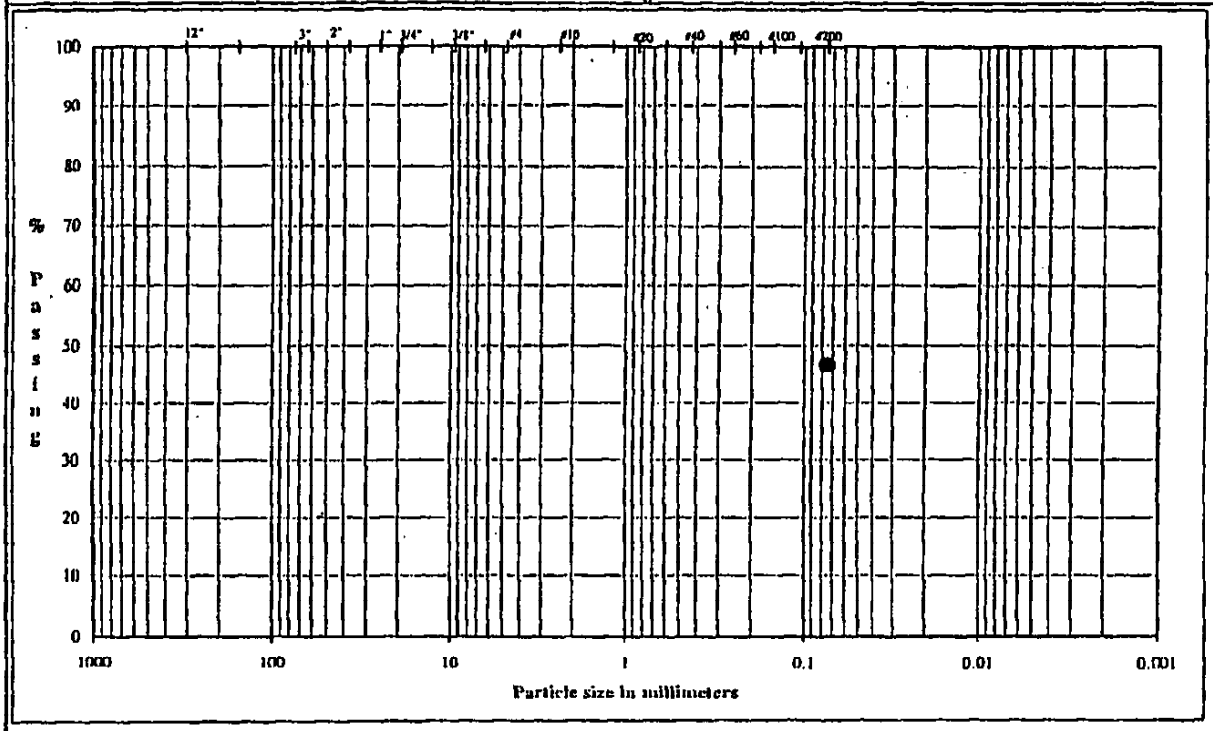
TECH TJ
DATE 12/0/02
CHECK
REVIEW

DECEMBER 2002 023-3459

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

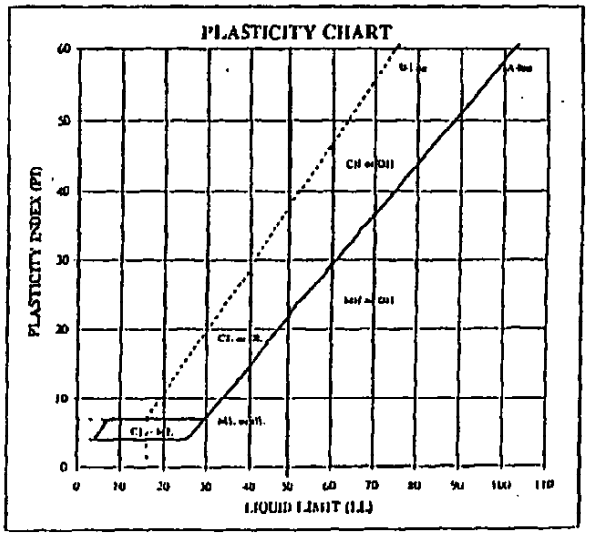
PROJECT NAME: GENESIS/HMM TYPE III LF-SHREVEPORT/LA
SAMPLE ID: HB-9 Depth: 19.0 - 20.0'
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8			
3.0"	75.0		Cobbles	
2.5"	63.5			
2.0"	50.0			
1.5"	37.5			
1.0"	25.0			
0.75"	19.0		Coarse Gravel	
0.50"	12.7			
0.375"	9.5			
#4	4.8		Fine Gravel	
#10	2.00		Coarse Sand	
#20	0.85			
#40	0.43		Medium Sand	
#60	0.25			
#100	0.15			
#200	0.075		Fine Sand	
			Fines	46.59



ATTERBERG LIMITS

PL	LL	PI	PI	LI
23.7	NP	NP	NP	NP

DESCRIPTION: Gray and Brown, FINE SAND, and clayey silt.

USCS: SM

TECH TJ
DATE 12/20/02
CHECK DA
REVIEW

FLOW PUMP #2B

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	GENESIS/HMM TYPE III LF-SHREVEPORT/LA		BOARD #	6	COMMENTS
PROJECT NUMBER	023-3459		CELL #	8	
SAMPLE ID	P-1	15.0-17.0'	Flow Pump Speed	10	
SAMPLE TYPE	UD		Technician	PWM	

Sample Data, Initial				Sample Data, Final	
Height, inches	2.963	B-Value, f	0.99	Height, inches	2.977
Diameter, inches	2.876	Cell Pres.	90.0	Diameter, inches	2.890
Area, cm²	41.91	Bot. Pres.	80.0	Area, cm²	42.32
Volume, cm³	315.43	Top Pres.	80.0	Volume, cm³	320.01
Mass, g	577.73	Tot. B.P.	80.0	Mass, g	582.51
Moisture Content, %	38.24	Head, max.	125.91	Moisture Content, %	39.39
Dry Density, pcf	82.67	Head, min.	125.91	Dry Density, pcf	81.49
Spec. Gravity	2.817	Max. Grad.	16.65	Volume Solids, cm³	148.35
Volume Solids, cm³	148.35	Min. Grad.	16.65	Volume Voids, cm³	171.66
Volume Voids, cm³	167.07			Void Ratio	1.16
Void Ratio	1.13			Saturation, %	95.9%
Saturation, %	95.7%				

Permeant: Deaired Tap Water

Flow Pump Rate: 2.33E-05 cm³/sec

USCS: CH

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	577.73	638.84
Wt Soil & Tare, f	g	417.91	474.32
Wt Tare	g	0.00	56.60
Wt Moisture Lost	g	159.82	164.52
Wt Dry Soil	g	417.91	417.72
Water Content	%	38.24%	39.39%

DESCRIPTION: Brown, SILTY CLAY, little fine sand.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
12/2/02	37592	11	30	20.8	0	0	0	0	1.79	125.91	16.65	3.3E-08
12/2/02	37592	11	35	20.8	5	5	300	300	1.79	125.91	16.65	3.3E-08
12/2/02	37592	11	40	20.8	5	10	300	600	1.79	125.91	16.65	3.3E-08
12/2/02	37592	11	45	20.8	5	15	300	900	1.79	125.91	16.65	3.3E-08 *
12/2/02	37592	11	50	20.8	5	20	300	1200	1.79	125.91	16.65	3.3E-08 *
12/2/02	37592	11	55	20.8	5	25	300	1500	1.79	125.91	16.65	3.3E-08 *
12/2/02	37592	12	0	20.8	5	30	300	1800	1.79	125.91	16.65	3.3E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 3.3E-08 cm/sec **

DATE 12/2/02
CHECK DJ
REVIEW

Golder Associates Inc.

LLDEQ-EDMS Document 36473764, Page 393 of 438

APPENDIX D

FINAL CLOSURE DOCUMENT

HARRELSON LANDFILL
TYPE III WASTE DISPOSAL FACILITY

DOCUMENT TO BE FILED IN THE PARISH RECORDS

FINAL CLOSURE OF A SOLID WASTE DISPOSAL FACILITY

(Name of permit holder) hereby notifies the public that the following described property was used for the disposal of solid waste. This site was closed on (date facility was closed) in accordance with the Louisiana Administrative Code, Title 33, Part VII. Inquires regarding the contents of (the facility) may be directed to (name of person with knowledge of the contents of the facility) at (address of person with knowledge of the content of the facility).

Property Description

(Provide the specific description of the location of the facility)

_____
Signature of person filing Parish Record

_____
Type Name and Title of Person Filing Parish Record

_____
Date

(A true copy of the document certified by the parish clerk of court must be sent to the Solid Waste Division, Post Office Box 82178, Baton Rouge, Louisiana 70884-2179.)

APPENDIX E

EMERGENCY RESPONSE PLAN AND TRAINING PROGRAM

Emergency Response Plan & Training Program

HARRELSON MATERIALS MANAGEMENT, INC.
Type III Landfill
Caddo Parish, Louisiana

HMM Landfill
1101 Russell Road
Shreveport, LA 71107
318.425.3218

UPDATED
June, 2007

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- 3.3 Managing Authority and Personnel
- 3.4 Location of Emergency Facilities and Evacuation Routes

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1.0 Introduction

The following document outlines emergency response procedures associated with the daily operation of the Harrelson Materials Management, Inc. ("HMM") Type III Landfill in Caddo Parish, Louisiana. This document is intended to comply with requirements outlined in the Louisiana Administrative Code 33:VII.721.C.5. This statute mandates that all Type III waste disposal facilities in the State of Louisiana must have an Emergency Response Plan, or ERP.

This ERP is designed and written to provide a reference and directive for HMM landfill operators in the event of an emergency (a threat to health, safety, or the environment). The ERP provides a systematic approach to emergency response for the purpose of preventing confusion and minimizing negative consequences during an accident or crisis. Specifically, this document addresses emergency response procedures associated with the operation of the Type III HMM landfill.

All personnel and operators at the Landfill should be familiar with the ERP. The ERP should be reviewed and updated (if necessary) on an annual basis to consider current operations, emergency contact information, and evacuation routes.

Provisions and procedures included in this plan are intended to address many different type of emergencies and contingencies. Section 3 of the ERP provides general information that is site specific to the HMM Landfill; including the location, type and size of the facility, purpose of the facility, geographic features, topography, climate, and utilities that service the facility. Section 4 identifies all Landfill buildings, and structures. Section 5 provides a list of personnel, equipment, and procedures for responding to an emergency situation. Section 6 describes the security measures at the HMM Landfill. Section 7 summarizes the personnel training conducted at the facility. Plan review and amendment procedures are discussed in Section 8. Finally, conclusions and recommendations are presented in Section 9 of this ERP.

2.0 Emergency Response Plan Requirements

An ERP is required at all permitted Type III waste facilities regulated in the State of Louisiana. The requirement that specifically requires the ERP is LAC33:VII.721.C.5(a):

"A plan outlining facility operations and emergency procedures to be followed in case of accident, fire, explosion, or other emergencies shall be developed and filed with the Office of Environmental Services, Permits Division and with the local fire department and the closest hospital or clinic. The plans shall be updated annually, or when implementation demonstrates that a revision is needed."

3.0 General Information

3.1 Site Location

The HMM Landfill is located in Caddo Parish in the City of Shreveport, Louisiana. The site can be accessed by Russell Road, which, itself, is accessed from I-220, by taking the Exit 5 Shreveport Blanchard Road exit, approximately ½ mile from I-220 intersection and approximately 0.25 miles north of Cross Lake. **Figure 1** illustrates the general geographic location of the HMM Landfill.

3.2 Landfill Classification and Service Area

The HMM Landfill currently consists of a Type III waste disposal area that is operated in accordance with the Louisiana Administrative Code 33:VII governing solid waste disposal in the State of Louisiana. A large portion of the site is dedicated to waste disposal activities. In addition to waste disposal, a small rock/concrete "separation" operation is also located within the landfill footprint near the entrance to the site. Both operations and owned and operated by HMM.

Type III waste materials consist of construction and demolition debris and wood waste. Industrial and household municipal solid waste is excluded from the HMM Landfill's waste stream. There is always a possibility, however, that excluded waste may be brought to the Landfill unintentionally and that this waste could potentially represent a threat to health and safety.

The Service Area for the facility is an unrestricted area; but, practically speaking, encompasses two Louisiana Parishes: Caddo and Bossier.

3.3 Managing Authority and Personnel

The Landfill is owned and managed by HMM. Currently, six (6) people are employed at the HMM Landfill. Key personnel are listed in **Table 1.** The Landfill Manager is designated as the Facility On-Scene Coordinator (FOSC).

Table 1
HMM Landfill
Key Personnel

Owner, Type A License	Michael Harrelson	(cell)318.286.6882
Landfill Mgr, Type B License [FOSC]	Marsha Harrelson	(off) 318.425.3218

3.4 Location of Emergency Facilities and Evacuation Routes

In general, safety, first aid, and fire fighting equipment are maintained on the equipment and in the Scale Master's truck at the HMM Landfill. In addition, personal protective equipment and radio communications have been provided site personnel. The Shreveport

Fire Department has provided a willingness to provide first response emergencies and services as indicated by their letter included in **Appendix C.**

In the event of a major emergency requiring an evacuation, the primary entrance to the Landfill will act as the primary evacuation route. The entrance/exit road for the HMM Landfill intersects Russell Road to the west. **Figure 2** depicts the location of the nearest medical facility in relation to the HMM Landfill.

4.0 Facility Structures

There are currently a limited number of permanent buildings or structures located at the HMM Landfill. These buildings include the main facility office building, one portable building adjacent to the Russell Road access (Tool Shed), and Security trailer.

Potable water, electricity and sanitary facilities are available at the main facility office building and Security Trailer. Telephone and cell phone communications are maintained at the office building and with each employee working at the landfill. This means that any employee has the capability of one-touch notification of the main office if an emergency is happening anywhere on the landfill property.

5.0 Emergency Procedures & Equipment

An "Emergency" is defined as any situation, condition, or circumstance that could be a potential danger to human life or health, the environment, or any situation that would require the response of emergency personnel. The HMM Landfill has established general guidelines and procedures for responding to emergency situations (See **Appendix A**). Emergency situations include, but are not limited to:

- *Fire: This situation would most likely include a trash fire, brush fire, or equipment fire. Fires can originate due to natural occurrences such as lightning, equipment malfunction, or human error.*
- *Medical Emergency: A medical emergency would include any situation or accident to anyone at the Landfill that requires medical attention beyond the established scope of "First Aid".*
- *Security Breach: A security breach would include any situation that would require the immediate response of law enforcement personnel. Potential security breaches would include unauthorized access after operating hours, illegal dumping, vandalism, or attempted arson associated with facility equipment.*
- *Unauthorized Waste: An unauthorized waste emergency would include any situation where there is a need for stabilization or removal of any hazardous substance, radioactive material, hazardous waste, explosives, medical waste or any type of unpermitted waste that can pose a threat to the lives or health of HMM employees.*
- *Vehicle Accident: The Landfill is located in relatively close proximity to a major interstate. As such a vehicle accident at the facility or in the vicinity of the facility is possible.*

- *Natural Disaster or Weather Related Emergency: A natural disaster and/or weather related emergency such as flood, tornado, or earthquake may require immediate attention in regards to emergency response at the site.*
- *Explosion: This situation would most likely include a break in the gas line that runs alongside the landfill's northeastern most border, approximately 50' from the property line. Explosions can originate through breaks due to heavy equipment use, lightning, or "holidays" in joints or pipe due to corrosion or erosion.*

5.1 Emergency Procedures

In the event of an emergency, the following guidelines (depending upon the severity and nature of the situation) are to be followed:

I) The communication system is to be activated and all personnel at the Landfill are to be notified regarding the emergency. The site should be evacuated if necessary. Evacuation routes are shown in **Figure 2**.

II) The Facility On-Scene Coordinator (FOSC) or an Alternate FOSC shall be immediately contacted if they are not notified already. The personnel discovering the emergency condition will then immediately initiate the following:

a) Call 911. Fire, Ambulance, or Police, if deemed necessary by the FOSC and conduct any necessary actions as directed by the FOSC and/or his alternate.

b) If the FOSC or his/her alternate is not available, the personnel discovering the emergency will then exercise his/her best judgment and implement the FOSC response plan listed below.

The FOSC will implement the following:

1. Notify state and/local agencies and emergency response personnel if their help is needed.
2. If there is a chemical release, fire, or explosion immediately identify the character, exact source, amount, and real extent of any released materials. The reconnaissance should only be conducted if it can be done without compromising the FOSC's personal safety or the safety of others.
3. Concurrently, assess possible hazards (both direct and indirect effects) to human health and the environment that may result from the release, fire, or explosion.
4. If it is determined that the release, fire or explosion may threaten human health or the environment outside the facility, the following should be reported:
   Notify the local authorities for possible evacuation and provide aid, if necessary. The notification must include the following:
   i. Name and telephone number of the reporter;

ii. Name and address of the facility;
iii. Time, and type of incident;
iv. Type of emergency and the name and quantity of any materials involved;
v. The extent of injuries; and,
vi. The possible hazards to human health and the environment, outside the facility.

5. If evacuation of the HMM Landfill is necessary, all persons should be notified and accounted for.
6. The FOSC shall take all reasonable measures to ensure that fires, explosions and releases do not occur, reoccur, or spread to other operations at the facility.
7. Immediately after an emergency, the emergency coordinator must provide for treating, storing, or disposing of recovered waste, contaminated soil or water or any other material that results from any chemical release, fire, or explosion.
8. The emergency coordinator must ensure that, in the effected area of the facility:
    a. No waste that is incompatible with the released material is treated, stored, or disposed of until clean-up procedures are completed.
    b. All emergency equipment listed in the Emergency Response Plan (ERP) is cleaned and fit for its intended use before operations are resumed.
    c. The extent of injuries and an assessment of hazards to human health and the environment is documented.
9. Documentation and reporting – All emergencies or occurrences and response measures implemented should be documented and maintained as part of the HMM permanent operating record (**Appendix B**).

Permanent operating records pertaining to the Landfill operations are generally maintained in a fireproof cabinet at the main HMM office.

5.2 Emergency Equipment

The emergency response equipment that is available and a description of their location at the facility are shown in **Table 2.**

Table 2
Emergency Response Equipment Summary

Description	*Location/Remarks*
Eye & Ear Protection	Ear plugs & eye goggles-LF office trailer
Eye Wash Area	First Aid kit-LF Office Trailer
Rubber Boots, Hard Hats	LF Office Trailer
Shovels	LF- Tool Shed
Absorbent Material	Cover dirt piles
Fire Plug	LF Office
Fire Extinguishers	Located on Equipment, LF Office and Tool Shed
Water Sources	LF office, Sediment pond
Communication	Each employee issued a cell phone
Vacuum Trucks	Adjacent to Landfill Office Trailer

Table 3
Spill and Emergency Contact List

Contact	*Phone Number*
Police, Fire and Medical Response (emergency)	911
Shreveport Police Dept	911
Louisiana State Police (emergency)	911
Caddo Parish Sheriff's Office	911
Shreveport Fire Dept	911
Caddo Parish	318.221.6273
Caddo-Bossier Office of Homeland Security & Emergency (OHSEP)	318.425.5351
WK Bossier Health Center	318.212.7500
LDEQ-Permits Division	225.219.3181

6.0 Security

The maximum days and hours of operation will be 6:30 AM to 9 PM Monday through Saturday. At all other times, the entrance to the Landfill will be locked, thus eliminating access when the Landfill is closed. Normal operational hours will be 7 AM to 5:30 PM Monday through Friday, and 7:30 AM to 3:30 PM on Saturday. The normal operational hours will be posted at the gate. During operating hours, the single entrance to the facility is continuously manned and monitored by a certified solid waste operator. During non-operating hours, the single entrance is locked.

7.0 Personnel Training Plan

The Landfill has a specific number and level of certified landfill operators employed at the facility as required by the Louisiana Administrative Code, Title 46, Part XXIII and the LDEQ. The Board of Certification and Training for Solid Waste Disposal System Operators and the Office of Environmental Services, Permits Division will be notified within 30 days of any changes in the employment status of certified operators.

Personnel training records for all HMM Landfill operators and personnel are kept on file as part of the facility permanent operating record. All new hires will be required to read and understand the purpose and location of this ERP. Training sessions will be conducted

annually (once per calendar year) for all employees working at the HMM Landfill. These sessions consists of:

- an intense review of the EPR
- an emergency drill exercise
- a discussion of potential emergencies and each individual's expected role with regard to Section 5.1 Emergency Procedures
- a written exam given each employee over the material covered, above.

These sessions will be conducted by the designated Facility On-Scene Coordinator (FOSC). The training program will be developed and conducted in accordance with OSHA Publication 3088 "How to Prepare for Workplace Emergencies" (**Appendix A).**

8.0 Plan Review and Amendments

This ERP is to be reviewed and evaluated at least once every year from the date that this plan is finalized and goes into effect. This policy should remain in effect until the Landfill is officially closed in accordance with LDEQ requirements. This ERP should also be reviewed and amended whenever:

- The plan fails in an emergency situation; and/or,
- The Landfill changes its design, construction, operation, or maintenance in a way that materially affects the Landfill's potential to respond to an emergency.

The ERP is to be amended as soon as possible, but no later than one month after such a change occurs.

9.0 Conclusions and Recommendations

Potential emergencies include but are not limited to:

1) A fire or explosion of any type;
2) Unauthorized dumping or any breach in Landfill security;
3) Medical emergencies;
4) Stabilization of any unauthorized materials or hazardous waste (includes radioactive materials and infectious waste);
5) Weather related emergencies (tornado, severe thunderstorm, etc.);
6) Vehicles crash; and,
7) Natural disaster (e.g., earthquake, flood).

The following recommendations should be considered as necessary for responding to emergencies at the Landfill:

- A copy of this plan should remain at the HMM Landfill at all times. All HMM employees should be familiar with this ERP and should have access to a copy at all times. They should also be aware of the locations of all local hospitals within the area.

- All new employees at the Landfill must have the necessary training for landfill operations and Hazardous Waste recognition as required by the LDEQ. It is also important that all new employees read and understand this ERP.
- All operators should have proper ear protection, eye protection, steel toe boots, and a hard hat at all times.

FIGURE 1

SITE LOCATION MAP

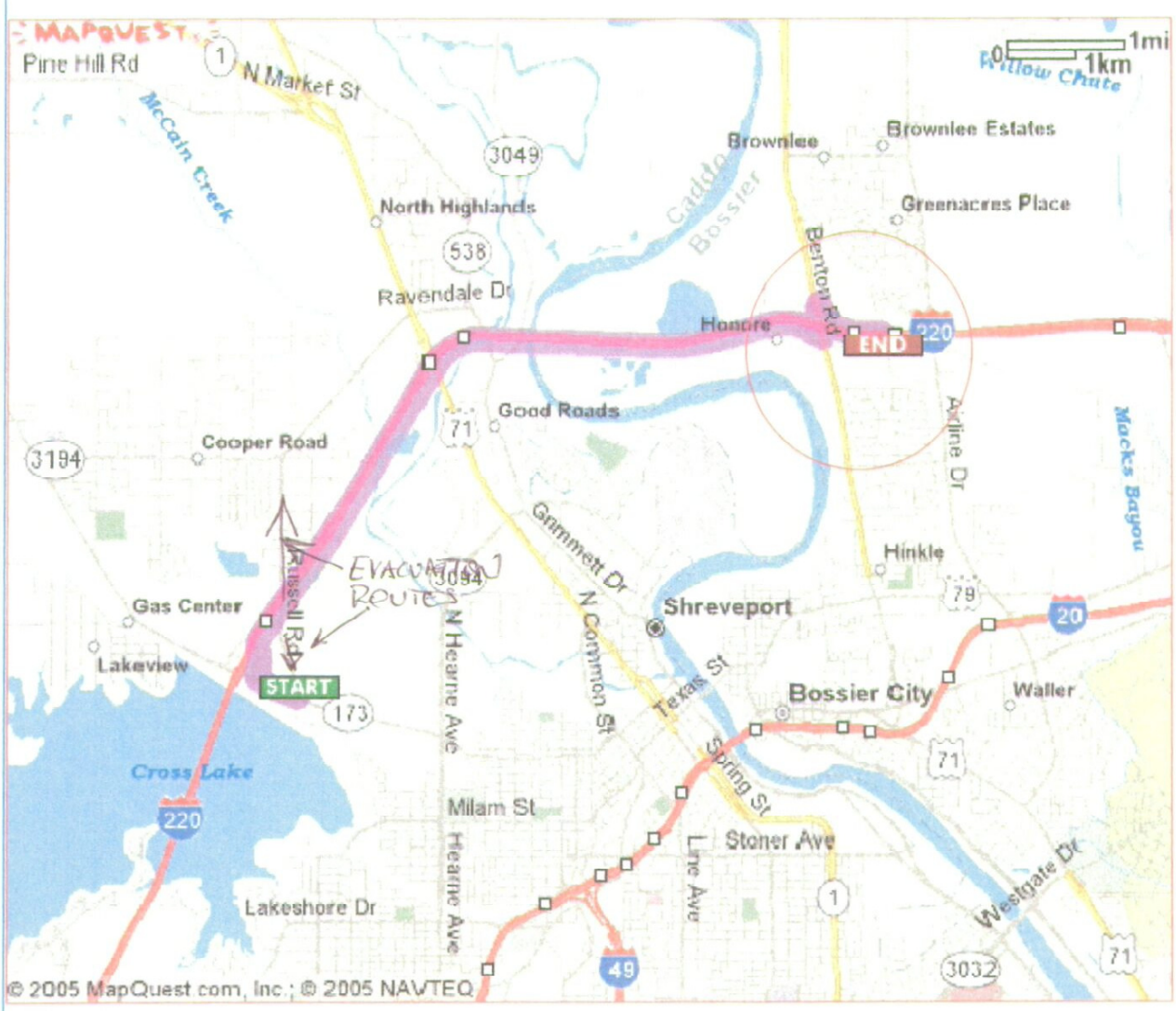
DESIGNED BY:	D. Taylor
DRAWN BY:	D. Taylor
APPVD. BY:	B. Edwards
DATE:	2/1/05
ACAD NO.	
SCALE:	NTS

EMERGENCY RESPONSE PLAN
HARRELSON MATERIALS MANAGEMENT LANDFILL

CADDO PARISH, LOUISIANA

EDWARDS ENGINEERING, P.A.
CIVIL AND ENVIRONMENTAL ENGINEERING, PLANNING AND CONSULTING
9802 Maumelle Blvd
North Little Rock, AR 72113
(501) 219-2808
Fax (501) 219-2809

JOB NO.: RS-AR-WMV-05-02



WK BOSSIER HEALTH CENTER
2400 HOSPITAL DRIVE
BOSSIER CITY, LA 71111

FIGURE 2

MAP TO NEAREST HOSPITAL

DESIGNED BY:	D. Taylor
DRAWN BY:	D. Taylor
APPVD. BY:	B. Edwards
DATE:	2/1/05
ACAD NO.	
SCALE:	NTS

EMERGENCY RESPONSE PLAN
HARRELSON MATERIALS MANAGEMENT LANDFILL
CADDO PARISH, LOUISIANA

EDWARDS ENGINEERING, P.A.
CIVIL AND ENVIRONMENTAL ENGINEERING - PLANNING AND CONSULTING
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North Little Rock, AR 72113
(501) 219-2808
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JOB NO.: RS-AR-WMV-05-02

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APPENDIX A
HOW TO PREPARE FOR WORKPLACE EMERGENCIES – OSHA 3088

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How to Plan for Workplace Emergencies and Evacuations

U.S. Department of Labor
Occupational Safety and Health Administration

OSHA 3088
2001 (Revised)

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How to Plan for Workplace Emergencies and Evacuations

U.S. Department of Labor
Elaine L. Chao, Secretary

John L. Henshaw, Assistant Secretary
Occupational Safety and Health Administration

OSHA 3088
2001 (Revised)

This booklet provides a generic overview of a standards-related topic. This publication does not alter or determine compliance responsibilities which are described in the OSHA standards and the Occupational Safety and Health Act. Because interpretations and enforcement policy may change over time, the best sources for additional guidance on OSHA compliance requirements are current administrative interpretations and decisions by the Occupational Safety and Health Review Commission and the courts. This publication is in the public domain and may be reproduced fully or partially without permission. Source credit is requested but not required.

OSHA will make this information available to sensory impaired individuals upon request. Call (202) 693-1999.

Introduction

Nobody expects an emergency or disaster – especially one that affects them, their employees, and their business personally. Yet the simple truth is that emergencies and disasters can strike anyone, anytime, and anywhere. You and your employees could be forced to evacuate your company when you least expect it.

This booklet is designed to help you, the employer, plan for that possibility. The best way to protect yourself, your workers, and your business is to expect the unexpected and develop a well-thought-out emergency action plan to guide you when immediate action is necessary.

What is a workplace emergency?

A workplace emergency is an unforeseen situation that threatens your employees, customers, or the public; disrupts or shuts down your operations; or causes physical or environmental damage. Emergencies may be natural or manmade and include the following:

- Floods,
- Hurricanes,
- Tornadoes,
- Fires,
- Toxic gas releases,
- Chemical spills,
- Radiological accidents,
- Explosions,
- Civil disturbances, and
- Workplace violence resulting in bodily harm and trauma.

How do you protect yourself, your employees, and your business?

The best way is to prepare to respond to an emergency before it happens. Few people can think clearly and logically in a crisis, so it is important to do so in advance, when you have time to be thorough.

Brainstorm the worst-case scenarios. Ask yourself what you would do if the worst happened. What if a fire broke out in your boiler room? Or a hurricane hit your building head-on? Or a train carrying hazardous waste derailed while passing your loading dock? Once you have identified potential emergencies, consider how they would affect you and your workers and how you would respond.

What is an emergency action plan?

An emergency action plan covers designated actions employers and employees must take to ensure employee safety from fire and other emergencies. Not all employers are required to establish an emergency action plan. See the flowchart on page 11 to determine if you are. Even if you are not specifically required to do so, compiling an emergency action plan is a good way to protect yourself, your employees, and your business during an emergency.

Putting together a comprehensive emergency action plan that deals with all types of issues specific to your worksite is not difficult.

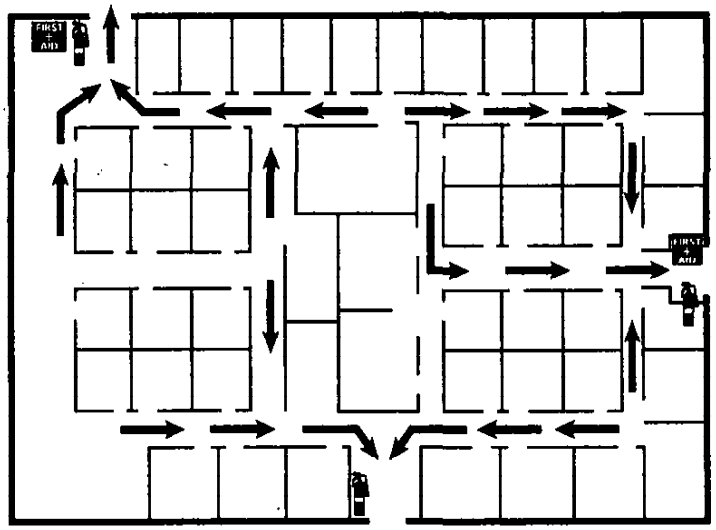
What should your emergency action plan include?

You may find it beneficial to include your management team and employees in the process. Explain your goal of protecting lives and property in the event of an emergency, and ask for their help in establishing and implementing your emergency action plan. Their commitment and support are critical to the plan's success.

When developing your emergency action plan, it's a good idea to look at a wide variety of potential emergencies that could occur in your workplace. It should be tailored to your worksite and include information about all potential sources of emergencies. Developing an emergency action plan means you should do a hazard assessment to determine what, if any, physical or chemical hazards in your workplaces could cause an emergency. If you have more than one worksite, each site should have an emergency action plan.

At a minimum, your emergency action plan must include the following:

- A preferred method for reporting fires and other emergencies;
- An evacuation policy and procedure;
- Emergency escape procedures and route assignments, such as floor plans, workplace maps, and safe or refuge areas;



- Names, titles, departments, and telephone numbers of individuals both within and outside your company to contact for additional information or explanation of duties and responsibilities under the emergency plan;
- Procedures for employees who remain to perform or shut down critical plant operations, operate fire extinguishers, or perform other essential services that cannot be shut down for every emergency alarm before evacuating; and
- Rescue and medical duties for any workers designated to perform them.

You also may want to consider designating an assembly location and procedures to account for all employees after an evacuation.

In addition, although they are not specifically required by OSHA, you may find it helpful to include in your plan the following:

- The site of an alternative communications center to be used in the event of a fire or explosion; and
- A secure on- or offsite location to store originals or duplicate copies of accounting records, legal documents, your employees' emergency contact lists, and other essential records.

How do you alert employees to an emergency?

Your plan must include a way to alert employees, including disabled workers, to evacuate or take other action, and how to report emergencies, as required. Among the steps you must take are the following:

- Make sure alarms are distinctive and recognized by all employees as a signal to evacuate the work area or perform actions identified in your plan;
- Make available an emergency communications system such as a public address system, portable radio unit, or other means to notify employees of the emergency and to contact local law enforcement, the fire department, and others; and
- Stipulate that alarms must be able to be heard, seen, or otherwise perceived by everyone in the workplace. You might want to consider providing an auxiliary power supply in the event that electricity is shut off. (*29 CFR* 1910.165(b)(2) offers more information on alarms.)

Although it is not specifically required by OSHA, you also may want to consider the following:

- Using tactile devices to alert employees who would not otherwise be able to recognize an audible or visual alarm; and
- Providing an updated list of key personnel such as the plant manager or physician, in order of priority, to notify in the event of an emergency during off-duty hours.

How do you develop an evacuation policy and procedures?

A disorganized evacuation can result in confusion, injury, and property damage. That is why when developing your emergency action plan it is important to determine the following:

- Conditions under which an evacuation would be necessary;
- A clear chain of command and designation of the person in your business authorized to order an evacuation or shutdown. You may want to designate an "evacuation warden" to assist others in an evacuation and to account for personnel;
- Specific evacuation procedures, including routes and exits. Post these procedures where they are easily accessible to all employees;
- Procedures for assisting people with disabilities or who do not speak English;
- Designation of what, if any, employees will continue or shut down critical operations during an evacuation. These people must be

capable of recognizing when to abandon the operation and evacuate themselves; and

- A system for accounting for personnel following an evacuation. Consider employees' transportation needs for community-wide evacuations.

Under what conditions should you call for an evacuation?

In the event of an emergency, local emergency officials may order you to evacuate your premises. In some cases, they may instruct you to shut off the water, gas, and electricity. If you have access to radio or television, listen to newscasts to keep informed and follow whatever official orders you receive.

In other cases, a designated person within your business should be responsible for making the decision to evacuate or shut down operations. Protecting the health and safety of everyone in the facility should be the first priority. In the event of a fire, an immediate evacuation to a predetermined area away from the facility is the best way to protect employees. On the other hand, evacuating employees may not be the best response to an emergency such as a toxic gas release at a facility across town from your business.

The type of building you work in may be a factor in your decision. Most buildings are vulnerable to the effects of disasters such as tornadoes, earthquakes, floods, or explosions. The extent of the damage depends on the type of emergency and the building's construction. Modern factories and office buildings, for example, are framed in steel and are structurally more sound than neighborhood business premises may be. In a disaster such as a major earthquake or explosion, however, nearly every type of structure will be affected. Some buildings will collapse and others will be left with weakened floors and walls.

What is the role of coordinators and evacuation wardens during an emergency?

When drafting your emergency action plan, you may wish to select a responsible individual to lead and coordinate your emergency plan and evacuation. It is critical that employees know who the coordinator is and understand that person has the authority to make decisions during emergencies.

The coordinator should be responsible for the following:

- Assessing the situation to determine whether an emergency exists requiring activation of your emergency procedures;
- Supervising all efforts in the area, including evacuating personnel;

- Coordinating outside emergency services, such as medical aid and local fire departments, and ensuring that they are available and notified when necessary; and
- Directing the shutdown of plant operations when required.

You also may find it beneficial to coordinate the action plan with other employers when several employers share the worksite, although OSHA standards do not specifically require this.

In addition to a coordinator, you may want to designate evacuation wardens to help move employees from danger to safe areas during an emergency. Generally, one warden for every 20 employees should be adequate, and the appropriate number of wardens should be available at all times during working hours.

Employees designated to assist in emergency evacuation procedures should be trained in the complete workplace layout and various alternative escape routes. All employees and those designated to assist in emergencies should be made aware of employees with special needs who may require extra assistance, how to use the buddy system, and hazardous areas to avoid during an emergency evacuation.

How do you establish evacuation routes and exits?

When preparing your emergency action plan, designate primary and secondary evacuation routes and exits. To the extent possible under the conditions, ensure that evacuation routes and emergency exits meet the following conditions:

- Clearly marked and well lit;
- Wide enough to accommodate the number of evacuating personnel;
- Unobstructed and clear of debris at all times; and
- Unlikely to expose evacuating personnel to additional hazards.

If you prepare drawings that show evacuation routes and exits, post them prominently for all employees to see.

How do you account for employees after an evacuation?

Accounting for all employees following an evacuation is critical. Confusion in the assembly areas can lead to delays in rescuing anyone trapped in the building, or unnecessary and dangerous search-and-rescue operations. To ensure the fastest, most accurate accountability of your employees, you may want to consider including these steps in your emergency action plan:

- Designate assembly areas where employees should gather after evacuating;
- Take a head count after the evacuation. Identify the names and last known locations of anyone not accounted for and pass them to the official in charge;
- Establish a method for accounting for non-employees such as suppliers and customers; and

How should you plan for rescue operations?

- Establish procedures for further evacuation in case the incident expands. This may consist of sending employees home by normal means or providing them with transportation to an offsite location.

It takes more than just willing hands to save lives. Untrained individuals may endanger themselves and those they are trying to rescue. For this reason, it is generally wise to leave rescue work to those who are trained, equipped, and certified to conduct rescues.

If you have operations that take place in permit-required confined spaces, you may want your emergency action plan to include rescue procedures that specifically address entry into each confined space. (See also OSHA Publication 3138, *Permit-Required Confined Spaces*, and the National Institute for Occupational Safety and Health (NIOSH) Publication 80-106, *Criteria for a Recommended Standard... Working in Confined Spaces.*)

What medical assistance should you provide during an emergency?

If your company does not have a formal medical program, you may want to investigate ways to provide medical and first-aid services. If medical facilities are available near your worksite, you can make arrangements for them to handle emergency cases. Provide your employees with a written emergency medical procedure to minimize confusion during an emergency.

If an infirmary, clinic, or hospital is not close to your workplace, ensure that onsite person(s) have adequate training in first aid. The American Red Cross, some insurance providers, local safety councils, fire departments, or other resources may be able to provide this training. Treatment of a serious injury should begin within 3 to 4 minutes of the accident.

Consult with a physician to order appropriate first-aid supplies for emergencies. Medical personnel must be accessible to provide advice and consultation in resolving health problems that occur in the workplace. Establish a relationship with a local ambulance service so transportation is readily available for emergencies.

What role should employees play in your emergency action plan?

The best emergency action plans include employees in the planning process, specify what employees should do during an emergency, and ensure that employees receive proper training for emergencies. When you include your employees in your planning, encourage them to offer suggestions about potential hazards, worst-case scenarios, and proper emergency responses. After you develop the plan, review it with your employees to make sure everyone knows what to do before, during and after an emergency.

Keep a copy of your emergency action plan in a convenient location where employees can get to it, or provide all employees a copy. If you have 10 or fewer employees, you may communicate your plan orally.

What employee information should your plan include?

In the event of an emergency, it could be important to have ready access to important personal information about your employees. This includes their home telephone numbers, the names and telephone numbers of their next of kin, and medical information.

What type of training do your employees need?

Educate your employees about the types of emergencies that may occur and train them in the proper course of action. The size of your workplace and workforce, processes used, materials handled, and the availability of onsite or outside resources will determine your training requirements. Be sure all your employees understand the function and elements of your emergency action plan, including types of potential emergencies, reporting procedures, alarm systems, evacuation plans, and shutdown procedures. Discuss any special hazards you may have onsite such as flammable materials, toxic chemicals, radioactive sources, or water-reactive substances. Clearly communicate to your employees who will be in charge during an emergency to minimize confusion.

General training for your employees should address the following:

- Individual roles and responsibilities;
- Threats, hazards, and protective actions;
- Notification, warning, and communications procedures;
- Means for locating family members in an emergency;
- Emergency response procedures;
- Evacuation, shelter, and accountability procedures;
- Location and use of common emergency equipment; and
- Emergency shutdown procedures.

You also may wish to train your employees in first-aid procedures, including protection against bloodborne pathogens; respiratory protection, including use of an escape-only respirator; and methods for preventing unauthorized access to the site.

Once you have reviewed your emergency action plan with your employees and everyone has had the proper training, it is a good idea to hold practice drills as often as necessary to keep employees prepared. Include outside resources such as fire and police departments when possible. After each drill, gather management and employees to evaluate the effectiveness of the drill. Identify the strengths and weaknesses of your plan and work to improve it.

How often do you need to train your employees?

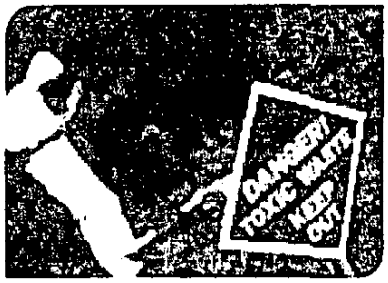
Review your plan with all your employees and consider requiring annual training in the plan. Also offer training when you do the following:

- Develop your initial plan;
- Hire new employees;
- Introduce new equipment, materials, or processes into the workplace that affect evacuation routes;
- Change the layout or design of the facility; and
- Revise or update your emergency procedures.

What does your plan need to include about hazardous substances?

No matter what kind of business you run, you could potentially face an emergency involving hazardous materials such as flammable, explosive, toxic, noxious, corrosive, biological, oxidizable, or radioactive substances.

The source of the hazardous substances could be external, such as a local chemical plant that catches on fire or an oil truck that overturns on a nearby freeway. The source may be within your physical plant. Regardless of the source, these events could have a direct impact on your employees and your business and should be addressed by your emergency action plan.



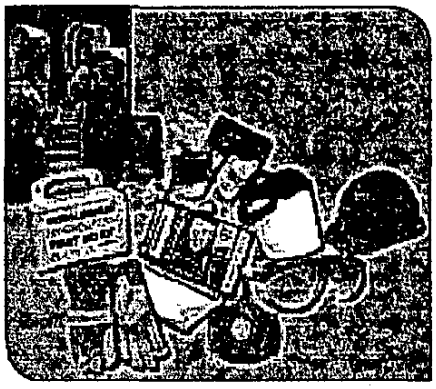
If you use or store hazardous substances at your worksite, you face an increased risk of an emergency involving hazardous materials and should address this possibility in your emergency action plan. OSHA's Hazard Communication Standard (*29 CFR* 1910.1200) requires employers who use hazardous chemicals to inventory them, keep the manufacturer-supplied Material Safety Data Sheets (MSDSs) for them in a place accessible to workers, label containers of these chemicals with their hazards, and train employees in ways to protect themselves against those hazards. A good way to start is to determine from your hazardous chemical inventory what hazardous chemicals you use and to gather the MSDSs for the chemicals. MSDSs describe the hazards that a chemical may present, list the precautions to take when handling, storing, or using the substance, and outline emergency and first-aid procedures.

For specific information on how to respond to emergencies involving hazardous materials and hazardous waste operations, refer to *29 CFR*, Part 1910.120(q) and OSHA Publication 3114, *Hazardous Waste and Emergency Response Operations.* Both are available online at www.osha.gov.

What special equipment should you provide for emergencies?

Your employees may need personal protective equipment to evacuate during an emergency. Personal protective equipment must be based on the potential hazards in the workplace. Assess your workplace to determine potential hazards and the appropriate controls and protective equipment for those hazards. Personal protective equipment may include items such as the following:

- Safety glasses, goggles, or face shields for eye protection;
- Hard hats and safety shoes for head and foot protection;
- Proper respirators;
- Chemical suits, gloves, hoods, and boots for body protection from chemicals;



- Special body protection for abnormal environmental conditions such as extreme temperatures; and
- Any other special equipment or warning devices necessary for hazards unique to your worksite.

How do you choose appropriate respirators and other equipment?

Consult with health and safety professionals before making any purchases. Respirators selected should be appropriate to the hazards in your workplace, meet OSHA standards criteria, and be certified by the National Institute for Occupational Safety and Health.

Respiratory protection may be necessary if your employees must pass through toxic atmospheres of dust, mists, gases, or vapors, or through oxygen-deficient areas while evacuating. There are four basic categories of respirators for use in different conditions. All respirators must be NIOSH-certified under the current *29 CFR* 1910.134. See also OSHA's *Small Entity Compliance Guide for Respiratory Protection, 1999*, online at www.osha.gov.

Who should you coordinate with when drafting your emergency action plan?

Although there is no specific OSHA requirement to do so, you may find it useful to coordinate your efforts with any other companies or employee groups in your building to ensure the effectiveness of your plan. In addition, if you rely on assistance from local emergency responders such as the fire department, local HAZMAT teams, or other outside responders, you may find it *useful to coordinate your emergency plans with these organizations.* This ensures that you are aware of the capabilities of these outside responders and that they know what you expect of them.

What are OSHA's requirements for emergencies?

Some of the key OSHA requirements for emergencies can be found in the following sections of the agency's General Industry Occupational Safety and Health Standards (*29 CFR* 1910).

Subpart E – Means of Egress

1910.37	Means of egress
1910.38	Employee emergency plans and fire prevention plans
Appendix	Means of egress

Subpart H – Hazardous Materials

1910.119	Process safety management of highly hazardous chemicals
1910.120	Hazardous waste operations and emergency response

Subpart I – Personal Protective Equipment

1910.133	Eye and face protection
1910.134	Respiratory protection
1910.135	Occupational head protection
1910.136	Occupational foot protection
1910.138	Hand protection

Subpart J – General Environmental Controls

1910.146	Permit-required confined spaces
1910.147	Control of hazardous energy sources

Subpart K – Medical and First Aid

1910.151	Medical services and first aid

Subpart L – Fire Protection

1910.155-156	Fire protection and fire brigades
1910.157-163	Fire suppression equipment
1910.164	Fire detection systems
1910.165	Employee alarm systems

Appendices A-E of Subpart L

Subpart R – Special Industries, Electrical Power Generation, Transmission, and Distribution

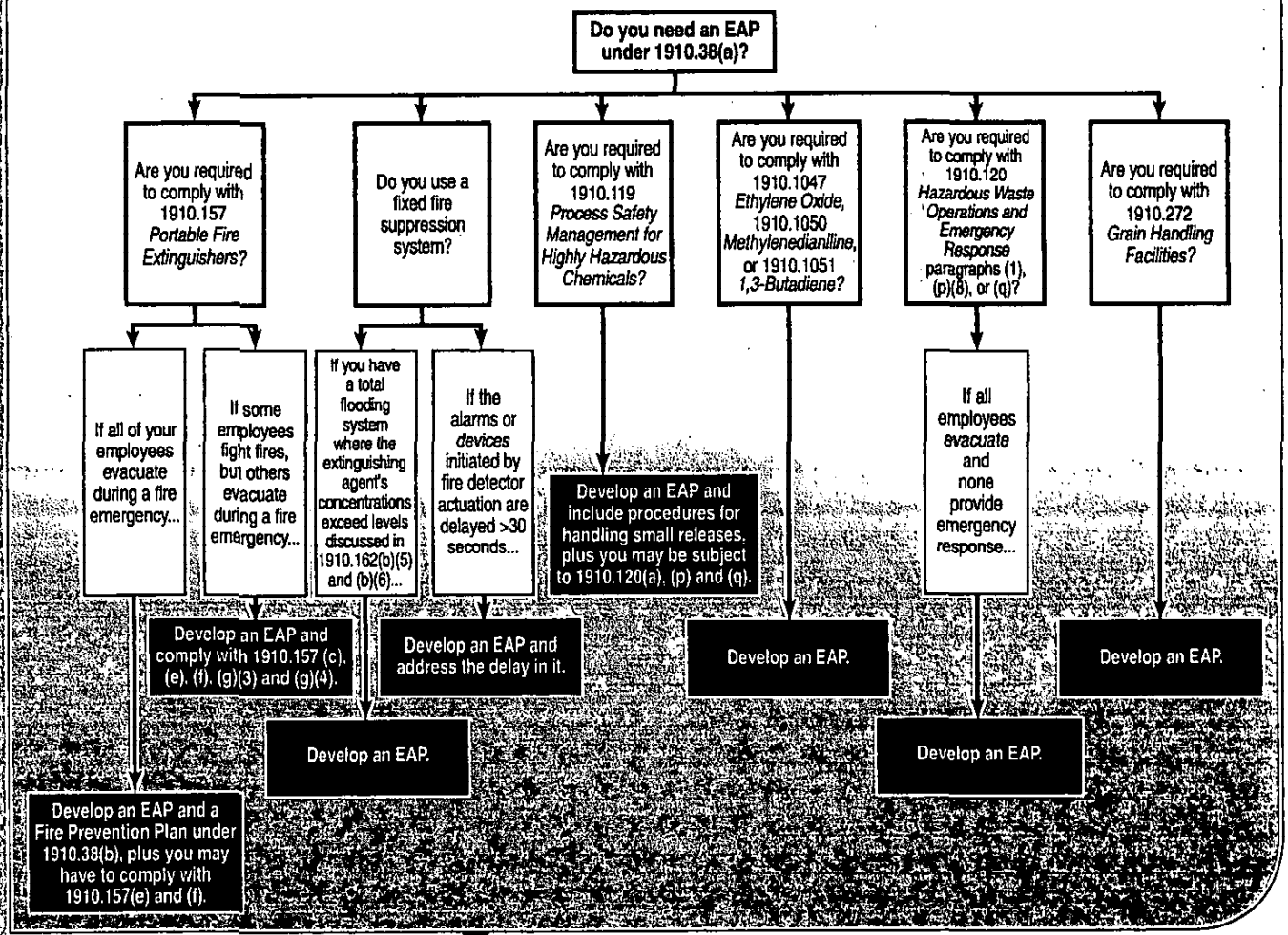
Subpart Z – Toxic and Hazardous Substances

1910.1030	Bloodborne pathogens
1910.1200	Hazard communication

What other OSHA standards address emergency planning requirements?

In addition to *29 CFR* 1910.38(a), several other OSHA standards address emergency planning requirements. These include the *29 CFR* 1910.120(q), *Hazardous Waste Operations and Emergency Response; 29 CFR* 1910.156, *Fire Brigades;* and *29 CFR* 1910.146(k), *Permit-Required Confined Spaces.* The OSHA Publication 3122, *Principal Emergency Response and Preparedness Requirements in OSHA Standards and Guidance for Safety and Health Problems,* provides a broad view of emergency planning requirements across OSHA standards.

Standards That Refer to 1910.38(a) *Emergency Action Plan (EAP)* and Additional Emergency Planning Procedures



What assistance does OSHA provide?

OSHA provides a wide range of references and services to help employers and employees improve workplace health and safety and comply with regulatory requirements. These include the following:

- Education and training opportunities,
- Publications,
- Electronic services,
- Free onsite consultation services, and
- Participation in the Voluntary Protection Programs.

To file a complaint, report an emergency, or seek OSHA advice, assistance, or products, call 1-800-321 OSHA or your nearest regional office, listed in Appendix 1. The teletypewriter (TTY) number is 1-877-889-5627.

Information on these and other OSHA programs and services is posted on the agency website at www.osha.gov.

What education and training does OSHA offer?

OSHA area offices offer a variety of information services including publications, audiovisual aids, technical advice, and speakers for special engagements.

In addition, OSHA's Training Institute in Des Plaines, IL, provides basic and advanced courses in safety and health for federal and state *compliance officers, state* consultants, federal agency employees, and private-sector employers, employees, and their representatives.

Due to the high demand for OSHA Training Institute courses, OSHA Training Institute Education Centers also offer them at sites throughout the United States. These centers are nonprofit colleges, universities, and other organizations selected through a competitive process.

OSHA also provides grants to nonprofit organizations to conduct specialized workplace training and education not available from other sources. Grants are awarded annually. Recipients contribute 20 percent of the total grant cost.

For more information on grants, training, and education, contact the OSHA Training Institute, Office of Training and Education by mail at 1555 Times Drive, Des Plaines IL 60018; by phone at (847) 297-4810, or by fax at (847) 297-4874.

What other publications does OSHA offer?

OSHA offers more than 100 documents, including brochures, fact sheets, posters, pocket cards, flyers, technical documents, and a quarterly magazine. These documents are available online at www.osha.gov or by calling (202) 693-1888. Among the titles are the following:

- *Access to Medical and Exposure Records* – OSHA 3110
- *All About OSHA* – OSHA 2056
- *Chemical Hazard Communication* – OSHA 3084
- *Consultation Services for the Employer* – OSHA 3047
- *Controlling Electrical Hazards* – OSHA 3075
- *Employer Rights and Responsibilities Following an OSHA Inspection* – OSHA 3000
- *Employee Workplace Rights* – OSHA 3021
- *Hazardous Waste and Emergency Response* – OSHA 3114
- *Job Hazard Analysis* – OSHA 3071
- *OSHA Handbook for Small Business* – OSHA 2209
- *Personal Protective Equipment* – OSHA 3077
- *Respirator Protection* – OSHA 3079

What electronic services does OSHA provide?

OSHA standards, interpretations, directives, and additional information are posted on the agency's website at www.osha.gov. Visits to the site continue to increase, with nearly 1.4 million visitors using the site each month for a total of 23 million hits.

Among the popular Internet offerings are electronic tools to help small businesses understand and comply with OSHA regulations and promote safety and health in their workplaces. These e-Tools include the Expert Advisors, interactive software programs that help businesses identify workplace hazards. By answering a few simple questions on their computer screens, employers get reliable answers on how OSHA regulations apply to their unique work sites.

Another popular Internet product is eCATS, OSHA's electronic Compliance Assistance Tools, which help businesses identify and correct workplace hazards. A totally new generation of e-Tools coming soon will combine both decision tree logic software and graphics, giving users enhanced capabilities and the best of both worlds.

In addition, a wide variety of OSHA materials including standards, interpretations, directives, and more can be purchased on CD-ROM from the Government Printing Office. To order, write to Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Specify *OSHA Regulations, Documents and Technical Information on CD-ROM, (ORDT)*, S/N 729-1300000-5. The price is $45 per year ($57.50 overseas); single copy $17 ($21.25 overseas).

What free onsite consultation services does OSHA provide?

The OSHA Consultation Service offers free onsite safety and health consultation services to help employers establish and maintain safe and healthful workplaces. The service is funded largely by OSHA and is delivered by professional safety and health consultants within state governments. Developed primarily for smaller employers with more hazardous operations, the service includes an appraisal of all mechanical systems, physical work practices, environmental workplace hazards, and all aspects of the employer's job safety and health program.

The onsite consultation program is separate from OSHA's inspection efforts. No penalties are proposed or citations issued for safety or health problems identified by an OSHA consultant. The service is confidential. The employer's and firm's name, and any information about the workplace, including any unsafe or unhealthful working conditions the consultant identifies, are not reported routinely to the OSHA inspection staff. The employer, however, is obligated to correct any serious job safety and health hazards identified in a timely manner, and commits to do so when requesting the service.

For more information, see Appendix 3 for a list of contact telephone numbers.

What are the Voluntary Protection Programs?

The Voluntary Protection Programs, or VPPs, recognize and promote effective safety and health program management. Companies in the VPP have strong safety and health programs, implemented and managed cooperatively by their management and labor forces in cooperation with OSHA. Sites approved for VPP's three programs – Star, Merit, and Demonstration – meet and maintain rigorous standards. Benefits to participants include the following:

- Lost-workday case rates generally 60 to 80 percent below industry averages;
- Reduced workers' compensation and other injury- and illness-related costs;
- Improved employee motivation to work safely, leading to better quality and productivity;
- Positive community recognition and interaction;
- Further improvement and revitalization of already good safety and health programs; and
- Partnership with OSHA.

For more information, contact the VPP manager in your OSHA regional office, visit OSHA's website, or see Appendix 1 for a list of telephone numbers.

What partnership opportunities does OSHA provide?

OSHA has initiated partnerships with employers, employees, and employee representatives in a wide range of industries to encourage, assist, and recognize efforts to eliminate workplace hazards. Participants work together to identify a common goal, develop plans to achieve it, and implement those plans in a cooperative way. *Partnerships can transform relationships between* OSHA *and an* employer or entire industry. Former adversaries recognize that working together to solve workplace safety and health problems is to everyone's advantage.

For more information, contact your OSHA regional office. See Appendix 1 for a list of telephone numbers.

What is the value of a good safety and health program?

A good, effectively managed worker safety and health program can be a big factor in reducing work-related injuries and illnesses and their related costs. OSHA offers voluntary guidelines to help employers and employees in workplaces it covers develop effective safety and health programs. *Safety and Health Program Management Guidelines (Federal Register* 54(18): 3908-3916, January 26, 1989) identifies four general elements critical to a successful safety and health management program. These are:

- Management leadership and employee involvement;
- An analysis of worksite hazards;
- Use of hazard prevention and control initiatives; and
- Safety and health training.

These guidelines are posted on the OSHA website at www.osha-slc.gov/FedReg_osha_data/FED19890126.html. See also OSHA's Safety and Health Management Systems eCAT at www.osha-slc.gov/SLTC/safetyhealthecat/index.html.

What is the role of state programs?

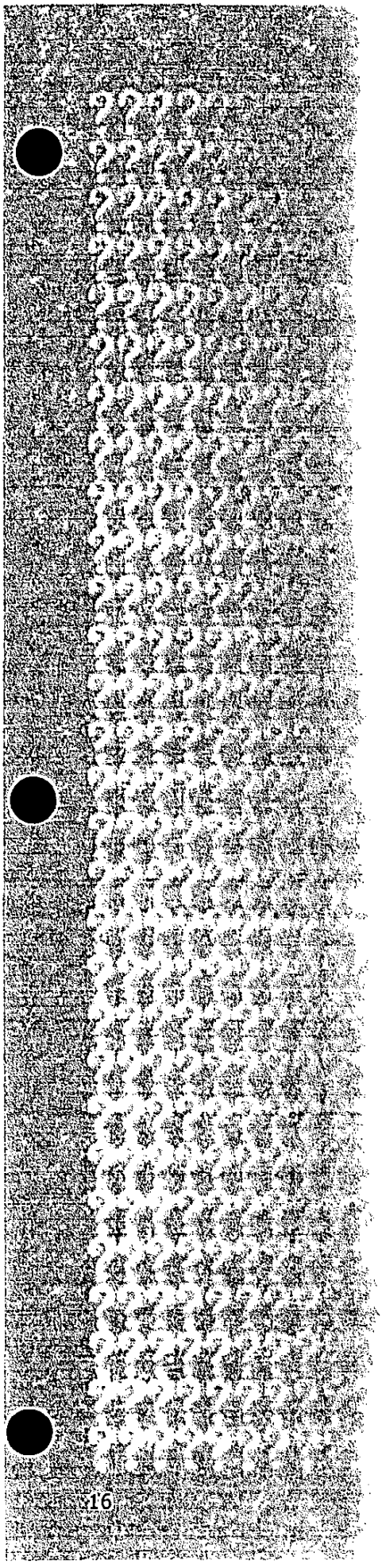
The *Occupational Safety and Health Act of 1970* encourages states to develop and operate their own job safety and health plans. States that do so must adopt standards and enforce requirements that are at least as effective as federal requirements. Twenty-four states and two territories have adopted their own plans, three of which cover only public employees. For more information, visit OSHA's website and see Appendix 2 for a listing of states and territories with approved plans.

What other groups or associations can help me?

Various organizations can provide you with safety and health information that may help you in formulating your emergency action plan. A few are listed here.

Safety Data Sheets, Guides and Manuals

- *AIHA Hygienic Guide Series.* American Industrial Hygiene Association, 2700 Prosperity Avenue, Fairfax, VA 22031.
- *ANSI Standards, Z37 Series, Acceptable Concentrations of Toxic Dusts and Gases.* American National Standards Institute, 11West 42nd Street, New York, NY 10036.



- *ASTM Standards and Related Material.* American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

Safety Standards and Specifications Groups

- American National Standards Institute, 11 West 42nd Street, New York, NY 10036. Coordinates and administers the federal voluntary standardization system in the United States.
- American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103. The world's largest source of voluntary consensus standards for materials, products, systems, and services.

Fire Protection Organizations

- Factory Insurance Association, 85 Woodland Street, Hartford, CT 06105. Composed of capital stock insurance companies that provide engineering, inspection, and loss-adjustment services.
- Factory Mutual System, 1151 Boston-Providence Turnpike, Norwood, MA 02062. An industrial fire protection, engineering, and inspection bureau established by mutual fire insurance companies.
- National Fire Protection Association, 470 Batterymarch Park, Quincy, MA 02269. A clearinghouse for information on fire protection and prevention as well as NFPA standards.
- Underwriter Laboratories, Inc., 207 East Ohio Street, Chicago, IL 60611. A nonprofit organization that publishes annual lists of manufacturers that provide products meeting appropriate standards.

Appendices

Appendix 1
OSHA Regional and Area Office Directory

OSHA Regional Offices

REGION I
(CT,* ME, MA, NH, RI, VT*)
JFK Federal Building, Room E340
Boston, MA 02203
(617) 565-9860

REGION II
(NJ,* PR,* VI*)
201 Varick Street, Room 670
New York, NY 10014
(212) 337-2378

REGION III
(DE, DC, MD,* PA,* VA,* WV)
The Curtis Center
170 S. Independence Mall West
Suite 740 West
Philadelphia, PA 19106-3309
(215) 861-4900

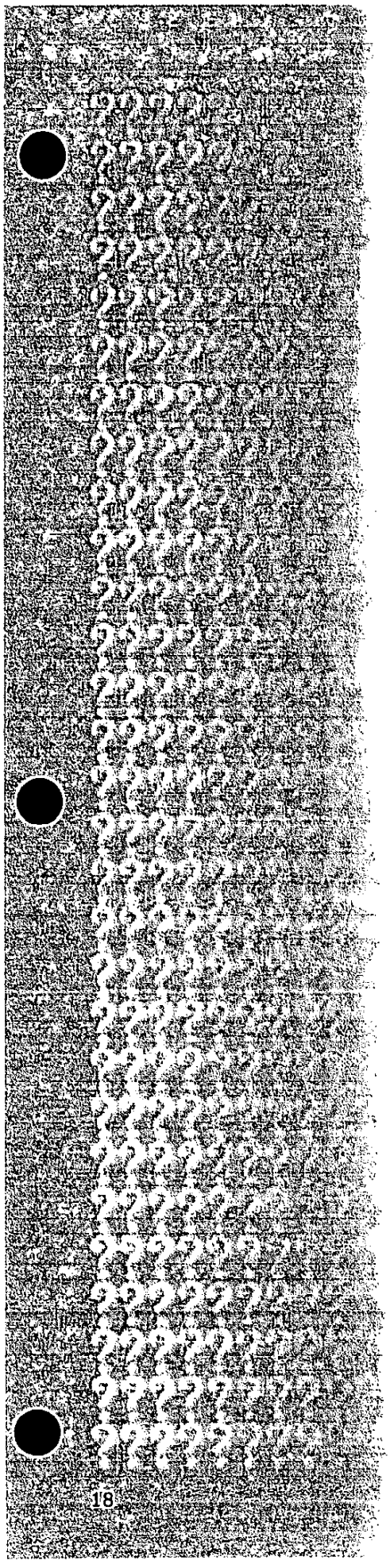
REGION IV
(AL, FL, GA, KY,* MS, NC,* SC,* TN*)
Atlanta Federal Center
61 Forsyth Street, SW, Room 6T50
Atlanta, GA 30303
(404) 562-2300

REGION V
(IL, IN,* MI;* MN,* OH, WI)
230 South Dearborn Street, Room 3244
Chicago, IL 60604
(312) 353-2220

REGION VI
(AR, LA, NM,* OK, TX)
525 Griffin Street, Room 602
Dallas, TX 75202
(214) 767-4731 or 4736 x224

REGION VII
(IA,* KS, MO, NE)
City Center Square
1100 Main Street, Suite 800
Kansas City, MO 64105
(816) 426-5861

REGION VIII
(CO, MT, ND, SD, UT,* WY*)
1999 Broadway, Suite 1690
Denver, CO 80202-5716
(303) 844-1600



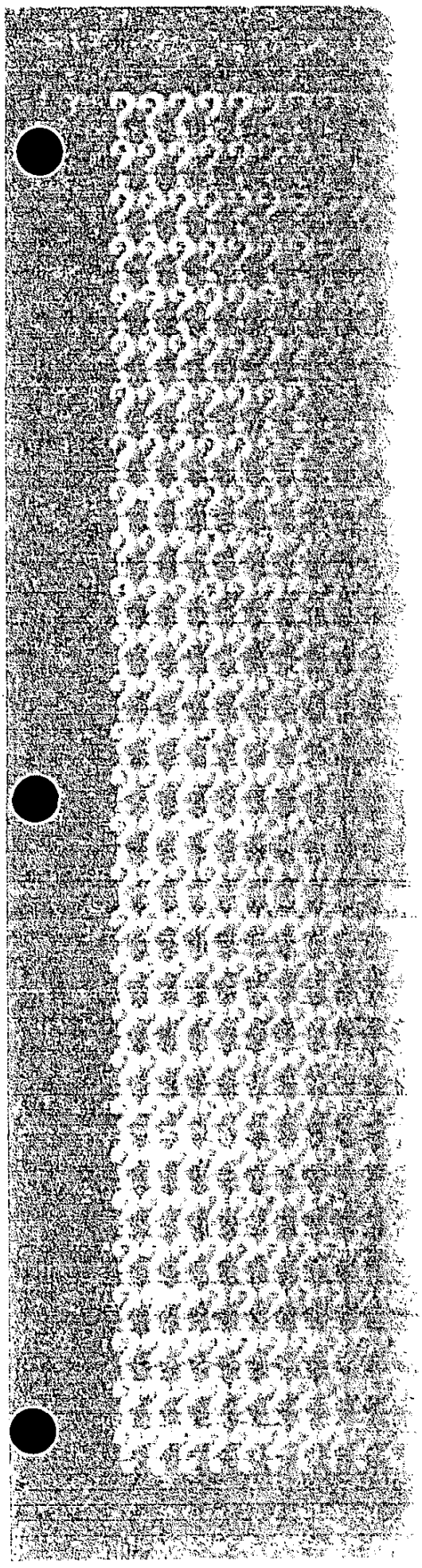
REGION IX
(American Samoa, AZ,* CA,* HI, NV*)
71 Stevenson Street, Room 420
San Francisco, CA 94105
(415) 975-4310

REGION X
(AK,* ID, OR,* WA*)
1111 Third Avenue, Suite 715
Seattle, WA 98101-3212
(206) 553-5930

*These states and territories operate their own OSHA-approved job safety and health programs (Connecticut, New Jersey, and New York plans cover public employees only). States with approved programs must have a standard that is identical to, or at least as effective as, the federal standard.

OSHA Area Offices

Birmingham, AL	(205) 731-1534
Mobile, AL	(334) 441-6131
Anchorage, AK	(907) 271-5152
Phoenix, AZ	(602) 640-2348
Little Rock, AR	(501) 324-6291(5818)
San Diego, CA	(619) 557-5909
Sacramento, CA	(916) 566-7471
Denver, CO	(303) 844-5285
Englewood, CO	(303) 843-4500
Bridgeport, CT	(203) 579-5581
Hartford, CT	(860) 240-3152
Wilmington, DE	(302) 573-6518
Fort Lauderdale, FL	(954) 424-0242
Jacksonville, FL	(904) 232-2895
Tampa, FL	(813) 626-1177
Savannah, GA	(912) 652-4393
Smyrna, GA	(770) 984-8700
Tucker, GA	(770) 493-6644/6742
Boise, ID	(208) 321-2960
Calumet City, IL	(708) 891-3800
Des Plaines, IL	(847) 803-4800
Fairview Heights, IL	(618) 632-8612
North Aurora, IL	(630) 896-8700
Peoria, IL	(309) 671-7033
Indianapolis, IN	(317) 226-7290
Des Moines, IA	(515) 284-4794
Wichita, KS	(316) 269-6644
Frankfort, KY	(502) 227-7024
Baton Rouge, LA	(225) 389-0474/0431
Bangor, ME	(207) 941-8177
Portland, ME	(207) 780-3178
August, ME	(207) 622-8417
Linthicum, MD	(410) 865-2055/2056



Braintree, MA	(617) 565-6924
Methuen, MA	(617) 565-8110
Springfield, MA	(413) 785-0123
Lansing, MI	(517) 327-0904
Minneapolis, MN	(612) 664-5460
Jackson, MS	(601) 965-4606
Kansas City, MO	(816) 483-9531
St. Louis, MO	(314) 425-4289
Billings, MT	(406) 247-7494
Raleigh, NC	(919) 856-4770
Omaha, NE	(402) 221-3182
Carson City, NV	(775) 885-6963
Concord, NH	(603) 225-1629
Avenel, NJ	(732) 750-3270
Hasbrouck Heights, NJ	(201) 288-1700
Marlton, NJ	(609) 757-5181
Parsippany, NJ	(973) 263-1003
Albuquerque, NM	(505) 248-5302
Albany, NY	(518) 464-4338
Bayside, NY	(718) 279-9060
Bowmansville, NY	(716) 684-3891
North Syracuse, NY	(315) 451-0808
Tarrytown, NY	(914) 524-7510
Westbury, NY	(516) 334-3344
Bismark, ND	(701) 250-4521
Cincinnati, OH	(513) 841-4132
Cleveland, OH	(216) 522-3818
Columbus, OH	(614) 469-5582
Toledo, OH	(419) 259-7542
Oklahoma City, OK	(405) 231-5351/5389
Portland, OR	(503) 326-2251
Allentown, PA	(610) 776-0592
Erie, PA	(814) 833-5758
Harrisburg, PA	(717) 782-3902
Philadelphia, PA	(215) 597-4955
Pittsburgh, PA	(412) 395-4903
Wilkes-Barre, PA	(570) 826-6538
Guaynabo, PR	(787) 277-1560
Providence, RI	(401) 528-4669
Columbia, SC	(803) 765-5904
Nashville, TN	(615) 781-5423
Austin, TX	(512) 916-5783/5788
Corpus Christi, TX	(512) 888-3420
Dallas, TX	(214) 320-2400/2558
El Paso, TX	(915) 534-6251
Fort Worth, TX	(817) 428-2470 (485-7647)
Houston, TX	(281) 591-2438/2787
Houston, TX	(281) 286-0583/0584
Lubbock, TX	(806) 472-7681/7685
Salt Lake City, UT	(801) 530-6901

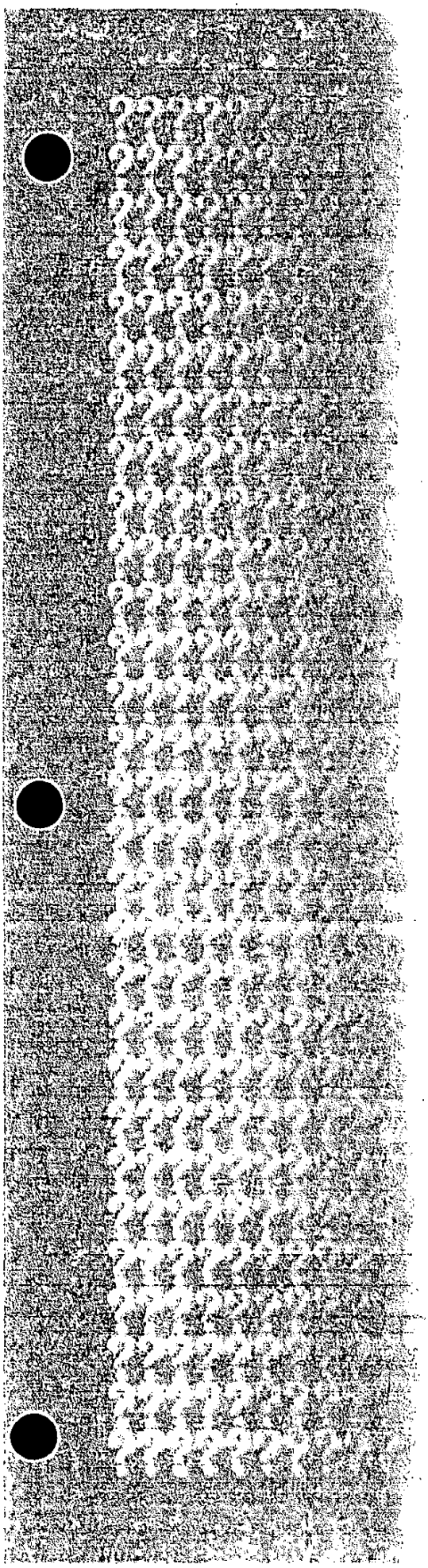
Norfolk, VA	(757) 441-3820
Bellevue, WA	(206) 553-7520
Charleston, WV	(304) 347-5937
Appleton, WI	(920) 734-4521
Eau Claire, WI	(715) 832-9019
Madison, WI	(608) 264-5388
Milwaukee, WI	(414) 297-3315

Appendix 2
OSHA-Approved Safety and Health Plans

Juneau, AK	(907) 465-2700
Phoenix, AZ	(602) 542-5795
San Francisco, CA	(415) 703-5050
Wethersfield, CT	(860) 566-5123
Honolulu, HI	(808) 586-8844
Indianapolis, ID	(317) 232-2378
Des Moines, IA	(515) 281-3447
Indianapolis, IN	(317) 232-3325
Frankfort, KY	(502) 564-3070
Baltimore, MD	(410) 767-2215
Lansing, MI	(517) 373-7230
St. Paul, MN	(651) 296-2342
Raleigh, NC	(919) 807-2900
Trenton, NJ	(609) 292-2975
Santa Fe, NM	(505) 827-2850
Carson City, NV	(775) 687-3032
Albany, NY	(518) 457-2741
Salem, OR	(503) 378-3272
Hato Rey, PR	(787) 754-2119
Columbia, SC	(803) 896-4300
Nashville, TN	(615) 741-2582
Salt Lake City, UT	(801) 530-6901
Richmond, VA	(804) 786-2377
Christiansted, St. Croix, VI	(340) 773-1990
Montpelier VT	(802) 828-2288
Olympia, WA	(360) 902-4200 (360) 902-5430
Cheyenne, WY	(307) 777-7786

Appendix 3
OSHA Consultation Offices

Anchorage, AK	(907) 269-4957
Tuscaloosa, AL	(205) 348-3033
Little Rock, AR	(501) 682-4522
Phoenix, AZ	(602) 542-1695
Sacramento, CA	(916) 574-2555
Fort Collins, CO	(970) 491-6151
Wethersfield, CT	(860) 566-4550
Washington, DC	(202) 541-3727
Wilmington, DE	(302) 761-8219



Tampa, FL	(813) 974-9962
Atlanta, GA	(404) 894-2643
Tiyam, GU	9-1-(671) 475-1101
Honolulu, HI	(808) 586-9100
Des Moines, IA	(515) 281-7629
Boise, ID	(208) 426-3283
Chicago, IL	(312) 814-2337
Indianapolis, IN	(317) 232-2688
Topeka, KS	(785) 296-7476
Frankfort, KY	(502) 564-6895
Baton Rouge, LA	(225) 342-9601
West Newton, MA	(617) 727-3982
Laurel, MD	(410) 880-4970
Augusta, ME	(207) 624-6460
Lansing, MI	(517) 322-1809
Saint Paul, MN	(651) 297-2393
Jefferson City, MO	(573) 751-3403
Jackson, MS	(601) 987-3981
Helena, MT	(406) 444-6418
Raleigh, NC	(919) 807-2905
Bismarck, ND	(701) 328-5188
Lincoln, NE	(402) 471-4717
Concord, NH	(603) 271-2024
Trenton, NJ	(609) 292-3923
Santa Fe, NM	(505) 827-4230
Albany, NY	(518) 457-2238
Henderson, NV	(702) 486-9140
Columbus, OH	(614) 644-2631
Oklahoma City, OK	(405) 528-1500
Salem, OR	(503) 378-3272
Indiana, PA	(724) 357-2396
Hato Rey, PR	(787) 754-2171
Providence, RI	(401) 222-2438
Columbia, SC	(803) 734-9614
Brookings, SD	(605) 688-4101
Nashville, TN	(615) 741-7036
Austin, TX	(512) 804-4640
Salt Lake City, UT	(801) 530-6901
Montepilier, VT	(802) 828-2765
Richmond, VA	(804) 786-6359
Christiansted St. Croix, VI	(809) 772-1315
Olympia, WA	(360) 902-5638
Madison, WI	(608) 266-9383
Waukesha, WI	(262) 523-3044
Charleston, WV	(304) 558-7890
Cheyenne, WY	(307) 777-7786

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APPENDIX B
EMERGENCY INCIDENT FORM

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EMERGENCY INCIDENT FORM

Harrelson Materials Management
Harrelson Landfill
1101 Russell Road
Shreveport, Louisiana 71137
(318) 425-3218

Report Date: _____

Time: _____

Reporting Party:
Name: _____
Position: _____

Emergency Information and Description:
Date: _____ Time: _____
Emergency Location and Source: _____
_____
_____
_____
If Hazardous Material or Spill Specify:
_____
Amount: _____
Cause of Spill: _____

Status of Containment:
Containment Condition: _____
Spill Offsite: _____
Has Spill Reached Water Course: _____
Name of Water Body: _____

Report to Fort Smith Fire Department (911):
Report Date: _____ Time: _____
Person Spoken With: _____
Comments: _____

Report to LDEQ Emergency Response:
Report Date: _____ Time: _____
Person Spoken With: _____
Comments: _____

Report to National Response Center (1-800-424-8802):
Report Date: _____ Time: _____
Person Spoken With: _____
Comments: _____

General Comments: _____
_____
_____

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APPENDIX C
SHREVEPORT FIRE DEPARTMENT ERP LETTER

SHREVEPORT FIRE DEPARTMENT

263 N. Common Street
Shreveport, Louisiana 71101
(318) 673-6650 • FAX: (318) 673-6656

Kelvin J. Cochran, Fire Chief

February 11, 2005

Harrelson Landfill
1101 Russell Road
Shreveport, LA 71137

Re: SFD Emergency response to Harrelson Landfill

Dear Sir:

Shreveport Fire Department makes runs to Harrelson Landfill on first response emergencies. We arrive with the capability to handle incidents such as fires (Structural or otherwise) trench rescue, high angle rescue, medical emergencies and emergencies involving hazardous material.

These response capabilities are maintained 24 hours per day, 7 days per week, for 52 weeks per year. This task is accomplished with a compliment of 20 engine companies, 7 aerial apparatus, 2 rescue trucks, 8 advanced life support medic units and other more specialized units such as a K-9 rescue and recovery team.

The aforementioned task is accomplished by approximately 450 first response personnel. All of which are Louisiana State Certified Professional Firefighters, 99% are Emergency Medical Technicians, 133 are EMT Paramedics, and 66 are Louisiana State Certified Hazardous Materials Technicians. These personnel are as evenly dispersed as possible on one of the three, 24 hour shifts.

Also, we have a mutual aid agreement with Caddo Fire District 3 in the event that we would need their help at this location or at any other incident in this area of our jurisdiction.

If any additional information is needed, please contact me at 318-673-6650.

Sincerely,

Mack Allen McCoy

Mack A. McCoy
Deputy Chief

Fire Administration
263 N. Common Street
Shreveport, LA 71101
(318) 673-6650

Deputy Fire Chief
263 N. Common Street
Shreveport, LA 71101
(318) 673-6658

Assistant Chief
263 N. Common Street
Shreveport, LA 71101
(318) 673-6662

Communications
1144 Texas Avenue
Shreveport, LA 71101
(318) 675-2200
Fax (318) 675-2206

EMS
263 N. Common Street
Shreveport, LA 71101
(318) 673-6720
Fax (318) 673-6727

Maintenance
6300 Kennedy
Shreveport, LA 71109
(318) 673-6730
Fax (318) 673-6735

Prevention
505 Travis Street, Suite 510
Shreveport, LA 71101
(318) 673-6740
Fax (318) 673-6744

Training
6440 Greenwood Road
Shreveport, LA 71119
(318) 673-6766
Fax (318) 673-6769

www.shreveportfire.org