Graphic Packaging International, Inc.
West Monroe Mill
West Monroe, Ouachita Parish, Louisiana

Solid Waste Permit Renewal Application
NPDES Wastewater Treatment Facility
GD-073-0405/P-0199
and
Ash/Sludge Lagoons
GD-073-0405/P-0244

Agency Interest No. 1432

Volume I of II

May 2007

PROVIDENCE

PUBLIC NOTICE
LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY (LDEQ)
GRAPHIC PACKAGING INTERNATIONAL, INC./WEST MONROE MILL
NPDES WASTEWATER TREATMENT FACILITY & ASH/SLUDGE LAGOONS

TECHNICALLY COMPLETE SOLID WASTE PERMIT RENEWAL APPLICATION

The LDEQ, Office of Environmental Services, has determined that a permit renewal application for Graphic Packaging International, Inc. (previously Riverwood International, USA), West Monroe Facility, P.O. Box 35800, West Monroe, Louisiana 71294-5800, for the NPDES Wastewater Facility and the Ash/Sludge Lagoon impoundment systems, is technically complete and acceptable for public review. **The facility is located at 1000 Jonesboro Road in West Monroe, Ouachita Parish.**

Graphic Packaging International, Inc. owns and operates the West Monroe facility, an unbleached Kraft pulp and paper mill. The company requested to renew its permit for the existing Type I industrial surface impoundment and to consolidate the two permits P-0199 and P-0244. The NPDES Wastewater Treatment System (P-0199) includes the following impoundments: Primary Clarifier Sludge/Bark Boiler Ash Sluice Pond, High Intensity Aeration (HIASB), High Intensity Aeration Basin Effluent Canal, No. 1 Pond, No. 2 Pond, No. 3 Pond and No. 4 Pond.

The Ash/Sludge Impoundments (P-0244) receive the underflow from the primary clarifier, which contain all the solid from the total mill effluents. The impoundment also receives sluiced ash from the bark boiler multi-cyclone collectors.

The request to consolidate the permits is based on the following: 1) the impoundments receive similar waste types; 2) the impoundments share a groundwater monitoring system; 3) the geology and hydrology in the area of the impoundments is consistent.

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., Thursday, May 1, 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 renewal 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 the Ouachita Parish Library, West Monroe Branch, 315 Cypress Street, West Monroe, Louisiana 71291, the Ouachita Parish Police Jury, 300 St. John Street, Monroe, Louisiana 71210-3007 and the LDEQ Northeast Regional Office, 1823 Hwy 546, West Monroe, Louisiana 71292-0442.

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 1432, Permit Number P-0199 (combining P-0199 and P-0244), and Activity Number PER20010002.

Scheduled for publication: Thursday, March 27, 2008

BOBBY JINDAL
GOVERNOR

HAROLD LEGGETT, PH.D.
SECRETARY

State of Louisiana

DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL SERVICES

MAR 1 3 2008

CERTIFIED MAIL 7003 2260 0005 9323 6930
RETURN SERVICE REQUESTED

Ms. Elizabeth B. Smith, Senior Environmental Engineer
Graphic Packaging International, Inc.
1000 Jonesboro Road
Post Office Box 35800
West Monroe Louisiana 71294-5800

RE: Notice of Technical Completeness
Graphics Packaging International, Inc.
West Monroe Facility
AI #1432 / GTD-073-0405 / /P-0199 (combined P-0199 and P-0244)
PER20010002
Ouachita Parish

Dear Ms. Smith:

The Waste Permits Division is in receipt of the final copies of your submittal dated May 22, 2007, and subsequent materials submitted on November 7, 2007, and January 16, 2008. After review of these submittals, 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.E.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 1432, Permit Number P-0199, Permit Activity Number PER20010002 and Site Identification Number GTD-073-0405 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 Services Section at (225) 219-3060.

Sincerely,

Bijan Sharafkhani, P.E.
Administrator
Waste Permits Division

ca

c: Yolunda Righteous, Providence Engineering
Northeast Regional Office

PROVIDENCE

1201 Main Street
Baton Rouge, LA 70802
(225) 766-7400

P.O. Box 31
Sulphur, LA 70664
(337) 528-0066

450 E. Pass Rd., #106
Gulfport, MS 39507
(228) 897-7676

1200 Walnut Hill Lane, #1000
Irving, TX 75038
(972) 550-9326

January 16, 2008

Louisiana Department of Environmental Quality
Office of Environmental Services
P.O. Box 4313
Baton Rouge, Louisiana 70821-4313
Attn: Timothy Seiler

Ref: Solid Waste Permit Renewal Application
Graphic Packaging International, Inc.
GD-073-0405/P-0199/P-0244
Agency Interest Number 1432
Providence Project Number 001-007

Dear Mr. Seiler:

Providence Engineering and Environmental Group LLC, (Providence) on behalf of Graphic Packaging International, Inc. (Graphic Packaging), hereby submits to the Louisiana Department of Environmental Quality (LDEQ), Permits Division six copies of replacement pages for the technically complete permit renewal application for the above referenced consolidated solid waste permits located at the West Monroe Mill.

Please do not hesitate to contact me at (225) 766-7400 if you have any questions or if you need any additional information.

Sincerely,
Providence Engineering and Environmental Group LLC

John P. Price for

Yolunda M. Righteous
Environmental Science Project Manager

cc: Elizabeth Smith, Graphic Packaging

PROVIDENCE

1201 Main Street
Baton Rouge, LA 70802
(225) 766-7400

P.O. Box 31
Sulphur, LA 70664
(337) 528-0066

450 E. Pass Rd., #106
Gulfport, MS 39507
(228) 897-7676

1200 Walnut Hill Lane, #1000
Irving, TX 75038
(972) 550-9326

November 7, 2007

Louisiana Department of Environmental Quality
Office of Environmental Services
P.O. Box 4313
Baton Rouge, Louisiana 70821-4313
Attn: Curt Auzenne

Ref: Solid Waste Permit Renewal Application
Graphic Packaging International, Inc.
GD-073-0405/P-0199/P-0244
Agency Interest Number 1432
Providence Project Number 001-007

Dear Mr. Auzenne:

Providence Engineering and Environmental Group LLC, (Providence) on behalf of Graphic Packaging International, Inc. (Graphic Packaging), hereby submits to the Louisiana Department of Environmental Quality (LDEQ), Permits Division six copies of replacement pages for the technically complete permit renewal application for the above referenced consolidated solid waste permits located at the West Monroe Mill.

Please do not hesitate to contact me at (225) 766-7400 if you have any questions or if you need any additional information.

Sincerely,
Providence Engineering and Environmental Group LLC

John P. Price for

Yolunda M. Righteous
Environmental Science Project Manager

cc: *Elizabeth Smith, Graphic Packaging*

original to IOSW
copy to SW/GI/Tomsel/AUG

PROVIDENCE

ENGINEERING & ENVIRONMENTAL GROUP LLC

1201 Main Street
Baton Rouge, LA 70802
(225) 766-7400

P.O. Box 31
Sulphur, LA 70664
(337) 528-0066

450 E. Pass Rd., #106
Gulfport, MS 39507
(228) 897-7676

1200 Walnut Hill Lane, #1000
Irving, TX 75038
(972) 550-9326

COPY

May 22, 2007

RECEIVED
MAY 22 2007
LDEQ

Louisiana Department of Environmental Quality
Office of Environmental Services
P.O. Box 4313
Baton Rouge, Louisiana 70821-4313
Attn: Bijan Sharafkhani

Ref: Solid Waste Permit Renewal Application
Graphic Packaging International, Inc.
GD-073-0405/P-0199/P-0244
Agency Interest Number 1432
Providence Project Number 001-007

Dear Mr. Sharafkhani:

Providence Engineering and Environmental Group LLC, (Providence) on behalf of Graphic Packaging International, Inc. (Graphic Packaging), hereby submits to the Louisiana Department of Environmental Quality (LDEQ), Permits Division six copies of the technically complete permit renewal application for the above referenced consolidated solid waste permits located at the West Monroe Mill.

Standard Permits P-0199 (NPDES Impoundments) and P-0244 (21-Acre and 41-Acre Ash/Sludge Impoundments) have been consolidated into one permit document. The consolidation of the referenced permits is based on the following: 1) the impoundments receive similar waste types; 2) the impoundments share a groundwater monitoring system; and 3) the geology and hydrology in the area of the impoundments are consistent. These items are further detailed in the permit renewal application.

Please do not hesitate to contact me at (225) 766-7400 if you have any questions or if you need any additional information.

Very truly yours,
Providence Engineering and Environmental Group LLC

Yolunda M. Righteous

Yolunda M. Righteous
Environmental Science Project Manager

cc: Elizabeth Smith, Graphic Packaging

GRAPHIC PACKAGING INTERNATIONAL, INC.

WEST MONROE MILL
WEST MONROE, OUACHITA PARISH, LOUISIANA

SOLID WASTE PERMIT RENEWAL APPLICATION

NPDES WASTEWATER TREATMENT FACILITY
GD-073-0405/P-0199

AND

ASH/SLUDGE LAGOONS
GD-073-0405/P-0244

AGENCY INTEREST NO. 1432

MAY 2007

PROVIDENCE

PROVIDENCE ENGINEERING AND ENVIRONMENTAL GROUP LLC
1201 MAIN STREET
BATON ROUGE, LOUISIANA 70802
(225) 766-7400
PROVIDENCE PROJECT NO. 001-007

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INTRODUCTION

Graphic Packaging International, Inc. (Graphic Packaging) owns and operates the West Monroe facility, an unbleached kraft pulp and paper mill, located at 1000 Jonesboro Road (Louisiana Highway 34) in West Monroe, Ouachita Parish, Louisiana. Graphic Packaging was formerly known as Riverwood International USA, Inc. Graphic Packaging's West Monroe facility is located on approximately 3,200 acres of land in West Monroe, Ouachita Parish, Louisiana. The facility is located in Sections 11, 14, and 52 of Township 17 North, Range 3 East. The facility is bound by the cities of West Monroe and Monroe to the north and east, respectively; the Ouachita River (River Mile 161.2), agricultural and commercial land to the south; and the West Monroe/West Ouachita Sewage Treatment Facility to the west.

The **NPDES Wastewater Treatment System** (P-0199) includes the following impoundments:.

- Primary Clarifier Sludge/Bark Boiler Ash Sluice Pond
- High Intensity Aeration (HIASB)
- High Intensity Aeration Basin Effluent Canal
- No.1 Pond
- No. 2 Pond
- No. 3 Pond
- No. 4 Pond

The **21-Acre and 41-Acre Ash/Sludge Impoundments** (P-0244) receive the underflow from the primary clarifier, which contain all the settled solids from the total mill effluent. The impoundments also receive sluiced ash from the bark boiler multi-cyclone collectors.

In 1994, a Solid Waste Permit Modification and a Mandatory Modification Document for the NPDES and Ash/Sludge Impoundments System were submitted in accordance with the Louisiana Solid Waste Rules and Regulations to the Louisiana Department of Environmental Quality (LDEQ). To date, the Solid Waste Permit Modification and the Mandatory Modification for the wastewater treatment system are currently pending with the LDEQ. In correspondence dated July 26, 2001, a request was made by Riverwood International (now Graphic Packaging) to the LDEQ to consolidate the two permits (P-0199 and P-0244) and to convert the mandatory modification for those same permits into the permit renewal application for the West Monroe facility.

The submittal of this document serves to update and replace the pending permit application and Mandatory Modification with current facility information/operations and consolidate the permitting requirements for the NPDES and Ash/Sludge impoundments.

The request to consolidate the permits is based on the following: 1) the impoundments receive similar waste types; 2) the impoundments share a groundwater monitoring system; and 3) the geology and hydrology in the area of the impoundments is consistent. These items are further detailed in the permit application.

LAC 33:VII.519

PART I: PERMIT APPLICATION FORM

SOLID WASTE STANDARD PERMIT APPLICATION – PART I

(The form shall be completed in accordance with the instructions found in LAC 33:VII.519.A.1)

A. **Applicant (Permit Holder):** Graphic Packaging International, Inc.

B. **Facility Name:** West Monroe Facility

C. **Facility Location/Description:** 1000 Jonesboro Road (LA Highway 34), West Monroe, Ouachita Parish, Louisiana

D. **Location** **Section** 11, 14, and 52 **Township** 17 N **Range** 3E

Parish: Ouachita

Coordinates: Latitude **Degrees** 32° **Minutes** 28' **Seconds** 30"

Longitude **Degrees** 92° **Minutes** 8' **Seconds** 00"

E. **Mailing Address:** Post Office Box 35800, West Monroe, LA 71294-5800

F. **Contact:** Cynthia J. Brown

G. **Telephone:** (318) 362-2612

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

Type I

Industrial Landfill ___
Industrial Surface Impoundment X
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 Waste Handling Facility ___
Residential/Commercial Shredder/Compactor/Baler ___
Residential/Commercial Transfer Station ___

Residential/Commercial Refuse-Derived Fuel ___
Residential/Commercial Autoclave Waste Handling Facility ___

Type III

Construction/Demolition-Debris Landfill ___
Woodwaste Landfill ___
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: __X__Existing ____ Proposed

K. Total Acreage 3,200 **Processing Acreage** 0 **Disposal Acreage** 450

L. Environmental Permits: (List)

- Solid Waste Permit No. P-0071 (Industrial Landfill)
- Solid Waste Standard Permit P-0199 (NPDES Solid Waste Impoundments and 35-acre Ash/Sludge Ponds)
- Solid Waste Standard Permit P-0224 (for 21-acre and 41-acre Ash/Sludge Ponds)
- LDEQ Title V, Part 70 Air Operating Permit #2160-00001-V2
- LPDES Permit No. LA0007617
- U.S. Army Corps of Engineers Permit No. LMKOD-FE 1522-14-9H23-15 (21-acre impoundment)

Graphic Packaging will acquire and update, as necessary, the environmental permits to meet all applicable state and federal regulations.

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.

(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.)

Not applicable. This section is no longer a requirement of the Louisiana Revised Statute.

N. **Zoned:** **Yes** ____ **No** X **Zoning Requested** N/A
Zone Classification: N/A

(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			3327 wet tons/week	
Commercial				
Other				

P. **Service Area:** No outside waste is accepted at this site.

List of Parishes: Not Applicable

Statewide Not Applicable **Unlimited** Not Applicable

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

A photocopy of the original Proof of Publication is provided in **Appendix A**

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 Gary Boettcher

Date 5-16-2007

Typed Name and Title **Gary Boettcher, Vice President & Resident Manager**

(NOTE: Attach proof of the legal authority of the signee to sign for the applicant.)

Proof of the signatory legal authority to sign for the applicant is provided as **Appendix B**.

LAC 33:VII.520

COMPLIANCE INFORMATION

Media Type (check one)
Hazardous Waste ____ Air ____
Solid Waste ✓ Water
Radiation Licensing ____

Agency Interest Number: 1432

Department of Environmental Quality Permits Division P.O. Box 82135 Baton Rouge, LA 70884-2135 (225) 765-0219	**Addendum to Permit Applications Per LAC 33:I.1701**	

Please Type Or Print		For Permits Division Use Only
Company Name: Graphic Packaging International, Inc.		
Parent Company (if Company Name given above is a division): N/A		
Plant name (if any): West Monroe Facility		
Nearest town: West Monroe	Parish where located: Ouachita	

Use attachments to provide the required information. "NA" is not an acceptable answer. If a particular section does not apply to you, explain why.

1. Please provide a list of the states where you as applicant* have federal or state environmental permits identical to, or of a similar nature to, the permit for which you are applying. See **Attachment 1**.

   * 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.

2. Do you owe any outstanding fees or final penalties to the Department? No __X__ Yes ___
   If yes, please explain. **See Attachment 1.**

3. Is your company a corporation or limited liability company? No___ Yes __X__ If yes, attach a copy of your company's Certificate of Registration and/or Certificate of Good Standing from the Secretary of State. **See Attachment 2 (Certificate of Registration).**

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, and complete.

Responsible Official

Name	City	State	Zip
Gary Boettcher	West Monroe	LA	71294
Title: Vice President and Resident Manager	Business phone: (318) 362-2000		
Company: Graphic Packaging International, Inc.	Signature of responsible official: Gary Boettcher		
Suite, mail drop, or division	Date: 4-19-2006		
Street or P.O. Box: Post Office Box 35800			

The Department may require the submission of additional information if it deems such information necessary.

ATTACHMENT 1

Addendum to Permit Applications
Per LAC 33:I.1701

1. Graphic Packaging, Inc. does not have a federal or state environmental permit in identical to, or of a similar nature to, the permit being applied for in Louisiana.

2. Graphic Packaging, Inc. does not owe any outstanding fees or final penalties to the Louisiana Department of Environmental Quality (LDEQ).

3. Graphic Packaging, Inc. is required to register with the Secretary of State, and did so on 11/29/04. A copy of proof of registration is enclosed as Attachment 2.

ATTACHMENT 2

CERTIFICATE OF REGISTRATION

UNITED STATES OF AMERICA

State of Louisiana

Fox McKeithen

SECRETARY OF STATE

As Secretary of State, of the State of Louisiana, I do hereby Certify that

the annexed and following is a True and Correct copy of an Amended Application for Certificate of Authority as shown by comparison with document filed and recorded in this Office on August 21, 2003.

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,

August 25, 2003

BME 32431640F

Secretary of State

STATE OF LOUISIANA
UNION JUSTICE CONFIDENCE
SECRETARY OF STATE

CERTIFICATE SS 102 S (R 3-88)

W. Fox McKeithen
Secretary of State

APPLICATION FOR AUTHORITY TO TRANSACT BUSINESS IN LOUISIANA

(R.S. 12:304)

Foreign Corporation
Enclose $100.00 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

STATE OF Georgia

Check one: ( ) Non Profit (x) Business

Check one: ( ) Original Application (x) Amended Application

PARISH/COUNTY OF Cobb

1. Corporation name: Graphic Packaging International, Inc.
2. Previous name: Riverwood International Corporation
3. Principal Office address in state or country of incorporation: 2711 Centerville Road, Suite 400, Wilmington, DE 19808
4. Federal tax identification number: 84-0772929
5. Principal business office address: 814 Livingston Court, Marietta, GA 30067

PLEASE INCLUDE COMPLETE STREET ADDRESSES FOR THE FOLLOWING.

6. Principal business establishment in Louisiana: 1000 JONESBORO ROAD, WEST MONROE, LA 71292
7. Registered office address in Louisiana: c/o Corporation Service Company 320 Somerulos Street, Baton Rouge, Louisiana 70802-6129
8. Registered agent's name and address in Louisiana: Corporation Service Company 320 Somerulos Street, Baton Rouge, Louisiana 70802-6129
9. Nature of business to be transacted in Louisiana: MANUFACTURING
10. Names and addresses of directors and officers: SEE ATTACHED

To be signed by any officer

August 20th 2003
Title and Date

~~Edward W. Stuetz, Jr.~~
Acting General Counsel and Secretary

Sworn to and subscribed before me, the undersigned Notary Public, on this date: August 20th, 2003

Notary Public, Cobb County, Georgia
My Commission Expires September 19, 2004

Notary

AGENT'S ACCEPTANCE AND ACKNOWLEDGEMENT OF APPOINTMENT

I hereby acknowledge and accept the appointment of registered agent for and on behalf of the above named corporation.

Corporation Service Company Brian Courtney Asst. V. Pres

By:

Registered Agent

Brian Courtney, Asst. V.P.

HARRY B. DAVIS
MY COMMISSION # CC 858962
EXPIRES: November 28, 2003
Bonded Thru Notary Public Underwriters

Sworn to and subscribed before me on this date: 8/20/03

Notary

326 Rev. 1/01

35540012

Directors & Officers
Addresses

DIRECTORS		OFFICERS	
Beckett, John D.	R.W. Beckett Corporation P.O. Box 1289 Elyria, OH 44036	Blount, Daniel J. Chief Financial Officer, Treasurer, Senior Vice President, Integration	Graphic Packaging International, Inc. 814 Livingston Court Marietta, GA 30067
Botta, G. Andrea	Morgan Stanley 1585 Broadway New York, NY 10036	Coors, Jeffrey H. Executive Chairman	Graphic Packaging International, Inc. 4455 Table Mountain Drive Golden, CO 80403
Conway, Kevin J.	Clayton, Dubilier & Rice, Inc. 375 Park Avenue, 18th Floor New York, NY 10152	Humphrey, Steven M. President and Chief Executive Officer	Graphic Packaging International, Inc. 814 Livingston Court Marietta, GA 30067
Coors, Jeffrey H.	Graphic Packaging International, Inc. 4455 Table Mountain Drive Golden, CO 80403	Juby, Wayne E. Senior Vice President, Human Resources	Graphic Packaging International, Inc. 814 Livingston Court Marietta, GA 30067
Humphrey, Steven M.	Graphic Packaging International, Inc. 814 Livingston Court Marietta, GA 30067	Saucier, Steven D. Senior Vice President, Paperboard Operations	Graphic Packaging International, Inc. 835 A-1 Franklin Court Marietta, GA 30067
Logan, Harold R. Jr.	TransMontaigne, Inc. 1670 Broadway, Suite 3100 Denver, CO 80202	Scheible, David W. Executive Vice President of Commercial Operations	Graphic Packaging International, Inc. 4455 Table Mountain Drive Golden, CO 80403
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Delaware

The First State

I, HARRIET SMITH WINDSOR, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THAT THE SAID "RIVERWOOD INTERNATIONAL CORPORATION", FILED A CERTIFICATE OF MERGER, CHANGING ITS NAME TO "GRAPHIC PACKAGING INTERNATIONAL, INC.", THE EIGHTH DAY OF AUGUST, A.D. 2003, AT 10:10 O'CLOCK A.M.

Harriet Smith Windsor

Harriet Smith Windsor, Secretary of State

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AUTHENTICATION: 2593057

DATE: 08-20-03

LAC 33:VII.521

PART II: SUPPLEMENTARY INFORMATION, ALL PROCESSING AND DISPOSAL FACILITIES

§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.

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 the maps and drawings must be legible, and engineering drawings are required.

Graphic Packaging operates a 2,700 ton/day unbleached kraft pulp and paper mill in West Monroe, Louisiana. Graphic Packaging was formerly known as Riverwood International USA, Inc.

Graphic Packaging West Monroe Facility is located on approximately 3,200 acres of land in West Monroe, Ouachita Parish, Louisiana. The facility is located in Sections 11, 14, and 52 of Township 17 North, Range 3 East.

The facility is bound by the cities of West Monroe and Monroe to the north and east, respectively; the Ouachita River (River Mile 161.2), agricultural and commercial land to the south; and, the West Monroe/West Ouachita Sewage Treatment Facility to the west.

A location map of the facility is provided as **Figure 1**, Site Location Map. The property lines, solid waste facilities, major road net, major drainage systems, drainage flow

patterns, closest population centers, and other general land features are shown on the figure.

Areas served by the NPDES and Ash/Sludge Impoundments are entirely within the ownership area of the West Monroe Facility, shown in **Figure 2**.

The location of the local public-use airport is indicated on **Figure 1**.

The location of the 100-year flood plain is shown on **Figure 3**. The flood map, **Figure 3**, taken from the FEMA Flood Map indicates the latest flood information around the facilities. **Figure 1** includes a legible road network map of the area.

b. **A letter from the appropriate agency or agencies regarding those facilities receiving waste generated off-site, stating that the 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.**

This regulation is not applicable to the existing impoundments or wastewater treatment system because neither facility receives waste generated off-site. Furthermore, no impact on traffic flow in the area is anticipated because the waste generated on-site is generally transferred to the impoundments or wastewater treatment system via pipeline.

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:**

i. **Residential;**
ii. **Health-care facilities and schools;**
iii. **Agricultural;**
iv. **Industrial and manufacturing;**
v. **Other commercial;**
vi. **Recreational; and**
vii. **Undeveloped.**

Existing land use within a three-mile radius of the site has been estimated based on available maps, aerial photographs, and reviewing the U.S.G.S. 15-minute series

quadrangle map, South Monroe, Louisiana, and North Monroe, Louisiana.

Based on this information, the land use for the area within a three-mile radius of the solid waste surface impoundments is estimated to be as follows:

Residential – 20%
Health-care facilities and schools – 5%
Agricultural – 15%
Industrial and manufacturing – 30%
Other commercial – 20%
Recreational – 5%
Undeveloped – 5%

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 for an aerial photograph for Type III facilities.)**

An aerial photograph is presented as **Figure 4** and shows the one-mile radius around all of the impoundments. Current land use in the area surrounding the facility is predominantly industrial, commercial, and farming, as is evident on the photograph.

e. **Environmental Characteristics – the following information on environmental characteristics:**

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

As demonstrated by documents that were obtained from the Louisiana Department of Culture, Recreation and Tourism, the Louisiana Department of Wildlife & Fisheries and the U.S. Army Corps of Engineers (provided as **Appendix C**), there are no registered historical sites, recreational areas, archaeological sites, wildlife areas, swamps or marshes, habitats for endangered species or other sensitive ecological areas within 1,000 feet of the solid waste facilities.

Wetland areas were identified in the vicinity of the impoundments and the appropriate United States Army Corps of Engineers (USACE) Section 404 Permits were obtained for the construction of each impoundment. The wetland areas are identified in the USACE application forms presented in **Appendix C**.

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

Documentation has been obtained from the Louisiana Department of Culture, Recreation and Tourism and the Louisiana Department of Wildlife & Fisheries to verify that there are no registered historical sites, recreation areas, archaeological sites, designated wildlife-management areas, habitats for endangered species, or other sensitive ecologic areas within 1,000 feet of the existing facilities. This documentation is presented in **Appendix C**.

Wetland areas have been delineated in the vicinity of the impoundments, and the appropriate USACE Section 404 Permit was obtained for each of the impoundments. This documentation is also included in **Appendix C**.

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

The designated wetland areas in the vicinity of the impoundments will not be impacted by the operation of the facilities. The operation of the impoundments does not result in discharge to surrounding wetlands or waterways. The primary clarifier sludge and sluiced ash are transferred to the impoundments via pipeline, and water decants off the surface of the material into a decant canal that returns the water to the primary clarifier for further treatment. Erosion will be controlled through permanent erosion control features such as seeding of the slopes of embankments and by controlling flow of surface water runoff through ditches.

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

The quality of surface water in the vicinity of the solid waste facilities will not be impacted by the operation of those facilities. During previous construction activities in 1996, disturbed areas were graded such that surface water drained toward temporary drainage features constructed in designated locations. The collected surface water was pumped to the decant canal, retained in detention ponds, or discharged in accordance with a Construction Storm Water Permit. Surface water pumped to the decant canal was routed to the primary clarifier for treatment. Following treatment, the storm water was discharged through the permitted outfall. A State Water Quality Certification was obtained from the LDEQ for construction of the 41-acre impoundment, which involved alteration of a small segment (approximately 3.2 acres) of wetlands area. This certification is presented in **Appendix C**.

During operation of the impoundments, wastewater that decants off the waste into the decant canal is returned to the primary clarifier for treatment prior to discharge through the permitted outfall.

Groundwater quality is continuously monitored downgradient of the solid waste facilities. Groundwater was not impacted by the construction or operation of the solid waste impoundments. Groundwater monitoring performed for the impoundments has not revealed any evidence of impact to groundwater from the facility.

The 21-acre ash/sludge impoundment contains a three-foot thick low permeability recompacted clay liner designed to contain the waste within the impoundment. A slurry wall was also constructed around the perimeter of the existing impoundments, which offers an additional measure of groundwater protection. The slurry wall extends down from the mid-base of the levees into an underlying clay liner. Additional groundwater protection is provided by the installation of a synthetic liner over the recompacted clay liner in the 41-acre impoundment.

Pursuant to LAC 33:VII.709.A.4, a wetlands demonstration is not required for the NPDES impoundments, which are existing solid waste units receiving waste prior to October 9, 1993.

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

The estimated population within a three-mile radius of the surface impoundments is 64,099 people, based upon the U.S. Census Bureau 2000 Census information. The following table provides a comparison of the estimated total population and population density within a 1, 2, and 3 mile radius of the facility.

Radius in Miles from Facility	Estimated Total Population	Estimated Housing Units	Estimated Population Density (persons/mi^2)
1.0	22,697	9,312	1071
2.0	42,651	17,676	1048
3.0	64,099	64,099	967

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

a. **Wells. Map showing the locations of all known or recorded shot holes and seismic lines, private water wells, oil and/or gas wells, operating or abandoned, within the facility and within 2,000 feet of the facility perimeter and the locations of all locations of all public water systems, industrial water wells and irrigation wells within one mile of the facility. A plan shall be provided to prevent adverse effects on the environment from the wells and shot holes located on the facility.**

Graphic Packaging maintains eight deep wells (*i.e.*, 300-700 feet deep) onsite. In addition, six shallow monitoring wells are located around the solid waste landfill (operated under Standard Permit P-0071). A map of all private water wells, oil and/or gas wells, known or recorded shot holes located within the facility and within 2,000 feet of the perimeter of the site and the locations of all public water systems, industrial water wells, and irrigation wells within one-mile of the facility is provided as **Figure 5**.

Appendix D contains a list of all known wells, their depth, usage and withdrawal rates as recorded by the Louisiana Department of Transportation and Development (LDOTD).

As indicated on **Figure 5**, no shot holes are recorded or known to exist on the site. Because the only wells located on the site are monitoring wells installed specifically to monitor groundwater quality, adverse effects on the environment due to the presence of these wells is not anticipated. Therefore, the requirements to submit a plan to prevent adverse effects on the environment from the monitoring wells are not applicable to Graphic Packaging.

One monitoring well, MW-16, was previously located within the limits of the 41-acre impoundment and was plugged and abandoned in April 1996 prior to construction of the impoundment (see **Appendix E**). No adverse effects on the environment are anticipated from the monitoring wells located on the site. After post-closure monitoring requirements have been met, the monitoring wells will be plugged and abandoned in accordance with the guidelines presented in **Appendix F**.

b. Faults

i. scaled map showing the locations of all recorded faults within the facility and within one mile of the perimeter of the facility; and

No faults have been recorded within Ouachita Parish (K.K. Wang, "Geology of Ouachita Parish", U.S. Geological Bulletin No. 28). Therefore none are recorded within a one-mile radius of the perimeter of the facility.

ii. demonstration, if applicable, of alternative fault set-back distance as provided in LAC 33:VII.709.A.5.

This regulation is not applicable because there are no faults recorded within a one-mile radius of the facility.

c. Utilities. Scaled map showing the location of all pipelines, power lines, and rights-of-way within the site.

The location of all pipelines, power lines, and rights-of-way is shown on **Figure 6**.

Figure 1 shows the locations of oil and gas pipelines in the surrounding areas.

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;

A Site Master Plan of the waste management area, showing property lines, buildings, units of the facility, drainage ditches, roads, all of the solid waste units and other elements of the process or disposal system are presented as **Figure 6**.

Wastewater from the mill discharges to a primary clarifier followed by a system of flow-through lagoons, which include the High Intensity Aeration Basin (HIAB), Effluent Canal and NPDES Ponds 1, 2, 3 and 4. A waste flow diagram is presented as **Figure 7**.

The 35-acre impoundment for Primary Clarifier Sludge/Bark Ash Sluice reached capacity in 1989.

The 21-acre surface impoundment, constructed in 1990, was augmented by a 41-acre surface impoundment that was constructed in 1996. The facility receives underflow from the clarifier along with bark-fired boiler ash, which is the same waste stream received by the other impoundments. Decant from the ash/sludge impoundment is returned to the Primary Clarifier.

b. the perimeter barrier and other control measures;

Graphic Packaging maintains a security system at the West Monroe Plant, including the waste management facilities. In accordance with LAC 33:VII.709.B.1.a, the system includes perimeter, locked or continuously manned gates, and an entry system, which prevents unauthorized persons from having access to the plant and waste management facilities.

Roads leading to the waste management areas are located within the main plant site where entrance is monitored by

security guards 24 hours per day. Security checks of the waste management area are made at least once per eight-hour shift.

The waste management area is located within approximately 3,200 acres of Graphic Packaging property. Unauthorized entry from the north and northwest, where primary access roads exist, is controlled by company perimeter fences and guard gates.

Figure 6 also indicates fences and barriers preventing access to the waste management areas. To the west, a fence separates the West Monroe/West Ouachita Sewerage Treatment Facility. Effluent drainage ditches and woods discourage entry from the south and southwest. To the north, water (*i.e.*, Black Bayou and Toney Bayou) and wooded areas discourage ingress. Entry from the northeast is prevented by security fencing.

c. a buffer zone;

At the time of the original permit application submittal, the 21-acre impoundment was located approximately 105 feet from the nearest property line. In accordance with LAC 33:VII.709.B.2.a, authorization for a reduction in the 200-foot buffer zone requirement was obtained from the adjacent property owner (Mr. and Mrs. Huey Lenard, Farmer), which is presented in **Appendix G**.

A location map of the adjacent Lenard property is also presented in **Appendix G**. (See also **Figures 1** and **6** showing the Lenard property lying to the east of facility site).

After construction of the 21-acre ash/sludge impoundment, Graphic Packaging purchased the adjacent property, located east of the 21-acre impoundment, extending over to Toney Bayou Road, from Mr. and Mrs. Huey Lenard. This property is the site of the 41-acre impoundment. Property to the north, south, and west of the site is owned by Graphic Packaging; property to the east is owned by Mr. and Mrs. Huey Lenard. A 200-foot buffer zone will be maintained between the levee of the 41-acre impoundment and the property to the east owned by Mr. and Mrs. Lenard.

All elements of the NPDES system are located more than 200 feet from the company property line except for the Primary Clarifier Sludge/Ash Sluice Pond. This pond is about 100 feet inside the property line, which abuts the West

Monroe/West Ouachita Sewerage Treatment Plant, another NPDES system.

d. fire protection measures;

The Graphic Packaging solid waste management areas are mainly occupied by open surface impoundments containing sludge and sluiced ash. As shown in **Figure 7**, the waste stream contained in the 41-acre ash/sludge impoundment is of the same composition as the waste stream contained in the 21-acre ash/sludge impoundment and the NPDES impoundments. Wastes in the ash/sludge and NPDES impoundments are not flammable and are generally maintained in a wetted condition, which further minimizes or eliminates the potential for a fire.

In the unlikely event a fire was to occur in this area, the company fire brigade team would respond. In addition, the company fire team will be backed up by parish and city equipment, if necessary.

Additional information about fire protection and medical care at Graphic Packaging is given in the facility's Contingency Plan and Emergency Procedures Plan in **Appendix H**.

e. landscaping and other beautification efforts;

In accordance with LAC 33:VII.709.B.4, landscaping and other beautification efforts are not required for solid waste disposal facilities located within the boundaries of a plant or industry, which generates the waste to be disposed. Therefore, landscaping and beautification efforts are not required for the solid waste surface impoundments.

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

Graphic Packaging does not accept wastes from outside the plant. All solid wastes managed at the site are generated at the plant. These wastes consist of non-hazardous industrial solid wastes generated as the result of pulp and paper manufacturing activities. As previously stated, the waste currently received by the 41-acre ash/sludge impoundment is of the same composition as the waste received by the 21-acre ash/sludge impoundment, and is generated as described below.

Wastewater from all mill process sewers is routed to the primary clarifier. Clarified wastewater is sent to the NPDES Ponds for further treatment and eventual discharge. Underflow from the clarifier is currently sent to the Primary Clarifier Sludge/Bark Boiler Ash Sluice Pond and re-routed to the impoundments.

The primary clarifier underflow contains all settled solids from the total mill effluent. This includes fiber, fines, wood debris, ashes, grits and dregs discharged from the process. Water insoluble, inert materials are retained in the impoundment. Decant from the impoundments is returned to the primary clarifier for biological treatment. A grab sample of the clarifier underflow is collected approximately three times per week. Flow measurements and Total Suspended Solids (TSS) analyses are conducted weekly. Approximately 75 tons/day of sludge are estimated to be deposited in the 41-acre Ash/Sludge Impoundment.

The impoundments also receive sluiced ash from the bark boiler multi-cyclone collectors. The sluice is currently pumped through a six-inch plastic pipe to the primary sludge ash sluice pond.

Approximately 20 to 25 percent of the mill steam and power requirements are satisfied by burning bark and other wood residue fuels. Combustion gases are first centrifugally cleaned by passage through multi-cyclones followed by char re-injection and then washed by flow through a Venturi Scrubber before final discharge. Bleed off from the Venturi Scrubber with makeup from other process wastewaters is used to sluice the dry material from the multi-cyclone catch. The bulk of the ash sluice is typical solids from the burning of softwood and hardwood residues consisting mainly of inert grit and silicates. A grab sample is collected from the bark boiler ash sluice line approximately three times per week. The quantities of sluice ash generated vary but normally averages 20 tons/day.

While no devices exist to specifically measure and record solids deposition in the various ponds of the NPDES System, data is gathered that allows reasonable estimations.

Primary Clarifier Sludge

The difference between solids measured on the clarifier influent and overflow represents solids in the clarifier underflow. Combined with clarifier flow rate, the solids in the

primary clarifier sludge pond can be estimated. The method of choice, at this time, is analysis of clarifier underflow grab samples collected approximately three times per week for suspended solids content and using the underflow rate to determine daily primary clarifier sludge deposition in the Primary Clarifier Sludge/Bark Boiler Ash Sluice Pond.

Bark Boiler Ash Sluice

Although this flow is virtually impossible to sample accurately, the ash content of wood is fairly well established (*i.e.*, 0.5 - 1.0%) and wood residue fuel consumption rate for the bark boiler is recorded. The total ash generated can then be estimated. Please note that this would be a dry ash. Approximately 10% of this total exits in the boiler as dry grate ash with 90% ash, plus some quantity of unburned wood char, being swept through the dry collector. The dry multi-cyclone collector catch is classified to reinject the bulk of the wood char back into the boiler. The resultant classified ash with less than 10-15% retained char is then sluiced in water. Some portion of this ash solubilizes in the water sluice becoming part of the dissolved solids in the plant NPDES discharge. Although this estimation overstates the actual Bark Boiler Ash deposited in the primary sludge/ash sluice pond, it is adequate for engineering purposes.

Secondary Biological Sludge

As bacteria consume biodegradable substances in the NPDES wastewater treatment system, their biomass is increased. This increase in protoplasm, as BOD is reduced, results in biological solids, which will settle out. As available food and nutrients decrease, the bacteria go into an Endogenous Respiration state and the biomass decreases over time. Final autolysis of the organisms results in a minimum residue, which is a fine mud.

Under the terms of Permit LA0007617 total suspended solids (TSS) are measured in the final discharge from #4 Pond (discharge 401). As part of our internal systems verification, TSS is also measured at the HIAB discharge at the front end of the NPDES system. The difference between these two loadings represents biological solids deposited over the various ponds of the NPDES system. **Appendix I** presents data, which shows how these biological solids are deposited over the entire NPDES system. Nearly 90% of these solids fall out in the first 3 elements of the NPDES treatment train.

Periodic maintenance of the settling ponds, both mechanically aerated and facultative, may require removal of biological sludges to maintain efficiencies. Estimates of the amounts of biological sludges involved in these transfers will be based on sludge volumes detected in the ponds before and after cleaning. All such maintenance transfers will be made to the Primary Clarifier Sludge/Ash Sluice Pond. The LDEQ will be advised of all such transfers prior to beginning the transfers.

g. NPDES discharge points (existing and proposed); and

The existing discharge points are identified on **Figure 6**. No new discharge points were needed as a result of adding the 41-acre impoundment.

The following outfalls exist at the Graphic Packaging Facility:

Outfall 001A:	Treated Mill Effluent
Outfall 002A:	Parish Stormwater Drainage
Outfall 003A:	Parish Stormwater Drainage
Outfall 401A:	Treated Mill Effluent

No further outfalls are currently proposed for the NPDES system.

h. other features, as appropriate.

There are no other features that are appropriate.

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

a. areas for isolating nonputrescible waste or incinerator ash, and borrow areas; and

As shown in **Figure 7**, the waste stream contained in the 21-acre impoundment is the same waste stream received by the 41-acre impoundment and the NPDES Impoundments. This waste stream does not contain incinerator ash. Potential borrow areas are located at least 500 feet from the limits of the impoundment and the waste is completely isolated from the surrounding area by the impoundment levee system. Therefore, no areas are needed for isolating nonputrescible waste or incinerator ash and borrow areas.

b. location of leachate collection/treatment/removal system.

In accordance with LAC 33:VII.713.B.3, leachate collection, treatment, and/or removal systems and leak detection and removal systems are not required for Type I surface impoundments, and were therefore not constructed for the impoundments.

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 landfarms), 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;

Surface drainage is prevented from entering the 21-acre impoundment and the 41-acre impoundment by levees that are approximately 15 feet higher (elevation 85 feet MSL) than the surrounding grade (elevation of approximately 70 feet MSL). Precipitation that falls directly into the impoundments is collected on the surface of the waste and eventually is routed to the primary clarifier through the decant canal. Rain that falls outside the impoundment levees is directed away from the facility as indicated on Figure A-5 (Surface Water Management Plan) presented in Appendix J.

Dikes and levees about the NPDES ponds normally preclude surface drainage into these ponds as dikes and levee elevations are higher than adjacent ground surfaces.

While not usually considered surface drainage, there is one minor source of flow into the NPDES system. This source is the landfill leachate collection system (P-0071), which is injected into the mill effluent prior to the Primary Clarifier.

During periods of flooding, ponds are inundated in the following order: Pond 4, Pond 3, Pond 2, Pond 1, Effluent Canal, and lastly the Decant Canal.

The Decant Canal is subject to minimal solids deposition because of solids depositing in the Sludge/Ash Pond and the light, almost colloidal nature of any solids that may flow through. While velocities in this narrow conduit mitigate against sedimentation, this canal is dredged periodically to protect decant pumps.

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

Currently, storm water runoff from the solid waste management areas, including the 21-acre and 41-acre impoundments, at the Graphic Packaging West Monroe Facility is treated and then discharged through Outfall 401, which is shown on Figure 6. Flow at Outfall 401 is monitored by a Parshall Flume as provided for in the water discharge permit. Flow proportional composite sampling is completed three times per week for BOD5 and TSS compliance determination. Grab samples for pH analysis are also collected three times per week.

Storm water runoff from the area surrounding the 41-acre impoundment is clean since it is not possible for the runoff in areas outside the levees of the impoundment to have contact with the waste. This runoff drains to the surface water collection ditches located on the south and east sides of the 41-acre impoundment. The runoff is then directed into the pond located immediately north of the impoundment, as indicated on Figure A-5 (Surface Water Management Plan) presented in Appendix J. This pond was created several years ago through the excavation of borrow material, leaving a large excavation that filled with water. The pond eventually overflows into an existing drainage canal that drains to Toney Bayou, which in turn drains into the Ouachita River.

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

The 24-hour, 25-year rainfall is approximately eight inches in the West Monroe area as stated in the U.S. Department of Commerce Technical Paper No. 40 of 1961, "Rainfall Frequency Atlas of the United States". However, in accordance with LAC 33:VII.713.A.3, the design standard of nine inches for facilities located above 31 degrees north latitude was used for this storm event in analyses for sizing the surface water collection ditches.

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

No aquifer recharge areas are present at the site or within 1,000 feet of the site perimeter. Therefore, no adverse

impact to aquifer recharge areas is anticipated from the operation of the ash/sludge impoundments. The nearest aquifer recharge area is located greater than two miles to the west, which is a recharge area for the Terrace deposits (yields groundwater of variable quality). The recharge areas for the most important groundwater source for Ouachita Parish, the Sparta Sand, are located outside of Ouachita Parish.

The 40-acre pond was constructed with a 60-mil HDPE liner. The NPDES pond is not lined; however, the remaining impoundments were constructed with a clay liner, thus reducing the potential recharge into the groundwater.

In addition, GPI has operated a groundwater monitoring system since 1986. The groundwater monitoring wells are sampled on a semiannual basis in order to ensure that liners are functioning properly and to determine any adverse impact in the groundwater quality. The groundwater monitoring program is in place to protect the surrounding area to adverse impacts.

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.**

The 21-acre and 41-acre ash/sludge impoundments are located within the 100-year flood plain of the Ouachita River. To investigate the effect of the 41-acre impoundment on the storage capacity of the flood plain and on the flow of the 100-year base flood, a hydrologic model of the Ouachita River was obtained from the U.S. Army Corps of Engineers. The model was modified to represent the floodplain conditions with the 21-acre impoundment, and again with the 41-acre impoundment. The results of the model indicated there is a negligible increase (less than 0.1 feet) in the flood stage due to the presence of the impoundment. The flood base flow will be affected only in the vicinity of the Graphic Packaging Plant, where the regulatory floodway width will increase by less than approximately 250 feet at one section. Documentation for the flood studies was incorporated into the Parish Development Permit presented in Appendix C.

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 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:

a. isometric profile and cross-sections of soils, by type, thickness, and permeability;

The site of the impoundments is located in the alluvial valley of the Ouachita River, three-quarters of a mile south of West Monroe and one-half mile west of the Horseshoe Bend in the Ouachita River. Surface and near surface materials consist of varying thicknesses of Holocene brown and gray clays, sandy and silty clays, and Pleistocene tan and gray sands and basal gravel to as deep as approximately 35 feet. Although the Cockfield Formation is not normally found in the valley, the lithology of the samples recovered in the test borings closely resembles that of the Lower Cockfield. The samples consisted of brown to gray finely-laminated clay with numerous partings of white to light gray silt and fine sand. If this assumption is correct, correlation with the Electric Log of Graphic Packaging Well Number 13 indicates that the Cockfield would extend to approximately 100 feet below existing ground level. The clays and sands of the Cook Mountain Formation would then occur to a depth of about 300 feet where the massive sands with interbedded clays of the Sparta Formation are encountered and extend to approximately 880 feet below existing ground level. Below the Sparta are the clays and silty clays of the Cane River Formation. This stratigraphy is represented on a fence diagram, **Figure 8**.

A total of 43 borings were installed in the vicinity of the 21-acre impoundment as shown on **Figure 9**. Borings designated 1 through 25 were hand-augured to depths varying from five to fourteen feet below the surface. Borings B-1 through B-3, B-5 through B-15 and SW-1 through SW-4 were drilled to a depth of 12 to 38 feet below the surface. Of these 18 borings, 12 were continuously sampled to a depth 5 feet below the bottom elevation (*i.e.*, 64 feet msl) of the 21-acre impoundment and 15 of the 18 were to a depth of at least 20 feet below the bottom elevation. Logs of all of these borings and test results are presented in **Appendix L**. An isometric profile of the soils encountered beneath the 21-acre impoundment is presented on **Figure 10**.

The site of the 41-acre impoundment was investigated through installation of 31 borings. Borings DM-1 through DM-20 were drilled to at least 30 feet below the planned excavation depth of the impoundment (to elevation 31.0 feet msl), with the exception of DM-20, which was drilled to a depth of 100 feet below land surface (bls). The borings were spaced no greater than 450 feet apart, as required by LAC 33:VII.709.C.1.c. *Continuous sampling was performed* throughout these borings with the exception of DM-20, which was sampled continuously to a depth of 45 feet bls and at five-foot intervals thereafter to completion. Borings HB-1 through HB-10 were hand auger borings located approximately mid-way between the "DM" borings in the interior of the impoundment. These hand-augured borings were terminated below the upper clay layer, typically at 8 to 12 feet bls, and were performed to determine the continuity and thickness of the upper clay. Since the 41-acre impoundment was designed to tie into the 21-acre impoundment and share the eastern levee of the 21-acre impoundment, some of the borings performed for the investigation of the 21-acre impoundment also provide information on subsurface conditions for the 41-acre impoundment.

Figure 9 shows the location of all boreholes performed for both the 21-acre and 41-acre impoundments. Geologic cross sections A-A', B-B', C-C', D-D', E-E', F-F' through the site of the 21- acre and 41-acre impoundments are shown on **Figure 11a**. Geologic cross sections G-G' and H-H' through the site of the 21-acre and 41-acre impoundments are shown on **Figure 11b**. The locations of the cross-sections are indicated on **Figure 12.** An isometric profile for the site of the 41-acre impoundment is shown in **Figure 13**. As shown on these figures, the soils in this area generally consist of clays underlain by sands, silty sands, sandy clays and silty clays. Laboratory testing of samples from borings performed for the site investigations included moisture content, dry density, Atterberg limits and permeability tests. The results of these tests are shown on **Table 1** for the 21-acre impoundment site and on **Table 2** for the 41-acre impoundment site. As indicated by this data, coefficients of permeability ranged from 10^{-6} to 10^{-9} cm/sec for on-site in-situ clays, silty clays, and sandy clays.

Portions of the 21-acre impoundment were constructed in or over (but in no known case entirely through) shallow sand and gravel deposits that were of limited thickness (generally less than 20 feet). Similar conditions were encountered

during construction of the 41-acre impoundment, although gravel deposits were not evident during the geotechnical investigation performed for the 41-acre site. This is not unusual for most of north Louisiana west of the Ouachita River. Normal good engineering practices were employed to dewater the site during construction. The 21-acre impoundment bottom and inside slopes are protected by a recompacted minimum three-foot clay liner in accordance with the LDEQ regulations that were in effect when this impoundment was constructed. Additionally, the 21-acre impoundment outfall design provides for positive level control to prevent differential liner pressure during periods of high river levels. Monitor wells around the 21-acre impoundment, the number, type and location of which have been approved by LDEQ and have been installed under separate agreement, will indicate liner failure, should that occur. Monitoring wells have also been installed to monitor the 41-acre impoundment, as discussed in the responses to LAC 33:VII.521.F.5.

Southwestern Laboratories conducted permeability tests, using falling head permeameters, on samples of sandy clay removed from the upper eight feet in the vicinity of (former) Piezometer P-1, for both clean water and process effluent. Under the short time frame and limiting solids of these tests, no difference was seen which would indicate that solids tend to "blind" this soil. Both tests, however, resulted in permeabilities of 1.17×10^{-8} cm/sec. In routine analysis of these waste streams for solids, EPA 0.45 micron filters "blind" rapidly so that these fine (fiber fines, clay particles, *etc.*) solids will seal the impoundment is intuitive. These test further demonstrated these clays are more than adequate in permeability characteristics.

Additional aspects of liner construction, groundwater protection, and groundwater control during construction are provided in the responses to LAC 33:VII.521.C.

Southwestern Laboratories' soils report (included in **Appendix K**) presents the required soils test data for the NPDES impoundments. All figures indicate the scales used and other pertinent data.

A fence diagram of the entire area covered by solid waste impoundments and of the entire facility has been prepared as **Figure 8.**

Graphic Packaging has been placing borings and wells around the 21-acre impoundments at the directions and approval of the LDEQ since 1985. From 1985 to 1990, Graphic Packaging completed a comprehensive program to define the subsurface conditions around the perimeter of the 21-acre impoundment at the direction of the LDEQ. The wells and borings around the 21-acre and 41-acre impoundments were also installed under the direction of the LDEQ. The total number of wells and borings drilled at the site exceeds 100, and greater than 10% of these have been drilled deeper than 60 feet. Ten cross-sections and two fence diagrams have been prepared using almost all of the borings/wells.

In addition two 500-foot borings are included as **Figure 14**. These borings confirm the general site configuration of a shallow clay layer (Stratum II), a shallow sand layer (Stratum III), an intermediate clay later (Stratum IV), a deep sand layer (Stratum V), and a final thick deep clay layer (Stratum VI) which extends to below 200 feet MSL. Deeper borings would only penetrate the Stratum VI deep clay layer. Graphic Packaging believes that sufficient characterization of the site has been performed to adequately delineate site geology and hydrogeology.

The uppermost aquifer is Stratum II sand, which is discontinuous in some areas of the site, especially towards the southeast corner, which is solid clay down to Stratum V sand. In those areas Strata II and IV (silty clay) appear to meet. Stratum IV is the lower confining unit of the solid waste units. An Isopach Map of the surface of Stratum IV has been prepared as **Figure 15**.

The information shown in the cross-sections in **Figure 11** indicate that all sand lenses at about the 30-foot MSL elevation are part of Stratum III. Stratum V rarely occurs at a higher elevation than 50 feet MSL. The area below the 21-acre and 41-acre impoundments is indicative of active alluvial deposition during the Holocene. The area contains numerous small lenses of deposition within the larger Strata. The new cross sections clarify the locations of the main Strata under these impoundments.

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

Available logs of all soil borings taken in the vicinity of the 21-acre impoundment and the 41-acre impoundment (as shown in **Figure 9**) are provided in **Appendix L**. Logs of soil borings made in the vicinity of the NPDES impoundments are provided in the Southwestern Laboratories soils report in **Appendix K**.

It should be noted that there is no log available for Boring B-4 by Woodward-Cycle, because this boring was never performed. In a 1985 meeting with Mr. N. Dave of LDEQ, following the Woodward-Clyde borings, this was discussed and Mr. Dave agreed B-4 would not be necessary. Mr. Dave, at the same meeting, requested four additional borings in the site at other locations for better overall definition. These were eventually performed by Southwestern Laboratories and are shown on the boring location plan as "SW-1", "SW-2", "SW-3", and "SW-4". All borings were tremie grouted to full depth upon their completion.

Procedures for plugging of abandoned borings or wells will conform to the LDOTD, Office of Public Works "Water Well Rules, Regulations and Standards – State of Louisiana" and/or LDEQ requirement that legally supersedes these requirements in the future. In general, the plant will provide for the sealing of any vertical migration path potentially resulting from exploratory borings and/or monitoring programs. Current well plugging procedures are outlined in **Appendix F**.

c. results of tests for classifying soils (moisture contents, Atterberg limits, gradation, etc.), measuring soil strength, and determining the coefficients of permeability, and other applicable geotechnical tests;

Laboratory testing of soils included moisture content, Atterberg limits, unconfined compression tests, triaxial strength tests, grain size analyses, and permeability tests. Results of some of the laboratory tests are presented on the boring logs in **Appendix L**. Further data for the NPDES impoundment area is provided in **Appendix K**. In addition, results of the permeability tests performed for the 21-acre impoundment are summarized on **Table 1**. Results of

laboratory testing (moisture contents, dry unit weight, Atterberg limits, permeability, and shear strength) performed for the 41-acre impoundment is presented on **Table 2**.

d. **geologic cross-section from available published information depicting the stratigraphy to a depth of at least 200 feet below the ground surface;**

Geologic cross-sections available in published information (from the U.S. Geologic Survey) did not reflect geology in the immediate vicinity of the site. However, drillers' logs were available for two 500' deep wells (#2A and #3A) that were drilled north of the existing plant landfill on Graphic Packaging West Monroe property.

GPI reviewed all available documents and was unable to obtain the locations for boreholes 2A and 3A. However, the borings can be utilized to determine deeper stratigraphy at the facility. The boring logs have been utilized to interpret the corresponding stratigraphic nomenclature used in the cross-sections. As shown, the upper surface is void of Strata I (Fill material). However, the rest of the boring logs correspond well with stratigraphy noted on other boring logs and the cross sections. The stratigraphy encountered while drilling these wells is shown on **Figure 14**.

Detailed stratigraphy to a depth of 100 feet below ground surface is shown on **Figure 8** for the impoundment site.

e. **for faults mapped as existing through the facility, verification of their presence by geophysical mapping or stratigraphic correlation of boring logs. If the plane of the fault is verified within the facility's boundaries, a discussion of measures that will be taken to mitigate adverse effects on the facility and the environment;**

No evidence of surface faulting exists within the Holocene deposits of Ouachita Parish (K.K. Wang, "Geology of Ouachita Parish", 1952). The Sparta Formation contains some subsurface faults, at depths of approximately 600 to 800 feet, which do not extend to the surface. Therefore, no faults are known to exist through the facility and mitigating measures are not applicable.

f. **for a facility located in a seismic impact zone, a report with calculations demonstrating that the facility will be designed and operated so that it can withstand the stresses caused by the maximum ground motion, as provided in LAC 33:VII.709.C.2; and**

In accordance with LAC 33:VII.709.C.2, the existing NPDES impoundments and the 21-acre ash/sludge impoundment currently receive waste and are therefore exempt from this requirement. However, the 41-acre impoundment did not receive waste prior to October 9, 1993. Therefore ground motion caused by seismic activity was considered in the design of the 41-acre impoundment.

The West Monroe, Louisiana area is in seismic impact zone 1, as shown on **Figure 16**. The maximum acceleration for this seismic zone is 0.1g, or 3.22 ft/sec^2. To demonstrate that the 41-acre ash/sludge impoundment is designed to withstand the stresses caused by the maximum ground motion, several runs of the slope stability model PCSTBL5M (developed by Purdue University) were performed, with an acceleration of 0.1g included in the model, to evaluate the safety factors for the most critical failure circles. The results of these analyses are discussed in the Geotechnical Report prepared by Dames & Moore, presented in **Appendix K**. As indicated by these results, the 41-acre impoundment is designed with a minimum factor of safety of 1.1 against failure from the maximum acceleration of 0.1g.

g. **for a facility located in an unstable area, a demonstration of facility design as provided in LAC 33:VII.709.C.3.**

As discussed in the above response, seismic zone 1 represents an area of a very low impact (acceleration of 0.1 x gravity) from earthquake activity, which would probably not be considered as an unstable area. However, the stability of the 41-acre ash/sludge impoundment was evaluated using this acceleration in the slope stability model. Documentation of the analyses is provided in the Geotechnical Report presented in **Appendix K**.

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 (a geotechnical engineer, soil scientist, or geologist) along with a description of the method used to determine soil characteristics; and**

   a. **Logs of all known soil borings taken on the facility and a description of the methods used to seal abandoned soil borings.**

   The impoundments are Type I facilities. Therefore, this citation is not applicable.

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

1. The following information on subsurface hydrology is required for all Type I facilities and Type II landfills and surface impoundments:

a. delineation of the following information for the water table and all permeable zones from the ground surface to a depth of at least 30 feet below the base of excavation:

i. areal extent beneath the facility;

The general location of permeable zones beneath the site of the solid waste facilities are shown on Geologic Cross Sections A-A' through F-F', presented as **Figures 11** of this permit renewal application. As shown on these figures, an upper permeable zone is present from approximately elevation 62 feet msl to elevation 48 feet msl, and varies in thickness across the site. This zone (Stratum III on the cross sections) contains mainly silty sand/sandy silt (SM/ML) deposits, with occasional silty clay/clayey silt layers. Due to the presence of these clayey layers, the vertical permeability of this zone was considerably less than the horizontal permeability, 1.5×10^{-7} cm/sec vertical permeability versus 1.2×10^{-4} horizontal permeability (averaged results from laboratory testing). In-situ permeability for this zone was also determined through slug tests performed in piezometer PZ-1, located as shown on **Figure 9**. These tests indicated a horizontal permeability of approximately 6.4×10^{-4} cm/sec. All monitoring wells, except MW-13, MW-14, and MW-15 are screened in this permeable zone.

A second permeable zone, identified as Stratum V on the cross sections (**Figure 11**) occurs from approximately elevation 41 feet msl to elevation 35 feet msl across most of the site. This permeable zone is very thin to non-existent on the southern edge of the site, and generally thickens to the north. At the location of boring DM-1 (near Toney Bayou), this zone is hydraulically connected to the overlying

permeable zone. Monitoring well MW-16 was screened in this lower permeable zone and was plugged and abandoned in April 1996 (see **Appendix E**).

No additional permeable zones are known to exist to a depth of 30 feet below the base of the excavation. Neither of the permeable zones described above are used as a source of drinking water in Ouachita Parish.

Fresh groundwater occurs in Ouachita Parish in unconsolidated deposits of Holocene, Pleistocene and Eocene ages. The alluvium, which ranges in age from Holocene to Pleistocene, forms the youngest water-bearing unit in the area. The alluvium is thick enough to be considered a significant source of water only beneath the Ouachita Valley. The lower part of the alluvium (sand and gravel) is considered to be Pleistocene in age. The alluvium of the Ouachita River is developed as a source of water for domestic, stock, irrigation, and industrial uses. In general, the surface of the alluvium is relatively flat, while its base, resting on the eroded surface of the (Cook Mountain Formation) Cockfield Formation, is very irregular. Based on boring logs collected in the vicinity of the site (presented in **Appendix J**), the alluvium was recorded at the natural ground surface. The base of the alluvium varied between depths of 20 and 35 feet below the natural ground surface. The regional groundwater movement in the alluvium appears to be toward the Ouachita River. The quality of water in the alluvium varies considerably from place to place. In a few locations, water low in iron content is reported; otherwise, water from the alluvium contains objectionable quantities of iron and generally is very hard.

The Cockfield Formation beds in Ouachita Parish consist of gravel-free sands and clays, which occasionally contain ironstone concretions. This formation has been defined beneath the alluvium at the site, beginning at a depth of approximately 35 feet bls and is only about 20 feet in thickness under the site. The Cockfield Formation occurs only locally in Ouachita Parish. Only shallow, small capacity, domestic wells (20 gpm or less) yield water from the Cockfield, mainly in the southwestern part of the Parish. The demand for water from the Cockfield is

low due to the low population density in this part of the parish. Since the formation is thin and the surface is dissected deeply by streams, part of the sands of the Cockfield is unsaturated, limiting the potential of the unit as a source of water. The depth to water in wells screened in many of the sands in the Cockfield Formation is related to topography. Water levels are deepest where relief is greatest and shallower in flat areas. Streams that cut into the unit act as drains for the shallower sands. As a result, groundwater gradients locally are toward the streams. All of the water passing through the Cockfield that is not discharged locally to streams is discharged into the Ouachita Valley alluvial deposits where these deposits are in contact.

Underlying the Cockfield Formation is the Cook Mountain Formation, made up of clays, silty clays, marls and fine-grained glauconitic sands. The Cook Mountain Formation is a source of water for domestic wells only on the eastern part of Ouachita Parish. Elsewhere, the sands in the Cook Mountain are discontinuous and of limited extent and the clays retard the vertical movement of water. A potentiometric map of the Cook Mountain Formation is presented in **Appendix M**. The map shows that the water levels decline toward the center of pumping from the Sparta in West Monroe. Thus, the Cook Mountain Formation is in hydraulic connection with the underlying Sparta Sand in eastern Ouachita Parish and water levels in the Cook Mountain are seen to be adjusting to long-term pumping from the Sparta. At the Graphic Packaging West Monroe facility, the Cook Mountain Formation separates groundwater from the alluvium and the underlying Sparta Sand. The Cook Mountain ranges from 150 to 250 feet in thickness and is approximately 250 feet thick under the site area.

Underlying the Cook Mountain Formation is the Sparta Sand, which is the most important source of groundwater in Ouachita Parish. The Sparta ranges from about 450 to 700 feet in thickness and at the Graphic Packaging West Monroe site is approximately 700 feet thick, beginning at a depth of about 300 feet below grade. The Sparta Sand, as the formation name implies, is mostly sand with interbedded silt, clay, and lignite. Although the sand

beds are discontinuous and individual sands cannot be traced for any distance, they are mostly interconnected and form thick sandy zones that are aerially extensive. A depression in the potentiometric surface has formed at the major center of pumping from the Sparta at West Monroe as indicated in **Appendix M**. A water level measurement in Graphic Packaging's Well No. 9 (Ou-77) collected on March 23, 1982 indicated the potentiometric surface of the Sparta Sand was at Elevation 171.18 feet below NGVD.

Most of the fresh water in the Sparta in Ouachita Parish is soft, sodium bicarbonate type. However, water quality varies aerially and with depth. The chloride content of the water from the Sparta increases with depth. Beneath the Ouachita Valley the chloride content of water in the Sparta is generally higher than in the areas to the west. Water in the Sparta becomes more and more salty to the east, becoming totally salty a short distance from Richland Parish. Water from the Sparta is also amber colored to some extent and exhibits a characteristic "rotten egg odor" in places.

In Ouachita Parish, water from the Sparta is used for municipal, industrial, domestic and, to a small extent, for livestock, aquaculture and preservation needs. About 20 million gallons per day (MGD) of groundwater is pumped from the Sparta in Ouachita Parish. Fifty to sixty percent of groundwater use is industrial, with the largest withdrawal occurring in West Monroe. Other industrial users are compressor stations, a carbon black plant, chemical plants and generating stations. West Monroe pumps from 3 to 5 mgd seasonally for municipal use.

ii. thickness and depth of the permeable zones and fluctuations;

The thickness of each of the major strata defined beneath the solid waste facilities is shown on **Figure 8**. Additional subsurface cross sections are shown on **Figure 11**. As indicated by these cross sections, the upper permeable zone (Stratum III) underlying the ash/sludge impoundments is encountered at approximately five feet below land surface (bls) and extends to approximately 20 feet bls at most

locations. The second permeable zone (Stratum V) is encountered at a depth of approximately 28 to 30 feet bls, and extends to a depth of approximately 35 feet bls. This permeable zone does not appear to be continuous across the site (see **Figure 11**), and is not evident under the 21-acre impoundment (across Toney Bayou), based on the information available. These upper permeable zones are part of the alluvium that extends from ground surface to a depth of approximately 20 to 30 feet bls in the vicinity of the site.

The Cockfield Formation underlies the alluvium, beginning at a depth of approximately 20 to 35 feet bls, and is estimated to be only about 20 feet in thickness beneath the site.

The Cook Mountain Formation underlies the Cockfield Formation, beginning at a depth of approximately 50 to 60 feet bls under the site. The Cook Mountain ranges from 150 to 250 feet in thickness and is approximately 250 feet thick under the site area.

Underlying the Cook Mountain Formation is the Sparta Sand, which is encountered at a depth of approximately 700 feet thick under the Graphic Packaging West Monroe site.

A table showing quarterly water levels is included as **Table 3** and accompanying potentiometric maps are included as **Figure 17**. The potentiometric data indicates that the shallow groundwater flow direction remains consistently to the east towards the Ouachita River, which is normally at or below 50 feet MSL. Flow from Toney Bayou, which is downgradient of the impoundments, seems to be connected to the shallow groundwater flow. **Table 3** shows the new monitoring construction data and lists the depth of the well screens. The well installation reports and plug and abandonment reports for all of the wells are included in **Appendix E.** The well screen depth in association with water levels is presented on **Figure 11.**

iii. direction(s) and rate(s) of groundwater flow based on information obtained from piezometers and shown on potentiometric maps; and

Groundwater monitoring wells were installed to provide detection monitoring for the 21-acre impoundment in 1989. Sampling of these wells was performed quarterly for the first year after installation and semi-annually thereafter. Sampling activities include measuring water levels, which are used in developing potentiometric surface maps to document any seasonal variations in water level. Groundwater monitoring performed since 1989 has revealed that groundwater depth is highly dependent on the Ouachita River level, and that groundwater flow is normally toward the Ouachita River. A piezometric surface map developed for borings installed around the NPDES System is presented as **Figure 18**.

The entire monitoring well system for the waste management area completely encircles the NPDES System, including the 21-acre impoundment and the 41-acre impoundment. With the possible exception of MW-13, MW-14 and MW-15, all wells are screened in the hydraulically-connected shallow sand strata. As such, the monitoring system, as originally approved, is adequate for monitoring the groundwater regardless of flow direction.

Potentiometric surface contour maps for the distinct aquifers are presented in **Appendix M**. These maps include general groundwater contours in the alluvium for Ouachita Parish, the Cook Mountain Formation and the Sparta Sand. In addition, a potentiometric map of the shallow water table underlying the impoundment system is shown on **Figures 17**. A potentiometric map developed from water level measurements (from July 20 to 31, 1992) in the borings performed on the site of the 41-acre impoundment is presented on **Figure 19**.

iv. any change in groundwater flow direction anticipated to result from any facility activities.

No change in groundwater flow direction is anticipated to result from any facility activities.

GPI will incorporate water level measurements of all impoundments when constructing potentiometric maps. The water level measurements will be conducted in conjunction with semiannual groundwater sampling activities. GPI will report the impoundment water level measurements with the groundwater monitoring reports.

In addition, GPI will present the data on potentiometric surface maps to determine if the impoundments are hydraulically connected (if a mounding effect is shown).

b. delineation of the following, from all available information, for all recognized aquifers which have their upper surfaces within 200 feet of the ground surface:

i. areal extent;

Fresh groundwater occurs in Ouachita Parish in unconsolidated deposits of Holocene (youngest), Pleistocene, and Eocene (oldest) ages. The alluvium is thick enough to be considered a significant source of water only beneath the Ouachita Valley. The lower part of the alluvium (sand and gravel) is considered to be Pleistocene in age. The alluvium of the Ouachita River is developed as a source of water for domestic, stock, irrigation, and industrial uses. In general, the surface of the alluvium is relatively flat, while its base, resting on the eroded surface of the Cockfield Formation, is very irregular. Based on boring logs collected in the vicinity of the 21-acre impoundment (presented in **Appendix L**), the alluvium was recorded at the natural ground surface. The base of the alluvium varied between depths of 20 and 35 feet below the natural ground surface. The regional groundwater movement in the alluvium appears to be toward the Ouachita River. The quality of water in the alluvium varies considerably from place to place. In a few locations, water low in iron content is reported; otherwise, water from the alluvium contains objectionable quantities of iron and generally is very hard.

The Cockfield Formation beds in Ouachita Parish consist of gravel-free sands and clays which occasionally contain ironstone concretions. This formation has been defined beneath the alluvium at the site, beginning at a depth of approximately 35 feet

bls and is only about 20 feet in thickness under the site. The Cockfield Formation occurs only locally in Ouachita Parish. Only shallow, small capacity, domestic wells (20 gpm or less) yield water from the Cockfield, mainly in the southwestern part of the Parish. The demand for water from the Cockfield is low due to the low population density in this part of the parish. Since the formation is thin and the surface is dissected deeply by streams, part of the sands of the Cockfield is unsaturated, limiting the potential of the unit as a source of water. The depth to water in wells screened in many of the sands in the Cockfield Formation is related to topography. Water levels are deepest where relief is greatest and shallower in flat areas. Streams that cut into the unit act as drains for the shallower sands. As a result, groundwater gradients locally are toward the streams. All of the water passing through the Cockfield that is not discharged locally to streams is discharged into the Ouachita Valley alluvial deposits where these deposits are in contact.

Underlying the Cockfield Formation is the Cook Mountain Formation, made up of clays, silty clays, marls, and fine-grained glauconitic sands. The Cook Mountain Formation is a source of water for domestic wells only on the eastern part of Ouachita Parish. Elsewhere, the sands in the Cook Mountain are discontinuous and of limited extent and the clays retard the vertical movement of water. A potentiometric map of the Cook Mountain Formation is presented in **Appendix M**. The map shows that the water levels decline toward the center of pumping from the Sparta in West Monroe. Thus, the Cook Mountain Formation is in hydraulic connection with the underlying Sparta Sand in eastern Ouachita Parish and water levels in the Cook Mountain are seen to be adjusting to long-term pumping from the Sparta. At the Graphic Packaging site, the Cook Mountain Formation separates groundwater from the alluvium and the underlying Sparta Sand. The Cook Mountain ranges from 150 to 250 feet in thickness and is approximately 250 feet thick under the site area.

Underlying the Cook Mountain Formation is the Sparta Sand, which is the most important source of groundwater in Ouachita Parish. The Sparta ranges

from about 450 to 700 feet in thickness and at the Graphic Packaging site is approximately 700 feet thick, beginning at a depth of about 300 feet below grade. The Sparta Sand, as the formation name implies, is mostly sand with interbedded silt, clay, and lignite. Although the sand beds are discontinuous and individual sands cannot be traced for any distance, they are mostly interconnected and form thick sandy zones that are aerially extensive. A depression in the potentiometric surface has formed at the major center of pumping from the Sparta at West Monroe as indicated in the figure contained in **Appendix M**.

The Cook Mountain Formation (aquifer) occurs throughout the site at a depth of approximately 50 to 60 feet bls and in areal extent throughout Ouachita Parish.

ii. **thickness and depth to the upper surface;**

The Cockfield Formation underlies the alluvium, beginning at a depth of approximately 20 to 35 feet bls, and is estimated to be only about 20 feet in thickness beneath the site.

The Cook Mountain Formation aquifer underlies the Cockfield Formation, an aquitard of approximately 30 to 40 feet in thickness. The Cook Mountain occurs at a depth of approximately 50 to 60 feet bls under the site. The Cook Mountain ranges from 150 to 250 feet in thickness and is approximately 250 feet thick under the site area.

Underlying the Cook Mountain Formation, is the Sparta Sand, which is encountered at a depth of approximately 300 feet bls and is approximately 700 feet thick under the Graphic Packaging West Monroe site.

iii. **any interconnection of aquifers; and**

As discussed in the above response to LAC 33:VII.521.E.1.a.i, the upper permeable zone and the second permeable zone encountered beneath the site of the impoundment are hydraulically connected in the northwest corner of the site, near Toney Bayou, as shown on **Figure 8**.

The Cook Mountain Formation is in hydraulic connection with the underlying Sparta Sand in eastern Ouachita Parish and water levels in the Cook Mountain are evidently adjusting to long-term pumping from the Sparta. At the Graphic Packaging West Monroe site, the Cockfield Formation acts as an aquitard and separates groundwater from the alluvium and the underlying Sparta Sand.

iv. direction(s) and rate(s) of groundwater flow shown on potentiometric maps.

Potentiometric surface contour maps for the distinct aquifers are presented in **Appendix M**. These maps include general groundwater contours in the alluvium for Ouachita parish, the Cook Mountain Formation and the Sparta Sand.

2. The following information on subsurface hydrology is required for Type II landfarms. Delineation of the following information for the water table and all permeable zones from the ground surface to a depth of at least 30 feet below the zone of incorporation:

a. aereal extent beneath the facility;

b. thickness and depth of the permeable zones and fluctuations;

c. direction(s) and rate(s) of groundwater flow based on information obtained from piezometers and shown on potentiometric maps; and

d. any change in groundwater flow direction anticipated to result from any facilities activities.

Not applicable. The Graphic Packaging Facility does not include landfarms of any type.

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 landfarms), LAC 33:717.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), 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."

Design plans and specifications for the 21-acre Ash/Sludge Pond were prepared by the following:

- Manville Engineering
- ERM-Southwest, Inc.
- Soil Testing Engineers, Inc.
- John G. Maroney

Areas of responsibility and project organizations were as follows:

- Manville Engineering – Project management and project execution
- ERM-Southwest, Inc. – Permitting and conformance with LDEQ requirements
- Soil Testing Engineers, Inc. – Slope stability calculations, liner and levee placement details, and geotechnical performance criteria
- John G. Maroney – grading plans, site plans and typical construction details

The 21-acre ash/sludge impoundment has been designed based on good engineering practices and a detailed knowledge of the site subsurface characteristics. Certification that the information contained in the original permit application met the requirements of the Louisiana Solid Waste Rules and Regulations was provided by Mr. Michael E. Pisani, P.E., of ERM-Southwest, Inc. Certification that the 21-acre ash/sludge impoundment met the geotechnical design considerations outlined in the LSWRR was provided by Mr.

Gordon P. Boutwell, Jr., Ph.D., P.E., of Soil Testing Engineers, Inc. The plans and specifications for the 41-acre surface impoundment were prepared under the direction of Ms. Terri Richardson of Dames & Moore, with assistance from the Graphic Packaging Engineering Division. Certification that the design, plans and specifications for the NPDES impoundments met all requirements of (1986) Louisiana Solid Waste Rules and Regulations was made by Michael P. Collins, P.E.

At the time the Graphics Packaging Ash/Sludge and NPDES impoundments were designed and built, these regulations were not in effect. The impoundments were, however, built using good engineering practices. The 21-acre surface impoundments are currently being maintained to comply with LAC 33:VII.713. The 41-acre ash/sludge impoundment was constructed in compliance with the requirements of LAC 33:VII.711.

Based on knowledge of the design and operation of the solid waste facilities covered under this permit application, I affirm that, to the best of my knowledge, information, and belief, the Graphic Packaging Impoundments meet the requirements outlined in the Louisiana Solid Waste Rules and Regulations.

_____

Name

_____

Title

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

a. detailed plan-view drawing(s) showing original contours, proposed elevations of the base of units prior to installation of the liner system, and boring locations;

For the 21-acre impoundment, a detailed plan view and cross sections showing pertinent details of the constructed impoundment are shown on Drawings No. 63-0-18005 and 63-0-18003 (prepared by John G. Maroney and Associates), presented in **Appendix J**. The locations of borings performed to investigate the site of the 21-acre impoundment are shown on **Figure D-2**, and on **Figure A-3** of **Appendix J**

A detailed plan-view drawing showing the original contour elevations of the site for the 41-acre impoundment is shown on the Site Plan View, presented as **Figure A-1** in **Appendix J**. The elevations of the base of the 41-acre impoundment prior to installation of the liner system are shown on the Excavation Plan View, presented as **Figure A-2** of **Appendix J**.

Appendix J presents cross sections of all the NPDES system elements and their respective water elevations. Those elements which were originally proposed to be permitted as solid waste impoundments (*i.e.*, the facility) are identified. Groundwater table location, where available, is indicated (see **Table 3**).

All of the NPDES ponds were designed for an average 1.5' freeboard. The solid waste facility elements of this NPDES system equal or exceed this freeboard.

The HIAB and 35-acre Primary Clarifier Sludge/Bark Boiler Ash Sluice pond have freeboards in excess of 2 feet. The Effluent Canal and No.1 pond freeboard is between 1.5 and 2.0 feet.

The freeboard requirement is assumed to be needed to allow capacity for prevention of over filling of impoundments by influent or rainfall as well as to prevent wave action over running the levees.

NPDES Ponds 1, 2, and 3 are provided with three sets of two 36-inch culverts at discharges (*i.e.*, outfalls) and Pond 4 discharges through a six-foot wide Parshall Flume. These culverts and flume are more than sufficient to discharge the maximum system flow plus the maximum rainfall volume (*i.e.*, 12" rain episode). This makes overflow as a result of excessive influent impossible and the 1.5-foot freeboard is adequate.

The No.1 pond is "U" shaped (see Site Master Plan **Figure 6**) and, with each leg about 3,500 feet long and approximately 400

feet wide, has the longest straight sections of all these ponds. Wave creation and magnitude is the direct result of wind action over a protracted period of time applied over a suitable uninterrupted stretch of water of sufficient depth to propagate wave intensity. At an average of 5 feet in these ponds, water depth is insufficient for any sizeable wave propagation. Variable wind directions and general absence of a predominant wind direction for any extended periods of time mitigate against sizeable wave action. During the years since construction in about 1957, at no time has wave action been known to overtop the levee crown of any of these ponds.

The Effluent Canal is of such shape and dimensions (see Site Master Plan **Figure 6**) that wave action cannot be significant on its surface. It is fitted with two sets of discharge culverts (approximately 40 inch diameters), which is more than adequate to handle the maximum system flow.

Daily inspections of pond levees and outfalls assure that any pluggage of discharge structures and potential overflow would be detected and immediate corrective action taken.

For the above reasons the levee heights and normal freeboards indicated are justified. The only occasion that freeboard will not be present will be during flood episodes for which variance to flood protection, surface drainage preventions and freeboard maintenance have been previously requested.

b. detailed drawings of slopes, levees, and other pertinent features; and

Detailed drawings of slopes, levees, and other pertinent features of the 21-acre impoundment are shown on Figure 20 and Figures 21, 22 and 23. Detailed drawings of the 21-acre impoundment are also included on Drawings No. 63-0-18005 and 63-0-18003 in Appendix J (prepared by John G. Maroney and Associates).

Detailed drawings of the layout, levees, and liner system construction (prepared by Dames & Moore, Inc.) for the 41-acre impoundment are presented on Figures A-1 through A-4 in Appendix J. Drawings of slopes, levees, and other pertinent features of the NPDES impoundments are also included in Appendix J.

The levees have been designed for a minimum safety factor of 1.25 for the case of sudden drawdown to ensure structural integrity. To investigate the effect that receding floodwater would have on the structural integrity of the 41-acre ash/sludge impoundment, sudden drawdown of water was included in the slope stability model developed to analyze the factor of safety against slope failure for exterior levee slopes. This analysis is

conservative since the actual recedance of floodwater is generally gradual. The results of the analyses are discussed in the Geotechnical Report prepared by Dames & Moore, presented in Appendix K.

c. **the type of material and its source for levee construction. Calculations shall be submitted demonstrating that an adequate volume of material is available for the required levee construction.**

The clay liner and levee of the 21-acre impoundment were constructed from clays classified as CL or CH in accordance with the Unified Soil Classification System (USCS). These clays were obtained from the excavation performed for the impoundment and from a nearby on-site borrow source. All clay material was tested and evaluated before its use in construction to verify that it would meet the specifications for clay liner and levee construction, which are presented in **Appendix J** (prepared by John G. Maroney). An adequate volume of material was available for construction of the 21-acre impoundment.

The clay liner and levees of the 41-acre impoundment were also constructed using clayey soils classified as CL or CH, which meet the specifications (prepared by Dames & Moore) presented in **Appendix J**. An adequate volume of material was available for construction of the existing impoundment. A 3-foot thick slurry wall, composed of bentonite and earthen materials, was also constructed beneath the levees (see **Figure 21**). The top of the slurry wall was constructed approximately 3-feet above the natural ground level. The base on the slurry is embedded a minimum of 3-feet into the underlying, impermeable clay layer.

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; and**

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.**

Not applicable. The solid waste impoundments described in this document are not landfills.

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

   a. **representative cross-sections and geologic cross-sections showing original and final grades, approximate dimensions of daily fill and cover, drainage, the water table, groundwater conditions, the location and type of liner, and other pertinent information;**

   A plan view of the 21-acre facility showing final grades, drainage, and top of clay liner elevations is presented on Drawing No. 63-0-18005 in **Appendix J**. A plan view and cross section showing approximate original and final grades, the typical groundwater elevation, clay liner, and levee slopes is shown on **Figure 20**, and detailed levee cross sections are shown on Drawing No. 63-0-18003 in **Appendix J** along with the construction specifications prepared by John G. Maroney. Daily fill and cover do not apply to surface impoundments, and are therefore not shown on the drawings or figures.

   Three piezometers were installed in the impoundment area to monitor the groundwater elevations prior to construction. Groundwater at the West Monroe facility is not subject to rapid changes in elevation, but is dependent on the rise and fall of the Ouachita River and on precipitation. Experience at Graphic Packaging has shown that groundwater elevations do not generally rise above the critical level during May through October of each year. Although provisions were included in the original permit application for control of groundwater during construction (ditches, dewatering trenches, *etc.*), no significant groundwater problems were experienced during construction. Liner placement was completed during a single construction season and the impoundment was immediately placed in service (*e.g.* partially flooded), which prevented bottom or lateral heave from affecting the liner.

   Materials used for the levee construction consisted of clays and silty clays meeting an in-place permeability of no greater than 10^{-7} cm/sec. Placement of materials for the levees and liner was performed in accordance with the Construction Quality Assurance Plan contained in **Appendix J**. Erosion control of exposed slopes was prevented by planting

grasses native to the area. The tops of levees were surfaced with eight-inch thick Class B road base (with a gravel surface) to provide for all-weather access to the impoundment.

A 3-foot thick slurry wall, composed of bentonite and earthern materials, was also constructed beneath the levees (see **Figure 21**). The top of the slurry wall was constructed approximately 3-feet above the natural ground level. The base on the slurry is embedded a minimum of 3-feet into the underlying, impermeable clay layer.

A plan view of the 41-acre impoundment is presented as **Figure A-3** in **Appendix J**. This plan shows the location of levees and the top of clay liner (and synthetic liner) elevations. Representative cross sections showing original and final grades, and levee and liner system details are shown on **Figure A-4** in **Appendix J**. Geologic cross-sections A-A', B-B', C-C', D-D', E-E' and F-F' (**Figure 11**), illustrate the subsurface geologic and hydrogeologic conditions underlying the impoundment, and also show the approximate excavation limits and original grade at each section location. These cross-sections include complete descriptions of soil types developed through evaluation of test data from borings performed for the site investigation. The surface water management plan showing drainage control around the proposed impoundment is presented on **Figure A-5** in **Appendix J**. Daily fill and cover do not apply to surface impoundments, and are therefore not shown on these drawings.

b. a description of the liner system, which shall include: calculations of anticipated leachate volumes, rationale for particular designs of such systems, and drawings; and

The 21-acre impoundment contains a minimum three-foot thick recompacted clay liner with a permeability of 10^{-7} cm/sec or less, installed in accordance with the LDEQ-approved QA/QC Plan and specifications presented in **Appendix J**. Plan view and cross-sectional drawings of this liner are presented on Drawing No. 63-0-18005 and 63-0-18003 in **Appendix J** (prepared by John G. Maroney). This liner was selected because it met the requirements of the LSWRR for solid waste surface impoundments, provides adequate containment of the waste, and provides protection of the environment.

The 41-acre impoundment is designed to contain a minimum three-foot thick recompacted clay liner with a permeability of 10^{-7} cm/sec or less, overlain by a minimum 60-mil geosynthetic liner, each installed in accordance with the QA/QC Plans and specifications presented in **Appendix J** (prepared by Dames & Moore). Plan view and cross-sectional drawings of this liner system are presented on the drawings in **Appendix J** (**Figures A-3** and **A-4**, prepared by Dames & Moore). This liner system meets the requirements of the proposed LSWRR (dated September 1992) for solid waste surface impoundments, provides adequate containment of the waste, and protects the surrounding environment.

Surface impoundments do not generate leachate. Therefore, calculations for anticipated leachate volumes are not addressed.

The NPDES system soils report by Southwestern Laboratories (**Appendix K**) shows the degree to which suitable natural liner exists under the NPDES impoundments. The High Intensity Aeration Basin was lined with 2 feet of recompacted clay in all areas where natural clay did not occur during its construction. While no specific liner was applied during the 1963 construction of the Effluent Canal and No.1 Pond, nor the later 35-acre Primary Clarifier Sludge/Ash Sluice Pond, fine particle deposition over the years have blinded any permeable soils under the NPDES impoundments.

c. **a description of the leachate collection and removal system, which shall include calculations of anticipated leachate volumes, rationale for particular designs of such systems, and drawings.**

The design of the impoundments does not include leachate collection and removal systems because surface impoundments do not generate leachate. Therefore, this requirement is not applicable.

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

a. a minimum of three piezometers or monitoring wells in the same zone must be provided in order to determine groundwater flow direction;

Monitoring wells MW-16, MW-17, MW-18, and MW-19 were proposed in the original permit application to provide detection monitoring of the 21-acre impoundment. Monitoring wells MW-7 through MW-19 are used to monitor groundwater around Graphic Packaging's NPDES and ash/sludge impoundments. The locations of these wells are shown on **Figure 9**. Wells MW-16, MW-17, MW-18, and MW-19 were installed in December 1989 and have provided data on groundwater conditions and quality for the last 16 years. Groundwater at the West Monroe facility is not subject to rapid changes in elevation, but is dependent on the rise and fall of the Ouachita River and on precipitation. Typical groundwater elevations and flow direction beneath the 21-acre impoundment are shown on the potentiometric maps presented as **Figures 17**. Based on the data obtained as part of the monitoring program, water elevations do not generally rise above approximately elevation 62 feet mls from May through October of each year.

The 41-acre impoundment was designed to tie into the existing facilities and shares the eastern levee of the 21-acre impoundment. Monitoring wells MW-16 and MW-17 are located along this levee and are within or very close to the limits of the impoundment. A piezometer, PZ-1, was installed during the site investigation for the impoundment to serve as a third data point (with MW-16 and MW-17) for determining groundwater flow direction beneath the facility. The locations of MW-16, MW-17, and PZ-1 are shown on **Figure A-3** of **Appendix J**, relative to the layout of the 41-acre impoundment.

Groundwater levels were also measured in open boreholes (after a recovery period) during the period of July 20 to July 31, 1992, which are shown on **Figure 19**. Based on this data, the typical groundwater elevation underlying the 41-acre impoundment is approximately 59 to 63 feet msl. Slug and bail tests were also conducted in the upper permeable zone in PZ-1 to determine the hydrogeological characteristics of this zone, as discussed in Section E.

MW-16 and PZ-1 were plugged and abandoned in April 1996 because both MW-16 and PZ-1 lied within the limits of the proposed impoundment, as shown on **Figure 9**. The installation of monitoring wells MW-20 through MW-24 was performed between October and December 1996. The installation report is included in **Appendix E**. The locations of the groundwater monitoring wells for the impoundments are addressed in response to LAC 33:VII.521.F.c, and are shown on **Figure A-3** in **Appendix J**.

As a result of the new well installations, Graphic Packaging has constructed cross-sections and isometrics, **Figure 11**. **Figure 9** presents the well and boring locations used in the cross sections. **Figure 12** is the cross-section location map, **Figure 11** shows the cross-section through the impoundments and **Figure 8** is a fence diagram of the impoundment system. **Figure 11** illustrates that all of the wells are screened in Stratum III with the exception of MW-13, MW-14, MW-15, and MW-16 (now plugged and abandoned). All of these wells are screened in Stratum V at the direction of the LDEQ, since Stratum III is discontinuous at the southeast corner of the site. In each case, the most significant permeable layer adjacent to the impoundments is being monitored for detection of releases. **Figures 17a, b, c,** and **d** show potentiometric maps with groundwater direction flow to the east towards Ouachita River.

GPI will collect water level data from the impoundments at the time of groundwater sampling. GPI will present the data on potentiometric surface maps to determine if a mounding effect is observed. At that time, a determination of upgradient and downgradient wells will be evaluated.

Based upon site conditions, GPI requests a variance with respect to monitoring well spacing. Installation of an additional monitoring well between the northeast corner of Pond 4 and MW-22 is not feasible without the disturbance of high quality (bottomland hardwood) wetland habitat.

An additional monitoring well will be installed between MW-14 and MW-15. The construction timeline will be predicated on facility field conditions, as this area is subject to backflooding conditions along the Ouachita River.

b. for groundwater monitoring wells, cross-sections illustrating construction of wells, a scaled map indicating well locations and the relevant point of compliance, and pertinent data on each well, presented in tabular form, including drilled depth, the depth to which the well is cased, screen interval, slot size, elevations of the top and bottom of the screen, casing size, type of grout, ground surface elevations, etc.;

Wells MW-16, MW-17, MW-18, and MW-19 were proposed (and later approved by LDEQ) as wells to specifically monitor the 21-acre impoundment. These wells were installed in December 1989 in accordance with the LDOTD and LDEQ requirements for monitoring wells. Construction of wells MW-16, MW-17, MW-18, and MW-19 were observed by Mr. Dave McQueen of the LDEQ Northeast Regional Office. Monitoring well MW-16 was plugged and abandoned in April 1996. The wells were constructed of flush-joint threaded, Schedule 40 PVC casing and 0.01-inch machine slotted screen. A three-foot bentonite seal was placed in the borehole using pelletized bentonite and allowed to hydrate for a minimum of six hours before applying grout. The remainder of the annular space was tremie-grouted to the surface with a 4-6% bentonite mixture with the quantities of cement, bentonite, and water as shown on **Table 5** (provided by the LDEQ).

Man-made access pads were constructed to provide drilling access and elevate the surface grade of monitoring wells MW-17 and MW-18 to approximately 75 feet msl. These two wells were later extended upward to a minimum top of casing elevation of 85 feet msl. Concrete pads were poured around the well and sloped to provide drainage away from the well. For security, a locking cap was placed over the vented riser pipe. General well construction details are shown in **Appendix N**, and the well construction data for wells MW-16, MW-17, MW-18, and MW-19 is presented in tabular form on **Table 3.**

A complete construction report including all boring logs, as-built construction diagrams for each well showing all pertinent features such as screen intervals (MSL elevations) ground surface elevations, bentonite seal, protective casing, concrete slab, *etc.* was submitted to the LDEQ in November 1990. This report also included discussion of construction methods including grout component proportions, hydration periods for the bentonite seal and grout, *etc.*

Graphic Packaging has installed five new wells (MW-20 through MW-24) to monitor the 41-acre impoundment, one of which (MW-20) also serves as a replacement of MW-16. MW-16 was plugged and abandoned in April 1996 (see

Appendix E). These wells are screened in the uppermost permeable zone and the uppermost aquifer, in accordance with LAC 33:VII.709.E.1.a and b. The locations of these wells are shown on **Figure A-3** in **Appendix J** and **Figure 9**. The wells are constructed on pads that extend out form the impoundment levees, so that access to the wells can be obtained from the levee road system and so that the wells will be above the 100-year flood elevation of 83.1 feet msl. The wells were constructed similar to the other monitoring wells in the area, and in accordance with the "Water Wells Rules, Regulations, and Standards, State of Louisiana", as adopted by the LDOTD, as required by LAC 33: VII.709.E.1.c.i. In accordance with LAC 33:VII.709.E.1.d.i-iii, a report was submitted to the LDEQ within 90 days after construction of the wells and included daily field notes documenting construction procedures and any unusual occurrences, a boring log for each well with surveyed surface or top of casing elevation, and an as-built diagram for each well showing all pertinent features.

The construction and installation details for monitoring wells are included as **Appendix N**.

Upon a determination of upgradient and downgradient wells, the point of compliance wells will be established.

c. **a groundwater monitoring program including a sampling and analysis plan that includes consistent sampling and analysis procedures that ensure that monitoring results provide reliable indications of groundwater quality;**

Groundwater monitoring for the impoundment system is performed in accordance with the "Groundwater Sampling and Analysis Plan" developed for the waste management facilities at Graphic Packaging, presented in **Appendix N**. The groundwater sampling and analysis plan includes the procedures for sample collection, preservation and shipment, chain of custody control, and quality assurance/quality control, as required by LAC 33:VII.709.E.2.b.i-iv. The sampling and analysis plan also includes the selection of parameters to be sampled and analyzed for each event, analytical methods to be employed (from SW-846), the sampling frequency during detection monitoring, and the practical quantitation limit (PQL) for each parameter, as specified in LAC 33:VII.709.E.2.c.i-v.

The monitoring program for the 21-acre impoundment includes obtaining samples from an upgradient well, MW-19, and from downgradient wells MW-17, MW-18 and MW-20, performing analysis for pH, specific conductivity, chemical

oxygen demand (COD), total organic carbon (TOC), total dissolved solids (TDS), sulfate, and any metals detected from 3005 Appendix C, Table 1(arsenic, barium, cadmium, chromium, lead, and total aluminum). The preservation, container specification, analytical methods, and holding times for each parameter are listed in **Tables 2** of the sampling and analysis plan (see **Appendix N**). The analytical results from each sampling event are evaluated and discussed in a report to the LDEQ submitted within 60 days following the sampling event. As previously mentioned, MW-16 was plugged and abandoned in April 1996 and monitoring well, MW-20, has been installed to replace it.

Groundwater monitoring for the 41-acre impoundment is performed using well MW-19 as the upgradient well and monitoring wells MW-20, MW-21, and MW-22 as the downgradient wells. The location of the monitoring wells around the two impoundments is shown on **Figure 9**. The sampling and analysis is performed in the same manner and for the same analytes as discussed above for the 21-acre impoundment, since the two impoundments receive the same waste stream.

Detection monitoring will be conducted for the life of the facility and for the duration of the post-closure period (LAC 33:VII.709.E.3.d).

Appendix O contains extensive analytical data regarding characteristics of the solid waste in the impoundments. The analytical data and the facility's water discharge permit indicate that no volatile, semi-volatile chemicals are present in the effluent. The general chemistry parameters used since 1990 to monitor the solid waste impoundments are good indicators of the type wastes disposed of in the units. Quarterly and semi-annual sampling conducted since 1990 have confirmed no release from the units has occurred. **Table 4** contains practical quantitation limits (PQLs) for the constituents.

d. **for an existing facility, all data on samples taken from monitoring wells in place at the time of the permit application must be included. (If this data exists in the Solid Waste Division records, the administrative authority may allow references to the data in the permit application.) For an existing facility with no wells, groundwater data shall be submitted within 90 days after the installation of monitoring wells. For a new facility, groundwater data (one sampling event) shall be submitted before waste is accepted;**

As stated above, groundwater monitoring has been performed for the impoundment system since it was put in service. Semi-annual groundwater monitoring is conducted and the results obtained from all sampling events is summarized in the groundwater monitoring reports and submitted to the LDEQ. No evidence of groundwater contamination has been revealed through groundwater monitoring.

Appendix O contains extensive analytical data regarding characteristics of the solid waste in the impoundments. The analytical data and the facility's water discharge permit indicate that no volatile, semi-volatile chemicals are present in the effluent. The general chemistry parameters used since 1990 to monitor the solid waste impoundments are good indicators of the type wastes disposed of in the units. Semi-annual sampling conducted since 1990 have confirmed no release from the units has occurred.

e. **a plan for detecting, reporting, and verifying changes in groundwater; and**

The groundwater samples collected for each sampling event are analyzed for the constituents identified in the Groundwater Sampling and Analysis Plan, presented in **Appendix N**.

The statistical analysis will be evaluated in accordance with the June 2007 revised solid waste regulations. Only those parameters with detected values will be analyzed for statistically significant increases. Any extreme or outlier values will be identified along with percent of non-detects. Poisson's Prediction Interval will be utilized for parameters with greater than 90% non-detects. The Nonparametric Prediction Interval will be utilized for parameters with greater than 15% non-detects but less than 90% non-detects. For parameters with less than 15% non-detects, those non-detects will be replaced with ½ the detection limit and analyzed to determine if the data is normally distributed

utilizing either the original data, logarithmic transformed data, natural logarithmic transformed data, square root transformed data, or cube root transformed data (in order). Normalized data will be evaluated utilizing the parametric prediction interval method and non-normal data will be evaluated utilizing the non-parametric prediction interval.

f. the method for plugging and abandonment of groundwater monitoring systems.

After completion of service, groundwater monitoring wells will be plugged and abandoned in accordance with LAC 33:VII.709.E.1.e and the guidelines provided in "Water Well Rules and Regulations, State of Louisiana" as adopted by the LDOTD, Water Resources Section. The general procedures for plugging and abandonment of monitoring wells are presented in **Appendix F**.

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.

For the reasons discussed in the response to LAC 33:VII.713.B.3.g in this section, a gas collection and treatment or removal system is not planned for the Graphic Packaging ash/sludge and NPDES impoundments.

G. Facility Administrative Procedures. Standards governing facility administration procedures are contained in LAC 33:VII.711.C (Type I and Type II landfills), LAC 33:VII.713.C (Type I and II surface impoundments), LAC 33:VII.715.C (Type I and II landfarms), 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;

Records will be maintained during the life of the solid waste facilities and will be kept on file for at least three years after closure pursuant to LAC 33:VII.713.C.1.b.i. The following records will be maintained at the West Monroe Plant and these records will be made available to LDEQ officials during facility inspections:

- Copy of the Solid Waste Permit Application and any Solid Waste Permit Modification
- Copy of the current Solid Waste Rules and Regulations
- Solid Waste Annual Reports; an annual report stating amounts and types of waste handled during the permit maintenance period will be submitted to the Administrative Authority pursuant to LAC 33:VII.713.C.1.a.i
- Monitoring Well Installation Reports for wells associated with the Solid Waste facilities
- Groundwater monitoring results, laboratory reports, chain-of-custody forms and semi-annual reports submitted to the LDEQ pursuant to LAC 33:VII.709.E.3.e and 33:VII.521.F.5.d for the groundwater monitoring network associated with the solid waste facilities
- Disposal records of any solid waste (*i.e.*, sludges) removed from the permitted solid waste facility

- A copy of work orders issued for the repair of peripheral dikes associated with the solid waste facilities

- A copy of the approved solid waste permit

- Copies of daily operating logs, inspection logs, and quality assurance/quality control records

- A copy of the Closure Plan, as presented in Appendix N, and post-closure monitoring reports

- A copy of the certified field notes and quality assurance/quality control records for construction of liner systems of the facilities

- A copy of operator training programs

The above records will be used by Graphic Packaging to account for waste volumes generated, groundwater quality, and maintenance of the solid waste facilities. Each of the above items will be used to monitor the operation of the solid waste facilities.

Graphic Packaging will submit annual solid waste disposer reports to the administrative authority by August 1 of each reporting year in accordance with LAC 33:VII.713.C.1.a.i-v.

In addition to other records listed above, Graphic Packaging will maintain the following records on-site for the life of the facility and on file for at least three years after closure:

- Records demonstrating that liners and leak-detection and cover systems are constructed or installed in accordance with Graphic Packaging's approved liner specifications per LAC 33:VII.713.C.1.b:iii.(k).

- Any applicable or required data deemed necessary by the administrative authority per LAC 33:VII.713.C.1.b.iii.(m)

- Copies of all documents received from or submitted to the LDEQ per LAC 33:VII.713.C.1.b.iii.(p)

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

Key operating personnel at the West Monroe Facility are:

- Vice President and General Manager, Paperboard Division
- Operations Manager
- Power and Recovery Manager
- Engineering Services Manager
- Environmental Department Manager
- Operators and Maintenance Staff

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

Graphic Packaging pulp and paper mill operates 24 hours a day, 7 days a week. A guard is on duty 24 hours every day to continuously monitor entry points during operating hours. The solid waste facilities operate continuously.

2. Administrative procedures for Type II 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.).

Not Applicable.

H. Facility Operational Plans. Standards governing facility operational plans are contained in LAC 33:VII.711.D (Type I and II landfills), LAC 33:VII.713.D (Type I and II surface impoundments), LAC 33:VII.715.D (Type I and II landfarms), 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;

Wastewater from all mill processes is routed to the primary clarifier. Clarified wastewater is sent to the NPDES Ponds for further treatment and eventual discharge. Underflow from the clarifier is currently sent to the Primary Clarifier Sludge/Bark Boiler Ash Sluice Impoundment and then routed to the 21-acre and 41-acre impoundments.

The primary clarifier underflow contains all settled solids from the total mill effluent. This includes fiber fines, wood debris, ashes, grits and dregs discharged from the process. Water insoluble, inert materials are retained in the impoundments. Decant from the ash/sludge impoundments is returned to the primary clarifier for biological treatment. Approximately 120 tons/day of sludge are deposited in the ash/sludge impoundments.

The impoundments also receive sluiced ash from the bark boiler multi-cyclone collectors. The sluice is currently pumped through a six-inch plastic pipe to the ash/sludge impoundments along with the primary clarifier underflow.

Approximately 20 to 25 percent of the mill steam and power requirements are satisfied by burning primarily bark and other wood residue fuels. Combustion gases are first centrifugally cleaned by passage through multi-cyclones followed by char reinjection and then washed by flow through a Venturi Scrubber.

Bleed off from the Venturi Scrubber with makeup from other process wastewaters is used to sluice solids from the

burning of softwood and hardwood residues consisting mainly of inert grit and silicates. Decant is again returned to the primary clarifier for biological treatment. The quantities of sluice ash generated vary but normally averages 20 tons/day.

The maximum quantities of wastes per year to all of the solid waste units are calculated at approximately 173,000 wet tons/year.

Appendix O contains the analyses of the waste streams to be received into the solid waste units

Only wastes generated on the Graphic Packaging property are disposed of in the impoundment system. These wastes are typical of those generated by coated and uncoated unbleached southern pine/hardwood kraft and semi-chemical pulp production. Two types of waste streams are introduced into the impoundment system. Decant from the HIAB, which is directed into the NPDES impoundments, and underflow from the Primary Clarifier, which is directed into the 35-acre, 21-acre and 41-acre impoundments. The only difference in these two streams is the concentration of solids. The only other solid waste entering the impoundment systems, other than by direct discharge from primary clarifier underflow or bark boiler ash sluice piping, are mill sewer clean-out wastes, gravity dewatered fiber spills and NPDES pond cleanout solids. All these solids would normally be included in primary clarifier underflow and have the same characteristics of the routine solid waste going into this impoundment. The bark boiler sluice material is dependent upon fuels provided to the boiler.

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

Nearly all solids handling of wastes at the ash/sludge impoundments is performed by simple hydraulic transport and gravimetric sedimentation. Sludge pumps motivate the primary clarifier underflow and ash sluice pumps handle the sluiced ash from the bark-fired boiler, as discussed in LAC 33:VII.521.H.1.a, above. In addition to the primary clarifier underflow and sluiced ash, secondary biological solids may be infrequently removed to the impoundments from the aeration ponds by barge-mounted sludge pumps and temporary piping and material such as sewer cleanout is occasionally hauled to the ash/sludge impoundments using a

vacuum truck. Decant from the impoundments is returned to the primary clarifier via an overflow pipe as shown in **Appendix J**. The decant is returned to the clarifier via the decant canal and separate decant line, which is also used for decant from the 41-acre impoundment.

c. minimum equipment to be furnished at the facility;

Very little equipment is needed for the operation or maintenance of the impoundments. Permanent equipment includes the pipelines carrying the waste and the associated pipeline support system, and the permanent decant structure. Graphic Packaging will provide construction equipment, as needed, for performing routine maintenance of exterior levee slopes and ditches.

d. plans to segregate wastes, if applicable;

Since the wastes are compatible, no plan to segregate the wastes is necessary. The 41-acre impoundment receives the same waste stream as the 21-acre impoundment.

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

All equipment involved in plant operations including the waste management area is periodically inspected and maintained to prevent breakdowns and insure the containment of wastes. The operation of the ash/sludge impoundments is not highly dependent upon equipment and controls.

Operations at the plant continue as usual during most types of inclement weather. Severe weather conditions, such as hurricanes or other violent storms, may result in the closing of the plant, depending on the location and severity of such weather and the likelihood of direct impact on the plant. Decisions to close the plant in inclement weather are made by plant management personnel.

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 or emergency services, and training programs); and**

A complete description about fire protection, emergency and contingency procedures for explosions, fires or other emergencies, including training, and proximity to fire protection and medical care facilities at Graphic Packaging is given in the facility's Contingency Plan and Emergency Procedures Plan in **Appendix H**. Fire or explosion type emergencies are not likely or probable in the waste management area. In the unlikely event of a fire or explosion in this area, the company fire brigade is available with backup from the community fire department, if necessary.

Certification letters regarding off-site fire protection services and emergency medical services in accordance with R.S. 30:2157 are located in the Appendix C.

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

Provisions for vector, litter and dust control are not necessary due to the characteristics of the waste.

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

a. **a comprehensive operational plan describing the total operation including (but not limited to) inspection of incoming waste to ensure that only permitted wastes are accepted (Type II landfills must provide a plan for random inspection of incoming waste loads to ensure that hazardous wastes or regulated PCB wastes are not disposed of in the facility.); traffic control; support facilities; equipment operation, personnel involvement; and day-to-day activities. A quality-assurance/quality-control [QA/QC] plan shall be provided for facilities receiving industrial waste; domestic sewage sludge; incinerator ash; friable asbestos; nonhazardous petroleum-contaminated media; and debris generated from underground storage tanks [UST], corrective action, or other special wastes as determined by the administrative authority. The QA/QC plan shall include (but shall not be limited to) the necessary**

methodologies; analytical personnel; preacceptance and delivery restrictions; and appropriate responsibilities of the generator, transporter, processor, and disposer. The QA/QC plan shall ensure that only permitted, nonhazardous wastes are accepted;

A comprehensive operational plan, which describes the total operation of the impoundments, the waste inspection and testing procedures, personnel monitoring activities, equipment operation, and a QA/QC Plan for waste monitoring, sampling, and analysis is presented in **Appendix P** and summarized below. The waste disposed of in the solid waste facilities is generated on-site, therefore traffic control and transporter considerations are not applicable.

No hazardous waste and flammable waste are allowed to enter the solid waste facilities. The waste is generated and transported to the NPDES and ash/sludge impoundments via pipeline, therefore the composition of the waste is very consistent and deposition of the waste occurs in a very controlled manner. Determination of the non-hazardous nature of the solid waste is made through knowledge of the processes generating the waste.

Open burning is not practiced in the vicinity of the solid waste facilities, and will not be practiced in the future without the prior authorization from the proper authorities. Materials are not salvaged from the solid waste facilities. Graphic Packaging is researching beneficial reuse of the materials, and in the event that beneficial use is determined to be practical and is approved by the LDEQ, wastes may be removed from the impoundments at a later date for this recycle/reuse alternative. Scavenging from the surface impoundments is not allowed.

The waste deposited in the solid waste facilities is generated at the Graphic Packaging West Monroe Plant. Wastewater from the mill process is routed to the primary clarifier. Clarified wastewater is sent to the NPDES Ponds for further treatment and eventual discharge. Underflow from the clarifier is currently sent to the Primary Clarifier Sludge/Bark Boiler Ash Sluice Impoundment and then routed to the 21-acre and 41-acre impoundments.

The primary clarifier underflow contains all settled solids from the total mill effluent. This includes fiber, fines, wood debris, ashes, grits and dregs discharged from the process. Water insoluble, inert materials are retained in the

impoundment. Decant from the impoundment is returned to the primary clarifier for biological treatment. Approximately 133,000 wet tons/year of sludge are deposited in the impoundment.

The 21-acre impoundment also receives sluiced ash from bark boiler multi-cyclone collectors. The sluice was previously pumped through a six-inch plastic pipe to the sludge ash sluice pond along with the primary clarifier underflow. The six-inch line has been rerouted to the 41-acreimpoundment.

Approximately 20 to 25 percent of the mill steam and power requirements are satisfied by burning primarily bark and other wood residue fuels. Natural gas and fuel oils are burned as auxiliary fuels. Combustion gases are first centrifugally cleaned by passage through multi-cyclones followed by char reinjection and then washed by flow through a Venturi Scrubber. Bleed off from the Venturi Scrubber with makeup from other process wastewaters is used to sluice the dry material from the multi-cyclone catch. The bulk of the ash sluice is typical solids from the burning of softwood and hardwood residues consisting mainly of inert grit and silicates. Decant is again returned to the primary clarifier for biological treatment. The quantities of sluice ash generated vary but normally averages 11,000 wet tons/year.

The waste deposited in the ash/sludge impoundments fills the unit from the bottom up, with water decanting off the surface of the settled waste. No individual units exist within the impoundments and no sequencing of waste placement can be performed because of the high water content of the waste.

The roads that provide access to the ash/sludge impoundments are located along the tops of the levees, at approximately elevation 85 feet msl. The roads are topped with eight-inch thick road base material (Class B) and are graded to drain surface water off to side ditches. Water is not able to pond on these roads, therefore operational methods or changes during wet weather are not needed to maintain the roads. Furthermore, these roads experience very little traffic because waste is not hauled to the impoundments, but is transported via pipeline.

The exterior levee slopes and drainage system around the 21-acre impoundment and those constructed for the 41-acre impoundment are inspected daily and following major storm

events for evidence of erosion and other potential problems. Any areas that have experienced significant erosion will be repaired and ditch areas that are not draining properly will be remedied. Since erosion control measures are planned for these areas, erosion is not anticipated to be a problem.

The impoundments are inspected daily and after storms to detect any deterioration of dikes and levees, overtopping, malfunctions, or improper operation. Inspections and repair are recorded in the facility's logbooks and are kept on-site for the life of the facility and up to three years after closure. Levee damage is repaired immediately, if needed.

The designed capacity of the impoundments will not be affected by any natural occurrence, other than possibly a natural disaster. Major storm events do not affect the design capacity because the water that collects on the surface if the ash/sludge material decants off into the decant canal, which routes to the primary clarifier for treatment. The decant structures and canals are inspected periodically to ensure they are operating properly.

The tops of the levees are surfaced with eight-inch thick road base to provide an all-weather surface and provide protection against erosion. Therefore, significant erosion of the tops of the levees is not anticipated.

Rainwater that collects within the impoundments decants off the surface of the ash/sludge material through the decant structure and into the decant canal. Therefore, the two-foot interior freeboard is maintained even following major storm events.

The ash/sludge impoundments are designed with an interior freeboard of two feet. Rainwater that collects within the impoundments decants off the surface of the waste through the decant structure and into the decant canal. Therefore, the two-foot interior freeboard is maintained even following major storm events. The waste level in the impoundments is also monitored and remaining capacity of each impoundment is assessed at least on a monthly basis. The waste is not conducive to formation of large waves because of the high solids content.

If a leak in an impoundment is found, either through visual inspection of the levees or through detection in groundwater, Graphic Packaging will notify the administrative authority in accordance with LAC 33:I.Subpart 2.

The waste streams (ash and sludge) deposited in the 21-acre impoundment have been tested for TCLP constituents, and the analytical results are presented in **Appendix O**. TCLP analysis for the waste was submitted to the LDEQ, prior to acceptance of the waste into the 41-acre impoundment. Graphic Packaging requests that annual testing of the wastes be waived based on the relatively consistent chemical nature of the waste and the documented knowledge of the waste content. As described in the response to LAC 33:VII.521.H.1.a, the waste stream consists mainly of primary clarifier underflow (sand, grit, fines, wood debris, fiber, ashes, and dregs) and sluiced ash from the bark-fired boiler multi-cyclone collectors. The chemical composition of the sluice ash material is dependent upon the fuels provided to the boiler. No petroleum-contaminated debris from UST corrective action is disposed of in the impoundments.

Graphic Packaging's Contingency Plan and Emergency Procedures are presented in **Appendix H**. This plan is updated as needed and filed with the local fire department and hospital.

Employee training and safety procedures are addressed in the Contingency Plan and Emergency Procedures document (**Appendix H**). As indicated in the Employee Training and Safety Section of the Contingency Plan, emergency and safety training is conducted at the time a person begins employment and continues thereafter through attendance at weekly safety meetings.

The impoundments are provided with sufficient equipment to meet operational needs. The impoundments function on a continuous basis with the assistance of automatic pumps, valves, and piping. Dredging or earth moving equipment needed on a periodic basis to repair levees or maintain impoundment depth is available at Graphic Packaging, as needed.

b. salvaging procedures and control, of applicable; and

Materials are not salvaged from the solid waste facilities, and therefore this regulation is not applicable. Graphic Packaging is researching beneficial reuse of the materials. In the event beneficial use is determined to be practical and is approved by the LDEQ, wastes may be removed for this recycle/reuse alternative.

c. **scavenging control.**

Not applicable. Materials are not scavenged from the surface impoundments.

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

Not applicable. The solid waste facilities described in this document are not landfarms.

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

a. **a description of the method used to handle process waters and other water discharges which are subject to NPDES permit and state water discharge permit requirements and regulations; and**

b. **a plan for the disposal and periodic testing of ash (all ash and residue must be disposed of in a permitted facility).**

This item does not apply to this permit, since the facility is not a Type I-A, Type II-A, or Type III facility.

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

a. **a description of the testing to be performed on the fuel or compost; and**

b. **a description of the uses for and the types of fuel/compost to be produced.**

This item does not apply to this permit, since the facility is not a Type I-A, Type II-A, or Type III facility.

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

This item does not apply to this permit, since the facility is not a Type I-A, Type II-A, or Type III facility.

7. The operational plans for Type I and II facilities receiving waste with a potential to produce gases must include a comprehensive air monitoring plan.

This item is not applicable to this permit. The Graphic Packaging surface impoundments do not contain putrescible wastes in amounts sufficient to produce gases, and therefore a comprehensive air monitoring plan is not required.

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 time-frames and time-frames for the installation of all major features such as monitoring wells and liners. (Time-frames must be specified in days, with day one being the date of standard permit issuance); and

All construction for the units covered by these solid waste permits has been completed. No additional construction activity is currently planned. The newest unit, the 41-acre impoundment, began receiving waste in February 1997. Groundwater monitoring has been performed in accordance with the existing permit for the solid waste facilities, and is now performed on a semi-annual basis.

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

All construction for the units covered by this solid waste permit has been completed. No additional construction activity is currently planned.

2. The implementation plans for Type I and 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.

A plan for closing the solid waste facilities is provided in **Appendix Q**.

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 landfarms), LAC 33:VII.717.I (Type I-A and II-A facilities), LAC 33:VII.721.D (construction and demolition debris and woodwaste 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 proposed schedule for closure of the solid waste facilities is provided in the Closure and Post-Closure Plan (for in-place closure), presented in **Appendix Q**.

The use of the Graphic Packaging West Monroe property as an industrial site for the production of paper and related products has an indefinite lifetime. As long as the mill is in operation, the surface impoundment area will be used in the treatment of wastewater.

The possibility of closure of the surface impoundments in the foreseeable future is remote due to the necessity of their use in properly treating the effluent from the on-site Paper Mill. The only possible scenario that would result in closure would be as a result of a suspension of paper mill operation. This process would result in no new waste deposition after closure proceedings are initiated.

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

Graphic Packaging has decided to close all units with waste in-place. Consequently, a Closure/Post-Closure Plan has been prepared in accordance with the provisions of LAC 33:VII.713.E and F (**Appendix Q**).

In accordance with the provisions of LAC 33:VII.713.E.5 of the solid waste regulations, Graphic Packaging understands that upon determination by the administrative authority that a facility has completed closure in accordance with an approved plan, the administrative authority shall release the closure fund to the permit holder.

Closure of the 35-acre primary ash/sludge pond and decant canal shall be performed on an identical basis to closure of

the other units and has been included in the Closure Plan (**Appendix Q**).

The units will be closed with waste in-place in accordance with the Closure Plan (**Appendix Q**).

The existing levee system around the impoundments will be left intact to serve as flood control for the area and serve to control surface runoff.

Monitoring wells will be maintained for thirty years after closure and discharge from the lagoons will be monitored and reported according to applicable discharge requirements.

In accordance with LAC 33:VII.713.E.1, Graphic Packaging will notify the administrative authority within 90 days of closure as to the anticipated date of closure, methodology for closure, schedule and estimated cost of closure activities, and planned changes to the Graphic Packaging Closure and Post-Closure Plan.

At least 90 days prior to the closure of the ponds, Graphic Packaging will submit a detailed closure drawing package that will contain a plan view showing final contours of the closed impoundments.

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.**

The estimated cost of closure of each of the impoundments, under the stated conditions, is presented in the Closure and Post-Closure Plan in **Appendix Q**.

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

a. **a description of the final cover and the methods and procedures used to install the cover;**

Graphic Packaging has decided to close all units with waste in-place. Consequently, a Closure/Post-Closure Plan has been prepared in accordance with the provisions of LAC 33:VII.713.E and F (**Appendix Q**).

b. an estimate of the largest area of the facility ever requiring a final cover at any time during the active life;

All of the surface impoundment units will be closed in place. The NPDES Wastewater Treatment System and the Ash/Sludge Lagoons will be closed concurrently. Therefore, the largest area that will require final cover at any time is approximately 450 acres.

c. an estimate of the maximum inventory of solid waste ever on-site over the active life of the facility; and

As indicated on **Table 2** of **Appendix Q**, the maximum inventory of solid waste ever on site over the active life of the facility is estimated to be 4,930,000 cubic yards.

d. a schedule for completing all activities necessary for closure.

A schedule for completing all activities necessary for closure of any of the Graphic Packaging impoundments is provided in each closure plan in **Appendix Q**. Prior to closure of any solid waste impoundment at the West Monroe facility, Graphic Packaging will notify the administrative authority in writing at least 90 days before closure the solid waste unit. The notification of intent to close will include the planned date of closure, any requested changes in the approved closure plan, a closure schedule and estimated closure costs.

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;

The sequence of final closure operations for each impoundment is presented in the Closure and Post-Closure Plan in **Appendix Q**. Each surface impoundment will be closed as a whole individual unit at the time of closure.

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

The Closure and Post-Closure Plan provided in **Appendix Q** present the in-place closure option as the intended methodology to close the ash/sludge impoundments. This option is discussed in detail in **Appendix Q**. The administrative authority will be notified at least 90 days prior

to closure of a facility as to the method of closure to be pursued, in accordance with LAC 33:VII.713.E.1.

A drawing showing the proposed final contours for the impoundments is included in the closure plan in **Appendix Q**.

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

A copy of the document that will be filed upon closure of the facility is included in **Appendix Q**. This document will be filed with the official parish recordkeeper indicating the location and use of the property for solid waste disposal.

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 landfarms), 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

Long-term use of the site after closure is anticipated to be in accordance with the industrial setting of the plant. After closure, the impoundments would remain as open grassland unless other use is approved by the LDEQ.

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.

An estimate of the cost of hiring a third party to conduct post-closure activities, assuming the impoundments are closed in place, is presented in the Closure and Post-Closure Plan, presented in **Appendix Q**.

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

a. the method for conducting post-closure activities, including a description of the monitoring and maintenance activities and the frequency at which they will be performed;

During the post-closure care period, the solid waste units covered under this permit will be inspected to ensure the integrity and effectiveness of the final cover system (including making repairs to the cover as necessary to correct the effects of settling, subsidence, erosion, or other events), the run-on and runoff systems, and the groundwater monitoring system. Annual inspections will be completed to ensure that the units are maintained in accordance with applicable requirements. Any problems noted during these inspections will be promptly corrected.

The final cover will be maintained to prevent run-on and runoff from eroding or otherwise causing damage, and annual reports will be submitted to LDEQ's Office of Environmental Compliance Surveillance Division on the integrity of the final cover. The groundwater monitoring system will be maintained and the groundwater will be monitored in accordance with the Groundwater Sampling and Analysis Plan (Appendix N).

Graphic Packaging understands that the post-closure care period may be decreased by the administrative authority if the permit holder demonstrates that the reduced period is sufficient to protect the human health and the environment in accordance with LAC 33:I.Chapter 13, and this demonstration is approved by the administrative authority. Any demonstration submitted will provide supporting data, including adequate groundwater monitoring data.

Graphic Packaging understands that the administrative authority may increase the post-closure care period if it is determined that the lengthened period is necessary to protect the human health and the environment in accordance with LAC 33:I.Chapter 13.

b. the method for abandonment of monitoring systems, leachate collection systems, gas-collection systems, etc.;

Groundwater monitoring wells for the facilities will be abandoned in accordance with the guidelines presented in the version of "Water Well Rules and Regulations, State of Louisiana" in effect at the time as discussed in the response to LAC 33:VII.521.F.5.f, and in accordance with the guidelines presented in **Appendix F**.

There are no leachate or gas collection systems to abandon.

c. measures planned to ensure public safety, including access control and gas control; and

The groundwater monitoring plan will be continued after facility closure until permission is obtained from the LDEQ to terminate sampling. The LDEQ will state reasonable basis for plan continuation beyond the proposed requirement of thirty years. Gas control is not applicable because the waste does not generate significant amounts of methane gas. Access control will continue to be provided by the access restrictions discussed in response to LAC 33:VII.521.B.1.b, which will be maintained. Fencing has been installed to prevent access to the 41-acre impoundment as shown on **Figure A-1** in **Appendix J.**

d. a description of the planned uses of the facility during the post-closure period.

The groundwater monitoring plan will be continued after facility closure until permission is obtained from the LDEQ to terminate sampling. The Department will state reasonable basis for plan continuation beyond the currently required thirty years.

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

Graphic Packaging, Inc. owns and operates the West Monroe Plant. A copy of the current corporate annual report, which includes the names of all officers of the company, is provided in **Appendix R**.

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 the principal owners, stockholders, general partners, or officers:

Operating Personnel:

- Vice President and Resident Manager, Paper Board Division (Plant 31)
- Operations Manager
- Engineering Services Manager
- Power and Recovery Superintendent
- Environmental Department Manager

A list of the corporate officers of Graphic Packaging, Inc. is provided in the Annual Report presented in **Appendix R**.

3. evidence of liability coverage, including:

a. personal injury, employees, and the public (coverage, carriers, and any exclusions or limitations);

See response to LAC 33:VII.521.L.3.c.

b. property damage (coverage and carrier);

See response to LAC 33:VII.521.L.3.c.

c. environmental risks; and

Evidence of Graphic Packaging's use of the Financial Test as the appropriate financial assurance mechanism to meet the financial responsibility during operation for liability coverage, including personal injury, employees, and the public (coverage, carriers, and any exclusions or limitations); property damage (coverage and carrier); and environmental risks, is included in the Financial Assurance Documentation (Appendix S).

See **Appendix S** for a response to LAC 33:VII.727.A.1.a-f.

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

Evidence of Graphic Packaging's use of the Financial Test as the appropriate mechanism to meet the financial responsibility for closure and post-closure care for the solid waste facilities is included in the Financial Assurance Documentation (**Appendix S**).

See **Appendix S** for the responses to the applicable requirements of LAC 33:VII.727.A.2.a-k.

M. Special Requirements

The administrative authority may require additional information for special processes or systems and for supplementary environmental analysis.

No other additional information has been represented at this time.

LAC 33:VII.523

PART III: ADDITIONAL SUPPLEMENTARY INFORMATION

ENVIRONMENTAL ASSESSMENT STATEMENT

LAC 33:VII.523.A-E

APRIL 2006

PREPARED BY:

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PROVIDENCE PROJECT NO. 001-007

LAC 33:VII.523
Part III: Additional Supplementary Information

The following supplementary information is required for all solid waste processing and disposal facilities.

INTRODUCTION

Environmental permit applicants (both new and existing facilities) are required to provide relevant information in response to questions commonly referred to as "IT Questions", which address the potential for facilities to adversely impact the human and natural environment in the vicinity of the proposed or existing facility. These responses must be considered by the LDEQ during the decision–making process on environmental permits pursuant to the Louisiana Supreme decision in the case of Save Ourselves, Inc. vs. Louisiana Control Commission. While this ruling was designed to address impacts associated with new facilities, existing facilities must consider the impact of continued operation versus the impacts of constructing a new facility at different locations.

Graphic Packaging was granted standard permits (P-0199 and P-0244) for solid waste facilities located at the West Monroe Facility in West Monroe, Louisiana. Since the issuance of the standard permits, Graphic Packaging has demonstrated a record of environmental compliance and continues to provide economic benefits to the surrounding area. The following responses clearly demonstrate that the potential adverse environmental impacts resulting from the continued operation of the solid waste facilities have been appropriately addressed and pale in comparison to the alternative of constructing an alternate facility for wastewater management at the facility.

BACKGROUND

In 1994, a Solid Waste Permit Modification and a Mandatory Modification Document for the NPDES and Ash/Sludge Impoundments system were submitted in accordance with the Louisiana Solid Waste Rules and Regulations to the LDEQ. To date, the Solid Waste Permit Modification and the Mandatory Modification for the wastewater treatment system are currently pending with the LDEQ. In a correspondence dated July 26, 2001, a request was made by Riverwood International (now Graphic Packaging) to the LDEQ to consolidate the two permits (P-0199 and P-0244) and to convert the mandatory modification for those same permits into the permit renewal application for the West Monroe facility.

The submittal of this document serves to update and replace the pending permit applications and Mandatory Modification with current facility information/operations and to consolidate the permitting requirements for the NPDES and Ash/Sludge impoundments. The request to consolidate the permits is based on the following: 1) the impoundments receive similar waste types; 2) the impoundments share a groundwater monitoring system; and 3) the geology and hydrology in the area of the impoundments is consistent. These items are further detailed in the permit application.

FACILITY OVERVIEW

Graphic Packaging owns and operates the West Monroe facility, an unbleached kraft pulp and paper mill, located at 1000 Jonesboro Road (Louisiana Highway 34) in West Monroe, Ouachita Parish, Louisiana. Graphic Packaging was formerly known as Riverwood International USA, Inc. Graphic Packaging's West Monroe facility is located on approximately 3,200 acres of land in West Monroe, Ouachita Parish, Louisiana. The facility is located in Sections 11, 14, and 52 of Township 17 North, Range 3 East. The facility is bound by the cities of West Monroe and Monroe to the north and east, respectively; the Ouachita River (River Mile 161.2), agricultural and commercial land to the south; and, the Ouachita Sewage Treatment Facility to the west.

The NPDES Wastewater Treatment System includes: 1) Primary Clarifier Sludge/Bark Boiler Ash Sluice Pond; 2) High Intensity Aeration (HIASB); 3) High Intensity Aeration Basin Effluent Canal; 4) No.1 Pond; 5) No. 2 Pond; 6) No. 3 Pond; and 7) No. 4 Pond. The 21-acre and 41-acre Ash/Sludge Impoundments receive the underflow from the primary clarifier, which contain all the settled solids from the total mill effluent. Approximately 150 tons/day of sludge are deposited in the impoundments. The impoundments also receive sluiced ash from the bark boiler multi-cyclone collectors. The quantities of sluice ash generated vary but normally averages 20 tons/day.

PROCESS DESCRIPTION

Graphic Packaging operates a 2,700 ton/day unbleached kraft pulp and paper mill in West Monroe, Louisiana. The facility has approximately 1264 full-time employees and approximately 9 contract employees. The mill operates 24-hours a day, seven days a week, and 52 weeks per year.

Wastewater from the mill discharges to a primary clarifier followed by a system of flow-through the NPDES Wastewater Treatment System, which includes the High Intensity Aeration Basin (HIAB), Effluent Canal and NPDES Ponds 1, 2, 3, and 4.

The first impoundment (35-acre pond) for Primary Clarifier Sludge/Bark Ash Sluice reached capacity in 1989. The 21-acre surface impoundment has been augmented by a 41-acre surface impoundment. The facility receives underflow from the clarifier along with bark-fired boiler ash, which is the same waste stream received by the impoundments. Decant from the ash/sludge impoundment is returned to the Primary Clarifier.

A plan view and cross-sections of the 41-acre impoundment are presented on the impoundment design drawings. A plan view of the 21-acre impoundment is also presented in permit application and includes design dimensions and elevations. A plan view and cross section of the 21-acre impoundment is also shown in the application.

The location of this impoundment is adjacent to existing industrial and agricultural operations and away from significant backwater areas for the Ouachita River. Because backwater does move into this general area, a flood study was performed to evaluate the potential effect the construction of the 41-acre impoundment would have on the 100-

year flood level. The results of the flood study are included in the Parish Development Permit. The results of the flood study indicated that the 41-acre impoundment reduced available backwater storage, impede the 100-year flow or increase flow down or upstream only negligibly.

The Primary Clarifier, HIAB, 21-acre and 41-acre ponds all have levees at least 84 feet MSL, which is above the 100-year flood level of 83 feet MSL. These units contain the greatest concentration of solids. Only the NPDES impoundments have a levee at 75 feet MSL. The Corps of Engineers' study indicates that the solid waste units are not considered to be a flood plain hazard. Since the NPDES Impoundments carry decant and do not carry heavy solids, since the solids are directed into adequately protected impoundments (the 21-acre and 41-acre sludge impoundments), the impact of washout from the NPDES Impoundments in a flood situation will be minimal.

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

This application does not propose a new facility. Rather, this application is a permit application for existing solid waste surface impoundments (facilities) located within the boundary of the Graphic Packaging West Monroe Facility located in West Monroe, Louisiana. The facilities currently operate in accordance with permits issued by the LDEQ. The design of the facilities meets all applicable state and federal regulations of the solid waste permits and the water discharge permit. The principal objectives of the facilities design are to minimize the potential for adverse environmental effects and to avoid, to the maximum extent possible, any adverse environmental effects. Consideration has been given to location characteristics, facility characteristics, surface hydrology, storm water management, geology, and other factors in order to avoid and/or minimize to the greatest extent possible any adverse environmental effects. Continued operation of the facilities in accordance with the stricter standards of the current solid waste regulations assures that real and potential adverse environmental effects of the facilities will continue to be avoided to the maximum extent possible.

The facilities are contained within property owned by Graphic Packaging and were designed and constructed to minimize any potential pathways for the release of waste materials. All contaminated and uncontaminated storm water is directed through permitted outfalls and is sampled and reported in accordance with the terms of the facilities water discharge permit. Additionally, adequate freeboard is maintained between the top of the levees and pond water levels. The areas surrounding the surface impoundments and outboard side slopes of the dikes are monitored and maintained to prevent erosion and increase stability of side slopes.

The surface impoundments are used only for the wastewater and process area storm water as discussed in the response to LAC 33:VII.521.B.1.a. Wastewater flow through the impoundment system is controlled and monitored in accordance with the Graphic Packaging water discharge permit requirements. This surface impoundment system is for the exclusive use of Graphic Packaging. No hazardous waste, PCB waste, or other unauthorized or unpermitted wastewaters are placed in the impoundments. The control

and monitoring of the outflow for water discharge permitting purposes serve to confirm this.

The Graphic Packaging West Monroe Facility is fenced to prevent unauthorized ingress or egress, except by willful entry. Entrance is gained only through the facility entry gate. All visitors must check in at the office and are not allowed access to the process areas without appropriate authorization. The gate is locked at night and on weekends. To ensure safety and security at night, the main entrance and control areas are well lit. Lighting throughout the plant is sufficient for normal surveillance, discouraging vandalism and recognizing spills.

Although the possibility of fire or other emergency from the operation of the impoundments is unlikely, Graphic Packaging has emergency procedures to respond to any type of emergency that might arise at the facility. In the event it is necessary, plans are in place to transport seriously injured personnel to a local hospital. The Contingency Plan and Emergency Procedures will be reviewed periodically.

The possible adverse effects of the solid waste impoundments are considered minimal. Potential discharges to the environment are monitored with surface water discharge permits and with groundwater monitoring wells. There are no wetlands, endangered species, recreational areas, wildlife management area, or sensitive ecological areas within 1,000 feet of the facility.

The impoundments are existing units within the boundaries of the facility, which were constructed in natural clay with low permeability. The potential media impact includes soils immediately underlying the impoundments, shallow groundwater, surface water and air. Soils and shallow groundwater could be affected by leakage under the impoundments. Surface waters and soils could be affected by a break in the levee. Process area overflows or upsets could affect air and surface water. Surface water and groundwater are the most realistic media of concern, both of which are monitored under a water discharge permit and a groundwater monitoring system.

The possible adverse effects of the solid waste impoundments are considered minimal. Impacts to surface waters from levee breakage would be monitored via permitted outfalls with specific parameter limits. Impacts to surface waters would therefore be limited to the ecosystem associated with these water bodies. The area surrounding the facility is graded so that non-process area storm water runoff is directed away from the impoundments.

There are minimal real adverse environmental affects of the permitted impoundments. The impoundments were constructed in a bed of natural clay with low permeability. There are no wetlands, endangered species, recreational areas, wildlife management area, or sensitive ecological areas within 1,000 feet of the facility. Approximately 15% of the existing land use within three miles of the facility is agricultural. Additionally, environmentally sensitive areas are avoided or protected by effective barriers. All contaminated and uncontaminated storm water is directed through permitted outfalls and is sampled and reported in accordance with the terms of the facility's water discharge permit.

Non-process area storm water runoff from the plant and process area storm water runoff are collected, treated as necessary, and discharged via permitted outfalls, where they are monitored in accordance with permit requirements. Impacts to surface waters from levee breakage would be monitored via permitted outfalls with specific parameter limits.

Additionally, a number of facility design characteristics and operational characteristics minimize the potential adverse effects to groundwater posed by the facility's operations. These include the liner and groundwater monitoring system, as well as the careful control of incoming waste types. To monitor groundwater quality in the vicinity of the ponds, Graphic Packaging has installed a monitor well network to evaluate groundwater quality in the uppermost permeable zone. Overall, these measures prevent the spread of constituents to subsurface soils and groundwater and facilitate detection of any possible migration as soon as possible.

Additionally, a number of facility design characteristics and operational characteristics minimize the potential adverse effects to groundwater posed by the facility's operations. These include the liner, slurry wall, and groundwater monitoring system, as well as the careful control of incoming waste types. To monitor groundwater quality in the vicinity of the ponds, Graphic Packaging has installed a monitor well network to evaluate groundwater quality in the uppermost permeable zone. Overall, these measures prevent the spread of constituents to subsurface soils and groundwater and facilitate detection of any possible migration as soon as possible.

The nature of the impoundments coupled with relatively impermeability of the clays reduces the potential for releases of contaminants. Clearly, the site characteristics act to minimize, to the extent possible, threats to groundwater.

Air emissions resulting from a release, although highly unlikely from the impoundments, would potentially affect industrial workers at the plant. However, these workers are trained for such events as part of the facility's worker safety programs and applicable state and federal worker safety programs. There are no organic vapors, gases or odors emitted from the impoundments that could endanger local residents or other living organisms. For these reasons, as well as the operational controls in place, there are no impacts to the environment as a result of odor, vectors, dust or litter.

In the development of the facility, care and consideration was, and is, given to the protection and preservation of surrounding areas.

There are no known registered historical or archeological areas near the solid waste facilities. No designated wildlife areas have been established in the vicinity of the site and there is no apparent unique habitat for listed endangered species. The existing solid waste facilities operated and maintained as to have no negative effect on the surrounding environment.

Graphic Packaging has taken measures specifically designed to protect the environment and monitor any effects the proposed facility may potentially have on the environment. The 21-acre impoundment has a perimeter slurry wall and an engineered liner consisting of three feet of recompacted clays of low permeability to reduce the potential for leakage. This liner has also been installed in the 41-acre impoundment, and is overlain by a 60-mil

high-density polyethylene liner, which provides additional environmental protection. In addition, a groundwater monitoring plan, as described in Section F of this permit application, will be implemented for the 41-acre impoundment to detect any possible contamination at the earliest point. The groundwater underlying the site of the existing 21-acre impoundment has shown no evidence of impact from the operation of the facility.

As discussed in the permit application, the facilities are monitored to ensure that overtopping does not occur and that a minimum 2-foot freeboard is maintained during normal operating procedures.

Graphic Packaging has a Contingency and Emergency Procedure Plan to address and minimize any hazards to the environment from fire, explosions, or any release of wastes to the air, soil, or surface waters.

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

A cost-benefit analysis shows that the environmental, social, and economic benefits of the impoundments outweigh the environmental, social, and economic costs associated with the impoundments.

Environmental benefits of the impoundments include avoidance of a large construction project to build the equivalent storage capacity, or a different type of wastewater storage system, either of which may have more impact on the environment than continuing to use the existing unit. Economically, building a new wastewater system would be cost prohibitive versus maintaining the current impoundments. There are no social costs associated with the impoundments, since the units are located on Graphic Packaging property; are functioning well; and there are no historic, cultural, or recreational sites in the vicinity of the facility. The existing impoundments provide benefits to the environment versus an equivalent tank-based system.

Since surface water discharges are monitored under an existing water discharge permit and shallow groundwater is monitored, the negative costs of replacing the system far outweigh any environmental benefits. The air emissions from the ponds are negligible, well below permitting requirements. Similarly, the costs to replace the system far outweigh the minimal benefit to air quality.

Adherence to the water quality standards established by the LDEQ is intended to ensure no significant degradation of surface water quality, fauna, or flora. There would be no benefit to replacing the existing system since the new system would require meeting the same stringent standards.

The impoundments are essential to the operations of the West Monroe facility. The facility operates 24-hours a day, seven days a week, and 52 weeks per year and generates tax revenues for Ouachita Parish and the State of Louisiana. The impoundments are existing units within an active facility for which no issues related to traffic, odors, dust, litter or safety have been identified.

Operation of the surface impoundments is an integral part of the day-to-day operations of the facility. There are also economic benefits to the local vendors and suppliers that conduct business with the facility. The economic viability of the facility is dependent upon the ability of Graphic Packaging to continue to operate the surface impoundments.

The facility was originally permitted at the present location because it is owned and operated by the facility it serves. The facility accepts only those waste streams generated at the facility. Economic development will not be precluded by this permit application because the surface impoundments are already established and the permit application will not negatively impact the economic viability of the surrounding community. In actuality, the surrounding community, parish and state all benefit from the existence of the West Monroe Facility. Since the facility is an existing facility, property values will not be affected.

The responsibility for the operation, maintenance, monitoring, and closure will remain with Graphic Packaging. Financial assurances are provided on an annual basis to the LDEQ in accordance with the Solid Waste Regulations.

In summary, the viability of the facility is dependent on Graphic Packaging's ability to continue utilizing the surface impoundments. The surface impoundments are a key element in the continued operation of the facility and the long-term wastewater management practices at the facility. An assessment of the benefits and the need for the continued operation of the existing facility, show clearly that the social and economic benefits of the facility outweigh the environmental-impact costs.

523.C. A discussion and description of possible alternative projects which would offer more protection to the environment without unduly curtailing nonenvironmental benefits.

No alternative projects were considered. The impoundments were in existence prior to the Louisiana Solid Waste Regulations affecting such units and are operating well, with no identified negative environmental or social impacts.

Alternative projects available include lining the existing impoundment, building new lined impoundments, or using tanks for storage instead of impoundments. An aboveground tank system and/or a liner system for each pond could afford greater protection than the existing system but both of these options are considered to be impractical and cost prohibitive.

The impoundments are essential to facility operations. Therefore, taking them out of service is cost prohibitive. Neither of the other alternatives was considered due to the high implementation cost and questionable benefits.

Graphic Packaging has evaluated the technical and economic feasibility of selected alternatives for treating, storing and disposing of the plant's solid wastes. There is no evidence of negative environmental impact due to the existing impoundments. Similar environmental protection with alternative technologies has not been demonstrated.

Solid waste deposited in the impoundments could be removed and filtered at great difficulty and cost. Disposal of the filtered waste at an off-site facility would consume much needed commercial or municipal disposal capacity without any environmental benefit.

Graphic Packaging plans to continue looking at alternatives for all solid waste disposal. A program is being developed to evaluate the onsite and offsite re-use of primary sludge and ash. The NPDES primary clarifier sludge and bark boiler ash sluice deposited in the impoundments are being evaluated because of chemical and physical characteristics suitable for various options under consideration. If feasible, the impoundments will be "mined" to supply the sludge and ash for the identified "beneficial uses."

523.D. A discussion of possible alternative sites that would offer more protection to the environment without unduly curtailing nonenvironmental benefits.

Graphic Packaging is applying for a standard permit for existing facilities. Because these are existing facilities, a traditional site analysis is not appropriate and therefore was not conducted as part of this permit application. Graphic Packaging manages existing solid waste facilities with an existing infrastructure and operational procedures. In light of the fact that these are existing facilities for the long-term management of wastewater generated on-site and constructed and operated in accordance with the regulations and applicable permits, there are no other sites that could provide more protection.

The facility was in existence when the Louisiana Solid Waste Regulations went into effect and Graphic Packaging continues to use the impoundments as designed. Additionally, there are no known environmentally sensitive areas in the vicinity of the facility and the impoundments are not in an area prone to flooding.

As described previously, groundwater is monitored by a system of existing monitor wells screened in the uppermost permeable zone at the site. The purpose of the monitor well system is to detect any impacts to the groundwater at the site from the ponds.

Water quality is protected. Wastewater and process area storm water are collected in the impoundment system and discharged via permitted outfalls.

The facility is not located along the coast where hurricane damage is considered a high potential hazard and the facility does not pose any unusual or extraordinary vulnerabilities.

The site does not pose potential health risks. Air emissions at the facility are regulated and monitored under an air permit issued by the LDEQ. Process and storm water are discharged under an existing discharge permit. Based on the continued monitoring program for solid waste, air and water, the impoundments do not pose a risk to human health.

Odors are not typically noticeable from the ponds, which are located well within the property. There are no noises associated with the ponds. The impoundments therefore are not causing a nuisance to surrounding land users.

Since the impoundments were previously existing units at the time of the regulations, it was determined that the current location is the best site. An alternative site would not likely provide any more environmental protection than the current location. An alternative site would be costly considering the costs of acquiring additional property, construction costs, and additional costs and logistics of maintaining an off-site facility. As a result, the current location of the impoundments was the only site considered. The chosen location was based on proximity to the process area, future land use plans, and other evaluations. The current location continues to fulfill the needs of Graphic Packaging. An alternative site location would be more costly with no particular increase in protection of the environment. As a result, the current impoundment location was considered the best site.

In addition, the design, construction, operation, and groundwater monitoring system of the facility is protective of human health and the environment.

There are no alternative sites that would offer more protection to the environment than the proposed facility without unduly curtailing non-environmental benefits.

523.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.

The existing impoundments are an integral part of the wastewater process flow at the facility. Graphic Packaging employs quality assurance controls in its analytical program for groundwater monitoring as well as for surface water discharge monitoring. The details of the quality assurance program for groundwater are included in the permit application, developed in accordance with SW-846 methodology and include controls for various indicators such as initial and continuing calibrations, tuning, surrogate recoveries and various test blanks. Similarly, quality controls for the analytical program for the monitoring program of the discharge permit have been established in accordance with the selected laboratory method. Inspections of the impoundments are made routinely.

Graphic Packaging has investigated all reasonable alternatives to the continued use of the impoundments and found that it is being operated with minimum environmental or human health effects. Additional protection could be gained via use of synthetic liners in all the impoundments or use of tanks, however, as discussed previously, such improvements are not required by regulation and would be cost prohibitive, with little increased benefit or advantage with respect to protection of the environment.

The design of the surface impoundments complies with all applicable requirements of the solid waste regulations and the water discharge permit. There are no additional mitigating factors that have been identified that would offer more protection to the environment than the facility as proposed without unduly curtailing nonenvironmental benefits. The protective measures in place include:

- A perimeter levee system and slurry wall to prevent migration of wastewater from the facility
- A clay liner
- A groundwater monitoring system designed to detect any release of constituents from the facility before any such contamination can move either off site or into surrounding groundwater aquifers

The surface impoundments are designed as an integral part of the wastewater management plan of the West Monroe Facility. The impoundments only serve the facility. The dedicated nature of the solid waste units ensure that no off-spec wastes will be placed in the units. Moreover, waste minimization, recovery, and recycling are all part of the facility's overall waste management plan.

The design, construction, operation, and groundwater monitoring system of the facility will be very protective of human health and the environment. As such, there are no additional mitigating factors that have been identified that would offer more protection to the environment than the facility as proposed without unduly curtailing nonenvironmental benefits.

As previously stated, Graphic Packaging's boiler ash/primary clarifier sludge impoundments are designed and operated to minimize hazards to human health and environment. In addition, the proposed groundwater monitoring system will be located as to intercept any potential contamination at the earliest practical occurrence. The operation of the solid waste management facilities do not pose a hazard to human health and environment that would require additional mitigating measures other than the general operating and emergency procedures contained in the enclosed permit application.

TABLE 1

GEOTECHNICAL LABORATORY TEST RESULTS
21-ACRE ASH/SLUDGE IMPOUNDMENT

TABLE 1
GEOTECHNICAL LABORATORY TEST RESULTS
21-ACRE ASH/SLUDGE IMPOUNDMENT
GRAPHIC PACKAGING, INC.
WEST MONROE, LOUISIANA

Boring No.	Sample Depth (feet)	Elevation (feet)	LL	PI	Initial M/C	d	K (cm/sec)	Type Test	M/C Test
B-2	12 - 14	64.7 - 62.7	82	54	37	115	1.2 x 10 -8	Undisturbed - Lab	CH
B-3	10 - 12	66.0 - 64.0	30	16	17	115	3.1 x 10 -9	Undisturbed - Lab	CL
B-5	6 - 8	65.7 - 63.7	31	17	16	115	5.8 x 10 -8	Undisturbed - Lab	CL
B-6	6 - 8	64.2 - 62.2	-	-	25	98	1.8 x 10 -8	Field	CH
B-8	4 - 6	68.8 - 66.8	45	31	17	117	5.6 x 10 -9	Undisturbed - Lab	CL
B-8	6 - 8	66.8 - 64.8	43	31	18	115	2.9 x 10 -7	Undisturbed - Lab	CH
B-9	4 - 6	59.2 - 57.2	43	29	17	115	6.3 x 10 -9	Undisturbed - Lab	CL
B-9*	20 - 22	53.2 - 51.2	57	38	31	88	5.6 x 10 -6	Undisturbed - Lab	CL/ML
B-10	4 - 6	62.6 - 60.6	82	58	37	83	1.1 x 10 -8	Undisturbed - Lab	CH
B-11	4 - 6	65.1 - 63.1	44	30	17	110	8.4 x 10 -9	Undisturbed - Lab	CL
B-11	6 - 8	63.1 - 61.1	23	13	15	117	1.6 x 10 -6	Undisturbed - Lab	CL
B-13	4 - 6	68.4 - 66.4	41	28	15	120	2.0 x 10 -8	Undisturbed - Lab	CL
B-13	8 - 10	64.4 - 62.4	21	2	8	118	1.4 x 10 -6	Undisturbed - Lab	ML

* Test on sample run from Cockfield Formation.
Samples collected by Woodward-Clyde Consultants.

NOTES:
LL = Liquid Limit
PI = Plastic Index
M/C = Moisture Content
d = Density, pcf
k = Coefficient of Permeability
CH = High plasticity clay
CL = Low plasticity clay
ML = Silt

TABLE 2

GEOTECHNICAL LABORATORY TEST RESULTS
41-ACRE ASH/SLUDGE IMPOUNDMENT

TABLE 2
GEOTECHNICAL LABORATORY TEST RESULTS
41-ACRE ASH/SLUDGE IMPOUNDMENT
GRAPHIC PACKAGING, INC.
WEST MONROE, LOUISIANA

Boring No.	Sample Depth (ft bls)	Soil Description	% Moisture Content	Dry Density (pcf)	Atterberg Limits LL	PL	PI	Coefficient of Permeability (cm/sec @ 20°C)	Shear Tests Cohesion (psf)
DM-1	4 - 5	Silty Clay	23.4	98.0	37	18	19		595 (UC)
		Clay w/ Sandy Clay	19.9	107.5				1.8×10^{-8} (V)	
		Clay w/ Sandy Clay	24.0	96.9				5.3×10^{-8} (H)	
	25 - 26	Clay w/ Silt Lenses	32.3		89	25	64		
DM-2	19 - 20	Silty Clay	31.9	89.8	48	20	28		920 (UC)
		Silty Clay	29.7	95.7				1.8×10^{-8} (V)	
		Silty Clay	26.4	96.8				1.0×10^{-8} (H)	
	22 - 23	Clay	32.5	89.8	49	21	28		735 (UC)
		Clay w/ Silt Lenses	31.8	92.4				6.4×10^{-8} (V)	
		Clay w/ Silt Lenses	34.9	86.6				2.7×10^{-8} (H)	
DM-3	3 - 4	Clayey Silt	18.2		26	19	7		
	30.5 - 32	Si Clay w/ sa si lay	24.1		31	17	14		
DM-4	0.5 - 2	Clayey Silt	15.1		26	19	7		
	25.5 - 27	Si Clay w/ cl Layers	43.8		38	18	20		
	35.5 - 37	Clay w/ Sand Pockets	31.0		64	22	42		
DM-5	7 - 10	Silty Clay w/ Clay & Sandy Silt Layers	22.7	97.7	39	18	21		C = 0, o = 43° (direct shear)
	10.5 - 12	Sandy Silt w/ Clay poc	23.9		24	18	6		
DM-6	4 - 5	Clay w/ Silt Pockets	30.0	91.2					960 (UC)
	5 - 6	Clay w/ Silt Pockets	41.0	79.9	79	25	54	1.7×10^{-8} (V)	
		Clay w/ sa si Pockets	40.2	79.7				9.6×10^{-8} (H)	
	21 - 22	Silty Clay	27.8	94.5					1215 (UC)
DM-7	4 - 5	Clay w/ Silt Pockets	29.9	90.5	71	23	48		1120 (UC)
	27 - 28	Clay w/ tr Silt	25.0	100.8	66	20	46	3.6×10^{-7} (V)	
		Clay w/ Silt Pockets	25.4	98.1				3.5×10^{-8} (H)	
DM-8	6 - 7	Silty Clay	24.4	100.1	33	19	14		775 (UC)
	36 - 37	Sandy Clay	20.7	106.4	36	18	18		1240 (UC)
DM-9	7 - 8	Clay w/ Silt Pockets	30.2	89.5	58	19	39		615 (UC)
	22 - 23	Silty Clay	30.3		41	18	23		
DM-10	2 - 3	Cl silt w/ cl len	21.0	102.9	27	18	9		1085 (UU)
	15 - 16	Sa silt w/ cl len			26	19	7	2.9×10^{-7} (V)	
		Sa silt w/ cl len	22.8	105.4				1.0×10^{-8} (H)	
	36 - 37	Si clay w/ tr sand	23.8	100.9	45	19	26		1630 (UC)
DM-13	4 - 5	Silty clay	22.4		30	17	13		
	22 - 23	Sa silt w/ cl layers	25.3	98.2					960 (UU)
	28 - 29	Si clay w/ cl layers	31.9		47	19	28		
DM-15	4 - 5	Si cl w/ sa si lenses	22.4		40	18	22		
	31 - 32	Clay w/ silt pockets	34.6	88.8	53	21	32	8.1×10^{-8} (V)	
		Clay w/ si cl len	35.0	86.9				1.3×10^{-7} (H)	
	37.5 - 39	Cl sand w/ sand lay						grain size	
DM-16	6 - 7	Clay w/ silt pockets	39.5		72	23	49		
	36 - 37	Sandy Clay	21.6		31	17	14		

TABLE 2
GEOTECHNICAL LABORATORY TEST RESULTS
41-ACRE ASH/SLUDGE IMPOUNDMENT
GRAPHIC PACKAGING, INC.
WEST MONROE, LOUISIANA

Boring No.	Sample Depth (ft bls)	Soil Description	% Moisture Content	Dry Density (pcf)	Atterberg Limits			Coefficient of Permeability (cm/sec @ 20°C)	Shear Tests Cohesion (psf)
					LL	PL	PI		
DM-17	10 - 11	Sa si w/ si cl layers	26.8	96.2					395 (UU)
	22 - 23	Clay w/ si len & poc	30.4	90.8	52	21	31		555 (UC)
	34 - 35	Clay	43.7	77.2	77	20	50	1.2×10^{-8} (V)	
		Clay	42.1	77.1				2.1×10^{-8} (H)	
DM-18	0.5 - 2	Si cl w/ cl si lay			27	18	9		
	4 - 5	Si cl w/ sa cl lay			46	19	27	3.6×10^{-9} (V)	
		Si cl w/ sa cl lay						1.2×10^{-8} (H)	
	15 - 16	Sa si w/ si cl lay	30.2	91.3	26	19	7		265 (UU)
	31 - 32	Clay w/ si pockets	31.6	86.7	66	22	44		1510 (UC)
DM-20	4 - 6	Clay w/ sa si	26.5						
	8 - 9	Cl w/ cl si lay	24.6	96.3					1305 (UC)
	17 - 18	Sa si w/ cl len			23	18	5	1.5×10^{-8} (V)	
		Sa si w/ si sa lay	21.8	84.5				2.4×10^{-4} (H)	
	20 - 21								
	44 - 45	Cl sa w/ si sa lay	21.4	106.2	26	19	7	5.1×10^{-6} (V)	
		Cl sa w/ si sa lay	23.2	103.4				2.1×10^{-6} (H)	
	53 - 55	Si sa w/ cl layers	25.3	102.3	28	19	9	6.4×10^{-6} (V)	
		Si sa w/ cl layers	24.3	100.5				7.5×10^{-4} (H)	
	59 - 60	Clay w/ sa si lenses	36.4	84					1255 (UU)

TABLE 2
GEOTECHNICAL LABORATORY TEST RESULTS
41-ACRE ASH/SLUDGE IMPOUNDMENT
GRAPHIC PACKAGING, INC.
WEST MONROE, LOUISIANA

Boring No.	Sample Depth (ft bls)	Soil Description	% Moisture Content	Dry Density (pcf)	Atterberg Limits			Grain Size Analysis Percent Passing the No. 200 Sieve
					LL	PL	PI	
HB-2	0.5 - 1	Silty Clay	24		32	13	19	
	3 - 4	Silty Clay	24		24	12	22	93
	4.5 - 6.5	Clay w/ si pockets	40		81	29	52	
HB-3	5 - 5.5	Clay w/ si pockets	35		60	16	44	
	7 - 7.5	Clay w/ si pockets	35		78	29	49	
	8.5 - 9	Clay	42		95	27	68	99
HB-4	3.5 - 5	Clay w/ si pockets	33		62	20	42	
	6 - 6.5	Clay w/ si pockets	43		74	23	51	
	11 - 12	Clay w/ si pockets	46		81	23	58	
HB-5	0 - 2	Clay w/ si pockets	28		63	21	42	
	2 - 4	Clay w/ si pockets	37		65	21	42	
HB-6	2 - 4	Clay w/ si pockets	26		56	16	40	97
	6 - 8	Si clay w/ cl layers	25		45	17	28	
HB-7	2 - 4	Clay w/ si pockets	31		67	14	53	
HB-8	4 - 6	Clay w/ si pockets	35		67	20	47	
	6 - 8	Si cl w/ cl si layers	28		42	16	26	
HB-9	2 - 4	Clay w/ si pockets	31					97
HB-10	2 - 4	Clay w/ si cl layers	40		59	15	44	
	10 - 12	Clay w/ si pockets	34		58	22	36	
HB-11	2 - 4	Silty Clay	22		30	15	15	
	4 - 6	Clay w/ si pockets	36		64	19	45	
HB-12	4 - 6	Clay w/ si pockets	37		71	23	48	
HB-13	2 - 4	Clayey silt	24		23	17	6	
HB-14	2 - 3	Clay w/ si cl layers	24					82

TABLE 3

MONITORING WELL CHARACTERISTICS AND WELL INFORMATION AND MONITORING RESULTS

TABLE 3

Monitoring Well Characteristics
Graphic Packaging, Inc.

Well No.	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-17	MW-18
Installation Date	Dec. 1989	Dec. 1989	Dec. 1989	Dec. 1989	Dec. 1989	Dec. 1989	Dec. 1989	Dec. 1989	Dec. 1989	Dec. 1989	Dec. 1989
Unit Monitored	NPDES Impoundment	NPDES Impoundment	NPDES Impoundment	NPDES Impoundment	NPDES Impoundment	NPDES Impoundment	NPDES Impoundment	NPDES Impoundment	NPDES Impoundment	NPDES Impoundment	NPDES Impoundment
Latitude (deg., min., sec.)	32° 28' 25"	32° 22' 14"	32° 27' 57"	32° 27' 35"	32° 27' 26"	32° 27' 14"	32° 26' 57"	32° 27' 22"	32° 27' 40"	32° 28' 14"	32° 28' 18"
Longitude (deg., min., sec.)	92° 08' 52"	92° 20' 25"	92° 08' 48"	92° 08' 31"	92° 08' 23"	92° 08' 10"	92° 08' 00"	92° 07' 41"	92° 07' 55"	92° 08' 21"	92° 08' 89"
Gradient	unknown	UP	UP	UP	UP	UP	DOWN	DOWN	DOWN	DOWN	DOWN
Well Construction (size and material)	4-inch PVC	4-inch PVC	4-inch PVC	4-inch PVC	4-inch PVC	4-inch PVC	4-inch PVC	4-inch PVC	4-inch PVC	4-inch PVC	4-inch PVC
Top of casing elevation (ft msl)	82.2	87.09	88.8	80	81.42	83.44	80.13	78.58	77.83	85.5	88.5
Concrete pad elevation (ft msl)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Well Depth (ft bgs)	28.45	42.97	32.86	30.00	29.12	26.92	64.8	63.81	58.81	38.7	35.05
Screen Interval (ft bgs) FROM	16	29	22	17	16	16	53	51	47	20	22.75
TO	25.5	38.5	31.5	26.5	25.5	24.5	62.5	60.5	56.5	29.5	32.25
Sump Length (ft)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sampling Equipment	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump
Depth to Water (ft below TOC)	15.24	16.36	17.52	10.53	7.13	13.6	17.44	16.2	13.95	24.18	21.78
Groundwater Elevation (feet msl)	67.13	70.73	69.13	69.62	74.54	70.34	62.92	62.72	64.14	61.25	66.76
Volume Purged (gal)	27	52	32	40	45	41	93	96	90	30	22
Date Sampled	9/29/2005	9/28/2005	9/30/2005	9/26/2005	9/26/2005	9/26/2005	9/26/2005	9/27/2005	9/27/2005	9/29/2005	9/29/2005
pH - Lab (std. units @20°C)	5.3	5.9	6.3	6.6	6.5	6.6	6.6	6.6	6.5	4.9	4.0
pH- Field (std. units)	5.7	6.4	6.8	7.1	7	6.9	7.2	7.1	7.1	4.9	4.0
Specific Conductance - Lab (umhos/cm)	528	1,594	4,640	2,650	1,604	2,680	820	1,048	767	6,880	3,250
Specific Conductance - Field (umhos/cm)	479	1,234	3,143	2,503	1,076	1,365	674	800	604	6,573	3,180
Temperature - Field (°C)	19.7	23.9	19.5	19.6	19	19	19.3	18.8	19.6	21.7	19.6
Total Dissolved Solids - Lab (mg/L)	377	930	2950	1724	1112	2227	510	635	482	5587	2398
Total Organic Carbon - Lab (mg/L)	3.5	10.5	12.2	54.1	26.4	19.6	3.5	33.8	6.6	7.9	5.9
Chemical Oxygen Demand - Lab (mg/L)	18.0	39.0	29.0	166	71.0	135	10.0	101	<16.3	65.0	41.0
Sulfates - Lab (mg/L)	101.0	80.0	433	200	110	800	163	60.0	50.0	2669	1533
Aluminum - Lab (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.8	4.61

TABLE 3

Monitoring Well Characteristics
Graphic Packaging, Inc.

Well No.	MW-19	MW-20	MW-21	MW-22	MW-23	MW-24
Installation Date	Dec. 1989	10/30/1996	10/29/1996	10/24/1996	10/25/1996	10/29/1996
Unit Monitored	NPDES Impoundment	Ash/Sludge Impoundment	Ash/Sludge Impoundment	Ash/Sludge Impoundment	Ash/Sludge Impoundment	Ash/Sludge Impoundment
Latitude (deg., min., sec.)	32° 28' 15"	32° 28' 30"	32° 28' 27"	32° 28' 22"	32° 28' 11"	32° 28' 06"
Longitude (deg., min., sec.)	92° 08' 30"	92° 08' 17"	92° 08' 01"	92° 07' 58"	92° 08' 12"	92° 08' 21"
Gradient	UP	DOWN	Up	Down	Down	Up
Well Construction (size and material)	4-inch PVC	4-inch PVC	4-inch PVC	4-inch PVC	4-inch PVC	4-inch PVC
Top of casing elevation (ft msl)	87.24	88.03	88.04	88.12	88.04	88.06
Concrete pad elevation (ft msl)	NA	86.02	85.99	86.01	86	85.97
Well Depth (ft bgs)	30.25	49.15	39.65	42.38	42.81	42.62
Screen Interval (ft bgs) FROM	17	50.25	59	56.4	55.55	55.55
TO	26.5	40.5	49.25	46.65	45.8	45.8
Sump Length (ft)	0.5	0.5	0.5	0.5	0.5	0.5
Sampling Equipment	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump	Dedicated Bladder Pump
Depth to Water (ft below TOC)	16.62	24.2	21.73	22.14	22.51	19.88
Groundwater Elevation (feet msl)	70.65	64.23	66.47	66.12	65.6	68.13
Volume Purged (gal)	27	35	18	14	40	17
Date Sampled	9/28/2005	9/29/2005	9/30/2005	9/30/2005	9/30/2005	9/30/2005
pH - Lab (std. units @20°C)	6.0	6.4	6.7	6.3	6.4	6.0
pH- Field (std. units)	6.5	7.0	7.1	7.0	7.0	7.0
Specific Conductance - Lab (umhos/cm)	6,110	608	506	561	665	1,746
Specific Conductance - Field (umhos/cm)	5,053	582	486	583	595	1,470
Temperature - Field (°C)	21.2	20.0	19.9	20.0	20.0	19.7
Total Dissolved Solids - Lab (mg/L)	4166	408	318	325	448	1037
Total Organic Carbon - Lab (mg/L)	7.8	2.8	2.2	2.8	1.7	10.4
Chemical Oxygen Demand - Lab (mg/L)	51.0	<16.3	17.0	<16.3	<16.3	25.0
Sulfates - Lab (mg/L)	1567	12.7	16.0	23.3	86.7	66.7
Aluminum - Lab (mg/L)	0.6	0.39	0.33	0.47	0.34	0.48

TABLE 4

PRACTICAL QUANTITATION LIMITS – GROUNDWATER MONITORING PROGRAM WASTEWATER TREATMENT PONDS

TABLE 4

PRACTICAL QUANTITATION LIMITS (PQL)
GROUNDWATER MONITORING PROGRAM
WASTEWATER TREATMENT PONDS

Parameter	PQL	Unit
pH	NA	Std. Units
Total Dissolved Solids	5.0	mg/L
Specific Conductance	1.0	umhos/cm
Sulfate as SO_4	10.0	mg/L
Total Aluminum	0.20	mg/L
Chemical Oxygen Demand	10.0	mg/L

TABLE 5

RECOMMENDED MIX DESIGNS FOR CEMENT-BENTONITE GROUT

TABLE 5
RECOMMENDED MIX DESIGNS FOR CEMENT-BENTONITE GROUT [1]

		4% Mix		5%Mix		6% Mix		7% Mix	
Sacks of Cement	Pounds of Cement	Pounds of Bentonite	Gallons of Water	Pounds of Bentonite	Gallons of Water	Pounds of Bentonite	Gallons of Water	Pounds of Bentonite	Gallons of Water
1	94	3.8	7.8	4.7	8.5	5.6	9.1	6.6	9.8
2	188	7.5	15.6	9.4	17.0	11.2	18.2	13.2	19.6
3	282	11.3	23.4	14.1	25.5	16.9	27.3	19.7	29.4
4	376	15.0	31.2	18.8	34.0	22.6	36.4	26.3	39.2
5	470	18.8	39.0	23.5	42.5	28.2	45.5	32.9	49.0
6	564	22.6	46.8	28.2	51.0	33.8	54.6	39.5	58.8
7	658	26.3	54.6	32.9	59.5	39.5	63.7	46.1	68.6
8	752	30.1	62.4	37.6	68.0	45.1	72.8	52.6	78.4
9	846	33.8	70.2	42.3	76.5	50.8	81.9	59.2	88.2
10	940	37.6	78.0	47.0	85.0	56.4	91.0	65.8	98.0

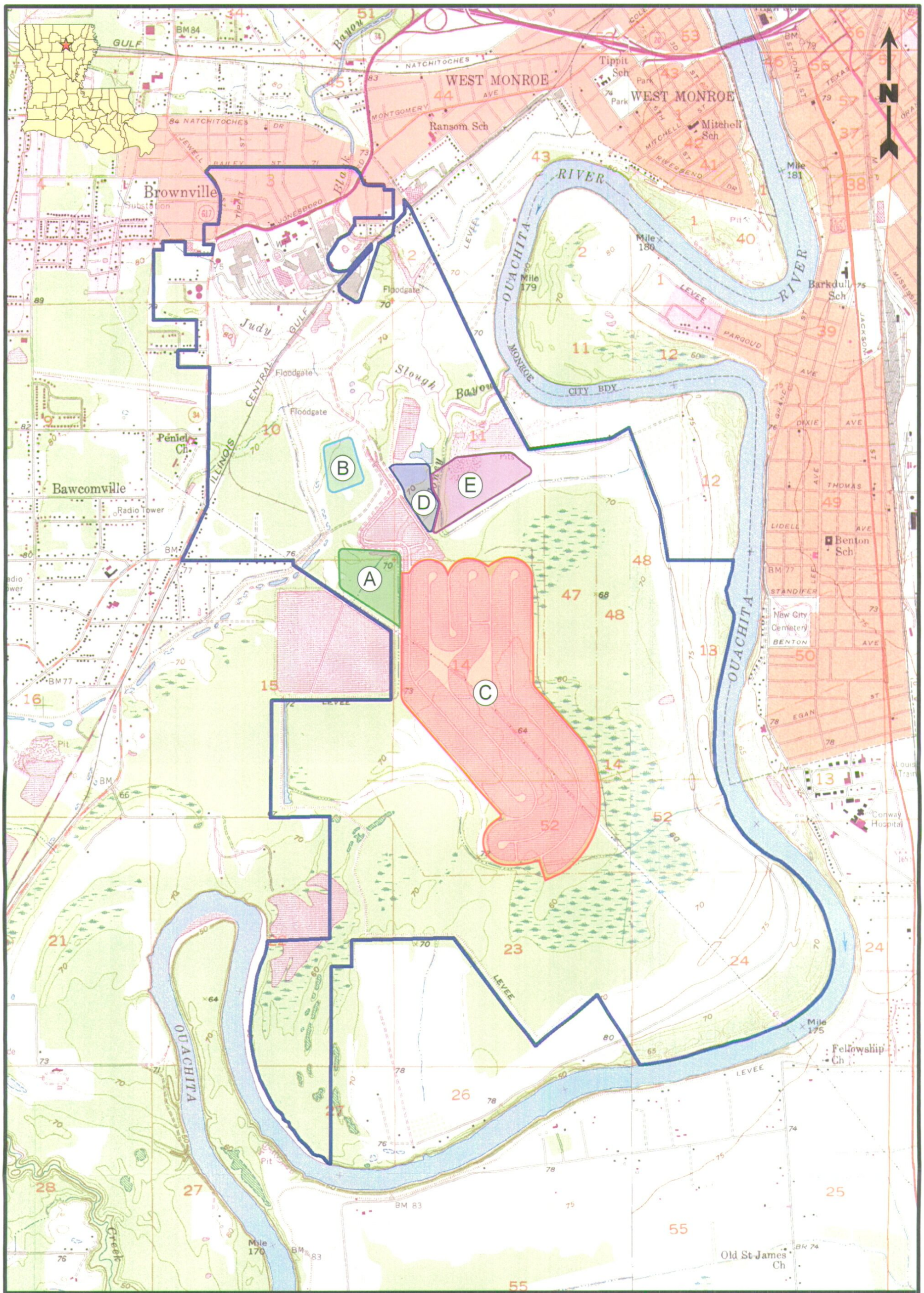
Slurry Weights

4% Mix = 14.1 lbs/gal
5% Mix = 13.8 lbs.gal
6% Mix = 13.5 lbs/gal
7% Mix = 13.3 lbs/gal

Notes:
[1] Halliburton Cementing Tables©, Halliburton Services, Duncan, Oklahoma

FIGURE 1

SITE LOCATION MAP



Legend

- Property Boundary
- Heliport
- A - 35 Acre Primary Sludge Pond
- B - High Intensity Aeration Basin
- C - NPDES Impoundments
- D - 21 Acre Impoundment
- E - 41 Acre Impoundment

Note:

No airports within 10,000 feet of the NPDES wastewater treatment facility and ash/sludge lagoons.

Reference

Base map comprised of U.S.G.S. 7.5 minute topographic map, "West Monroe South, LA" and "Monroe South, LA" dated 1957 photorevised 1969 and 1975.

2,000 1,000 0 2,000 Feet

Site Location Map

Solid Waste Permit Renewal Application
Ouachita Parish

Graphic Packaging International, Inc.
West Monroe, Louisiana

PROVIDENCE
ENGINEERING & ENVIRONMENTAL GROUP LLC

Doc. Code:	001-007	Drawn: LMH	1
		Checked:	
Dwg. No.:	001-007-B004	Approved:	Figure
		Date: 01/15/07	

FIGURE 2

OWNERSHIP MAP

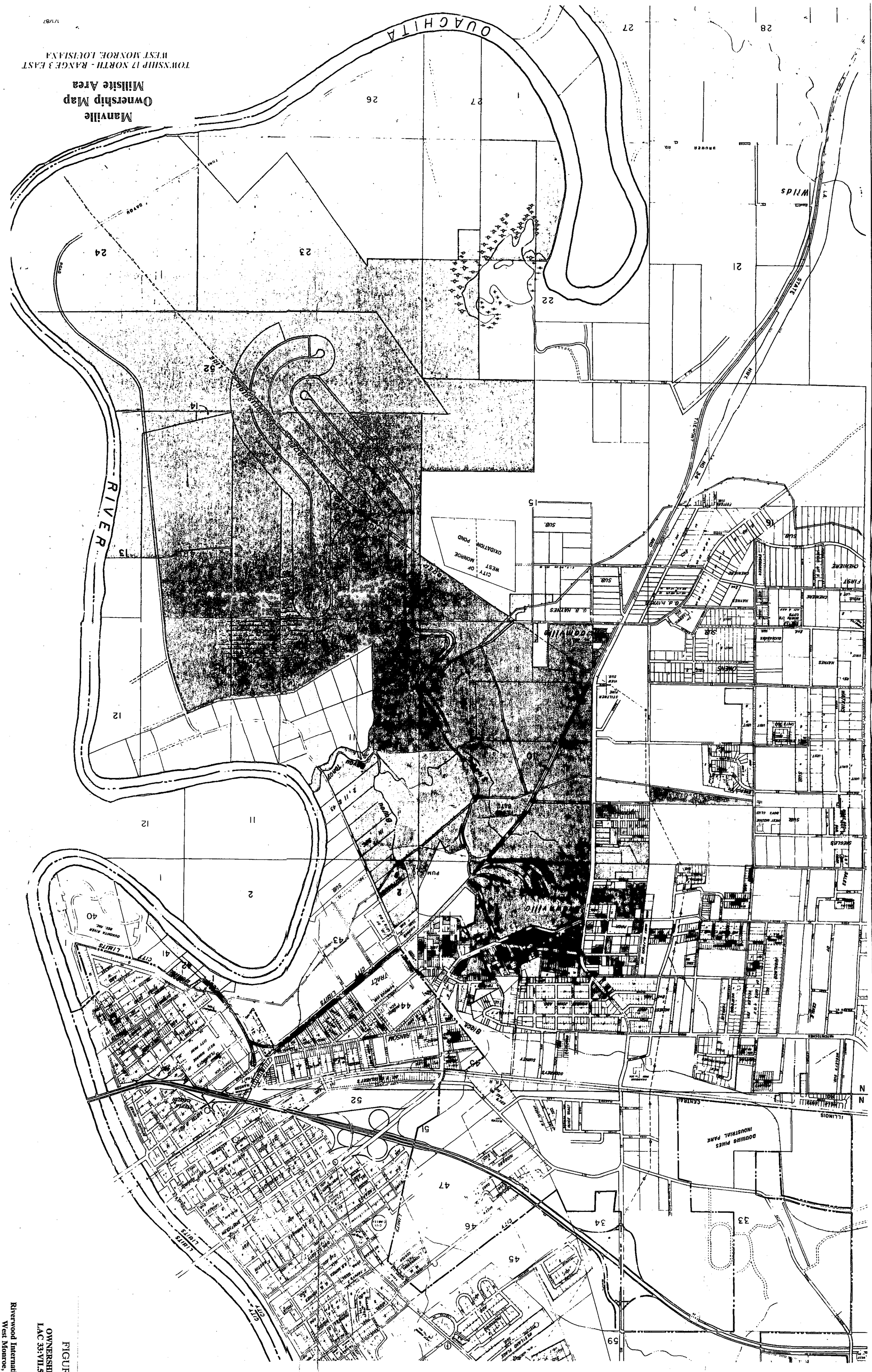


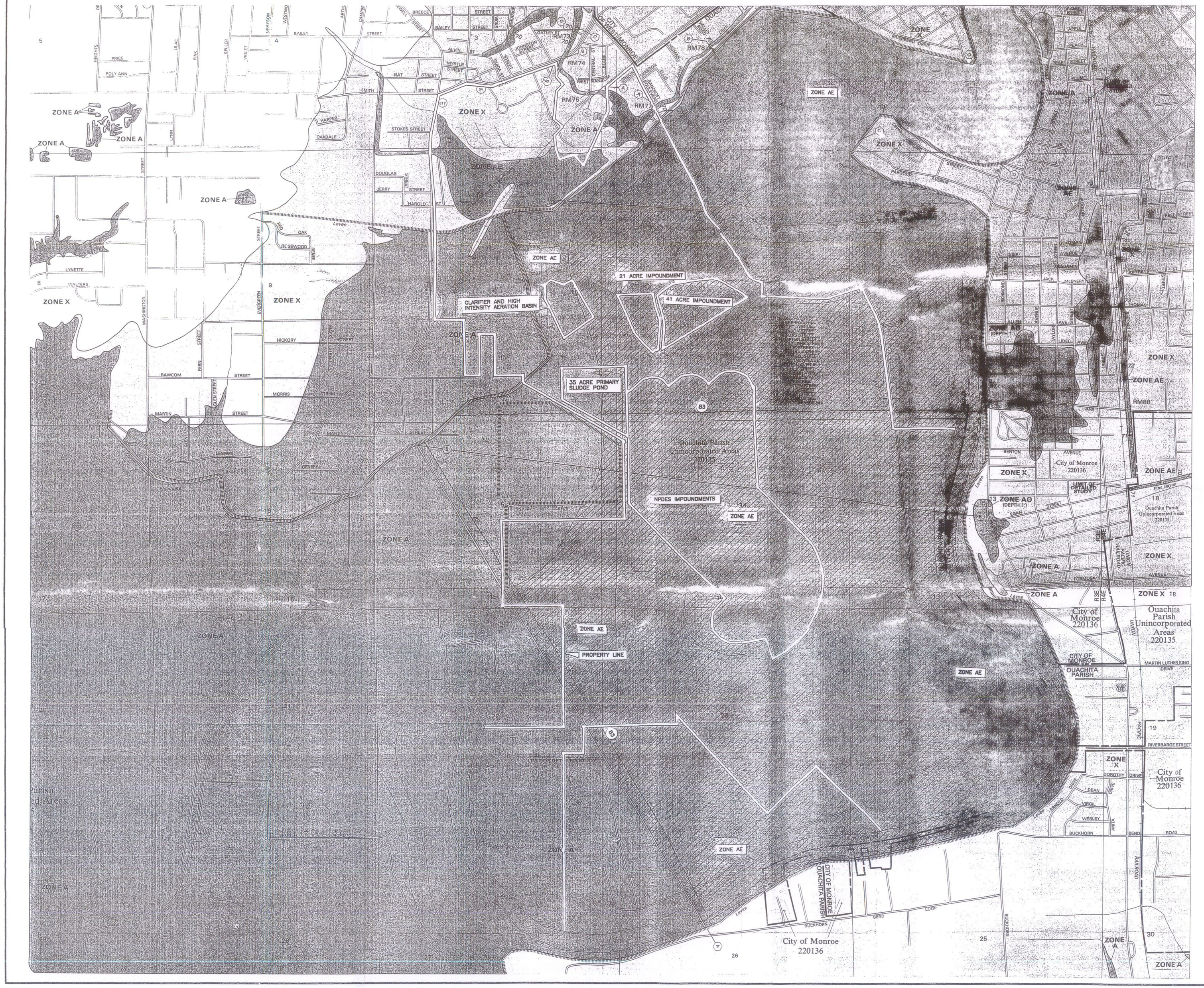
FIGURE 2

OWNERSHIP MAP
LAC 33:VII.521.A.1.a.

Riverwood International USA, Inc.
West Monroe, Louisiana

FIGURE 3

LOCATION OF 100-YEAR FLOOD PLAIN



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
OUACHITA PARISH, LOUISIANA AND INCORPORATED AREAS

PANEL 70 OF 140

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MONROE, CITY OF	220136	0070	E
WEST MONROE, CITY OF	220138	0070	E
UNINCORPORATED AREAS	220135	0070	E

PANEL LOCATION

Notice To User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

MAP NUMBER
22073C0070 E

EFFECTIVE DATE:
MARCH 15, 1994

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
OUACHITA PARISH, LOUISIANA AND INCORPORATED AREAS

PANEL 95 OF 140

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MONROE, CITY OF	220136	0095	E
UNINCORPORATED AREAS	220135	0095	E

PANEL LOCATION

Notice To User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

MAP NUMBER
22073C0095 E

EFFECTIVE DATE:
MARCH 15, 1994

Federal Emergency Management Agency

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- **ZONE A** No base flood elevations determined.
- **ZONE AE** Base flood elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE A99** To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.
- **ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside 500-year floodplain.
- **ZONE D** Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS†

Identified 1983 | Identified 1990 or later | Otherwise Protected Areas

*Coastal barrier areas are normally located within or adjacent to special flood hazard areas.

Floodplain Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet*

(D) — (D) (EL 987) — Cross Section - Line

Base Flood Elevation in Feet Where Uniform Within Zone.*

RM7X — Elevation Reference Mark

•M1.5 — River Mile

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

Coastal base flood elevations apply only landward of 0.0 NGVD, and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

For description of elevation reference marks, see map number 22073C0005

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

For community map revision history prior to countywide mapping, see section 6.0 of the Flood Insurance Study Report.

For adjoining map panels see separately printed Map Index.

MAP REPOSITORY

Refer to Repository Listing on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP

MARCH 15, 1994

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

Refer to the Flood Insurance Rate Map Effective date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE

1000 0 1000 FEET

KSI ENVIRONMENTAL CONSULTANTS

Kenner, Louisiana 70065 • (504)443-4470 • ksirion@aol.com

FIGURE 3

LOCATION OF 100-YEAR FLOOD PLAIN

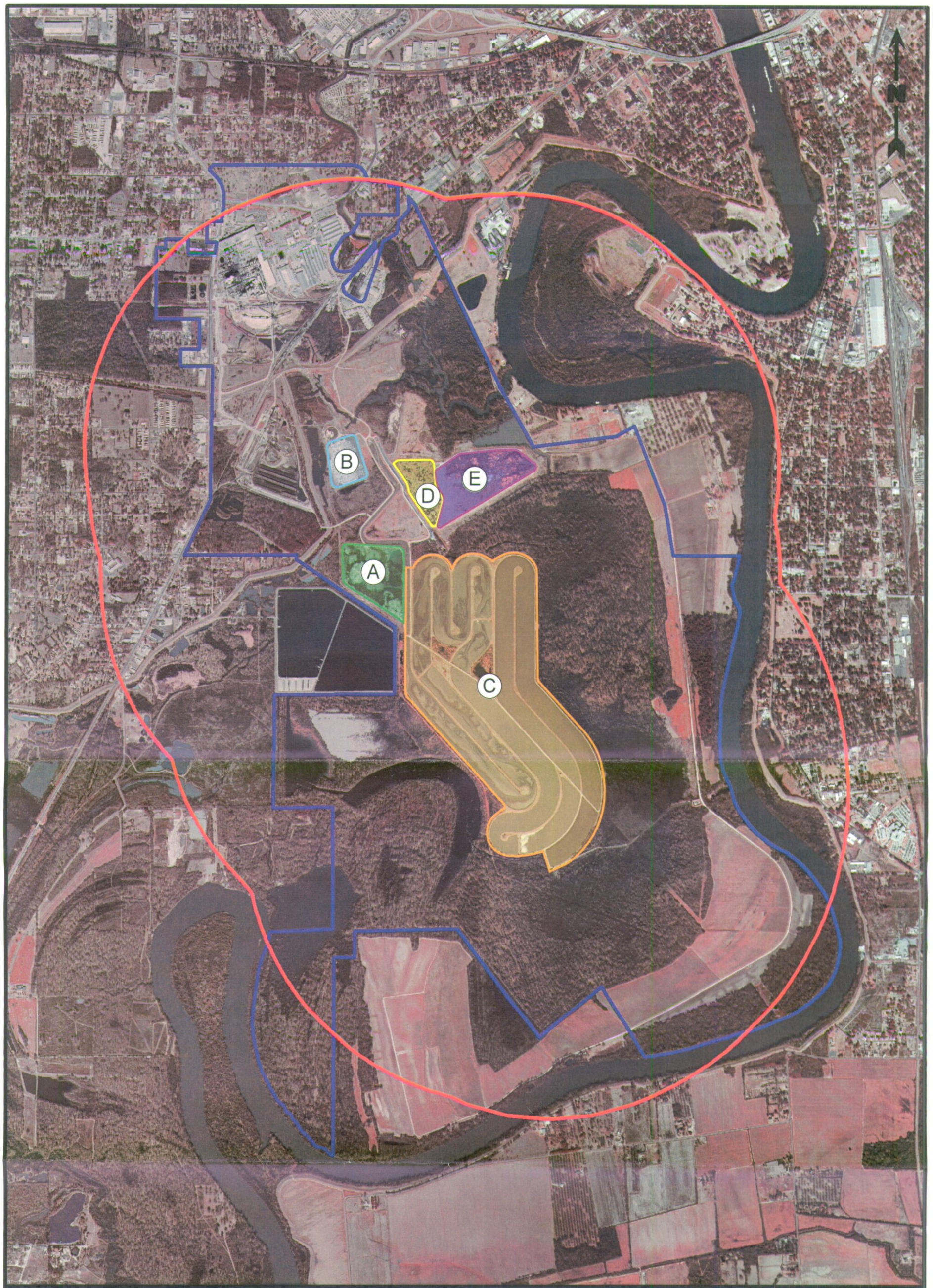
LAC33:VII.521.A.1.a.

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

JAN 97

FIGURE 4

AERIAL PHOTOGRAPH



Legend

- Property Boundary
- 1 Mile Buffer of Ponds
- A - 35 Acre Primary Sludge Pond
- B - High Intensity Aeration Basin
- C - NPDES Impoundments
- D - 21 Acre Impoundment
- E - 41 Acre Impoundment

Reference

Base map comprised of 2004 aerial photograph.

2,000 1,000 0 2,000 Feet

Aerial Photograph

Solid Waste Permit Renewal Application
Ouachita Parish

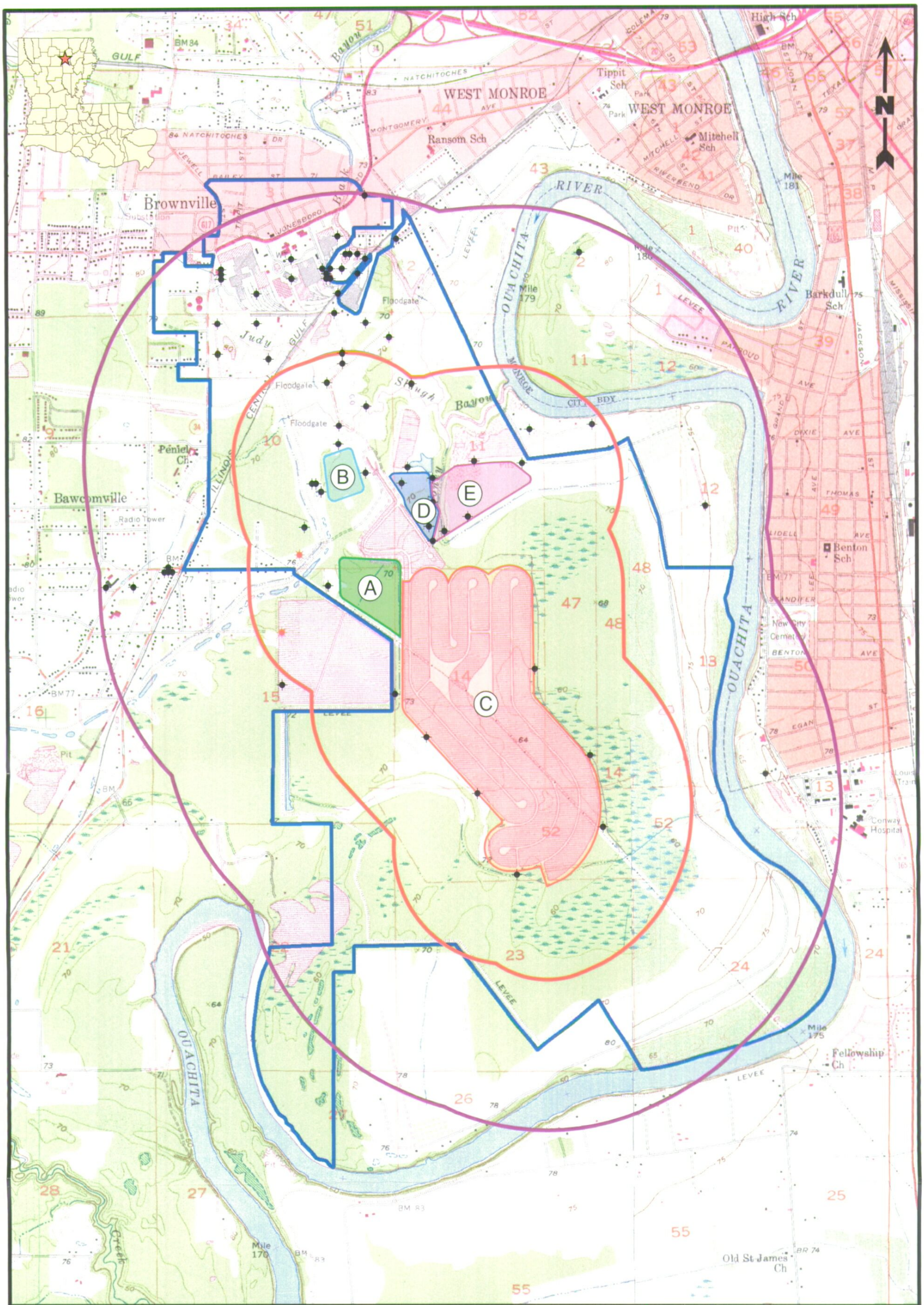
Graphic Packaging International, Inc.
West Monroe, Louisiana

PROVIDENCE
ENGINEERING & ENVIRONMENTAL GROUP LLC

Doc. Code: 001-007	Drawn: LMH	4
	Checked:	
Dwg. No.: 001-007-B002	Approved:	Figure
	Date: 01/05/07	

FIGURE 5

WATER WELL LOCATION MAP



Legend

- Property Boundary
- A - 35 Acre Primary Sludge Pond
- B - High Intensity Aeration Basin
- C - NPDES Impoundments
- D - 21 Acre Impoundment
- E - 40 Acre Impoundment
- 1 Mile Buffer
- 2000 Foot Buffer
- LaDOTD Registered Water Wells
- Oil and Gas Wells

Reference

Base map comprised of U.S.G.S. 7.5 minute topographic map, "West Monroe South, LA" and "Monroe South, LA" dated 1957 photorevised 1969 and 1975.
LaDOTD registered water wells obtained from the LaDOTD registered water well data-server.
Oil and gas wells obtained from the Louisiana Oil Spill Coordinator's Office (LOSCO) 1999 dataset.

2,000 1,000 0 2,000 Feet

Well Location Map

Response to NODs
Ouachita Parish

Graphic Packaging International, Inc.
West Monroe, Louisiana

PROVIDENCE

Drawn By	LMH	09/21/07
Checked By	MTP	09/21/07
Approved By	VRG	09/21/07

Project Number 001-007

Drawing Number 001-007-B007

5
Figure

FIGURE 6

SITE MASTER PLAN

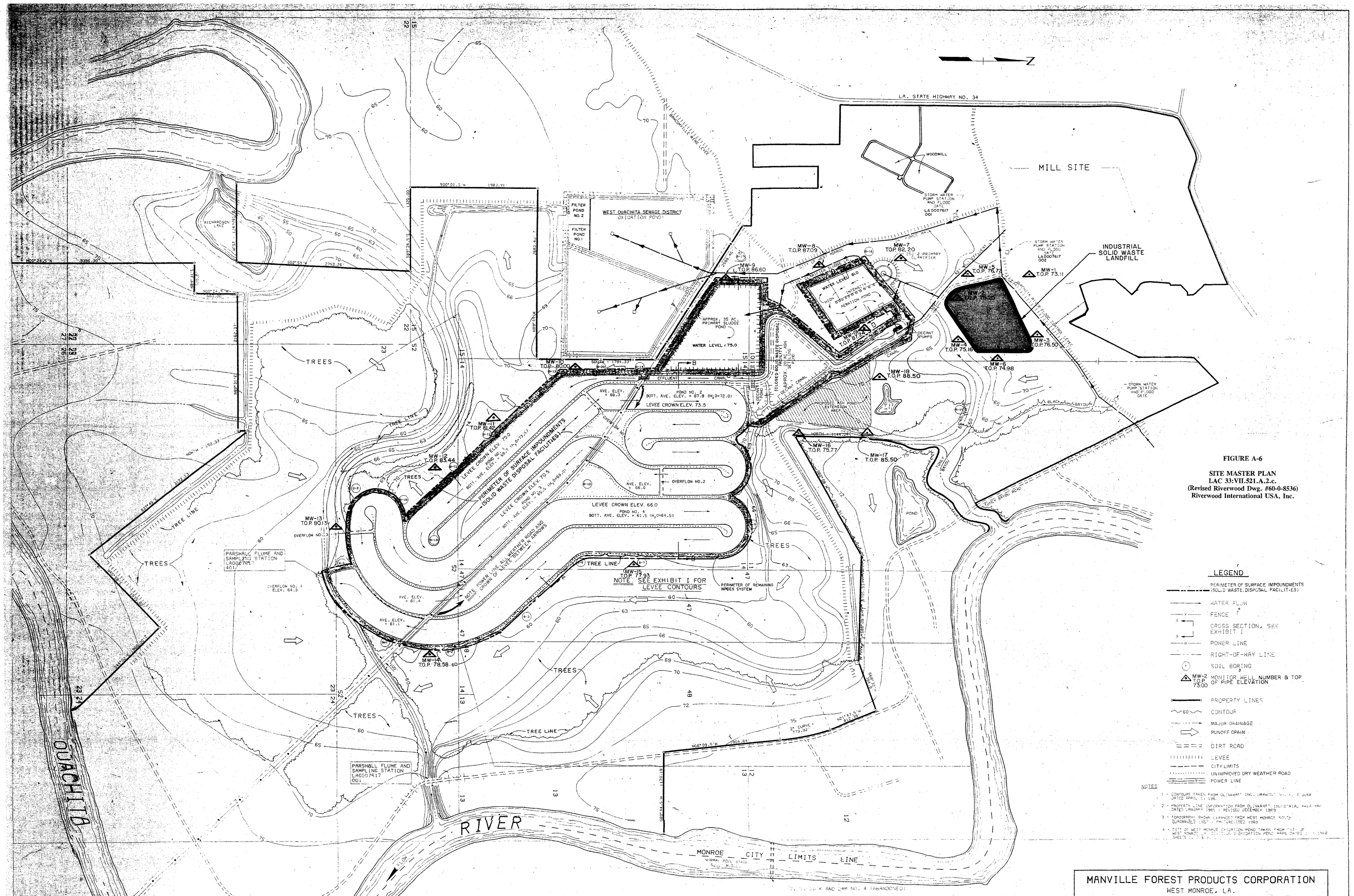


FIGURE A-6

SITE MASTER PLAN
LAC 33:VII.521.A.2.c.
(Revised Riverwood Dwg. #60-0-8536)
Riverwood International USA, Inc.

MANVILLE FOREST PRODUCTS CORPORATION
WEST MONROE, LA.
SOLID WASTE PERMIT APPLICATION
INDUSTRIAL SOLID WASTE LANDFILL
SITE MASTER PLAN
(SECTION 6.4.3.B.1)

ERM-Southwest, Inc.

DRAWING NO.	REFERENCES	NO.	REVISIONS	MADE	CKD	DATE
		5	HIGHLIGHTED LANDFILL	DA	REL	2/14/92
		4	REVISED MONITERING WELL NUMBERS & T.O.P. ELEVATIONS	RCH	RCH	1-12-90
		3	REVISED PROPOSED MONITERING WELLS	RCH	RCH	10-25-89
		2	UPDATED FACILITY LOCATIONS	JEB	JEB	[illegible]
		1	ADDED OLINKRAFT, INC. PROPERTY TO SECTION 10	RG	RG	1-21-74

SCALE 1" = 500'

		DATE
DESIGN BY	[illegible]	[illegible]
DRAWN BY	R. RENEAU	[illegible]
CHECKED BY	G. B.	[illegible]
SUPV. BY		
SUBM'TD BY		
APP'D BY		
APP'D BY		

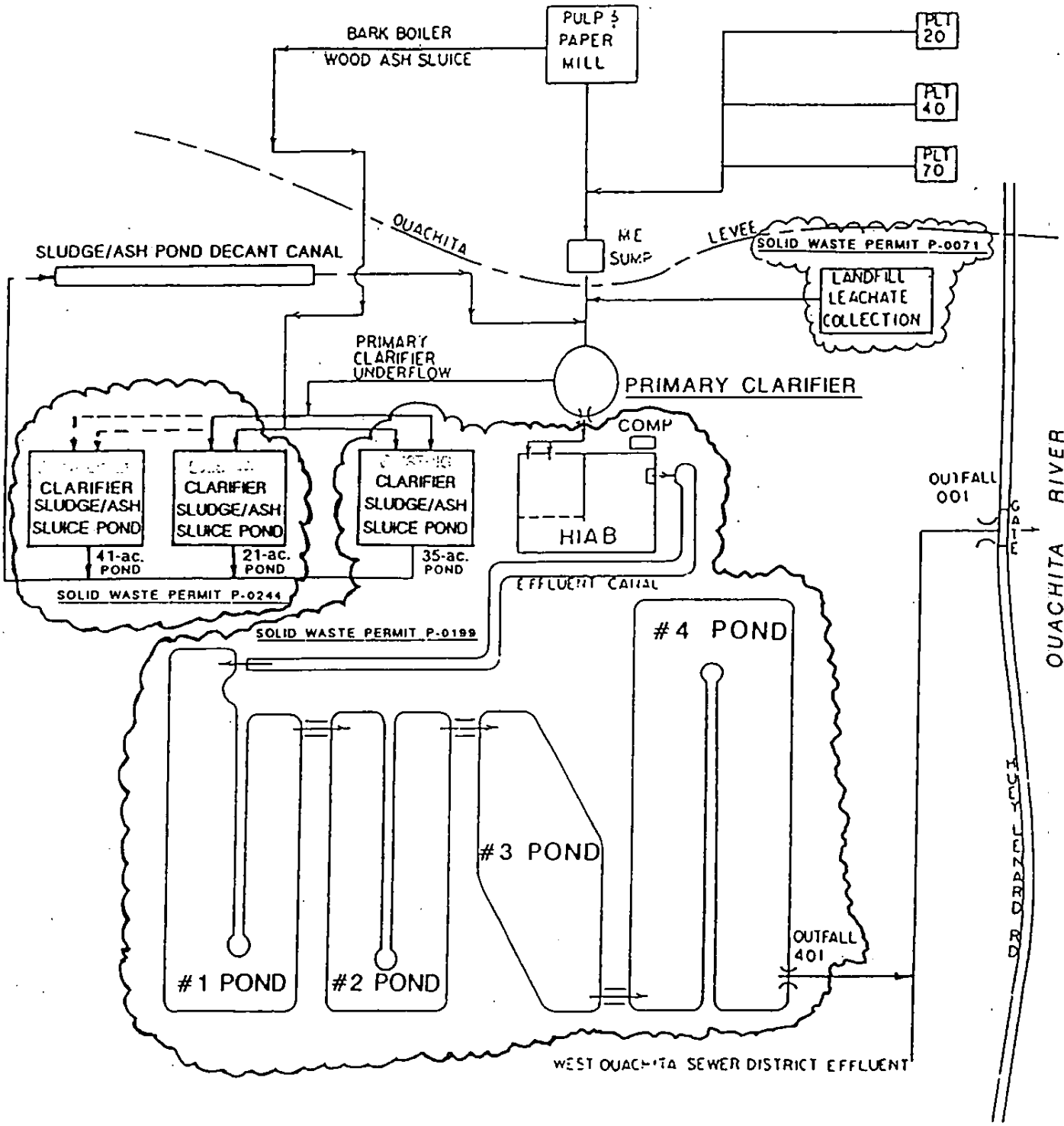
MANVILLE
MANVILLE FOREST PRODUCTS CORPORATION — WEST MONROE, LOUISIANA — PAPERBOARD DIVISION

COMPLIED MAP OF OLINKRAFT INC. PROPERTY IN TOWNSHIP 17, NORTH-RANGE 3, EAST OUACHITA PARISH, LOUISIANA

DRAWING NUMBER 60-0-8536 — REV. 4

FIGURE 7

NPDES SYSTEM FLOW DIAGRAM



ERM-Southwest, Inc.
HOUSTON • NEW ORLEANS • AUSTIN • DALLAS • EL PASO
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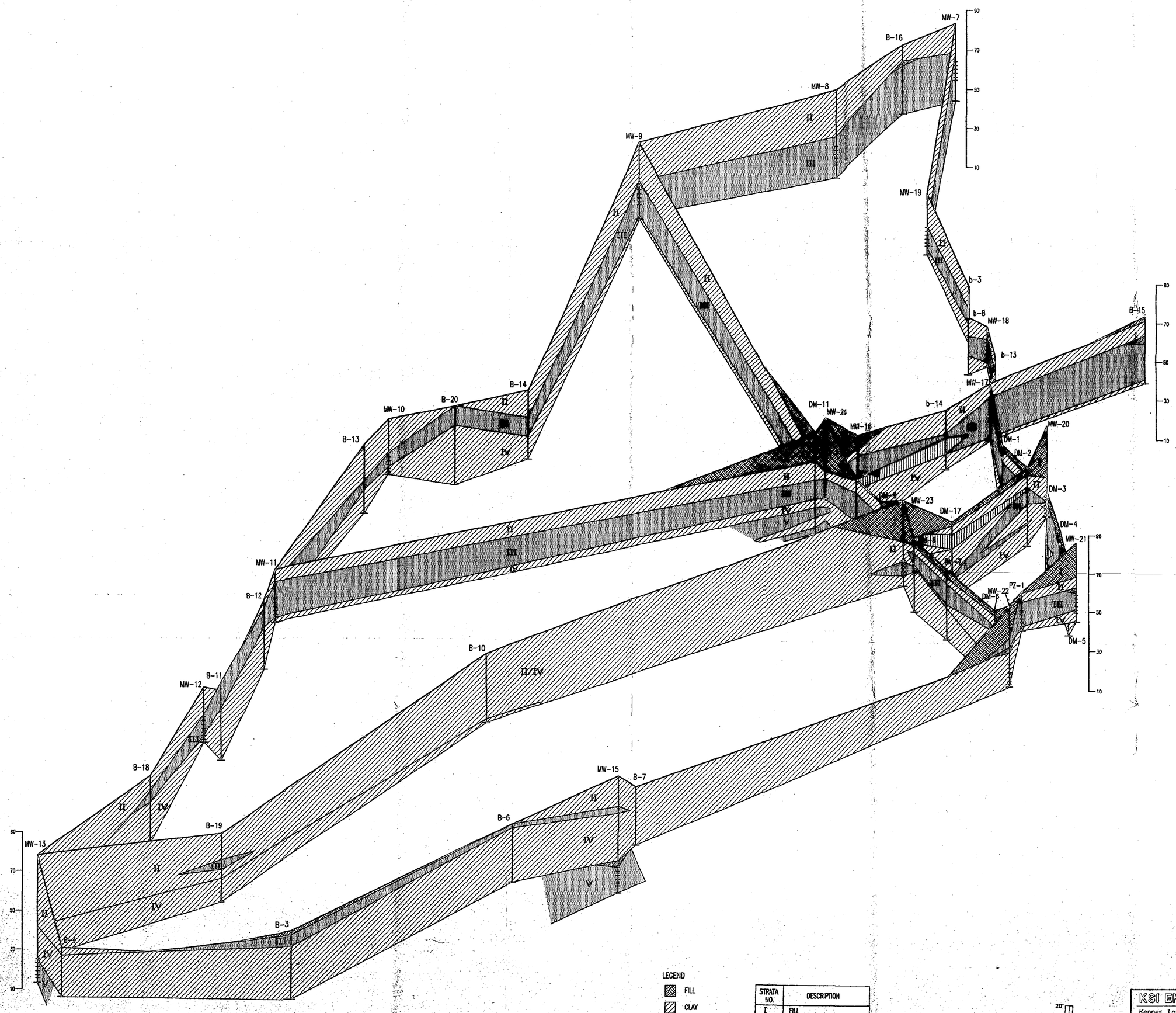
DATE	12/93	W.O.NO.	183-14

FIGURE 7
NPDES SYSTEM FLOW DIAGRAM
LAC 3:VII.521.B1.a.

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

FIGURE 8

FENCE DIAGRAM



LEGEND

- FILL
- CLAY
- SAND
- SILT
- SANDY CLAY

STRATA NO.	DESCRIPTION
I	FILL
II	CLAY TO SILTY CLAY
III	SILTY SAND TO SANDY SILT
IV	SILTY CLAY TO CLAY
V	SAND TO SILTY SAND
VI	CLAY, WITH SILT POCKETS

20'
0
0 300'

SCALE: HORIZ. - 1" = 300'
VERT. - 1" = 20'

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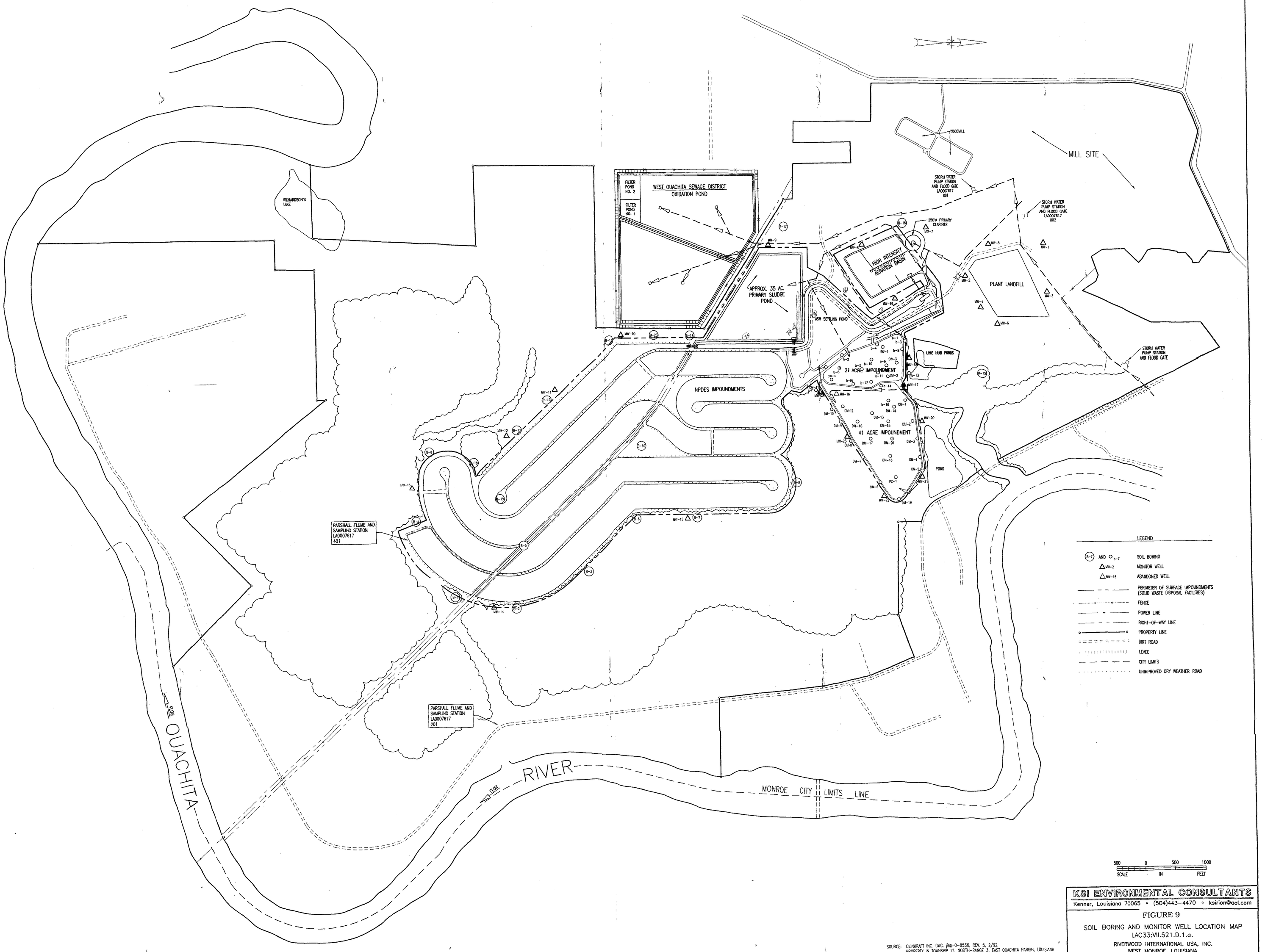
FIGURE 8

FENCE DIAGRAM
LAC33:VII.521.D.1.a.
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

JAN. 97

FIGURE 9

SOIL BORING LOCATION MAP



SOURCE: CLINKRAFT INC. DWG. 60-0-8536, REV. 5, 2/92
PROPERTY IN TOWNSHIP 17, NORTH-RANGE 3, EAST OUACHITA PARISH, LOUISIANA

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FIGURE 9

SOIL BORING AND MONITOR WELL LOCATION MAP
LAC33:VII.521.D.1.a.

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

FEB 97

FIGURE 10

ASH/SLUDGE POND ISOMETRIC PROFILE

DRAWN BY:	CHECKED BY:	DATE	JOB NO.
		11/15/92	

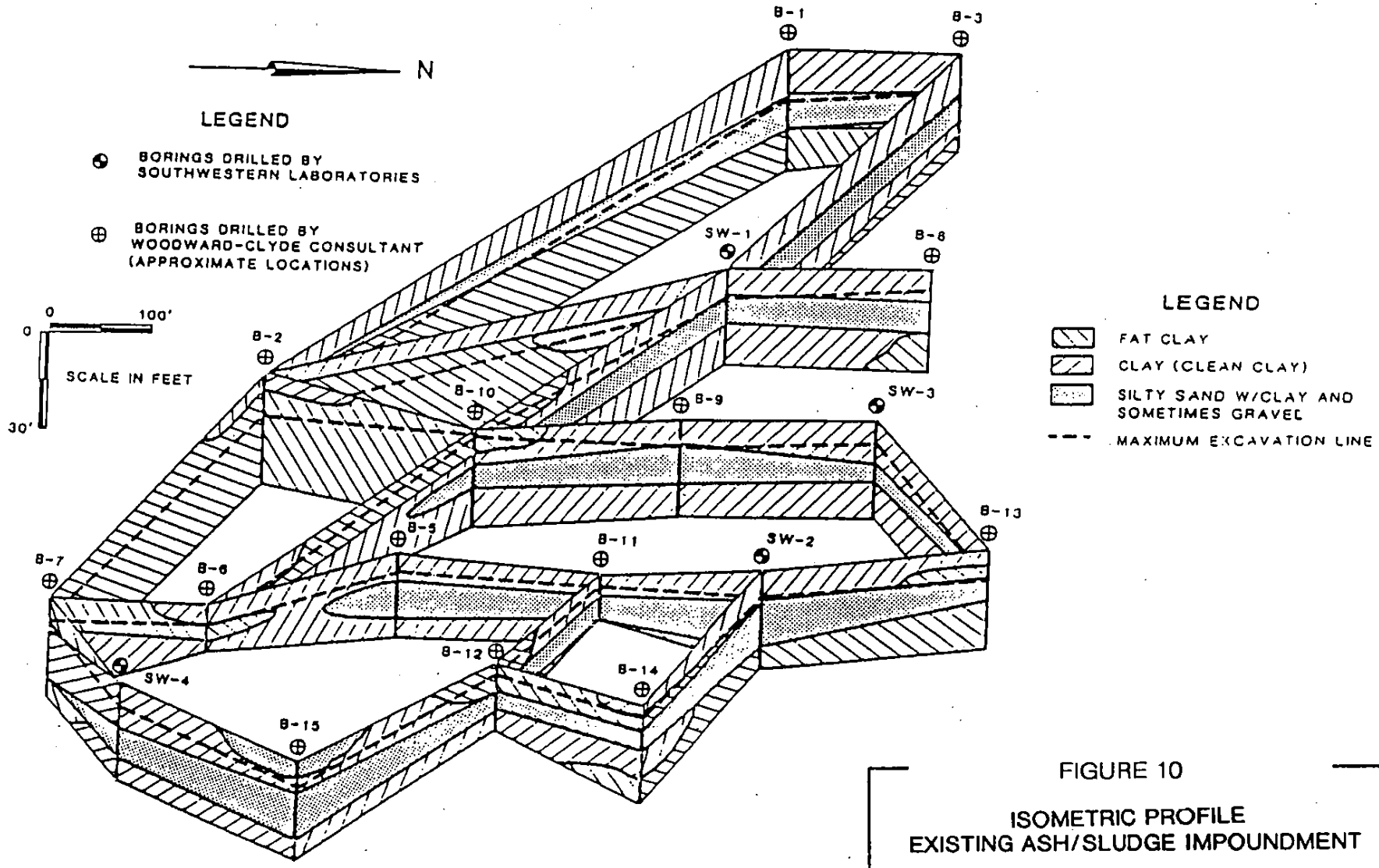


FIGURE 10

ISOMETRIC PROFILE
EXISTING ASH/SLUDGE IMPOUNDMENT

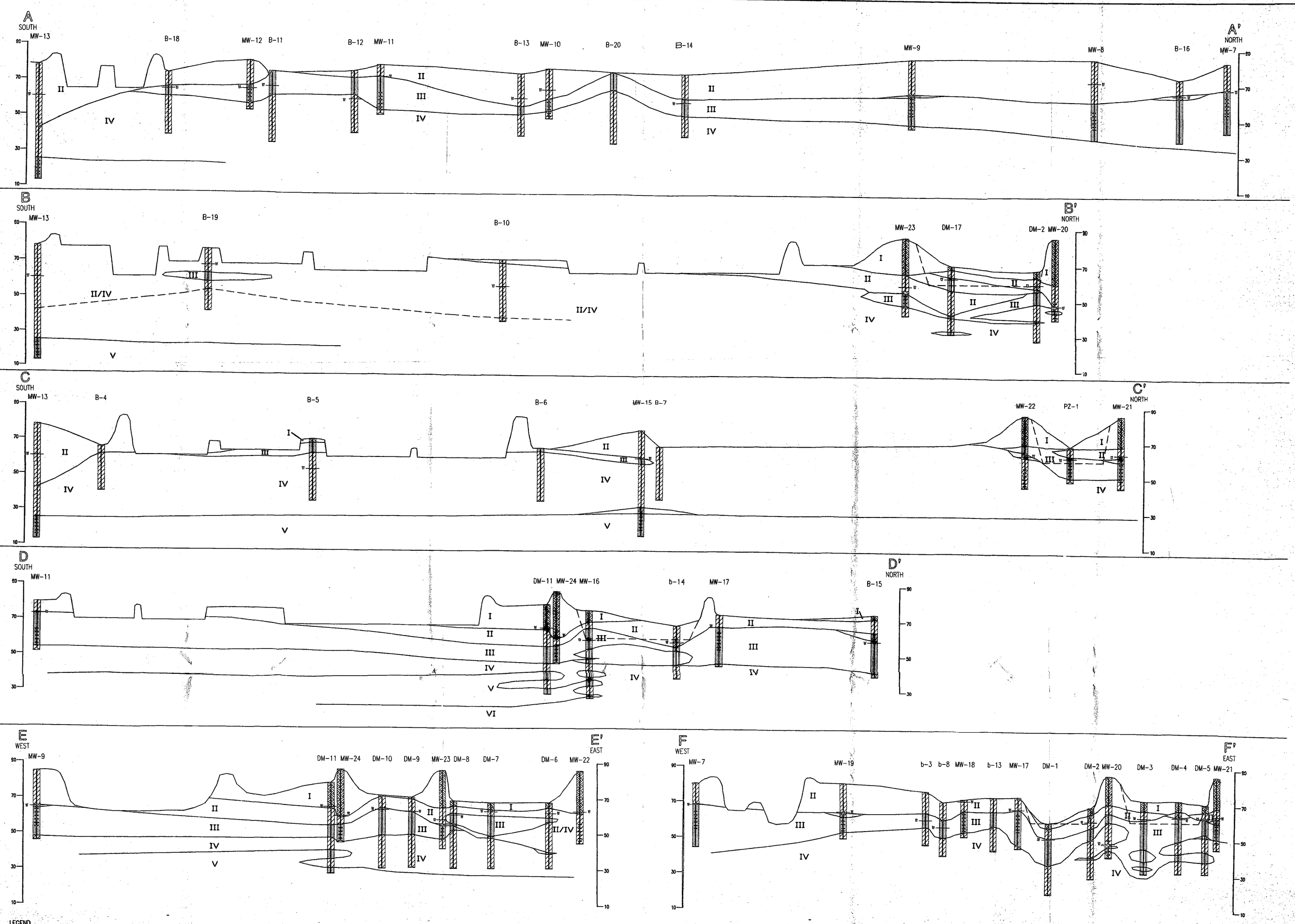
DAMES & MOORE

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

REFERENCE: FROM FIGURE 2-8
PROVIDED BY ERM-SOUTHWEST, INC

FIGURE 11a

CROSS-SECTIONS A-A', B-B', C-C', D-D', E-E', and F-F'



KSI ENVIRONMENTAL CONSULTANTS
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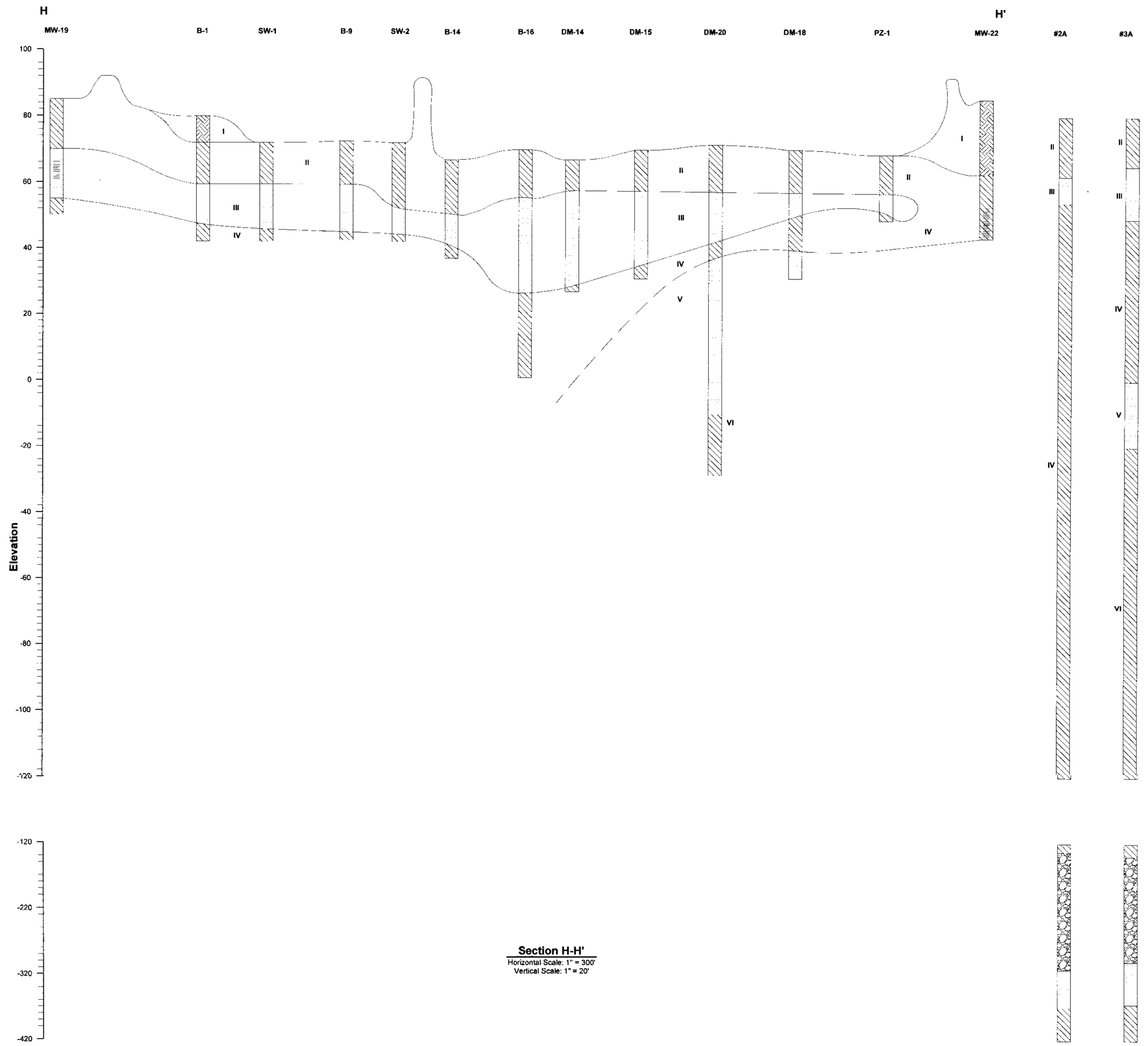
FIGURE 11

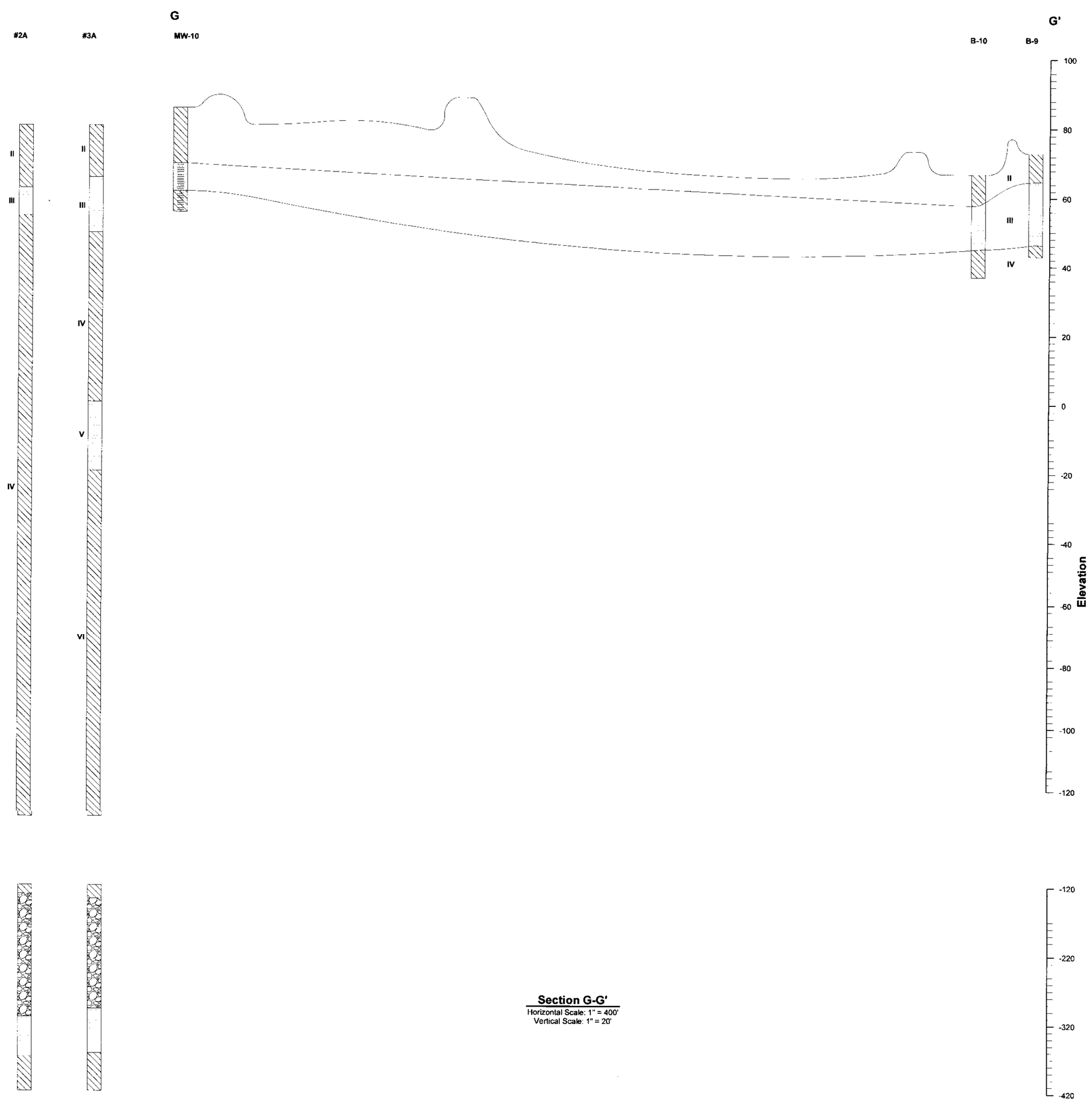
CROSS SECTIONS A-A', B-B', C-C', D-D', E-E' & F-F'
LAC33:VII.521.D.1.a.
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

FIGURE 11b

CROSS-SECTIONS G-G' and H-H'



Section H-H'
Horizontal Scale: 1" = 300'
Vertical Scale: 1" = 20'



Section G-G'
Horizontal Scale: 1" = 400'
Vertical Scale: 1" = 20'

LEGEND

- FILL
- CLAY
- SAND
- SILT
- SANDY CLAY
- SCREEN
- SHALE

STRATA NO.	DESCRIPTION
I	FILL
II	CLAY TO SILTY CLAY
III	SILTY SAND TO SANDY SILT
IV	SILTY CLAY TO CLAY
V	SAND TO SILTY SAND
VI	CLAY, WITH SILT POCKETS

Cross Sections G-G' and H-H'

Solid Waste Permit Renewal Application
Ouachita Parish

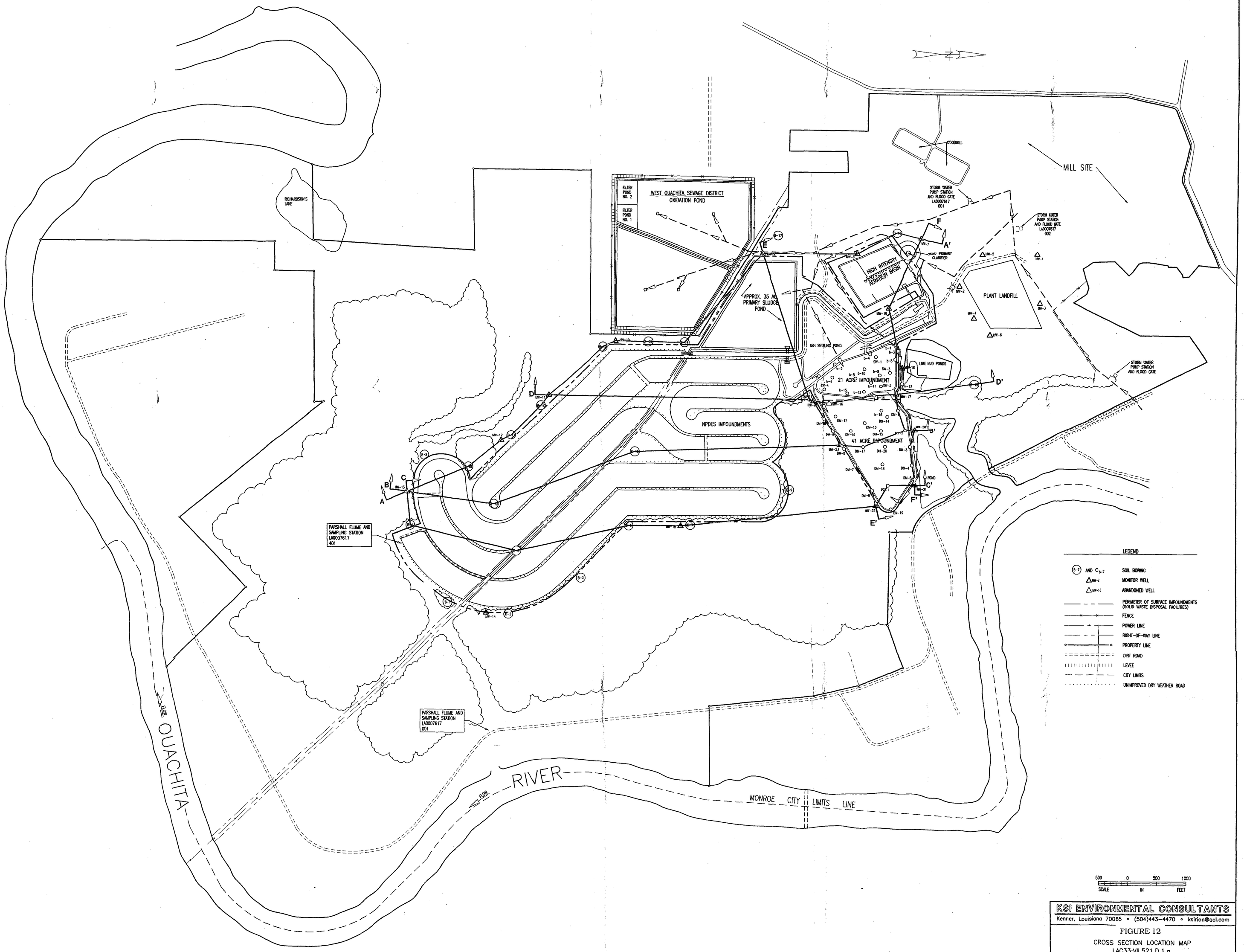
Graphic Packaging International, Inc.
West Monroe, Louisiana

Drawn By	JCS	09/14/07
Checked By	LMH	09/17/07
Approved By	MTP	09/17/07
Project Number 001-007		
Drawing Number		11B

PROVIDENCE

FIGURE 12

CROSS-SECTION LOCATION MAP



SOURCE: OLINKRAFT INC. DWG. #60-0-8536, REV. 5, 2/92
PROPERTY IN TOWNSHIP 17, NORTH-RANGE 3, EAST OUACHITA PARISH, LOUISIANA

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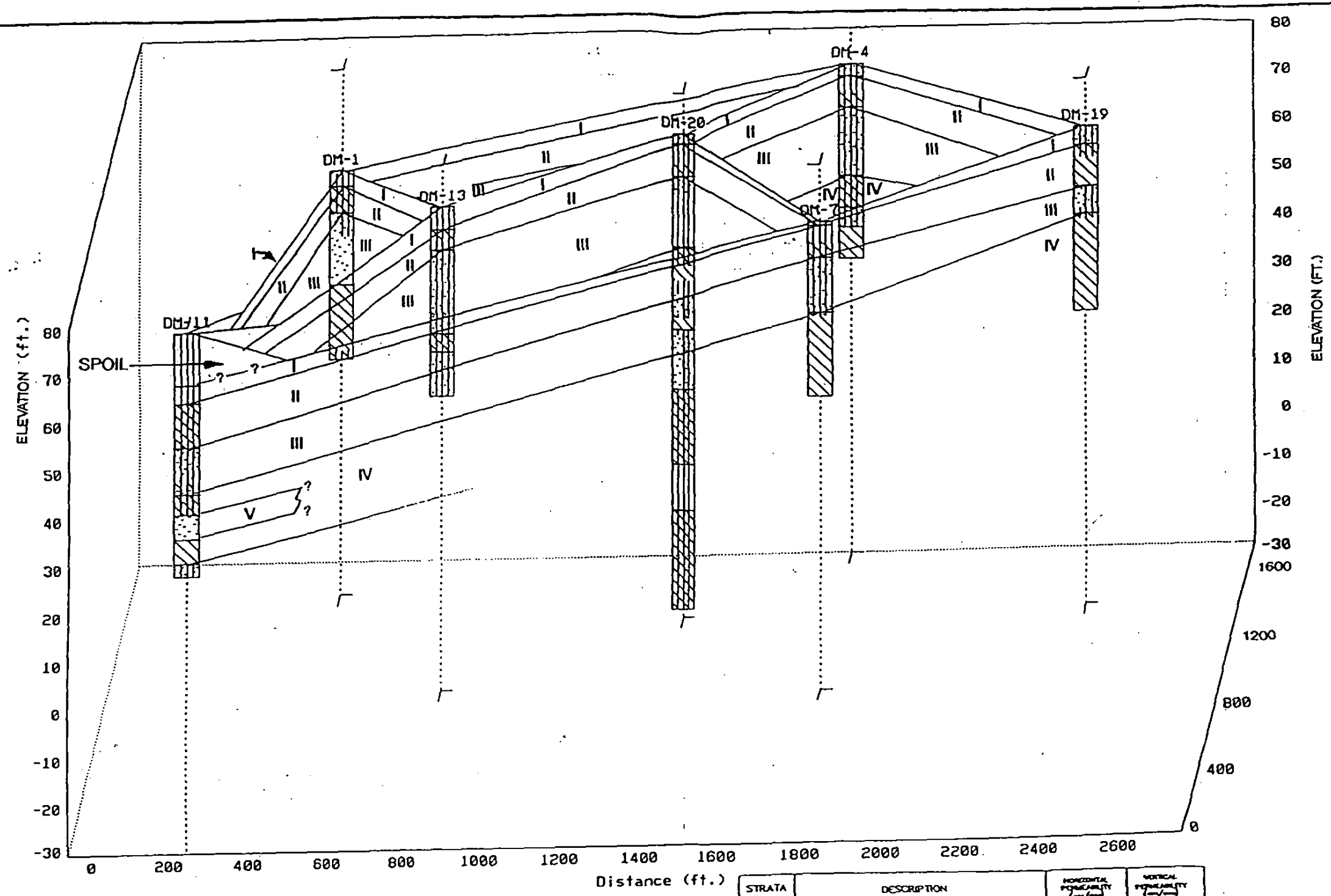
FIGURE 12
CROSS SECTION LOCATION MAP
LAC33:VII.521.D.1.a.
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

FEB 97

FIGURE 13

GEOLOGIC ISOMETRIC PROFILE



NOTES:

1. NUMERICAL DESIGNATIONS REFER TO STRATA DESCRIPTIONS SHOWN ON THE TABLE TO THE RIGHT.
2. PERMEABILITIES SHOWN WERE DETERMINED THROUGH LABORATORY TESTING OF UNDISTURBED SAMPLES.
3. SEE FIGURE D-2 FOR BORING LOCATIONS.

STRATA NO.	DESCRIPTION	HORIZONTAL PERMEABILITY (cm/sec)	VERTICAL PERMEABILITY (cm/sec)
I	SILTY SAND (TO BE STRIPPED)	——	——
II	CLAY TO SILTY CLAY	2.5×10^{-8}	7.8×10^{-9}
III	SILTY SAND TO SANDY SILT	1.2×10^{-4}	1.5×10^{-7}
IV	SILTY CLAY TO CLAY	2.3×10^{-8}	1.1×10^{-7}
V	SAND TO SILTY SAND	——	——
VI	CLAY, WITH SILT POCKETS	1.3×10^{-7}	8.1×10^{-8}
VII	CLAYEY SAND WITH SILTY SAND LAYERS	2.1×10^{-8}	5.1×10^{-8}
VIII	CLAY, WITH SAND AND SILT LENSES	7.5×10^{-8}	6.4×10^{-8}

SOURCE: P-0244 PERMIT MODIFICATION FIGURE 4-9
(DAMES & MOORE PROJECT NO. 24379-002-137; NOVEMBER 23, 1992).

ERM-Southwest Inc.

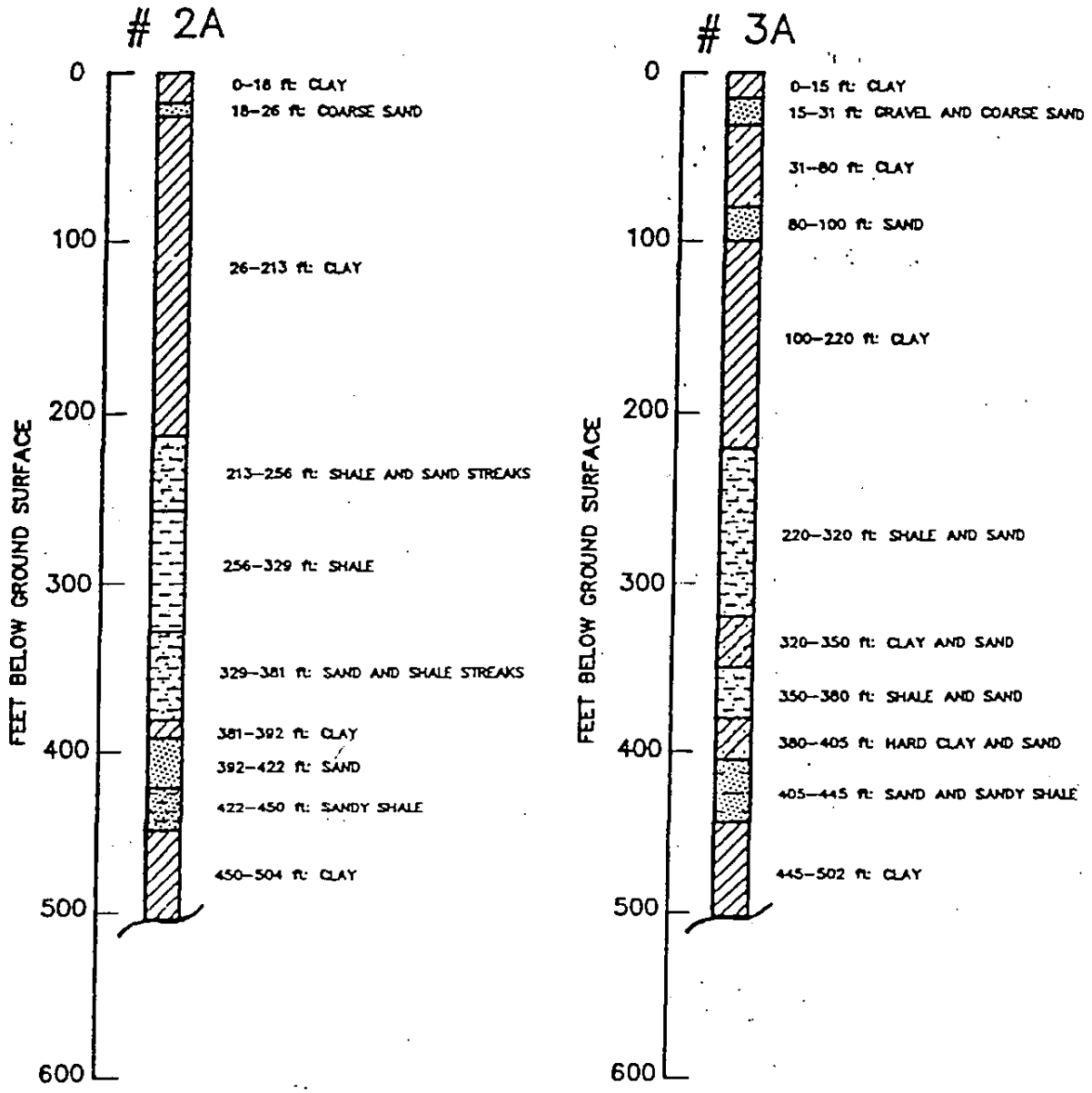
ERM

FIGURE 13
GEOLOGIC ISOMETRIC PROFILE
LAC 33:VII.521.D.1.a.
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

DESIGN:	CHECKED:	DATE: 12/93	SHEET NO.
DRAWN:	SCALE:	W.O.NO.: 183-14	of

FIGURE 14

GEOLOGIC STRATA FROM DEEP WELL LOGS



NOTES:
1. THE ABOVE LOGS WERE PROVIDED BY THE WELL DRILLERS, LAYNE WESTERN DRILLING COMPANY. THE WELLS ARE LOCATED APPROXIMATELY 500 FEET APART ON RIVERWOOD INTERNATIONAL PLANT PROPERTY.

SOURCE: P-0244 PERMIT MODIFICATION FIGURE 4-10
(DAMES & MOORE PROJECT NO. 24379-002-137; NOVEMBER 23, 1992).

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DATE 12/93 | W.O.NO. 183-14

FIGURE 14
GEOLOGIC STRATA FROM DEEP WELL LOGS
LAC 33:VII.521.D.1.d.
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

FIGURE 15

ISOPACH MAP OF STRATUM IV

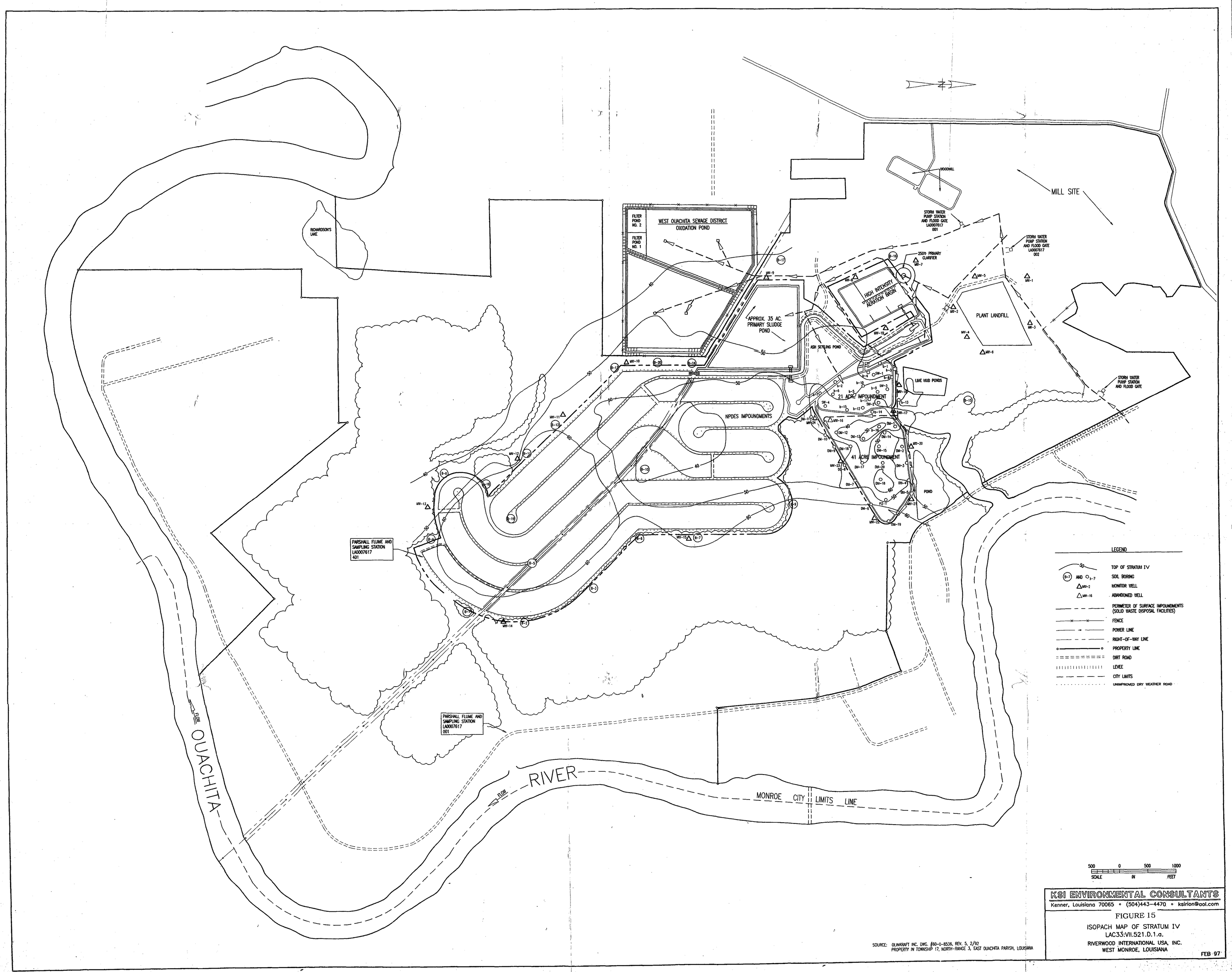
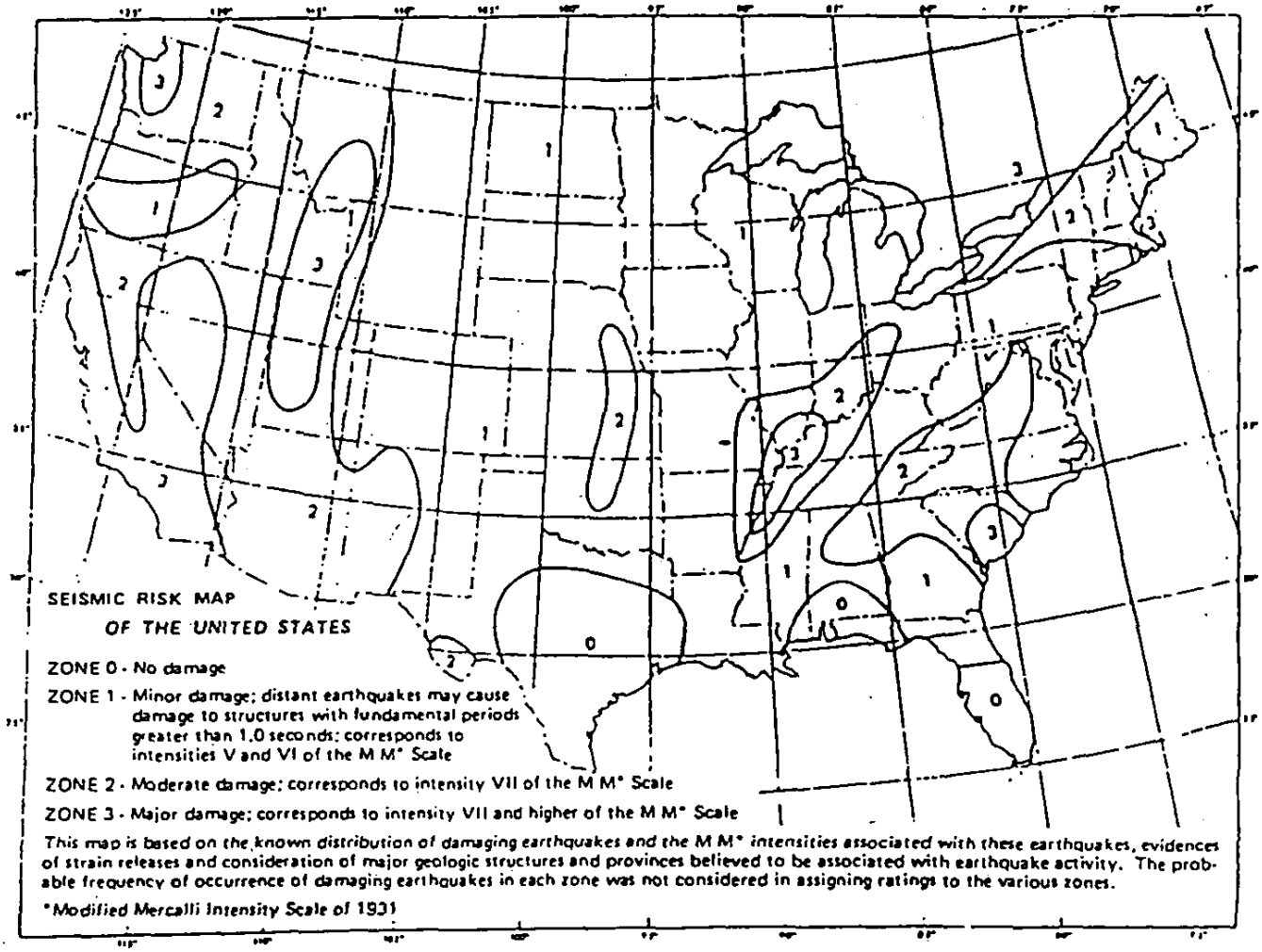

RICHARDSON'S LAKE
WEST OUACHITA SEWAGE DISTRICT
OXIDATION POND
FILTER POND NO. 2
FILTER POND NO. 1
APPROX. 35 AC. PRIMARY SLUDGE POND
ASH SETTLING POND
HIGH INTENSITY AERATION BASIN
2509 PRIMARY CLARIFIER
WOODMILL
MILL SITE
STORM WATER PUMP STATION AND FLOOD GATE LA0007617 001
STORM WATER PUMP STATION AND FLOOD GATE LA0007617 002
STORM WATER PUMP STATION AND FLOOD GATE
PLANT LANDFILL
LIME MUD PONDS
21 ACRE IMPOUNDMENT
41 ACRE IMPOUNDMENT
NPDES IMPOUNDMENTS
POND
PARSHALL FLUME AND SAMPLING STATION LA0007617 401
PARSHALL FLUME AND SAMPLING STATION LA0007617 001
FLOW
OUACHITA
RIVER
MONROE CITY LIMITS LINE
LEGEND
TOP OF STRATUM IV
SOIL BORING
MONITOR WELL
ABANDONED WELL
PERIMETER OF SURFACE IMPOUNDMENTS (SOLID WASTE DISPOSAL FACILITIES)
FENCE
POWER LINE
RIGHT-OF-WAY LINE
PROPERTY LINE
DIRT ROAD
LEVEE
CITY LIMITS
UNIMPROVED DRY WEATHER ROAD
500 0 500 1000
SCALE IN FEET
KSI ENVIRONMENTAL CONSULTANTS
Kenner, Louisiana 70065 • (504)443-4470 • ksirion@aol.com
FIGURE 15
ISOPACH MAP OF STRATUM IV
LAC33:VII.521.D.1.a.
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA
FEB 97
SOURCE: OLINKRAFT INC. DWG. #60-0-8536, REV. 5, 2/92
PROPERTY IN TOWNSHIP 17, NORTH-RANGE 3, EAST OUACHITA PARISH, LOUISIANA

FIGURE 16

SEISMIC IMPACT ZONE



DRAWING BASED ON SEISMIC MAP OF THE CONTIGUOUS UNITED STATES, UNIFORM BUILDING CODE BY INTERNATIONAL CONFERENCE OF BUILDING OFFICALS.

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ERM

DATE	11/93	W.O.NO.	183-14

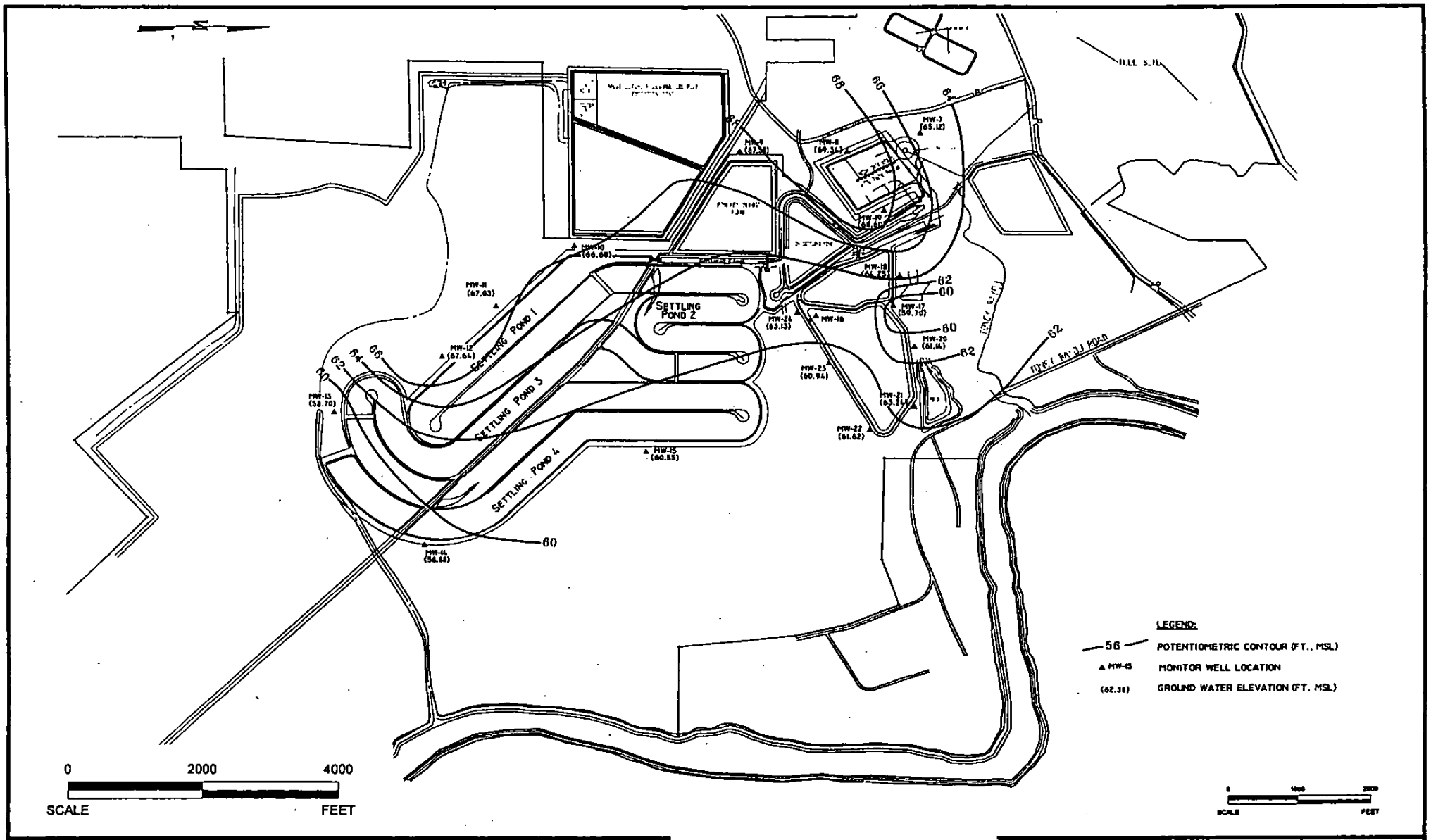
FIGURE 16

SEISMIC IMPACT ZONES
LAC33:VII.521.D.1.f.

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

FIGURE 17A

POTENTIOMETRIC SURFACE MAP – NPDES IMPOUNDMENT SYSTEM
NOVEMBER 17, 2003



ERM-Southwest, Inc.

HOUSTON · NEW ORLEANS · AUSTIN · MOBILE · BEAUMONT · BATON ROUGE · CORPUS CHRISTI

DESIGN: AGP	DRAWN: LAH/MHB	CHKD.: AGP
DATE: 02/03/04	SCALE: AS SHOWN	REV.:

W.O.NO.: 0014780A205 B04

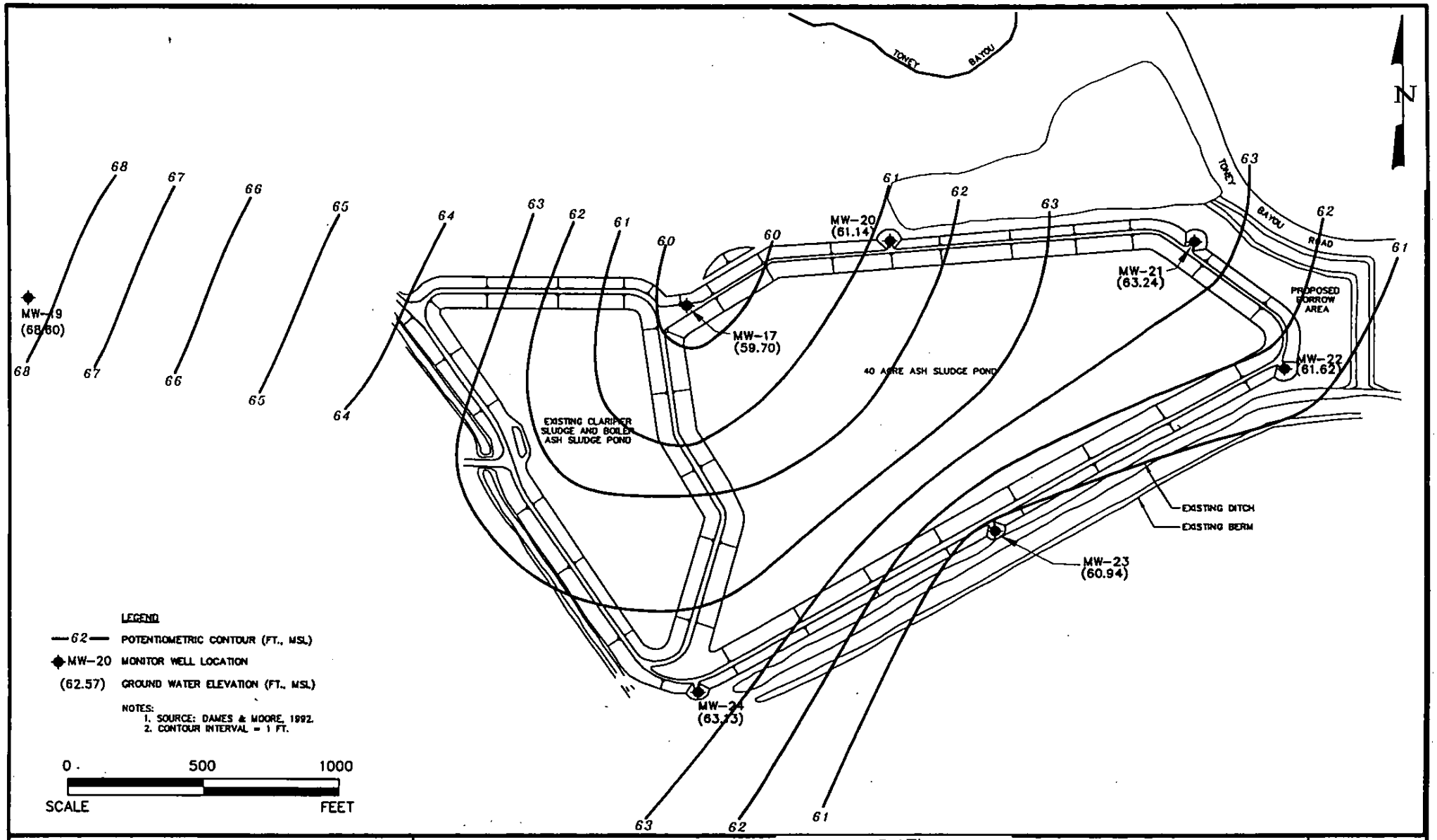
FIGURE 17a

POTENTIOMETRIC SURFACE MAP
NPDES IMPOUNDMENT SYSTEM
November 17, 2003
Graphic Packaging International, Incorporated
West Monrore, Louisiana

ERM

FIGURE 17B

POTENTIOMETRIC SURFACE MAP – 40 ACRE ASH SLUDGE POND
NOVEMBER 17, 2003



ERM-Southwest, Inc.

HOUSTON · NEW ORLEANS · AUSTIN · MOBILE · BEAUMONT · BATON ROUGE · CORPUS CHRISTI

DESIGN: AGP	DRAWN: MHB	CHKD.: CRH
DATE: 02/03/04	SCALE: AS SHOWN	REV.:

W.O. NO.: 0014280A206.B04

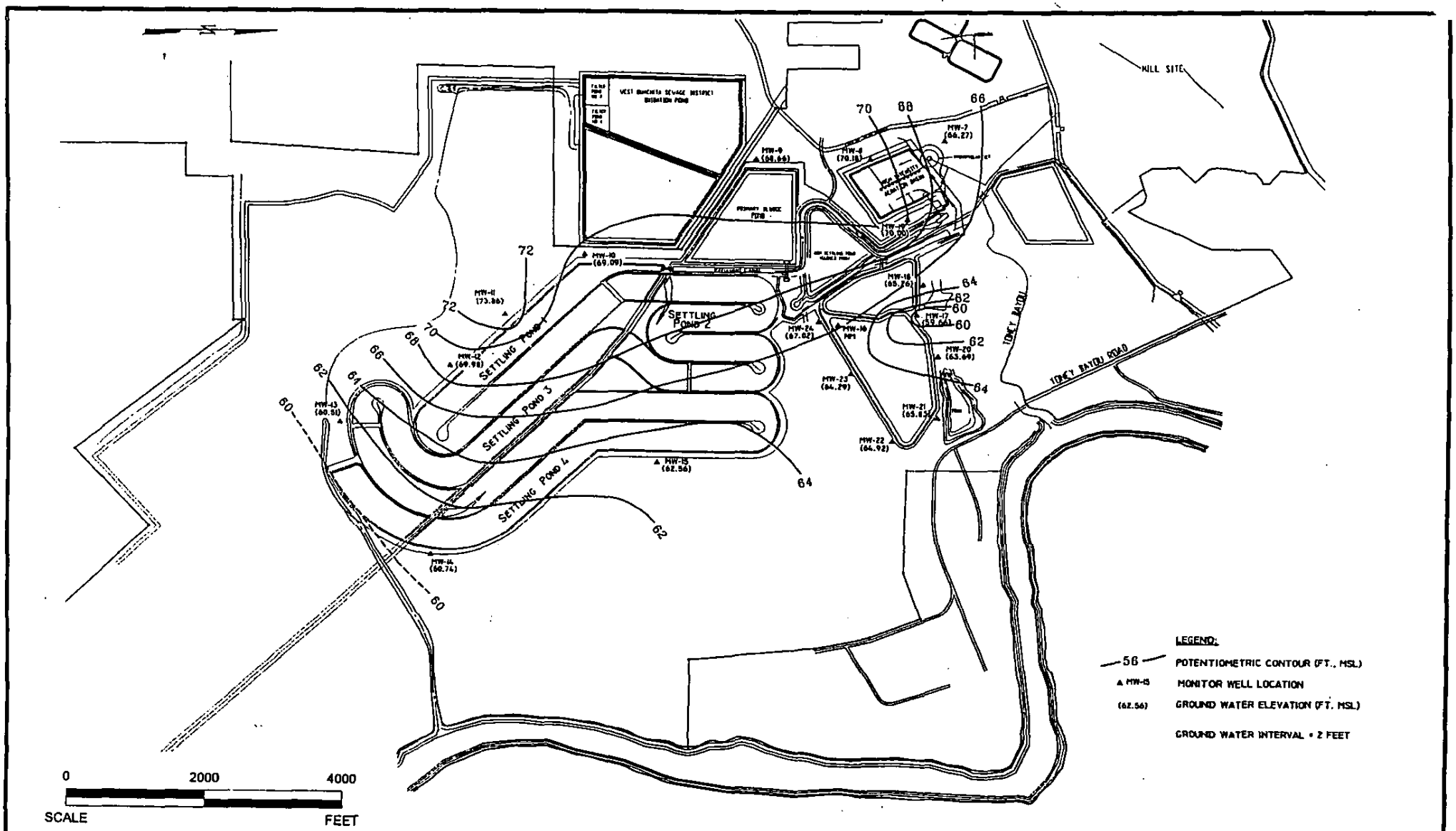
FIGURE 17b

POTENTIOMETRIC SURFACE MAP
40 ACRE ASH SLUDGE POND
November 17, 2003
Graphic Packaging International, Incorporated
West Monroe, Louisiana

ERM.

FIGURE 17C

POTENTIOMETRIC SURFACE MAP - NPDES IMPOUNDMENT SYSTEM
JUNE 7, 2004



ERM-Southwest, Inc.

HOUSTON · NEW ORLEANS · AUSTIN · MOBILE · BEAUMONT · BATON ROUGE · CORPUS CHRISTI

DESIGN: JPG/AGP	DRAWN: MHB	CHKD.: AGP
DATE: 07/22/04	SCALE: AS SHOWN	REV.:
W.O.NO.: 0018372A203 G04		

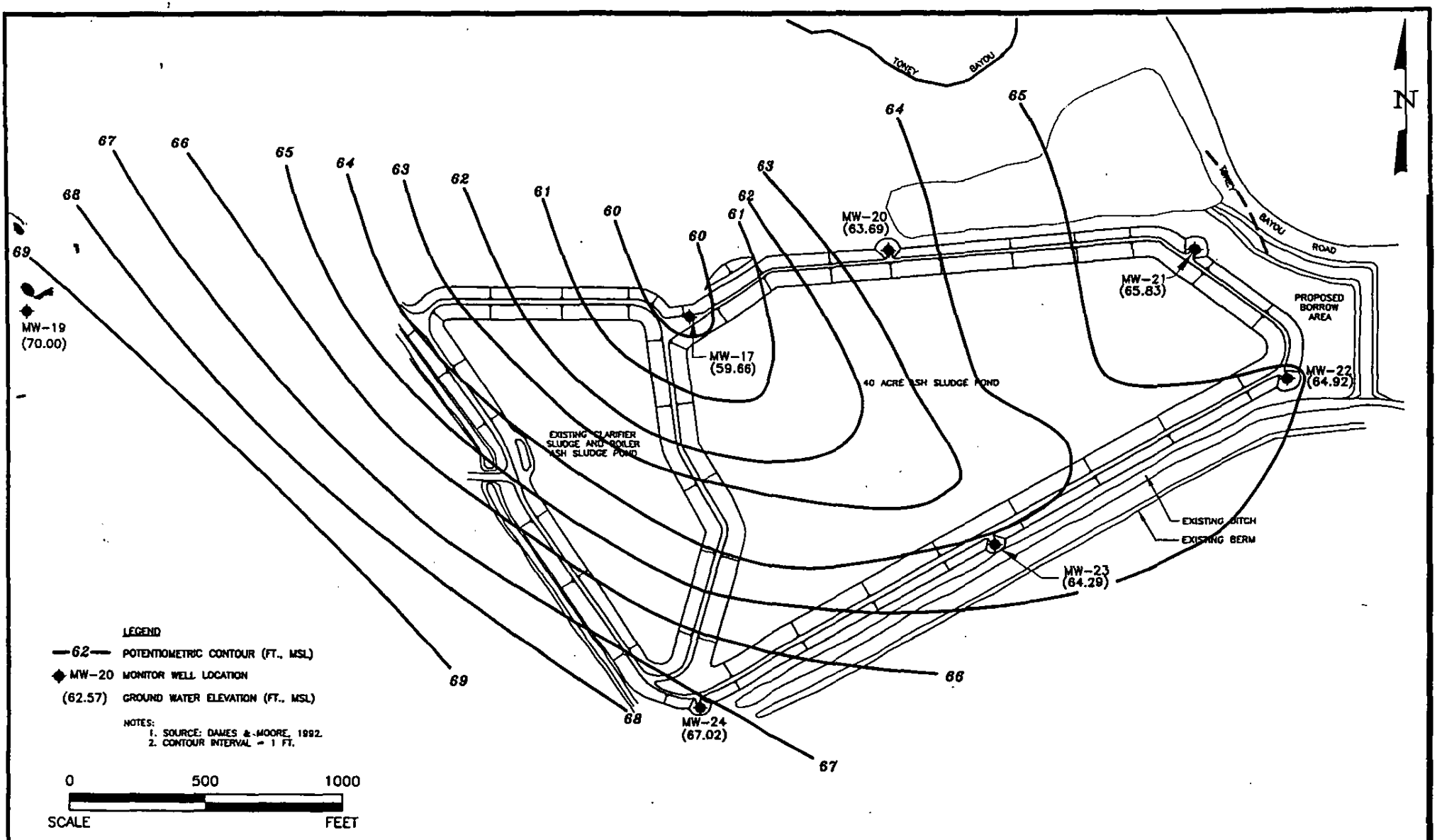
FIGURE 17c

POTENTIOMETRIC SURFACE MAP
NPDES IMPOUNDMENT SYSTEM
JUNE 7, 2004
Riverwood International, U.S.A.
West Monroe, Louisiana

ERM.

FIGURE 17D

POTENTIOMETRIC SURFACE MAP – 40 ACRE ASH SLUDGE POND
JUNE 7, 2004



ERM-Southwest, Inc.
HOUSTON · NEW ORLEANS · AUSTIN · MOBILE · BEAUMONT · BATON ROUGE · CORPUS CHRISTI

DESIGN: JPG/AGP	DRAWN: MHB	CHKD.: AGP
DATE: 07/22/04	SCALE: AS SHOWN	REV.:
W.O.NO.: 0018372A202 G04		

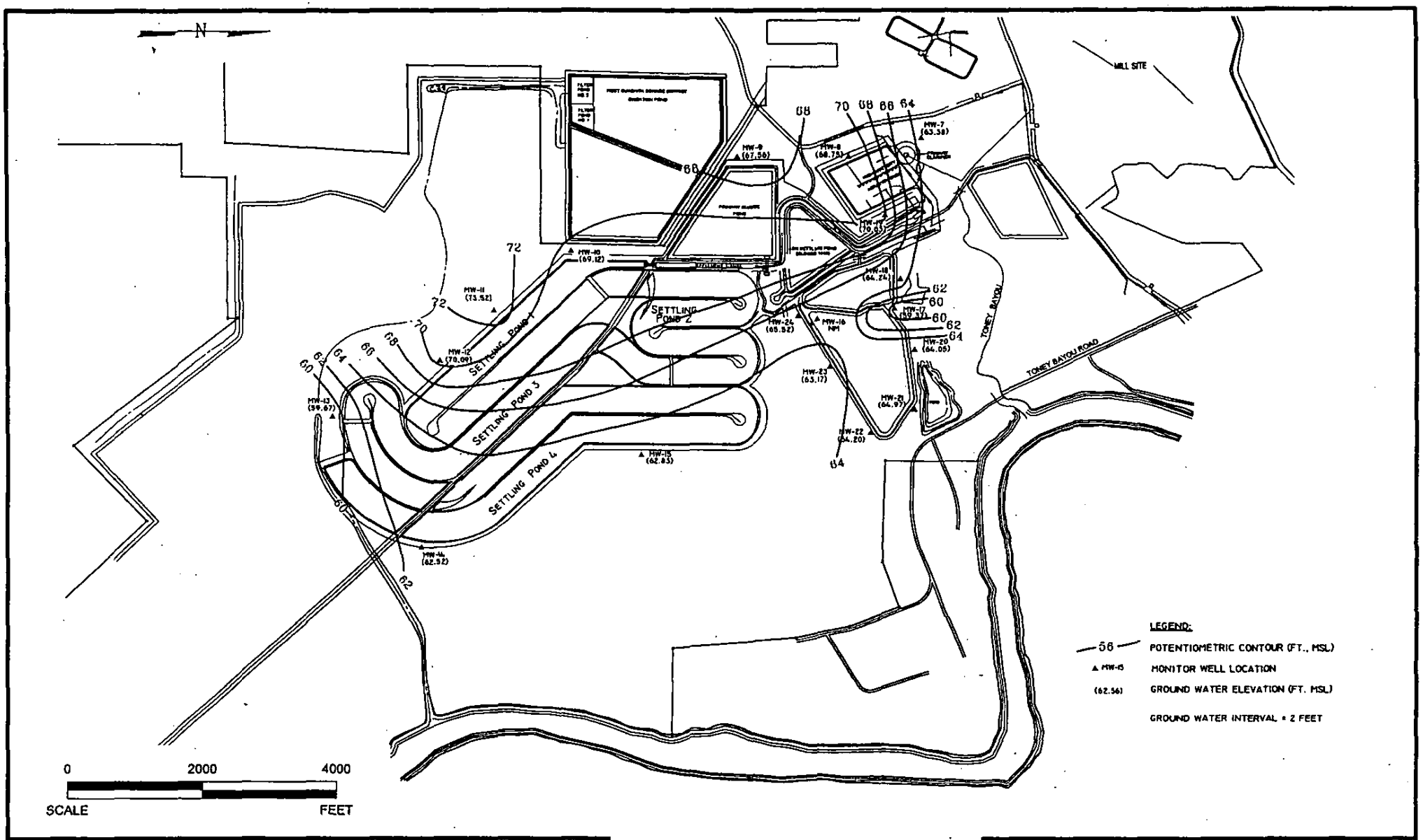
FIGURE 17d

POTENTIOMETRIC SURFACE MAP
40 ACRE ASH SLUDGE POND
JUNE 7, 2004
Riverwood International U.S.A., Inc
West Monroe, Louisiana

ERM

FIGURE 17E

POTENTIOMETRIC SURFACE MAP – NPDES IMPOUNDMENT SYSTEM
DECEMBER 2004



ERM-Southwest, Inc.
HOUSTON · NEW ORLEANS · AUSTIN · MOBILE · BEAUMONT · BATON ROUGE

DESIGN: JPG	DRAWN: MHB	CHKD.: JPG/CRH
DATE: 01/31/05	SCALE: AS SHOWN	REV.:
W.O.NO.: 0018372A205 A05		

FIGURE 17e

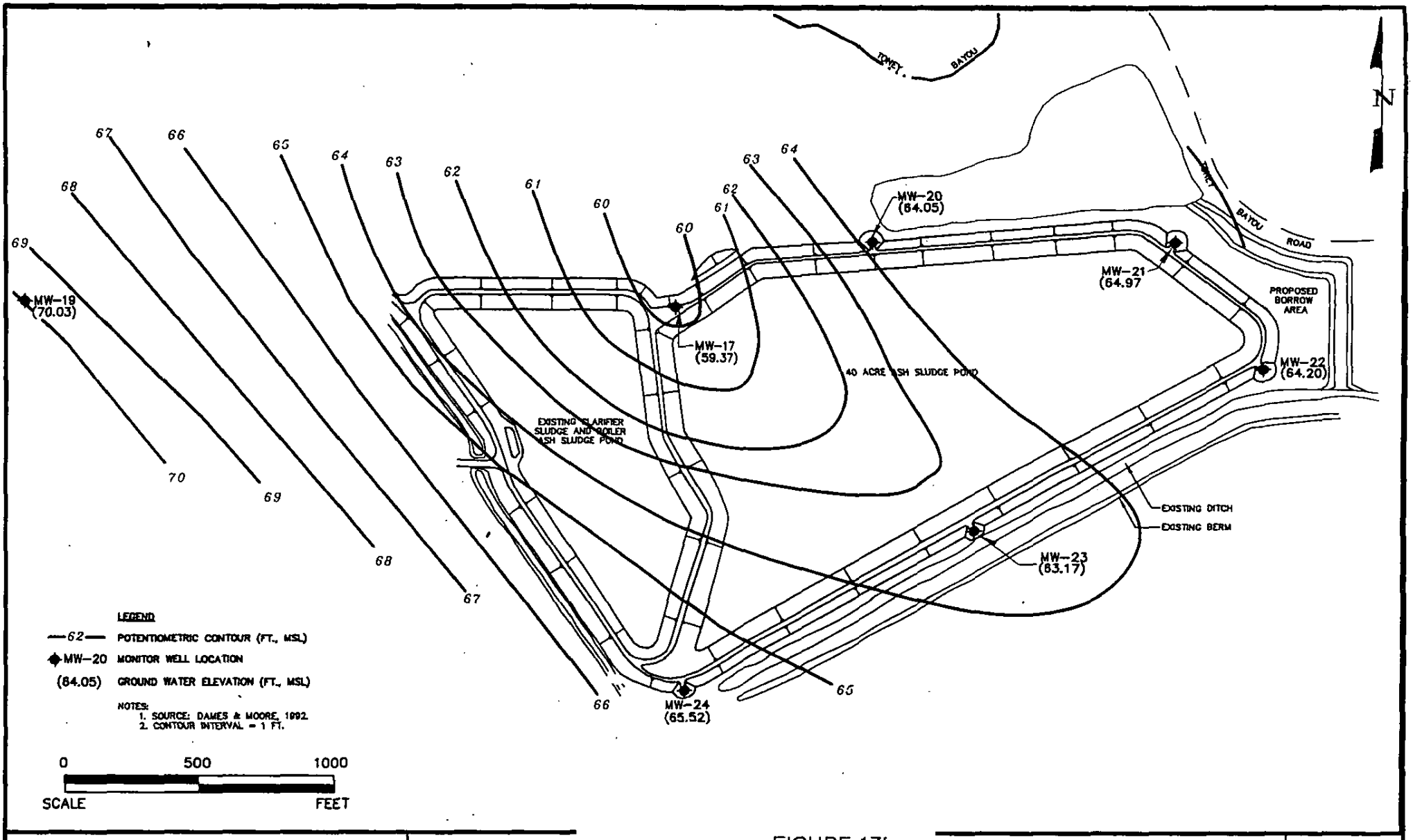
POTENTIOMETRIC SURFACE MAP
NPDES IMPOUNDMENT SYSTEM

Graphic Packaging International, Inc.
West Monroe, Louisiana

ERM

FIGURE 17F

POTENTIOMETRIC SURFACE MAP – 40 ACRE ASH SLUDGE POND
DECEMBER 2004



ERM-Southwest, Inc.
HOUSTON · NEW ORLEANS · AUSTIN · MOBILE · BEAUMONT · BATON ROUGE

DESIGN: JPG	DRAWN: MHB	CHKD.: JPG/CRH
DATE: 01/31/05	SCALE: AS SHOWN	REV.:
W.O.NO.: 0018377A206 A05		

FIGURE 17f

POTENTIOMETRIC SURFACE MAP
40 ACRE ASH SLUDGE POND

Graphic Packaging International, Inc.
West Monroe, Louisiana

ERM

FIGURE 17G

GROUNDWATER CONTOUR MAP
MARCH 30, 2005

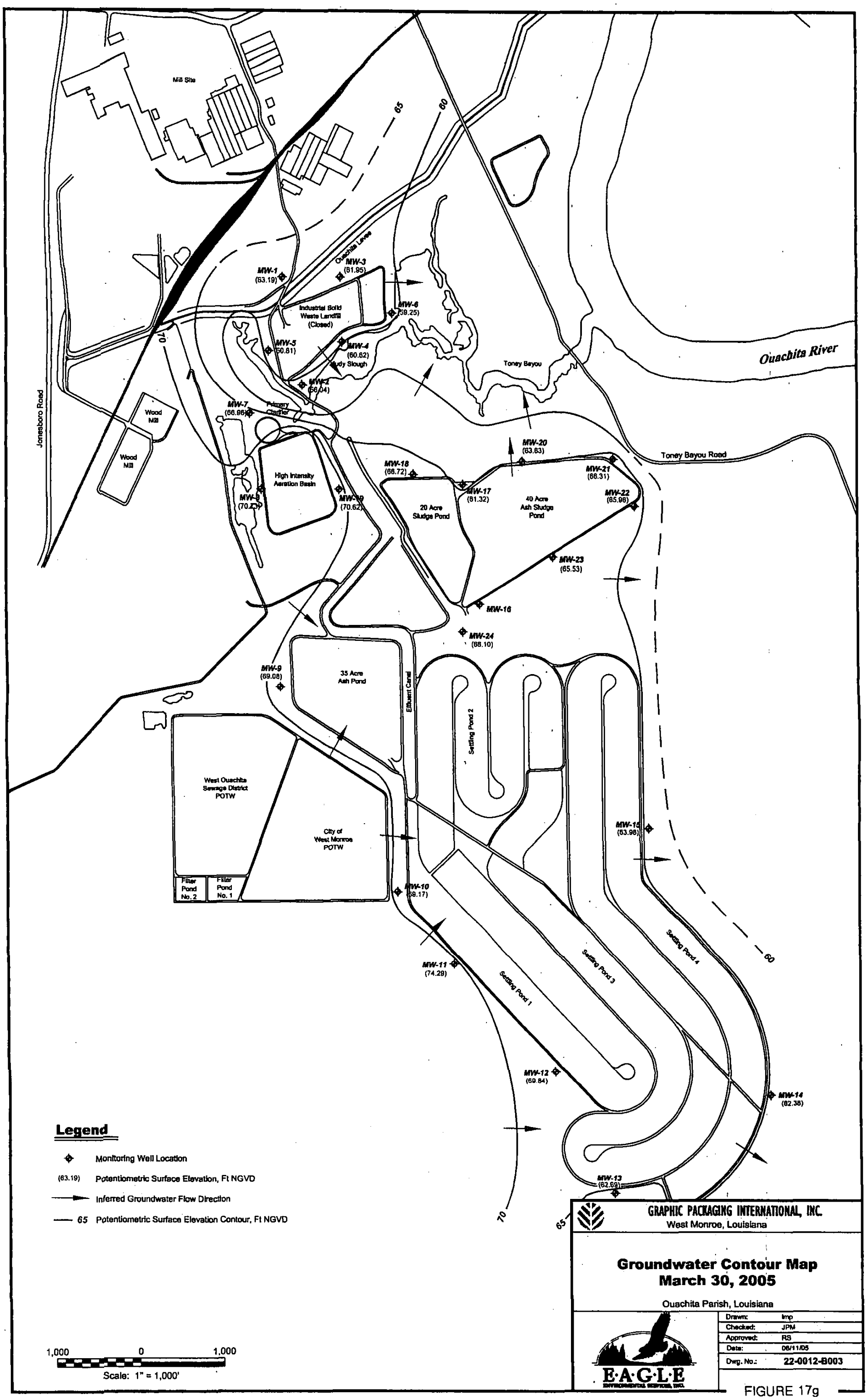
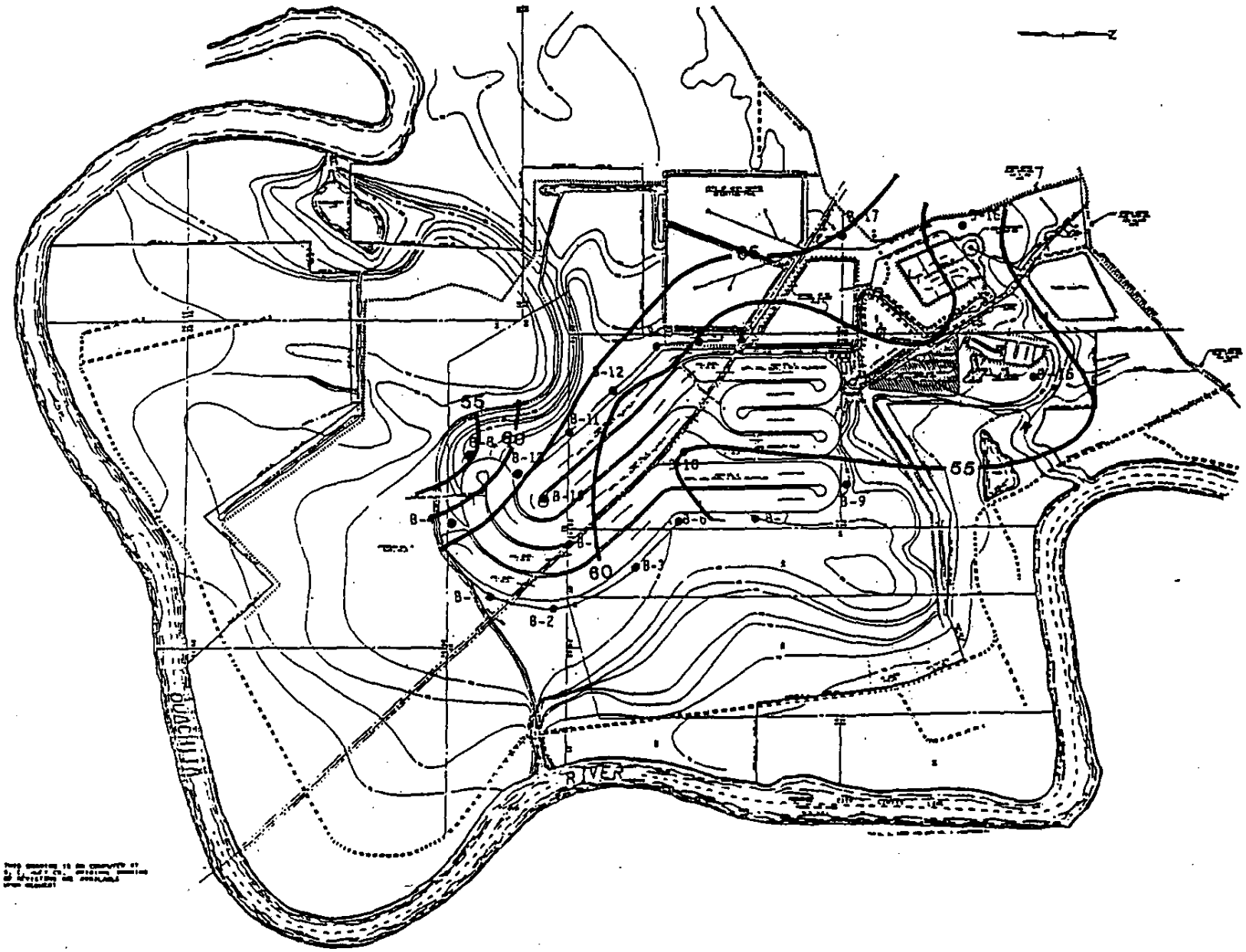

Mill Site
65
60
Ouachita Levee
MW-1
(63.19)
MW-3
(61.95)
Industrial Solid
Waste Landfill
(Closed)
MW-6
(59.25)
MW-5
(60.81)
MW-4
(60.62)
Mudy Slough
MW-2
(66.04)
Toney Bayou
Ouachita River
Jonesboro Road
Wood
Mill
Wood
Mill
MW-7
(66.96)
Primary
Clarifier
High Intensity
Aeration Basin
MW-8
(70.23)
MW-19
(70.62)
MW-18
(66.72)
MW-20
(63.83)
MW-21
(66.31)
Toney Bayou Road
MW-17
(61.32)
20 Acre
Sludge Pond
40 Acre
Ash Sludge
Pond
MW-22
(65.96)
MW-23
(65.53)
MW-16
MW-24
(68.10)
MW-9
(69.08)
35 Acre
Ash Pond
Effluent Canal
Settling Pond 2
West Ouachita
Sewage District
POTW
City of
West Monroe
POTW
Filter
Pond
No. 2
Filter
Pond
No. 1
MW-15
(63.98)
MW-10
(68.17)
MW-11
(74.29)
Settling Pond 1
Settling Pond 3
Settling Pond 4
60
MW-12
(69.84)
MW-14
(62.38)
MW-13
(62.69)
70
65
Legend
Monitoring Well Location
(63.19) Potentiometric Surface Elevation, Ft NGVD
Inferred Groundwater Flow Direction
65 Potentiometric Surface Elevation Contour, Ft NGVD
1,000 0 1,000
Scale: 1" = 1,000'
GRAPHIC PACKAGING INTERNATIONAL, INC.
West Monroe, Louisiana
Groundwater Contour Map
March 30, 2005
Ouachita Parish, Louisiana
Drawn: lmp
Checked: JPM
Approved: RS
Date: 06/11/05
Dwg. No.: 22-0012-B003
E·A·G·L·E

FIGURE 17g

FIGURE 18

PIEZOMETRIC ELEVATION SURFACE



ERM-Southwest, inc.
NEW ORLEANS, LOUISIANA HOUSTON, TEXAS

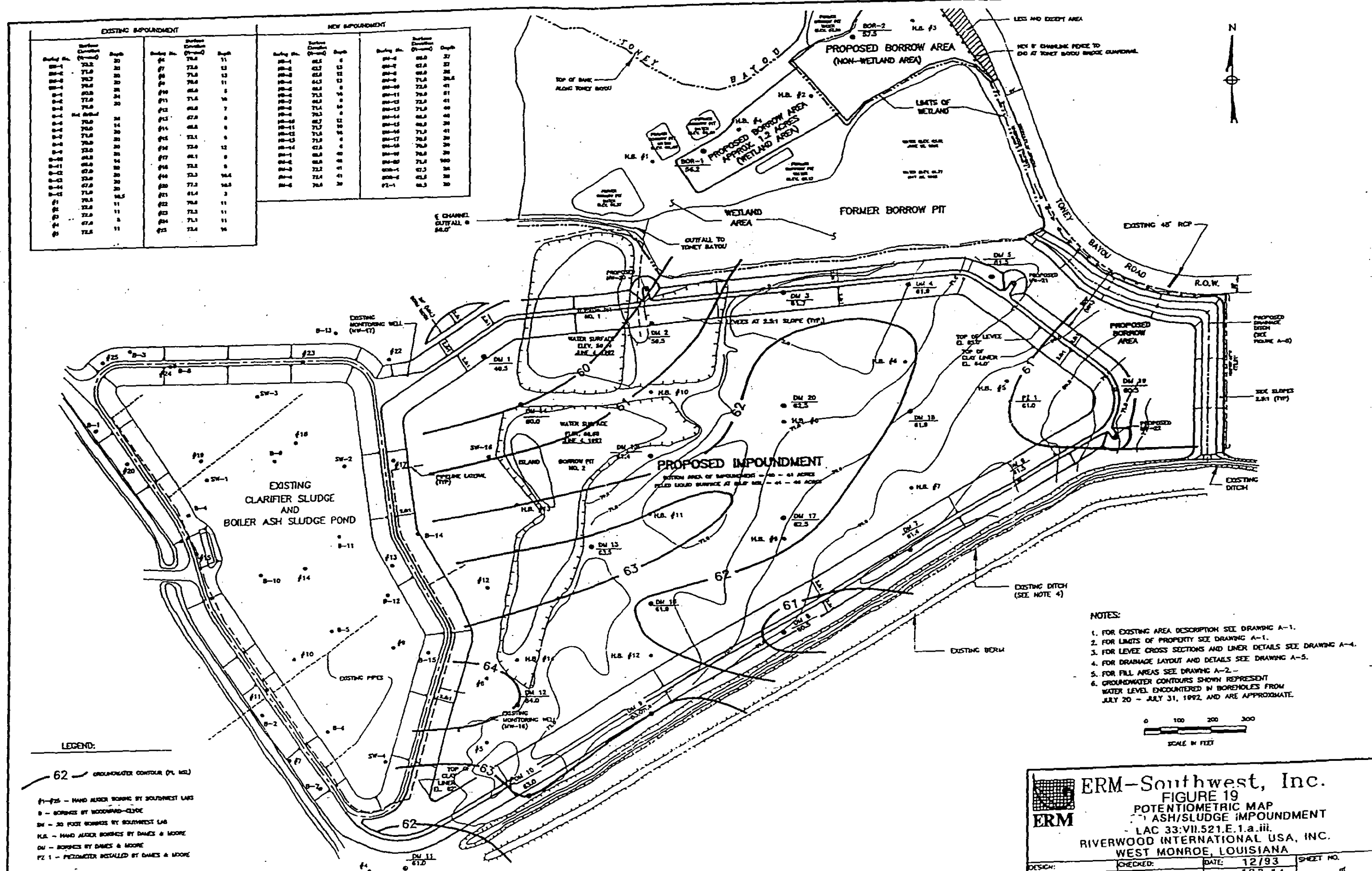
FIGURE 18

PIEZOMETRIC ELEVATION SURFACE

LAC 33-VII 521 E 1 a iii

FIGURE 19

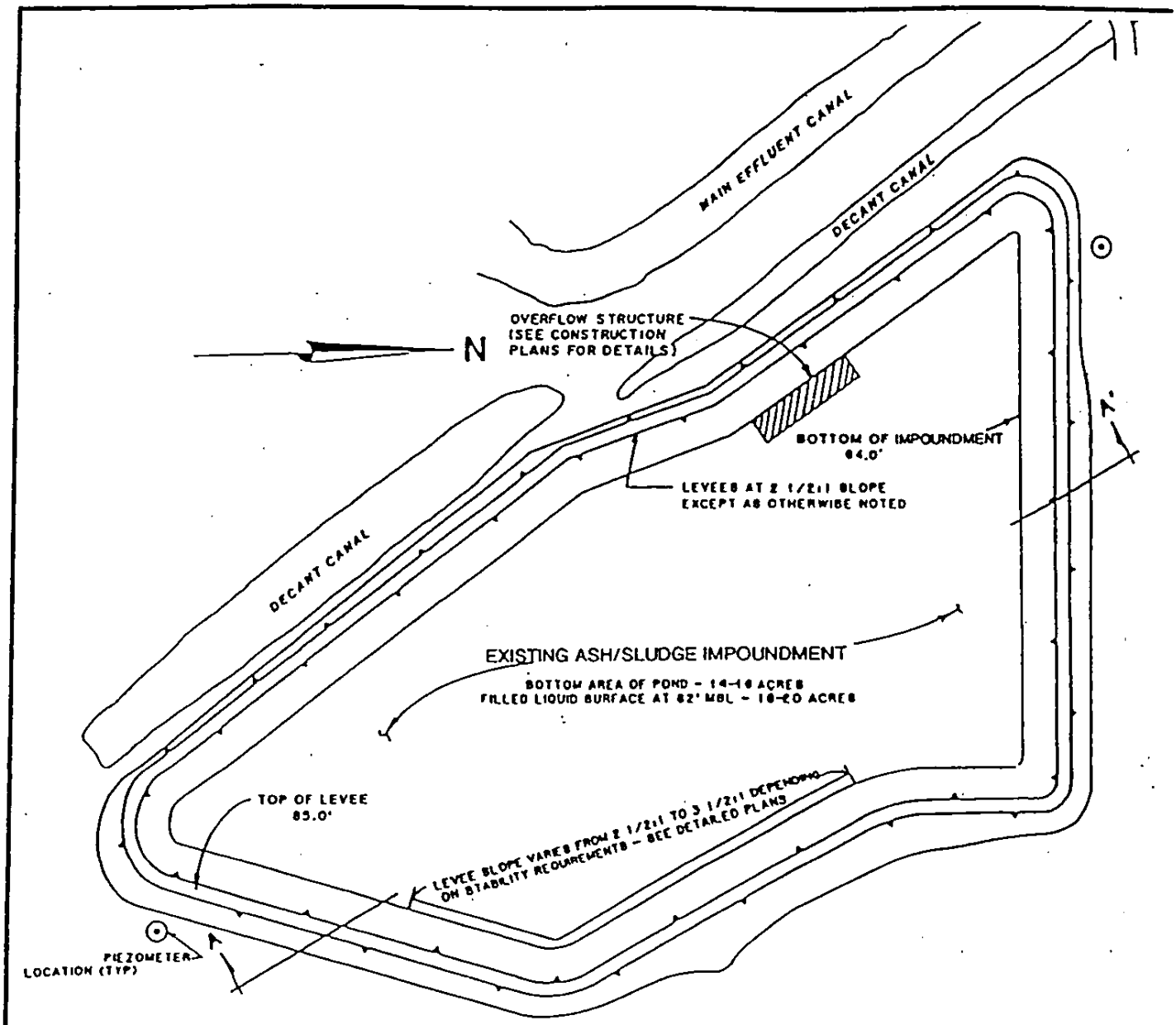
POTENTIOMETRIC MAP – 41-ACRE ASH/SUDGE IMPOUNDMENTS



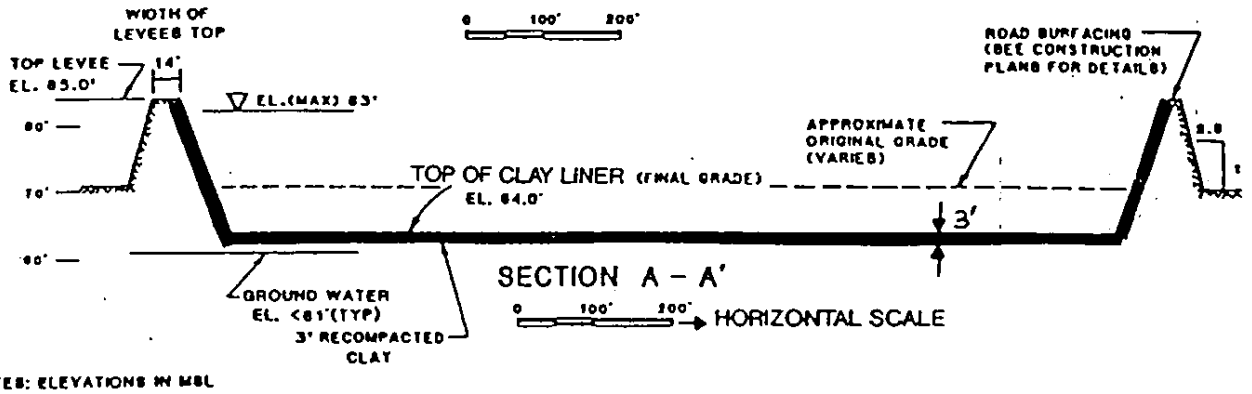
SOURCE: P-0244 PERMIT MODIFICATION FIGURE 5-3
(DAMES & MOORE PROJECT NO. 24379-002-137; NOVEMBER 23, 1992).

FIGURE 20

21-ACRE ASH/SLUDGE IMPOUNDMENT PLAN VIEW AND CROSS-SECTION



BOILER ASH/SLUDGE IMPOUNDMENT



NOTES: ELEVATIONS IN MSL

SOURCE: P-0244 PERMIT MODIFICATION FIGURE 6-1
(DAMES & MOORE PROJECT NO. 24379-002-137; NOVEMBER 23, 1992).

ERM-Southwest, Inc.
HOUSTON • NEW ORLEANS • AUSTIN • DALLAS • EL PASO
ERM

DATE 12/93 | W.O.NO. 183-14

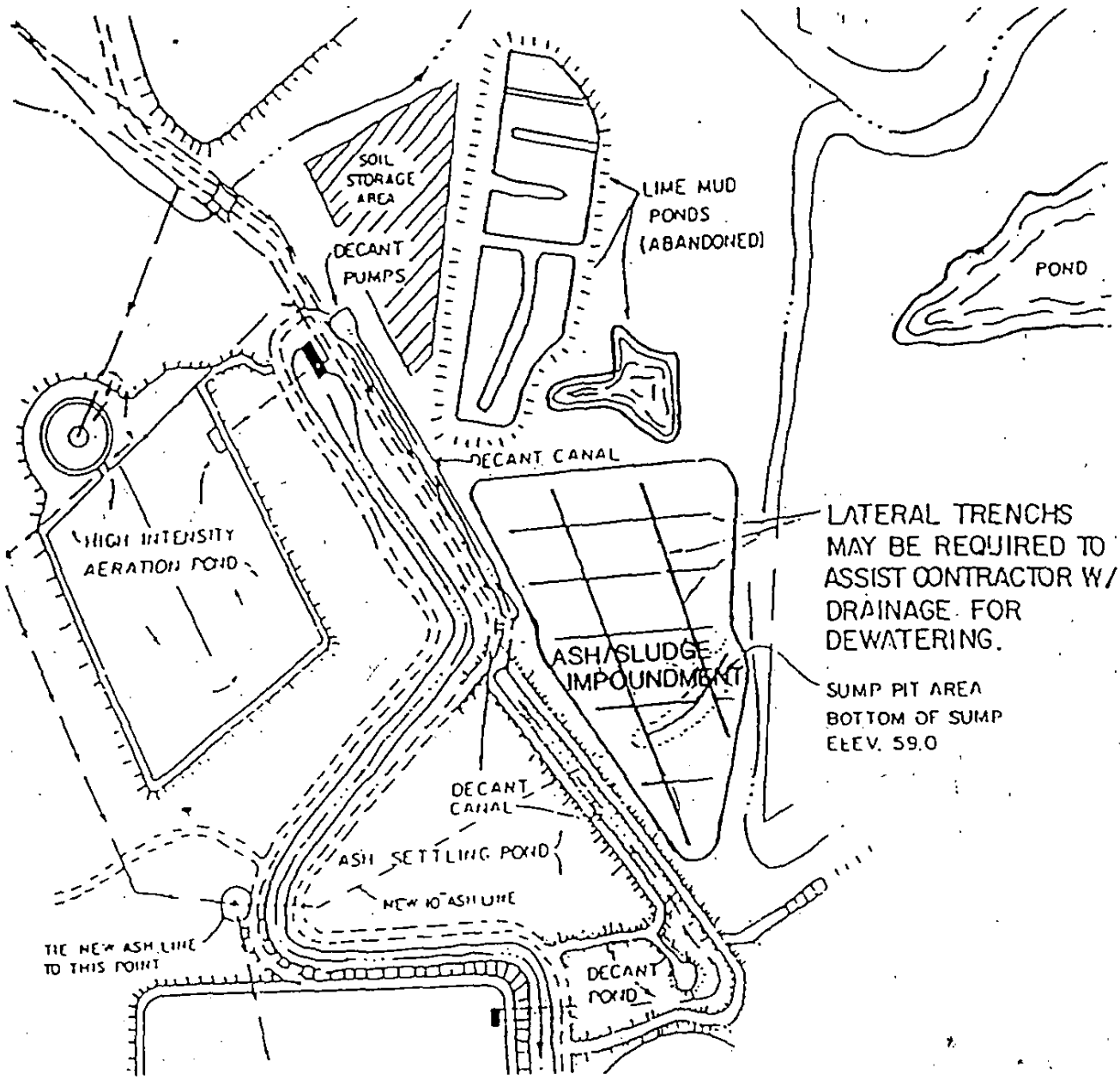
FIGURE 20

EXISTING ASH/SLUDGE IMPOUNDMENT
PLAN VIEW & CROSS-SECTION
LAC 33:VII.521.B.1.

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

FIGURE 21

TRENCHING REQUIREMENTS BELOW ELEVATION 65.0'



CLARIFIER SLUDGE AND BOILER ASH SLUICE IMPOUNDMENT

SOURCE: P-0244 PERMIT MODIFICATION FIGURE 6-2
(DAMES & MOORE PROJECT NO. 24379-002-137; NOVEMBER 23, 1992).

ERM-Southwest, Inc.
HOUSTON • NEW ORLEANS • AUSTIN • DALLAS • EL PASO
ERM

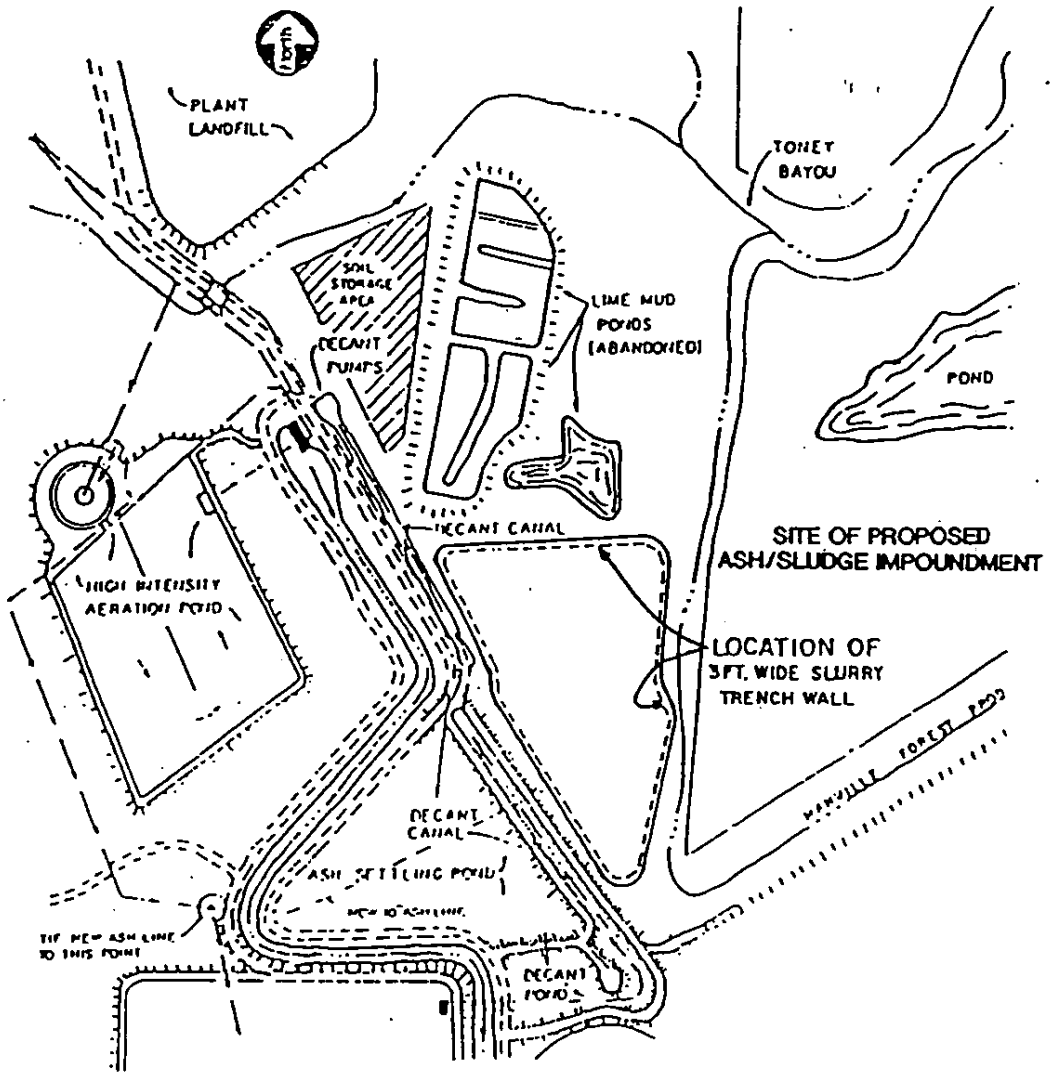
FIGURE 21

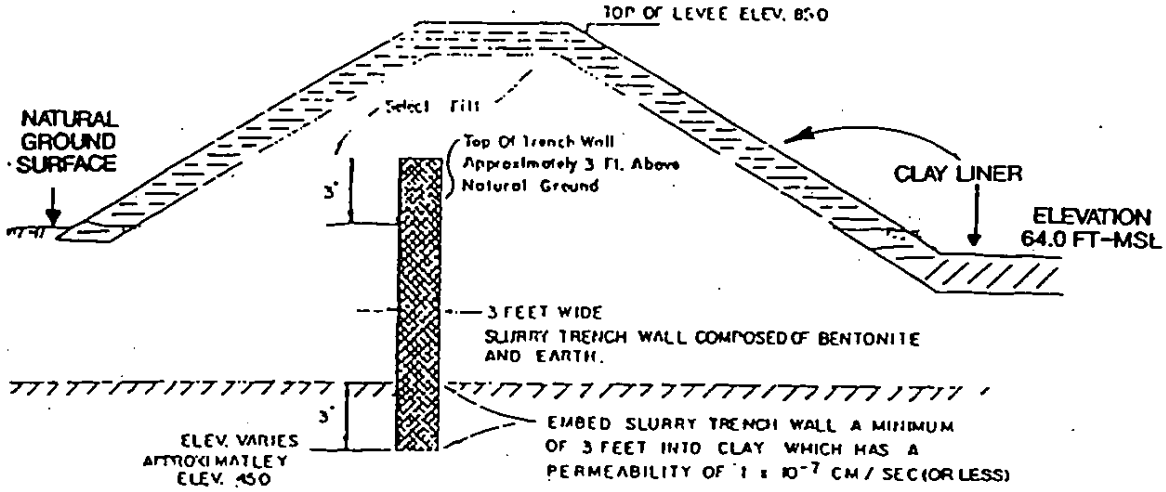
TRENCHING REQUIREMENTS BELOW ELEVATION 65.0'
LAC 33:VII.521.G.2.b.
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

DATE 12/93	W.O.NO. 183-14.

FIGURE 22

SLURRY WALL LOCATION AND SECTION





LEVEE SECTION

SOURCE: P-0244 PERMIT MODIFICATION FIGURE 6-3
(DAMES & MOORE PROJECT NO. 24379-002-137; NOVEMBER 23, 1992).

ERM–Southwest, Inc.
HOUSTON • NEW ORLEANS • AUSTIN • DALLAS • EL PASO
ERM

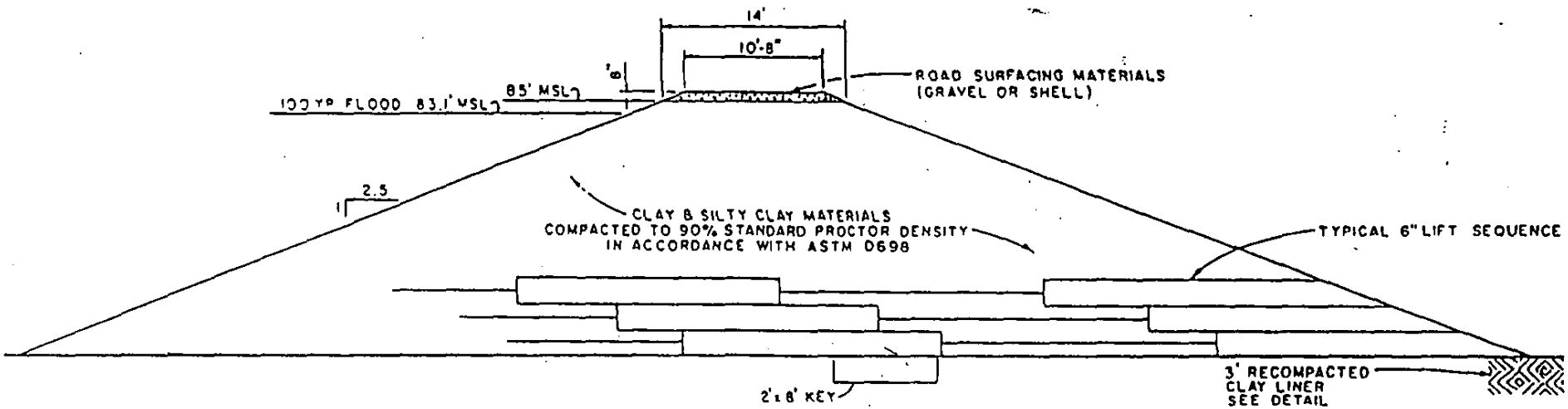
DATE 12/93 | W.O.NO. 183-14

FIGURE 22

SLURRY WALL LOCATION AND SECTION
LAC 33:VII.521.G.2.b.
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

FIGURE 23

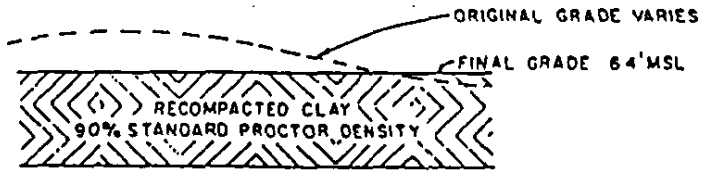
ASH/SLUDGE IMPOUNDMENT LEVEE CONSTRUCTION



DETAIL – LEVEE
1/8" = 1'-0"

NOTE

1. LEVEE EARTHWORK AVERAGE QUANTITIES:
   LOOSE FILL: 64.0 YD³ PER LINEAR FOOT OF LEVEE
   COMPACTED FILL: 47.4 YD³ PER LINEAR FOOT OF LEVEE
2. LIFT SEQUENCES WILL BE STAGGERED TO PREVENT SEEPAGE PLANES. IN ADDITION THE SURFACE WILL BE SCARIFIED BETWEEN LIFTS. THE SEQUENCING SHOWN HERE IS FOR ILLUSTRATIVE PURPOSES ONLY. ACTUAL LIFT SEQUENCING AND THICKNESS WILL BE DETERMINED BY THE FIELD ENGINEER.



DETAIL – CLAY LINER
1/4" = 1'-0"

SOURCE: P-0244 PERMIT MODIFICATION FIGURE 6-4
(DAMES & MOORE PROJECT NO. 24379-002-137; NOVEMBER 23, 1992).

ERM–Southwest, Inc.
HOUSTON • NEW ORLEANS • AUSTIN • DALLAS • EL PASO
ERM

DATE 12/93 | W.O.NO. 183-14

FIGURE 23

ASHSLUDGE IMPOUNDMENT
LEVEE CONSTRUCTION
LAC 33:VII.521.G.2.b.
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

APPENDIX B

PROOF OF THE SIGNATORY LEGAL AUTHORITY

DELEGATION OF AUTHORITY

The undersigned, being the President and Chief Executive Officer of Graphic Packaging International, Inc. ("GPI"), hereby appoints Mr. Gary Boettcher ("Mr. Boettcher") to be the undersigned's responsible official, responsible corporate officer, duly authorized representative, manager, and officially designated representative to sign and submit to the United States Environmental Protection Agency, the Louisiana Department of Environmental Quality, and any other appropriate governmental entity having jurisdiction, any and all permit applications, permit modifications, reports, compliance test results, or other documents required to be submitted to the aforesaid government entities relating to GPI's West Monroe, Louisiana paper mill operations. This delegation is intended to vest Mr. Boettcher with authority to act as the authorized signatory under all applicable federal and state regulatory programs, including without limitation Louisiana Administrative Code, Title 33, Parts I, III, V, VII, and IX, any federal equivalents, and 40 C.F.R. 370.1 *et seq.* Mr. Boettcher's authority further includes without limitation the authority to sign and submit the reports and documents listed in **Exhibit A.**

On behalf of GPI, Mr. Boettcher is authorized to act as, among other things, (1) a "responsible official" and "duly authorized representative" as defined in LAC 33:III.502, (2) as a "responsible corporate officer," "manager," and "duly authorized representative" as defined in LAC 33:IX.2503, (3) as a "responsible corporate officer," "manager," and "duly authorized representative" as defined in LAC 33:V.507, (4) as an authorized individual under LAC 33:VII.519.R, (5) and as a "senior management official" and "officially designated representative of the owner or operator" as defined in 40 C.F.R. 370.40(b), 370.41, and 372.85. A summary of Mr. Boettcher's authority and job responsibilities is set forth below.

Mr. Boettcher is the Vice President and Resident Manager for GPI's West Monroe, Louisiana paper mill facility ("the West Monroe Facility"). He is responsible for the overall operation of the West Monroe Facility, which employs more than 250 persons and has gross annual sales or expenditures exceeding $25,000,000.00 (in 2nd quarter 1980 dollars). Mr. Boettcher is authorized to make management decisions that govern the operation of the West Monroe Facility, including (1) the explicit or implicit duty of making capital investment recommendations and (2) initiating and directing other comprehensive measures to ensure long term environmental compliance with environmental laws and regulations. Mr. Boettcher is further able to ensure that the necessary systems are established or that actions have been taken to gather complete and accurate information for permit application requirements. As the Vice President and Resident Manager, Mr. Boettcher also has the authority to sign documents in accordance with corporate procedures. Mr. Boettcher is authorized to delegate all or a portion of the authority granted herein in appropriate cases.

This Delegation of Authority is granted and accepted effective the 23rd day of January, 2006 and shall remain in effect until revoked by me or my successor, or the employment relationship between GPI and Mr. Boettcher is terminated. A copy of this Delegation of Authority will be provided to the Louisiana Department of Environmental Quality.

Stephen M. Humphrey
President and Chief Executive Officer

Attest:

Printed Name: Roseann M. Alexander
Assistant Secretary

Accepted:

Gary Boettcher
Vice President and Resident Manager

Exhibit A

Annual Reports

- Tier II - (SARA 312).
- Toxic Release Inventory (TRI) - Form R - (SARA 313).
- Annual Emission Statement (AES) – Emission Inventory Statement (EIS).
- Toxic Emission Data Inventory (TEDI).
- Hazardous Waste Generation.
- Particulate Matter (PM) stack test #4Recovery Boiler and #5Recovery Boiler.
- Title V air permit Annual Compliance Certification (ACC).
- #4Recovery Boiler and #5Recovery Boiler natural gas usage.
- #4Recovery Boiler – precipitator stacks, boiler heat input from black liquor (BL) per month and 12 month rolling average for each month.
- #4Recovery Boiler Smelt Dissolving Tank Vent –Boiler black liquor solids (BLS) fired per month and 12 month rolling average for each month.
- Solid Waste Generator Report (West Monroe campus).
- Solid Waste Disposer Reports for Standard Permits No. P-0199 and P-0244.
- Landfill Cap Inspection Reports for Standard Permit No. P-0071 and Wildspur woodwaste disposal site.
- Multi-Sector General Permit Discharge Monitoring Reports (West Monroe Campus & Wildspur Satellite Woodyard).
- Total Trihalomethane and Haloacetic Acids (TTHM/HAA5) monitoring results for Drinking Water Systems A & B.

Semi-Annual Reports

- Title V air permit Semi-annual Monitoring report.
- Groundwater Monitoring Report (Standard Permits No. P-0071, P-0199, and P-0244).

Quarterly Reports

- Continuous Emission Monitor (CEM) report.
- Hazardous Waste generator's tax.
- #1 High Pressure Boiler Scrubber report.

Monthly Reports

- Discharge Monitoring Reports (DMRs) for NPDES Permit #LA0007617 and LWDPS Permit #WP1932.
- Monthly Operating Reports (chlorine residuals) for Drinking Water Systems A & B.

As Needed

- Cluster Rule MACT I gas collection system bypasses.
- Effluent system bypasses and releases to stormwater.
- Courtesy notifications and other environmental related matters as required or deemed appropriate.

APPENDIX C

ENVIRONMENTALLY SENSITIVE AREA DOCUMENTATION

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

January 19, 2007

Mr. Renee Pittman
Providence Engineering & Environmental Group LLC
1201 Main Street
Baton Rouge, LA 70802

Re: Providence Engineering Project No. 001-007

Dear Mr. Pittman,

I am in receipt of your solicitation of views request for the project for renewal of existing solid waste permit(s) for Graphic Packaging International, Inc., in Ouachita Parish, Louisiana.

The Division of Outdoor Recreation in the Louisiana Office of State Parks administers the Land and Water Conservation Fund program for Louisiana. In this capacity we compile an inventory of recreational sites within the state for publication in the Statewide Comprehensive Outdoor Recreation Plan (SCORP) published periodically. The most recent SCORP was published for the period of 2003-2008 with an inventory developed in 2003.

Based on the information provided, there does not appear to be any conflict regarding the renewal of existing permit(s) with existing recreational facilities identified in the most recent SCORP.

Sincerely,

Cleve Hardman
Director of Outdoor Recreation

RECEIVED
JAN 22 2007
PROVIDENCE ENGINEERING & ENVIRONMENTAL GROUP LLC

DEPARTMENT OF THE ARMY

VICKSBURG DISTRICT, CORPS OF ENGINEERS
4155 CLAY STREET
VICKSBURG, MISSISSIPPI 39183-3435

REPLY TO
ATTENTION OF:

January 23, 2007

Operations Division

SUBJECT: Graphic Packaging International, Incorporated - Solid Waste Permit Renewal, Type I Industrial Surface Impoundments, 1000 Jonesboro Road (LA Highway 34), West Monroe, Ouachita Parish, Louisiana; Providence Engineering Project No. 001-007

RECEIVED
JAN 26 2007
PROVIDENCE ENGINEERING & ENVIRONMENTAL GROUP LLC

Ms. Renee L. Pittman
Providence Engineering and
Environmental Group LLC
1201 Main Street
Baton Rouge, Louisiana 70802

Dear Ms. Pittman:

We received your correspondence, subject as above, on January 19, 2007. We are working diligently to reply to you in a timely manner. For ease of reference, we assigned your correspondence identification number MVK-2007-76. Please refer to this number should you write or call us about your request.

If you have any questions about the status of your request, please call this office at (601) 631-5064 or (601) 631-7071.

Sincerely,

Kenneth P. Mosley
Acting Chief, Regulatory Branch

State of Louisiana

KATHLEEN BABINEAUX BLANCO
GOVERNOR

DEPARTMENT OF WILDLIFE & FISHERIES
POST OFFICE BOX 98000
BATON ROUGE, LA 70898-9000
(225) 765-2800

BRYANT O. HAMMETT, JR.
SECRETARY

Date	January 30, 2007
Name	Renee L. Pittman
Company	Providence Engineering and Environmental Group
Street Address	1201 Main Street
City, State, Zip	Baton Rouge, LA 70802
Project	Graphic Packaging International, Inc. Solid Waste Permit Renewal Application Project No.: 001-007
Invoice Number	07013001

RECEIVED
FEB 1 2007
PROVIDENCE ENGINEERING & ENVIRONMENTAL GROUP LLC

Personnel of the Habitat Section of the Fur and Refuge Division have reviewed the preliminary data for the captioned project. After careful review of our database, no impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed project. No state or federal parks, wildlife refuges, scenic streams, or wildlife management areas are known at the specified site within Louisiana's boundaries.

The Louisiana Natural Heritage Program (LNHP) 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. LNHP requires that this office be acknowledged in all reports as the source of all data provided here. If at any time Heritage tracked species are encountered within the project area, please contact the LNHP Data Manager at 225-765-2643. If you have any questions, or need additional information, please call 225-765-2357.

Sincerely,

Nicole Lorenz for

Gary Lester, Coordinator
Natural Heritage Program

Ouachita Parish Fire Department

Chief Patrick Hemphill

P.O. Box 4343 . Monroe, Louisiana 71211-4343
(318) 325-1621 . FAX (318) 322-7139

Renee Pittman
Providence Engineering
1201 Main Street
Baton Rouge, LA 70802

Patrick Hemphill
Fire Chief
Ouachita Parish Fire Department

January 23, 2007

Dear Ms. Pittman,

Regarding you request for information concerning Graphic Packaging International in West Monroe, Louisiana (your project number 001-007):

Your question was in regard to the response capabilities of our department in the event of a hazardous waste incident at Graphic Packaging's facility at 1000 Jonesboro Road in West Monroe.

First, allow me to point out a misstatement in LRS 30:2157 to "meet the requirements of Section 472 of the Life Safety Code of the National Fire Protection Association". NFPA 472 *Standard for Professional Competence of Responders to Hazardous Materials Incidents* is a standard unto itself, and not a part of NFPA 101 *Life Safety Code*. This misrepresentation, of course, is not the fault of your firm, but an oversight by the drafters of the statute.

The Ouachita Parish Fire Department responds to all hazardous materials incidents within our jurisdiction in the role of a first responder, meeting the requirement of an awareness level response in NFPA 472. If the response requires operations or technicians level action, we are, under state law, required to notify the "authority having jurisdiction" – the Louisiana State Police. The situation would then be mitigated, with our assistance, under their direction.

If further clarification is needed, please feel free to contact me at 318-325-1621.

Sincerely,

Patrick Hemphill
Fire Chief

RECEIVED
JAN 28 2007
PROVIDENCE ENGINEERING & ENVIRONMENTAL GROUP LLC

PROVIDENCE
ENGINEERING & ENVIRONMENTAL GROUP LLC

1201 Main Street
Baton Rouge, LA 70802
(225) 766-7400

P.O. Box 31
Sulphur, LA 70664
(337) 528-0066

450 E. Pass Rd., #106
Gulfport, MS 39507
(228) 897-7676

1200 Walnut Hill Lane, #1000
Irving, TX 75038
(972) 550-9326

January 15, 2007

St. Francis Medical Center
309 Jackson Street
Monroe, Louisiana 71201
Attn: Mr. Mike Nolan

Ref: Request for Information
Graphic Packaging International, Inc.
Solid Waste Permit Renewal Application
Type I Industrial Surface Impoundments
Providence Engineering Project No. 001-007

Dear Mr. Nolan:

Graphic Packaging International, Inc. (Graphic Packaging) operates an industrial solid waste surface impoundment unit in accordance with the Louisiana Department of Environmental Quality (LDEQ) solid waste regulations. The facility is located at 1000 Jonesboro Road in West Monroe, Ouachita Parish, Louisiana. Currently, Graphic Packaging is applying for a renewal of the existing solid waste permit(s).

In accordance with R.S. 30:2157 of the Louisiana Revised Statutes, facilities seeking a solid waste permit from the LDEQ must obtain certification from the nearest hospital as to the hospital's ability to accept and treat patients contaminated with hazardous materials. Although the impoundments manage non-hazardous, industrial solid waste, this certification is required in the event that there is a hazardous waste incident associated with the surface impoundments.

Please respond with a letter to this address certifying that the St. Francis Medical Center has the ability to treat and will treat patients that have been exposed to hazardous materials from Graphic Packaging. A copy of the referenced statue is enclosed for your review.

Thank you for your assistance in this matter. If you have any questions, please do not hesitate to call me at (225) 766-7400.

Sincerely,
Providence Engineering and Environmental Group LLC

Renee L. Pittman

Renee L. Pittman

Enclosure: As stated

001-007-005DK

RS 30:2157

§2157. Emergency response standards

A. Prior to the issuance of the permit, an applicant for a solid waste disposal facility shall review and consider the ability of the local emergency response agencies and medical care facilities to respond to a hazardous material incident at the facility subject to the permit.

B. The applicant shall obtain certification from the local fire department as to whether or not that department has the ability to meet the response requirements of Section 472 of the Life Safety Code of the National Fire Protection Association. The applicant shall obtain certification from the local emergency medical services agency as to whether or not that agency has the ability to meet the response requirements of Section 473 of the Life Safety Code of the National Fire Protection Association. The applicant shall obtain certification from the local hospital as to whether they are able to accept and treat patients who are contaminated with hazardous materials.

C. In the event any such agency or hospital cannot certify that it is able to meet the requirements referenced in Subsection B of this Section, the applicant shall identify in the permit application the closest fire department, emergency medical service and hospital that can provide the services listed in Subsection B above. The department shall review and consider these agencies and hospitals to be the emergency response agencies and medical care facilities to respond to a hazardous material incident at the facility as a condition of the permit.

D. The requirements of this Section shall not apply if the applicant has the ability to meet the response requirements of Section 472 of the Life Safety Code of the National Fire Protection Association.

Acts 1997, No. 345,§ 1, eff. June 20, 1997.

PROVIDENCE
ENGINEERING & ENVIRONMENTAL GROUP LLC

1201 Main Street
Baton Rouge, LA 70802
(225) 766-7400

P.O. Box 31
Sulphur, LA 70664
(337) 528-0066

450 E. Pass Rd., #106
Gulfport, MS 39507
(228) 897-7676

1200 Walnut Hill Lane, #1000
Irving, TX 75038
(972) 550-9326

January 15, 2007

Ouachita Parish Fire Department
1000 New Natchitoches Road
West Monroe, LA 71291
Attn: Chief Patrick Hemphill

Ref: Request for Information
Graphic Packaging International, Inc.
Solid Waste Permit Renewal Application
Type I Industrial Surface Impoundments
Providence Engineering Project No. 001-007

Dear Chief Hemphill:

Graphic Packaging International, Inc. (Graphic Packaging) operates an industrial solid waste surface impoundment unit in accordance with the Louisiana Department of Environmental Quality (LDEQ) solid waste regulations. The facility is located at 1000 Jonesboro Road in West Monroe, Ouachita Parish, Louisiana. Currently, Graphic Packaging is applying for a renewal of the existing solid waste permit(s).

As part of the application process and in accordance with R.S. 30:2157 of the Louisiana Revised Statutes, facilities seeking a solid waste permit from the LDEQ must obtain certification from the local fire department as to the department's ability to respond to emergency situations at the facility and as to whether or not the fire department has the ability to meet the response requirements of Section 472 of the Life Safety Code of the National Fire Protection Association. Although the impoundments manage non-hazardous, industrial solid waste, this certification is required in the event that there is a hazardous waste incident associated with the surface impoundment unit. A copy of the revised statute is enclosed for your review.

Please respond with a letter to this address certifying that the Ouachita Parish Fire Department will respond to emergency situations at Graphic Packaging and can meet the response requirements of Section 472 of the Life Safety Code of the National Fire Protection Association.

Thank you for your assistance in this matter. If you have any questions, please do not hesitate to call me at (225) 766-7400.

Sincerely,
Providence Engineering and Environmental Group LLC

Renee L. Pittman

Renee L. Pittman

Enclosure: As stated

001-007-005DK

RS 30:2157

§2157. Emergency response standards

A. Prior to the issuance of the permit, an applicant for a solid waste disposal facility shall review and consider the ability of the local emergency response agencies and medical care facilities to respond to a hazardous material incident at the facility subject to the permit.

B. The applicant shall obtain certification from the local fire department as to whether or not that department has the ability to meet the response requirements of Section 472 of the Life Safety Code of the National Fire Protection Association. The applicant shall obtain certification from the local emergency medical services agency as to whether or not that agency has the ability to meet the response requirements of Section 473 of the Life Safety Code of the National Fire Protection Association. The applicant shall obtain certification from the local hospital as to whether they are able to accept and treat patients who are contaminated with hazardous materials.

C. In the event any such agency or hospital cannot certify that it is able to meet the requirements referenced in Subsection B of this Section, the applicant shall identify in the permit application the closest fire department, emergency medical service and hospital that can provide the services listed in Subsection B above. The department shall review and consider these agencies and hospitals to be the emergency response agencies and medical care facilities to respond to a hazardous material incident at the facility as a condition of the permit.

D. The requirements of this Section shall not apply if the applicant has the ability to meet the response requirements of Section 472 of the Life Safety Code of the National Fire Protection Association.

Acts 1997, No. 345,§ 1, eff. June 20, 1997.

PROVIDENCE
ENGINEERING & ENVIRONMENTAL GROUP LLC

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450 E. Pass Rd., #106
Gulfport, MS 39507
(228) 897-7676

1200 Walnut Hill Lane, #1000
Irving, TX 75038
(972) 550-9326

January 15, 2007

American Medical Response
607 N. 3rd Street
Monroe, Louisiana 71201
Attn: Administrative Assistant

Ref: Request for Information
Graphic Packaging International, Inc.
Solid Waste Permit Renewal Application
Type I Industrial Surface Impoundments
Providence Engineering Project No. 001-007

Dear Sir or Madam:

Graphic Packaging International, Inc. (Graphic Packaging) operates an industrial solid waste surface impoundment unit in accordance with the Louisiana Department of Environmental Quality (LDEQ) solid waste regulations. The facility is located at 1000 Jonesboro Road in West Monroe, Ouachita Parish, Louisiana. Currently, Graphic Packaging is applying for a renewal of the existing solid waste permit(s).

As part of the application process and in accordance with R.S. 30:2157 of the Louisiana Revised Statutes, facilities seeking a solid waste permit from the LDEQ must obtain certification from the local emergency medical services agency as to its ability to respond to emergency situations at the facility and as to whether or not it has the ability to meet the response requirements of Section 473 of the Life Safety Code of the National Fire Protection Association. Although the impoundments manage non-hazardous, industrial solid waste, this certification is required in the event that there is a hazardous waste incident associated with the surface impoundment unit. A copy of the revised statute is enclosed for your review.

Please respond with a letter to this address certifying that Acadian Ambulance Service will respond to emergency situations at Graphic Packaging and can meet the response requirements of Section 473 of the Life Safety Code of the National Fire Protection Association.

Thank you for your assistance in this matter. If you have any questions, please do not hesitate to call me at (225) 766-7400.

Sincerely,
Providence Engineering and Environmental Group LLC

Renee L. Pittman

Renee L. Pittman

Enclosure: As stated

001-007-005PK

RS 30:2157

§2157. Emergency response standards

A. Prior to the issuance of the permit, an applicant for a solid waste disposal facility shall review and consider the ability of the local emergency response agencies and medical care facilities to respond to a hazardous material incident at the facility subject to the permit.

B. The applicant shall obtain certification from the local fire department as to whether or not that department has the ability to meet the response requirements of Section 472 of the Life Safety Code of the National Fire Protection Association. The applicant shall obtain certification from the local emergency medical services agency as to whether or not that agency has the ability to meet the response requirements of Section 473 of the Life Safety Code of the National Fire Protection Association. The applicant shall obtain certification from the local hospital as to whether they are able to accept and treat patients who are contaminated with hazardous materials.

C. In the event any such agency or hospital cannot certify that it is able to meet the requirements referenced in Subsection B of this Section, the applicant shall identify in the permit application the closest fire department, emergency medical service and hospital that can provide the services listed in Subsection B above. The department shall review and consider these agencies and hospitals to be the emergency response agencies and medical care facilities to respond to a hazardous material incident at the facility as a condition of the permit.

D. The requirements of this Section shall not apply if the applicant has the ability to meet the response requirements of Section 472 of the Life Safety Code of the National Fire Protection Association.

Acts 1997, No. 345,§ 1, eff. June 20, 1997.

PARISH DEVELOPMENT PERMIT APPLICATION

OUACHITA PARISH POLICE JURY
Ouachita Parish, Louisiana

APPLICATION FOR DEVELOPMENT PERMIT

Date: August 26, 1992 No. _____

1. Name of Applicant: Riverwood International USA, Inc.

   Address: 1000 Jonesboro Road, West Monroe, LA 71294

   Telephone: (318) 362-2436

   Check as applicable: Owner: XX Developer: _____ Other: _____

2. Name of Development: Proposed Impoundment

3. Location: Section 11 Township 17N

   Range 3E Other _____

   Street Address: _____
   (If applicable)

   Attach copy of legal description of property.(See Exhibit 1)

4. Development Area (Acres): 41 Acres

5. Description of Development: Diked Impoundment for Wastewater Treatment

6. List of Proposed Improvements:

   1. Impoundment

   2. East Ditch

7. Description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of the proposed development:

Upper portion of Toney Bayou will be filled. Runoff will be diverted through New Ditch along East side of impoundment to pond north of impoundment. Runoff will overflow pond to Toney Bayou.

8. Describe any impact which the proposed development would have on flooding conditions in upstream, downstream and adjacent areas:

Flood stage and floodway width for 100-year flood were calculted using HEC-2 software Drawings 1 and 2 depict cross-sections for floodway width calculations. Table 1 compares calculations without and with proposed impoundment. Impoundment does not change flood stage. Floodway width is increased only at impoundment

9. Additional comments:

Proposed impoundment is located within Zone A of FIRM 220135 0100 A (July 2, 1980) New FIRM is being prepared by a consultant for FEMA. Preliminary map indicates that the area will be designated as Zone AE on the updated FIRM. HEC-2 Model was obtained from consultant. Three cross-sections were added to depict existing impoundments and proposed impoundment. Floodway width and flood stage calculations were compared (Table 1) to evaluate impact of proposed impoundment.

10. List of Attached Exhibits:

1. Property map and legal description
2. Drawings 1 and 2: Locations of cross-sections
3. HEC-2 output file (RVRWD1.OUT) - Current conditions
4. HEC-2 output file (RVRD2.OUT) - With proposed impoundment
5. Table 1: Summary of Calcualtions

Joseph Buller Jr

Submitted By: Joseph Buller, JR., P.E. Date: August 26, 1992

Senior Engineer, Dames & Moore

FOR OFFICIAL'S USE ONLY

Date Received: _____ By: _____

Comments: _____

_____

_____

_____

_____

_____

_____

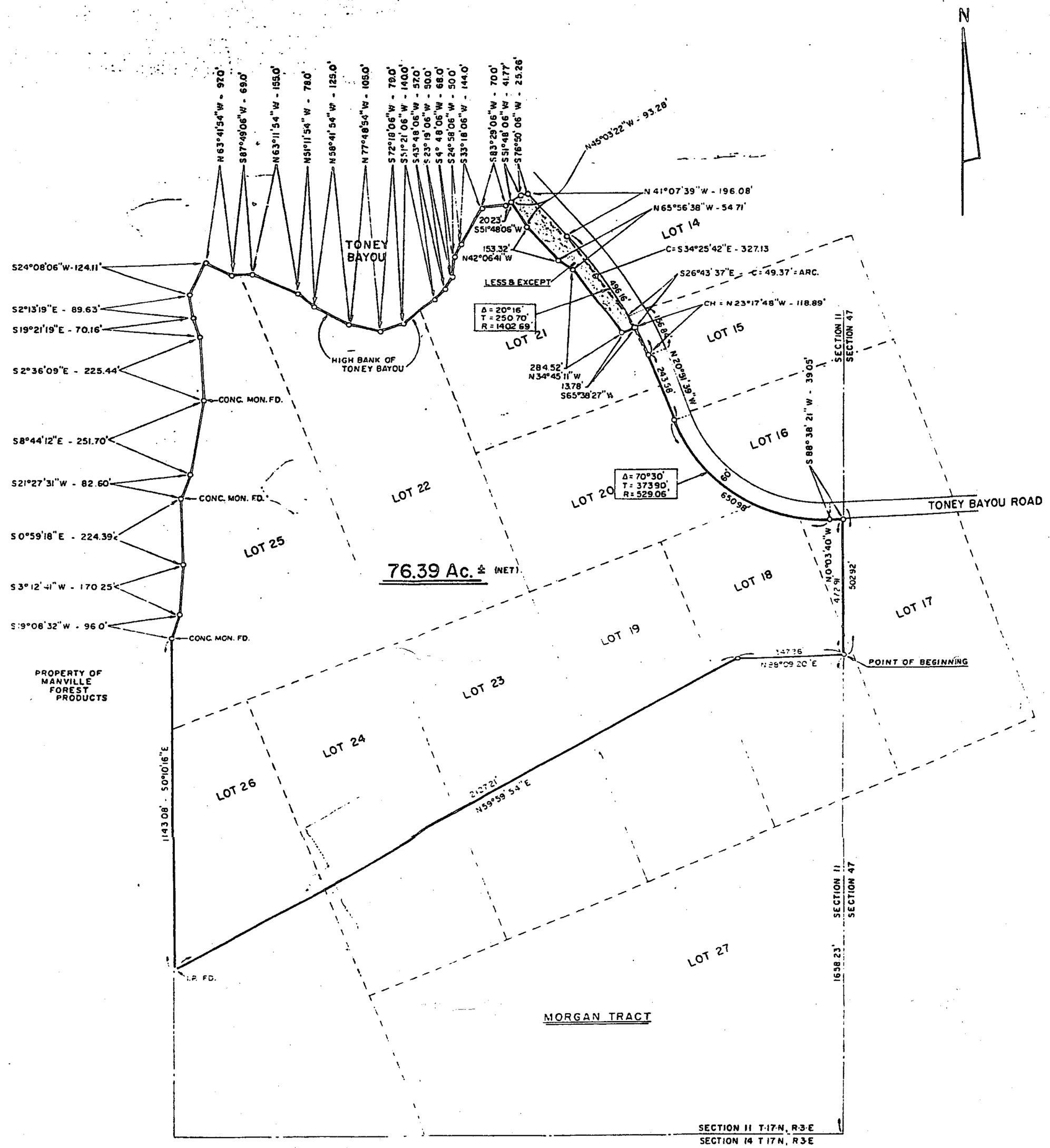
_____

_____

APPROVED ☐ DISAPPROVED ☐

By: _____

Date: _____



PROPERTY PURCHASED BY RIVERWOOD INTERNATIONAL FROM HUEY LENARD

A certain tract or parcel of land situated in portions of Lots 18, 19, 23, 24, 26 and all of Lots 20, 21, 22 and 25 of the subdivision of the Morgan Tract in Section 11, T17N, R3E, Ouachita Parish, Louisiana, containing 76.94 acres of land, more or less, and being more particularly described as commencing at the corner common to Sections 11, 14 and 47, T17N, R3E; thence North 0 degrees 03 minutes 40 seconds West along the East line of Section 11, said line also being the common line between Sections 11 and 14, a distance of 1658.23 feet to the POINT OF BEGINNING; thence continue North 0 degrees 03 minutes 40 seconds West along the East line of Section 11 a distance of 472.91 feet to a point where the East line of Section 11 intersects the South Right-of-Way line of Toney Bayou Road; thence South 88 degrees 38 minutes 21 seconds West along the South Right-of-Way line of Toney Bayou Road a distance of 39.05 feet to the Point of Curve of a curve to the right, the radius of said curve being 529.06 feet with the Tangent being 373.90 feet and the Delta Angle of said curve being 70 degrees 30 minutes; thence proceed Northwesterly along said curve, being the West Right-of-Way line of Toney Bayou Road, a distance of 650.98 feet to the Point of Tangency of said curve; thence continue along the West Right-of-Way line of Toney Bayou Road North 20 degrees 51 minutes 39 seconds West a distance of 243.58 feet to a point of curve of a curve to the left; thence continue along said curve to the left, the radius of said curve being 1402.69 feet, the Delta Angle being 20 degrees 16 minutes, the Tangent being 250.70 feet, said curve also being the West Right-of-Way line of Toney Bayou Road, a distance of 496.16 feet to the Point of Tangency of said curve; thence proceed North 41 degrees 07 minutes 39 seconds West along said West Right-of-Way line a distance of 196.08 feet to the intersection of the West Right of Way line of Toney Bayou Road with the high bank of Toney Bayou; thence South 76 degrees 50 minutes 06 seconds West along said high bank a distance of 25.26 feet; thence South 51 degrees 48 minutes 06 seconds West a distance of 62.0 feet; thence South 83 degrees 29 minutes 06 seconds West along said high bank a distance of 70.00 feet; thence South 33 degrees 18 minutes 06 seconds West along said high bank a distance of 144.0 feet; thence South 24 degrees 58 minutes 06 seconds West along said high bank a distance of 50.00 feet; thence South 4 degrees 48 minutes 06 seconds West along said high bank a distance of 68.0 feet; thence South 23 degrees 19 minutes 06 seconds West along said high bank a distance of 50.0 feet; thence South 43 degrees 48 minutes 06 seconds West along said high bank a distance of 57.0 feet; thence South 51 degrees 21 minutes 06 seconds West along said high bank a distance of 140.0 feet; thence South 72 degrees 18 minutes 06 seconds West along said high bank a distance of 79.0 feet; thence North 77 degrees 48 minutes 54 seconds West along said high bank a distance of 105.0 feet; thence North 58 degrees 41 minutes 54 seconds West along said high bank a distance of 125.0 feet; thence North 51 degrees 11 minutes 54 seconds West along said high bank a distance of 78.0 feet; thence North 63 degrees 11 minutes 54 seconds West along said high bank a distance of 155.0 feet; thence South 87 degrees 49 minutes 06 seconds West along said high bank a distance of 69.0 feet; thence South 63 degrees 41 minutes 54 seconds West along said high bank a distance of 97.0 feet; thence South 14 degrees 08 minutes 06 seconds West along said high bank a distance of 124.11 feet to the property belonging to Manville Forest Products; continue thence along the property line belonging to Manville Forest Products the following calls: thence South 2 degrees 13 minutes 19 seconds East a distance of [illegible] feet; thence South 19 degrees 21 minutes 19 seconds East a distance of [illegible] feet; thence South 2 degrees 36 minutes [illegible] seconds East a distance of 225.44 feet; thence South 8 degrees 44 minutes 12 seconds East a distance of 251.70 feet; thence South 21 degrees 27 minutes 31 seconds West a distance of 82.60 feet; thence South 0 degrees 59 minutes 18 seconds East a distance of [illegible] feet; thence South 3 degrees 12 minutes 41 seconds West a distance of [illegible] feet; thence South 19 degrees 08 minutes 32 seconds West a distance of 96.00 feet; thence South [illegible] degrees 10 minutes [illegible] seconds East a distance of 1143.08 feet; thence North 59 degrees 59 minutes 54 seconds East a distance of 2107.21 feet; thence North [illegible] degrees [illegible] minutes 20 seconds East a distance of [illegible] feet to the POINT OF BEGINNING, and being subject to all rights of way, easements and servitudes of record or of use.

LESS AND EXCEPT RIGHT OF WAY FOR NEW BRIDGE ACROSS TONEY BAYOU

A certain tract or parcel of land situated in Lot 21 of the subdivision of the Morgan Tract in Section 11, T17N, R3E, Ouachita Parish, Louisiana, and being more particularly described as commencing at the corner common to Sections 11, 14 and 47, T17N, R3E; thence North 0 degrees 03 minutes 40 seconds West along the East line of Section 11, said line also being the common line between Sections 11 and 14, a distance of 1658.23 feet; thence continue North 0 degrees 03 minutes 40 seconds West along the East line of Section 11 a distance of 472.91 feet to point where the East line of Section 11 intersects the South Right-of-Way line of Toney Bayou Road; thence South 88 degrees 38 minutes 21 seconds West along the South Right-of-Way line of Toney Bayou Road a distance of 39.05 feet to the Point of Curve of a curve to the right, the radius of said curve being 529.06 feet with the Tangent being 373.90 feet and the Delta Angle of said curve being 70 degrees 30 minutes; thence proceed Northwesterly along said curve, being the West Right-of-Way line of Toney Bayou Road, a distance of 650.98 feet to the Point of Tangency of said curve; thence continue along the West Right-of-Way line of Toney Bayou Road North 20 degrees 51 minutes 39 seconds West a distance of 243.58 feet to a point of curve of a curve to the left; thence North 23 degrees 17 minutes 48 seconds West along a sub-chord of said curve to the left (having a radius of 1402.69 feet, a Delta Angle of 20 degrees 16 minutes and a Tangent of 250.70 feet), said curve also being the West line of Toney Bayou Road, a distance of 118.89 feet to the POINT OF BEGINNING; thence South 65 degrees 38 minutes 27 seconds West a distance of 13.78 feet; thence North 34 degrees 45 minutes 11 seconds West along the chord of a curve to the left (having a radius of 788.53 feet, a Delta Angle of 20 degrees 47 minutes 16 seconds) a distance of 284.52 feet; thence North 65 degrees 56 minutes 38 seconds West a distance of 54.71 feet; thence North 42 degrees 06 minutes 41 seconds West a distance of 153.32 feet; thence North 45 degrees 03 minutes 22 seconds West a distance of 93.28 feet to the Northerly line of Lot 21 of said Subdivision of the Morgan Tract; thence North 51 degrees 48 minutes 03 seconds East along the Northerly line of Lot 21 of said Subdivision of the Morgan Tract a distance of 41.77 feet; thence North 76 degrees 50 minutes 06 seconds East along the Northerly line of Lot 21 of said Subdivision of the Morgan Tract a distance of 25.26 feet to the original Westerly line of Toney Bayou Road (60 ft. Right-of-Way); thence South 41 degrees 07 minutes 39 seconds East along the original Westerly line of Toney Bayou Road a distance of 196.08 feet to the Point of Curvature of a curve to the right; thence South 34 degrees 25 minutes 42 seconds East along the sub-chord of said curve to the right (having a radius of 1402.69 feet, a Delta Angle of 20 degrees 16 minutes and a Tangent of 250.70 feet), said curve being the original Westerly line of Toney Bayou Road, a distance of 327.13 feet; thence South 26 degrees 43 minutes 37 seconds East along the sub-chord of said curve to the right (having a radius of 1402.69 feet, a Delta Angle of 20 degrees 16 minutes and a Tangent of 250.70 feet), said curve being the original Westerly line of Toney Bayou Road, a distance of 49.35 feet to the POINT OF BEGINNING, and containing 0.55 acres, more or less.

CERTIFICATION

I, JOHN G. MARONEY, A REGISTERED LAND SURVEYOR IN THE STATE OF LOUISIANA, CERTIFY THAT I HAVE SURVEYED THE TRACT OF LAND HEREON SHOWN AND HAVE MONUMENTED EACH CORNER WITH AN IRON PIN.

John G. Maroney

JOHN G. MARONEY
REG. LAND SURVEYOR, No 2474

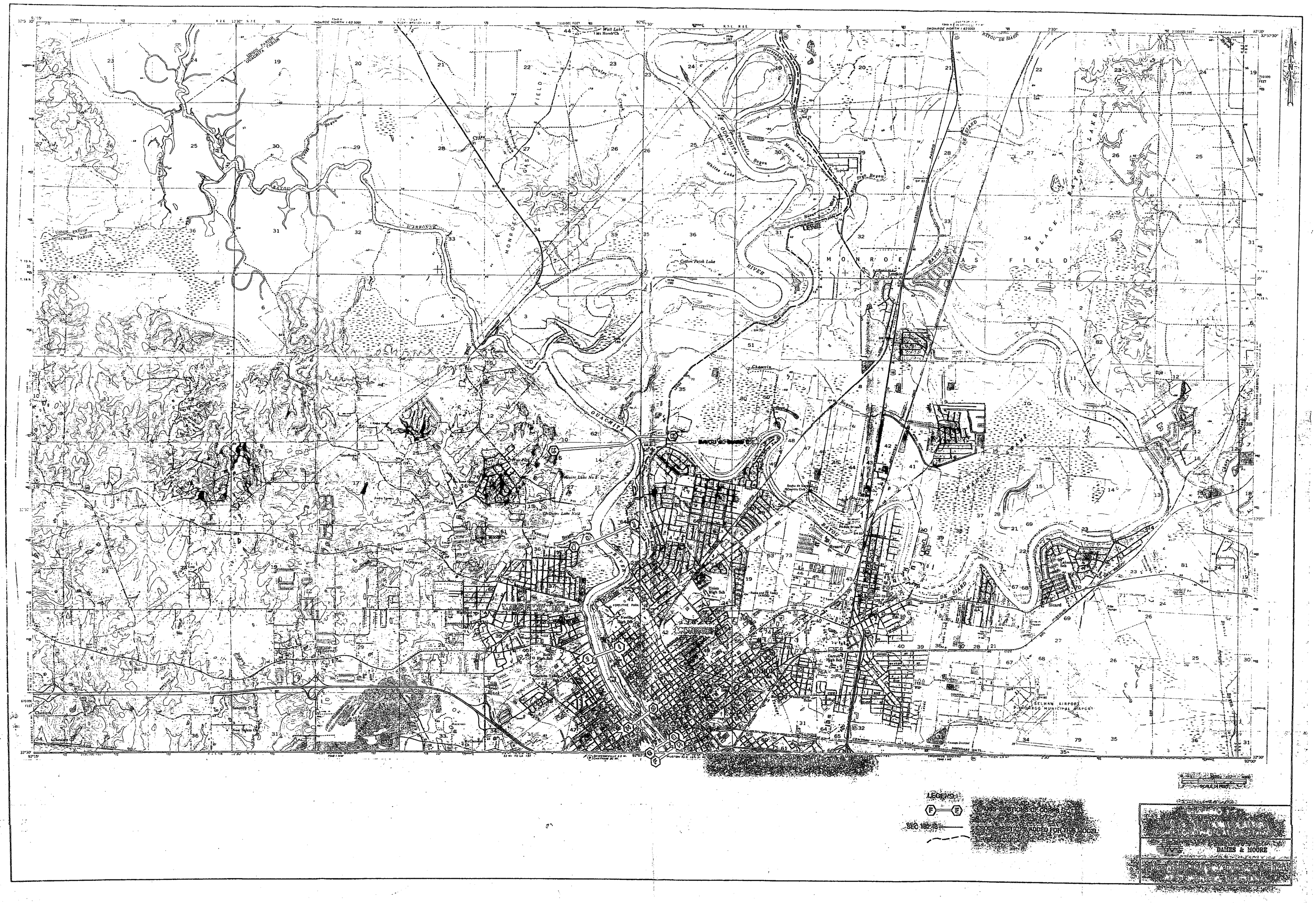
STATE OF LOUISIANA
JOHN G. MARONEY
REG. No. 2833
REGISTERED
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

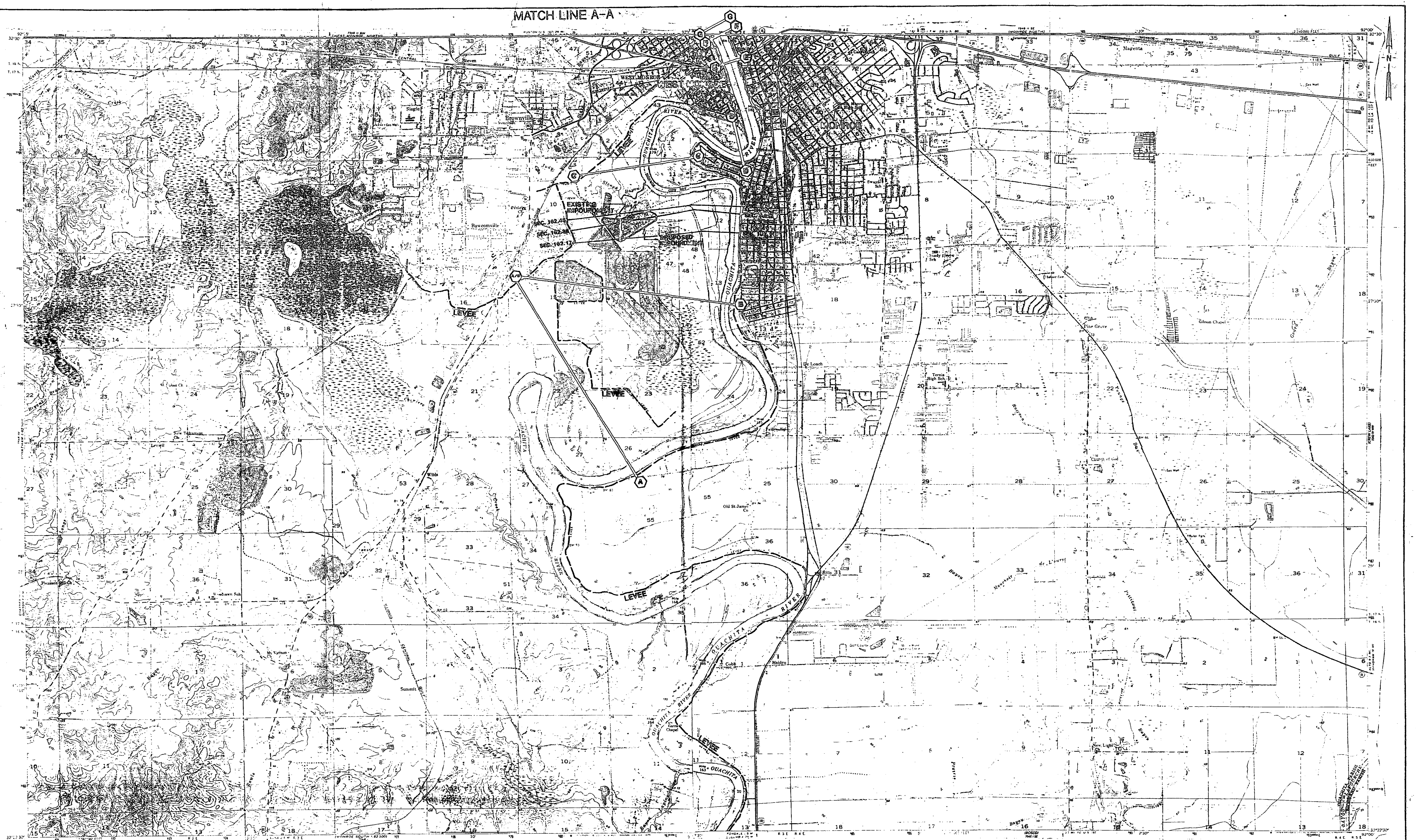
SCALE 1"=20'
DATE DEC. 1991
DRAWN BY HO

PLAT OF SURVEY OF
PORTIONS OF LOTS 17, 18, 19, 23, 24, 26 AND ALL OF LOTS 20, 21, 22 & 25
OF THE SUBDIVISION OF THE MORGAN TRACT IN SEC. 11, T 17 N, R 3 E
OUACHITA PARISH, LOUISIANA
FOR
Riverwood International

JOHN G. MARONEY
CONSULTING ENGINEERS, INC.
REGISTERED LAND SURVEYORS
208 LOUISVILLE AVENUE P.O.B. 2473
MONROE LOUISIANA 71201
PHONE (318) 388 1151

SHEET
OF
FILE NUMBER


MONROE GAS FIELD
OUACHITA RIVER
BLACK BAYOU LAKE
BAYOU DE SIARD
Cotton Patch Lake
Mean Lake
Walters Lake
Claiborne Bayou
Bayou Desiard
Claiborne
Lamar
Sicard
Selman Airport
Monroe Municipal Airport
Union High Sch
Carroll High Sch
Forsythe Park
Sewage Disposal
Sewage Lagoon
Sewage Pumping Station
Water Tank
Water Well
Cemetery
Church
Hospital
Radio Tower
Power Line
Pipeline
Levee
Dam
Bridge
Ferry
Railroad
Highway
Gulf Pipeline
Kansas Pipeline
Sewer Line
Water Line
Gas Line
Electric Line
Telephone Line
Telephone Pole
Fence
Trail
Road
Creek
Bayou
Lake
Pond
Swamp
Marsh
Woods
Orchard
Vineyard
Pasture
Cultivated Field
Sand
Gravel
Rock
Quarry
Pit
Mine
Tunnel
Bridge
Culvert
Dam
Levee
Ferry
Railroad
Highway
Road
Trail
Fence
Power Line
Telephone Line
Telephone Pole
Water Line
Gas Line
Electric Line
Sewer Line
Pipeline
Gulf Pipeline
Kansas Pipeline
Sewage Disposal
Sewage Lagoon
Sewage Pumping Station
Water Tank
Water Well
Cemetery
Church
Hospital
Radio Tower
Orchard
Vineyard
Pasture
Cultivated Field
Sand
Gravel
Rock
Quarry
Pit
Mine
Tunnel



LEGEND:

F —— F CROSS-SECTION [illegible]

SEC 162.45 —— [illegible]

— — — LEVEE LOCATION

0 2000 4000
SCALE IN FEET

DRAWING [illegible]
CROSS-SECTION LOCATIONS FOR FLOODWAY CALCULATIONS

DAMES & MOORE

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version  4.6.0;  February 1991        *
 *                                        *
 *  RUN DATE    14AUG92    TIME   14:27:53 *
 *****************************************
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*********************************
*  U.S. ARMY CORPS OF ENGINEERS
*  HYDROLOGIC ENGINEERING CENTER
*  609 SECOND STREET, SUITE D
*  DAVIS, CALIFORNIA 95616-4687
*        (916) 756-1104
*********************************
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X     X  XXXXXXX   XXXXX            XXXXX
X     X  X       X     X          X     X
X     X  X       X                      X
XXXXXXX  XXXX    X         XXXXX   XXXXX
X     X  X       X                X
X     X  X       X     X          X
X     X  XXXXXXX   XXXXX          XXXXXXX
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1

14AUG92 14:27:53 PAGE 1

THIS RUN EXECUTED 14AUG92 14:27:53

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*************************************
 HEC-2 WATER SURFACE PROFILES

 Version  4.6.0;  February 1991
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FR FREE FORMAT
T1  OUACHITA RIVER MILE 158.44 TO 171.60 - RIVERWOOD INTERNATIONAL CORP
T2  MODIFIED ST.LOUIS DISTRICT COE FEB 1975 100' LEVEE, 3000' NO LEVEE MODEL
T3  100 YEAR ENCROACHMENTS - NATURAL

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    NVINS     Q         WSEL      FQ

      0         2         0         0         0         0         0         0       83.30

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

    1.0                -1.0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    100       110       200       150

J5  LPRNT     NUMSEC                    ********REQUESTED SECTION NUMBERS********

    -10       -10

NC    0.04      0.04      .035       .1        .3
QT       2    109000    109000
ET       0         0      4.10    10119     18950
X1  158.44       47.     10119    10614
GR     95.0    9949.0      86.8   9950.0      77.0   9980.0      78.1   9986.0      79.0  10009.0
GR     76.2   10028.0      70.1  10047.0      63.5  10089.0      59.8  10108.0      58.5  10119.0
GR     52.7   10127.0      46.7  10148.0      38.1  10168.0      24.8  10189.0      21.8  10208.0
GR     22.0   10229.0      22.9  10247.0      23.0  10268.0      22.0  10288.0      22.0  10329.0
GR     21.0   10348.0      21.0  10430.0      19.0  10467.0      24.8  10488.0      23.1  10508.0
GR     27.0   10529.0      44.3  10547.0      51.0  10568.0      54.6  10604.0      58.8  10614.0
GR     58.8   10636.0      60.6  10687.0      68.1  10703.0      70.0  10800.0      73.0  11950.0
GR     70.0   15490.0      60.0  15820.0      50.0  16170.0      50.0  17100.0      60.0  17560.0
GR     70.0   17900.0      70.0  18620.0      69.0  20280.0      70.0  22000.0      70.0  22930.0
       84.4   22960.0      95.0  22961.0
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ET	0	0	4.10	10084	20100					
X1	158.63	34.	10084	10673	1050	860	1003			
GR	95.0	9979.0	86.9	9980.0	85.2	9998.0	86.8	10005.0	86.8	10016.0
GR	67.0	10084.0	56.5	10170.0	51.2	10199.0	43.7	10219.0	27.9	10260.0
GR	25.0	10281.0	21.2	10300.0	21.1	10320.0	22.1	10340.0	22.1	10360.0
GR	19.1	10420.0	19.0	10460.0	21.9	10518.0	22.1	10542.0	23.1	10562.0
GR	25.1	10580.0	40.0	10599.0	50.9	10618.0	54.6	10659.0	62.1	10673.0
GR	62.1	10707.0	62.1	10730.0	63.9	10748.0	65.4	10777.0	78.0	10830.0
GR	70.0	12040.0	70.0	23340.0	85.1	23370.0	95.0	23371.0		

ET 0 0 4.10 10084 20100
CITY OF MONROE, LOUISIANA CORP. LIMITS
X1 158.72 459 459 459 0.53

ET	0	0	4.10	10158	19450					
X1	158.82	40.	10158	10652	410	475	475			
GR	95.0	9999.0	87.0	10000.0	86.3	10023.0	71.1	10053.0	70.2	10066.0
GR	67.1	10075.0	61.6	10098.0	59.0	10123.0	59.3	10148.0	57.9	10158.0
GR	54.9	10160.0	28.9	10218.0	26.8	10239.0	26.0	10259.0	26.8	10280.0
GR	25.1	10299.0	24.0	10319.0	24.0	10339.0	22.9	10358.0	23.0	10399.0
GR	21.0	10439.0	20.8	10460.0	20.0	10479.0	20.8	10498.0	24.2	10519.0
GR	24.7	10536.0	27.0	10559.0	29.7	10578.0	37.9	10596.0	48.0	10617.0
GR	55.0	10637.0	59.2	10640.0	63.3	10652.0	63.3	10676.0	63.3	10695.0
GR	63.3	10815.0	78.7	10840.0	70.0	11420.0	84.3	23060.0	95.0	23061.0

ET	0	0	4.10	10074	21400					
X1	159.20	50.	10074	10567	1900	2260	2006			
GR	95.0	9996.0	87.0	9997.0	83.6	10005.0	69.3	10049.0	67.5	10067.0
GR	66.5	10074.0	54.9	10090.0	51.9	10099.0	25.9	10140.0	22.9	10159.0
GR	17.1	10179.0	16.1	10201.0	17.0	10221.0	17.1	10241.0	18.2	10260.0
GR	16.2	10280.0	17.2	10300.0	17.2	10340.0	20.2	10400.0	26.2	10421.0
GR	27.4	10441.0	29.2	10460.0	39.2	10484.0	46.6	10499.0	55.2	10521.0
[illegible]	59.1	10535.0	61.2	10550.0	67.3	10567.0	68.5	10594.0	71.8	10613.0
GR	72.5	10629.0	72.2	10646.0	70.0	10770.0	65.0	10790.0	65.0	11000.0
GR	70.0	11060.0	75.0	11130.0	79.6	11240.0	75.0	11540.0	70.0	12270.0
GR	60.0	13460.0	60.0	15780.0	70.0	17120.0	70.0	20400.0	73.0	20410.0
GR	73.0	21940.0	70.0	21950.0	70.0	23700.0	84.6	23730.0	95.0	23731.0

ET	0	0	10.4							
X1	159.73	48.	10135	10714	2880	2520	2798			
GR	95.0	10069.0	87.3	10070.0	72.6	10079.0	72.6	10120.0	72.6	10135.0
GR	60.8	10150.0	54.2	10170.0	50.2	10179.0	44.2	10200.0	34.2	10219.0
GR	30.4	10240.0	23.5	10258.0	23.6	10280.0	25.5	10300.0	26.4	10320.0
GR	22.5	10359.0	21.6	10379.0	21.5	10400.0	20.3	10420.0	21.5	10440.0
GR	23.5	10459.0	24.5	10480.0	26.5	10500.0	29.5	10518.0	31.4	10540.0
GR	31.3	10561.0	33.4	10579.0	49.3	10619.0	51.4	10640.0	54.6	10654.0
GR	58.6	10668.0	62.2	10699.0	65.3	10714.0	66.3	10754.0	68.0	10799.0
GR	70.0	11530.0	75.0	11660.0	77.5	12000.0	75.0	12320.0	75.0	12880.0
GR	70.0	13640.0	65.0	14330.0	60.0	14500.0	60.0	15800.0	70.0	19370.0
GR	70.0	24930.0	85.0	24960.0	95.0	24961.0				

1

ET	0	0	4.10	10161	23200					
X1	160.13	44.	10161	10723	2400	1100	2112			
GR	95.0	10029.0	88.9	10030.0	78.0	10039.0	77.2	10050.0	71.0	10081.0
GR	69.9	10100.0	67.5	10161.0	63.6	10171.0	47.2	10200.0	30.0	10220.0
GR	25.1	10241.0	23.2	10261.0	21.3	10301.0	21.0	10421.0	22.2	10440.0
GR	24.1	10461.0	25.0	10481.0	26.9	10500.0	27.9	10521.0	28.0	10540.0
GR	29.9	10580.0	36.9	10600.0	55.1	10635.0	58.3	10645.0	62.1	10674.0
GR	65.9	10689.0	70.1	10710.0	73.3	10723.0	74.1	10749.0	73.3	10798.0
GR	70.0	11160.0	70.0	11710.0	75.0	11870.0	76.8	12040.0	75.0	12620.0
GR	75.0	13300.0	70.0	14030.0	65.0	14730.0	60.0	14910.0	60.0	18000.0
GR	70.0	22690.0	70.0	28430.0	85.0	28460.0	95.0	28461.0		

ET 0 0 4.10 10049 22400

X1	160.51	45.	10049	10648	2220	1120	2006			
GR	95.0	9889.0	86.8	9890.0	75.0	10000.0	63.0	10049.0	58.2	10055.0
GR	54.4	10069.0	48.2	10109.0	26.0	10168.0	25.1	10187.0	22.9	10207.0
GR	22.2	10228.0	22.0	10290.0	18.8	10348.0	18.9	10370.0	17.8	10388.0
GR	17.7	10408.0	19.9	10430.0	22.7	10448.0	27.9	10468.0	40.9	10488.0
GR	46.9	10507.0	48.1	10529.0	50.2	10550.0	54.0	10568.0	55.1	10585.0
GR	58.6	10608.0	62.9	10619.0	80.2	10648.0	80.2	10739.0	70.0	10840.0
GR	75.0	11150.0	76.1	11430.0	75.0	11840.0	75.0	12530.0	70.0	13280.0
GR	65.0	13920.0	60.0	14400.0	60.0	15700.0	60.0	17260.0	70.0	18400.0
GR	70.0	26380.0	75.0	26650.0	75.0	27620.0	84.9	27650.0	95.0	27651.0
ET	0	0	4.10	10049	21350					
X1	160.67	48.	10049	10625	1000	820	844			
GR	95.0	9579.0	87.9	9580.0	75.0	9610.0	75.0	9720.0	55.0	9900.0
GR	65.0	10000.0	59.3	10049.0	56.0	10069.0	55.3	10072.0	54.1	10089.0
GR	48.1	10109.0	37.0	10128.0	31.0	10150.0	31.1	10189.0	30.1	10209.0
GR	28.2	10229.0	27.2	10249.0	27.2	10270.0	26.0	10290.0	24.1	10312.0
GR	22.1	10350.0	18.1	10370.0	16.9	10390.0	17.0	10410.0	19.1	10451.0
GR	22.2	10470.0	24.2	10491.0	27.0	10510.0	31.0	10530.0	47.2	10550.0
GR	51.2	10570.0	76.4	10625.0	77.1	10656.0	80.0	10680.0	80.0	10810.0
GR	75.4	11000.0	75.0	11220.0	75.0	11640.0	70.0	12530.0	65.0	12820.0
GR	60.0	12980.0	60.0	14780.0	70.0	17720.0	70.0	25860.0	75.0	26010.0
GR	75.0	26490.0	84.5	26520.0	95.0	26521.0				
ET	0	0	4.10	10039	20300					
X1	160.86	47.	10039	10649	1003	990	1003			
GR	95.0	9629.0	88.4	9630.0	70.0	9660.0	63.5	9881.0	63.5	9899.0
GR	63.5	9970.0	63.5	10021.0	63.5	10039.0	51.9	10111.0	50.0	10131.0
GR	42.8	10150.0	32.9	10171.0	27.7	10191.0	23.9	10210.0	22.9	10231.0
GR	22.9	10251.0	21.7	10270.0	22.8	10291.0	22.8	10311.0	18.8	10390.0
GR	17.8	10411.0	13.7	10430.0	11.7	10451.0	8.0	10470.0	12.9	10491.0
GR	13.8	10510.0	18.8	10529.0	45.8	10570.0	54.8	10610.0	63.3	10626.0
GR	65.9	10634.0	71.9	10645.0	72.1	10649.0	72.3	10650.0	72.1	10685.0
GR	72.1	10712.0	72.1	10724.0	75.0	10850.0	70.0	11670.0	65.0	11950.0
GR	60.0	12700.0	60.0	14210.0	65.0	15600.0	70.0	16850.0	70.0	25110.0
GR	84.3	25140.0	95.0	25141.0						

ET	0	0	4.10	10139	19350					
X1	161.05	44.	10139	10697	810	1180	1003			
GR	95.0	9759.0	88.9	9760.0	70.0	9790.0	62.2	10008.0	62.6	10054.0
GR	67.0	10069.0	62.1	10094.0	59.5	10112.0	57.1	10139.0	54.9	10142.0
GR	51.9	10148.0	47.9	10169.0	36.8	10188.0	30.9	10208.0	23.9	10227.0
GR	18.0	10248.0	19.7	10268.0	18.9	10288.0	18.8	10348.0	17.7	10368.0
GR	19.0	10388.0	16.9	10428.0	16.9	10508.0	19.0	10527.0	19.9	10547.0
GR	25.5	10567.0	37.9	10587.0	48.9	10607.0	55.1	10631.0	57.2	10646.0
GR	55.0	10666.0	58.7	10676.0	64.2	10697.0	69.8	10737.0	72.1	10746.0
GR	75.7	10756.0	75.0	11260.0	65.0	11580.0	60.0	11950.0	60.0	14200.0
GR	70.0	15890.0	70.0	23910.0	84.2	23940.0	95.0	23941.0		
ET	0	0	4.10	10101	18200					
X1	161.40	50.	10101	10739	1600	2100	1848			
GR	95.0	9889.0	89.3	9890.0	87.0	9920.0	86.8	10005.0	77.8	10033.0
GR	75.8	10067.0	74.3	10086.0	71.7	10101.0	64.8	10121.0	54.8	10146.0
GR	50.4	10161.0	47.5	10181.0	42.5	10201.0	32.5	10221.0	21.8	10260.0
GR	18.8	10281.0	18.7	10300.0	17.7	10320.0	21.6	10341.0	19.7	10361.0
GR	19.6	10381.0	20.8	10401.0	20.7	10420.0	21.8	10440.0	21.7	10460.0
GR	22.7	10479.0	22.5	10540.0	23.6	10559.0	23.5	10619.0	27.5	10640.0
GR	35.4	10659.0	46.3	10680.0	50.3	10700.0	54.5	10715.0	59.5	10727.0
GR	63.2	10739.0	64.8	10769.0	64.6	10849.0	70.0	11210.0	75.0	11750.0
GR	60.0	13730.0	60.0	15560.0	70.0	16380.0	70.0	17620.0	73.0	17630.0
GR	72.0	20470.0	70.0	20480.0	70.0	22230.0	84.3	22260.0	95.0	22261.0
ET	0	0	10.4							
X1	162.00	37.	10153	10716	3220	3090	3168			
GR	95.0	10041.0	86.5	10042.0	78.4	10072.0	78.2	10137.0	78.2	10153.0
GR	67.1	10169.0	62.5	10190.0	55.5	10195.0	53.0	10199.0	46.0	10220.0
GR	37.1	10239.0	32.1	10259.0	28.0	10279.0	27.0	10299.0	27.0	10340.0
GR	24.9	10380.0	24.9	10559.0	21.8	10580.0	22.9	10600.0	28.9	10638.0

GR	30.0	10659.0	59.7	10701.0	61.4	10709.0	65.9	10716.0	69.5	10745.0
GR	72.6	10764.0	72.1	10800.0	70.2	10860.0	70.0	11070.0	80.0	11350.0
GR	80.5	11520.0	80.0	11710.0	75.0	12290.0	70.0	12670.0	70.0	19730.0
GR	85.0	19760.0	95.0	19761.0						
ET	0	0	10.4							
X1	162.17	25.	10120	10710	950	634	950			
GR	95.0	10000.0	86.5	10010.0	78.4	10040.0	78.2	10120.0	27.5	10280.0
GR	27.2	10350.0	25.0	10370.0	25.0	10540.0	22.0	10590.0	30.0	10650.0
GR	65.0	10710.0	65.0	10840.0	70.0	10970.0	75.0	11150.0	80.0	11310.0
GR	80.0	11650.0	74.0	12290.0	76.0	12300.0	74.0	12310.0	70.0	12900.0
GR	68.0	14500.0	70.0	16000.0	70.0	19550.0	85.0	19560.0	95.0	19570.0
ET	0	0	10.4							
X1	162.38	34.0	10030	10780	1100	1047	1100			
GR	95.0	10000.0	88.6	10010.0	59.7	10030.0	50.5	10050.0	54.0	10100.0
GR	50.2	10150.0	23.5	10280.0	21.0	10330.0	23.0	10360.0	23.0	10420.0
GR	21.8	10450.0	21.8	10520.0	65.0	10620.0	65.0	10780.0	70.0	10810.0
GR	70.0	10880.0	65.0	10950.0	70.0	11290.0	75.0	11430.0	80.0	11550.0
GR	80.0	11760.0	74.0	12900.0	76.0	12910.0	74.0	12920.0	70.0	14900.0
GR	68.0	15120.0	70.0	15270.0	70.0	17480.0	85.5	17520.0	85.5	18220.0
GR	70.0	18260.0	70.0	20100.0	84.6	20110.0	95.0	20120.0	0.0	0.0

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ET	0	0	10.4							
X1	162.45	31.0	10030	10900	280	330	250			
GR	95.0	10000.0	88.6	10010.0	59.7	10030.0	50.5	10050.0	54.0	10100.0
GR	50.2	10150.0	23.5	10280.0	21.0	10330.0	23.0	10360.0	23.0	10420.0
GR	21.8	10450.0	21.8	10520.0	65.0	10670.0	65.0	10900.0	70.0	11300.0
GR	80.0	11600.0	80.0	11800.0	74.0	13090.0	76.0	13100.0	74.0	13110.0
GR	70.0	14000.0	70.0	14400.0	68.0	14800.0	70.0	15000.0	72.0	15300.0
GR	74.0	15310.0	72.0	15320.0	70.0	17200.0	70.0	20300.0	84.6	20310.0
GR	95.0	20320.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0	0	10.4							
X1	162.60	50.	10135	10790	870	1069	868			
GR	95.0	10099.0	88.6	10100.0	59.7	10135.0	55.7	10139.0	52.2	10145.0
GR	51.1	10160.0	51.1	10180.0	53.2	10200.0	54.2	10220.0	52.1	10239.0
GR	50.2	10260.0	44.2	10279.0	37.1	10299.0	32.2	10320.0	28.0	10340.0
GR	25.0	10360.0	25.0	10379.0	23.0	10399.0	22.1	10420.0	22.1	10440.0
GR	21.0	10459.0	23.1	10480.0	22.0	10499.0	23.2	10519.0	21.1	10540.0
GR	21.0	10620.0	21.9	10640.0	24.9	10659.0	26.0	10680.0	30.0	10700.0
GR	36.9	10719.0	49.2	10741.0	55.5	10758.0	64.4	10779.0	64.9	10782.0
GR	69.9	10790.0	70.8	10814.0	69.9	10825.0	69.9	10849.0	69.9	10899.0
GR	70.0	11430.0	75.0	11920.0	80.0	11980.0	80.0	12120.0	75.0	15780.0
GR	75.0	16300.0	70.0	17070.0	70.0	20510.0	84.6	20540.0	95.0	20541.0
ET	0	0	4.10	9950	12050					
X1	162.80	33.	10118	10650	1480	410	1056			
GR	95.0	9898.0	88.5	9899.0	56.6	9929.0	56.6	10024.0	60.3	10049.0
GR	58.3	10072.0	56.6	10100.0	56.7	10117.0	56.6	10118.0	48.9	10141.0
GR	33.8	10159.0	27.0	10179.0	24.9	10200.0	26.1	10219.0	26.1	10280.0
GR	25.0	10299.0	26.2	10320.0	24.1	10361.0	25.1	10380.0	25.1	10400.0
GR	26.1	10419.0	26.2	10478.0	26.0	10500.0	27.1	10520.0	29.0	10540.0
GR	36.2	10559.0	46.2	10579.0	55.6	10611.0	63.8	10629.0	80.5	10650.0
GR	80.5	10670.0	81.0	12050.0	95.0	12051.0				
ET	0	0	10.40							
X1	163.18	32.	10192	10647	2006	2006	2006			
GR	95.0	8799.0	88.4	8800.0	71.80	8830.0	66.8	10090.0	60.8	10138.0
GR	60.6	10148.0	59.3	10165.0	59.6	10186.0	59.1	10192.0	38.1	10239.0
GR	33.2	10258.0	27.2	10319.0	25.2	10358.0	22.1	10379.0	21.2	10399.0
GR	21.2	10421.0	22.2	10439.0	19.1	10500.0	17.0	10520.0	22.1	10540.0
GR	24.2	10558.0	32.6	10577.0	47.9	10598.0	55.9	10617.0	64.1	10630.0
GR	69.3	10642.0	75.3	10647.0	75.3	10675.0	76.9	10692.0	75.3	10731.0
GR	80.3	12040.0	95.0	12041.0						
ET	0	0	10.40							
X1	163.32	37.	10126	10636	739	739	739			

GR	95.0	7619.0	80.0	7620.0	70.0	8360.0	70.0	9560.0	72.8	9936.0
GR	67.8	10036.0	66.1	10091.0	66.1	10126.0	51.9	10158.0	46.0	10178.0
GR	36.0	10198.0	28.9	10218.0	25.9	10239.0	24.1	10258.0	18.1	10299.0
GR	16.0	10318.0	16.1	10339.0	18.2	10358.0	18.2	10379.0	16.0	10419.0
GR	19.2	10439.0	18.0	10458.0	19.2	10478.0	21.1	10498.0	21.1	10519.0
GR	31.1	10538.0	39.4	10558.0	49.2	10579.0	53.2	10597.0	56.0	10599.0
GR	60.9	10618.0	69.5	10636.0	71.0	10682.0	69.8	10698.0	69.5	10748.0
GR	76.0	11450.0	95.0	11451.0						

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ET	0	0	4.10	8050	13700					
X1	163.76	41.	10126	10670	1850	2820	2323			
GR	95.0	7259.0	88.4	7260.0	71.6	7290.0	70.0	7940.0	66.6	9990.0
GR	63.5	10041.0	63.8	10052.0	63.5	10126.0	55.2	10163.0	50.4	10180.0
GR	33.5	10220.0	31.6	10240.0	31.5	10260.0	29.5	10280.0	29.5	10301.0
GR	26.7	10320.0	25.4	10340.0	25.4	10361.0	24.5	10381.0	22.5	10401.0
GR	21.5	10421.0	21.6	10441.0	19.5	10480.0	20.5	10500.0	20.4	10520.0
GR	21.5	10540.0	27.4	10580.0	35.6	10600.0	51.2	10621.0	54.9	10628.0
GR	70.7	10670.0	70.9	10696.0	70.8	10751.0	75.3	10777.0	75.3	11020.0
GR	70.0	11260.0	60.0	12060.0	60.0	12360.0	70.0	14230.0	88.0	14260.0
GR	95.0	14261.0								
ET	0	0	10.40							
X1	163.93	39.	10130	10664	670	1040	897			
GR	95.0	7559.0	88.4	7560.0	71.5	7590.0	70.0	9360.0	71.5	10033.0
GR	67.2	10059.0	65.8	10089.0	65.1	10115.0	63.6	10130.0	56.0	10144.0
GR	35.0	10199.0	30.9	10220.0	29.0	10239.0	24.1	10260.0	23.1	10280.0
GR	25.1	10299.0	23.0	10319.0	23.1	10441.0	22.0	10461.0	21.9	10481.0
GR	20.9	10500.0	21.9	10521.0	24.1	10541.0	29.9	10560.0	39.6	10580.0
GR	52.4	10602.0	56.1	10611.0	59.9	10626.0	71.9	10657.0	77.5	10664.0
GR	77.5	10772.0	77.5	11310.0	70.0	11380.0	60.0	11800.0	60.0	12280.0
GR	70.0	12680.0	70.0	12790.0	88.4	12820.0	95.0	12821.0		
X1	164.34	41.	10100	10711	2040	2280	2165			
GR	95.0	8809.0	80.0	8810.0	70.0	9180.0	70.0	9820.0	63.4	10000.0
GR	63.4	10051.0	63.5	10068.0	63.4	10100.0	62.2	10119.0	59.5	10154.0
GR	55.8	10182.0	52.0	10201.0	48.9	10220.0	41.0	10241.0	28.1	10255.0
GR	22.3	10262.0	20.2	10281.0	14.2	10301.0	11.1	10321.0	7.1	10342.0
GR	2.2	10362.0	1.4	10380.0	-.6	10400.0	-1.6	10422.0	4.3	10462.0
GR	3.3	10482.0	3.4	10502.0	19.0	10541.0	40.9	10580.0	44.0	10600.0
GR	44.9	10620.0	54.9	10660.0	61.0	10682.0	66.4	10698.0	76.4	10711.0
GR	77.2	10758.0	76.4	10775.0	76.4	10799.0	76.4	11400.0	88.3	11430.0
GR	95.0	11431.0								
X1	164.74	42.	10139	10636	1160	2420	2112			
GR	95.0	9119.0	80.0	9120.0	73.8	10025.0	75.3	10075.0	66.2	10110.0
GR	63.0	10139.0	56.0	10166.0	52.1	10176.0	49.4	10195.0	41.2	10217.0
GR	31.8	10237.0	24.1	10258.0	16.2	10297.0	18.1	10317.0	13.1	10338.0
GR	12.1	10357.0	13.1	10377.0	13.0	10402.0	12.1	10417.0	12.1	10437.0
GR	10.2	10477.0	9.0	10498.0	15.0	10518.0	20.0	10537.0	33.1	10577.0
GR	39.4	10598.0	50.4	10617.0	55.9	10630.0	59.3	10636.0	59.3	10638.0
GR	59.3	10650.0	60.3	10664.0	60.8	10695.0	62.2	10721.0	64.5	10746.0
GR	71.2	10795.0	74.7	10831.0	76.3	10857.0	76.7	10870.0	75.6	10895.0
GR	88.3	10925.0	95.0	10926.0						
X1	165.19	39.	10052	10720	2350	2740	2376			
GR	95.0	9990.0	88.2	9991.0	79.0	10021.0	76.6	10052.0	68.5	10091.0
GR	63.0	10122.0	58.0	10136.0	54.9	10152.0	47.0	10187.0	40.2	10209.0
GR	32.3	10228.0	29.4	10248.0	27.2	10268.0	21.4	10290.0	13.6	10329.0
GR	11.6	10370.0	12.6	10389.0	14.4	10408.0	15.6	10430.0	15.6	10450.0
GR	18.5	10469.0	20.4	10490.0	21.5	10509.0	23.5	10529.0	23.4	10549.0
GR	25.5	10570.0	28.3	10589.0	34.4	10608.0	51.2	10650.0	55.0	10668.0
GR	61.1	10688.0	65.0	10705.0	71.2	10720.0	71.3	10728.0	71.2	10747.0

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GR	71.2	10798.0	75.0	11770.0	89.3	11800.0	95.0	11801.0

X1	165.61	38.	10108	10700	2580	1900	2218			
GR	95.0	10016.0	88.6	10017.0	72.9	10047.0	71.0	10078.0	71.0	10098.0
GR	71.0	10108.0	59.3	10130.0	55.6	10139.0	54.5	10140.0	48.9	10159.0
GR	37.5	10180.0	25.8	10241.0	19.8	10260.0	12.7	10280.0	10.0	10301.0
GR	7.9	10340.0	7.9	10361.0	7.0	10380.0	6.9	10400.0	9.2	10422.0
GR	14.1	10440.0	24.0	10482.0	29.7	10521.0	40.9	10560.0	42.9	10582.0
GR	48.8	10601.0	55.9	10651.0	59.9	10700.0	62.4	10750.0	66.1	10831.0
GR	67.3	10839.0	68.0	10861.0	68.6	10901.0	69.0	10908.0	75.0	12290.0
GR	80.0	12330.0	88.6	12360.0	95.0	12361.0				
X1	165.95	43.	10111	10829	2540	1200	1795			
GR	100.0	9869.0	87.4	9870.0	72.1	9900.0	67.1	10028.0	68.1	10038.0
GR	67.2	10050.0	62.7	10111.0	53.6	10178.0	46.6	10199.0	36.6	10220.0
GR	36.6	10220.0	31.0	10237.0	30.9	10279.0	31.9	10299.0	30.0	10338.0
GR	30.1	10377.0	29.1	10398.0	29.0	10439.0	31.1	10460.0	32.1	10479.0
GR	31.8	10538.0	29.9	10558.0	26.8	10618.0	26.9	10638.0	29.8	10657.0
GR	23.9	10677.0	32.0	10699.0	33.9	10717.0	33.9	10738.0	41.9	10778.0
GR	51.4	10797.0	55.8	10809.0	60.8	10829.0	60.8	10862.0	62.3	10899.0
GR	70.6	10923.0	73.5	10950.0	76.2	10998.0	76.5	11022.0	80.0	11490.0
GR	80.0	11550.0	88.7	11580.0	100.0	11581.0				
X1	166.37	38.	10098	10827	2218	2218	2218			
GR	100.0	10039.0	87.8	10040.0	67.2	10043.0	63.8	10050.0	60.7	10069.0
GR	59.1	10098.0	56.0	10103.0	50.7	10119.0	44.8	10159.0	34.7	10199.0
GR	30.9	10219.0	29.9	10239.0	26.7	10260.0	25.0	10279.0	24.9	10299.0
GR	26.9	10319.0	31.0	10339.0	30.8	10418.0	33.9	10479.0	34.1	10498.0
GR	32.0	10520.0	32.1	10559.0	33.0	10579.0	33.1	10618.0	32.1	10640.0
GR	32.2	10698.0	35.1	10718.0	46.2	10737.0	51.1	10758.0	55.0	10777.0
GR	56.4	10779.0	62.6	10811.0	69.9	10827.0	71.3	10847.0	87.9	10889.0
GR	87.9	10930.0	88.0	10960.0	100.0	10961.0				
X1	166.57	36	10087	10810	1056	1056	1056			
GR	86.2	9969	66.2	9971	61.2	10071	61.2	10087	57.9	10094
GR	56	10119	31.7	10219	29.8	10239	29.7	10299	30.7	10321
GR	30.8	10379	31.8	10400	31.7	10459	32.9	10479	32.6	10499
GR	31.8	10518	31.9	10537	29.7	10558	31.6	10578	30.7	10598
GR	30.7	10619	31.6	10638	33.5	10657	36.9	10679	38.9	10698
GR	46.7	10719	49.9	10739	54	10758	56.1	10763	65.3	10800
GR	67.6	10810	68.3	10833	86.9	10888	87.4	10898	92.4	10998
GR	112.4	11000								

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X1	166.69	92	9969	10810	612	612	612			
GR	86.2	9942	79	9942.1	78	9969	65	9991	78	9993
GR	78.5	9994	100	9995	100	9999	78.5	10000	78	10001
GR	58	10003	42	10100.9	48	10101.5	78	10103	78.5	10105
GR	100	10106	100	10110	78.5	10111	78	10113	48	10114.5
GR	40	10115.1	34	10160	30	10176	29.8	10239	29.8	10254.9
GR	48	10255.5	78	10257	78.5	10259	100	10260	100	10264
GR	78.5	10265	78	10267	48	10268.5	29.7	10269.1	29.7	10299
GR	30.7	10321	30.8	10379	31.8	10400	31.7	10459	32	10467
GR	48	10467.5	78	10469	78.5	10471	100	10472	100	10476

1

GR	78.5	10477	78	10479	48	10480.5	32.9	10481.1	32.6	10499
GR	31.8	10518	31.9	10537	29.7	10558	31.6	10578	30.7	10598
GR	30.7	10617.9	48	10618.5	78	10620	78.5	10622	100	10623
GR	100	10627	78.5	10628	78	10630	48	10631.5	31.4	10632.1
GR	33.5	10657	36.9	10679	38.9	10698	45.2	10715	78	10717
GR	78.5	10719	100	10720	100	10724	78.5	10725	78	10727
GR	49	10729	54	10758	56.1	10763	65.3	10800	67.6	10810
GR	67.5	10815	78	10816	78.5	10817	100	10818	100	10822
GR	78.5	10823	78	10824	68	10825	68.3	10833	86.9	10888
GR	87.4	10898	92.4	10998						
X1	166.71	0	0	0	116	116	116	0	0	0
X1	166.76	51	10083	10868	275	275	275			
GR	106.1	9937	86.1	9939	81.1	10039	80.5	10050	74.6	10083
GR	69.3	10088	63.8	10108	56.1	10128	50.7	10139	49.4	10160

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GR     42.7     10180     39.7     10200     35.1     10219     31.9     10241     31.9     10260
GR       30     10280     31.8     10300     31.9     10319       31     10339     33.1     10360
GR       34     10380     33.9     10420     34.9     10440     33.9     10460     35.9     10480
GR       37     10500     36.9     10520     34.1     10578     33.8     10600       35     10621
GR     34.1     10639     34.9     10660     34.9     10680     32.9     10700       33     10719
GR     34.7     10739     35.6     10759     47.6     10798     50.6     10820     55.8     10838
GR     68.8     10868     68.8     10889     68.8     10900     68.8     10904     79.8     10958
GR     80.4     10964       80     10969     76.8     10977     73.8     11001     78.8     11101
GR     98.8     11103

X1   166.95       44.     10027     10916     1003     1003     1003
GR    106.7    9916.0      86.7    9918.0     81.7  10018.0     81.7  10027.0     78.2  10045.0
GR     58.6   10100.0      56.3   10103.0     38.9  10160.0     35.9  10180.0     34.9  10200.0
GR     32.1   10218.0      29.9   10238.0     29.0  10261.0     29.0  10279.0     28.1  10299.0
GR     29.8   10318.0      29.1   10339.0     30.0  10357.0     29.9  10377.0     32.0  10397.0
GR     31.1   10419.0      30.9   10438.0     31.9  10458.0     30.9  10477.0     30.9  10519.0
GR     31.9   10538.0      29.0   10559.0     31.8  10578.0     33.7  10618.0     35.7  10637.0
GR     35.7   10699.0      38.6   10756.0     41.5  10778.0     46.4  10798.0     50.5  10819.0
GR     51.8   10841.0      54.5   10857.0     55.6  10868.0     61.1  10898.0     86.0  10916.0
GR     87.8   10940.0      86.7   10996.0     91.7  11096.0    111.7  11098.0

NC        0         0         0       0.3      0.5
X1   167.02        32     10128     11048      402      402      402         0         0         0
X3       10         0         0         0        0        0        0     84.50     84.50
GR    87.15     10097     85.32     10104     82.9  10104.1     82.5     10115      75.5     10128
GR     75.5   10128.1      63.2     10144     52.5    10193     39.2     10272      28.5   10351.2
GR     28.5   10351.5      27.1     10400     24.4    10474     24.4   10475.2      24.4   10524.8
GR     24.4     10526      31.3     10600     32.3  10649.3     32.3   10649.4      32.7     10728
GR     36.8     10806      52.2     10885     61.4  10963.7     61.4   10963.8        64     10992
GR     66.5     11020      70.1     11034     77.3    11048     77.3   11048.1      81.1     11053
GR    85.09   11053.1     87.25     11056

ET        0         0      4.10     10128    11048
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                ENDOM ( DESIARD ST. ) BRIDGE
X1   167.03         0         0         1        1        1
BT       28     10104     85.32     85.32  10104.1    85.32     82.9     10115     85.51      82.5
BT    10128     85.84      75.5   10128.1    85.84    78.73    10193     87.46     80.27     10272
BT    89.17     81.98   10351.2     89.83    82.67  10351.5    89.83     82.94     10400     90.46
BT    82.92     10474     90.55     82.93  10475.2    90.55     24.4   10524.8     90.55      24.4
BT    10526     90.55     82.93     10600    90.26    82.64  10649.3     89.64     82.64   10649.4
BT    89.64     82.46     10728      89.2    82.01    10806    88.21     81.02     10885     87.15
BT    79.96   10963.7     86.09     78.09  10963.8    86.09    82.09     10992     85.71     81.65
BT    11020     85.38     81.27     11048    85.13    81.02  11048.1     85.13      77.3     11053
BT    85.09      81.1   11053.1     85.09    85.09

ET        0         0      4.10     10128    11048
X1   167.04         0         0         0       38       38       38
X2        0         0         0         0        0        0        1

ET        0         0     10.40
X1   167.05         0         0         0        1        1        1
X3       10         0         0         0        0        0        0     85.32     85.09         0

X1   167.07        39     10102     11008      181      181      181
GR    108.2      9994      88.2      9996     83.2    10096     83.1     10102      67.3     10139
GR     60.4     10172      56.1     10208     49.6    10237     41.8     10259      34.7     10290
GR     26.8     10339      25.9     10359     25.9    10377     27.7     10399      26.9     10418
GR     29.8     10478        30     10498     31.8    10519     32.7     10537      32.8     10558
GR     31.9     10578      31.8     10619     30.8    10638     28.7     10658      28.6     10698
GR     29.7     10719      34.7     10739     36.5    10760     42.4     10797      47.7     10837
GR     53.7     10859        56     10874       59    10898     69.3     10970      78.6     11008
GR     80.1     11028      81.1     11047     86.1    11147    106.1     11149

ET                         10.41
                ICG R.R. BRIDGE
X1   167.10        22     10105     11020      181      181      181         0         0         0
X3       10         0         0         0        0        0        0     84.50     84.50         0
GR    87.21   10084.5      85.4   10084.6     79.9    10105       71     10123      66.2     10134
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GR	54.4	10200	38.1	10300	33.6	10345	28.1	10400	30.3	10517
GR	33	10600	35.4	10700	34.6	10800	56.1	10895	66.2	10973
GR	67.2	10982	73.7	11000	75.6	11013	76.2	11020	86.5	11020.1
GR	86.9	11092	87.36	11092.1	0	0	0	0	0	0
SB	0.95	1.56	2.6	0	189	49	26955	7.93	28.1	28.1
ET			10.41							
X1	167.11	0	0	0	19	19	19	0	0	0
X2	0	0	1	80.76	86.44	0	0	0	0	0
X3	10	0	0	0	0	0	0	86.44	86.44	0
BT	15	10084.5	87.21	0	10084.6	86.68	0	10103	86.84	0
BT	10200	86.88	0	10300	86.91	0	10351	86.57	0	10400
BT	86.54	0	10500	86.44	0	10600	86.51	0	10700	86.63
BT	0	10800	86.61	0	10896	86.57	0	10973	86.7	0
BT	11092	86.9	0	11092.1	87.36	0	0	0	0	0

1

ET			10.40							
X1	167.13	39	10102	11008	127	127	127	0	0	0
GR	108.2	9994	88.2	9996	83.2	10096	83.1	10102	67.3	10139
GR	60.4	10172	56.1	10208	49.6	10237	41.8	10259	34.7	10290
GR	26.8	10339	25.9	10359	25.9	10377	27.7	10399	26.9	10418
GR	29.8	10478	30	10498	31.8	10519	32.7	10537	32.8	10558
GR	31.9	10578	31.8	10619	30.8	10638	28.7	10658	28.6	10698
GR	29.7	10719	34.7	10739	36.5	10760	42.4	10797	47.7	10837
GR	53.7	10859	56	10874	59	10898	69.3	10970	78.6	11008
GR	80.1	11028	81.1	11047	86.1	11147	106.1	11149		
NC	0	0	0	0.1	0.3	0	0	0	0	0
X1	167.32	35.	10132	10895	1003	1003	1003			
GR	94.2	10000.0	74.2	10002.0	69.2	10102.0	64.5	10114.0	61.6	10132.0
GR	56.3	10221.0	52.0	10261.0	52.0	10282.0	50.0	10302.0	50.0	10322.0
GR	49.0	10340.0	38.1	10381.0	28.1	10441.0	31.9	10460.0	24.2	10481.0
GR	20.9	10501.0	21.0	10559.0	21.9	10580.0	20.9	10600.0	22.0	10620.0
GR	21.8	10640.0	24.1	10680.0	22.9	10702.0	22.9	10722.0	23.8	10740.0
GR	25.6	10759.0	30.0	10779.0	45.0	10820.0	51.0	10839.0	56.5	10848.0
GR	62.5	10869.0	78.1	10895.0	80.5	10909.0	85.5	11009.0	105.5	11011.0
NC	0	0	0	0.3	0.5	0	0	0	0	0
X1	167.50	34	9803	10884	1028	1028	1028	0	0	0
X3	10	0	0	0	0	0	0	84.80	84.80	0
GR	89.6	9785	85.4	9790	76.8	9803	68.6	9815	66.3	9837
GR	62.2	9855	58.9	9895	58.6	9935	58.3	9975	58.2	10015
GR	58.1	10055	57.1	10095	57.1	10095.1	54.5	10197	32.7	10299
GR	27.2	10398	25	10432.9	25	10433	23.9	10451	23.9	10452
GR	20.8	10500	23.9	10548	23.9	10549	24.9	10567.9	24.9	10568
GR	27	10601	33.8	10701	48	10803	63.6	10860	72.9	10884
GR	76.75	10905	78.9	10927	89.38	10945	89.6	10945.1	0	0
ET	0	0	4.10	9803	10884					
		LEA JOYNER (US HWY. 80) BRIDGE								
X1	167.51	0	0	0	1	1	1	0	0	0
BT	32	9790	85.4	85.4	9803	85.4	76.8	9815	85.42	76.77
BT	9837	85.76	77.11	9855	86.22	77.57	9895	87.27	78.62	9935
BT	88.56	79.91	9975	90.02	81.37	10015	91.54	82.89	10055	93.05
BT	84.4	10095	94.59	85.94	10095.1	94.59	80.09	10197	98.15	83.65
BT	10299	100.42	85.92	10398	101.36	86.86	10432.9	101.28	86.78	10433
BT	101.28	84.48	10451	101.30	84.50	10452	101.300	23.9	10500	101.33
BT	20.8	10548	101.32	23.9	10549	101.32	84.52	10567.9	101.32	84.52
BT	10568	101.32	86.82	10601	101.31	86.81	10701	99.77	85.27	10803
BT	95.85	81.35	10860	93.37	78.87	10884	92.19	77.69	10905	91.25
BT	76.75	10927	90.19	78.9	10945	89.38	89.38	0	0	0
ET	0	0	4.10	9803	10884					
X1	167.52	0	0	0	54	54	54	0	0	0
X2	0	0	0	0	0	0	1	0	0	0

1

ET	0	0	10.40							
X1	167.53	0	0	0	1	1	1	0	0	0
X3	10	0	0	0	0	0	0	85.4	89.38	0
X1	167.70	37.	10161	10799	922	922	922			
GR	86.4	9930.0	66.4	9932.0	61.4	10032.0	61.4	10049.0	61.4	10080.0
GR	61.4	10104.0	61.4	10127.0	61.4	10135.0	62.3	10149.0	61.4	10161.0
GR	56.3	10165.0	46.0	10199.0	37.7	10221.0	33.9	10242.0	29.9	10280.0
GR	30.0	10300.0	27.9	10321.0	28.0	10361.0	26.0	10400.0	26.1	10500.0
GR	24.1	10521.0	24.1	10539.0	23.1	10559.0	22.9	10600.0	18.0	10619.0
GR	24.1	10640.0	30.1	10659.0	32.2	10679.0	42.4	10699.0	47.2	10719.0
GR	53.5	10738.0	56.9	10744.0	60.9	10762.0	79.6	10799.0	82.5	10828.0
GR	87.5	10928.0	107.5	10930.0						
NC	0	0	0	0.1	0.3					
X1	168.06	38.	10049	10784	1760	2000	1901			
GR	100.0	9439.0	91.0	9440.0	67.2	9470.0	67.2	9989.0	67.4	10018.0
GR	67.2	10049.0	60.6	10099.0	56.5	10139.0	48.9	10168.0	40.9	10189.0
GR	34.8	10209.0	32.7	10230.0	29.7	10249.0	29.9	10270.0	28.8	10289.0
GR	29.0	10308.0	27.6	10328.0	27.8	10409.0	26.8	10430.0	26.7	10450.0
GR	24.6	10490.0	24.5	10510.0	22.7	10529.0	21.7	10550.0	21.7	10571.0
GR	24.8	10590.0	25.7	10609.0	35.4	10629.0	44.0	10650.0	49.6	10669.0
GR	49.7	10689.0	55.9	10721.0	62.2	10735.0	66.2	10753.0	79.5	10779.0
GR	80.3	10784.0	88.0	10787.0	100.0	10788.0				
X1	168.44	48.	10100	10860	1850	2090	2006			
GR	100.0	9699.0	91.4	9700.0	67.3	9730.0	71.0	10024.0	71.4	10039.0
GR	70.9	10049.0	66.9	10079.0	66.9	10089.0	66.9	10100.0	61.3	10121.0
GR	58.1	10151.0	56.5	10198.0	55.6	10201.0	55.6	10220.0	53.7	10241.0
GR	49.7	10261.0	42.6	10281.0	38.8	10301.0	35.1	10319.0	34.7	10341.0
GR	32.0	10360.0	35.0	10380.0	36.9	10400.0	35.8	10420.0	35.8	10440.0
GR	33.9	10482.0	33.8	10501.0	32.6	10520.0	29.0	10540.0	26.8	10560.0
GR	29.7	10579.0	30.9	10600.0	28.8	10641.0	29.8	10660.0	28.6	10682.0
GR	28.8	10701.0	30.5	10720.0	34.8	10740.0	36.6	10760.0	44.8	10779.0
GR	46.8	10800.0	56.4	10810.0	59.6	10828.0	62.1	10849.0	65.1	10860.0
GR	68.8	10898.0	87.9	10901.0	100.0	10902.0				
X1	168.97	34.	10097.5	10661.2	2860	2775	2798			
GR	100.0	9759.0	89.0	9760.0	74.0	9790.0	73.9	10037.9	71.5	10097.5
GR	64.8	10119.3	61.7	10128.7	56.9	10138.1	44.3	10159.9	44.2	10178.8
GR	39.2	10197.6	30.1	10218.9	31.0	10237.8	29.9	10259.2	23.8	10298.4
GR	20.1	10318.7	17.0	10338.1	17.1	10358.0	18.1	10378.3	22.0	10417.6
GR	24.9	10437.5	30.0	10458.0	33.8	10476.4	37.9	10557.9	40.6	10577.3
GR	50.8	10596.8	56.9	10610.2	63.7	10620.2	69.3	10637.2	80.3	10661.2
GR	82.5	10689.5	86.3	10700.9	89.1	10731.0	100.0	10732.0		
X1	169.38	39.	10108	10599	1540	2750	2164			
GR	100.0	9929.0	89.9	9930.0	77.7	9960.0	73.6	10028.0	70.6	10058.0
GR	69.6	10098.0	68.7	10108.0	66.0	10118.0	61.1	10129.0	56.9	10134.0
GR	56.1	10139.0	47.1	10159.0	42.1	10180.0	39.1	10198.0	27.2	10219.0
GR	24.3	10239.0	15.1	10259.0	16.1	10280.0	11.0	10300.0	9.1	10319.0
GR	13.2	10359.0	16.2	10380.0	22.1	10440.0	26.2	10459.0	27.1	10479.0
GR	30.3	10500.0	40.3	10539.0	51.2	10559.0	55.2	10580.0	61.9	10599.0

GR	62.8	10607.0	61.9	10629.0	64.9	10678.0	67.0	10698.0	65.0	10800.0
GR	65.0	12140.0	80.0	12260.0	88.5	12290.0	100.0	12291.0		
ET	0	0	4.10	9900	12800					
X1	169.80	52.	10060	10977	2800	1450	2218			
GR	100.0	9319.0	89.6	9320.0	62.6	9350.0	62.6	10060.0	59.7	10081.0
GR	58.4	10100.0	57.1	10105.0	52.1	10140.0	52.0	10160.0	53.1	10181.0
GR	51.1	10220.0	49.0	10240.0	46.1	10260.0	46.1	10279.0	43.9	10320.0
GR	45.1	10337.0	45.0	10359.0	44.1	10380.0	44.0	10420.0	42.1	10439.0
GR	36.5	10462.0	29.0	10499.0	26.2	10518.0	24.1	10538.0	24.1	10581.0
GR	22.9	10598.0	23.1	10620.0	21.9	10638.0	22.1	10661.0	22.9	10679.0
GR	22.9	10720.0	21.9	10739.0	21.9	10779.0	23.0	10798.0	23.0	10859.0
GR	25.0	10880.0	30.9	10900.0	53.9	10940.0	60.2	10960.0	68.1	10968.0
GR	71.0	10977.0	71.7	11000.0	71.3	11029.0	73.1	11050.0	73.3	11070.0

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GR     75.0    11280.0     70.0    11490.0     65.0    11900.0     65.0    13160.0     80.0    13240.0
GR     90.0    13400.0    100.0    13401.0
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ET        0        0     10.40
X1   170.20      36.     10099     10694     2160      2020      2112
GR     100.0   8339.0      89.4    8340.0     80.0    8370.0      65.0    8490.0      65.0    9900.0
GR      65.5   9999.0      62.4   10049.0     63.4   10080.0      61.3   10099.0      57.0   10115.0
GR      51.9  10140.0      46.1   10159.0     41.0   10201.0      37.9   10261.0      40.0   10279.0
GR      35.9  10360.0      32.9   10380.0     27.9   10400.0      19.9   10440.0      15.9   10460.0
GR      14.0  10500.0      19.0   10520.0     25.0   10560.0      24.9   10580.0      25.8   10601.0
GR      43.9  10620.0      41.0   10640.0     57.1   10671.0      75.6   10694.0      75.6   10698.0
GR      76.8  10728.0      82.6   10744.0     79.7   10757.0      81.2   10798.0      90.0   11670.0
GR     100.0  11671.0

X1   170.58      45.   10024.1   10811.8     1420      2490      2006
GR     100.0   8639.0      89.4    8640.0     80.0    8670.0      70.0    8820.0      65.0    9040.0
GR      65.0   9900.0      74.0    9925.2     74.0    9969.6      74.0    9988.9      74.0   10024.1
GR      74.0  10024.2      55.1   10059.2     51.0   10079.6      43.0   10099.0      39.1   10119.4
GR      36.9  10140.0      34.9   10180.5     35.0   10199.9      34.0   10219.9      31.9   10240.5
GR      32.0  10280.3      32.9   10300.5     33.0   10339.8      30.1   10360.0      30.1   10399.8
GR      30.9  10419.6      31.1   10460.3     29.9   10479.3      30.0   10501.2      29.0   10519.7
GR      30.9  10559.7      31.0   10599.9     33.0   10639.5      41.0   10679.7      46.9   10697.9
GR      50.8  10738.1      57.5   10811.8     57.5   10826.4      57.5   10889.0      63.3   10922.9
GR      67.3  10948.8      70.0   11520.0     80.0   12960.0      90.0   13170.0     100.0   13530.0

X1   170.96      41.     10082     10594     1870      2080      2006
GR     100.0   9239.0      88.5    9240.0     80.0    9270.0      65.0    9340.0      65.0    9860.0
GR      70.0   9930.0      64.9   10020.0     64.0   10050.0      63.9   10082.0      62.1   10102.0
GR      56.9  10129.0      56.8   10141.0     55.7   10160.0      52.9   10180.0      45.9   10199.0
GR      37.1  10220.0      23.1   10259.0     15.1   10300.0      10.3   10319.0       8.3   10339.0
GR      11.2  10361.0      10.0   10382.0      6.1   10419.0       7.0   10440.0       7.2   10460.0
GR      12.8  10479.0      30.2   10500.0     33.7   10518.0      36.9   10540.0      48.8   10559.0
GR      56.7  10578.0      67.0   10594.0     67.0   10649.0      67.0   10698.0      65.0   10850.0
GR      60.0  11100.0      60.0   12080.0     70.0   12160.0      80.0   14060.0      90.0   14160.0
GR     100.0  14260.0
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X1   171.40      47.     10179     10841     2590      1900      2323
GR     100.0   9819.0      89.3    9820.0     80.0    9850.0      75.3   10035.0      75.1   10063.0
GR      66.8  10130.0      63.0   10179.0     56.7   10189.0      48.6   10200.0      37.6   10220.0
GR      27.7  10240.0      20.7   10260.0     15.8   10280.0      11.8   10321.0      12.9   10340.0
GR      14.9  10359.0      17.7   10380.0     18.9   10400.0      20.6   10435.0      20.9   10460.0
GR      22.9  10480.0      23.9   10500.0     25.7   10521.0      26.6   10542.0      29.6   10561.0
GR      30.7  10580.0      33.7   10600.0     35.7   10621.0      36.6   10641.0      39.6   10660.0
GR      49.4  10700.0      49.3   10721.0     51.3   10741.0      53.6   10753.0      53.7   10760.0
GR      58.5  10801.0      64.4   10841.0     66.1   10860.0      70.8   10926.0      70.0   11190.0
GR      60.0  11830.0      60.0   12060.0     71.0   12320.0      60.0   12560.0      70.0   12780.0
GR      80.0  15620.0     100.0   15740.0

                CITY OF MONROE, LOUISIANA CORP. LIMITS
X1   171.54                                  820       500       729

ET        0        0      4.10      9800     14000
X1   171.60      44.     10099     10676       420       260       327
GR     100.0   8159.0      88.4    8160.0     80.0    8190.0      75.0    8540.0      75.0    9920.0
GR      64.4  10051.0      64.4   10099.0     60.2   10121.0      58.2   10128.0      54.5   10151.0
GR      52.9  10159.0      51.9   10180.0     50.1   10198.0      40.7   10219.0      33.0   10238.0
GR      27.7  10259.0      24.1   10278.0     22.0   10299.0      21.9   10320.0      21.1   10339.0
GR      23.0  10381.0      23.0   10399.0     20.1   10420.0      18.0   10458.0      18.1   10499.0
GR      21.1  10518.0      21.1   10538.0     24.9   10558.0      32.1   10577.0      38.1   10598.0
GR      49.8  10619.0      54.1   10637.0     65.3   10663.0      72.5   10676.0      72.7   10697.0
GR      72.5  10747.0      70.0   11080.0     70.0   11670.0      60.0   11820.0      60.0   12200.0
GR      70.0  12260.0      70.0   15230.0     80.0   15330.0     100.0   15430.0
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T1  OUACHITA RIVER MILE 158.44 TO 171.60 - RIVERWOOD INTERNATIONAL
T2  MODIFIED ST.LOUIS DISTRICT COE FEB 1975 1000' LEVEE, 3000' NO LEVEE MODEL
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T3 100 YEAR ENCROACHMENTS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	3	0	0	0	0	0	0	84.30	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15		-1.0							

1

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468X THIS RUN EXECUTED 14AUG92 14:28:05

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.0; February 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

YEAR ENCROACHMENTS - NAT

SUMMARY PRINTOUT TABLE 100

SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	HJ	DEPTH	CWSEL	VCH	E
167.110	84.21	80.76	84.47	86.44	109000.00	.00	10.00	.01	56.24	84.34	2.89	84
167.110	85.22	80.76	85.49	86.44	109000.00	.00	10.00	.01	57.27	85.37	2.82	85

1

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YEAR ENCROACHMENTS - NAT

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STE
	158.440	83.30	.00	83.31	12997.00	718.48	26272.00	82009.53	.00	.00	10119.00	10614.00	
	158.440	84.30	1.00	84.31	8831.00	.00	30287.44	78712.56	8831.00	10119.00	10119.00	10614.00	1895
	158.630	83.30	.00	83.31	13338.42	146.58	34450.64	74402.79	.00	.00	10084.00	10673.00	
	158.630	84.30	1.00	84.31	10016.00	.00	39411.17	69588.84	10016.00	10084.00	10084.00	10673.00	2010
	158.720	83.30	.00	83.31	13335.54	141.48	35655.68	73202.84	.00	.00	10084.00	10673.00	
	158.720	84.30	1.00	84.32	10016.00	.00	40599.96	68400.03	10016.00	10084.00	10084.00	10673.00	2010
*	158.820	83.28	.00	83.33	12199.10	2485.42	62157.36	44357.21	.00	.00	10158.00	10652.00	
	158.820	84.29	1.01	84.33	9292.00	.00	56698.00	52302.00	9292.00	10158.00	10158.00	10652.00	1945
*	159.200	83.34	.00	83.35	13721.61	215.27	26099.86	82684.87	.00	.00	10074.00	10567.00	
*	159.200	84.34	1.00	84.34	11326.00	.00	26992.23	82007.77	11326.00	10074.00	10074.00	10567.00	2140
	159.730	83.35	.00	83.35	14884.30	183.64	24866.72	83949.65	.00	.00	10135.00	10714.00	
	159.730	84.35	1.00	84.35	12958.27	.00	25481.53	83518.48	.08	10135.00	10135.00	10714.00	2309
	160.130	83.35	.00	83.36	18422.13	388.53	19268.10	89343.38	.00	.00	10161.00	10723.00	
	160.130	84.35	1.00	84.35	13039.00	.00	22035.73	86964.27	13039.00	10161.00	10161.00	10723.00	2320

160.510	83.35	.00	83.36	17723.23	266.42	22862.14	85871.45	.00	.00	10049.00	10648.00	
160.510	84.35	1.00	84.36	12351.00	.00	26034.19	82965.82	12351.00	10049.00	10049.00	10648.00	2240
160.670	83.36	.00	83.36	16925.82	2975.47	23957.10	82067.43	.00	.00	10049.00	10625.00	
160.670	84.35	1.00	84.36	11301.00	.00	28459.59	80540.41	11301.00	10049.00	10049.00	10625.00	2135
160.860	83.36	.00	83.36	15499.81	2603.71	26405.80	79990.49	.00	.00	10039.00	10649.00	
160.860	84.36	1.00	84.36	10261.00	.00	31426.67	77573.34	10261.00	10039.00	10039.00	10649.00	2030
161.050	83.36	.00	83.37	14169.43	2728.32	27850.07	78421.60	.00	.00	10139.00	10697.00	
161.050	84.36	1.00	84.37	9211.00	.00	33031.85	75968.14	9211.00	10139.00	10139.00	10697.00	1935
161.400	83.36	.00	83.37	12242.35	150.76	34477.45	74371.79	.00	.00	10101.00	10739.00	
161.400	84.37	1.00	84.38	8099.00	.00	39124.79	69875.22	8099.00	10101.00	10101.00	10739.00	1820
* 162.000	83.37	.00	83.39	9703.17	137.85	45240.63	63621.53	.00	.00	10153.00	10716.00	
162.000	84.38	1.01	84.40	8488.75	.00	46526.84	62473.16	.09	10153.00	10153.00	10716.00	1864
162.170	83.38	.00	83.40	9537.35	133.21	43923.74	64943.05	.00	.00	10120.00	10710.00	
162.170	84.38	1.01	84.40	8325.24	.00	45264.16	63735.83	.08	10120.00	10120.00	10710.00	1844
162.380	83.39	.00	83.41	9384.66	78.14	48055.05	60866.80	.00	.00	10030.00	10780.00	
162.380	84.39	1.01	84.41	8296.05	.00	49403.23	59596.78	.09	10030.00	10030.00	10780.00	1903
162.450	83.39	.00	83.41	10295.56	71.82	47411.56	61516.62	.00	.00	10030.00	10900.00	
162.450	84.40	1.01	84.42	9086.05	.00	48918.46	60081.54	.09	10030.00	10030.00	10900.00	1911

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SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STI
162.600	83.39	.00	83.42	10431.24	169.25	55593.94	53236.81	.00	.00	10135.00	10790.00	
162.600	84.40	1.01	84.43	9335.33	.00	56772.27	52227.73	.09	10135.00	10135.00	10790.00	1947
* 162.800	83.30	.00	83.48	2146.27	10625.65	96785.38	1588.97	.00	.00	10118.00	10650.00	
* 162.800	84.31	1.01	84.49	2100.00	8614.45	97683.44	2702.11	2100.00	9950.00	10118.00	10650.00	1205
163.180	83.44	.00	83.56	3231.25	25947.86	77553.97	5498.17	.00	.00	10192.00	10647.00	
163.180	84.43	.99	84.57	2092.16	25353.69	80052.52	3593.80	.06	9046.11	10192.00	10647.00	1113
163.320	83.51	.00	83.59	3830.63	27737.45	73415.38	7847.19	.00	.00	10126.00	10636.00	
163.320	84.50	1.00	84.59	2799.45	27885.95	75782.33	5331.73	.06	8222.91	10126.00	10636.00	1102
* 163.760	83.60	.00	83.62	6984.11	25424.76	40708.34	42866.90	.00	.00	10126.00	10670.00	
* 163.760	84.61	1.00	84.63	5650.00	22820.30	43370.55	42809.14	5650.00	8050.00	10126.00	10670.00	1370
163.930	83.60	.00	83.64	5243.68	24435.39	54534.45	30030.16	.00	.00	10130.00	10664.00	
163.930	84.60	1.00	84.64	4545.40	23693.08	56298.24	29008.68	.07	7970.95	10130.00	10664.00	1251
164.340	83.59	.00	83.69	2608.37	17018.55	88768.58	3212.88	.00	.00	10100.00	10711.00	
164.340	84.59	1.00	84.69	1741.43	16372.48	91492.13	1135.37	.05	9175.93	10100.00	10711.00	10917
164.740	83.60	.00	83.76	1794.13	6111.80	97055.30	5832.91	.00	.00	10139.00	10636.00	
164.740	84.60	1.00	84.77	1084.57	5087.28	99888.73	4024.00	.04	9659.81	10139.00	10636.00	10744
165.190	83.71	.00	83.84	1782.62	134.48	97601.93	11263.59	.00	.00	10052.00	10720.00	
165.190	84.71	1.00	84.84	1245.13	.00	100946.90	8053.11	.05	10052.00	10052.00	10720.00	11297
165.610	83.79	.00	83.90	2317.00	775.44	87883.81	20340.74	.00	.00	10108.00	10700.00	
165.610	84.80	1.00	84.90	1701.32	.00	90481.59	18518.40	.05	10108.00	10108.00	10700.00	11809
165.950	83.83	.00	83.95	1686.24	4153.63	99369.38	5476.99	.00	.00	10111.00	10829.00	
165.950	84.83	1.00	84.95	977.27	2239.87	102767.40	3992.76	.04	10023.02	10111.00	10829.00	11000
166.370	83.87	.00	84.02	838.26	2049.17	106503.80	447.03	.00	.00	10098.00	10827.00	
166.370	84.88	1.01	85.03	729.00	.00	109000.00	.00	.02	10098.00	10098.00	10827.00	10827
166.570	83.91	.00	84.05	909.91	3855.65	104349.50	794.84	.00	.00	10087.00	10810.00	
166.570	84.91	1.00	85.07	744.44	761.20	108238.80	.00	.04	10065.56	10087.00	10810.00	10810

166.690	83.94	.00	84.08	898.73	120.35	108149.00	730.61	.00	.00	9969.00	10810.00	
166.690	84.95	1.02	85.10	808.60	.00	109000.00	.00	.01	9969.00	9969.00	10810.00	10810
166.710	83.94	.00	84.09	898.76	120.69	108147.80	731.50	.00	.00	9969.00	10810.00	
166.710	84.96	1.02	85.10	808.61	.00	109000.00	.00	.01	9969.00	9969.00	10810.00	10810
166.760	83.96	.00	84.10	1119.75	192.78	106719.40	2087.80	.00	.00	10083.00	10868.00	
166.760	84.97	1.01	85.12	785.00	.00	109000.00	.00	.02	10083.00	10083.00	10868.00	10868
166.950	84.01	.00	84.13	942.76	19.06	108980.90	.00	.00	.00	10027.00	10916.00	
166.950	85.03	1.02	85.15	888.30	.00	109000.00	.00	.00	10027.00	10027.00	10916.00	10916

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STEI
	167.020	84.03	.00	84.15	920.00	.00	109000.00	.00	.00	.00	10128.00	11048.00	
	167.020	85.05	1.02	85.16	920.00	.00	109000.00	.00	.00	10128.00	10128.00	11048.00	11048
*	167.030	84.01	.00	84.17	949.02	.00	109000.00	.01	.00	.00	10128.00	11048.00	
*	167.030	85.03	1.02	85.18	920.00	.00	109000.00	.00	920.00	10128.00	10128.00	11048.00	11048
	167.040	84.02	.00	84.17	949.02	.00	109000.00	.01	.00	.00	10128.00	11048.00	
	167.040	85.03	1.02	85.19	920.00	.00	109000.00	.00	920.00	10128.00	10128.00	11048.00	11048
*	167.050	84.07	.00	84.18	920.00	.00	109000.00	.00	.00	.00	10128.00	11048.00	
*	167.050	85.09	1.02	85.20	920.00	.00	109000.00	.00	.00	10128.00	10128.00	11048.00	11048
	167.070	84.06	.00	84.20	1027.88	2.07	108883.20	114.71	.00	.00	10102.00	11008.00	
	167.070	85.09	1.02	85.21	906.00	.00	109000.00	.00	.00	10102.00	10102.00	11008.00	11008
	167.100	84.07	.00	84.20	915.00	.00	109000.00	.00	.00	.00	10105.00	11020.00	
	167.100	85.09	1.02	85.22	915.00	.00	109000.00	.00	.00	10105.00	10105.00	11020.00	11020
	167.110	84.34	.00	84.47	915.00	.00	109000.00	.00	.00	.00	10105.00	11020.00	.
	167.110	85.37	1.03	85.49	915.00	.00	109000.00	.00	.00	10105.00	10105.00	11020.00	11020.
	167.130	84.34	.00	84.47	1038.68	3.63	108866.70	129.64	.00	.00	10102.00	11008.00	.
	167.130	85.37	1.03	85.49	906.00	.00	109000.00	.00	.00	10102.00	10102.00	11008.00	11008.
	167.320	84.37	.00	84.51	985.51	2323.98	106584.30	91.75	.00	.00	10132.00	10895.00	.
	167.320	85.39	1.02	85.53	763.00	.00	109000.00	.00	.02	10132.00	10132.00	10895.00	10895.
	167.500	84.45	.00	84.55	1081.00	.00	109000.00	.00	.00	.00	9803.00	10884.00	.
	167.500	85.48	1.03	85.57	1081.00	.00	109000.00	.00	.00	9803.00	9803.00	10884.00	10884.
*	167.510	84.43	.00	84.57	1145.03	.00	108980.50	19.52	.00	.00	9803.00	10884.00	.
*	167.510	85.46	1.03	85.60	1081.00	.00	109000.00	.00	1081.00	9803.00	9803.00	10884.00	10884.
	167.520	84.43	.00	84.58	1145.04	.00	108980.50	19.52	.00	.00	9803.00	10884.00	.
	167.520	85.46	1.03	85.60	1081.00	.00	109000.00	.00	1081.00	9803.00	9803.00	10884.00	10884.
*	167.530	84.49	.00	84.59	1081.00	.00	109000.00	.00	.00	.00	9803.00	10884.00	.
*	167.530	85.53	1.03	85.62	1081.00	.00	109000.00	.00	.00	9803.00	9803.00	10884.00	10884.
	167.700	84.50	.00	84.64	937.74	8103.06	100842.10	54.81	.00	.00	10161.00	10799.00	.
	167.700	85.52	1.03	85.67	761.28	4835.30	104164.70	.00	.04	10037.72	10161.00	10799.00	10799.
	168.060	84.59	.00	84.70	1337.58	13596.73	95402.67	.60	.00	.00	10049.00	10784.00	.
	168.060	85.61	1.03	85.73	1142.65	10152.72	98847.28	.00	.04	9641.35	10049.00	10784.00	10784.
	168.440	84.63	.00	84.77	1192.08	7822.89	100193.20	983.87	.00	.00	10100.00	10860.00	.
	168.440	85.66	1.03	85.80	999.76	5093.94	103906.10	.00	.04	9860.24	10100.00	10860.00	10860.
	168.970	84.68	.00	84.91	927.41	4572.49	104370.50	57.02	.00	.00	10097.50	10661.20	.
	168.970	85.71	1.03	85.95	618.00	936.24	108063.80	.00	.04	10043.20	10097.50	10661.20	10661.

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	S1
*	169.380	84.92	.00	84.99	2335.12	1561.83	69294.99	38143.18	.00	.00	10108.00	10599.00	
*	169.380	85.96	1.04	86.04	1953.80	.00	70827.13	38172.87	.05	10108.00	10108.00	10599.00	120
*	169.800	85.00	.00	85.02	3994.84	13249.07	67520.75	28230.17	.00	.00	10060.00	10977.00	
*	169.800	86.03	1.03	86.07	2900.00	3273.12	78632.91	27093.98	2900.00	9900.00	10060.00	10977.00	128
*	170.200	85.00	.00	85.06	2820.02	39009.56	69474.84	515.60	.00	.00	10099.00	10694.00	
	170.200	86.04	1.04	86.10	2070.46	37514.29	71485.70	.00	.05	8623.54	10099.00	10694.00	106
	170.580	85.05	.00	85.09	4412.18	21035.54	68142.05	19822.40	.00	.00	10024.10	10811.80	
	170.580	86.09	1.04	86.13	3221.07	19521.33	70547.28	18931.39	.06	8969.96	10024.10	10811.80	121
	170.960	85.08	.00	85.11	4858.73	12780.25	51139.47	45080.29	.00	.00	10082.00	10594.00	
	170.960	86.12	1.04	86.15	3666.41	10461.07	52656.52	45882.42	.06	9478.99	10082.00	10594.00	131
	171.400	85.10	.00	85.13	5817.08	2181.00	60208.25	46610.75	.00	.00	10179.00	10841.00	
	171.400	86.14	1.04	86.18	4077.74	.00	61484.55	47515.45	.06	10179.00	10179.00	10841.00	142
	171.540	85.11	.00	85.14	5817.11	2181.49	60201.55	46616.96	.00	.00	10179.00	10841.00	
	171.540	86.15	1.04	86.18	4075.58	.00	61480.09	47519.91	.06	10179.00	10179.00	10841.00	142
	171.600	85.12	.00	85.14	7183.79	10160.60	48032.00	50807.40	.00	.00	10099.00	10676.00	
	171.600	86.15	1.03	86.19	4200.00	3463.68	57106.29	48430.04	4200.00	9800.00	10099.00	10676.00	140

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YEAR ENCROACHMENTS - NAT

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA
	158.440	.00	.00	.00	19.00	109000.00	83.30	.00	83.31	.03	.99	222222.3065286
	158.440	.00	.00	.00	19.00	109000.00	84.30	.00	84.31	.04	1.12	174402.1056518
	158.630	1003.00	.00	.00	19.00	109000.00	83.30	.00	83.31	.05	1.21	193364.4049703
	158.630	1003.00	.00	.00	19.00	109000.00	84.30	.00	84.31	.06	1.36	159656.5044122
	158.720	459.00	.00	.00	19.53	109000.00	83.30	.00	83.31	.05	1.27	186292.2047147
	158.720	459.00	.00	.00	19.53	109000.00	84.30	.00	84.32	.07	1.41	154344.8042088
*	158.820	475.00	.00	.00	20.00	109000.00	83.28	.00	83.33	.16	2.34	109314.3027497
	158.820	475.00	.00	.00	20.00	109000.00	84.29	.00	84.33	.13	2.10	111753.2030077
*	159.200	2006.00	.00	.00	16.10	109000.00	83.34	.00	83.35	.03	.99	229768.8064575
*	159.200	2006.00	.00	.00	16.10	109000.00	84.34	.00	84.34	.03	1.00	211156.3062946
	159.730	2798.00	.00	.00	20.30	109000.00	83.35	.00	83.35	.03	.90	244024.5066285
	159.730	2798.00	.00	.00	20.30	109000.00	84.35	.00	84.35	.03	.90	231484.3066071
	160.130	2112.00	.00	.00	21.00	109000.00	83.35	.00	83.36	.02	.71	311916.6085101
	160.130	2112.00	.00	.00	21.00	109000.00	84.35	.00	84.35	.02	.79	253421.6075532
	160.510	2006.00	.00	.00	17.70	109000.00	83.35	.00	83.36	.02	.80	279058.7074740
	160.510	2006.00	.00	.00	17.70	109000.00	84.35	.00	84.36	.03	.89	226057.2066413
	160.670	844.00	.00	.00	16.90	109000.00	83.36	.00	83.36	.02	.84	271535.7073265
	160.670	844.00	.00	.00	16.90	109000.00	84.35	.00	84.36	.03	.97	209157.2062022
	160.860	1003.00	.00	.00	8.00	109000.00	83.36	.00	83.36	.02	.85	263835.1073662
	160.860	1003.00	.00	.00	8.00	109000.00	84.36	.00	84.36	.03	.99	202692.5062551
	161.050	1003.00	.00	.00	16.90	109000.00	83.36	.00	83.37	.02	.93	244606.7069886
	161.050	1003.00	.00	.00	16.90	109000.00	84.36	.00	84.37	.03	1.08	186005.6058910
	161.400	1848.00	.00	.00	17.70	109000.00	83.36	.00	83.37	.03	1.04	207811.0060510
	161.400	1848.00	.00	.00	17.70	109000.00	84.37	.00	84.38	.04	1.16	166748.4054355

*	162.000	3168.00	.00	.00	21.80	109000.00	83.37	.00	83.39	.08	1.60	138943.80382892
	162.000	3168.00	.00	.00	21.80	109000.00	84.38	.00	84.40	.08	1.61	132325.20382190
	162.170	950.00	.00	.00	22.00	109000.00	83.38	.00	83.40	.08	1.54	140483.60389591
	162.170	950.00	.00	.00	22.00	109000.00	84.38	.00	84.40	.08	1.56	133575.80388662
	162.380	1100.00	.00	.00	21.00	109000.00	83.39	.00	83.41	.09	1.53	132466.80359004
	162.380	1100.00	.00	.00	21.00	109000.00	84.39	.00	84.41	.09	1.54	126246.00355695
	162.450	250.00	.00	.00	21.00	109000.00	83.39	.00	83.41	.08	1.37	145694.90390721
	162.450	250.00	.00	.00	21.00	109000.00	84.40	.00	84.42	.08	1.38	138721.50387554

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA .0
	162.600	868.00	.00	.00	21.00	109000.00	83.39	.00	83.42	.09	1.72	128062.40355761
	162.600	868.00	.00	.00	21.00	109000.00	84.40	.00	84.43	.10	1.72	122986.50351712
*	162.800	1056.00	.00	.00	24.10	109000.00	83.30	.00	83.48	.41	3.62	35566.52169800
*	162.800	1056.00	.00	.00	24.10	109000.00	84.31	.00	84.49	.39	3.58	36789.20173904
	163.180	2006.00	.00	.00	17.00	109000.00	83.44	.00	83.56	.33	3.28	51786.01190153
	163.180	2006.00	.00	.00	17.00	109000.00	84.43	.00	84.57	.33	3.33	46753.20190140
	163.320	739.00	.00	.00	16.00	109000.00	83.51	.00	83.59	.22	2.73	65873.60232786
	163.320	739.00	.00	.00	16.00	109000.00	84.50	.00	84.59	.22	2.76	60036.68232662
*	163.760	2323.00	.00	.00	19.50	109000.00	83.60	.00	83.62	.07	1.50	132543.80411640
*	163.760	2323.00	.00	.00	19.50	109000.00	84.61	.00	84.63	.07	1.56	120126.50399346
	163.930	897.00	.00	.00	20.90	109000.00	83.60	.00	83.64	.13	2.03	92974.67304420
	163.930	897.00	.00	.00	20.90	109000.00	84.60	.00	84.64	.13	2.05	88502.93304690
	164.340	2165.00	.00	.00	-1.60	109000.00	83.59	.00	83.69	.22	2.73	54422.71232585
	164.340	2165.00	.00	.00	-1.60	109000.00	84.59	.00	84.69	.22	2.76	49502.19232778
	164.740	2112.00	.00	.00	9.00	109000.00	83.60	.00	83.76	.31	3.41	40189.84197239
	164.740	2112.00	.00	.00	9.00	109000.00	84.60	.00	84.77	.31	3.45	36579.84197234
	165.190	2376.00	.00	.00	11.60	109000.00	83.71	.00	83.84	.30	3.04	43728.39198528
	165.190	2376.00	.00	.00	11.60	109000.00	84.71	.00	84.84	.31	3.08	40118.26197079
	165.610	2218.00	.00	.00	6.90	109000.00	83.79	.00	83.90	.23	2.82	52481.26225768
	165.610	2218.00	.00	.00	6.90	109000.00	84.80	.00	84.90	.24	2.85	48338.86223010
	165.950	1795.00	.00	.00	23.90	109000.00	83.83	.00	83.95	.27	2.88	43765.45209978
	165.950	1795.00	.00	.00	23.90	109000.00	84.83	.00	84.95	.27	2.92	39836.64210124
	166.370	2218.00	.00	.00	24.90	109000.00	83.87	.00	84.02	.32	3.09	36175.19193664
	166.370	2218.00	.00	.00	24.90	109000.00	84.88	.00	85.03	.33	3.10	35184.41189087
	166.570	1056.00	.00	.00	29.70	109000.00	83.91	.00	84.05	.34	3.14	36396.70188027
	166.570	1056.00	.00	.00	29.70	109000.00	84.91	.00	85.07	.35	3.18	34507.58185035
	166.690	612.00	.00	.00	29.70	109000.00	83.94	.00	84.08	.65	3.07	36011.29135714
	166.690	612.00	.00	.00	29.70	109000.00	84.95	.00	85.10	.63	3.02	36080.97137371
	166.710	116.00	.00	.00	29.70	109000.00	83.94	.00	84.09	.64	3.07	36021.22135764
	166.710	116.00	.00	.00	29.70	109000.00	84.96	.00	85.10	.63	3.02	36092.93137433
	166.760	275.00	.00	.00	30.00	109000.00	83.96	.00	84.10	.33	3.04	37539.56189344
	166.760	275.00	.00	.00	30.00	109000.00	84.97	.00	85.12	.34	3.04	35876.24188283
	166.950	1003.00	.00	.00	28.10	109000.00	84.01	.00	84.13	.29	2.80	38953.22201805
	166.950	1003.00	.00	.00	28.10	109000.00	85.03	.00	85.15	.27	2.74	39786.39208976

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA .0
	167.020	402.00	.00	.00	24.40	109000.00	84.03	.00	84.15	.27	2.72	40052.45208639
	167.020	402.00	.00	.00	24.40	109000.00	85.05	.00	85.16	.26	2.66	40987.83214184
*	167.030	1.00	85.09	82.94	24.40	109000.00	84.01	.00	84.17	1.10	3.13	34846.01103812
*	167.030	1.00	85.09	82.94	24.40	109000.00	85.03	.00	85.18	1.11	3.13	34845.82103675
	167.040	38.00	85.09	82.94	24.40	109000.00	84.02	.00	84.17	1.10	3.13	34846.01103812
	167.040	38.00	85.09	82.94	24.40	109000.00	85.03	.00	85.19	1.11	3.13	34845.82103675
*	167.050	1.00	.00	.00	24.40	109000.00	84.07	.00	84.18	.27	2.72	40091.10208975
*	167.050	1.00	.00	.00	24.40	109000.00	85.09	.00	85.20	.25	2.66	41031.23216004
	167.070	181.00	.00	.00	25.90	109000.00	84.06	.00	84.20	.34	2.92	37595.51187581
	167.070	181.00	.00	.00	25.90	109000.00	85.09	.00	85.21	.32	2.85	38259.88193999
	167.100	181.00	.00	.00	28.10	109000.00	84.07	.00	84.20	.34	2.91	37484.90187727
	167.100	181.00	.00	.00	28.10	109000.00	85.09	.00	85.22	.32	2.84	38420.08193638
	167.110	19.00	86.44	80.76	28.10	109000.00	84.34	.00	84.47	.33	2.89	37730.08189778
	167.110	19.00	86.44	80.76	28.10	109000.00	85.37	.00	85.49	.31	2.82	38670.94196436
	167.130	127.00	.00	.00	25.90	109000.00	84.34	.00	84.47	.33	2.90	37874.41189662
	167.130	127.00	.00	.00	25.90	109000.00	85.37	.00	85.49	.31	2.83	38509.48196035
	167.320	1003.00	.00	.00	20.90	109000.00	84.37	.00	84.51	.31	3.02	37359.05194599
	167.320	1003.00	.00	.00	20.90	109000.00	85.39	.00	85.53	.32	3.02	36048.86192248
	167.500	1028.00	.00	.00	20.80	109000.00	84.45	.00	84.55	.25	2.49	43708.35217141
	167.500	1028.00	.00	.00	20.80	109000.00	85.48	.00	85.57	.24	2.43	44822.16223549
*	167.510	1.00	85.40	86.86	20.80	109000.00	84.43	.00	84.57	.87	3.05	35802.97116955
*	167.510	1.00	85.40	86.86	20.80	109000.00	85.46	.00	85.60	.95	3.02	36111.00111609
	167.520	54.00	85.40	86.86	20.80	109000.00	84.43	.00	84.58	.87	3.05	35804.28116948
	167.520	54.00	85.40	86.86	20.80	109000.00	85.46	.00	85.60	.95	3.02	36111.97111587
*	167.530	1.00	.00	.00	20.80	109000.00	84.49	.00	84.59	.25	2.49	43755.01217528
*	167.530	1.00	.00	.00	20.80	109000.00	85.53	.00	85.62	.24	2.43	44871.02223944
	167.700	922.00	.00	.00	18.00	109000.00	84.50	.00	84.64	.31	3.14	37316.43197300.
	167.700	922.00	.00	.00	18.00	109000.00	85.52	.00	85.67	.31	3.18	35749.28196356.
	168.060	1901.00	.00	.00	21.70	109000.00	84.59	.00	84.70	.29	2.86	43605.71203042.
	168.060	1901.00	.00	.00	21.70	109000.00	85.61	.00	85.73	.29	2.90	41606.47202462.
	168.440	2006.00	.00	.00	26.80	109000.00	84.63	.00	84.77	.34	3.02	39817.73188265.
	168.440	2006.00	.00	.00	26.80	109000.00	85.66	.00	85.80	.35	3.06	37813.64185431.
	168.970	2798.00	.00	.00	17.00	109000.00	84.68	.00	84.91	.52	3.92	30212.76150618.
	168.970	2798.00	.00	.00	17.00	109000.00	85.71	.00	85.95	.53	3.97	27914.27149851.

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA .01
*	169.380	2164.00	.00	.00	9.10	109000.00	84.92	.00	84.99	.19	2.60	60728.31248565.
*	169.380	2164.00	.00	.00	9.10	109000.00	85.96	.00	86.04	.20	2.61	57839.31245497.
*	169.800	2218.00	.00	.00	21.90	109000.00	85.00	.00	85.02	.08	1.54	99577.01389711.
*	169.800	2218.00	.00	.00	21.90	109000.00	86.03	.00	86.07	.10	1.76	81599.67346904.
*	170.200	2112.00	.00	.00	14.00	109000.00	85.00	.00	85.06	.18	2.37	64546.20256331.
	170.200	2112.00	.00	.00	14.00	109000.00	86.04	.00	86.10	.18	2.38	61180.31255177.
	170.580	2006.00	.00	.00	29.00	109000.00	85.05	.00	85.09	.11	1.84	88677.98323796.
	170.580	2006.00	.00	.00	29.00	109000.00	86.09	.00	86.13	.11	1.87	81773.44324436.

170.960	2006.00	.00	.00	6.10	109000.00	85.08	.00	85.11	.10	1.84	99219.98351026
170.960	2006.00	.00	.00	6.10	109000.00	86.12	.00	86.15	.10	1.86	92317.38351781
171.400	2323.00	.00	.00	11.80	109000.00	85.10	.00	85.13	.09	1.75	104953.50361385
171.400	2323.00	.00	.00	11.80	109000.00	86.14	.00	86.18	.09	1.76	95251.62357689
171.540	729.00	.00	.00	11.80	109000.00	85.11	.00	85.14	.09	1.75	104971.80361461
171.540	729.00	.00	.00	11.80	109000.00	86.15	.00	86.18	.09	1.76	95257.44357794
171.600	327.00	.00	.00	18.00	109000.00	85.12	.00	85.14	.08	1.64	123146.80380901
171.600	327.00	.00	.00	18.00	109000.00	86.15	.00	86.19	.11	1.91	92429.27331419

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YEAR ENCROACHMENTS - MAT

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	158.440	109000.00	83.30	.00	.00	.00	12997.00	.00
	158.440	109000.00	84.30	1.00	.00	1.00	8831.00	.00
	158.630	109000.00	83.30	.00	.00	.00	13338.42	1003.00
	158.630	109000.00	84.30	1.00	.00	1.00	10016.00	1003.00
	158.720	109000.00	83.30	.00	.00	.00	13335.54	459.00
	158.720	109000.00	84.30	1.00	.00	1.00	10016.00	459.00
*	158.820	109000.00	83.28	.00	-.02	.00	12199.10	475.00
	158.820	109000.00	84.29	1.01	-.01	1.01	9292.00	475.00
*	159.200	109000.00	83.34	.00	.06	.00	13721.61	2006.00
*	159.200	109000.00	84.34	1.00	.05	1.00	11326.00	2006.00
	159.730	109000.00	83.35	.00	.01	.00	14884.30	2798.00
	159.730	109000.00	84.35	1.00	.01	1.00	12958.27	2798.00
	160.130	109000.00	83.35	.00	.00	.00	18422.13	2112.00
	160.130	109000.00	84.35	1.00	.00	1.00	13039.00	2112.00
	160.510	109000.00	83.35	.00	.00	.00	17723.23	2006.00
	160.510	109000.00	84.35	1.00	.00	1.00	12351.00	2006.00
	160.670	109000.00	83.36	.00	.00	.00	16925.82	844.00
	160.670	109000.00	84.35	1.00	.00	1.00	11301.00	844.00
	160.860	109000.00	83.36	.00	.00	.00	15499.81	1003.00
	160.860	109000.00	84.36	1.00	.00	1.00	10261.00	1003.00
	161.050	109000.00	83.36	.00	.00	.00	14169.43	1003.00
	161.050	109000.00	84.36	1.00	.00	1.00	9211.00	1003.00
	161.400	109000.00	83.36	.00	.00	.00	12242.35	1848.00
	161.400	109000.00	84.37	1.00	.01	1.00	8099.00	1848.00
*	162.000	109000.00	83.37	.00	.01	.00	9703.17	3168.00
	162.000	109000.00	84.38	1.01	.01	1.01	8488.75	3168.00
	162.170	109000.00	83.38	.00	.01	.00	9537.35	950.00
	162.170	109000.00	84.38	1.01	.01	1.01	8325.24	950.00
	162.380	109000.00	83.39	.00	.01	.00	9384.66	1100.00
	162.380	109000.00	84.39	1.01	.01	1.01	8296.05	1100.00
	162.450	109000.00	83.39	.00	.01	.00	10295.56	250.00
	162.450	109000.00	84.40	1.01	.01	1.01	9086.05	250.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	162.600	109000.00	83.39	.00	.00	.00	10431.24	868.00
	162.600	109000.00	84.40	1.01	.00	1.01	9335.33	868.00
*	162.800	109000.00	83.30	.00	-.10	.00	2146.27	1056.00
*	162.800	109000.00	84.31	1.01	-.09	1.01	2100.00	1056.00
	163.180	109000.00	83.44	.00	.14	.00	3231.25	2006.00
	163.180	109000.00	84.43	.99	.13	.99	2092.16	2006.00
	163.320	109000.00	83.51	.00	.07	.00	3830.63	739.00
	163.320	109000.00	84.50	1.00	.07	1.00	2799.45	739.00
*	163.760	109000.00	83.60	.00	.10	.00	6984.11	2323.00
*	163.760	109000.00	84.61	1.00	.10	1.00	5650.00	2323.00
	163.930	109000.00	83.60	.00	-.01	.00	5243.68	897.00
	163.930	109000.00	84.60	1.00	-.01	1.00	4545.40	897.00
	164.340	109000.00	83.59	.00	-.01	.00	2608.37	2165.00
	164.340	109000.00	84.59	1.00	-.01	1.00	1741.43	2165.00
	164.740	109000.00	83.60	.00	.01	.00	1794.13	2112.00
	164.740	109000.00	84.60	1.00	.00	1.00	1084.57	2112.00
	165.190	109000.00	83.71	.00	.11	.00	1782.62	2376.00
	165.190	109000.00	84.71	1.00	.11	1.00	1245.13	2376.00
	165.610	109000.00	83.79	.00	.09	.00	2317.00	2218.00
	165.610	109000.00	84.80	1.00	.09	1.00	1701.32	2218.00
	165.950	109000.00	83.83	.00	.03	.00	1686.24	1795.00
	165.950	109000.00	84.83	1.00	.03	1.00	977.27	1795.00
	166.370	109000.00	83.87	.00	.05	.00	838.26	2218.00
	166.370	109000.00	84.88	1.01	.05	1.01	729.00	2218.00
	166.570	109000.00	83.91	.00	.03	.00	909.91	1056.00
	166.570	109000.00	84.91	1.00	.03	1.00	744.44	1056.00
	166.690	109000.00	83.94	.00	.03	.00	898.73	612.00
	166.690	109000.00	84.95	1.02	.04	1.02	808.60	612.00
	166.710	109000.00	83.94	.00	.01	.00	898.76	116.00
	166.710	109000.00	84.96	1.02	.01	1.02	808.61	116.00
	166.760	109000.00	83.96	.00	.02	.00	1119.75	275.00
	166.760	109000.00	84.97	1.01	.01	1.01	785.00	275.00
	166.950	109000.00	84.01	.00	.05	.00	942.76	1003.00
	166.950	109000.00	85.03	1.02	.06	1.02	888.30	1003.00

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	167.020	109000.00	84.03	.00	.02	.00	920.00	402.00
	167.020	109000.00	85.05	1.02	.02	1.02	920.00	402.00
*	167.030	109000.00	84.01	.00	-.02	.00	949.02	1.00
*	167.030	109000.00	85.03	1.02	-.02	1.02	920.00	1.00
	167.040	109000.00	84.02	.00	.00	.00	949.02	38.00
	167.040	109000.00	85.03	1.02	.00	1.02	920.00	38.00
*	167.050	109000.00	84.07	.00	.05	.00	920.00	1.00

*	167.050	109000.00	85.09	1.02	.06	1.02	920.00	1.00
	167.070	109000.00	84.06	.00	.00	.00	1027.88	181.00
	167.070	109000.00	85.09	1.02	.00	1.02	906.00	181.00
	167.100	109000.00	84.07	.00	.01	.00	915.00	181.00
	167.100	109000.00	85.09	1.02	.01	1.02	915.00	181.00
	167.110	109000.00	84.34	.00	.27	.00	915.00	19.00
	167.110	109000.00	85.37	1.03	.27	1.03	915.00	19.00
	167.130	109000.00	84.34	.00	.00	.00	1038.68	127.00
	167.130	109000.00	85.37	1.03	.00	1.03	906.00	127.00
	167.320	109000.00	84.37	.00	.03	.00	985.51	1003.00
	167.320	109000.00	85.39	1.02	.02	1.02	763.00	1003.00
	167.500	109000.00	84.45	.00	.08	.00	1081.00	1028.00
	167.500	109000.00	85.48	1.03	.09	1.03	1081.00	1028.00
*	167.510	109000.00	84.43	.00	-.02	.00	1145.03	1.00
*	167.510	109000.00	85.46	1.03	-.02	1.03	1081.00	1.00
	167.520	109000.00	84.43	.00	.00	.00	1145.04	54.00
	167.520	109000.00	85.46	1.03	.01	1.03	1081.00	54.00
*	167.530	109000.00	84.49	.00	.06	.00	1081.00	1.00
*	167.530	109000.00	85.53	1.03	.06	1.03	1081.00	1.00
	167.700	109000.00	84.50	.00	.00	.00	937.74	922.00
	167.700	109000.00	85.52	1.03	-.01	1.03	761.28	922.00
	168.060	109000.00	84.59	.00	.09	.00	1337.58	1901.00
	168.060	109000.00	85.61	1.03	.09	1.03	1142.65	1901.00
	168.440	109000.00	84.63	.00	.05	.00	1192.08	2006.00
	168.440	109000.00	85.66	1.03	.05	1.03	999.76	2006.00
	168.970	109000.00	84.68	.00	.05	.00	927.41	2798.00
	168.970	109000.00	85.71	1.03	.05	1.03	618.00	2798.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	169.380	109000.00	84.92	.00	.24	.00	2335.12	2164.00
*	169.380	109000.00	85.96	1.04	.25	1.04	1953.80	2164.00
*	169.800	109000.00	85.00	.00	.08	.00	3994.84	2218.00
*	169.800	109000.00	86.03	1.03	.07	1.03	2900.00	2218.00
*	170.200	109000.00	85.00	.00	.00	.00	2820.02	2112.00
	170.200	109000.00	86.04	1.04	.01	1.04	2070.46	2112.00
	170.580	109000.00	85.05	.00	.06	.00	4412.18	2006.00
	170.580	109000.00	86.09	1.04	.06	1.04	3221.07	2006.00
	170.960	109000.00	85.08	.00	.03	.00	4858.73	2006.00
	170.960	109000.00	86.12	1.04	.03	1.04	3666.41	2006.00
	171.400	109000.00	85.10	.00	.02	.00	5817.08	2323.00
	171.400	109000.00	86.14	1.04	.02	1.04	4077.74	2323.00
	171.540	109000.00	85.11	.00	.01	.00	5817.11	729.00
	171.540	109000.00	86.15	1.04	.01	1.04	4075.58	729.00
	171.600	109000.00	85.12	.00	.01	.00	7183.79	327.00
	171.600	109000.00	86.15	1.03	.00	1.03	4200.00	327.00

SUMMARY OF ERRORS AND SPECIAL NOTES

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WARNING SECNO=    158.820  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    159.200  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    159.200  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    162.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    162.800  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    162.800  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    163.760  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    163.760  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    167.030  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    167.030  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    167.050  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    167.050  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    167.510  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    167.510  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    167.530  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    167.530  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    169.380  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    169.380  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    169.800  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=    169.800  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    170.200  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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FLOODWAY DATA, YEAR ENCROACHMENTS - NAT
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
158.440	8831.	174402.	.6	84.3	83.3	1.0
158.630	10016.	159656.	.7	84.3	83.3	1.0
158.720	10016.	154345.	.7	84.3	83.3	1.0
158.820	9292.	111753.	1.0	84.3	83.3	1.0
159.200	11326.	211156.	.5	84.3	83.3	1.0
159.730	12958.	231484.	.5	84.3	83.3	1.0
160.130	13039.	253422.	.4	84.4	83.4	1.0
160.510	12351.	226057.	.5	84.4	83.4	1.0
160.670	11301.	209157.	.5	84.4	83.4	1.0
160.860	10261.	202693.	.5	84.4	83.4	1.0
161.050	9211.	186006.	.6	84.4	83.4	1.0
161.400	8099.	166748.	.7	84.4	83.4	1.0
162.000	8489.	132325.	.8	84.4	83.4	1.0
162.170	8325.	133576.	.8	84.4	83.4	1.0
162.380	9002.	126246.	.9	84.4	83.4	1.0
162.450	9086.	138721.	.8	84.4	83.4	1.0
162.600	9335.	122987.	.9	84.4	83.4	1.0

162.800	2100.	36789.	3.0	84.3	83.3	1.0
163.180	2092.	46753.	2.3	84.4	83.4	1.0
163.320	2799.	60037.	1.8	84.5	83.5	1.0
163.760	5650.	120127.	.9	84.6	83.6	1.0
163.930	4545.	88503.	1.2	84.6	83.6	1.0
164.340	1741.	49502.	2.2	84.6	83.6	1.0
164.740	1085.	36580.	3.0	84.6	83.6	1.0
165.190	1245.	40118.	2.7	84.7	83.7	1.0
165.610	1701.	48339.	2.3	84.8	83.8	1.0
165.950	977.	39837.	2.7	84.8	83.8	1.0
166.370	729.	35184.	3.1	84.9	83.9	1.0
166.570	744.	34508.	3.2	84.9	83.9	1.0
166.690	841.	36081.	3.0	84.9	83.9	1.0
166.710	841.	36093.	3.0	84.9	83.9	1.0
166.760	785.	35876.	3.0	85.0	84.0	1.0
166.950	888.	39786.	2.7	85.0	84.0	1.0
167.020	920.	40988.	2.7	85.0	84.0	1.0
167.030	920.	34846.	3.1	85.0	84.0	1.0
167.040	920.	34846.	3.1	85.0	84.0	1.0
167.050	920.	41031.	2.7	85.1	84.1	1.0
167.070	906.	38260.	2.8	85.1	84.1	1.0
167.100	915.	38420.	2.8	85.1	84.1	1.0
167.110	915.	38671.	2.8	85.3	84.3	1.0
167.130	906.	38509.	2.8	85.3	84.3	1.0
167.320	763.	36049.	3.0	85.4	84.4	1.0

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FLOODWAY DATA, YEAR ENCROACHMENTS - NAT
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
167.500	1081.	44822.	2.4	85.5	84.5	1.0
167.510	1081.	36111.	3.0	85.4	84.4	1.0
167.520	1081.	36112.	3.0	85.4	84.4	1.0
167.530	1081.	44871.	2.4	85.5	84.5	1.0
167.700	761.	35749.	3.0	85.5	84.5	1.0
168.060	1143.	41606.	2.6	85.6	84.6	1.0
168.440	1000.	37814.	2.9	85.6	84.6	1.0
168.970	618.	27914.	3.9	85.7	84.7	1.0
169.380	1954.	57839.	1.9	85.9	84.9	1.0
169.800	2900.	81600.	1.3	86.0	85.0	1.0
170.200	2070.	61180.	1.8	86.0	85.0	1.0
170.580	3221.	81773.	1.3	86.1	85.1	1.0
170.960	3666.	92317.	1.2	86.1	85.1	1.0
171.400	4078.	95252.	1.1	86.1	85.1	1.0
171.540	4076.	95257.	1.1	86.1	85.1	1.0
171.600	4200.	92429.	1.2	86.1	85.1	1.0

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*****************************************
*  HEC-2 WATER SURFACE PROFILES         *
*                                       *
*  Version   4.6.0;  February 1991      *
*                                       *
*  RUN DATE    14AUG92    TIME   14:28:31 *
*****************************************
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*********************************
*  U.S. ARMY CORPS OF ENGINEERS
*  HYDROLOGIC ENGINEERING CENTER
*  609 SECOND STREET, SUITE D
*  DAVIS, CALIFORNIA 95616-4687
*          (916) 756-1104
*********************************
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X     X  XXXXXXX  XXXXX            XXXXX
X     X  X       X    X           X    X
X     X  X       X                     X
XXXXXXX  XXXX    X         XXXXX   XXXXX
X     X  X       X                X
X     X  X       X    X           X
X     X  XXXXXXX  XXXXX            XXXXXXX
```

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14AUG92 14:28:31 PAGE 1

THIS RUN EXECUTED 14AUG92 14:28:31

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*************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.0;  February 1991
*************************************
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FR FREE FORMAT
T1  OUACHITA RIVER MILE 158.44 TO 171.60 - RIVERWOOD INTERNATIONAL CORP
T2  MODIFIED ST.LOUIS DISTRICT COE FEB 1975 100' LEVEE, 3000' NO LEVEE MODEL
T3  100 YEAR ENCROACHMENTS - NATURAL - WITH PROPOSED IMPOUNDMENT

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    NVINS     Q         WSEL      FQ

      0         2         0         0         0         0         0         0     83.30

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

    1.0                -1.0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    100       110       200       150

J5  LPRNT     NUMSEC                    ********REQUESTED SECTION NUMBERS********

    -10       -10

NC    0.04      0.04      .035       .1        .3
OT       2    109000    109000
ET       0         0      4.10    10119     18950
X1  158.44       47.     10119    10614
GR     95.0    9949.0      86.8   9950.0      77.0   9980.0      78.1   9986.0      79.0  10009.0
GR     76.2   10028.0      70.1  10047.0      63.5  10089.0      59.8  10108.0      58.5  10119.0
GR     52.7   10127.0      46.7  10148.0      38.1  10168.0      24.8  10189.0      21.8  10208.0
GR     22.0   10229.0      22.9  10247.0      23.0  10268.0      22.0  10288.0      22.0  10329.0
GR     21.0   10348.0      21.0  10430.0      19.0  10467.0      24.8  10488.0      23.1  10508.0
GR     27.0   10529.0      44.3  10547.0      51.0  10568.0      54.6  10604.0      58.8  10614.0
GR     58.8   10636.0      60.6  10687.0      68.1  10703.0      70.0  10800.0      73.0  11950.0
GR     70.0   15490.0      60.0  15820.0      50.0  16170.0      50.0  17100.0      60.0  17560.0
GR     70.0   17900.0      70.0  18620.0      69.0  20280.0      70.0  22000.0      70.0  22930.0
GR     84.4   22960.0      95.0  22961.0
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ET	0	0	4.10	10084	20100					
X1	158.63	34.	10084	10673	1050	860	1003			
GR	95.0	9979.0	86.9	9980.0	85.2	9998.0	86.8	10005.0	86.8	10016.0
GR	67.0	10084.0	56.5	10170.0	51.2	10199.0	43.7	10219.0	27.9	10260.0
GR	25.0	10281.0	21.2	10300.0	21.1	10320.0	22.1	10340.0	22.1	10360.0
GR	19.1	10420.0	19.0	10460.0	21.9	10518.0	22.1	10542.0	23.1	10562.0
GR	25.1	10580.0	40.0	10599.0	50.9	10618.0	54.6	10659.0	62.1	10673.0
GR	62.1	10707.0	62.1	10730.0	63.9	10748.0	65.4	10777.0	78.0	10830.0
GR	70.0	12040.0	70.0	23340.0	85.1	23370.0	95.0	23371.0		

ET 0 0 4.10 10084 20100
CITY OF MONROE, LOUISIANA CORP. LIMITS
X1 158.72 459 459 459 0.53

ET	0	0	4.10	10158	19450					
X1	158.82	40.	10158	10652	410	475	475			
GR	95.0	9999.0	87.0	10000.0	86.3	10023.0	71.1	10053.0	70.2	10066.0
GR	67.1	10075.0	61.6	10098.0	59.0	10123.0	59.3	10148.0	57.9	10158.0
GR	54.9	10160.0	28.9	10218.0	26.8	10239.0	26.0	10259.0	26.8	10280.0
GR	25.1	10299.0	24.0	10319.0	24.0	10339.0	22.9	10358.0	23.0	10399.0
GR	21.0	10439.0	20.8	10460.0	20.0	10479.0	20.8	10498.0	24.2	10519.0
GR	24.7	10536.0	27.0	10559.0	29.7	10578.0	37.9	10596.0	48.0	10617.0
GR	55.0	10637.0	59.2	10640.0	63.3	10652.0	63.3	10676.0	63.3	10695.0
GR	63.3	10815.0	78.7	10840.0	70.0	11420.0	84.3	23060.0	95.0	23061.0

ET	0	0	4.10	10074	21400					
X1	159.20	50.	10074	10567	1900	2260	2006			
GR	95.0	9996.0	87.0	9997.0	83.6	10005.0	69.3	10049.0	67.5	10067.0
GR	66.5	10074.0	54.9	10090.0	51.9	10099.0	25.9	10140.0	22.9	10159.0
GR	17.1	10179.0	16.1	10201.0	17.0	10221.0	17.1	10241.0	18.2	10260.0
GR	16.2	10280.0	17.2	10300.0	17.2	10340.0	20.2	10400.0	26.2	10421.0
GR	27.4	10441.0	29.2	10460.0	39.2	10484.0	46.6	10499.0	55.2	10521.0
GR	59.1	10535.0	61.2	10550.0	67.3	10567.0	68.5	10594.0	71.8	10613.0
GR	72.5	10629.0	72.2	10646.0	70.0	10770.0	65.0	10790.0	65.0	11000.0
GR	70.0	11060.0	75.0	11130.0	79.6	11240.0	75.0	11540.0	70.0	12270.0
GR	60.0	13460.0	60.0	15780.0	70.0	17120.0	70.0	20400.0	73.0	20410.0
GR	73.0	21940.0	70.0	21950.0	70.0	23700.0	84.6	23730.0	95.0	23731.0

ET	0	0	10.4							
X1	159.73	48.	10135	10714	2880	2520	2798			
GR	95.0	10069.0	87.3	10070.0	72.6	10079.0	72.6	10120.0	72.6	10135.0
GR	60.8	10150.0	54.2	10170.0	50.2	10179.0	44.2	10200.0	34.2	10219.0
GR	30.4	10240.0	23.5	10258.0	23.6	10280.0	25.5	10300.0	26.4	10320.0
GR	22.5	10359.0	21.6	10379.0	21.5	10400.0	20.3	10420.0	21.5	10440.0
GR	23.5	10459.0	24.5	10480.0	26.5	10500.0	29.5	10518.0	31.4	10540.0
GR	31.3	10561.0	33.4	10579.0	49.3	10619.0	51.4	10640.0	54.6	10654.0
GR	58.6	10668.0	62.2	10699.0	65.3	10714.0	66.3	10754.0	68.0	10799.0
GR	70.0	11530.0	75.0	11660.0	77.5	12000.0	75.0	12320.0	75.0	12880.0
GR	70.0	13640.0	65.0	14330.0	60.0	14500.0	60.0	15800.0	70.0	19370.0
GR	70.0	24930.0	85.0	24960.0	95.0	24961.0				

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ET	0	0	4.10	10161	23200					
X1	160.13	44.	10161	10723	2400	1100	2112			
GR	95.0	10029.0	88.9	10030.0	78.0	10039.0	77.2	10050.0	71.0	10081.0
GR	69.9	10100.0	67.5	10161.0	63.6	10171.0	47.2	10200.0	30.0	10220.0
GR	25.1	10241.0	23.2	10261.0	21.3	10301.0	21.0	10421.0	22.2	10440.0
GR	24.1	10461.0	25.0	10481.0	26.9	10500.0	27.9	10521.0	28.0	10540.0
GR	29.9	10580.0	36.9	10600.0	55.1	10635.0	58.3	10645.0	62.1	10674.0
GR	65.9	10689.0	70.1	10710.0	73.3	10723.0	74.1	10749.0	73.3	10798.0
GR	70.0	11160.0	70.0	11710.0	75.0	11870.0	76.8	12040.0	75.0	12620.0
GR	75.0	13300.0	70.0	14030.0	65.0	14730.0	60.0	14910.0	60.0	18000.0
GR	70.0	22690.0	70.0	28430.0	85.0	28460.0	95.0	28461.0		

ET	0	0	4.10	10049	22400

X1	160.51	45.	10049	10648	2220	1120	2006			
GR	95.0	9889.0	86.8	9890.0	75.0	10000.0	63.0	10049.0	58.2	10055.0
GR	54.4	10069.0	48.2	10109.0	26.0	10168.0	25.1	10187.0	22.9	10207.0
GR	22.2	10228.0	22.0	10290.0	18.8	10348.0	18.9	10370.0	17.8	10388.0
GR	17.7	10408.0	19.9	10430.0	22.7	10448.0	27.9	10468.0	40.9	10488.0
GR	46.9	10507.0	48.1	10529.0	50.2	10550.0	54.0	10568.0	55.1	10585.0
GR	58.6	10608.0	62.9	10619.0	80.2	10648.0	80.2	10739.0	70.0	10840.0
GR	75.0	11150.0	76.1	11430.0	75.0	11840.0	75.0	12530.0	70.0	13280.0
GR	65.0	13920.0	60.0	14400.0	60.0	15700.0	60.0	17260.0	70.0	18400.0
GR	70.0	26380.0	75.0	26650.0	75.0	27620.0	84.9	27650.0	95.0	27651.0
ET	0	0	4.10	10049	21350					
X1	160.67	48.	10049	10625	1000	820	844			
GR	95.0	9579.0	87.9	9580.0	75.0	9610.0	75.0	9720.0	55.0	9900.0
GR	65.0	10000.0	59.3	10049.0	56.0	10069.0	55.3	10072.0	54.1	10089.0
GR	48.1	10109.0	37.0	10128.0	31.0	10150.0	31.1	10189.0	30.1	10209.0
GR	28.2	10229.0	27.2	10249.0	27.2	10270.0	26.0	10290.0	24.1	10312.0
GR	22.1	10350.0	18.1	10370.0	16.9	10390.0	17.0	10410.0	19.1	10451.0
GR	22.2	10470.0	24.2	10491.0	27.0	10510.0	31.0	10530.0	47.2	10550.0
GR	51.2	10570.0	76.4	10625.0	77.1	10656.0	80.0	10680.0	80.0	10810.0
GR	75.4	11000.0	75.0	11220.0	75.0	11640.0	70.0	12530.0	65.0	12820.0
GR	60.0	12980.0	60.0	14780.0	70.0	17720.0	70.0	25860.0	75.0	26010.0
GR	75.0	26490.0	84.5	26520.0	95.0	26521.0				
ET	0	0	4.10	10039	20300					
X1	160.86	47.	10039	10649	1003	990	1003			
GR	95.0	9629.0	88.4	9630.0	70.0	9660.0	63.5	9881.0	63.5	9899.0
GR	63.5	9970.0	63.5	10021.0	63.5	10039.0	51.9	10111.0	50.0	10131.0
GR	42.8	10150.0	32.9	10171.0	27.7	10191.0	23.9	10210.0	22.9	10231.0
GR	22.9	10251.0	21.7	10270.0	22.8	10291.0	22.8	10311.0	18.8	10390.0
GR	17.8	10411.0	13.7	10430.0	11.7	10451.0	8.0	10470.0	12.9	10491.0
GR	13.8	10510.0	18.8	10529.0	45.8	10570.0	54.8	10610.0	63.3	10626.0
GR	65.9	10634.0	71.9	10645.0	72.1	10649.0	72.3	10650.0	72.1	10685.0
GR	72.1	10712.0	72.1	10724.0	75.0	10850.0	70.0	11670.0	65.0	11950.0
GR	60.0	12700.0	60.0	14210.0	65.0	15600.0	70.0	16850.0	70.0	25110.0
GR	84.3	25140.0	95.0	25141.0						

ET	0	0	4.10	10139	19350					
X1	161.05	44.	10139	10697	810	1180	1003			
GR	95.0	9759.0	88.9	9760.0	70.0	9790.0	62.2	10008.0	62.6	10054.0
GR	67.0	10069.0	62.1	10094.0	59.5	10112.0	57.1	10139.0	54.9	10142.0
GR	51.9	10148.0	47.9	10169.0	36.8	10188.0	30.9	10208.0	23.9	10227.0
GR	18.0	10248.0	19.7	10268.0	18.9	10288.0	18.8	10348.0	17.7	10368.0
GR	19.0	10388.0	16.9	10428.0	16.9	10508.0	19.0	10527.0	19.9	10547.0
GR	25.5	10567.0	37.9	10587.0	48.9	10607.0	55.1	10631.0	57.2	10646.0
GR	55.0	10666.0	58.7	10676.0	64.2	10697.0	69.8	10737.0	72.1	10746.0
GR	75.7	10756.0	75.0	11260.0	65.0	11580.0	60.0	11950.0	60.0	14200.0
GR	70.0	15890.0	70.0	23910.0	84.2	23940.0	95.0	23941.0		
ET	0	0	4.10	10101	18200					
X1	161.40	50.	10101	10739	1600	2100	1848			
GR	95.0	9889.0	89.3	9890.0	87.0	9920.0	86.8	10005.0	77.8	10033.0
GR	75.8	10067.0	74.3	10086.0	71.7	10101.0	64.8	10121.0	54.8	10146.0
GR	50.4	10161.0	47.5	10181.0	42.5	10201.0	32.5	10221.0	21.8	10260.0
GR	18.8	10281.0	18.7	10300.0	17.7	10320.0	21.6	10341.0	19.7	10361.0
GR	19.6	10381.0	20.8	10401.0	20.7	10420.0	21.8	10440.0	21.7	10460.0
GR	22.7	10479.0	22.5	10540.0	23.6	10559.0	23.5	10619.0	27.5	10640.0
GR	35.4	10659.0	46.3	10680.0	50.3	10700.0	54.5	10715.0	59.5	10727.0
GR	63.2	10739.0	64.8	10769.0	64.6	10849.0	70.0	11210.0	75.0	11750.0
GR	60.0	13730.0	60.0	15560.0	70.0	16380.0	70.0	17620.0	73.0	17630.0
GR	72.0	20470.0	70.0	20480.0	70.0	22230.0	84.3	22260.0	95.0	22261.0
ET	0	0	10.4							
X1	162.00	37.	10153	10716	3220	3090	3168			
GR	95.0	10041.0	86.5	10042.0	78.4	10072.0	78.2	10137.0	78.2	10153.0
GR	67.1	10169.0	62.5	10190.0	55.5	10195.0	53.0	10199.0	46.0	10220.0
GR	37.1	10239.0	32.1	10259.0	28.0	10279.0	27.0	10299.0	27.0	10340.0
GR	24.9	10380.0	24.9	10559.0	21.8	10580.0	22.9	10600.0	28.9	10638.0

GR	30.0	10659.0	59.7	10701.0	61.4	10709.0	65.9	10716.0	69.5	10745.0
GR	72.6	10764.0	72.1	10800.0	70.2	10860.0	70.0	11070.0	80.0	11350.0
GR	80.5	11520.0	80.0	11710.0	75.0	12290.0	70.0	12670.0	70.0	19730.0
GR	85.0	19760.0	95.0	19761.0						
ET	0	0	10.4							
X1	162.17	29.	10120	10710	950	634	950			
GR	95.0	10000.0	86.5	10010.0	78.4	10040.0	78.2	10120.0	27.5	10280.0
GR	27.2	10350.0	25.0	10370.0	25.0	10540.0	22.0	10590.0	30.0	10650.0
GR	65.0	10710.0	65.0	10840.0	70.0	10970.0	75.0	11150.0	80.0	11310.0
GR	80.0	11650.0	74.0	12290.0	76.0	12300.0	74.0	12310.0	70.0	12900.0
GR	68.0	14500.0	70.0	16000.0	70.0	16560.0	85.5	16600.0	85.5	17400.0
GR	70.0	17440.0	70.0	19550.0	85.0	19560.0	95.0	19570.0		
ET	0	0	10.4							
X1	162.38	33.0	10030	10780	1100	1047	1100			
GR	95.0	10000.0	88.6	10010.0	59.7	10030.0	50.5	10050.0	54.0	10100.0
GR	50.2	10150.0	23.5	10280.0	21.0	10330.0	23.0	10360.0	23.0	10420.0
GR	21.8	10450.0	21.8	10520.0	65.0	10620.0	65.0	10780.0	70.0	10810.0
GR	70.0	10880.0	65.0	10950.0	70.0	11290.0	75.0	11430.0	80.0	11550.0
GR	80.0	11760.0	74.0	12900.0	76.0	12910.0	74.0	12920.0	70.0	14900.0
GR	68.0	15120.0	70.0	15270.0	85.5	15310.0	85.5	18220.0	70.0	18260.0

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GR	70.0	20100.0	84.6	20110.0	95.0	20120.0	0.0	0.0		
ET	0	0	10.4							
X1	162.45	31.0	10030	10900	280	330	250			
GR	95.0	10000.0	88.6	10010.0	59.7	10030.0	50.5	10050.0	54.0	10100.0
GR	50.2	10150.0	23.5	10280.0	21.0	10330.0	23.0	10360.0	23.0	10420.0
GR	21.8	10450.0	21.8	10520.0	65.0	10670.0	65.0	10900.0	70.0	11300.0
GR	80.0	11600.0	80.0	11800.0	74.0	13090.0	76.0	13100.0	74.0	13110.0
GR	70.0	14000.0	70.0	14400.0	68.0	14800.0	70.0	15000.0	72.0	15300.0
GR	74.0	15310.0	72.0	15320.0	70.0	17200.0	70.0	20300.0	84.6	20310.0
GR	95.0	20320.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0	0	10.4							
X1	162.60	50.	10135	10790	870	1069	868			
GR	95.0	10099.0	88.6	10100.0	59.7	10135.0	55.7	10139.0	52.2	10145.0
GR	51.1	10160.0	51.1	10180.0	53.2	10200.0	54.2	10220.0	52.1	10239.0
GR	50.2	10260.0	44.2	10279.0	37.1	10299.0	32.2	10320.0	28.0	10340.0
GR	25.0	10360.0	25.0	10379.0	23.0	10399.0	22.1	10420.0	22.1	10440.0
GR	21.0	10459.0	23.1	10480.0	22.0	10499.0	23.2	10519.0	21.1	10540.0
GR	21.0	10620.0	21.9	10640.0	24.9	10659.0	26.0	10680.0	30.0	10700.0
GR	36.9	10719.0	49.2	10741.0	55.5	10758.0	64.4	10779.0	64.9	10782.0
GR	69.9	10790.0	70.8	10814.0	69.9	10825.0	69.9	10849.0	69.9	10899.0
GR	70.0	11430.0	75.0	11920.0	80.0	11980.0	80.0	12120.0	75.0	15780.0
GR	75.0	16300.0	70.0	17070.0	70.0	20510.0	84.6	20540.0	95.0	20541.0
ET	0	0	4.10	9950	12050					
X1	162.80	33.	10118	10650	1480	410	1056			
GR	95.0	9898.0	88.5	9899.0	56.6	9929.0	56.6	10024.0	60.3	10049.0
GR	58.3	10072.0	56.6	10100.0	56.7	10117.0	56.6	10118.0	48.9	10141.0
GR	33.8	10159.0	27.0	10179.0	24.9	10200.0	26.1	10219.0	26.1	10280.0
GR	25.0	10299.0	26.2	10320.0	24.1	10361.0	25.1	10380.0	25.1	10400.0
GR	26.1	10419.0	26.2	10478.0	26.0	10500.0	27.1	10520.0	29.0	10540.0
GR	36.2	10559.0	46.2	10579.0	55.6	10611.0	63.8	10629.0	80.5	10650.0
GR	80.5	10670.0	81.0	12050.0	95.0	12051.0				
ET	0	0	10.40							
X1	163.18	32.	10192	10647	2006	2006	2006			
GR	95.0	8799.0	88.4	8800.0	71.80	8830.0	66.8	10090.0	60.8	10138.0
GR	60.6	10148.0	59.3	10165.0	59.6	10186.0	59.1	10192.0	38.1	10239.0
GR	33.2	10258.0	27.2	10319.0	25.2	10358.0	22.1	10379.0	21.2	10399.0
GR	21.2	10421.0	22.2	10439.0	19.1	10500.0	17.0	10520.0	22.1	10540.0
GR	24.2	10558.0	32.6	10577.0	47.9	10598.0	55.9	10617.0	64.1	10630.0
GR	69.3	10642.0	75.3	10647.0	75.3	10675.0	76.9	10692.0	75.3	10731.0
GR	80.3	12040.0	95.0	12041.0						
ET	0	0	10.40							

X1	163.32	37.	10126	10636	739	739	739			
GR	95.0	7619.0	80.0	7620.0	70.0	8360.0	70.0	9560.0	72.8	9936.0
GR	67.8	10036.0	66.1	10091.0	66.1	10126.0	51.9	10158.0	46.0	10178.0
GR	36.0	10198.0	28.9	10218.0	25.9	10239.0	24.1	10258.0	18.1	10299.0
GR	16.0	10318.0	16.1	10339.0	18.2	10358.0	18.2	10379.0	16.0	10419.0
GR	19.2	10439.0	18.0	10458.0	19.2	10478.0	21.1	10498.0	21.1	10519.0
GR	31.1	10538.0	39.4	10558.0	49.2	10579.0	53.2	10597.0	56.0	10599.0
GR	60.9	10618.0	69.5	10636.0	71.0	10682.0	69.8	10698.0	69.5	10748.0

GR	76.0	11450.0	95.0	11451.0

ET	0	0	4.10	8050	13700					
X1	163.76	41.	10126	10670	1850	2820	2323			
GR	95.0	7259.0	88.4	7260.0	71.6	7290.0	70.0	7940.0	66.6	9990.0
GR	63.5	10041.0	63.8	10052.0	63.5	10126.0	55.2	10163.0	50.4	10180.0
GR	33.5	10220.0	31.6	10240.0	31.5	10260.0	29.5	10280.0	29.5	10301.0
GR	26.7	10320.0	25.4	10340.0	25.4	10361.0	24.5	10381.0	22.5	10401.0
GR	21.5	10421.0	21.6	10441.0	19.5	10480.0	20.5	10500.0	20.4	10520.0
GR	21.5	10540.0	27.4	10580.0	35.6	10600.0	51.2	10621.0	54.9	10628.0
GR	70.7	10670.0	70.9	10696.0	70.8	10751.0	75.3	10777.0	75.3	11020.0
GR	70.0	11260.0	60.0	12060.0	60.0	12360.0	70.0	14230.0	88.0	14260.0
GR	95.0	14261.0								

ET	0	0	10.40							
X1	163.93	39.	10130	10664	670	1040	897			
GR	95.0	7559.0	88.4	7560.0	71.5	7590.0	70.0	9360.0	71.5	10033.0
GR	67.2	10059.0	65.8	10089.0	65.1	10115.0	63.6	10130.0	56.0	10144.0
GR	35.0	10199.0	30.9	10220.0	29.0	10239.0	24.1	10260.0	23.1	10280.0
GR	25.1	10299.0	23.0	10319.0	23.1	10441.0	22.0	10461.0	21.9	10481.0
GR	20.9	10500.0	21.9	10521.0	24.1	10541.0	29.9	10560.0	39.6	10580.0
GR	52.4	10602.0	56.1	10611.0	59.9	10626.0	71.9	10657.0	77.5	10664.0
GR	77.5	10772.0	77.5	11310.0	70.0	11380.0	60.0	11800.0	60.0	12280.0
GR	70.0	12680.0	70.0	12790.0	88.4	12820.0	95.0	12821.0		

X1	164.34	41.	10100	10711	2040	2280	2165			
GR	95.0	8809.0	80.0	8810.0	70.0	9180.0	70.0	9820.0	63.4	10000.0
GR	63.4	10051.0	63.5	10068.0	63.4	10100.0	62.2	10119.0	59.5	10154.0
GR	55.8	10182.0	52.0	10201.0	48.9	10220.0	41.0	10241.0	28.1	10255.0
GR	22.3	10262.0	20.2	10281.0	14.2	10301.0	11.1	10321.0	7.1	10342.0
GR	2.2	10362.0	1.4	10380.0	-.6	10400.0	-1.6	10422.0	4.3	10462.0
GR	3.3	10482.0	3.4	10502.0	19.0	10541.0	40.9	10580.0	44.0	10600.0
GR	44.9	10620.0	54.9	10660.0	61.0	10682.0	66.4	10698.0	76.4	10711.0
GR	77.2	10758.0	76.4	10775.0	76.4	10799.0	76.4	11400.0	88.3	11430.0
GR	95.0	11431.0								

X1	164.74	42.	10139	10636	1160	2420	2112			
GR	95.0	9119.0	80.0	9120.0	73.8	10025.0	75.3	10075.0	66.2	10110.0
GR	63.0	10139.0	56.0	10166.0	52.1	10176.0	49.4	10195.0	41.2	10217.0
GR	31.8	10237.0	24.1	10258.0	16.2	10297.0	18.1	10317.0	13.1	10338.0
GR	12.1	10357.0	13.1	10377.0	13.0	10402.0	12.1	10417.0	12.1	10437.0
GR	10.2	10477.0	9.0	10498.0	15.0	10518.0	20.0	10537.0	33.1	10577.0
GR	39.4	10598.0	50.4	10617.0	55.9	10630.0	59.3	10636.0	59.3	10638.0
GR	59.3	10650.0	60.3	10664.0	60.8	10695.0	62.2	10721.0	64.5	10746.0
GR	71.2	10795.0	74.7	10831.0	76.3	10857.0	76.7	10870.0	75.6	10895.0
GR	88.3	10925.0	95.0	10926.0						

X1	165.19	39.	10052	10720	2350	2740	2376			
GR	95.0	9990.0	88.2	9991.0	79.0	10021.0	76.6	10052.0	68.5	10091.0
GR	63.0	10122.0	58.0	10136.0	54.9	10152.0	47.0	10187.0	40.2	10209.0
GR	32.3	10228.0	29.4	10248.0	27.2	10268.0	21.4	10290.0	13.6	10329.0
GR	11.6	10370.0	12.6	10389.0	14.4	10408.0	15.6	10430.0	15.6	10450.0
GR	18.5	10469.0	20.4	10490.0	21.5	10509.0	23.5	10529.0	23.4	10549.0
GR	25.5	10570.0	28.3	10589.0	34.4	10608.0	51.2	10650.0	55.0	10668.0

GR	61.1	10688.0	65.0	10705.0	71.2	10720.0	71.3	10728.0	71.2	10747.0
GR	71.2	10798.0	75.0	11770.0	89.3	11800.0	95.0	11801.0		

X1	165.61	38.	10108	10700	2580	1900	2218			
GR	95.0	10016.0	88.6	10017.0	72.9	10047.0	71.0	10078.0	71.0	10098.0
GR	71.0	10108.0	59.3	10130.0	55.6	10139.0	54.5	10140.0	48.9	10159.0
GR	37.5	10180.0	25.8	10241.0	19.8	10260.0	12.7	10280.0	10.0	10301.0
GR	7.9	10340.0	7.9	10361.0	7.0	10380.0	6.9	10400.0	9.2	10422.0
GR	14.1	10440.0	24.0	10482.0	29.7	10521.0	40.9	10560.0	42.9	10582.0
GR	48.8	10601.0	55.9	10651.0	59.9	10700.0	62.4	10750.0	66.1	10831.0
GR	67.3	10839.0	68.0	10861.0	68.6	10901.0	69.0	10908.0	75.0	12290.0
GR	80.0	12330.0	88.6	12360.0	95.0	12361.0				
X1	165.95	43.	10111	10829	2540	1200	1795			
GR	100.0	9869.0	87.4	9870.0	72.1	9900.0	67.1	10028.0	68.1	10038.0
GR	67.2	10050.0	62.7	10111.0	53.6	10178.0	46.6	10199.0	36.6	10220.0
GR	36.6	10220.0	31.0	10237.0	30.9	10279.0	31.9	10299.0	30.0	10338.0
GR	30.1	10377.0	29.1	10398.0	29.0	10439.0	31.1	10460.0	32.1	10479.0
GR	31.8	10538.0	29.9	10558.0	26.8	10618.0	26.9	10638.0	29.8	10657.0
GR	23.9	10677.0	32.0	10699.0	33.9	10717.0	33.9	10738.0	41.9	10778.0
GR	51.4	10797.0	55.8	10809.0	60.8	10829.0	60.8	10862.0	62.3	10899.0
GR	70.6	10923.0	73.5	10950.0	76.2	10998.0	76.5	11022.0	80.0	11490.0
GR	80.0	11550.0	88.7	11580.0	100.0	11581.0				
X1	166.37	38.	10098	10827	2218	2218	2218			
GR	100.0	10039.0	87.8	10040.0	67.2	10043.0	63.8	10050.0	60.7	10069.0
GR	59.1	10098.0	56.0	10103.0	50.7	10119.0	44.8	10159.0	34.7	10199.0
GR	30.9	10219.0	29.9	10239.0	26.7	10260.0	25.0	10279.0	24.9	10299.0
GR	26.9	10319.0	31.0	10339.0	30.8	10418.0	33.9	10479.0	34.1	10498.0
GR	32.0	10520.0	32.1	10559.0	33.0	10579.0	33.1	10618.0	32.1	10640.0
GR	32.2	10698.0	35.1	10718.0	46.2	10737.0	51.1	10758.0	55.0	10777.0
GR	56.4	10779.0	62.6	10811.0	69.9	10827.0	71.3	10847.0	87.9	10889.0
GR	87.9	10930.0	88.0	10960.0	100.0	10961.0				
X1	166.57	36	10087	10810	1056	1056	1056			
GR	86.2	9969	66.2	9971	61.2	10071	61.2	10087	57.9	10094
GR	56	10119	31.7	10219	29.8	10239	29.7	10299	30.7	10321
GR	30.8	10379	31.8	10400	31.7	10459	32.9	10479	32.6	10499
GR	31.8	10518	31.9	10537	29.7	10558	31.6	10578	30.7	10598
GR	30.7	10619	31.6	10638	33.5	10657	36.9	10679	38.9	10698
GR	46.7	10719	49.9	10739	54	10758	56.1	10763	65.3	10800
GR	67.6	10810	68.3	10833	86.9	10888	87.4	10898	92.4	10998
GR	112.4	11000								

INTERSTATE HWY. 20 BRIDGE

X1	166.69	92	9969	10810	612	612	612			
GR	86.2	9942	79	9942.1	78	9969	65	9991	78	9993
GR	78.5	9994	100	9995	100	9999	78.5	10000	78	10001
GR	58	10003	42	10100.9	48	10101.5	78	10103	78.5	10105
GR	100	10106	100	10110	78.5	10111	78	10113	48	10114.5
GR	40	10115.1	34	10160	30	10176	29.8	10239	29.8	10254.9
GR	48	10255.5	78	10257	78.5	10259	100	10260	100	10264
GR	78.5	10265	78	10267	48	10268.5	29.7	10269.1	29.7	10299
GR	30.7	10321	30.8	10379	31.8	10400	31.7	10459	32	10467

GR	48	10467.5	78	10469	78.5	10471	100	10472	100	10476
GR	78.5	10477	78	10479	48	10480.5	32.9	10481.1	32.6	10499
GR	31.8	10518	31.9	10537	29.7	10558	31.6	10578	30.7	10598
GR	30.7	10617.9	48	10618.5	78	10620	78.5	10622	100	10623
GR	100	10627	78.5	10628	78	10630	48	10631.5	31.4	10632.1
GR	33.5	10657	36.9	10679	38.9	10698	45.2	10715	78	10717
GR	78.5	10719	100	10720	100	10724	78.5	10725	78	10727
GR	49	10729	54	10758	56.1	10763	65.3	10800	67.6	10810
GR	67.5	10815	78	10816	78.5	10817	100	10818	100	10822
GR	78.5	10823	78	10824	68	10825	68.3	10833	86.9	10888
GR	87.4	10898	92.4	10998						
X1	166.71	0	0	0	116	116	116	0	0	0
X1	166.76	51	10083	10868	275	275	275			
GR	106.1	9937	86.1	9939	81.1	10039	80.5	10050	74.6	10083

GR	69.3	10088	63.8	10108	56.1	10128	50.7	10139	49.4	10160
GR	42.7	10180	39.7	10200	35.1	10219	31.9	10241	31.9	10260
GR	30	10280	31.8	10300	31.9	10319	31	10339	33.1	10360
GR	34	10380	33.9	10420	34.9	10440	33.9	10460	35.9	10480
GR	37	10500	36.9	10520	34.1	10578	33.8	10600	35	10621
GR	34.1	10639	34.9	10660	34.9	10680	32.9	10700	33	10719
GR	34.7	10739	35.6	10759	47.6	10798	50.6	10820	55.8	10838
GR	68.8	10868	68.8	10889	68.8	10900	68.8	10904	79.8	10958
GR	80.4	10964	80	10969	76.8	10977	73.8	11001	78.8	11101
GR	98.8	11103								
X1	166.95	44.	10027	10916	1003	1003	1003			
GR	106.7	9916.0	86.7	9918.0	81.7	10018.0	81.7	10027.0	78.2	10045.0
GR	58.6	10100.0	56.3	10103.0	38.9	10160.0	35.9	10180.0	34.9	10200.0
GR	32.1	10218.0	29.9	10238.0	29.0	10261.0	29.0	10279.0	28.1	10299.0
GR	29.8	10318.0	29.1	10339.0	30.0	10357.0	29.9	10377.0	32.0	10397.0
GR	31.1	10419.0	30.9	10438.0	31.9	10458.0	30.9	10477.0	30.9	10519.0
GR	31.9	10538.0	29.0	10559.0	31.8	10578.0	33.7	10618.0	35.7	10637.0
GR	35.7	10699.0	38.6	10756.0	41.5	10778.0	46.4	10798.0	50.5	10819.0
GR	51.8	10841.0	54.5	10857.0	55.6	10868.0	61.1	10898.0	86.0	10916.0
GR	87.8	10940.0	86.7	10996.0	91.7	11096.0	111.7	11098.0		
NC	0	0	0	0.3	0.5					
X1	167.02	32	10128	11048	402	402	402	0	0	0
X3	10	0	0	0	0	0	0	84.50	84.50	
GR	87.15	10097	85.32	10104	82.9	10104.1	82.5	10115	75.5	10128
GR	75.5	10128.1	63.2	10144	52.5	10193	39.2	10272	28.5	10351.2
GR	28.5	10351.5	27.1	10400	24.4	10474	24.4	10475.2	24.4	10524.8
GR	24.4	10526	31.3	10600	32.3	10649.3	32.3	10649.4	32.7	10728
GR	36.8	10806	52.2	10885	61.4	10963.7	61.4	10963.8	64	10992
GR	66.5	11020	70.1	11034	77.3	11048	77.3	11048.1	81.1	11053
GR	85.09	11053.1	87.25	11056						

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ET	0	0	4.10	10128	11048					
		ENDOM (DESIARD ST.) BRIDGE								
X1	167.03	0	0	0	1	1	1			
BT	28	10104	85.32	85.32	10104.1	85.32	82.9	10115	85.51	82.5
BT	10128	85.84	75.5	10128.1	85.84	78.73	10193	87.46	80.27	10272
BT	89.17	81.98	10351.2	89.83	82.67	10351.5	89.83	82.94	10400	90.46
BT	82.92	10474	90.55	82.93	10475.2	90.55	24.4	10524.8	90.55	24.4
BT	10526	90.55	82.93	10600	90.26	82.64	10649.3	89.64	82.64	10649.4
BT	89.64	82.46	10728	89.2	82.01	10806	88.21	81.02	10885	87.15
BT	79.96	10963.7	86.09	78.09	10963.8	86.09	82.09	10992	85.71	81.65
BT	11020	85.38	81.27	11048	85.13	81.02	11048.1	85.13	77.3	11053
BT	85.09	81.1	11053.1	85.09	85.09					
ET	0	0	4.10	10128	11048					
X1	167.04	0	0	0	38	38	38			
X2	0	0	0	0	0	0	1			
ET	0	0	10.40							
X1	167.05	0	0	0	1	1	1			
X3	10	0	0	0	0	0	0	85.32	85.09	0
X1	167.07	39	10102	11008	181	181	181			
GR	108.2	9994	88.2	9996	83.2	10096	83.1	10102	67.3	10139
GR	60.4	10172	56.1	10208	49.6	10237	41.8	10259	34.7	10290
GR	26.8	10339	25.9	10359	25.9	10377	27.7	10399	26.9	10418
GR	29.8	10478	30	10498	31.8	10519	32.7	10537	32.8	10558
GR	31.9	10578	31.8	10619	30.8	10638	28.7	10658	28.6	10698
GR	29.7	10719	34.7	10739	36.5	10760	42.4	10797	47.7	10837
GR	53.7	10859	56	10874	59	10898	69.3	10970	78.6	11008
GR	80.1	11028	81.1	11047	86.1	11147	106.1	11149		
ET			10.41							
		ICG R.R. BRIDGE								
X1	167.10	22	10105	11020	181	181	181	0	0	0
X3	10	0	0	0	0	0	0	84.50	84.50	0

GR	87.21	10084.5	85.4	10084.6	79.9	10105	71	10123	66.2	10134
GR	54.4	10200	38.1	10300	33.6	10345	28.1	10400	30.3	10517
GR	33	10600	35.4	10700	34.6	10800	56.1	10895	66.2	10973
GR	67.2	10982	73.7	11000	75.6	11013	76.2	11020	86.5	11020.1
GR	86.9	11092	87.36	11092.1	0	0	0	0	0	0
SB	0.95	1.56	2.6	0	189	49	26955	7.93	28.1	28.1
ET			10.41							
X1	167.11	0	0	0	19	19	19	0	0	0
X2	0	0	1	80.76	86.44	0	0	0	0	0
X3	10	0	0	0	0	0	0	86.44	86.44	0
BT	15	10084.5	87.21	0	10084.6	86.68	0	10103	86.84	0
BT	10200	86.88	0	10300	86.91	0	10351	86.57	0	10400
BT	86.54	0	10500	86.44	0	10600	86.51	0	10700	86.63
BT	0	10800	86.61	0	10896	86.57	0	10973	86.7	0
BT	11092	86.9	0	11092.1	87.36	0	0	0	0	0

ET			10.40							
X1	167.13	39	10102	11008	127	127	127	0	0	0
GR	108.2	9994	88.2	9996	83.2	10096	83.1	10102	67.3	10139
GR	60.4	10172	56.1	10208	49.6	10237	41.8	10259	34.7	10290
GR	26.8	10339	25.9	10359	25.9	10377	27.7	10399	26.9	10418
GR	29.8	10478	30	10498	31.8	10519	32.7	10537	32.8	10558
GR	31.9	10578	31.8	10619	30.8	10638	28.7	10658	28.6	10698
GR	29.7	10719	34.7	10739	36.5	10760	42.4	10797	47.7	10837
GR	53.7	10859	56	10874	59	10898	69.3	10970	78.6	11008
GR	80.1	11028	81.1	11047	86.1	11147	106.1	11149		
NC	0	0	0	0.1	0.3	0	0	0	0	0
X1	167.32	35.	10132	10895	1003	1003	1003			
GR	94.2	10000.0	74.2	10002.0	69.2	10102.0	64.5	10114.0	61.6	10132.0
GR	56.3	10221.0	52.0	10261.0	52.0	10282.0	50.0	10302.0	50.0	10322.0
GR	49.0	10340.0	38.1	10381.0	28.1	10441.0	31.9	10460.0	24.2	10481.0
GR	20.9	10501.0	21.0	10559.0	21.9	10580.0	20.9	10600.0	22.0	10620.0
GR	21.8	10640.0	24.1	10680.0	22.9	10702.0	22.9	10722.0	23.8	10740.0
GR	25.6	10759.0	30.0	10779.0	45.0	10820.0	51.0	10839.0	56.5	10848.0
GR	62.5	10869.0	78.1	10895.0	80.5	10909.0	85.5	11009.0	105.5	11011.0
NC	0	0	0	0.3	0.5	0	0	0	0	0
X1	167.50	34	9803	10884	1028	1028	1028	0	0	0
X3	10	0	0	0	0	0	0	84.80	84.80	0
GR	89.6	9785	85.4	9790	76.8	9803	68.6	9815	66.3	9837
GR	62.2	9855	58.9	9895	58.6	9935	58.3	9975	58.2	10015
GR	58.1	10055	57.1	10095	57.1	10095.1	54.5	10197	32.7	10299
GR	27.2	10398	25	10432.9	25	10433	23.9	10451	23.9	10452
GR	20.8	10500	23.9	10548	23.9	10549	24.9	10567.9	24.9	10568
GR	27	10601	33.8	10701	48	10803	63.6	10860	72.9	10884
GR	76.75	10905	78.9	10927	89.38	10945	89.6	10945.1	0	0
ET	0	0	4.10	9803	10884					
		LEA JOYNER (US HWY. 80) BRIDGE								
X1	167.51	0	0	0	1	1	1	0	0	0
BT	32	9790	85.4	85.4	9803	85.4	76.8	9815	85.42	76.77
BT	9837	85.76	77.11	9855	86.22	77.57	9895	87.27	78.62	9935
BT	88.56	79.91	9975	90.02	81.37	10015	91.54	82.89	10055	93.05
BT	84.4	10095	94.59	85.94	10095.1	94.59	80.09	10197	98.15	83.65
BT	10299	100.42	85.92	10398	101.36	86.86	10432.9	101.28	86.78	10433
BT	101.28	84.48	10451	101.30	84.50	10452	101.300	23.9	10500	101.33
BT	20.8	10548	101.32	23.9	10549	101.32	84.52	10567.9	101.32	84.52
BT	10568	101.32	86.82	10601	101.31	86.81	10701	99.77	85.27	10803
BT	95.85	81.35	10860	93.37	78.87	10884	92.19	77.69	10905	91.25
BT	76.75	10927	90.19	78.9	10945	89.38	89.38	0	0	0
ET	0	0	4.10	9803	10884					
X1	167.52	0	0	0	54	54	54	0	0	0
X2	0	0	0	0	0	0	1	0	0	0

ET	0	0	10.40							
X1	167.53	0	0	0	1	1	1	0	0	0
X3	10	0	0	0	0	0	0	85.4	89.38	0
X1	167.70	37.	10161	10799	922	922	922			
GR	86.4	9930.0	66.4	9932.0	61.4	10032.0	61.4	10049.0	61.4	10080.0
GR	61.4	10104.0	61.4	10127.0	61.4	10135.0	62.3	10149.0	61.4	10161.0
GR	56.3	10165.0	46.0	10199.0	37.7	10221.0	33.9	10242.0	29.9	10280.0
GR	30.0	10300.0	27.9	10321.0	28.0	10361.0	26.0	10400.0	26.1	10500.0
GR	24.1	10521.0	24.1	10539.0	23.1	10559.0	22.9	10600.0	18.0	10619.0
GR	24.1	10640.0	30.1	10659.0	32.2	10679.0	42.4	10699.0	47.2	10719.0
GR	53.5	10738.0	56.9	10744.0	60.9	10762.0	79.6	10799.0	82.5	10828.0
GR	87.5	10928.0	107.5	10930.0						
NC	0	0	0	0.1	0.3					
X1	168.06	38.	10049	10784	1760	2000	1901			
GR	100.0	9439.0	91.0	9440.0	67.2	9470.0	67.2	9989.0	67.4	10018.0
GR	67.2	10049.0	60.6	10099.0	56.5	10139.0	48.9	10168.0	40.9	10189.0
GR	34.8	10209.0	32.7	10230.0	29.7	10249.0	29.9	10270.0	28.8	10289.0
GR	29.0	10308.0	27.6	10328.0	27.8	10409.0	26.8	10430.0	26.7	10450.0
GR	24.6	10490.0	24.5	10510.0	22.7	10529.0	21.7	10550.0	21.7	10571.0
GR	24.8	10590.0	25.7	10609.0	35.4	10629.0	44.0	10650.0	49.6	10669.0
GR	49.7	10689.0	55.9	10721.0	62.2	10735.0	66.2	10753.0	79.5	10779.0
GR	80.3	10784.0	88.0	10787.0	100.0	10788.0				
X1	168.44	48.	10100	10860	1850	2090	2006			
GR	100.0	9699.0	91.4	9700.0	67.3	9730.0	71.0	10024.0	71.4	10039.0
GR	70.9	10049.0	66.9	10079.0	66.9	10089.0	66.9	10100.0	61.3	10121.0
GR	58.1	10151.0	56.5	10198.0	55.6	10201.0	55.6	10220.0	53.7	10241.0
GR	49.7	10261.0	42.6	10281.0	38.8	10301.0	35.1	10319.0	34.7	10341.0
GR	32.0	10360.0	35.0	10380.0	36.9	10400.0	35.8	10420.0	35.8	10440.0
GR	33.9	10482.0	33.8	10501.0	32.6	10520.0	29.0	10540.0	26.8	10560.0
GR	29.7	10579.0	30.9	10600.0	28.8	10641.0	29.8	10660.0	28.6	10682.0
GR	28.8	10701.0	30.5	10720.0	34.8	10740.0	36.6	10760.0	44.8	10779.0
GR	46.8	10800.0	56.4	10810.0	59.6	10828.0	62.1	10849.0	65.1	10860.0
GR	68.8	10898.0	87.9	10901.0	100.0	10902.0				
X1	168.97	34.	10097.5	10661.2	2860	2775	2798			
GR	100.0	9759.0	89.0	9760.0	74.0	9790.0	73.9	10037.9	71.5	10097.5
GR	64.8	10119.3	61.7	10128.7	56.9	10138.1	44.3	10159.9	44.2	10178.8
GR	39.2	10197.6	30.1	10218.9	31.0	10237.8	29.9	10259.2	23.8	10298.4
GR	20.1	10318.7	17.0	10338.1	17.1	10358.0	18.1	10378.3	22.0	10417.6
GR	24.9	10437.5	30.0	10458.0	33.8	10476.4	37.9	10557.9	40.6	10577.3
GR	50.8	10596.8	56.9	10610.2	63.7	10620.2	69.3	10637.2	80.3	10661.2
GR	82.5	10689.5	86.3	10700.9	89.1	10731.0	100.0	10732.0		
X1	169.38	39.	10108	10599	1540	2750	2164			
GR	100.0	9929.0	89.9	9930.0	77.7	9960.0	73.6	10028.0	70.6	10058.0
GR	69.6	10098.0	68.7	10108.0	66.0	10118.0	61.1	10129.0	56.9	10134.0
GR	56.1	10139.0	47.1	10159.0	42.1	10180.0	39.1	10198.0	27.2	10219.0
GR	24.3	10239.0	15.1	10259.0	16.1	10280.0	11.0	10300.0	9.1	10319.0
GR	13.2	10359.0	16.2	10380.0	22.1	10440.0	26.2	10459.0	27.1	10479.0
GR	30.3	10500.0	40.3	10539.0	51.2	10559.0	55.2	10580.0	61.9	10599.0

1

GR	62.8	10607.0	61.9	10629.0	64.9	10678.0	67.0	10698.0	65.0	10800.0
GR	65.0	12140.0	80.0	12260.0	88.5	12290.0	100.0	12291.0		
ET	0	0	4.10	9900	12800					
X1	169.80	52.	10060	10977	2800	1450	2218			
GR	100.0	9319.0	89.6	9320.0	62.6	9350.0	62.6	10060.0	59.7	10081.0
GR	58.4	10100.0	57.1	10105.0	52.1	10140.0	52.0	10160.0	53.1	10181.0
GR	51.1	10220.0	49.0	10240.0	46.1	10260.0	46.1	10279.0	43.9	10320.0
GR	45.1	10337.0	45.0	10359.0	44.1	10380.0	44.0	10420.0	42.1	10439.0
GR	36.5	10462.0	29.0	10499.0	26.2	10518.0	24.1	10538.0	24.1	10581.0
GR	22.9	10598.0	23.1	10620.0	21.9	10638.0	22.1	10661.0	22.9	10679.0
GR	22.9	10720.0	21.9	10739.0	21.9	10779.0	23.0	10798.0	23.0	10859.0
GR	25.0	10880.0	30.9	10900.0	53.9	10940.0	60.2	10960.0	68.1	10968.0

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GR     71.0    10977.0     71.7    11000.0     71.3    11029.0     73.1    11050.0     73.3    11070.0
GR     75.0    11280.0     70.0    11490.0     65.0    11900.0     65.0    13160.0     80.0    13240.0
GR     90.0    13400.0    100.0    13401.0
---------------------------------------------------------------------------------------------------------
ET        0        0     10.40
X1   170.20      36.     10099     10694      2160     2020      2112
GR    100.0    8339.0     89.4     8340.0     80.0     8370.0    65.0     8490.0     65.0     9900.0
GR     65.5    9999.0     62.4    10049.0     63.4    10080.0    61.3    10099.0     57.0    10115.0
GR     51.9   10140.0     46.1    10159.0     41.0    10201.0    37.9    10261.0     40.0    10279.0
GR     35.9   10360.0     32.9    10380.0     27.9    10400.0    19.9    10440.0     15.9    10460.0
GR     14.0   10500.0     19.0    10520.0     25.0    10560.0    24.9    10580.0     25.8    10601.0
GR     43.9   10620.0     41.0    10640.0     57.1    10671.0    75.6    10694.0     75.6    10698.0
GR     76.8   10728.0     82.6    10744.0     79.7    10757.0    81.2    10798.0     90.0    11670.0
GR    100.0   11671.0

X1   170.58      45.   10024.1    10811.8      1420     2490      2006
GR    100.0    8639.0     89.4     8640.0     80.0     8670.0    70.0     8820.0     65.0     9040.0
GR     65.0    9900.0     74.0     9925.2     74.0     9969.6    74.0     9988.9     74.0    10024.1
GR     74.0   10024.2     55.1    10059.2     51.0    10079.6    43.0    10099.0     39.1    10119.4
GR     36.9   10140.0     34.9    10180.5     35.0    10199.9    34.0    10219.9     31.9    10240.5
GR     32.0   10280.3     32.9    10300.5     33.0    10339.8    30.1    10360.0     30.1    10399.8
GR     30.9   10419.6     31.1    10460.3     29.9    10479.3    30.0    10501.2     29.0    10519.7
GR     30.9   10559.7     31.0    10599.9     33.0    10639.5    41.0    10679.7     46.9    10697.9
GR     50.8   10738.1     57.5    10811.8     57.5    10826.4    57.5    10889.0     63.3    10922.9
GR     67.3   10948.8     70.0    11520.0     80.0    12960.0    90.0    13170.0    100.0    13530.0

X1   170.96      41.     10082      10594      1870     2080      2006
GR    100.0    9239.0     88.5     9240.0     80.0     9270.0    65.0     9340.0     65.0     9860.0
GR     70.0    9930.0     64.9    10020.0     64.0    10050.0    63.9    10082.0     62.1    10102.0
GR     56.9   10129.0     56.8    10141.0     55.7    10160.0    52.9    10180.0     45.9    10199.0
GR     37.1   10220.0     23.1    10259.0     15.1    10300.0    10.3    10319.0      8.3    10339.0
GR     11.2   10361.0     10.0    10382.0      6.1    10419.0     7.0    10440.0      7.2    10460.0
GR     12.8   10479.0     30.2    10500.0     33.7    10518.0    36.9    10540.0     48.8    10559.0
GR     56.7   10578.0     67.0    10594.0     67.0    10649.0    67.0    10698.0     65.0    10850.0
GR     60.0   11100.0     60.0    12080.0     70.0    12160.0    80.0    14060.0     90.0    14160.0
GR    100.0   14260.0
1
   14AUG92      14:28:31                                                                          PAGE    13


X1   171.40      47.     10179      10841      2590     1900      2323
GR    100.0    9819.0     89.3     9820.0     80.0     9850.0    75.3    10035.0     75.1    10063.0
GR     66.8   10130.0     63.0    10179.0     56.7    10189.0    48.6    10200.0     37.6    10220.0
GR     27.7   10240.0     20.7    10260.0     15.8    10280.0    11.8    10321.0     12.9    10340.0
GR     14.9   10359.0     17.7    10380.0     18.9    10400.0    20.6    10435.0     20.9    10460.0
GR     22.9   10480.0     23.9    10500.0     25.7    10521.0    26.6    10542.0     29.6    10561.0
GR     30.7   10580.0     33.7    10600.0     35.7    10621.0    36.6    10641.0     39.6    10660.0
GR     49.4   10700.0     49.3    10721.0     51.3    10741.0    53.6    10753.0     53.7    10760.0
GR     58.5   10801.0     64.4    10841.0     66.1    10860.0    70.8    10926.0     70.0    11190.0
GR     60.0   11830.0     60.0    12060.0     71.0    12320.0    60.0    12560.0     70.0    12780.0
GR     80.0   15620.0    100.0    15740.0

            CITY OF MONROE, LOUISIANA CORP. LIMITS
X1   171.54                                   820      500       729

ET        0        0      4.10     9800     14000
X1   171.60      44.     10099     10676      420      260       327
GR    100.0    8159.0     88.4     8160.0     80.0     8190.0    75.0     8540.0     75.0     9920.0
GR     64.4   10051.0     64.4    10099.0     60.2    10121.0    58.2    10128.0     54.5    10151.0
GR     52.9   10159.0     51.9    10180.0     50.1    10198.0    40.7    10219.0     33.0    10238.0
GR     27.7   10259.0     24.1    10278.0     22.0    10299.0    21.9    10320.0     21.1    10339.0
GR     23.0   10381.0     23.0    10399.0     20.1    10420.0    18.0    10458.0     18.1    10499.0
GR     21.1   10518.0     21.1    10538.0     24.9    10558.0    32.1    10577.0     38.1    10598.0
GR     49.8   10619.0     54.1    10637.0     65.3    10663.0    72.5    10676.0     72.7    10697.0
GR     72.5   10747.0     70.0    11080.0     70.0    11670.0    60.0    11820.0     60.0    12200.0
GR     70.0   12260.0     70.0    15230.0     80.0    15330.0   100.0    15430.0
1
   14AUG92      14:28:31                                                                          PAGE    14


T1  OUACHITA RIVER MILE 158.44 TO 171.60 - RIVERWOOD INTERNATIONAL
```

T2 MODIFIED ST.LOUIS DISTRICT COE FEB 1975 1000' LEVEE, 3000' NO LEVEE MODEL
T3 100 YEAR ENCROACHMENTS - WITH PROPOSED IMPOUNDMENT

	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
J1	0	3	0	0	0	0	0	0	84.30	

	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
J2	15		-1.0							

THIS RUN EXECUTED 14AUG92 14:28:43

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.0; February 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

YEAR ENCROACHMENTS - NAT

SUMMARY PRINTOUT TABLE 100

SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	N3	DEPTH	CWSEL	VCH	EG
167.110	84.22	80.76	84.47	86.44	109000.00	.00	10.00	.01	56.25	84.35	2.89	84.
167.110	85.23	80.76	85.50	86.44	109000.00	.00	10.00	.01	57.27	85.37	2.82	85.

YEAR ENCROACHMENTS - NAT

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STEN
	158.440	83.30	.00	83.31	12997.00	718.48	26272.00	82009.53	.00	.00	10119.00	10614.00	.
	158.440	84.30	1.00	84.31	8831.00	.00	30287.44	78712.56	8831.00	10119.00	10119.00	10614.00	18950.
	158.630	83.30	.00	83.31	13338.42	146.58	34450.64	74402.79	.00	.00	10084.00	10673.00	.
	158.630	84.30	1.00	84.31	10016.00	.00	39411.17	69588.84	10016.00	10084.00	10084.00	10673.00	20100.
	158.720	83.30	.00	83.31	13335.54	141.48	35655.68	73202.84	.00	.00	10084.00	10673.00	.
	158.720	84.30	1.00	84.32	10016.00	.00	40599.96	68400.03	10016.00	10084.00	10084.00	10673.00	20100.
*	158.820	83.28	.00	83.33	12199.10	2485.42	62157.36	44357.21	.00	.00	10158.00	10652.00	.
	158.820	84.29	1.01	84.33	9292.00	.00	56698.00	52302.00	9292.00	10158.00	10158.00	10652.00	19450.
*	159.200	83.34	.00	83.35	13721.61	215.27	26099.86	82684.87	.00	.00	10074.00	10567.00	.
*	159.200	84.34	1.00	84.34	11326.00	.00	26992.23	82007.77	11326.00	10074.00	10074.00	10567.00	21400.
	159.730	83.35	.00	83.35	14884.30	183.64	24866.72	83949.65	.00	.00	10135.00	10714.00	.
	159.730	84.35	1.00	84.35	12958.27	.00	25481.53	83518.48	.08	10135.00	10135.00	10714.00	23093.
	160.130	83.35	.00	83.36	18422.13	388.53	19268.10	89343.38	.00	.00	10161.00	10723.00	.
	160.130	84.35	1.00	84.35	13039.00	.00	22035.73	86964.27	13039.00	10161.00	10161.00	10723.00	23200.

160.510	83.35	.00	83.36	17723.23	266.42	22862.14	85871.45	.00	.00	10049.00	10648.00	
160.510	84.35	1.00	84.36	12351.00	.00	26034.19	82965.82	12351.00	10049.00	10049.00	10648.00	2240
160.670	83.36	.00	83.36	16925.82	2975.47	23957.10	82067.43	.00	.00	10049.00	10625.00	
160.670	84.35	1.00	84.36	11301.00	.00	28459.59	80540.41	11301.00	10049.00	10049.00	10625.00	2135
160.860	83.36	.00	83.36	15499.81	2603.71	26405.80	79990.49	.00	.00	10039.00	10649.00	
160.860	84.36	1.00	84.36	10261.00	.00	31426.67	77573.34	10261.00	10039.00	10039.00	10649.00	2030
161.050	83.36	.00	83.37	14169.43	2728.32	27850.07	78421.60	.00	.00	10139.00	10697.00	
161.050	84.36	1.00	84.37	9211.00	.00	33031.85	75968.14	9211.00	10139.00	10139.00	10697.00	1935
161.400	83.36	.00	83.37	12242.35	150.76	34477.45	74371.79	.00	.00	10101.00	10739.00	
161.400	84.37	1.00	84.38	8099.00	.00	39124.79	69875.22	8099.00	10101.00	10101.00	10739.00	1820
* 162.000	83.37	.00	83.39	9703.17	137.85	45240.63	63621.53	.00	.00	10153.00	10716.00	
162.000	84.38	1.01	84.40	8488.75	.00	46526.84	62473.16	.09	10153.00	10153.00	10716.00	1864
162.170	83.38	.00	83.40	8726.38	141.98	46815.04	62042.98	.00	.00	10120.00	10710.00	
162.170	84.38	1.01	84.40	7616.75	.00	48246.16	60753.84	.08	10120.00	10120.00	10710.00	1854
162.380	83.38	.00	83.41	7174.65	94.44	58087.11	50818.45	.00	.00	10030.00	10780.00	
162.380	84.39	1.01	84.42	6340.82	.00	59804.61	49195.39	.08	10030.00	10030.00	10780.00	1928
162.450	83.40	.00	83.42	10295.57	71.82	47403.50	61524.67	.00	.00	10030.00	10900.00	
162.450	84.41	1.01	84.42	9081.13	.00	48930.43	60069.57	.09	10030.00	10030.00	10900.00	1911

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STE
162.600	83.40	.00	83.43	10431.28	169.29	55560.71	53270.00	.00	.00	10135.00	10790.00	
162.600	84.41	1.01	84.44	9337.90	.00	56732.88	52267.13	.09	10135.00	10135.00	10790.00	1947
* 162.800	83.31	.00	83.49	2146.28	10627.35	96775.96	1596.69	.00	.00	10118.00	10650.00	
* 162.800	84.32	1.01	84.50	2100.00	8615.45	97672.99	2711.56	2100.00	9950.00	10118.00	10650.00	1205
163.180	83.45	.00	83.57	3231.26	25957.81	77534.23	5507.96	.00	.00	10192.00	10647.00	
163.180	84.44	.99	84.57	2093.44	25364.03	80031.24	3604.73	.06	9045.96	10192.00	10647.00	1113
163.320	83.51	.00	83.60	3830.63	27752.60	73395.16	7852.24	.00	.00	10126.00	10636.00	
163.320	84.51	1.00	84.60	2800.14	27901.99	75760.50	5337.51	.06	8222.52	10126.00	10636.00	1102
* 163.760	83.61	.00	83.63	6984.14	25432.02	40695.28	42872.70	.00	.00	10126.00	10670.00	
* 163.760	84.61	1.00	84.63	5650.00	22826.29	43358.59	42815.12	5650.00	8050.00	10126.00	10670.00	1370
163.930	83.61	.00	83.64	5243.71	24446.13	54518.19	30035.68	.00	.00	10130.00	10664.00	
163.930	84.61	1.00	84.65	4545.78	23704.54	56280.67	29014.79	.07	7970.68	10130.00	10664.00	1251
164.340	83.60	.00	83.70	2608.39	17027.77	88754.80	3217.44	.00	.00	10100.00	10711.00	
164.340	84.60	1.00	84.70	1742.28	16381.19	91478.23	1140.58	.05	9175.74	10100.00	10711.00	1091
164.740	83.61	.00	83.77	1794.15	6119.87	97044.83	5835.31	.00	.00	10139.00	10636.00	
164.740	84.60	1.00	84.77	1085.25	5096.06	99877.52	4026.42	.04	9659.18	10139.00	10636.00	1074
165.190	83.72	.00	83.84	1782.66	134.75	97592.32	11272.93	.00	.00	10052.00	10720.00	
165.190	84.71	1.00	84.85	1245.58	.00	100936.00	8063.96	.05	10052.00	10052.00	10720.00	1129
165.610	83.80	.00	83.90	2317.04	775.99	87871.07	20352.93	.00	.00	10108.00	10700.00	
165.610	84.80	1.00	84.91	1701.82	.00	90467.41	18532.58	.05	10108.00	10108.00	10700.00	1180
165.950	83.83	.00	83.95	1686.28	4155.61	99362.41	5481.98	.00	.00	10111.00	10829.00	
165.950	84.84	1.00	84.96	978.28	2241.46	102760.50	3998.05	.04	10022.95	10111.00	10829.00	1100
166.370	83.88	.00	84.03	838.29	2049.75	106502.80	447.42	.00	.00	10098.00	10827.00	
166.370	84.89	1.01	85.04	729.00	.00	109000.00	.00	.02	10098.00	10098.00	10827.00	1082
166.570	83.91	.00	84.06	909.93	3856.88	104347.70	795.38	.00	.00	10087.00	10810.00	
166.570	84.92	1.00	85.07	744.51	762.96	108237.00	.00	.04	10065.49	10087.00	10810.00	1081

166.690	83.94	.00	84.09	898.75	120.58	108148.20	731.22	.00	.00	9969.00	10810.00
166.690	84.96	1.02	85.10	888.60	.00	109000.00	.00	.01	9969.00	9969.00	10810.00 1081(
166.710	83.95	.00	84.10	898.80	120.92	108147.00	732.10	.00	.00	9969.00	10810.00
166.710	84.97	1.02	85.11	808.61	.00	109000.00	.00	.01	9969.00	9969.00	10810.00 1081(
166.760	83.97	.00	84.11	1119.90	193.24	106716.90	2089.85	.00	.00	10083.00	10868.00
166.760	84.98	1.01	85.12	785.00	.00	109000.00	.00	.02	10083.00	10083.00	10868.00 1086(
166.950	84.02	.00	84.14	942.91	19.20	108980.80	.00	.00	.00	10027.00	10916.00
166.950	85.04	1.02	85.16	888.31	.00	109000.00	.00	.00	10027.00	10027.00	10916.00 1091(

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STE
	167.020	84.04	.00	84.16	920.00	.00	109000.00	.00	.00	.00	10128.00	11048.00	
	167.020	85.06	1.02	85.17	920.00	.00	109000.00	.00	.00	10128.00	10128.00	11048.00	1104(
*	167.030	84.02	.00	84.17	949.02	.00	109000.00	.01	.00	.00	10128.00	11048.00	
*	167.030	85.04	1.02	85.19	920.00	.00	109000.00	.00	920.00	10128.00	10128.00	11048.00	1104(
	167.040	84.03	.00	84.18	949.02	.00	109000.00	.01	.00	.00	10128.00	11048.00	
	167.040	85.04	1.02	85.19	920.00	.00	109000.00	.00	920.00	10128.00	10128.00	11048.00	1104(
*	167.050	84.07	.00	84.19	920.00	.00	109000.00	.00	.00	.00	10128.00	11048.00	
*	167.050	85.10	1.02	85.21	920.00	.00	109000.00	.00	.00	10128.00	10128.00	11048.00	1104(
	167.070	84.07	.00	84.20	1028.18	2.11	108882.80	115.11	.00	.00	10102.00	11008.00	
	167.070	85.09	1.02	85.22	906.00	.00	109000.00	.00	.00	10102.00	10102.00	11008.00	1100(
	167.100	84.08	.00	84.21	915.00	.00	109000.00	.00	.00	.00	10105.00	11020.00	
	167.100	85.10	1.02	85.23	915.00	.00	109000.00	.00	.00	10105.00	10105.00	11020.00 1102(	
	167.110	84.35	.00	84.47	915.00	.00	109000.00	.00	.00	.00	10105.00	11020.00	
	167.110	85.37	1.03	85.50	915.00	.00	109000.00	.00	.00	10105.00	10105.00	11020.00 1102(	
	167.130	84.35	.00	84.48	1038.98	3.68	108866.30	130.08	.00	.00	10102.00	11008.00	
	167.130	85.38	1.03	85.50	906.00	.00	109000.00	.00	.00	10102.00	10102.00	11008.00 1100(	
	167.320	84.38	.00	84.51	985.66	2325.29	106582.60	92.09	.00	.00	10132.00	10895.00	
	167.320	85.40	1.02	85.54	763.00	.00	109000.00	.00	.02	10132.00	10132.00	10895.00 1089(	
	167.500	84.46	.00	84.56	1081.00	.00	109000.00	.00	.00	.00	9803.00	10884.00	
	167.500	85.49	1.03	85.58	1081.00	.00	109000.00	.00	.00	9803.00	9803.00	10884.00 1088(	
*	167.510	84.44	.00	84.58	1145.05	.00	108980.50	19.53	.00	.00	9803.00	10884.00	
*	167.510	85.47	1.03	85.61	1081.00	.00	109000.00	.00	1081.00	9803.00	9803.00	10884.00 1088(	
	167.520	84.44	.00	84.58	1145.06	.00	108980.50	19.53	.00	.00	9803.00	10884.00	
	167.520	85.47	1.03	85.61	1081.00	.00	109000.00	.00	1081.00	9803.00	9803.00	10884.00 1088(	
*	167.530	84.50	.00	84.60	1081.00	.00	109000.00	.00	.00	.00	9803.00	10884.00	
*	167.530	85.54	1.03	85.63	1081.00	.00	109000.00	.00	.00	9803.00	9803.00	10884.00 1088(	
	167.700	84.50	.00	84.65	937.89	8105.43	100839.50	55.05	.00	.00	10161.00	10799.00	
	167.700	85.53	1.03	85.68	761.35	4838.61	104161.40	.00	.04	10037.65	10161.00	10799.00 1079(	
	168.060	84.59	.00	84.71	1337.60	13602.03	95397.37	.61	.00	.00	10049.00	10784.00	
	168.060	85.62	1.03	85.74	1142.76	10159.05	98840.95	.00	.04	9641.24	10049.00	10784.00 1078(	
	168.440	84.64	.00	84.77	1192.09	7826.65	100189.10	984.24	.00	.00	10100.00	10860.00	
	168.440	85.67	1.03	85.81	999.88	5099.05	103901.00	.00	.04	9860.12	10100.00	10860.00 1086(	
	168.970	84.69	.00	84.92	927.45	4576.31	104366.50	57.22	.00	.00	10097.50	10661.20	
	168.970	85.72	1.03	85.96	618.23	940.86	108059.10	.00	.04	10042.97	10097.50	10661.20 1066(	

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STE
*	169.380	84.93	.00	85.00	2335.16	1562.83	69284.54	38152.63	.00	.00	10108.00	10599.00	
*	169.380	85.97	1.04	86.04	1953.93	.00	70815.50	38184.50	.05	10108.00	10108.00	10599.00	12061
*	169.800	85.00	.00	85.03	3994.96	13250.96	67510.98	28238.06	.00	.00	10060.00	10977.00	
*	169.800	86.04	1.03	86.08	2900.00	3273.57	78624.32	27102.12	2900.00	9900.00	10060.00	10977.00	12800
*	170.200	85.00	.00	85.07	2820.76	39018.30	69464.78	516.92	.00	.00	10099.00	10694.00	
	170.200	86.05	1.04	86.11	2070.63	37525.50	71474.49	.00	.05	8623.38	10099.00	10694.00	10694
	170.580	85.06	.00	85.09	4412.36	21039.91	68128.97	19831.12	.00	.00	10024.10	10811.80	
	170.580	86.10	1.04	86.14	3221.81	19526.26	70533.00	18940.74	.06	8969.84	10024.10	10811.80	12191
	170.960	85.09	.00	85.12	4858.82	12782.47	51127.63	45089.90	.00	.00	10082.00	10594.00	
	170.960	86.13	1.04	86.16	3667.25	10463.85	52643.84	45892.30	.06	9478.91	10082.00	10594.00	13146
	171.400	85.11	.00	85.14	5817.14	2182.10	60193.02	46624.88	.00	.00	10179.00	10841.00	
	171.400	86.15	1.04	86.18	4079.08	.00	61468.08	47531.92	.06	10179.00	10179.00	10841.00	14258
	171.540	85.11	.00	85.14	5817.17	2182.58	60186.34	46631.08	.00	.00	10179.00	10841.00	
	171.540	86.16	1.04	86.19	4076.93	.00	61463.61	47536.38	.06	10179.00	10179.00	10841.00	14255
	171.600	85.12	.00	85.15	7183.85	10166.41	48016.91	50816.68	.00	.00	10099.00	10676.00	
	171.600	86.16	1.03	86.19	4200.00	3464.76	57093.92	48441.31	4200.00	9800.00	10099.00	10676.00	14000

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YEAR ENCROACHMENTS - NAT

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.0
	158.440	.00	.00	.00	19.00	109000.00	83.30	.00	83.31	.03	.99	222222.3065286	
	158.440	.00	.00	.00	19.00	109000.00	84.30	.00	84.31	.04	1.12	174402.10565187	
	158.630	1003.00	.00	.00	19.00	109000.00	83.30	.00	83.31	.05	1.21	193364.40497033	
	158.630	1003.00	.00	.00	19.00	109000.00	84.30	.00	84.31	.06	1.36	159656.50441227	
	158.720	459.00	.00	.00	19.53	109000.00	83.30	.00	83.31	.05	1.27	186292.20471472	
	158.720	459.00	.00	.00	19.53	109000.00	84.30	.00	84.32	.07	1.41	154344.80420885	
*	158.820	475.00	.00	.00	20.00	109000.00	83.28	.00	83.33	.16	2.34	109314.30274973	
	158.820	475.00	.00	.00	20.00	109000.00	84.29	.00	84.33	.13	2.10	111753.20300774	
*	159.200	2006.00	.00	.00	16.10	109000.00	83.34	.00	83.35	.03	.99	229768.80645758	
*	159.200	2006.00	.00	.00	16.10	109000.00	84.34	.00	84.34	.03	1.00	211156.30629467	
	159.730	2798.00	.00	.00	20.30	109000.00	83.35	.00	83.35	.03	.90	244024.50662853	
	159.730	2798.00	.00	.00	20.30	109000.00	84.35	.00	84.35	.03	.90	231484.30660710	
	160.130	2112.00	.00	.00	21.00	109000.00	83.35	.00	83.36	.02	.71	311916.60851014	
	160.130	2112.00	.00	.00	21.00	109000.00	84.35	.00	84.35	.02	.79	253421.60755324	
	160.510	2006.00	.00	.00	17.70	109000.00	83.35	.00	83.36	.02	.80	279058.70747400	
	160.510	2006.00	.00	.00	17.70	109000.00	84.35	.00	84.36	.03	.89	226057.20664137	
	160.670	844.00	.00	.00	16.90	109000.00	83.36	.00	83.36	.02	.84	271535.70732653	
	160.670	844.00	.00	.00	16.90	109000.00	84.35	.00	84.36	.03	.97	209157.20620223	
	160.860	1003.00	.00	.00	8.00	109000.00	83.36	.00	83.36	.02	.85	263835.10736623	
	160.860	1003.00	.00	.00	8.00	109000.00	84.36	.00	84.36	.03	.99	202692.50625513	
	161.050	1003.00	.00	.00	16.90	109000.00	83.36	.00	83.37	.02	.93	244606.70698864	
	161.050	1003.00	.00	.00	16.90	109000.00	84.36	.00	84.37	.03	1.08	186005.60589105	
	161.400	1848.00	.00	.00	17.70	109000.00	83.36	.00	83.37	.03	1.04	207811.00605100	

	161.400	1848.00	.00	.00	17.70	109000.00	84.37	.00	84.38	.04	1.16	166748.4054355
*	162.000	3168.00	.00	.00	21.80	109000.00	83.37	.00	83.39	.08	1.60	138943.8038289
	162.000	3168.00	.00	.00	21.80	109000.00	84.38	.00	84.40	.08	1.61	132325.2038219
	162.170	950.00	.00	.00	22.00	109000.00	83.38	.00	83.40	.09	1.64	129174.5036553
	162.170	950.00	.00	.00	22.00	109000.00	84.38	.00	84.40	.09	1.66	122855.0036464
	162.380	1100.00	.00	.00	21.00	109000.00	83.38	.00	83.41	.13	1.85	102866.5029697
	162.380	1100.00	.00	.00	21.00	109000.00	84.39	.00	84.42	.14	1.86	98105.0029383
	162.450	250.00	.00	.00	21.00	109000.00	83.40	.00	83.42	.08	1.37	145728.0039084
	162.450	250.00	.00	.00	21.00	109000.00	84.41	.00	84.42	.08	1.38	138680.3038751

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA
	162.600	868.00	.00	.00	21.00	109000.00	83.40	.00	83.43	.09	1.72	128166.3035609
	162.600	868.00	.00	.00	21.00	109000.00	84.41	.00	84.44	.10	1.72	123100.5035205
*	162.800	1056.00	.00	.00	24.10	109000.00	83.31	.00	83.49	.41	3.62	35583.6716986
*	162.800	1056.00	.00	.00	24.10	109000.00	84.32	.00	84.50	.39	3.58	36806.6017396
	163.180	2006.00	.00	.00	17.00	109000.00	83.45	.00	83.57	.33	3.28	51811.7119025
	163.180	2006.00	.00	.00	17.00	109000.00	84.44	.00	84.57	.33	3.33	46781.0519024
	163.320	739.00	.00	.00	16.00	109000.00	83.51	.00	83.60	.22	2.73	65903.8023290
	163.320	739.00	.00	.00	16.00	109000.00	84.51	.00	84.60	.22	2.76	60068.2723278
*	163.760	2323.00	.00	.00	19.50	109000.00	83.61	.00	83.63	.07	1.50	132598.3041187
*	163.760	2323.00	.00	.00	19.50	109000.00	84.61	.00	84.63	.07	1.56	120172.0039956
	163.930	897.00	.00	.00	20.90	109000.00	83.61	.00	83.64	.13	2.03	93015.4830458
	163.930	897.00	.00	.00	20.90	109000.00	84.61	.00	84.65	.13	2.05	88545.4130486
	164.340	2165.00	.00	.00	-1.60	109000.00	83.60	.00	83.70	.22	2.73	54442.9923268
	164.340	2165.00	.00	.00	-1.60	109000.00	84.60	.00	84.70	.22	2.76	49524.4523287
	164.740	2112.00	.00	.00	9.00	109000.00	83.61	.00	83.77	.31	3.41	40203.76197304
	164.740	2112.00	.00	.00	9.00	109000.00	84.60	.00	84.77	.31	3.45	36594.89197301
	165.190	2376.00	.00	.00	11.60	109000.00	83.72	.00	83.84	.30	3.04	43742.1019860
	165.190	2376.00	.00	.00	11.60	109000.00	84.71	.00	84.85	.31	3.08	40133.38197152
	165.610	2218.00	.00	.00	6.90	109000.00	83.80	.00	83.90	.23	2.82	52498.96225855
	165.610	2218.00	.00	.00	6.90	109000.00	84.80	.00	84.91	.24	2.85	48358.26223098
	165.950	1795.00	.00	.00	23.90	109000.00	83.83	.00	83.95	.27	2.88	43778.25210048
	165.950	1795.00	.00	.00	23.90	109000.00	84.84	.00	84.96	.27	2.92	39853.52210194
	166.370	2218.00	.00	.00	24.90	109000.00	83.88	.00	84.03	.32	3.09	36181.53193717
	166.370	2218.00	.00	.00	24.90	109000.00	84.89	.00	85.04	.33	3.10	35190.12189135
	166.570	1056.00	.00	.00	29.70	109000.00	83.91	.00	84.06	.34	3.14	36403.55188082
	166.570	1056.00	.00	.00	29.70	109000.00	84.92	.00	85.07	.35	3.18	34515.09185087
	166.690	612.00	.00	.00	29.70	109000.00	83.94	.00	84.09	.64	3.07	36018.05135748
	166.690	612.00	.00	.00	29.70	109000.00	84.96	.00	85.10	.63	3.02	36087.25137404
	166.710	116.00	.00	.00	29.70	109000.00	83.95	.00	84.10	.64	3.07	36027.98135797
	166.710	116.00	.00	.00	29.70	109000.00	84.97	.00	85.11	.63	3.02	36099.20137465
	166.760	275.00	.00	.00	30.00	109000.00	83.97	.00	84.11	.33	3.04	37547.98189401
	166.760	275.00	.00	.00	30.00	109000.00	84.98	.00	85.12	.33	3.04	35882.33188334
	166.950	1003.00	.00	.00	28.10	109000.00	84.02	.00	84.14	.29	2.80	38960.27201862
	166.950	1003.00	.00	.00	28.10	109000.00	85.04	.00	85.16	.27	2.74	39793.26209034

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA
	167.020	402.00	.00	.00	24.40	109000.00	84.04	.00	84.16	.27	2.72	40059.3220869
	167.020	402.00	.00	.00	24.40	109000.00	85.06	.00	85.17	.26	2.66	40994.9421424
*	167.030	1.00	85.09	82.94	24.40	109000.00	84.02	.00	84.17	1.10	3.13	34846.0110381
*	167.030	1.00	85.09	82.94	24.40	109000.00	85.04	.00	85.19	1.11	3.13	34845.8210367
	167.040	38.00	85.09	82.94	24.40	109000.00	84.03	.00	84.18	1.10	3.13	34846.0110381
	167.040	38.00	85.09	82.94	24.40	109000.00	85.04	.00	85.19	1.11	3.13	34845.8210367
*	167.050	1.00	.00	.00	24.40	109000.00	84.07	.00	84.19	.27	2.72	40098.0120903
*	167.050	1.00	.00	.00	24.40	109000.00	85.10	.00	85.21	.25	2.66	41038.3821606
	167.070	181.00	.00	.00	25.90	109000.00	84.07	.00	84.20	.34	2.92	37603.2318763
	167.070	181.00	.00	.00	25.90	109000.00	85.09	.00	85.22	.32	2.85	38266.8919405
	167.100	181.00	.00	.00	28.10	109000.00	84.08	.00	84.21	.34	2.91	37491.7818778
	167.100	181.00	.00	.00	28.10	109000.00	85.10	.00	85.23	.32	2.84	38427.1719369
	167.110	19.00	86.44	80.76	28.10	109000.00	84.35	.00	84.47	.33	2.89	37736.9718983
	167.110	19.00	86.44	80.76	28.10	109000.00	85.37	.00	85.50	.31	2.82	38678.0719649
	167.130	127.00	.00	.00	25.90	109000.00	84.35	.00	84.48	.33	2.90	37882.2318972
	167.130	127.00	.00	.00	25.90	109000.00	85.38	.00	85.50	.31	2.83	38516.5219609
	167.320	1003.00	.00	.00	20.90	109000.00	84.38	.00	84.51	.31	3.02	37366.4719465
	167.320	1003.00	.00	.00	20.90	109000.00	85.40	.00	85.54	.32	3.02	36054.7919229
	167.500	1028.00	.00	.00	20.80	109000.00	84.46	.00	84.56	.25	2.49	43716.4421720
	167.500	1028.00	.00	.00	20.80	109000.00	85.49	.00	85.58	.24	2.43	44830.5022361
*	167.510	1.00	85.40	86.86	20.80	109000.00	84.44	.00	84.58	.87	3.05	35806.1811692
*	167.510	1.00	85.40	86.86	20.80	109000.00	85.47	.00	85.61	.95	3.02	36113.3311155
	167.520	54.00	85.40	86.86	20.80	109000.00	84.44	.00	84.58	.87	3.05	35807.4811692
	167.520	54.00	85.40	86.86	20.80	109000.00	85.47	.00	85.61	.96	3.02	36114.3111152
*	167.530	1.00	.00	.00	20.80	109000.00	84.50	.00	84.60	.25	2.49	43763.1321756
*	167.530	1.00	.00	.00	20.80	109000.00	85.54	.00	85.63	.24	2.43	44879.3922401
	167.700	922.00	.00	.00	18.00	109000.00	84.50	.00	84.65	.31	3.14	37323.4319735
	167.700	922.00	.00	.00	18.00	109000.00	85.53	.00	85.68	.31	3.18	35756.9419641
	168.060	1901.00	.00	.00	21.70	109000.00	84.59	.00	84.71	.29	2.86	43615.7120310
	168.060	1901.00	.00	.00	21.70	109000.00	85.62	.00	85.74	.29	2.90	41617.2620252
	168.440	2006.00	.00	.00	26.80	109000.00	84.64	.00	84.77	.33	3.02	39826.5918833
	168.440	2006.00	.00	.00	26.80	109000.00	85.67	.00	85.81	.35	3.06	37823.3218545
	168.970	2798.00	.00	.00	17.00	109000.00	84.69	.00	84.92	.52	3.92	30219.6215064
	168.970	2798.00	.00	.00	17.00	109000.00	85.72	.00	85.96	.53	3.97	27921.7914985

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA
*	169.380	2164.00	.00	.00	9.10	109000.00	84.93	.00	85.00	.19	2.60	60745.3424865
*	169.380	2164.00	.00	.00	9.10	109000.00	85.97	.00	86.04	.20	2.61	57856.8424555
*	169.800	2218.00	.00	.00	21.90	109000.00	85.00	.00	85.03	.08	1.54	99605.8638984
*	169.800	2218.00	.00	.00	21.90	109000.00	86.04	.00	86.08	.10	1.76	81621.3634702
*	170.200	2112.00	.00	.00	14.00	109000.00	85.00	.00	85.07	.18	2.37	64566.6225642
	170.200	2112.00	.00	.00	14.00	109000.00	86.05	.00	86.11	.18	2.38	61199.1625527
	170.580	2006.00	.00	.00	29.00	109000.00	85.06	.00	85.09	.11	1.84	88709.7232394

170.580	2006.00	.00	.00	29.00	109000.00	86.10	.00	86.14	.11	1.87	81806.77324585
170.960	2006.00	.00	.00	6.10	109000.00	85.09	.00	85.12	.10	1.84	99254.83351184
170.960	2006.00	.00	.00	6.10	109000.00	86.13	.00	86.16	.10	1.85	92354.47351944
171.400	2323.00	.00	.00	11.80	109000.00	85.11	.00	85.14	.09	1.75	104995.10361559
171.400	2323.00	.00	.00	11.80	109000.00	86.15	.00	86.18	.09	1.76	95296.35357865
171.540	729.00	.00	.00	11.80	109000.00	85.11	.00	85.14	.09	1.75	105013.30361635
171.540	729.00	.00	.00	11.80	109000.00	86.16	.00	86.19	.09	1.75	95302.25357970
171.600	327.00	.00	.00	18.00	109000.00	85.12	.00	85.15	.08	1.64	123198.10381110
171.600	327.00	.00	.00	18.00	109000.00	86.16	.00	86.19	.11	1.91	92460.23331569

YEAR ENCROACHMENTS - NAT

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	158.440	109000.00	83.30	.00	.00	.00	12997.00	.00
	158.440	109000.00	84.30	1.00	.00	1.00	8831.00	.00
	158.630	109000.00	83.30	.00	.00	.00	13338.42	1003.00
	158.630	109000.00	84.30	1.00	.00	1.00	10016.00	1003.00
	158.720	109000.00	83.30	.00	.00	.00	13335.54	459.00
	158.720	109000.00	84.30	1.00	.00	1.00	10016.00	459.00
*	158.820	109000.00	83.28	.00	-.02	.00	12199.10	475.00
	158.820	109000.00	84.29	1.01	-.01	1.01	9292.00	475.00
*	159.200	109000.00	83.34	.00	.06	.00	13721.61	2006.00
*	159.200	109000.00	84.34	1.00	.05	1.00	11326.00	2006.00
	159.730	109000.00	83.35	.00	.01	.00	14884.30	2798.00
	159.730	109000.00	84.35	1.00	.01	1.00	12958.27	2798.00
	160.130	109000.00	83.35	.00	.00	.00	18422.13	2112.00
	160.130	109000.00	84.35	1.00	.00	1.00	13039.00	2112.00
	160.510	109000.00	83.35	.00	.00	.00	17723.23	2006.00
	160.510	109000.00	84.35	1.00	.00	1.00	12351.00	2006.00
	160.670	109000.00	83.36	.00	.00	.00	16925.82	844.00
	160.670	109000.00	84.35	1.00	.00	1.00	11301.00	844.00
	160.860	109000.00	83.36	.00	.00	.00	15499.81	1003.00
	160.860	109000.00	84.36	1.00	.00	1.00	10261.00	1003.00
	161.050	109000.00	83.36	.00	.00	.00	14169.43	1003.00
	161.050	109000.00	84.36	1.00	.00	1.00	9211.00	1003.00
	161.400	109000.00	83.36	.00	.00	.00	12242.35	1848.00
	161.400	109000.00	84.37	1.00	.01	1.00	8099.00	1848.00
*	162.000	109000.00	83.37	.00	.01	.00	9703.17	3168.00
	162.000	109000.00	84.38	1.01	.01	1.01	8488.75	3168.00
	162.170	109000.00	83.38	.00	.01	.00	8726.38	950.00
	162.170	109000.00	84.38	1.01	.01	1.01	7616.75	950.00
	162.380	109000.00	83.38	.00	.00	.00	7174.65	1100.00
	162.380	109000.00	84.39	1.01	.00	1.01	6340.82	1100.00
	162.450	109000.00	83.40	.00	.02	.00	10295.57	250.00
	162.450	109000.00	84.41	1.01	.02	1.01	9081.13	250.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	162.600	109000.00	83.40	.00	.00	.00	10431.28	868.00
	162.600	109000.00	84.41	1.01	.00	1.01	9337.90	868.00
*	162.800	109000.00	83.31	.00	-.10	.00	2146.28	1056.00
*	162.800	109000.00	84.32	1.01	-.09	1.01	2100.00	1056.00
	163.180	109000.00	83.45	.00	.14	.00	3231.26	2006.00
	163.180	109000.00	84.44	.99	.13	.99	2093.44	2006.00
	163.320	109000.00	83.51	.00	.07	.00	3830.63	739.00
	163.320	109000.00	84.51	1.00	.07	1.00	2800.14	739.00
*	163.760	109000.00	83.61	.00	.10	.00	6984.14	2323.00
*	163.760	109000.00	84.61	1.00	.10	1.00	5650.00	2323.00
	163.930	109000.00	83.61	.00	-.01	.00	5243.71	897.00
	163.930	109000.00	84.61	1.00	-.01	1.00	4545.78	897.00
	164.340	109000.00	83.60	.00	-.01	.00	2608.39	2165.00
	164.340	109000.00	84.60	1.00	-.01	1.00	1742.28	2165.00
	164.740	109000.00	83.61	.00	.01	.00	1794.15	2112.00
	164.740	109000.00	84.60	1.00	.00	1.00	1085.25	2112.00
	165.190	109000.00	83.72	.00	.11	.00	1782.66	2376.00
	165.190	109000.00	84.71	1.00	.11	1.00	1245.58	2376.00
	165.610	109000.00	83.80	.00	.09	.00	2317.04	2218.00
	165.610	109000.00	84.80	1.00	.09	1.00	1701.82	2218.00
	165.950	109000.00	83.83	.00	.03	.00	1686.28	1795.00
	165.950	109000.00	84.84	1.00	.03	1.00	978.28	1795.00
	166.370	109000.00	83.88	.00	.05	.00	838.29	2218.00
	166.370	109000.00	84.89	1.01	.05	1.01	729.00	2218.00
	166.570	109000.00	83.91	.00	.03	.00	909.93	1056.00
	166.570	109000.00	84.92	1.00	.03	1.00	744.51	1056.00
	166.690	109000.00	83.94	.00	.03	.00	898.75	612.00
	166.690	109000.00	84.96	1.02	.04	1.02	808.60	612.00
	166.710	109000.00	83.95	.00	.01	.00	898.80	116.00
	166.710	109000.00	84.97	1.02	.01	1.02	808.61	116.00
	166.760	109000.00	83.97	.00	.02	.00	1119.90	275.00
	166.760	109000.00	84.98	1.01	.01	1.01	785.00	275.00
	166.950	109000.00	84.02	.00	.05	.00	942.91	1003.00
	166.950	109000.00	85.04	1.02	.06	1.02	888.31	1003.00

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	167.020	109000.00	84.04	.00	.02	.00	920.00	402.00
	167.020	109000.00	85.06	1.02	.02	1.02	920.00	402.00
*	167.030	109000.00	84.02	.00	-.02	.00	949.02	1.00
*	167.030	109000.00	85.04	1.02	-.02	1.02	920.00	1.00
	167.040	109000.00	84.03	.00	.00	.00	949.02	38.00
	167.040	109000.00	85.04	1.02	.00	1.02	920.00	38.00

	167.050	109000.00	84.07	.00	.05	.00	920.00	1.00
*	167.050	109000.00	85.10	1.02	.06	1.02	920.00	1.00
	167.070	109000.00	84.07	.00	.00	.00	1028.18	181.00
	167.070	109000.00	85.09	1.02	.00	1.02	906.00	181.00
	167.100	109000.00	84.08	.00	.01	.00	915.00	181.00
	167.100	109000.00	85.10	1.02	.01	1.02	915.00	181.00
	167.110	109000.00	84.35	.00	.27	.00	915.00	19.00
	167.110	109000.00	85.37	1.03	.27	1.03	915.00	19.00
	167.130	109000.00	84.35	.00	.00	.00	1038.98	127.00
	167.130	109000.00	85.38	1.03	.00	1.03	906.00	127.00
	167.320	109000.00	84.38	.00	.03	.00	985.66	1003.00
	167.320	109000.00	85.40	1.02	.02	1.02	763.00	1003.00
	167.500	109000.00	84.46	.00	.08	.00	1081.00	1028.00
	167.500	109000.00	85.49	1.03	.09	1.03	1081.00	1028.00
*	167.510	109000.00	84.44	.00	-.02	.00	1145.05	1.00
*	167.510	109000.00	85.47	1.03	-.02	1.03	1081.00	1.00
	167.520	109000.00	84.44	.00	.00	.00	1145.06	54.00
	167.520	109000.00	85.47	1.03	.01	1.03	1081.00	54.00
*	167.530	109000.00	84.50	.00	.06	.00	1081.00	1.00
*	167.530	109000.00	85.54	1.03	.06	1.03	1081.00	1.00
	167.700	109000.00	84.50	.00	.00	.00	937.89	922.00
	167.700	109000.00	85.53	1.03	-.01	1.03	761.35	922.00
	168.060	109000.00	84.59	.00	.09	.00	1337.60	1901.00
	168.060	109000.00	85.62	1.03	.09	1.03	1142.76	1901.00
	168.440	109000.00	84.64	.00	.05	.00	1192.09	2006.00
	168.440	109000.00	85.67	1.03	.05	1.03	999.88	2006.00
	168.970	109000.00	84.69	.00	.05	.00	927.45	2798.00
	168.970	109000.00	85.72	1.03	.05	1.03	618.23	2798.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	169.380	109000.00	84.93	.00	.24	.00	2335.16	2164.00
*	169.380	109000.00	85.97	1.04	.25	1.04	1953.93	2164.00
*	169.800	109000.00	85.00	.00	.08	.00	3994.96	2218.00
*	169.800	109000.00	86.04	1.03	.07	1.03	2900.00	2218.00
*	170.200	109000.00	85.00	.00	.00	.00	2820.76	2112.00
	170.200	109000.00	86.05	1.04	.01	1.04	2070.63	2112.00
	170.580	109000.00	85.06	.00	.06	.00	4412.36	2006.00
	170.580	109000.00	86.10	1.04	.06	1.04	3221.81	2006.00
	170.960	109000.00	85.09	.00	.03	.00	4858.82	2006.00
	170.960	109000.00	86.13	1.04	.03	1.04	3667.25	2006.00
	171.400	109000.00	85.11	.00	.02	.00	5817.14	2323.00
	171.400	109000.00	86.15	1.04	.02	1.04	4079.08	2323.00
	171.540	109000.00	85.11	.00	.01	.00	5817.17	729.00
	171.540	109000.00	86.16	1.04	.01	1.04	4076.93	729.00
	171.600	109000.00	85.12	.00	.01	.00	7183.85	327.00
	171.600	109000.00	86.16	1.03	.00	1.03	4200.00	327.00

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 158.820 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 159.200 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 159.200 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 162.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 162.800 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 162.800 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 163.760 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 163.760 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 167.030 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 167.030 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 167.050 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 167.050 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 167.510 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 167.510 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 167.530 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 167.530 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 169.380 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 169.380 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 169.800 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 169.800 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 170.200 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

1

FLOODWAY DATA, YEAR ENCROACHMENTS - NAT
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
158.440	8831.	174402.	.6	84.3	83.3	1.0
158.630	10016.	159656.	.7	84.3	83.3	1.0
158.720	10016.	154345.	.7	84.3	83.3	1.0
158.820	9292.	111753.	1.0	84.3	83.3	1.0
159.200	11326.	211156.	.5	84.3	83.3	1.0
159.730	12958.	231484.	.5	84.3	83.3	1.0
160.130	13039.	253422.	.4	84.4	83.4	1.0
160.510	12351.	226057.	.5	84.4	83.4	1.0
160.670	11301.	209157.	.5	84.4	83.4	1.0
160.860	10261.	202693.	.5	84.4	83.4	1.0
161.050	9211.	186006.	.6	84.4	83.4	1.0
161.400	8099.	166748.	.7	84.4	83.4	1.0
162.000	8489.	132325.	.8	84.4	83.4	1.0
162.170	8423.	122855.	.9	84.4	83.4	1.0
162.380	9257.	98105.	1.1	84.4	83.4	1.0

162.450	9081.	138680.	.8	84.4	83.4	1.0
162.600	9338.	123100.	.9	84.4	83.4	1.0
162.800	2100.	36807.	3.0	84.3	83.3	1.0
163.180	2093.	46781.	2.3	84.4	83.4	1.0
163.320	2800.	60068.	1.8	84.5	83.5	1.0
163.760	5650.	120172.	.9	84.6	83.6	1.0
163.930	4546.	88545.	1.2	84.6	83.6	1.0
164.340	1742.	49524.	2.2	84.6	83.6	1.0
164.740	1085.	36595.	3.0	84.6	83.6	1.0
165.190	1246.	40133.	2.7	84.7	83.7	1.0
165.610	1702.	48358.	2.3	84.8	83.8	1.0
165.950	978.	39854.	2.7	84.8	83.8	1.0
166.370	729.	35190.	3.1	84.9	83.9	1.0
166.570	745.	34515.	3.2	84.9	83.9	1.0
166.690	841.	36087.	3.0	84.9	83.9	1.0
166.710	841.	36099.	3.0	85.0	84.0	1.0
166.760	785.	35882.	3.0	85.0	84.0	1.0
166.950	888.	39793.	2.7	85.0	84.0	1.0
167.020	920.	40995.	2.7	85.0	84.0	1.0
167.030	920.	34846.	3.1	85.0	84.0	1.0
167.040	920.	34846.	3.1	85.0	84.0	1.0
167.050	920.	41038.	2.7	85.1	84.1	1.0
167.070	906.	38267.	2.8	85.1	84.1	1.0
167.100	915.	38427.	2.8	85.1	84.1	1.0
167.110	915.	38678.	2.8	85.3	84.3	1.0
167.130	906.	38517.	2.8	85.3	84.3	1.0
167.320	763.	36055.	3.0	85.4	84.4	1.0

1

FLOODWAY DATA, YEAR ENCROACHMENTS - NAT
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
167.500	1081.	44831.	2.4	85.5	84.5	1.0
167.510	1081.	36113.	3.0	85.4	84.4	1.0
167.520	1081.	36114.	3.0	85.4	84.4	1.0
167.530	1081.	44879.	2.4	85.5	84.5	1.0
167.700	761.	35757.	3.0	85.5	84.5	1.0
168.060	1143.	41617.	2.6	85.6	84.6	1.0
168.440	1000.	37823.	2.9	85.6	84.6	1.0
168.970	618.	27922.	3.9	85.7	84.7	1.0
169.380	1954.	57857.	1.9	85.9	84.9	1.0
169.800	2900.	81621.	1.3	86.0	85.0	1.0
170.200	2071.	61199.	1.8	86.0	85.0	1.0
170.580	3222.	81807.	1.3	86.1	85.1	1.0
170.960	3667.	92354.	1.2	86.1	85.1	1.0
171.400	4079.	95296.	1.1	86.1	85.1	1.0
171.540	4077.	95302.	1.1	86.1	85.1	1.0
171.600	4200.	92460.	1.2	86.1	85.1	1.0

TABLE 1
SUMMARY OF CALCULATIONS

SECTION	RIVER MILE	100-YEAR FLOOD STAGE		FLOODWAY WIDTH	
		WITHOUT IMPOUNDMENT	WITH IMPOUNDMENT	WITHOUT IMPOUNDMENT	WITH IMPOUNDMENT
A	158.44	83.3	83.3	8,831	8,831
B	161.40	83.4	83.4	8,099	8,099
162.17	162.17	83.4	83.4	8,325	8,423
162.38	162.38	83.4	83.4	9,002	9,257
162.45	162.45	83.4	83.4	9,086	9,081
C	163.76	83.6	83.6	5,650	5,650
D	165.61	83.8	83.8	1,701	1,702
E	166.69	83.9	83.9	841	841
F	167.03	84.0	84.0	920	920
G	167.10	84.1	84.1	915	915
H	167.51	84.4	84.4	1,081	1,081
I	168.44	84.6	84.6	1,000	1,000
J	170.20	85.0	85.0	2,070	2,070
K	171.60	85.1	85.1	4,200	4,200

NOTES:
1. Section refers to cross-sections located on Drawings 1 and 2.
2. 100-Year flood stage in feet above mean sea level.
3. Floodway refers to regulatory floodway, with width given in feet.
4. All calculations from HEC-2 output files RVRWD1.OUT (without impoundment and RVRWD2.OUT (with impoundment).

ENVIRONMENTALLY SENSITIVE AREA DOCUMENTATION

Proposed 41-Acre Impoundment

DEPARTMENT OF THE ARMY PERMIT

Permittee Riverwood International USA, Incorporated

Permit No. CELMK-OD-FE 14-12H23-34

Issuing Office CELMK-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: The permittee is authorized to construct levees in wetlands in Ouachita Parish, Louisiana, to form a surface impoundment which would tie into an existing impoundment system. The placement of the levees would also cause the existing drainage into Toney Bayou to be rerouted into an existing pond at the project site.

Wetland acres permitted: 4.5
Wetland acres mitigated: 6.15

Project Location: Section 11, T17N-R3E, within the Ouachita River Drainage Basin, Ouachita Parish, West Monroe, Louisiana.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on 1 MARCH 1996. 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 one 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 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.

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:

The attached mitigation plan (including addendum) shall be implemented prior to or concurrent with project construction.

Further Information:

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

(x) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

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

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

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.

February 26, 1993

(PERMITTEE) *(DATE)*

RIVERWOOD INTERNATIONAL USA, INCORPORATED

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

1 March 1993

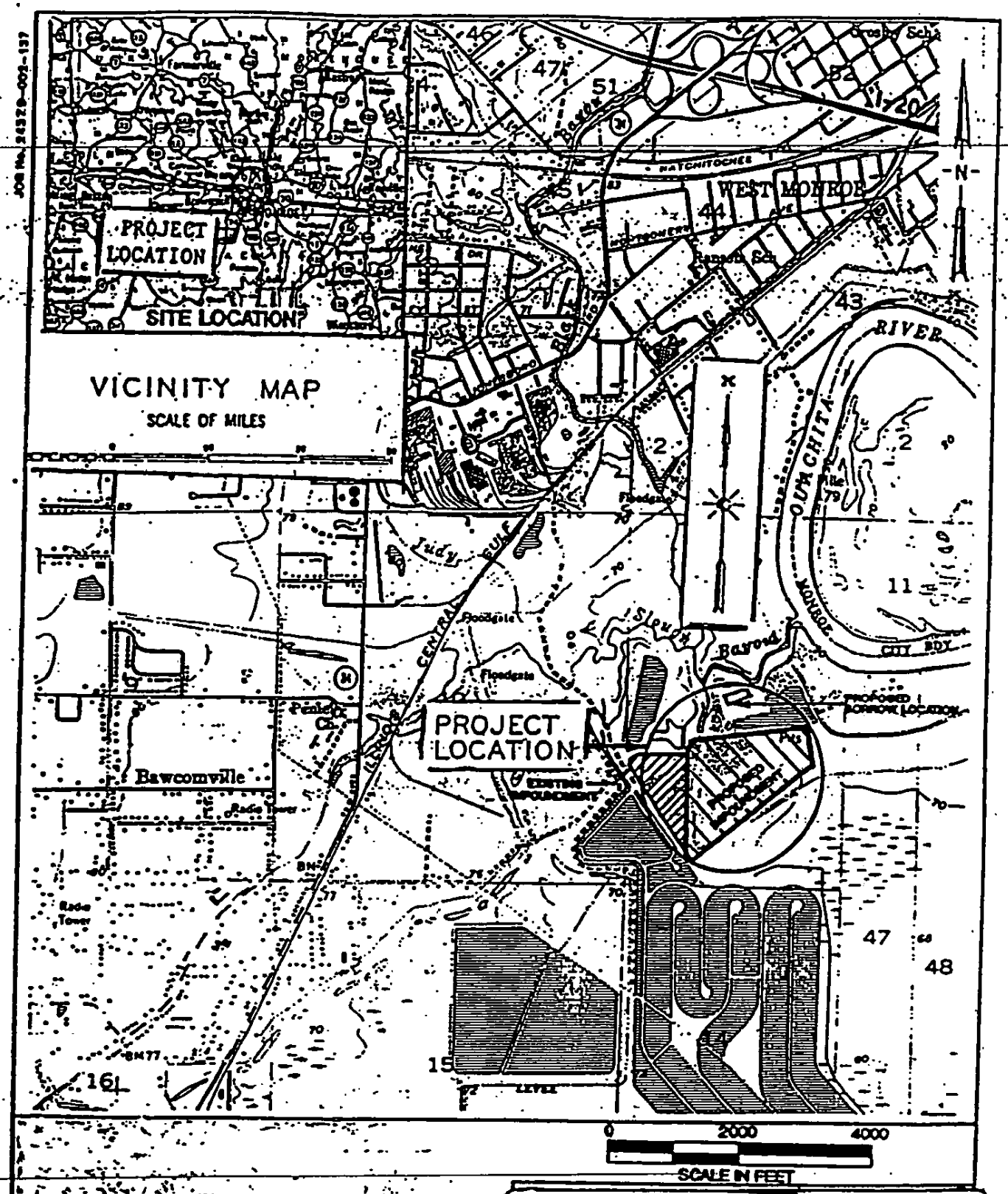
(DISTRICT ENGINEER) *(DATE)*

for STEPHENSON W. PAGE
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)*

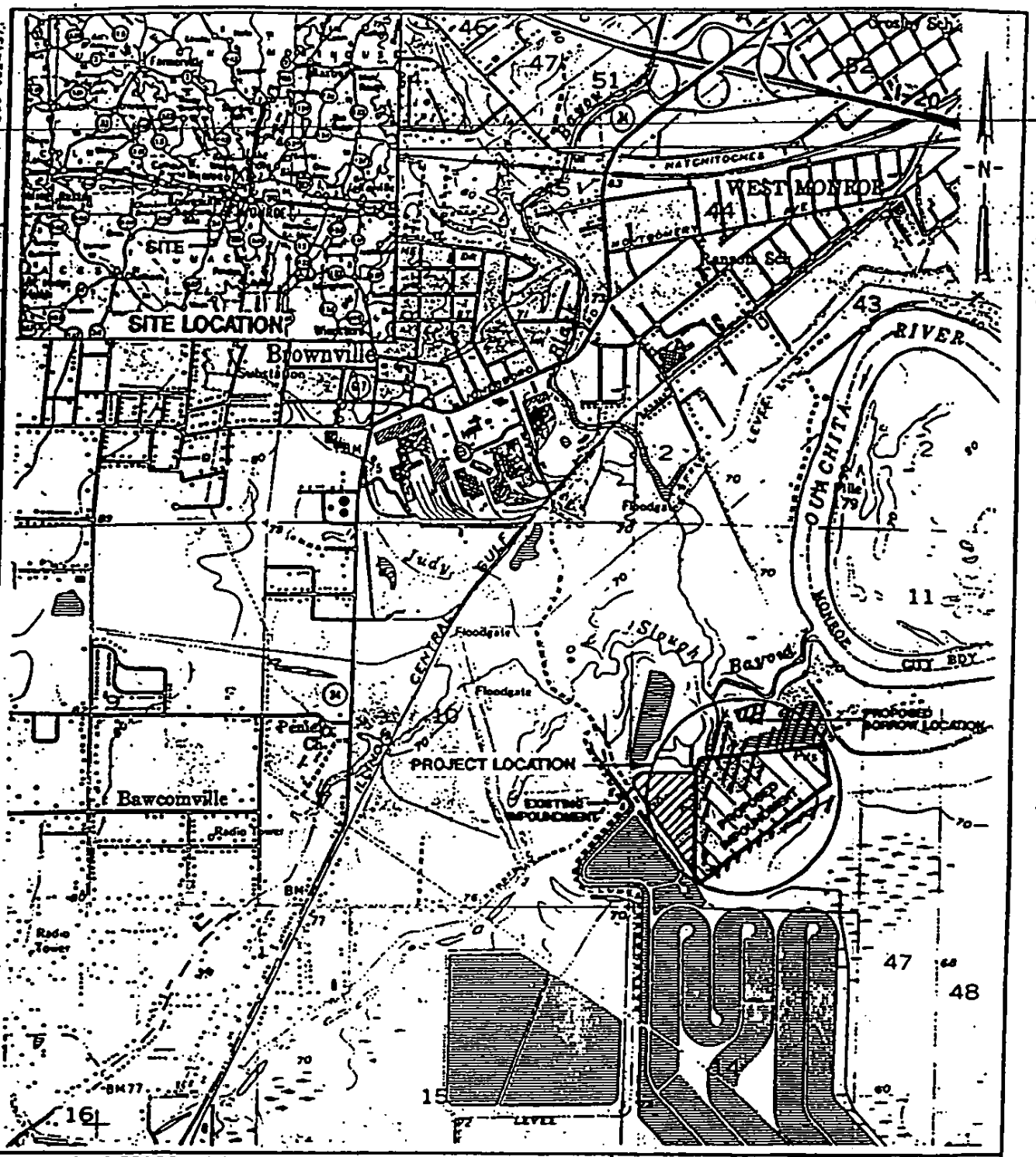
☆U.S. GOVERNMENT PRINTING OFFICE: 1986 — 717-425



CELMK-OD-FE 14-12H23-34

RIVERWOOD INTERNATIONAL USA INC

PROPOSED SURFACE IMPOUNDMENT
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA



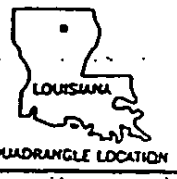
REFERENCE: SITE LOCATION MAP TAKEN FROM RAND McNALLY ROAD MAP OF ARKANSAS, LOUISIANA AND MISSISSIPPI.
SITE VICINITY MAP TAKEN FROM U.S.G.S. QUADRANGLE MAP, 7.5 MINUTE SERIES, WEST MONROE SOUTH, LA. DATED 1957, PHOTOREVISED 1969 AND 1975.

0 2000 4000
SCALE IN FEET

FIGURE 1
SITE VICINITY MAP

Symbol :

waters of the U.S Including Wetlands



QUADRANGLE LOCATION

CELMK-OD-FE 14-12H23-34

RIVERWOOD INTERNATIONAL USA INC

Wetland Map

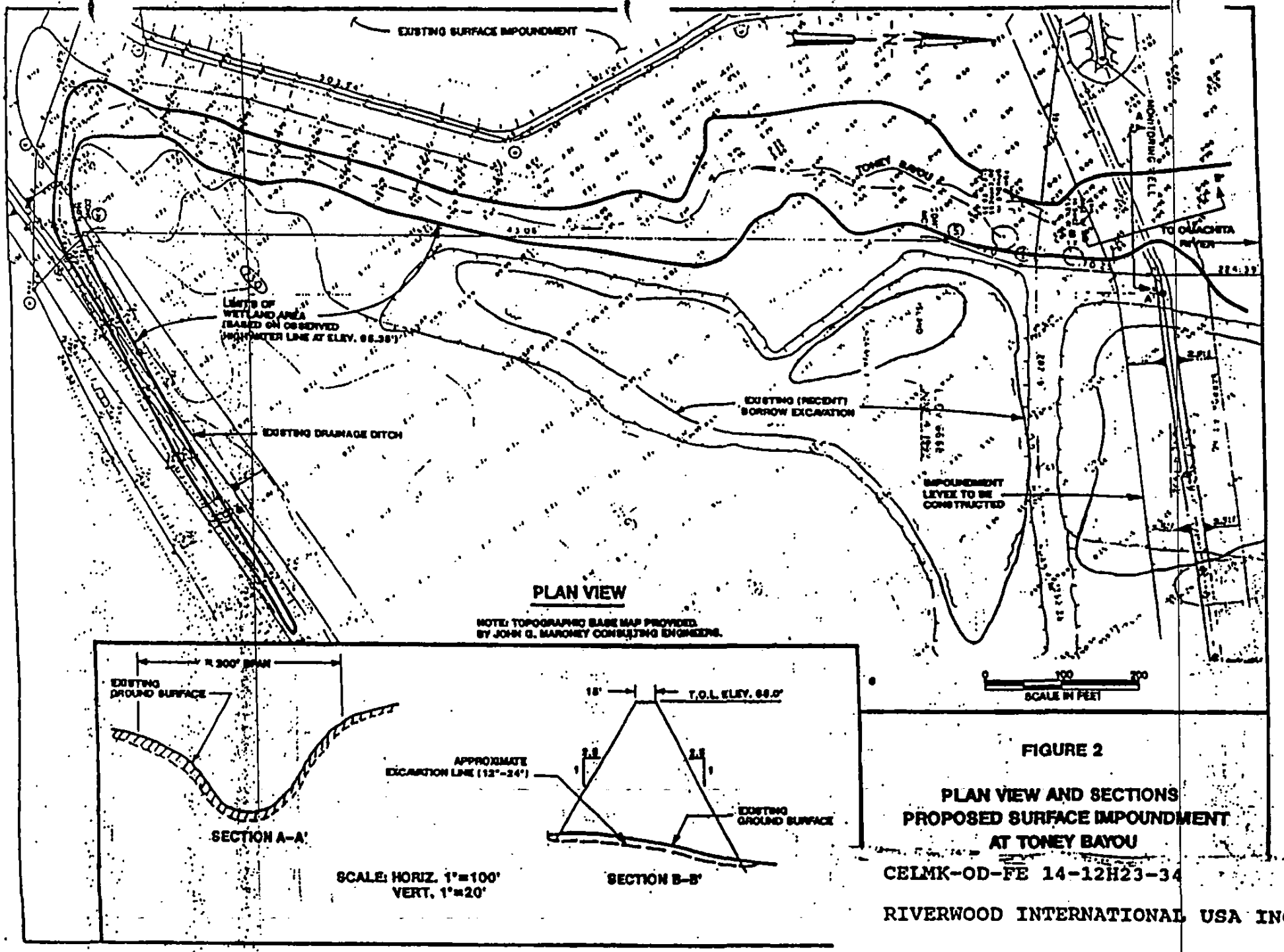
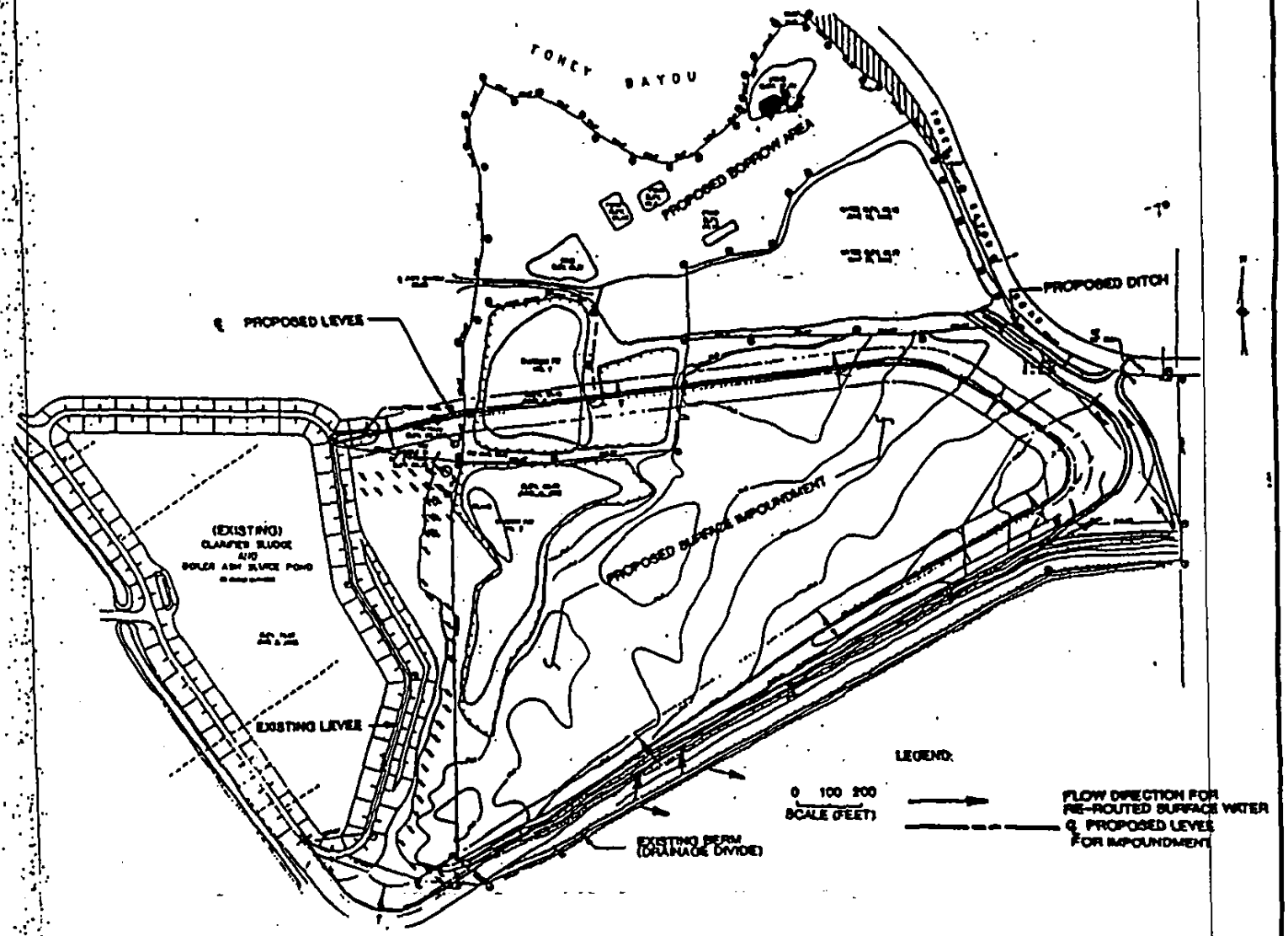


FIGURE 2

PLAN VIEW AND SECTIONS
PROPOSED SURFACE IMPOUNDMENT
AT TONEY BAYOU

CELMK-OD-FE 14-12H23-34

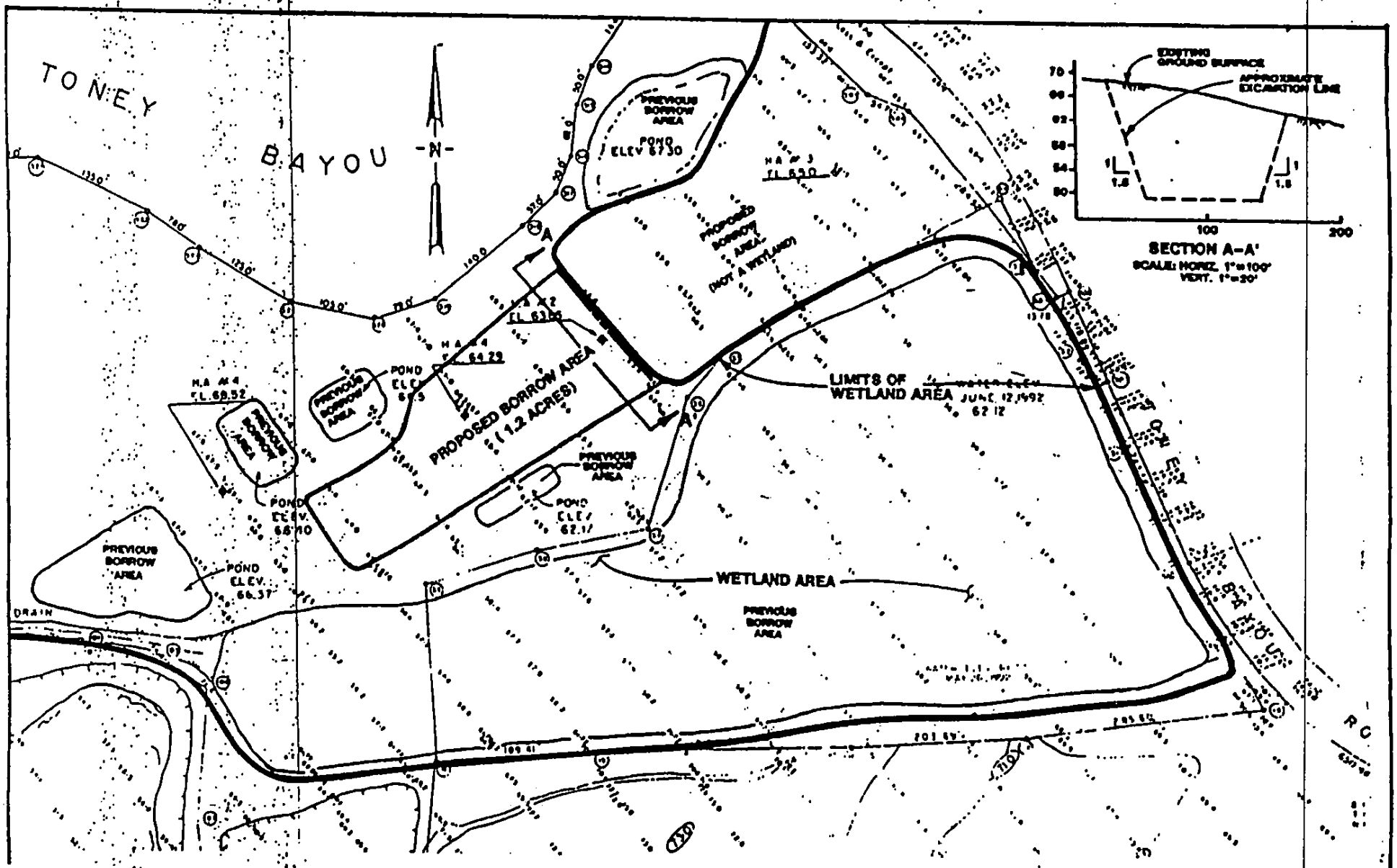
RIVERWOOD INTERNATIONAL USA INC



CELMK-OD-FE 14-12H23-34

RIVERWOOD INTERNATIONAL USA INC

FIGURE 3
PLAN VIEW
PROPOSED SURFACE IMPOUNDMENT
RIVERWOOD INTERNATIONAL USA, INC.



CELMK-OD-FE 14-12H23-34

RIVERWOOD INTERNATIONAL USA INC.

FIGURE 4
PROPOSED BORROW LOCATION
WITHIN WETLAND AREA
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

State of Louisiana
Department of Environmental Quality

Edwin W. Edwards
Governor

Kai David Midboe
Secretary

OCT - 2 9 1992

WQC 920821-14

Dames & Moore
4949 Essen Lane, Suite 900
Baton Rouge, LA 70809

Attention: Mr. Terri L. Richardson, Agent for Riverwood International USA, Inc.

RE: Proposal for Riverwood International USA, Inc. to construct a surface impoundment for the storage of solid waste, which will be located adjacent to an existing 21-acre surface impoundment at its West Monroe plant, Ouachita Parish.

Gentlemen:

This is to acknowledge receipt of "Proof of Publication" of public notice, above reference, forwarded to you with our letter dated September 18, 1992.

It is our opinion that your proposed project will not violate water quality standards of the State of Louisiana, therefore, we offer no objection to this project provided that the levees are seeded and revegetated in order to prevent erosion, that drainage ditches are constructed with a slope no greater than 3:1 (horizontal:vertical) and allowed to revegetate, and that all practicable means are utilized to minimize any discharge of water pollutants that can result from the proposed project. Also, any discharges from the area will require a permit from this office and/or the Office of Solid & Hazardous Waste.

In accordance with statutory authority contained in the Louisiana Revised Statutes of 1950, Title 30, Chapter 11, Part IV, Section 2074 A(3) and provisions of Section 401 of the Clean Water Act (P.L. 95-217), the Office of Water Resources certifies that it is reasonable to expect that water quality standards of Louisiana provided for under Section 303 of P.L. 95-217 will not be violated.

Sincerely,

J. Dale Givens, Assistant Secretary
Office of Water Resources

JDG:JWL
c: Corps of Engineers
Vicksburg District

DAMES & MOORE
4949 ESSEN LANE, SUITE 900, BATON ROUGE, LOUISIANA 70809
(504) 769-2600 FAX: (504) 769-3695

December 23, 1992

Department of the Army
Vicksburg District Corps of Engineers
2101 North Frontage Road
Vicksburg, Mississippi 39180-5181

Attn: Ms. Elizabeth S. Guynes
Ms. Karen Tachji

Wetlands Mitigation Plan
U.S. Army COE Permit
No. CELMK-OD-FE 14-12H23-34
Proposed Surface Impoundment
Riverwood International USA, Inc.
West Monroe, Louisiana

Dear Ms. Guynes and Ms. Tachji:

On behalf of our client, Riverwood International USA, Inc., we hereby transmit a copy of the Wetlands Mitigation Plan for Department of the Army Permit Number CELMK-OD-FE 14-12H23-34. This plan addresses the measures that will be taken to off-set unavoidable direct impact on 4.5 acres of wetlands located near or within a proposed impoundment construction site.

The attached mitigation plan describes the activities that will be undertaken at the site to mitigate 3.3 acres of forested wetlands along Toney Bayou and 1.2 acres of herbaceous wetlands located in a previously-disturbed wetlands area that is proposed for use as a borrow area. The mitigation plan was prepared by Dames & Moore personnel specialized in wetlands biology and ecology. The plan identifies 3.3 acres of planned forested mitigation area and 1.2 acres of planned herbaceous mitigation area, and includes planting plans and specifications for each area. This plan offers 1:1 mitigation of the forested and herbaceous wetland areas to be affected by construction of the proposed impoundment.

Dames & Moore has reviewed the comments received from the Department of the Interior, Fish and Wildlife Service (dated December 9, 1992) and from the United States

Environmental Protection Agency (dated December 15, 1992) concerning the proposed project. In response to the requests by these agencies for additional forested wetland mitigation, we have identified an "optional" mitigation area on the plan that could provide for additional forested mitigation, if required. Although the additional acreage is approximately 1.7 acres (rather than the 3.3 additional requested), this area offers the following advantages:

- a ratio of 1.5:1 for forested wetland mitigation would be achieved;
- the area is a recently-disturbed borrow area and of low habitat quality;
- the area is bordered by wetlands on the north, east, and west sides (including Toney Bayou to the west), which should enhance the ability of the area to become established as a wetland; and
- the area is presently not a wetland and is not forested.

Please note that Riverwood International has agreed to comply with the request for 2:1 mitigation of forested wetlands, if required by the Corps of Engineers. However, based on Dames & Moore's observations, the property near the construction site that may be considered available for additional wetland mitigation is presently heavily-forested and provides a natural buffer between industrial activities and neighboring farmland or commercial property. We do not recommend clearing presently forested property with potentially good habitat value in order to convert the land to a wetland habitat. Therefore, if the 2:1 mitigation of forested wetlands is required, some of the mitigation would have to be accomplished at another location within the plant.

Please review the Wetlands Mitigation Plan for the proposed impoundment and advise us as to your decision. If you have any questions concerning this plan or the proposed construction, contact Ms. Terri Richardson at (504) 769-2600, in the Dames & Moore Baton Rouge office.

Very truly yours,

DAMES & MOORE

Terri L. Richardson

Terri L. Richardson, P.E.
Senior Engineer

enc.

cc w/enc: Mr. J.E. Boyles
Riverwood International USA, Inc.

TLR:tlr

ADDENDUM
~~WETLANDS MITIGATION PLAN~~
PROPOSED SURFACE IMPOUNDMENT
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

1. The methods and materials used to create hydric soil conditions in the mitigation areas will primarily include the use of a clayey soil confining layer installed approximately three feet below the finished grade of each area. This clayey soil will include clayey silt to silty or sandy clay material removed during topsoil stripping operations or from on-site excavations. This clayey layer will be approximately one to two feet thick and will serve to hold water within the surface soils and thereby hydrate the wetland mitigation area.

   In addition, the existing topsoil in the location of both wetland mitigation areas will be scraped and stockpiled during the excavation process. This topsoil contains an assemblage of wetland and transitional vegetation species which will be able to recruit and establish an herbaceous ground cover within the wetland mitigaiton areas. This design will lead to quicker establishment and stabilization of the entire mitigation area.

2. Tree planting will be completed by a landscape or wetland planting contractor. Trees will be container-grown, one-gallon size specimens and will be hand planted.

3. Wetland mitigation monitoring will be completed once per year for three years following completion of the wetland construction and planting. During each monitoring event, tree survival rate will be determined by assessing a tagged subsample of trees (25%) which will represent a cross section of mitigation wetland. If tree survival falls below an 80% rate as determined during an annual monitoring event, then additional trees will be planted to maintain the 80% survival rate. If the tagged subsample does not appear to represent the actual survival rate throughout the entire mitigation area, then a complete count of all trees in the mitigation area will be completed to assess tree survival. At the completion of three years, the monitoring will be discontinued as long as tree survival shows a trend of maintaining the 80% survival rate. Otherwise, the monitoring will be continued until this trend is established.

4. If the wetland mitigation monitoring shows that the trees are not meeting the 80% survival criteria, then additional trees will be planted following the annual monitoring event. In addition, if hydrological or physical problems occur within the wetland, the applicant will undertake remedial actions as necessary to rectify the problem. Some problems may require comment from the regulatory agencies and they will be contacted for guidance. Any remedial action taken and the results of such action will be reported to the regulatory agencies involved.

ORIGINAL

Ouachita Parish Police Jury

P. O. Box 3007 • Monroe, Louisiana 71210-3007
(318) 323-5188 • FAX (318) 387-7882

District A
Arlan E. Rawls

District B
Benton Frost

District C
Ben Marshall

District D
Abe E. Pierce, III

District E
Adele W. Ransom

District F
Ervin Turner

May 5, 1993

Riverwood International USA, Inc.
1000 Jonesboro Road
West Monroe, Louisiana 71294

Re: Riverwood International USA, Inc.
Development Permit

Dear Sirs:

On April 5, 1993 the Ouachita Parish Police Jury granted a Development Permit to Riverwood International USA, Inc. for 41 acres of development in Section 11, Township 17 North, Range 3 East. A description of the development is a solid waste pond for ash/sludge disposal to be built on Riverwood International's property in the Toney Bayou area, West Ouachita.

Should you have any questions concerning this matter, please contact me. Thank you.

Sincerely,

C.T. Janway

C.T. Janway
Director of Public Works

CTJ/rs
Files: 3.02-93077
WP Files #6-A:RIVWODEV

Edwin W. Edwards
Governor

Mark H. Hilzim
Secretary

Melinda Schwegmann
Lieutenant Governor
and Commissioner

Jim Ball
Assistant Secretary

State of Louisiana
Department of Culture, Recreation and Tourism
OFFICE OF STATE PARKS

May 17, 1993

Mr. Bob Escher
Dames & Moore
4949 Essen, Suite 900
Baton Rouge, LA 70809

Re: Request for Further Information
Riverwood International Corporation
Solid Waste Landfill Permit Renewal
W.O. #183-08

Dear Mr. Escher:

We have reviewed the above mentioned permit renewal and to the best of our knowledge, there are no existing or proposed public recreation areas listed in our inventory that are within 1000 feet of the project. We recommend that you contact the local governing bodies in the area of your project. They will be able to provide further comments on this subject.

If you have any questions concerning this matter, please contact this office.

Sincerely,

Sandra Murray
for Elinor M. Craven
Director of Outdoor Recreation

EMC:SM:rm

DAMES & MOORE
4949 ESSEN LANE, SUITE 900, BATON ROUGE, LOUISIANA 70809
(504) 769-2600 FAX: (504) 769-3695

December 23, 1992

Department of the Army
Vicksburg District Corps of Engineers
2101 North Frontage Road
Vicksburg, Mississippi 39180-5181

Attn: Ms. Elizabeth S. Guynes
Ms. Karen Tachji

Wetlands Mitigation Plan
U.S. Army COE Permit
No. CELMK-OD-FE 14-12H23-34
Proposed Surface Impoundment
Riverwood International USA, Inc.
West Monroe, Louisiana

Dear Ms. Guynes and Ms. Tachji:

On behalf of our client, Riverwood International USA, Inc., we hereby transmit a copy of the Wetlands Mitigation Plan for Department of the Army Permit Number CELMK-OD-FE 14-12H23-34. This plan addresses the measures that will be taken to off-set unavoidable direct impact on 4.5 acres of wetlands located near or within a proposed impoundment construction site.

The attached mitigation plan describes the activities that will be undertaken at the site to mitigate 3.3 acres of forested wetlands along Toney Bayou and 1.2 acres of herbaceous wetlands located in a previously-disturbed wetlands area that is proposed for use as a borrow area. The mitigation plan was prepared by Dames & Moore personnel specialized in wetlands biology and ecology. The plan identifies 3.3 acres of planned forested mitigation area and 1.2 acres of planned herbaceous mitigation area, and includes planting plans and specifications for each area. This plan offers 1:1 mitigation of the forested and herbaceous wetland areas to be affected by construction of the proposed impoundment.

Dames & Moore has reviewed the comments received from the Department of the Interior, Fish and Wildlife Service (dated December 9, 1992) and from the United States

Environmental Protection Agency (dated December 15, 1992) concerning the proposed project. In response to the requests by these agencies for additional forested wetland mitigation, we have identified an "optional" mitigation area on the plan that could provide for additional forested mitigation, if required. Although the additional acreage is approximately 1.7 acres (rather than the 3.3 additional requested), this area offers the following advantages:

- a ratio of 1.5:1 for forested wetland mitigation would be achieved;
- the area is a recently-disturbed borrow area and of low habitat quality;
- the area is bordered by wetlands on the north, east, and west sides (including Toney Bayou to the west), which should enhance the ability of the area to become established as a wetland; and
- the area is presently not a wetland and is not forested.

Please note that Riverwood International has agreed to comply with the request for 2:1 mitigation of forested wetlands, if required by the Corps of Engineers. However, based on Dames & Moore's observations, the property near the construction site that may be considered available for additional wetland mitigation is presently heavily-forested and provides a natural buffer between industrial activities and neighboring farmland or commercial property. We do not recommend clearing presently forested property with potentially good habitat value in order to convert the land to a wetland habitat. Therefore, if the 2:1 mitigation of forested wetlands is required, some of the mitigation would have to be accomplished at another location within the plant.

Please review the Wetlands Mitigation Plan for the proposed impoundment and advise us as to your decision. If you have any questions concerning this plan or the proposed construction, contact Ms. Terri Richardson at (504) 769-2600, in the Dames & Moore Baton Rouge office.

Very truly yours,

DAMES & MOORE

Terri L. Richardson

Terri L. Richardson, P.E.
Senior Engineer

enc.

cc w/enc: Mr. J.E. Boyles
Riverwood International USA, Inc.

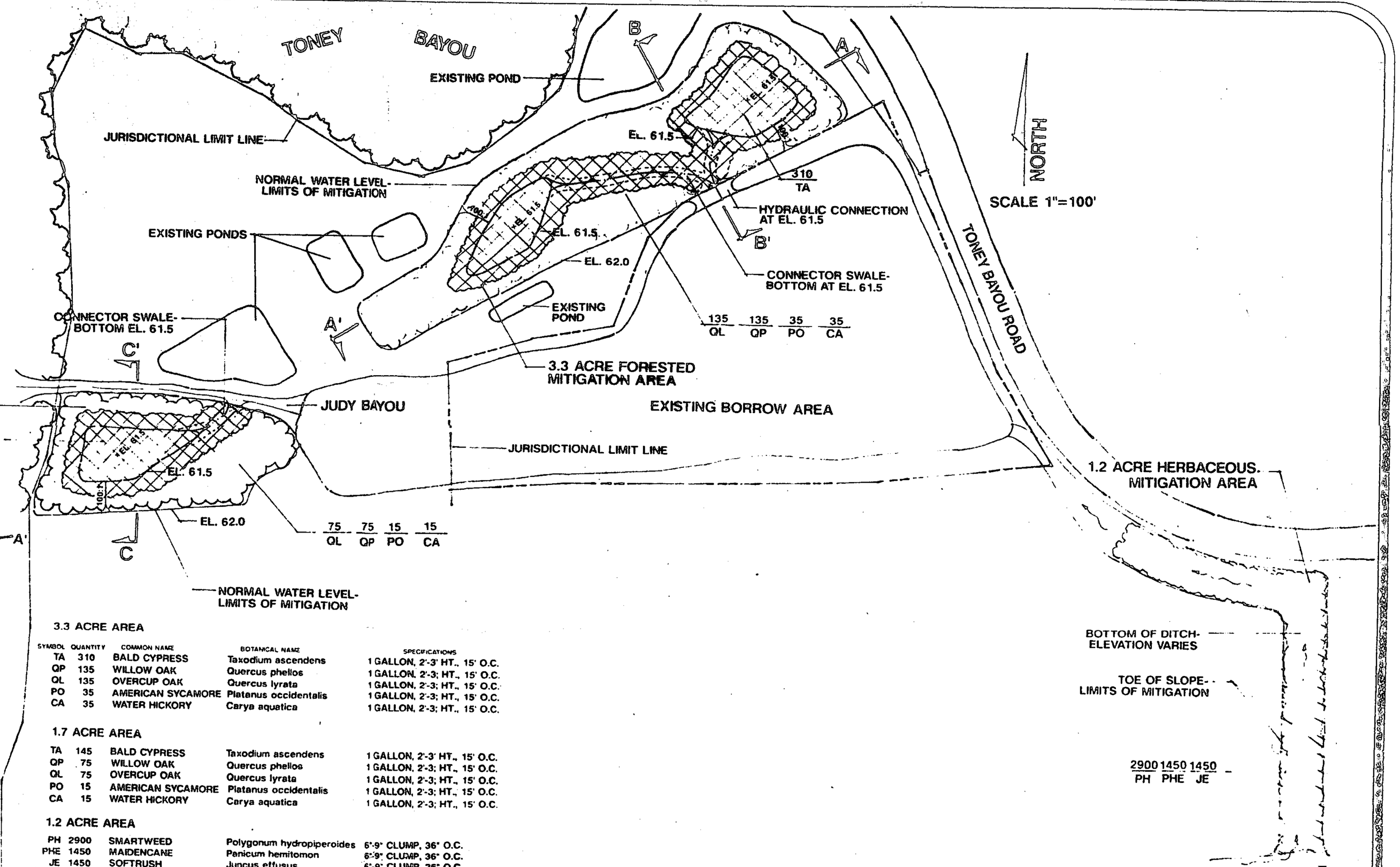
TLR:tlr

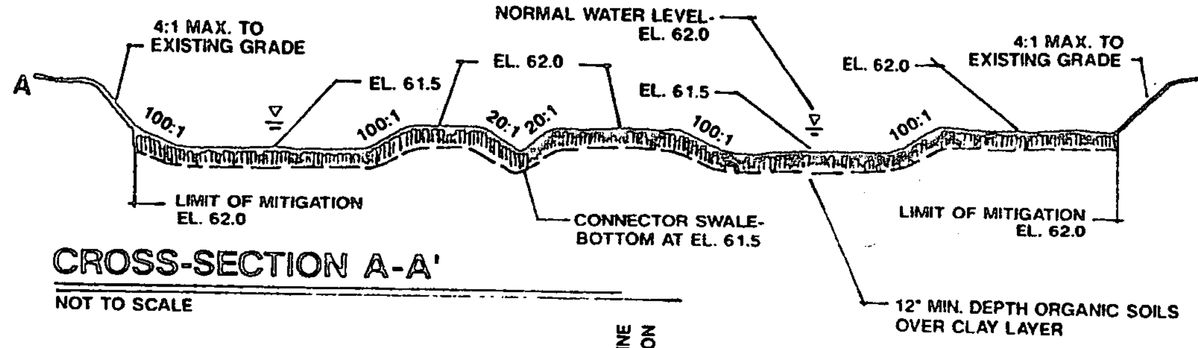
RIVERWOOD INTERNATIONAL
WEST MONROE, LOUISIANA

WETLAND MITIGATION PLAN

DECEMBER 22, 1992

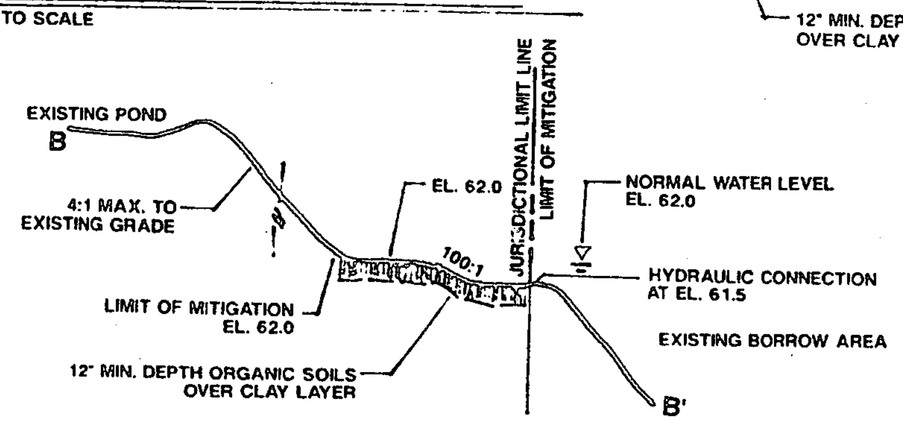
FOR PERMITTING PURPOSES ONLY- NOT FOR CONSTRUCTION





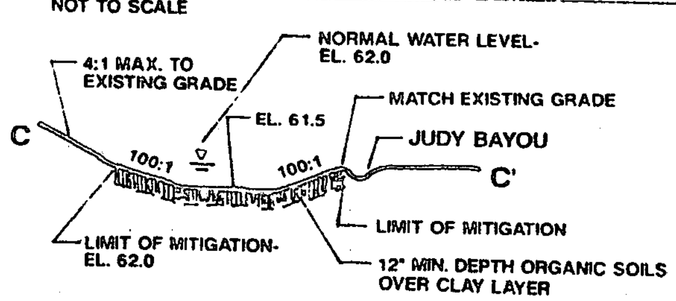
CROSS-SECTION A-A'

NOT TO SCALE



CROSS-SECTION B-B'

NOT TO SCALE



CROSS-SECTION C-C'

NOT TO SCALE

3.3 ACRE AREA

SYMBOL	QUANTITY	COMMON NAME	BOTANICAL NAME	SPECIFICATIONS
TA	310	BALD CYPRESS	Taxodium ascendens	1 GALLON, 2'-3' HT., 15' O.C.
QP	135	WILLOW OAK	Quercus phellos	1 GALLON, 2'-3; HT., 15' O.C.
QL	135	OVERCUP OAK	Quercus lyrata	1 GALLON, 2'-3; HT., 15' O.C.
PO	35	AMERICAN SYCAMORE	Platanus occidentalis	1 GALLON, 2'-3; HT., 15' O.C.
CA	35	WATER HICKORY	Carya aquatica	1 GALLON, 2'-3; HT., 15' O.C.

1.7 ACRE AREA

TA	145	BALD CYPRESS	Taxodium ascendens	1 GALLON, 2'-3' HT., 15' O.C.
QP	75	WILLOW OAK	Quercus phellos	1 GALLON, 2'-3; HT., 15' O.C.
QL	75	OVERCUP OAK	Quercus lyrata	1 GALLON, 2'-3; HT., 15' O.C.
PO	15	AMERICAN SYCAMORE	Platanus occidentalis	1 GALLON, 2'-3; HT., 15' O.C.
CA	15	WATER HICKORY	Carya aquatica	1 GALLON, 2'-3; HT., 15' O.C.

1.2 ACRE AREA

PH	2900	SMARTWEED	Polygonum hydropiperoides	6"-9" CLUMP, 36" O.C.
PHE	1450	MAIDENCANE	Panicum hemitomon	6"-9" CLUMP, 36" O.C.
JE	1450	SOFTRUSH	Juncus effusus	6"-9" CLUMP, 36" O.C.

DAMES & MOORE

CIVIL ENGINEERING/ WATER RESOURCES/ WASTE MANAGEMENT/PLANNING
ENVIRONMENTAL SERVICES/ GEOTECHNICAL ENGINEERING

TAMPA (813)875-1115
TALLAHASSEE (904)942-5615
SARASOTA (813)378-4055
ORLANDO (407)841-2727
MIAMI (305)858-4757
BRADENTON (813)753-3065
BOCA RATON (407)392-9070

Edwin W. Edwards
Governor

Mark H. Hilzim
Secretary

Melinda Schwegmann
Lieutenant Governor
and Commissioner

Gerri Hobdy
Assistant Secretary

State of Louisiana
Department of Culture, Recreation and Tourism
OFFICE OF CULTURAL DEVELOPMENT

September 17, 1992

Mrs. Terri L. Richardson, P.E.
Dames & Moore
4949 Essen Lane, Suite 900
Baton Rouge, Louisiana 70809

Re: Solid Waste Permit Application
Proposed Sold Waste Surface Impoundment
Riverwood International USA, Inc.
West Monroe, Ouachita Parish, Louisiana

Dear Mrs. Richardson:

Reference is made to your letter dated July 29, 1992, concerning the above solid waste permit application. A review of our site file data reveals that there are no known archaeological sites or historical structures located within 1000' of the permit site.

If we may be of further assistance, do not hesitate to contact my staff in the Divisions of Archaeology and Historic Preservation.

Sincerely,

Gerri Hobdy
State Historic Preservation Officer

GH:PR:s

Kathleen M. Byrd, Ph.D., Director
Division of Archaeology
P.O. Box 44247 (1051 N. Third Street)
Baton Rouge, LA 70804
(504) 342-8170
Fax: (504) 342-3207

State of Louisiana

Joe L. Herring
Secretary

Department of Wildlife and Fisheries
Post Office Box 98000
Baton Rouge, LA 70898-9000
(504) 765-2800

Edwin W. Edwards
Governor

September 24, 1992

Ms. Terri L. Richardson, P.E.
Senior Engineer
Dames & Moore
4949 Essen Lane, Suite 900
Baton Rouge, LA 70809

RE: Proposed Solid Waste Surfact Impoundment
Riverwood International USA, Inc.
West Monroe, LA

Dear Ms. Richardson:

Personnel of the Louisiana Department of Wildlife and Fisheries have reviewed the information which you provided to us. Based upon that information, we have made a cursory assessment of possible impacts of the above referenced project upon fish and wildlife resources and their habitat.

The data available to us indicate no known threatened or endangered species of animal is resident within the project area. No Wildlife Management Areas are in the immediate vicinity. We are not aware of any designated sensitive ecological areas near the project site.

No stream protected under the Louisiana Natural and Scenic Rivers Act will be affected by the proposed activity. Therefore, no Scenic Rivers permit will be required for this project.

Potential impacts to other fish and wildlife resources are expected to be minimal.

Sincerely,

Lee Caubarreaux
Assistant Secretary

LC/MBW/mw

DEPARTMENT OF THE ARMY
VICKSBURG DISTRICT, CORPS OF ENGINEERS
2101 NORTH FRONTAGE ROAD
VICKSBURG, MISSISSIPPI 39180-5191

OFFICIAL BUSINESS
CELMK-OD-F

FIRST CLASS MAIL
U.S. POSTAGE
PAID
Vicksburg, MS
Permit No. 56

US Army Corps
of Engineers

PUBLIC NOTICE

MR VANCE GARDNER
MANAGER ENVIRONMENMENTAL
PO BOX 35800
WEST MONROE LA 71294-5800

US Army Corps
of Engineers

Vicksburg District
2101 North Frontage Road
Vicksburg, MS 39180-5191

Public Notice

APPLICATION NO.
CELMK-OD-FE 14-12H23-34
EVALUATOR PHONE NO.
Ms. Karen Tachji (601) 631-7136
DATE 10 NOVEMBER 1992
EXPIRATION DATE 9 DECEMBER 1992

Interested parties are hereby notified that the U.S. Army Corps of Engineers, Vicksburg District, is considering an application for a Department of the Army Permit for the work described herein. Comments should be forwarded to the Vicksburg District, ATTN: CELMK-OD-F at the above address and must reach this office by the cited expiration date.

Law Requiring a Permit: Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), which applies to structures or work in navigable waters of the United States and 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.

Name of Applicant:

Mr. Bill H. Chastain
Riverwood International USA, Incorporated
P.O. Box 35800
West Monroe, Louisiana 71294-5800

Location of Proposed Work: Section 11, T17N-R3E, within the Ouachita River Drainage Basin, Ouachita Parish, West Monroe, Louisiana.

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

The applicant has applied for a Department of the Army Section 404 permit to conduct excavation and fill activities associated with the construction of levees. The purposes of this project are to provide a surface impoundment layout which ties into existing facilities and to redirect drainage flow around the impoundment into an existing pond. The following descriptions of the proposed project and associated impacts are based upon information provided by the applicant.

Proposed work would occur at two separate wetland areas. Work at wetland area number 1 (see figure 2), which would be incorporated into the impoundment (see figure 1), would consist of clearing, grubbing, minor excavation, and placement of fill material. The fill material is required to construct levees and a liner for the impoundment. This wetland area includes the upper reach of Toney Bayou (approximately 100 to 200 feet wide) and a small section of a connecting drainage ditch. Surface water that currently flows through the existing drainage ditch into Toney Bayou would be redirected to flow around the impoundment and into an existing pond (see figure 3).

A second wetland area is planned for use as a potential borrow source (see figures 1 and 4). This area would be mechanically cleared. Its clay soils would be excavated to a maximum depth of approximately 20 feet. The excavated clay would be used to construct a low permeability liner for the proposed surface impoundment.

During construction of the impoundment, approximately 7,700 cubic yards of soil would be excavated from the bayou and drainage ditch to provide a firm base for construction of the impoundment levees and floor. Construction of impoundment levees and clay liner in the area would require the placement of approximately 18,000 cubic yards of excavated material. A total of approximately 20 acres of wetlands would be impacted by the proposed project, and the work would occur within ordinary high water. Since the proposed project would be located in wetlands, all mechanized land clearing and discharges of dredged and fill material at the site require 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: Our initial review indicates that there are no properties currently listed in the National Register of Historic Places or eligible for listing, which would be affected by the work. By copy of this notice, we are soliciting comments on the existence of specific sites or structures which may be affected by the work.

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.

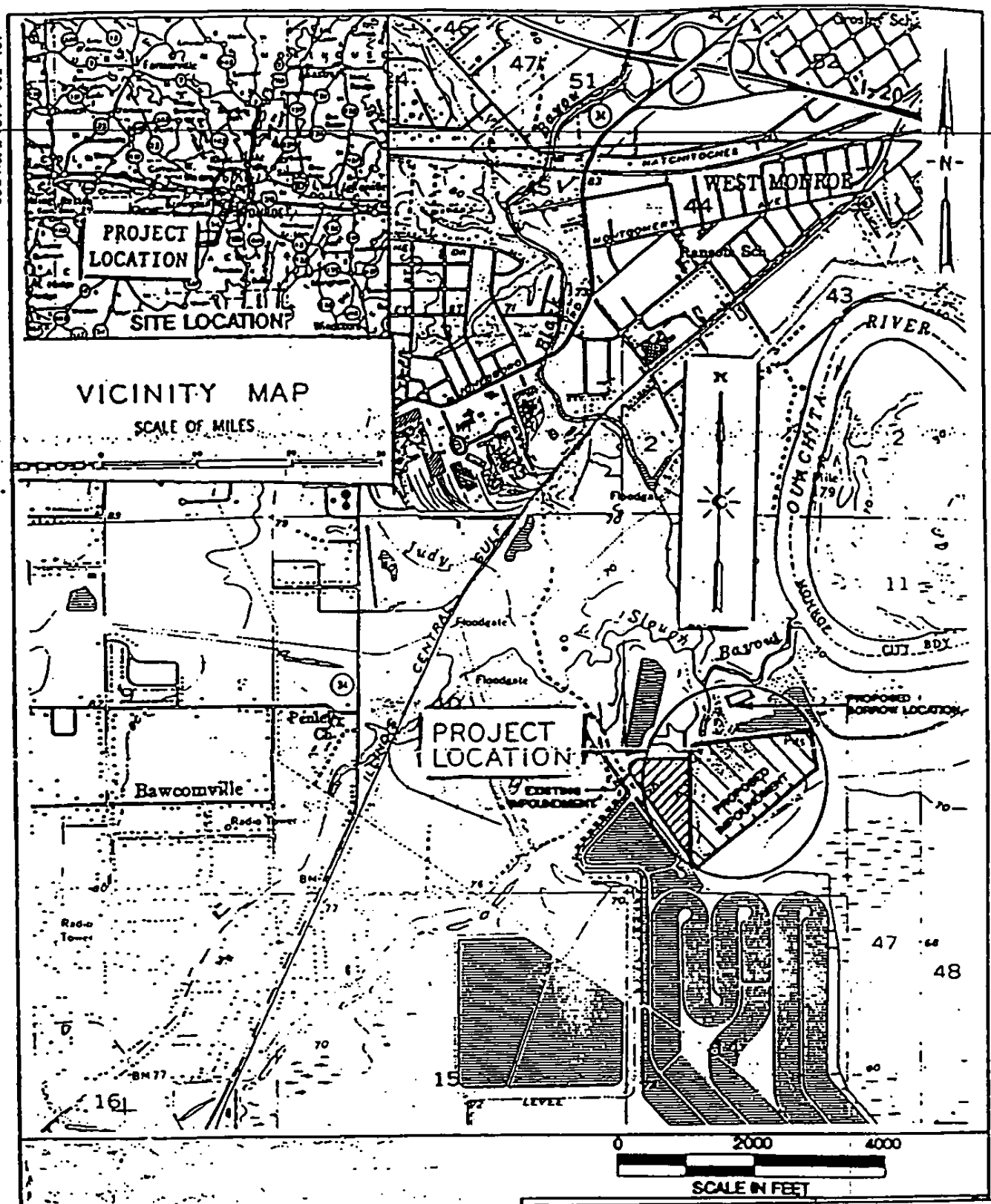
Evaluation Factors: The decision whether or not to issue a permit will be based upon an evaluation of the probable impact of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits which may 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.

Harold Lee

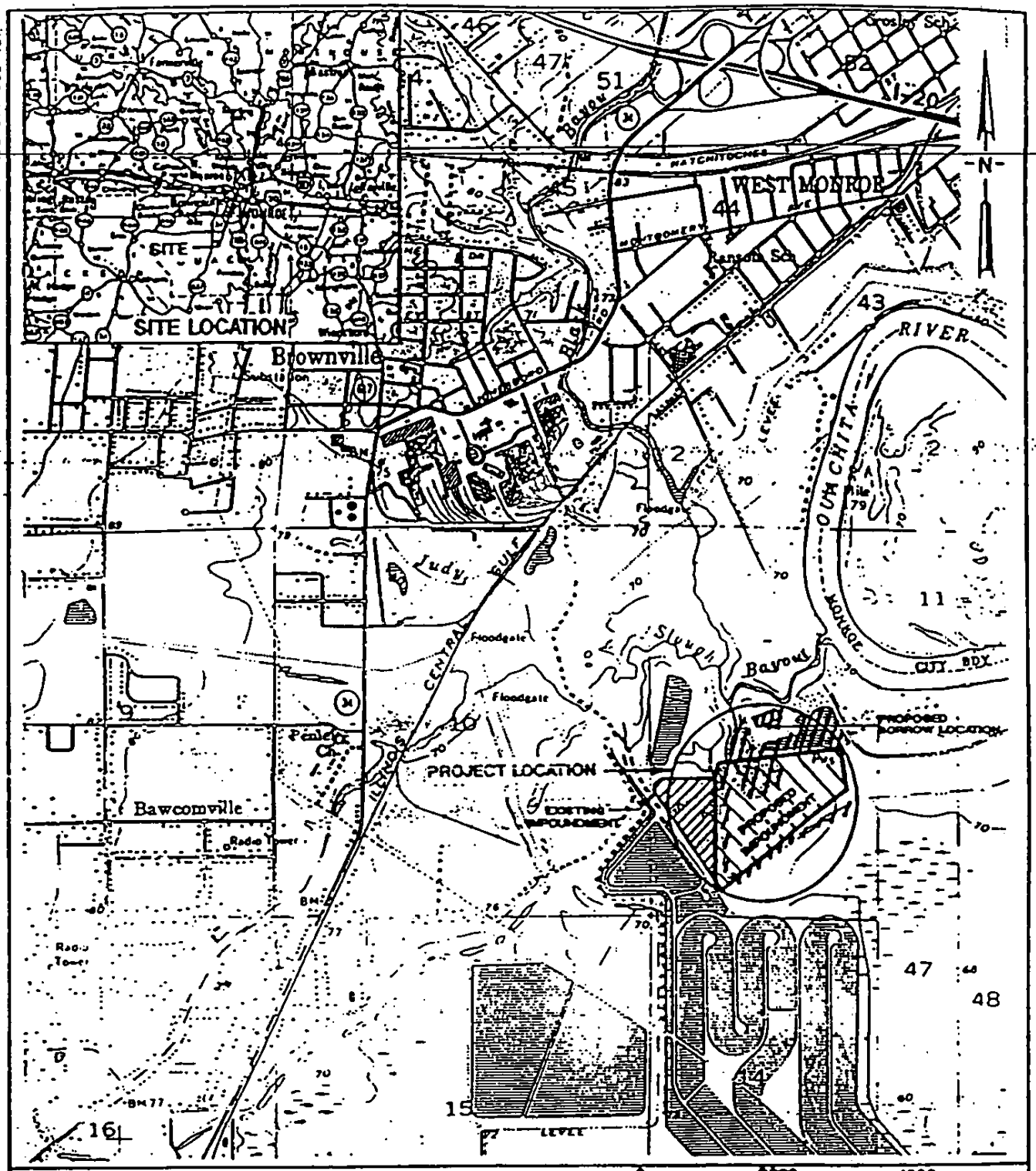
for Elizabeth S. Guynes
Chief, Regulatory Branch



CELMK-OD-FE 14-12H23-34

RIVERWOOD INTERNATIONAL USA INC

PROPOSED SURFACE IMPOUNDMENT
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA



REFERENCE: SITE LOCATION MAP TAKEN FROM RAND McNALLY ROAD MAP OF ARKANSAS, LOUISIANA AND MISSISSIPPI.
SITE VICINITY MAP TAKEN FROM U.S.G.S. QUADRANGLE MAP, 7.5 MINUTE SERIES, WEST MONROE SOUTH, LA. DATED 1957, PHOTOREVISED 1969 AND 1975.

0 2000 4000
SCALE IN FEET

FIGURE 1
SITE VICINITY MAP

Symbol :

▨ waters of the U.S Including Wetlands

QUADRANGLE LOCATION

CELMK-OD-FE 14-12H23-34

RIVERWOOD INTERNATIONAL USA INC

Wetland M.

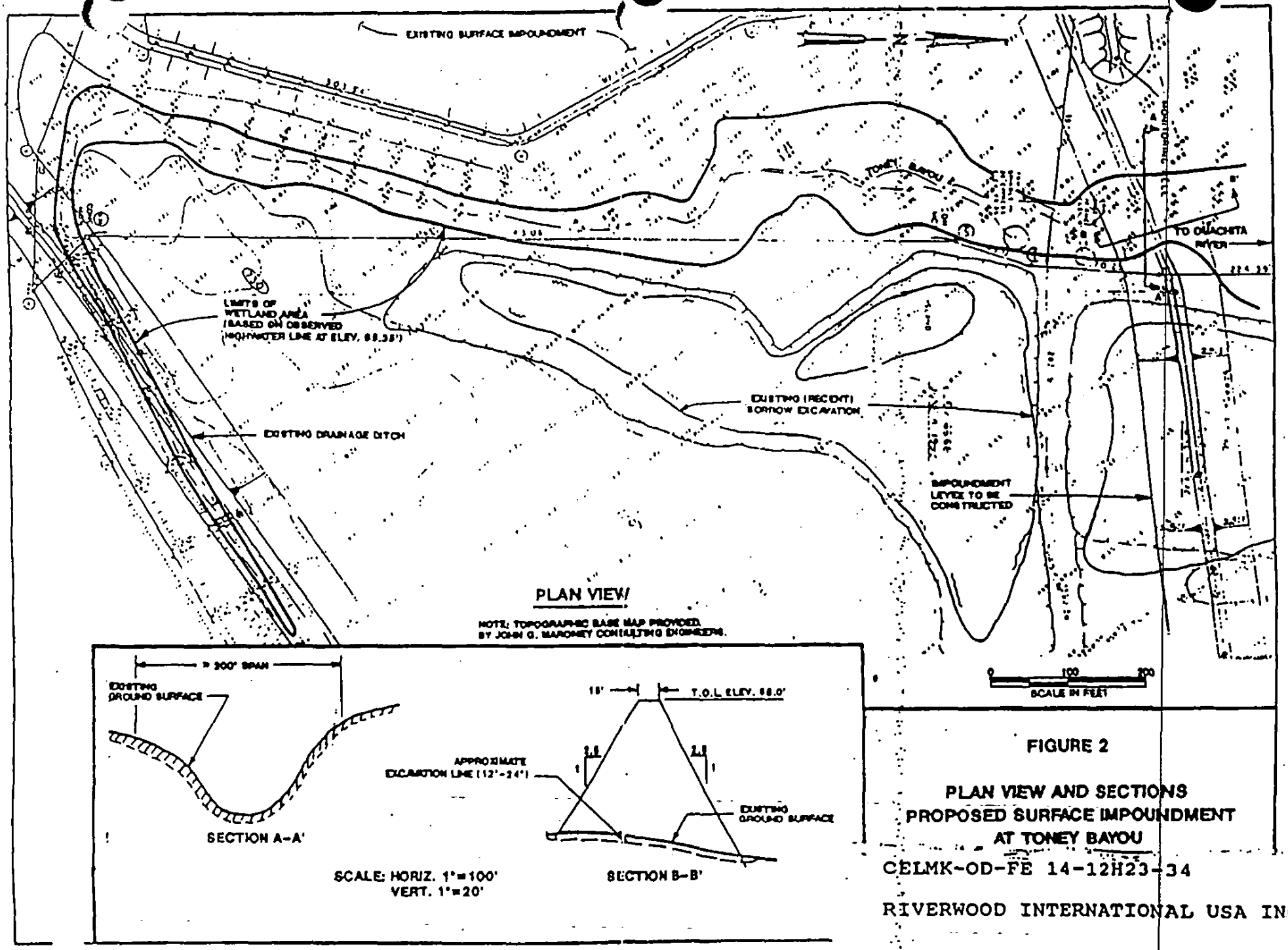
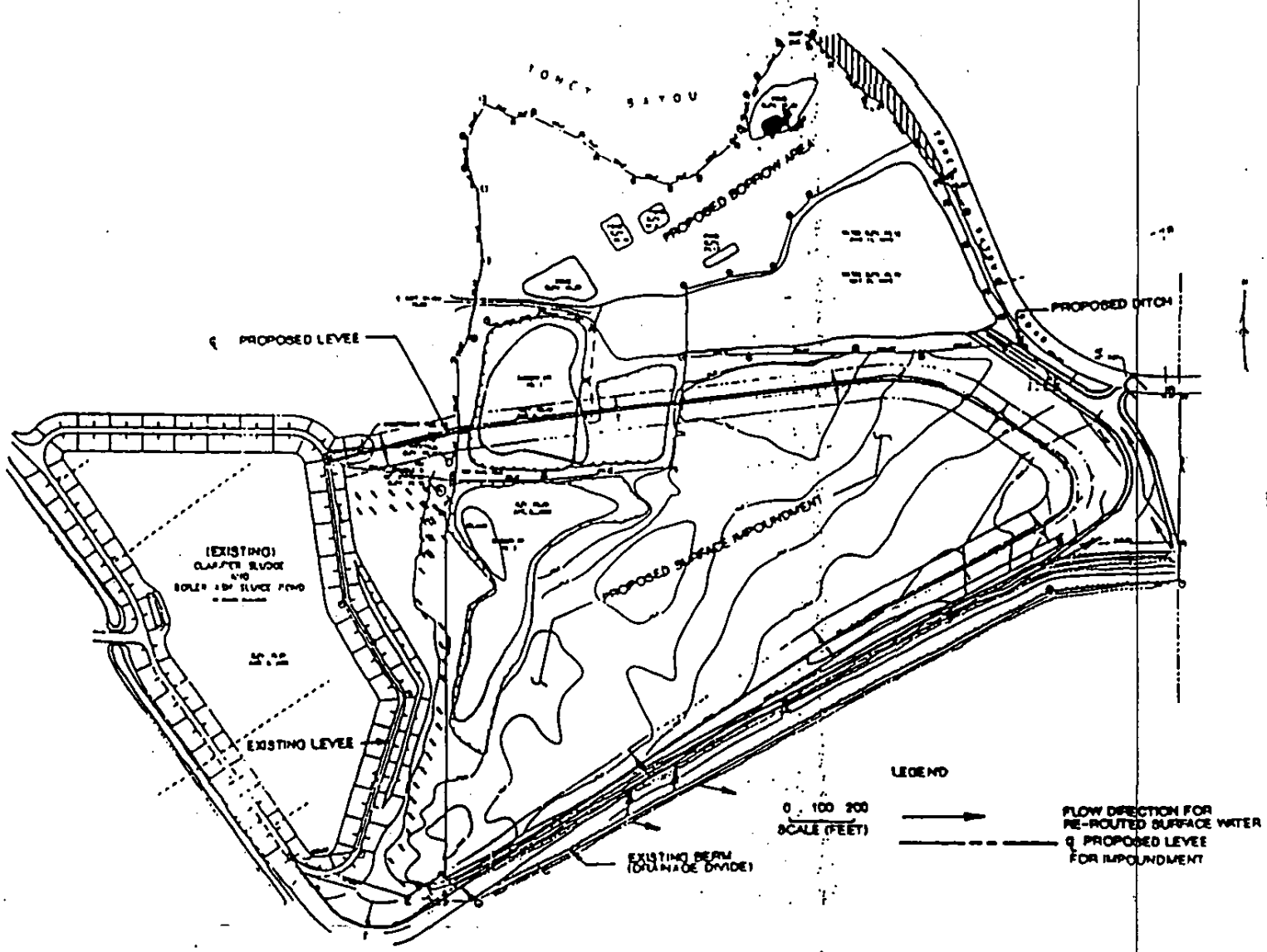


FIGURE 2

PLAN VIEW AND SECTIONS
PROPOSED SURFACE IMPOUNDMENT
AT TONEY BAYOU

CELMK-OD-FE 14-12H23-34

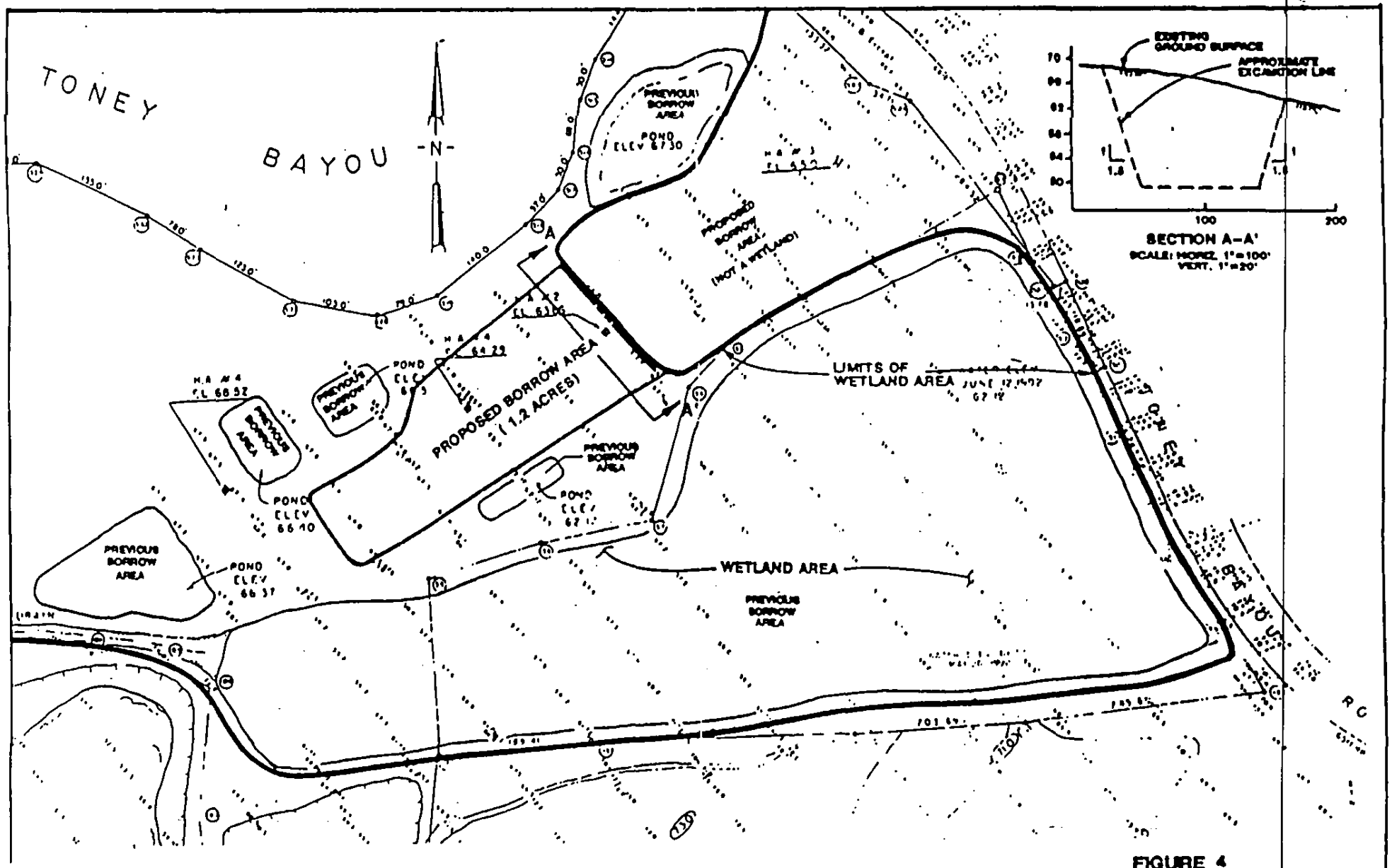
RIVERWOOD INTERNATIONAL USA INC



CELMK-OD-FE 14-12H23-34

RIVERWOOD INTERNATIONAL USA INC

FIGURE 3
PLAN VIEW
PROPOSED SURFACE IMPOUNDMENT
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA



CELMK-OD-FE 14-12H23-34

RIVERWOOD INTERNATIONAL USA INC.

FIGURE 4
PROPOSED BORROW LOCATION WITHIN WETLAND AREA
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

DAMES & MOORE
4949 ESSEN LANE, SUITE 900, BATON ROUGE, LOUISIANA 70809
(504) 769-2600 FAX: (504) 769-3695

August 4, 1992

USACE, Vicksburg District
3515 I-20 Frontage Road
Vicksburg, Mississippi 39180-5191

Attention: CELMK-OD-F

RE: Request for COE Permit
Proposed Surface Impoundment
Riverwood International USA, Inc.
West Monroe, Louisiana

Gentlemen:

Riverwood International USA, Incorporated is proposing to permit and construct a surface impoundment for the storage of solid waste, which will be located adjacent to an existing 21-acre surface impoundment at its West Monroe, Louisiana plant. The type of waste to be disposed in the impoundment consists of primary clarifier sludge and bark-fired boiler ash from an unbleached pulp and paper mill. A permit modification is being developed for the proposed impoundment and will be submitted to the Louisiana Department of Environmental Quality, Solid Waste Division upon completion.

On behalf of Riverwood International USA, Inc., we are hereby submitting the enclosed application form to the Corps of Engineers in accordance with requirements of the Part 1 (Item 13) Permit Application. A copy of this application is also being forwarded to Mr. Larry Wiesepape of the Louisiana Department of Environmental Quality, Office of Water Resources, with a request for a state water quality certification.

If you have any questions concerning this request, or require additional information, please contact me at (504) 769-2600 or Mr. J. E. Boyles at Riverwood International USA, Inc. (318) 362-2436. We appreciate your consideration of this matter.

Very truly yours,

DAMES & MOORE, INC.

Terri L. Richardson

Terri L. Richardson, P.E.
Senior Engineer

TLR:tlr
enc.

cc: Mr. J.E. Boyles
Riverwood International USA, Inc.

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

(33 CFR 325)

OMB APPROVAL NO. 0710-0003
Expires 30 September 1992

ic reporting burden for this collection of information is estimated to average 5 hours per response for the majority of cases, including the time for reviewing instructions, arching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Applications for larger or more complex projects, or those in ecologically sensitive areas, could take up to 500 hours. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Please DO NOT RETURN your completed form to either of these addresses. Send your completed form to: Department of Defense, U.S. Army Corps of Engineers, Attn: CECW-OR, 20 Mass. Ave., N.W. Washington, DC 20314-1000.

The Department of the Army permit program is authorized by Section 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act and Section 103 of the Marine, Protection, Research and Sanctuaries Act. These laws require permits authorizing activities in or affecting navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Information provided on this form will be used in evaluating the application for a permit. Information in this application is made a matter of public record through issuance of a public notice. Disclosure of the information requested is voluntary; however, the data requested are necessary in order to communicate with the applicant and to evaluate the permit application. If necessary information is not provided, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application *(see sample drawings and instructions)* and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

1. APPLICATION NUMBER *(To be assigned by Corps)*

2. NAME AND ADDRESS OF APPLICANT

Riverwood International USA, Incorporated
1000 Jonesboro Road (LA Hwy. 34)
Post Office Box 35800
West Monroe, LA 71294-5800

Telephone no. during business hours

Mr. Bill H. Chastain
A/C (318) 388-3670 (Residence)
A/C (318) 362-2609 (Office)

3. NAME, ADDRESS, AND TITLE OF AUTHORIZED AGENT

Mr. Vance Gardner
Manager, Environmental
P.O. Box 35800, West Monroe, LA 71294-5800

Telephone no. during business hours

A/C (318) 388-1052 (Residence)
A/C (318) 362-2273 (Office)

Statement of Authorization: I hereby designate and authorize Mr. Vance Gardner to act in my behalf as my agent in the processing of this permit application and to furnish, upon request, supplemental information in support of the application.

SIGNATURE OF APPLICANT: Bill H. Chastain

DATE: 8-4-92

4. DETAILED DESCRIPTION OF PROPOSED ACTIVITY

4a. ACTIVITY

Riverwood International USA, Incorporated plans to construct a surface impoundment to be permitted under the requirements of the Louisiana Solid Waste Rules and Regulations. Current plans include layout of the impoundment as shown on attached Figure 1. The outlined area on Figure 2 identifies a wetland area which will be incorporated into the impoundment. The wetland area includes the upper reach of Toney Bayou (approximately 100 to 200 feet wide) and a small section of a connecting drainage ditch. The activity in this area will consist of clearing, grubbing, minor excavation, and placement of fill material to construct levees and a low permeability liner for the impoundment.

Surface water that currently flows through the existing drainage ditch into Toney Bayou will be re-directed to flow around the impoundment and into an existing pond as shown on Figure 3.

A second wetland area that is planned for use as a potential borrow source is shown on Figure 1. A plan and section of this area is shown on Figure 4. This area will be mechanically cleared, and excavation of clay soils will be performed to a maximum depth of approximately 20 feet. The clay excavated will be used to construct a low permeability liner for the proposed surface impoundment.

4b. PURPOSE

The purpose of the proposed incorporation of the section of bayou and drainage ditch into the impoundment is to provide an impoundment layout which ties into existing facilities as shown on Figure 3. The surface impoundment will be used for the disposal of primary clarifier sludge and ash (sand and grit) from a wood residue fired boiler. The ash will be sluiced and pumped to the proposed impoundment where insoluble components will settle out and decant will be returned to the wastewater treatment system.

The purpose of clearing and excavation in the proposed borrow area is to provide clay for construction of the low-permeability liner and levees for the impoundment.

4c. DISCHARGE OF DREDGED OR FILL MATERIAL

During construction of the impoundment, approximately 7,700 cubic yards of soil will be excavated from the bayou and drainage ditch area to provide a firm base for construction of the impoundment levees and floor. Construction of impoundment levees and clay liner in the area will require the placement of approximately 18,000 cubic yards of clay material, to be obtained from within the area of the new impoundment (see attached Figure 2).

5. NAMES AND ADDRESSES OF ADJOINING PROPERTY OWNERS, LESSEES, ETC., WHOSE PROPERTY ALSO ADJOINS THE WATERWAY

Property owners, lessees, etc. whose property adjoins Toney Bayou are as follows:

Mr. Bill Ratliffe
P.O. Box 1008
~~Monroe, LA 71210-1008~~

Mr. Huey Deville
c/o Mr. Larry Deville
~~141 Martin Road~~
West Monroe, LA 71292-2626

6 WATERBODY AND LOCATION ON WATERBODY WHERE ACTIVITY EXISTS OR IS PROPOSED

Activity is proposed for the upper reach of Toney Bayou, an unnamed ditch that drains into Toney Bayou, and a wetland area near Toney Bayou. Toney Bayou drains into the Ouachita River at approximately river mile marker 163.5.

7 LOCATION ON LAND WHERE ACTIVITY EXISTS OR IS PROPOSED

ADDRESS:

1000 Jonesboro Road (La. Hwy 34)
STREET, ROAD, ROUTE OR OTHER DESCRIPTIVE LOCATION

Ouachita (Parish) — COUNTY
Louisiana — STATE
71294 — ZIP CODE

Ouachita Parish Police Jury
LOCAL GOVERNING BODY WITH JURISDICTION OVERSITE

8 Is any portion of the activity for which authorization is sought now complete? ☐ YES ☒ NO
If answer is "yes" give reasons, month and year the activity was completed. Indicate the existing work on the drawings.

9 List all approvals or certifications and denials received from other federal, interstate, state or local agencies for any structures, construction, discharges or other activities described in this application

ISSUING AGENCY	TYPE APPROVAL	IDENTIFICATION NO	DATE OF APPLICATION	DATE OF APPROVAL	DATE OF DENIAL
EPA, Region VI	NPDES	LA 0007617	1974, revised in 1977	Oct. 25, 1987	None
Louisiana DEQ	Safe Water Quality Certification	(Pending review of this permit application, submittal to LDEQ will coincide with submittal to the Corps of Engineers)			
Louisiana DEQ	Solid Waste Permit	Permit No. P-0244	May 1, 1989	July 12, 1990	
Louisiana DEQ	Water Discharge Permit	WP1932		Oct. 26, 1987	

10 Application is hereby made for a permit or permits to authorize the activities described herein. I certify that I am familiar with the information contained in the application, and that to the best of my knowledge and belief such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities or I am acting as the duly authorized agent of the applicant.

Bill Ratliffe — SIGNATURE OF APPLICANT
8-4-92 — DATE
Vance Gardner — SIGNATURE OF AGENT
8-11-92 — DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 3 has been filled out and signed.

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

Affiliated with ENG 4345

CERTIFICATION OF LEGAL INTEREST

This is to certify that I, the undersigned, do own or have other legal interest in the subject property and wish to have the attached permit application evaluated.

[xx] I also hereby grant permission for entry upon and inspection of the said property for permit evaluation purposes with the understanding that I can withdraw this right-of-entry only in writing and that responsible effort will be made to contact the undersigned prior to entry upon said property.

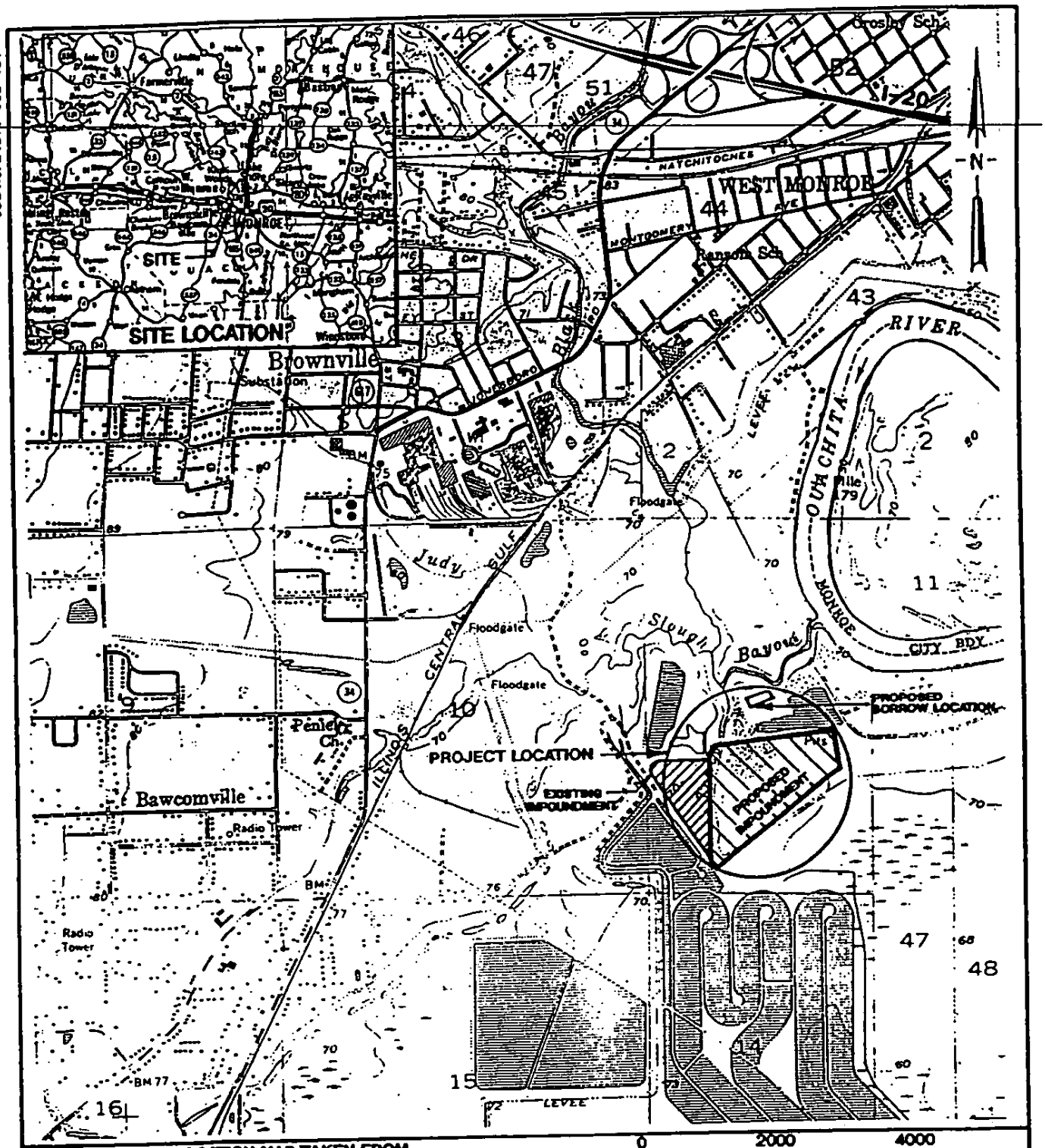
[ ] I do not grant permission for entry upon and inspection of the said property for permit evaluation purposes with the understanding that if an onsite inspection is needed the permit process may be hampered.

Signature

Assistant Secretary
Legal Interest Title

LMK Form 1158
JULY 91

JOB No. 24379-002-137



REFERENCE: SITE LOCATION MAP TAKEN FROM RAND McNALLY ROAD MAP OF ARKANSAS, LOUISIANA AND MISSISSIPPI.
SITE VICINITY MAP TAKEN FROM U.S.G.S. QUADRANGLE MAP, 7.5 MINUTE SERIES, WEST MONROE SOUTH, LA. DATED 1957, PHOTOREVISED 1969 AND 1975.

0 2000 4000
SCALE IN FEET

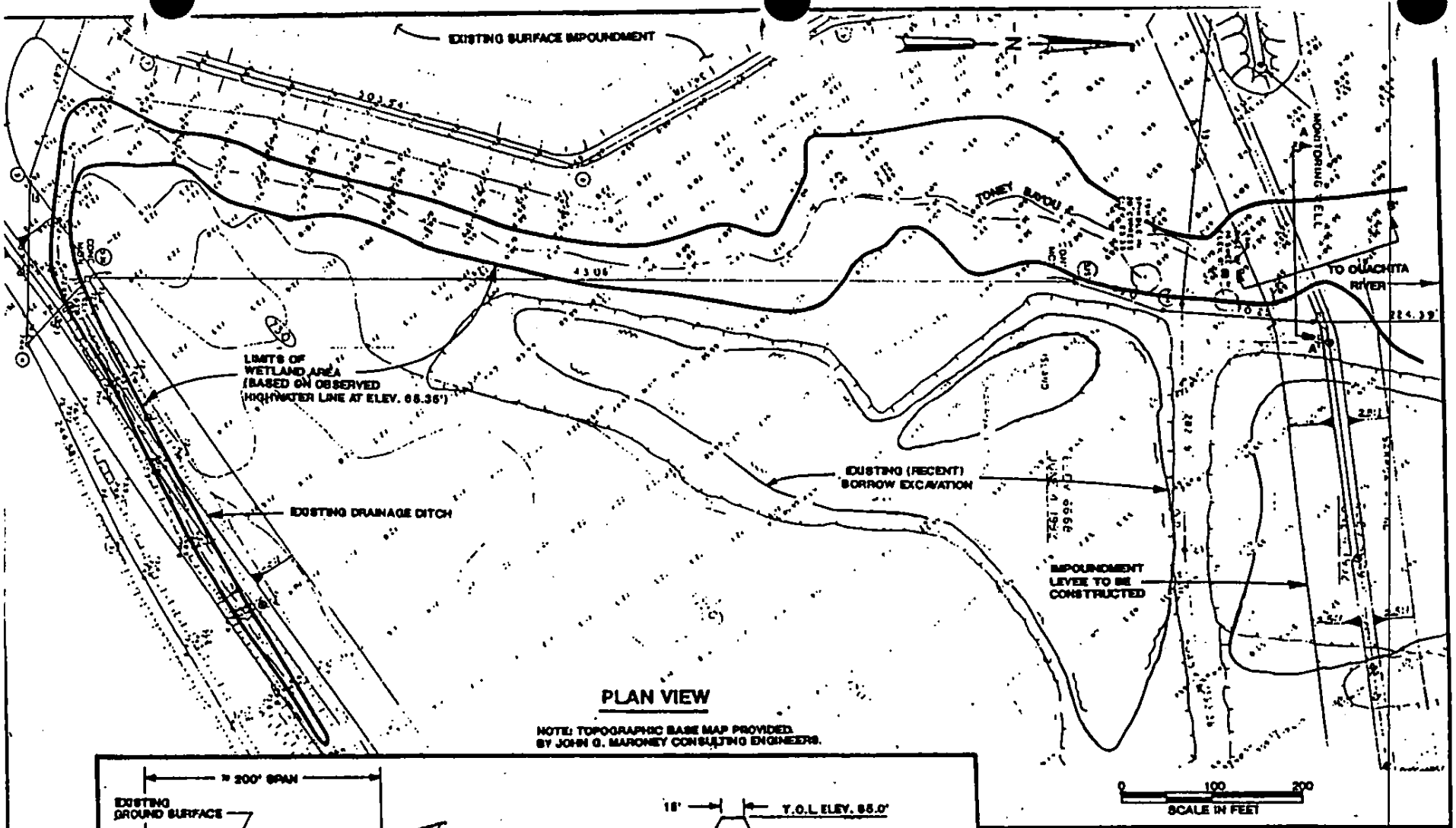
QUADRANGLE LOCATION

FIGURE 1

SITE VICINITY MAP

DAMES & MOORE

PROPOSED SURFACE IMPOUNDMENT
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA



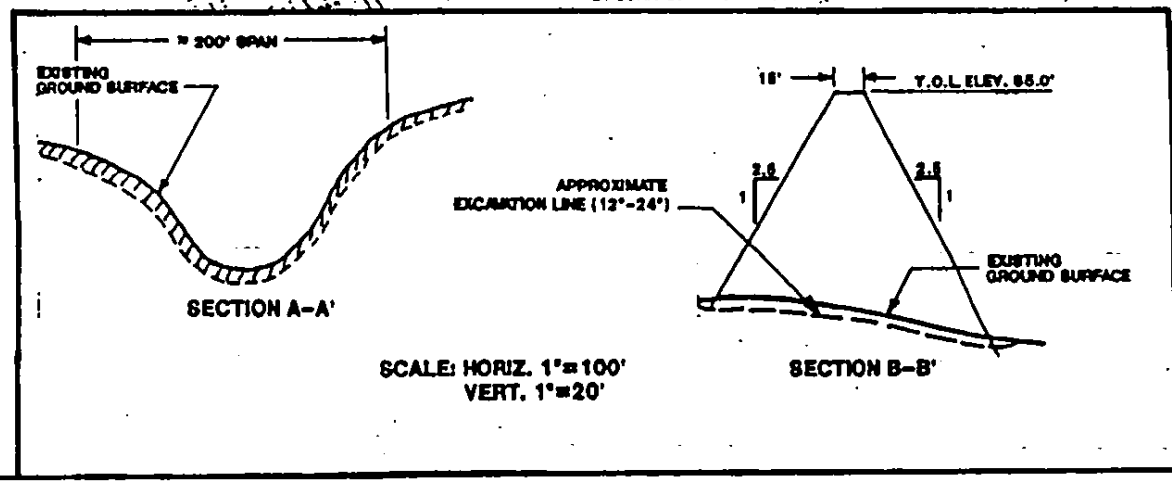


FIGURE 2

PLAN VIEW AND SECTIONS
PROPOSED SURFACE IMPOUNDMENT
AT TONEY BAYOU

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

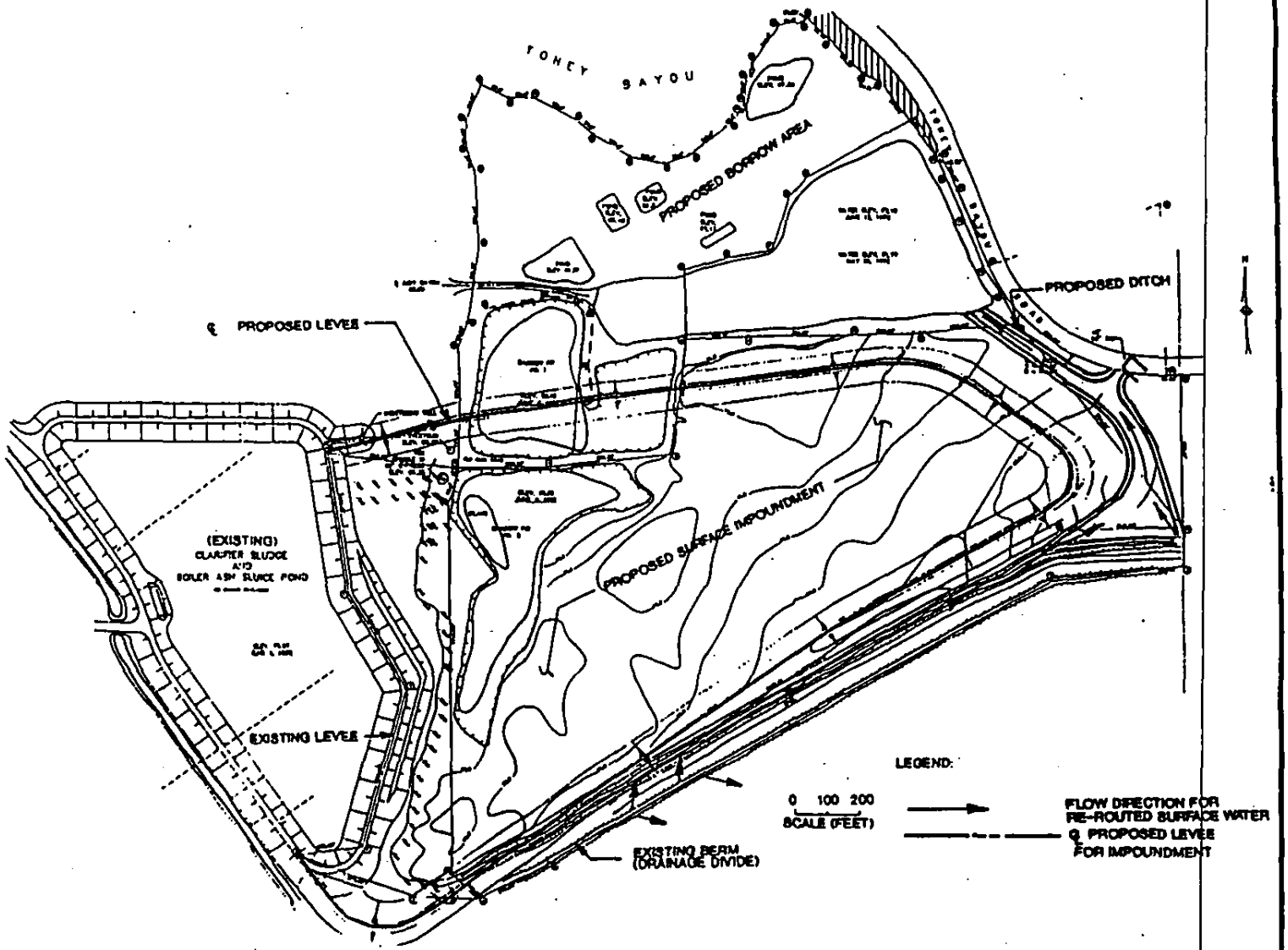


FIGURE 3
PLAN VIEW
PROPOSED SURFACE IMPOUNDMENT

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

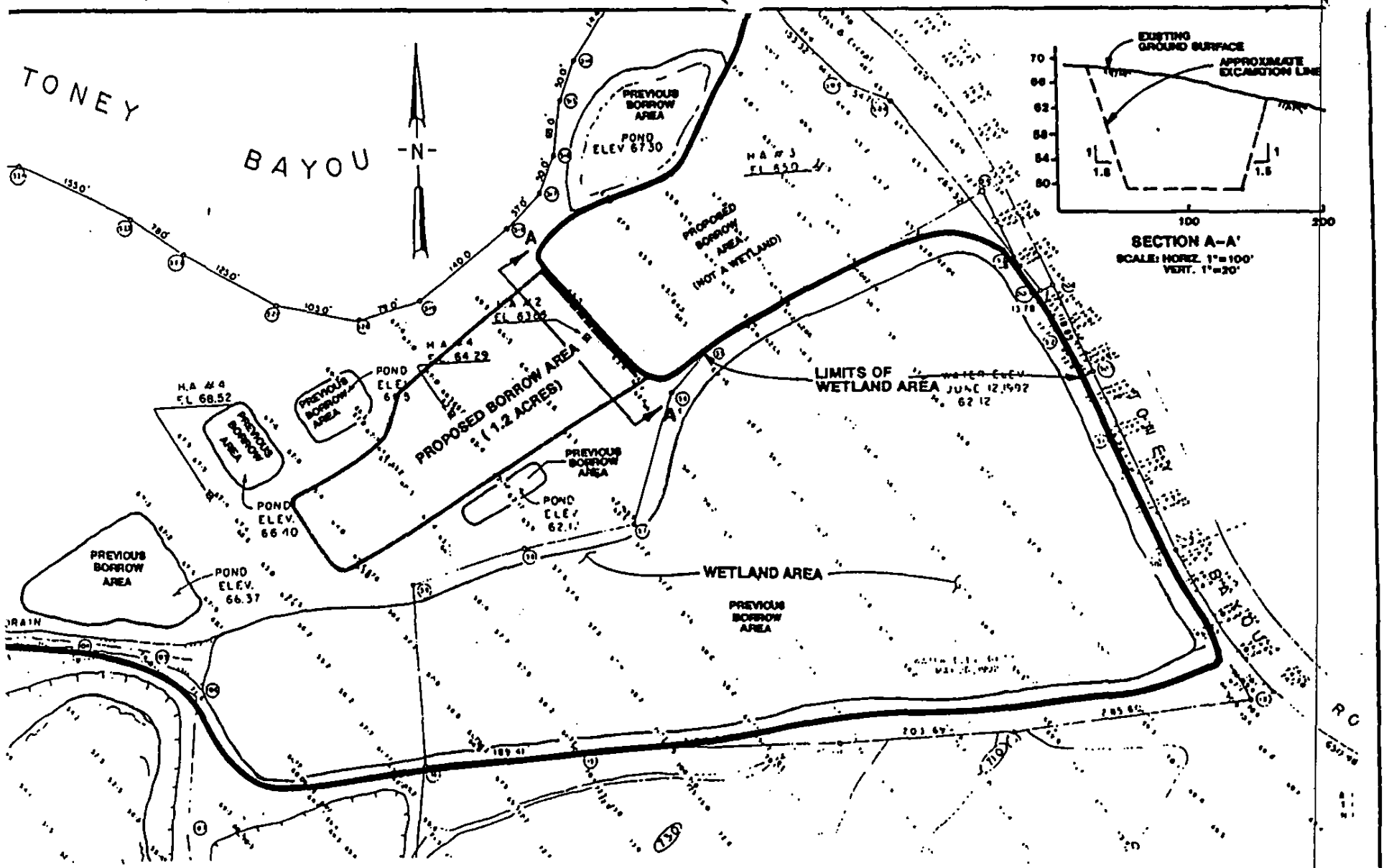


FIGURE 4
PROPOSED BORROW LOCATION
WITHIN WETLAND AREA
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

State of Louisiana

Department of Environmental Quality

Edwin W. Edwards
Governor

Kai David Midboe
Secretary

OCT 29 1992

WQC 920821-14

Dames & Moore
4949 Essen Lane, Suite 900
Baton Rouge, LA 70809

Attention: Mr. Terri L. Richardson, Agent for Riverwood International USA, Inc.

RE: Proposal for Riverwood International USA, Inc. to construct a surface impoundment for the storage of solid waste, which will be located adjacent to an existing 21-acre surface impoundment at its West Monroe plant, Ouachita Parish.

Gentlemen:

This is to acknowledge receipt of "Proof of Publication" of public notice, above reference, forwarded to you with our letter dated September 18, 1992.

It is our opinion that your proposed project will not violate water quality standards of the State of Louisiana, therefore, we offer no objection to this project provided that the levees are seeded and revegetated in order to prevent erosion, that drainage ditches are constructed with a slope no greater than 3:1 (horizontal:vertical) and allowed to revegetate, and that all practicable means are utilized to minimize any discharge of water pollutants that can result from the proposed project. Also, any discharges from the area will require a permit from this office and/or the Office of Solid & Hazardous Waste.

In accordance with statutory authority contained in the Louisiana Revised Statutes of 1950, Title 30, Chapter 11, Part IV, Section 2074 A(3) and provisions of Section 401 of the Clean Water Act (P.L. 95-217), the Office of Water Resources certifies that it is reasonable to expect that water quality standards of Louisiana provided for under Section 303 of P.L. 95-217 will not be violated.

Sincerely,

J. Dale Givens, Assistant Secretary
Office of Water Resources

JDG:JWL
c: Corps of Engineers
Vicksburg District

DAMES & MOORE
4949 ESSEN LANE, SUITE 900, BATON ROUGE, LOUISIANA 70809
(504) 769-2600 FAX: (504) 769-3695

August 4, 1992

Louisiana Department of Environmental Quality
Office of Water Resources
P.O. Box 82215
Baton Rouge, Louisiana 70884-2215

Attention: Mr. Larry Wiesepape

RE: Request for Water Quality Certification
Proposed Surface Impoundment
Riverwood International USA, Inc.
West Monroe, Louisiana

Gentlemen:

Riverwood International USA, Incorporated is proposing to permit and construct a surface impoundment for the storage of solid waste, which will be located adjacent to an existing 21-acre surface impoundment at its West Monroe, Louisiana plant. The type of waste to be disposed in the impoundment consists of primary clarifier sludge and bark-fired boiler ash from an unbleached pulp and paper mill. A permit modification is being developed for the proposed impoundment and will be submitted to the Louisiana Department of Environmental Quality, Solid Waste Division upon completion.

The proposed construction involves placement of fill material in a wetlands area, therefore ENG Form 4345 has been completed and submitted to the U. S. Army Corps of Engineers for their approval. On behalf of Riverwood International USA, Inc., we hereby submit the enclosed copy of the application form (ENG Form 4345) and request a written certification that the work will not violate the State's water quality standards. This certification is required to complete the processing of the application.

If you have any questions concerning this request, or require additional information, please contact me at (504) 769-2600 or Mr. J. E. Boyles at Riverwood International USA, Inc. (318) 362-2436. We appreciate your consideration of this matter.

Very truly yours,

DAMES & MOORE, INC.

Terri L. Richardson

Terri L. Richardson, P.E.
Senior Engineer

TLR:tlr
enc.
cc: Mr. J.E. Boyles
Riverwood International USA, Inc.

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

(33 CFR 325)

OMB APPROVAL NO. 0710-0003
Expires 30 September 1992

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The Department of the Army permit program is authorized by Section 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act and Section 103 of the Marine, Protection, Research and Sanctuaries Act. These laws require permits authorizing activities in or affecting navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Information provided on this form will be used in evaluating the application for a permit. Information in this application is made a matter of public record through issuance of a public notice. Disclosure of the information requested is voluntary; however, the data requested are necessary in order to communicate with the applicant and to evaluate the permit application. If necessary information is not provided, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

1. APPLICATION NUMBER (To be assigned by Corps)

2. NAME AND ADDRESS OF APPLICANT

Riverwood International USA, Incorporated
1000 Jonesboro Road (LA Hwy. 34)
Post Office Box 35800
West Monroe, LA 71294-5800

Telephone no. during business hours

Mr. Bill H. Chastain
A/C (318) 388-3670 (Residence)
A/C (318) 362-2609 (Office)

3. NAME, ADDRESS, AND TITLE OF AUTHORIZED AGENT

Mr. Vance Gardner
Manager, Environmental
P.O. Box 35800, West Monroe, LA 71294-5800

Telephone no during business hours

A/C (318) 388-1052 (Residence)
A/C (318) 362-2273 (Office)

Statement of Authorization: I hereby designate and authorize Mr. Vance Gardner to act in my behalf as my agent in the processing of this permit application and to furnish, upon request, supplemental information in support of the application.

SIGNATURE OF APPLICANT: Bill H. Chastain

DATE: 9-4-92

4. DETAILED DESCRIPTION OF PROPOSED ACTIVITY

4a. ACTIVITY

Riverwood International USA, Incorporated plans to construct a surface impoundment to be permitted under the requirements of the Louisiana Solid Waste Rules and Regulations. Current plans include layout of the impoundment as shown on attached Figure 1. The outlined area on Figure 2 identifies a wetland area which will be incorporated into the impoundment. The wetland area includes the upper reach of Toney Bayou (approximately 100 to 200 feet wide) and a small section of a connecting drainage ditch. The activity in this area will consist of clearing, grubbing, minor excavation, and placement of fill material to construct levees and a low permeability liner for the impoundment.

Surface water that currently flows through the existing drainage ditch into Toney Bayou will be re-directed to flow around the impoundment and into an existing pond as shown on Figure 3.

A second wetland area that is planned for use as a potential borrow source is shown on Figure 1. A plan and section of this area is shown on Figure 4. This area will be mechanically cleared, and excavation of clay soils will be performed to a maximum depth of approximately 20 feet. The clay excavated will be used to construct a low permeability liner for the proposed surface impoundment.

4b. PURPOSE

The purpose of the proposed incorporation of the section of bayou and drainage ditch into the impoundment is to provide an impoundment layout which ties into existing facilities as shown on Figure 3. The surface impoundment will be used for the disposal of primary clarifier sludge and ash (sand and grit) from a wood residue fired boiler. The ash will be sluiced and pumped to the proposed impoundment where insoluble components will settle out and decant will be returned to the wastewater treatment system.

The purpose of clearing and excavation in the proposed borrow area is to provide clay for construction of the low-permeability liner and levees for the impoundment.

4c. DISCHARGE OF DREDGED OR FILL MATERIAL

During construction of the impoundment, approximately 7,700 cubic yards of soil will be excavated from the bayou and drainage ditch area to provide a firm base for construction of the impoundment levees and floor. Construction of impoundment levees and clay liner in the area will require the placement of approximately 18,000 cubic yards of clay material, to be obtained from within the area of the new impoundment (see attached Figure 2).

5. NAMES AND ADDRESSES OF ADJOINING PROPERTY OWNERS, LESSEES, ETC., WHOSE PROPERTY ALSO ADJOINS THE WATERWAY

Property owners, lessees, etc. whose property adjoins Toney Bayou are as follows:

Mr. Bill Ratliffe
P.O. Box 1008
Monroe, LA 71210-1008

Mr. Huey Deville
c/o Mr. Larry Deville
141 Martin Road
West Monroe, LA 71292-2626

6 WATERBODY AND LOCATION ON WATERBODY WHERE ACTIVITY EXISTS OR IS PROPOSED

Activity is proposed for the upper reach of Toney Bayou, an unnamed ditch that drains into Toney Bayou, and a wetland area near Toney Bayou. Toney Bayo drains into the Ouachita River at approximately river mile marker 163.5.

7 LOCATION ON LAND WHERE ACTIVITY EXISTS OR IS PROPOSED

ADDRESS:

1000 Jonesboro Road (La. Hwy 34)
STREET, ROAD, ROUTE OR OTHER DESCRIPTIVE LOCATION

Ouachita (Parish) — COUNTY
Louisiana — STATE
71294 — ZIP CODE

Ouachita Parish Police Jury
LOCAL GOVERNING BODY WITH JURISDICTION OVERSITE

8 Is any portion of the activity for which authorization is sought now complete? ☐ YES ☒ NO
If answer is "yes" give reasons, month and year the activity was completed. Indicate the existing work on the drawings.

9 List all approvals or certifications and denials received from other federal, interstate, state or local agencies for any structures, construction, discharges or other activities described in this application.

ISSUING AGENCY	TYPE APPROVAL	IDENTIFICATION NO	DATE OF APPLICATION	DATE OF APPROVAL	DATE OF DENIAL
EPA, Region VI	NPDES	LA 0007617	1974, revised in 1977	Oct. 25, 1987	None
Louisiana DEQ	Safe Water Quality Certification	(Pending review of this permit application, submittal to LDEQ will coincide with submittal to the Corps of Engineers)			
Louisiana DEQ	Solid Waste Permit	Permit No. P-0244	May 1, 1989	July 12, 1990	
Louisiana DEQ	Water Discharge Permit	WP1932		Oct. 26, 1987	

10 Application is hereby made for a permit or permits to authorize the activities described herein. I certify that I am familiar with the information contained in the application, and that to the best of my knowledge and belief such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities or I am acting as the duly authorized agent of the applicant.

Bill Ratliffe — SIGNATURE OF APPLICANT
8-4-92 — DATE
Vance Gardner — SIGNATURE OF AGENT
8-11-92 — DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 3 has been filled out and signed.

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

Affiliated with ENG 4345

CERTIFICATION OF LEGAL INTEREST

This is to certify that I, the undersigned, do own or have other legal interest in the subject property and wish to have the attached permit application evaluated.

[x] I also hereby grant permission for entry upon and inspection of the said property for permit evaluation purposes with the understanding that I can withdraw this right-of-entry only in writing and that responsible effort will be made to contact the undersigned prior to entry upon said property.

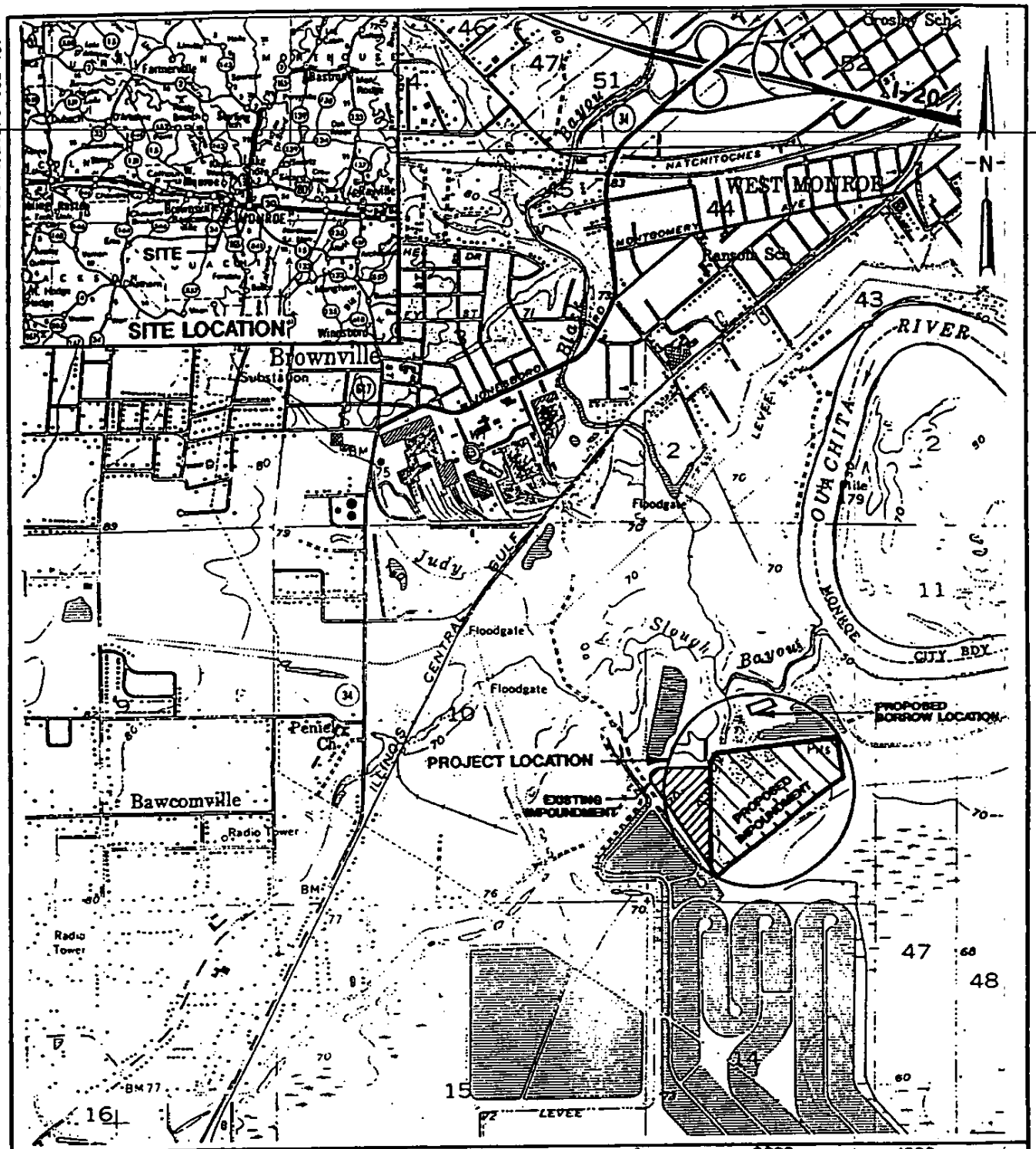
[ ] I do not grant permission for entry upon and inspection of the said property for permit evaluation purposes with the understanding that if an onsite inspection is needed the permit process may be hampered.

Signature

Assistant Secretary
Legal Interest Title

LMK Form 1158
JULY 91

JOB No. 24378-002-137



REFERENCE: SITE LOCATION MAP TAKEN FROM RAND McNALLY ROAD MAP OF ARKANSAS, LOUISIANA AND MISSISSIPPI.
SITE VICINITY MAP TAKEN FROM U.S.G.S. QUADRANGLE MAP, 7.5 MINUTE SERIES, WEST MONROE SOUTH, LA. DATED 1957, PHOTOREVISED 1969 AND 1975.

0 2000 4000
SCALE IN FEET

QUADRANGLE LOCATION

FIGURE 1

SITE VICINITY MAP

DAMES & MOORE

PROPOSED SURFACE IMPOUNDMENT
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

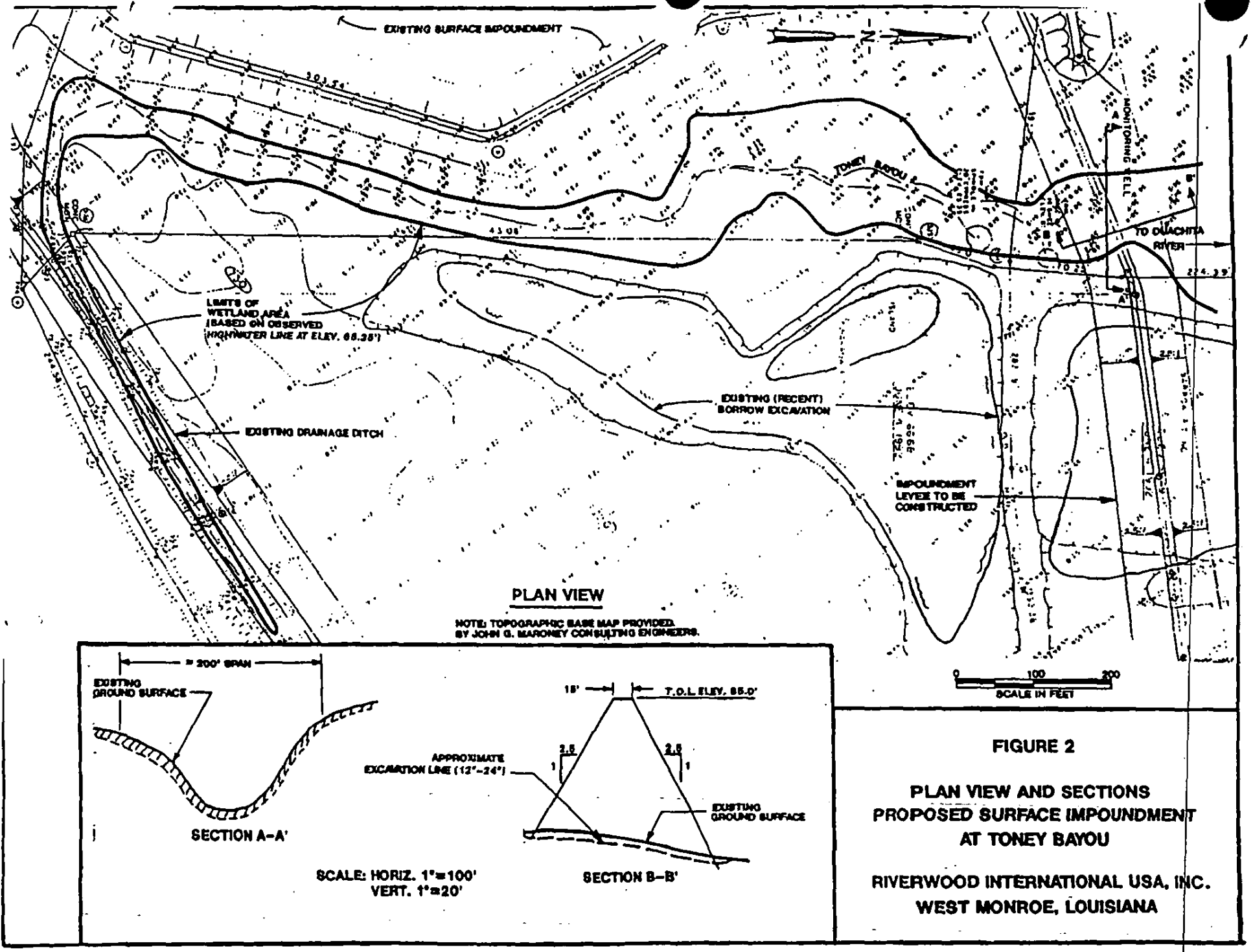


FIGURE 2

PLAN VIEW AND SECTIONS
PROPOSED SURFACE IMPOUNDMENT
AT TONEY BAYOU

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

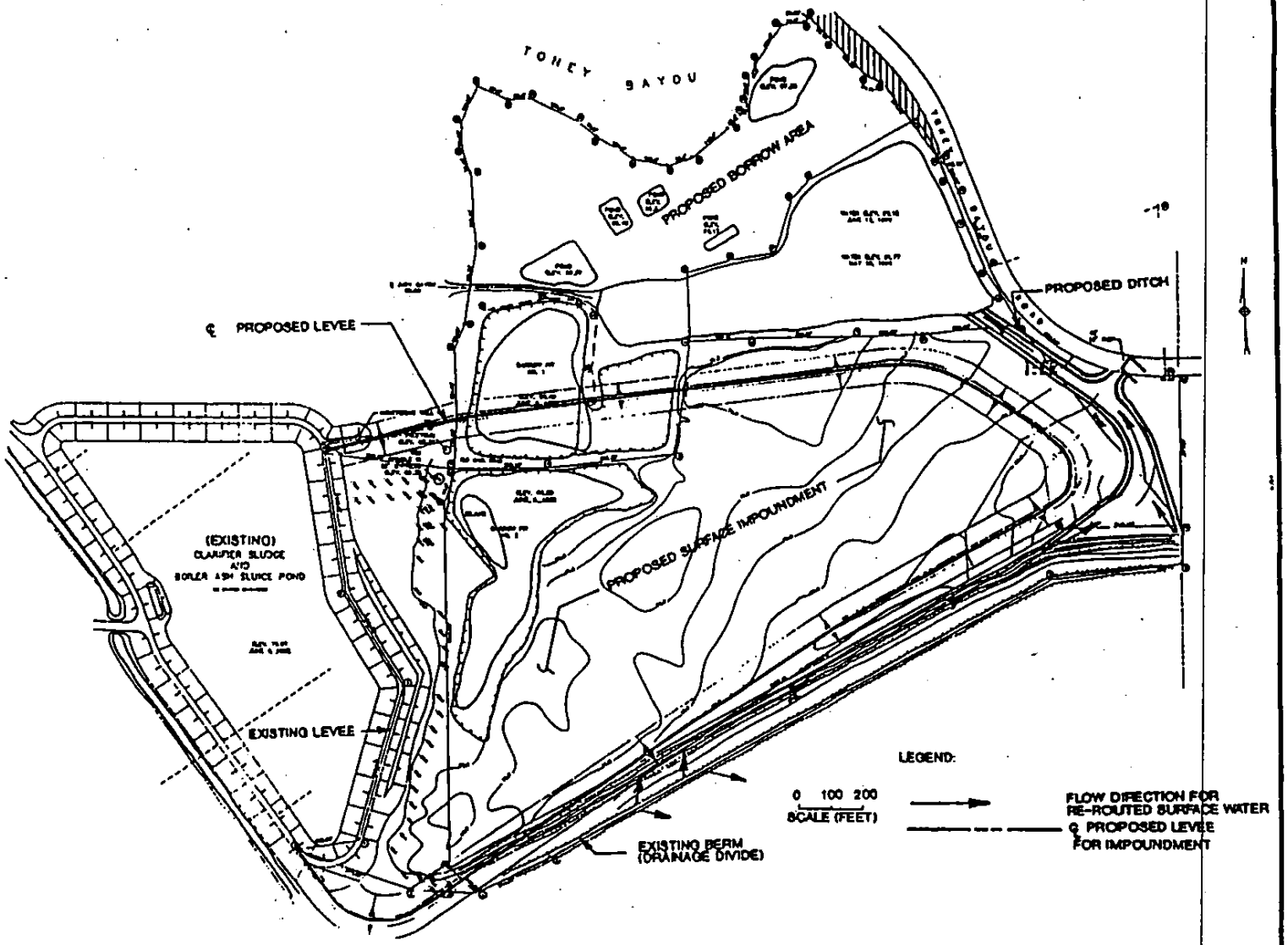


FIGURE 3
PLAN VIEW
PROPOSED SURFACE IMPOUNDMENT

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

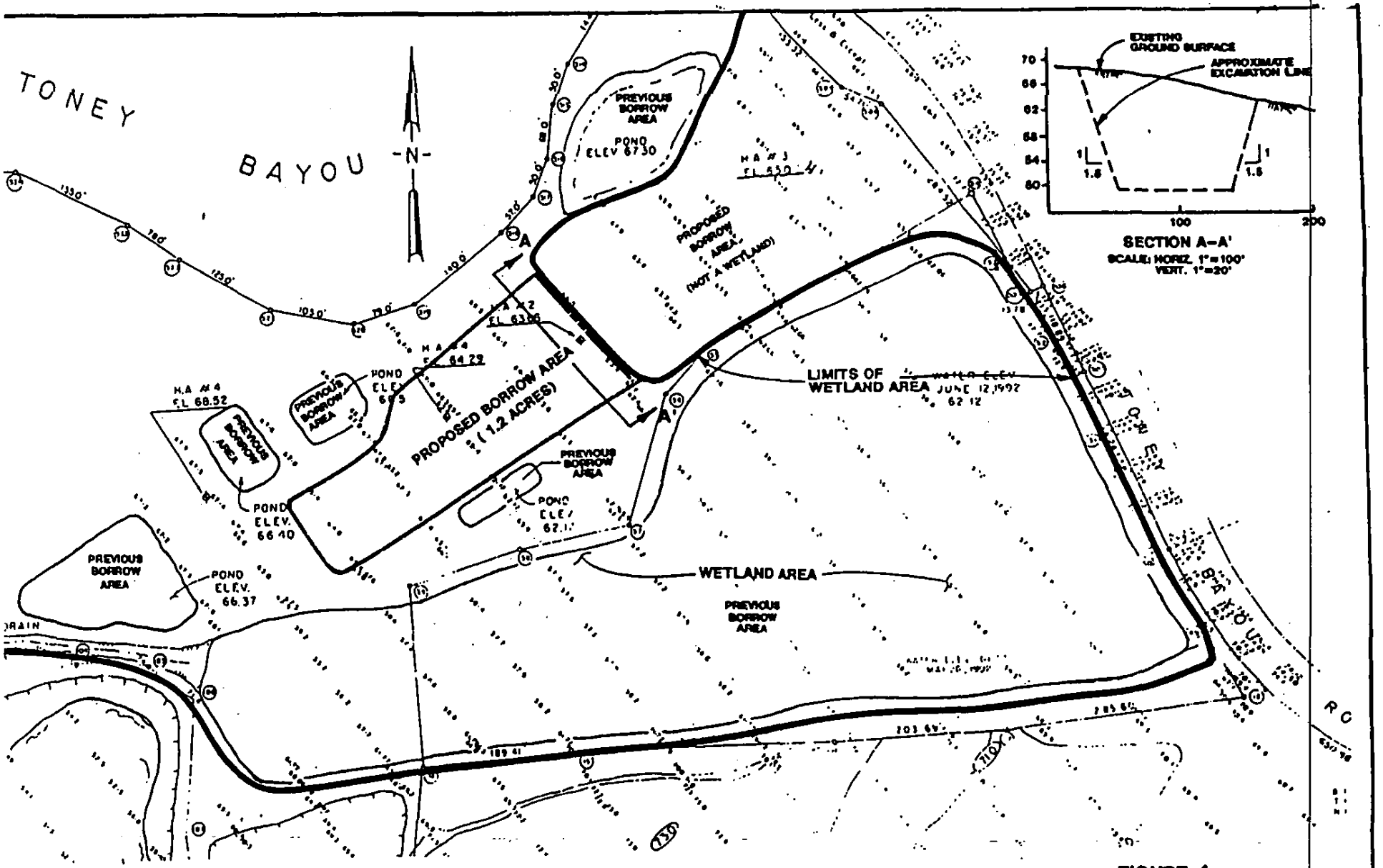


FIGURE 4
PROPOSED BORROW LOCATION
WITHIN WETLAND AREA
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

RECEIVED SEP 23 1992

State of Louisiana

Department of Environmental Quality

Edwin W. Edwards
Governor

Kai David Midboe
Secretary

SEP 18 1992

WQC 920821-14

Dames & Moore
4949 Essen Lane, Suite 900
Baton Rouge, LA 70809

Attention: Mr. Terri L. Richardson, Agent for Riverwood International USA, Inc.

Re: Proposal for Riverwood International USA, Inc. to construct a surface impoundment for the storage of solid waste, which will be located adjacent to an existing 21-acre surface impoundment at its West Monroe plant, Ouachita Parish.

Gentlemen:

We have reviewed the information of the above referenced proposal as contained in your submittal dated August 4, 1992.

Enclosed is a copy of a public notice to be published by you one time in the official State Journal, THE ADVOCATE of Baton Rouge. (As provided for by LRS 30:2074 A(3), the cost of this publication is to be at your expense). PLEASE REQUEST THAT THE ADVOCATE OF BATON ROUGE FURNISH US WITH PROOF OF PUBLICATION OF THIS NOTICE.

A ten day period after the date of publication will allow for public comment. After this ten day period has expired, a decision as to whether to grant Water Quality Certification will be made in accordance with statutory authority contained in Louisiana Revised Statutes of 1950, Title 30, Chapter 11, Part IV, Section 2074 A(3) and provisions of Section 401 of the Clean Water Act (Public Law 95-217).

Sincerely,

Larry Wiesepape
Certifications Coordinator

LW:JWL
enclosure
c: Corps of Engineers
Vicksburg District

PUBLIC NOTICE TO BE RUN IN THE

THE ADVOCATE OF BATON ROUGE
P.O. Box 588
Baton Rouge, La. 70821
Attn: Ms. Vickie Thompson

Notice is hereby given that Dames & Moore has applied to the Department of the Army, Corps of Engineers Vicksburg District, for a permit for Riverwood International USA, Inc. to construct a surface impoundment for the storage of solid waste, which will be located adjacent to an existing 21-acre surface impoundment at its West Monroe plant, Ouachita Parish. They are now applying to the Louisiana Department of Environmental Quality, Office of Water Resources for a Water Quality Certification in accordance with statutory authority contained in the Louisiana Revised Statutes of 1950, Title 30, Chapter 11, Part IV, Section 2074 A(3) and provisions of Section 401 of the Clean Water Act (P.L. 95-217).

Comments concerning this application can be filed with the Office of Water Resources within ten days of this notice using reference No. WQC 920821-14 to the following address:

Louisiana Department of Environmental Quality
Office of Water Resources
Water Pollution Control Division
P.O. Box 82215
Baton Rouge, La. 70884-2215
Telephone: (504) 765-0664

Additional information is on file with the above office, and may be inspected at any time between 8:00 a.m. and 4:30 p.m. weekdays. Copies may be obtained upon payment of cost of printing. A final decision on this application will be made within 60 days after publication of this notice.

(Exclude from Public Notice)

c: Northeast Regional Office - For Your Comments

Record comments below and return this form to the above address, attention Larry Wiesepape, Certifications Coordinator

_____ I do not have any comments on this public notice.

_____ Comments. (write here or attach additional information)

DAMES & MOORE
4949 ESSEN LANE, SUITE 900, BATON ROUGE, LOUISIANA 70809
(504) 769-2600 FAX: (504) 769-3695

September 25, 1992

THE ADVOCATE OF BATON ROUGE
P.O. Box 588
Baton Rouge, Louisiana 70821-0588

Attention: Ms. Vickie Thompson

RE: Public Notice
Louisiana Department of
Environmental Quality
Water Quality Certification
Riverwood International USA, Inc.
D&M Job No. 24379-002-137

Dear Ms. Thompson:

Attached please find a public notice from the Louisiana Department of Environmental Quality, Office of Water Resources. We hereby request that this notice appear in THE ADVOCATE on Wednesday, September 30, 1992. Following the publication of this notice, please send notarized proof of publication and an invoice for your services to:

Dames & Moore
4949 Essen Lane, Suite 900
Baton Rouge, LA 70809
Attn: Ms. Terri Richardson

We appreciate your assistance with this matter. Please contact me or Mr. Zia Tammami in Dames & Moore's Baton Rouge office, at 769-2600, if you have any questions concerning this request.

Very truly yours,

DAMES & MOORE, INC.

Terri L. Richardson

Terri L. Richardson, P.E.
Senior Engineer

enc.
TLR:tlr

CAPITAL CITY PRESS

Publisher of

THE ADVOCATE

PROOF OF PUBLICATION

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

September 30, 1992

Laura Manno

Advertising Representative

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

30 day of September 19 92 A

Notary Public

My Commission Expires: Indefi

PUBLIC NOTICE

Notice is hereby given that Dames & Moore has applied to the Department of the Army, Corps of Engineers Vicksburg District, for a permit for Riverwood International USA, Inc. to construct a surface impoundment for the storage of solid waste, which will be located adjacent to an existing 21-acre surface impoundment at its West Monroe plant, Ouachita Parish. They are now applying to the Louisiana Department of Environmental Quality, Office of Water Resources for a Water Quality Certification in accordance with statutory authority contained in the Louisiana Revised Statutes of 1950, Title 30, Chapter 11, Part IV, Section 2074 A(3) and provisions of Section 401 of the Clean Water Act (P.L. 95-217).

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Environmental Quality
Office of Water Resources
Water Pollution Control Division
P. O. Box 82215
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Telephone: (504) 765-0664

Additional information is on file with the above office, and may be inspected at any time between 8:00 a.m. and 4:30 p.m. weekdays. Copies may be obtained upon payment of cost of printing. A final decision on this application will be made within 60 days after publication of this notice

92498—sep 30—11

92498
WQC 920821-14

ORIGINAL SENT TO
DEPT OF ENVIRONMENTAL
QUALITY.

Environmentally Sensitive Area Documentation

Existing 21-Acre Impoundment

Buddy Roemer
Governor

Paul Hardy
Lieutenant Governor
and Commissioner

State of Louisiana
Department of Culture, Recreation and Tourism
OFFICE OF CULTURAL DEVELOPMENT

Henry A. Truxill
Secretary

Leslie P. Tassin,
Assistant Secretar

May 4, 1989

Mr. Charles B. Welch
Manville Forest Products Corporation
Post Office Box 488
West Monroe, Louisiana 71294-0488

Re: Solid Waste Permit Application
New Surface Impoundment
West Monroe Plant
Ouachita Parish, Louisiana

Dear Mr. Welch:

Reference is made to your letter dated April 6, 1989, concerning the above solid waste permit application. A review of our site file data reveals that there are no known archaeological sites or historical structures located within 1000' of the permit site.

If we may be of further assistance, do not hesitate to contact my staff in the Divisions of Archaeology and Historic Preservation.

Sincerely,

LP Tassin

Leslie P. Tassin
State Historic Preservation Officer

LPT:PGR:s

Kathleen M. Byrd, Ph.D., Director
Division of Archaeology
P.O. Box 44247 (900 Riverside North)
Baton Rouge, LA 70804

Manville Forest Products Corporation
Post Office Box 488
West Monroe, Louisiana 71294-0488
318 362-2000 Telex 588430

Manville

April 6, 1989

Department of Culture, Recreation & Tourism
Office of Cultural Development
Information Section
666 N. Foster Drive
Baton Rouge, LA 70821

RE: Manville Forest Products Corporation,
Proposed Solid Waste Surface Impoundment

Dear Sir/Madam:

Manville Forest Products Corporation is developing a solid waste permit application for a new surface impoundment at the West Monroe Plant in Ouachita Parish. The Monroe Plant is a 1700 ton/day unbleached kraft pulp and paper mill occupying approximately 2,000 acres of land in West Monroe, Louisiana. The area surrounding the plant is occupied primarily by agricultural, commercial and residential concerns. The latitude and longitude coordinates for the plant are:

Latitude - 32° 28′ 25"
Longitude - 92° 08′ 30"

Attached are portions of the USGS map (West Monroe Quadrangle) indicating the approximate location of the proposed impoundment to be permitted.

LAC 33:VII.1107.C.2.e.i (Solid Waste Rules and Regulations) requires a list of all known historical, recreational areas and archaeological sites within 1,000 feet of the site. We would appreciate receiving a letter from you listing any known environmentally sensitive areas, as described above, within the vicinity of the West Monroe Plant. In the event that any sensitive areas are identified, please discuss whether or not the proposed facility would have a potential impact. Your letter will be included as documentation in the Solid Waste Permit Application .

If you have any questions, please contact me at (318) 362-2780.

Sincerely,

Charles B. Welch
Manager, Environmental Control

State of Louisiana

VIRGINIA VAN SICKLE
SECRETARY

DEPARTMENT OF WILDLIFE AND FISHERIES
POST OFFICE BOX 98000
BATON ROUGE, LA. 70898
PHONE (504) 765-2800

BUDDY ROEMER
GOVERNOR

May 10, 1989

Mr. Charles B. Welch
Manager, Environmental Control
Manville Forest Products Corp.
P.O. Box 488
West Monroe, LA 71294-0488

RE: Proposed Surface Impoundments
West Monroe Plant, Ouachita Parish

Dear Mr. Welch:

Personnel of the Louisiana Department of Wildlife and Fisheries have reviewed the information which you provided to us. Based upon that information, we have made a cursory assessment of possible impacts of the above referenced project upon fish and wildlife resources and/or their habitat.

The data currently available to us indicate no known threatened or endangered species of animal exists within the proposed impoundment area. No Wildlife Management Areas are in the immediate vicinity, nor are we aware of any designated sensitive ecological areas. There are no wetlands of significant size within the immediate project vicinity, however, all wetlands are rather sensitive and are significant both physico-chemically and biologically.

No stream protected under the Louisiana Natural and Scenic Rivers Act will be affected by the proposed activity.

Sincerely,

Robert Misso

for Virginia Van Sickle, Secretary
La. Dept. Wildlife & Fisheries

VVS/MBW/mw

Manville Forest Products Corporation
Post Office Box 488
West Monroe, Louisiana 71294-0488
318 362-2000 Telex 588430

Manville

April 6, 1989

Department of Wildlife and Fisheries
Information Section
2156 Wooddale Boulevard
Baton Rouge, LA 70821

RE: Manville Forest Products Corporation,
Proposed Solid Waste Surface Impoundment

Dear Sir/Madam:

Manville Forest Products Corporation is developing a solid waste permit application for a new surface impoundment at the West Monroe Plant in Ouachita Parish. The Monroe Plant is a 1700 ton/day unbleached kraft pulp and paper mill occupying approximately 2,000 acres of land in West Monroe, Louisiana. The area surrounding the plant is occupied primarily by agricultural, commercial and residential concerns. The latitude and longitude coordinates for the plant are:

Latitude - 32° 28′ 25″
Longitude - 92° 08′ 30″

Attached are portions of the USGS map (West Monroe Quadrangle) indicating the approximate location of the proposed impoundment to be permitted.

LAC 33:VII.1107.C.2.e.i (Solid Waste Rules and Regulations) requires a list of all designated wildlife management areas, swamps and marshes, habitat for endangered species and other sensitive ecological areas within 1,000 feet of the site. We would appreciate receiving a letter from you listing any known environmentally sensitive areas, as described above, within the vicinity of the West Monroe Plant. In the event that any environmentally sensitive areas are identified, please discuss whether or not the proposed facility would have a potential impact. Your letter will be included as documentation in the Solid Waste Permit Application.

If you have any questions, please contact me at (318) 362-2780.

Sincerely,

Charles B. Welch
Manager, Environmental Control

DEPARTMENT OF THE ARMY
VICKSBURG DISTRICT, CORPS OF ENGINEERS
P. O. BOX 60
VICKSBURG, MISSISSIPPI 39180 -0060

REPLY TO
ATTENTION OF:

17 June 1985

Operations Division
Regulatory

Manville Forest Products Corporation
P.O. Box 488
West Monroe, Louisiana 71291

Dear Sir:

In compliance with your request, we are enclosing a permit (Enclosure 1) issued by authority of the Secretary of the Army.

Should you find that any material changes are necessary in the location or plans of the work, it will be necessary that you submit revised plans prior to commencement of the work.

Special attention should be paid to paragraphs g. and n. under the General Conditions and the Special Conditions (where applicable) of this permit. The appropriate information should be forwarded to the following address: Corps of Engineers, ATTN: LMKOD-F, Post Office Box 60, Vicksburg, Mississippi 39180-0060, or telephone number (601) 634-5298.

We also enclose executed ENG Form 4336 (Enclosure 2), which is to be conspicuously displayed at the site of the work.

Sincerely,

Edward G. McGregor

Edward G. McGregor
Chief, Regulatory Branch

Enclosures

LMK FL 486
18 Sep 84
Previous edition obsolete

Application No. LMKOD-FE 1522-14-9H23-15

Name of Applicant Manville Forest Products Corporation

Effective Date 17 June 1985

Expiration Date (*If applicable*) 17 June 1988

DEPARTMENT OF THE ARMY
PERMIT

Referring to written request dated April 1, 1985 for a permit to:

(X) Perform work in or affecting navigable waters of the United States, upon the recommendation of the Chief of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of March 3, 1899 (*33 U.S.C. 403*);

(X) Discharge dredged or fill material into waters of the United States upon the issuance of a permit from the Secretary of the Army acting through the Chief of Engineers pursuant to Section 404 of the Clean Water Act (*33 U.S.C. 1344*);

( ) Transport dredged material for the purpose of dumping it into ocean waters upon the issuance of a permit from the Secretary of the Army acting through the Chief of Engineers pursuant to Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (*86 Stat. 1052; P.L. 92-532*);

Manville Forest Products Corporation
Post Office Box 488
West Monroe, Louisiana 71291

is hereby authorized by the Secretary of the Army:

to perform work in or affecting navigable waters of the United States and deposit dredged and/or fill material into waters of the United States in conjunction with construction of an impoundment basin

in wetlands adjacent to the Ouachita River

at Section 11, T17N-R3E, Ouachita Parish, Louisiana

In accordance with the plans and drawings attached hereto which are incorporated in and made a part of this permit (*on drawings, give file number or other definite identification marks.*)

subject to the following conditions:

1. General Conditions:

a. That all activities identified and authorized herein shall be consistent with the terms and conditions of this permit; and that any activities not specifically identified and authorized herein shall constitute a violation of the terms and conditions of this permit which may result in the modification, suspension or revocation of this permit, in whole or in part, as set forth more specifically in General Conditions 3(c), hereto, and in the institution of such legal proceedings as the United States Government may consider appropriate, whether or not this permit has been previously modified, suspended or revoked in whole or in part.

b. That all activities authorized herein shall, if they involve, during their construction or operation, any discharge of pollutants into waters of the United States or ocean waters, be at all times consistent with applicable water quality standards, effluent limitations and standards of performance, prohibitions, pretreatment standards and management practices established pursuant to the Clean Water Act (33 U.S.C. 1344), the Marine Protection, Research and Sanctuaries Act of 1972 (P.L. 92-532, 86 Stat. 1052), or pursuant to applicable State and local law.

c. That when the activity authorized herein involves a discharge during its construction or operation, or any pollutant (including dredged or fill material), into waters of the United States, the authorized activity shall, if applicable water quality standards are revised or modified during the term of this permit, be modified, if necessary, to conform with such revised or modified water quality standards within 6 months of the effective date of any revision or modification of water quality standards, or as directed by an implementation plan contained in such revised or modified standards, or within such longer period of time as the District Engineer, in consultation with the Regional Administrator of the Environmental Protection Agency, may determine to be reasonable under the circumstances.

d. That the discharge will not destroy a threatened or endangered species as identified under the Endangered Species Act, or endanger the critical habitat of such species.

e. That the permittee agrees to make every reasonable effort to prosecute the construction or operation of the work authorized herein in a manner so as to minimize any adverse impact on fish, wildlife, and natural environmental values.

f. That the permittee agrees that he will prosecute the construction or work authorized herein in a manner so as to minimize any degradation of water quality.

g. That the permittee shall allow the District Engineer or his authorized representative(s) or designee(s) to make periodic inspections at any time deemed necessary in order to assure that the activity being performed under authority of this permit is in accordance with the terms and conditions prescribed herein.

h. That the permittee shall maintain the structure or work authorized herein in good condition and in reasonable accordance with the plans and drawings attached hereto.

i. That this permit does not convey any property rights, either in real estate or material, or any exclusive privileges; and that it does not authorize any injury to property or invasion of rights or any infringement of Federal, State, or local laws or regulations.

j. That this permit does not obviate the requirement to obtain state or local assent required by law for the activity authorized herein.

k. That this permit may be either modified, suspended or revoked in whole or in part pursuant to the policies and procedures of 33 CFR 325.7.

l. That in issuing this permit, the Government has relied on the information and data which the permittee has provided in connection with his permit application. If, subsequent to the issuance of this permit, such information and data prove to be materially false, materially incomplete or inaccurate, this permit may be modified, suspended or revoked, in whole or in part, and/or the Government may, in addition, institute appropriate legal proceedings.

m. That any modification, suspension, or revocation of this permit shall not be the basis for any claim for damages against the United States.

n. That the permittee shall notify the District Engineer at what time the activity authorized herein will be commenced, as far in advance of the time of commencement as the District Engineer may specify, and of any suspension of work, if for a period of more than one week, resumption of work and its completion.

o. That if the activity authorized herein is not completed on or before _____ day of _____, 19_____, (three years from the date of issuance of this permit unless otherwise specified) this permit, if not previously revoked or specifically extended, shall automatically expire.

p. That this permit does not authorize or approve the construction of particular structures, the authorization or approval of which may require authorization by the Congress or other agencies of the Federal Government.

q. That if and when the permittee desires to abandon the activity authorized herein, unless such abandonment is part of a transfer procedure by which the permittee is transferring his interests herein to a third party pursuant to General Condition t hereof, he must restore the area to a condition satisfactory to the District Engineer.

r. That if the recording of this permit is possible under applicable State or local law, the permittee shall take such action as may be necessary to record this permit with the Register of Deeds or other appropriate official charged with the responsibility for maintaining records of title to and interests in real property.

s. That there shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein.

t. That this permit may not be transferred to a third party without prior written notice to the District Engineer, either by the transferee's written agreement to comply with all terms and conditions of this permit or by the transferree subscribing to this permit in the space provided below and thereby agreeing to comply with all terms and conditions of this permit. In addition, if the permittee transfers the interests authorized herein by conveyance of realty, the deed shall reference this permit and the terms and conditions specified herein and this permit shall be recorded along with the deed with the Register of Deeds or other appropriate official.

u. That if the permittee during prosecution of the work authorized herein, encounters a previously unidentified archeological or other cultural resource within the area subject to Department of the Army jurisdiction that might be eligible for listing in the National Register of Historic Places, he shall immediately notify the district engineer.

II. Special Conditions: (*Here list conditions relating specifically to the proposed structure or work authorized by this permit*):

The following Special Conditions will be applicable when appropriate:

STRUCTURES IN OR AFFECTING NAVIGABLE WATERS OF THE UNITED STATES:

a. That this permit does not authorize the interference with any existing or proposed Federal project and that the permittee shall not be entitled to compensation for damage or injury to the structures or work authorized herein which may be caused by or result from existing or future operations undertaken by the United States in the public interest.

b. That no attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized by this permit.

c. That if the display of lights and signals on any structure or work authorized herein is not otherwise provided for by law, such lights and signals as may be prescribed by the United States Coast Guard shall be installed and maintained by and at the expense of the permittee.

d. That the permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the authorized structure or work, shall, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the waterway to its former conditions. If the permittee fails to comply with the direction of the Secretary of the Army or his authorized representative, the Secretary or his designee may restore the waterway to its former condition, by contract or otherwise, and recover the cost thereof from the permittee.

e. Structures for Small Boats: That permittee hereby recognizes the possibility that the structure permitted herein may be subject to damage by wave wash from passing vessels. The issuance of this permit does not relieve the permittee from taking all proper steps to insure the integrity of the structure permitted herein and the safety of boats moored thereto from damage by wave wash and the permittee shall not hold the United States liable for any such damage.

MAINTENANCE DREDGING:

a. That when the work authorized herein includes periodic maintenance dredging, it may be performed under this permit for _____ years from the date of issuance of this permit (*ten years unless otherwise indicated*);

b. That the permittee will advise the District Engineer in writing at least two weeks before he intends to undertake any maintenance dredging.

DISCHARGES OF DREDGED OR FILL MATERIAL INTO WATERS OF THE UNITED STATES:

a. That the discharge will be carried out in conformity with the goals and objectives of the EPA Guidelines established pursuant to Section 404(b) of the Clean Water Act and published in 40 CFR 230;

b. That the discharge will consist of suitable material free from toxic pollutants in toxic amounts.

c. That the fill created by the discharge will be properly maintained to prevent erosion and other non-point sources of pollution.

DISPOSAL OF DREDGED MATERIAL INTO OCEAN WATERS:

a. That the disposal will be carried out in conformity with the goals, objectives, and requirements of the EPA criteria established pursuant to Section 102 of the Marine Protection, Research and Sanctuaries Act of 1972, published in 40 CFR 220-228.

b. That the permittee shall place a copy of this permit in a conspicuous place in the vessel to be used for the transportation and/or disposal of the dredged material as authorized herein.

This permit shall become effective on the date of the District Engineer's signature.

Permittee hereby accepts and agrees to comply with the terms and conditions of this permit.

Bill H. Chastain — June 7, 1985

PERMITTEE — DATE

MANVILLE FOREST PRODUCTS CORPORATION

BY AUTHORITY OF THE SECRETARY OF THE ARMY:

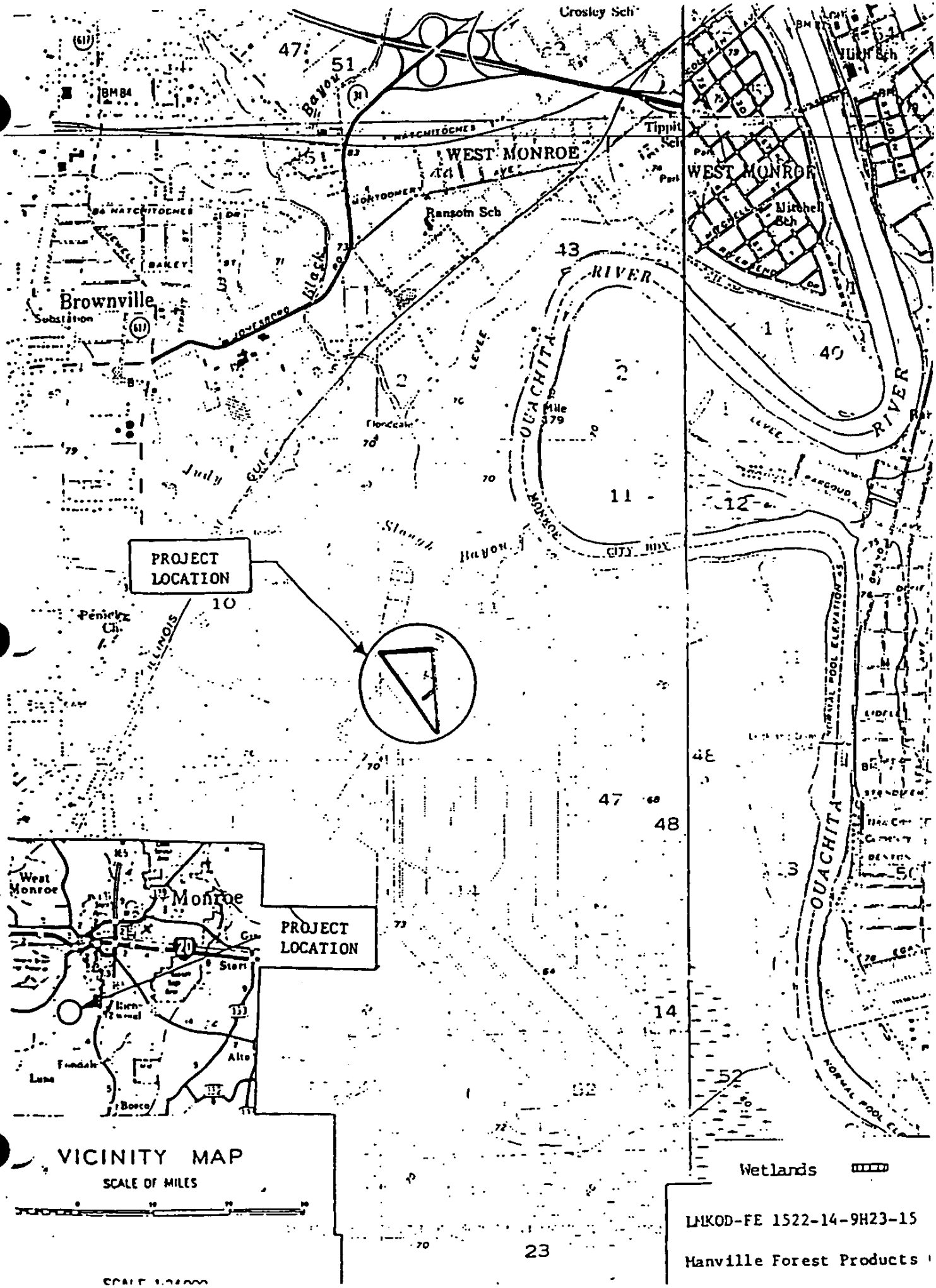
Edward J. McGregor — 6/14/85

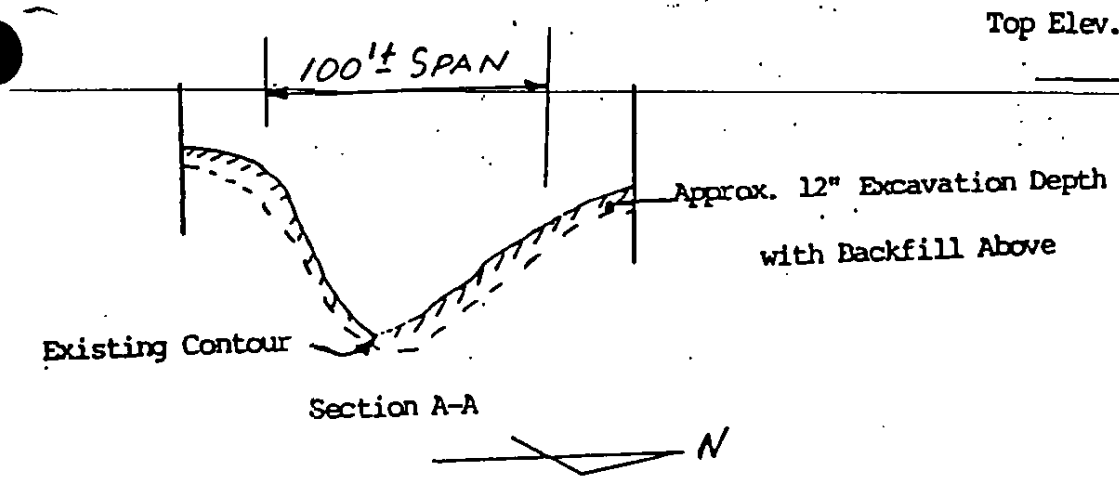
DENNIS J. YORK — DATE

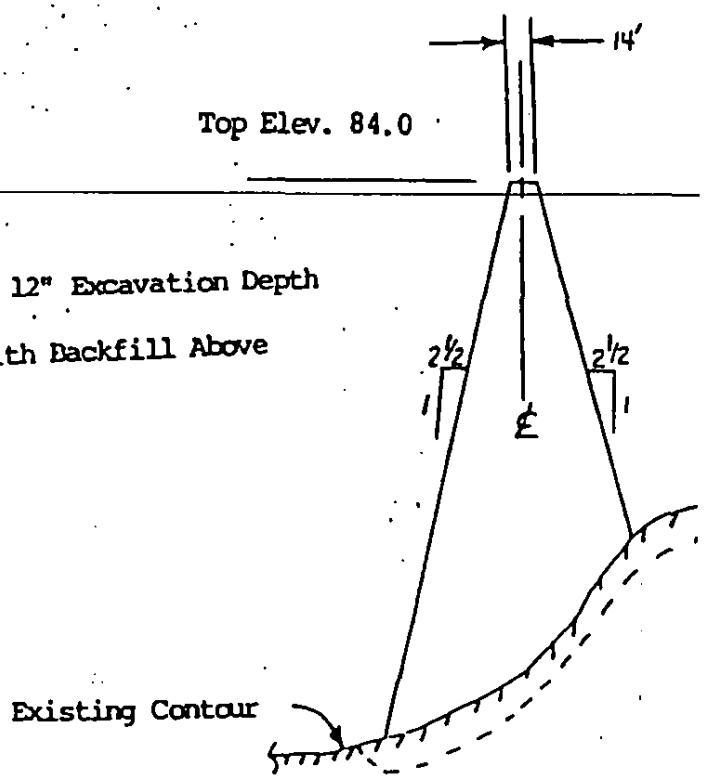
DISTRICT ENGINEER,
U.S. ARMY, CORPS OF ENGINEERS

Transferee hereby agrees to comply with the terms and conditions of this permit.

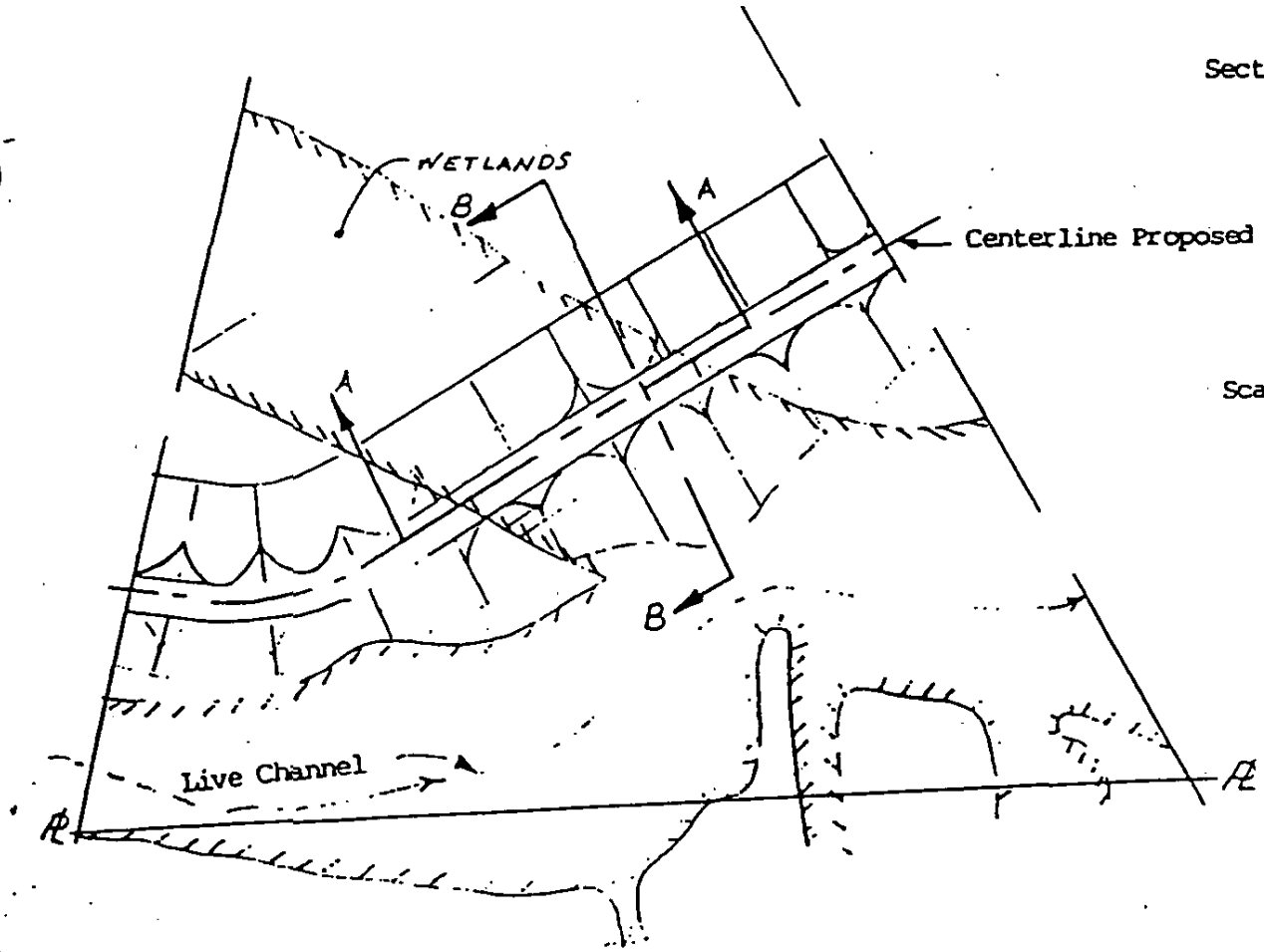
_____ TRANSFEREE — _____ DATE


Crosley Sch
WEST MONROE
Ransom Sch
Brownville
Substation
Mitchell Sch
RIVER
OUACHITA
Mile 379
Judy
Slough
Bayou
CITY BDY
PROJECT LOCATION
Penick Ch.
ILLINOIS
West Monroe
Monroe
PROJECT LOCATION
Start
Alto
Fondale
Luna
Bosco
NORMAL POOL ELEVATION 45
VICINITY MAP
SCALE OF MILES
Wetlands
LMKOD-FE 1522-14-9H23-15
Manville Forest Products





Section B-B



Scale: Horz. 1'

Vert. 1

AREA PLAN

PROPOSED ASH POND LEVEE AT DRAIN CROSSING

APPENDIX D

WATER WELL DATA

Public Works Water Resources Division
Water Resources Section
Wells located within 1 mile radius
of Latitude 32°28'30" and Longitude 92°08'00"

Parish	Section	Owner Name	DOTD Well #	Owner Well #	Driller's Name	Well Depth (ft)	Well Use	Casing Size (in)	Drill Date	Water Level (ft)	W.L. Date Measured	Geologic Unit	Latitude	Longitude	Avail Info	Distance In Miles
Ouachita	10	RIVERWOOD INTER	-80	3	LAYNE (LA)	721	OBSERVATION	16X10	1929	194.6	5/3/1956	124SPRT	322843	920844	D Q W	0.75
Ouachita	3	RIVERWOOD INTER	-83	2	LAYNE (LA)	727	PLUGGED	18X16X10	1929	214	9/12/1955	124SPRT	322857	920845	D Q W	0.89
Ouachita	3	ALLIED CHEM	-117		LAYNE (LA)	647	PLUGGED	8X6	May-41	195.1	2/19/1946	124SPRT	322908	920830	D Q W	0.87
Ouachita	10	RIVERWOOD INTER	-486	10	CHANDLER WTR	580	INDUSTRIAL	6X4	1974			124SPRT	322809	920854		0.96
Ouachita	10	RIVERWOOD INTER	-631		CONTINENTAL	640	PLUGGED	6	May-96	270	5/14/1996	124SPRT	322818	920852	D W	0.87
Ouachita	10	RIVERWOOD INTER	-633	2	CONTINENTAL	660	INDUSTRIAL	5	Aug-96	270	8/2/1996	124SPRT	322818	920851	D W	0.86
Ouachita	10	RIVERWOOD INTER	-635	2A	LAYNE (MS)	726	INDUSTRIAL	18	Feb-92	260	2/14/1992	124SPRT	322853	920846	ED W	0.86
Ouachita	10	RIVERWOOD INTER	-636	3A	LAYNE (MS)	687	INDUSTRIAL	18	Mar-92	251	4/30/1992	124SPRT	322845	920844	ED W	0.77
Ouachita	10	GEORGIA PACIFIC	-653	1	LAYNE (MS)	675	INDUSTRIAL	8	2-Aug	281	10/24/2002	0	322851	920838	EDMQ W	0.73
Ouachita	10	GEORGIA PACIFIC	-654	2	LAYNE (MS)	675	INDUSTRIAL	8	2-Sep	281	10/24/2002	0	322851	920838	EDM W	0.73
Ouachita	10	MANVILLE CORP	-5006Z	R-1	UNKNOWN	25	PLUGGED	4				112ORVAC	322830	920845		0.73
Ouachita	10	MANVILLE CORP	-5007Z	R-2	UNKNOWN	20	PLUGGED	4				112ORVAC	322839	920848		0.79
Ouachita	10	MANVILLE CORP	-5008Z	R-3	UNKNOWN	16	PLUGGED	4				112ORVAC	322834	920838		0.62
Ouachita	10	MANVILLE CORP	-5009Z	B-5	UNKNOWN	23	PLUGGED	4				112ORVAC	322848	920832		0.62
Ouachita	4	GREATER OU WTR	-5019Z		UNKNOWN	460	PLUGGED					124SPRT	322905	920743		0.72
Ouachita	3	GENERAL CHEM	-5153Z	P-1	FOUNDATION	18	PLUGGED	2	May-87	13	5/12/1987	112ORVAC	322901	920848	D W	0.98
Ouachita	3	GENERAL CHEM	-5154Z	P-2	FOUNDATION	18	PLUGGED	2	May-87	13	5/12/1987	112ORVAC	322900	920848	D W	0.96

Public Works Water Resources Division
Water Resources Section
Wells located within 1 mile radius
of Latitude 32°28'30" and Longitude 92°08'00"

Ouachita	3	GENERAL CHEM	-5157Z	P-5	FOUNDATION	18	PLUGGED	2	May-87	13	5/12/1987	112ORVAC	322900	920847	D W	0.95
Ouachita	3	GENERAL CHEM	-5158Z	P-6	FOUNDATION	18	PLUGGED	2	May-87	13	5/12/1987	112ORVAC	322902	920847	D W	0.98
Ouachita	4	GREATER OU WTR	-5205Z		UNKNOWN	467	PLUGGED					124SPRT	322905	920743		0.72
Ouachita	11	RIVERWOOD INTER	-5273Z	P-1	SOUTHWESTERN	20	PIEZOMETER	2	Oct-89	13	10/24/1989	112ORVAC	322819	920827	D W	0.48
Ouachita	11	RIVERWOOD INTER	-5274Z	P-2	SOUTHWESTERN	20	PIEZOMETER	2	Oct-89	13	10/24/1989	112ORVAC	322809	920822	D W	0.54
Ouachita	11	RIVERWOOD INTER	-5275Z	P-3	SOUTHWESTERN	20	PLUGGED	4	Oct-89	12	10/24/1989	112ORVAC	322819	920821	D W	0.4
Ouachita	10	RIVERWOOD INTER	-5280Z	MW-7	PSI/PTL	26	MONITOR	4	Dec-89	19.74	12/23/1989	112ORVA	322825	920852	D W	0.85
Ouachita	10	RIVERWOOD INTER	-5281Z	MW-8	PSI/PTL	39	MONITOR	4	Dec-89	19.81	12/23/1989	112ORVA	322814	920850	D W	0.86
Ouachita	15	RIVERWOOD INTER	-5282Z	MW-9	PSI/PTL	32	MONITOR	4	Dec-89	14.32	12/23/1989	112ORVAC	322757	920848	D W	1
Ouachita	47	RIVERWOOD INTER	-5288Z	MW-15	PSI/PTL	57	MONITOR	4	Dec-89	18.75	12/23/1989	112ORVA	322740	920755	D W	0.96
Ouachita	11	RIVERWOOD INTER	-5289Z	MW-16	PSI/PTL	42	MONITOR	4	Dec-89	14.92	12/23/1989	112ORVA	322808	920818	D W	0.51
Ouachita	11	RIVERWOOD INTER	-5290Z	MW-17	PSI/PTL	20	MONITOR	4	Dec-89	14.71	12/23/1989	112ORVAC	322814	920821	D W	0.46
Ouachita	10	RIVERWOOD INTER	-5291Z	MW-19	PSI/PTL	27	PLUGGED	4	Dec-89	19.49	12/23/1989	112ORVAC	322815	920836	D W	0.65
Ouachita	11	RIVERWOOD INTER	-5292Z	MW-18	PSI/PTL	18	MONITOR	4	Dec-89	9.59	12/23/1989	112ORVAC	322818	920829	D W	0.52
Ouachita	11	RIVERWOOD INTER	-5843Z	MW-20	SOUTHWESTERN	46	MONITOR	4	Oct-96	24	10/31/1996	112ORVA	322830	920817	D W	0.27
Ouachita	11	RIVERWOOD INTER	-5844Z	MW-21	SOUTHWESTERN	37	MONITOR	4	Oct-96	25	10/31/1996	112ORVAC	322827	920801	D W	0.06

Public Works Water Resources Division
Water Resources Section
Wells located within 1 mile radius
of Latitude 32°28'30" and Longitude 92°08'00"

Ouachita	11	RIVERWOOD INTER	-5845Z	MW-22	SOUTHWESTERN	40	MONITOR	4	Oct-96	24	10/31/1996	112ORVAC	322822	920758	D W	0.16
Ouachita	11	RIVERWOOD INTER	-5846Z	MW-23	SOUTHWESTERN	41	MONITOR	4	Oct-96	24	10/31/1996	112ORVAC	322811	920812	D W	0.41
Ouachita	11	RIVERWOOD INTER	-5847Z	MW-24	SOUTHWESTERN	41	MONITOR	4	Oct-96	22	10/31/1996	112ORVA	322806	920821	D W	0.57
Ouachita	11	D & J CONSTR CO	-5924Z		HAMLIN	360	DOMESTIC	4	Sep-97	204	9/2/1997	124SPRT	322829	920756	D W	0.07
Ouachita	47	D & J CONSTR CO	-6124Z	Jan-99	HAMMETT	71	IRRIGATION	4	Jul-99	36	7/25/1999	112ORVA	322830	920740	D W	0.32
Ouachita	12	LENARD, HUEY	-6290Z		GENTRY	365	DOMESTIC	4	1-Sep	130	8/25/2001	124SPRT	322813	920711	D W	0.86
Ouachita	3	GENERAL CHEM	-6431Z	MW-1	UNKNOWN	23	PLUGGED	2	Aug-85	13.5	8/22/1985	0	322902	920844	D W	0.94
Ouachita	3	GENERAL CHEM	-6432Z	MW-2	UNKNOWN	23	PLUGGED	2	Aug-85	14.5	8/21/1985	0	322901	920840	D W	0.88
Ouachita	3	GENERAL CHEM	-6433Z	MW-3	UNKNOWN	25	PLUGGED	2	Aug-85	17	8/21/1985	0	322904	920838	D W	0.89
Ouachita	3	GENERAL CHEM	-6434Z	MW-4	UNKNOWN	27	PLUGGED	2	Aug-85	20	8/21/1985	0	322905	920843	D W	0.96
Ouachita	3	GENERAL CHEM	-6435Z	MW-5	UNKNOWN	25	PLUGGED	2		17.39	00/00/85	0	322905	920842	D W	0.95
Ouachita	3	GENERAL CHEM	-6436Z	MW-6	UNKNOWN	20	PLUGGED	2		10.86	00/00/00	0	322905	920840	D W	0.93

Available Information:
E - Geophysical Log
D - Driller's Log
M - Mechanical Analysis
Q - Quality of Water
P - Pumping Test
W - Water Level
B - Bacteriological Analysis

APPENDIX E

MONITORING WELL INSTALLATION AND PLUGGING AND ABANDONMENT REPORTS

PLUGGING AND ABANDONMENT REPORT

Riverwood International U.S.A., Inc.
Ash/Sludge Impoundments
Monitoring Well #16
GD-073-0405/P-0244 and P-0199
Ouachita Parish
West Monroe, Louisiana

Prepared For:
Riverwood International U.S.A., Inc.
P.O. Box 35800
West Monroe, LA 71294-5800

Prepared By:
Petroleum Automation Consultants, Inc.
P.O. Box 588, 109 Canterberry Road
Swartz, LA 71281

Sarah E. Moore, Project Manager

April 29, 1996

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1.0 INTRODUCTION 1

2.0 BACKGROUND 1

3.0 FIELD PROCEDURES 2

4.0 RESULTS 2

FIGURES

1 Monitoring Well Location Map

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APPENDICES

A Field Notes

B LDOTD Plugging and Abandonment Form

1.0 INTRODUCTION

On behalf of Riverwood International U.S.A., Inc., Petroleum Automation Consultants, Inc. (PAC) has prepared this Plugging and Abandonment (P&A) Report for groundwater monitoring well MW-16 at Riverwood's facility in West Monroe, Louisiana. This well is under the regulatory authority of the Louisiana Department of Environmental Quality Solid Waste Division. Solid Waste Permit Modification #5, which was approved by the Solid Waste Division in correspondence dated June 23, 1994 contained the provision for P&A of MW-16. On behalf of Riverwood, PAC submitted a P&A Plan dated April 2, 1996 to the Solid Waste Division. Mr. Hamilton Shaw of the Solid Waste Division gave verbal approval to proceed with P&A on April 3, 1996. Working in conjunction with Maxim Technologies, Inc. (formerly Southwestern Laboratories, Inc.) of Shreveport, Louisiana, PAC conducted P&A field activities on April 3 and 4, 1996. A description, documentation, and results of P&A are included in this report.

2.0 BACKGROUND

The Riverwood facility is located south of Jonesboro Road (La. Highway 34) in West Monroe, Louisiana on the west side of the Ouachita River. Monitoring well MW-16 is located southwest of Toney Bayou Road near the facility's sludge ponds and surface impoundments (Figure 1). Monitoring well MW-16 was installed in 1989 according to requirements of Standard Permit No. P-0199 (NPDES Treatment System). This well also fulfills part of the groundwater monitoring requirement for Standard Permit No. P-0244, which covers a separately-permitted ash/sludge impoundment contained within the NPDES Treatment System. MW-16 was last sampled in November 1995. P&A of this well makes way for construction of a new ash/sludge impoundment.

Monitoring well MW-16 was installed using hollow stem auger drilling techniques with a borehole diameter of 10 inches. The well was registered with the Louisiana Department of Transportation and Development (LDOTD) Water Resources Section as a 27 foot deep well. Gauging prior to P&A showed the well to be 45.2 feet deep from top of casing.

3.0 FIELD ACTIVITIES

PAC commenced P&A field activities on April 3, 1996 by removing the concrete well pad, protective casing, and barrier posts using a jackhammer. These materials were disposed off-site. The dedicated sampling pump was removed and stored on-site.

The ground surface at MW-16 was built up approximately 5 feet higher than the surrounding land. In order to facilitate access for the drill rig, a construction crew on-site used a dozer to remove approximately 5 feet of earth from around the well. This work took place on the morning of April 4, 1996.

Maxim Technologies, Inc. mobilized to the site on April 4, 1996 and began overdrilling MW-16 using a CME-75 drill rig with 10" O.D., 6 7/8" I.D. hollow stem augers. MW-16 was overdrilled to a total depth of 45 feet and all well casing and screen recovered. PAC and Maxim grouted the borehole from the bottom up using rigid tremie pipe and a Moyno grout pump. The grout consisted of Type I portland cement with approximately 5% by weight natural bentonite. The grout was mixed in a tank by circulating through a pump. PAC measured a grout weight of 14.2 lbs/gallon for the two batches of grout which were mixed.

4.0 RESULTS

The borehole seal was inspected by PAC on April 5 and 8, 1996. The grout surface remained within one foot of ground surface. Photographs of the plugged well showing the grout level are included in this report. Field notes compiled by James O. Jones of PAC, documenting plugging and abandonment procedures, are included in Appendix A. A plugging and abandonment form was submitted to the LDOTD Water Resources Section on April 22, 1996. A copy of this form is included in Appendix B.

APPENDIX A

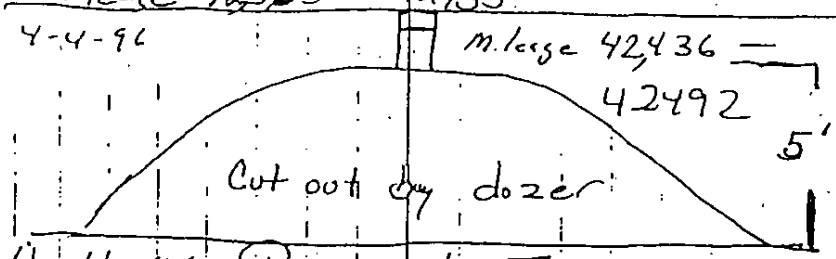
Field Notes

Riverwood International 4-3-96
Arrived a office a 0800 gather all supplies for job. arrived on site @ 0930 break out concrete and pull barrier port and clean up big pieces of concrete

Mileage 42363 – 42435

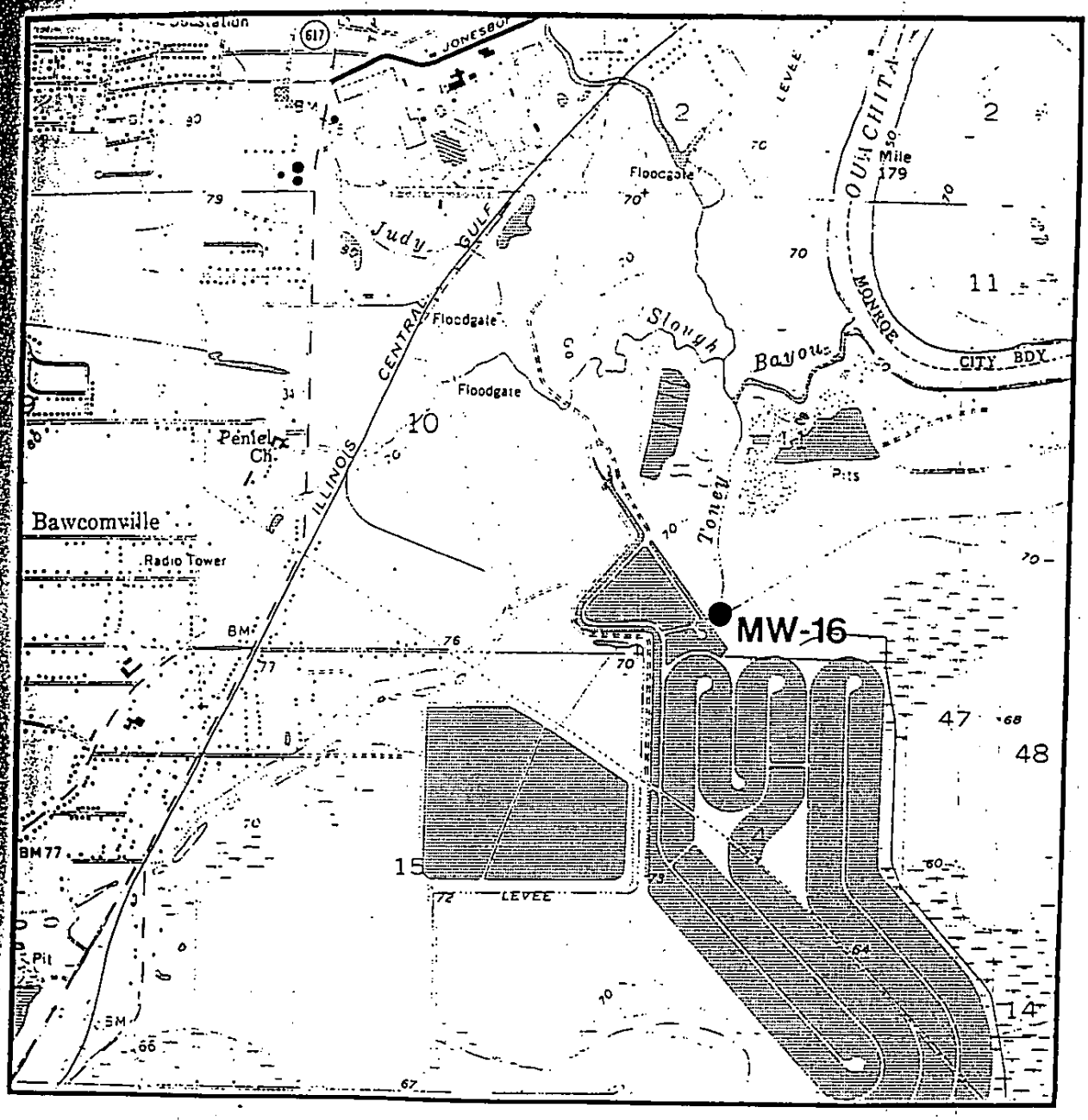
4-4-96

Mileage 42,436 – 42492



4-4-96 Riverwood International
Arrived @ office @ 0800, to pickup red + white truck left office a 0825 arrived @ Mrs Smith office @ 0845 drove in the plant with mrs smith to locate water supply. afterwards met with Maxim Crew @ Brickel street @ 0920 took them to the Drill site and went back to show the water truck personal where to get water after filling water truck went back to site and the Driller began drilling @ 1030

James O. Jones



USGS 7.5 MINUTE SERIES
WEST MONROE SOUTH, LOUISIANA
1957
PHOTOREVISED 1969 & 1975

0 1/2 1 MILE

SCALE 1 : 24000

West Monroe South
Quadrangle

PAC Petroleum Automation Consultants, Inc.	Riverwood International USA, Inc.	Monitoring Well Location Map	Figure
Environmental Services	1000 Jonesboro Road West Monroe, Louisiana		1
Job No. / Drawn By: / Date			
96036 / DSI/JOI / 4-1-96			

12156F1 4-2-96

BEST COPY

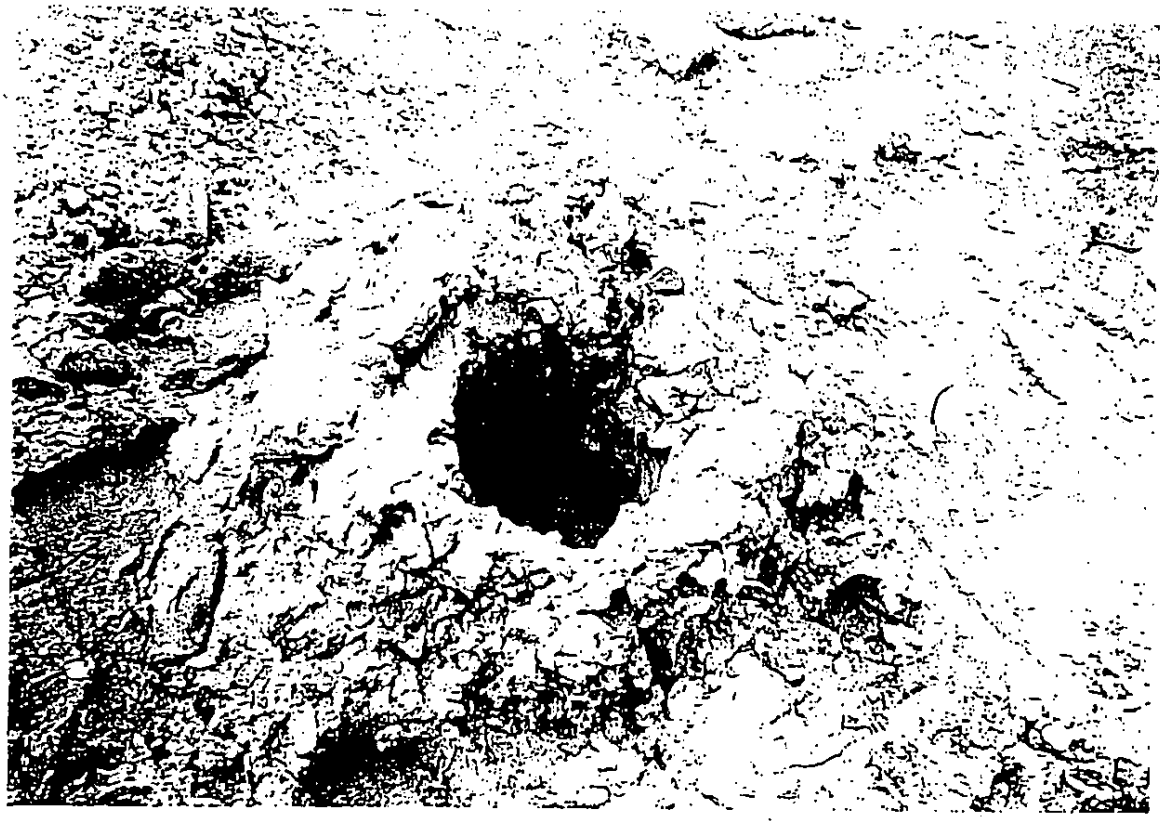


Photo 1. MW-16 borehole with grout surface within one foot of ground surface. Car keys are for scale. April 5, 1996.

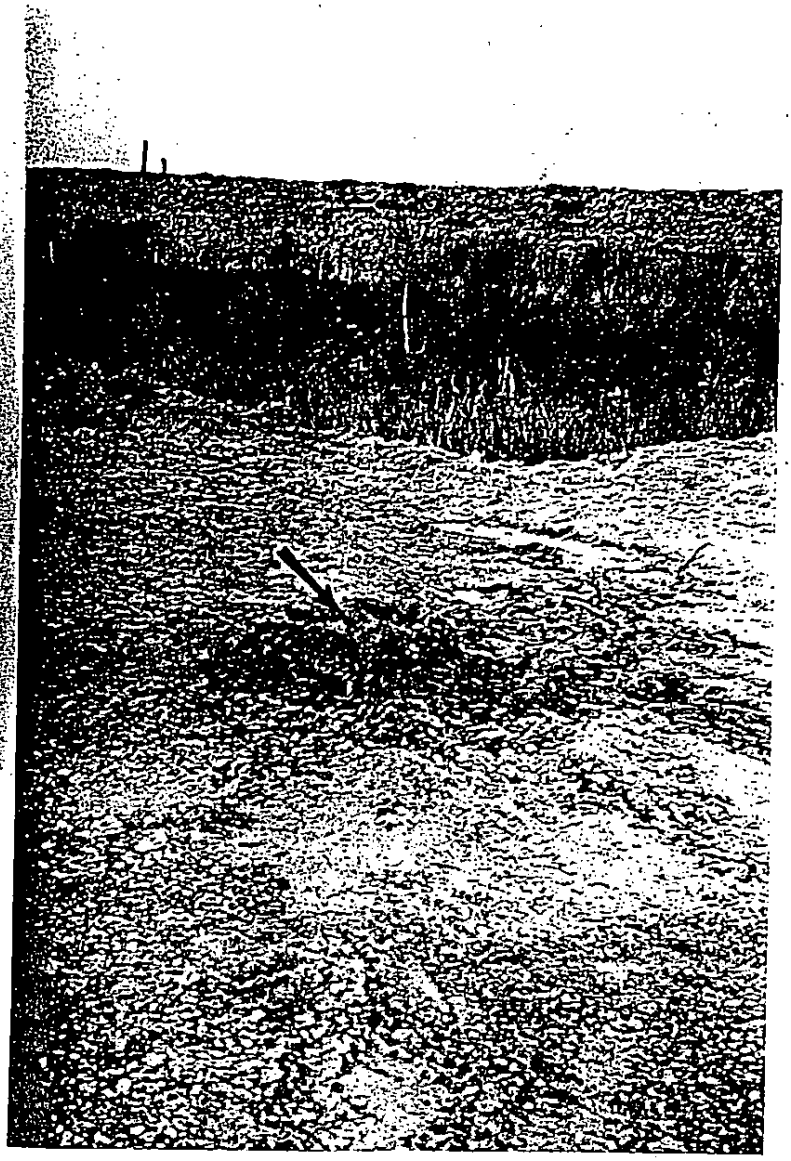


Photo 2. Former MW-16 location indicated by arrow. View toward southwest with levee of surface impoundment in background. April 5, 1996.

4-4-96 Riverwood Interchange 1 (Cont)
The on site construction worker prepared site with dozer @ 1000.

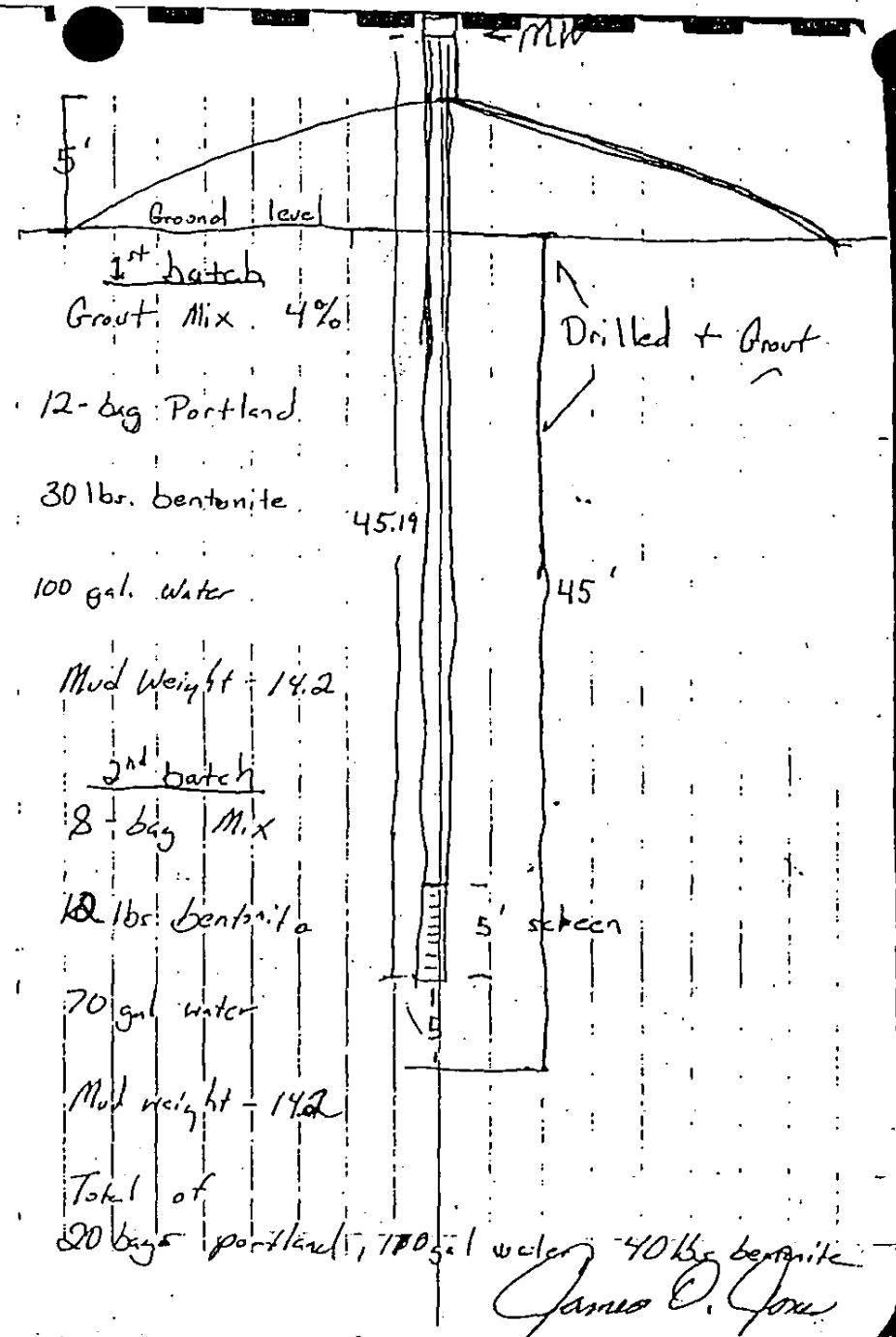
Drilling began @ 1030 - 1130
Drilled from 5' to 50' total of 45'
pulled all PVC Casing and began Grouting @ 1225 with the use of a tremma tube
Mud weight of 14.2.

While drilling Ray said that @ 42.5 the soil got tight and it felt like Clay. After pulling all Augers @ the last three feet there was Clay looks like undisturbed clay a Green Clay

Crew finished grouting @ 1225 and began clean up @ site
Crew took Lunch break @ 1330 was back @ 1430.

At about 1435 Dean Dozer arrived from DEQ. We talked veiwed the P/A of the Monitor Well. Mrs Smith arrived and we talked a little more and Dean left site at above 1450

James D. Jones



James D. Jones

APPENDIX B

LDOTD Plugging and Abandonment Form

PLEASE PRINT IN INK OR TYPE WHEN COMPLETING THIS FORM

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
WATER RESOURCES SECTION
WATER WELL PLUGGING AND ABANDONMENT FORM (DOTD-GW-2)

MAIL ORIGINAL TO:
Department of
Transportation and Development
Attn. Chief - Water Resources Section
P.O. BOX 94245
Baton Rouge, LA 70804-9245
(504) 379-1434

1. WELL OWNER: (if different from owner when drilled, note in item 5) Riverwood International USA, Inc.
ADDRESS: P.O. Box 35800, West Monroe, LA 71294
OWNERS WELL NUMBER (if any) MW-16

2. LOCATION OF WELL: Parish: Ouachita, Well is Near West Monroe
Approximately 0.5 miles from SW or Toney Bayou
(Crossroads, Town, City, Railroad, Any Landmark, etc.)
Road near Riverwood surface impoundments.
(Please draw sketch on back of Original)

3. WELL INFO: Casing material PVC, Diameter of casing 4 in.,
Depth of well 42.3 ft., Date drilled 12/15/89 by (give name of water well contractor who installed well or hole): PSI/PTL

4. Describe in detail how well or hole was plugged: (materials used, amount of casing and/or screen removed, or left in hole, etc.)
Well was overdrilled and borehole reamed to 50 ft. depth. Borehole was grouted with mechanically mixed 5% bentonite grout using tremie pipe lowered to base of borehole. After 24 hrs., grout surface within one ft. of groundsurface.

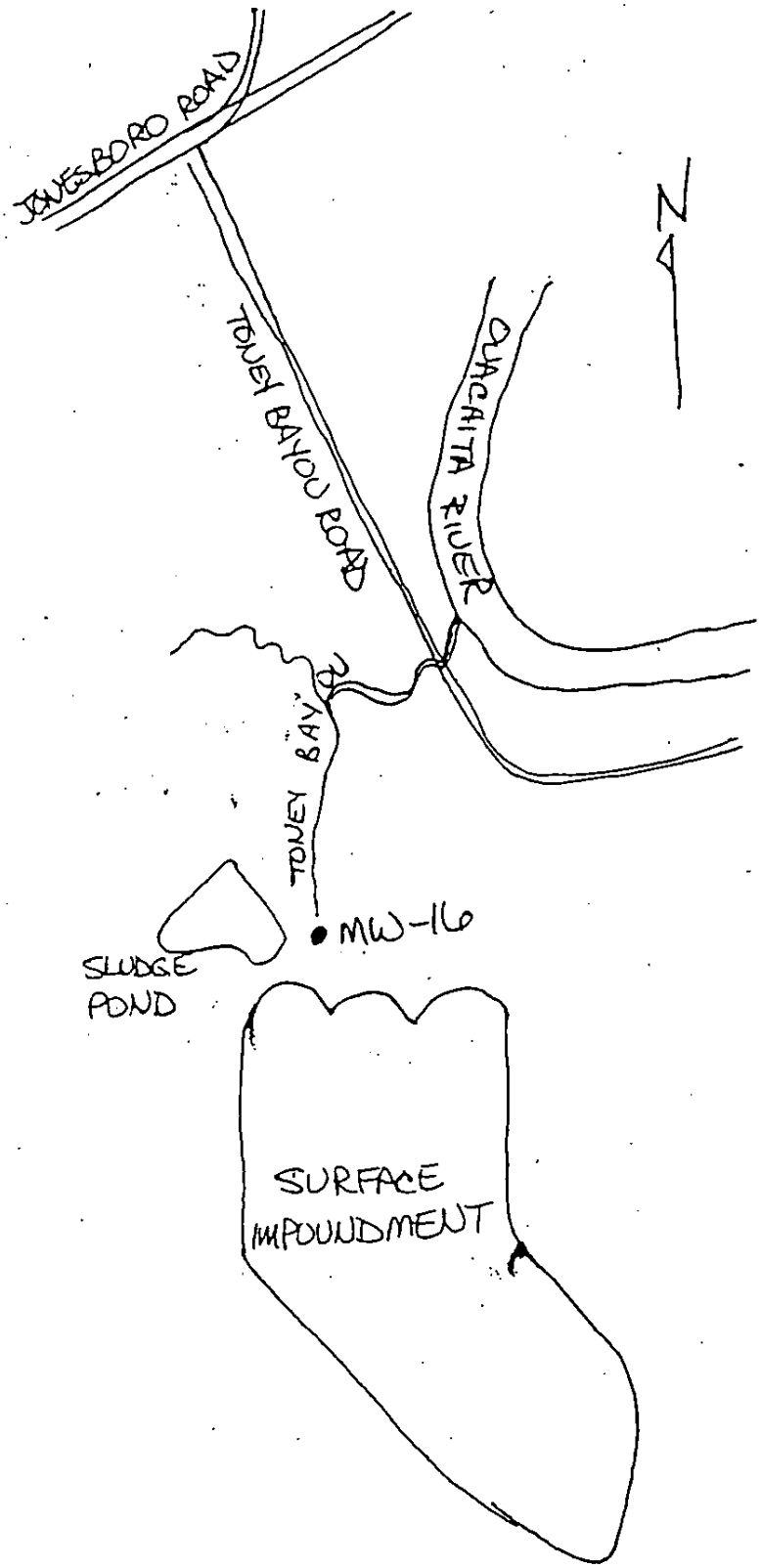
5. REMARKS:

I certify that this work was done and completed in accordance with Rules and Regulations of the State on April 4, 19 96 by (name and no. of contractor) Southwestern Laboratories, Inc. WWC- 261
Authorized Signature: Lloyd G. Hoover Date. 4/16/96

State	Parish	Local Well No.	Identification Number	OFFICE USE ONLY	Section	Township	Range	Quad. No.
22		-	0					

(REV. 6/92)

DOTD'S COPY


JONESBORO ROAD
TOWEY BAYOU ROAD
OUACHITA RIVER
N
TOWEY BAY
MW-16
SLUDGE POND
SURFACE IMPOUNDMENT

APPENDIX F

PROCEDURES FOR PLUGGING AND ABANDONMENT OF MONITORING WELLS AND GEOTECHNICAL BORINGS

GRAPHIC PACKAGING INTERNATIONAL, INC.
WEST MONROE MILL
WEST MONROE, LOUISIANA

PROCEDURES FOR PLUGGING AND ABANDONMENT OF MONITORING WELLS AND GEOTECHNICAL BORINGS

APRIL 2006

PROVIDENCE ENGINEERING AND ENVIRONMENTAL GROUP LLC
6160 PERKINS ROAD, SUITE 100
BATON ROUGE, LOUISIANA 70808
(225) 766-7400

PROCEDURES FOR PLUGGING AND ABANDONMENT OF MONITORING WELLS AND GEOTECHNICAL BORINGS

The *Water Well Rules and Regulations, State of Louisiana* (LAC 70:XIII), as adopted by the Louisiana Department of Transportation and Development, water Resource Section, shall apply to all plugging and abandonment of wells and holes including, but not limited to, observation wells, monitoring wells, piezometer wells, lead-detection wells, assessment wells, recovery wells, abandoned pilot holes, test holes, and geotechnical boreholes. Additionally, all plugging and abandonment activities shall follow the procedures set forth in the DOTD and LDEQ publication *Construction of Geotechnical Boreholes and Groundwater Monitoring System Handbook.*

In addition to the standards in LAC 70:XIII, the following standards shall be applied to plugging and abandonment:

- For any well, the primary method of plugging and abandonment shall be removal of the well's casing and other component of the well including, but not limited to the following: the screen, grout, bentonite seal, filter pack, concrete slab, protective casing, guard posts, and native soil in immediate contact with the grout, and subsequent installation of cement-bentonite grout inside the well's casing, guard posts, and native soil in immediate contact with the grout from the bottom of the resulting borehole to the ground surface using the tremie method.

- In areas where all or part of the well's casing and other components of the well cannot be plugged and abandoned with the procedure stated above, the well shall be plugged and abandoned by installation of cement-bentonite grout inside the well's casing from the bottom of the well to the ground surface, provided that the annular seal is demonstrated to be adequately sealed and the following items are submitted:

  - Supporting documentation, prior to plugging the well that demonstrated that removal of all or part of the well's casing and other components of the well will be detrimental to the environment; and/or
  - Certification and supporting documentation by a qualified professional that shows that removal of the well's casing was attempted and that continued attempts to remove all or part of the well's casing and other components of the well would have been detrimental to the environment.

- After plugging and abandoning a well, all surface features of the well, including but not limited to the concrete slab, guard posts, sand, protective casing, shall be dismantled and disposed of in an environmentally sound manner and the surface shall be restored to its original condition.

- Graphic Packaging will notify the LDEQ of the plugging and abandonment of monitoring wells or geotechnical borings and keep records of such abandonments.

APPENDIX G

ADJACENT PROPERTY BUFFER ZONE WAIVERS

Mr. and Mrs. Huey Lenard
198 Shelby Lenard Road
West Monroe, Louisiana 71291

May 26, 1989

Administrator
Solid Waste Division
Office of Solid and Hazardous Waste
Lousiana Department of Environmental Quality
P. O. Box 44307
Baton Rouge, Louisiana 70804-4307

Gentlemen:

We have been advised of the intention of Manville Forest Products Corporation to construct a primary clarifier sludge/ash sluice pond at a site on MFPC's property in West Monroe, Louisiana, which is adjacent to property owned and occupied by us.

We are aware that pursuant to Louisiana's Solid Waste Rules and Regulations, namely Louisiana Administrative Code Title 33, Part VII, Section 1305.A.3.d., that MFPC is required to construct such a pond at least 200 feet from adjoining landowner's property lines. It is our understanding that the new facility will be constructed so that in some places it will be as close as 105 feet to our property. Pursuant to the above referenced regulation, LAC 33:VII.1305A.3.d., we hereby give our permission for the Louisiana Department of Environmental Quality to reduce the buffer zone requirement so as to accomodate MFPC's needs in this matter. We agree that this permission is irrevocable, and is binding on our heirs, successors and assigns.

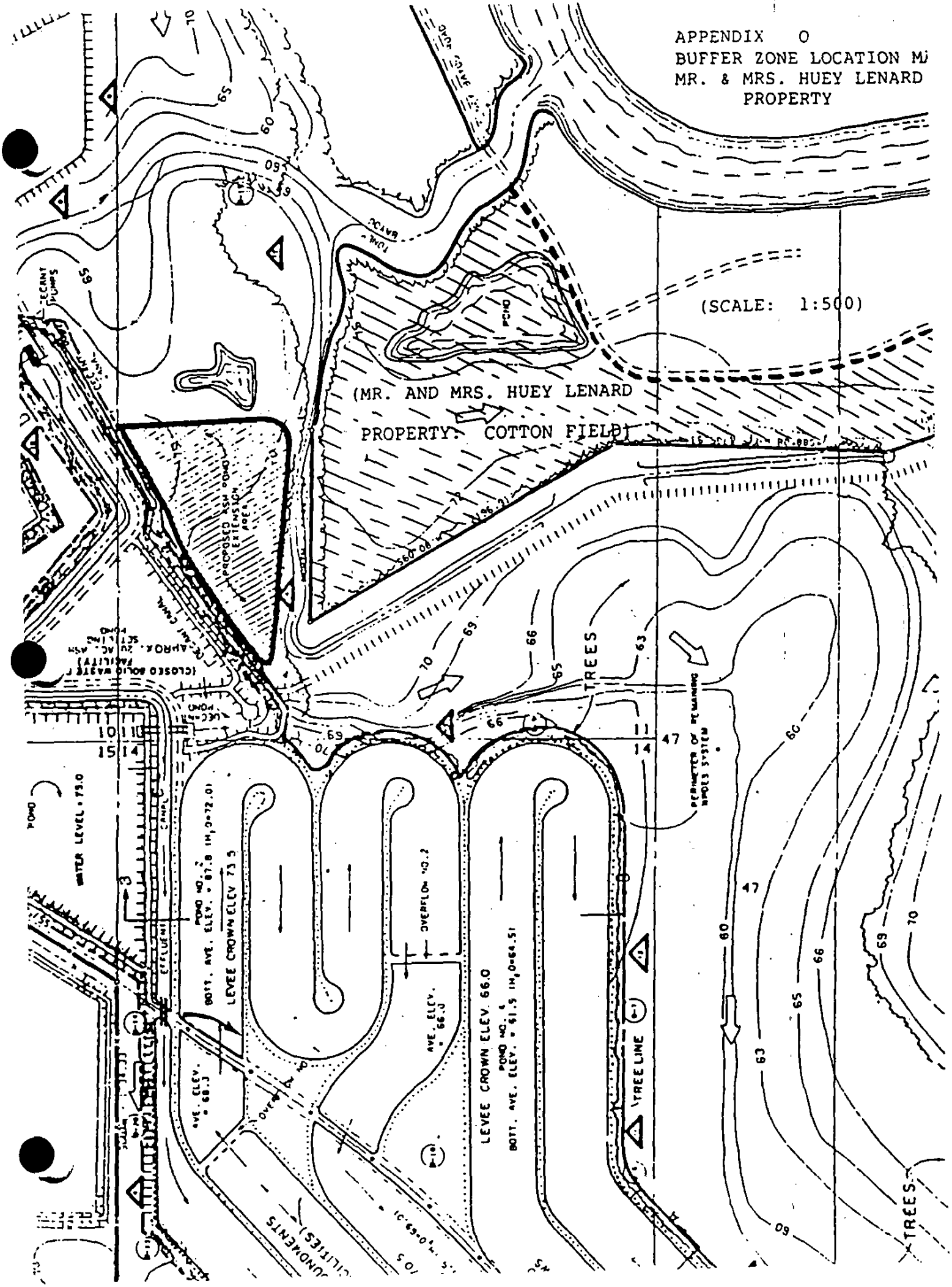
Manville will provide to you property line information showing the proposed site of the facility. If you have any questions please do not hesitate to contact us.

Sincerely,

Huey Lenard
Huey Lenard

Mrs. Huey Lenard
Mrs. Huey Lenard

APPENDIX O
BUFFER ZONE LOCATION MA
MR. & MRS. HUEY LENARD
PROPERTY



APPENDIX H

CONTINGENCY PLAN AND EMERGENCY PROCEDURES

Emergency Response
Initial Actions

This is a controlled document. Any changes must be made through the Health, Safety and Environmental Manager's office.

CONTROLLED COPY
(UNCONTROLLED IF NOT IN RED)

BOOK 61

Emergency Communication Checklist

1) What is the nature of the Emergency?

_____

2) What is your Name?

_____

3) What is the exact location of the Emergency?

_____

4) Is anyone injured? If so, what is the employee's name?

_____

_____

5) What type of assistance is needed? (fire truck, ambulance, first aid kit, stretcher, etc.)

_____

6) How may I contact you? (Mill radio, phone extension number)

_____

Employee Injury

In the event a fellow employee or contractor is injured:

Initial Steps:

Note: *DO NOT leave the victim(s) unattended if possible*

1) **Get the attention and assistance of a co-worker**
2) **Have co-worker call for assistance using one of the following methods:**
   - ➢ Mill Radio, or
   - ➢ Dial 2333 (Security)

     or
   - ➢ 2398 (Powerhouse)
3) **Review and complete Emergency Communication Checklist**

Warning:

1. If the victim is unconscious or has a head, neck and/or back injury, **DO NOT MOVE THEM** unless further harm could occur.
2. If you encounter an unconscious employee during digester boilouts or filter sock cleaning, be aware of H_2S gas and take appropriate precautions.

Helping the victim:

1) **Ask the victim for permission to help them:**
   - If the injured person(s) is unconscious, consent to help is implied.
   - If the injured person(s) agrees to be helped, go to step 2.
   - If the injured person(s) refuses your help, remain with them until help arrives.
2) **Take precautions such as: bodily fluid barriers, CPR mouthpiece, etc.**
3) **Render First Aid (CPR, stopping blood loss, elevating body part, etc.)**
4) **Remain with the victim(s) until help arrives.**

Mill Incident

Definition:

Incident – an event that has, or could reasonable have, resulted in adverse impact to Plant 31 facilities, personnel, product quality or operation in which no personnel injuries normally occur

Examples:

- Structural integrity failures (tank failure)
- Spills
- Fires
- Vehicle accidents
- Blood Borne Pathogen Cleanup
- Violation of Safety Programs

Warning:

In the event of a tank faillure, go to Chemical Release Response Action - 05

Initial Steps:

1) **Get the attention and assistance of a co-worker**
2) **Have co-worker call for assistance using one of the following methods:**
   - ➢ Mill Radio, or
   - ➢ Dial 2333 (Security)

     or
   - ➢ 2398 (Powerhouse)
3) **Review and complete Emergency Communication Checklist**

Further Steps:

1) **Erect temporary warning signs / barrier tape to prevent entry into designated area(s)**
2) **Prevent other personnel from entering the area to avoid employee injury and/or contamination**
3) **Monitor the area until assistance arrives. (Emergency Response Procedures may be initiated)**

Emergency Rescue

Warning:

DO NOT ATTEMPT TO RESCUE TRAPPED PERSONNEL.
Most untrained rescuers become victims themselves. Remain in the area until Emergency Service Personnel arrive.

Note: *DO NOT leave the area if possible.*

Initial Steps:

1) **Get the attention and assistance of a co-worker**
2) **Have co-worker call for assistance using one of the following methods:**
   - ➢ Mill Radio, or
   - ➢ Dial 2333 (Security)

     or
   - ➢ 2398 (Powerhouse)
3) **Review and complete Emergency Communication Checklist**

Further Actions:

1) **Remain calm**
2) **Get the victim(s) attention**
3) **Maintain continuous verbal (and visual) contact if possible**
4) **Remain in the area until an Area Supervisor and Emergency Service Personnel arrive. (Emergency Response Procedures may be initiated)**
5) **Be prepared to give a status report including the following information:**
   - What happened
   - When it began
   - Current status

Fires and Explosions

If area personnel can extinguish the fire:

1) **Put the fire out**
2) **Establish a Fire Watch to guard against re-flash**

> **Caution:** *Failure to establish a Fire Watch could result in a re-flash.*

3) **Notify Supervisor or Tour Foreman**

If backup support is needed to extinguish the fire:

1) **Get the attention and assistance of a co-worker**
2) **Have co-worker call for assistance using one of the following methods:**
   - ➢ Mill Radio, or
   - ➢ Dial 2333 (Security)

     or
   - ➢ 2398 (Powerhouse)
3) **Review and complete Emergency Communication Checklist**
4) **Prevent other personnel from entering the area to avoid employee injury**
5) **Remain in the area until an Area Supervisor and Emergency Service Personnel arrive. (Emergency Response Procedures may be initiated)**
6) **Be prepared to give a status report including the following information:**
   - What happened
   - When it began
   - Current status

Chemical Releases
Hazardous / Non-Hazardous

'otential Chemical Releases include:

- Liquors (White, Green and Black)
- Hydrochloric Acid
- Sulfuric Acid
- Phosphoric Acid
- Chlorine
- Ammonia
- Biocides
- Unidentified odors or plumes

ıitial Steps:

1) **Get the attention and assistance of a co-worker**
2) **Have co-worker call for assistance using one of the following methods:**
   - ➢ Mill Radio, or
   - ➢ Dial 2333 (Security)

     or
   - ➢ 2398 (Powerhouse)
3) **Review and complete Emergency Communication Checklist**

'urther Steps:

1) **Erect temporary warning signs / barrier tape to prevent entry into designated area(s)**
2) **Prevent other personnel from entering the area to avoid employee injury and/or contamination.**
5) **Monitor the area until an Area Supervisor and Emergency Service Personnel arrive. (Emergency Response Procedures may be initiated)**
6) **Be prepared to give a status report including the following information:**
   - What happened
   - When it began
   - Current status

Flooding

Definitions:

Internal Sources – flooding from sources inside the Mill such as a water main bursting

External Sources:

- Flooding from sources outside the Mill such as the River
- Can normally be monitored, anticipated and preparations made

Warning:

DO NOT attempt to navigate flooded areas alone.
Unseen holes, wires, and equipment could result in injury or death.

Initial Steps:

1) **Have co-worker call for assistance using one of the following methods:**
   - ➢ Mill Radio, or
   - ➢ Dial 2333 (Security)

     or
   - ➢ 2398 (Powerhouse)
2) **Review and complete Emergency Communication Checklist**

Further Actions:

2) **Prevent personnel and vehicles from entering the area**
3) **Monitor the area, if safety permits, until an Area Supervisor and Emergency Service Personnel arrive. (Emergency Response Procedures may be initiated)**
4) **Be prepared to give a status report including the following information:**
   - What happened
   - When it began
   - Current status

Bomb Threats

Warning:

1. **DO NOT** use a radio to communicate in the event of any type of Bomb Threat. Radio transmissions can detonate certain types of bombs.
2. **DO NOT** handle or tamper with a suspect letter or package.

Note: *If an explosion occurs, see "Fires and Explosions" on Page 4*

A) Bomb Threat by Telephone:

1) Remain calm
2) Keep the caller on the line (pretend telephone reception is poor)
3) Signal a co-worker to get a Supervisor / Tour Foreman
4) Complete as much of the Bomb Threat Checklist as possible

B) Bomb Threat by Mail:

1) Notify a Supervisor / Tour Foreman
2) Evacuate the area
3) Assemble in your Area's Emergency Evacuation assembly point.

C) Suspicious Material or Package Found in the Mill:

1) Call Security at 2333 or 2016 and report suspicious material or package
2) Monitor the area until Security arrives
3) Prevent other personnel from entering the area
4) Be prepared to give a status report including the following information:
   - Where the suspected material or package is located
   - When it was noticed
   - Current Status

D) Supervisory Responses:

1) Call Security at 2333
2) Activate Emergency Call List
3) Emergency Response Procedures may be initiated

High Winds, Storm Warnings and Tornadoes

nitial Steps:

1) **Security shall monitor a weather radio and will inform the Powerhouse of any warnings that have been issued**
2) **Powerhouse operator / Shift Engineer shall notify all control room operators or area supervisors of the Warning**
3) **Remain indoors if at all possible**

n the event outdoor travel is required:

Warning:

DO NOT travel outdoors alone. The "Buddy System" **MUST** be used.

Caution: *Be aware of flying debris and flooded areas* *(refer to pg. 6 for Flooding actions).*

f a Funnel Cloud is spotted:

1) **Proceed to the nearest permanent structure**
2) **Gather in the basement, or lowest level of the structure, if possible**
3) **Report the Funnel Cloud sighting using one of the following methods:**
   - ➢ Mill Radio, or
   - ➢ Dial 2333 (Security)

     or
   - ➢ 2398 (Powerhouse)
4) **Remain indoors until an "All Clear" notification is received**

Supervisors:

1) **Call your Area Manager to receive instructions regarding Emergency Shutdown requirements**
2) **Take a "Head Count" periodically**

Community Emergencies

Definition:

Community Emergency – emergency that may originate on or off-site whose effects spread throughout the community near the Mill

Examples:

- Chemical Release
- Fire
- Vehicle accident that originates off-site, but impacts the Mill

Off-Site Emergencies

Note: *Management will determine appropriate responses to all community emergencies which directly or indirectly affect the Mill*

If a call is received from the community:

Initial Step:

Get as much information as possible including:

1. **Caller's name**
2. **Telephone number**
3. **Nature of the incident**

Note: ***DO NOT*** *offer opinions or judgements. Inform the caller that Riverwood management will respond as soon as possible.*

Further Actions:

1) **Notify your Supervisor and/or Manager**
2) **If you are unable to reach your Supervisor, call Security at 2333**

APPENDIX I

SOLIDS COLLECTION DATA

CONFIDENTIAL

MANVILLE FOREST PRODUCTS CORPORATION RESEARCH REPORT

Environmental

Report No. 86.004

Date: January 16, 1985

SOLIDS DEPOSITION IN NPDES TREATMENT SYSTEM

by
L. A. Risdal

Introduction

Tests were run on composite samples from each oxidation pond and the Treated Effluent Canal in NPDES treatment system to determine amount of solids settling out. Tests were performed for three consecutive months. Also data was obtained from MFPC Plant 31 to estimate total amount of solids and useable fiber lost to sludge/ash sluice pond. Data for the last six months were used for this estimation.

Discussion

Composite samples were taken from each oxidation pond and effluent canal in the NPDES treatment system to test for Total Suspended Solids (TSS) and Total Volatile Suspended Solids (TVSS). Results of testing showed that most of the solids were settling in HiASB, Canal and Pond #1. There is less than one ton of solids settling in Ponds 2, 3, and 4. Useable fiber and total solids were also calculated for sludge/ash sluice pond deposition. An estimated 14.1 of useable fiber is lost per day to the sludge/ash sluice pond. This fiber is biodegradable. Also an estimated 63 tons per day of solids including useable fiber is deposited per day to the sludge/ash sluice pond. This supports estimates from older data indicating primary clarifier sludge deposition to average 50 tons/day at current production levels.

See summary of results attached.

Procedure

Composite samples were taken from each oxidation pond and effluent canal outfall in the NPDES treatment system through the months of September, October, and November. Samples were then iced down and taken to Environmental Control Lab for testing. Two tests were performed on samples; (1) total suspended solids (TSS) and, (2) total volatile suspended solids (TVSS). Testing of samples was performed for three months, five days a week. A 25-200 ml. aliquot of sample was taken to filter through a glass fiber filter to collect suspended matter. Once sample had been filtered, filter and residue were placed in a pre-weighed porcelain crucible and dried overnight at 103°C. After samples had been dried in oven, they were then removed from oven and placed in a dessicator to cool. After cooling in dessicator, samples were weighed for TSS. Once weighed they were then placed in furnace at 550°C for 15-20 minutes. After firing in furnace samples were taken out, cooled in dessicator, and weighed for TVSS. Results of tests are shown in tons per day.

RR 86.004

Estimated daily tons of solids and useable fiber loss were calculated from da obtained from Plant 31 of MFPC. This data shows how much useable fiber and tot. solids are lost to the sludge/ash sluice pond. Solids in the clarifier underflow determined from a grab sample of sludge each shift by determining percent solids (W/ and multiplying by the constant set clarifier underflow flow for that shift. Useab fiber in effluent is determined by collecting a composite sample of effluent ea shift and classifying solids using a Bauer-McNett screening test. This is not Tot Solids but indicates useable fiber lost to sewer.

Calculations and Test Methods

Tons/day of TSS or TVSS = (401 flow MMCD) . (TSS or TVSS) . (8.34)/2000

Deposition in Ponds = Previous pond outfall - following pond outfall.

Total Suspended Solids: Standard Methods 16th ed. 209C

Total Volatile Suspended Solids: Standard Methods 16th ed. 209D

Estimated useable fiber loss total tons per year = daily average tons x 350 mil operating days/year.

Doc. 0339

Summary
Estimated Daily Tons of Solids Lost to Bludge/Ash Sluice

Month	Number Of Analysis Days	Total Tons	Monthly Daily Ton Average
July	27	2540	94.07
August	26	2083	80.13
September	24	1608	67.01
October	25	1477	59.09
November	25	944.1	37.77
December	11	441	40.10
Totals 6	138	9093.1	378.17
Average		1515.52	63.03

Useable Fiber Loss to Sludge/Ash Sluice Pond

Estimated total tons per year = daily average (14.1) x 350 days = 4935 tons.

Estimated daily average tons per day = 14.1 tons.

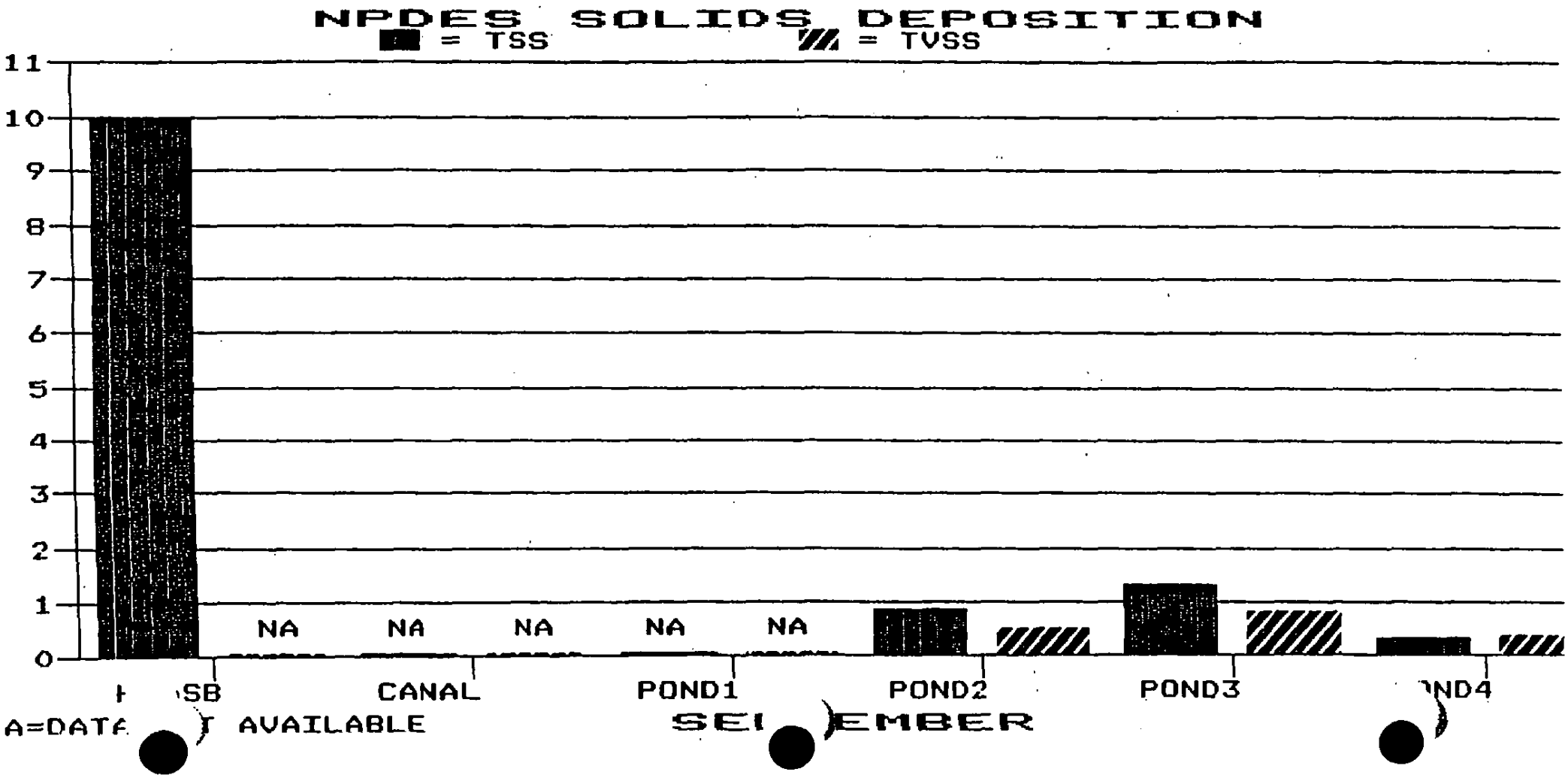
Summary
Tons Deposited in NPDES Treatment System Ponds

Deposition in Ponds-Tons/Day

	September		October		November		3 Mos. Average		% Of Total
	TSS	TVSS	TSS	TVSS	TSS	TVSS	TSS	TVSS	TSS
HiASB	10.00	ND	7.00	ND	9.10	ND	8.70	ND	42.9
Canal	ND	ND	1.77	.99	2.26	1.06	2.00	1.02	9.9
Pond 1	ND	ND	7.36	3.74	5.66	3.17	7.02	3.75	34.6
Pond 2	.87	.53	.66	.34	1.19	.68	.89	.51	4.4
Pond 3	1.32	.83	.95	.95	.13	.15	.79	.62	3.9
Pond 4	.34	.38	1.24	.90	.92	.74	.88	.70	4.3
Totals	12.53	1.74	18.98	6.82	19.26	5.80	20.28	6.60	100.0
Days of asting	17		23		17				

ND = No Data

1


NPDES SOLIDS DEPOSITION
= TSS
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11
10
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CANAL
POND1
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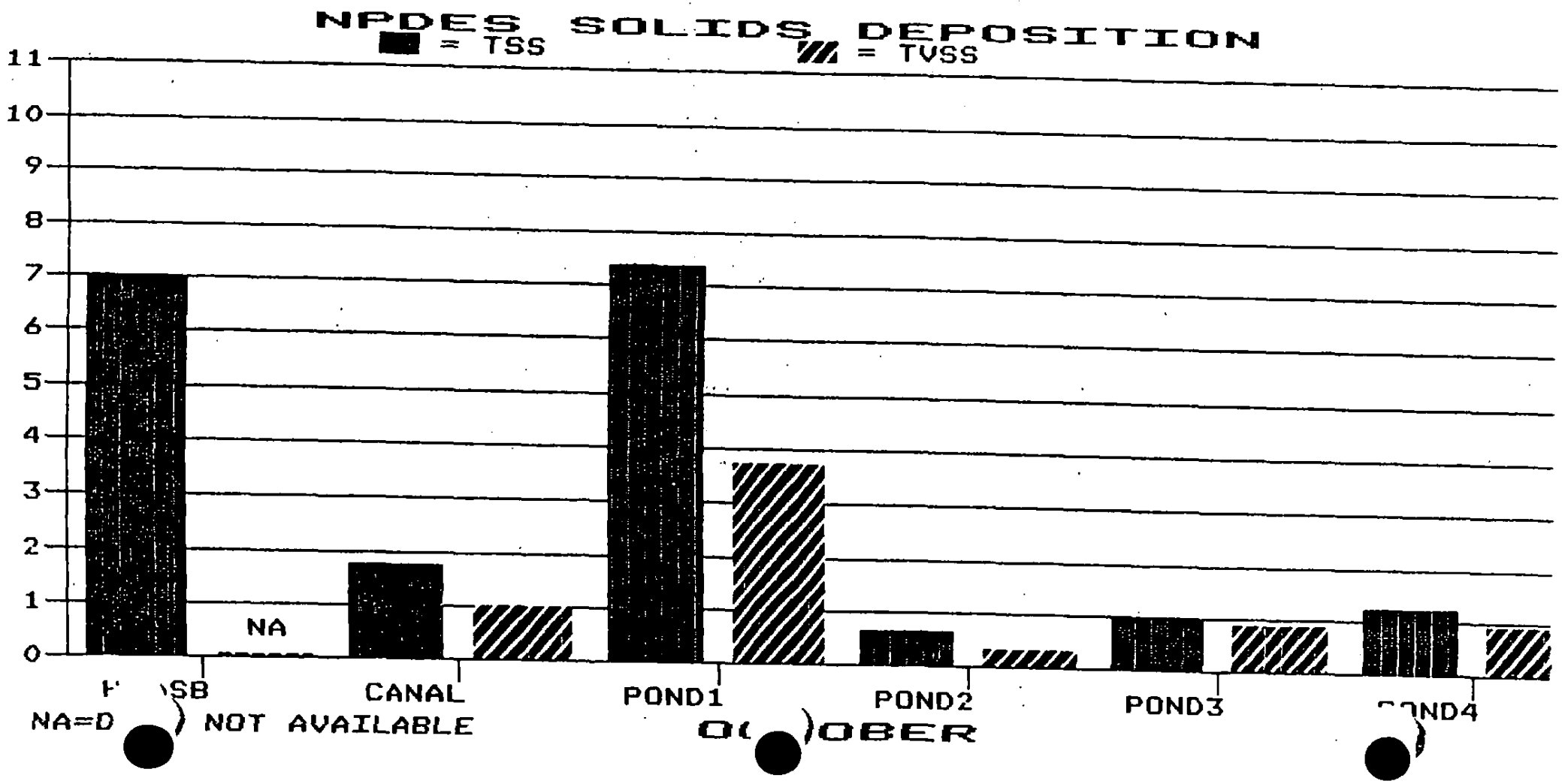
POND3
A=DATA
AVAILABLE
SEPTEMBER

2


NPDES SOLIDS DEPOSITION
= TSS
= TVSS
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10
9
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CANAL
POND1
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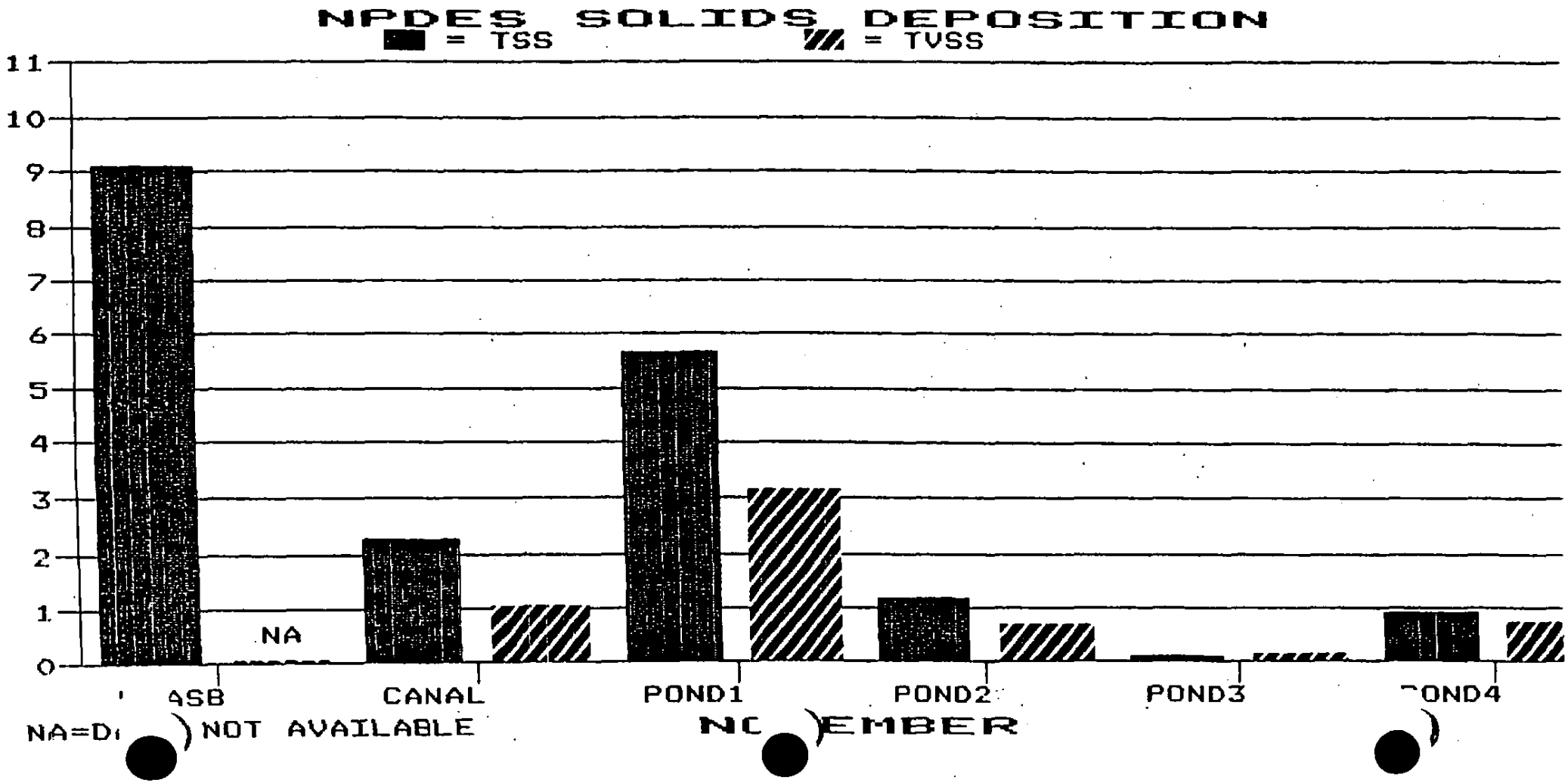
NA=D NOT AVAILABLE
OCTOBER

3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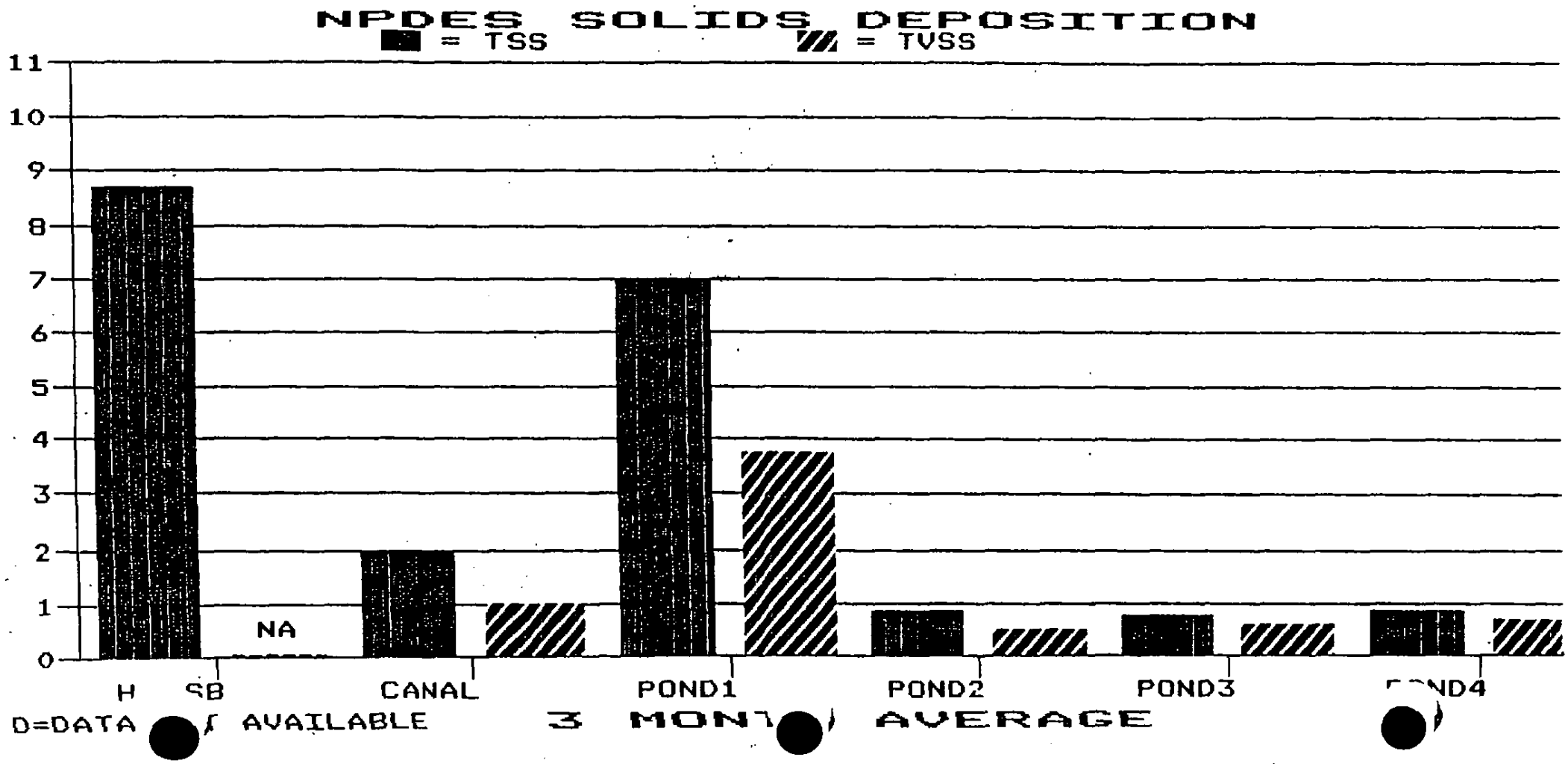
NOVEMBER

4


NPDES SOLIDS DEPOSITION
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POND1
POND2
POND3
POND4
D=DATA
AVAILABLE
3
AVERAGE

USEABLE FIBER LOSSES TO SEWERS IN 1985

	1000#/DAY JAN.	1000#/DAY FEB.	1000#/DAY MAR.	1000#/DAY MAY	1000#/DAY SEP.	1000#/DAY OCT.	1000#/DAY NOV.
1		22.7	15	29	15.8		
2			9.3		22.4	29.9	15.2
3	36.6		15.5	21.1		25.3	19.1
4	42.3		9.7	28			20.8
5	33.4	38.6	21	23.7	16.9		30.6
6	29.7	71.2	12.7	17.4			33.1
7	19.7	48.2	14	17.8		11.6	21.3
8	22.1	20.9	14.2	24.4		15	19.9
9		28.4	23.6	37.6	45.7	14.9	21.8
10	31.3	34	17.9	49.4	33.9	32.9	18.2
11	22.9	32.7	25.7	22.2	41.4	13.5	17.7
12	22.9		14.9	15.6	36	26.4	18.7
13	23	70.8	14.8	7.2	32.7	42.7	16.8
14	22.1	23.2	23.2	14	30.4	37	19
15	23.5	23.4	23.9	19.2	29.7	13	32.8
16	22.7	21.2	27	19.1	24.2	21.2	
17	14.2	15.9	19	45.7	24	26.2	27.4
18	20.3	24.7	34.7	48.4	23.4	5.4	25.7
19	14.4		29.6	73.6	12		35.3
20	30.6	24.6	27.1	26.7	13.4	20	17.6
21	26.1	44.4	18.4	27	20.4	22.8	30.7
22	30.5	20.8	28.6	19.6	33.3	10.3	67.7
23	49.6	16.4	40.4	18.3		15	17.5
24	43.3	18.6	60	20.2		15	49.1
25	52.4	20.8	72	23.1		28.2	39.7
26	36.9	20.3	49.1	26.1			15
27	48.1	12.2	108.5	34.9		23.4	22
28	19.9	15.1	62.1	20.9		27.2	33.2
29	8.7		64.3	62.4		24.7	15.7
30			69.6	47.3		31.6	16.9
31	55.7		96.8	28.3		37.6	14.9
SUM	802.9	669.1	1062.6	868.2	455.6	570.8	733.4
AVG	29.7	29.1	34.3	28.9	26.8	22.8	25.3
DAY	27	23	31	30	17	25	29

ESTIMATED TOTAL TONS PER YEAR = DAILY AVG(14.1)*350 DAYS = 4935 TONS

ESTIMATED DAILY AVERAGE TONS PER DAY = 14.1 TONS

SUMMARY OF ESTIMATED DAILY TONS OF PRIMARY SOLIDS DEPSITED IN SLUDGE / ASH SLUICE POND

	MONTH	NUMBER OF ANALYSIS DAYS	TOTAL TONS	DAILY TON AVERAGE
	JUL.	27	2540	94.07
	AUG.	26	2083	80.13
	SEP.	24	1608	67.01
	OCT.	25	1477	59.09
	NOV.	25	944.1	37.77
	DEC.	11	441	40.10
TOTALS:	6	138	1515.52	63.03

PRIMARY SLUDGE DATA

JULY 1985

	7-3 GPM	% SOL	#/SHFT	3-11 GPM	% SOL	#/SHFT	11-7 GPM	% SOL	#/SHFT
1	900	0.71	25592.0	900	1.86	67043.7	800	2.70	86508.0
2	900	1.10	39649.5	800	5.24	167889.6	960	0.89	34218.7
3	900	0.42	15138.9	1200	1.81	86988.6	1210	0.95	46037.5
4	1140	0.55	25111.4	1220	3.20	156355.2	1380	1.44	79587.4
5	1200	1.09	52385.4	1150	1.00	46057.5	1000	1.51	60475.5
6	1000	5.68	227484.0	1150	0.91	41912.3	1260	1.28	64592.6
7	1200	1.04	49982.4	1120	1.16	52033.0	1400	1.29	72330.3
8	1300	1.48	77056.2	1120	4.83	216654.5	1380	0.89	49189.4
9	1250	0.78	39048.8	900	1.43	51544.4	900	0.66	23789.7
10	1200	0.86	41331.6	1150	1.47	67704.5	1100	0.67	29516.9
11	1350	0.79	42713.3	1260	0.64	32296.3	850	0.48	16340.4
12	1100	1.55	68285.3	1340	1.67	89623.9	1280	0.89	45625.0
13	1200	1.88	90352.8	1380	2.32	128224.1	1200	0.96	46137.6
14									
15	1150	0.70	32240.3	1350	1.30	70287.8	1200	0.81	38928.6
16	1200	2.99	143699.4	1400	1.77	99243.9	1250	0.72	36045.0
17	1125	1.50	67584.4	1400	1.95	109336.5	1300	0.91	47379.2
18	1200	5.46	262407.6	1100	1.08	47579.4	1100	0.65	28635.8
19	1410	0.46	25976.4	1200	0.76	36525.6	1200	1.13	54307.8
20	1380	1.31	72402.4	1200	0.94	45176.4	1100	1.32	58152.6
21	1100	1.38	60795.9	1040	0.87	36237.2	1000	1.53	61276.5
	900	1.84	66322.8	980	0.98	38464.0	950	1.33	50603.2
	940	0.72	27105.8	920	0.65	23949.9	900	0.40	14418.0
24	900	0.45	16220.3	900	0.37	13336.7	900	0.31	11174.0
25									
26	910	0.41	14942.7	940	1.24	46682.3	920	0.57	21002.2
27	870	0.28	9756.2	870	0.62	21603.0	900	0.30	10813.5
28	1400	1.42	79619.4	1300	1.87	97361.6	1200	5.16	247989.6
29	1030	0.81	33413.7	900	2.86	103088.7	1250	0.90	45056.3
30									
31									
SUM	30155	37.66	853.31	30190	44.8	996.60	29890	30.65	690.07
AVG	1117	1.39	63208	1118	1.66	73822	1107	1.14	51116
DAY	27	27	27	27	27	27	27	27	27

SUM = VALUE IS CALCULATED AS TONS OF SOLIDS

TOTAL TONS OF SOLIDS DEPOSITED IN SLUDGE POND = 2540

DAILY AVERAGE OF SOLIDS IN TONS = 94.07

PRIMARY SLUDGE DATA

AUG 1985

	7-3 GPM	% SOL	#/SHFT	3-11 GPM	% SOL	#/SHFT	11-7 GPM	% SOL	#/SHFT
1									
2	1200	0.31	14898.6	1200	1.60	76896.0	1400	0.55	30838.5
3	1350	0.98	52986.2	1200	2.30	110538.0	1380	4.44	245394.4
4	1350	0.28	15138.9	1300	4.05	210863.3	1360	1.00	54468.0
5	1100	3.07	135248.9	1200	0.99	47579.4	1380	0.76	42004.4
6	900	0.64	23068.8	1350	0.84	45416.7	1520	0.89	54179.6
7	1100	1.54	67844.7	800	1.04	33321.6	1120	1.21	54275.8
8	900	1.43	51544.4	1120	1.21	54275.8	1020	1.06	43302.1
9	1250	1.36	68085.0	1500	1.04	62478.0	1140	0.77	35155.9
10									
11	1100	3.12	137451.6	1020	0.91	37174.4	980	0.84	32969.2
12	1100	0.48	21146.4	1120	1.05	47098.8	1060	0.68	28868.0
13	1100	1.30	57271.5	1160	1.46	67828.7	1100	1.28	56390.4
14	1200	0.92	44215.2	1080	1.81	78289.7	1200	0.96	46137.6
15									
16	1050	4.15	174517.9	1000	0.61	24430.5	1300	0.48	24991.2
17	1400	0.41	22988.7	1110	0.46	20449.5	1070	0.56	23998.0
18	1000	1.22	48861.0	1100	0.84	37006.2	1000	0.42	16821.0
19	1000	0.78	31239.0	960	0.66	25375.7	900	0.52	18743.4
20	1100	0.92	40530.6	1000	0.81	32440.5	1100	1.20	52866.0
21	1580	2.98	188571.4	1340	0.91	48837.0	1200	2.10	100926.0
[illegible]	380	0.48	26529.1	1350	0.42	22708.4	1200	2.61	125436.6
[illegible]	1350	0.49	26493.1	1300	0.57	29677.1	1200	2.52	121111.2
24	1000	0.46	18423.0	1000	0.36	14418.0	1250	1.67	83604.4
25	1520	1.46	88879.0	1300	1.33	69246.5	1250	2.08	104130.0
26									
27	1010	0.46	18607.2	1000	0.33	13216.5	1020	0.36	14706.4
28	1010	0.76	30742.4	1450	0.46	26713.4	1480	0.41	24302.3
29	1100	0.44	19384.2	1200	0.32	15379.2	1100	0.23	10132.7
30	1080	0.42	18166.7	1100	0.30	13216.5	1040	0.32	13328.6
31									
SUM	30230	30.86	721.42	30260	26.68	632.44	30770	29.92	729.54
AVG	1163	1.19	55494	1164	1.03	48649	1183	1.15	56119
DAY	26	26	26	26	26	26	26	26	26

SUM = VALUE IS CALCULATED AS TONS OF SOLIDS

TONS OF SOLIDS DEPOSITED IN SLUDGE POND = 2083

DAILY AVERAGE OF TONS OF SOLIDS = 80.13

PRIMARY SLUDGE DATA

SEPT 1985

	7-3 GPM	% SOL	#/SHFT	3-11 GPM	% SOL	#/SHFT	11-7 GPM	% SOL	#/SHFT
1	1000	0.30	12015.0	1150	0.34	15659.6	1050	0.27	11354.2
2	1000	0.28	11214.0	1000	0.71	28435.5	1000	0.44	17622.0
3	1000	0.42	16821.0	1150	0.39	17962.4	1040	0.48	19993.0
4	950	0.46	17501.9	1000	0.54	21627.0	1090	0.27	11786.7
5	1075	0.42	18082.6	1050	0.34	14297.9	1460	1.46	85370.6
6	1250	2.67	133666.9	1400	0.38	21306.6	1090	0.46	20081.1
7	1150	0.38	17501.9	1100	2.96	130402.8	1400	0.58	32520.6
8	1440	0.40	23068.8	1480	0.48	28451.5	840	0.41	13793.2
9									
10	1100	1.37	60355.4	1580	2.80	177181.2	1400	2.56	143539.2
11	1500	0.90	54067.5	1100	1.10	48460.5	1150	1.92	88430.4
12	1150	0.77	35464.3	1090	0.42	18334.9	1150	0.84	38688.3
13	1000	0.93	37246.5	1000	0.76	30438.0	1000	0.84	33642.0
14	1000	1.10	44055.0	930	1.02	37991.4	900	1.78	64160.1
15	1100	0.94	41411.7	1040	0.66	27490.3	1050	1.12	47098.8
16	1050	0.62	26072.6	1040	0.57	23741.6	1050	1.63	68545.6
17									
18	1140	0.63	28763.9	1050	0.42	17662.1	1000	0.87	34843.5
19	1100	0.43	18943.7	1100	0.71	31279.1	1100	0.80	35244.0
20	960	0.44	16917.1	975	0.68	26553.2	1000	0.52	20826.0
21									
22	1150	0.49	22568.2	1100	5.45	240099.8	1120	3.22	144436.3
24	1100	0.81	35684.6	1000	1.15	46057.5	1120	0.73	32744.9
25									
26	1200	0.47	22588.2	1200	1.04	49982.4	1120	0.82	36781.9
27				0					
28	1050	0.96	40370.4	1040	1.02	42485.0	1040	1.09	45400.7
29	1000	1.14	45657.0	920	1.34	49373.6	1000	2.13	85306.5
30	1000	1.29	51664.5	1060	1.38	58585.1	1580	0.77	48724.8
31									
SUM	26465	18.62	415.85	26555	26.66	601.93	26750	26.01	590.47
AVG	1103	0.78	34654	1062	1.11	50161	1115	1.08	49206
DAY	24	24	24	25	24	24	24	24	24

SUM = VALUE IS CALCULATED AS TONS OF SOLIDS

TONS OF SOLIDS DEPOSITED IN SLUDGE POND = 1608

DAILY AVERAGE OF TONS OF SOLIDS = 67.01

PRIMARY SLUDGE DATA

OCT 1985

	7-3 GPM	% SOL	#/SHFT	3-11 GPM	% SOL	#/SHFT	11-7 GPM	% SOL	#/SHFT
	1050	0.76	31959.9	940	1.18	44423.5	1100	0.97	42733.4
	1080	1.02	44119.1	1080	0.91	39361.1	1000	0.43	17221.5
	980	0.41	16092.1	940	0.34	12800.0	900	0.46	16580.7
	1120	0.74	33193.4	1000	0.34	13617.0	940	0.44	16564.7
	1150	1.18	54347.9	1100	0.92	40530.6	1000	0.79	31639.5
	1100	2.20	96921.0	1320	0.82	43350.1	1450	1.59	92335.3
)	1250	0.40	20025.0	1480	1.10	65201.4	1500	0.46	27634.5
1	1480	0.73	43270.0	1400	0.56	31399.2	1500	0.43	25832.3
2	1500	0.55	33041.3	1500	0.48	28836.0	1500	0.62	37246.5
3	1350	0.65	35143.9	1500	0.71	42653.3	1450	0.86	49942.4
4	1350	0.91	49201.4	1340	0.66	35420.2	1400	0.66	37006.2
5	1350	0.68	36765.9	1320	0.54	28547.6	1280	0.60	30758.4
6	1350	0.68	36765.9	1250	0.71	35544.4	1100	0.64	28195.2
7									
8									
9	1100	0.49	21587.0	900	0.75	27033.8	1320	0.72	38063.5
20	1570	0.40	25151.4	1500	0.52	31239.0	1460	0.25	14618.3
	1130	0.41	18555.2	1000	0.49	19624.5	1000	0.37	14818.5
	960	0.34	13072.3	950	0.34	12936.2	950	0.21	7990.0
	1010	0.29	11730.6	1000	0.49	19624.5	1000	0.27	10813.5
24	1100	0.46	20265.3	1080	0.75	32440.5	1000	0.35	14017.5
25	1000	0.54	21627.0	1000	0.43	17221.5	1000	0.58	23229.0
26	1000	2.36	94518.0	1000	1.89	75694.5	1000	1.38	55269.0
27	1000	1.58	63279.0	1000	1.06	42453.0	1000	0.81	32440.5
28	1400	4.28	239979.6	1350	0.71	38387.9	1100	0.63	27754.7
29	1350	1.92	103809.6	1200	0.80	38448.0	1080	0.51	22059.5
30	1200	1.91	91794.6	1100	3.00	132165.0	1030	0.84	34651.3
31									
SUM	29930	25.89	628.11	29250	20.5	474.48	29060	15.87	374.71
AVG	1197	1.04	50249	1170	0.82	37958	1162	0.63	29977
DAY	25	25	25	25	25	25	25	25	25

SUM = VALUE IS CALCULATED AS TONS OF SOLIDS

TONS OF SOLIDS DEPOSITED IN SLUDGE POND = 1477

DAILY AVERAGE OF TONS OF SOLIDS = 59.09

PRIMARY SLUDGE DATA

NOV 1985

	7-3 GPM	% SOL	#/SHFT	3-11 GPM	% SOL	#/SHFT	11-7 GPM	% SOL	#/SHFT
1	1200	0.95	45657.0	1100	0.54	23789.7	990	0.41	16256.3
2	1000	0.57	22828.5	1100	0.46	20265.3	1440	0.49	28259.3
3	1250	0.50	25031.3	1440	0.37	21338.6	1000	0.44	17622.0
4	900	0.54	19464.3	900	0.46	16580.7	860	0.41	14121.6
5	860	1.08	37198.4	900	2.82	101646.9	900	0.76	27394.2
6	900	1.23	44335.4	880	0.84	29605.0	900	0.84	30277.8
7	950	0.82	31199.0	820	0.56	18391.0	840	0.49	16484.6
8	950	0.67	25491.8	920	0.51	18791.5	840	0.64	21530.9
9	800	0.69	22107.6	840	0.71	23885.8	840	1.03	34651.3
10	800	0.51	16340.4	920	0.67	24686.8	860	0.87	29965.4
11	960	0.48	18455.0	860	0.56	19288.1	860	1.05	36165.2
12	920	0.48	17686.1	900	0.57	20545.7	910	0.60	21867.3
13	900	0.38	13697.1	920	0.44	16212.2	910	0.37	13484.8
14	940	0.31	11670.6	950	0.81	30818.5	940	0.39	14682.3
15	920	0.34	12527.6	940	1.12	42164.6	940	0.56	21082.3
16	940	0.38	14305.9	1000	0.62	24831.0	980	0.47	18447.0
17	1000	0.41	16420.5	980	0.86	33754.1	995	0.79	31481.3
18	980	0.46	18054.5	900	0.23	8290.4	910	0.50	18222.8
19	900	0.42	15138.9	900	1.04	37486.8	900	0.50	18022.5
20	900	0.57	20545.7	900	0.57	20545.7	900	0.79	28475.6
21									
22	900	1.24	44695.8	950	1.97	74953.6	900	0.98	35324.1
23									
24	890	1.29	45981.4	900	0.41	14778.5	900	1.30	46858.5
25	900	0.77	27754.7	900	0.74	26673.3	900	0.61	21987.5
26									
27	860	0.47	16188.2	900	0.39	14057.6	900	0.41	14778.5
28									
29									
30	900	0.40	14418.0	840	0.52	17493.8	840	0.38	12784.0
31									
SUM	23420	15.96	298.60	23560	18.79	350.44	23155	16.08	295.11
AVG	937	0.64	23888	942	0.75	28035	926	0.64	23609
DAY	25	25	25	25	25	25	25	25	25

SUM = VALUE IS CALCULATED AS TONS OF SOLIDS

TONS OF SOLIDS DEPOSITED IN SLUDGE POND = 944.1

DAILY AVERAGE OF TONS OF SOLIDS = 37.77

PRIMARY SLUDGE DATA

DEC 1985

	7-3 GPM	% SOL	#/SHFT	3-11 GPM	% SOL	#/SHFT	11-7 GPM	% SOL	#/SHFT
1	880	0.88	31014.7	940	1.55	58352.9	940	0.42	15811.7
2	900	0.43	15499.4	920	0.69	25423.7	940	0.57	21458.8
3	900	0.41	14778.5	960	0.36	13841.3	960	0.44	16917.1
4									
5									
6									
7									
8	880	1.01	35596.4	880	0.44	15507.4	880	0.34	11983.0
9									
10									
11									
12									
13									
14									
15	1380	0.49	27081.8	1400	0.72	40370.4	1400	0.50	28035.0
16	1200	0.44	21146.4	1200	0.41	19704.6	1300	0.46	23949.9
17									
18									
19									
20	1000	0.06	2403.0	1000	1.52	60876.0	1160	0.36	16724.9
21	1100	0.59	25992.5	1400	0.40	22428.0	1400	0.32	17942.4
24									
25									
26									
27									
28	1100	0.22	9692.1	1440	0.43	24799.0	1100	0.34	14978.7
29	1050	0.33	13877.3	1020	0.74	30229.7	1000	0.68	27234.0
30									
31	1010	1.16	46922.6	900	0.96	34603.2	1000	2.42	96921.0
SUM	11400	6.02	122.00	12060	8.22	173.07	12080	6.85	145.98
AVG	1036	0.55	22182	1096	0.75	31467	1098	0.62	26541
DAY	11	11	11	11	11	11	11	11	11

SUM = VALUE IS CALCULATED AS TONS OF SOLIDS

TONS OF SOLIDS DEPOSITED IN SLUDGE POND = 441

DAILY AVERAGE OF TONS OF SOLIDS = 40.10

B:DEPOSITS for SITEWISE deposition analysis

NOTE: This is NOT LINKED to any other program !!!

NPDES

SEPTEMBER

DAY OF THE MONTH	401 FLOW	HIASB TOTAL VOLATILE SUSPENDED SOLIDS	HIASB TOTAL VOLATILE TONS TVSS	HIASB TOTAL SUSPENDED SOLIDS	HIASB TOTAL TONS OF TSS	HIASB PERCENT VOLATILES OF TSS	CANAL TOTAL VOLATILE SUSPENDED SOLIDS	CANAL TOTAL VOLATILE TONS TVSS	CANAL TOTAL SUSPENDED SOLIDS	CANAL TOTAL TONS OF TSS	CANAL PERCENT VOLATILES OF TSS
1											
2											
3											
4											
5											
6	24.8			52.9	5.471						
7											
8											
9	22.9										
10	21										
11	20.8			110	9.541						
12	20.9			96	8.367						
13	19.4			70	5.663						
14											
15											
16	19.5										
17	20.5	56	4.787	94	8.036	59.6					
18	19.8	64	5.284	94	7.761	68.1					
19	19.8	72	5.945	113	9.330	63.7					
20	19.9	62	5.145	107	8.879	57.9					
21											
22											
23	20.3	75	6.349	134	11.343	56.0					
24	20.1	78	6.538	136	11.399	57.4					
25	21.1			110	9.679						
26	22.4			60	5.604		29	2.709	48	4.484	60.4
27	22.6	40	3.770	71	6.691	56.3	27	2.545	50	4.712	54.0
	23.4	34	3.318	62	6.050	54.8	35.5	3.464	71.5	6.977	49.7
31											
SUM	359.20	481.00	41.13	1309.90	113.81	473.82	91.50	8.72	169.50	16.17	164.07
AVG	21.13	60.13	5.14	93.56	8.13	59.23	30.50	2.91	56.50	5.39	54.69
NO. DAYS	17	8	8	14	14	8	3	3	3	3	3
STDDEVN	1.35	16.06	1.16	26.86	2.03	4.51	4.44	0.49	13.03	1.38	5.42

NPDES SEP NPDES

POND1 TOTAL VOLATILE SUSPENDED SOLIDS	POND1 TOTAL VOLATILE TONS TVSS	POND1 TOTAL SUSPENDED SOLIDS	POND1 TOTAL TONS OF TSS	POND1 PERCENT VOLATILES OF TSS	POND2 TOTAL VOLATILE SUSPENDED SOLIDS	POND2 TOTAL VOLATILE TONS TVSS	POND2 TOTAL SUSPENDED SOLIDS	POND2 TOTAL TONS OF TSS	POND2 PERCENT VOLATILES OF TSS
29.5	3.051	43.5	4.499	67.8	14	1.448	20	2.068	70.0
19.3	1.843	26.5	2.531	72.8	17.5	1.671	20.3	1.939	86.2
15.8	1.384	24.8	2.172	63.7	14.3	1.252	22.3	1.953	64.1
20.0	1.735	31.5	2.732	63.5	16.3	1.414	26.5	2.299	61.5
15.5	1.351	23.5	2.048	66.0	15.3	1.333	25.8	2.249	59.3
22.8	1.844	32.8	2.653	69.5	17	1.375	25.8	2.087	65.9
41.3	3.358	61	4.960	67.7	14	1.138	20.8	1.691	67.3
30.0	2.565	45	3.847	66.7	18	1.539	26.5	2.265	67.9
31.5	2.601	47.5	3.922	66.3	24.5	2.023	35.25	2.910	69.5
32.0	2.642	49	4.046	65.3	25.75	2.126	37.75	3.117	68.2
35.0	2.904	55.5	4.606	63.1	24	1.992	39	3.236	61.5
32.5	2.751	50	4.233	65.0	26.75	2.264	40.25	3.407	66.5
33.0	2.766	55.5	4.652	59.5	38	3.185	57.25	4.799	66.4
37.0	3.256	56.5	4.971	65.5	41	3.607	60.25	5.301	68.0
32.5	3.036	51.5	4.811	63.1	29.5	2.756	49	4.577	60.2
26.5	2.497	48.5	4.571	54.6	21	1.979	39	3.675	53.8
18.0	1.756	32.5	3.171	55.4	12	1.171	20.5	2.000	58.5
472.20	41.34	735.10	64.42	1095.45	368.90	32.27	566.25	49.57	1114.99
27.78	2.43	43.24	3.79	64.44	21.70	1.90	33.31	2.92	65.59
17	17	17	17	17	17	17	17	17	17
7.83	0.65	12.15	1.02	4.60	8.46	0.72	12.93	1.11	6.96

NPDES SEP NPDES

POND3 TOTAL VOLATILE SUSPENDED SOLIDS	POND3 TOTAL VOLATILE TONS TVSS	POND3 TOTAL SUSPENDED SOLIDS	POND3 TOTAL TONS OF TSS	POND3 PERCENT VOLATILES OF TSS	POND4 TOTAL VOLATILE SUSPENDED SOLIDS	POND4 TOTAL VOLATILE TONS TVSS	POND4 TOTAL SUSPENDED SOLIDS	POND4 TOTAL TONS OF TSS	POND4 PERCENT VOLATILES OF TSS
24	2.482	35	3.620	68.6	9.33	0.965	13.3	1.375	70.2
4.25	0.406	12.8	1.222	33.2	0.5	0.048	9.5	0.907	5.3
10.5	0.919	16	1.401	65.6	1.5	0.131	6	0.525	25.0
9.25	0.802	14.3	1.240	64.7	9.5	0.824	16.5	1.431	57.6
11.5	1.002	17.5	1.525	65.7	10	0.872	14.3	1.246	69.9
10.3	0.833	14.8	1.197	69.6	4.5	0.364	7.25	0.587	62.1
8.5	0.691	9.75	0.793	87.2	7.75	0.630	11.6	0.943	66.8
12.25	1.047	15.5	1.325	79.0	3.75	0.321	5	0.427	75.0
9.25	0.764	11	0.908	84.1	5.5	0.454	8.5	0.702	64.7
9.25	0.764	12.75	1.053	72.5	11	0.908	12.5	1.032	88.0
8	0.664	11.25	0.934	71.1	7.75	0.643	13	1.079	59.6
10.75	0.910	16	1.354	67.2	6	0.508	10.75	0.910	55.8
18.75	1.572	29.75	2.494	63.0	9.25	0.775	18	1.509	51.4
15.5	1.364	23	2.024	67.4	11.5	1.012	21.75	1.914	52.9
15.75	1.471	22.5	2.102	70.0	11.5	1.074	22.75	2.125	50.5
17	1.602	26	2.450	65.4	11	1.037	25.5	2.403	43.1
8.25	0.805	14.75	1.439	55.9	11.5	1.122	23.25	2.269	49.5
203.05	18.10	302.65	27.08	1150.28	131.83	11.69	239.45	21.38	947.35
11.94	1.06	17.80	1.59	67.66	7.75	0.69	14.09	1.26	55.73
17	17	17	17	17	17	17	17	17	17
4.83	0.50	7.08	0.73	11.71	3.56	0.34	6.31	0.61	19.08

	SEPTEMBER		NPDES		NPDES		SEPTEMBER		
DEPOSITED IN CANAL TVSS TON/DAY	DEPOSITED IN CANAL TSS TON/DAY	DEPOSITED IN POND1 TVSS TON/DAY	DEPOSITED IN POND1 TSS TON/DAY	DEPOSITED IN POND2 TVSS TON/DAY	DEPOSITED IN POND2 TSS TON/DAY	DEPOSITED IN POND3 TVSS TON/DAY	DEPOSITED IN POND3 TSS TON/DAY	DEPOSITED IN POND4 TVSS TON/DAY	DEPOSITED IN POND4 TSS TON/DAY
#VALUE!	#VALUE!	#VALUE!	#VALUE!	1.60	2.43	-1.03	-1.55	1.52	2.24
#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.17	0.59	1.27	0.72	0.36	0.32
#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.13	0.22	0.33	0.55	0.79	0.88
#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.32	0.43	0.61	1.06	-0.02	-0.19
#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.02	-0.20	0.33	0.72	0.13	0.28
#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.47	0.57	0.54	0.89	0.47	0.61
#VALUE!	#VALUE!	#VALUE!	#VALUE!	2.22	3.27	0.45	0.90	0.06	-0.15
#VALUE!	#VALUE!	#VALUE!	#VALUE!	1.03	1.58	0.49	0.94	0.73	0.90
#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.58	1.01	1.26	2.00	0.31	0.21
#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.52	0.93	1.36	2.06	-0.14	0.02
#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.91	1.37	1.33	2.30	0.02	-0.15
#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.49	0.83	1.35	2.05	0.40	0.44
#VALUE!	#VALUE!	#VALUE!	#VALUE!	-0.42	-0.15	1.61	2.30	0.80	0.98
#VALUE!	#VALUE!	#VALUE!	#VALUE!	-0.35	-0.33	2.24	3.28	0.35	0.11
#VALUE!	1.12	-0.33	-0.33	0.28	0.23	1.28	2.48	0.40	-0.02
1.23	1.98	0.05	0.14	0.52	0.90	0.38	1.23	0.57	0.05
-0.15	-0.93	1.71	3.81	0.59	1.17	0.37	0.56	-0.32	-0.83
#VALUE!	#VALUE!	#VALUE!	#VALUE!	9.07	14.85	14.18	22.49	6.41	5.70
#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.53	0.87	0.83	1.32	0.38	0.34
2	3	3	3	17	17	17	17	17	17
#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.65	0.93	0.74	1.10	0.43	0.67

NOTE: This is NOT LINKED to any other program !!!

OCT.

OCTOBER

DAY	401 FLOW	HIASB TOTAL VOLATILE SUSPENDED SOLIDS	HIASB TOTAL VOLATILE TONS TVSS	HIASB TOTAL SUSPENDED SOLIDS	HIASB TOTAL TONS OF TSS	HIASB PERCENT VOLATILES OF TSS	+ CANAL TOTAL VOLATILE SUSPENDED SOLIDS	CANAL TOTAL VOLATILE TONS TVSS	CANAL TOTAL SUSPENDED SOLIDS	CANAL TOTAL TONS OF TSS	CANAL PERCENT VOLATILES OF TSS
	23.2	46	4.450	82	7.933	56.1	+ 55.5	5.369	99	9.578	56.1
	22.9	46	4.393	78	7.448	59.0	+ 57	5.443	98.5	9.406	57.9
3	22.6	62	5.843	121	11.403	51.2	+ 86	8.105	160.5	15.126	53.6
4	21.1	82	7.215	153	13.462	53.6	+ 73	6.423	130	11.438	56.2
5							+				
6							+				
7	20.6	90	7.731	144	12.370	62.5	+ 85	7.302	139	11.940	61.2
8	20.5	129	11.028	227	19.405	56.8	+ 94.5	8.078	146.5	12.524	64.5
9	20.4	138	11.739	251	21.352	55.0	+ 124	10.548	212	18.034	58.5
10	20.6	128	10.995	278	23.881	46.0	+ 116	9.965	204	17.524	56.9
11	20.7	132	11.394	238	20.544	55.5	+ 112	9.668	175	15.106	64.0
12							+				
13							+				
14	21.8	146	13.272	278	25.272	52.5	+ 77	7.000	133	12.090	57.9
15	23	84	8.056	136	13.044	61.8	+ 88	8.440	209	20.045	42.1
16	23.1	98	9.440	162	15.605	60.5	+ 70	6.743	114	10.981	61.4
17	22.7	108	10.223	228	21.582	47.4	+ 88	8.330	160	15.145	55.0
18	22.8	80	7.606	146	13.881	54.8	+ 70	6.655	140	13.311	50.0
19							+				
20							+				
21	23.4	74	7.221	110	10.734	67.3	+ 74	7.221	110	10.734	67.3
22	23.5	68	6.664	112	10.975	60.7	+ 66	6.468	110	10.779	60.0
23	23.4	58	5.660	90	8.782	64.4	+ 74	7.221	148	14.442	50.0
24	22.8	75	7.131	100	9.508	75.0	+ 49	4.659	75	7.131	65.3
25	22.8	60	5.705	105	9.983	57.1	+ 49	4.659	89	8.462	55.1
26							+				
27							+				
28	24.1	104	10.452	160	16.080	65.0	+ 100	10.050	173	17.386	57.8
29	25.2	105	11.034	182	19.125	57.7	+ 80	8.407	146	15.342	54.8
30	23.7	88	8.697	168	16.603	52.4	+ 70	6.918	136	13.441	51.5
31	26.3	78	8.554	122	13.380	63.9	+ 74	8.116	106	11.625	69.8
							+				
	521.20	2079.00	194.50	3671.00	342.35	1336.24	1832.00	171.79	3213.50	301.59	1326.62
	22.66	90.39	8.46	159.61	14.88	58.10	79.65	7.47	139.72	13.11	57.68
AYS	23	23	23	23	23	23	23	23	23	23	23
STDDEVN	1.52	29.29	2.47	62.18	5.24	6.62	19.96	1.64	37.74	3.28	6.25

NPDES

OCT

POND1 TOTAL VOLATILE SUSPENDED SOLIDS	POND1 TOTAL VOLATILE TONS TVSS	POND1 TOTAL SUSPENDED SOLIDS	POND1 TOTAL TONS OF TSS	POND1 PERCENT VOLATILES OF TSS	+	POND2 TOTAL VOLATILE SUSPENDED SOLIDS	POND2 TOTAL VOLATILE TONS TVSS	POND2 TOTAL SUSPENDED SOLIDS	POND2 TOTAL TONS OF TSS	POND2 PERCENT VOLATILES OF TSS
24.5	2.370	40.5	3.918	60.5	+	17.5	1.693	26	2.515	67.3
22.0	2.101	37	3.533	59.5	+	11.75	1.122	18	1.719	65.3
22.0	2.073	38	3.581	57.9	+	15.5	1.461	26	2.450	59.6
31.0	2.728	49	4.311	63.3	+	20	1.760	30	2.640	66.7
					+					
					+					
42.5	3.651	63	5.412	67.5	+	42	3.608	72	6.185	58.3
39.0	3.334	52	4.445	75.0	+	51	4.360	79	6.753	64.6
42.0	3.573	58	4.934	72.4	+	35.5	3.020	46	3.913	77.2
45.0	3.866	65	5.584	69.2	+	34	2.921	48	4.123	70.8
57.0	4.920	83	7.164	68.7	+	35	3.021	48	4.143	72.9
					+					
					+					
73.0	6.636	120	10.909	60.8	+	66	6.000	99	9.000	66.7
53.0	5.083	93	8.920	57.0	+	73	7.001	107	10.262	68.2
51.0	4.913	73	7.032	69.9	+	67	6.454	106	10.211	63.2
38.0	3.597	64	6.058	59.4	+	44	4.165	74	7.005	59.5
38.0	3.613	74	7.036	51.4	+	45	4.278	66	6.275	68.2
					+					
					+					
43.0	4.196	56	5.464	76.8	+	37	3.610	46	4.489	80.4
32.0	3.136	47	4.606	68.1	+	32	3.136	47	4.606	68.1
26.0	2.537	26	2.537	100.0	+	29	2.830	43	4.196	67.4
35.0	3.328	38	3.613	92.1	+	35	3.328	39	3.708	89.7
30.5	2.900	64	6.085	47.7	+	25	2.377	50	4.754	50.0
					+					
					+					
45.0	4.322	59	5.929	76.3	+	34	3.417	42	4.221	81.0
49.0	5.149	90	9.458	54.4	+	27	2.837	51	5.359	52.9
41.0	4.052	64	6.325	64.1	+	26	2.570	47	4.645	55.3
31.0	3.400	50	5.484	62.0	+	27	2.961	36	3.948	75.0
					+					
910.50	85.68	1403.50	132.34	1533.72		829.25	77.93	1246.00	117.12	1548.34
39.59	3.73	61.02	5.75	66.68		36.05	3.39	54.17	5.09	67.32
23	23	23	23	23		23	23	23	23	23
12.15	1.11	21.37	2.02	12.08		16.10	1.49	24.87	2.31	9.40

OCT

POND3 TOTAL VOLATILE SUSPENDED SOLIDS	POND3 TOTAL VOLATILE TONS TVSS	POND3 TOTAL SUSPENDED SOLIDS	POND3 TOTAL TONS OF TSS	POND3 PERCENT VOLATILES OF TSS	+	POND4 TOTAL VOLATILE SUSPENDED SOLIDS	POND4 TOTAL VOLATILE TONS TVSS	POND4 TOTAL SUSPENDED SOLIDS	POND4 TOTAL TONS OF TSS	POND4 PERCENT VOLATILES OF TSS
18	1.741	29	2.806	62.1	+	13.75	1.330	30.25	2.927	45.5
10.25	0.979	16	1.528	64.1	+	15.5	1.480	29	2.769	53.4
9.5	0.895	16.5	1.555	57.6	+	11.5	1.084	27.75	2.615	41.4
19	1.672	27	2.376	70.4	+	11	0.968	21.5	1.892	51.2
					+					
					+					
13.25	1.138	21.25	1.825	62.4	+	16.75	1.439	34.25	2.942	48.9
19.5	1.667	30.5	2.607	63.9	+	16	1.368	32.5	2.778	49.2
31.5	2.680	47.5	4.041	66.3	+	17.5	1.489	33	2.807	53.0
28	2.405	41	3.522	68.3	+	17	1.460	33	2.835	51.5
28	2.417	42	3.625	66.7	+	14.5	1.252	26	2.244	55.8
					+					
					+					
30	2.727	40.5	3.682	74.1	+	17	1.545	29	2.636	58.6
34	3.261	75	7.193	45.3	+	31	2.973	51	4.891	60.8
34	3.275	61	5.876	55.7	+	17.3	1.666	27	2.601	64.1
43	4.070	90	8.519	47.8	+	15.65	1.481	24.95	2.362	62.7
48	4.564	75	7.131	64.0	+	16.65	1.583	24.6	2.339	67.7
					+					
					+					
36	3.513	42	4.098	85.7	+	17	1.659	25.4	2.478	66.9
27	2.646	37	3.626	73.0	+	18.3	1.793	31.3	3.067	58.5
29	2.830	39	3.806	74.4	+	17	1.659	25	2.439	68.0
29	2.757	31	2.947	93.5	+	25	2.377	24.5	2.329	102.0
22	2.092	38	3.613	57.9	+	16	1.521	29.5	2.805	54.2
					+					
					+					
30	3.015	44	4.422	68.2	+	17.6	1.769	27	2.713	65.2
32	3.363	59	6.200	54.2	+	18.3	1.923	39.3	4.130	46.6
17	1.680	32	3.163	53.1	+	17.5	1.730	43	4.250	40.7
28	3.071	64	7.019	43.8	+	20	2.193	35	3.838	57.1
					+					
616.00	58.46	998.25	95.18	1472.35		397.80	37.74	703.80	66.69	1323.11
26.78	2.54	43.40	4.14	64.02		17.30	1.64	30.60	2.90	57.53
23	23	23	23	23		23	23	23	23	23
9.66	0.95	19.26	1.94	11.89		4.05	0.43	6.75	0.72	12.62

NPDES OCTOBER

DEPOSITED IN CANAL TVSS TON/DAY	DEPOSITED IN CANAL TSS TON/DAY	DEPOSITED IN POND1 TVSS TON/DAY	DEPOSITED IN POND1 TSS TON/DAY	DEPOSITED IN POND2 TVSS TON/DAY	DEPOSITED IN POND2 TSS TON/DAY	DEPOSITED IN POND3 TVSS TON/DAY	DEPOSITED IN POND3 TSS TON/DAY	DEPOSITED IN POND4 TVSS TON/DAY	DEPOSITED IN POND4 TSS TON/DAY
-0.92	-1.64	3.00	5.66	0.68	1.40	-0.05	-0.29	0.41	-0.12
-1.05	-1.96	3.34	5.87	0.98	1.81	0.14	0.19	-0.50	-1.24
-2.26	-3.72	6.03	11.54	0.61	1.13	0.57	0.90	-0.19	-1.06
0.79	2.02	3.70	7.13	0.97	1.67	0.09	0.26	0.70	0.48
0.43	0.43	3.65	6.53	0.04	-0.77	2.47	4.36	-0.30	-1.12
2.95	6.88	4.74	8.08	-1.03	-2.31	2.69	4.15	0.30	-0.17
1.19	3.32	6.98	13.10	0.55	1.02	0.34	-0.13	1.19	1.23
1.03	6.36	6.10	11.94	0.94	1.46	0.52	0.60	0.94	0.69
1.73	5.44	4.75	7.94	1.90	3.02	0.60	0.52	1.17	1.38
6.27	13.18	0.36	1.18	0.64	1.91	3.27	5.32	1.18	1.05
-0.38	-7.00	3.36	11.13	-1.92	-1.34	3.74	3.07	0.29	2.30
2.70	4.62	1.83	3.95	-1.54	-3.18	3.18	4.33	1.61	3.28
1.89	6.44	4.73	9.09	-0.57	-0.95	0.09	-1.51	2.59	6.16
0.95	0.57	3.04	6.28	-0.67	0.76	-0.29	-0.86	2.98	4.79
0.00	0.00	3.02	5.27	0.59	0.98	0.10	0.39	1.85	1.62
0.20	0.20	3.33	6.17	0.00	0.00	0.49	0.98	0.85	0.56
-1.56	-5.66	4.68	11.90	-0.29	-1.66	0.00	0.39	1.17	1.37
2.47	2.38	1.33	3.52	0.00	-0.10	0.57	0.76	0.38	0.62
1.05	1.52	1.76	2.38	0.52	1.33	0.29	1.14	0.57	0.81
0.40	-1.31	5.53	11.46	1.11	1.71	0.40	-0.20	1.25	1.71
2.63	3.78	3.26	5.88	2.31	4.10	-0.53	-0.84	1.44	2.07
1.78	3.16	2.87	7.12	1.48	1.68	0.89	1.48	-0.05	-1.09
0.44	1.75	4.72	6.14	0.44	1.54	-0.11	-3.07	0.88	3.18
22.72	40.76	86.11	169.25	7.75	15.22	19.47	21.94	20.71	28.49
0.99	1.77	3.74	7.36	0.34	0.66	0.85	0.95	0.90	1.24
23	23	23	23	23	23	23	23	23	23
1.80	4.45	1.61	3.25	1.02	1.72	1.26	2.04	0.86	1.85

NOTE: This is NOT LINKED to any other program !!!

NOV. NOVEMBER

day	401 FLOW	HIASB TOTAL VOLATILE SUSPENDED SOLIDS	HIASB TOTAL VOLATILE TONS TVSS	HIASB TOTAL SUSPENDED SOLIDS	HIASB TOTAL TONS OF TSS	HIASB PERCENT VOLATILES OF TSS	CANAL TOTAL VOLATILE SUSPENDED SOLIDS	CANAL TOTAL VOLATILE TONS TVSS	CANAL TOTAL SUSPENDED SOLIDS	CANAL TOTAL TONS OF TSS	CANAL PERCENT VOLATILES OF TSS
1	24.2	78	7.871	132	13.321	59.1	70	7.064	116	11.706	60.3
2											
3											
4	22.4	76	7.099	170	15.879	44.7	62	5.791	122	11.396	50.8
5	21.3	84	7.461	164	14.567	51.2	76	6.750	134	11.902	56.7
6	20.3	102	8.634	174	14.729	58.6	84	7.111	150	12.698	56.0
7	19.5	94	7.644	180	14.637	52.2	80	6.505	150	12.197	53.3
8	18.8	114	8.937	212	16.620	53.8	90	7.056	180	14.111	50.0
9											
10											
11	19	122	9.666	214	16.955	57.0	66	5.229	106	8.398	62.3
12	19	92	7.289	120	9.508	76.7	92	7.289	92	7.289	100.0
13	19.1	114	9.080	154	12.266	74.0	116	9.239	160	12.744	72.5
14	19.1	120	9.558	206	16.407	58.3	111	8.841	178	14.177	62.4
15	18.7	100	7.798	180	14.036	55.6	80	6.238	148	11.541	54.1
16											
17											
18	18.7	70	5.459	120	9.357	58.3	48	3.743	90	7.018	53.3
19	18.3	88	6.715	174	13.278	50.6	68	5.189	140	10.684	48.6
20	17.9	66	4.926	136	10.151	48.5	60	4.479	120	8.957	50.0
21	17.9	60	4.479	110	8.211	54.5	62	4.628	104	7.763	59.6
22	17.9	64	4.777	114	8.509	56.1	62	4.628	106	7.912	58.5
23											
24											
25	19.2	58	4.644	108	8.647	53.7	64	5.124	106	8.487	60.4
26	19.6	88	7.192	144	11.769	61.1	68	5.558	112	9.154	60.7
27	20.6	78	6.700	130	11.167	60.0	62	5.326	104	8.934	59.6
28											
29											
30											
31											
	371.50	1668.00	135.93	2942.00	240.02	1084.08	1421.00	115.79	2418.00	197.07	1129.11
	19.55	87.79	7.15	154.84	12.63	57.06	74.79	6.09	127.26	10.37	59.43
DAYS	19	19	19	19	19	19	19	19	19	19	19
STDDEVN	1.62	20.21	1.66	34.65	2.95	7.69	17.60	1.46	27.50	2.31	11.38

NPDES NPDES

NOV

POND1 TOTAL VOLATILE SUSPENDED SOLIDS	POND1 TOTAL VOLATILE TONS TVSS	POND1 TOTAL SUSPENDED SOLIDS	POND1 TOTAL TONS OF TSS	POND1 PERCENT VOLATILES OF TSS	+	POND2 TOTAL VOLATILE SUSPENDED SOLIDS	POND2 TOTAL VOLATILE TONS TVSS	POND2 TOTAL SUSPENDED SOLIDS	POND2 TOTAL TONS OF TSS	POND2 PERCENT VOLATILES OF TSS
28.0	2.826	43	4.339	65.1	+	21	2.119	36	3.633	58.3
					+					
					+					
27.0	2.522	46	4.297	58.7	+	25	2.335	39	3.643	64.1
31.0	2.753	62	5.507	50.0	+	26	2.309	49	4.352	53.1
33.0	2.793	48	4.063	68.8	+	21	1.778	27	2.286	77.8
42.0	3.415	79	6.424	53.2	+	30	2.439	57	4.635	52.6
44.0	3.449	78	6.115	56.4	+	25	1.960	44	3.449	56.8
					+					
					+					
39.0	3.090	59	4.675	66.1	+	39	3.090	59	4.675	66.1
52.0	4.120	46	3.645	113.0	+	34	2.694	35	2.773	97.1
43.0	3.425	46	3.664	93.5	+	31	2.469	33	2.628	93.9
41.0	3.266	61	4.858	67.2	+	31	2.469	42	3.345	73.8
52.0	4.055	79	6.160	65.8	+	23	1.794	40	3.119	57.5
					+					
					+					
26.0	2.027	54	4.211	48.1	+	40	3.119	67	5.225	59.7
29.0	2.213	49	3.739	59.2	+	34	2.595	59	4.502	57.6
27.0	2.015	60	4.479	45.0	+	28	2.090	51	3.807	54.9
37.0	2.762	66	4.926	56.1	+	21	1.568	37	2.762	56.8
35.0	2.613	54	4.031	64.8	+	25	1.866	41	3.060	61.0
					+					
					+					
33.0	2.642	53	4.243	62.3	+	26	2.082	43	3.443	60.5
36.0	2.942	53	4.332	67.9	+	26	2.125	38	3.106	68.4
31.0	2.663	68	5.841	45.6	+	20	1.718	30	2.577	66.7
					+					
					+					
					+					
					+					
					+					
686.00	55.59	1104.00	89.55	1206.78		526.00	42.62	827.00	67.02	1236.73
36.11	2.93	58.11	4.71	63.51	+	27.68	2.24	43.53	3.53	65.09
19	19	19	19	19		19	19	19	19	19
7.96	0.59	11.54	0.88	16.27		5.93	0.44	10.82	0.82	12.65

NOV

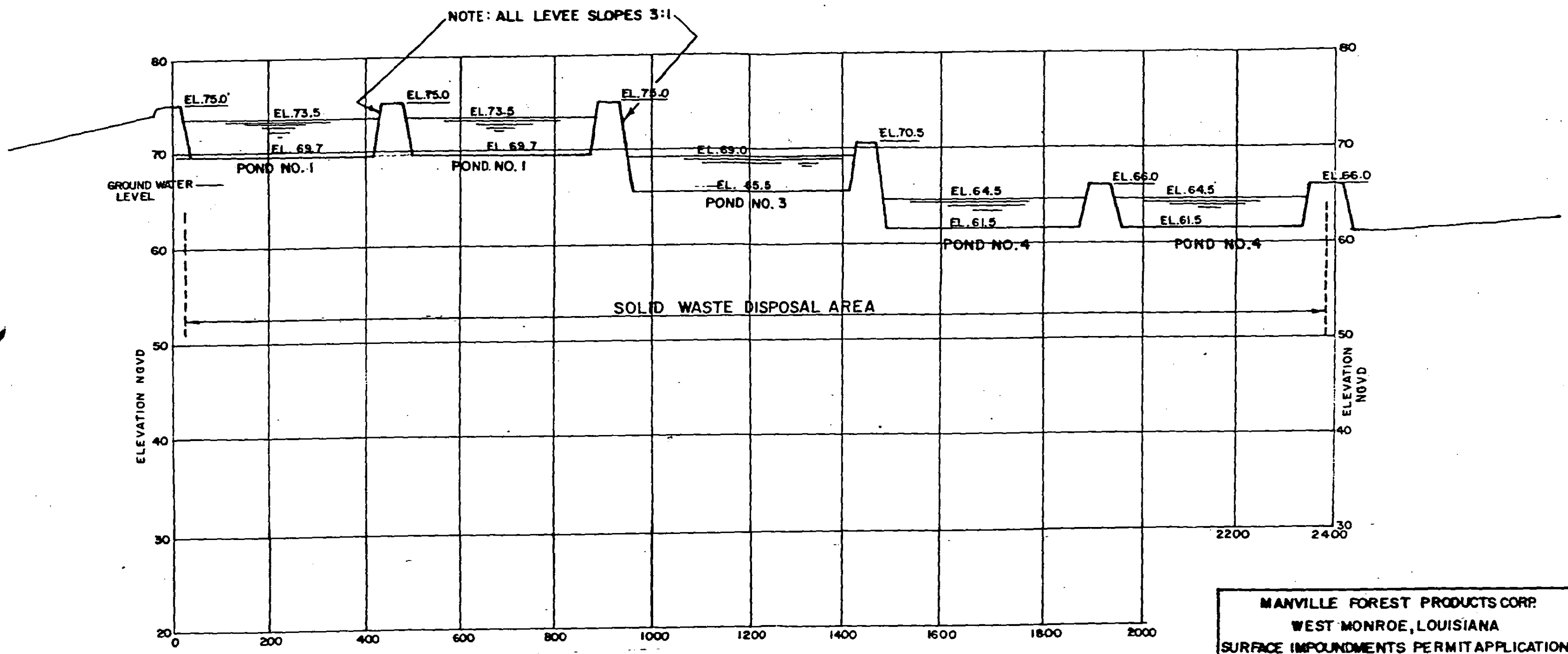
POND3 TOTAL VOLATILE SUSPENDED SOLIDS	POND3 TOTAL VOLATILE TONS TVSS	POND3 TOTAL SUSPENDED SOLIDS	POND3 TOTAL TONS OF TSS	POND3 PERCENT VOLATILES OF TSS	+	POND4 TOTAL VOLATILE SUSPENDED SOLIDS	POND4 TOTAL VOLATILE TONS TVSS	POND4 TOTAL SUSPENDED SOLIDS	POND4 TOTAL TONS OF TSS	POND4 PERCENT VOLATILES OF TSS
24	2.422	36	3.633	66.7	+	15	1.514	29.5	2.977	50.8
					+					
					+					
22	2.055	41	3.830	53.7	+	16.5	1.541	33.5	3.129	49.3
25	2.221	42	3.730	59.5	+	16	1.421	34	3.020	47.1
31	2.624	35	2.963	88.6	+	18	1.524	33	2.793	54.5
25	2.033	33	2.683	75.8	+	16	1.301	35	2.846	45.7
19	1.490	28	2.195	67.9	+	18	1.411	35	2.744	51.4
					+					
					+					
30	2.377	60	4.754	50.0	+	18	1.426	35	2.773	51.4
41	3.248	33	2.615	124.2	+	29	2.298	34	2.694	85.3
37	2.947	52	4.142	71.2	+	10.5	0.836	11	0.876	95.5
26	2.071	38	3.027	68.4	+	17.5	1.394	27.5	2.190	63.6
19	1.482	38	2.963	50.0	+	14.5	1.131	26	2.027	55.8
					+					
					+					
27	2.105	69	5.381	39.1	+	19	1.482	34	2.651	55.9
30	2.289	66	5.037	45.5	+	15	1.145	28.5	2.175	52.6
28	2.090	48	3.583	58.3	+	16.5	1.232	35.5	2.650	46.5
24	1.791	41	3.060	58.5	+	18	1.344	35	2.613	51.4
24	1.791	37	2.762	64.9	+	19.5	1.456	37.5	2.799	52.0
					+					
					+					
18	1.441	28	2.242	64.3	+	13	1.041	26.5	2.122	49.1
25	2.043	46	3.760	54.3	+	14.5	1.185	26	2.125	55.8
14	1.203	25	2.148	56.0	+	11.5	0.988	20.5	1.761	56.1
					+					
					+					
					+					
					+					
					+					
489.00	39.72	796.00	64.51	1216.81	+	316.00	25.67	577.00	46.97	1069.78
25.74	2.09	41.89	3.40	64.04	+	16.63	1.35	30.37	2.47	56.30
19	19	19	19	19		19	19	19	19	19
6.43	0.51	12.40	0.94	18.51		3.85	0.30	6.49	0.54	12.82

NOVEMBER NOVEMBER

DEPOSITED IN CANAL TVSS TON/DAY	DEPOSITED IN CANAL TSS TON/DAY	DEPOSITED IN POND1 TVSS TON/DAY	DEPOSITED IN POND1 TSS TON/DAY	DEPOSITED IN POND2 TVSS TON/DAY	DEPOSITED IN POND2 TSS TON/DAY	DEPOSITED IN POND3 TVSS TON/DAY	DEPOSITED IN POND3 TSS TON/DAY	DEPOSITED IN POND4 TVSS TON/DAY	DEPOSITED IN POND4 TSS TON/DAY
0.81	1.61	4.24	7.37	0.71	0.71	-0.30	0.00	0.91	0.66
1.31	4.48	3.27	7.10	0.19	0.65	0.28	-0.19	0.51	0.70
0.71	2.66	4.00	6.40	0.44	1.15	0.09	0.62	0.80	0.71
1.52	2.03	4.32	8.63	1.02	1.78	-0.85	-0.68	1.10	0.17
1.14	2.44	3.09	5.77	0.98	1.79	0.41	1.95	0.73	-0.16
1.88	2.51	3.61	8.00	1.49	2.67	0.47	1.25	0.08	-0.55
4.44	8.56	2.14	3.72	0.00	0.00	0.71	-0.08	0.95	1.98
0.00	2.22	3.17	3.64	1.43	0.87	-0.55	0.16	0.95	-0.08
-0.16	-0.48	5.81	9.08	0.96	1.04	-0.48	-1.51	2.11	3.27
0.72	2.23	5.58	9.32	0.80	1.51	0.40	0.32	0.68	0.84
1.56	2.50	2.18	5.38	2.26	3.04	0.31	0.16	0.35	0.94
1.72	2.34	1.72	2.81	-1.09	-1.01	1.01	-0.16	0.62	2.73
1.53	2.59	2.98	6.94	-0.38	-0.76	0.31	-0.53	1.14	2.86
0.45	1.19	2.46	4.48	-0.07	0.67	0.00	0.22	0.86	0.93
-0.15	0.45	1.87	2.84	1.19	2.16	-0.22	-0.30	0.45	0.45
0.15	0.60	2.02	3.88	0.75	0.97	0.07	0.30	0.34	-0.04
-0.48	0.16	2.48	4.24	0.56	0.80	0.64	1.20	0.40	0.12
1.63	2.62	2.62	4.82	0.82	1.23	0.08	-0.65	0.86	1.63
1.37	2.23	2.66	3.09	0.94	3.26	0.52	0.43	0.21	0.39
20.14	42.95	60.20	107.52	12.97	22.53	2.89	2.51	14.06	17.54
1.06	2.26	3.17	5.66	0.68	1.19	0.15	0.13	0.74	0.92
19	19	19	19	19	19	19	19	19	19
1.10	1.90	1.18	2.17	0.74	1.13	0.47	0.78	0.45	1.09

APPENDIX J

IMPOUNDMENT DRAWINGS, SPECIFICATIONS AND QA/QC PLANS



SECTION "A-A"

SCALE: 1" = 200' HORZ.
1" = 10' VERT.

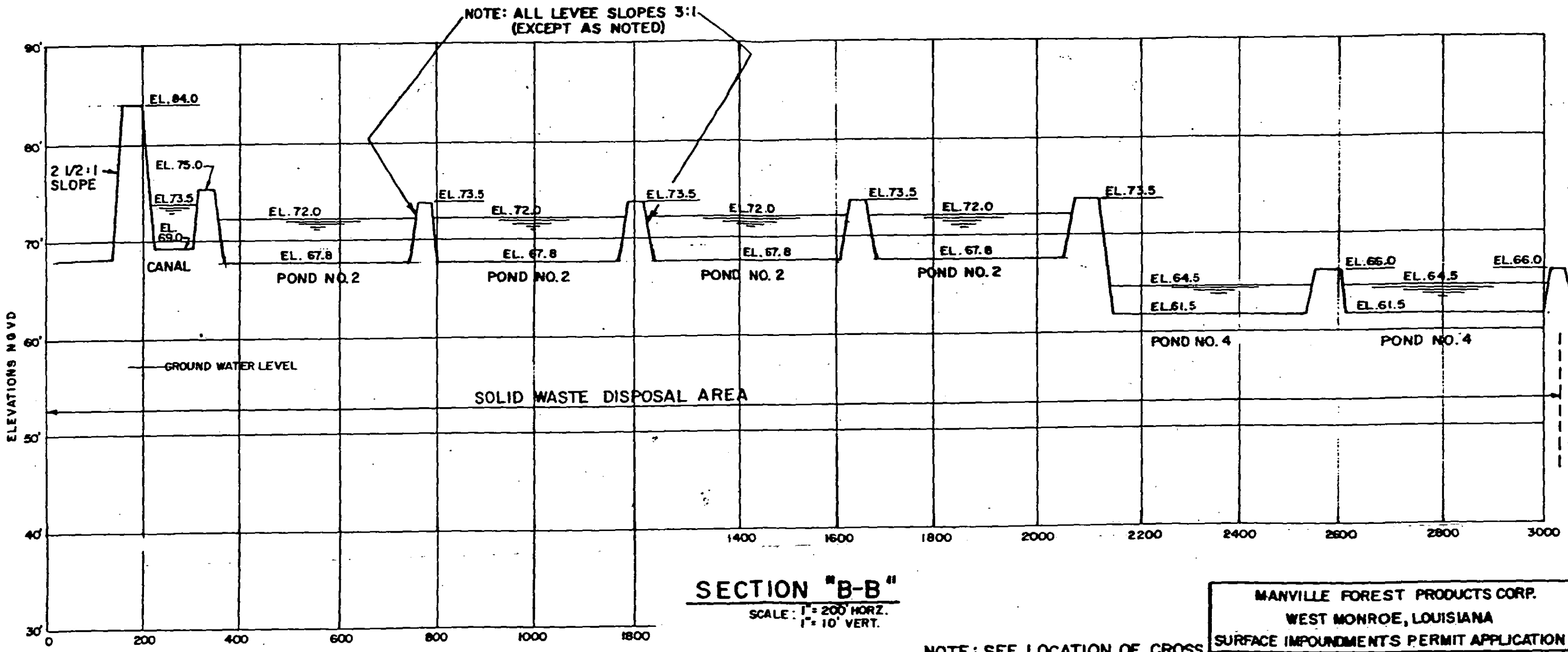
NOTE: SEE LOCATION OF CROSS SECTION ON EXHIBIT C

MANVILLE FOREST PRODUCTS CORP.
WEST MONROE, LOUISIANA
SURFACE IMPOUNDMENTS PERMIT APPLICATION

EXHIBIT I
PAGE 1 of 4
CROSS SECTION OF
SURFACE IMPOUNDMENTS
(SECTION 6.4.3.C.3.f.(1))

OFFICE OF S.E.HUEY CO. MONROE, LA.

ENGINEERS & SURVEYORS



SECTION "B-B"

SCALE: 1" = 200' HORZ.
1" = 10' VERT.

NOTE: SEE LOCATION OF CROSS SECTION ON EXHIBIT C

MANVILLE FOREST PRODUCTS CORP.
WEST MONROE, LOUISIANA
SURFACE IMPOUNDMENTS PERMIT APPLICATION

EXHIBIT I
PAGE 2 of 4
CROSS SECTION OF
SURFACE IMPOUNDMENTS
(SECTION 6.4.3.C.3.f.(1))

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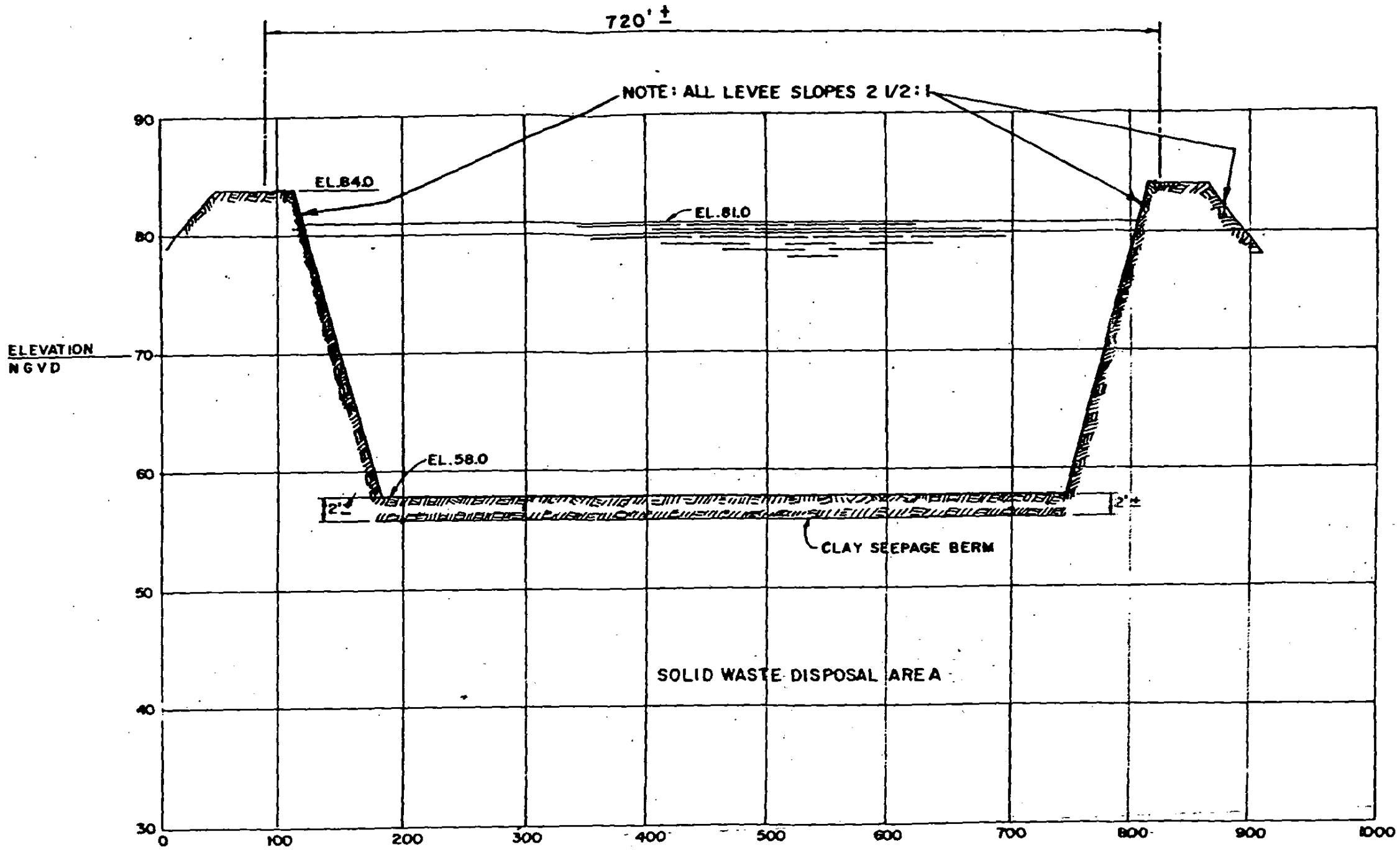
ENGINEERS & SURVEYORS



SECTION "D-D"

HIGH INTENSITY AERATION POND

SCALE: 1" = 100' HORZ.
1" = 10' VERT.

NOTE: SEE LOCATION OF CROSS SECTION ON EXHIBIT C

MANVILLE FOREST PRODUCTS CORP.
WEST MONROE, LOUISIANA
SURFACE IMPOUNDMENTS PERMIT APPLICATION

EXHIBIT I
PAGE 3 of 4

CROSS SECTION OF
SURFACE IMPOUNDMENTS
(SECTION 6.4.3.C.3.1.(1))

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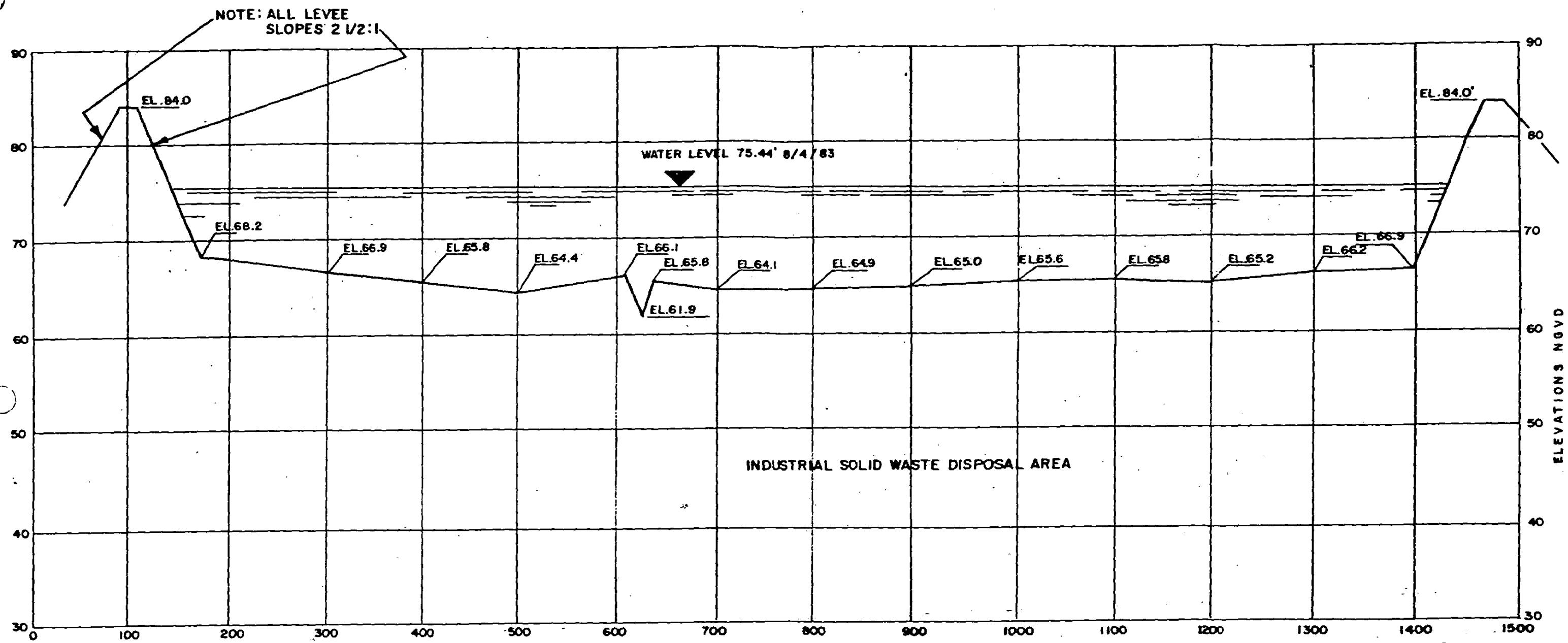
ENGINEERS & SURVEYORS



PRIMARY CLARIFIER SLUDGE/BARK BOILER ASH SLUICE POND

SECTION "C-C"

SCALE: 1" = 100' HORZ.
1" = 10' VERT.

NOTE: SEE LOCATION OF CROSS SECTION ON EXHIBIT C

MANVILLE FOREST PRODUCTS CORP.
WEST MONROE, LOUISIANA
SURFACE IMPOUNDMENTS PERMIT APPLICATION

EXHIBIT I
PAGE 4 of 4
CROSS SECTION OF
SURFACE IMPOUNDMENTS
(SECTION 6.4.3.C.3.f.(1))

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ENGINEERS & SURVEYORS

IMPOUNDMENT DRAWINGS, SPECIFICATIONS, & QA/QC PLANS

Proposed 41-Acre Impoundment:

Figure A-1	Site Plan View - Proposed Ash/Sludge Impoundment
Figure A-2	Excavation Plan View - Proposed Ash/Sludge Impoundment
Figure A-3	General Layout and Borehole Locations - Proposed Ash/Sludge Impoundment
Figure A-4	Impoundment Cross Sections - Proposed Ash/Sludge Impoundment
Figure A-5	Surface Water Management Plan - Proposed Ash/Sludge Impoundment

Technical Specifications

Ash/Sludge Impoundment Construction - Proposed 41-Acre Impoundment

QA/QC Plans

Quality Assurance/Quality Control Plan for Clay Liner and Levee Construction
Quality Assurance/Quality Control Plan for Geosynthetic Liner Installation

Existing 21-Acre Impoundment:

Drawing No. 63-0-18005	Plan Layout of Clarifier Sludge and Boiler Ash Sluice Pond
Drawing No. 63-0-18003	Levee Cross-Sections for Boiler Ash Sluice Pond

Technical Specifications

Clay Liner and Levee Construction

QA/QC Plan

Construction Quality Assurance Plan - Liner and Levee Construction

TECHNICAL SPECIFICATIONS

ASH/SLUDGE IMPOUNDMENT CONSTRUCTION

PROPOSED 41-ACRE IMPOUNDMENT

prepared for:

Riverwood International, USA, Inc.
West Monroe, Louisiana

prepared by:

DAMES & MOORE, INC.
4949 Essen Lane, Suite 900
Baton Rouge, Louisiana

TECHNICAL SPECIFICATIONS

Organization

100 Scope of Work

200 Earthwork Specifications

- 201 Clearing and Grubbing
- 202 Excavation
- 203 Placement of Structural Fill
- 204 Impoundment Levee and Clay Liner Construction
- 205 Road Surfacing
- 206 Surface Water Drainage Control
- 207 Temporary Erosion Control
- 208 Seeding

300 Synthetic Liner Installation

SECTION 100

SCOPE OF WORK

100.1 The scope of work for this project includes providing all tools, equipment, materials, and labor necessary to successfully complete construction of an approximately 41-acre surface impoundment for the containment of sludge and boiler ash. The scope of work includes, but may not be limited to, the following items:

- Clearing and grubbing of the entire area within the limits of the impoundment, areas designated for borrow material, and areas to be graded to alter drainage;

- Excavation within the limits of the impoundment, in designated borrow area(s), and as required for drainage control features;

- Segregation of usable and unusable materials encountered during excavation, and placement of segregated materials (other than clayey soils) at soils storage locations designated by the Owner. Material usable for clay liner and levee construction shall be immediately placed in lifts for this construction;

- Embankment construction for the sides of the impoundment, and clay liner construction over the entire surface area of the impoundment. The clay liner constructed for the impoundment shall be a minimum of three feet in thickness and have a maximum permeability of 1×10^{-7} cm/sec;

- Grading and construction of surface water drainage features;

- Establishment of erosion control features (seeding, mulching) on the exposed embankment areas and in newly-constructed drainage ditches;

- Construction of a road surface on embankments; and

- Synthetic liner installation over the prepared surface of the completed clay liner.

The detailed specifications for each of the above items are contained in following Sections 200 - 300.

SECTION 200
EARTHWORK SPECIFICATIONS

201. CLEARING AND GRUBBING

201.1 Description of Work

This work consists of mechanical clearing and removal of the upper layer of topsoil, vegetation, stumps, roots, logs, and other debris or objectionable material within the limits of the impoundment, bayou areas to be filled to grade, or designated borrow areas.

201.2 General Construction Requirements

Impoundment levee limits, borrow area limits, and limits of other areas to be cleared (for ditch construction or flood mitigation) will be established by the Owner. The Owner may designate certain items (trees, etc.) to remain, which shall be preserved by the Contractor. Construction lines and grade shall be maintained by the Contractor

201.3 Clearing and Grubbing Requirements

The upper topsoil containing roots and debris shall be removed and disposed of at a location designated by the Owner. The Contractor shall then remove additional (usable) topsoil which should be cleaned and stockpiled at the Owner's designated soil storage location, for later use.

Holes resulting from removal of stumps, roots, or other large or protruding objects shall be backfilled and compacted with approved fill material (see Section 203.3), unless the area is to undergo excavation to a lower grade.

Perishable material such as stumps, grass, roots, or logs may be burned in a controlled manner, under the constant observation of watchmen. The Contractor shall notify the Owner at least 3 days prior to burning so that the appropriate authorities can be notified prior to burning material on plant property. The Contractor shall be knowledgeable of all applicable laws and local ordinances pertaining to outdoor burning, including Section 11 of the Louisiana Air Control Commission, entitled "Control of Air Pollution from Outdoor Burning". The burning shall be controlled such that surrounding areas of wetland, forest, and grass cover are not affected.

Certain debris and materials cleared from the site may not be admissible for burning, based on the above-cited regulations. The Contractor shall remove these materials

from the site and dispose of at locations designated by the Owner. Waste material and trash from the Contractor's operation and facilities shall be disposed of as directed by the Owner.

202. EXCAVATION

202.1 Description of Work

This work consists of excavation of draining ditches to drain two existing borrow pits on the site, mucking of soils and organic material from the bayou, ditch, and borrow pit areas that are within the limits of the impoundment, excavation to the lines and grades indicated for the impoundment, excavation necessary to obtain borrow soils, and excavation for ditches and channels. All excavation and grading work shall conform to the lines, grades, and dimensions shown on the design plans and cross-sections provided by the engineer.

202.2 General Requirements for Material Segregation

The Contractor shall perform clearing, grubbing, and mucking (where applicable) of areas prior to excavation activities. Material segregation shall be the responsibility of the Contractor.

Information concerning site soils will be provided to the Contractor in the form of boring logs and geologic cross-sections, which will include descriptions and classifications of soils encountered in the subsurface investigation. The Contractor shall perform excavation activities in a manner which provides for segregation of usable and unusable soils with minimum mixing. Usable and unusable soils are defined as follows:

usable soils:

clayey soils, including sandy clay, silty clay, and clay, classified as CL or CH and having a permeability of 1×10^{-7} cm/sec or less, which shall be used for embankment and clay liner construction

topsoil that is relatively clean and contains no foreign material, which may be used as topsoil for the upper 4 to 6 inches of the exterior levee surface

sand-clay-gravel mixtures that is usable for construction of road base on the top of levees or for structural fill

unusable soils:

topsoil containing debris, roots, and excess organic matter

muck excavation, including decaying stumps, humus, roots, logs, or other material that is wet or contains excess organic matter, that is excavated from the bottom of natural bayous or sloughs

silty soils, including sandy silt, clayey silt, and silt classified as ML, excavated from within the limits of the impoundment

sands and silty sands
soils excavated during construction or modification of drainage ditches

Usable clayey soils that are excavated shall be transported directly for use in clay liner or levee construction. Other usable soils shall be stored in separate stockpiles at locations designated by the Owner. The Contractor shall take care to minimize mixing of usable soils with other materials.

All soils that are not usable shall be disposed of by the Contractor at the soils storage area on site as designated by the Owner.

202.2.1 Drainage Excavation

This work includes all excavation required to drain standing water from two existing borrow pits that are partially within the limits of the impoundment, and excavation required for the re-routing of a drainage ditch located along the south side of the site. The excavation for the drainage ditch will include excavation of a large ditch along the east side of the site (between the impoundment and Toney Bayou Road) which shall connect the existing ditch and Toney Bayou.

202.2.2 Muck Excavation

This work includes all excavation required to remove the upper soil and organic matter in the bayou and borrow pit bottoms, which will be unusable for clay liner or embankment construction or any other uses due to wetness and high organic content. The approximate depth of mucking in these areas is estimated to be 3 feet. If excessively soft or wet soils are encountered below this depth, the Contractor shall notify the Owner immediately so that the muck excavation depth can be re-evaluated.

202.2.3 Impoundment Excavation

The excavation limits of the impoundment will be identified by the Owner prior to commencement of excavation in that area. The Contractor shall perform clearing and grubbing and any required mucking excavation within the limits of the impoundment before proceeding with excavation of usable and unusable soils. Usable and unusable soils shall be segregated and stockpiled or immediately placed in use in accordance with the requirements of Section 202.2. Below the upper 12-inch topsoil layer (at most locations) is approximately 1 to 3 feet of clayey or silty sand, which is usable for topsoil. Underlying this strata, beginning at approximately 2 to 4 feet bgs, is an estimated 4- to 10-foot thick layer of silty clay to clay (CL - CH) which shall be excavated by the Contractor with care to minimize mixing with other materials. These clayey soils shall be immediately placed in lifts for the clay liner or levee construction.

The boring logs and cross-sections provided indicate a layer of sandy silt to silty sand underlying the clay layer, from approximately elevation 63 feet (or 8 to 12 feet bgs) to below the proposed impoundment excavation bottom. These soils will likely be moist to wet, and shall be dewatered by the Contractor, if needed. The Contractor shall stockpile excavated silts in the soils storage location designated by the Owner. If another type of material, such as clayey sand or a sand-clay-gravel mixture, is encountered during excavation in this predominantly silty and sandy material, the material shall be stockpiled at a location designated by the Owner for possible future use for road surfacing.

Additional excavation may be required in the sandy silt material discussed above, in order to provide a means of dewatering and drying the excavation bottom. The Contractor shall provide the necessary pumps, piping, and equipment to dewater the excavation and maintain the excavation in a dry condition throughout excavation and during embankment and clay liner construction. The Contractor will be responsible for construction of trenches or temporary sumps that may be needed for dewatering the impoundment excavation. Collection and drainage of surface water within the impoundment shall also be performed by the Contractor.

202.2.4 Borrow Area Excavation

The limits of on-site borrow area excavations will be delineated by the Owner prior to commencement of excavation for borrow. The areas shall be cleared and grubbed by the Contractor prior to performing excavation activities. The Contractor shall excavate all unusable material that overlies the clayey soils and dispose of the material in a soil stockpile location designated by the Owner. Materials approved for clay liner or impoundment levee construction shall have the properties specified in Section 204.2. Laboratory testing of the borrow clays shall be performed by the Engineer prior to acceptance of the material for use in the clay liner, in accordance with the procedures presented in Section 204.3. Clays meeting this requirement shall be excavated from the borrow area and transported for placement in horizontal lifts for the impoundment levee and liner construction. Processing and moisture content control for the clay lifts shall be performed by the Contractor prior to compaction. Specifications for clay processing are presented in Section 204.4.

The Contractor shall provide for dewatering of the on-site borrow excavation(s) via construction of a temporary sump and pumping to control groundwater and surface water from rainfall. The Contractor shall take every precaution to avoid unnecessary disturbance of adjacent environmentally sensitive areas, and shall control or filter water discharged from borrow excavations to minimize release of suspended solids to nearby ponds.

202.2.5 Ditch Excavation

Excavation for drainage ditches shall be performed to the lines and grades shown on the plans. Clearing, grubbing, and excavation activities associated with regrading the existing drainage ditch should be limited to the widths and depths indicated on Figure A-5 (Appendix A), and the Contractor shall take care to minimize disturbance to the area.

The Contractor shall perform excavation to regrade the existing ditch (along the south edge of the site) and construct a new ditch extending from this ditch to the large pond located immediately north of the new impoundment. The new section of connecting ditch shall be directed approximately parallel to Toney Bayou Road. The ditch shall be constructed to the lines and grades indicated on Figure A-5.

203. PLACEMENT OF STRUCTURAL FILL

203.1 Description of Work

This work consists of placement and compaction of fill required to bring site elevation up to an elevation of approximately 60.0 feet msl in the old borrow areas, ditch area, or bayou area where elevations will likely be lower than 60.0 feet following clearing, grubbing, or mucking operations. Structural fill may also be used in areas where the exterior levee slope is to be benched or widened at the base to provide increased slope stability.

203.2 General Requirements

The Contractor shall provide all personnel and equipment needed to perform placement and compaction of structural fill material.

203.3 Soil Specifications

Structural fill material that is placed to bring the subgrade elevation up to elevation 61.0 feet msl shall consist of clayey sand or sandy clay material that is not usable for impoundment levee or clay liner use, but acceptable for general fill. Fill material shall be free of organic matter, roots, or debris.

203.4 Soil Placement and Compaction

Structural fill material shall be placed upon a firm base in maximum 12-inch thick lifts and compacted as well as practicable by the Contractor, but to a minimum of 90 percent of standard proctor compaction for the material. Soft or wet areas in the base that require dewatering or additional excavation shall be brought to the attention of the Project Manager prior to performing the work.

204. IMPOUNDMENT LEVEE AND CLAY LINER CONSTRUCTION

204.1 Description of Work

This work includes all labor, materials, and equipment necessary to haul, process, place, and compact clayey soils to successfully complete construction of the levees and clay liner for the surface impoundment.

204.2 Soil Liner Specifications

The clayey soils used for construction of levees and clay liner for the impoundment shall have the following properties:

Classification (USCS)	CL - CH
Plasticity Index (P.I.)	> = 15
Liquid Limit	> = 30 %
Percent Passing No. 200 Sieve	> = 70 %
Permeability (cm/sec)	1×10^{-7} maximum

In addition, the clayey soils shall be free of roots, debris, trash, or deleterious material.

204.3 Preconstruction Soil Testing

Bulk samples of clayey soils encountered during excavation for the impoundment or from potential borrow sources shall be obtained by the engineer and tested for suitability for clay liner and levee construction. The bulk samples shall be tested by the Standard Proctor test method (ASTM D-698) and the remolded sample from the Proctor test shall be tested for permeability by the constant head method. A minimum of one Proctor and one permeability test shall be performed for each type of clayey soil encountered. Excavation, testing, and evaluation of off-site soils shall not be performed until on-site sources have been exhausted.

Clayey soils proposed for use in impoundment levee and clay liner construction (whether from on-site or off-site sources) shall also be tested prior to use in construction to verify that the material meets the above material specifications for Atterberg limits, grainsize, and moisture content. A minimum of one sample per material type shall be obtained and tested for grain size (ASTM D-1140), Atterberg Limits (ASTM D-4318), and natural water content (ASTM D-2216). The Engineer and the Owner shall review the results of laboratory testing of soils and determine the suitability of soils for such use.

The Contractor shall notify the Owner of all off-site borrow sources from which he plans to obtain clayey soils for use in levee or liner construction, so that the

appropriate testing may be performed.

204.4 Soil Processing

The Contractor shall process the clay and add water, if necessary, prior to compaction of each lift to achieve a moisture content of from 0 to 8 % wet of optimum, as determined by the Standard Proctor test method. The processing shall be performed by discing or tilling the soil to reduce the maximum clod size to less than 2 inches. Processing should also remove rootholes, lenses, channels, and other structural non-uniformities from the soil. Processing methods and results shall be acceptable to the Owner.

204.5 Subgrade Preparation

The Contractor shall prepare the subgrade surface such that it is free of irregular protrusions, excessively wet or loose soil, and abrupt changes of grade. The subgrade shall be sufficiently firm that no rutting occurs during placement of the clay liner.

204.6 Soil Placement and Compaction

Clayey soils that have been pre-approved for levee and liner construction shall be placed in horizontal lifts not exceeding 8 inches in thickness after compaction. If the soil is too wet, discing and aerating of the soil shall be performed by the Contractor to achieve the proper moisture content prior to compaction. If the soil is too dry, the Contractor shall add water uniformly to the soil and mix the soil by discing. The Contractor shall compact each lift of suitable approved material to 90 percent of the maximum density as determined by the Standard Proctor test method (ASTM D-698). Water content at compaction shall range from 0 - 8 % wet of optimum as determined by the Standard Proctor test. Compaction shall be performed using a sheepsfoot roller with appropriate foot size. Discing or scarifying between lifts shall be performed as necessary to provide adequate bonding between layers.

Testing of the compacted lifts of clayey soils shall be performed in accordance with the requirements stated in the following Section 204.7. All areas of the clay liner or levee that do no meet the permeability requirements or compaction requirements shall be removed and replaced by the Contractor. Each lift shall be fully completed and achieve passing tests for density before the next lift is placed.

The clay liner and impoundment levee shall be constructed to the lines and grades indicated on the drawings. The final surface of the clay liner on the floor of the impoundment shall be compacted with a smooth-drum roller, rubber-tired roller, or other method approved by the Owner. The clay liner constructed on slopes shall be performed by placement and compaction of the soil in horizontal lifts that are slightly

overbuilt, and later trimmed back for a smooth surface...

The surface of the existing ash pond levee (to be shared by the two impoundments) shall be stripped of the surface vegetation to a maximum depth of one foot. The sections of the existing levee to which the new levees will tie into shall be scarified on the surface.

The top three feet of material that lines the bottom and interior slopes of the impoundment shall constitute the clay liner. The final thickness of the clay liner shall be a minimum of three feet, as verified through initial and final surveys of the excavation and top of clay liner, respectively. The Contractor shall provide a minimum one week notice to the Owner before commencing construction of the clay liner so that the initial survey can be performed.

204.7 Clay Liner Construction Testing and Monitoring

Monitoring and all Quality Assurance/Quality Control (QA/QC) testing during construction of the impoundment levee and clay liner shall be performed under the supervision of a Professional Engineer registered in Louisiana. Construction monitoring and testing procedures are outlined in the QA/QC Plan. The engineer will supervise the work of a soils technician, present on site during construction, who shall obtain the required samples for permeability testing and perform density testing using a Nuclear Density Gauge. The soils technician shall be certified in the use of the gauge, and shall assume responsibility for the proper use, storage, and transportation of the gauge.

The clayey soils placed to form the impoundment levee and clay liner shall be compacted to a minimum of 90 percent, based on the Standard Proctor test method, which shall be verified through density testing using the Nuclear Gauge method (ASTM D-2922) on 150-foot centers (150-foot x 150-foot grid) for each lift. If any density test fails, that section of the clay lift shall be reworked, recompacted, and retested for density in accordance with the QA/QC Plan.

Relatively undisturbed samples of the clay liner portion of the levee (defined as the upper three feet of compacted clay lining the interior slopes) and of the clay liner on the bottom of the impoundment shall be obtained for permeability testing. The samples of clay liner shall be obtained by the on-site soils technician at a frequency of one sample per lift, on 750-foot horizontal gridpoints. The samples shall be tested for permeability using the constant head test method, and at least two samples per vertical foot of liner (total of 6 tests for the entire project) shall be tested utilizing the flex-wall permeability test method (Backpressure Saturated Triaxial Test EPA Method 9100). All permeability testing shall be performed by a geotechnical soils laboratory. Results of the permeability tests shall be reported by the laboratory within three days from receipt of samples. The permeability of samples obtained

from the clay liner shall be 1×10^{-7} cm/sec or less to be considered as passing. If a permeability test fails, the surrounding grid area of 375 feet (halfway to next grid point) on each side of the test shall be reworked, recompacted, and then resampled (for permeability and density) until passing test results are achieved.

The soils technician shall plug all holes resulting from Shelby Tube samples (for permeability testing) with a bentonite grout.

204.8 Acceptance of Work

Areas of compacted clay lifts which do not meet density, moisture, or permeability requirements shall be repaired or replaced by the Contractor with material and workmanship that meets the requirements of these specifications.

The Contractor shall receive verification from the engineer or his designee that each foot of compacted clay placed for the liner or impoundment levee has passed all testing and retesting, and is accepted.

205. ROAD BASE

205.1 General Description of Work

This work consists of providing all materials, labor, and equipment necessary to install a minimum eight-inch thick road base on top of the impoundment levees.

205.2 Soil Specifications

Road base installed on the top of all levees of the new impoundment shall consist of a sand-clay-gravel material obtained during excavation for the impoundment. The sand-clay-gravel shall be overlain by a 1 1/2 inch wash gravel. All materials shall be compacted to facilitate adequate trafficability and drainage. Following excavations performed on site, the Owner will determine if it will be necessary to obtain additional material from off-site sources to construct the road surface.

206. SURFACE WATER DRAINAGE CONTROL

206.1 Description of Work

This work consists of providing all labor and equipment necessary to satisfactorily promote and maintain adequate site drainage. The Contractor shall provide temporary and permanent drainage control of surface water which falls on the site. The Contractor shall perform grading and construct temporary ditches, as necessary, to direct surface water away from the areas of work. The Contractor shall regrade the existing drainage ditch to drain to the northeast, and construct an extension of the ditch approximately parallel to Toney Bayou Road. The ditch extension shall drain into the existing pond (former borrow pit) on the site. The Contractor shall take precautions to avoid water pollution of nearby streams and ponds.

206.2 General Requirements

The Contractor shall provide and maintain the proper pumps, hoses, and generators to dewater work areas and borrow pits so that standing water is removed. Where dewatering is performed by construction of temporary ditches, the Contractor shall control the flow and provide for erosion control to prevent water pollution of downstream waters. In conjunction with control of surface water, the Contractor shall provide temporary and permanent erosion control as specified in Section 207.

206.3 Construction of Permanent Ditch

The Contractor shall clear and grade the existing drainage ditch located immediately south of the impoundment only within the limits specified on Figure A-5, so that disturbance to the ditch is minimized. The ditch shall be graded to the elevations shown on Figure A-5, so that the flow of runoff within the ditch will be reversed (the ditch presently flows west toward Toney Bayou. Excavation of the ditch shall be performed in accordance with Section 202.2.5 of these specifications. A new section of ditch shall be constructed by the Contractor beginning at the east end of the re-graded ditch and proceeding north toward the existing large pond located immediately north of the proposed impoundment. The new ditch will drain into the east end of the pond, as shown on Figure A-5. Permanent erosion control measures shall be installed by the Contractor within two days of completion of ditch construction. The Contractor shall plant vegetation in the ditch in accordance with the Wetlands Mitigation Plan developed for this project. A copy of this plan will be furnished to the Contractor.

A Storm Water Construction Permit will be posted at the construction site which will include a detailed plan for erosion control and surface water management during construction. The Contractor shall be in full compliance with this permit at all times.

207. TEMPORARY EROSION CONTROL

207.1 Description of Work

This work consists of providing temporary erosion control measures for all work areas of the project or associated with the project, including borrow pit areas. The Contractor shall implement Best Management Practices (BMP) for temporary erosion control and shall filter discharges, if necessary, to prevent release of water with high suspended solids into nearby ponds. Where permanent erosion control measures are planned, the Contractor shall implement these measures as soon as practical.

A plan for temporary erosion control during all construction operations will be posted at the site on the Stormwater Construction Permit. This permit is a stormwater control plan developed to minimize the effects of construction activity on surrounding property and downstream drainage areas, particularly environmentally-sensitive areas. The Contractor shall be in compliance with this permit at all times

207.2 General Requirements for Temporary Erosion Control

Temporary erosion control measures shall be provided by the Contractor throughout construction, or until permanent erosion control measures are in place. The Contractor shall prevent pollution and siltation of nearby ponds, natural ditches, and streams resulting from the site construction activities.

The Contractor shall provide all materials, labor, and equipment necessary to facilitate proper installation or construction of erosion control measures.

207.3 Requirements for Wetland Areas

Construction operations in Toney Bayou and in the on-site borrow area shall be limited to the clearing, grubbing, excavation, and filling operations necessary to perform the work, and operations necessary to implement erosion control measures. Upon completion of work in these areas and establishment of permanent erosion control measures (where applicable), the Contractor shall remove the temporary erosion control measures with care to avoid disturbance to the surrounding area. Excavated material shall not be deposited in the designated wetland areas, except as authorized or as part of the construction process. The Contractor shall also take precautions to prevent pollution of wetlands or surface waters from fuels, oils, lubricants, waste materials, garbage, or construction debris.

207.4 Permanent Erosion Control

Permanent erosion control measures shall be installed by the Contractor as soon as

construction work in completed in an area, unless directed otherwise by the Owner. Specifications for seeding for permanent erosion control are provided in Section 208.

207.5 Materials

All materials provided by the Contractor for temporary erosion control shall meet commercial grade standards and shall be approved by the Owner prior to use for the project. Materials that are incorporated into the completed project shall meet specifications for those materials. All materials will be visually inspected and approved before use.

Grass planted for temporary erosion control shall be an approved quick-growing species that will not compete with permanent grasses. Mulches shall consist of stems or stalks of oats, rye, rice, wheat, or other approved straws. Fertilizer shall be a commercial grade acceptable to the Owner.

207.6 Protection of Work During Construction

The Contractor shall be responsible for protection of work during inclement weather and during any periods of suspension of the work. A smooth-drum roller, rubber-tired roller, or other approved equipment shall be available on site for smooth-rolling the surface of the clay liner and levee areas prior to anticipated rainfall events. The surface of these areas shall also be sloped to enhance runoff of rainwater with minimal impact on adjacent exposed areas of erodible earth.

207.7 Protection of Work During Flooding of the Ouachita River

The Owner may require the Contractor to flood the impoundment if the backwaters of the Ouachita River rise to a level that is potentially detrimental to the clay liner. The Contractor shall furnish pumping equipment at the site that is capable of pumping at least 3000 gallons per minute in the event that the impoundment will have to be flooded with water to protect the liner. The Contractor well also be required to pump the water from the impoundment after the backwater has receded. The Contractor shall repair any damage to the clay liner resulting from backflooding the impoundment.

If the backwaters of the Ouachita River reach the exterior levee slopes during construction, the Contractor shall try to protect the slopes from erosion as much as possible.

208. SEEDING

208.1 Description of Work

The Contractor shall perform seeding, fertilizing, mulching, watering, and maintenance in designated areas for establishment of permanent grass cover. A 4- to 6-inch thick layer of topsoil shall also be installed by the Contractor in areas that require seeding but lack topsoil, such as the exterior slopes of levees.

208.2 Materials

The Contractor shall supply only pre-approved materials meeting commercial grade standards for the project. Permanent materials will be accepted for the project based on visual inspection.

Mulches: Vegetative mulch shall be a straw mulch free of mold or other evidence of decomposition and weed seed. Mulches shall be delivered to the project site in bales of uniform size, and shall be stored in an area designated by the Owner. The Contractor shall provide protection for the mulch material from wet weather.

Asphalt: Asphalt for mulching shall be approved emulsified asphalt that conforms to the requirements of Section 1002, Louisiana Standard Specification for Roads and Bridges.

Seeds: Seed furnished for permanent grass cover shall be of the following mixture (depending on planting date):

March - Sept. planting -	15 lbs/acre Pensacola Bahia seed 15 lbs/acre Hulled Bermuda seed
Sept. - Feb. planting -	20 lbs/acre Kentucky 31 Vescue seed 10 lbs/acre Crimson Clover seed 10 lbs/acre Pensacola Bahia Grass or Hulled Bermuda Grass

Each variety of seed shall be furnished and delivered in separate bags or containers and shall be free from moisture or mildew. The containers shall include labelling identifying purity, germination, and type of seed, in accordance with USDA requirements. Seed furnished shall be of the previous season's crop, with the date of analysis shown on each bag within nine months of the time of delivery to the site.

Fertilizer: All fertilizer furnished shall be a pellet or granular fertilizer with an analysis of 8-8-8 for percent nitrogen, phosphoric acid, and potash

nutrients, respectively. Fertilizer shall be applied at the rate of 1,000 pounds per acre.

208.3 Seeding Operations

All areas to be seeded shall be cultivated to a depth of at least four inches. The seed bed shall be cultivated sufficiently to a state of good tilth to prevent the seed from being covered too deep for optimum germination. The soil shall be thoroughly pulverized to a minimum depth of 3 inches.

Fertilizer shall be incorporated into the seeding at the rate of 1,000 pounds per acre. After seeding has been completed, the area shall be watered immediately using water obtained from a source approved by the Owner.

208.4 Mulching Operations

The Contractor shall uniformly place approved straw or hay mulch on all seeded areas within 48 hours after seeding, at the rate of 1 1/2 to 2 tons per acre. Mulching shall be placed with mechanical equipment capable of distributing the mulch uniformly by blowing it onto the area. The equipment shall be provided with jet nozzles in the muzzle of the blower through which asphalt is ejected simultaneously with the mulch, coating the mulch uniformly with asphalt as it is blown through the nozzle. Asphalt shall be applied at the rate of 75 to 175 gallons per ton of mulch. Manual application of mulch and after-spraying with asphalt will be permitted in areas that are inaccessible to equipment.

Mulching shall begin at the top of slopes and extend downward. The Contractor shall take care to avoid spraying asphalt on areas that are not designated for mulching operations. The asphalt-tacked mulch shall be loose enough to allow air to circulate, but compact enough to partially shade the ground and reduce the impact of rainfall on the soil surface.

SECTION 300
HDPE LINER INSTALLATION

301. GENERAL REQUIREMENTS

301.1 General Description of Work

A 60 mil high density polyethylene (HDPE) liner shall be installed over the entire interior area of the ash/sludge impoundment, as shown on Figure A-3 (Appendix A). The HDPE liner will overly and be in direct contact with the three-foot thick recompacted clay liner installed in the impoundment. The work for this item consists of furnishing all labor, materials, tools, and equipment necessary to install and test the synthetic liner in accordance with the design drawings and specifications for the project.

The Contractor shall be responsible for the shipment, handling, and storage of the HDPE liner to the Riverwood International USA, Inc. Plant in West Monroe, Louisiana. The liner shall be delivered to the site prior to commencement of the work, and shall be stored on the site in a location designated by the Owner. The liner shall be shipped in rolls and seamed in the field. The Contractor shall supply the necessary equipment for lifting and handling of the material.

301.2 Contractor's Submittals

After award of the Contract and prior to commencement of the work, the Contractor shall obtain from the Manufacturer and submit to the Engineer a detailed Quality Control Procedures Manual for the manufacturing and testing of the HDPE synthetic liner. This Manual shall contain the following information: resin sampling and testing frequencies and procedures, synthetic liner sampling and testing frequencies and procedures, liner thickness control and calibration methods, and synthetic liner handling and storage methods.

The Contractor shall submit a detailed Quality Control Procedures Manual for the installation and testing of the synthetic liner. This Manual shall include: handling and storage procedures, deployment procedures, field seaming procedures, liner repair procedures, and leak testing procedures. The Contractor shall provide an installation schedule for the project, including time estimates for completion of the various activities described in these specifications.

The Contractor shall also submit to the QA/QC Manager, within one week prior to shipment of rolls of material to the site, the following information for each roll of liner:

- Certification that the resin meets specification requirements and that all resin is from the same supplier
- Statement of resin production dates
- Quality Control Certificates from the Manufacturer and resin supplier
- Laboratory certification that the liner meets the specification requirements
- Certification that all rolls of liner are manufactured from one resin type obtained from one supplier
- Statement of HDPE liner production dates
- A copy of quality control certificates issued by the liner Manufacturer
- Statement certifying that no reclaimed polymer is added to the resin
- Certification for extrudate beads and/or rod that the material meets the specification requirements, is produced using the same resin type, and was obtained from the same resin supplier used to manufacture the HDPE liner

The QA/QC Manager may refuse use of any roll of synthetic liner supplied without the required quality control documentation.

301.3 Qualifications of Personnel

The Contractor shall submit resumes of personnel to be employed in supervisory positions (as Field Superintendent), as Quality Assurance Technicians, or as Welding Technicians on this project. The resume shall include, at a minimum, the name of the employee, position, and experience to date in the position which the person will be assuming on this project. The qualifications of the Manufacturer and Installer's personnel shall meet the following minimum requirements:

Manufacturer - The company shall be specialized in the manufacture of HDPE liner, with documentation of a minimum of 20 million square feet of material manufactured.

Installer - The company shall be specialized in the installation of HDPE liner, with documentation of a minimum of 5 million square feet of HDPE liner installation. The

Installer shall provide documentation that the company is a licensed or approved installer of the manufacturer's product.

Master Seamer - The Master Seamer shall have a minimum of 5 million square feet of seaming work using the type of seaming apparatus to be used on this project.

301.4 Material Specifications

The synthetic liner shall consist of high density polyethylene (HDPE) liner manufactured of new, first quality materials. The liner shall be free of undispersed raw materials, holes, blisters, striations, surface roughness, or any sign of contamination by foreign matter. The HDPE liner shall have a smooth or matte finish on both sides of the material and shall have uniform thickness, color, and texture. All HDPE materials shall have sufficient strength and resistance to chemical or ultraviolet radiation attack for the intended use.

The HDPE liner shall have a minimum thickness of 60 mils (1.5 mm), with a tolerance of + 10 percent. The liner material shall be manufactured with a minimum 22.0 feet seamless width. Labels on each roll of material shall identify the thickness, length, width, roll number, batch number, and Manufacturer.

The Contractor shall supply certification from the Manufacturer that the HDPE liner meets the minimum specifications (unless otherwise qualified) shown in Table 1. Certification shall also be supplied by the Contractor stating that the resin used in the manufacturing of the liner meets the specifications presented in Table 2. The geomembrane shall be tested at the frequencies specified in the QA/QC Plan, Section 5.0 Conformance Testing.

301.5 Delivery, Storage, and Handling

Rolls of material delivered to the site shall be accompanied by the required submittals (Section 205.2) to the QA/QC Manager. Rolls without proper documentation shall be stored at a separate location until the documentation is received. Damaged rolls will also be set aside and stored at a separate location designated by the Project Manager until use or rejection of the material is determined by the Project Manager (Owner). The Owner will be the final authority regarding acceptance or rejection of material.

The rolls of material shall be stored on a level prepared surface in an area designated by the Project Manager. The material shall be protected from puncture, dirt, grease, moisture, mud, excessive heat, and mechanical abrasion. The rolls shall be stacked in accordance with the Manufacturer's recommendation, but no more than

three rolls high.

Appropriate handling equipment shall be used to load, move, and deploy rolls of geomembrane. Appropriate equipment includes cloth chokers and spreader bar for loading and spreader and roll bars for deployment. Panels of material shall not be dragged on the ground, and the material shall not be folded. The Installer is responsible for off-loading, storage, and transporting the material from the storage area to the impoundment facility. All damage to the geomembrane shall be documented by the QA/QC Monitor. Damaged geomembrane shall be repaired in accordance with these Specifications or shall be replaced at no cost to the Owner.

TABLE 1
HDPE SYNTHETIC LINER PROPERTIES

Property	Test Method (ASTM)	Value
Thickness (+ 10%)	D1593	60 mils
Specific gravity	D792 Method A	0.93
Mechanical Properties		
Tensile strength[2] (force per unit width at break)	D638	240 lb/in
Tensile strength (force per unit width at yield[1])	D638	140 lb/in
Elongation at break	D638	600%
Elongation at yield	D638	10%
Modulus of elasticity	D638	80 ksi
Tear resistance	D1004 Die C	45 lbs
Puncture resistance	FTMS 101 Method 2065	80 lbs
Environmental Properties		
Carbon black content range	D1603	2 to 3%
Carbon black dispersion (specified value)	D3015	A-2
Melt index (range)	D1238, Condition 190/2.16	0.1 - 1.1 g/10 min.
Dimensional stability (each direction)	D1204 212° F 15 min.	3% max. change

[1] The value corresponds to a stress of 2,000 psi.
[2] The value corresponds to a stress of 3,750 psi.

TABLE 2

HDPE RESIN PROPERTIES

Property	Test Method (ASTM)	Value
Specific Gravity (resin + carbon black)	ASTM D 792 Method A	0.935 to 0.95
Melt Index	ASTM D 1238 Condition E	<= 1 g/10 min

Additional Requirements for Resin:

- Resin shall be comprised of new, first-quality HDPE, manufactured specifically for producing HDPE geomembrane.
- The resin shall all be of the same type; with no intermixing of resin types.
- Testing frequency shall be 1 per 50,000 square feet or 1 per resin batch, whichever is greater.

301.6 Quality Assurance/Quality Control for HDPE Liner Installation

The Contractor shall supply the additional information required in the Quality Assurance/Quality Control Plan. The Contractor and the Installer shall perform the liner installation in accordance with these specifications and the QA/QC Plan. The QA/QC Plan shall be implemented under the direction of the QA/QC Manager.

302. GEOMEMBRANE INSTALLATION

302.1 Anchor Trench Excavation

The Contractor shall excavate an anchor trench to the lines and grade indicated on Figure A-3. Anchor trenches shall be constructed on the top of the levees only. The clay excavated from the anchor trench shall be stockpiled immediately outside the anchor trench. Open anchor trenches shall be graded to drain as directed by the Project Manager. The HDPE liner shall be installed to cover the entire bottom width of the anchor trench. Adjacent liner panels shall be seamed through the entire width of the anchor trench, and the liner shall be temporarily anchored in the anchor trench (using an approved method) until the liner is permanently anchored with backfill.

Following installation of HDPE liner in the anchor trench, the Contractor shall backfill the anchor trench by placing eight-inch thick lifts of clay and compacting the clay to the maximum extent practicable using a hydraulic packer or other approved means. The method of compaction used when backfilling the anchor trench shall not damage the HDPE liner.

302.2 Geomembrane Deployment

The 60 mil HDPE liner shall be installed under the direction of a Field Superintendent, furnished by the Contractor, who is experienced in the installation of HDPE liner for this type of application. The Field Superintendent shall be in charge of the installation and shall be responsible for the quality of work performed.

Prior to the commencement of the synthetic liner installation, the QA/QC Manager and Field Superintendent shall inspect the prepared subgrade for protrusions, debris, or sharp objects of any kind. Any objects found that could damage the HDPE liner shall be removed from the subgrade. The Engineer and the Field Superintendent shall approve the condition of the subgrade prior to beginning installation of the HDPE liner.

The HDPE liner shall be installed in the ash/sludge impoundment in accordance with the following guidelines:

- Deployment shall not be performed during precipitation, in the presence of excessive moisture or ponded water, or in the presence of excessive winds.

- Deployment of the panels shall be in a manner that eliminates the need for seaming across a slope and that allows sufficient

lining material to accommodate normal shrinkage and settlement. No horizontal (across or parallel to slope) seams shall be allowed within three feet of the crest of the levees or within 5 feet of the toes of the levees;

- Panels shall be deployed in an orientation which minimizes the amount of seaming required;

- The Contractor shall provide adequate temporary loading of the edges of the panels to prevent any uplift from wind;

- Panels of the synthetic liner shall have a minimum 3 inch overlap for extrusion welding and a minimum 5 inch overlap for fusion welding;

- If the panels are to be extrusion welded, adjacent panels shall be temporarily bonded prior to seaming;

- Personnel working on the geomembrane shall not smoke, wear shoes that may damage the material, throw metal clamps or other tools used in the work area, or engage in other activities that could damage the liner; and

- No vehicular traffic shall be allowed on the geomembrane. The Installer shall protect high traffic areas (equipment and workers) by placement of geotextile or geomembrane rub sheets.

The Contractor shall be responsible for maintenance of the clay liner throughout installation of the geomembrane. Any rough areas and any areas of the subgrade that are damaged during installation of the geomembrane shall be repaired by the Contractor.

The QA/QC Monitor shall visually inspect the sheet surface as it is deployed, and shall mark any suspect areas for repair or testing. Areas of geomembrane that require more than one patch per 5,000 square feet shall be replaced by the Installer at no cost to the Owner.

302.3 Geomembrane Seaming

Panels of the synthetic liner shall be welded together using the fusion welding or extrusion welding process. If extrusion welded, the edge of the top panel shall be bevelled and a minimum 1 inch wide strip of the bottom panel shall be abraded over the surface prior to welding. All surfaces to be welded shall be clean and free of moisture. No seaming shall be performed if the ambient temperature is above 104°

F (40° C) or below 40° F (5° C). Seaming may be performed at ambient temperatures between 40° F and 50° F if adequate preheating of the liner is provided by the sun or by artificial means just prior to seaming.

The seaming apparatus shall be equipped with temperature gauges giving the applicable temperatures. For the extrusion welding process, the Installer shall certify that the extrudate is compatible with the HDPE material specifications for this project. Heat degraded extrudate shall be purged from the barrel of the machine whenever the extruder is stopped. The Installer shall provide one spare, operable seaming apparatus on site at all times during the installation process. The Contractor shall provide a power source capable of providing constant voltage under combined-line load. If power generators will be located on the geomembrane, the Contractor shall provide splash pads large enough to catch spilled fuel.

Test seams shall be completed at the beginning of each seaming period for each seaming apparatus that will be used that day. These trial seams shall be at least two feet long if extrusion welded and at least ten feet long if fusion welded and shall be made on fragment pieces of HDPE liner. One-inch wide strips will be cut from each end of the test seam which shall be tested by the Installer for failure in shear or peel modes. The Installer shall provide a tensiometer capable of quantitatively measuring geomembrane strength, accurate to + or - 2 lbs per inch of geomembrane width for testing the test seam strips. A specimen passes when the break is film tear bond (FTB), the break is ductile, and when the strength at break is 70 percent (wedge welder) or 60 percent (extrusion welder) of sheet minimum yield strength for the peel test; or 90 percent of sheet minimum yield strength for the shear test.

A break at the weld-sheet interface (adhesion) is considered a non-FTB and is a failing test. A break through the weld is considered a FTB if the break is ductile and if the strength for 60 mil HDPE is at least 126 lbs. for shear, 84 lbs. in peel for the extrusion weld, 98 lbs. in peel for the wedge weld; otherwise the break is considered a failure. A test seam sample passed when both specimens have a passing result in peel and shear tests. If a test fails, the entire test seam procedure shall be repeated. If repeated failure occurs, the operator or apparatus should not be used until deficiencies or conditions are corrected and two consecutive passing test seams are achieved.

The Engineer shall observe the testing of the strips from the trial seams and verify that conditions are adequate for seaming and that the apparatus is in acceptable working condition.

The Installer shall perform seaming operations in accordance with the following guidelines:

- Seams shall be oriented down, not across, the line of slope and the

number of field seams shall be minimized;

- Only qualified personnel shall perform seaming operations, and each operator shall pass the field seaming test at the beginning of a seaming period. Seaming operators shall be directly supervised by at least one Master Seamer, who has at least 5 million square feet of seaming experience using the same type of apparatus in use at the site;

- Overlap of at least 3 inches for extrusion welding and 5 inches for wedge welding shall be maintained during seaming operations;

- No solvent or adhesive products shall be used unless pre-approved in writing by the Owner. For extrusion welding, the edges of the geomembrane shall be bevelled before bonding and the seam area shall be continuously tacked down prior to welding;

- The geomembrane surface shall be clean and free of grease, moisture, dust, dirt, debris, or other foreign matter in the weld area;

- Number 80 grit sandpaper shall be used for the disc grinder;

- Areas were grinding has removed more than 4 mils of material shall be patched;

- Grind all areas to be re-welded or beaded;

- Wrinkles and fishmouths shall be cut along ridges and patched in areas where appropriate overlap is not available;

- Adequate lighting shall be provided by the Contractor if seaming is performed at night;

- Avoid start-stop welding, and grind existing weld back two inches from point of stoppage before continuing;

- Test and set "hot air system" using scrap material at least each day prior to commencing seaming and adjust hot air velocity to preclude wind effects. Adjust contact pressure rollers to prevent surface ripples in the material;

- Use only equipment that has passed the field seaming test that day;

- For hot wedge welding, the apparatus shall be automated vehicular mounted devices equipped with gauges giving applicable temperatures and pressures. The edge of cross seams shall be ground to smooth incline (top and bottom) prior to welding, and cross seams shall be capped with a minimum 12-inch patch of identical geomembrane. A smooth insulting plate or fabric shall be placed beneath the hot welding apparatus after usage. Test seams shall be conducted for each apparatus used prior to start of work and at mid-day.

302.4 Destructive Seam Testing

Destructive seam testing of the welded seams of HDPE liner shall be performed by the Installer and the QA/QC Monitor, in accordance with these specifications and the Quality Assurance/Quality Control Plan for Geosynthetic Liner Installation (QA/QC Plan). A minimum of one test per 500 feet of seam shall be performed. Additional tests may be required if the QA/QC Monitor suspects that a seam may not meet the specification requirements. Reasons for performing additional tests may include wrinkling in the seam area, equipment not functioning properly, adverse weather conditions, dirty or dusty conditions, or history of failing tests. Destructive tests are performed to evaluate seam strength and long-term performance, and are performed throughout the seaming process. Locations for seam destructive samples are to be identified by the QA/QC Monitor.

Seam samples obtained for destructive testing shall be tested for failure in the peel and shear modes, and the results recorded and logged. Test locations shall be identified by the following guidelines:

- A minimum of one test per 500 linear feet of seam length welded by the same technician. This is an average frequency for the entire installation, and samples may be taken at more frequent intervals if warranted.

- Additional samples taken as the result of failed tests do not count toward the total number of tests or in considering frequency.

- Test locations are determined at the QA/QC Monitor's discretion.

- The Installer and his technicians shall not be informed in advance of test sample locations.

- The Installer shall cut the samples, from the liner under the observation of the QA/QC Monitor.

- Each sample shall be identified with a unique number which contains the

seam number and adjoining panel numbers. The sample number and location shall be documented on a panel layout drawing and on the seaming log.

- The sample location, seamer's initials, weather conditions, and other pertinent information shall be noted on the Destructive Seam Test records.

At each sample location, two seam samples shall first be obtained at a distance of 42 inches apart, each sample measuring 1 inch wide by 12 inches long with the seam centered across the length. These samples shall be tested in the field by the QA/QC Monitor using a tensiometer capable of measuring shear and peel strengths. If one or both of the samples fails in either peel or shear, the Installer shall either reconstruct the seam between passed test locations or take another test sample 10 feet from the point of the failed test and repeat this procedure. If the second test passes, the Installer can cap the seam between the two passed test locations. If the second test fails, the procedure is repeated until a passing test is achieved and the length of poor quality seam has been established. Repeated failures may indicate a problem with the seaming apparatus and/or operator, and appropriate action should be taken.

After two field tests have passed, a sample shall be obtained from the area between the two sample locations for laboratory testing. The laboratory sample shall be 42 inches long by 12 inches wide, the seam centered along the length of the sample. This sample shall be divided into three parts: one 12-inch by 14-inch sample to be sent to the Installer's testing laboratory, one 12-inch by 14-inch sample to be sent to the QA/QC Monitor's selected laboratory, and one 12-inch by 14-inch sample shall be given to the Owner for archive storage. The laboratory test results shall be recorded on the Destructive Seam Test Form.

If the laboratory test results from the Installer's laboratory or from the QA/QC Monitor's selected laboratory fails in either peel or shear, the Installer may either reconstruct the entire seam or obtain additional samples from locations at least 10 feet on either side of the failed sample for additional laboratory testing. The sample size and division shall be the same as described for the original sample. This procedure shall be repeated until the failing seam is bounded by passing test seams on each side. Cap seams more than 50 feet in length shall also be tested by the laboratory. Final acceptance of seams is dependent on the passing of all seams as documented through laboratory testing. The field test seams are performed as a means of limiting the number of samples performed on failing seams.

The QA/QC Monitor shall ship the seam samples to the laboratory for destructive testing on the same day the sample is obtained, so that results can be determined as soon as possible. Laboratory testing shall include seam strength and peel (ASTM D-638). At least five one-inch samples shall be tested in each method (peel and shear), and the results shall be compared to the minimum test values presented below. The sample must yield in a FTB break, with break occurring at or above the minimum values shown in order for the sample to pass. FTB (film tear bond) refers to sample yield (ductile break) through the weld. A

break at the weld-sheet interface (adhesion) is considered a non-FTB break, which is a test failure.

Extrusion Weld, FTB	Wedge Weld, FTB
126 lbs. (shear)	126 lbs. (shear)
84 lbs. (peel)	98 lbs. (peel)

The testing laboratories shall provide test results within 24 hours of receiving samples. Certified laboratory reports shall be provided by the laboratories within 5 days. If a test fails, the QA/QC Monitor shall notify the Installer immediately, and additional test samples shall be obtained or the entire seam shall be reconstructed.

302.5 Geomembrane Leak Testing and Repairs

All repairs made to the HDPE liner shall be patched with the same (HDPE) lining material. Patches shall have rounded corners and shall extend at least four inches in all directions from the puncture. Seaming of the patches shall be done using the same procedures described above for field seaming using the extrusion welding technique.

All seams of the synthetic liner shall be leak tested by the Contractor using a vacuum or air pressure tester. For vacuum testing, the vacuum pump shall be engaged and the tank pressure reduced to approximately 5 psi. The vacuum box shall be placed over a strip of geomembrane seam wetted with a soapy solution and compressed. The bleed valve shall be closed and the vacuum valve opened, so that a vacuum is created for a period of at least 15 seconds. If bubbles are observed through the viewing window, the leak shall be marked for repair. If no bubbles are observed, the vacuum shall be released and moved to the next section of seam.

For seams produced using the double hot wedge welding device, air pressure testing shall be conducted using air pumps equipped with a pressure gauge capable of generating and sustaining a pressure of 25 to 30 psi, accurate within 1 psi. The apparatus shall be mounted on a cushion to protect the geomembrane. To perform the test, both ends of the seam to be tested shall be sealed, and a needle or other approved pressure feed device shall be inserted into the channel created by the double weld. The air pump shall be engaged to approximately 25 to 30 psi, the valve closed, and pressure sustained for a minimum of five minutes. If loss of pressure exceeds 2 psi or does not stabilize, locate the faulty area and repair. After testing, remove the pressure feed device and seal the penetration holes by extrusion welding.

All leaks detected shall be patched according to the above procedures, unless otherwise directed by the Engineer. Repairs made to the synthetic liner shall also be leak tested.

303. Final Inspection and Acceptance of Work

Upon completion of the HDPE liner installation, the Engineer shall visually inspect the entire surface of the lining material and, if assured that the quality of the installation has been satisfactory, will provide acceptance of the in-place liner. Any area of the HDPE liner that is of questionable quality or workmanship shall be identified by the Engineer and repaired or tested by the Contractor under direction of the Engineer.

After the installation has been accepted as complete by the Project Manager and the QA/QC Manager, the Installer shall submit to the Project Manager a certification stating that the geomembrane has been installed in accordance with the Contract Documents.

304. REFERENCES

304.1 American Society for Testing and Materials (ASTM)

D 638	Test Method for Tensile Properties of Plastics
D 792-66	Test Method for Specific Gravity and Density of Plastics by Displacement
D 1004-66	Test Method for Initial Tear Resistance of Plastic File and Sheeting
D 1238	Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer
D 1204-84	Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature
D 1603-76	Test Method for Carbon Black in Olefin Plastics
D 4437	Practice for Determining the Integrity of Field Seals Used in Joining Flexible Polymeric Sheet Geomembranes

304.2 Federal Test Method Standards (FTMS)

No. 101C - Method 2065 Puncture Resistance

304.3 National Sanitation Foundation (NSF)

NSF Standard 54-85 - Flexible Membrane Liners

304.4 Louisiana Standard Specifications for Roads and Bridges

Section 716 - Vegetative Mulch
Section 717 - Seeding

QUALITY ASSURANCE/QUALITY CONTROL PLAN
FOR SOIL LINER AND LEVEE CONSTRUCTION

Riverwood International USA, Inc.
West Monroe, Louisiana

1.0 INTRODUCTION

This document outlines the Quality Assurance/Quality Control (QA/QC) procedures for the installation of a three-foot thick recompacted clay liner in the Clarifier Sludge and Boiler Ash Sluice Pond at the Riverwood International USA, Inc.'s West Monroe, Louisiana facility. The objective of the construction QA/QC program is to verify that the materials and workmanship meet the project design standards and specifications, and to ensure that the proper construction techniques and procedures are followed. This program is to be administered by the QA/QC Manager.

2.0 RESPONSIBILITIES

The Contractor is responsible for all site preparation work, including clearing and grubbing, excavation, backfilling, temporary and permanent road construction, and construction of the levees, recompacted clay liner, and synthetic liner for the project. The Contractor is also responsible for locating, purchasing, and transporting any required borrow material for clay liner construction to the site, and shall inform the QA/QC Manager of clay borrow source locations so that the material may be tested and pre-approved.

The QA/QC Monitor is responsible for observing the construction of the clay liner, performing the required tests on the clay liner, and documenting all activities related to the QA/QC program. The QA/QC Monitor reports directly to the QA/QC Manager.

The QA/QC Manager is responsible for supervising and directing the work of the QA/QC Monitor, and is also responsible for preparation of the liner certification report, which must be certified by a Professional Engineer registered in Louisiana.

The Design Engineer is responsible for the drawings and specifications prepared for the project.

The Project Manager is the official on-site representative of the Owner, and is responsible for coordinating all field activities.

Prior to commencement of construction, a meeting shall be held at the site which shall be attended by the Contractor, the QA/QC Manager, the QA/QC Monitor, and the Project Manager. The objective of the preconstruction meeting is to review the requirements of the

specifications and QA/QC Plan and discuss any proposed modifications that may be recommended, review design requirements, review the responsibilities of each party and the lines of authority and communication, review requirements for documentation, discuss the construction schedule, and discuss other project-specific requirements as appropriate.

During construction, daily progress meetings shall be conducted at the site, which shall be attended by the Contractor and the QA/QC Monitor. The purpose of these meetings is to discuss the work schedule for the upcoming week and to review the test results for permeability and density testing.

3.0 LEVEE AND CLAY LINER MATERIAL EVALUATION

Soil materials used for construction of impoundment levees and clay liner shall consist of a clean select material free of organics, trash, excess silt, or other deleterious material. The soil shall be classified as CL or CH according to the Unified Soil Classification System. The material shall be spread and compacted in horizontal lifts no thicker than 8 inches. Compaction shall be performed using a sheepsfoot roller. The maximum clod size shall be less than 4 inches in all directions. The permeability of the compacted clay liner shall be equal to or less than the design requirement of 1×10^{-7} cm/sec.

Testing shall be performed on each different type of material proposed for use in clay liner and levee construction to verify the suitability of the material. A minimum of one test for moisture content, Atterberg limits, grain size, Standard Proctor (ASTM D 698), and remolded permeability shall be performed for each type of material.

All tests shall be documented, and the materials tested will be accepted or rejected based on the results of the tests performed. Testing of in-place liner and levee material during construction shall be performed in accordance with the requirements presented in the following Section.

4.0 CONSTRUCTION QA/QC ACTIVITIES

Construction QA/QC activities shall be performed as an evaluation of construction quality, and as part of the certification program. Construction quality evaluation shall include visual observation of the construction methods, testing of field density and moisture content, permeability testing, surveying of initial and final elevations to verify thickness, visual evaluation of lift thicknesses before and after compaction, and evaluation of the adequacy of layer bonding.

Density of the in-place compacted lifts shall be determined using the Nuclear Density Gauge. The Nuclear Density Method shall be checked periodically using the Sand Cone Method (ASTM D1556-64). At a minimum, one sand-cone test per 20 nuclear density tests

should be performed. If conflicting results are received, the sand-cone results should be accepted over the nuclear density gauge results. The laboratory and field testing of the in-place levee and clay liner during construction is outlined below in Table 1.

TABLE 1
CONSTRUCTION TESTING FREQUENCY FOR CLAY LINER EVALUATION

Test and Method	Laboratory Testing Frequency	Field Testing Frequency
Moisture Content (ASTM D-2216)	on 750 ft grid per vertical ft (1 per 21,000 yd^3)	
Particle Size (ASTM D-1140)	on 750 ft grid per vertical ft (1 per 21,000 yd^3)	
Atterberg Limits (ASTM D-4318)	on 750 ft grid per vertical ft (1 per 21,000 yd^3)	
Permeability (remolded)	on 750 ft grid per vertical ft (1 per 21,000 yd^3)	
Field Moisture/ Density (clay liner and levee)		on 150 ft grid per lift (1 per 400 yd^3)

Shelby tube samples of the compacted clay liner shall be obtained for laboratory testing at the frequency indicated in Table 1. The samples shall be tested using constant head permeability test methods, and at least two samples per vertical foot of liner (total of 6 for the entire project) shall be tested for permeability using the back-pressure saturated triaxial test (EPA Method 9100). All perforations produced in the clay liner from sampling activities shall be backfilled using bentonite chips, properly hydrated to fill the hole, or with a bentonite grout. Perforations resulting from the nuclear density probe shall be backfilled with clay soil, compacted in place with a tamping rod.

All areas of the levee and clay liner lifts that do not meet density and/or permeability (clay liner only) requirements shall be reworked by the Contractor. The QA/QC Monitor shall notify the Contractor of areas that fail density or permeability tests, document test results for all areas, document areas that were re-worked, and document the re-testing of areas that previously failed. The QA/QC Monitor shall also inform the QA/QC Manager and the Owner's Project Manager of the results of field and laboratory testing.

A final inspection of the completed clay liner shall be conducted by the QA/QC Manager.

5.0 DOCUMENTATION

The QA/QC Monitor shall document that all QA/QC requirements have been satisfied. The QA/QC Monitor shall keep daily logs of all construction observations, descriptive remarks, field test locations, results of field and laboratory tests performed, and notes from meetings and discussions held with other project personnel. The information contained in the daily logs shall be submitted on a regular basis to the QA/QC Manager, who shall prepare monthly summary reports for submittal to the Project Manager.

The QA/QC Monitor shall maintain a complete file of the design drawings, specifications, daily logs, and other pertinent files at the site. Design modifications may be required during construction, which shall require the approval of the Project Manager and the Design Engineer. Modifications to the design drawings or specifications shall take the form of an addendum or drawing revision.

The QA/QC Manager shall prepare a final certification report for submittal to the Owner and the Louisiana Department of Environmental Quality. This report will summarize the construction work and QA/QC activities performed, and will include test data log sheets, design or specification addendums, as-built drawings, and certification that the work has been performed in compliance with the plans and specifications. The report will be certified by a registered Professional Engineer, and as-built drawings will be certified by a Registered Land Surveyor.

QUALITY ASSURANCE/QUALITY CONTROL PLAN FOR GEOSYNTHETIC LINER INSTALLATION

Riverwood International USA, Inc.
West Monroe, Louisiana

1.0 INTRODUCTION

This document outlines the Quality Assurance/Quality Control (QA/QC) procedures for the installation of a 60-mil high density polyethylene (HDPE) liner in the Clarifier Sludge and Boiler Ash Sluice Pond at the Riverwood International USA, Inc.'s West Monroe, Louisiana facility. The objective of the construction QA/QC program is to verify that the materials and workmanship meet the project design standards and specifications, and to ensure that the proper construction techniques and procedures are followed. This program is to be administered by the QA/QC Manager.

To monitor compliance with the drawings and specifications for the project, the QA/QC program includes (1) a review of the Installer's quality control submittals, (2) material conformance testing, and (3) construction testing. Conformance testing refers to tests performed prior to installation of supplied materials, and construction testing includes activities performed during the synthetic liner installation.

All quality control testing shall be performed in accordance with this QA/QC Plan, and with the project construction drawings and specifications. All quality control documentation (forms, records, and drawings) used by the Contractor shall be in a form approved by the QA/QC Manager. The QA/QC Monitor(s) shall use daily report forms, data summary sheets, and drawings provided by the QA/QC Manager for recording the daily construction activities.

2.0 RESPONSIBILITIES

The Earthwork Contractor is responsible for all site preparation work required to prepare an acceptable smooth surface of the recompacted clay liner for the HDPE liner to be installed over. The Contractor is also responsible for oversight of the geosynthetic liner installer, who is to be subcontracted by the Contractor.

The HDPE Installation Contractor (Installer) is responsible for the quality and workmanship of the liner installation. The Installer shall install the HDPE liner over the entire interior area of the proposed 41-acre impoundment.

The QA/QC Monitor is responsible for observing the installation of the synthetic liner, performing the required tests on the liner, and documenting all activities related to the

QA/QC program. The QA/QC Monitor reports directly to the QA/QC Manager.

The QA/QC Manager is responsible for supervising and directing the work of the QA/QC Monitor, and is also responsible for preparation of the liner certification report, which must be certified by a Professional Engineer registered in Louisiana.

The Design Engineer is responsible for the drawings and specifications prepared for the project.

The Project Manager is the official on-site representative of the Owner, and is responsible for coordinating all field activities.

3.0 PRECONSTRUCTION MEETING

Prior to commencement of the synthetic liner installation, a meeting will be held at the site which shall be attended by the Contractor, the Installer (HDPE liner subcontractor), the QA/QC Manager, the QA/QC Monitor, and the Project Manager. The objective of the preconstruction meeting is to review the requirements of the specifications and QA/QC Plan and discuss any proposed modifications that may be recommended, review design requirements, review the responsibilities of each party and the lines of authority and communication, review requirements for documentation, discuss the construction schedule, and discuss other project-specific requirements as appropriate.

The Installer shall submit a liner installation schedule and a proposed panel layout drawing for review at the Preconstruction Meeting. The panel layout is subject to the approval of the QA/QC Manager.

4.0 MATERIAL SHIPMENT AND STORAGE

The rolls of HDPE liner delivered to the construction site shall be accompanied by the manufacturer's documentation required by Section 301.2 of the Technical Specifications. The Installer shall be responsible for submitting this documentation to the QA/QC Monitor and for providing the necessary equipment to unload the rolls of material. Care shall be taken to avoid damage to the material during the unloading process. Any roll of material that is damaged may be rejected. Rolls of material which do not have the required manufacturer's documentation may be rejected or shall be stored at a location separate from the accepted rolls until the documentation is received. All materials and equipment shall be stored at locations designated by the Project Manager (or Owner). The QA/QC Monitor shall visually inspect the outer surface of each roll for damage and shall perform an inventory of the rolls of material delivered to the site. Any rolls of material that are rejected by the QA/QC Monitor shall be removed from the site at the Installer's expense.

5.0 CONFORMANCE TESTING

The QA/QC Monitor shall obtain one HDPE liner sample per 50,000 square feet, or one sample per lot (whichever is greater), of the liner material delivered for the project for conformance testing. After removing the first three feet of the roll, a sample measuring three feet long by the width of the roll shall be obtained by the QA/QC Monitor. The machine direction and the manufacturer's roll identification number shall be marked on each sample.

The following conformance tests shall be performed on these samples by an approved geosynthetics laboratory:

Density (ASTM D-792 Method A or ASTM D-1505)

Carbon black content (ASTM D-1603)

Thickness (ASTM D-1593 or ASTM D-374 Method C)

Tensile characteristics (ASTM D-638)

Puncture resistance (FTMS 101B, Method 2065)

Carbon black dispersion (ASTM D-3015-85)

Minimum acceptable values for these properties are provided in Section 301.4 of the Technical Specifications. The QA/QC Monitor will review the test results and report any nonconformance to the Project Manager and the QA/QC Manager. Any rolls not meeting conformance standards shall be rejected.

6.0 HDPE LINER INSTALLATION

6.1 Surface Preparation

Prior to installation of the HDPE liner in an area, the QA/QC Monitor shall verify that the surface of the clay liner has been properly prepared. Specifically, the following requirements shall be met:

- The top of clay liner shall be at the lines and grades indicated on the design drawings, which shall be verified by a registered surveyor.

- The surface of the clay liner shall be rolled smooth to be free of surface irregularities, loose soil, stones, and protrusions.

- No desiccation cracking of the clay liner has occurred.

- No excessively wet or soft areas are present which could result in damage to the liner.

- Construction stakes and hubs have been removed.

- The Installer has certified, in writing, that the clay liner surface is acceptable for liner installation.

6.2 HDPE Liner Panel Placement

The QA/QC Monitor shall label each panel deployed with a unique identification number and shall maintain a chart showing the correspondence between roll numbers, certification documents, and panel numbers. The QA/QC Monitor shall also maintain a panel placement drawing showing the location of panels, seams, repairs, and patches.

During deployment of the HDPE liner panels, the QA/QC Monitor shall perform the following activities:

- Note the weather conditions. The liner should not be deployed in the presence of excess moisture (mist, heavy fog, etc.) or high wind. The Installer is responsible for any damage to the liner resulting from wind.

- Verify that the equipment used does not damage the liner.

- Verify that the clay liner surface is still in acceptable form, contains no protrusions that could damage the liner, and not has changed since its acceptance.

- Observe the surface of the panel for defects as it is deployed and document the locations of any defects observed, or, if rejected, note the reasons for rejection of the panel. The QA/QC Monitor shall also mark all defect for repair using an approved waterproof marker that is compatible with the liner (spray paint is not allowed).

- Verify that the method used to deploy the panels minimizes wrinkles and that the panels are properly anchored (using sandbags or other approved method).

- Record QA/QC data on the form provided by the QA/QC Manager. This data shall include panel identification number, roll number, date of deployment, weather conditions, and field seam numbers on each side of the panel.

- Verify that the panel deployment is proceeding in accordance with the approved panel layout drawing.

In addition, the QA/QC Monitor shall document that the people working on the HDPE liner do not smoke, wear shoes which could damage the liner, or engage in other activities that could damage the liner.

The Installer shall mark on each panel the panel number, roll number, and date deployed using an approved waterproof marker.

6.3 Liner Seaming Operations

Seams of the HDPE liner shall correspond to those shown on the approved panel layout drawing, unless otherwise approved by the QA/QC Monitor. The seams shall be numbered as indicated on the deployment forms. The Installer shall write the seam number, date seamed, welding technicians initials, seaming machine number, the welding temperature, and welding speed (wedge only).

Each welder and seaming apparatus shall be tested prior to each seaming period to determine if the equipment is operating properly. A seaming period consists of relatively uninterrupted operation of a seaming apparatus. If a seaming apparatus is not in use for a period exceeding an hour, a new test seam shall be performed prior to beginning operation again. A test seam is to be obtained from a trial weld performed on scrap pieces of liner under seaming conditions similar to those under which the panels will be seamed. Test welds shall also be performed any time the QA/QC Monitor believes that the welding apparatus may not be functioning properly, or if there are significant changes in temperature or humidity.

The QA/QC Monitor shall verify the following during seaming operations:

All Welding:

- The Installer has maintained the number of seaming technicians and welding machines previously agreed on, and has maintained equipment in good operating condition.

- Seaming equipment is operated properly so as to avoid damage to the liner.
- The ambient temperature measured six inches above the membrane surface is between 40 and 100° F.
- No solvents or adhesives are used in the seams.
- The weld area is free of moisture, dust, and debris.
- The weld area is cleaned just prior to welding with a clean rag.
- Panels are being seamed in accordance with the approved panel layout drawing and the specifications.

Extrusion Welding:

- The degraded extrudate is purged from the apparatus prior to beginning a seam, and is disposed of off the liner.
- Grinding of the panel edges was completed within one hour of seaming operations.
- The end section of welds that have cooled for more that 5 minutes are ground to expose new material prior to continuing a weld.
- Temporary bonding performed to hold the panels together does not damage the panels or interfere with seam testing.
- Seam overlap is a minimum of 3 inches.

Wedge Welding:

- Seam overlap is a minimum of 5 inches.
- Cross seam areas are ground to a smooth incline prior to welding, and are capped with a minimum 1-foot square patch of identical HDPE material.

The above information shall be noted on Field Seaming Record forms provided by the QA/QC Manager.

6.3.1 NonDestructive Seam Testing

Nondestructive seam testing shall be performed by the Installer using a vacuum box apparatus (extrusion welds) or an air lance (double wedge welds). During nondestructive testing of the seams, the QA/QC Monitor shall perform the following activities:

- Observe and record all testing.
- Record the date, seam number, technician name, and results of all testing on the Field Seaming Record forms provided by the QA/QC Manager.
- Mark all failed areas with a waterproof marker and notify the Installer of the required repairs.
- Verify that all testing and repairs are completed in accordance with the project specifications.
- Areas that have been repaired have been retested and passed, or (if failed again) repairs have been performed again.
- Repairs and retesting is continued until all repaired areas have passed.

The locations of all leaks identified from the testing shall be marked for repair and shall be initialed by the QA/QC Monitor following the repair.

6.3.2 Destructive Seam Testing

The QA/QC Monitor shall perform at least one destructive seam test per 500 feet of seam. Additional tests shall be performed if the QA/QC Monitor suspects that a seam may not meet the specification requirements. Reasons for performing additional tests may include wrinkling in the seam area, equipment not functioning properly, adverse weather conditions, dirty or dusty conditions, or history of failing tests. Destructive tests are performed to evaluate seam strength and long-term performance, and are performed throughout the seaming process. Locations for seam destructive samples are to be identified by the QA/QC Monitor.

Seam samples obtained for destructive testing shall be tested for failure in the peel and shear modes, and the results recorded and logged. Test locations shall be identified by the following guidelines:

- A minimum of one test per 500 linear feet of seam length welded by the same technician. This is an average frequency for the entire installation, and samples may be taken at more frequent intervals if warranted.
- Additional samples taken as the result of failed tests do not count toward the total number of tests or in considering frequency.
- Test locations are determined at the QA/QC Monitor's discretion.
- The Installer and his technicians shall not be informed in advance of test sample locations.
- The Installer shall cut the samples, from the liner under the observation of the QA/QC Monitor.
- Each sample shall be identified with a unique number which contains the seam number and adjoining panel numbers. The sample number and location shall be documented on a panel layout drawing and on the seaming log.
- The sample location, seamer's initials, weather conditions, and other pertinent information shall be noted on the Destructive Seam Test records.

At each sample location, two seam samples shall first be obtained at a distance of 42 inches apart, each sample measuring 1 inch wide by 12 inches long with the seam centered across the length. These samples shall be tested in the field by the QA/QC Monitor using a tensiometer capable of measuring shear and peel strengths. If one or both of the samples fails in either peel or shear, the Installer shall either reconstruct the seam between passed test locations or take another test sample 10 feet from the point of the failed test and repeat this procedure. If the second test passes, the Installer can cap the seam between the two passed test locations. If the second test fails, the procedure is repeated until a passing test is achieved and the length of poor quality seam has been established. Repeated failures may indicate a problem with the seaming apparatus and/or operator, and appropriate action should be taken.

After two field tests have passed, a sample shall be obtained from the area between the two sample locations for laboratory testing. The laboratory sample shall be 42 inches long by 12 inches wide, the seam centered along the length of the sample. This sample shall be

divided into three parts: one 12-inch by 14-inch sample to be sent to the Installer's testing laboratory, one 12-inch by 14-inch sample to be sent to the QA/QC Monitor's selected laboratory, and one 12-inch by 14-inch sample shall be given to the Owner for archive storage. The laboratory test results shall be recorded on the Destructive Seam Test Form.

If the laboratory test results from the Installer's laboratory or from the QA/QC Monitor's selected laboratory fails in either peel or shear, the Installer may either reconstruct the entire seam or obtain additional samples from locations at least 10 feet on either side of the failed sample for additional laboratory testing. The sample size and division shall be the same as described for the original sample. This procedure shall be repeated until the failing seam is bounded by passing test seams on each side. Cap seams more than 50 feet in length shall also be tested by the laboratory. Final acceptance of seams is dependent on the passing of all seams as documented through laboratory testing. The field test seams are performed as a means of limiting the number of samples performed on failing seams.

The QA/QC Monitor shall ship the seam samples to the laboratory for destructive testing on the same day the sample is obtained, so that results can be determined as soon as possible. Laboratory testing shall include seam strength and peel (ASTM D-638). At least five one-inch samples shall be tested in each method (peel and shear), and the results shall be compared to the minimum test values presented in Section 302.4 of the Technical Specifications. The testing laboratories shall provide test results within 24 hours of receiving samples. Certified laboratory reports shall be provided by the laboratories within 5 days. If a test fails, the QA/QC Monitor shall notify the Installer immediately, and additional test samples shall be obtained or the entire seam shall be reconstructed, as described above.

6.3.3 Repairs

Any areas of the HDPE liner marked for repair or identified as failing through the nondestructive or destructive seam testing shall be repaired in accordance with the requirements in Section 302.5 of the Technical Specifications. The QA/QC Monitor shall locate, describe, and log all repairs on the appropriate QA/QC forms. Repairs shall be performed using one of the following procedures:

1. Patching; which shall be performed to repair all holes, large defects, and destructive sample locations.

2. Extruding over the area; which may be used to repair small defects in the seams and panels, generally less than 0.5 inch in size.

3. Capping; which shall be used to repair failed seam areas and large areas where liner is cut out and removed due to excess wrinkling.

Wrinkles large enough to fold over shall be removed and the area shall be repaired by capping. If the material becomes stressed from contraction (trampoline effect) due to cold temperatures, the QA/QC Monitor shall identify the area for repair.

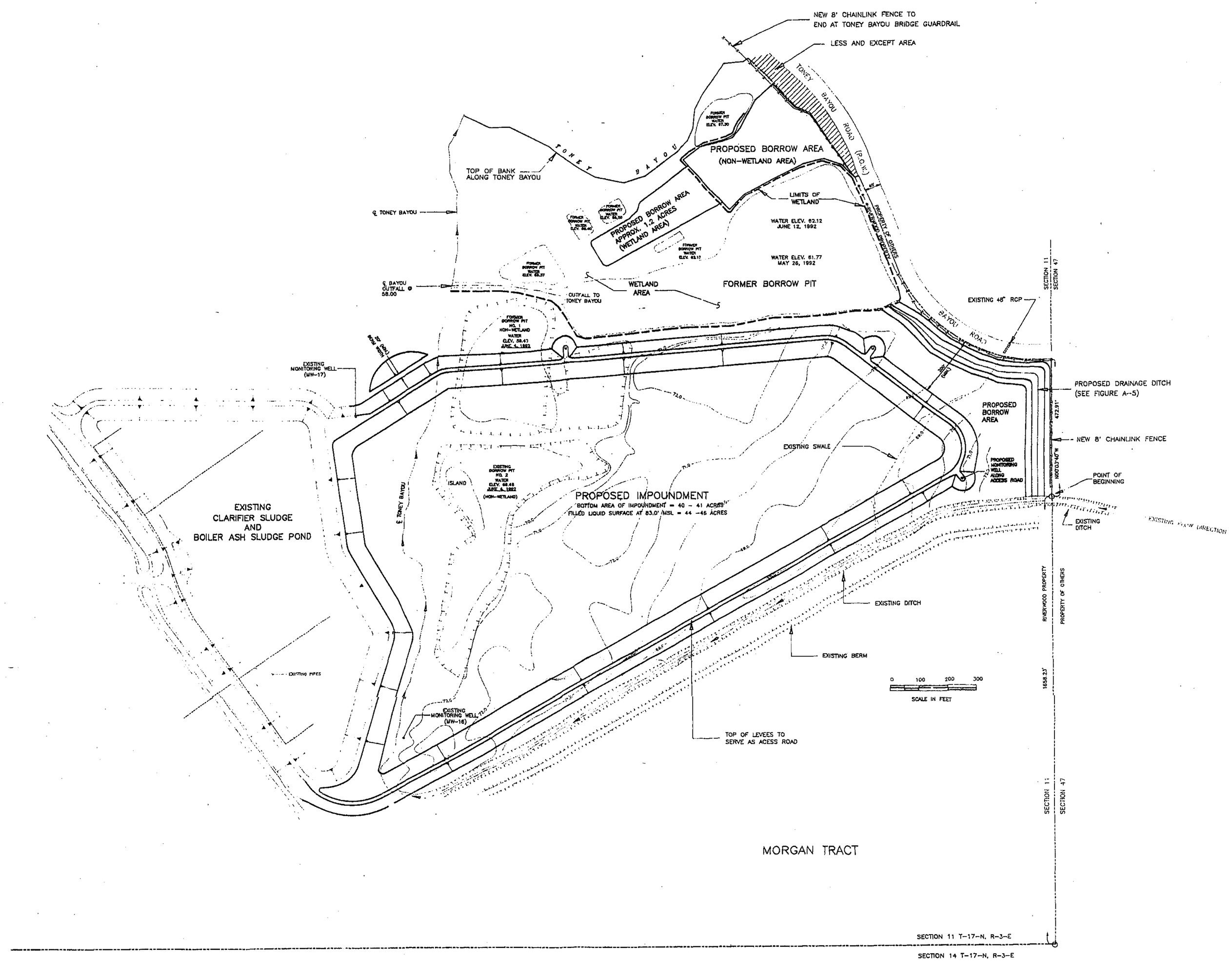
7.0 Progress Meetings

During synthetic liner installation, weekly progress meetings shall be conducted at the site, which shall be attended by the liner subcontractor and the QA/QC Monitor. The purpose of these meetings is to discuss the work schedule for the upcoming week and to review the test results for destructive and non-destructive testing.

8.0 Liner Acceptance

The Installer retains all responsibility for the HDPE liner until the installation has been accepted by the Owner. A final inspection of the geosynthetic liner will be performed by the QA/QC Manager, the Project Manager (Owner), and the Installer after the installation is completely finished, all seams have been inspected and approved, the required laboratory testing has been completed and approved, and all documentation has been received by the QA/QC Manger. An as-built drawing of the liner layout will be completed by the QA/QC Manager and included in a liner certification report.

DRAWN BY:	CHECKED BY:	DATE	JOB NO.
HLK		10/16/92	24379-002-137



N

NOTES:

1. FOR DETAILED IMPOUNDMENT LAYOUT SEE DRAWING A-3.
2. FOR LIMITS OF FILL AND EXCAVATION SEE DRAWING A-2.

LEGEND:

EXISTING GROUND ELEVATION CONTOUR (FEET, MEAN SEA LEVEL)

PROPOSED MONITORING WELL

0 100 200 300
SCALE IN FEET

STATE OF LOUISIANA
KENNETH P. MESSER
REG. No. 22020
PROFESSIONAL ENGINEER
CIVIL ENGINEERING

Kenneth P. Messer
11/23/92

FIGURE A-1
SITE PLAN VIEW
PROPOSED ASH/SLUDGE IMPOUNDMENT

DAMES & MOORE

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

DRAWN BY:	CHECKED BY:	DATE	JOB NO.
HLK		10/16/92	24379-002-137

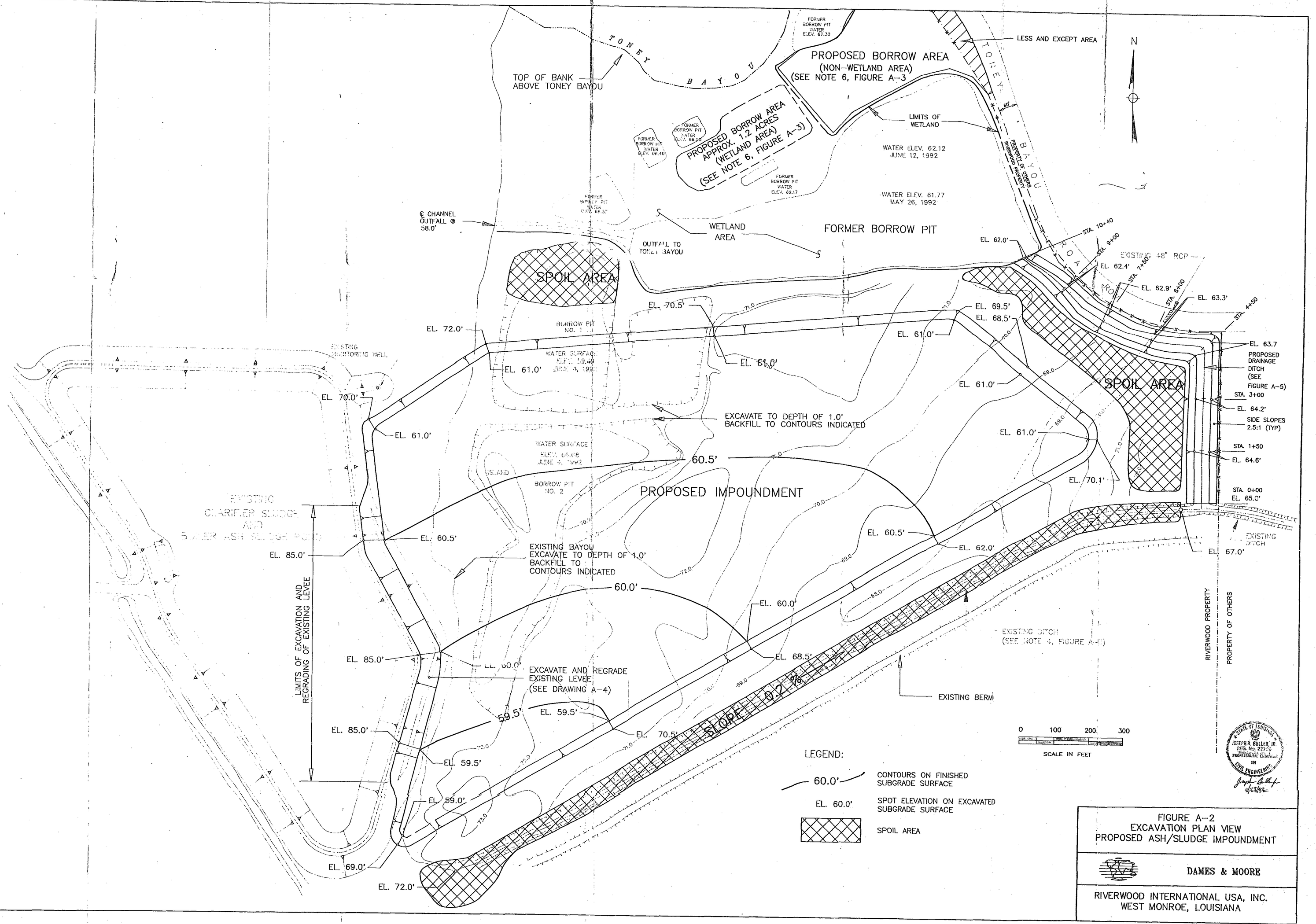


FIGURE A-2
EXCAVATION PLAN VIEW
PROPOSED ASH/SLUDGE IMPOUNDMENT

DAMES & MOORE

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

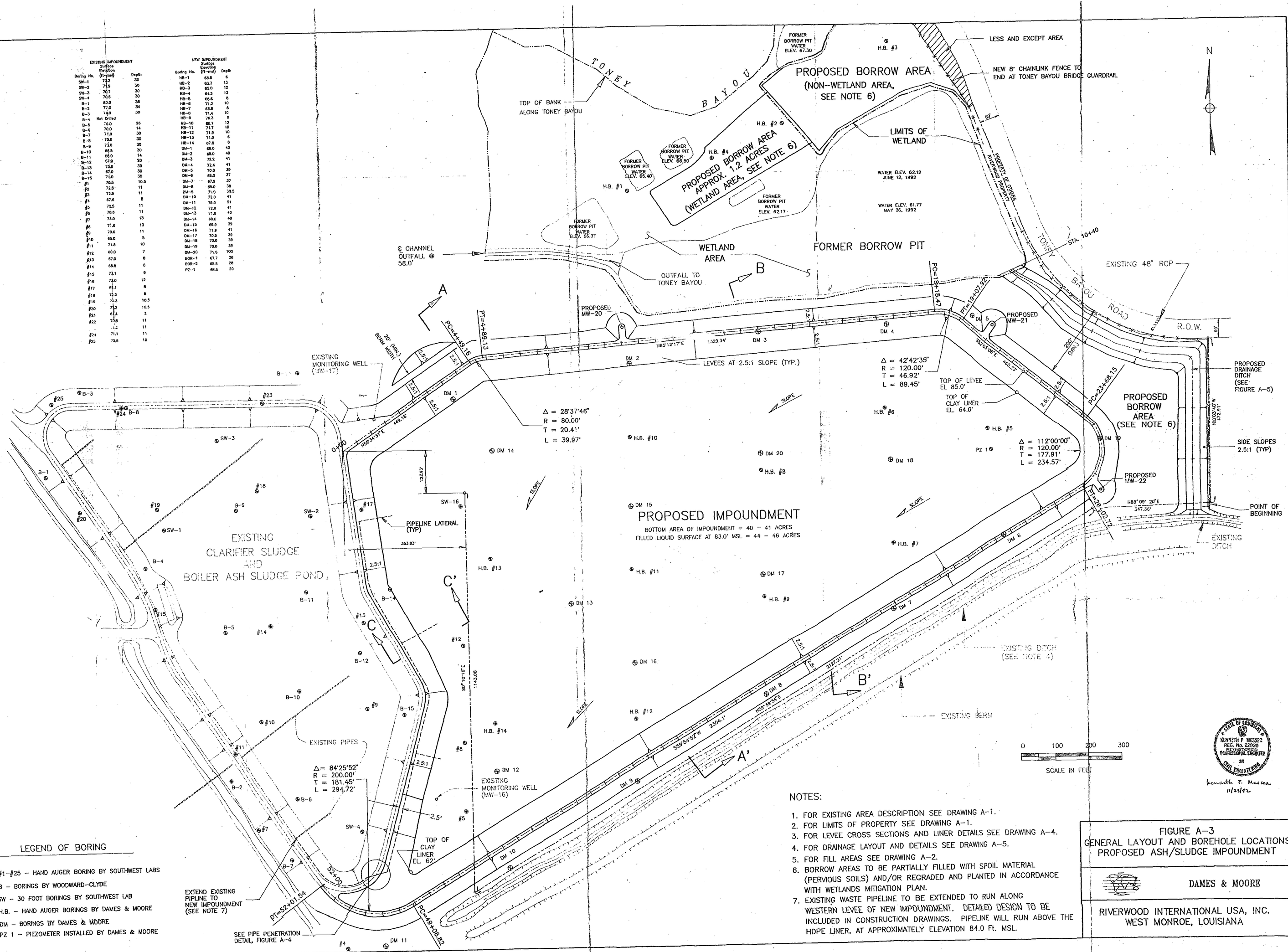
JOB NO.	DATE	CHECKED BY:	DRAWN BY:
24379-002-137	10/16/92		HLK

EXISTING IMPOUNDMENT

Boring No.	Surface Elevation (ft-msl)	Depth
SW-1	73.2	30
SW-2	71.9	30
SW-3	70.7	30
SW-4	70.6	30
B-1	80.0	35
B-2	77.0	34
B-3	74.0	30
B-4	Not Drilled	
B-5	70.0	26
B-6	70.0	14
B-7	71.0	30
B-8	70.0	30
B-9	73.0	30
B-10	64.5	30
B-11	66.0	14
B-12	67.0	20
B-13	73.0	30
B-14	67.0	30
B-15	71.0	30
#1	70.5	10.5
#2	72.8	11
#3	72.9	11
#4	67.6	8
#5	72.5	11
#6	70.6	11
#7	73.0	13
#8	71.6	13
#9	70.4	11
#10	65.0	5
#11	71.5	10
#12	60.0	7
#13	67.0	8
#14	68.8	6
#15	73.1	9
#16	73.0	12
#17	68.1	8
#18	71.2	8
#19	73.3	10.5
#20	71.2	10.5
#21	61.4	3
#22	70.8	11
	[illegible]	11
#24	71.1	11
#25	73.6	10

NEW IMPOUNDMENT

Boring No.	Surface Elevation (ft-msl)	Depth
HB-1	68.5	6
HB-2	63.7	13
HB-3	65.0	12
HB-4	64.3	13
HB-5	68.5	8
HB-6	71.2	10
HB-7	68.6	8
HB-8	71.4	10
HB-9	70.3	8
HB-10	68.7	12
HB-11	71.7	10
HB-12	71.9	10
HB-13	71.0	6
HB-14	67.6	6
DM-1	68.0	40
DM-2	68.0	40
DM-3	72.2	41
DM-4	72.4	41
DM-5	70.0	39
DM-6	69.0	37
DM-7	67.9	37
DM-8	69.0	38
DM-9	71.0	39.5
DM-10	72.0	41
DM-11	79.0	51
DM-12	72.0	41
DM-13	71.0	40
DM-14	68.0	40
DM-15	69.0	39
DM-16	71.8	41
DM-17	70.5	39
DM-18	70.0	39
DM-19	70.0	39
DM-20	71.6	100
BOR-1	67.7	28
BOR-2	65.5	28
PZ-1	68.5	20



LEGEND OF BORING

#1-#25 – HAND AUGER BORING BY SOUTHWEST LABS
B – BORINGS BY WOODWARD-CLYDE
SW – 30 FOOT BORINGS BY SOUTHWEST LAB
H.B. – HAND AUGER BORINGS BY DAMES & MOORE
DM – BORINGS BY DAMES & MOORE
PZ 1 – PIEZOMETER INSTALLED BY DAMES & MOORE

NOTES:

1. FOR EXISTING AREA DESCRIPTION SEE DRAWING A-1.
2. FOR LIMITS OF PROPERTY SEE DRAWING A-1.
3. FOR LEVEE CROSS SECTIONS AND LINER DETAILS SEE DRAWING A-4.
4. FOR DRAINAGE LAYOUT AND DETAILS SEE DRAWING A-5.
5. FOR FILL AREAS SEE DRAWING A-2.
6. BORROW AREAS TO BE PARTIALLY FILLED WITH SPOIL MATERIAL (PERVIOUS SOILS) AND/OR REGRADED AND PLANTED IN ACCORDANCE WITH WETLANDS MITIGATION PLAN.
7. EXISTING WASTE PIPELINE TO BE EXTENDED TO RUN ALONG WESTERN LEVEE OF NEW IMPOUNDMENT. DETAILED DESIGN TO BE INCLUDED IN CONSTRUCTION DRAWINGS. PIPELINE WILL RUN ABOVE THE HDPE LINER, AT APPROXIMATELY ELEVATION 84.0 Ft. MSL.

STATE OF LOUISIANA
KENNETH P. MESSER
REG. No. 22020
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING

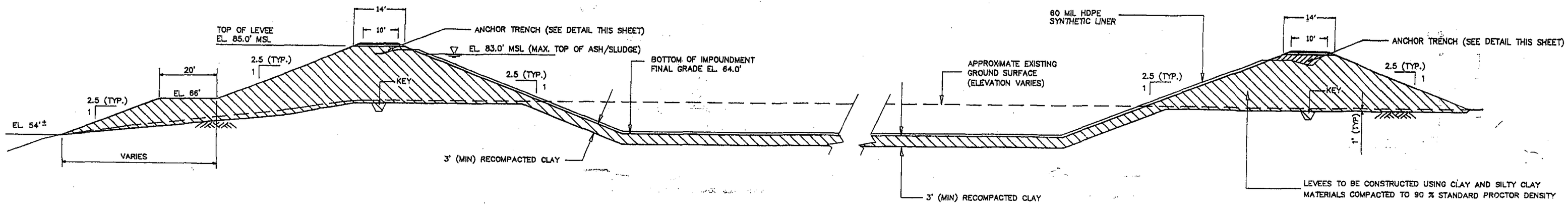
Kenneth P. Messer
11/23/92

FIGURE A-3
GENERAL LAYOUT AND BOREHOLE LOCATIONS
PROPOSED ASH/SLUDGE IMPOUNDMENT

DAMES & MOORE

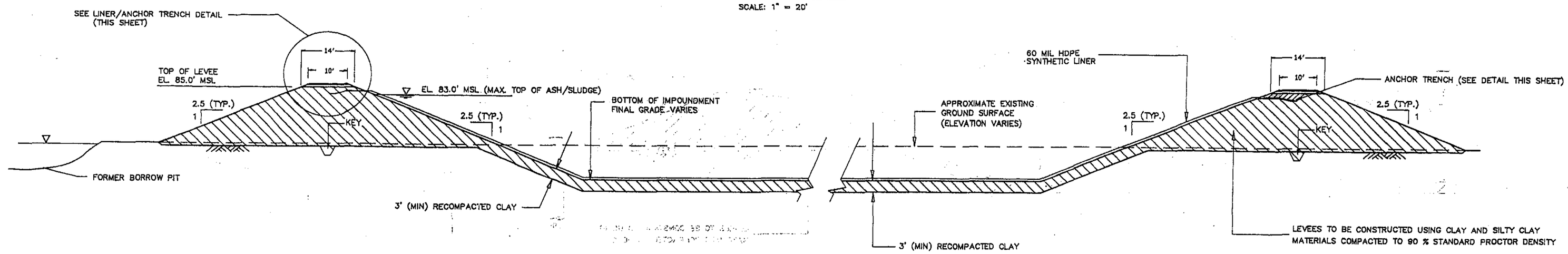
RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

JOB NO.	DATE	CHECKED BY:	DRAWN BY:
24379-002-137	11/2/92		HLK



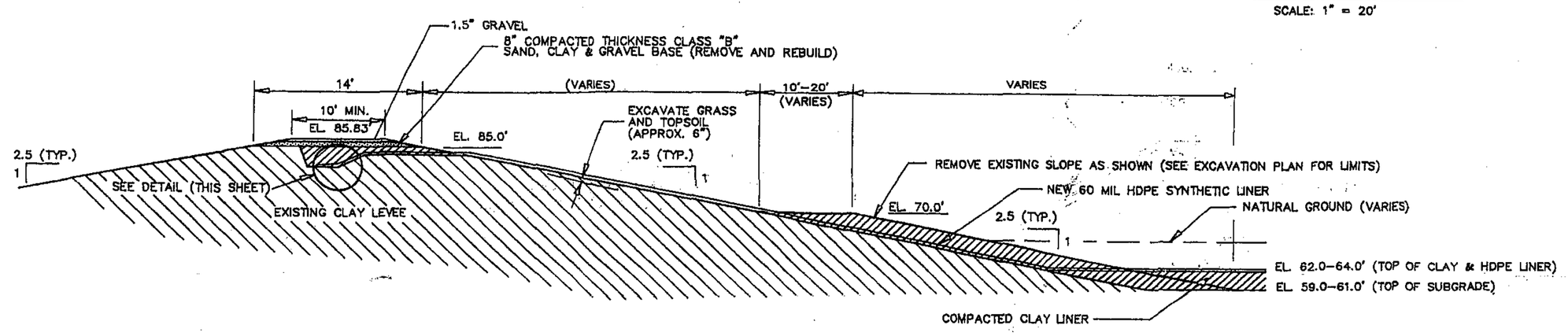
SECTION A–A'

SCALE: 1" = 20'



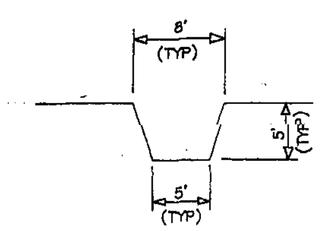
SECTION B–B'

SCALE: 1" = 20'

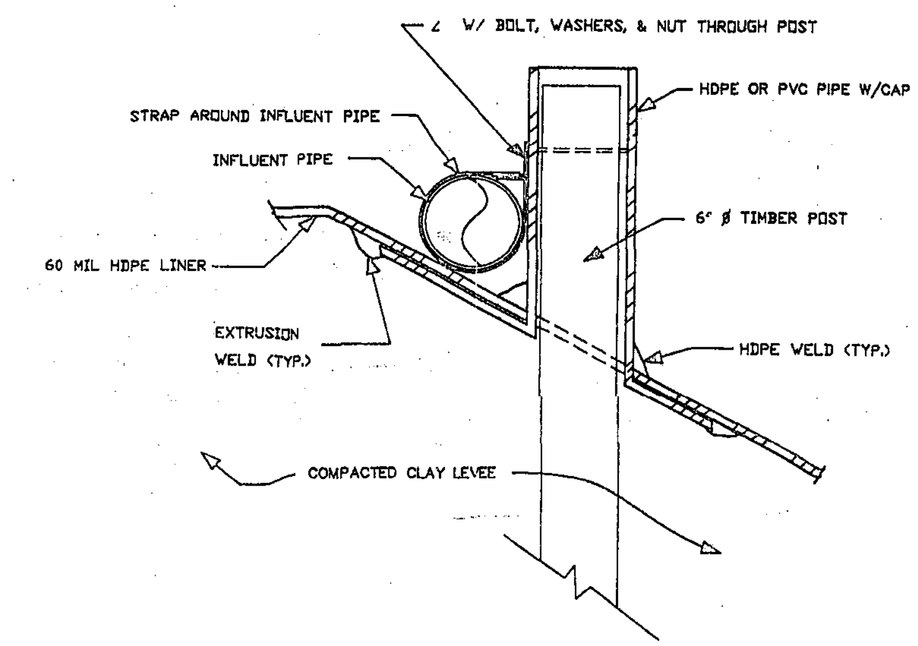


SECTION C–C'

SCALE: 1" = 20'

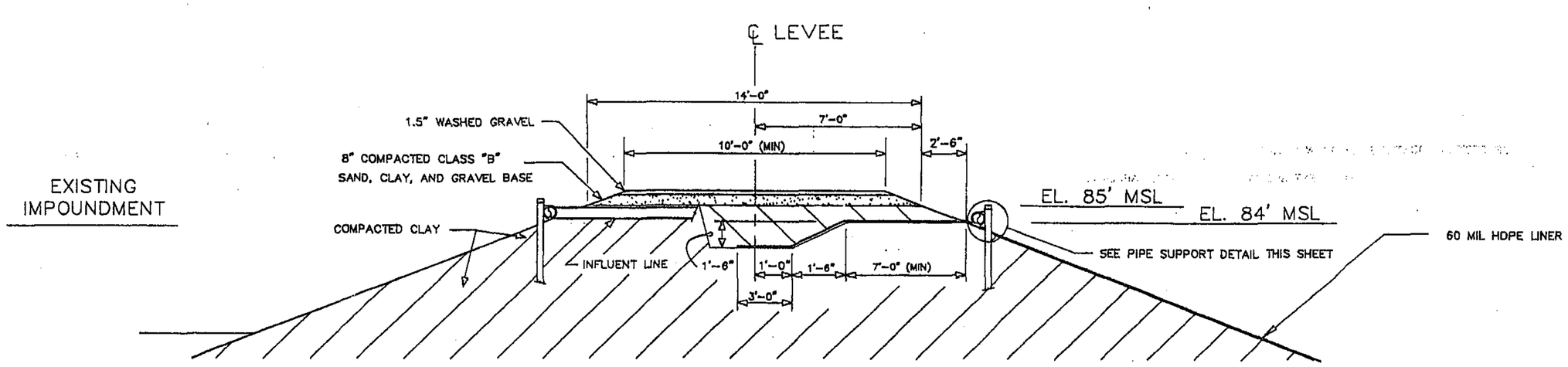


KEY DETAIL



PIPE SUPPORT DETAIL

N.T.S.



LINER/ANCHOR TRENCH DETAIL

N.T.S.

NOTES:

1. FOR SECTION LOCATIONS SEE DRAWING A-3.
2. FOR PLAN OF EXISTING IMPOUNDMENT SEE DWG. 63-0-18005, APPENDIX A.

STATE OF LOUISIANA
KENNETH P. MESSER
REG. No. 22020
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

Kenneth P. Messer
11/20/92

FIGURE A-4
IMPOUNDMENT CROSS-SECTIONS
PROPOSED ASH/SLUDGE IMPOUNDMENT

DAMES & MOORE

RIVERWOOD INTERNATIONAL USA, INC.
WEST MONROE, LOUISIANA

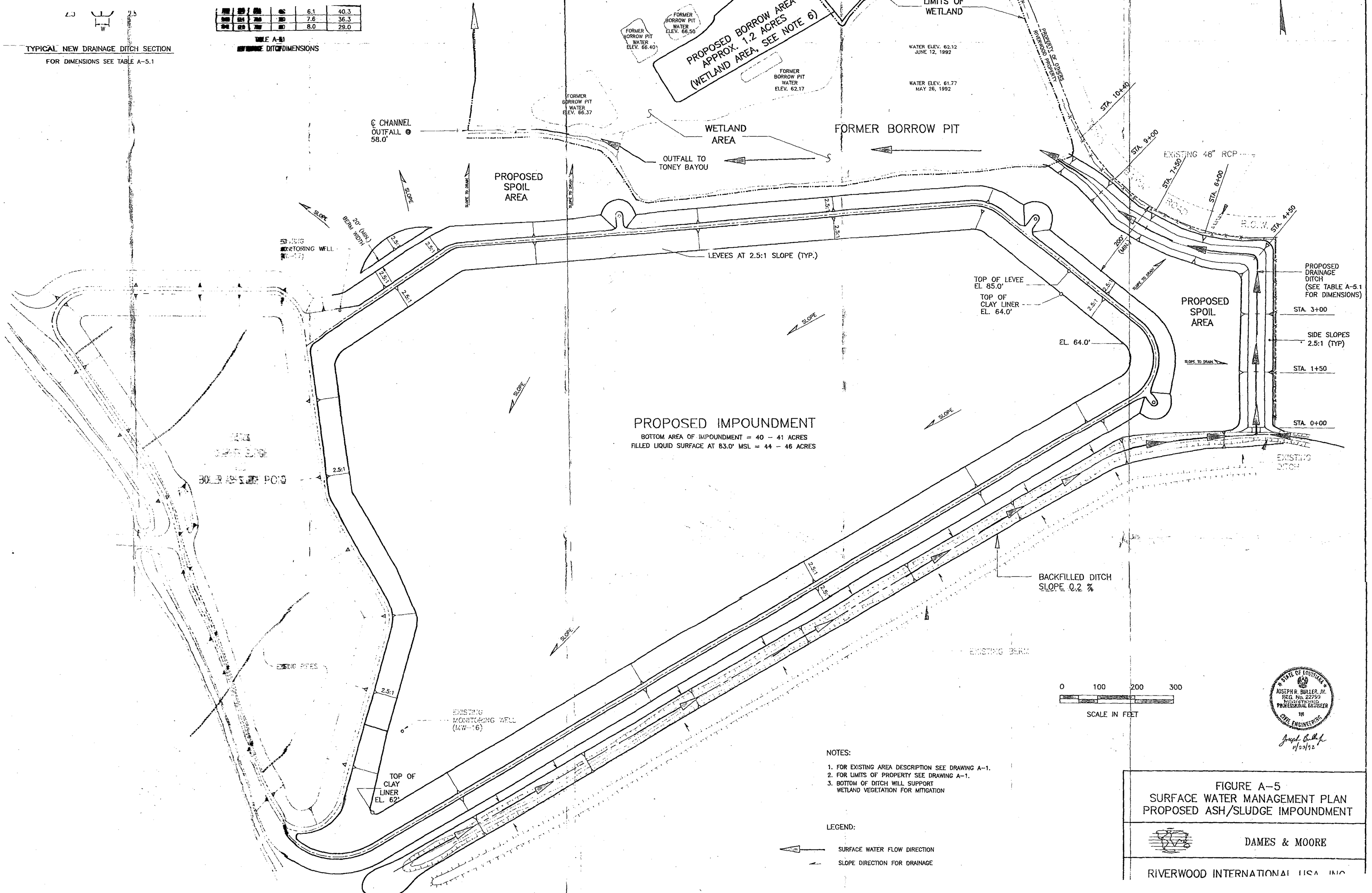
TYPICAL NEW DRAINAGE DITCH SECTION

FOR DIMENSIONS SEE TABLE A-5.1

[illegible]	[illegible]	[illegible]	[illegible]	6.1	40.3
[illegible]	[illegible]	[illegible]	[illegible]	7.6	36.3
[illegible]	[illegible]	[illegible]	[illegible]	8.0	29.0

TABLE A-5.1

[illegible] DITCH DIMENSIONS



NOTES:

1. FOR EXISTING AREA DESCRIPTION SEE DRAWING A-1.
2. FOR LIMITS OF PROPERTY SEE DRAWING A-1.
3. BOTTOM OF DITCH WILL SUPPORT WETLAND VEGETATION FOR MITIGATION

LEGEND:

SURFACE WATER FLOW DIRECTION

SLOPE DIRECTION FOR DRAINAGE

STATE OF LOUISIANA
JOSEPH R. BULLER, JR.
REG. No. 22793
REGISTERED PROFESSIONAL ENGINEER
CIVIL ENGINEERING

11/23/92

FIGURE A-5
SURFACE WATER MANAGEMENT PLAN
PROPOSED ASH/SLUDGE IMPOUNDMENT

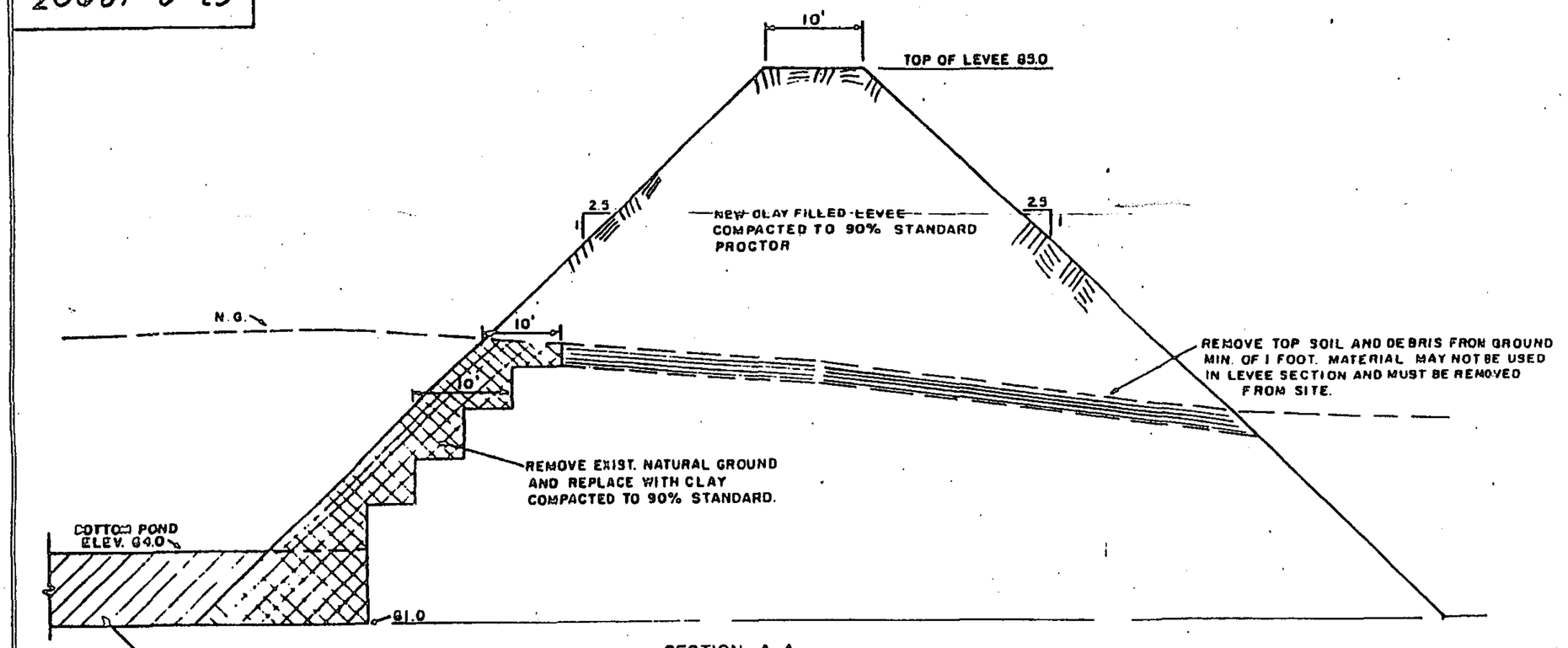
DAMES & MOORE

RIVERWOOD INTERNATIONAL USA, INC.

DRAWINGS, SPECIFICATIONS, AND QA PLAN

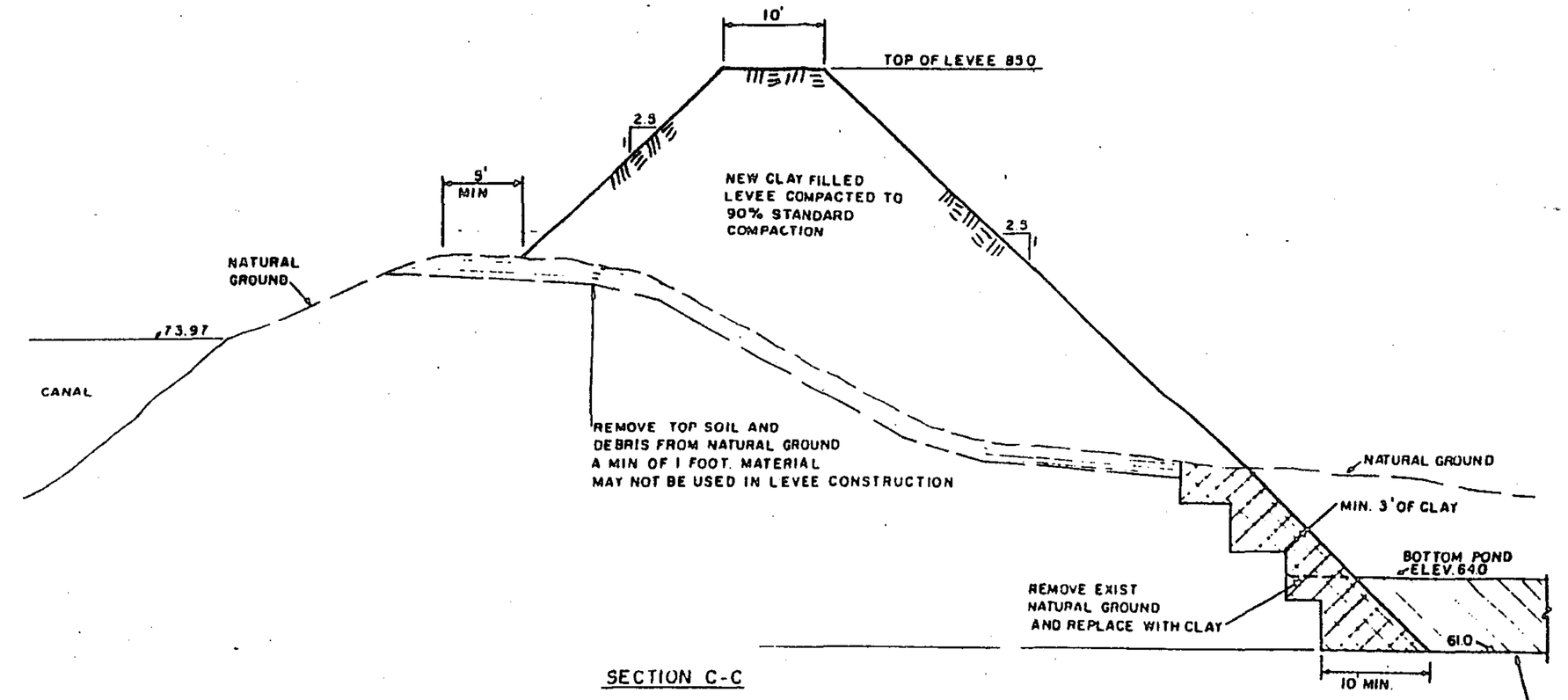
EXISTING 21-ACRE ASH/SLUDGE IMPOUNDMENT

63-0-18003



SECTION A-A

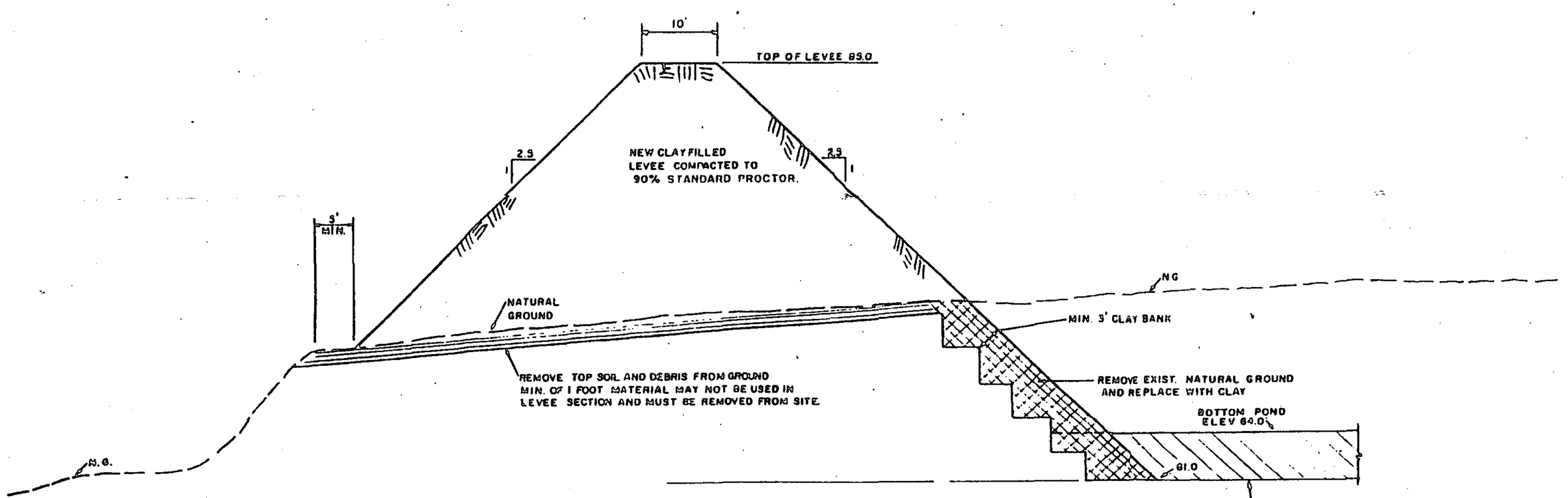
THE BOTTOM THREE FEET OF POND SHALL BE REMOVED TO ELEV. 61.00
ANY MATERIAL MEETING CLAY SPECIFICATIONS OF LEVEE SECTION MAY BE REUSED
BUT MUST BE RECOMPACTED TO 90% STANDARD SPECIFICATIONS.
MATERIAL NOT MEETING THESE SPECIFICATIONS MUST BE MUST REMOVED AND WILL
NOT BE REUSED



SECTION C-C

THE BOTTOM THREE FEET OF POND SHALL BE REMOVED TO ELEV. 61.00
ANY MATERIAL MEETING CLAY SPECIFICATIONS OF LEVEE SECTION MAY BE REUSED.
BUT MUST BE RECOMPACTED TO 90% STANDARD SPECIFICATIONS.
MATERIAL NOT MEETING THESE SPECIFICATIONS MUST BE REMOVED AND WILL NOT BE REUSED

NOTE: CLAY FILL FOR BOTTOM OF POND AND LEVEES TO HAVE PERMABILITY OF 1×10^{-7}
COMPACTED TO 90% STANDARD PROCTOR.



SECTION B-B

THE BOTTOM THREE FEET OF POND SHALL BE REMOVED TO ELEV 61.00
ANY MATERIAL MEETING CLAY SPECIFICATIONS OF LEVEE SECTION MAY BE REUSED.
BUT MUST BE RECOMPACTED TO 90% STANDARD SPECIFICATIONS.
MATERIAL NOT MEETING THESE SPECIFICATIONS MUST BE REMOVED AND WILL NOT BE REUSED

RELEASED FOR CONSTRUCTION
DATE:_____ BY:_____

DRAWING NO	REFERENCES	NO	REVISIONS	MADE	CKD	DATE

JOHN G. MARONEY
CONSULTING ENGINEERS, INC.
REGISTERED LAND SURVEYORS
200 LOUISVILLE AVENUE – P.O.B. 2473
MONROE, LOUISIANA 71201
PHONE (318) 388-1161

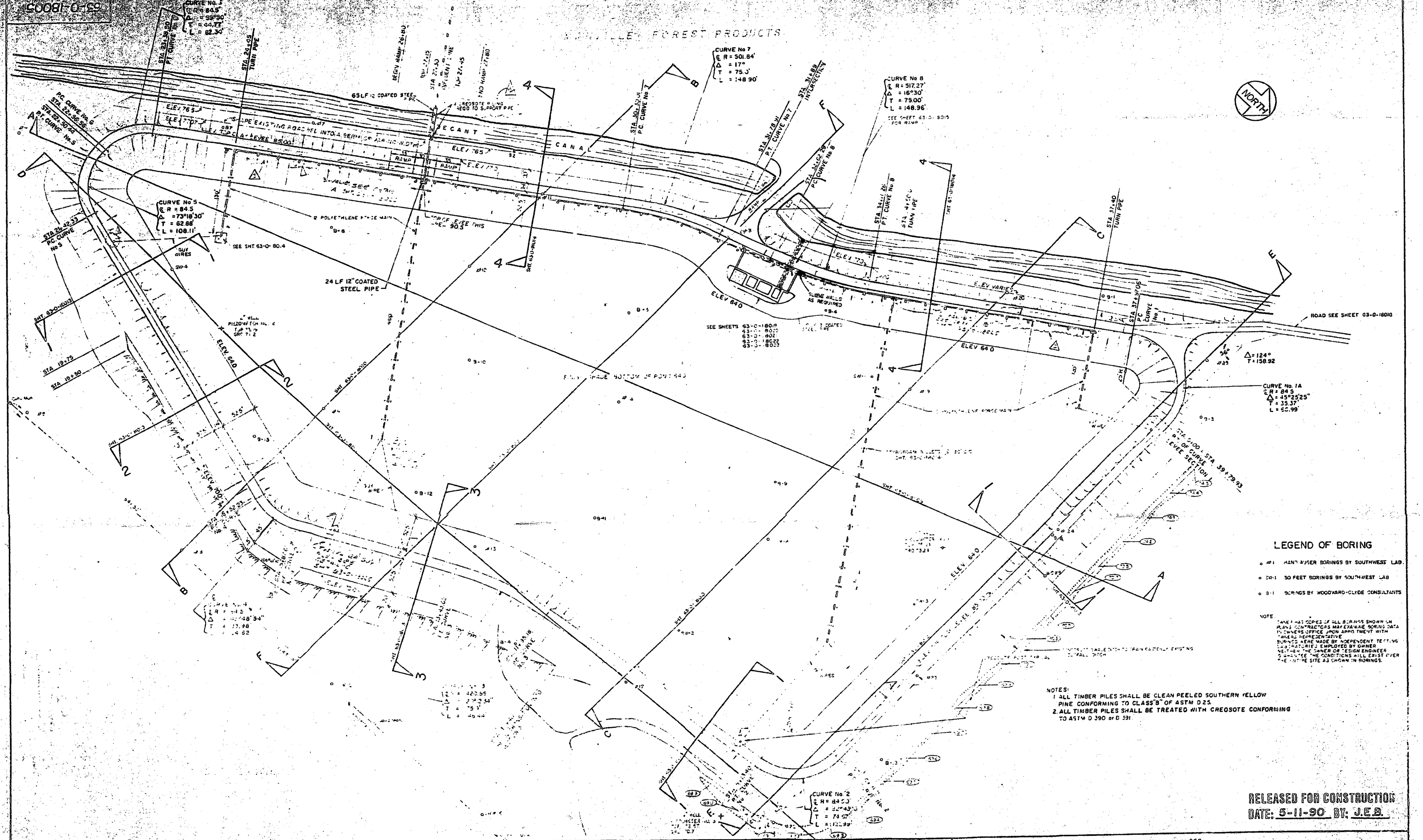
SCALE 1"=10'	DATE
DESIGN BY	
DRAWN BY	
CHECKED BY	
SUPV BY	
SUBM TO BY	
APP'D BY	
APP'D BY	
APP'D BY	

Manville
Manville Forest Products Corporation — West Monroe, Louisiana — Paperboard Division

SLUDGE & LEVEE CROSS-SECTIONS FOR BOILER ASH SLUICE POND

DRAWING NUMBER: 63 0-18003 — REV: 0

A2



RELEASED FOR CONSTRUCTION
DATE: 5-11-90 BY: J.E.B.

DRAWING NO	REFERENCES	NO.	REVISIONS	MADE	CKD	DATE
63-0-18005		1	GUY WIRE SUPPORTS MOVED			
		2	POLE SUPPORT FOR 2" POLY PIPE			
		3	[illegible]			

JOHN G. MARONEY
CONSULTING ENGINEERS, INC.
REGISTERED LAND SURVEYORS
208 LOUISVILLE AVENUE · P.O.B. 2473
MONROE LOUISIANA 71201
PHONE (319) 338-1151

SCALE	1" = 60'	DATE
DESIGN BY	J.G.M.	7-89
DRAWN BY	K.O.	7-89
CHECKED BY	J.G.M.	7-89
SUPV BY		
SUBMT'D BY		
APP'D BY		
APP'D BY		

Manville
Manville Forest Products Corporation
West Monroe, Louisiana
Paperboard Division

PLAN LAYOUT OF
CLARIFIER SLUDGE AND BOILER ASH SLUICE POND

DRAWING NUMBER 63-0-18005 REV 2

GENERAL CONDITIONS

AND

SPECIFICATIONS

CLARIFIER SLUDGE

AND

BOILER ASH SLUICE POND

at

MANVILLE FOREST PRODUCTS CORPORATION
West Monroe, Louisiana

Prepared By:

JOHN G. MARONEY CONSULTING ENGINEERS, INC.
208 Louisville Avenue
Monroe, Louisiana

I N D E X

SECTION	PAGE NO.
Proposal	
General Conditions of Construction Contract	
Supplemental General Conditions	1
Scope of Work	100-1
Earthwork	201-1
Styrofoam Buoyancy Billets	300-1
Concrete Work	400-1
Polyethylene Pipe	500-1

PROPOSAL

PROPOSAL OF: _____
(name)

_____
(address)

_____

to furnish and deliver all materials and to do and perform all work in accordance with the Contract Documents for:

CONSTRUCTION OF CLARIFIER SLUDGE AND BOILER ASH SLUICE POND

said Contract shall provide for:

Construction of levees through excavation of soil, concrete outfall structure, and related piping; and 12-inch polyethylene force main.

TO:

MANVILLE FOREST PRODUCTS CORPORATION
POST OFFICE BOX 488
WEST MONROE, LOUISIANA 71294

Gentlemen:

The undersigned bidder has carefully examined the Contract Documents referred to in the "Information to Bidders" and also the site of the work, and will provide all necessary labor, machinery, tools, apparatus, and other means of construction required to do all the work and furnish all material called for by the Contract Documents in the manner prescribed therein and in said contract and in accordance with the requirements of the Engineer under them.

The undersigned bidder offers to supply the labor and equipment for each unit item in the bid proposal with the exception as noted in the proposal.

CLARIFIER SLUDGE AND BOILER ASH SLUICE POND, MANVILLE FOREST PRODUCTS

Item No.	Quantity	Unit	Description of Item	UNIT PRICE Total Cost (in words)	Total Cost (in figures)	Extension
	1	Lump Sum	Clearing, Grubbing and De-rooting of entire site			
	241,250	cu.yd.	Excavation of soil within limits of pond, 83,000 cu. yds. hauled to soils storage area. Remainder to be used in levee and bottom construction			
	6,550	cu.yd.	Excavation of excessive silt or muck excavation taken to soils storage area			
	6,000	cu.yd.	Clay core of levee 14' in width by 4' in depth. Clay core to be used only if slurry trench cutoff wall is not constructed.			
	35,000	cu.yd.	Borrow excavation for pond bottom and interior pond walls hauled to size from contractor's borrow pit.			
	118,000	cu.yd.	Excavation of soil from Item No. 2 above used to construct levee sections			
	40,000	cu.yd.	Excavation of soil from Item No. 2 above used to construct clay bottom			

NOTE: It is estimated that from Item No. 2 above, there will be enough suitable dirt to use for Items No. 6 and 7.

CLARIFIER SLUDGE AND BOILER ASH SLUICE POND, MANVILLE FOREST PRODUCTS

Item No.	Quantity	Unit	Description of Item	UNIT PRICE Total Cost (in words)	Total Cost (in figures)	Extension
	6,510	sq.yd.	Sand-Clay-Gravel Base for Roadway Section minimum of 8" completed thickness. Complete in place.			
	6,510	sq.yd.	Washed gravel road surface minimum of 1-1/2" in thickness Complete in Place			
	1	Lump Sum	Concrete Outfall Structure with outfall piping and headwall. Complete in place.			
		l.f.	12" polyethlene pipe furnished by Owner, to be installed by Contractor. Contractor to furnish all necessary styrofoam pads, creosoted posts, piling clamps, and other miscellaneous items necessary to anchor and install pipe.			
2	1	Lump Sum	Flooding of pond to prevent Ouachita River from blowing out levee section.			
13	35	Each	Styrofoam billets for polyethlene pipe.			
14	50	Each	6" Creosoted post for pipe in west levee section 6' long			
15		l.f.	18" steel pipe epoxy coated casing for 12" polyethlene Schedule 40 pipe			

CLARIFIER SLUDGE AND BOILER ASH SLUICE POND, MANVILLE FOREST PRODUCTS

tem No.	Quantity	Unit	Description of Item	UNIT PRICE Total Cost (in words)	Total Cost (in figures)	Extension
16		l.f.	24" steel casing pipe Schedule 40 piping			
17	120	l.f.	creosoted piling for Decant crossing to support			
18	116,000	sq.ft.	Slurry trench wall 3' wide			
19		cu.yd.	Select fill for road ramps west of Decant Canal			
20	1	Lump Sum	Guy wiring ends of effluent pipe in ponds to levees			
21	1	Lump Sum	Clearing of Site for soils storage area			
22	1	Lump Sum	Dewatering of pond			
23	6	Acres	Fertilizing and seeding of levee			
24	4,150	cu.yd.	Top soil for areas to receive fertilizer 4" thick			
25	850	l.f.	Drainage swale constructed along north and east sides of levee to drain property north of levee.			

The Owner will act on this Proposal within thirty (30) days after the date of the opening and will notify the successful bidder by a "Notice of Acceptance".

The undersigned agrees as follows:

1. To do any extra work, not covered by the above schedule of prices, which may be ordered by the Engineer, and to accept as full compensation therefor such prices as may be agreed upon in writing by the Engineer and the Contractor in accordance with Article 14 of the General Conditions.

2. Within ten (10) days from the date of the "Notice of Acceptance" of this Proposal to execute the Contract and to furnish a satisfactory performance bond in the amount of 100% of the Contract sum guaranteeing the faithful performance of the work and payment of bills.

3. To begin work in the date specified in the "Notice to Proceed" and to prosecute said work in such a manner as to complete it within ___ working days.

Accompanying this Proposal is a Bid Bond or certified check or cashier's check for 5%, payable to Manville Forest Products Corporation, which is to be forfeited as liquidated damages, if, in the event that this proposal is accepted, the undersigned shall fail to execute the Contract and furnish satisfactory contract bond under the conditions and within the time specified in this Proposal; otherwise, said certified check shall be returned to the undersigned bidder.

Date: _____

CONTRACTOR LICENSE NO. _____

BIDDER: _____

BY: _____

OWNER: MANVILLE FOREST PRODUCTS CORPORATION

BY: _____

Contract No._____

Form No. 235 – Rev. 1-67

GENERAL CONDITIONS

OF

CONSTRUCTION CONTRACT

Dated

BETWEEN

MANVILLE FOREST PRODUCTS CORPORATION

AND

. . . . . .

INDEX

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ARTICLE 1 — Definitions

As used in the Contract Documents:

(a) The term "project" shall mean all buildings and other facilities and improvements called for by the drawings and specifications.

(b) The term "materials" shall mean all materials, supplies, products and articles of any nature to be embodied in the project, or used in connection therewith other than equipment and construction tools and machinery.

(c) The term "equipment" shall mean all machinery, apparatus, appliances, fixtures and devices of any nature to be embodied in the project, but shall not include construction tools and machinery.

(d) The term "Subcontractor" shall mean anyone having a direct contract with the Contractor to furnish services at the site of the project, to furnish material or equipment worked to a special design, or both.

(e) The term "work" shall mean all services to be performed under the Contract.

ARTICLE 2 — Correlation and Intent of Documents

(a) The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. In the event of any conflict or inconsistency between the printed and typewritten portions of the Contract, the latter shall govern. The intention of the documents is to include all labor and materials, equipment and transportation necessary for the proper execution of the work unless otherwise specified. Materials or work described in words which so applied have a well-known technical or trade meaning shall be held to refer to such recognized standards. The drawings generally show work fully drawn on only a portion of the drawings, the remainder being in outline. The fully drawn work must be understood as applying to other like or similar places.

(b) For convenience of reference and to facilitate the letting of subcontracts, the specifications may be separated into sections. Such separation shall not operate to make the Owner an arbitrator to establish subcontract limits between the Contractor and Subcontractors.

ARTICLE 3 — Drawings and Specifications for the Work

(a) The Contractor shall keep one copy of all drawings and specifications for the work, in good order, available to the Owner.

(b) The specifications and drawings are intended to describe and provide for a finished piece of work, complete in every detail.

(c) The Contractor represents that before submitting his bid and executing the Contract he informed himself fully as to the scope of the work required in accordance with the intent and meaning of the drawings and specifications and that he examined the premises sufficiently to compare them with the drawings and specifications and to satisfy himself as to the condition of the site, obstructions, the actual levels, and all excavation, filling in, etc. required in connection with the work. No allowance will be made by reason of conditions which could have been ascertained through such an examination or by reason of any alleged misunderstanding regarding the materials to be furnished or the work to be performed.

(d) Should during the progress of the work any error or inconsistency appear in the drawings or specifications, the Contractor, before proceeding with the work, shall request instructions from the Owner, and in no case shall he proceed with the work in uncertainty.

(e) Installation or other work in connection with manufactured materials and equipment shall be performed in compliance with the manufacturer's instructions, in the absence of instructions to the contrary from the Owner.

(f) Promptly following completion of the work, the Contractor shall furnish the Owner with marked drawings of the entire project showing all deviations made in field construction.

ARTICLE 4 — Detail Drawings and Instructions

(a) The Owner shall furnish, with reasonable promptness, additional instructions by means of drawings or otherwise necessary for the proper execution of the work. Subject to changes in the work made pursuant to the Agreement, all such drawings and instructions shall be consistent with the Contract Documents, as from time to time amended, true developments thereof, and reasonably inferable therefrom. The work shall be executed in conformity therewith, and the Contractor shall do no work without proper drawings and instructions.

(b) If work is called for in such a manner as to make it impossible to produce first-class work, or should discrepancies appear among the Contract Documents, the Contractor shall request instructions from the Owner before proceeding with the work. If the Contractor should fail to make such a request, no excuse will thereafter be entertained for failure to carry out the work in a satisfactory manner. Should a conflict exist in or between the drawings and the specifications, the Contractor shall be deemed to have estimated on the more expensive manner of doing the work unless he shall have asked for and obtained a written decision before submission of his proposal as to which method or materials will be required.

(c) Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, all copies of drawings and specifications reasonably necessary for the execution of the work.

ARTICLE 5 — Shop Drawings

(a) The Contractor shall check and verify all field measurements and shall submit with such promptness as to cause no delay in his own work or in that of any other contractor such number of copies as the Owner may request, checked and approved by him, of all shop or equipment installation drawings and schedules required for the Contractor's work and the Owner shall pass upon them with reasonable promptness, making desired corrections, including all necessary corrections relating to design and artistic effect. The Contractor shall make any corrections required by the Owner and file with the Owner corrected copies. Approval of such drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has in writing called the Owner's attention to such deviations at the time of submission and secured written approval; nor shall it relieve him from responsibility for errors in shop drawings or schedules. The requirements of this paragraph are subject to any more detailed requirements included in the specifications.

ARTICLE 6 — Ownership and Confidentiality of Documents and Information

(a) All drawings, specifications, technical documents of any other nature, and copies thereof prepared in connection with the project are the property of the Owner and are to be treated as confidential. They are not to be used on other work or disclosed to others without the Owner's prior written approval and, with the exception of one set, are to be delivered to the Owner on request at the completion of the work.

(b) The Contractor agrees to retain in confidence and not to disclose or use for the benefit of third parties any and all information disclosed to it by the Owner whether relating to process, product, equipment or apparatus embodied in or used in the design and/or construction of the project, provided, however, that such obligation shall not apply to information which is in the public domain prior to such disclosure by the Owner or which becomes public knowledge after such disclosure other than by breach of this covenant or which is known to the Contractor prior to such disclosure or which the Contractor has independently secured from a third party as a matter of right and without secrecy obligation attaching thereto.

(c) Paragraphs (a) and (b) of this Article notwithstanding, the Contractor may disclose to any Subcontractor, vendor or supplier any drawings, specifications, other technical documents or information which are to be treated as confidential, provided the recipient requires the same to perform his portion of the work and he agrees to be bound by the provisions of such paragraphs (a) and (b).

ARTICLE 7 — Materials, Equipment, Employees

(a) Unless otherwise stipulated, the Contractor shall provide and pay for all materials, equipment, labor, water, tools, construction machinery, light, power, water for building purposes, transportation and other facilities necessary for the execution and completion of the work.

(b) Unless otherwise specified, all materials and equipment shall be new, of best quality and free of defects. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials and equipment. The Contractor shall furnish for approval all samples, together with manufacturers' installation instructions, as directed. The work shall be in accordance with approved samples. Should the Contractor wish to substitute another material or equipment for one specified by name, he shall apply in writing to the Owner for permission, stating the credit or extra cost involved and providing appropriate supporting data and samples. No substitution will be made without the prior written approval of the Owner.

(c) The Owner has furnished, or will promptly furnish, the Contractor with a list of materials and equipment used in construction which are produced by the Owner

or which are derived from materials produced by the Owner.

Except as the Owner may otherwise consent, the Contractor shall utilize any such products to the maximum extent practicable in performing the work hereunder. Before placing any order in an amount of more than $5,000 for any material or equipment on the aforesaid list to be embodied in the project, the Contractor shall submit an itemized list of such materials and equipment to the Owner, indicating the supplier or suppliers from whom the Contractor wishes to procure each listed item. The Owner may elect to supply any such items to the Contractor at the market price thereof or may designate the supplier or suppliers from whom any such items shall be purchased by the Contractor; provided, however, that if any action which the Owner may elect to take pursuant to this sentence would result in an increase in cost to the Contractor or in a delay in the performance of the work, the Contractor will promptly advise the Owner accordingly, and the parties will agree on a practicable solution.

(d) Labor will be performed in the best, most workmanlike manner, by mechanics skilled in their respective trades. Mechanics whose work is unsatisfactory to the Owner, or who are careless, incompetent, insufficiently skilled or otherwise objectionable shall be dismissed promptly from the project.

(e) The Contractor shall use his best efforts to maintain satisfactory labor relations with organizations representing labor hired directly by the Contractor and by any Subcontractor. The Contractor will use his best efforts to promptly resolve disputes with the objective of reducing work stoppages to a minimum. To this end, the Contractor agrees to participate in an orientation conference with appropriate officials of labor organizations prior to the start of field construction for the purpose of establishing assignments of work to individual crafts, and to participate in additional conferences from time to time as required during the course of construction. Work assignments among crafts made as a result of any such conferences shall be recorded in writing and a copy thereof delivered to the Owner.

(f) The Contractor shall immediately notify the Owner of the occurrence of any labor dispute, or of a threatened or actual work stoppage, affecting employees of the Contractor or of a Subcontractor. If any such work stoppage should have occurred, the Owner, if he so elects, may participate in any negotiations between representatives of the labor organization and the employer and may make recommendations to such representatives or their principals with respect to an equitable settlement.

(g) Insofar as is practical and feasible, the Contractor shall obtain all labor, materials and supplies required for the execution of this work from sources within the State of Louisiana, within the intent and scope of Paragraph 2, of the Standard Tax Exemption Contract of the Department of Commerce and Industry of the State of Louisiana.

ARTICLE 8 — Patents

(a) With regard only to equipment independently designed or manufactured by the Contractor, the Contractor shall defend and hold the Owner harmless from all costs, damages and expenses of litigation arising from infringement or claim of infringement of existing U.S. patents relating to such equipment or the use thereof by the Owner.

(b) With regard to equipment purchased by the Contractor for installation in the project, the Contractor shall secure from manufacturers, vendors and Subcontractors for such equipment the following hold harmless clause:

"Seller shall defend and hold Buyer and Buyer's customer harmless from liability of every nature, including costs and expenses, for or on account of Seller's manufacture, sale or use of any patented or unpatented invention, article or appliance in the course of Seller's performance hereunder, the use and sale thereof by Buyer and the use thereof by Buyer's customer; provided, however, that the foregoing provisions shall not extend to infringement to the extent that such infringement results from compliance with designs or drawings originating with Buyer or Buyer's customer."

(c) Should the Owner authorize the Contractor to purchase or design equipment in accordance with specifications provided by the Owner, the Owner shall defend and hold the Contractor harmless from all costs, expenses and damages arising from infringement or claim of infringement of existing U.S. patents with respect to such equipment brought against the Contractor.

(d) The Owner shall defend and hold the Contractor harmless from all costs, expenses and damages arising from infringement or claim of infringement of any existing U.S. patents by any process to be embodied in the project based upon information supplied by the Owner.

(e) The obligations with respect to defense and hold harmless as contained in this Article shall be conditioned upon the party to be defended or held harmless giving prompt notification of any claim of infringement and on the cooperation of such party in the defense of any infringement claim brought against the other.

ARTICLE 9 — Surveys, Permits, Laws and Regulations

(a) Unless otherwise specified, the Owner shall furnish all surveys and obtain all easements, permits and licenses necessary for the performance of the work at the project site. Off-site inspections, permits and licenses for equipment shall be obtained by the Contractor at its expense.

(b) The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the drawings and specifications are at variance therewith, he shall promptly notify the Owner in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the work. If the Contractor performs any work contrary to such laws, ordinances, rules and regulations, and without such notice to the Owner, he shall bear all costs arising therefrom.

(c) Whenever the law of the place of building requires a sales, consumer, use or other similar tax, the Contractor shall bear such tax. Upon the Owner's request, the Contractor shall cooperate fully with the Owner in attempting to obtain exemption from any such taxes or in contesting payment thereof. The Contractor shall pay all fees or other charges for use of or damage to sidewalks, streets or other public or private property.

(d) The Contractor shall

(i) Locate and lay out buildings, structures and equipment, to assure the correct position on the property, to establish correct levels and to fix and locate all items, both above and below grade, required by the drawings;

(ii) assume responsibility for the accuracy and maintenance of grades, lines, levels and locations required for the work, including the verification of same and reporting any errors or inconsistencies to the Owner before commencing work.

ARTICLE 10 — Protection of Work and Property

(a) The Contractor shall maintain adequate protection of all his work from damage and shall protect the Owner's property and adjacent property from injury or loss arising in connection with this Contract. He shall make good any such damage, injury or loss, including without limitation loss of use, which is not covered by insurance maintained by the Owner pursuant to Article 16(a), at his expense except such as was caused by the Owner or his employees.

(b) The Contractor shall take all necessary precautions for the safety of employees on the work and shall comply with all applicable provisions of Federal, State and Municipal safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the work is being performed. He shall erect and properly maintain at all times, as required by the conditions and progress of the work, all necessary safeguards for the protection of workmen and the public and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways and falling materials; and he shall designate a responsible member of his organization on the work, whose duty shall be the prevention of accidents. The Contractor shall also comply with all security, safety and fire regulations of the Owner in force at the site of the project.

(c) In an emergency affecting the safety of life or of the work or of adjoining property, the Contractor, without special instruction or authorization, is hereby permitted to act, at his discretion, to prevent such threatened loss or injury, and he shall so act, without appeal, if so authorized or instructed. Any compensation claimed by the Contractor on account of emergency work shall be determined by agreement or arbitration.

ARTICLE 11 — Inspection and Acceptance of Work

(a) The Owner shall at all times have access to the work wherever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and for inspection.

(b) If the specifications, the Owner's instructions, laws, ordinances or any public authority require any work to be specially tested or approved, the Contractor shall give the Owner timely notice of its readiness for inspection, and if the inspection is by another authority than the Owner, of the date fixed for such inspection, required certificates of inspection being secured by the Contractor. Inspections shall be promptly made, and where practicable at the source of supply. If any work should be covered up without approval or consent of the Owner, it must, if required by the Owner, be uncovered for examination at the Contractor's expense. Inspections shall not operate as approval.

(c) Re-examination of questioned work may be ordered by the Owner, and if so ordered the work must be uncovered by the Contractor. If such work be found in accordance with the Contract Documents, the Owner shall pay the cost of re-examination and replacement. If such work be found not in accordance with the Contract Documents, the Contractor shall pay such cost, unless it be found that the defect in the work was caused by another contractor, and in that event the owner shall pay such cost.

(d) Temporary or trial usage by the Owner of any part of the project before final completion and written acceptance shall not be construed as evidence of acceptance of such part or of the project.

(e) Upon receipt of written notice that the work is ready for final inspection and acceptance and that such acceptance tests as may be provided for in the specifications have been successfully completed, the Owner shall promptly make an inspection; and when he finds the work acceptable under the Contract and the Contract fully performed, he shall promptly issue a certificate of acceptance, which shall be a condition precedent to final payment.

ARTICLE 12 — Correction of Work and Warranties

(a) The Contractor shall promptly remove from the premises all work failing to conform to the Contract, whether incorporated or not, and the Contractor shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the Owner and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement. If the Contractor should not remove and replace such work within a reasonable time, the Owner may remove and replace the same at the expense of the Contractor. If the Contractor should not pay the expenses of such removal and replacement by the Owner within ten days' time thereafter, the Owner without prejudice to his other rights and remedies, upon ten days' written notice, may sell the removed materials at auction or at private sale, accounting for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor.

(b) The Contractor warrants all work performed pursuant to this Contract and all materials and equipment used in such work against failure to comply with the pertinent drawings and specifications and against defects of workmanship or material for a period of one year from the date of final payment. The Contractor shall remedy promptly any defects covered by the aforesaid warranty which shall appear during the warranty period. The Owner shall give notice of observed defects with reasonable promptness. If the Contractor should fail to commence remedial action within ten days from the date of such notice or should fail to complete such action diligently, the Owner may itself or through another contractor remedy the defect in question at the Contractor's expense.

(c) With respect to materials and equipment purchased from others, the Contractor shall, unless otherwise approved by the Owner, procure for the Owner's benefit standard commercial or better guarantees and warranties of the respective vendors, manufacturers or suppliers of the materials and equipment so purchased, without however relieving the Contractor from his obligations under this Article.

(d) If the Owner deems it inexpedient to correct work damaged or not done in accordance with the Contract, an equitable financial adjustment shall be made therefor between the parties on the basis of costs saved by the Contractor.

ARTICLE 13 — The Owner's Right to do Work

(a) If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the Owner, after five working days' written notice to the Contractor may, without prejudice to any other remedy he may have, make good such deficiencies and Contractor shall be liable for any excess cost occasioned the Owner thereby.

ARTICLE 14 — Payments

(a) At least ten days before each payment falls due, the Contractor shall submit to the Owner an itemized application for payment, supported by such evidence of the Contractor's right to payment as the Owner may reasonably require. Any such application shall be certified by the chief financial officer of the Contractor and shall be subject to verification by the Owner.

(b) If payments prior to aceptance are made on valuation of work done, the Contractor shall, before the first application, submit to the Owner a schedule of values of the various parts of the work, including quantities, aggregating the total sum of the Contract, divided so as to facilitate payments to Subcontractors, made out in such form, and supported by such evidence as to its correctness, as the Owner may reasonably direct. This schedule, when approved by the Owner, shall be used as a basis for payment, unless it be found to be in error.

(c) If this Contract is on a cost plus fee basis, and if payments should be made prior to acceptance on account of materials or equipment not incorporated in the work but delivered and suitably stored at the site, or at some other location agreed upon in writing, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other procedure as will establish the Owner's

title to any such materials and equipment or otherwise adequately protect the Owner's interest.

(d) No payment made to the Contractor, nor partial or entire use or occupancy of the work by the Owner, shall be an acceptance of any work, materials or equipment not in accordance with this Contract.

(e) The Owner may withhold payment or, on account of subsequently discovered evidence, nullify the whole or a part of any previous payment to such extent as may be necessary to protect the Owner from loss on account of:

(i) Defective work not remedied.

(ii) Claims filed or reasonable evidence indicating probable filing of claims.

(iii) Failure of the Contractor to make payments properly to Subcontractors or for material, equipment or labor.

(iv) A reasonable doubt that the Contract can be completed for the balance then unpaid (not applicable if the Contract is on a cost plus fee basis).

(v) Damage to another contractor.

When the above grounds are removed payment shall be made for amounts withheld because of them.

(f) The Contractor hereby authorizes the Owner to pay any Subcontractor directly any past due amount owing by Contractor to such Subcontractor which would afford the basis of a mechanics lien, upon such Subcontractor's presenting satisfactory evidence to Owner that such amount is owed Subcontractor by Contractor and is past due and unpaid. Any amount paid by the Owner pursuant to this paragraph shall be deducted from the amount due the Contractor under this Contract. The Owner may require an affidavit from the Contractor relative to mechanics liens and a partial release of mechanics liens from Subcontractors before making any progress payment to the Contractor.

(g) The Contractor shall furnish at the time of final payment, and as a condition precedent thereto, a release satisfactory to the Owner discharging the Owner, its successors, assigns, officers, employees and agents of and from all liability, obligations and claims arising under or by virtue of the Contract, except for pending claims previously submitted to arbitration.

ARTICLE 15 — Contractor's Insurance

(a) The Contractor shall maintain at his expense the following types of insurance, issued by companies acceptable to the Owner, at Contractor's expense unless this Contract is on a cost plus fee basis:

(i) Workmen's Compensation Insurance, including occupational diseases, providing for the payment of benefits required by the laws of the state in which the project is located, covering the persons employed by the Contractor on work under the Contract. Employers' Liability Insurance with a minimum limit of $500,000, and Longshoremen's Harbor Workers' Compensation Act Insurance, if applicable, is to be provided on the same operations.

(ii) Comprehensive General Liability Insurance providing coverage on a personal injury basis with limits of at least:

Bodily Injury Liability:	$ 250,000	per person and $ 500,000	per occurrence.
Property Damage Liability:	$ 250,000	per accident and $	aggregate.

Such coverage shall include contractual liability and products (including completed operations). In the event the Contractor will be doing any excavating or grading work himself or through a Subcontractor, coverage will also be specifically provided to include liability of the Contractor arising from explosion, collapse and underground damage.

(iii) Comprehensive automobile liability insurance providing coverage with limits of at least:

Bodily Injury Liability: $100,000 per person and $300,000 per accident.

Property Damage Liability:$100,000 per accident.

(b) The Owner may revise the types and limits of insurance at any time during the period of the Contract at his expense.

(c) The Contractor shall require each Subcontractor to provide and maintain Workmen's Compensation, Employers' Liability Insurance in the amount of $100,000, and Longshoremen's and Harbor Workers' Compensation Act Insurance, if applicable, covering all persons employed by such Subcontractor on work to be performed under the Contract.

(d) The Contractor shall furnish the Owner with certificates issued by the insurance company or companies issuing insurance policies required by this Article. Such certificates shall provide that written notice shall be given to the Owner in the manner to be stipulated by the Owner thirty days prior to cancellation or modification of any such policy. All original insurance policies shall be made available for inspection by the Owner on request.

ARTICLE 16 — Owner's Insurance

(a) The Owner shall maintain at his expense insurance against accidental direct loss or damage, other than that resulting from war or radioactivity, to the materials, equipment, and other items intended to become a permanent part of the facilities under construction, including coverage of such property while in transit to or from the job site. Such insurance will cover the interest of the Owner, the Contractor and each Subcontractor. Monthly reports of construction values, in a form satisfactory to the Owner, will be made to the Owner.

(b) The Owner shall, if requested, furnish the Contractor with certificates issued by the insurance company or companies issuing the insurance policies required by this Article. Such certificates shall provide that written notice shall be given to the Contractor thirty days prior to cancellation of any coverage which said policies provide for the Contractor or a subcontractor.

ARTICLE 17 — Performance Bonds

(a) The Owner shall have the right to require the Contractor to furnish bond covering the faithful performance of the Contract, and the payment of all obligations arising thereunder, in such form as the Owner may prescribe and with such sureties as he may approve. If such bond is required, it shall be paid by the Owner.

ARTICLE 18 — Liens

(a) The Contractor shall, without cost to the Owner, obtain by bonding or otherwise, the prompt discharge of any lien or liens which may be filed in connection with the work hereunder. Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall have delivered to the Owner a complete release of all liens arising or which may arise out of this Contract, or receipts in full in lieu thereof, and, if required in either case, an affidavit of the chief financial officer of the Contractor stating that the releases and receipts include all the labor and material for which a lien could be filed; but the Contractor may, if any Subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner, to indemnify him against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may pay in discharging a lien, including all costs and reasonable attorneys' fees.

ARTICLE 19 — Hold Harmless

(a) The Contractor agrees to indemnify and hold harmless the Owner against any costs incurred by the Owner (including without limitation amounts paid pursuant to judgments or settlements ar

as counsel fees) in consequence of any claim by a third party against the Owner, including without limitation any claim by an employee of the Owner, the Contractor or a Subcontractor and any claim by a Subcontractor or another contractor, whether filed before or after final payment, based on actual or alleged damage to or destruction of property or injury to persons allegedly caused by the Contractor or any Subcontractor, or by their respective employees, in connection with the work.

(b) The Owner agrees to indemnify and hold harmless the Contractor against any costs incurred by the Contractor (including without limitation amounts paid pursuant to judgments or settlements and as counsel fees) in consequence of any claim by a third party against the Contractor, including without limitation any claim by an employee of the Owner, the Contractor or a Subcontractor, and any claim by a Subcontractor or another contractor, whether filed before or after final payment, based on actual or alleged damage to or destruction of property or injury to persons allegedly caused by the Owner or by any employee of the Owner.

(c) Each party shall promptly notify the other of the assertion of any claim against which such party is held harmless pursuant to this Article, shall give such other party the opportunity to defend any such claim, and shall not settle any such claim without the approval of the indemnifying party.

ARTICLE 20 — Assignment

(a) Neither party to the Contract shall assign the Contract without the written consent of the other; except that the Owner, without the Contractor's consent, may assign the Contract to any transferee of title to the project, but such an assignment shall not relieve the Owner from his payment obligations hereunder except to the extent that the same are actually performed by such transferee. The Contractor shall not assign any moneys due or to become due to him hereunder without the prior written consent of the Owner.

ARTICLE 21 — Separate Contracts

(a) The Owner reserves the right to let other contracts in connection with this project. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs, complying with any directions which the Owner may give in this respect.

(b) If any part of the Contractor's work depends for proper execution or results upon the work of any other contractor, the Contractor shall inspect and promptly report to the Owner any defects in such work that render it unsuitable for such proper execution and results. His failure so to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of his work, except as to defects which may develop in the other contractor's work after the execution of his work.

(c) To insure the proper execution of his subsequent work, the Contractor shall measure work already in place and shall at once report to the Owner any discrepancy between the executed work and the drawings.

(d) The Contractor shall schedule and coordinate the Contractor's work with the Owner and will cooperate with the Owner or other contractors working in the vicinity to minimize any interference with or delay to the work of others.

ARTICLE 22 — Subcontracts and Purchase Orders

(a) The Contractor shall not subcontract the work substantially as a whole. As soon as practicable, the Contractor shall notify the Owner in writing of the name of any Subcontractor proposed for furnishing services, materials or equipment, and of any supplier other than a Subcontractor proposed for furnishing materials or equipment in excess of $5,000, in connection with the project. The Con-

tractor shall not contract with any such Subcontractor or supplier to whose employment the Owner expresses a reasonable objection within ten days from the Owner's receipt of the aforesaid notice. If this Contract is on a cost plus fee basis, the Owner reserves the right to approve every subcontract.

(b) The Contractor shall not be required to award a subcontract or purchase order to any Subcontractor or supplier against whom he has a reasonable objection. The Contractor agrees that he is fully as responsible to the Owner for the acts and omissions of his Subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him. Nothing contained in the Contract Documents shall create any contractual relation between any Subcontractor or supplier and the Owner.

(c) All subcontracts and purchase orders for materials or equipment awarded by the Contractor in connection with the project shall contain the following statement in bold type on the face thereof:

"The items purchased hereby are for use in a construction project of Olinkraft, Inc."

(d) Except as the Owner may otherwise specifically approve, the Contractor agrees to bind every Subcontractor and every Subcontractor agrees to be bound by the terms of the Agreement, the General Conditions of the Contract, the Special Conditions, the drawings and specifications as far as applicable to his work, including the following provisions of this Article.

(e) The Subcontractor agrees —

(i) To be bound to the Contractor by terms of the Agreement, General Conditions of the Contract, the Special Conditions, the drawings and specifications, and to assume toward him all the obligations and responsibilities that he, by those documents, assumes toward the Owner.

(ii) To submit to the Contractor applications for payment in such reasonable time as to enable the Contractor to apply for payment under Article 14 of the General Conditions.

(iii) To make all claims for extras, for extensions of time and for damages for delays or otherwise, to the Contractor in the manner provided in the Contract for like claims by the Contractor upon the Owner, except that the time for making claims for extra cost is one week.

(f) The Contractor agrees —

(i) To be bound to the Subcontractor by all the obligations that the Owner assumes to the Contractor under the Agreement, General Conditions of the Contract, the Special Conditions, the drawings and specifications, and by all the provisions thereof affording remedies and redress to the Contractor from the Owner.

(ii) To pay the Subcontractor, upon the receipt of payment, if issued under a schedule of values, the amount allowed to the Contractor on account of the Subcontractor's work to the extent of the Subcontractor's interest therein.

(iii) To pay the Subcontractor, upon the receipt of payment from the Owner, if otherwise than as in (ii), so that at all times his total payments shall be as large in proportion to the value of the work done by him as the total amount paid to the Contractor is to the value of the work done by him.

(iv) To pay the Subcontractor to such extent as may be provided by the subcontract, if the subcontract should provide for earlier or larger payments than the above.

(v) To name as arbitrator under arbitration proceedings as provided in the General Conditions the person nominated by the Subcontractor, if the sole cause of dispute is the work, materials, rights or responsibilities of the Subcontractor; or, if of the Subcontractor and any other subcontractor jointly, to name as such arbitrator the person upon whom they agree.

(g) The Contractor and the Subcontractor agree that in the matter of arbitration their rights

and obligations and all procedure shall be analogous to those set forth in this Contract.

(h) Nothing in this Article shall create any obligation on the part of the Owner to pay or to see to the payment of any sums to any Subcontractor.

ARTICLE 23 — Arbitration

(a) All disputes and claims arising out of this Contract shall be submitted to arbitration by three arbitrators in accordance with the provisions, then obtaining, of the American Arbitration Association, and this agreement shall be specifically enforceable under the prevailing arbitration law, and judgment upon the award rendered may be entered in the court of the forum, state or federal, having jurisdiction. The decision of two arbitrators shall be binding. The Contractor shall not cause a delay of the work during any arbitration proceedings, except by agreement with the Owner.

(b) Notice of the demand for arbitration of a dispute shall be filed in writing with the other party to the Contract within a reasonable time after the dispute has arisen. In any case, the demand shall be made before the time of final payment, except as otherwise expressly stipulated by the parties.

(c) The arbitrators, if they deem that the case requires it, are authorized to award to the party whose contention is sustained, such sums as they or a majority of them shall deem proper to compensate him for the time and expense incident to the proceedings and, if the arbitration was demanded without reasonable cause, they may also award damages for delay. The arbitrators shall assess the costs and charges of the proceedings upon either or both parties.

ARTICLE 24 — Use of Premises

(a) The Contractor shall confine his tools and construction machinery, the storage of materials and equipment and the operations of his workmen to limits indicated by law, ordinances, permits or directions of the Owner and shall not unreasonably encumber the premises. The Contractor's employees shall be restricted to their work area, and shall not enter other areas of the plant without special permission from the Owner.

(b) The Contractor shall not load or permit any part of any structure to be loaded with a weight that will endanger its safety. The Contractor shall enforce the Owner's instructions regarding signs, advertisements, fires and smoking.

(c) The Contractor recognizes that the Owner urgently requires the plant and related facilities to be constructed hereunder. The Owner may himself, or through other contractors, install machinery and equipment and commence operations as soon as, in the opinion of the Owner, construction is sufficiently advanced to permit such installation and operations and, in any event, prior to final acceptance. The parties shall cooperate with each other with a view to avoiding interferences between their respective operations.

(d) All construction employees shall enter through gates designated as the Construction Gate. The Contractor's and subcontractors' employees shall park their vehicles in the area designated by Owner. Personal cars and trucks will not be permitted within the plant area.

(e) The Contractor shall furnish and maintain adequate temporary chemical toilets for the Contractor's employees. The same shall be kept in a clean, odorless and orderly condition, and at the completion of the job, removed and the site placed in a clean and orderly condition.

(f) All of the Contractor's employees shall wear a distinctive badge, marked with the Contractor's name and an identifying number. Badges must be properly displayed while on the Owner's property.

(g) The Contractor shall furnish drinking water and paper cups for the use of Contractor's employees.

(h) The Owner's operations on roads and railroads in the plant area shall not be interrupted by the Contractor's work.

ARTICLE 25 — Cutting, Patching

(a) The Contractor shall do all cutting, fitting or patching of his work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors shown upon, or reasonably implied by, the drawings and specifications for the completed structure. Any cost caused by defective or ill-timed work shall be borne by the party responsible therefor.

(b) The Contractor shall not endanger any work by cutting, excavating or otherwise altering the work and shall not cut or alter the work of any other contractor save with the consent of the Owner.

(c) No welding to or cutting up of equipment or building structure will be permitted without the written approval of the Owner, except where called for on approved drawings.

ARTICLE 26 — Cleaning Up

(a) The Contractor shall at all times keep the premises free from accumulations of waste materials or rubbish caused by his employees or work, and at the completion of the work he shall remove all his rubbish from and about the building and all his tools, scaffolding and surplus materials and shall leave his work "broom-clean" or its equivalent, unless more exactly specified. Without limiting the foregoing, the inside of any building shall be cleaned to remove all smears, stains, dirt and rubbish, and all windows shall be washed. In case of dispute the Owner may remove the rubbish and charge the cost equitably to the several contractors.

ARTICLE 27 — Waiver

(a) The failure of either party to insist in one or more instances upon the terms of the Contract, or to exercise any right hereunder, shall not be construed as a waiver of the future performance of any such term or the future exercise of such right, and the obligation of each party with respect to such future performance shall continue in full force and effect.

ARTICLE 28 — Notices and Authorized Representatives

(a) Any notice, waiver, request, instruction, designation, consent or approval under the Contract shall be given in writing, unless the same may be given orally in accordance with another provision of the Contract; if sent by registered mail, it shall be deemed to have been given when mailed, otherwise when received. Any such writing shall be addressed in such manner as the parties may from time to time advise each other in writing.

(b) In addition to the superintendent appointed pursuant to the Agreement, the persons authorized to act on behalf of the parties under this Contract shall be the signatories of this Contract, their successors in office and any individuals designated by such signatories or by their successors.

ARTICLE 29 — Independent Contractor

The Contractor shall be an independent contractor, maintaining control over his own employees and operations; and neither the Contractor nor anyone employed by the Contractor shall be deemed to be a servant, employee or agent of the Owner. The Contractor shall be responsible for and shall withhold or pay, or both, as may be required by law, all federal, state and local taxes and contributions with respect to, measured by, or based upon, compensation paid to or earned by the Contractor's employees.

ARTICLE 30 — Entire Contract; Modification; Governing Law

(a) This Contract shall constitute the entire and only agreement between the parties hereto relating to the subject matter hereof, superseding any previous agreements or understandings. There are no agreements, understandings or covenants between the parties of any kind, express or implied, oral or otherwise, pertaining to the work hereunder, which have not been set forth or specified herein. This Contract cannot be modified except by an instrument in writing signed by the duly authorized representatives of each party.

(b) The law of the place of building shall govern the construction and performance of this Contract.

INSTRUCTIONS TO SELLER

CLAUSES PRINTED ON THE REVERSE
EREOF AND ANY SUPPLEMENTAL
TIONS ATTACHED HERETO ARE
TIAL TERMS OF THIS ORDER

SERVI(
ORDE

EASE SIGN AND RETURN ACKNOWLEDGEMENT COPY TO PURCHASING MANAGER AT ABOVE ADDRESS

CONTRACTOR	
BY.....	BY.....

TERMS AND CONDITIONS

1. PERFORMANCE OF WORK. Contractor shall be an independent contractor. Unless otherwise specified, Contractor shall furnish al necessary labor, supervision, services, material, supplies, tools and equipment, and shall complete the work hereunder in compliance with the terms of this Order and of any applicable specifications. Contractor shall execute the work so as to require minimum shut-downs, if any, of Owner's operations, any such shut-downs to be scheduled by Owner. All materials shall be suitable for the purpose intended and shall be new unless otherwise specified. Contractor shall utilize Owner's products in the work to the extent practicable. Contractor shall at all times keep the premises free from accumulations of waste material and rubbish resulting from its operations and, upon completion, it shall remove all surplus materials and leave the premises broom clean. During the progress of the work, Contractor shall take every precaution against the possibility of fire and any other hazard to persons or property and shall comply with all safety regulations and instructions of Owner. Contractor will not permit any attachment or lien, arising out of work to be performed hereunder, to be imposed upon Owner's property.

2. TIME OF COMPLETION. Time is of the essence. Work shall be started and performed in accordance with terms hereof and of any applicable specifications and shall be completed on or before date set forth in this Order.

3. PRICE AND PAYMENT. Unless otherwise provided herein, price specified on this Order is a fixed price and includes all taxes not expressly imposed by law on Owner. Contractor represents that it is familiar with the premises, nature of the work, and conditions relating to performance of the work, and that the compensation specified herein is based on an independent examination of site and that Contractor will make no claims for additional compensation if conditions encountered differ from those anticipated by such examination. Unless otherwise provided, compensation specified herein shall be due thirty (30) days after completion of work in accordance with the terms of this Order and any applicable specifications and acceptance of work by Owner, and upon receipt of an invoice therefor; provided, however, that prior to payment Contractor shall deliver to Owner,if requested, (i) a release of all liens arising out of this Order or receipts in full covering all labor and materials for which a lien could be filed or a bond satisfactory to Owner idemnifying it against such liens, and (ii) a release discharging Owner, its successors and assigns, officers, employees and agents of and from all liabilities, obligations and claims arising under or by virtue of this Order.

4. INDEMNITY. Contractor shall indemnify Owner against: (a) any claim, demand, suit, loss or liability (including counsel fees and related expenses) arising out of work performed hereunder resulting from (i) injuries to or death of any person or persons or damage to any property occasioned by acts or omissions, whether or not negligent, of Contractor's officers, employees, agents or subcontractors, or (ii) infringement or alleged infringement or the like (except to the extent to which detailed specifications were furnished by Owner); (b) all liens and other encumbrances against the premises on account of debts or claims alleged to be due from Contractor to any person, including subcontractors, suppliers and employees or agent of Contractor; (c) any and all penalties and damages incurred by reason of Contractor's failure to obtain any required permits or licenses or to comply with all applicable laws, ordinances and regulations. If so directed by the Owner, Contractor will defend, at its own expense on behalf of Owner, any claims based upon contingencies against which Contractor is obligated to indemnify Owner hereunder.

The foregoing obligations shall survive completion or termination of this Order.

5. INSURANCE. Contractor and all of its subcontractors shall procure and maintain the following insurance in amounts at least equal to those specified:

	Minimum Coverage
1. Workmen's Compensation (Indicate waiver of subrogation)	Statutory
2. Employer's Liability	$250,000
3. Comprehensive General Liability (Including Contractual Liability)	
a. Bodily Injury	$250,000 per person $500,000 per accident
b. Property Damage	$250,000 per accident
4. Automobile	
a. Bodily Injury	$100,000 per person $300,000 per accident
b. Property Damage	$100,000 per accident

Certificates of Insurance evidencing the above coverages shall be filed with Owner. Provision is to be made in such certificates that any change in or termination of coverage will not be made without thirty (30) days prior notice to Owner.

6. COMPLIANCE WITH LAW. In the performance of this Order, Contractor shall comply with all laws, ordinances, rules and regulations Federal, State and local, applicable thereto. Contractor certifies to Owner that materials purchased by Owner hereunder were produced in compliance with all applicable requirements of the Fair Labor Standards Act of 1938, as amended, including the requirements as to records. The enclosed Equal Employment Opportunity requirements prescribed by Executive Order No. 11246, as amended, Executive Order No. 11625, Executive Order No. 11701 and the Vietnam Era Veteran's Readjustment Assistance Act of 1974 and Executive Order No. 11758 and the Rehabilitation Act of 1973 are incorporated herein, unless this transaction is exempt under applicable laws or regulations.

7. GUARANTEE. Contractor guarantees that all work performed hereunder shall be free from all defects of workmanship and material for a period of one year from date of acceptance of such work by Owner. Contractor agrees to indemnify Owner against all loss or damage arising during such period out of or in connection with any such defect and agrees, on notice from Owner, promptly to remedy any such defect at its sole cost. Owner may itself remedy any such defect or request another to do so, at Contractor's expense, if Contractor shall fail to take remedial action promptly upon receipt of notice of such defect.

8. TERMINATION. If Contractor should so fail to make progress as to endanger completion of work hereunder by the completion date specified herein, or should fail to comply with any provision of this Order or should file a voluntary petition under any bankruptcy law, be adjudicated a bankrupt, become insolvent or commit an act of bankruptcy, Owner may, after three (3) days written notice to Contractor, terminate this Order wholly or in part without prejudice to any other remedy. Owner may itself perform the terminated portion of the work, or may have same performed by another, at Contractor's expense.

9. CHANGES. Owner shall have the right to make changes by notice in writing in the nature or extent of work required by this Order, but no additional charge will be allowed unless authorized in writing by Owner. If any such change materially affects completion date or costs of the work Contractor shall promptly notify Owner thereof, and the parties shall negotiate an adjustment. Failure to agree upon an adjustment shall not excuse Contractor from its performance of the work hereunder, as changed by Owner.

10. TITLE. Title to all work completed or in the course of construction shall be in Owner.

11. TOOLS. If Owner should furnish any tools or equipment to Contractor, the latter shall use same at its own risk and shall be responsible for loss of or damage to such tools and equipment and injury and damage to all persons and other property arising out of the use thereof. Contractor shall store tools, equipment, materials and supplies located on Owner's premises only at places designated by Owner, and Owner assumes no responsibility for loss of or damage to same.

12. RECORDS. If this Order is on a basis other than fixed price, (a) Contractor shall maintain complete and accurate books and records in accordance with recognized commercial accounting practices and sufficient to reflect the actual cost of performing this Order; (b) Contractor shall furnish Owner with statements of its actual costs at such times and in such form and detail as Owner may request; (c) Owner and its representatives may inspect and audit Contractor's books, records and accounts relating to this Order at all reasonable times during performance thereof and for a period of one year thereafter; and (d) if required by Owner, Contractor's invoices shall be certified by an authorized representative of Contractor in a manner to prescribed by Owner.

13. ENTIRE AGREEMENT AND ASSIGNMENT. Contractor shall not assign this Order or any of its obligations, or any sums due or to become due, under this Order without the prior written approval of Owner, nor shall Contractor subcontract any of the work hereunder without such approval. This Order constitutes the entire agreement between the parties, superseding any previous agreements or understandings. This Order shall prevail in the event of any inconsistencies between this Order and the terms and conditions of any quotation, acknowledgement order or other form submitted by Contractor. Performance of any part of the work hereunder constitutes acceptance of all terms and conditions of this Order regardless of whether or not Contractor has acknowledged this Order.

SUPPLEMENTAL CONDITIONS

Manville Forest Products Corporation and its subsidiaries comply with the requirements of all applicable Equal Employment Opportunity laws and regulatio as described in the attached Purchase Order unless exempted therefrom by law. If you believe that this transaction is exempt from any such provisions, plea send Manville Forest Products Corporation a letter stating the facts upon which the exemption claim is based.

EXECUTIVE ORDER 11246

The Contractor/Seller will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. Tl Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their rac color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer, recruitment recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. Tl Contractor/Seller agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracti Officer setting forth the provisions of this Equal Opportunity clause.

2. The Contractor/Seller will, in all solicitations or advertisements for employees, state that all qualified applicants will receive consideration for employme without regard to race, color, religion, sex, or national origin.

3. The Contractor/Seller will send to each labor union or representative of workers with which there is a collective bargaining agreement or other contract understanding, a notice to be provided by the agency Contracting Officer, advising the labor union or workers' representative of the Contractor's commitmen under this Equal Opportunity clause and shall post copies of the notice in conspicuous places available to employees and applicants for employmen

4. The Contractor/Seller will comply, with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and releva orders of the Secretary of Labor.

5. The Contractor/Seller will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and of the rules, regulation and relevant orders of the Secretary of Labor, or pursuant thereto, and will permit access at reasonable times to its books, records, and accounts by tl contracting agency and the Secretary of Labor for purposes of investigation, to ascertain compliance with such rules, regulations and orders permitted by la

6. The Contractor/Seller will include the provisions of certification in every subcontract or purchase order unless exempted by rules, regulations, or orders the Secretary of Labor issued pursuant to section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon ea subcontractor or vendor.

NONSEGREGATED FACILITIES

Contractor/Seller certifies that it does not permit its employees to perform their services at any location, under its control where segregated facilities a maintained. It further certifies that it will not maintain or provide for its employees any segregated facilities at any of its establishments and that it will not pern its employees to perform their services at any location, under its control, where segregated facilities are maintained. Contractor/Seller agrees that a breach this certification is a violation of the Equal Opportunity clause. As used in this certification, the term "segregated facilities" means any waiting rooms, wo areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinki fountains, recreation or entertainment areas, transportation and housing facilities provided for the employees which are unlawfully segregated by expl directive or are in fact unlawfully segregated on the basis of race, color, religion, sex, or national origin, because of habit, local custom, or otherwise. It further agreed that where Contractor/Seller has obtained identical certifications from subcontractors, that it will retain such certifications in its files for speci time periods.

UTILIZATION OF MINORITY BUSINESS ENTERPRISES CLAUSE
(EXECUTIVE ORDER 11625 — Applicable to Contracts of $10,000 or more)

A. It is the policy of the Government that minority business enterprises shall have the maximum practicable opportunity to participate in the performance Government contracts.

B. The Contractor/Seller agrees to use its best efforts to carry out this policy in the award of its subcontracts to the fullest extent consistent with effice performance and economic considerations. As used herein, the term "minority business enterprise" means a business, at least 50 percent of which owned by minority group members or, in case of publicly owned businesses, at least 51 percent of the stock of which is owned by minority group members. F the purpose of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, America Eskimos, and American-Aleuts. Contractors may rely on written representations by subcontractors regarding their status as minority enterprises lieu of an independent investigation.

LISTING OF EMPLOYMENT OPENINGS and AFFIRMATIVE ACTION FOR DISABLED and VIETNAM ERA VETERANS
(EXECUTIVE ORDER 11701 — Applicable to Contracts of $10,000 or More)

The Contractor/Seller agrees, in order to provide special emphasis to the employment of qualified disabled veterans and veterans of the Vietnam era, that suitable employment openings of the contractor shall be offered for listing at an appropriate local office of the State Employment Service system wherein tl opening occurs and to provide such reports to such local office regarding employment openings and hires as may be required by 41 CFR 50-250. Tl Contractor/Seller will not discriminate against any employee or applicant for employment because he or she is a disabled veteran or veteran of the Vietna Era in regard to any position for which the employee or applicant is qualified. The Contractor/Seller agrees to take affirmative action to employ, advance employment and otherwise treat qualified disabled veterans and veterans of the Vietnam Era without discrimination based upon their disability or veter status in all employment practices as provided in the regulations formulated by the Department of Labor at 41 CFR Part 60-250.4.

AFFIRMATIVE ACTION for HANDICAPPED WORKERS
(EXECUTIVE ORDER 11758 - Applicable to Contracts in Excess of $2,500)

The Contractor/Seller will not discriminate against any employee or applicant for employment because of physical or mental handicap in regards to a position for which the employee or applicant for employment is qualified. The Contractor/Seller agrees to take affirmative action to employ, advance employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employme practices as provided in the regulations formulated by the Department of Labor at 41 CFR Part 60-741.3.

AFFIRMATIVE ACTION COMPLIANCE PROGRAM
(Applicable to Contracts of $50,000 or more if Contractor has 50 or more employees)

The Contractor/Seller agrees to develop a written affirmative action compliance program for each of its establishments as required by the regulatio formulated by the Department of Labor at 41 CFR 60-1.40.

CERTIFICATE OF INSURANCE

M - 3633 (REV. 4-84)

This is to certify that the following insurance policies are in full force and effect. Said insurance company(s) or agent agrees that in the event any changes are made in the policies which affect the interest of Manville Forest Products Corporation and/or subsidiary and/or affiliated companies, or in the event said policies are cancelled or materially changed, written notice will be given to Manville Forest Products Corporation at P.O. Box 488, West Monroe, Louisiana 71291 thirty (30) days prior to the effective date thereof.

Name of Insured _____

Address _____

Description of Operations Involved _____

INSURANCE POLICIES IN FORCE

COVERAGE	POLICY NUMBER	DATE EFFECTIVE/ EXPIRATION	LIMITS OF LIABILITY	
A. Worker's Compensation			Statutory Employer's Liability $_____ each occurrence	
			Bodily Injury	Property Damage
B. General Liability (Comprehensive)			$_____ each person $_____ each occurrence	$_____ each person $_____ aggregate
			$	Combined Single Limit
C. Automobile Liability			$_____ each person $_____ each occurrence	$_____ each accident
			$	Combined Single Limit
Note: Complete section D and E to show higher limits extended to policies in sections A, B, or C				
D. Umbrella(s)			$_____ each occurrence $_____ aggregate	
E. Other Excess Coverage(s)			$_____ each occurrence $_____ aggregate	

• Briefly explain what is covered: _____

Please answer the following questions regarding the foregoing policies.

A. Worker's Compensation and Employer's Liability:

1. It is hereby certified that this policy is filed with the proper authorities in the state(s) of: _____

B. Comprehensive General Liability:

1. Does the policy cover personal injury liabilities including injury to employees and contractual assumptions? ( ) YES ( ) NO
2. Is a cross liability clause included in the policy? ( ) YES ( ) NO
3. Does the policy extend coverage for broad form property damage? ( ) YES ( ) NO
4. If insured has contract with Manville Forest Products Corporation containing "hold harmless" agreement, in favor of Manville, does policy cover such assumed liability? ( ) YES ( ) NO
5. Territory Covered _____
6. Are products/completed operations covered? ( ) YES ( ) NO
7. Is "XCU" (Explosion, Collapse, & Underground) coverage afforded by policy? ( ) YES ( ) NO
8. Is contractual liability coverage included? ( ) YES ( ) NO

C. Automobile Liability:

1. Does this policy cover:
   (a) All owned automobiles? ( ) YES ( ) NO
   (b) Non-owned automobiles? ( ) YES ( ) NO
   (c) Hired automobiles? ( ) YES ( ) NO

It is understood that waivers of subrogation are required by Manville Forest Products Corporation and it is certified that contractor's policies described above in this certificate have been endorsed to waive any and all rights of subrogation, whether created by law, equity, or contract, against Manville Forest Products Corporation, its affiliated and subsidiary companies, or any employee, agent or contractor of Manville or against any person, firm or corporation for whom Manville may be acting.

This certificate is to be used to list such coverages as the policies listed thereon provide and does not reflect Manville insurance requirements.

Date _____ _____ *(Insurance Company)*

Place _____ By _____ *(Authorized Representative)*

_____ *(Name and Address of Producing Agent)*

Return To: MANVILLE FOREST PRODUCTS CORPORATION – Purchasing Department

SUPPLEMENTAL GENERAL CONDITIONS

1.0 GENERAL

The work to be completed under this contract includes the obtaining of all necessary permits, furnishing all tools, equipment, labor, and materials (unless specifically omitted herein) necessary to complete the installation of a Clarifier Sluice and Boiler Ash Pond and a polyethylene 10-inch pipeline at our West Monroe, Louisiana plant in accordance with the plans and specifications, and as outlined under "Scope of Work" in Section 100 of these Specifications.

Without prejudice to the foregoing, the quality of construction shall be as stipulated in these specifications and all work done by the Contractor shall be completed to the satisfaction of the Owner. The Owner requires materials and workmanship equal to present good industrial construction.

2.0 WORK SCHEDULE

2.1 Upon award of Contract, Contractor shall proceed immediately with ordering the required materials and preparing the required documents.

2.2 Contractor shall start actual field activities on or before _____. Contractor shall move onto site and set up field office prior to this date.

2.3 Completion of Work - The Owner requires that the work included under this contract shall be completed by November 30, 1990.

It is intended that the Contractor has proven the worth of his performance and it is ready for the Owner's check out by the above dates.

During the period of the Owner's check of the Contractor's performance, the Contractor shall make available well-qualified tradespeople to assist the Owner.

Installation ready for operation on December 1, 1990 at 7:00 A.M.

2.4 Contractor will be required to prepare within one week after contract award a detailed construction schedule incorporating dates shown in above schedule, a manpower curve by trade, and a procurement record listing all material and equipment to be supplied by Contractor. The schedule, manpower

curves, and procurement record shall be in such detail as to allow the weekly tracking of the Contractor's performance under this purchase order. The Contractor shall be fully responsible for obtaining the above information from his subcontractors.

The construction schedule shall be time-scaled showing detailed activities and restraints.

During weekly job meeting, Contractor and Construction Engineer will review schedules and all items affecting the schedules, including change orders, delivery of material and equipment, and manpower. All subcontractors will be expected to attend the weekly job meeting and review their portion of the project. The Contractor's project management will be expected to coordinate the schedule and work performed by the subcontractor.

Contractor should realize that the dates given for material and/or equipment delivery are approximate and could vary by as much as one (1) to two (2) weeks. Contractor agrees in acceptance of schedule that he can properly man project within terms and conditions of the contract.

The Owner shall not be liable for the inability of its suppliers to make deliveries within one (1) to two (2) weeks of the scheduled date.

Should delays occur beyond this anticipated period, Contractor's sole remedy shall be an extension of the completion date by an equal period only if particular piece of equipment is critical to final completion date.

3.0 OWNER SUPPLIED MATERIAL

3.1 The following materials will be furnished by the Owner:

a. _____ lineal feet, in 40-foot lengths, nominal 10-inch o.d. polybutylene pipe, Series 160, SDR 13.5, of Shell Chemical Company Resin 4121.

b. _____ each fabricated, mitered, 3 section, 14-inch radius, 45 degree elbows, matching material defined in 5.1.a.

c. _____ each fabricated, mitered, 2 sections of 18-inch tangents, long radius 30 degree elbows, matching material defined in 5.1.a.

d. _____ each fabricated, mitered, 2 sections of 24-inch tangents, long radius 22-1/2 degree elbows matching material defined in 5.1.a.

e. _____ each molded butt fusion flange assemblies. Each assembly shall include a molded stub end and

flange of material defined in 5.1.a and a ductile iron back-up flange of minimum of 1-inch thickness with eight (8) at 25/32-inch o.d. holes on a 9-1/2-inch bolt circle. (Note that required 5/8-inch o.d. galvanized bolts, nuts, and washers are not furnished by the Owners, and must be supplied by the Contractor.)

f. Two (2) each fabricated, mitered, 45 degree Wyes matching material defined in 5.1.a.

3.2 The Contractor must receive, unload, store, handle and protect the materials.

3.3 Unused materials will remain the property of the Owner.

4.0 SPECIAL INSPECTIONS AND TESTS

The Owner will arrange and pay for all tests and inspections of the construction that the Owner may require for proper control of the work. This refers to the compaction of soil, strength of concrete, fabrication and erection of steel, etc. Tests or inspections required by the Contractor will be the Contractor's responsibility.

5.0 RESPONSIBILITY FOR LOSS OF MATERIALS

The Owner will not be responsible for the Contractor's loss of tools, materials, etc. The Contractor must safeguard his own property.

6.0 SAFETY, FIRE PROTECTION

The Contractor shall adhere strictly to all Local, State, OSHA and Plant rules and regulations for industrial construction. Proper temporary lighting and barricades shall be employed and maintained around all open holes and other job hazards.

The Contractor shall also adhere strictly to fire protection recommendations as covered by NFPA 241.

Furnish ground fault circuit protection for all portable tools as per National Electric Code, Section 210-8, latest edition.

The Owner's Construction Engineer is not responsible for the Contractor's compliance with any applicable safety requirements, but is empowered to stop any activities of the Contractor (or its employees) that he considers dangerous.

The Contractor will be responsible for holding weekly safety meetings on the site, and a safety record must be posted in a conspicuous place.

The Construction Engineer may request the contractor to have a safety engineer on the site if the accident rate of the

Contractor or his subcontractors is considered excessive.

7.0 CLEANUP

The Contractor shall maintain the work area in a clean and satisfactory manner. Do not allow debris to accumulate. A cleanup shall be made once a week or as directed by the Construction Engineer. Construction debris must be removed, transported to and disposed at the Owner's landfill on site and approximately 1-1/2 miles from the project.

8.0 CODES AND ORDINANCES

All construction shall comply strictly with all Local, State and Federal codes and/or ordinances where such is applicable. It will be the Contractor's duty and responsibility to obtain the required approvals and all necessary permits, except that the Owner will obtain any EPA permits required.

9.0 CHANGE ORDERS

Quoted prices, submitted by the Contractor on all change orders over $1,000, including firm price changes, must be completely documented. This would include complete, detailed estimates, with man-hours, material quantities, etc. The formula and percentages as shown below shall be used for all change orders.

Change Order - Additions and Deletions: The Owner has the right to change the work. If a price cannot be established for the work changed, the Contractor shall perform the work on the basis of the "actual field cost" to the Contractor, plus overhead and profit computed, in accordance with the following:

A. Labor - All field labor including a proportionate part of foreman's and field engineer's time, if required (the payroll to be based on straight time only);

B. All established payroll taxes and assessments;

C. Materials - All materials purchased for this work. Agreed on value of materials taken from the contract work, either as used or unused materials;

D. Overhead:

1. Overhead shall be _____ percent of the total of Items A, B, and C;

2. The use of the Contractor's small tools, light equipment gear, scaffolds, etc., shall be considered a part of the overhead cost and shall not be billed as a separate item;

E. Profit shall be _____ percent of the total of Items A, B, C, and D;

F. All approved subcontract work directly relating to the change order;

G. Overhead and profit on subcontract work shall be _____ percent of Item F;

H. Other reimbursable items (not subject to overhead or profit):

1. Rental of heavy equipment,

2. Extra "out-of-pocket" insurance premiums,

3. Freight, trucking, customs, duties, telephone, telegrams, photos, etc.

4. Fees for permits, licenses, inspections, etc.

5. When approved in advance by Owner, travel expenses for men brought to the job specifically for this work and/or living expenses for men while working only on this work.

6. Premium payments for overtime work or special conditions.

7. Sales, Use or Occupational tax when applicable.

I. The Owner's engineer reserves the right to approve all items entering into the "actual field cost" prior to any work being performed under this Section 11.

J. The Owner has the right to audit the Contractor's records to verify charges submitted by the Contractor pursuant to this Section 12.

Full payment for all work covered by change order will be paid within forty-five (45) days after invoicing following completion of the work.

The above applies to all subcontractors' prices to the General Contractor unless changed otherwise by the Owner.

No requests for contract extras will be honored unless Owner's representative is notified prior to start of any work considered to be extra by Contractor.

10.0 SITE VISITS

The Contractor has visited the site with the Owner's representative and acquainted himself with existing conditions. The Contractor shall, at not time after the visit, assert that there is any misunderstanding in regard to the nature or extent of the work or working conditions.

11.0 FACILITIES AND SERVICES BY OWNER

11.1 The Owner will furnish one outlet of each service listed below without charge. The Contractor must maintain and extend these services.

11.1.1 Electrical Service 460 V, 3 phase, 100 amps and 115 V, single phase, 30 amps.

11.2 Uncovered storage space is available.

11.3 The Owner will not unload any of the Contractor's material or equipment. The Contractor shall be responsible for all material furnished by himself or transmitted to him by Manville Forest Products Corporation.

11.4 Construction parking will be in an area designated by Construction Engineer. The Contractor shall be responsible for the maintenance and security of this area as directed by the Owner.

11.5 The Contractor shall provide toilet facilities for his personnel. The Owner's toilet facilities and lunchrooms are not to be used by Contractor's personnel.

11.6 Contractor's employees are restricted to the project site and approved Contractor storage and field office areas. They are not to be allowed in any other plant location.

12.0 OTHER CONTRACTS

The Owner may have separate contracts in force at the same time and in the same areas. It will be important that this Contractor schedule his work and cooperate with all other Contractors.

13.0 OWNER'S OPERATIONS

The Contractor shall not interfere in any way with the Owner's present operations. The Contractor shall not remove any existing construction or create any openings without prior approval from the Construction Engineer. All openings shall be properly protected to the satisfactory of the Construction Engineer. The Owner's operations must be maintained at all times.

This plant is in operation 24 hours per day. The Contractor shall not make any connections to existing services that will interfere with plant operation. Any such connections that are required in accordance with the specifications and drawings shall be authorized by and accomplished under the supervision of the Owner's Construction Engineer.

14.0 STANDARDS

References made to trade, technical, governmental or other

codes, standards or specifications shall be interpreted as minimums and not maximums.

15.0 WELDING

Welding machines shall be grounded directly to the work. The use of building or equipment steel or conduits of any kind as common ground point is not allowed under any conditions. The Contractor shall be responsible for any wiring, instrumentation, computer or other electrical pieces of equipment damaged by not using the welding grounding method described above.

16.0 SHOP DRAWINGS

Five sets of shop drawings for wall reinforcing shall be supplied to Owner for approval prior to fabrication.

17.0 OPERATING MANUALS

Not Applicable.

18.0 INVOICING

Contractor will be expected to break down his lump sum price and submit monthly billings on special form attached to these specifications. The Construction Engineer must review and approve the breakdown of funds on the invoice prior to the first submission of invoice. The percentage of work applied for each billing must be reviewed with the Construction Engineer prior to submission of the invoice. Invoices are to be submitted once a month, on or about the last day of the month.

19.0 FIELD MEASUREMENTS

Contractor shall be responsible for the taking of all field measurements and the checking for any interferences before starting construction. Contractor shall notify Construction Engineer of any changes required to clear existing facilities.

20.0 ATTACHMENTS TO STEEL ROOF

Deleted.

21.0 JOB ACCIDENTS

This Contractor has the responsibility of notifying the Construction Engineer of all accidents to the Contractor's or subcontractor's personnel.

In the case of a lost-time accident, the Construction Engineer must be notified immediately. In all cases, a written report must be made within two days of an accident.

22.0 NO SMOKING POLICY

The Contractor is advised that smoking is prohibited in some project areas.

This regulation applies not only to Contractor's personnel working on the site, but to his vendors, truck drivers, etc., who visit the site.

If someone is smoking, they will be asked to extinguish their smoking material. Non-compliance with this request will result in the individual or Contractor being asked to leave the premises.

There will be no exceptions made to this regulation.

23.0 ASBESTOS CONTAINING MATERIALS

Deleted.

24.0 DRAWINGS

24.1 Contract Drawings:

Manville Drawings

Drawing	Revision	Title
63-0-18004		Clarifier Sludge and Boiler Ash Sluice Pond
63-0-18005		Plan Layout
63-0-18006		Existing Topography with Imposed New Levee Location
63-0-18007		Same
63-0-18008		Same
63-0-18009		Cross Section "A-A"
63-0-18010		Cross Section "B-B" and "C-C"
63-0-18011		Cross Section "D-D"
63-0-18012		Cross Sections "E-E" and "F-F"
63-0-18013		Levee Cross Sections 1, 2 and 3
63-0-18013A		Levee Cross Sections with Slurry Trench Wall
63-0-18014		Levee Cross Section 4 and Influent Line Details
63-0-18014A		Levee Cross Section 4 with Slurry Trench Wall
63-0-18015		Plan for Portion of Pond from Sta.0+00 to Sta. 11+95.18 and from Sta. 30+30.01 to Sta. 39+79.83
63-0-18016		Plan Portion of Pond Sta. 11+95 to Sta. 20+12
63-0-18017		Plan for Portion of Pond Sta. 21+42.33 to Sta. 23+38.90
63-0-18018		Plan of North Service Road to Pond

DRAWING	REVISION	TITLE
63-0-18019		Plan of Outfall Structure
63-0-18020		Wall and Footing Sections, Outfall Structure
63-0-18021		Wall and Footing Sections, Outfall Structure
63-0-18022		Handrail Details, Outfall Structure
63-0-18023		Screen Details, Outfall Structure
63-0-18024		Plan and Profile 12" Polyethylene Force Main
63-0-18025		Plan and Profile 12" Polyethylene Force Main
63-0-18026		Plan and Profile Slurry Trench Wall Sta. 0+00 to Sta.16+75 Sta. 16+75 to Sta. 31+50 Sta. 31+50 to Sta. 37+79.93

25.0 CONTRACT ADMINISTRATION

The Manville Forest Products Construction Engineer for this project will be J. E. Boyles.

26.0 GENERAL

26.1 No compressed air will be furnished by the Owner.

26.2 All miscellaneous iron and steel, including bolts, etc. shall be hot dipped galvanized, are included in the work under this Contract, and shall be furnished and installed by the Contractor unless specifically noted otherwise in the Documents.

26.3 The General Conditions notwithstanding, the Contractor is not required to engage a licensed land surveyor, however, the Contractor is required to locate and layout facilities to assure the correct position on the property, to establish correct levels, and to fix and locate all items, both above and below grade, required by the Drawings.

26.4 The Contractor will submit to the Owner, on forms provided by the Owner, a daily report showing the Contractor's manpower on the job (including manpower of Subcontractors). These shall be delivered to the Construction Engineer no later than 9:00 A.M. following each scheduled work day, whether actual work was or was not performed.

26.5 The Owner's operations on roads and railroads in the plant shall not be interrupted by the Contractor's work.

26.6 The following general notes, cautions, requirements and applicable standards pertaining to the polyethylene pipe, furnished by the Owner and to be installed by the Contractor, shall govern where not explicitly shown or noted otherwise on the Contract Drawings:

a. The Contractor shall note and take necessary steps to provide for thermal expansion and contraction of the polyethylene pipe (linear rate is approximately 0.85 inch/10 deg. F temperature change for each 100 feet of pipe) during joining and laying operations.

b. Minimum bend radius to be employed with the 10-inch nominal diameter polyethylene pipe shall be 20 feet.

c. Manufacturer's pipe and fittings descriptive literature and recommendations are included for the Contractor's information. These recommendations shall govern installation not shown or noted otherwise on the Drawings. Sections included are:

(1) Pipe and Fittings Section, pages 3 through 9.

(2) Joining Section, pages 1 through 13.

(3) Installation Techniques Section, pages 1 through 18.

(4) Shipping, Handling and Storage Section, page 1.

27.0 INSURANCE LIMITS

Minimum requirements for insurance shall be as follows:

	MINIMUM COVERAGE
1. Workmen's Compensation (Indicate Waiver of Subrogation)	Statutory Limits
Employer's Liability	$500,000
2. Comprehensive General Liability (Including Contractual Liability)	
a. Bodily Injury	$1,000,000 combined single limit or equivalent
b. Property Damage	
3. Automobile Liability	
a. Bodily Injury	$1,000,000 Combined single limit or equivalent
b. Property Damage	

SECTION 100

SCOPE OF WORK

101-1: GENERAL: The work for this project consists of the construction of a pond for the impoundment of sludge and boiler ash. It will contain the following inclusive items:

a.) Clearing and Grubbing: The owner has previously had the land where the pond is to be constructed cleared of trees and destumped. A few stumps may be encountered and will be disposed of in this contract.

The trees removed on the site were burned on the site. Debris from this burning will be encountered in upper portions of the excavation.

Contractor will be responsible for removing upper twelve (12) inches of this material and disposing of same on the owner's storage site.

Portions of this twelve (12) inches of material may be cleaned and used as top soil for levee sections.

b.) Existing soils shall be removed and either placed in levees or soil storage area. The soils placed in the levees shall have a minimum permeability of 1x10(-7) cm/sec.

Levees will be constructed from dirt found on the existing site.

All unusable dirt excavated and any usable dirt that may be left will all be placed at the owner's soil storage site.

Levees will be constructed to the heights and shapes shown on the plans.

c.) A three foot thick clay liner bottom will be constructed of a combination of existing excavated soil from pond and borrow dirt from contractor's off-site borrow pit. In some instances, the existing bottom elevations of the pond are below elevation 61. Any soils below this elevation may be filled with usable excavations from site. The entire bottom will be required to be excavated to elevation 61 to allow for a full three feet of clay liner. Fill to be constructed.

The interior slopes of the levees that are in cut sections below existing natural ground shall also be removed for a depth of three feet perpendicular to the slope of the levee and backfilled with select material.

d.) On top of the clay levee a sand-clay-gravel road base covered with 1-1/2 wash gravel will be constructed. From the excavations of the site, sand-clay-gravel material will be encountered. If the quality of this material meets

specifications, it may be used. If the material can be sweetened with other material from other pits to conform to specifications, it may be used. Contractor to figure his bid by using material from off site to be hauled to the job. Once excavation of sand-clay-gravel is completed and a determination is made as to what may be required to "sweeten" the existing excavated material, the owner may request a change order to use the material.

e.) Levees around the pond will be seeded.

f.) Pumping equipment and dewatering devices will be required of contractor. At certain times, in order to protect the completed portions of the levee from rising waters of the Ouachita River, the owner may request that the pond be flooded. Ample pumping equipment capable of pumping in excess of 3000 gallons per minute will be required. The same pumping equipment may be required to control the water on the inside of the levee once ring levee is closed. The control of dewatering inside of levee from rain water or seepage will be the responsibility of the contractor.

g.) A concrete outfall structure will be constructed as shown on the plans.

h.) A road will be constructed across the existing decant canal to provide access to the pond. The owner will furnish the contractor either thirty-six inch or forty-two inch polybutylene pipe for the contractor to install. Fill for crossing shall be of usable excavations from the site. A second service road will be constructed to the north for additional access.

i.) A system of pipes will be installed, supported by styrofoam logs, at various locations in the pond.

j.) A twelve inch influent pipe line will be constructed across adjacent property and the decant canal.

k.) Contractor will be expected to clean up site prior to final clean up of project.

l.) The ring levee of the pond, once the low area of the levee at the slough on the eastern side of the pond is raised, shall be raised in equal elevations. At no time shall the difference in the elevation of the levee be more than one foot.

SECTION 201

CLEARING AND GRUBBING

201.01: DESCRIPTION: This work consists of certain clearing, grubbing, removing and disposing of vegetation and debris within the limits of the pond.

(a) Clearing and Grubbing: This consists of the removal of any brush, stumps and debris; excavation and removal of all stumps, roots, submerged logs, snags, corduroy and other perishable and objectionable material; and disposing of removed material and cleaning up the area to be cleared.

201-2: GENERAL CONSTRUCTION REQUIREMENTS: The owner will establish levee limits and construction lines and shall designate items to remain. The contractor shall preserve all items designated to remain. The contractor shall be responsible for maintaining levee and construction lines during construction.

201-3: CLEARING AND GRUBBING: Stumps, roots and other protruding obstructions not designated to remain shall be cleared and grubbed (including mowing as required).

Grubbing with explosives will not be permitted without written permission from the owner.

Except in areas to be excavated, stump holes and other holes from which obstructions are removed shall be backfilled and compacted to the satisfaction of the owner with approved special fill (See Section 203.3).

Burning of perishable material shall be under constant care of watchmen and in such manner that anything designated to remain in the pond area, the surrounding forest cover or other adjacent property will not be jeopardized.

Burning shall be in accordance with all applicable laws and ordinances and in particular Section 11, entitled "Control of Air Pollution from Outdoor Burning" of the current regulations of the Louisiana Air Control Commission.

Materials and debris which cannot be burned and perishable materials which are not burned shall be removed from the right-of-way and disposed of at locations off the project to soils storage site within one mile of site. Non-burnable stumps, etc. shall be disposed of at designated area southeast of impoundment; perishable materials in the nature of contractor's trash only, shall be disposed of at owner's landfill just south of the Ouachita River levee and North of the impoundment.

SECTION 203

EXCAVATION AND EMBANKMENT

203-1: DESCRIPTION: This work consists of excavation, disposal, placement and compaction of all materials that are not provided for under other Sections of these specifications, including excavation and embankment construction for roadways, levees and other structures, excavation for ditches and channels, and all other grading operations necessary for the work in accordance with these specifications and in conformity with the lines, grades, thicknesses and typical cross sections shown on the plans or established by the engineer.

The plans include data regarding the boring and classification of existing materials. Neither the owner nor the engineer guarantee the accuracy of such information and bidders should make, at their own expense, such additional investigations as they consider necessary. No additional payment will be made for any increased costs due to inaccuracy of soil boring data shown on the plans.

203-2: UNUSABLE EXCAVATION: Unusable excavation consists of the excavation and disposal of all materials within the pond limits that cannot be used for levee construction, clay liner or top soil for seeding. See measurement and payment section of this specification.

203-2.1: Drainage Excavation: Drainage excavation includes all excavation made for the primary purpose of facilitating drainage beyond the limits of the pond section. Drainage excavation also includes inlet and outlet ditches to structures or roadway; changes in or deepening of channels of streams, berm ditches, ditches parallel or adjacent to the roadway beyond the limits of the pond. This material shall not be used in levee construction.

203-2.2: Muck Excavation: Muck excavation consists of the removal of soils and organic matter not usable for levees or clay liner. Muck shall include materials which will decay or produce subsidence in the embankment and may consist of decaying stumps, roots, logs, humus or other material not satisfactory for use in the embankment.

The top twelve (12) inches of material removed from pond construction prior to the placement of usable fill material shall be considered as muck material. Topsoil in this material that is clean and contains no brush or other foreign material may be stored in soils storage location and reused as top soil for seeding of levees.

Muck excavation also consists of material that may be encountered in the bottom of the natural sloughs that cannot be used due to excessive wetness or other causes that will not allow for new levee or clay liner from being installed properly. If such material is encountered at a depth not scheduled to be removed, owner shall be notified prior to the removal of said material so a

determination of the amount of material can be made.

203-2.3: Silt Excavation: In designated areas of the plans on levee Section 2, the existing silty soils for a depth of four (4) feet shall be removed and deposited in unusable soils area of the soils storage location area. Upon the removal of the top four (4) feet, owner's laboratory will check the remaining material to determine if additional material needs to be excavated. If determined by owner that additional excavation is required, contractor shall be paid for excavation at predetermined price in bid proposal.

203-2.4: Sand-Clay-Gravel Excavations: From soil borings made by owner, certain areas are indicated to have a good quality of sand-clay-gravel. This material may be stock piled at the soils storage location. Owner does not guarantee the quality of the material and whether it will meet the specifications set forth for road section. Material may be checked by contractor to see what additional materials are required to bring it into specification limits.

Any sand-clay-gravel excavated from owner's property shall remain in owner's soil storage location for future use by owner.

203-2.5: Unclassified Excavation: This excavation shall be defined as any material, other than those previously designated in this sub-section, that has a plasticity limit below 16 excavated from the site. This material shall not be used as part of the levee construction or the clay liner. This material shall be hauled to the soils storage location.

203-3: USABLE EXCAVATION: Usable excavation is defined as excavation whose composition is determined satisfactory for use in levee or pond liner construction. All soils for levee or clay liner construction shall have been tested and classified in their original position by owner's testing laboratory before being used in embankments or other final positions in the project.

203-3.1: Topsoil Excavation: As noted in Section 203-2.2, muck excavation that is clean and contains no brush or foreign material may be used for topsoil in the top four (4) to six (6) inches of exterior levee sections. Contractor shall not be paid an extra for topsoil hauled to site. See Measurement and Payment item for topsoil.

203-3.2: Clay Core of Levee: The center portion of the existing ground in levee section shall be excavated for a minimum width of fourteen (14) feet by a minimum depth of four (4) feet for the construction of a clay core. This clay core shall be of the same material to be used in the levee section or clay liner defined hereafter. This clay core section, at the owner's option, may be eliminated in the area where levee Section 3 will be constructed due to possible ground water conditions that may be encountered.

203-3.3: Levee Embankment: Existing soils consisting of clays

with plasticity index ranging from 16 to 40 may be utilized to construct the levees of the pond. These clays for the levee construction shall have a permeability of 1x10(-7) cm/sec.

This excavation shall be placed in eight inch lifts compacted to a minimum dry density of at least 90 per cent standard proctor compaction.

Existing excavation that meets clay liner permeability requirements may be used as clay liner.

Representative samples of excavated material shall be taken and classified by the owner's testing laboratory at the rate of one per 1000 cubic yards including grain size analysis and water content determinations to determine the suitability of the material for levee construction. Permeability tests by the owner's laboratory will require a minimum of three days before confirmation of the suitability of the soil. Any area that shows defective by owner's testing laboratory shall be removed and replaced at contractor's expense.

203-3.4: Embankments in other fill areas of the pond. Existing excavation that meets permeability requirements may be used in areas where fill is required to bring existing elevations to 61.0 M.S.L. This material may also be used to replace excavation when excessive drainage, silt or muck excavations are ordered by the Owner.

203-3.5: Borrow: Borrow is defined as excavation that is excavated from areas that are off the owner's property and has to be hauled to the site by contractor's vehicular equipment.

Borrow dirt shall be used for the construction of the three foot bottom clay liner and for the interior pond levee clay liner until filling operations reach natural ground. If for some reason existing usable excavation is not available to complete levee work, borrow may be used to complete levee construction. Owner shall be notified prior to placement of borrow material on any area above existing natural ground in order to determine quantity and compensation to contractor.

The contractor shall make his own arrangements for obtaining borrow at no additional expense to the owner. All borrow excavation shall have plasticity index ranging from 16 to 40. Borrow excavation shall have a permeability of 1x10(-7) cm/sec.

When sources of borrow are located adjacent to a stream or river on the National System of Wild and Scenic Rivers or the Louisiana National and Scenic River System, the borrow pits and any stockpiled materials shall be located at least 300 feet from the natural bank of the stream.

The contractor shall give the owner two weeks notice prior to the excavation of any borrow dirt from contractor's pit to allow owner's laboratory sufficient time to determine the suitability of

the borrow excavation.

Owner's laboratory shall have the right to monitor the pit at any time borrow is being removed from the pit to job site. At any time during the excavation of borrow, the owner's laboratory determines that the borrow material does not meet specifications, excavation shall cease and a new borrow pit found. If this should occur, owner will give no additional compensation to the contractor to find a new site. No time extension will be given to the contractor for changing borrow pit areas.

203-4.1: Compacted Clay Liner: The clay liner shall be defined as the top three feet of material that lines the bottom of the pond and the top three feet of material that lines the interior face of the levee section from elevation 61 to existing ground surface, which varies in elevation. This clay liner material shall have a minimum permeability of 1x10(-7) cm/sec.

The contractor shall provide seven days notice of the beginning of construction of the clay liner to allow owner to survey the completed initial excavation after completion of proof rolling and any additional excavation, but prior to beginning the construction of the compacted clay liner. The owner will confirm bottom excavations are at plan elevations to receive borrow for the clay liner. The owner's approval shall be issued in writing prior to contractor commencing placement of the clay liner. From this point until total completion and acceptance by the owner, the contractor shall protect and correct, if necessary, the clay liner.

Representative samples shall be taken and material classifications shall be made by the owner's testing laboratory at the rate of one per 1000 cubic yards, including grain size analysis and water content determinations to determine the suitability of the material for compacted clay liner construction. Any material determined not to be suitable shall be wasted at the directions of the engineer and additional material provided by the contractor at no additional payment.

In addition to the above, representative samples shall be taken at the rate of 1 per 5000 cubic yards of segregated material by the owner's testing laboratory and Atterberg limits determined. The samples shall be compacted to 90% maximum dry density in accordance with following requirements and permeability tests run upon the compacted samples. Permeability tests shall be performed using Falling Head testing apparatus.

In addition to the above, as the compacted clay liner is constructed, nuclear density tests shall be made upon in-place compacted material at the rate of nine tests per acre per lift. Also, Shelby Tube for permeability tests shall be taken from in place compacted material per every twelve inches of material (vertical measure) per acre.

In-place densities of compacted clay liner will be checked by the

owner's testing laboratory and shall be determined using the Nuclear Gauge method (ASTM D-2922).

Permeability testing of Shelby Tube samples shall be as specified above. The holes resulting from Shelby Tube sampling shall be grouted with a bentonite grout by the owner's testing laboratory. Permeability tests will take three days for testing laboratory to give results.

Any delays caused by performance of such tests or delays caused by failure of such tests shall be considered incidental to the work. No additional payment will be made for such delays.

203-5: GENERAL REQUIREMENTS: Excavation and embankment shall be finished to reasonably smooth and uniform surfaces. Final excavation and embankment slope lines shall be uniform in appearance. If final excavation and embankment slope lines vary by more than 0.03 feet per linear foot of slope dip in embankments and 0.03 feet per linear foot of slope swell in excavations, measured from a straight line between the top of the embankment and the toe of the slope, the slopes shall be reworked by the contractor until the above criteria have been met. Excavation operations shall be so conducted that material outside construction limits will not be disturbed.

Prior to beginning excavation, grading and embankment operations in an area, all necessary grubbing in that area shall have been completed.

Drainage excavation and rough grading shall be performed simultaneously, unless otherwise directed or permitted. Roots, stumps and other obstructions in sides and bottom of ditches and channel changes shall be cut to conform to required cross section and grade. No excavated material shall be left within 3 feet of the edge of ditch or channel.

In preparation of the natural ground to receive embankment material or preparation of the finished section in a cut area on which fill is to be placed, the contractor shall attempt all normal earthwork construction methods before undercutting will be considered by the owner. Such construction methods shall include, but are not limited to, the following:

(a) Draining and drying of the surface until the material is within reasonable limits of optimum moisture before compaction is attempted.

(b) Using lighter construction equipment for manipulation, disking, drying and compaction of the material.

(c) Dumping successive loads of material in a uniformly distributed layer of a thickness necessary to support the equipment while placing subsequent layers.

(d) Rerouting heavy construction equipment around the area

until the embankment can support such equipment without damage to foundation soils.

Unstable materials shall be removed by undercutting, unless otherwise directed, and the areas backfilled to the required section with usable soils if directed by owner's representative.

If undercutting is required, the contractor shall conduct his operations in such manner that the owner can make the necessary measurements before the backfill is placed. Undercut will be paid for as muck, and the required usable soils for backfilling will be paid for as levee excavation. Measurement of undercut will be made to the subgrade or original ground line, whichever is lower.

Embankment construction consists of constructing levee embankments, including preparation of the areas upon which they are to be placed; constructing dikes, when required; placing and compacting of approved material in areas where unusable material has been removed; placing and compacting embankment material in holes, pits and other depressions; and placing and compacting embankment materials for backfilling structures.

The contractor shall be responsible for the stability of all embankments constructed under the contract until final acceptance of the work and shall bear the expense of replacing any portions which have become damaged due to negligent work by the contractor, or to damages resulting from natural causes, such as rainfall, etc. except as covered in other sections of these specifications.

Excess and unusable excavated material shall be taken to soils storage location.

In cut areas, the top 12-inch layer on which fill or base material is to be placed shall be thoroughly scarified and the moisture content increased or reduced as necessary and compacted to at least 90 percent of maximum density. as per ASTM D-698.

203-6: EMBANKMENT CONSTRUCTION: Embankment material shall be placed in layers approximately parallel to the finished grade line not exceeding 8 inches compacted thickness. Each layer shall be placed for the full width of embankment, brought to a uniform moisture content and compacted to at least 90 percent of maximum density by ASTM D-698 before the next layer is placed. Operations shall be conducted in such manner as to obtain proper bonding between layers. Water shall be added or removed as necessary to obtain required density. At the contractor's option, approximately the top 2 inches of intermediate layers may be compacted with the succeeding layer. The 2-inch layer of the previous lift shall be brought to optimum moisture before placing the subsequent lift.

Compaction of embankments may be accomplished by any method that will obtain the specified density. Levee section shall be brought

up uniformly around entire perimeter of levee.

203-7: SOILS STORAGE LOCATION: The owner shall provide a site adjacent to the pond construction for the placement of muck, silt, unclassified excavations, topsoil and sand-clay-gravel excavations. Muck, silt and unclassified excavation shall be placed in one stockpile, topsoil in one stockpile and sand-clay-gravel excavation in a third. Excess usage material from within pond limits shall be placed in separate storage pile in location approved by owner. No specific compaction requirements will be made on these stockpiled areas. However, contractor shall make at least two passes of dozier over fill for compaction purposes.

The area that excavation will be placed shall be stripped of all grass and cross sectioned by owner's engineering firm prior to commencing excavation. Amount of unusable excavation shall be determined by final cross sections of this site.

203-8: METHOD OF MEASUREMENT AND PAYMENT: All excavated material shall become the property of the owner. Usable material from excavation will be used in embankments or other finished sections of the project. Excavated material that is surplus or unusable shall be disposed of by the contractor at soils storage location. All borrow dirt hauled to the site shall be used in construction of clay liner in the bottom of the pond and interior levee construction.

No measurement will be made of material temporarily removed and replaced to facilitate compaction of the material.

203-8.1: Drainage Excavation, Muck Excavation, Silt Excavation, Sand-Clay-Gravel Excavation and Unclassified Excavation: Measurement of these soils will be made by the cubic yard computed by the average end area method on the soils storage area. The end area will be bounded by (1) the original ground line established by field cross sections of the soils storage area before any excavations placed on area and (2) final ground line established by field cross sections after all excavations have been placed on soils storage area.

203-8.2: Excessive Silty or Muck Excavation: Silty soils excavated in excess of four (4) feet called for in Section 203-8.1 shall be by the cubic yard. Average end area of additional area required to be removed based on ground elevations of before excavation begins and final ground elevations where directed to by soils laboratory.

Muck excavations in excess of that called for on plans shall be by the cubic yard based on before and after cross sections of area to be mucked.

203-8.3: Topsoil Excavation: Measurement of topsoil is to be paid by the cubic yard. Topsoil shall be of a minimum thickness of four (4) inches and a maximum of six (6) inches. Topsoil to be placed on the exterior side of levee only. Excess top soil shall

be paid for under muck excavation above.

203-8.4: Clay Core of Levee: Measurement of excavation for clay core shall be by the cubic yard. Cubic yards will be based on removal and compacted replacement of in place yardage of a theoretical cross section fourteen (14) feet in width by four (4) feet in depth through length of levee section when required by plans.

203-8.5: Borrow Excavation: Borrow fill shall be paid for on the basis of truck measured dirt on cubic yards of material. Borrow dirt may be placed on entire bottom section of pond and along vertical walls from bottom of pond back to original natural ground elevation.

203-8.6: Usable Excavation - Levee Embankment: Measurement of levee embankment shall be by the cubic yard, computed by the average end area method. The end area will be bounded by (1) the original ground line established by field cross sections as shown on plan sheets in drawings and (2) the theoretical elevations of the finished levee section. The difference of (1) and (2) above determines the total cubic yards of dirt moved on the site. From this quantity the cubic yards paid to contractor for Items 203-8.1 and 203-8.5 will be deducted. No shrinkage factors will be added to figures in any section.

203-8.7: USABLE EXCAVATION IN OTHER FILL AREAS OF THE PROJECT: Measurement of usable excavation in area to replace muck excavation when directed by the owner's representative shall be by the cubic yard based on a before and after cross section of the area to be replaced.

203-8.8: Class B - Sand-Clay-Gravel Road Base: Measurement of sand-clay-gravel road base will be by the square yard and on an eight (8) inch minimum compacted thickness based on theoretical road section widths shown on plans.

203-8.9: Wash Gravel for Roadway: Measurement of wash gravel will be by the square yard and on a minimum thickness of one and one half inch based on the theoretical road widths shown on plans.

203-9: BASIS OF PAYMENT: The accepted quantities will be paid for at the contract unit prices which shall include furnishing all labor, equipment, and materials necessary to complete the items.

No direct payment will be made for acquisition of borrow materials outside the project and constructing haul roads, stockpiling, and rehandling of materials, precautionary measures to protect owner's property, dewatering as required, utilities, and furnishing necessary water and water equipment.

SECTION 204

TEMPORARY EROSION CONTROL

204-01: DESCRIPTION: This work consists of providing temporary erosion control measures on the project and in areas outside the project where work is accomplished in conjunction with the project, to prevent pollution of water, detrimental effects to property adjacent to the project and damage to work on the project. These measures shall consist of construction and maintenance of temporary erosion control features shown on the plans or as directed.

Installation of temporary erosion control features shall be coordinated with construction of permanent erosion control features to the extent necessary to assure economical, effective and continuous control of erosion and water pollution throughout the life of the contract.

204-2: CONTROL OF WATER POLLUTION: The contractor shall take precautions to prevent pollution of streams, canals, reservoirs and other water impoundments with fuel, oil, asphalt or other harmful materials. Also, he shall conduct his operations so as to avoid siltation of such streams.

Construction operations in streams, reservoirs, canals and other impoundments will be restricted to areas where it is necessary to perform filling or excavation to accomplish the work and areas which must be entered to construct temporary or permanent structures. As soon as conditions permit, streams and impoundments shall be promptly cleared of obstructions placed therein or caused by construction operations.

Except as necessary for construction, excavated material shall not be deposited in streams or impoundments, or in a position close enough thereto to be washed away by high water or runoff.

The contractor shall not disturb lands or waters outside the limits of construction, except as authorized.

204.3: MATERIALS: The contractor, at his expense, in ordering all materials not covered by project specifications shall meet commercial grade standards and shall be approved before being incorporated into the project. No testing of materials used in temporary erosion control features will be required unless such material is to be incorporated into the completed project. Acceptance will be on the basis of visual inspection.

(a) Mulches: Vegetative mulch shall consist of stems or stalks of oats, rye, rice, wheat or other approved straws.

(b) Seeding: Grass shall be an approved quick-growing species suitable to the area providing a temporary cover which will not compete with permanent grasses.

(c) Fertilizer: Fertilizer shall be a standard commercial grade acceptable to the owner.

204-4: PRECONSTRUCTION CONFERENCE: At the preconstruction conference or prior to the start of the applicable construction, the contractor shall present his proposed schedule for construction of the project. This schedule shall indicate the sequence of clearing and grubbing, earthwork operations and construction of permanent erosion control features, and the proposed use of temporary erosion control features. It shall also include proposed methods to prevent pollution of streams, reservoirs, canals and other impoundments as the result of construction operations.

204.5: EXPOSURE OF ERODIBLE EARTH: The owner may limit the surface areas of unprotected erodible earth exposed by clearing and grubbing, excavation or filling operations and may direct the contractor to provide temporary erosion or pollution control measures to prevent contamination of any stream, reservoir, canal or other impoundment or prevent detrimental effects on property outside the limits of the project at the contractor's expense.

204-6: INCORPORATION OF EROSION CONTROL FEATURES: Permanent erosion control features shall be incorporated into the project at the earliest practical time. Contractor to provide temporary erosion control features to protect unforeseen conditions that develop during construction, to control erosion at his expense.

204-7: PROTECTION DURING SUSPENSION OF CONTRACT TIME: If it is necessary that construction operations be suspended for an appreciable length of time, the contractor shall shape the top of the earthwork in such manner as to permit runoff of rainwater. Temporary slope drains shall be provided to carry runoff from cuts and embankments located in the vicinity of streams and impoundments. If such preventive measures fail, the contractor shall immediately take such other action as necessary to prevent erosion and siltation.

204-7.1: Backflooding of Pond: The contractor shall furnish pumping equipment at the site at all times when the Ouachita River has risen to a point that its backwaters are at an elevation of 61.0 feet, m.s.l. The owner, in order to protect the pond bottom, may require the contractor to flood the pond. Pumping equipment capable of pumping at least 3000 gallons per minute will be required to be at job site to perform this requirement. This same pumping equipment will be required to pump the water out of the pond. In either situation, the contractor shall provide necessary piping and control devices that will prevent washing or erosion of the completed pond sections. Any damage of the levee or bottom sections damaged by this pumping will be the responsibility of the contractor to repair at contractor's expense.

204-7.2: Erosion of levee section due to high water of Ouachita River: At times that the back waters of the Ouachita River begin

to reach the exterior portions of levee system, the contractor shall do as much as possible to try and prevent erosion. The owner recognizes that once the Ouachita River reaches the levee and begins to rise against it that the contractor has no control on what damage the river may cause. If such conditions arise, once the river has receded, a survey of the levee will be made to assess any possible damage. If damage has occurred, an extra will be issued to contractor. Any additional soil needed to correct washed out areas will be paid for based on same pay rate as Item No. 6 on proposal.

SECTION 205

SEEDING

205-1: DESCRIPTION: This section covers seeding, sodding (where required to control severe erosion) and fertilizing in general including: watering, maintenance, erosion damage repair, and clean-up.

Environmental Conditions: Work as indicated herein shall be accomplished only when satisfactory results can be reasonable expected. When conditions such as drought, excessive moisture, high winds, or other factors prevail to such an extent that satisfactory results are not likely to be obtained, the contractor shall stop all phases of this work.

205-2: SEED: Shall be properly labeled in accordance with U.S. Dept. of Agriculture Rules and Regulations. Seed shall be delivered in sealed, standard containers free from moist or moldy contents, and shall be free of other noxious weed seed in excess of the limits allowable under the Federal Seed Act. Common Bermuda grass seed shall not contain in excess of three percent of giant strains of Bermuda grass.

205-3: MATERIALS:

(a) Seed: See Note 4, Sheet 63-0-18011 for seed mixture required.

(b) Fertilizer: Shall be 8-8-8 grade, pelleted uniform in composition.

(1) Fertilizer for re-fertilizing shall be ammonium sulfate containing 21% nitrogen uniform in composition.

(c) Topsoil: Shall be the top 4 inches to 6 inches surface layer of soil. Topsoil shall be fertile, natural surface soil, free of subsoil, and toxic substances as well as stones 2 inches in dimension or larger. Top soil shall be free of all objectionable weeds or grasses.

205.4: PREPARATION: Prior to grading and tilling, vegetation that may interfere with the work specified, shall be mowed, grubbed and raked. The surface shall be cleared of miscellaneous construction materials that might hinder the work or subsequent maintenance.

Previously established grades shall be maintained on the areas to be treated in a true and even condition, repairs shall be made to previously graded areas. Areas having inadequate drainage or ponding near walks, driveways, or other areas shall be filled and graded to drain.

205-5: **INSTALLATION:** Seeding shall be done in accordance with Section 717 of latest specification of Louisiana Department of Transportation mixture "A" or "D", as shown in Table One.

SECTION 300

STYROFOAM BUOYANCY BILLETS

300-1: DESCRIPTION: This rigid lightweight polystyrene foam material shall be used to support the influent lines within the limits of pond as shown on drawings.

300-2: ENGINEERING DATA: Styrofoam logs used for this project shall be equal to those manufactured by Dow Chemical Company. Substitution shall require prior approval of bidding. The styrofoam shall meet the following requirements:

Density - lb./cu.ft. - 1.8
Compressive Strength:
p.s.i. at 5% deflection - 18.0
Buoyance Factor lb./cu.ft. - 55
Water Absorption Properties:
ASTM C272 (max.)
% by volume - 0.5

300-3: SIZE AND BUOYANCE DATA: Styrofoam logs shall be of the following size:

Billet Size	Cubic Feet	Approximate Weight Pounds	Maximum Buoyance Pounds
10"x20"x8"	11.11	20	610

300-4: INSTALLATION: Styrofoam brand buoyance billets may be installed with dowels, bolts, or bands.

300-4.1: Dowels: When connecting wood directly to the billets treated 3/4 inch maple dowels will be used. These dowels must be painted and driven at an acute angle three-quarters of the way through the Styrofoam billets.

300-4.2: Bolts or Threaded Rod Stock: Hot dipped galvanized bolts with wooden or metal washers will be used. Washers shall measure at least 6 inches in diameter to prevent the bolt head pulling through.

300-4.3: Bands: Bands shall be of stainless steel and at least two inches wide. Screws shall be hot-dipped galvanized, bronze or cadmium-plated screws or nails.

SECTION 400

CONCRETE WORK

400-1 SCOPE. EXTENT: The work required under this section consists of all concrete work and related items necessary to complete the work indicated on drawings and described in specifications.

400-2 COMPLIANCE WITH STANDARD AND INDUSTRY SPECIFICATIONS. Any material or operation specified by reference to the published specifications of a manufacturer, The American Society for Testing and Materials (ASTM). The American Concrete Instutute (ACI), the Portland Cement Association, the Concrete Reinforcing Steel Institute, the Local Buildings Code, or other published standard, shall comply with the requirements of the current specification or standard listed. In case of a conflict between the referenced specification and the project specifications, the project specifications shall govern.

400-3 MATERIALS AND ACCESSORIES:

400-3-01 Portland Cement: ASTM C150-60

400-3-02 Sand: clean, hard, natural sand or manufactured sand, a combination of both and conforming to ASTM C33-59.

400-3-03 Coarse Aggregate: Except as otherwise specified, aggregate shall be hard, durable, uncoated crushed stone, air cooled blast-furnace slag or gravel conforming to ASTM C-33-61T.

(1) Maximum size aggregate allowed is 1/5 of narrowest dimension between forms of the concrete manner or 3/4 of minimum clear spacing between reinforcing bars, or as recommended in ACI Standard No. 613-54.

(2) For concrete having an exterior surface exposed, 95 to 100% shall pass a 1 1/2 inch sieve; 35 to 70% shall pass a 3/4 inch sieve; 10 to 30% shall pass a 3/8 inch sieve and not over 5% shall pass a No. 4 sieve. Percentages are by weight.

(3) For applied cement finish (except exposed aggregate finish) use 1/8 inch minimum and 3/8 inch maximum size aggregate. except as specified otherwise.

400-3-04 Mixing Water: Clean and free from oil, acid and injurious amounts of vegetable matter. alkalies and other impurities.

400-3-05 Metal Reinforcement: Reinforcing steel shall be manufactured in the U.S.A. and shall meet the following specifications:

(1) Reinforcing Bars: Bars shall be deformed in accordance with ASTM A615 or A616 or A617. Reinforcement shall be clean and free from loose rust, scale or other coatings that will reduce bond.

(2) Welded Wire Fabric Reinforcing: (ASTM A497-72) Steel wire spot-welded at intersections and of size indicated. Use wire reinforcing in slabs of building, walks, and elsewhere indicated.

400-3-06 Metal Accessories: Include all spacers, chairs, tolsters, ties, and other devices necessary for properly placing. Spacing shall be galvanized where legs will be exposed in finished concrete surfaces. Accessories shall conform to requirements of the Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice for Reinforced Concrete Construction".

400-4 STORAGE OF MATERIALS: Store bagged cement on platforms off ground; protect stored cement against the elements. Handle and store fine and coarse aggregates separately in manner to prevent intrusion of foreign material. Protect all reinforcement until used. Do not use any frozen materials or any hardened cement.

400-5 CONSTRUCTION OF FORMS: Construct forms to slopes, lines, and dimensions shown, plumb and straight and sufficiently tight to prevent leakage; securely brace and shore forms to prevent displacement and to safely support construction loads. Provide access openings for cleaning and inspecting forms and reinforcing prior to depositing concrete. Do not coat forms with material that will stain or cause injury to exposed concrete surfaces. keep wood forms wet as necessary to prevent shrinkage.

400-7 CONCRETE WALKS: Concrete walks and concrete multipurpose areas shall be of sizes noted and indicated and shown on plans. Finish for those areas shall be light broom finish. Reinforcing and redwood dividers as indicated.

400-8 PLACING REINFORCEMENT: Place reinforcement accurately in position shown, securely fasten and support to prevent displacement before or during pouring. Cleaning, bending, placing and splicing of reinforcement shall be done in accordance with requirements of the local and state building codes and approved shop drawing.

Mesh reinforcement in slabs shall have sides and ends lapped not less than one mesh. All reinforcing shall be in place 12 hours before placing of concrete to allow proper inspection of reinforcing.

400-9 CLEANING, BENDING AND PLACING REINFORCING STEEL:

400-9-01 Bending: All bars shall be bent cold, and at time of pouring concrete shall be free of rust, scale and other foreign

materials. Bends for stirrups and ties shall be made around pins of not less than 4 diameters for smaller sizes. Bars with kinks or bends not shown on drawings will be discarded. Heating will not be permitted.

Wire mesh for slab reinforcement shall be set for 1 1/2 inch clearance to the top of slab unless otherwise shown and lapping shall be of no less than one full mesh at all splices. All joints, laps and crossings of reinforcing material shall be secured with 18 gage black annealed steel wire.

400-9-02 **Placing Reinforcement:** Metal reinforcement shall be accurately placed and adequately secured in position by concrete or metal chairs and spacers, except in footings and for slabs on fill. Where reinforcement in beams is placed in two or more layers, the clear distance between layers shall be no less than 1 inch, and the bars in the upper layers shall be placed directly above those in the bottom layer.

400-9-03 **Splices in Reinforcing:** Necessary splices not shown on drawings shall be lapped sufficiently to develop the strength of the bars by bond and securely wired. Splices in adjacent bars shall be staggered. Adjacent sheets of wire mesh shall be lapped at least six inches and securely wired. The clear distance bars shall also apply to the clear distance between a contact splice and adjacent contact splices of bars. Wire fabric used for reinforcing slabs on the ground shall have a minimum side and end lap of 4 inches.

400-10 INSERTS AND FASTENING DEVICES FOR OTHER WORK: Provide for installation of inserts, conduit, pipe sleeves, drains, hangers, metal ties, anchors, bolts, angle guards, dowels, thimbles, anchor slots, nailing strips, blocking, grounds, and other fastening device required for attachment of other work. Properly locate in cooperation with other trades and secure in position before concrete is poured.

400-11 STRENGTH, PROPORTIONS AND CONSISTENCY OF CONCRETE:

400-11-01 **Strength:** Except as otherwise specified, concrete shall have the compressive strength at 28 days of 4000 psi.

400-11-02 **Proportions:** The proportions of cement, aggregate and water shall be selected to provide the characteristics indicated for the required class of concrete. Conformance with the strength requirements shall be determined in accordance with the requirements of "Control Tests for Concrete" as hereinafter specified.

The method for determining the correct amount of water and aggregates for each batch shall be of type that will permit the proportion of water to cement to be closely controlled and easily checked at any time.

400-12 MIXING CONCRETE: Except as otherwise specified,

concrete shall be ready-mixed or job mixed at the Contractor's option, and Institute Building Code 318-77, Chapter 5.

400-13 CONTROL TESTS FOR CONCRETE:

400-13-01 **Testing Laboratory:** The Owner will retain the services of testing laboratory and pay all costs to take samples, make tests and submit reports of tests to the Engineer. The testing laboratory will provide for inspection at the concrete plant to see that concrete is properly mixed and that the consistency of mix is controlled.

400-13-02 **Extent of Tests:** The testing laboratory will take samples and make tests as hereinafter listed for each 50 cubic yards of fresh concrete or fraction thereof placed in the project but not less than one set for each day's concreting.

(1) **Compression and Strength Tests:** Each test shall consist of four standard 6" x 12" cylinders; two cylinders to be tested at the age of 28 days. Samples from which compression test specimens are molded shall be secured in accordance with ASTM C172-54. Specimens made to check the adequacy of the design for strength of concrete, or as a basis for acceptance of concrete, shall be made and laboratory cured in accordance with ASTM C-31-69. Additional tests of specimens cured entirely under field conditions may be utilized to check the adequacy of curing and protection of the concrete as directed. Strength tests shall be made in accordance with ASTM C39-72.

(2) **Slump Tests:** Test for slump shall be made at the place of deposit and in accordance with ASTM C172-71. Tests shall be made periodically, where cylinders are made, and as often in the opinion of the Engineer when a change in consistency of the concrete mix is noted. Unless otherwise noted or specified, the slump shall be within the following limits:

(a) All concrete: Maximum 6' - Minimum 3"

400-13-03 **Enforcements of Strength Requirements:** When the ultimate compressive strength of any cylinder falls below the specified strength for the class of concrete specified, the design mix and water content shall be adjusted to produce the strength for concrete that is subsequently placed. In addition, the Engineer may order additional curing for tht portion of the structure where the questionble concrete has been placed.

In the event that such additional curing does not give the strength required, as determined by load tests made in accordance with ACI 318-77, or cored cylinder tests and if removed and replace, or shall be reinforced as directed by the Engineer, at the Contractor's expense including the expense of the tests.

400-14 DEPOSITING CONCRETE:

400-14-01 Preparation: Before placing concrete, all debris, water and ice shall be removed from the places to be occupied by the concrete. Wood forms shall be thoroughly wetted or oiled and the reinforcement cleaned of ice or other coatings. Form work and the placement of reinforcement, pipes, sleeves, conduit hangers, anchors and other inserts shall be inspected and approved by the Engineer or his agent before any concrete is deposited.

400-14-02 Placing: The placing or depositing of all concrete shall be done in accordance with requirements of the American Concrete Institute Building Code 318-77 and as modified herein. Concrete shall be rapidly handled from mixer to forms and deposited as nearly as possible in its final position to avoid segregation due to rehandling or flowing. Concrete shall be spaded and worked by hand and vibrated to assure close contact with all surfaces of forms and reinforcement and leveled off at proper grade to receive finish. No concrete that has partially hardened or been contaminated by foreign material shall be deposited in the work, nor shall retempered concrete be used. All concrete shall be placed upon clean, damp surfaces, free from water, and never upon soft mud or dry porous earth.

400-14-03 Vibration: Concrete shall be placed with the aid of mechanical vibrating equipment. Vibration shall be applied directly to the concrete unless otherwise approved by the Engineer. The intensity of vibration shall be sufficient to cause flow or settlement of the concrete into place.

Vibration shall be applied at the point of deposit and in the area of freshly placed concrete. It shall be of sufficient duration to accomplish thorough compaction and complete embedment of reinforcement and fixtures but shall not be long enough to cause segregation of the mix. To secure even and dense surfaces, free from aggregation pockets or honeycomb, vibration shall be supplemented by hand spading in the corners and angles of forms and along form surfaces while the concrete is plastic under the vibratory action. Caution must be exercised when using vibrators and hand spades to prevent any injury to the inside face of the forms or any movement of the reinforcement.

400-15 CONSTRUCTION JOINTS: Construction joints shall be formed as indicated on the drawings, or as directed by the Engineer. Dowels and keys shall be used where indicated or required.

Whenever it is necessary to stop a day's work for any reason, such stops shall be located at the center of slabs and of beams or as directed by Engineer. Construction joints in concrete walls below grade shall have a continuous water stop, placed full lengths in each joint. Seal laps and joints of water stop tight. A temporary wood bulkhead shall be erected so that the jointing will follow a vertical plane at right angles with the

direction of the main reinforcement. To this bulkhead, fasten a wood strip 2" thick and of width equal to 1/3 the depth of the concrete slab to form a tongue and grooved joint.

Before concreting is resumed, the surfaces of previously placed concrete shall be roughened, cleaned, wetted and slushed with grout immediately before additional concrete is placed. Grout shall be 1 part Portland cement and 2 parts sand.

400-16 PROTECTION AND CURING: Protect concrete against rapid drying and keep moist for at least 6 days after placing; during this period, concrete shall be maintained above 70 degrees F. for at least 3 days or above 50 degrees F. for at least 5 days.

Cover cement finishes with mats, waterproof paper or other approved membrane within 24 hours after finishing and maintain in good condition for a minimum period of one week or as directed by the Engineer or his agent.

Concrete shall not be placed when the temperature is below 40 degrees and falling.

400-17 CONCRETE CURB: This item shall consist of the construction of the type of curb as designated on the plans and in conformity with the lines and grades, dimensions and typical sections as indicated and in accordance with these specifications.

All concrete for this item shall be proportioned and mixed to produce 4000 psi concrete and shall contain 5 1/2 sacks of cement per cubic yard and an admixture of "Pozzilith".

400-17-01 Subgrade: The subgrade shall be shaped to the required depth below finished surface in accordance with the dimensions shown on the plans and shall be compacted to 95%. The subgrade shall be shaped and compacted to a firm even surface and when possible shall be shaped and compacted at the same time and in the same manner as the subgrade for the pavement slab. All soft and yielding or justable material encountered shall be removed and replaced with suitable material.

400-17-02 Forms: The forms for the curbing and/or gutters shall be of metal, straight and free from warp and of sufficient strength with stakes to resist the pressure of concrete without springing. At least three stakes shall be provided at each ten feet. Metal forms shall be of approved section and shall be of a depth equal to the depth of the concrete curb and gutter; so designed to permit secure fastening at the tops. The outside form shall be straight from top to bottom. All forms shall be cleaned thoroughly and greased or soaped before concrete is placed against them. Forms which have become worn or bent or broken shall not be used until satisfactory to the Engineer.

400-17-03 Joints: Curb and gutter shall be constructed in uniform sections of 20 feet with each section separated from those adjoining by expansion joints located as shown on the plans. The material for joints shall be 3/4 inch Redwood board approved by the Engineer.

400-17-04 Depositing Concrete: The concrete shall be placed on the prepared subgrade, struck-off and compacted to the required thickness. All concrete shall be spaded or vibrated sufficiently to eliminate all voids and shall be tamped to bring all mortar to the surface after which it shall be finished to a smooth consistency. All edges shall be rounded with an approved finishing tool to the radius shown on the plans.

400-17-05 Finishing: The forms shall be removed within 24 hours after the concrete has been placed and the honey comb areas and other minor defects shall be cleaned and filled with mortar composed with Portland cement and sand mixed in the same proportion as provided for the concrete. Plastering will not be permitted on the faces of curbing and gutters and all rejected curb and gutter shall be removed and replaced without additional compensation. The top and face of the curb or gutter shall be finished while the concrete is still green, by wetting a wood block and rubbing the surface until it is smooth. A sufficient amount of water shall be used either by dipping the block in water or by throwing water on the curb or gutter with a brush.

400-17-06 Curing: After finishing, curb and gutter shall be cured with an impervious membrane curing compound. The curing compound shall be of a consistency suitable for spraying, shall be relatively nontoxic, and shall satisfactorily adhere to a horizontal surface of damp concrete when applied in sufficient quantity to produce a coverage of not more than 200 square feet per gallon. The resilient film shall be continuous, uniform, free from pin holes, moisture impermeable, and shall not react with the components of concrete. The compound shall be supplied with a white fugitive dye. Curing by constant wetting for 72 hours continuously will be permitted.

400-17-07 Backfilling: After the concrete has set sufficiently, the Contractor shall backfill adjacent to the curb or gutter with a suitable approved material which shall be compacted with mechanical tampers in layers of not more than six (6) inches until firm and solid.

SECTION 500

POLYETHYLENE PIPE

500:1 MATERIAL

Polyethylene pipe and fitting are made of polyethylene resin. The polyethylene base resin shall meet all requirements of ASTM D-1248 for Type III, Grade P34, Category 5, and has a PPI rating of PE 3408 by the Plastic Pipe Institute. The polyethylene base resin also shall have a PPI rating of PE 3406.

The pipe and fittings produced from this resin have a cell classification of PE 335434C under ASTM D-3350 and meet or exceed all the requirements of that specification.

Pipe used shall be manufactured by one of the following manufacturers: Plexco, Driscopipe from Phillips 66, Sclairpipe, or Dupont Aldyl "D".

500:2 QUALITY CONTROL

The molecular weight of polyethylenes is broken into four distinct classifications. They are:

Medium Molecular Weight .....less than 100,000
High Molecular Weight .....110,000 - 250,000
Extra High Molecular Weight ....205,000 - 1,500,000
Ultra High Molecular Weight ..1,500,000 and greater

PE3408 Industrial Pipe to be used shall be a High Density, Extra High Molecular Weight polyethylene resin.

Cell Classification for environmental stress crack resistance requires that 80% of the samples tested in accordance with ASTM D1693, Condition C, exceed 192 hours of testing without failures.

Pipe shall be stabilized with both UV stabilizers and a minimum of 2% carbon black against degradation due to ultraviolet light.

500:3 INSTALLATION OF PIPE

This section covers the four basic methods of installing pipe: underground, surface, suspended and marine. This section discusses how to handle the pipe, the tools, and proper joining procedures.

500:3.1 Installation of Underground Pipeline

a) Work Plan and Site Selection: A work site shall be provided that will have sufficient space for at least a day's joining of the pipe. The site should be free of sharp rocks and other debris that could cut or gouge the pipe. If the pipe is to be dragged over gravel or rough pavement, padding or rollers shall be used to eliminate this abrasion. For fusion operation in wet, windy, and wintry weather, simple shelters shall be made of 2 x 4's covered with polyethylene film.

b) Trenching: The maximum trench width, measured at the horizontal diameter of the pipe, shall not be more than the outside diameter of the pipe plus two feet6. However, in loose soil or sand, the trench width may be increased by sloping the sides or digging a wider offset trench.

Curved sections of pipe do not require thrust blocks if proper compaction is obtained. If changes of direction require tees or ells, provide thrust blocks. If thrust blocks are required, do not machine dig since this will damage the bearing surface of the trench wall. A small amount of hand digging just behind the fitting will keep the trench wall solid and undisturbed.

During preparation of the trench, certain conditions may be encountered that require special treatment to provide adequate bedding and foundation or to stabilize the trench walls or bottom. Where unstable or running trench soil is encountered, such as in excavations below ground water, the trench condition must be stabilized before laying the pipe. Well points or under drains may be used when excessive ground water exists. During dewatering, care should be taken to prevent removal of sand or silt and displacement of bedding or foundation soil material as a result of lateral or upward movement of the running soil. The use of shoring with sheeting may be specified to stabilize the trench walls during construction. If the sheeting is removed, the resulting slots should be backfilled and tamped in the same manner as the trench.

Where an unstable trench bottom is encountered as in mucky or sandy solid with poor bearing strength, stabilization of the bottom is required by undercutting the trench deeper than specified for the pipe invert and replacing to grade with a foundation and bedding of gravel or crushed stone. The use of the stone and gravel will act as a mat for the polyethylene pipe. The depth of the foundation and bedding will be dependent on the severity of the unstable trench bottom; however, a 6-inch layer is usually more than sufficient in most cases. If the foundation contains large particle size material, provide a cushion of acceptable beddng material between the foundation and the pipe. Care should be taken to prevent flow of the bedding material into the foundation material.

c) Pipe Laying: Pipe shall be joined above ground and laid out along the trench. It may be laid in the

ditch as digging continues, so as to keep to a minimum the amount of open trench behind the digger. The minimum length of trench to be opened for long lengths of joined pipe can be calculated from the following:

$$L = 100 + 6\,HD - H$$

where L = trench length, ft.
H = trench height, ft.
D = outside diameter of pipe, inches

This minimum trench length will accommodate the reverse bending of the pipe.

Care should be taken to avoid excessive scraping of the pipe by pulling it over rough or rocky ground. The use of rollers, logs or wood dunnage can be used to prevent scraping.

Shearing, bending or other movements should be prevented at flanged joints between polyethylene pipe and other rigid piping. At connections to valves, rigid pipe and fittings movement may be prevented by firm compaction of the haunching beneath the pipe and valve or fitting. A support pad 4-5 times the length of the valve or fitting is an alternative, especially in unstable soil. Where polyethylene pipe is to be connected to a valve or fitting attached to a rigid structure such as a manhole or valve box, a reinforced concrete pad should be poured under the pipe and flange and connected to the pad for the structure by means of reinforcing rods. This support pad should extend one foot or one pipe diameter, whichever is larger, from the structure. The polyethylene pipe should be firmly supported on the pad by a wood cradle with rubber-padded U-clamps to hold the pipe in place. Alternatively, a scooped pocket could be provided in the pad for the flange, and the pad support the pipe. Where settlement is not likely in stable soil, the polyethylene pipe could be secured in the wall of the manhole by a Link-Seal or by 3M Elastomeric Sewer Sealant soaked into jute or oakum. The Sewer Sealant is a polymeric material which foams on contact with water to ten times its original volume to form a flexible rubberlike gasket.

Firmly compacted backfill is usually sufficient to support polyethylene ells, tees and wyes. If the bearing strength of the surrounding soil is inadequate (such as muck or soft clay) to support heavy fittings and valves, concrete bearing pad with rubber cushions shall be used. These shall be large enough in area to provide stable support.

d) <u>Backfilling:</u> Backfilling should follow pipe laying as closely as possible to eliminate the possibility of pipe lifting due to flooding of open trenches or damage from falling boulders. The purpose of backfill is to provide firm, continuous support and to protect the pipe.

The final backfill is generally excavated material, which may

be the same or different soil than used in haunching or initial backfill. All backfilling, regardless of degree of compaction, requires continuous contact with the pipe below the spring line. The degree of support depends on how solidly the soil is compacted under the pipe. This soil under the pipe is called haunching.

Haunching and initial backfill material should be free of lumps, frozen clods, clay or large stones. Slightly damp material usually packs more solidly around the pipe. Generally, materials from bogs and marshes are mostly vegetable matter and should not be used for haunching and initial backfill. In rocky areas, haunching material can sometimes be shaved from the parts of the trench above the pipe. Acceptable materials are crushed stone, coarse sand and gravel. Fine sand, sand-clay mixtures, clay-gravel mixtures are acceptable in dry areas.

500:4.1 Installation of Surface Pipeline: The polyethylene pipeline shall be laid in a uniform bed of dirt. The surface bed may be prepared by bulldozing material into a mound or by using a V-plow to scrape a shallow trench. The trench shall be bedded with coarse sand and gravel.

Anchors shall be placed at vertical and horizontal changes of direction. Anchors shall be placed close to flange joints. If polyethylene pipe is flanged to steel or other pipe with a different expansion coefficient, both types of pipe should be secured to a common anchor block or anchored separately close together. When polyethylene pipe connects to rigid structures, it shall be anchored by a concrete pad. On soft or unstable ground, concrete blocks of sufficient area shall be used.

If lateral deflection is unacceptable, thermal movement must be accommodated by expansion bends or slide joints. Expansion joints should be at or near anchorage points. In some cases, it is necessary to restrain the lateral deflection of the pipe by stakes.

When pipe is laid on the surface and covered with earth, the same procedures shall be used in compacting the fill as in trench conditions. The acceptable materials for surrounding the pipe are the same as for trench backfilling. They should be compactible materials. The material should be compacted on each side of the pipe for a width equal to twice the outside diameter of the pipe for a height of at least one foot above the top of the pipe. The total width of this cover should be five pipe diameters. If the pipe is laid in the bottom of a valley, the width cannot always be met, but if the valley walls are firm, this approximates a trench condition or neutral embankment condition.

500:5.1 Special Handling Precautions for Fabricated Fittings: Polyethylene pipe and fittings are joined by heat fusion at the job site. This simple procedure creates

homogeneous joints which are strong as the pipe itself. However, certain precautions should be observed in the handling of fused pipe and fittings. For example:

When long lengths of pipe are fused to three sides of a tee, lift the newly fused assembly with care. Do not lift the tee without supporting the pipe which has been fused to the tee. Fabricated tees, as well as elbows and wyes, should not be allowed to carry the weight of long length of fused pipe.

Do not lift or move fused pipe and fittings any more than necessary. If you must pull the assembly into position, do not attach the pulling line to the fabricated fitting.

When fusing a fabricated tee and wye, use a flanged connection on the branch side. In some applications, use flanged connections on two sides of a tee or wye, and on one side of an elbow. With this procedure, pipe can be laid from either direction, eased into tight locations, or rolled into a trench - before the final connection is made at the tee, wye or elbow.

500:6.1 Installation of Marine Pipelines:

a) Joining and Assembly: Marine pipelines shall be assembled on land or on barges if the bending radius from the barge to water is not excessive. Pipe can be assembled at a remote site, and towed to the installation site. If a sufficiently large barge is available, it can be coiled in long lengths for direct uncoiling into the water. The joining machine must be sufficiently distant from the shore line so that wave action will not lift the joining machine by wave action on the pipe extending from the machine in the water.

CONSTRUCTION QUALITY ASSURANCE PLAN
LINER & LEVEE
ASH/SLUDGE POND

PART 1 - DESCRIPTION

1.01 GENERAL

Under this section of the specifications the Contractor shall provide all labor, tools, equipment and materials necessary to construct a compacted clay liner, containment levee and appurtenances where shown on and in accordance with the project drawings and these specifications. It is the intent of this work to provide a three (3) foot thick compacted clay liner with a coefficient of permeability of 1 x 10 E-7 cm/sec. or less.

1.01 QUALITY CONTROL

A. Survey The Contractor shall provide 14 days notice prior to initiation of construction of the compacted clay liner so as to allow the Owner to survey the completed initial excavation after completion of proof rolling to verify required limits and maximum elevations.

B. Testing Laboratory Services

i. Selected Fill Material

As the Contractor stockpiles segregated materials selected as suitable compacted clay liner material, representative samples shall be taken and material classification shall be made by the Owner's testing laboratory at the rate of one per 1000 cubic yards for grain size analysis to determine the suitability of the material for compacted clay liner construction. Any material determined to not be suitable shall be wasted at the direction of the Engineer and other material provided by the Contractor at no additional payment.

In addition to the above, representative samples shall be taken at the rate of 1 per 5000 cubic yards of segregated material by the Owner's testing laboratory and Atterberg Limits determined. The samples shall be compacted to 90% Standard Proctor density in accordance with paragraph 3.02 below and permeability tests run upon the compacted samples. Permeability tests shall be performed using Falling Head testing apparatus.

ii. *Compacted Material*

In addition to the above, as the compacted clay liner is constructed nuclear density tests shall be made upon in-place compacted material at the rate of 8 tests per acre per lift. Also, shelby tube samples for permeability tests shall be taken from in-place compacted material per every 12 inches of material (vertical measure) per acre.

In-place densities of compacted clay liner will be checked by the Owner's testing laboratory and shall be determined using the Nuclear Gauge method (ASTM D-2922)

Permeability testing of shelby tube samples shall be as specified above. The holes resulting from shelby tube sampling shall be grouted with a bentonite grout by the Owner's testing laboratory.

Any delays caused by performance of such tests or delays caused by failures of such tests shall be considered incidental to the work. No additional payments will be made for such delays.

Part 2 - PRODUCTS

2.01 CLAY LINER

Liner materials, tested as specified above, shall meet the following specifications:

A. Selected liner material shall be classified as CL or CH material.

B. Atterberg Limit requirements (ASTM D4318): liquid limit exceeding 30 and a plasticity index of 15 or more.

C. Selected liner material shall be free from all objectionable material, roots, organic, trash, etc.

PART 3 - EXECUTION

3.01 EXCAVATION AND SURFACE PREPARATION

Upon completion of the excavation in accordance with these specifications and/or as shown in the drawings, the excavated faces to receive the clay liner shall be proof-rolled to determine if any localized or weak areas exist. These areas, if any, shall be cleaned out to firm subsoils before placement of the compacted clay liner. The Contractor shall then notify the Owner so as to allow surveying as required by paragraph 1.02.A, above. Drainage shall be maintained as required by whatever means necessary including, but not limited to perimeter ditches, cross ditches, sumps and/or pumping equipment in order to keep surficial soils dry and facilitate

compaction.

3.02 COMPACTED CLAY LINER

The Contractor shall segregate the material he intends to utilize for construction of the compacted clay liner from other material at the site and as such segregated material is accumulated the Contractor shall determine its suitability for use as compacted clay liner materials as specified in paragraph 1.02.B, above. Equipment utilized in compaction operations shall be adequate, in the Owner's opinion, to obtain proper bonding between lifts. This may include various types of rollers, discs and water trucks.

The compacted clay liner shall be constructed in lifts of not greater than 8 inches loose measure and compacted to a minimum density of 90% Standard Proctor density in accordance with ASTM D-698. Moisture content at the time of compaction shall be between 2% and 8% of the optimum moisture content. Field density and permeability testing shall be accomplished as the compacted clay liner is constructed as specified in paragraph 1.02.B, above.

Any work which does not meet the above requirements and/or fails to meet the testing requirements shall be removed and replaced by the Contractor at no additional pay. Any re-testing of such work will be in accordance with the requirements in paragraph 1.02.B, above, but at the Contractor's expense and at no additional payment.

3.03 CERTIFICATION

The soil testing firm shall provide a liner and levee certification package upon completion of the work. The certification shall address, at a minimum the following:

- Selection and testing of liner and levee materials
- Placement of liner and levee materials
- In-place permeability testing
- QA/QC testing and results
- Verification of liner thickness

The certification must be completed by a certified registered professional engineer.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

Measurement for compacted clay liner shall be by the cubic yard complete-in-place and shall include all labor, materials, tools and equipment, coordination with testing laboratories, preparation, etc., as necessary to construct the liner as shown on the project drawings, as herein specified and in accordance with the Standard

Specifications, as applicable. The quantities measured shall be based upon the field surveys made by the Owner prior to and subsequent to construction of the compacted clay liner.

4.02 Payment

Payment shall be in accordance with the contract unit price per cubic yard for compacted clay liner. Any work item or material for which a pay item is not included and are necessary to complete the compacted clay liner shall be considered incidental to the work and shall be included in the contract unit price per cubic yard for compacted clay liner.

Payment will be made under;

Pay Item No. - Compacted Clay Liner - per cubic yard.